



## EUROPEAN RESEARCH EXECUTIVE AGENCY (REA)

REA.C – Future Society  
C.4 – Reforming European R&I and Research Infrastructures

### GRANT AGREEMENT

**Project 101130652 — RIANA**

#### PREAMBLE

This **Agreement** ('the Agreement') is **between** the following parties:

**on the one part,**

the **European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and**

**on the other part,**

1. 'the coordinator':

**DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY)**, PIC 999986969, established in NOTKESTRASSE 85, HAMBURG 22607, Germany,

and the following other beneficiaries, if they sign their 'accession form' (see Annex 3 and Article 40):

2. **FORSCHUNGSZENTRUM JULICH GMBH (FZJ)**, PIC 999980470, established in WILHELM JOHNEN STRASSE, JULICH 52428, Germany,

3. **LUNDS UNIVERSITET (ULUND)**, PIC 999901318, established in Paradisgatan 5c, LUND 22100, Sweden,

4. **CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)**, PIC 999979500, established in PIAZZALE ALDO MORO 7, ROMA 00185, Italy,

5. **CONSORCIO PARA LA CONSTRUCCION EQUIPAMIENTO Y EXPLOTACION DEL LABORATORIO DE LUZ SINCROTRON (ALBA-CELLS)**, PIC 999917226, established in CARRER DE LA LLUM 2-26, CERDANYOLA DEL VALLES BARCELONA 08290, Spain,

6. **IDRYMA TECHNOLOGIAS KAI EREVNAS (FORTH)**, PIC 999995893, established in N PLASTIRA STR 100, IRAKLEIO 70013, Greece,

7. **HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV (HZDR)**, PIC 999470541, established in BAUTZNER LANDSTRASSE 400, DRESDEN 01328, Germany,

8. **UNIVERSIDAD AUTONOMA DE MADRID (UAM)**, PIC 999861354, established in CALLE EINSTEIN 3 CIUDAD UNIV CANTOBLANCO RECTORADO, MADRID 28049, Spain,

9. **AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE (AREA)**, PIC 999549887, established in PADRICIANO 99, TRIESTE 34149, Italy,
10. **EUROPEAN SYNCHROTRON RADIATION FACILITY (ESRF)**, PIC 999484121, established in 71 AVENUE DES MARTYRS, GRENOBLE 38000, France,
11. **CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (CNRS)**, PIC 999997930, established in RUE MICHEL ANGE 3, PARIS 75794, France,
12. **INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA LASERILOR PLASMEI SI RADIATIEI (INFLPR RA)**, PIC 999499253, established in Atomistilor 409, Magurele / Ilfov 077125, Romania,
13. **POLITECNICO DI MILANO (POLIMI)**, PIC 999879881, established in PIAZZA LEONARDO DA VINCI 32, MILANO 20133, Italy,
14. **EUROPEAN X-RAY FREE-ELECTRON LASERFACILITY GMBH (EUROPEAN XFEL)**, PIC 974524469, established in HOLZKOPPEL 4, SCHENEFELD 22869, Germany,
15. **UNIVERSIDADE DE COIMBRA (UC)**, PIC 997826391, established in PACO DAS ESCOLAS, COIMBRA 3004-531, Portugal,
16. **RUDER BOSKOVIC INSTITUTE (RBI)**, PIC 999875031, established in Bijenicka cesta 54, ZAGREB 10000, Croatia,
17. **UNIwersytet Jagiellonski (SOLARIS JU)**, PIC 999642716, established in UL GOLEBIA 24, KRAKOW 31-007, Poland,
18. **SYNCHROTRON SOLEIL SOCIETE CIVILE (SOLEIL)**, PIC 998721507, established in L ORME DES MERISIERS, SAINT AUBIN 91190, France,
19. **STICHTING RADBOUD UNIVERSITEIT (FELIX / RU)**, PIC 999992110, established in HOUTLAAN 4, NIJMEGEN 6525 XZ, Netherlands,
20. **LASERLAB-EUROPE AISBL (LLE-AISBL)**, PIC 901479686, established in RUE DU TRÔNE 98, BRUSSELS 1050, Belgium,
21. **FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA (ICN2)**, PIC 999606923, established in CAMPUS DE LA UAB EDIFICI Q ICN2, CERDANYOLA DEL VALLES 08193, Spain,
22. **NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU (NTNU)**, PIC 999977851, established in HOGSKOLERINGEN 1, TRONDHEIM 7491, Norway,
23. **UNIVERSITEIT ANTWERPEN (UANTWERPEN)**, PIC 999902870, established in PRINSSTRAAT 13, ANTWERPEN 2000, Belgium,
24. **VYSOKE UCENI TECHNICKE V BRNE (BUT)**, PIC 999873091, established in ANTONINSKA 548/1, BRNO STRED 601 90, Czechia,
25. **KAUNO TECHNOLOGIJOS UNIVERSITETAS (KTU)**, PIC 999844961, established in K DONELAICIO 73, KAUNAS LT-44029, Lithuania,

26. **INSTITUTUL NATIONAL DE CERCETAREDEZVOLTARE PENTRU MICROTEHNOLOGIE (IMT Bucharest)**, PIC 999617690, established in EROU IANCU NICOLAE STREET 32B, VOLUNTARI 077190, Romania,
27. **TARTU ULIKOOL (UTARTU)**, PIC 999895013, established in ULIKOOLI 18, TARTU 50090, Estonia,
28. **INESC MICROSISTEMAS E NANOTECNOLOGIAS - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES PARA OS MICROSISTEMAS E AS NANOTECNOLOGIAS (INESC MN)**, PIC 998133590, established in RUA ALVES REDOL 9, LISBOA 1000 029, Portugal,
29. **UNIwersytet im. Adama Mickiewicza w Poznaniu (AMU)**, PIC 999886865, established in ULICA HENRYKA WIENIAWSKIEGO 1, POZNAN 61 712, Poland,
30. **LATVIJAS UNIVERSITATES CIETVIELU FIZIKAS INSTITUTS (ISSP UL)**, PIC 999852139, established in KENGARAGA IELA 8, RIGA LV-1063, Latvia,
31. **AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (CSIC)**, PIC 999991722, established in CALLE SERRANO 117, MADRID 28006, Spain,
32. **ELETTRA - SINCROTRONE TRIESTE SCPA (ELETTRA)**, PIC 999589851, established in SS 14 KM 163.5 AREA SCIENCE PARK, BASOVIZZA TRIESTE 34149, Italy,
33. **VEREIN ZUR FORDERUNG DER ELEKTRONENMIKROSKOPIE UND FEINSTRUKTURFORSCHUNG (ZFE)**, PIC 988302058, established in STEYRERGASSE 17, GRAZ 8010, Austria,
34. **ATOMMAGKUTATO INTEZET (Atomki)**, PIC 999869890, established in BEM TER 18/C, DEBRECEN 4026, Hungary,
35. **GSI HELMHOLTZZENTRUM FUR SCHWERIONENFORSCHUNG GMBH (GSI)**, PIC 999995214, established in PLANCKSTRASSE 1, DARMSTADT 64291, Germany,
36. **INSTITUTO SUPERIOR TECNICO (IST)**, PIC 999992983, established in AVENIDA ROVISCO PAIS 1, LISBOA 1049 001, Portugal,
37. **INSTITUT JOZEF STEFAN (JSI)**, PIC 999971837, established in Jamova 39, LJUBLJANA 1000, Slovenia,
38. **JYVASKYLAN YLIOPISTO (JYU)**, PIC 999842245, established in SEMINAARINKATU 15, JYVASKYLA 40100, Finland,
39. **KATHOLIEKE UNIVERSITEIT LEUVEN (KU Leuven)**, PIC 999991334, established in OUDE MARKT 13, LEUVEN 3000, Belgium,
40. **USTAV JADERNE FYZIKY AV CR (NPI CAS)**, PIC 999969412, established in Husinec - Řež 130, REZ - PRAHA 25068, Czechia,
41. **UNIVERSIDAD DE SEVILLA (USE)**, PIC 999862518, established in CALLE S. FERNANDO 4, SEVILLA 41004, Spain,

42. **UPPSALA UNIVERSITET (UU)**, PIC 999985029, established in VON KRAEMERS ALLE 4, UPPSALA 751 05, Sweden,

43. **ACADEMISCH ZIEKENHUIS GRONINGEN (UMCG)**, PIC 999914801, established in HANZEPLEIN 1, GRONINGEN 9713 GZ, Netherlands,

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator and affiliated entities (if any).

If only one beneficiary signs the grant agreement (‘mono-beneficiary grant’), all provisions referring to the ‘coordinator’ or the ‘beneficiaries’ will be considered — mutatis mutandis — as referring to the beneficiary.

The parties referred to above have agreed to enter into the Agreement.

By signing the Agreement and the accession forms, the beneficiaries accept the grant and agree to implement the action under their own responsibility and in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

The Agreement is composed of:

Preamble

Terms and Conditions (including Data Sheet)

Annex 1 Description of the action<sup>1</sup>

Annex 2 Estimated budget for the action

Annex 2a Additional information on unit costs and contributions (if applicable)

Annex 3 Accession forms (if applicable)<sup>2</sup>

Annex 3a Declaration on joint and several liability of affiliated entities (if applicable)<sup>3</sup>

Annex 4 Model for the financial statements

Annex 5 Specific rules (if applicable)

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<sup>1</sup> Template published on [Portal Reference Documents](#).

<sup>2</sup> Template published on [Portal Reference Documents](#).

<sup>3</sup> Template published on [Portal Reference Documents](#).

## TERMS AND CONDITIONS

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## DATA SHEET

### 1. General data

Project summary:

Project summary
<p>Research in the fields of nanoscience and nanotechnology is vital for sustainability globally: advancement in nanoscience and nanotechnology cannot be achieved without using research infrastructures (RI). RIANA encompasses 7 European networks of top-level RIs to cover the most advanced techniques relevant for synthesis, nanofabrication, processing, characterization, analytics, as well as simulation capacity. Highly customised and efficient access to 69 infrastructures is coordinated via a single-entry point and enabled through comprehensive Science and Innovation Service by senior scientists, experts for the transfer of technology from academia to industry, and highly trained Junior Scientists. The Junior Scientist boost RI experience to an entirely new level: they provide customised Science Service supporting users from initial ideas to hands-on experiments, data analysis and dissemination of results to generate the greatest impact from access to world-class RI. This core of RIANA is aligned to attract experienced and new users from academia or industry making their promising ideas a success and push them to higher TRL. RIANA is flexible to upcoming emergent scientific topics and needs: together with stakeholders from the nanocommunity, RIANA implements the opportunity to offer flexible access to additional infrastructures in, and even outside of Europe beyond the current consortium, and to direct the Science Service towards evolving user needs via additional specialised Junior Scientists. Based on the four years of experience, the RIANA consortium will develop a roadmap for the future of the nanoscience and nanotechnology at European RIs.</p>

Keywords:

- Research Infrastructure Access Nanoscience Nanotechnology

Project number: 101130652

Project name: Research Infrastructure Access in NANoscience & nanotechnology

Project acronym: RIANA

Call: HORIZON-INFRA-2023-SERV-01

Topic: HORIZON-INFRA-2023-SERV-01-01

Type of action: HORIZON Research and Innovation Actions

Granting authority: European Research Executive Agency

Grant managed through EU Funding & Tenders Portal: Yes (eGrants)

Project starting date: fixed date: 1 March 2024

Project end date: 29 February 2028

Project duration: 48 months

Consortium agreement: Yes

### 2. Participants

List of participants:

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
1	COO	DESY	DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY	DE	999986969	3 995 331.25	3 995 331.25
2	BEN	FZJ	FORSCHUNGSZENTRUM JULICH GMBH	DE	999980470	1 409 921.25	1 409 921.25
3	BEN	ULUND	LUNDS UNIVERSITET	SE	999901318	794 802.50	794 802.50
4	BEN	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE	IT	999979500	485 896.25	485 896.25
4.1	AE	FBK	FONDAZIONE BRUNO KESSLER	IT	999625450	38 552.50	38 552.50

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
4.2	AE	INRIM	ISTITUTO NAZIONALE DI RICERCA METROLOGICA	IT	998627805	25 920.00	25 920.00
4.3	AE	POLITO	POLITECNICO DI TORINO	IT	999977754	25 920.00	25 920.00
5	BEN	ALBA-CELLS	CONSORCIO PARA LA CONSTRUCCION EQUIPAMIENTO Y EXPLOTACION DEL LABORATORIO DE LUZ SINCROTRON	ES	999917226	389 715.00	389 715.00
6	BEN	FORTH	IDRYMA TECHNOLOGIAS KAI EREVNAS	EL	999995893	475 875.00	475 875.00
7	BEN	HZDR	HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV	DE	999470541	509 800.00	509 800.00
8	BEN	UAM	UNIVERSIDAD AUTONOMA DE MADRID	ES	999861354	466 150.00	466 150.00
9	BEN	AREA	AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE	IT	999549887	374 577.50	374 577.50
10	BEN	ESRF	EUROPEAN SYNCHROTRON RADIATION FACILITY	FR	999484121	323 125.00	323 125.00
11	BEN	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR	999997930	469 146.88	469 146.88
11.1	AE	U. Bordeaux	UNIVERSITE DE BORDEAUX	FR	949735440	52 500.00	52 500.00
11.2	AE	ULille	UNIVERSITE DE LILLE	FR	888146648	3 909.38	3 909.37
12	BEN	INFLPR RA	INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA LASERILOR PLASMEI SI RADIATIEI	RO	999499253	121 762.50	121 762.50
13	BEN	POLIMI	POLITECNICO DI MILANO	IT	999879881	133 920.00	133 920.00
14	BEN	EUROPEAN XFEL	EUROPEAN X-RAY FREE-ELECTRON LASERFACILITY GMBH	DE	974524469	149 812.50	149 812.50
15	BEN	UC	UNIVERSIDADE DE COIMBRA	PT	997826391	92 500.00	92 500.00
16	BEN	RBI	RUDER BOSKOVIC INSTITUTE	HR	999875031	293 837.50	293 837.50
17	BEN	SOLARIS JU	UNIWERSYTET JAGIELLONSKI	PL	999642716	345 000.00	345 000.00
18	BEN	SOLEIL	SYNCHROTRON SOLEIL SOCIETE CIVILE	FR	998721507	418 520.00	418 520.00
19	BEN	FELIX / RU	STICHTING RADBODU UNIVERSITEIT	NL	999992110	23 400.00	23 400.00
20	BEN	LLE-AISBL	LASERLAB-EUROPE AISBL	BE	901479686	632 250.00	632 250.00
20.1	AE	IZF	INSTITUT ZA FIZIKU	HR	991352029	65 000.00	65 000.00
20.2	AE	CLPU	CONSORCIO PARA EL DISENO, CONSTRUCCION, EQUIPAMIENTO Y EXPLOTACION DEL CENTRO DE LASERES PULSADOS ULTRACORTOS ULTRAIINTENSOS	ES	998136791	20 000.00	20 000.00
20.3	AE	UCM	UNIVERSIDAD COMPLUTENSE DE MADRID	ES	999874546	20 000.00	20 000.00
20.4	AE	FZU	FYZIKALNI USTAV AV CR V.V.I	CZ	999873867	65 000.00	65 000.00
20.5	AE	LENS	LABORATORIO EUROPEO DI SPETTROSCOPIE NON LINEARI	IT	999582479	60 000.00	60 000.00
20.6	AE	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	999992401	30 000.00	30 000.00
20.7	AE	FVB-MBI	FORSCHUNGSVERBUND BERLIN EV	DE	999927120	228 000.00	228 000.00
20.8	AE	MUT	WOJSKOWA AKADEMIA TECHNICZNA IM.JAROSLAWA DABROWSKIEGO	PL	999887835	60 000.00	60 000.00
20.9	AE	UKRI	UNITED KINGDOM RESEARCH AND INNOVATION	UK	906446474	65 000.00	65 000.00
21	BEN	ICN2	FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA	ES	999606923	155 487.50	155 487.50
22	BEN	NTNU	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	NO	999977851	39 000.00	39 000.00
23	BEN	UANTWERPEN	UNIVERSITEIT ANTWERPEN	BE	999902870	451 425.00	451 425.00
24	BEN	BUT	VYSOKE UCENI TECHNICKE V BRNE	CZ	999873091	34 255.00	34 255.00
25	BEN	KTU	KAUNO TECHNOLOGIJOS UNIVERSITETAS	LT	999844961	108 222.50	108 222.50
26	BEN	IMT Bucharest	INSTITUTUL NATIONAL DE	RO	999617690	95 295.00	95 295.00

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
			CERCETAREDEZVOLTARE PENTRU MICROTEHNOLOGIE				
27	BEN	UTARTU	TARTU ULIKOOL	EE	999895013	25 920.00	25 920.00
28	BEN	INESC MN	INESC MICROSISTEMAS E NANOTECNOLOGIAS - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES PARA OS MICROSISTEMAS E AS NANOTECNOLOGIAS	PT	998133590	25 920.00	25 920.00
29	BEN	AMU	UNIWERSYTET IM. ADAMA MICKIEWICZA W POZNANIU	PL	999886865	143 687.50	143 687.50
30	BEN	ISSP UL	LATVIJAS UNIVERSITATES CIETVIELU FIZIKAS INSTITUTS	LV	999852139	25 920.00	25 920.00
31	BEN	CSIC	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES	999991722	24 000.00	24 000.00
32	BEN	ELETTRA	ELETTRA - SINCROTRONE TRIESTE SCPA	IT	999589851	85 200.00	85 200.00
33	BEN	ZFE	VEREIN ZUR FORDERUNG DER ELEKTRONENMIKROSKOPIE UND FEINSTRUKTURFORSCHUNG	AT	988302058	85 800.00	85 800.00
34	BEN	Atomki	ATOMMAGKUTATO INTEZET	HU	999869890	35 700.00	35 700.00
35	BEN	GSI	GSI HELMHOLTZZENTRUM FUR SCHWERIONENFORSCHUNG GMBH	DE	999995214	49 725.00	49 725.00
36	BEN	IST	INSTITUTO SUPERIOR TECNICO	PT	999992983	57 375.00	57 375.00
37	BEN	JSI	INSTITUT JOZEF STEFAN	SI	999971837	36 975.00	36 975.00
38	BEN	JYU	JYVASKYLAN YLIOPISTO	FI	999842245	47 175.00	47 175.00
39	BEN	KU Leuven	KATHOLIEKE UNIVERSITEIT LEUVEN	BE	999991334	47 175.00	47 175.00
40	BEN	NPI CAS	USTAV JADERNE FYZIKY AV CR	CZ	999969412	68 850.00	68 850.00
41	BEN	USE	UNIVERSIDAD DE SEVILLA	ES	999862518	49 725.00	49 725.00
42	BEN	UU	UPPSALA UNIVERSITET	SE	999985029	89 250.00	89 250.00
43	BEN	UMCG	ACADEMISCH ZIEKENHUIS GRONINGEN	NL	999914801	49 725.00	49 725.00
<b>Total</b>						14 496 952.51	14 496 952.50

**Coordinator:**

- DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY)

**3. Grant****Maximum grant amount, total estimated eligible costs and contributions and funding rate:**

Total eligible costs (BEN and AE)	Funding rate (%)	Maximum grant amount (Annex 2)	Maximum grant amount (award decision)
14 496 952.51	100	14 496 952.50	14 496 952.50

**Grant form:** Budget-based**Grant mode:** Action grant**Budget categories/activity types:**

- A. Personnel costs
  - A.1 Employees, A.2 Natural persons under direct contract, A.3 Seconded persons
  - A.4 SME owners and natural person beneficiaries
- B. Subcontracting costs

- C. Purchase costs
  - C.1 Travel and subsistence
  - C.2 Equipment
  - C.3 Other goods, works and services
  
- D. Other cost categories
  - D.2 Internally invoiced goods and services
  - D.3 Transnational access to research infrastructure unit costs
  - D.4 Virtual access to research infrastructure unit costs
  
- E. Indirect costs

**Cost eligibility options:**

- In-kind contributions eligible costs
  
- Parental leave
  
- Project-based supplementary payments
  
- Average personnel costs (unit cost according to usual cost accounting practices)
  
- Limitation for subcontracting
  
- Travel and subsistence:
  - Travel: Actual costs
  - Accommodation: Actual costs
  - Subsistence: Actual costs
  
- Equipment: depreciation only
  
- Indirect cost flat-rate: 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any)
  
- VAT: Yes
  
- Other ineligible costs

**Budget flexibility:** Yes (no flexibility cap)

**4. Reporting, payments and recoveries**

**4.1 Continuous reporting** (art 21)

**Deliverables:** see Funding & Tenders Portal Continuous Reporting tool

**4.2 Periodic reporting and payments**

**Reporting and payment schedule (art 21, 22):**

Reporting					Payments	
Reporting periods			Type	Deadline	Type	Deadline (time to pay)
RP No	Month from	Month to				
					Initial prefinancing	30 days from entry into force/10 days before starting date – whichever is the latest
1	1	24	Periodic report	60 days after end of reporting period	Interim payment	90 days from receiving periodic report
2	25	48	Periodic report	60 days after end of reporting period	Final payment	90 days from receiving periodic report

**Prefinancing payments and guarantees:**

Prefinancing payment	
Type	Amount
Prefinancing 1 (initial)	11 597 562.00

**Reporting and payment modalities (art 21, 22):**

Mutual Insurance Mechanism (MIM): Yes

MIM contribution: 5% of the maximum grant amount (724 847.63), retained from the initial prefinancing

Restrictions on distribution of initial prefinancing: The prefinancing may be distributed only if the minimum number of beneficiaries set out in the call conditions (if any) have acceded to the Agreement and only to beneficiaries that have acceded.

Interim payment ceiling (if any): 90% of the maximum grant amount

Exception for revenues: Yes

No-profit rule: Yes

Late payment interest: ECB + 3.5%

Bank account for payments:

DE79210500000303800010

Conversion into euros: Double conversion

Reporting language: Language of the Agreement

**4.3 Certificates (art 24):**

Certificates on the financial statements (CFS):

Conditions:

Schedule: only at final payment, if threshold is reached

Standard threshold (beneficiary-level):

- financial statement: requested EU contribution to costs  $\geq$  EUR 430 000.00

Special threshold for beneficiaries with a systems and process audit(see Article 24): financial statement: requested EU contribution to costs  $\geq$  EUR 725 000.00

#### **4.4 Recoveries** (art 22)

##### **First-line liability for recoveries:**

Beneficiary termination: Beneficiary concerned

Final payment: Each beneficiary for their own debt

After final payment: Beneficiary concerned

##### **Joint and several liability for enforced recoveries (in case of non-payment):**

Individual financial responsibility: Each beneficiary is liable only for its own debts (and those of its affiliated entities, if any)

Joint and several liability of affiliated entities — n/a

#### **5. Consequences of non-compliance, applicable law & dispute settlement forum**

##### **Suspension and termination:**

Additional suspension grounds (art 31)

Additional termination grounds (art 32)

##### **Applicable law** (art 43):

Standard applicable law regime: EU law + law of Belgium

##### **Dispute settlement forum** (art 43):

Standard dispute settlement forum:

EU beneficiaries: EU General Court + EU Court of Justice (on appeal)

Non-EU beneficiaries: Courts of Brussels, Belgium (unless an international agreement provides for the enforceability of EU court judgements)

#### **6. Other**

**Specific rules (Annex 5):** Yes

##### **Standard time-limits after project end:**

Confidentiality (for X years after final payment): 5

Record-keeping (for X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)

Reviews (up to X years after final payment): 2

Audits (up to X years after final payment): 2

Extension of findings from other grants to this grant (no later than X years after final payment): 2

Impact evaluation (up to X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)



## **CHAPTER 1 GENERAL**

### **ARTICLE 1 — SUBJECT OF THE AGREEMENT**

This Agreement sets out the rights and obligations and terms and conditions applicable to the grant awarded for the implementation of the action set out in Chapter 2.

### **ARTICLE 2 — DEFINITIONS**

For the purpose of this Agreement, the following definitions apply:

**Actions** — The project which is being funded in the context of this Agreement.

**Grant** — The grant awarded in the context of this Agreement.

**EU grants** — Grants awarded by EU institutions, bodies, offices or agencies (including EU executive agencies, EU regulatory agencies, EDA, joint undertakings, etc.).

**Participants** — Entities participating in the action as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties.

**Beneficiaries (BEN)** — The signatories of this Agreement (either directly or through an accession form).

**Affiliated entities (AE)** — Entities affiliated to a beneficiary within the meaning of Article 187 of EU Financial Regulation 2018/1046<sup>4</sup> which participate in the action with similar rights and obligations as the beneficiaries (obligation to implement action tasks and right to charge costs and claim contributions).

**Associated partners (AP)** — Entities which participate in the action, but without the right to charge costs or claim contributions.

**Purchases** — Contracts for goods, works or services needed to carry out the action (e.g. equipment, consumables and supplies) but which are not part of the action tasks (see Annex 1).

**Subcontracting** — Contracts for goods, works or services that are part of the action tasks (see Annex 1).

**In-kind contributions** — In-kind contributions within the meaning of Article 2(36) of EU Financial

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<sup>4</sup> For the definition, see Article 187 Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council of 18 July 2018 on the financial rules applicable to the general budget of the Union, amending Regulations (EU) No 1296/2013, (EU) No 1301/2013, (EU) No 1303/2013, (EU) No 1304/2013, (EU) No 1309/2013, (EU) No 1316/2013, (EU) No 223/2014, (EU) No 283/2014, and Decision No 541/2014/EU and repealing Regulation (EU, Euratom) No 966/2012 ('EU Financial Regulation') (OJ L 193, 30.7.2018, p. 1): "**affiliated entities** [are]:

- (a) entities that form a sole beneficiary [(i.e. where an entity is formed of several entities that satisfy the criteria for being awarded a grant, including where the entity is specifically established for the purpose of implementing an action to be financed by a grant)];
- (b) entities that satisfy the eligibility criteria and that do not fall within one of the situations referred to in Article 136(1) and 141(1) and that have a link with the beneficiary, in particular a legal or capital link, which is neither limited to the action nor established for the sole purpose of its implementation".

Regulation 2018/1046, i.e. non-financial resources made available free of charge by third parties.

**Fraud** — Fraud within the meaning of Article 3 of EU Directive 2017/1371<sup>5</sup> and Article 1 of the Convention on the protection of the European Communities' financial interests, drawn up by the Council Act of 26 July 1995<sup>6</sup>, as well as any other wrongful or criminal deception intended to result in financial or personal gain.

**Irregularities** — Any type of breach (regulatory or contractual) which could impact the EU financial interests, including irregularities within the meaning of Article 1(2) of EU Regulation 2988/95<sup>7</sup>.

**Grave professional misconduct** — Any type of unacceptable or improper behaviour in exercising one's profession, especially by employees, including grave professional misconduct within the meaning of Article 136(1)(c) of EU Financial Regulation 2018/1046.

**Applicable EU, international and national law** — Any legal acts or other (binding or non-binding) rules and guidance in the area concerned.

**Portal** — EU Funding & Tenders Portal; electronic portal and exchange system managed by the European Commission and used by itself and other EU institutions, bodies, offices or agencies for the management of their funding programmes (grants, procurements, prizes, etc.).

## **CHAPTER 2 ACTION**

### **ARTICLE 3 — ACTION**

The grant is awarded for the action **101130652 — RIANA** ('action'), as described in Annex 1.

### **ARTICLE 4 — DURATION AND STARTING DATE**

The duration and the starting date of the action are set out in the Data Sheet (see Point 1).

## **CHAPTER 3 GRANT**

### **ARTICLE 5 — GRANT**

#### **5.1 Form of grant**

The grant is an action grant<sup>8</sup> which takes the form of a budget-based mixed actual cost grant (i.e. a

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<sup>5</sup> Directive (EU) 2017/1371 of the European Parliament and of the Council of 5 July 2017 on the fight against fraud to the Union's financial interests by means of criminal law (OJ L 198, 28.7.2017, p. 29).

<sup>6</sup> OJ C 316, 27.11.1995, p. 48.

<sup>7</sup> Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).

<sup>8</sup> For the definition, see Article 180(2)(a) EU Financial Regulation 2018/1046: '**action grant**' means an EU grant to finance "an action intended to help achieve a Union policy objective".

grant based on actual costs incurred, but which may also include other forms of funding, such as unit costs or contributions, flat-rate costs or contributions, lump sum costs or contributions or financing not linked to costs).

## **5.2 Maximum grant amount**

The maximum grant amount is set out in the Data Sheet (see Point 3) and in the estimated budget (Annex 2).

## **5.3 Funding rate**

The funding rate for costs is 100% of the action's eligible costs.

Contributions are not subject to any funding rate.

## **5.4 Estimated budget, budget categories and forms of funding**

The estimated budget for the action is set out in Annex 2.

It contains the estimated eligible costs and contributions for the action, broken down by participant and budget category.

Annex 2 also shows the types of costs and contributions (forms of funding)<sup>9</sup> to be used for each budget category.

If unit costs or contributions are used, the details on the calculation will be explained in Annex 2a.

## **5.5 Budget flexibility**

The budget breakdown may be adjusted — without an amendment (see Article 39) — by transfers (between participants and budget categories), as long as this does not imply any substantive or important change to the description of the action in Annex 1.

However:

- changes to the budget category for volunteers (if used) always require an amendment
- changes to budget categories with lump sums costs or contributions (if used; including financing not linked to costs) always require an amendment
- changes to budget categories with higher funding rates or budget ceilings (if used) always require an amendment
- addition of amounts for subcontracts not provided for in Annex 1 either require an amendment or simplified approval in accordance with Article 6.2
- other changes require an amendment or simplified approval, if specifically provided for in Article 6.2
- flexibility caps: not applicable.

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<sup>9</sup> See Article 125 EU Financial Regulation 2018/1046.

## ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS AND CONTRIBUTIONS

In order to be eligible, costs and contributions must meet the **eligibility** conditions set out in this Article.

### 6.1 General eligibility conditions

The **general eligibility conditions** are the following:

(a) for actual costs:

- (i) they must be actually incurred by the beneficiary
- (ii) they must be incurred in the period set out in Article 4 (with the exception of costs relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)
- (iii) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
- (iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation
- (v) they must be identifiable and verifiable, in particular recorded in the beneficiary's accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary's usual cost accounting practices
- (vi) they must comply with the applicable national law on taxes, labour and social security and
- (vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency

(b) for unit costs or contributions (if any):

- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
- (ii) the units must:
  - be actually used or produced by the beneficiary in the period set out in Article 4 (with the exception of units relating to the submission of the final periodic report, which may be used or produced afterwards; see Article 21)
  - be necessary for the implementation of the action and
- (iii) the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 20)

(c) for flat-rate costs or contributions (if any):

- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2

- (ii) the costs or contributions to which the flat-rate is applied must:
- be eligible
  - relate to the period set out in Article 4 (with the exception of costs or contributions relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)
- (d) for lump sum costs or contributions (if any):
- (i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2
  - (ii) the work must be properly implemented by the beneficiary in accordance with Annex 1
  - (iii) the deliverables/outputs must be achieved in the period set out in Article 4 (with the exception of deliverables/outputs relating to the submission of the final periodic report, which may be achieved afterwards; see Article 21)
- (e) for unit, flat-rate or lump sum costs or contributions according to usual cost accounting practices (if any):
- (i) they must fulfil the general eligibility conditions for the type of cost concerned
  - (ii) the cost accounting practices must be applied in a consistent manner, based on objective criteria, regardless of the source of funding
- (f) for financing not linked to costs (if any): the results must be achieved or the conditions must be fulfilled as described in Annex 1.

In addition, for direct cost categories (e.g. personnel, travel & subsistence, subcontracting and other direct costs) only costs that are directly linked to the action implementation and can therefore be attributed to it directly are eligible. They must not include any indirect costs (i.e. costs that are only indirectly linked to the action, e.g. via cost drivers).

**In-kind contributions** provided by third parties free of charge may be declared as eligible direct costs by the beneficiaries which use them (under the same conditions as if they were their own, provided that they concern only direct costs and that the third parties and their in-kind contributions are set out in Annex 1 (or approved ex post in the periodic report, if their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; ‘simplified approval procedure’).

## 6.2 Specific eligibility conditions for each budget category

For each budget category, the **specific eligibility conditions** are as follows:

### Direct costs

#### A. Personnel costs

**A.1 Costs for employees (or equivalent)** are eligible as personnel costs if they fulfil the general eligibility conditions and are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action.

They must be limited to salaries (including net payments during parental leave), social security contributions, taxes and other costs linked to the remuneration, if they arise from national law or the employment contract (or equivalent appointing act) and be calculated on the basis of the costs actually incurred, in accordance with the following method:

{daily rate for the person  
multiplied by  
number of day-equivalents worked on the action (rounded up or down to the nearest half-day)}.

The daily rate must be calculated as:

{annual personnel costs for the person  
divided by  
215}.

The number of day-equivalents declared for a person must be identifiable and verifiable (see Article 20).

The actual time spent on parental leave by a person assigned to the action may be deducted from the 215 days indicated in the above formula.

The total number of day-equivalents declared in EU grants, for a person for a year, cannot be higher than 215, minus time spent on parental leave (if any).

For personnel which receives supplementary payments for work in projects (project-based remuneration), the personnel costs must be calculated at a rate which:

- corresponds to the actual remuneration costs paid by the beneficiary for the time worked by the person in the action over the reporting period
- does not exceed the remuneration costs paid by the beneficiary for work in similar projects funded by national schemes ('national projects reference')
- is defined based on objective criteria allowing to determine the amount to which the person is entitled

and

- reflects the usual practice of the beneficiary to pay consistently bonuses or supplementary payments for work in projects funded by national schemes.

The national projects reference is the remuneration defined in national law, collective labour agreement or written internal rules of the beneficiary applicable to work in projects funded by national schemes.

If there is no such national law, collective labour agreement or written internal rules or if the project-based remuneration is not based on objective criteria, the national project reference will be the average

remuneration of the person in the last full calendar year covered by the reporting period, excluding remuneration paid for work in EU actions.

If the beneficiary uses average personnel costs (unit cost according to usual cost accounting practices), the personnel costs must fulfil the general eligibility conditions for such unit costs and the daily rate must be calculated:

- using the actual personnel costs recorded in the beneficiary's accounts and excluding any costs which are ineligible or already included in other budget categories; the actual personnel costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the personnel costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

**A.2 and A.3 Costs for natural persons working under a direct contract** other than an employment contract and costs for **seconded persons by a third party against payment** are also eligible as personnel costs, if they are assigned to the action, fulfil the general eligibility conditions and:

- (a) work under conditions similar to those of an employee (in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed) and
- (b) the result of the work belongs to the beneficiary (unless agreed otherwise).

They must be calculated on the basis of a rate which corresponds to the costs actually incurred for the direct contract or secondment and must not be significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

**A.4** The work of **SME owners** for the action (i.e. owners of beneficiaries that are small and medium-sized enterprises<sup>10</sup> not receiving a salary) or **natural person beneficiaries** (i.e. beneficiaries that are natural persons not receiving a salary) may be declared as personnel costs, if they fulfil the general eligibility conditions and are calculated as unit costs in accordance with the method set out in Annex 2a.

## **B. Subcontracting costs**

**Subcontracting costs** for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible, if they are calculated on the basis of the costs actually incurred, fulfil the general eligibility conditions and are awarded using the

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<sup>10</sup> For the definition, see Commission Recommendation 2003/361/EC: micro, small or medium-sized enterprise (SME) are enterprises

- engaged in an economic activity, irrespective of their legal form (including, in particular, self-employed persons and family businesses engaged in craft or other activities, and partnerships or associations regularly engaged in an economic activity) and
- employing fewer than 250 persons (expressed in 'annual working units' as defined in Article 5 of the Recommendation) and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

beneficiary's usual purchasing practices — provided these ensure subcontracts with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

Subcontracting may cover only a limited part of the action.

The tasks to be subcontracted and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2 (or may be approved ex post in the periodic report, if the use of subcontracting does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; 'simplified approval procedure').

## C. Purchase costs

**Purchase costs** for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible if they fulfil the general eligibility conditions and are bought using the beneficiary's usual purchasing practices — provided these ensure purchases with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

### C.1 Travel and subsistence

Purchases for **travel, accommodation and subsistence** must be calculated as follows:

- travel: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- accommodation: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- subsistence: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel .

### C.2 Equipment

Purchases of **equipment, infrastructure or other assets** used for the action must be declared as depreciation costs, calculated on the basis of the costs actually incurred and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

Only the portion of the costs that corresponds to the rate of actual use for the action during the action duration can be taken into account.

Costs for **renting or leasing** equipment, infrastructure or other assets are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.

### C.3 Other goods, works and services



Purchases of **other goods, works and services** must be calculated on the basis of the costs actually incurred.

Such goods, works and services include, for instance, consumables and supplies, promotion, dissemination, protection of results, translations, publications, certificates and financial guarantees, if required under the Agreement.

## **D. Other cost categories**

### **D.2 Internally invoiced goods and services**

**Costs for internally invoiced goods and services** directly used for the action may be declared as unit cost according to usual cost accounting practices, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions for such unit costs and the amount per unit is calculated:

- using the actual costs for the good or service recorded in the beneficiary's accounts, attributed either by direct measurement or on the basis of cost drivers, and excluding any cost which are ineligible or already included in other budget categories; the actual costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

'Internally invoiced goods and services' means goods or services which are provided within the beneficiary's organisation directly for the action and which the beneficiary values on the basis of its usual cost accounting practices.

This cost will not be taken into account for the indirect cost flat-rate.

### **D.3 Transnational access to research infrastructure unit costs**

**Unit costs for providing transnational access to research infrastructure** are eligible, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions, are calculated in accordance with the method set out in Annex 2a and exclude any cost which are ineligible or already included in other budget categories.

Beneficiaries that declare costs under this cost category cannot use other cost categories such as internally invoiced goods and services or equipment costs (for charging the capital costs of the infrastructure), unless explicitly allowed in the call conditions.

This cost will not be taken into account for the indirect cost flat-rate.

### **D.4 Virtual access to research infrastructure unit costs**

**Unit costs for providing virtual access to research infrastructure are eligible**, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions, are calculated in accordance with the method set out in Annex 2a and exclude any cost which are ineligible or already included in other budget categories.

Beneficiaries that declare costs under this cost category cannot use other cost categories such as internally invoiced goods and services or equipment costs (for charging the capital costs of the infrastructure), unless explicitly allowed by the call conditions.

This cost will not be taken into account for the indirect cost flat-rate.

### **Indirect costs**

#### **E. Indirect costs**

**Indirect costs** will be reimbursed at the flat-rate of 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any).

### **Contributions**

Not applicable

### **6.3 Ineligible costs and contributions**

The following costs or contributions are **ineligible**:

- (a) costs or contributions that do not comply with the conditions set out above (Article 6.1 and 6.2), in particular:
  - (i) costs related to return on capital and dividends paid by a beneficiary
  - (ii) debt and debt service charges
  - (iii) provisions for future losses or debts
  - (iv) interest owed
  - (v) currency exchange losses
  - (vi) bank costs charged by the beneficiary's bank for transfers from the granting authority
  - (vii) excessive or reckless expenditure
  - (viii) deductible or refundable VAT (including VAT paid by public bodies acting as public authority)
  - (ix) costs incurred or contributions for activities implemented during grant agreement suspension (see Article 31)
  - (x) in-kind contributions by third parties: not applicable
- (b) costs or contributions declared under other EU grants (or grants awarded by an EU Member State, non-EU country or other body implementing the EU budget), except for the following cases:
  - (i) Synergy actions: not applicable

- (ii) if the action grant is combined with an operating grant<sup>11</sup> running during the same period and the beneficiary can demonstrate that the operating grant does not cover any (direct or indirect) costs of the action grant
- (c) costs or contributions for staff of a national (or regional/local) administration, for activities that are part of the administration’s normal activities (i.e. not undertaken only because of the grant)
- (d) costs or contributions (especially travel and subsistence) for staff or representatives of EU institutions, bodies or agencies
- (e) other :
  - (i) country restrictions for eligible costs: not applicable
  - (ii) costs or contributions declared specifically ineligible in the call conditions.

## 6.4 Consequences of non-compliance

If a beneficiary declares costs or contributions that are ineligible, they will be rejected (see Article 27).

This may also lead to other measures described in Chapter 5.

## CHAPTER 4 GRANT IMPLEMENTATION

### SECTION 1 CONSORTIUM: BENEFICIARIES, AFFILIATED ENTITIES AND OTHER PARTICIPANTS

#### **ARTICLE 7 — BENEFICIARIES**

The beneficiaries, as signatories of the Agreement, are fully responsible towards the granting authority for implementing it and for complying with all its obligations.

They must implement the Agreement to their best abilities, in good faith and in accordance with all the obligations and terms and conditions it sets out.

They must have the appropriate resources to implement the action and implement the action under their own responsibility and in accordance with Article 11. If they rely on affiliated entities or other participants (see Articles 8 and 9), they retain sole responsibility towards the granting authority and the other beneficiaries.

They are jointly responsible for the *technical* implementation of the action. If one of the beneficiaries fails to implement their part of the action, the other beneficiaries must ensure that this part is implemented by someone else (without being entitled to an increase of the maximum grant amount and subject to an amendment; see Article 39). The *financial* responsibility of each beneficiary in case of recoveries is governed by Article 22.

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<sup>11</sup> For the definition, see Article 180(2)(b) of EU Financial Regulation 2018/1046: ‘**operating grant**’ means an EU grant to finance “the functioning of a body which has an objective forming part of and supporting an EU policy”.

The beneficiaries (and their action) must remain eligible under the EU programme funding the grant for the entire duration of the action. Costs and contributions will be eligible only as long as the beneficiary and the action are eligible.

The **internal roles and responsibilities** of the beneficiaries are divided as follows:

(a) Each beneficiary must:

- (i) keep information stored in the Portal Participant Register up to date (see Article 19)
- (ii) inform the granting authority (and the other beneficiaries) immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 19)
- (iii) submit to the coordinator in good time:
  - the prefinancing guarantees (if required; see Article 23)
  - the financial statements and certificates on the financial statements (CFS) (if required; see Articles 21 and 24.2 and Data Sheet, Point 4.3)
  - the contribution to the deliverables and technical reports (see Article 21)
  - any other documents or information required by the granting authority under the Agreement
- (iv) submit via the Portal data and information related to the participation of their affiliated entities.

(b) The coordinator must:

- (i) monitor that the action is implemented properly (see Article 11)
- (ii) act as the intermediary for all communications between the consortium and the granting authority, unless the Agreement or granting authority specifies otherwise, and in particular:
  - submit the prefinancing guarantees to the granting authority (if any)
  - request and review any documents or information required and verify their quality and completeness before passing them on to the granting authority
  - submit the deliverables and reports to the granting authority
  - inform the granting authority about the payments made to the other beneficiaries (report on the distribution of payments; if required, see Articles 22 and 32)
- (iii) distribute the payments received from the granting authority to the other beneficiaries without unjustified delay (see Article 22).

The coordinator may not delegate or subcontract the above-mentioned tasks to any other beneficiary or third party (including affiliated entities).

However, coordinators which are public bodies may delegate the tasks set out in Point (b)(ii) last indent and (iii) above to entities with ‘authorisation to administer’ which they have created or which are controlled by or affiliated to them. In this case, the coordinator retains sole responsibility for the payments and for compliance with the obligations under the Agreement.

Moreover, coordinators which are ‘sole beneficiaries’<sup>12</sup> (or similar, such as European research infrastructure consortia (ERICs)) may delegate the tasks set out in Point (b)(i) to (iii) above to one of their members. The coordinator retains sole responsibility for compliance with the obligations under the Agreement.

The beneficiaries must have **internal arrangements** regarding their operation and co-ordination, to ensure that the action is implemented properly.

If required by the granting authority (see Data Sheet, Point 1), these arrangements must be set out in a written **consortium agreement** between the beneficiaries, covering for instance:

- the internal organisation of the consortium
- the management of access to the Portal
- different distribution keys for the payments and financial responsibilities in case of recoveries (if any)
- additional rules on rights and obligations related to background and results (see Article 16)
- settlement of internal disputes
- liability, indemnification and confidentiality arrangements between the beneficiaries.

The internal arrangements must not contain any provision contrary to this Agreement.

## ARTICLE 8 — AFFILIATED ENTITIES

The following entities which are linked to a beneficiary will participate in the action as ‘affiliated entities’:

- **FONDAZIONE BRUNO KESSLER (FBK)**, PIC 999625450, linked to CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)
- **ISTITUTO NAZIONALE DI RICERCA METROLOGICA (INRIM)**, PIC 998627805, linked to CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)
- **POLITECNICO DI TORINO (POLITO)**, PIC 999977754, linked to CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)
- **UNIVERSITE DE BORDEAUX (U. Bordeaux)**, PIC 949735440, linked to CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (CNRS)

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<sup>12</sup> For the definition, see Article 187(2) EU Financial Regulation 2018/1046: “Where several entities satisfy the criteria for being awarded a grant and together form one entity, that entity may be treated as the **sole beneficiary**, including where it is specifically established for the purpose of implementing the action financed by the grant.”

- **UNIVERSITE DE LILLE (ULille)**, PIC 888146648, linked to CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (CNRS)
- **INSTITUT ZA FIZIKU (IZF)**, PIC 991352029, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **CONSORCIO PARA EL DISEÑO, CONSTRUCCIÓN, EQUIPAMIENTO Y EXPLOTACION DEL CENTRO DE LASERES PULSADOS ULTRACORTOS ULTRAINTENSOS (CLPU)**, PIC 998136791, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **UNIVERSIDAD COMPLUTENSE DE MADRID (UCM)**, PIC 999874546, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **FYZIKALNI USTAV AV CR V.V.I (FZU)**, PIC 999873867, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **LABORATORIO EUROPEO DI SPETTROSCOPIE NON LINEARI (LENS)**, PIC 999582479, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (CEA)**, PIC 999992401, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **FORSCHUNGSVERBUND BERLIN EV (FVB-MBI)**, PIC 999927120, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **WOJSKOWA AKADEMIA TECHNICZNA IM.JAROSLAWA DABROWSKIEGO (MUT)**, PIC 999887835, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)
- **UNITED KINGDOM RESEARCH AND INNOVATION (UKRI)**, PIC 906446474, linked to LASERLAB-EUROPE AISBL (LLE-AISBL)

Affiliated entities can charge costs and contributions to the action under the same conditions as the beneficiaries and must implement the action tasks attributed to them in Annex 1 in accordance with Article 11.

Their costs and contributions will be included in Annex 2 and will be taken into account for the calculation of the grant.

The beneficiaries must ensure that all their obligations under this Agreement also apply to their affiliated entities.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the affiliated entities.

Breaches by affiliated entities will be handled in the same manner as breaches by beneficiaries. Recovery of undue amounts will be handled through the beneficiaries.

If the granting authority requires joint and several liability of affiliated entities (see Data Sheet, Point 4.4), they must sign the declaration set out in Annex 3a and may be held liable in case of enforced recoveries against their beneficiaries (see Article 22.2 and 22.4).

## **ARTICLE 9 — OTHER PARTICIPANTS INVOLVED IN THE ACTION**

### **9.1 Associated partners**

Not applicable

### **9.2 Third parties giving in-kind contributions to the action**

Other third parties may give in-kind contributions to the action (i.e. personnel, equipment, other goods, works and services, etc. which are free-of-charge) if necessary for the implementation.

Third parties giving in-kind contributions do not implement any action tasks. They may not charge costs or contributions to the action, but the costs for the in-kind contributions are eligible and may be charged by the beneficiaries which use them, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries' costs.

The third parties and their in-kind contributions should be set out in Annex 1.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the third parties giving in-kind contributions.

### **9.3 Subcontractors**

Subcontractors may participate in the action, if necessary for the implementation.

Subcontractors must implement their action tasks in accordance with Article 11. The costs for the subcontracted tasks (invoiced price from the subcontractor) are eligible and may be charged by the beneficiaries, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries' costs.

The beneficiaries must ensure that their contractual obligations under Articles 11 (proper implementation), 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the subcontractors.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the subcontractors.

### **9.4 Recipients of financial support to third parties**

If the action includes providing financial support to third parties (e.g. grants, prizes or similar forms of support), the beneficiaries must ensure that their contractual obligations under Articles 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the third parties receiving the support (recipients).

The beneficiaries must also ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the recipients.

## **ARTICLE 10 — PARTICIPANTS WITH SPECIAL STATUS**

## 10.1 Non-EU participants

Participants which are established in a non-EU country (if any) undertake to comply with their obligations under the Agreement and:

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)
- for the submission of certificates under Article 24: to use qualified external auditors which are independent and comply with comparable standards as those set out in EU Directive 2006/43/EC<sup>13</sup>
- for the controls under Article 25: to allow for checks, reviews, audits and investigations (including on-the-spot checks, visits and inspections) by the bodies mentioned in that Article (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.).

Special rules on dispute settlement apply (see Data Sheet, Point 5).

## 10.2 Participants which are international organisations

Participants which are international organisations (IOs; if any) undertake to comply with their obligations under the Agreement and:

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)
- for the submission of certificates under Article 24: to use either independent public officers or external auditors which comply with comparable standards as those set out in EU Directive 2006/43/EC
- for the controls under Article 25: to allow for the checks, reviews, audits and investigations by the bodies mentioned in that Article, taking into account the specific agreements concluded by them and the EU (if any).

For such participants, nothing in the Agreement will be interpreted as a waiver of their privileges or immunities, as accorded by their constituent documents or international law.

Special rules on applicable law and dispute settlement apply (see Article 43 and Data Sheet, Point 5).

## 10.3 Pillar-assessed participants

Pillar-assessed participants (if any) may rely on their own systems, rules and procedures, in so far as they have been positively assessed and do not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries.

‘Pillar-assessment’ means a review by the European Commission on the systems, rules and procedures which participants use for managing EU grants (in particular internal control system, accounting

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<sup>13</sup> Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).



system, external audits, financing of third parties, rules on recovery and exclusion, information on recipients and protection of personal data; see Article 154 EU Financial Regulation 2018/1046).

Participants with a positive pillar assessment may rely on their own systems, rules and procedures, in particular for:

- record-keeping (Article 20): may be done in accordance with internal standards, rules and procedures
- currency conversion for financial statements (Article 21): may be done in accordance with usual accounting practices
- guarantees (Article 23): for public law bodies, prefinancing guarantees are not needed
- certificates (Article 24):
  - certificates on the financial statements (CFS): may be provided by their regular internal or external auditors and in accordance with their internal financial regulations and procedures
  - certificates on usual accounting practices (CoMUC): are not needed if those practices are covered by an ex-ante assessment

and use the following specific rules, for:

- recoveries (Article 22): in case of financial support to third parties, there will be no recovery if the participant has done everything possible to retrieve the undue amounts from the third party receiving the support (including legal proceedings) and non-recovery is not due to an error or negligence on its part
- checks, reviews, audits and investigations by the EU (Article 25): will be conducted taking into account the rules and procedures specifically agreed between them and the framework agreement (if any)
- impact evaluation (Article 26): will be conducted in accordance with the participant's internal rules and procedures and the framework agreement (if any)
- grant agreement suspension (Article 31): certain costs incurred during grant suspension are eligible (notably, minimum costs necessary for a possible resumption of the action and costs relating to contracts which were entered into before the pre-information letter was received and which could not reasonably be suspended, reallocated or terminated on legal grounds)
- grant agreement termination (Article 32): the final grant amount and final payment will be calculated taking into account also costs relating to contracts due for execution only after termination takes effect, if the contract was entered into before the pre-information letter was received and could not reasonably be terminated on legal grounds
- liability for damages (Article 33.2): the granting authority must be compensated for damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement only if the damage is due to an infringement of the participant's internal rules and procedures or due to a violation of third

parties' rights by the participant or one of its employees or individual for whom the employees are responsible.

Participants whose pillar assessment covers procurement and granting procedures may also do purchases, subcontracting and financial support to third parties (Article 6.2) in accordance with their internal rules and procedures for purchases, subcontracting and financial support.

Participants whose pillar assessment covers data protection rules may rely on their internal standards, rules and procedures for data protection (Article 15).

The participants may however not rely on provisions which would breach the principle of equal treatment of applicants or beneficiaries or call into question the decision awarding the grant, such as in particular:

- eligibility (Article 6)
- consortium roles and set-up (Articles 7-9)
- security and ethics (Articles 13, 14)
- IPR (including background and results, access rights and rights of use), communication, dissemination and visibility (Articles 16 and 17)
- information obligation (Article 19)
- payment, reporting and amendments (Articles 21, 22 and 39)
- rejections, reductions, suspensions and terminations (Articles 27, 28, 29-32)

If the pillar assessment was subject to remedial measures, reliance on the internal systems, rules and procedures is subject to compliance with those remedial measures.

Participants whose assessment has not yet been updated to cover (the new rules on) data protection may rely on their internal systems, rules and procedures, provided that they ensure that personal data is:

- processed lawfully, fairly and in a transparent manner in relation to the data subject
- collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes
- adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed
- accurate and, where necessary, kept up to date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and
- processed in a manner that ensures appropriate security of the personal data.

Participants must inform the coordinator without delay of any changes to the systems, rules and procedures that were part of the pillar assessment. The coordinator must immediately inform the granting authority.

Pillar-assessed participants that have also concluded a framework agreement with the EU, may moreover — under the same conditions as those above (i.e. not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries) — rely on the provisions set out in that framework agreement.

## **SECTION 2 RULES FOR CARRYING OUT THE ACTION**

### **ARTICLE 11 — PROPER IMPLEMENTATION OF THE ACTION**

#### **11.1 Obligation to properly implement the action**

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement, the call conditions and all legal obligations under applicable EU, international and national law.

#### **11.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

### **ARTICLE 12 — CONFLICT OF INTERESTS**

#### **12.1 Conflict of interests**

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the Agreement could be compromised for reasons involving family, emotional life, political or national affinity, economic interest or any other direct or indirect interest ('conflict of interests').

They must formally notify the granting authority without delay of any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The granting authority may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

#### **12.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28) and the grant or the beneficiary may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

### **ARTICLE 13 — CONFIDENTIALITY AND SECURITY**

#### **13.1 Sensitive information**

The parties must keep confidential any data, documents or other material (in any form) that is identified

as sensitive in writing ('sensitive information') — during the implementation of the action and for at least until the time-limit set out in the Data Sheet (see Point 6).

If a beneficiary requests, the granting authority may agree to keep such information confidential for a longer period.

Unless otherwise agreed between the parties, they may use sensitive information only to implement the Agreement.

The beneficiaries may disclose sensitive information to their personnel or other participants involved in the action only if they:

- (a) need to know it in order to implement the Agreement and
- (b) are bound by an obligation of confidentiality.

The granting authority may disclose sensitive information to its staff and to other EU institutions and bodies.

It may moreover disclose sensitive information to third parties, if:

- (a) this is necessary to implement the Agreement or safeguard the EU financial interests and
- (b) the recipients of the information are bound by an obligation of confidentiality.

The confidentiality obligations no longer apply if:

- (a) the disclosing party agrees to release the other party
- (b) the information becomes publicly available, without breaching any confidentiality obligation
- (c) the disclosure of the sensitive information is required by EU, international or national law.

Specific confidentiality rules (if any) are set out in Annex 5.

### **13.2 Classified information**

The parties must handle classified information in accordance with the applicable EU, international or national law on classified information (in particular, Decision 2015/444<sup>14</sup> and its implementing rules).

Deliverables which contain classified information must be submitted according to special procedures agreed with the granting authority.

Action tasks involving classified information may be subcontracted only after explicit approval (in writing) from the granting authority.

Classified information may not be disclosed to any third party (including participants involved in the action implementation) without prior explicit written approval from the granting authority.

Specific security rules (if any) are set out in Annex 5.

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<sup>14</sup> Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

### **13.3 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## **ARTICLE 14 — ETHICS AND VALUES**

### **14.1 Ethics**

The action must be carried out in line with the highest ethical standards and the applicable EU, international and national law on ethical principles.

Specific ethics rules (if any) are set out in Annex 5.

### **14.2 Values**

The beneficiaries must commit to and ensure the respect of basic EU values (such as respect for human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities).

Specific rules on values (if any) are set out in Annex 5.

### **14.3 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## **ARTICLE 15 — DATA PROTECTION**

### **15.1 Data processing by the granting authority**

Any personal data under the Agreement will be processed under the responsibility of the data controller of the granting authority in accordance with and for the purposes set out in the Portal Privacy Statement.

For grants where the granting authority is the European Commission, an EU regulatory or executive agency, joint undertaking or other EU body, the processing will be subject to Regulation 2018/1725<sup>15</sup>.

### **15.2 Data processing by the beneficiaries**

The beneficiaries must process personal data under the Agreement in compliance with the applicable EU, international and national law on data protection (in particular, Regulation 2016/679<sup>16</sup>).

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<sup>15</sup> Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC (OJ L 295, 21.11.2018, p. 39).

<sup>16</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural

They must ensure that personal data is:

- processed lawfully, fairly and in a transparent manner in relation to the data subjects
- collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes
- adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed
- accurate and, where necessary, kept up to date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and
- processed in a manner that ensures appropriate security of the data.

The beneficiaries may grant their personnel access to personal data only if it is strictly necessary for implementing, managing and monitoring the Agreement. The beneficiaries must ensure that the personnel is under a confidentiality obligation.

The beneficiaries must inform the persons whose data are transferred to the granting authority and provide them with the Portal Privacy Statement.

### **15.3 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## **ARTICLE 16 — INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS — ACCESS RIGHTS AND RIGHTS OF USE**

### **16.1 Background and access rights to background**

The beneficiaries must give each other and the other participants access to the background identified as needed for implementing the action, subject to any specific rules in Annex 5.

‘Background’ means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that is:

- (a) held by the beneficiaries before they acceded to the Agreement and
- (b) needed to implement the action or exploit the results.

If background is subject to rights of a third party, the beneficiary concerned must ensure that it is able to comply with its obligations under the Agreement.

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persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (‘GDPR’) (OJ L 119, 4.5.2016, p. 1).

## 16.2 Ownership of results

The granting authority does not obtain ownership of the results produced under the action.

‘Results’ means any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can be protected, as well as any rights attached to it, including intellectual property rights.

## 16.3 Rights of use of the granting authority on materials, documents and information received for policy, information, communication, dissemination and publicity purposes

The granting authority has the right to use non-sensitive information relating to the action and materials and documents received from the beneficiaries (notably summaries for publication, deliverables, as well as any other material, such as pictures or audio-visual material, in paper or electronic form) for policy, information, communication, dissemination and publicity purposes — during the action or afterwards.

The right to use the beneficiaries’ materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable licence, which includes the following rights:

- (a) **use for its own purposes** (in particular, making them available to persons working for the granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services)
- (b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes)
- (c) **editing or redrafting** (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation)
- (d) **translation**
- (e) **storage** in paper, electronic or other form
- (f) **archiving**, in line with applicable document-management rules
- (g) the right to authorise **third parties** to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority
- (h) **processing**, analysing, aggregating the materials, documents and information received and **producing derivative works**.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

If materials or documents are subject to moral rights or third party rights (including intellectual property rights or rights of natural persons on their image and voice), the beneficiaries must ensure

that they comply with their obligations under this Agreement (in particular, by obtaining the necessary licences and authorisations from the rights holders concerned).

Where applicable, the granting authority will insert the following information:

“© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the [name of granting authority] under conditions.”

#### **16.4 Specific rules on IPR, results and background**

Specific rules regarding intellectual property rights, results and background (if any) are set out in Annex 5.

#### **16.5 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such a breach may also lead to other measures described in Chapter 5.

### **ARTICLE 17 — COMMUNICATION, DISSEMINATION AND VISIBILITY**

#### **17.1 Communication — Dissemination — Promoting the action**

Unless otherwise agreed with the granting authority, the beneficiaries must promote the action and its results by providing targeted information to multiple audiences (including the media and the public), in accordance with Annex 1 and in a strategic, coherent and effective manner.

Before engaging in a communication or dissemination activity expected to have a major media impact, the beneficiaries must inform the granting authority.

#### **17.2 Visibility — European flag and funding statement**

Unless otherwise agreed with the granting authority, communication activities of the beneficiaries related to the action (including media relations, conferences, seminars, information material, such as brochures, leaflets, posters, presentations, etc., in electronic form, via traditional or social media, etc.), dissemination activities and any infrastructure, equipment, vehicles, supplies or major result funded by the grant must acknowledge EU support and display the European flag (emblem) and funding statement (translated into local languages, where appropriate):



Funded by the  
European Union



Co-funded by the  
European Union





Funded by the  
European Union



Co-funded by the  
European Union

The emblem must remain distinct and separate and cannot be modified by adding other visual marks, brands or text.

Apart from the emblem, no other visual identity or logo may be used to highlight the EU support.

When displayed in association with other logos (e.g. of beneficiaries or sponsors), the emblem must be displayed at least as prominently and visibly as the other logos.

For the purposes of their obligations under this Article, the beneficiaries may use the emblem without first obtaining approval from the granting authority. This does not, however, give them the right to exclusive use. Moreover, they may not appropriate the emblem or any similar trademark or logo, either by registration or by any other means.

### **17.3 Quality of information — Disclaimer**

Any communication or dissemination activity related to the action must use factually accurate information.

Moreover, it must indicate the following disclaimer (translated into local languages where appropriate):

“Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them.”

### **17.4 Specific communication, dissemination and visibility rules**

Specific communication, dissemination and visibility rules (if any) are set out in Annex 5.

### **17.5 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## **ARTICLE 18 — SPECIFIC RULES FOR CARRYING OUT THE ACTION**

### **18.1 Specific rules for carrying out the action**

Specific rules for implementing the action (if any) are set out in Annex 5.

### **18.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such a breach may also lead to other measures described in Chapter 5.

## **SECTION 3 GRANT ADMINISTRATION**

### **ARTICLE 19 — GENERAL INFORMATION OBLIGATIONS**

#### **19.1 Information requests**

The beneficiaries must provide — during the action or afterwards and in accordance with Article 7 — any information requested in order to verify eligibility of the costs or contributions declared, proper implementation of the action and compliance with the other obligations under the Agreement.

The information provided must be accurate, precise and complete and in the format requested, including electronic format.

#### **19.2 Participant Register data updates**

The beneficiaries must keep — at all times, during the action or afterwards — their information stored in the Portal Participant Register up to date, in particular, their name, address, legal representatives, legal form and organisation type.

#### **19.3 Information about events and circumstances which impact the action**

The beneficiaries must immediately inform the granting authority (and the other beneficiaries) of any of the following:

- (a) **events** which are likely to affect or delay the implementation of the action or affect the EU's financial interests, in particular:
  - (i) changes in their legal, financial, technical, organisational or ownership situation (including changes linked to one of the exclusion grounds listed in the declaration of honour signed before grant signature)
  - (ii) linked action information: not applicable
- (b) **circumstances** affecting:
  - (i) the decision to award the grant or
  - (ii) compliance with requirements under the Agreement.

#### **19.4 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## ARTICLE 20 — RECORD-KEEPING

### 20.1 Keeping records and supporting documents

The beneficiaries must — at least until the time-limit set out in the Data Sheet (see Point 6) — keep records and other supporting documents to prove the proper implementation of the action in line with the accepted standards in the respective field (if any).

In addition, the beneficiaries must — for the same period — keep the following to justify the amounts declared:

- (a) for actual costs: adequate records and supporting documents to prove the costs declared (such as contracts, subcontracts, invoices and accounting records); in addition, the beneficiaries' usual accounting and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documents
- (b) for flat-rate costs and contributions (if any): adequate records and supporting documents to prove the eligibility of the costs or contributions to which the flat-rate is applied
- (c) for the following simplified costs and contributions: the beneficiaries do not need to keep specific records on the actual costs incurred, but must keep:
  - (i) for unit costs and contributions (if any): adequate records and supporting documents to prove the number of units declared
  - (ii) for lump sum costs and contributions (if any): adequate records and supporting documents to prove proper implementation of the work as described in Annex 1
  - (iii) for financing not linked to costs (if any): adequate records and supporting documents to prove the achievement of the results or the fulfilment of the conditions as described in Annex 1
- (d) for unit, flat-rate and lump sum costs and contributions according to usual cost accounting practices (if any): the beneficiaries must keep any adequate records and supporting documents to prove that their cost accounting practices have been applied in a consistent manner, based on objective criteria, regardless of the source of funding, and that they comply with the eligibility conditions set out in Articles 6.1 and 6.2.

Moreover, the following is needed for specific budget categories:

- (e) for personnel costs: time worked for the beneficiary under the action must be supported by declarations signed monthly by the person and their supervisor, unless another reliable time-record system is in place; the granting authority may accept alternative evidence supporting the time worked for the action declared, if it considers that it offers an adequate level of assurance
- (f) additional record-keeping rules: not applicable

The records and supporting documents must be made available upon request (see Article 19) or in the context of checks, reviews, audits or investigations (see Article 25).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 25), the beneficiaries must keep these records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The granting authority may accept non-original documents if they offer a comparable level of assurance.

## 20.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs or contributions insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 27), and the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## ARTICLE 21 — REPORTING

### 21.1 Continuous reporting

The beneficiaries must continuously report on the progress of the action (e.g. **deliverables, milestones, outputs/outcomes, critical risks, indicators**, etc; if any), in the Portal Continuous Reporting tool and in accordance with the timing and conditions it sets out (as agreed with the granting authority).

Standardised deliverables (e.g. progress reports not linked to payments, reports on cumulative expenditure, special reports, etc; if any) must be submitted using the templates published on the Portal.

### 21.2 Periodic reporting: Technical reports and financial statements

In addition, the beneficiaries must provide reports to request payments, in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2):

- for additional prefinancings (if any): an **additional prefinancing report**
- for interim payments (if any) and the final payment: a **periodic report**.

The prefinancing and periodic reports include a technical and financial part.

The technical part includes an overview of the action implementation. It must be prepared using the template available in the Portal Periodic Reporting tool.

The financial part of the additional prefinancing report includes a statement on the use of the previous prefinancing payment.

The financial part of the periodic report includes:

- the financial statements (individual and consolidated; for all beneficiaries/affiliated entities)
- the explanation on the use of resources (or detailed cost reporting table, if required)

- the certificates on the financial statements (CFS) (if required; see Article 24.2 and Data Sheet, Point 4.3).

The **financial statements** must detail the eligible costs and contributions for each budget category and, for the final payment, also the revenues for the action (see Articles 6 and 22).

All eligible costs and contributions incurred should be declared, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts that are not declared in the individual financial statements will not be taken into account by the granting authority.

By signing the financial statements (directly in the Portal Periodic Reporting tool), the beneficiaries confirm that:

- the information provided is complete, reliable and true
- the costs and contributions declared are eligible (see Article 6)
- the costs and contributions can be substantiated by adequate records and supporting documents (see Article 20) that will be produced upon request (see Article 19) or in the context of checks, reviews, audits and investigations (see Article 25)
- for the final periodic report: all the revenues have been declared (if required; see Article 22).

Beneficiaries will have to submit also the financial statements of their affiliated entities (if any). In case of recoveries (see Article 22), beneficiaries will be held responsible also for the financial statements of their affiliated entities.

### **21.3 Currency for financial statements and conversion into euros**

The financial statements must be drafted in euro.

Beneficiaries with general accounts established in a currency other than the euro must convert the costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union* (ECB website), calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal* for the currency in question, they must be converted at the average of the monthly accounting exchange rates published on the European Commission website (InforEuro), calculated over the corresponding reporting period.

Beneficiaries with general accounts in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

### **21.4 Reporting language**

The reporting must be in the language of the Agreement, unless otherwise agreed with the granting authority (see Data Sheet, Point 4.2).

### **21.5 Consequences of non-compliance**

If a report submitted does not comply with this Article, the granting authority may suspend the payment deadline (see Article 29) and apply other measures described in Chapter 5.

If the coordinator breaches its reporting obligations, the granting authority may terminate the grant or the coordinator's participation (see Article 32) or apply other measures described in Chapter 5.

## **ARTICLE 22 — PAYMENTS AND RECOVERIES — CALCULATION OF AMOUNTS DUE**

### **22.1 Payments and payment arrangements**

Payments will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

They will be made in euro to the bank account indicated by the coordinator (see Data Sheet, Point 4.2) and must be distributed without unjustified delay (restrictions may apply to distribution of the initial prefinancing payment; see Data Sheet, Point 4.2).

Payments to this bank account will discharge the granting authority from its payment obligation.

The cost of payment transfers will be borne as follows:

- the granting authority bears the cost of transfers charged by its bank
- the beneficiary bears the cost of transfers charged by its bank
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

Payments by the granting authority will be considered to have been carried out on the date when they are debited to its account.

### **22.2 Recoveries**

Recoveries will be made, if — at beneficiary termination, final payment or afterwards — it turns out that the granting authority has paid too much and needs to recover the amounts undue.

Each beneficiary's financial responsibility in case of recovery is in principle limited to their own debt and undue amounts of their affiliated entities.

In case of enforced recoveries (see Article 22.4), affiliated entities will be held liable for repaying debts of their beneficiaries, if required by the granting authority (see Data Sheet, Point 4.4).

### **22.3 Amounts due**

#### **22.3.1 Prefinancing payments**

The aim of the prefinancing is to provide the beneficiaries with a float.

It remains the property of the EU until the final payment.

For **initial prefinancings** (if any), the amount due, schedule and modalities are set out in the Data Sheet (see Point 4.2).

For **additional prefinancings** (if any), the amount due, schedule and modalities are also set out in the Data Sheet (see Point 4.2). However, if the statement on the use of the previous prefinancing

payment shows that less than 70% was used, the amount set out in the Data Sheet will be reduced by the difference between the 70% threshold and the amount used.

The contribution to the Mutual Insurance Mechanism will be retained from the prefinancing payments (at the rate and in accordance with the modalities set out in the Data Sheet, see Point 4.2) and transferred to the Mechanism.

Prefinancing payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

### 22.3.2 Amount due at beneficiary termination — Recovery

In case of beneficiary termination, the granting authority will determine the provisional amount due for the beneficiary concerned. Payments (if any) will be made with the next interim or final payment.

The **amount due** will be calculated in the following step:

Step 1 — Calculation of the total accepted EU contribution

#### Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the beneficiary for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the accepted costs of the beneficiary), taking into account requests for a lower contribution to costs and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution' for the beneficiary.

The **balance** is then calculated by deducting the payments received (if any; see report on the distribution of payments in Article 32), from the total accepted EU contribution:

$$\left\{ \begin{array}{l} \text{total accepted EU contribution for the beneficiary} \\ \text{minus} \\ \text{prefinancing and interim payments received (if any)} \end{array} \right\}.$$

If the balance is **positive**, the amount will be included in the next interim or final payment to the consortium.

If the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount due, the amount to be recovered and the reasons why and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered and ask this amount to be paid to the coordinator (**confirmation letter**).

If payment is not made to the coordinator by the date specified in the confirmation letter, the granting authority may call on the Mutual Insurance Mechanism to intervene, if continuation of the action is guaranteed and the conditions set out in the rules governing the Mechanism are met.

In this case, it will send a **beneficiary recovery letter**, together with a **debit note** with the terms and date for payment.

The debit note for the beneficiary will include the amount calculated for the affiliated entities which also had to end their participation (if any).

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

The amounts will later on also be taken into account for the next interim or final payment.

### 22.3.3 Interim payments

Interim payments reimburse the eligible costs and contributions claimed for the implementation of the action during the reporting periods (if any).

Interim payments (if any) will be made in accordance with the schedule and modalities set out the Data Sheet (see Point 4.2).

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **interim payment** will be calculated by the granting authority in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the interim payment ceiling

#### Step 1 — Calculation of the total accepted EU contribution

The granting authority will calculate the ‘accepted EU contribution’ for the action for the reporting period, by first calculating the ‘maximum EU contribution to costs’ (applying the funding rate to the accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions from beneficiary termination (if any). The resulting amount is the ‘total accepted EU contribution’.

#### Step 2 — Limit to the interim payment ceiling



The resulting amount is then capped to ensure that the total amount of prefinancing and interim payments (if any) does not exceed the interim payment ceiling set out in the Data Sheet (see Point 4.2).

Interim payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

#### **22.3.4 Final payment — Final grant amount — Revenues and Profit — Recovery**

The final payment (payment of the balance) reimburses the remaining part of the eligible costs and contributions claimed for the implementation of the action (if any).

The final payment will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

Payment is subject to the approval of the final periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **final grant amount for the action** will be calculated in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

##### Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the action for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the total accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution'.

##### Step 2 — Limit to the maximum grant amount

If the resulting amount is higher than the maximum grant amount set out in Article 5.2, it will be limited to the latter.

##### Step 3 — Reduction due to the no-profit rule

If the no-profit rule is provided for in the Data Sheet (see Point 4.2), the grant must not produce a profit (i.e. surplus of the amount obtained following Step 2 plus the action's revenues, over the eligible costs and contributions approved by the granting authority).

‘Revenue’ is all income generated by the action, during its duration (see Article 4), for beneficiaries that are profit legal entities (— with the exception of income generated by the exploitation of results, which are not considered as revenues).

If there is a profit, it will be deducted in proportion to the final rate of reimbursement of the eligible costs approved by the granting authority (as compared to the amount calculated following Steps 1 and 2 minus the contributions).

The **balance** (final payment) is then calculated by deducting the total amount of prefinancing and interim payments already made (if any), from the final grant amount:

$$\left\{ \begin{array}{l} \text{final grant amount} \\ \text{minus} \\ \text{prefinancing and interim payments made (if any)} \end{array} \right\}.$$

If the balance is **positive**, it will be **paid** to the coordinator.

The amount retained for the Mutual Insurance Mechanism (see above) will be released and **paid** to the coordinator (in accordance with the rules governing the Mechanism).

The final payment (or part of it) may be offset (without the beneficiaries’ consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

If — despite the release of the Mutual Insurance Mechanism contribution — the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to recover, the final grant amount, the amount to be recovered and the reasons why
- requesting a report on the distribution of payments to the beneficiaries within 30 days of receiving notification and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received) and the coordinator has submitted the report on the distribution of payments, it will calculate the **share of the debt per beneficiary**, by:

- (a) identifying the beneficiaries for which the amount calculated as follows is negative:

$$\left\{ \left\{ \text{total accepted EU contribution for the beneficiary} \right\} \right.$$

divided by

total accepted EU contribution for the action}  
 multiplied by  
 final grant amount for the action},  
 minus  
 {prefinancing and interim payments received by the beneficiary (if any)} }

and

(b) dividing the debt:

{amount calculated according to point (a) for the beneficiary concerned  
 divided by  
 the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to  
 point (a)}  
 multiplied by  
 the amount to be recovered}.

and confirm the amount to be recovered from each beneficiary concerned (**confirmation letter**), together with **debit notes** with the terms and date for payment.

The debit notes for beneficiaries will include the amounts calculated for their affiliated entities (if any).

If the coordinator has not submitted the report on the distribution of payments, the granting authority will **recover** the full amount from the coordinator (**confirmation letter** and **debit note** with the terms and date for payment).

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

### 22.3.5 Audit implementation after final payment — Revised final grant amount — Recovery

If — after the final payment (in particular, after checks, reviews, audits or investigations; see Article 25) — the granting authority rejects costs or contributions (see Article 27) or reduces the grant (see Article 28), it will calculate the **revised final grant amount** for the beneficiary concerned.

The **beneficiary revised final grant amount** will be calculated in the following step:

Step 1 — Calculation of the revised total accepted EU contribution

#### Step 1 — Calculation of the revised total accepted EU contribution

The granting authority will first calculate the ‘revised accepted EU contribution’ for the beneficiary, by calculating the ‘revised accepted costs’ and ‘revised accepted contributions’.

After that, it will take into account grant reductions (if any). The resulting ‘revised total accepted EU contribution’ is the beneficiary revised final grant amount.

If the revised final grant amount is lower than the beneficiary's final grant amount (i.e. its share in the final grant amount for the action), it will be **recovered** in accordance with the following procedure:

The **beneficiary final grant amount** (i.e. share in the final grant amount for the action) is calculated as follows:

$$\left\{ \begin{array}{l} \text{total accepted EU contribution for the beneficiary} \\ \text{divided by} \\ \text{total accepted EU contribution for the action} \end{array} \right\} \times \text{final grant amount for the action}$$

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount to be recovered and the reasons why and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered (**confirmation letter**), together with a **debit note** with the terms and the date for payment.

Recoveries against affiliated entities (if any) will be handled through their beneficiaries.

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

## 22.4 Enforced recovery

If payment is not made by the date specified in the debit note, the amount due will be recovered:

- (a) by offsetting the amount — without the coordinator or beneficiary's consent — against any amounts owed to the coordinator or beneficiary by the granting authority.

In exceptional circumstances, to safeguard the EU financial interests, the amount may be offset before the payment date specified in the debit note.

For grants where the granting authority is the European Commission or an EU executive agency, debts may also be offset against amounts owed by other Commission services or executive agencies.

- (b) financial guarantee(s): not applicable
- (c) joint and several liability of beneficiaries: not applicable
- (d) by holding affiliated entities jointly and severally liable (if any, see Data Sheet, Point 4.4)
- (e) by taking legal action (see Article 43) or, provided that the granting authority is the European Commission or an EU executive agency, by adopting an enforceable decision under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 100(2) of EU Financial Regulation 2018/1046.

If the Mutual Insurance Mechanism was called on by the granting authority to intervene, recovery will be continued in the name of the Mutual Insurance Mechanism. If two debit notes were sent, the second one (in the name of the Mutual Insurance Mechanism) will be considered to replace the first one (in the name of the granting authority). Where the MIM intervened, offsetting, enforceable decisions or any other of the above-mentioned forms of enforced recovery may be used *mutatis mutandis*.

The amount to be recovered will be increased by **late-payment interest** at the rate set out in Article 22.5, from the day following the payment date in the debit note, up to and including the date the full payment is received.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2015/2366<sup>17</sup> applies.

For grants where the granting authority is an EU executive agency, enforced recovery by offsetting or enforceable decision will be done by the services of the European Commission (see also Article 43).

## 22.5 Consequences of non-compliance

**22.5.1** If the granting authority does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros ('reference rate'), plus the rate specified in the Data Sheet (Point 4.2). The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only on request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

If payments or the payment deadline are suspended (see Articles 29 and 30), payment will not be considered as late.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

**22.5.2** If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 28) and the grant or the coordinator may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

## ARTICLE 23 — GUARANTEES

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<sup>17</sup> Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (OJ L 337, 23.12.2015, p. 35).

Not applicable

## **ARTICLE 24 — CERTIFICATES**

### **24.1 Operational verification report (OVR)**

Not applicable

### **24.2 Certificate on the financial statements (CFS)**

If required by the granting authority (see Data Sheet, Point 4.3), the beneficiaries must provide certificates on their financial statements (CFS), in accordance with the schedule, threshold and conditions set out in the Data Sheet.

The coordinator must submit them as part of the periodic report (see Article 21).

The certificates must be drawn up using the template published on the Portal, cover the costs declared on the basis of actual costs and costs according to usual cost accounting practices (if any), and fulfil the following conditions:

- (a) be provided by a qualified approved external auditor which is independent and complies with Directive 2006/43/EC<sup>18</sup> (or for public bodies: by a competent independent public officer)
- (b) the verification must be carried out according to the highest professional standards to ensure that the financial statements comply with the provisions under the Agreement and that the costs declared are eligible.

The certificates will not affect the granting authority's right to carry out its own checks, reviews or audits, nor preclude the European Court of Auditors (ECA), the European Public Prosecutor's Office (EPPO) or the European Anti-Fraud Office (OLAF) from using their prerogatives for audits and investigations under the Agreement (see Article 25).

If the costs (or a part of them) were already audited by the granting authority, these costs do not need to be covered by the certificate and will not be counted for calculating the threshold (if any).

### **24.3 Certificate on the compliance of usual cost accounting practices (CoMUC)**

Not applicable

### **24.4 Systems and process audit (SPA)**

Beneficiaries which:

- use unit, flat rate or lump sum costs or contributions according to documented (i.e. formally approved and in writing) usual costs accounting practices (if any) or
- have formalised documentation on the systems and processes for calculating their costs and contributions (i.e. formally approved and in writing), have participated in at least 150 actions under Horizon 2020 or the Euratom Research and Training Programme (2014-2018 or

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<sup>18</sup> Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).

2019-2020) and participate in at least 3 ongoing actions under Horizon Europe or the Euratom Research and Training Programme (2021-2025 or 2026-2027)

may apply to the granting authority for a systems and process audit (SPA).

This audit will be carried out as follows:

Step 1 – Application by the beneficiary.

Step 2 – If the application is accepted, the granting authority will carry out the systems and process audit, complemented by an audit of transactions (on a sample of the beneficiary's Horizon Europe or the Euratom Research and Training Programme financial statements).

Step 3 – The audit result will take the form of a risk assessment classification for the beneficiary: low, medium or high.

Low-risk beneficiaries will benefit from less (or less in-depth) ex-post audits (see Article 25) and a higher threshold for submitting certificates on the financial statements (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3).

## **24.5 Consequences of non-compliance**

If a beneficiary does not submit a certificate on the financial statements (CFS) or the certificate is rejected, the accepted EU contribution to costs will be capped to reflect the CFS threshold.

If a beneficiary breaches any of its other obligations under this Article, the granting authority may apply the measures described in Chapter 5.

## **ARTICLE 25 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS**

### **25.1 Granting authority checks, reviews and audits**

#### **25.1.1 Internal checks**

The granting authority may — during the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing costs and contributions, deliverables and reports.

#### **25.1.2 Project reviews**

The granting authority may carry out reviews on the proper implementation of the action and compliance with the obligations under the Agreement (general project reviews or specific issues reviews).

Such project reviews may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiary concerned and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent, outside experts. If it uses outside experts, the coordinator or beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The coordinator or beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The granting authority may request beneficiaries to provide such information to it directly. Sensitive information and documents will be treated in accordance with Article 13.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with the outside experts.

For **on-the-spot visits**, the beneficiary concerned must allow access to sites and premises (including to the outside experts) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a **project review report** will be drawn up.

The granting authority will formally notify the project review report to the coordinator or beneficiary concerned, which has 30 days from receiving notification to make observations.

Project reviews (including project review reports) will be in the language of the Agreement.

### 25.1.3 Audits

The granting authority may carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Such audits may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the beneficiary concerned and will be considered to start on the date of the notification.

The granting authority may use its own audit service, delegate audits to a centralised service or use external audit firms. If it uses an external firm, the beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. Sensitive information and documents will be treated in accordance with Article 13.

For **on-the-spot** visits, the beneficiary concerned must allow access to sites and premises (including for the external audit firm) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a **draft audit report** will be drawn up.

The auditors will formally notify the draft audit report to the beneficiary concerned, which has 30 days from receiving notification to make observations (contradictory audit procedure).

The **final audit report** will take into account observations by the beneficiary concerned and will be formally notified to them.



Audits (including audit reports) will be in the language of the Agreement.

## **25.2 European Commission checks, reviews and audits in grants of other granting authorities**

Where the granting authority is not the European Commission, the latter has the same rights of checks, reviews and audits as the granting authority.

## **25.3 Access to records for assessing simplified forms of funding**

The beneficiaries must give the European Commission access to their statutory records for the periodic assessment of simplified forms of funding which are used in EU programmes.

## **25.4 OLAF, EPPO and ECA audits and investigations**

The following bodies may also carry out checks, reviews, audits and investigations — during the action or afterwards:

- the European Anti-Fraud Office (OLAF) under Regulations No 883/2013<sup>19</sup> and No 2185/96<sup>20</sup>
- the European Public Prosecutor's Office (EPPO) under Regulation 2017/1939
- the European Court of Auditors (ECA) under Article 287 of the Treaty on the Functioning of the EU (TFEU) and Article 257 of EU Financial Regulation 2018/1046.

If requested by these bodies, the beneficiary concerned must provide full, accurate and complete information in the format requested (including complete accounts, individual salary statements or other personal data, including in electronic format) and allow access to sites and premises for on-the-spot visits or inspections — as provided for under these Regulations.

To this end, the beneficiary concerned must keep all relevant information relating to the action, at least until the time-limit set out in the Data Sheet (Point 6) and, in any case, until any ongoing checks, reviews, audits, investigations, litigation or other pursuits of claims have been concluded.

## **25.5 Consequences of checks, reviews, audits and investigations — Extension of results of reviews, audits or investigations**

### **25.5.1 Consequences of checks, reviews, audits and investigations in this grant**

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to rejections (see Article 27), grant reduction (see Article 28) or other measures described in Chapter 5.

Rejections or grant reductions after the final payment will lead to a revised final grant amount (see Article 22).

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<sup>19</sup> Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18/09/2013, p. 1).

<sup>20</sup> Council Regulation (Euratom, EC) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15/11/1996, p. 2).

Findings in checks, reviews, audits or investigations during the action implementation may lead to a request for amendment (see Article 39), to change the description of the action set out in Annex 1.

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations in any EU grant may also lead to consequences in other EU grants awarded under similar conditions ('extension to other grants').

Moreover, findings arising from an OLAF or EPPO investigation may lead to criminal prosecution under national law.

### 25.5.2 Extension from other grants

Results of checks, reviews, audits or investigations in other grants may be extended to this grant, if:

- (a) the beneficiary concerned is found, in other EU grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and
- (b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — within the time-limit for audits set out in the Data Sheet (see Point 6).

The granting authority will formally notify the beneficiary concerned of the intention to extend the findings and the list of grants affected.

If the extension concerns **rejections of costs or contributions**: the notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings
- (b) the request to submit revised financial statements for all grants affected
- (c) the correction rate for extrapolation, established on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected, if the beneficiary concerned:
  - (i) considers that the submission of revised financial statements is not possible or practicable or
  - (ii) does not submit revised financial statements.

If the extension concerns **grant reductions**: the notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings and
- (b) the **correction rate for extrapolation**, established on the basis of the systemic or recurrent errors and the principle of proportionality.

The beneficiary concerned has **60 days** from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method/rate**.

On the basis of this, the granting authority will analyse the impact and decide on the implementation (i.e. start rejection or grant reduction procedures, either on the basis of the revised financial statements or the announced/alternative method/rate or a mix of those; see Articles 27 and 28).

## **25.6 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, costs or contributions insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 27), and the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

## **ARTICLE 26 — IMPACT EVALUATIONS**

### **26.1 Impact evaluation**

The granting authority may carry out impact evaluations of the action, measured against the objectives and indicators of the EU programme funding the grant.

Such evaluations may be started during implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiaries and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent outside experts.

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

### **26.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the granting authority may apply the measures described in Chapter 5.

## **CHAPTER 5 CONSEQUENCES OF NON-COMPLIANCE**

### **SECTION 1 REJECTIONS AND GRANT REDUCTION**

#### **ARTICLE 27 — REJECTION OF COSTS AND CONTRIBUTIONS**

##### **27.1 Conditions**

The granting authority will — at beneficiary termination, interim payment, final payment or afterwards — reject any costs or contributions which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 25).

The rejection may also be based on the extension of findings from other grants to this grant (see Article 25).

Ineligible costs or contributions will be rejected.

##### **27.2 Procedure**

If the rejection does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the rejection, the amounts and the reasons why. The coordinator or

beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the rejection (payment review procedure).

If the rejection leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

### **27.3 Effects**

If the granting authority rejects costs or contributions, it will deduct them from the costs or contributions declared and then calculate the amount due (and, if needed, make a recovery; see Article 22).

## **ARTICLE 28 — GRANT REDUCTION**

### **28.1 Conditions**

The granting authority may — at beneficiary termination, final payment or afterwards — reduce the grant for a beneficiary, if:

- (a) the beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or
- (b) the beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (see Article 25).

The amount of the reduction will be calculated for each beneficiary concerned and proportionate to the seriousness and the duration of the errors, irregularities or fraud or breach of obligations, by applying an individual reduction rate to their accepted EU contribution.

### **28.2 Procedure**

If the grant reduction does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the reduction, the amount to be reduced and the reasons why. The coordinator or beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the reduction (payment review procedure).

If the grant reduction leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

### **28.3 Effects**

If the granting authority reduces the grant, it will deduct the reduction and then calculate the amount due (and, if needed, make a recovery; see Article 22).

## **SECTION 2 SUSPENSION AND TERMINATION**

### **ARTICLE 29 — PAYMENT DEADLINE SUSPENSION**

#### **29.1 Conditions**

The granting authority may — at any moment — suspend the payment deadline if a payment cannot be processed because:

- (a) the required report (see Article 21) has not been submitted or is not complete or additional information is needed
- (b) there are doubts about the amount to be paid (e.g. ongoing audit extension procedure, queries about eligibility, need for a grant reduction, etc.) and additional checks, reviews, audits or investigations are necessary, or
- (c) there are other issues affecting the EU financial interests.

#### **29.2 Procedure**

The granting authority will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day the notification is sent.

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining time to pay (see Data Sheet, Point 4.2) will resume.

If the suspension exceeds two months, the coordinator may request the granting authority to confirm if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the report and the revised report is not submitted (or was submitted but is also rejected), the granting authority may also terminate the grant or the participation of the coordinator (see Article 32).

### **ARTICLE 30 — PAYMENT SUSPENSION**

#### **30.1 Conditions**

The granting authority may — at any moment — suspend payments, in whole or in part for one or more beneficiaries, if:

- (a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including

improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or

- (b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant.

If payments are suspended for one or more beneficiaries, the granting authority will make partial payment(s) for the part(s) not suspended. If suspension concerns the final payment, the payment (or recovery) of the remaining amount after suspension is lifted will be considered to be the payment that closes the action.

## 30.2 Procedure

Before suspending payments, the granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to suspend payments and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

At the end of the suspension procedure, the granting authority will also inform the coordinator.

The suspension will **take effect** the day after the confirmation notification is sent.

If the conditions for resuming payments are met, the suspension will be **lifted**. The granting authority will formally notify the beneficiary concerned (and the coordinator) and set the suspension end date.

During the suspension, no prefinancing will be paid to the beneficiaries concerned. For interim payments, the periodic reports for all reporting periods except the last one (see Article 21) must not contain any financial statements from the beneficiary concerned (or its affiliated entities). The coordinator must include them in the next periodic report after the suspension is lifted or — if suspension is not lifted before the end of the action — in the last periodic report.

## ARTICLE 31 — GRANT AGREEMENT SUSPENSION

### 31.1 Consortium-requested GA suspension

#### 31.1.1 Conditions and procedure

The beneficiaries may request the suspension of the grant or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 35) — make implementation impossible or excessively difficult.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the suspension takes effect; this date may be before the date of the submission of the amendment request and
- the expected date of resumption.

The suspension will **take effect** on the day specified in the amendment.

Once circumstances allow for implementation to resume, the coordinator must immediately request another **amendment** of the Agreement to set the suspension end date, the resumption date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the amendment. This date may be before the date of the submission of the amendment request.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during grant suspension are not eligible (see Article 6.3).

## 31.2 EU-initiated GA suspension

### 31.2.1 Conditions

The granting authority may suspend the grant or any part of it, if:

- (a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:
  - (i) substantial errors, irregularities or fraud or
  - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or
- (b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant
- (c) other:
  - (i) linked action issues: not applicable
  - (ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

### 31.2.2 Procedure

Before suspending the grant, the granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to suspend the grant and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

The suspension will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification).

Once the conditions for resuming implementation of the action are met, the granting authority will formally notify the coordinator a **lifting of suspension letter**, in which it will set the suspension end date and invite the coordinator to request an amendment of the Agreement to set the resumption date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the lifting of suspension letter. This date may be before the date on which the letter is sent.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during suspension are not eligible (see Article 6.3).

The beneficiaries may not claim damages due to suspension by the granting authority (see Article 33).

Grant suspension does not affect the granting authority's right to terminate the grant or a beneficiary (see Article 32) or reduce the grant (see Article 28).

## ARTICLE 32 — GRANT AGREEMENT OR BENEFICIARY TERMINATION

### 32.1 Consortium-requested GA termination

#### 32.1.1 Conditions and procedure

The beneficiaries may request the termination of the grant.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the consortium ends work on the action ('end of work date') and
- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

The termination will **take effect** on the termination date specified in the amendment.

If no reasons are given or if the granting authority considers the reasons do not justify termination, it may consider the grant terminated improperly.

#### 32.1.2 Effects



The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Improper termination may lead to a grant reduction (see Article 28).

After termination, the beneficiaries' obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

## 32.2 Consortium-requested beneficiary termination

### 32.2.1 Conditions and procedure

The coordinator may request the termination of the participation of one or more beneficiaries, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing)
- the date the beneficiary ends work on the action ('end of work date')
- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

If the termination concerns the coordinator and is done without its agreement, the amendment request must be submitted by another beneficiary (acting on behalf of the consortium).

The termination will **take effect** on the termination date specified in the amendment.

If no information is given or if the granting authority considers that the reasons do not justify termination, it may consider the beneficiary to have been terminated improperly.

### 32.2.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a **report on the distribution of payments** to the beneficiary concerned
- (ii) a **termination report** from the beneficiary concerned, for the open reporting period until

termination, containing an overview of the progress of the work, the financial statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)

- (iii) a second **request for amendment** (see Article 39) with other amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

If the second request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the second request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

Improper termination may lead to a reduction of the grant (see Article 31) or grant termination (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

### **32.3 EU-initiated GA or beneficiary termination**

#### **32.3.1 Conditions**

The granting authority may terminate the grant or the participation of one or more beneficiaries, if:

- (a) one or more beneficiaries do not accede to the Agreement (see Article 40)
- (b) a change to the action or the legal, financial, technical, organisational or ownership situation of a beneficiary is likely to substantially affect the implementation of the action or calls into

- question the decision to award the grant (including changes linked to one of the exclusion grounds listed in the declaration of honour)
- (c) following termination of one or more beneficiaries, the necessary changes to the Agreement (and their impact on the action) would call into question the decision awarding the grant or breach the principle of equal treatment of applicants
  - (d) implementation of the action has become impossible or the changes necessary for its continuation would call into question the decision awarding the grant or breach the principle of equal treatment of applicants
  - (e) a beneficiary (or person with unlimited liability for its debts) is subject to bankruptcy proceedings or similar (including insolvency, winding-up, administration by a liquidator or court, arrangement with creditors, suspension of business activities, etc.)
  - (f) a beneficiary (or person with unlimited liability for its debts) is in breach of social security or tax obligations
  - (g) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has been found guilty of grave professional misconduct
  - (h) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed fraud, corruption, or is involved in a criminal organisation, money laundering, terrorism-related crimes (including terrorism financing), child labour or human trafficking
  - (i) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) was created under a different jurisdiction with the intent to circumvent fiscal, social or other legal obligations in the country of origin (or created another entity with this purpose)
  - (j) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:
    - (i) substantial errors, irregularities or fraud or
    - (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.)
  - (k) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (extension of findings from other grants to this grant; see Article 25)
  - (l) despite a specific request by the granting authority, a beneficiary does not request — through the coordinator — an amendment to the Agreement to end the participation of one of its affiliated entities or associated partners that is in one of the situations under points (d), (f), (e), (g), (h), (i) or (j) and to reallocate its tasks, or

(m) other:

- (i) linked action issues: not applicable
- (ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

### 32.3.2 Procedure

Before terminating the grant or participation of one or more beneficiaries, the granting authority will send a **pre-information letter** to the coordinator or beneficiary concerned:

- formally notifying the intention to terminate and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the termination and the date it will take effect (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

For beneficiary terminations, the granting authority will — at the end of the procedure — also inform the coordinator.

The termination will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification; ‘termination date’).

### 32.3.3 Effects

(a) for **GA termination**:

The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the last open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

If the grant is terminated for breach of the obligation to submit reports, the coordinator may not submit any report after termination.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Termination does not affect the granting authority’s right to reduce the grant (see Article 28) or to impose administrative sanctions (see Article 34).

The beneficiaries may not claim damages due to termination by the granting authority (see Article 33).

After termination, the beneficiaries' obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

(b) for **beneficiary termination**:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a **report on the distribution of payments** to the beneficiary concerned
- (ii) a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, the financial statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)
- (iii) a **request for amendment** (see Article 39) with any amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

If the request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

## **SECTION 3 OTHER CONSEQUENCES: DAMAGES AND ADMINISTRATIVE SANCTIONS**

### **ARTICLE 33 — DAMAGES**

#### **33.1 Liability of the granting authority**

The granting authority cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of the implementation of the Agreement, including for gross negligence.

The granting authority cannot be held liable for any damage caused by any of the beneficiaries or other participants involved in the action, as a consequence of the implementation of the Agreement.

#### **33.2 Liability of the beneficiaries**

The beneficiaries must compensate the granting authority for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement, provided that it was caused by gross negligence or wilful act.

The liability does not extend to indirect or consequential losses or similar damage (such as loss of profit, loss of revenue or loss of contracts), provided such damage was not caused by wilful act or by a breach of confidentiality.

### **ARTICLE 34 — ADMINISTRATIVE SANCTIONS AND OTHER MEASURES**

Nothing in this Agreement may be construed as preventing the adoption of administrative sanctions (i.e. exclusion from EU award procedures and/or financial penalties) or other public law measures, in addition or as an alternative to the contractual measures provided under this Agreement (see, for instance, Articles 135 to 145 EU Financial Regulation 2018/1046 and Articles 4 and 7 of Regulation 2988/95<sup>21</sup>).

## **SECTION 4 FORCE MAJEURE**

### **ARTICLE 35 — FORCE MAJEURE**

A party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

‘Force majeure’ means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties’ control,
- was not due to error or negligence on their part (or on the part of other participants involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

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<sup>21</sup> Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

## **CHAPTER 6 FINAL PROVISIONS**

### **ARTICLE 36 — COMMUNICATION BETWEEN THE PARTIES**

#### **36.1 Forms and means of communication — Electronic management**

EU grants are managed fully electronically through the EU Funding & Tenders Portal ('Portal').

All communications must be made electronically through the Portal, in accordance with the Portal Terms and Conditions and using the forms and templates provided there (except if explicitly instructed otherwise by the granting authority).

Communications must be made in writing and clearly identify the grant agreement (project number and acronym).

Communications must be made by persons authorised according to the Portal Terms and Conditions. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a 'legal entity appointed representative (LEAR)'. The role and tasks of the LEAR are stipulated in their appointment letter (see Portal Terms and Conditions).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Portal.

#### **36.2 Date of communication**

The sending date for communications made through the Portal will be the date and time of sending, as indicated by the time logs.

The receiving date for communications made through the Portal will be the date and time the communication is accessed, as indicated by the time logs. Formal notifications that have not been accessed within 10 days after sending, will be considered to have been accessed (see Portal Terms and Conditions).

If a communication is exceptionally made on paper (by e-mail or postal service), general principles apply (i.e. date of sending/receipt). Formal notifications by registered post with proof of delivery will be considered to have been received either on the delivery date registered by the postal service or the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

#### **36.3 Addresses for communication**

The Portal can be accessed via the Europa website.

The address for paper communications to the granting authority (if exceptionally allowed) is the official mailing address indicated on its website.

For beneficiaries, it is the legal address specified in the Portal Participant Register.

## **ARTICLE 37 — INTERPRETATION OF THE AGREEMENT**

The provisions in the Data Sheet take precedence over the rest of the Terms and Conditions of the Agreement.

Annex 5 takes precedence over the Terms and Conditions; the Terms and Conditions take precedence over the Annexes other than Annex 5.

Annex 2 takes precedence over Annex 1.

## **ARTICLE 38 — CALCULATION OF PERIODS AND DEADLINES**

In accordance with Regulation No 1182/71<sup>22</sup>, periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

‘Days’ means calendar days, not working days.

## **ARTICLE 39 — AMENDMENTS**

### **39.1 Conditions**

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

### **39.2 Procedure**

The party requesting an amendment must submit a request for amendment signed directly in the Portal Amendment tool.

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3). If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

The request for amendment must include:

- the reasons why
- the appropriate supporting documents and

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<sup>22</sup> Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8/6/1971, p. 1).



- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

The granting authority may request additional information.

If the party receiving the request agrees, it must sign the amendment in the tool within 45 days of receiving notification (or any additional information the granting authority has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected.

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date of entry into force or other date specified in the amendment.

## **ARTICLE 40 — ACCESSION AND ADDITION OF NEW BENEFICIARIES**

### **40.1 Accession of the beneficiaries mentioned in the Preamble**

The beneficiaries which are not coordinator must accede to the grant by signing the accession form (see Annex 3) directly in the Portal Grant Preparation tool, within 30 days after the entry into force of the Agreement (see Article 44).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 44).

If a beneficiary does not accede to the grant within the above deadline, the coordinator must — within 30 days — request an amendment (see Article 39) to terminate the beneficiary and make any changes necessary to ensure proper implementation of the action. This does not affect the granting authority's right to terminate the grant (see Article 32).

### **40.2 Addition of new beneficiaries**

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 39. It must include an accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool.

New beneficiaries will assume the rights and obligations under the Agreement with effect from the date of their accession specified in the accession form (see Annex 3).

Additions are also possible in mono-beneficiary grants.

## **ARTICLE 41 — TRANSFER OF THE AGREEMENT**

In justified cases, the beneficiary of a mono-beneficiary grant may request the transfer of the grant to a new beneficiary, provided that this would not call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiary must submit a request for **amendment** (see Article 39), with

- the reasons why
- the accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool and
- additional supporting documents (if required by the granting authority).

The new beneficiary will assume the rights and obligations under the Agreement with effect from the date of accession specified in the accession form (see Annex 3).

## **ARTICLE 42 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE GRANTING AUTHORITY**

The beneficiaries may not assign any of their claims for payment against the granting authority to any third party, except if expressly approved in writing by the granting authority on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the granting authority has not accepted the assignment or if the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the granting authority.

## **ARTICLE 43 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES**

### **43.1 Applicable law**

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

Special rules may apply for beneficiaries which are international organisations (if any; see Data Sheet, Point 5).

### **43.2 Dispute settlement**

If a dispute concerns the interpretation, application or validity of the Agreement, the parties must bring action before the EU General Court — or, on appeal, the EU Court of Justice — under Article 272 of the Treaty on the Functioning of the EU (TFEU).

For non-EU beneficiaries (if any), such disputes must be brought before the courts of Brussels, Belgium — unless an international agreement provides for the enforceability of EU court judgements.

For beneficiaries with arbitration as special dispute settlement forum (if any; see Data Sheet, Point 5), the dispute will — in the absence of an amicable settlement — be settled in accordance with the Rules for Arbitration published on the Portal.

If a dispute concerns administrative sanctions, offsetting or an enforceable decision under Article 299 TFEU (see Articles 22 and 34), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice — under Article 263 TFEU.

For grants where the granting authority is an EU executive agency (see Preamble), actions against

offsetting and enforceable decisions must be brought against the European Commission (not against the granting authority; see also Article 22).

#### **ARTICLE 44 — ENTRY INTO FORCE**

The Agreement will enter into force on the day of signature by the granting authority or the coordinator, depending on which is later.

#### **SIGNATURES**

##### **For the coordinator**

Annika Henrike Thies with ECAS id n00a4m3m signed in the Participant Portal on 27/11/2023 at 11:33:55 (transaction id SigId-9387-VnM1OoBK1ECyDCJ4LC7nekd7QMrLL6VReq5buDffDEPxt8boa2voga2pc7dDqWoyHLZ3Tjvr3WQPaC8QoK7W-yntOf97TTHq5v0i419YzOO-VEponNqRnewBUJuXxDFPkf4bsznKEHeMA1faU217sfazzS8ZTcrO85AMihPE6Zl7sM2hL03E1v2l80TVaGv33H0).  
Timestamp by third party at  
2023.11.27 11:34:03 CET

##### **For the granting authority**

Signed by Sari VARTIAINEN-MATHIEU with ECAS id vartisi as an authorised representative on 27-11-2023 15:52:57 (transaction id SigId-16676-zj2BTazhb8QdWZUNEvNI5ZBw0b1gdafIOu10MxS4f7WbhX6tbG6n1fdGB4r11YCQIZoWp6mcUN1557uAJERXZ-yntOf97TTHq5v0i419YzOO-0RTFJaqe2EpNNdPwYJPZmj0pIW1Z7zTPMVQnpY1qA4PQKM3k6ELJC0zsUsmzy3H0jaclaxvPn2AeEiOatennG8G)  
2023.11.27 15:53:01 CET



**ANNEX 1**



**Horizon Europe (HORIZON)**

**Description of the action (DoA)**

**Part A**

**Part B**

## DESCRIPTION OF THE ACTION (PART A)

### COVER PAGE

Part A of the Description of the Action (DoA) must be completed directly on the Portal Grant Preparation screens.

<b>PROJECT</b>	
<i>Grant Preparation (General Information screen) — Enter the info.</i>	
<b>Project number:</b>	101130652
<b>Project name:</b>	Research Infrastructure Access in NAnoscience & nanotechnology
<b>Project acronym:</b>	RIANA
<b>Call:</b>	HORIZON-INFRA-2023-SERV-01
<b>Topic:</b>	HORIZON-INFRA-2023-SERV-01-01
<b>Type of action:</b>	HORIZON-RIA
<b>Service:</b>	REA/C/04
<b>Project starting date:</b>	fixed date: 1 March 2024
<b>Project duration:</b>	48 months

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List of critical risks .....	47
Research infrastructure .....	49

## PROJECT SUMMARY

### Project summary

*Grant Preparation (General Information screen) — Provide an overall description of your project (including context and overall objectives, planned activities and main achievements, and expected results and impacts (on target groups, change procedures, capacities, innovation etc)). This summary should give readers a clear idea of what your project is about.*

*Use the project summary from your proposal.*

Research in the fields of nanoscience and nanotechnology is vital for sustainability globally: advancement in nanoscience and nanotechnology cannot be achieved without using research infrastructures (RI).

RIANA encompasses 7 European networks of top-level RIs to cover the most advanced techniques relevant for synthesis, nanofabrication, processing, characterization, analytics, as well as simulation capacity. Highly customised and efficient access to 69 infrastructures is coordinated via a single-entry point and enabled through comprehensive Science and Innovation Service by senior scientists, experts for the transfer of technology from academia to industry, and highly trained Junior Scientists. The Junior Scientist boost RI experience to an entirely new level: they provide customised Science Service supporting users from initial ideas to hands-on experiments, data analysis and dissemination of results to generate the greatest impact from access to world-class RI.

This core of RIANA is aligned to attract experienced and new users from academia or industry making their promising ideas a success and push them to higher TRL. RIANA is flexible to upcoming emergent scientific topics and needs: together with stakeholders from the nanocommunity, RIANA implements the opportunity to offer flexible access to additional infrastructures in, and even outside of Europe beyond the current consortium, and to direct the Science Service towards evolving user needs via additional specialised Junior Scientists.

Based on the four years of experience, the RIANA consortium will develop a roadmap for the future of the nanoscience and nanotechnology at European RIs.

## LIST OF PARTICIPANTS

### PARTICIPANTS

*Grant Preparation (Beneficiaries screen) — Enter the info.*

Number	Role	Short name	Legal name	Country	PIC
1	COO	DESY	DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY	DE	999986969
2	BEN	FZJ	FORSCHUNGSZENTRUM JULICH GMBH	DE	999980470
3	BEN	ULUND	LUNDS UNIVERSITET	SE	999901318
4	BEN	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE	IT	999979500
4.1	AE	FBK	FONDAZIONE BRUNO KESSLER	IT	999625450
4.2	AE	INRIM	ISTITUTO NAZIONALE DI RICERCA METROLOGICA	IT	998627805
4.3	AE	POLITO	POLITECNICO DI TORINO	IT	999977754
5	BEN	ALBA-CELLS	CONSORCIO PARA LA CONSTRUCCION EQUIPAMIENTO Y EXPLOTACION DEL LABORATORIO DE LUZ SINCROTRON	ES	999917226
6	BEN	FORTH	IDRYMA TECHNOLOGIAS KAI EREVNAS	EL	999995893
7	BEN	HZDR	HELMHOLTZ-ZENTRUM DRESDEN- ROSSENDORF EV	DE	999470541

<b>PARTICIPANTS</b>					
<i>Grant Preparation (Beneficiaries screen) — Enter the info.</i>					
<b>Number</b>	<b>Role</b>	<b>Short name</b>	<b>Legal name</b>	<b>Country</b>	<b>PIC</b>
8	BEN	UAM	UNIVERSIDAD AUTONOMA DE MADRID	ES	999861354
9	BEN	AREA	AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE	IT	999549887
10	BEN	ESRF	EUROPEAN SYNCHROTRON RADIATION FACILITY	FR	999484121
11	BEN	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR	999997930
11.1	AE	U. Bordeaux	UNIVERSITE DE BORDEAUX	FR	949735440
11.2	AE	ULille	UNIVERSITE DE LILLE	FR	888146648
12	BEN	INFLPR RA	INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA LASERILOR PLASMEI SI RADIATIEI	RO	999499253
13	BEN	POLIMI	POLITECNICO DI MILANO	IT	999879881
14	BEN	EUROPEAN XFEL	EUROPEAN X-RAY FREE-ELECTRON LASERFACILITY GMBH	DE	974524469
15	BEN	UC	UNIVERSIDADE DE COIMBRA	PT	997826391
16	BEN	RBI	RUDER BOSKOVIC INSTITUTE	HR	999875031
17	BEN	SOLARIS JU	UNIWERSYTET JAGIELLONSKI	PL	999642716
18	BEN	SOLEIL	SYNCHROTRON SOLEIL SOCIETE CIVILE	FR	998721507
19	BEN	FELIX / RU	STICHTING RADBOUD UNIVERSITEIT	NL	999992110
20	BEN	LLE-AISBL	LASERLAB-EUROPE AISBL	BE	901479686
20.1	AE	IZF	INSTITUT ZA FIZIKU	HR	991352029
20.2	AE	CLPU	CONSORCIO PARA EL DISEÑO, CONSTRUCCION, EQUIPAMIENTO Y EXPLOTACION DEL CENTRO DE LASERES PULSADOS ULTRACORTOS ULTRAIINTENSOS	ES	998136791
20.3	AE	UCM	UNIVERSIDAD COMPLUTENSE DE MADRID	ES	999874546
20.4	AE	FZU	FYZIKALNI USTAV AV CR V.V.I	CZ	999873867
20.5	AE	LENS	LABORATORIO EUROPEO DI SPETTROSCOPIE NON LINEARI	IT	999582479
20.6	AE	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	999992401
20.7	AE	FVB-MBI	FORSCHUNGSVERBUND BERLIN EV	DE	999927120
20.8	AE	MUT	WOJSKOWA AKADEMIA TECHNICZNA IM.JAROSLAWA DABROWSKIEGO	PL	999887835
20.9	AE	UKRI	UNITED KINGDOM RESEARCH AND INNOVATION	UK	906446474
21	BEN	ICN2	FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA	ES	999606923

<b>PARTICIPANTS</b>					
<i>Grant Preparation (Beneficiaries screen) — Enter the info.</i>					
<b>Number</b>	<b>Role</b>	<b>Short name</b>	<b>Legal name</b>	<b>Country</b>	<b>PIC</b>
22	BEN	NTNU	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	NO	999977851
23	BEN	UANTWERPEN	UNIVERSITEIT ANTWERPEN	BE	999902870
24	BEN	BUT	VYSOKE UCENI TECHNICKE V BRNE	CZ	999873091
25	BEN	KTU	KAUNO TECHNOLOGIJOS UNIVERSITETAS	LT	999844961
26	BEN	IMT Bucharest	INSTITUTUL NATIONAL DE CERCETAREDEZVOLTARE PENTRU MICROTEHNOLOGIE	RO	999617690
27	BEN	UTARTU	TARTU ULIKOOL	EE	999895013
28	BEN	INESC MN	INESC MICROSISTEMAS E NANOTECNOLOGIAS - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES PARA OS MICROSISTEMAS E AS NANOTECNOLOGIAS	PT	998133590
29	BEN	AMU	UNIWERSYTET IM. ADAMA MICKIEWICZA W POZNANIU	PL	999886865
30	BEN	ISSP UL	LATVIJAS UNIVERSITATES CIETVIELU FIZIKAS INSTITUTS	LV	999852139
31	BEN	CSIC	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES	999991722
32	BEN	ELETTRA	ELETTRA - SINCROTRONE TRIESTE SCPA	IT	999589851
33	BEN	ZFE	VEREIN ZUR FORDERUNG DER ELEKTRONENMIKROSKOPIE UND FEINSTRUKTURFORSCHUNG	AT	988302058
34	BEN	Atomki	ATOMMAGKUTATO INTEZET	HU	999869890
35	BEN	GSI	GSI HELMHOLTZZENTRUM FUR SCHWERIONENFORSCHUNG GMBH	DE	999995214
36	BEN	IST	INSTITUTO SUPERIOR TECNICO	PT	999992983
37	BEN	JSI	INSTITUT JOZEF STEFAN	SI	999971837
38	BEN	JYU	JYVASKYLAN YLIOPISTO	FI	999842245
39	BEN	KU Leuven	KATHOLIEKE UNIVERSITEIT LEUVEN	BE	999991334
40	BEN	NPI CAS	USTAV JADERNE FYZIKY AV CR	CZ	999969412
41	BEN	USE	UNIVERSIDAD DE SEVILLA	ES	999862518
42	BEN	UU	UPPSALA UNIVERSITET	SE	999985029
43	BEN	UMCG	ACADEMISCH ZIEKENHUIS GRONINGEN	NL	999914801





## LIST OF WORK PACKAGES

<b>Work packages</b>						
<i>Grant Preparation (Work Packages screen) — Enter the info.</i>						
<b>Work Package No</b>	<b>Work Package name</b>	<b>Lead Beneficiary</b>	<b>Effort (Person-Months)</b>	<b>Start Month</b>	<b>End Month</b>	<b>Deliverables</b>
WP1	Management	1 - DESY	52.00	1	48	D1.1 – Kick-off report D1.2 – Data Management Plan D1.3 – AM Report 1 D1.4 – AM Report 2 D1.5 – AM Report 3 D1.6 – AM Report 4 D1.7 – NANO Roadmap D1.8 – Ethics report 1 D1.9 – Ethics report 2 D1.10 – Policy Brief D1.11 – Cumulative Expenditure M12 D1.12 – Cumulative Expenditure M36
WP2	Customised access to Science Service	9 - AREA	493.00	1	48	D2.1 – Junior scientist allocation D2.2 – Science service report 1 D2.3 – Science service report 2 D2.4 – JSB experience reports 1 D2.5 – JSB experience reports 2
WP3	Customised access to Research Infrastructures	3 - ULUND	79.00	1	48	D3.1 – Guide for the Proposal Review Panel D3.2 – User guide D3.3 – Mid-term report on TA and VA provision D3.4 – Report on TA and VA provision
WP4	Customised access to Innovation Service	4 - CNR	191.00	1	48	D4.1 – Report on engagement to industrial community and market analysis D4.2 – Evaluation report



<b>Work packages</b>						
<i>Grant Preparation (Work Packages screen) — Enter the info.</i>						
<b>Work Package No</b>	<b>Work Package name</b>	<b>Lead Beneficiary</b>	<b>Effort (Person-Months)</b>	<b>Start Month</b>	<b>End Month</b>	<b>Deliverables</b>
						D4.3 – Midterm report on innovation service D4.4 – Report on academic proposals of industrial interest D4.5 – Report on industry- oriented pilot cases D4.6 – Final report of WP 4
WP5	Training and education	6 - FORTH	38.00	1	48	D5.1 – Report on training activities D5.2 – Final report on training activities
WP6	Outreach, dissemination, and impact	8 - UAM	34.50	1	48	D6.1 – Dissemination, exploitation and communication plan D6.2 – FAIR data guideline document D6.3 – Surveys and impact evaluation study 1 D6.4 – Surveys and impact evaluation study 2

## Work package WP1 – Management

<b>Work Package Number</b>	WP1	<b>Lead Beneficiary</b>	1. DESY
<b>Work Package Name</b>	Management		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

WP 1 will cover the coordination of the overall project to ensure the objectives are delivered on time, including the contractually and financially follow-up of the project and use of resources. The IP rules of the consortium will be elaborated and shared by an elected external ethics advisor. The project aims to provide the framework for the realisation of a European wide access provision to the leading analytical research infrastructures in Europe through a single-entry point. WP 1's central role in the communication and interaction of the other WPs, the consortium members among each other as well as with the EC will be further supported by a Nano Strategy Board (NSB), which fosters the communication of the consortium with the prospective user groups. This duality of the WP will allow an effective steering of the project towards a NANO Roadmap for sustainable research and innovation in nanoscience and technology.

The work is broken down into the following tasks:

Day to day project management relying on the suitable governance structure of the RIANA consortium, monitoring the project progress and in close interaction with the EC and REA respectively

Coordination of the Nano Strategy Board

Development of a roadmap for nanoscience and nanotechnology at European Research Infrastructures (NANO Roadmap)

Appointment of an external Ethics Advisor and related work

### Description

#### Task 1.1 Project management (DESY) M1-M48

A project with partners all over Europe needs a sound and transparent governance structure, as shown in Fig. 10. The consortium will sign a Consortium Agreement based on the DESCA48 model to establish the framework and terms of cooperation of the consortium in connection with the implementation of the project. The adoption of the ALLEA Code of Conduct<sup>49</sup> by all project participants will be stipulated. To attentively monitor the progress and implementation of the project, the deliverables and milestones will serve as benchmarks for supervision. A data management plan will be developed and regularly updated.

The General Assembly (GA) will be the ultimate decision-making body of the consortium, being responsible for the project policy and definition of programme of activities. It shall oversee the project's targets and time schedules, dissemination and exploitation activities, and financial planning and review the progress. Each beneficiary is represented in the GA. The GA will elect a chair (and a vice chair) and will meet at least once a year. The Coordinator will attend the meetings without voting rights.

The Executive Board (EB), chaired by the scientific coordinator, will be responsible for the overall technical coordination and monitoring of the WP progress. The EB will consist of all WP leaders and co-leaders, including the Coordinator, and will meet regularly (at least quarterly). Scheduling and internal communication as well as changes and risks are managed by the EB. The Coordinator will manage the day-to-day communication, financial, administrative, legal, and ethical issues (the latter together with an external ethics advisor), and the general meetings of RIANA, and act as contact and liaison for consortium partners with the EC, REA and external stakeholders.

Task 1.1 will manage the submission of regular reports, financial statements and deliverables as defined in the contract to the participant portal. Suggested by the Coordinator, the GA will appoint an external ethics advisor responsible for the personal data management. A data management plan (DMP) will be established. Actions envisaged by RIANA to foster diversity, equity and inclusion (DEI) are described in Chapter 1.2.7. An Ethics Officer will be nominated at the start of the project who will be in charge of DEI to monitor job advertising and board member appointments as well as the dissemination of the project to improve gender balance in all roles.

A kick-off meeting will be held at DESY in M1. Annual meetings of the whole consortium will be organized in connection with the regular General Assembly meeting and the Nano Strategy Board members will be invited.

To foster the promotion of young talents, the Junior Scientists of the scientific service (WP 2) shall form a board (JSB) and elect a chair (and a vice chair) who will participate the EB without voting rights. In addition, a board of senior scientists from the RI networks (SSB) will be established to ensure good communication between RIANA as a whole and the RI networks. SSB members are invited to attend the GA and EB meetings without voting rights.

As the project strives to offer customised access to a huge portfolio of unique analytical research infrastructures for

nanoscience and nanotechnology-based research, a Nano Strategy Board (NSB) will be established, described in Task 1.2.

#### Task 1.2 Nano Strategy Board (FZJ, DESY) M1-M48

RIANA will provide a customised access to European large-scale research infrastructures for users in the area of nanoscience and nanotechnology. The Nano Strategy Board (NSB) will act as an important steering committee of independent nanoscience and nanotechnology experts representing the broad user community as well as strategic stakeholder.

The members of the NSB should be interdisciplinary to represent the major disciplines of nanoscience and nanotechnology. The members of the NSB should also be intersectoral, to include academic researchers from universities and research institutes, as well as user associations and industry. To fulfill these requirements, the NSB shall consist of tentatively 11-13 independent experts representing the key stakeholders:

2-4 independent experts to represent certain areas of nanoscience and nanotechnology from academia, i.e. from European universities or research institutes leading in nanoscience, or from European organizers of the leading international nanoscience conference (e.g. IEEE NANO) or European initiatives in material science (e.g. AMI2030),

2 representatives of the Nanotechnology Industries Association (NIA)

5 representatives from user associations/user from networks (one each): ESUO (European synchrotron and FEL user organization), European Microscopy Society (EMS), ENSA (European Neutron Scattering Association), user representatives from ion facilities (RADIATE) and the laser facilities (LLE-AISBL) 2 independent experts to represent certain areas of nanoscience and nanotechnology.

The NSB elects a chair (and a vice-chair) and meets at least once a year, more often at the beginning of the project. The NSB is moderated by the scientific coordinator, supported by the task leader of Task 1.2, both without voting rights. Furthermore, 7 representatives from the 7 RIANA research infrastructures networks with special expertise in nanoscience are advisory members to the NSB, providing expertise, without voting rights. Additionally, the JSB chair is included without voting rights.

The tasks of the NSB are:

advising the GA and EB on the strategy of the RIANA project,

advocating for existing and new initiatives in the European nanoscience and nanotechnology community, guiding the dissemination of the RIANA calls towards the European nano community,

overseeing the evaluated proposals to identify topical gaps and upcoming needs, suggesting the specialization of the not yet determined Junior Scientist positions, providing input and advice to the development of the NANO Roadmap.

#### Task 1.3 Junior and Senior Scientists Boards (DESY) M1-M48

A Junior Scientists Board (JSB) with all Junior Scientists (see WP 2) as members will be set up to ensure the exchange of knowledge and gained experiences between the Junior Scientists. The Junior Scientists elect a chair and a vice chair who are invited to attend the EB and GA meetings to get an ear and a strong voice within the project consortium. JSB meets at least twice a year and additionally on request. JSB allows the junior scientists to collect experiences in project management beyond their deep involvement in scientific service provision to users.

In addition to JSB also a Senior Scientists Board (SSB) with one representative from each RI network will be set up to ensure a smooth communication towards the infrastructures across all work packages with specific focus on supporting the RIANA Science Service in terms of expert network (Task 2.3). Furthermore, SSB ensures good communication towards the RI networks on RIANA progress. The elected chair or vice chair is invited to attend the EB and GA meetings. SSB meets at least twice a year and additionally on request.

#### Task 1.4 Roadmap of nanoscience and nanotechnology at European RIs (DESY, UAM-CMAM, all) M24 – M48

To generate a lasting impact of the project and to better address policymakers and funders, a roadmap of the nanoscience and nanotechnology at European research infrastructures (NANO Roadmap) shall be developed. Together with WP 6, the scientific coordinator initiates a task force with experts from NSB, JSB and from the RIANA facilities as well as from NFFA to work out the NANO Roadmap which will be discussed thoroughly within the GA.

The NANO Roadmap shall show the future perspectives of the facilities as well as the one from the users coming from the broad field of nanoscience and nanotechnology in Europe. The experience gained in the frame of the RIANA project will be a guideline for the roadmap.

#### Task 1.5 Ethics (DESY) M1-M48

An external Ethics Advisor is foreseen to advise the EU project RIANA in all data protection and ethics related issues. The external Ethics Advisor will be appointed by the GA during the kick-off meeting and the scope of the work will be defined (M6).

In addition, an internal Ethics Officer will be appointed by and report to the Executive Board in the first EB meeting. The internal Ethics Officer (1) acts as contact person for all ethics related questions and concerns of the consortium, (2) supports and surveys appointments to foster Diversity, Equity, and Inclusion, and (3) fosters open science and FAIR data in close collaboration with Task 6.3.

A first ethics report will be available in M12 (and updated in M36).
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## Work package WP2 – Customised access to Science Service

<b>Work Package Number</b>	WP2	<b>Lead Beneficiary</b>	9. AREA
<b>Work Package Name</b>	Customised access to Science Service		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

This work package aims to create a strategic organizational structure to ensure efficient access to the large and diverse set of interdisciplinary techniques available in RIANA beyond simple access provision. The RIANA Science Service will enable suite of techniques the timely and efficient evaluation of scientific questions by the entire suite of techniques available through the RIANA consortium.

The combined access to this interdisciplinary set of scientific services will be provided by a team of Junior Scientists distributed in the different facilities of the RIANA network under the guidance of an Expert Network consisting of senior researchers and instrumentation scientists from all installations providing access within RIANA. Together, these young specialists of RIANA techniques will help user groups to make optimum use of all techniques offered by RIANA, providing scientific advice and support streamlining their scientific question for an efficient use of the access provided by RIANA, operating the experiment at RIANA facilities and thereafter analyzing the data. Thus, they will ensure the high quality of service within RIANA throughout the whole chain of a user experiment from advising the user from the very beginning towards the end.

The organizational structure of the access provision will be designed in such a way to incentivize interdisciplinary experiments and to make the most effective use of the installations.

WP 2 is broken down into the following tasks:

coordination of the scientific service and operate the RIANA helpdesk customized access to scientific services provided by the Junior Scientist

adapt the scientific services to complementary urgent scientific questions in nanoscience and nanotechnology

The training of the Junior Scientists to strengthen them for the multidisciplinary scientific support is described and performed under WP 5.

### Description

Task 2.1 Coordination of Science Service (AREA, FZJ, DESY, SOLEIL, ULUND, ALBA-CELLS, SOLARIS, Uantwerpen, ICN2, HZDR, UAM, RBI, IMT, UKaunas, AMU) M1-M48

This task will coordinate the activities of the Junior Scientists providing hands-on support on a day-to day level to users. Each Junior Scientist is specialized on a certain experimental method, of which 16 are already determined (see Task 2.2) and 5 are left open to be determined later on in the project, and should have experience (post-doc) within nanoscience and -nanotechnology. The Junior Scientist shall intervene from the experiment preparation phase by helping users to write proposals and to liaise with other research infrastructures to ensure the feasibility of experiments combining different techniques. When proposals are accepted, the Junior Scientists will support users with hands-on experiments and accompany the users in the interpretation of the data.

A straight forward management structure of the RIANA Science Service, broken down into two levels, will be put in place to:

coordinate the first user contacts and establish the contacts to the Junior Scientists according to their specialization

coordinate the hands-on service by the Junior Scientists

coordinate the standardization efforts in data analysis by the Junior Scientists to enable on-line services organize support by senior experts from RIANA facilities on request

ensure the follow up of the users (e.g. in terms FAIR data and open science)

operate the RIANA helpdesk to answer requests from scientists, general public or journalists

As many beneficiaries of RIANA are also involved in ReMade@ARI, this WP task will consider the experiences gained in the ReMade@ARI

Task 2.2 Access to Science Service through Junior Scientists (DESY, SOLEIL, ULUND, ALBA-CELLS, AREA, SOLARIS, FZJ, Uantwerp, ICN2, HZDR, UAM, RBI, IMT, UKaunas, AMU) M1-M48

The scientific service interacting with the users directly will be performed by Junior Scientists (21 in total). They will be recruited in one of the host organisations presented below for 36 months dedicating 2/3 of their time to the RIANA

scientific service activities and the other third will be reserved for their own research be on cost of the employing beneficiary. Their job models should be as flexible as possible to attract the best scientists and foster DEI, see Chapter 1.2.7. Five Junior Scientist positions are not defined yet as an adaptation of the scientific service should be made possible towards open topical gaps and scientific needs arising during progressing the project. Their job profile shall be following the suggestion of NSB (see Task 1.2) and they should be in place for the second half of the project. Additionally, a network of senior experts from the RIANA facilities, e.g. beamline scientists, will support the RIANA Science Service beyond specific expertise of the Junior Scientists and act also as scientific facility contact, down to the level of the installations, not only for this task but also for the technical feasibility check of the proposal in WP 3 and the training program in WP 5.

According to the user needs, the Junior Scientists individually or as a team will provide hands-on support such as: help throughout formulation of beamtime proposals and definition of experiment modalities and constraints as well as promote the use of correlative workflows in combination with other techniques provided by the consortium assist in preparation and performance of the multimethod experiments at the facilities, if necessary on site aid on data analysis, interpretation and handling ensuring the FAIR principles support in simulation if necessary contribute to reports and publications

This extra support of Junior Scientists in addition to normal support by RI staff is particularly valuable for inexperienced users that are enabled to conduct experiments at a level of complexity that would not be possible otherwise. Overall, the Junior Scientist shall be actively involved in knowledge exchange and scientific discussion among RIANA colleagues. A set of technological specializations are foreseen for the first 16 Junior Scientist, see table below. Laserlab-Europe decided not to host specific Junior Scientists as they provide service to very diverse laser installation. Instead, they will provide enhanced local support financed by higher unit cost corresponding to the average costs of two Junior scientists.

Beyond the great enhancement of direct user support, the Junior Scientists play a major role enabling RIs to transfer from in-person access to more in-line service, by providing standardized data analysis solutions that are interoperable between RIs, which is a critical bottleneck today, prohibiting more on-line services.

Task 2.3 Access to Science Service through Senior Scientists (AREA, DESY, SOLEIL, ULUND, ALBA- CELLS, SOLARIS, FZJ, Uantwerp, ICN2, HZDR, UAM, RBI, IMT, UKaunas) M1-M48

One of the main assets of the service provision within RIANA will be the Science Services through Senior Scientists. This distributed network of Senior Scientists hosted at each RI offering access through RIANA, will drive the engagement of the user communities with the wide and interdisciplinary offer provided by RIANA. Its aim is to act as facilitator, assessing the research challenges in nanoscience and nanotechnology, and ultimately discussing work plans with users for successful experiments, thereby strongly supporting the user community in close collaboration with the Junior Scientist assigned to the user project for best exploitation of the opportunities put in place by RIANA. In particular, Senior Scientists will enable much more than passive applications; it will trigger new ideas for exploiting the RIANA platform that the user community has not yet even thought of, paving the way for novel approaches and expanding the use of the wide variety of analytical techniques on offer. This proactive engagement with the community will be central to leveraging the demanding access proposals that will make the best use of RI access and advance nanoscience and technology research.

Targeted outreach and training will be devised for the user community with the aim to build their capacity to exploit the platform with its entire spectrum of analytical techniques in the longer-term. New talents will be attracted through the nanotechnology research projects benefitting from structured multi-probe access, thereby providing a field of highly-stimulating and challenging science driven by real world needs.

This will combine the expert knowledge and skills of the facilities, in the form of senior instrument scientists, to advise on how best to exploit RIANA for high-quality, high-impact nanoscience and nanotechnology outcome from RI access. close collaboration with the Junior Scientist assigned to the user project for best exploitation of the opportunities put in place by RIANA. In particular, Senior Scientists will enable much more than passive applications; it will trigger new ideas for exploiting the RIANA platform that the user community has not yet even thought of, paving the way for novel approaches and expanding the use of the wide variety of analytical techniques on offer. This proactive engagement with the community will be central to leveraging the demanding access proposals that will make the best use of RI access and advance nanoscience and technology research.

Targeted outreach and training will be devised for the user community with the aim to build their capacity to exploit the platform with its entire spectrum of analytical techniques in the longer-term. New talents will be attracted through the nanotechnology research projects benefitting from structured multi-probe access, thereby providing a field of highly-stimulating and challenging science driven by real world needs.

This will combine the expert knowledge and skills of the facilities, in the form of senior instrument scientists, to advise on how best to exploit RIANA for high-quality, high-impact nanoscience and nanotechnology outcome from RI access.

List of networks and host organisations for Junior Scientists and their respective specialization:

1) LEAPS - DESY - X-ray imaging

In 2D and 3D, full-field mode and scanning mode. Use of different contrast modalities including absorption, holography, phase-contrast, ptychography, X-ray fluorescence, X-ray diffraction, X-ray beam induced current, X-ray excited optical luminescence

2) LEAPS - SOLEIL - X-ray photoemission spectroscopy

X-ray photoelectron spectroscopy (XPS), angle-resolved photoelectron spectroscopy (ARPES), and absorption spectroscopy (XAS)

3) LEAPS - MAX IV - X-ray scattering

Small and large angle X-ray scattering, in transmission as well as in grazing incidence geometry

4) LEAPS - ALBA - X-ray diffraction

High resolution powder diffraction and high pressure micro-diffraction, as well as small and wide angle X-ray scattering including operando and in situ sample environments

5) LEAPS - SOLARIS - X-ray absorption spectroscopy

X-ray absorption near-edge structure spectroscopy (XANES), extended X-ray absorption fine structure (EXAFS), pump-probe XAS, quick-XAS

6) e-DREAM - AREA - Electron imaging and spectroscopy

Advanced (scanning) transmission electron microscopy (TEM) techniques for in situ / operando experiments combined with electron energy loss spectroscopy (EELS)

7) e-DREAM - FZJ-ER-C - Electron imaging

Four-dimensional scanning, and aberration corrected high-resolution transmission electron microscopy (TEM), integrated differential contrast imaging and off-axis electron holography, with an emphasis on the use of quantitative phase contrast techniques

8) e-DREAM - UAntwerp - Electron spectroscopy and imaging

Advanced electron energy loss spectroscopy (EELS), energy dispersive X-ray spectroscopy (EDX), electron tomography, imaging of beam sensitive materials using low-dose techniques, and in-situ heating, liquid, and gas experiments

9) e-DREAM - ICN2 - Electron imaging and spectroscopy

(Scanning) transmission electron microscopy (TEM) imaging and related energy dispersive (EDX) and/or electron energy loss spectroscopy (EELS)

10) RADIATE - HZDR - Focused ion beam

Irradiation with focused ion beams using microbeams (accelerator sources), nanobeams (liquid metal ion sources) and focused beam with diameters of 0.4 nm to 3 nm (He/Ne ion microscope sources)

11) RADIATE - UAM - Ion implantation

Materials modification by irradiation with ion beams (heavy and light ions) to dope the material at selected depth or modifying atomic structure by energy deposition

12) RADIATE - RBI - Elemental characterization

Ion beam analysis techniques (PIXE, RBS, NRA, TOF-ERDA, MeV SIMS, etc.) using focused or broad beam MeV light and heavy ions

13) LENS - FZJ-JCNS - Neutron techniques

In situ/in operando experiments with a combination of neutron techniques at MLZ in Garching (Germany) including chemistry and biology laboratories and auxiliary equipment if needed.

14) EuroNanoLab - IMT - Nanofabrication techniques

Fabrication of micro- and nano-devices, with various masking, deposition, and etching processes

15) EuroNanoLab - UKaunas - Nanofabrication techniques

Clean room technologies and main tools of nanofabrication, such as e-beam / UV / nanoimprint lithography, deep reactive ion etching. For characterization and analysis of laboratory-based X-ray diffraction, X-ray photoelectron spectroscopy, Raman scattering, and atomic force microscopy

## Work package WP3 – Customised access to Research Infrastructures

<b>Work Package Number</b>	WP3	<b>Lead Beneficiary</b>	3. ULUND
<b>Work Package Name</b>	Customised access to Research Infrastructures		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

The overall objective of WP 3 is to ensure the smooth management of all administrative and organisational procedures necessary for providing users from academia and industry with efficient customised transnational access (TA) to multi-facility services via a continuous open call during the whole project time.

Specific objectives:

set-up and operate a single-entry access proposal management portal that provides user-friendly access to the joint services (Task 3.1);

maintain a central User Office to ensure support for users regarding all aspects of proposal submission and review (Task 3.1);

coordinate the external proposal review process to ensure transparent, fair and impartial procedures (Task 3.2); coordinate with facilities to ensure TA scheduling and reporting (Task 3.3);

maintain a central office to handle the reimbursement of travel and accommodation expenses of users visiting facilities (Task 3.4).

### Description

This WP will coordinate the scheduling of Transnational Access (TA) across facilities to match user needs and instrument availability at facility level, and will monitor the TA administration and accounting, allowing for dynamic revision of access allocation between individual facilities. The described overall workflow is graphically presented in Fig. 6 in Chapter 1.2. After the initial call for TA has opened, proposals may be submitted at any time until the final closing.

The work package leader is ULUND with LLE-AISBL as co-leader. Both are long-term experienced with operating user office, TA and a single-entry point. Tasks in this work package will focus primarily on TA for general access (implying results publication), but the central management access portal will also be used to support industrial users handling proprietary access without sharing of results (with support of WP 4).

**Task 3.1 Coordination of facility access with single-entry point – UO (ULUND, LLE-AISBL/FVB-MBI) M1-M48**

This task will be dedicated to the setup and continuous management of a single-entry point for the administrative and organisational procedures necessary to provide user access based on the experiences made within ReMade@ARI. The process and tools will allow academic and industrial users to request TA in an integrated, systematic and user-friendly way. The specific aims of this work package are:

set up and manage a single-entry access proposal management portal that provides user-friendly access to the joint and comprehensive services of the participating analytical research infrastructures;

coordinate the proposal preparation and review workflow, consisting of integrated multi-method/multi-facility continuous access management, feasibility assessment at single facility level, external evaluations of the scientific excellence; maintain a central User Office to ensure support for users and facility staff for all aspects of proposal submission;

The project access management portal will relate to the project webpage (WP 6), showing an overview of the provided tools and techniques offered by the project partners building on the example of existing platforms such like WayForLight50. The system will include a user-friendly single-entry “dashboard” providing easy access to the integrated multi-facility services, guidance and technical support for users with registration and submission of proposals. The submitted proposals will need to request access to two or more facilities within the consortium offering complementary techniques to address the scientific case; Through this portal, users will be able to interact with the RIANA Science Service (WP 2), that will provide advanced user support in terms of technical advice prior to proposal submission. The support will be of high relevance for inexperienced users to receive a first input on the benefit of combining different techniques for their research interests. The portal will allow two routes for proposal submission: a general TA route (TA-G, requiring open result sharing) and an Industry Access Route (TA- I). Proposal submission will be managed through a continuous call, allowing submission at any time. This will provide agile scheduling of measurements across the consortium with a convenient adjustment to user needs, in comparison to the periodical calls offered by some of the participating networks for the general access to their facilities (outside the framework of a collaborative project as RIANA). Proposal templates will be available on the portal and web page, along with detailed descriptions of the



procedure in a custom User Guide. The portal will include a unified proposal processing procedure relying on an external Selection Panel (see Task 3.2). Record of documents and statistical tools integrated in the system will support the monitoring of the selection and evaluation processes as well as the monitoring of follow-up processes for reporting user statistics, gathering of research outputs (e.g. publications) and user feedback on the quality of the access services. The complete process of access management, from proposal submission through evaluation and scheduling of multi-facility TA to reporting, will be controlled through the online proposal management system. After a year of project implementation, an evaluation of each step of the process will be performed and optimisation will occur where necessary. The process will allow an optional continuously available consultation step in which users will submit through the access management system a simple scientific case. They will then be contacted by Science Service (WP 2) experts that will advise the users on the complementary techniques to consider and on the submission process of a proposal leading to TA allocation after review.

Once a complete proposal is submitted and checked from the feasibility point of view at selected sites, it will be sent for peer review evaluation and scoring (three level: 1. accept in any case; 2. accept if there are evidently sufficient resources; 3. reject.). For proposals that do not meet the required excellence standard, the users will receive comments for improvements by the reviewers with the opportunity to resubmit. Accepted proposals will undergo TA scheduling by the Joint Access Node (JAN; Task 3.4).

Task 3.1. (supported by Task 3.4.) will also establish a smooth communication with local User Offices at the different facilities to ease preparation for scheduling and user travel. After a user visit to a facility is completed, both the users and local scientific contact at facility level as well as Junior Scientists will be asked to report to the project the visit outcomes. The key features of the process are the continuous overview by the Science Service supporting the users, the single-entry point where all the process and communication take place and the possibility to visit more than one facility through a single proposal.

#### Task 3.2 Review process (LLE-AISBL/FVB-MBI, ULUND) M1-M44

The proposal review process will be performed by a common, fully external Selection Panel that relies on a large pool of external referees providing expertise in all relevant fields of science covered by the networks involved in the project. This pool will include referees with expertise in industrial applications as well as in health and environmental safety of nanomaterials, ensuring that the evaluation of proposals considers scientific merit and evaluation criteria as well as specific needs of industrial users. The Selection Panel supervising and managing the review process will be composed of three international experts, nominated and elected by the General Assembly. A subcontract will be concluded by LLE-AISBL with the Chair of the RIANA Access Selection Panel, an external and independent renowned scientist, who will be responsible for moderating the review process. The Panel acts on behalf of the Consortium, but is independent in its scientific judgements. The selection of proposals is done on the basis of the selection criteria shown in Chapter 1.1, followed by priority for new users.

Specific procedures and rules for the proposal submission, review and allocation will be defined at the beginning of the project in order to guarantee a transparent and fair evaluation and ranking of the proposals and to differentiate towards other access opportunities.

#### Task 3.3 Joint Access Node (CNRS-LP3, INFLPR, LLE-AISBL/FVB-MBI, ULUND) M3-M48

Once the proposals have been reviewed and ranked above threshold, TA scheduling will be done across the facilities to match the user needs and instrument availabilities at the individual facilities, considering the experimental needs of the project. This step will be managed by an internal Joint Access Node (JAN) composed of the task leader and one representative per RI network. JAN can provide an overview of TA allocation spread across the portfolio of facilities at any time. Furthermore, it allows to balance TA allocation through the consortium while adapting to the individual needs of each experiment at the same time. Table 3.1k gives an overview of offered TA hours by each facility.

The RIANA consortium involves eight different networks of which seven will be providing TA to their facilities: LEAPS, Laserlab-Europe, e-DREAM, RADIATE, LENS, EuroNanoLab and EUSMI and may offer additional TA to external facilities (Task 3.3.8). The project will coordinate with facilities to ensure accurate and timely reporting in the portal by users and by facilities on the actual TA that occurred.

Below the brief description of instrumentation and techniques is outlined for each network and their facilities.

##### Task 3.3.1 Access to LEAPS facilities (ULUND, ALBA, DESY, ELETTRA, ESRF, EuXFEL, FELIX, FERMI, SOLARIS, SOLEIL) M3-M48

Name of the infrastructures: ALBA-ES, DESY (PETRA III and FLASH)-DE, ELETTRA-IT, ESRF-FR, EU- XFEL-DE, FELIX-NL, FERMI-IT, MAX IV-SE, SOLARIS-PL, SOLEIL-FR

Location of the infrastructures: Barcelona ES, Hamburg DE, Trieste IT, Grenoble FR, Nijmegen NL, Lund SE, Krakow PL, Saint-Aubin FR

Web site address: [www.leaps-initiative.eu](http://www.leaps-initiative.eu)

Amount of unit cost asked in RIANA: 195 EUR per hour

Duration of a typical experiment: 3-4 days

Description of the infrastructures

The League of European Accelerator-based Photon Sources – LEAPS – is a strategic consortium bringing together 19 highly dedicated accelerator-based facilities situated across Europe. Consisting of high-brilliance synchrotron radiation facilities and free electron lasers (FELs), it provides unique analytical tools for destruction-free operando and in situ studies. Research covers many scientific disciplines from materials, drug design, biochemistry, health, catalysis, geosciences and planetary research to palaeontology and cultural heritage. Over 1 million hours of access per year are provided by LEAPS facilities to researchers from academia and industry after a successful review process, where excellence and relevance rank the incoming proposals. As long as results are made public, the access is free of charge.<sup>51</sup> For the RIANA project 11 of the LEAPS facilities offer access to their instruments. The energy range of the produced light ranges from infra-red (IR) to hard X-rays, which allows to target molecular systems, surfaces, or buried structures in a bulk system. Nanoscience and nanotechnology research is present in all of these areas and through all stages from fundamental to industrial applications.

The facilities and even more the beamlines are highly specialized, which allows state-of-the-art measurements to be carried out. A very rough categorization of the measurement techniques can be done into diffraction, imaging, scattering, and spectroscopy. In diffraction experiments at beamlines profit from high spatial resolution or high throughput capabilities, which allows e.g. the screening of protein crystals for possible medicines effective against SARS-CoV-2, or in a grazing incident geometry the observation of layers growth on single crystals or flat surfaces.

Imaging with high resolution is offered with different contrast modalities, e.g. enabling the visualisation of composition variations, buried structures and in-situ observation of catalytic activities. Some beamlines even offer 3D imaging with tomography.

Small and large angle scattering measurements allow the unravelling of size, shape, orientation and crystallinity of mesoscale structures, which can be applied to solids, liquids, dispersions and in grazing incidence also thin films.

The spectroscopic aspect of accelerator-based photon sources is probably the widest in regards to application. By tuning the incoming photon energy, the reaction of the system can be evaluated and information on nearest neighbour configurations, electronic states, catalytic activity and more can be gained. FELs in particular are ideally suited for time-resolved studies where chemical states are observed in pump-probe experiments.

As LEAPS facilities are characterization-based machines, they offer state-of-the-art analytical techniques to evaluate samples, which might have been prepared in a cleanroom environment (EuroNanoLab), or were structured by focused ion beams (RADIATE/e-DREAM). Where laser-based studies are diffraction limited or do not have enough penetration depth, X-rays offer to fill this aspect in characterization.

The eleven facilities are listed below with the beamlines offered in the framework of RIANA:

ALBA: BOREAS (XMD), CLAESS (XAS, XES), CIRCE (PES), LOREA (ARPES), MSPD (XRD), NCD- SWEET (SAXS/WAXS)

DESY/FLASH: PB, BL1, BL3, FL23, FL24, FL26 (pump-probe, PES, XRD, holography, imaging, electron- and ion-spectroscopy)

DESY/PETRA III: P01 (NRS, IXS, RIXS), P02.1 (XRD, total scattering), P04 (coherence-based soft X-ray methods), P06 (scanning X-ray microscopy), P08 (HR-XRD), P10 (GINIX setup), P23 (in-situ imaging, XRD), P62 (SAXS/WAXS), and P66 (UV-VUV)

ELETTRA: ESCAMicroscopy (PES, imaging), Nanospectroscopy (PES, XAS (XPEEM), imaging, LEEM), NanoESCA (PES, XAS, ARPES (XPEEM)), TwinMic (XRF, XAS, imaging, ptychography), Spectromicroscopy (ARPES, imaging), SISSI (IR)

ESRF: ID01(scanning XRD, BCDI), ID16B (X-ray imaging, XRF, XEOL, XANES, XBIC, XRD, phase contrast), ID31(XRD, XRR, GISAXS, SAXS, WAXS, PDF analysis, GID, Compton scattering)

EU-XFEL: SCS (soft X-ray: CXS, RIXS), SQS (soft X-ray: e-TOF, I-TOF, velocity map imaging, reaction microscope, RIXS), MID (CDI, XPCS, XCCA, XSVS, pump-probe, TRXS), HED (hard X-ray with extreme conditions: pressure, temperature, electric field; HE optical lasers, XRD, HRIXS), FXE (XRD, XDS, WACS, XES, RIXS, XANES, EXAFS), SPB/SFX (CDI, serial fs X-ray crystallography, fluctuation XS, MHZ X-ray microscopy and radiography)

FELIX: IR-IR pump-probe station, IR-visible time-resolved instrument, single-shot time-resolved imaging setup, gas-phase molecular spectroscopy

FERMI: Mini-Timer DiProi (RCDI, ptychography), EIS Timer (transient grating experiments), Magnedyn (REXS/RIXS)

MAX IV: CoSAXS (SAXS), NanoMAX (hard X-ray imaging), SoftiMAX (soft X-ray spectromicroscopy, coherent imaging), MAXPEEM (SPEM, LEES)

SOLARIS: URANOS (ARPES), Phelix (Spin resolved ARPES), DEMETER (XPEEM, STXM), SOLCRYST (SC- XRD, HPMX, SX), CIRI (IR s-SNOM, AFM-IR)

SOLEIL: -XRF, XANES/EXAFS), HERMES (STXM, XPEEM), DEIMOS (Magnetic spectroscopy),

DIFFABS (Diffraction and absorption spectroscopy), CASSIOPEE (ARPES/SRPES), TEMPO (UHV-XPS/NAP- XPS,

absorption spectroscopy), ANTARES (XPD, nanoARPES), ANATOMIX (hard X-ray tomography), SEXTANTS (XRMS, RIXS), GALAXIES (Hard XPS), SAMBA (Hard XAS), NANOSCOPIUM (Multi-technique X-ray imaging and tomography), SIXS (Hard X-ray surface interface scattering), SIRIUS (Soft-matter diffraction), SWING (Hard X-ray scattering).

Task 3.3.2 Access to Laserlab-Europe facilities (INFLPR, IZF, CNRS, UC, UKRI, CLPU, UCM, POLIMI, FZU, MUT, LENS, CEA, ULUND, FORTH) M3-M48

Name of the infrastructures: CALT, CELIA/U.Bordeaux, CETAL, CLF, CLL, CLPU, CLUR, CUSBO, FTIR, HiLASE, IOE, LENS, LIDYL, LLC, LP3/U.Lille, ULF

Location of the infrastructures: Zagreb-HR, Bordeaux-FR, Magurele-RO, Didcot-UK, Magurele-RO, Coimbra- PT, Salamanca-ES, Madrid-ES, Milan- -CZ, Warsaw-PL, Florence-IT, Paris-FR, Lund-SE, Marseille-FR, Heraklion-GR

Web site address: [www.laserlab-europe.eu](http://www.laserlab-europe.eu)

Amount of unit cost asked in RIANA: 125 € per hour

Duration of a typical experiment: from a few days up to 2 weeks

#### Description of the infrastructures

Laserlab-Europe brings together 46 leading national laser research infrastructures in 22 European countries, all with different and complementary technical specifications and areas of expertise. Together, they provide a unique integrated, cross-domain and multifaceted approach to complex scientific and technological questions. The majority of the members provide open access to their facilities to scientists from all over the world to perform experiments in a large variety of inter-disciplinary research, covering advanced laser science and applications in most domains of research and technology. The users, from academia as well as from industry, perform leading- edge, groundbreaking and technically-demanding laser-based experiments at the most suitable installation in each case, irrespectively of location or nationality.

The scientific opportunities for efficient and novel research for innovative applications in nanoscience and nanotechnologies, offered by Laserlab-Europe, complement very well the techniques offered by its partner facilities in ARIE. Laserlab-Europe offers an unparalleled spectral coverage from terahertz to hard X-rays and a variety of advanced ultrafast spectroscopic techniques with temporal resolution down to attoseconds. In particular, high-resolution laser spectroscopy, in both the spectral and temporal domains, opens doors to advanced investigations. In addition, some of the offered laser diagnostics equipment and techniques can be applied to in- field studies, even in hostile environments. Laserlab-Europe offers access also to ultra-short pulses of laser- accelerated electrons and protons. These can be utilised on their own or in combination with well-synchronised optical or X-ray pulses for time-resolved studies.

Specifically:

CALT (IZF): controllable synthesis of nanomaterials and their optical, electronic, chemical, structural, morphological and surface characterization. By tuning the synthesis parameters, new functionalities and properties arise as the next step in the value chain from the fundamental research toward final product. Various non-invasive spectroscopic techniques (UV-VIS-NIR, absorption, photoluminescence, Raman spectroscopy, FTIR, nano-FTIR, transient absorption spectroscopy, time-resolved photoemission) together with scanning probe techniques (Atomic Force Microscopy, Scanning Electron Microscopy) will be available.

CNRS/CELIA /U.Bordeaux: 3-axis micromachining workstation for drilling or surface and dielectrics bulk structuring with femtosecond laser (100 W, 1030 nm, 500 fs) in repetitive single pulse mode (kHz-MHz) with pump-probe option or in GHz-burst mode.

CETAL (INFLPR): Unique infrastructure combination of laser nano- micro-processing, complete functional properties characterization (including HR-TEM/STEM 300kV) and lithographic facilities: CETAL-PW laser system for experiments in ultra-intense regime; Pulsed Laser Deposition up to 200mm substrate diameter, LIFT systems.

CLF (UKRI): multiple laser-based imaging stations allowing a combination of techniques to be brought to bear on the samples under investigation. Techniques relevant to nanoparticle studies include TIRF microscopy; confocal microscopy (FLIM, FRET, Airyscan and multiphoton); super-resolution microscopy (MINIFLUX, STED, STORM, SIM); Cryo-microscopy (Cryo-STORM, Cryo-SIL, Cryo-FIB-SEM); light sheet microscopy, micro- Raman spectroscopy and optical trapping in air and liquid environments. Techniques are supported by our data analysis team.

CLL (UC): Fully integrated experimental facilities: from synthesis of organic and inorganic compounds and polymers to optical and photophysical characterization, with fast kinetics (fs-ms). Transient Absorption (fs & ns- ms TA), & Photoacoustics (ns & ps) Fluorescence: Time resolved Emission (fs-UC & ps-ns TCSPC) & Steady- state (emission range from 280-1500 nm). Photochemical Reactors. Cryostats. 2D-IR. Micro-Raman. Labs with facilities for organic synthesis and characterization

CLPU: VEGA ultrafast laser system made by three arms (20TW, 200TW, 1PW peak power) independent and synchronized. The system is able to perform multi-source pump & probe experiments by a diverse ensemble of secondary sources (e.g., protons, ions, electrons, THz, IR, Vis, X-rays) useful for time-resolved imaging, spectroscopy, diffraction, implantation etc. Advanced instruments are offered or custom made in order to chase the most updated applications by the users.

CLUR (UCM): nanosecond and femtosecond pulsed lasers in irradiation of metallic and bimetallic nanoparticles with

the main purpose of inducing aspect ratio modifications, structural modifications, including the production of hollow nanoparticles, and melting and alloying in bimetallic nanoparticles.

CUSBO (POLIMI): portfolio of non-invasive and non-destructive, space- and time-resolved optical spectroscopy techniques for the stationary and transient characterization of the electronic and optical properties of nanomaterials. The techniques include broadband time-resolved photoluminescence (TRPL), TRPL microscopy, hyperspectral microscopy in the visible and near infrared, broadband coherent Raman microscopy, transient absorption spectroscopy with temporal resolution down to 10 fs, wide-field transient absorption microscopy, two-dimensional electronic spectroscopy.

HiLASE: unique equipment for laser micromachining, laser nanostructuring, pulsed laser deposition, mass spectrometric studies, and nanoparticle synthesis by pulsed laser ablation in liquids. This includes laser processing workstations with an option of use different laser surface structuring techniques, including a wide range of irradiation parameters, vacuum chambers, ultra-precise time-of-flight mass-spectrometer, high-time-resolution imaging, and UV-vis spectroscopy. Material characterization tools include confocal microscope, SEM, contact angle measuring device, AFM+Raman, XRD, and dynamic light scattering system.

IOE (MUT): unique workstation for EUV processing of materials using intense pulses of extreme ultraviolet (EUV). The EUV pulses are produced by a laser plasma source based on a gas puff target. The EUV beam is focused on the processed materials with maximum energy density (fluence) of EUV radiation up to 1 J/cm<sup>2</sup>, which corresponds to an intensity of up to 109 W/cm<sup>2</sup>. The workstation can be used in research on the micro- and nano- processing of materials (microfabrication, micro-texturing, annealing) for the needs of biomedical and materials engineering and electronic technologies.

LENS: different laser-based techniques allowing the characterization and processing of nanomaterials. They include high resolution time resolved spectroscopic techniques in an extended spectral interval (from UV to THz), two-dimensional electronic and vibrational spectroscopy, spectroscopy under extreme conditions (pressure and temperature), nanofabrication of integrated optical devices through direct laser writing, Scanning Near-Field Optical Microscopy (SNOM) with a spatial resolution of about 100 nm.

LIDYL (CEA): The NanoLight lab will allow high speed ptychographic imaging of extended samples with spatial resolution in the 10s nanometer range, ultimately additionally offering chemical sensitivity.

LLC (ULUND): a wide range of advanced laser techniques for interdisciplinary research, bridging fundamental curiosity-driven light-matter interaction studies to practical applications, with a strong capacity for applications in nanoscience. The facility comprises high-power laser laboratories, including installations for attosecond and XUV spectroscopy and microscopy, electron and ion spectrometers, quantum information and quantum optics laboratories, femtochemistry laboratories, combustion diagnostics laboratories, mobile LIDAR systems for remote sensing, and biomedical laser laboratories.

CNRS/LP3: provides access through the LaMP and ASUR platforms to a wide range of lasers for additive/subtractive micro/nano-fabrication, material structuring, in-situ diagnostics, as well as laser process development, including industrial lasers (290 fs to 10 ns, 355 nm to 1064 nm and 9.6  $\mu$ m pulses), beam shaping and characterization devices; to study high intensity laser-matter interaction in ultra-short regime, such as ablation, damage test and X-ray source generation (availability / laser beams: 10 TW-100 Hz 25fs@800nm, a fs OPA 0.3 - 9 $\mu$ m, and hard <1ps - 100 Hz X-ray sources for time-resolved X-ray imaging/diffraction).

ULF: workstations for 2D micro-/nanostructuring with Direct Laser Interference patterning capability, for 3D multiphoton nanostructuring in the bulk, workstations for laser sintering, laser doping, laser synthesis of nanoparticles and nanoconjugates, workstations for Pulsed Laser Deposition and Laser-Induced Forward Transfer, state-of-the-art XUV attosecond beamlines and energetic THz beamlines are also available, workstations for optical characterization, temperature-dependent micro-R/T and micro-PL, XRD, SEM, TEM, photoacoustic and temperature-dependent nonlinear imaging, pump-probe spectroscopy.

Task 3.3.3 Access to e-DREAM facilities (FZJ, UAntwerp, AREA, ICN2, ZFE, NTNU) M3-M48

Name of the infrastructures: AREA, FZJ ER-C, ICN2, NTNU, UAntwerp, ZFE

Location of the infrastructures: Trieste (IT), Jülich (DE), Barcelona (ES), Trondheim (NO), Antwerp (BE), Graz (AT)

Web site address [www.e-dream-eu.org](http://www.e-dream-eu.org)

Amount of unit cost asked in RIANA: 97.5 € per hour Duration of a typical experiment: from a few days up to 2 weeks Description of the infrastructures

The European Distributed Research Infrastructure for Advanced Electron Microscopy (e-DREAM) represents a distributed network of nine leading European transmission electron microscopy research infrastructures, six of which are participating in RIANA.

The facilities offer complementary expertise in imaging, diffraction and spectroscopy, including ultra-high-resolution aberration-corrected (sub-80-pm) structural and compositional characterisation, spectroscopic imaging with sub-5-meV energy resolution, three-dimensional tomographic characterisation, mapping of electrical potentials and magnetic fields using phase-contrast techniques that include holography, differential contrast imaging and ptychography, cathodoluminescence, time-resolved experiments, secondary electron imaging and operando measurements performed

on working devices subjected to gas or liquid environments, elevated or reduced temperatures and applied voltages, which can be used to unveil microscopic and local details of materials that are inaccessible with other techniques. Cryo electron microscopes and low dose imaging modes are available for studies of electron beam sensitive materials. The facilities also offer sample preparation using focused ion beam and conventional techniques, and software that can be used for the analysis of large data volumes recorded at high data rates using direct electron detectors, for the automation of experimental workflows and for image simulation. If required, remote operation of instruments can be offered at selected facilities.

In situ capabilities are available to study samples in liquid or gas environments and under electric field stimuli. But beyond the raw performance specifications of the instruments, it is especially the expertise in getting the most from these instruments that makes e-DREAM unique. This relies on a critical mass European workforce of specialists in various sub-techniques with broad attention to statistics driven data interpretation.

Transmission electron microscopy is a complementary tool for the rest of characterization techniques adding the advantage of an unbeatable spatial resolution. It allows the direct visualization of materials and structures at the atomic scale, with resolutions below 50 pm, letting combine the imaging with spectroscopy.

AREA: 1 conventional TEM equipped for tomography and in-situ, 1 FIB SEM for sample preparation and advanced slice and view (including UHV sample transfer); 1 SEM/STEM, 1 double corrected TEM/STEM: low dose TEM and STEM imaging modes; phase contrast methods in TEM and STEM, including techniques based on 4D STEM; optimized bright field and DPC for visualisation of light elements (e.g. Li), advanced data processing, EDX and EELS; high resolution EELS spectrometer coupled to a hybrid pixelated detector for low background noise spectroscopy and measurements at high energy range; advanced data analysis based on open-source python- based packages.

FZJ ER-C: 7 aberration corrected and 5 conventional TEMs (including 3 cryo TEMs) and 3 FIB SEMs; holders for electrical biasing with different specimen geometries; holders for in situ TEM in the presence of gases and at elevated and reduced temperature; low dose TEM and STEM imaging modes; phase contrast methods in TEM and STEM, including electron holography and techniques based on 4D STEM; secondary electron imaging in a probe- aberration-corrected TEM; Cc corrected imaging of thick samples; automation of experimental workflows; real- time and optimised analysis of large data volumes recorded at high data rates.

ICN2: 1 aberration corrected and 1 conventional TEMs and 1 FIB SEM; low dose TEM and STEM imaging modes; phase contrast methods in TEM and STEM, including techniques based on 4D STEM; iDPC for visualisation of light elements (e.g. Li), advanced data processing, EDX and EELS; low dose TEM and STEM imaging modes; high resolution EELS spectrometer coupled to a direct electron detector for low background noise spectroscopy and measurements at high energy range.

NTNU: 1 double aberration corrected and 2 conventional TEMs (1 LaB6 and 1 FEG), broad sample prep lab, including access to 3 FIB SEMs (1 PFIB). Several dedicated holders, including heating and biasing, EDS and EELS. Two direct electron detectors used for 4D STEM techniques (including precession illumination and DPC based field mapping), tailored advanced data analysis based on open-source python-based packages.

Uantwerp: 3 aberration corrected and 2 conventional TEMs and 1 FIB SEM; holders for in-situ gas and liquid experiments, tomography, vacuum transfer, electrical biasing, cooling and heating. Specialised in (in situ) tomographic techniques and advanced low dose imaging, 4D STEM for strain mapping and ptychography. EELS and EDX capabilities on all corrected instruments. A broad range of statistical data processing techniques to reliably extract maximum information from TEM experiments.

TU Graz (ZFE): 1 aberration corrected TEM featuring large angle X-ray sensors (Super-X), combined X-ray and EELS studies at the atomic scale, 1 conventional TEM and 1 FIB; various heating and cooling holders, cryo- transfer specimen holders and tomography holders are available. The ZFE centre specialises in methods such as, EELS and EFTEM spectroscopy and imaging, EELS near-edge fine structure analysis, valence EELS of plasmonic nanostructures, material science electron tomography, high resolution TEM imaging, diffraction and simulation.

Task 3.3.4 Access to RADIATE facilities (HZDR, AGOR, ATOMKI, CNRS, GSI, IST, JSI, JYU, KU Leuven, NPI CAS, RBI, UAM, USE, UU) M3-M48

Name of the infrastructures: AGOR (AGOR), TL (ATOMKI), SAFIR (CNRS), CIRIL/GANIL (CNRS), GSI (GSI), IBC (HZDR), LATR (IST), MIC (JSI), AccLab (JYU), IMBL (KU Leuven), LT (NPI CAS), AF (RBI), CMAM (UAM), CNA (USE), TL (UU)

Location of the infrastructures: Groningen NL, Debrecen HU, Paris FR, Caen FR, Darmstadt DE, Dresden DE, Lisabon PT, Ljubljana SI, Jyvaskyla FI, Leuven BE, Husinec-SE

Web site address: <https://www.ionbeamcenters.eu/ion-beam-facilities/>

Amount of unit cost asked in RIANA: 127.50 € per hour Duration of a typical experiment: from a few days up to 2 weeks Description of the infrastructures

RADIATE is the network of ion beam accelerator facilities. Taking its name from an ongoing European project, the network includes both RADIATE members and associates. The role of network coordination lies with HZDR.

Ion beam accelerators and focused ion beam systems are extremely flexible tools for both analysis and modification of materials properties. Modification is based on both incorporating species to the material at a controlled location and depth (implantation), damaging the material structure by electronic and/or nuclear excitation (irradiation) and by controlled removal of material with nanometer precision. In all cases the aim may be to modify materials properties in a customized way, or test the resilience of a material in conditions relevant to its future operational environment. Analysis techniques are based on different ion-matter interaction combinations. Elastic scattering techniques (Rutherford backscattering or Elastic Recoil Detection) provide information on atomic composition depth profiling of thin layer samples, with wide capabilities in terms of species detection and depth resolutions in the 10 nm range. Inelastic techniques (Nuclear Reaction Analysis) yield better depth resolutions for some specific cases of particular interest, such as hydrogen detection. Finally, techniques based on the detection of characteristic photons (either from atomic, PIXE, or nuclear levels, PIGE) yield depth-averaged composition information with ppm sensitivity. In all cases 2D resolution may be obtained at proper microbeam setups, with micron-range lateral resolution or even submicron in some very specific setups, thereby generating 2D maps with the analysis techniques described above. Measurements are usually performed in vacuum conditions, but may also be done at atmospheric pressure and in operando by extraction of the ion beam through a thin window. Last but not least, for single crystal samples the channeling technique allows structural information about crystal lattice and impurities to be obtained, taking advantage of the dependence of the relevant cross-sections with respect to the relative angle between the incoming beam direction and the crystal axes. Access to ion beam facilities is typically granted in terms of a few beam days, depending on the details of the experiment to be performed. After successful review, the beam time proposals will be allocated to one of the ion beam facilities in the RADIATE network according to an established “distribution matrix” which lists providers for each specific method, parameter range and measurement conditions. Thereby, the techniques and capabilities described above will be offered globally to the user community by the list of facilities mentioned, and the user will be able to select the appropriate equipment either directly or under assistance. Data analysis and access to analysis and simulation software for all the below-mentioned methods. An overview of the techniques and capabilities collectively offered by this network is summarised below:

Doping/irradiation with ions from almost the whole periodic system at energies from few tens eV to GeV  
Local irradiation and modification with focused ion beams

Elemental analysis and depth profiling: RBS, channeling RBS, non-RBS, ERD, NRA, PIXE/PIGE, MEIS  
Lateral imaging of the elemental composition using RBS and PIXE with  $^{-}$ beam, (ambient) MeV SIMS  
Lateral imaging of defects by channeling RBS/PIXE and IBIC

Specialized lithography with focused ion beams and electron beams (IBC/HZDR)

Sample preparation with nanometer precision, e.g. for transmission microscopy (electron, X-ray, ...) with FIB techniques

Task 3.3.5 Access to LENS facilities (FZJ) M3-M48

Name of the infrastructures: Maier-Leibnitz-Zentrum (MLZ)

Location of the infrastructures: Garching (DE)

Web site address: <https://mlz-garching.de/>

Amount of unit cost asked in RIANA: 315 EUR per hour

Duration of a typical experiment: 4 days

Description of the infrastructures

LENS is the League of Advanced European Neutron Sources. It has ten members, including the European flagship neutron sources ILL (FR) and ESS (SE), together with national neutron sources ISIS (UK), MLZ (DE), FZJ (DE), LLB (FR), IFE (NO), PSI (CH), BNC (HU), NPI (CZ)). Neutrons are an excellent probe for the structural analysis of nanoscale materials because of their high penetration depth, their particular sensitivity for light elements, because of their spin enabling structural analysis of magnetic materials, and because of the possibility for contrast enhancement by isotope substitution, e.g. by deuteration. Small-angle neutron scattering can provide structural information on nanoscale materials over length scales from 0.1 – 1000 nm, which covers all relevant length scales for nanomaterials. Furthermore, sample environments such as magnets, cryostats, high-pressure cells, hot stages, stopped-flow cells and automated sample changers are available. Special neutron- and X-ray-transparent reactors allow in-situ experiments, e.g. during the synthesis of organic and inorganic nanoparticles.

For RIANA, FZJ will provide access to neutron instruments at the research reactor FRM-II at the MLZ for small-angle neutron scattering (SANS) at its instruments KWS-1, KWS-2, and KWS-3, for neutron reflectivity measurements (NR) at its reflectometer MARIA, for polarized neutron single crystal diffraction at its diffractometer POLI, for hot neutron single crystal diffraction at its diffractometer HEIDI, for neutron protein crystallography at its diffractometer BIODIFF, for polarized neutron spectroscopy at its instrument DNA, for cold neutron triple-axis spectroscopy at its instrument PANDA, for neutron backscattering spectroscopy at its instrument SPHERES, and for neutron spin echo spectroscopy at its spectrometer J-NSE. Access to further neutron instruments and techniques at the Maier-Leibnitz-Zentrum (MLZ), e.g. for engineering materials neutron diffraction, for neutron imaging, and for neutron activation analysis can be provided upon request.

### Task 3.3.6 Access to EuroNanoLab facilities (CNR, CEITEC, POLITO, INRIM, FBK, POLIMI, UKaunas, IMT, UTartu, INESC, ISSP) M3-M48

Name of the infrastructures: CzechNanoLab (CEITEC Nano), It-fab (CNR-IMM Bologna, CNR-IMM Agrate, CNR-IMM Lecce, CNR-IMM Roma, CNR-NANOTEC, POLIFAB - Politecnico of Milano, PIQUET – Politecnico of Torino, PIQUET – INRIM, FBK), MNAAPC (Ukaunas), MINAFAB (IMT), UTartu, MicroNanoFabs@PT (INESC), ISSP

Location of the infrastructures: Brno (CZ), Bologna (IT), Agrate (IT), Lecce (IT), Roma (IT), Milano (IT), Torino (IT), Trento (IT), Kaunas (LT), Bucharest (RO), Tartu (EE), Braga (PT)

Web site address: <https://euronanolab.eu/>

Amount of unit cost asked in RIANA: 60 EUR per hour

Duration of a typical experiment: 40 hours (5 days of 8 hours each)

#### Description of the infrastructures

EuroNanoLab (ENL) is a unique initiative that consolidates Europe's national nanofabrication centres, services, and core resources into a single, coordinated Nanofabrication research infrastructure, at the European level. These nanofabrication facilities provide open-access to equipment and know-how, to European scientists or companies that need to fabricate nano-devices for their research activity. ENL is a network of more than 40 state-of-the-art academic nanofabrication cleanrooms involving 14 European countries (Czech Republic, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, Norway, Netherlands, Portugal, Romania, Spain, Sweden). The EuroNanoLab consortium has existed since 2014. ENL gathers together 15 nodes coming from 14 countries and 1 international organization.

In general, the following techniques are provided to the project at the facilities: Micro- and nanotechnology techniques and facilities, namely deposition techniques, materials growth and synthesis, patterning techniques, optical, electron beam, ion beam and soft lithographies, etching techniques, bonding techniques, electron and functional characterization of micro- and nano-structures and devices. Nanofabrication Process competencies are offered: Standardisation and sharing of fabrication processes and development of new processes supporting the establishment of cross-European fabrication lines. Standardised cleanroom procedures: Standardisation and best practices of user training, safety routines and operation procedures for cleanroom facilities to enable easy transfer of knowledge and users between the RI-nodes and efficient pan-European operation.

CzechNanoLab, [www.czechnanolab.cz](http://www.czechnanolab.cz), national-level research infrastructure in the nanotechnologies field listed on the Czech Roadmap of Research Infrastructures. CzechNanoLab consists of two sites, CEITEC Nano located in Brno, and the Laboratory of Nanostructures and Nanomaterials (LNSM), located in Prague. These two nodes provide fast and easy access to cutting-edge equipment and expertise for the fabrication and analysis of nanostructures and nanomaterials and access to 1700 m<sup>2</sup> of cleanroom space, Access will be provided by the CEITEC Nano node.

It-fab, [itfab.bo.imm.cnr.it](http://itfab.bo.imm.cnr.it), interconnecting the Italian cluster of Micro and Nano Fabrication research infrastructures encompassing CNR-DSFTM (IMM and Nanotec Institutes), PoliFAB from Politecnico of Milano, FBK-SD, Inphotec, Politecnico of Torino and INRIM. The integrated micro/nanofabrication facilities include more than 400 equipment in about 4000 m<sup>2</sup> of cleanrooms, located in 11 different facilities.

Access will be provided by the CNR-IMM Bologna, CNR-IMM Agrate, CNR-IMM Roma, CNR-IMM Lecce, CNR-NANOTEC, POLIFAB – Politecnico of Milano (POLIMI), PIQUET – Politecnico of Torino (POLITO), PIQUET - INRIM, FBK nodes

ISSP (Institute of Solid State Physics, University of Latvia), [www.cfi.lu.lv](http://www.cfi.lu.lv), being the Latvian national research centre for micro and nano fabrication and nanocharacterisation. ISSP offers 650 m<sup>2</sup> of cleanrooms focused on photonics, sensors, OLED development, and bio-medical devices (microfluidics). Access will be provided by the ISSP node.

MNAAPC (UKaunas), [apcis.ktu.lt](http://apcis.ktu.lt), the open access centre of micro-, nanotechnologies and analysis at the Kaunas University of Technology is the Lithuanian national research infrastructure offering analytical and technological services including thin films and coating deposition, optical technologies, nanolithography, reactive ion etching for nano- and microstructures, diffractive optics, nanophotonics, microfluidic devices and biosensors. Access will be provided by the UKaunas node. MicroNanoFabs@PT (INESC), [www.inesc-mn.pt](http://www.inesc-mn.pt), interconnecting the national cleanroom at INESC-MN and the international at INL into a Portuguese national infrastructure network. The cleanroom INESC-MN offers 350 m<sup>2</sup> of cleanroom space. Access will be provided by the INESC-MN node.

UTartu, interconnecting the Estonian academic cleanroom infrastructure, encompassing Institute of Physics (Tartu), Tartu Observatory (Tõravere) and Tartu Science Park (Tartu). The cleanroom infrastructure offers 300 m<sup>2</sup> cleanroom space. Access will be provided by the UTartu node.

IMT-MINAFAB, [www.imt.ro/MINAFAB](http://www.imt.ro/MINAFAB), is the largest cleanroom in Romania, dedicated to micro and nanofabrication for nanoelectronics, MEMS, NEMS, microfluidics and opto-electronic applications. It is acknowledged as a national research infrastructure by the Ministry for Research and Innovation since 2017. MINAFAB consists of more than 1.000 m<sup>2</sup> of class 100 – 100.000 cleanroom with a wide range of equipment from photolithographic mask fabrication to etching, deposition and characterization. Access will be provided by the IMT node.

### 3.3.7 Access to EUSMI facilities (FZJ, AMU, CSIC, FORTH, INFRANALYTICS) M3-M48

Name of the Infrastructures: Adam Mickiewicz University in Poznan, NanoBiomedical Centre (AMU), Agencia Estatal

Consejo Superior de Investigaciones Científicas (CSIC), Forschungszentrum Juelich (FZJ IBI-4 & JSC); Foundation for Research and Technology-Hellas (FORTH), University of Lille, CNRS (INFRANALYTICS),  
 Location of the Infrastructures: Posnan (PL), San Sebastian (ES), Juelich (DE), Heraklion (EL), Lille (FR)  
 Web site address: <https://eusmi-h2020.eu/>

Amount of unit cost asked in RIANA: 40 EUR per hour and 0.02 EUR per c-hour (virtual access)

Duration of a typical experiment: 40-80 hours

Description of the network

The European Infrastructure for Spectroscopy, Scattering and Imaging of Soft Matter (EUSMI) consist of a consortium of 15 partners across Europe providing access to their facilities for the synthesis, characterization and modelling of soft and biological materials. EUSMI drive academic research and innovation in soft nanotechnology by providing a multidisciplinary set of essential research capabilities and expertise to guide users, developing the next generation of techniques and instruments to synthesize, characterize, and numerically simulate novel soft matter materials and contributing to the creation of a broad knowledge basis. The instrumentation and methodology available in the EUSMI consortium, covers the full suite required for soft matter and biophysics research. Some of the instruments are extraordinary or even unique, e. g. the high-end NMR spectrometers at INFRANALYTICS or the vertical rheo-SAXS detection line at FZJ.

Five partners of the EUSMI consortium, AMU, CSIC, FZJ, FORTH and INFRANALYTICS will participate in the RIANA project. Specifics about their installations and accessible instrumentation are detailed below.

AMU; active in the eight research fields manufacturing of nanomaterials, surface physicochemistry, soft matter, energy, environmental protection, therapy and diagnostics, tissue engineering, sensors and biosensors is offering access to: Biological Laboratory for the analysis and imaging of cell processes using the "In Cell Analyzer" system, fluorescence microscopy, and a biosensor based on the optical phenomenon of surface plasmon resonance; Electron Microscopy(TEM 120 kV, HRTEM 200 kV, SEM/CryoSEM); Nuclear Magnetic Resonance (400, 600, 800 MHz NMR); Atomic Force Microscopy and Optical microscopies,

CSIC offers access to its broadband dielectric spectroscopy laboratory (BDS-Lab) which is a general-purpose facility focused and optimized for studying dynamical processes in soft matter systems (for instance, polymers, foams, gels, liquids, colloids, and biological materials, among others) with the best instruments covering a huge frequency range (from 1  $\mu$ Hz to 50 GHz). It combines a variety of experimental techniques in the frequency domain as well as in the time domain.

FZJ (IBI-4) is offering microscopy to a variety of customized light scattering and imaging methods for the investigation of soft and biological matter in equilibrium and under the effect of external fields at the Institute for Biomacromolecular Systems and Processes (IBI-4) FZJ (JSC) offers access to the supercomputer JURECA through the Juelich Supercomputing Centre (JSC) which provides supercomputer resources, IT tools, methods and know-how to FZJ internals and for currently more than 200 German and European computing projects. Pre-installed software packages on JURECA can be accessed via modules. A large number of packages is available for various kinds of applications, e.g. quantum chemistry and materials science.

FORTH provides access to its polymer and colloid research installation (SMI) which has a strong focus on the experimental study of dynamics and rheology of well-characterized materials and determination of the physical origin of their response. Instruments made accessible will comprise a full range of rheometers, covering a large range of sample environments, non-standard dynamic light scattering including passive micro-rheology and confocal microscopy for colloids as well as quantitative phase contrast microscopy.

INFRANALYTICS is the leading French NMR facility involved in several research projects in the field of nanoscience, including the characterization of quantum dots (semiconducting nanocrystals), photovoltaic thin- films, glass thin-films used as electrolytes of microbatteries, nanoporous materials (metal-organic frameworks, zeolites) and nanocatalysts. They offer access to some of the most powerful NMR spectrometers worldwide.

Task 3.3.8 Access to facilities external of RIANA (DESY) M3-M48

RIANA offers access to a vast range of European RI as described in Tasks 3.3.1 – 3.3.7, but there may be significant demand of users for infrastructures in nanoscience and nanotechnology that are not yet covered, or that are not yet covered in sufficient redundancy. For example, there is a single provider of neutron sources and for super computing, which may not suffice. Furthermore, the upgraded Advanced Photon Source (APS-U) will start operation probably during the second year of the RIANA project. At that time, APS-U will offer the world's brightest X-ray beams with the best beamlines to study nanomaterials.

Within the RIANA budget, there is a 1 000 000 € reserve for customization that may be used to provide additional TA/VA from listed RIANA beneficiaries, or to provide TA/VA through new partners that are not yet beneficiaries. Several partners including European neutron sources and the US-synchrotrons (APS-U and NSLS II) have signalled their interest to collaborate with RIANA through Letters of Support.

The strategic decision about such partnership will be with the GA upon suggestion by the NSB, and the coordination of this access is with the project coordinator.



**Task 3.3.9 Industrial access (CNR, all) M3-M48**

Access to the above-mentioned facilities of the different networks will also be provided to industrial users who wish to opt for TA that does not result in open shearing of measurement outcomes. In practical terms, access management will be managed as described in Task 3.1 using the same single-entry portal. The workflow will be supported by WP 4 to guarantee a smooth and efficient support for industrial users wishing to benefit of TA through the RIANA project.

**Task 3.4 User travel reimbursement office (LLE-AISBL/FVB-MBI, ULUND) M1-M48**

In close collaboration with the RIANA User Office (Task 3.1), the reimbursement of travel and subsistence expenses of external users visiting facilities will be managed centrally. This will allow efficient monitoring and management of funds and an overview of expenses at all times. All relevant information and instructions will be compiled in a User Guide. For the calculation of project budget dedicated to TA reimbursement, it is assumed an average duration of 5 days per visit to a facility. The reserved budget for travel reimbursement of 475 200 € was estimated based on 396 visits, 2 users/visit, 600 €/visit/user.

**Work package WP4 – Customised access to Innovation Service**

<b>Work Package Number</b>	WP4	<b>Lead Beneficiary</b>	4. CNR
<b>Work Package Name</b>	Customised access to Innovation Service		
<b>Start Month</b>	1	<b>End Month</b>	48

**Objectives**

Nanoscience explores material combinations that may display controllable changes of a macroscopic function. Such functional properties are not only of high interest for applications addressing main challenges and EU priorities but also for the development of highly innovative technologies within the industrial landscape. Nanotechnology-oriented innovations are rapidly changing their technological target across a range of sectors: their timely development needs customized access to the most advanced nanoscience research and testing facilities. WP 4 offers Innovation Service to support industry-oriented RI access and develops the framework and the methodology to adapt access support in particular for small and medium companies (SME) aiming to mature their technology, to increase their corresponding TRL, and/or to upscale their production processes.

The work is broken down into following tasks:

create and operate a Platform of Industrial Contact Officers (PICO) enhance interoperability

elaborate methodologies for overcoming technology barriers

outreach and screening of academic RIANA user projects for innovation

provide customized access for SMEs directly by RIANA facilities or with support of intermediaries as an integral stewardship to access for industry.

All of these tasks are implemented at short time scale such that users can profit from the developments within the project duration already.

**Description****Task 4.1 Platform of Industrial Contact Officers – PICO (ESRF, CNR, DESY, ALBA-CELLS, all networks) M1-M48**

There is clear evidence that a support to industrial clients for easy access to the RI and monitoring of the experiments is important. With exceptions in pharmaceuticals for the development of active substances, companies generally do not hold expertise for experiments on publicly accessible RIs. To tackle this relevant aspect related to RI activities, we will implement the Platform of Industrial Contact Officers (PICO) with selected staff (Senior and Junior Scientist) of the different service providers of networks participating to RIANA, with the goal to assess the needs of industrial users and address them with the most appropriate combination of techniques and analytical methodologies. PICO will have the specific role of a) strengthening the outreach to potential industrial users, b) publicizing the offered analytic capabilities, c) screening and monitoring the nanotechnology SME landscape (including innovative start-ups), and d) disseminating successful results from industrial access, building on the foundations of the action proposed in NFFA-Europe52 and NEP projects. Thus, the role of the PICOs will be in particular to close the gap between institutions/providers having already in place a policy and/or an activity focused on industry-oriented services (typically in large scale infrastructures), and small and medium size laboratories, where industry needs are less in focus. This objective will be tackled by specific and dedicated hiring of expert staff to act as industrial contract officers within the networks involved in RIANA.

In tight collaboration with WP 2, ICOs will help industrial users in making the right choice and obtaining an efficient

outcome from their access to RIANA, by guidance to navigate the catalogue of available techniques and by support (via experts) to prepare structured proposals in a field-driven approach (e.g. chemistry, energy, material processing) rather than the simple technique-driven choice. To reach these goals, coordination of PICO will be given by DESY, ALBA (bringing experience acquired in LEAPS) and by ESRF, CNR (following the consolidated experience in NFFA, where a bridge to distributed research infrastructure is in place). PICOs will meet remotely on a regular basis; in some cases, officers affiliated to networks with less experience in industry-oriented sectors will be hosted at large scale facilities for short training period, to facilitate the identification of good practices as well as to align methodology and exchange within RIANA. PICO will also interact with private intermediaries. The NFFA Europe position paper<sup>53</sup> provided indications on how to bridge expertise between academic and industry-based laboratories, and successful experience are found in the recent past as in the case of VINNOVA<sup>54</sup>. The successful approach holds on requiring and encouraging partnerships between the companies and supporting organisations. These aspects will be further developed within WP 4, with the main objective of promoting opportunities for industrially-oriented research. A link will be created with the European Material Characterisation Council (EMCC) (as guaranteed by ESRF, as member of the Organisation Management Board of the EMCC). Finally, the industry tailored tools developed by PICO will be available for the industrial community of other EU projects when appropriate. Some promotional actions and some stewarding activities will be indeed coordinated among running EU projects and other activities of the RIANA networks and with a fruitful exchange of best practices.

#### Task 4.2 Enabling industrial innovation (DESY, EuXFEL, FORTH, CNR, POLIMI) M1-M48

The objectives of this task are to overcome technological barriers industrial users may (and usually do) find in designing, performing and exploiting experiments/access to labs and facilities. Good scientific practice is the ability to replicate measurements and experiments by other research groups in order to verify the results. However, repeatability, verifiability, and comparability (e.g. at different locations) of measurements and experiments is equally important for industry to check quality deviations in process or product development, and when comparing large quantities of samples: this corresponds to a need of developing interoperability protocols and tests.

In this task, a feasibility study will be carried out to evaluate the adaptation of existing instruments to enable and simplify industrial access. This will be carried out through streamlining of measurements workflow across instruments and of data analysis across the RIANA facilities (Task 4.2.1). The definition of standard operating procedures of the collected results for specific nanosystems will also be performed (see Task 4.2.3 and Task 4.4). Furthermore, a structured approach with the objective of precisely analysing the experiences of industry users will be pursued to improve the quality of services present at RI, both when using new tools/methodologies and when testing/characterizing known objects/products, including capabilities and perspectives of TRL increase (Task 4.2.2).

Results of this analysis will be cross-linked with a cost analysis of the overall path, to provide the industrial actor a conclusion on the readiness level of the project/process (Task 4.2.3). Note that the workflow towards upscaling will be designed in collaboration with both industrial and academic users (Task 4.2.2). This involves consultancy prior to the project (pre-access) as well as during its implementation. The portfolio of analytic tools currently available in the participating facilities together with the new approaches will be tested within two industry-oriented pilot cases to facilitate their access by industrial users, in terms of easy operability, of reliability, of speed and cost of data acquisition and of reproducibility of the results.

##### Task 4.2.1 Enhance interoperability (EuXFEL, DESY, FORTH, CNR) M1-M48

In the first part of this subtask, the focus will be on a commissioning and integration of a technical solution for a sample environment as a co-development between EU-XFEL and final users from applied science. The sample environment shall be portable to other laboratories and infrastructures, and meanwhile with the best effort to be applicable to the largest possible technology platform of nanomaterials.

In the second part of this subtask, interoperability shall be enabled concerning the handling of samples that are large yet contain nanostructures between one facility and another (FORTH, CNR). Compatibility of techniques will be considered, also from a metrology and reliability approach. Also, crucial aspects as sample container and safety considerations will be kept into account in e.g. transfer from clean rooms to lasers laboratories.

The outcome will be critically evaluated and suggestions for improvement will be worked out after thorough discussion with RIANA facilities as well as with NSB.

##### Task 4.2.2 TRL increase and quality control of nanostructures (FORTH, CNR, POLIMI) M1-M48

The identification of the workflow for upscaling processes (FORTH, CNR) will initially map facilities and their cross-capacities for support towards TRL increase, with the aim of designing suitable workflows having possible industrial impact, in particular for laser manufacturing, silicon photonics, and sensing applications. Compatibility of characterization in real time with the production line will be evaluated on selected process, as e.g. wafer productions in clean-rooms and cross check during fabrication/growth, so to obtain early definition of their acceptable quality or not.

Quality control of nanostructures by optical microscopy/spectroscopy (POLIMI): Optical spectroscopy enables non-invasive, non-destructive quality control of nanostructured materials, providing fingerprints of their chemical

composition and structure. We will develop quality control protocols by means of a multimodal hyperspectral microscope capable of acquiring simultaneously reflectance, fluorescence and Raman spectra of nanostructures over a wide field of view. The instrument, which employs a proprietary technique based on a birefringent interferometer, will be operated by POLIMI in collaboration with its spin-off company NIREOS (<https://www.nireos.com/>) and will be used for large area screening of nanostructured materials.

#### Task 4.2.3 Cost analysis (CNR, FORTH) M1-M48

Guidance on the cost analysis and on the environmental impact of the industrial projects will be provided. These services will assess the opportunity of pre-commercialization, ensuring at the same time the aspect of durability, reparability, and safe recycling, by reducing carbon footprint, energy usage and waste. Indeed, improved performances are mandatory from the scientific and technical point of view, as well as the capability to provide new functionalities in nanomaterials: in view of the transfer to the market, the batch-to-batch reproducibility, the up-scalability of production processes and the definition of standards and scaling factors are mandatory. All these points will be carefully analyzed, in close combination with the economic impact of each of them, to assess the potential economic and financial advantage of the newly developed solutions. The consultancy service will help industrial users in identifying materials, technologies and processes more suited towards pre-commercialization and future production.

At the same time, via an integrated collaboration between device modelling, materials definition and production, micro- and nano-fabrication technologies, structural and functional characterization of material and devices as well as use and disposal of systems and devices, the environmental impact and the carbon footprint of the proposed technologies will be analyzed, with the aim of assessing their sustainability together with the environment-friendly and resource-saving compliance. This guidance activity will also support industrial users in exploring new routes to avoid the use of toxic, pollutants or rare materials and to substitute them with bio-compatible ones, as well as in analyzing carefully and controlling the effects on human health and the environment, particularly crucial for devices and systems containing nanomaterials.

#### Task 4.3 Industry-oriented pilot cases (ESRF, CNR, AREA, FORTH) M1-M48

This task will focus on testing new approaches that can be expected to improve the quality of service at RIs, including the direct involvement of external knowledge providers and SMEs. In particular, industry tailored access will be explored both in a laboratory environment and at large scale facilities, covering more than one facility/network. The underlying idea of these pilot cases is to support technology maturation in specific fields, where the interest/direct contribution of SME and industry-oriented networks will be (i) conveyed for case-specific needs to instrument scientists and developers and (ii) supported in the development of novel protocols for enhanced user programme and generation of valuable IP. These could be further developed in common activities with SMEs which, over the lifetime of RIANA, may become service providers as intermediaries.

##### Task 4.3.1 Laser nanostructuring for surface functionalization (FORTH) M1-M48

This pilot activity will focus on laser surface functionalization in order to explore the technical feasibility of large-area laser nanofabrication relevant to (i) antibacterial, self-cleaning and antifouling; (ii) drag and friction reduction in engine lubrication components; (iii) broadband antireflective nanotextures (see list of interested SMEs below). The aim is to upgrade laboratory setups enabling surface nanostructuring from the scale of the beam area, to semiautomated workstations, capable of producing uniform processed areas exceeding 100 cm<sup>2</sup>. In the long term, since the technology can be completely automated and has the potential to be integrated into a manufacturing industrial line, further lowering of the production cost and upscaling to larger attainable sizes and throughput numbers may be realized. Experimental trials of different technical solutions will be carried out targeting at the specifications and performances of the applications, i.e. high-speed surface nanotexturing with beam shaping for larger spots on the workpiece with constant fluence, investigating the use of shorter wavelengths to ease generation of smaller structures. Those technical solutions will consider industrial aspects such as the process reproducibility as well as a fast-inline binary (OK/NOK) quality check system combined with an integrated database. FORTH will give provide potential users the hands-on technical experience they need to solve complex laser surface functionalisation challenges. It will allow for the machining of large samples with precise motion synchronization between scanner and linear stages, offering exceptional beam direction and shot-to-shot stability and acceleration to steer the laser beam around the sample. Laser process machine control is handled by a specialized software. Validation will be performed with various techniques available in RIANA as (i) High resolution analysis of surface and interface chemistry; (ii) high resolution imaging of surfaces and interfaces (e. g. electron or atomic force microscopy); (iii) analysis of distribution and diffusion of elements.

Potentially interested SMEs: Novinano (UKR), Fluence (PL), Pulsar Photonics (DE), Fusion Bionic (DE), Biomimetic (EL), Bionic Surface technologies (AT), IMDEA (ES), FLITE (US)

##### Task 4.3.2 High throughput characterisation workflow for batteries (ESRF, CNR, AREA) M1-M48

The present pilot is constructed to deliver a high-throughput operando characterisation workflow for batteries, starting

from high throughput operando XRD micro-mapping of commercial batteries performed at the ID31 beamline at ESRF, which is specifically tailored for the in-situ characterization of nanomaterials used in advanced batteries.

The devised battery setup will consist of a battery cyler holding the assembled cells, a robotic arm used as a cell changer and the cell receiver for fixing the cells for actual measurement. The cell will be then characterized in all its parts (cathode, electrolyte, anode) by XRD, PDF and SAXS. Ability to measure 16 cells in one measurement campaign will increase the throughput of the system 16x. Given that the typical charging cycle is 1-8 h, each cell may be characterized at different states of the charge, allowing to fully assess the behavior of materials inside the battery during operation. This initial operando XRD will allow the identification of critical areas in the device. The experimental workflow will be implemented with scaling down technologies in order to enable operando scanning transmission electron microscopy (STEM). This second step will be realized in collaboration with the EU project IMPRESS by the e-DREAM and NFFA consortia (AREA and CNR), keeping compatibility in the sample environment.

The final objective is to develop a fully harmonised operando battery characterization workflow, going from synchrotron XRD mapping to STEM. Such a correlative workflow has a great potential to become a relevant one for all Artificial Intelligence assisted battery material discovery, where large datasets for different materials at different conditions need to be acquired (see <https://www.big-map.eu>) and to be further extended to other fields, such as nanomaterials for circular and hydrogen economy, where large materials screening campaigns will be necessary, in order to progress the knowledge.

#### Task 4.4 Outreach and screening of access cases of industrial interest (EuXFEL) M1-M48

A continuous and systematic screening of the accepted academic proposals will be carried out upon user agreement in close collaboration with WP 2 and WP 3 during the project to explore possible applications for industrial interest. The input information will be collected in full respect of the confidentiality related to possible IP and/or of the scientific embargo, with explicit request to user/proposer, after feasibility check of their proposal, and after finalization of the experiment(s) as a second step. The main description of the class of the sample and the observed characteristics will be sufficient for a first level analysis. The collection of the most attractive cases and the proposed analysis will allow to identify the main industrial stakeholders and ecosystems that can be interested to a specific experiment with a similar set up. In coordination with WP 6, that will develop the communication material, a dialogue between users/proposer and target industry environment will be opened and carried out, for possible industrial access during the project or as future post-impacting effect. A report with the main results will be written and made available to the community.

#### Task 4.5 Customised access for SMEs (DESY, all) M1-M48

With respect to this task, RIANA will exploit synergies with other active projects, like NEP, ReMade@ARI and LEAPS-INNOV. DESY, in synergy with the PICO will coordinate the collaboration and the professional private intermediary companies. In this task, we will pursue a combination of external and internal support services while demanding a contribution from the applicant companies that seek access through the proprietary access route in contrast to the standard non-proprietary access route for academic users.

Within the proprietary access route, industry users can apply for subsidised access through the central access point at any time. To ease the burden on SMEs, SMEs will receive a flat fee of 1 000 € for covering the access costs when the project is accepted for funding. They can also use this to commission an external knowledge provider to submit the application via a performance-based contract. Industrial users, like scientific users, will be provided with measurement time, materials and services from the project; however, with the restriction that industrial users will have to pay a contribution equal to the difference between the full access costs of the RI and the costs reimbursed by the project. In contrast to previous projects funded by EC (e.g. CALIPSOplus, LEAPS-INNOV), we require an appropriate contribution from the industrial users emphasizing the value of these services. Furthermore, this will give the industry users the possibility to estimate what these services will cost approximately after the end of the RIANA project. On the other hand, however, we will intensify the support for SMEs to make it as easy as possible for them to access and use the RI. Therefore, SMEs will receive support of a maximum of 10 000 € for the contractual commitment of intermediary companies, as knowledge providers who will carry out and accompany the measurements / the experiment. Accordingly, budget is reserved for up to 24 successful applications from SMEs receiving support over the lifetime of RIANA.

It is planned that external knowledge providers will act as subcontractors for this task by allowing the knowledge providers to support the specific expert work foreseen in proposals of industry. Confirmation of the involvement of a knowledge provider will be made as part of the evaluation of the application for access and payment will be made after completion of the work via reimbursement of the invoice paid by the SME applicant. Successful proposals will be expected to provide a concise report on their work, including a publishable summary highlighting the impact of the work on nanoscience and use of the RIANA facilities. Peer reviewed publications will be welcome, but not a requirement. The activity carried out in WP 3 / WP 4 in collaboration with industry may give rise to novel IP, which will be the property of the inventors and whose access and exploitation will be defined on a case-by-case basis following agreement between the industry and the consortium member(s).

## Work package WP5 – Training and education

<b>Work Package Number</b>	WP5	<b>Lead Beneficiary</b>	6. FORTH
<b>Work Package Name</b>	Training and education		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

This WP will take care of the training needs for the Junior Scientists and facility staff as well as for the users to achieve the best profit from the new customized and multi-disciplinary access approach in RIANA. A training platform will be established to build a sustainable team of researchers (staff members and Junior Scientists) by increasing their scientific excellence as well as knowledge on IP rights in order to enable an efficient technology transfer of applications from the users in the nanotechnology related science fields and to increase the interaction between the RI networks. Furthermore, education opportunities for users, in particular for young or new users, on the broad portfolio of instruments and data analysis offered by RIANA are foreseen. A representative of each RI network will be announced to support the organisation of the cross RI network training.

The work is broken down into following tasks:

A facility staff training particularly with regard to the Junior Scientists (WP 2) with a staff exchange program and regular tutorial webinars on technical and scientific topics as well as on non-technical topics such as on intellectual property rights (IPR) etc.

A user training program by providing pre-access training visits, specific online software trainings, and perform two RIANA user meetings

A horizontal training program for staff and users such as tutorial webinars and training schools on micro- and nanostructuring techniques organized by RIANA itself as well as opening already existing schools within the RI networks to the whole RIANA consortium and its users.

All activities of WP 5 will be thoroughly discussed within the RIANA Executive Board and matched with the other WPs.

### Description

Task 5.1 Internal training within RIANA (HZDR, INFLPR, all) M1-M48

The aim of Task 5.1 is to involve, connect and enhance the present communities of staff researchers in the field of nanotechnology to build a sustainable cohort of interdisciplinary Junior Scientists and staff members.

To achieve this task's objective the following activities are planned which will be coordinated with Task 5.2 and Task 5.3 as well as WP 2 and WP 6.

Task 5.1.1 Staff exchanges (HZDR, all) M6-M36

To facilitate the efficient handling of inter-network user proposals RIANA will provide training for the Junior Scientists. The aim of this training is to enable Junior Scientists from different networks to better understand the challenges and opportunities experienced by the partner networks and thereby improve their specific experimental skills and competences. We foresee up to 21 short term visits of inter-network labs (in average one week, for each a budget of 1000 € is reserved). Junior Scientists can apply twice a year and must choose a lab outside their network. While multiple grants are possible, they will need to target different host networks. For the grant selection, special emphasis will be given to the scientific quality training program and the prospects to publishing the collaborative results in a peer reviewed scientific journal. Task leader will make a pre-ranking whereas the RIANA executive board will finally decide. These inter-network visits will enhance the user experience as the involved staff members obtain a deeper understanding of the partner networks. Thereby, inter-network user proposals – which are the heart of RIANA and will be granted by WP 3 – can be supervised and supported better by the involved staff scientist.

In addition, we will support scientific exchange between the networks by an “Invite an expert” initiative. This “Invite an expert” initiative will support the invitation of inter-network speakers for keynote or invited presentations to relevant meetings from the inviting network. A maximum of one “Invite an expert” exchanges is planned per network and year. The support will be provided in the form of a financial contribution to the travel and meeting costs for the invited expert.

Task 5.1.2 Internal webinars (INFLPR, all) M1-M44

Within the RIANA consortium regular (monthly) webinars/online meetings and if necessary in-person workshops linked with other events will be organised to exchange knowledge between the RI networks and in close cooperation with WP 1. The Junior Scientists are particularly invited to attend those webinars and other interested staff members are welcomed too. Beside webinars on RI relevant nanoscience and nanotechnology online trainings on IPR, patent application, FAIR data management (WP 6), and gender and unconscious behaviour are planned. Furthermore, senior researchers from the

networks experienced in the exploitation of research results will report on their experience with start-ups and/or spinoffs. Speakers and trainers for these webinars will mainly come from RIANA beneficiaries.

To boost the innovation potential at least two innovation contests will be organized by the network partners. These short in-person events linked to the RIANA annual meeting (in year 2 & 4) will target Junior Scientists who want to develop a business plan and elevator pitch for their innovation. The best projects of the innovation competitions will be highlighted and advertised.

#### Task 5.2 External training to academic and industrial users (FORTH, HZDR, all) M1-M48

In Task 5.2 training actions will be implemented aiming at the development of additional skills for the professional and career prospect enhancement of users originating from both the academic and the industrial sector. The training actions are at the same time expected to facilitate and maximize the research and innovation output of the user projects and help to prepare more competitive new ones. The training actions will help to increase awareness for the added value offered by the joint use of facilities through participation of representatives of the RI networks. The attractiveness of the RIANA infrastructures will also be increased and the dissemination of the project results will be facilitated.

##### Task 5.2.1 RIANA user meetings (FORTH) M12-M48

The RIANA consortium will organize RIANA User Meetings which will bring together a significant number of users (and potential future users). In the two meetings (around M24 and M44) that are envisaged, users will be educated through scientific interaction with scientists across different disciplines and with the RI network representatives. The users will have a unique opportunity to disseminate their project results and provide feedback on RIANA's Access program via round table discussions. Access providers will also have the opportunity to present recent upgrades, new experimental set-ups or diagnostics. The RIANA user meetings will be typically hosted by a volunteering access providing facility and the program will be set-up with advice of the Nano Strategy Board (WP 1).

The RIANA User Meetings will further allow users to widely disseminate their project's output while engaging desired target groups, as well as to collect comments and advice for a further fine-tuning of the project (if it is still underway) or for optimal shaping of a possible new project. To increase the awareness of the project's outputs, the users will be required in due time following the user meeting to summarize their presentation, the objectives and project achievements in a short report (in the form of a blog report or a video or a newsletter) that will be uploaded on RIANA's webpage. The users will receive full re-imbursment for their travel expenses for their participation in the user meeting only after completion of this report. The RIANA user meetings will be excellent opportunities to be educated about the best practices and about the exploitation of user project results.

##### Task 5.2.2 Pre-access user training visits (FORTH) M1-M48

Pre-access, proactive training targeted especially to young members of a user group can be awarded up to 50 in total immediately prior to the actual awarded access and will be organized together with the scientific service (WP 2). They will consist of a training stay of typically one-week duration at the access providing infrastructures to get acquainted with the techniques and methods needed for the project implementation. The stay can be extended in well-justified exceptional cases. The training pre-access visit can be realized in the form of an actual real visit or alternatively by remote means provided that the host laboratory can provide this successfully and that both parties agree. Live remote sessions that will prepare the users and familiarize them with the actual laboratory environment can also be offered. The availability of the pre-access user training visit will be interrogated during the proposal evaluation procedure. Following the acceptance of a proposal the appropriateness of the training demand will be assessed by Task 5.2, supported also by WP 2 in decision making, and the hosting facility which will provide in-kind the pre-access training service. Travel and subsistence of the trainee(s) will be covered as a simple extension of the overall user travel reimbursement. The trained users are required to deliver short reports on the result and the degree of satisfaction of the training pre-access visits, in addition to the user project report.

##### Task 5.2.3 Online software training (FORTH, HZDR) M1-M48

Online software training tools will be made available to the users via the RIANA webpage at any time. Comprehensive training tools are already available for the LEAPS and LENS RIs (see <https://pan-training.eu>). The software training tools consist of interactive online software and theoretical simulations/algorithms for training on the optimal use of specific instruments and setups, and on the data analysis software. Live remote sessions pre- and post-access -depending on the hosting infrastructures- may be also utilized to better train the users on the machinery, instruments and data analysis.

Beyond the existing ones, further software tools will be developed and used as pilot cases. One pilot case will be developed by FORTH. It will consist of a predictive tool for providing maps of zones where laser-matter interaction results in the creation of nanostructures in additive and subtractive laser-processing by means of a machine learning approach. The tool will be developed and tested with real users of the laser infrastructure at FORTH before making it available for virtual access to a wider infrastructure audience. A second pilot software tool will be prepared by HZDR.

The tool will use specialized codes and fine-tune them to simulate and analyze ion beam analysis techniques for the creation and characterization of nanostructures.

#### Task 5.3 Horizontal training and educational actions (CNRS/CELIA/U.Bordeaux), CNRS (LP3), UC M1-M48

Training and educational actions under task 5.3 are open to internal members of the RIANA consortium as well as to external academic and industrial users. These actions include educational meetings on the various technologies offered by the different networks of the RIANA consortium as well as remote training by tutorial and more specialized webinars.

##### Task 5.3.1: Training schools (CNRS/CELIA/U.Bordeaux)) M1-M36

During the first three years, of the project, each year a one-week general RIANA training school on all micro-and nanostructuring techniques as well as the different characterization methods offered by the RIANA networks including advantages and limits will be held. These one-week training schools will be open for a selected number of in-person participants including visits to installations of the hosting facility. The general lessons can be followed remotely and are open to a larger number of participants.

Moreover, the several networks of the RIANA consortium regularly organize training schools in different formats, many of them offering hands-on training (in-person) or virtual hands-on remote training. For example, training events for the neutron user community (LENS network) are annual summer schools such as the Jülich 'JCNS Laboratory Course' or the ILL Bombannes Summer School. The Jülich Lab Course consists of one week (in presence) of lectures followed by a week of hands-on experiments at the neutron instruments at the research reactor FRM-II/MLZ in Garching near Munich. Both schools admit young researchers on the M.Sc./Ph.D./PostDoc level from all countries. Moreover, web-based short courses can be organized, involving 'hands-on' experiments on digital twins, to train small groups or individual users. This could be done with the help of the Junior Scientist dedicated for LENS within RIANA. Within the e-DREAM network (electron beams), the network partners propose a set of training schools dedicated to junior or more experienced scientists, as well as shorter workshops on specific TEM techniques. Additionally, all nodes of e-DREAM provide hands-on training to their users at their installations. The EuroNanoLab network is actually doing most of the training in-person and hands-on directly in the lab. However, the network is currently transferring as much training as possible and reasonable into e-learning format, and a testing version of an e-learning platform is already deployed. Within the EUSMI network, different regular training events are established, e.g. the annual "Ampere NMR School". The biannual lab course on dielectric spectroscopy in the BDS-Lab of CSIC in San Sebastian (paused during the pandemic) offers hands-on training, whereas basic and advanced MOOC on NMR-spectroscopy exist as well and can be offered to the community. Additionally, all EUSMI partners provide individual on-site user training, guidance and supervision to warrant safe and successful project implementation. A similar variety of summer schools, workshops and online training exist within the communities of LEAPS, Laserlab-Europe, RADIATE and NFFA.

Within the RIANA project, grants for participating in these training schools and workshops will be given to a selected number of participants per year covering travel and accommodation ensuring excellent training and education condition for RIANA members and users. An annual call will allow for selecting the candidates by a committee formed of the WP 5 task leaders. Master students, PhD students, Junior Scientists as well as technical staff members can apply for these grants (up to 1 000 € and up to 15 per school), where external users will have to cover their participation costs. Being able to provide fund for more young scientists maybe even for external user and those from the widening countries a crowd funding towards facilities and industry will be activated. The final approval on grants will be done the EB.

##### Task 5.3.2 RIANA technology webinars and database (LP3, UC, all) M1-M48

Tutorial webinars from all different networks will be held and recorded for archiving in a RIANA training video database. The tutorials will be prepared by all networks introducing and explaining their technologies and applications proposing at least one tutorial of each network partner. As a guide, Laserlab-Europe will provide a tutorial on an introduction into laser techniques and the possibilities of surface micro- and nanostructuring and other micro-, nano- laser machining techniques (e.g. welding) of various materials such as metals, semiconductors, soft/organic, and transparent materials. For the latter, even in-volume nanostructuring and backside modifications are accessible.

Additionally, all networks will propose further and more specialized webinars within the whole duration of the project, illustrating the potentials of the different approaches. For example, seminars on special laser processing techniques will be offered such as laser-induced forward transfer (LIFT) or pulsed laser-ablation (PLD) of thin films and pulsed laser-ablation in liquids (PLAL) for nanomaterial synthesis covering a wide area in nanomaterials science, reaching users in both academia and industry.

Furthermore, within the RIANA project, a database containing all webinars will be installed and set up such that it can be easily integrated into sustainable online platforms like WayForLight or platforms established under EOSC. The database will be accessible to all consortium members. Moreover, educational videos and pre-access training videos for users will be stored as well in this database and accessible to users in order to optimally prepare their venue to the facilities.

## Work package WP6 – Outreach, dissemination, and impact

<b>Work Package Number</b>	WP6	<b>Lead Beneficiary</b>	8. UAM
<b>Work Package Name</b>	Outreach, dissemination, and impact		
<b>Start Month</b>	1	<b>End Month</b>	48

### Objectives

WP 6 is designed as an instrument to maximize impact of the core project activities. This is done with a two-fold strategy: fostering dialogue with the user community so as to attract the users with the best potential for impact, during the project execution and with a special effort during its initial phases; and working with a more long-term view, so as to promote that the actions performed during the project make the best possible impact once the project is finished.

This strategy is deployed in four tasks:

outreach to the European nanoscience community with information tools and user-oriented events, including an online open desk for any interested people and answering questions on nanoscience and nanotechnology capabilities as offered by the RIANA consortium

disseminate RIANA activities and results via project website and social media and provide marketing materials for WP 2 and WP 4

Promote FAIR data management and open science practices;

Evaluate the impact of RIANA on providing customized TA and networking between RI networks

### Description

WP coordination will be taken care of by UAM, complemented by FZJ. WP 6 activity will interface closely with other WPs. The deployment of the dissemination, exploitation and communication plan in Chapter 2.2 is the main rationale of WP 6 and the plan will be updated during the project. Communication actions addressed to industrial communities are an essential part of the dissemination, exploitation and communication plan provided in Chapter 2.2. Due to the high specificity of the dialogue with industry the implementation actions are dealt with in WP 4, as an integral part of the interplay with industry, whereas the communication materials developed in WP 6 will serve as a basis for such implementations.

Task 6.1 Outreach to European nanoscience and nanotechnology community (UAM, all) M1-M42

This task is focused on the immediate objective of attracting users to the core activities of the project. Therefore, it shall make a substantial effort during its initial stages, to be sustained thereon and having a more limited activity at the end of the project. Challenge driven customized access is a new paradigm which has emerged in many different contexts during the past years. It needs to establish with the potential user community an effective dialog to be sought by three main actions:

Generate and disseminate a set of information tools about the portfolio of techniques and installations offered by the project consortium. This set will include video/webinars (WP 5), leaflet and poster materials, it will be generated within this project task, with inputs received from all members of the RIANA consortium, and will be disseminated by all project actors taking suitable opportunities, such as conferences, workshops and, notably, already existing user meeting series. The dissemination of these materials will also be done via the standard project dissemination platforms, described below in Task 6.2. In order to better deploy this activity to engage users it is foreseen to fund participation to up to 8 nanoscience conferences during the first two years of the project, including the option of setting up a RIANA booth. Some examples of the conferences which are considered as suitable targets for this are: E-MRS (Spring and Fall meetings, yearly); NaNaX (resuming in 2023 after covid, previously biyearly); Nano-Bio-tech (yearly); European congress on advanced nanotechnology and nanomaterials (yearly). The funds for the 6 booths are foreseen in WP 6, whereas the persons involved at the different conferences will come from the wide network of RIANA members, profiting from their scientific activities linked to these conferences. In addition to presence at these scientific events, naturally, the user access calls launched within RIANA will be publicized via the tools explained below in Task 6.2.

Plan and organize three user-oriented events during the first half of the project execution in addition to the RIANA user meeting organized by WP 5. The preliminary plan, to be further elaborated during the first stages of the project is to go for one-day satellite events to: one important nanoscience conference; a user meeting of one of the LEAPS facilities participating in the project consortium; a user meeting or similar event organized by e-DREAM or some other of the networks taking part in the project consortium.

Finally, as a means of exploiting in the best possible way the fostering actions indicated above, an open desk will be



established with the purpose of reacting to any questions from any people (citizen, journalists or researchers) via the project webpage to channel internally to experts within the RIANA consortium, e.g. to the scientific service team or RIANA user office.

#### Task 6.2 Webpage and dissemination of project results (RBI, UAM, DESY, all) M1-M48

The purpose of this task is to make the best possible dissemination of the results generated in the RIANA project, in such a way that the impact generated is maximized. This requires three main types of actions: those oriented to generating contents for dissemination; those focused on creating the proper channels through which the contents may be transmitted to the target groups; and finally, those corresponding to the actual usage of the dissemination channels and follow-up of such usage. These three aspects will be described below in detail.

- Generation of dissemination materials will be based on elaborating posters and slides featuring the project results with a focus on results obtained through TA that are published in high impact journals to demonstrate project achievements. Two sets of slides and posters are planned, first at the mid and second at the end of the project. The preparation of these materials will involve all actors of the RIANA network. While those slides and posters are targeting other researchers, the content will be translated into easy language for the project website to be understandable also for non-experts to address citizens and journalists.

- The main channels foreseen for these dissemination materials are the project webpage and social networks. The project webpage is a pivotal instrument, which goes much beyond the dissemination aspect described in this task. Indeed, the webpage will also be a main tool for user attraction (see Task 6.1 above), to address industry (WP 4) and access to the user calls launched within RIANA (WP 3) as well as to training opportunities internally and externally for users (WP 5). Due to its criticality it is foreseen to have a first webpage version in production, even if it has initially very limited contents, early on in the project execution (M3). Once available, the webpage will incorporate gradually all the contents which are needed. Social networks are a complementary essential channel for project dissemination. The two networks we consider for RIANA are LinkedIn and Twitter. LinkedIn is targeted at a professional public, broader than the audience one may expect for direct access to the webpage. In particular one may expect a better input to industry via this route. On the other hand, Twitter is the tool of choice for the broad general public, with the capability of attracting their attention to the project activities and to curiosity for science in general. Emphasis may be done on young kids and particularly on girls.

- As RIANA is a large, diverse and powerful network, we will use these dissemination channels to inform about features and news of all RIANA members. In that way the RIANA webpage and its LinkedIn and Twitter accounts will become a joint platform for highlighting capabilities, news and prospects for this wide portfolio of facilities and scientific instruments. It is expected that such approach will be a win-win case, as facilities will have the opportunity of gaining additional visibility, and the flow of interesting news coming from all these sources will make the RIANA dissemination channels more attractive for the public. The task leader will have to keep fluent contact to communication offices of the RIANA members so as to receive in a fluent way the materials generated at the different facilities via the Junior Scientists or network of senior experts (WP 2).

- In addition to the channels indicated above, the presence at conferences, which is to be focused on attraction of users during the initial stages of the project (see Task 6.1 above) will turn its attention towards dissemination of project outcomes during the second half of the project. We aim at being present with a RIANA booth at 3 conferences during this second half of the projects, taking as a reference the same type of events already mentioned in Task 6.1. Altogether, with Task 6.1 and Task 6.2 we plan to have 9 (6+3) booths at conferences. One of the project outcomes which may deserve special attention during this last stage of the project is the NANO Roadmap to be developed in the framework of WP 1. In addition to this the output of the impact analysis study foreseen in Task 6.4 will also be an important element for dissemination. These are both seen as ideal complements to the dissemination of direct scientific results stemming from access to RIANA facilities by users.

- Last but not least, Task 6.2 includes a systematic registry and follow-up of all the dissemination activities performed during the project. This is particularly important and not straightforward, as RIANA is very broad and diverse network, and many of the dissemination actions will be done in a decentralized way, so that the actors directly in charge of Task 6.2 will be facilitators of dissemination materials. Therefore, keeping track of all the actions performed becomes particularly relevant, so as to detect gaps and overlaps, risks and opportunities.

#### Task 6.3 Promotion of FAIR data management (SOLEIL) M1-M48

The goal of this task is to extend and deepen the adoption and use of FAIR data principles within the European nanoscience community to allow publication and access of national nanoscience facilities' data and services within the EOSC. The task will profit from the experience gained in projects such as ExPaNDS and PanOSC to help and inspire smaller facilities which are typically not involved in such ambitious projects, and which do not have normally very developed data management methodologies. Large facilities will be role models for smaller ones, adapting whatever needs to be adapted, to form practical solutions and form a center of knowledge and expertise in this domain. The outcome will be a reference document, easy to read and containing guidelines and practical hints to enable FAIR best practices.

To this end, the task will have the specific objectives of:

Providing advocacy of FAIR data principles within the nanoscience community, actively promoting its advantages to senior management, instrument scientists and user communities. This will include providing FAIR data guidelines working closely with WP 5 for the provision of training material.

Providing recommendations for adapting facilities' policies and practices to facilitate the publication and use of FAIR data and aligning those policies in the light of the policy recommendations of the EOSC, and in the light of developments such as GDPR.

Developing a common metadata framework to support FAIR data within the nanoscience community. This would include making recommendations on publishing data into EOSC data discovery portals (e.g. OpenAire- Zenodo, EUDat-B2Find).

Develop an approach to facilities' data management plans (DMP) and link DMPs to metadata repositories including capturing metadata at different stages in the data lifecycle. The RIANA DMP (WP 1) will be adopted accordingly.

Promote best practices in Persistent Identifier Infrastructure (PID), including interlinking between PIDs from a variety of PID providers and for a variety of resources such as raw and derived data, people, publications, funders, instruments and equipment, samples, and software.

To help disseminating FAIR best practices the following initiatives will be developed: Setting up an open desk about FAIR data where any facility of the RIANA network may consult on topics related to FAIR data. Monitoring project publications and actively promoting upload of data to repositories for all these publications.

#### Task 6.4 Evaluation of generated impact (FZJ, UAM, DESY, all) M1-M48

FZJ, in collaboration with the other partners of the consortium, will define indicators to evaluate the impact of the project, in particular as far as TA and industry activities are concerned. This task will build on the work done in the RI Paths project<sup>55,56</sup>, which provides a set of recommended indicators in different "pathways" specific to RIs (RI-PATHS - Charting Impact Pathways of Investment in Research Infrastructures | EFIS Centre). The most relevant ones are: the access of academic users, with generation of knowledge encoded in scientific publications; the innovation input to companies (with emphasis on SMEs); the collaboration of industry and academia to access the facilities. The expertise provided by the RI Paths project is available for this WP in RIANA thanks to the involvement of the UAM team in both projects.

The indicators will be both quantitative (e.g., amount of access provided to industrial users) and qualitative (based on feedback from users). The indicators will be analyzed systematically, their impact will be assessed and a report will be written, both to understand the impact generated and to disseminate the outcomes of the project.

This task will start with a detailed definition of the indicators and the impact analysis methodology. The campaign to collect input for the impact study will be performed systematically until the end of the project. The impact analysis will be carried out at two points during the project (M31 & M46), following the same methodology and using accumulated data in the second iteration. As the impact evaluation study is an ambitious and important exercise, it is planned to devote some funds to subcontract external expertise to accomplish this objective.

and it is thus planned to devote some funds to engaging professional support to accomplish this objective.

## STAFF EFFORT

Staff effort per participant							
Grant Preparation (Work packages - Effort screen) — Enter the info.							
Participant	WP1	WP2	WP3	WP4	WP5	WP6	Total Person-Months
1 - DESY	48.00	135.00	1.00	16.00			200.00
2 - FZJ	2.00	50.00	3.00	8.00		6.00	69.00
3 - ULUND		25.00	38.00				63.00
4 - CNR			1.00	58.00			59.00
4.1 - FBK					2.00		2.00
5 - ALBA-CELLS		25.00		8.00			33.00
6 - FORTH				36.00	12.00		48.00
7 - HZDR		25.00		4.00	8.00		37.00
8 - UAM	2.00	25.00	1.00			11.00	39.00
9 - AREA		20.50	1.00	24.00			45.50
10 - ESRF			3.00	21.00			24.00
11 - CNRS			2.50		4.00		6.50
11.1 - U. Bordeaux					6.00		6.00
11.2 - ULille			0.50				0.50
12 - INFLPR RA			1.00		4.00		5.00
13 - POLIMI				8.00			8.00
14 - EUROPEAN XFEL			3.00	8.00			11.00
15 - UC					2.00		2.00
16 - RBI		25.00				11.00	36.00

<b>Staff effort per participant</b>							
<i>Grant Preparation (Work packages - Effort screen) — Enter the info.</i>							
<b>Participant</b>	<b>WP1</b>	<b>WP2</b>	<b>WP3</b>	<b>WP4</b>	<b>WP5</b>	<b>WP6</b>	<b>Total Person-Months</b>
17 - SOLARIS JU		25.00					25.00
18 - SOLEIL		25.00				4.50	29.50
20.7 - FVB-MBI			24.00				24.00
21 - ICN2		12.50					12.50
23 - UANTWERPEN		25.00					25.00
24 - BUT						2.00	2.00
25 - KTU		25.00					25.00
26 - IMT Bucharest		25.00					25.00
29 - AMU		25.00					25.00
<b>Total Person-Months</b>	52.00	493.00	79.00	191.00	38.00	34.50	887.50



## LIST OF DELIVERABLES

### Deliverables

*Grant Preparation (Deliverables screen) — Enter the info.*

*The labels used mean:*

*Public — fully open (🚩 automatically posted online)*

*Sensitive — limited under the conditions of the Grant Agreement*

*EU classified — RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision [2015/444](#)*

Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D1.1	Kick-off report	WP1	1 - DESY	R — Document, report	PU - Public	2
D1.2	Data Management Plan	WP1	1 - DESY	DMP — Data Management Plan	PU - Public	3
D1.3	AM Report 1	WP1	1 - DESY	R — Document, report	PU - Public	12
D1.4	AM Report 2	WP1	1 - DESY	R — Document, report	PU - Public	24
D1.5	AM Report 3	WP1	1 - DESY	R — Document, report	PU - Public	36
D1.6	AM Report 4	WP1	1 - DESY	R — Document, report	PU - Public	48
D1.7	NANO Roadmap	WP1	1 - DESY	R — Document, report	PU - Public	46
D1.8	Ethics report 1	WP1	1 - DESY	OTHER	PU - Public	12
D1.9	Ethics report 2	WP1	1 - DESY	OTHER	PU - Public	36
D1.10	Policy Brief	WP1	1 - DESY	R — Document, report	PU - Public	24
D1.11	Cumulative Expenditure M12	WP1	1 - DESY	R — Document, report	PU - Public	12
D1.12	Cumulative Expenditure M36	WP1	1 - DESY	R — Document, report	PU - Public	36
D2.1	Junior scientist allocation	WP2	9 - AREA	R — Document, report	PU - Public	3
D2.2	Science service report 1	WP2	1 - DESY	R — Document, report	PU - Public	24

**Deliverables**

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D2.3	Science service report 2	WP2	1 - DESY	R — Document, report	PU - Public	48
D2.4	JSB experience reports 1	WP2	1 - DESY	R — Document, report	PU - Public	15
D2.5	JSB experience reports 2	WP2	1 - DESY	R — Document, report	PU - Public	46
D3.1	Guide for the Proposal Review Panel	WP3	3 - ULUND	R — Document, report	SEN - Sensitive	4
D3.2	User guide	WP3	3 - ULUND	R — Document, report	PU - Public	6
D3.3	Mid-term report on TA and VA provision	WP3	11 - CNRS	R — Document, report	SEN - Sensitive	24
D3.4	Report on TA and VA provision	WP3	11 - CNRS	R — Document, report	SEN - Sensitive	48
D4.1	Report on engagement to industrial community and market analysis	WP4	6 - FORTH	R — Document, report	PU - Public	18
D4.2	Evaluation report	WP4	4 - CNR	R — Document, report	PU - Public	18
D4.3	Midterm report on innovation service	WP4	10 - ESRF	R — Document, report	PU - Public	24
D4.4	Report on academic proposals of industrial interest	WP4	1 - DESY	R — Document, report	PU - Public	42
D4.5	Report on industry- oriented pilot cases	WP4	10 - ESRF	R — Document, report	PU - Public	46
D4.6	Final report of WP 4	WP4	4 - CNR	R — Document, report	PU - Public	48
D5.1	Report on training activities	WP5	6 - FORTH	R — Document, report	PU - Public	24
D5.2	Final report on training activities	WP5	6 - FORTH	R — Document, report	PU - Public	46

**Deliverables**

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D6.1	Dissemination, exploitation and communication plan	WP6	8 - UAM	R — Document, report	PU - Public	6
D6.2	FAIR data guideline document	WP6	18 - SOLEIL	R — Document, report	PU - Public	12
D6.3	Surveys and impact evaluation study 1	WP6	2 - FZJ	R — Document, report	PU - Public	31
D6.4	Surveys and impact evaluation study 2	WP6	2 - FZJ	R — Document, report	PU - Public	46

**Deliverable D1.1 – Kick-off report**

<b>Deliverable Number</b>	D1.1	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Kick-off report		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	2	<b>Work Package No</b>	WP1

<b>Description</b>
Kick-off Meeting report written

**Deliverable D1.2 – Data Management Plan**

<b>Deliverable Number</b>	D1.2	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Data Management Plan		
<b>Type</b>	DMP — Data Management Plan	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	3	<b>Work Package No</b>	WP1

<b>Description</b>
Data Management Plan written

**Deliverable D1.3 – AM Report 1**

<b>Deliverable Number</b>	D1.3	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	AM Report 1		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP1

<b>Description</b>
Reports of Annual Meetings written

**Deliverable D1.4 – AM Report 2**

<b>Deliverable Number</b>	D1.4	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	AM Report 2		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP1

<b>Description</b>
Reports of Annual Meetings written



**Deliverable D1.5 – AM Report 3**

<b>Deliverable Number</b>	D1.5	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	AM Report 3		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP1

<b>Description</b>
Reports of Annual Meetings written

**Deliverable D1.6 – AM Report 4**

<b>Deliverable Number</b>	D1.6	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	AM Report 4		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP1

<b>Description</b>
Reports of Annual Meetings written

**Deliverable D1.7 – NANO Roadmap**

<b>Deliverable Number</b>	D1.7	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	NANO Roadmap		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP1

<b>Description</b>
Roadmap of nanoscience at EU research infrastructures

**Deliverable D1.8 – Ethics report 1**

<b>Deliverable Number</b>	D1.8	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Ethics report 1		
<b>Type</b>	OTHER	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP1

<b>Description</b>
Ethics advisor report & update

**Deliverable D1.9 – Ethics report 2**

<b>Deliverable Number</b>	D1.9	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Ethics report 2		
<b>Type</b>	OTHER	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP1

<b>Description</b>
Ethics advisor report & update

**Deliverable D1.10 – Policy Brief**

<b>Deliverable Number</b>	D1.10	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Policy Brief		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP1

<b>Description</b>
Brief feedback on the relevance and contribution of the project to the policy areas

**Deliverable D1.11 – Cumulative Expenditure M12**

<b>Deliverable Number</b>	D1.11	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Cumulative Expenditure M12		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP1

<b>Description</b>
Finacial Report on the cumulative project expenditure

**Deliverable D1.12 – Cumulative Expenditure M36**

<b>Deliverable Number</b>	D1.12	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Cumulative Expenditure M36		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	36	<b>Work Package No</b>	WP1

<b>Description</b>
Finacial Report on the cumulative project expenditure

**Deliverable D2.1 – Junior scientist allocation**

<b>Deliverable Number</b>	D2.1	<b>Lead Beneficiary</b>	9. AREA
<b>Deliverable Name</b>	Junior scientist allocation		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	3	<b>Work Package No</b>	WP2

<b>Description</b>
Description of the procedure to allocate Junior Scientists to TA proposals and projects

**Deliverable D2.2 – Science service report 1**

<b>Deliverable Number</b>	D2.2	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Science service report 1		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP2

<b>Description</b>
Science service report 1 written

**Deliverable D2.3 – Science service report 2**

<b>Deliverable Number</b>	D2.3	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Science service report 2		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP2

<b>Description</b>
Science service report 1 written

**Deliverable D2.4 – JSB experience reports 1**

<b>Deliverable Number</b>	D2.4	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	JSB experience reports 1		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	15	<b>Work Package No</b>	WP2

<b>Description</b>
JSB experience reports written

**Deliverable D2.5 – JSB experience reports 2**

<b>Deliverable Number</b>	D2.5	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	JSB experience reports 2		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP2

<b>Description</b>
JSB experience reports written

**Deliverable D3.1 – Guide for the Proposal Review Panel**

<b>Deliverable Number</b>	D3.1	<b>Lead Beneficiary</b>	3. ULUND
<b>Deliverable Name</b>	Guide for the Proposal Review Panel		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	4	<b>Work Package No</b>	WP3

<b>Description</b>
Guide for review panel written

**Deliverable D3.2 – User guide**

<b>Deliverable Number</b>	D3.2	<b>Lead Beneficiary</b>	3. ULUND
<b>Deliverable Name</b>	User guide		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	6	<b>Work Package No</b>	WP3

<b>Description</b>
User guide written

**Deliverable D3.3 – Mid-term report on TA and VA provision**

<b>Deliverable Number</b>	D3.3	<b>Lead Beneficiary</b>	11. CNRS
<b>Deliverable Name</b>	Mid-term report on TA and VA provision		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP3

<b>Description</b>
Mid-term report on TA and VA provision written

**Deliverable D3.4 – Report on TA and VA provision**

<b>Deliverable Number</b>	D3.4	<b>Lead Beneficiary</b>	11. CNRS
<b>Deliverable Name</b>	Report on TA and VA provision		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	SEN - Sensitive
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP3

<b>Description</b>
Report on TA and VA provision written

**Deliverable D4.1 – Report on engagement to industrial community and market analysis**

<b>Deliverable Number</b>	D4.1	<b>Lead Beneficiary</b>	6. FORTH
<b>Deliverable Name</b>	Report on engagement to industrial community and market analysis		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	18	<b>Work Package No</b>	WP4

<b>Description</b>
First report written on engagement to industrial community and market analysis

**Deliverable D4.2 – Evaluation report**

<b>Deliverable Number</b>	D4.2	<b>Lead Beneficiary</b>	4. CNR
<b>Deliverable Name</b>	Evaluation report		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	18	<b>Work Package No</b>	WP4

<b>Description</b>
Report written with critical evaluation and suggestions for improvements of SME access

**Deliverable D4.3 – Midterm report on innovation service**

<b>Deliverable Number</b>	D4.3	<b>Lead Beneficiary</b>	10. ESRF
<b>Deliverable Name</b>	Midterm report on innovation service		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP4

<b>Description</b>
Midterm report on customized access to innovation service

**Deliverable D4.4 – Report on academic proposals of industrial interest**

<b>Deliverable Number</b>	D4.4	<b>Lead Beneficiary</b>	1. DESY
<b>Deliverable Name</b>	Report on academic proposals of industrial interest		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	42	<b>Work Package No</b>	WP4

<b>Description</b>
Report on screening of academic proposals with possible applications of industrial interest

**Deliverable D4.5 – Report on industry- oriented pilot cases**

<b>Deliverable Number</b>	D4.5	<b>Lead Beneficiary</b>	10. ESRF
<b>Deliverable Name</b>	Report on industry- oriented pilot cases		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP4

<b>Description</b>
Report on industry- oriented pilot cases

**Deliverable D4.6 – Final report of WP 4**

<b>Deliverable Number</b>	D4.6	<b>Lead Beneficiary</b>	4. CNR
<b>Deliverable Name</b>	Final report of WP 4		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	48	<b>Work Package No</b>	WP4

<b>Description</b>
Final report on customized access to innovation service

**Deliverable D5.1 – Report on training activities**

<b>Deliverable Number</b>	D5.1	<b>Lead Beneficiary</b>	6. FORTH
<b>Deliverable Name</b>	Report on training activities		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	24	<b>Work Package No</b>	WP5

<b>Description</b>
Report on RIANA training activities

**Deliverable D5.2 – Final report on training activities**

<b>Deliverable Number</b>	D5.2	<b>Lead Beneficiary</b>	6. FORTH
<b>Deliverable Name</b>	Final report on training activities		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP5

<b>Description</b>
Final report on RIANA training activities and their impact

**Deliverable D6.1 – Dissemination, exploitation and communication plan**

<b>Deliverable Number</b>	D6.1	<b>Lead Beneficiary</b>	8. UAM
<b>Deliverable Name</b>	Dissemination, exploitation and communication plan		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	6	<b>Work Package No</b>	WP6

<b>Description</b>
Dissemination, exploitation and communication plan written

**Deliverable D6.2 – FAIR data guideline document**

<b>Deliverable Number</b>	D6.2	<b>Lead Beneficiary</b>	18. SOLEIL
<b>Deliverable Name</b>	FAIR data guideline document		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	12	<b>Work Package No</b>	WP6

<b>Description</b>
FAIR data guideline document written, based on previous experience, available at project webpage

**Deliverable D6.3 – Surveys and impact evaluation study 1**

<b>Deliverable Number</b>	D6.3	<b>Lead Beneficiary</b>	2. FZJ
<b>Deliverable Name</b>	Surveys and impact evaluation study 1		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	31	<b>Work Package No</b>	WP6

<b>Description</b>
Surveys with their corresponding impact evaluation study written

**Deliverable D6.4 – Surveys and impact evaluation study 2**

<b>Deliverable Number</b>	D6.4	<b>Lead Beneficiary</b>	2. FZJ
<b>Deliverable Name</b>	Surveys and impact evaluation study 2		
<b>Type</b>	R — Document, report	<b>Dissemination Level</b>	PU - Public
<b>Due Date (month)</b>	46	<b>Work Package No</b>	WP6

<b>Description</b>
Surveys with their corresponding impact evaluation study written





## LIST OF MILESTONES

<b>Milestones</b>						
<i>Grant Preparation (Milestones screen) — Enter the info.</i>						
<b>Milestone No</b>	<b>Milestone Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Means of Verification</b>	<b>Due Date (month)</b>	
1	NSB Constitution	WP1	1-DESY	Up and running	6	
2	DEI (Diversity, Equality, Inclusion) Officer	WP1	1-DESY	Appointed and started to work	2	
3	Ethics Advisor	WP1	1-DESY	Appointed and started to work	6	
4	5 Junior Scientist positions suggested by NSB	WP1	1-DESY	NSB agreed on topics for the Junior scientists	16	
5	List of 16 Junior Scientists	WP2	9-AREA	Employment in process	9	
6	Final list of all Junior Scientists	WP2	9-AREA	Employment in process	23	
7	Proposal management system operational	WP3	3-ULUND	Up and running	6	
8	External Selection Panel established	WP3	3-ULUND	Experts selected and panel approved by GA	6	
9	RIANA call is open	WP3	3-ULUND	Call is announced on webpage	6	
10	RIANA call is closed	WP3	3-ULUND	Call is closed on webpage	42	
11	PICO strategy plan and implementation	WP4	4-CNR	Report written	12	
12	Call on Invite an Expert	WP5	6-FORTH	Call is sent out to the RIANA consortium	6	
13	Call on staff exchange visits	WP5	6-FORTH	Call is sent out to the RIANA consortium and published on webpage (internal)	9	
14	Calls on innovation contest 1	WP5	6-FORTH	Call is sent out to the RIANA consortium	24	
15	Calls on innovation contest 2	WP5	6-FORTH	Call is sent out to the RIANA consortium	44	
16	Database for online training activities	WP5, WP6	6-FORTH	Database is accessible	6	
17	First version of webpage in production	WP6	8-UAM	RIANA webpage is online	3	
18	First dissemination material to address users	WP6	8-UAM	RIANA leaflet, poster and video are ready,	6	

<b>Milestones</b>						
<i>Grant Preparation (Milestones screen) — Enter the info.</i>						
<b>Milestone No</b>	<b>Milestone Name</b>	<b>Work Package No</b>	<b>Lead Beneficiary</b>	<b>Means of Verification</b>	<b>Due Date (month)</b>	
19	Definition of impact survey and - evaluation methodology	WP6	8-UAM	EB agreed on impact survey and evaluation method	18	
20	Poster, set of slides on project outcomes	WP6	8-UAM	Material is available for consortium and content published on webpage	24	
21	Poster, set of slides on project results	WP6	8-UAM	Material is available for consortium and content published on webpage	43	

## LIST OF CRITICAL RISKS

<b>Critical risks &amp; risk management strategy</b>						
<i>Grant Preparation (Critical Risks screen) — Enter the info.</i>						
<b>Risk number</b>	<b>Description</b>	<b>Work Package No(s)</b>	<b>Proposed Mitigation Measures</b>			
1	Proposal management system not operational for first call	WP3	Regular monitoring of progress, prepare a web-based backup solution based on ReMade@ARI			
2	Restricted access to facilities due to e. g. another pandemic	WP4, WP3, WP2	Delay implementation of proposed work, reallocate access to alternative facilities, or have work done by local staff under remote guidance.			
3	Instruments not available due to severe damage	WP4, WP3	Delay implementation of proposed work, reallocate access to alternative facilities.			
4	Too few appropriate applications for Junior Scientists	WP2	Additional recruiting efforts through RIANA partner networks and personal contacts; existing facility staff will step in for the science service temporarily			

<b>Critical risks &amp; risk management strategy</b>			
<i>Grant Preparation (Critical Risks screen) — Enter the info.</i>			
<b>Risk number</b>	<b>Description</b>	<b>Work Package No(s)</b>	<b>Proposed Mitigation Measures</b>
5	Insufficient number of experts for proposal review	WP3	Reach out to existing networks related to nanoscience/technology e.g. AMI2030 and more globally
6	Difficulty to attract participants to the Innovation Contests	WP4, WP5, WP2	Tailoring the outreach and communication strategy to target a larger audience, advertise the contest broadly, including SME's. Delaying the first innovation contest at a later date.
7	Low response by SME for RIANA access	WP4	Improve outreach to industry through exhibitions and RI contacts
8	Low availability of facilities	WP4, WP3, WP2	Involve SSB to evaluate the problem and to find solutions; reassign user projects to other facilities
9	Difficulty to gather significant number of participants to the RIANA user meetings	WP5, WP3	Organization of user meetings at a better time and link it to an attractive other event.
10	During training schools there exists the risk of limited access to various infrastructure equipment and instruments or difficulties in the free circulation of persons	WP5	Parallel hands-on training sessions with low number of participants will be pursued and on-line training schools may be realized
11	Low response by user community on outreach and training activities	WP5, WP3, WP6	Use more already established user events to promote in-person for RIANA training and access opportunities, provide easier to participate online events, review together with NSB for more interesting training activities and better outreach channels
12	General cost increases due to inflation	WP4, WP5, WP1, WP3, WP6, WP2	Anticipated already in the budget to some extent



## RESEARCH INFRASTRUCTURE

### Transnational/virtual access to research infrastructure

Grant Preparation (Research Infrastructure screen) — Enter the info.

The labels used mean:

Access provider short name — Short name of the beneficiary, affiliated entity or associated partner. It can be the infrastructure owner or, if the owner of the infrastructure is another third party contributing resources, the beneficiary/affiliated entity who they are provided to (and who coordinates access to them).

Installation number — Number progressively the installations of a same infrastructure. An installation is a part or a service of an infrastructure that can be used independently from the rest.

Country — Enter the code of the country where the installation is located (or INT if access is provided by an international organisation, ERIC, or similar legal entity with international membership).

For mobile installations (e.g. a research vessel), give the country of its usual location (e.g. the homeport).

Type of access — Use the following access codes:

– 'TA-UC' or 'VA-UC' for transnational/virtual access with access costs declared on the basis of unit cost

– 'TA-AC' or 'VA-AC' for transnational/virtual access with access costs declared as actual costs

– 'TA-CB' or 'VA-CB' for transnational/virtual access with access costs declared as a combination of actual costs and unit cost.

Associated partners must indicate actual cost (TA-AC or VA-AC) and put 0 in the actual cost column.

Amount per unit — To be filled in only if you have installations for which you use unit costs (or a combination of actual costs and unit costs) (VA-UC, TA-UC, TA-CB or VA-CB).

Access costs — Cost of the access provided under the project. For access costs on the basis of unit costs, multiply the amount per unit by the quantity of access to be provided.

Columns with \* should be filled only for transnational access, not for virtual access.

Access Provider Short Name	Infrastructure Short Name	Installation		Country	Type of Access	Unit of Access	Estimated Quantity of Access	Amount per Unit (€)	Access Costs		Estimated Number of Users	Estimated Number of User Projects *
		Number	Short Name						as Unit Costs	as Actual Costs		
1 - DESY	FLASH	1	FLASH	DE	TA - UC	h	120.0	195.00	23 400.00	2	1	
1 - DESY	PETRA III	1	PETRA III	DE	TA - UC	h	1200.0	195.00	234 000.00	24	12	
1 - DESY	TNA Reserve	1	TNA Reserve	DE	TA - UC	h	5128.0	195.00	000 000.00	80	40	
20.1 - IZF	CALT	1	CALT	HR	TA - UC	h	520.0	125.00	65 000.00	10	5	
2 - FZJ	ER-C	1	ER-C	DE	TA - UC	h	1680.0	97.50	163 800.00	34	17	
2 - FZJ	IBI-4	1	IBI-4	DE	TA - UC	h	600.0	40.00	24 000.00	12	6	
2 - FZJ	JSC	1	JSC	DE	VA - UC	CPUh	5000000.0	0.02	100 000.00	20		
2 - FZJ	MLZ	1	MLZ	DE	TA - UC	h	960.0	315.00	302 400.00	20	10	
20.2 - CLPU	CLPU	1	CLPU	ES	TA - UC	h	160.0	125.00	20 000.00	4	2	

Access Provider Short Name	Infrastructure Short Name	Installation		Country	Type of Access	Unit of Access	Estimated Quantity of Access	Amount per Unit (€)	Access Costs		Estimated Number of Users	Estimated Number of User Projects *
		Number	Short Name						as Unit Costs	as Actual Costs		
3 - ULUND	LLC	1	LLC	SE	TA - UC	h	520.0	125.00	65 000.00		10	5
3 - ULUND	MAXIV	1	MAXIV	SE	TA - UC	h	600.0	195.00	17 000.00		12	6
20.3 - UCM	CLUR	1	CLUR	ES	TA - UC	h	160.0	125.00	20 000.00		4	2
4 - CNR	IMM Agrate	1	IMM Agrate	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4 - CNR	IMM Bologna	1	IMM Bologna	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4 - CNR	IMM Lecce	1	IMM Lecce	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4 - CNR	IMM Nanotec Lecce	1	IMM Nanotec Lecce	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4 - CNR	IMM Roma	1	IMM Roma	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4.1 - FBK	FBK	1	FBK	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4.2 - INRIM	PIQUET	1	PIQUET INRIM	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
4.3 - POLITO	PIQUET	2	PIQUET POLITO	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
20.4 - FZU	HILASE	1	HILASE	CZ	TA - UC	h	520.0	125.00	65 000.00		10	5
5 - ALBA-CELLS	ALBA	1	ALBA	ES	TA - UC	h	912.0	195.00	77 840.00		18	9
20.5 - LENS	LENS	1	LENS	IT	TA - UC	h	480.0	125.00	60 000.00		10	5
6 - FORTH	SMI	1	SMI	EL	TA - UC	h	600.0	40.00	24 000.00		12	6
6 - FORTH	ULF	1	ULF	EL	TA - UC	h	520.0	125.00	65 000.00		10	5
20.6 - CEA	LIDYL	1	LIDYL	FR	TA - UC	h	240.0	125.00	30 000.00		4	2
7 - HZDR	IBC	1	IBC	DE	TA - UC	h	570.0	127.50	72 675.00		12	6
8 - UAM	CMAM	1	CMAM	ES	TA - UC	h	460.0	127.50	58 650.00		10	5
20.8 - MUT	IOE	1	IOE	PL	TA - UC	h	480.0	125.00	60 000.00		10	5
9 - AREA	AREA	1	AREA	IT	TA - UC	h	880.0	97.50	85 800.00		18	9

Access Provider Short Name	Infrastructure Short Name	Installation		Country	Type of Access	Unit of Access	Estimated Quantity of Access	Amount per Unit (€)	Access Costs		Estimated Number of Users	Estimated Number of User Projects *
		Number	Short Name						as Unit Costs	as Actual Costs		
20.9 - UKRI	CLF	1	CLF	UK	TA - UC	h	520.0	125.00	65 000.00		10	5
10 - ESRF	ESRF	1	ESRF	FR	TA - UC	h	480.0	0.00	0.00		10	5
11 - CNRS	CELIA	1	CELIA	FR	TA - UC	h	320.0	125.00	40 000.00		6	3
11 - CNRS	CIRIL/GANIL	1	CIRIL/GANIL	FR	TA - UC	h	370.0	127.50	47 175.00		8	4
11 - CNRS	INFRANALYTICS	1	INFRANALYTICS	FR	TA - UC	h	600.0	40.00	24 000.00		12	6
11 - CNRS	LP3	1	LP3	FR	TA - UC	h	480.0	125.00	60 000.00		10	5
11 - CNRS	SAFIR	1	SAFIR	FR	TA - UC	h	370.0	127.50	47 175.00		8	4
12 - INFLEPR RA	CETAL	1	CETAL	RO	TA - UC	h	480.0	125.00	60 000.00		10	5
13 - POLIMI	CUSBO	1	CUSBO	IT	TA - UC	h	480.0	125.00	60 000.00		10	5
13 - POLIMI	POLIFAB	1	POLIFAB	IT	TA - UC	h	432.0	60.00	25 920.00		8	4
14 - EUROPEAN XFEL	EuXFEL	1	EuXFEL	DE	TA - UC	h	60.0	0.00	0.00		2	1
15 - UC	CLL	1	CLL	PT	TA - UC	h	520.0	125.00	65 000.00		10	5
16 - RBI	AF	1	AF	HR	TA - UC	h	460.0	127.50	58 650.00		10	5
17 - SOLARIS JU	SOLARIS	1	SOLARIS	PL	TA - UC	h	1200.0	195.00	234 000.00		24	12
18 - SOLEIL	SOLEIL	1	SOLEIL	FR	TA - UC	h	936.0	195.00	182 520.00		18	9
19 - FELIX / RU	FELIX	1	FELIX	NL	TA - UC	h	120.0	195.00	23 400.00		2	1
21 - ICN2	ICN2	1	ICN2	ES	TA - UC	h	880.0	97.50	85 800.00		18	9
22 - NTNU	NTNU	1	NTNU	NO	TA - UC	h	400.0	97.50	39 000.00		8	4
23 - UANTWERPEN	UAntwerp	1	UAntwerp	NL	TA - UC	h	1680.0	97.50	163 800.00		34	17
24 - BUT	CzechNanoLab	1	CzechNanoLab	CZ	TA - UC	h	432.0	60.00	25 920.00		8	4
25 - KTU	MNAAPC	1	MNAAPC	LT	TA - UC	h	432.0	60.00	25 920.00		8	4
26 - IMT Bucharest	MINAFAB	1	MINAFAB	RO	TA - UC	h	432.0	60.00	25 920.00		8	4

Access Provider Short Name	Infrastructure Short Name	Installation		Country	Type of Access	Unit of Access	Estimated Quantity of Access	Amount per Unit (€)	Access Costs		Estimated Number of Users	Estimated Number of User Projects *
		Number	Short Name						as Unit Costs	as Actual Costs		
27 - UTARTU	UTartu	1	UTartu	EE	TA - UC	h	432.0	60.00	25 920.00		8	4
28 - INESC MN	MicroNanoFabs@PT	1	MicroNanoFabs@PPT	PT	TA - UC	h	432.0	60.00	25 920.00		8	4
29 - AMU	AMU	1	AMU	PL	TA - UC	h	600.0	40.00	24 000.00		12	6
30 - ISSP UL	ISSP UL	1	ISSP UL	LV	TA - UC	h	432.0	60.00	25 920.00		8	4
31 - CSIC	BDS-Lab	1	BDS-Lab	ES	TA - UC	h	600.0	40.00	24 000.00		12	6
32 - ELETTRA	ELETTRA	1	ELETTRA	IT	TA - UC	h	240.0	160.00	38 400.00		4	2
32 - ELETTRA	FERMI	1	FERMI	IT	TA - UC	h	240.0	195.00	46 800.00		4	2
33 - ZFE	ZFE	1	ZFE	AT	TA - UC	h	880.0	97.50	85 800.00		18	9
34 - Atomki	ATL	1	ATL	HU	TA - UC	h	280.0	127.50	35 700.00		6	3
35 - GSI	GSI	1	GSI	DE	TA - UC	h	390.0	127.50	49 725.00		8	4
36 - IST	LATR	1	LATR	PT	TA - UC	h	450.0	127.50	57 375.00		10	5
37 - JSI	MIC	1	MIC	SI	TA - UC	h	290.0	127.50	36 975.00		6	3
38 - JYU	AccLab	1	AccLab	FI	TA - UC	h	370.0	127.50	47 175.00		8	4
39 - KU Leuven	IMBL	1	IMBL	BE	TA - UC	h	370.0	127.50	47 175.00		8	4
40 - NPI CAS	LT	1	LT	CZ	TA - UC	h	540.0	127.50	68 850.00		10	5
41 - USE	CNA	1	CNA	ES	TA - UC	h	390.0	127.50	49 725.00		8	4
42 - UU	UTL	1	UTL	SE	TA - UC	h	700.0	127.50	89 250.00		14	7
43 - UMCg	AGOR	1	AGOR	NL	TA - UC	h	390.0	127.50	49 725.00		8	4

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## HISTORY OF CHANGE

Date	Change
12.7.2023	<p>As few Milestones and Deliverables had more than one due month in the proposal, the numbering in the portal was changed as below:</p> <p>Milestone 5.3 has 2 due dates and is therefore now called “M14 and M15” accordingly, M14 is now M16, M15 → M17, M16 → M18, M17 → M19, M18 → M20, M19 → M21</p> <p>Deliverable D1.3 contains 4 individual reports and therefore are now numbered “D1.3-D1.6”, all following Deliverables were re-numbered accordingly (D1.7-D1.9)</p> <p>Deliverable D1.5 contains 2 individual reports and therefore is now called “D1.8 &amp; D1.9”, as D2.4 to D2.4 &amp; D2.5 (2 reports), D6.4 and D6.5 (2 surveys)</p>
18.7.2023	In the proposal, TU Graz was entered as beneficiary and ZFE as its affiliated entity. However, this was a misunderstanding and the structure should have been the other way around, what turned out too late before submission and therefore was agreed to be changed during the contract phase: ZFE is now the beneficiary and TU Graz is its affiliated entity (entered in the portal)
18.7.2023	CNRS and the University of Lille have a joint research unit, located in Lille, why the University of Lille is now included as affiliated entity (mentioned under 3.3.7). CELIA is a joint research unit of the CNRS and the Université Bordeaux. For this reason, U. Bordeaux was included as affiliated entity. The AE is now specifically (additionally) mentioned where CELIA is mentioned - now as CELIA/CNRS/U.Bordeaux: in Task 3.3, 5.3 in the portal and in Table 3.1k
19.7.2023	In response to the ESR (comment about “reassuring a large non-scientific public about safety issues”), a sentence on outreach and dissemination of safety aspects of nanotechnology was added in Section 2.2.1.
19.7.2023	In response to the ESR (comment about the “intellectual property rights strategy”), a sentence on IP was added in Section 2.2.5.
19.7.2023	In the portal, the budget was slightly changed (overall, this is cost-neutral): parts of the travel costs foreseen for the junior scientists were added to the Coordinator’s travel budget for later transfers, in order to allow more flexibility in the second phase of the project.
20.7.2023	The abstract wording was slightly updated for a better understanding.
20.7.2023	Laserlab is replaced by Laserlab-Europe throughout for consistency reasons.
20.7.2023	The WP names in Section 1.2.1 were corrected to be consistent with the names in the portal.
20.7.2023	Slight adaption of the task names in the boxes “WP x in a nutshell” for consistency with the WP descriptions in the portal.
20.7.2023	“FVB-MBI” was added to LLE-AISBL in the WP descriptions for clarity.
20.7.2023	The unit cost for e-DREAM facilities is corrected in the WP descriptions from 97 to 97.5 € (this was a typo, and is now consistent with the budget).
20.7.2023	The table of Junior Scientists with their network, host institution and specialization was converted to text in the WP description. Hereby, few typos were eliminated: (a) Host names Soleil → SOLEIL, AREA → FZJ-ERC, Uantwerp → UAntwerp, UKaunus → UKaunas; (b) Specialization of a Junior Scientist: Safety of R&D in nanocharacterization → Safety of nanomaterials
20.7.2023	The table with TNA in Section 1.2.3 and Table 3.1k were updated: a typo in the costs was eliminated; the names of beneficiaries and infrastructures were adapted to be consistent with the portal. The numbering in the Tables 3.1g, 3.1h, 3.i were adapted to be consistent with the participant numbers in the portal.
27.09.2023	<p><b>Annex 1, part A:</b></p> <p>PM for affiliated entities 11.1 U Bordeaux and 11.2 ULille has been added</p> <p>Research infrastructure table:</p> <ul style="list-style-type: none"> <li>- Virtual access provided by BEN2 FZJ: amount changed to 0,02€.</li> <li>- Update of figures of the installation ELETTERA and FERMI.</li> </ul>

	<ul style="list-style-type: none"> <li>- A “Policy Brief” has been added as a Deliverable (D) to M24</li> <li>- Two Deliverables (D) on “Cumulative Expenditure“ has been added (M12 and M36)</li> </ul>
27.09.2023	<p><b>Annex 1, part B:</b></p> <p>Table 3.1g Subcontractor costs items</p> <ul style="list-style-type: none"> <li>- Statement to subcontracts added</li> </ul> <p>Table 3.1h Purchase costs items</p> <ul style="list-style-type: none"> <li>- Statement to highest amount for “consumables” in the other goods, works and services added</li> <li>- Adjustment and/or justification for travel costs and/or adjustments to Other goods, works and services of beneficiaries: COO – DESY, BEN3 – ULUND, BEN5 – ALBA-CELLS, BEN6-FORTH, BEN7 – HZDR, BEN 8 – UAM, BEN 11 – CNRS, BEN 13 – POLIMI, BEN 16 – RBI, BEN 17 – SOLARIS, BEN 21 – ICN2, BEN 25 – KTU, BEN 26 – IMT, BEN 29 – AMU.</li> </ul> <p>Table 3.1i Other costs categories items</p> <ul style="list-style-type: none"> <li>- BEN 2 – FZJ: Amount of virtual access corrected to EUR 100.000,00.</li> <li>- BEN 27 – UTARTU: acronym adapted.</li> </ul> <p>Table 3.1k Summary of trans-national/virtual access provision:</p> <ul style="list-style-type: none"> <li>- Table 3.1k has been removed.</li> </ul>
27.09.2023	<p><b>Annex 2b</b></p> <ul style="list-style-type: none"> <li>- Network EuroNanoLab: the beneficiary for the infrastructure CzechNanoLab has been adapted to BUT.</li> <li>- Information of the reserve EUR 1.000.000 has been added.</li> </ul>
11.10.2023	<p><b>Annex 1, part A:</b></p> <ul style="list-style-type: none"> <li>- BEN 33 – ZFE: Deletion of the affiliated institution TU Graz: As ZFE alone will do the TA, and there are no costs/budget at the TU Graz, ZFE and TU Graz have agreed that TU Graz will drop out.</li> <li>- 6 PM added for BEN 1 – DESY in WP4 for the processing of the SME measurement times</li> <li>- WP4, task 4.5: Updating the number of SMEs to receive measurement times from 33 (old) to 24 (new); explanation: Due to a technical problem in the portal, the very last version of our proposal could not be submitted. In the submitted proposal, the figure of 33 SME was entered. However, this was not the last and correct figure but the correct figure is 24 SME.</li> </ul>
11.10.2023	<p><b>Annex 1, part B:</b></p> <p>Table 3.1g Subcontractor costs items</p> <ul style="list-style-type: none"> <li>- Subcontract for BEN 1 - DESY added (conversion of budget originally scheduled as other good, works and services)</li> </ul> <p>Table 3.1h Purchase costs items</p> <ul style="list-style-type: none"> <li>- BEN1 – DESY: deleted “SME discount and service by intermediary companies (264 k€, WP 4)” (converted to subcontract)</li> </ul>
11.10.2023	<p><b>Annex 2, Estimated budget for the action</b></p> <p>BEN 1 – DESY change of cost category in Taks 4.5 (Customised access for SMEs)</p> <ul style="list-style-type: none"> <li>- 264 k€ converted from other goods, works and services to subcontract</li> <li>- 6 PM (52,8 k€) added in Taks 4.5 for the processing of the SME measurement times</li> </ul> <p>The above mentioned changes are budget neutral</p>

## 1. EXCELLENCE

Recent crises in the form of the Covid-19 pandemic and Russia’s invasion to Ukraine have dramatically shown the vulnerability of our society. In this situation, it is particularly important to uphold European core values such as democracy and sustainability at all levels, including *ecologic sustainability* to keep our planet habitable on the long run, *economic sustainability* to fund a prosper and sustainable way of living, and *social sustainability* to enable every individuum profiting at present and in future.

Based on these core values, our society has developed a framework elucidating a path towards sustainability that is globally penned in the United Nations Sustainable Development Goals (SDG)<sup>1</sup> and at the European level in the European Green Deal<sup>2</sup> converting the linear economy into circular economy as outlaid in the Circular Economy Action Plan (CEAP)<sup>3</sup>. As researchers in the fields of nanoscience and nanotechnology, our mission is to pursue these goals that we thrive to accomplish in materials science with clever ideas, novel materials, and functional structures. The impact of this research is greatly enhanced by offering access to the world’s leading research infrastructures (RI) to the entire nanoscience and nanotechnology research community within the project **Research Infrastructure Access in NANoscience & nanotechnology (RIANA)**. This project encompasses both, *curiosity-driven research* in nanoscience with open research questions for long-term impact, and *challenge-driven research* in nanotechnology with targeted research questions for short- and mid-term impact.

Pursuing the SDG and European Green Deal goals, the Advanced Materials Initiative 2030 (AMI)<sup>4</sup> has identified focus areas of particular relevance for sustainability in the Materials 2030 Manifesto<sup>5</sup>, and outlined a path for materials research in these focus areas in the Materials 2030 roadmap<sup>6</sup>. In all 9 focus areas – *healthcare & medicine, constructions, energy, transportation, home & personal care, packaging, agriculture, textiles, electronics appliance* – nanoscience and nanotechnology plays an outstanding role with great potential to advance these areas: recent technological developments have revolutionized nanoresearch from nanoscopic control of synthesis to nanoprocessing, nanocharacterization, and artificial intelligence (AI) assisted analysis and design of new materials. Consequently, we strive to advance these focus areas within the RIANA project that is ideally suited to foster innovative solutions for sustainability in response to the call **HORIZON-INFRA-2023-SERV-01-01: Research infrastructure services to enable R&I addressing main challenges and EU priorities in the area For RI services for innovative applications of nanoscience and nanotechnology**.

Today, RI in Europe offer access to worldwide leading facilities. However, there is room for improvement in view of customized and joint access to multiple infrastructures targeted to nanoscience and nanotechnology. Specifically, we have identified the following gaps:

- (a) *Knowledge gap*: There is a scientific gap of knowledge in nanoscience and nanotechnology, which translates into the request for excellence in research for societally relevant applications.
- (b) *Innovation gap*: The transfer of results from fundamental research to innovative solutions appears particularly challenging in nanoscience and nanotechnology, which translates into the request to advance the technology readiness level (TRL).<sup>7</sup>
- (c) *Network gap*: The communities of researchers driving large-scale RI and those driving applications in nanoscience and nanotechnology are partially disconnected, which translates into the request to interconnect networks and foster truly cross-disciplinary research.
- (d) *Methodological gap*: There is a methodological gap between infrastructures satisfying single aspects of nanoscience and nanotechnology research. The distinct offers translate into the request of an integral solution offering access to synthesis, processing, and characterization.

Through the RIANA project, we propose to close these gaps through *single-entry access provision with full service from one hand* for the efficient and effective exploitation of Europe’s top-notch RI to accelerate nanoscience and nanotechnology research.

<sup>1</sup> <https://sdgs.un.org/>

<sup>2</sup> <https://www.consilium.europa.eu/en/policies/green-deal/>

<sup>3</sup> [https://environment.ec.europa.eu/strategy/circular-economy-action-plan\\_en/](https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en/)

<sup>4</sup> <https://www.ami2030.eu/>

<sup>5</sup> <https://www.ami2030.eu/wp-content/uploads/2022/06/advanced-materials-2030-manifesto-Published-on-7-Feb-2022.pdf>

<sup>6</sup> [https://www.ami2030.eu/wp-content/uploads/2022/12/2022-12-09\\_Materials\\_2030\\_RoadMap\\_VF4.pdf](https://www.ami2030.eu/wp-content/uploads/2022/12/2022-12-09_Materials_2030_RoadMap_VF4.pdf)

<sup>7</sup> The expression “innovation gap” is often used for a specific gap between low TRL (ca. 1 – 4) covered by academic research, and high TRL (ca. 5 – 9) covered by the private sector. Within RIANA, we refer to “innovation gap” in a broader sense: namely, to TRL gaps at any level, where support is sought for TRL increase.

## 1.1 Objectives and ambition

### 1.1.1 Objectives

With the UN Sustainable Development Goals, the European Green Deal, and the Circular Economy Action Plan, the United Nations and European Commission have presented strategies with increasing specificity that shall serve us as imperative. Pursuing these overarching goals of sustainability, the first objective of RIANA is to close the gaps identified above, specifically targeting challenges faced by conventional research in nanoscience and nanotechnology.

#### (a) Closing the knowledge gap through customized packages of access [WP 2 – 4]

The stakeholders and users of research infrastructures know best which knowledge gaps are to close in their specific field of nanoscience or nanotechnology, and RIANA offers the tools and supports the users with expertise to advance their field of research and development.

RIANA offers for each user coming from academia or industry a customized package that may include:

- guiding users to the research infrastructures that are best suited for the given science or technology case such that users can focus on their case rather than the technicality of research infrastructure,
- tailored access to the world’s leading research infrastructures – even if the research infrastructure may not yet be included in the vast catalogue of offered infrastructures,
- hands-on support conducting experiments and analysing data, enabling inexperienced users to profit from the most sophisticated infrastructures, and
- mentoring by senior scientists.

The package may even include further support that is not yet specified: significant funding is reserved for allocation during the project lifetime in response to the future request of users.

#### (b) Closing the innovation gap through a network of scientists and industry contact officers [WP 2 & 4]

Innovation gaps do not only concern companies, but all challenge-driven research thrives to increase the TRL from the observation of basic principles to the technology exploitation. RIANA supports the TRL increase throughout all levels: first by a network of skilled Junior Scientists distributed across the RIANA infrastructures, second by a network of Industry Contact Officers.

To ensure the challenge-driven research approach on the user side, TRL increase is one of the evaluation criteria for user proposals.

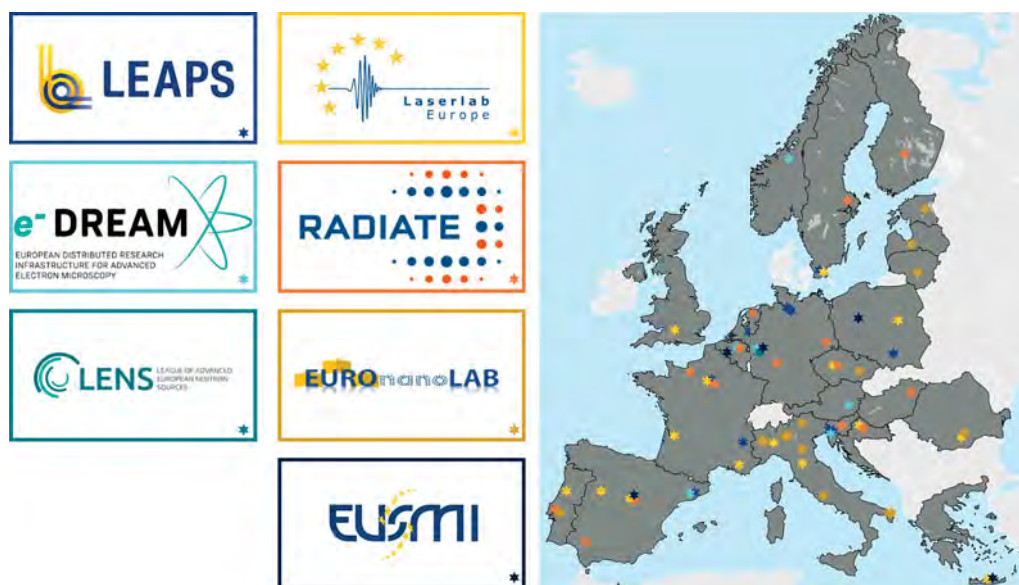


Figure 1: The RIANA consortium encompasses

- 56 beneficiaries offering access to
- 69 infrastructures in
- 22 European countries.

The infrastructures are homogeneously distributed across Europe from South to North and East to West. Hence, RIANA not only advances nanoscience and nanotechnology, but makes a significant contribution towards international collaboration supporting less privileged regions.

**(c) Closing the network gap through proactive cross-disciplinary exchange [WP 1 – 6]**

Given that cross-disciplinary exchange is critical for progress in such interdisciplinary fields as nanoscience and nanotechnology, it is a key objective of RIANA to nurture cross-disciplinary exchange both at the individual and the network levels. RIANA implements such networks at several levels:

- The Nano Strategy Board (NSB) is constituted of stakeholders from different communities including AMI. Acting as steering committee, it ensures the functionality of implemented structures and proactively fosters cross-disciplinary exchange.
- The networks of Junior Scientists and Senior Scientists from all project partners ensure cross-disciplinary exchange at the scientific level.
- The network of Industry Contact Officers ensures cross-disciplinary exchange at the industrial level.
- Training is offered to users to enable them performing research beyond their original comfort zone.

The RIANA consortium itself constitutes a cross-disciplinary international network of networks such that it is its nature to nurture collaboration across communities, infrastructures, and countries.

**(d) Closing the methodological gap through bridges over research methodologies [WP 2 – 4]**

Challenge-driven research in complex fields can only be satisfied by a range of methodologies. In the fields of nanoscience and nanotechnology, this typically encompasses the following 5 categories, see Fig. 3:

- *Simulation* (often artificial intelligence supported) to design and validate models and novel structures
- *Fabrication* to experimentally manufacture the materials with desired properties
- *Processing* to modify synthesized materials and structures
- *Characterization* to evaluate the properties of nanoobjects
- *Analysis* to understand the results from complex measurements yielding a complete picture

With the objective to build bridges across these 5 methodology categories, RIANA offers the complete suite as a single provider.

Beyond the objectives above closing gaps at a *structural level* with advanced concepts of access to research infrastructures, the objectives of RIANA are the following:

**(e) Provide customized trans-national access (TA) to research infrastructures [WP 3]**

RIANA offers TA to the world’s leading research infrastructures targeted to nanoscience and nanotechnology research: provision of **> 35 000 h instrument access**.

This high amount of TA is made possible by a discount access rate negotiated for RIANA with the infrastructure hosts covering in average 2/3 of the actual costs as in-kind contribution.

TA is offered through two distinct routes for non-proprietary and proprietary users.

**(f) Customization of TA through reserve [WP 3]**

RIANA is flexible to offer TA to the research infrastructures that will be requested beyond those that are already foreseen: **1 000 000 € serve as reserve for additional TA to RI** to be allocated upon specific user requests even beyond European infrastructures. For example, the Center for Nanomaterials (CNM at Argonne National Laboratory, USA) and the Brookhaven National Laboratory (USA) will be able to provide the most brilliant and smallest X-ray beam worldwide to users and are secured as RIANA partners.

**(g) Provide virtual access (VA) to computing infrastructures [WP 3]**

RIANA offers VA to high-power computing infrastructure targeted to nanoscience and nanotechnology research with smooth remote access: provision of **> 5 000 000 h CPU**.

The RIANA principle
RIANA offers customized access to state-of-the-art research infrastructures targeting nanoscience and nanotechnology <ul style="list-style-type: none"> <li>✓ matching the societal challenge of sustainability,</li> <li>✓ matching the individual requests of researchers from academia and industry.</li> </ul>

**(h) Provide customized one-to-one service (TA) to academic users [WP 2]**

RIANA offers TA in the form of science service through **21 Junior Scientists** that will serve as scientific backbone with customized one-to-one service matching the user requests. While the topics and host institution of 16 Junior Scientists are defined already for a kick-start of operation upon RIANA approval, **5 Junior Scientist positions serve as reserve for customized access** and shall be allocated only after the first user project started to keep flexibility in response to specific user requests.

**(i) Provide customized one-to-one service to industrial users [WP 4]**

For innovative nanotechnology solutions, a functional interface between industrial users and research infrastructures is critical. RIANA installs a **Platform of Industrial Contact Officers (PICO)** based on the proven concept at some of the large-scale research infrastructures to provide the link between industrial users and RI, offering support in any respect, including contractual.

**(j) Establish access modes through pilot studies [WP 4]**

Targeted to selected topics such as TRL upscaling or interoperability, **pilot studies** in selected nanoapplications shall evaluate how to foster innovation at research most effectively.

**(k) Comprehensive service through a single-entry point and landing page [WP 2 – 3 & 6]**

RIANA runs a user office providing **single-entry access with full service from one hand** and a **landing page** for general requests. This makes research a new experience of joint work between users and research infrastructures, where project administration is streamlined such that users can focus on their research.

**(l) Sustainability of the achievements through training [WP 2 & 5]**

Bidirectional training of users, industry contacts officers, and Junior Scientists guarantees sustainability of the knowledge and expertise beyond the project duration.

**(m) Provision of a roadmap for future research in nanoscience and nanotechnology [WP 1 – 4 & 6]**

The immense expertise at the forefront of research within RIANA will be consolidated in a NANO Roadmap for future research in nanoscience and nanotechnology at RI with an outlook to trends and a suggestion of strategies.

## 1.1.2 Excellence: nano-research beyond state of the art

At the core of the RIANA consortium is the ARIE<sup>8</sup> network that comprises European networks with a focus on large-scale research infrastructures. Targeted towards nanoscience and nanotechnology, further European networks are part of the consortium to offer access to research infrastructures as follows:

<b>LEAPS<sup>9</sup>:</b>	<b>Access to synchrotron- and free-electron-laser based photon sources</b>
<b>Laserlab-Europe<sup>10</sup></b>	<b>Access to laser sources</b>
<b>e-DREAM<sup>11</sup>:</b>	<b>Access to electron microscopy</b>
<b>RADIATE<sup>12</sup>:</b>	<b>Access to ion sources</b>
<b>LENS<sup>13</sup>:</b>	<b>Access to neutron sources</b>
<b>EuroNanoLab<sup>14</sup>:</b>	<b>Access to clean rooms</b>
<b>EUSMI<sup>15,16</sup>:</b>	<b>Access to soft matter research infrastructures, NMR</b>
	<b>Access to high-power computing</b>

<sup>8</sup> Analytical Research Infrastructures in Europe, <https://arie-eu.org>

<sup>9</sup> League of European Accelerator-based Photon Sources, <https://leaps-initiative.eu/>

<sup>10</sup> LaserlabEurope: Integrated Initiative of European Laser Research Infrastructures, <https://www.laserlab-europe.eu/>

<sup>11</sup> European Distributed REsearch Infrastructure for Advanced Electron Microscopy, <https://e-dream-eu.org/>

<sup>12</sup> <https://www.ionbeamcenters.eu/>

<sup>13</sup> League of Advanced European Neutron Sources, <https://lens-initiative.org/>

<sup>14</sup> <https://euronanolab.eu/>

<sup>15</sup> European Soft Matter Infrastructure, <https://eusmi-h2020.eu/>

<sup>16</sup> Jülich Supercomputing Centre (JSC), <https://www.fz-juelich.de/en/ias/jsc>

Beyond these networks offering RI access within RIANA, NFFA is part of the consortium with a crucial role of industry support and networking, but not offering access to avoid conflicts of interest with their ongoing EC-funded project NFFA EUROPE Pilot.<sup>17</sup> Furthermore, we are in contact with the European Joint Research Centre Nanobiotechnology Laboratory that shall be included as partner for access upon RIANA approval (as the JRC are mentioned in the call, they are not part of the proposal itself):

**NFFA<sup>18</sup>: Support of industry access and networking**  
**JRC Nanobiotechnology<sup>19</sup>: Access to laboratory tools for nanobiotechnology**

Covering this breadth of techniques, the RIANA consortium is ideally suited to offer customized access for research in nanoscience and nanotechnology with excellence beyond state of the art:

- ① **RIANA offers access to simply the best research infrastructures for nanoscience and nanotechnology** research that are worldwide at the forefront of their discipline.
- ② **RIANA is globally interconnected** resulting in a steady escalate of infrastructure improvement. Europe’s RI drive infrastructure developments in close collaboration with partners, and RIANA users shall directly profit from these developments. As an example, it is planned to offer access to the X-ray nanoprobe beamlines (CNM and ISN nanoprobes) at the APS-U storage ring (USA) that are scheduled to become operational during the RIANA project.
- ③ **RIANA can build upon proven network organizations for TA provision.** Taking advantage of successful previous collaborative projects, the established network of networks directly translates into small administrative overheads and maximum impact.
- ④ **RIANA combines access to infrastructures with hands-on science support** through a dynamic group of Junior Scientists to enable users performing complex experiments with maximum outcome. In analogy, industrial contact officers respond to the specific requests of industrial users to make best use of the valuable infrastructure access.
- ⑤ **RIANA stands for full service provision from one hand with single-entry access.** Users cannot specialize in every technique – the RIANA approach of highest-level support for infrastructure access enables users to entirely focus on excellence in their research.

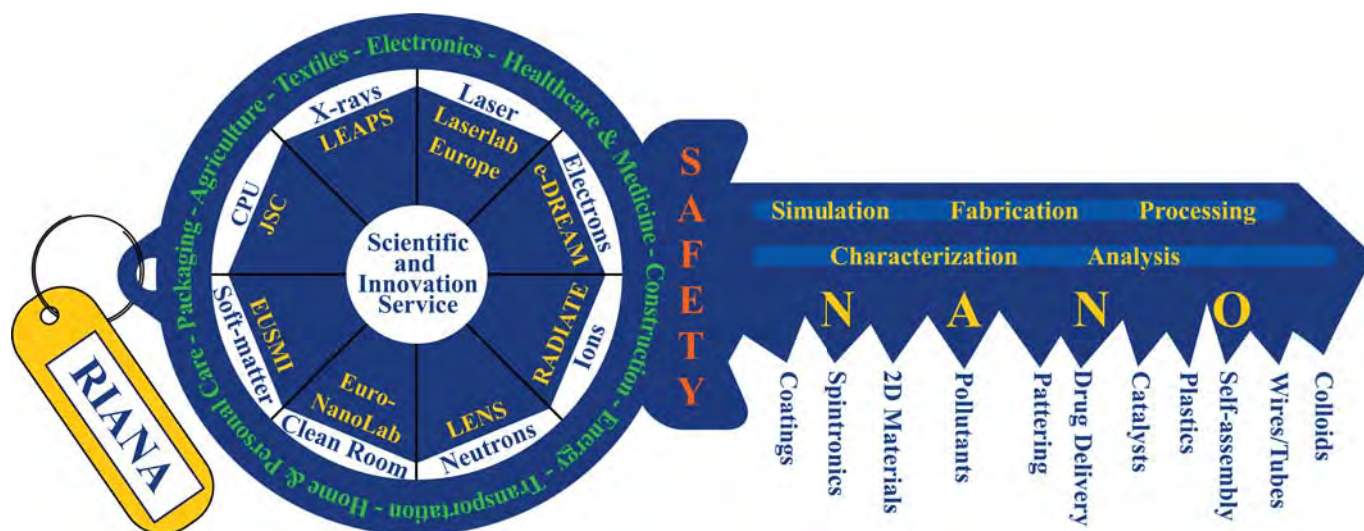


Figure 2: Visualisation of the research infrastructures and their organization in established networks together with the application areas in nanoscience and nanotechnology that are covered within RIANA from simulation to fabrication, processing, characterization and analysis for any type of nanostructures. Safety is key for all of them.

<sup>17</sup> <https://www.nffa.eu/news/project-updates/pilot-nep/>

<sup>18</sup> nanoscience foundries & fine analysis, <https://www.nffa.eu/>

<sup>19</sup> [https://joint-research-centre.ec.europa.eu/laboratories-and-facilities/jrc-nanobiotechnology-laboratory\\_en](https://joint-research-centre.ec.europa.eu/laboratories-and-facilities/jrc-nanobiotechnology-laboratory_en)

### What means “nanoscience” and “nanotechnology”?

There is a multitude of definitions for “nano” (etymologically originating from Greek “*nano*” and Latin “*nanus*” meaning “*dwarf*”), and every material consists of course of elements and structures that are at the scale of nanometres and below. In accordance with common use in the nanoscience and nanotechnology community, we refer to “nanobjects” whenever the structures of an object that determine its key properties are smaller than 100 nm in at least one dimension. Consequently, “nanoscience” is the science of nanoobjects, and “nanotechnology” is the technology exploiting nanoobjects.



Fantastic research in nanoscience and nanotechnology is already ongoing at all research infrastructures that are part of the RIANA consortium. It covers the full breadth of the 9 application areas highlighted in the AMI roadmap as the following examples demonstrate:

#### ✓ Healthcare & medicine



Using small-angle X-ray scattering together with small-angle neutron scattering details of the nanostructure of lipid/polymer nanoparticles, which are used to deliver mRNA, as applied in e.g. COVID-19 vaccines, have been revealed, which allows to optimize the nanoparticles for efficient cell uptake.<sup>20</sup>

#### ✓ Constructions



The presence of titanium in Ground Granulated Blast-furnace Slags has been suspected to modify cement properties. The structural origin of this chemical dependence of the performance of cements is investigated by determining directly the titanium speciation in various European slags by spectroscopic methods (e.g. XANES). Only the slags containing less than 1% TiO<sub>2</sub> show a compressive strength complying with the European Standard.<sup>21</sup>

#### ✓ Energy



By combining high-field NMR spectroscopy, X-ray diffraction, electron microscopy and time-resolved photoluminescence it was possible to elucidate how tetrapropylammonium cations can passivate defects at the surface of lead halide perovskites, and hence, improve the stability and reduce the nonradiative energy losses of these photovoltaic materials.<sup>22</sup>

#### ✓ Transportation



To study the morphological evolution on Pd nanocrystals under oxidising/reduction conditions a portable cell microreactor for correlative experiments has been designed within e-DREAM. The joint study has demonstrated the possibility to merge together the local probe capabilities of STEM with extended beam footprint synchrotron-based techniques (GISAXS-GIWAXS) to study the behaviour of catalytic materials under reactive environments.<sup>23</sup> Such catalytic materials are critical to purify exhaust both in stationary applications and in vehicles.

#### ✓ Home & personal care



Using small angle X-ray and neutron scattering studies combined with rheology, it was shown that sugar-based surfactants have the potential for the development of new sustainable formulated household and personal care products enabling the preparation of surfactant phases with remarkable thermal resilience.<sup>24</sup>

<sup>20</sup> <https://doi.org/10.3390/cells9092034>, <https://doi.org/10.1016/j.biomaterials.2018.10.020>

<sup>21</sup> <https://doi.org/10.1111/jace.17407>

<sup>22</sup> <https://onlinelibrary.wiley.com/doi/abs/10.1002/adfm.201909737>

<sup>23</sup> <https://www.pagepressjournals.org/index.php/microscopie/article/view/7803/7576>

<sup>24</sup> <https://doi.org/10.1016/j.jcis.2020.11.063>



## ✓ Packaging



Two infrastructures from two different networks participating in the project (i.e. Laserlab-Europe and LEAPS) have collaborated with industrial partners to elucidate integrity of food packaging (employing a diode-laser technique monitoring oxygen gas<sup>25</sup>) and to uncover fresh insights into the nanostructure of fiber materials (using advanced X-ray scattering imaging techniques<sup>26</sup>), with the aim to optimize the composition of materials used for paper straws.

## ✓ Agriculture



The photocatalytic degradation of ciprofloxacin (CIP) over CeO<sub>2</sub>/ZnO nanocomposites<sup>27</sup>, and the removal of methylene blue via adsorption and oxidative degradation with Nb<sub>2</sub>O<sub>5</sub> nanomaterials doped with phosphate ions<sup>28</sup> are relevant for water treatment and have been studied by applying X-ray, laser and electron-based characterization methods.

## ✓ Textiles



Tensile properties of elementary flax fibres were investigated through in situ synchrotron X-ray diffraction in order to understand the effect of tensile loading, on the internal reorganisation of crystalline cellulose; for the first time, these experiments were conducted for different relative humidity conditions. The results show that the microfibril angle decreases with the increase of the applied loading, indicating a partial realignment of the cellulose microfibrils with the loading axis.

The strain at break of the fibres increases with increasing relative humidity. This mechanical behaviour shows the plasticizing effect of water on the non-cellulosic amorphous matrix of cell wall.<sup>29</sup>

## ✓ Electronics appliance



Photonic integrated circuits play a key role in upcoming future technologies, such as quantum communication and computing. By means of broad-beam implantation of ions by a scanned focused ion beam or through a mask written by e-beam lithography arrays of single-photon emitters can be generated in silicon in a controlled way. This technology development can only be pursued by the complementary use of ions, e-beams and lasers for the final analysis of the optical devices.<sup>30</sup>

### Evaluation criteria of the review panel for user projects

Access to excellent research infrastructures shall be prioritized for those researchers with the brightest ideas and approach to make best use of the RI for nanoscience and nanotechnology in view of sustainability. The excellence of user projects is upheld by an independent review panel applying sharp evaluation criteria that include:

- ✓ Scientific excellence
- ✓ Potential to TRL increase
- ✓ Level of cross-disciplinarity
- ✓ Impact on safety for environment
- ✓ Impact on nanoscience or nanotechnology

Proposals are evaluated under the impression of the individual background of the authors, balancing privileges and prior experience to foster DEI and novel ideas from inexperienced researchers.

The evaluation criteria are generally the same for users coming from academia or industry, but the weight shifts from “scientific excellence” towards “TRL increase” with the TRL of the user project.

In addition to the project evaluation by the review panel, there will be a feasibility check at the infrastructure level, where the safety aspect is of particular relevance. For equally scored proposals, priority is given to those with participation and leadership of underrepresented minorities and new users.

<sup>25</sup> <https://doi.org/10.1007/s00340-008-3192-2>

<sup>26</sup> <https://www.maxiv.lu.se/article/tetra-pak-commences-first-of-its-kind-sustainability-research-at-max-iv/>

<sup>27</sup> <https://doi.org/10.1016/j.apsusc.2021.150338>

<sup>28</sup> <https://doi.org/10.1016/j.jhazmat.2022.129783>

<sup>29</sup> <https://doi.org/10.1016/j.indcrop.2022.115592>

<sup>30</sup> <https://doi.org/10.1038/s41467-022-35051-5>

### 1.1.3 Ambition: best RI service in the world

A multitude of previous projects and initiatives have established highly successful access modalities and continue improving them. Rather than re-inventing the wheel, **the focus of RIANA lies on access provision with the ambition to combine established best practice approaches** which yields a unique and particularly promising access scheme.

As a result of the evaluation of earlier TA projects and initiatives, the following key concepts are implemented in RIANA:

- ① **RIANA accepts user proposals based on a “continuous call” concept.** Continuous calls can offer access timelier than semi-annual discrete calls that are standard at most large-scale research infrastructures such as synchrotrons and neutron sources and projects such as “ReMade@ARI”<sup>31</sup>. In contrast, we found a way such that all infrastructures can cope with a continuous call within RIANA in the direct interest of academic and industrial users.
- ② **RIANA evaluates user proposals with a moderated Proposal Review Panel (PRP).** One of the challenges related to continuous calls is the requirement of continuous proposal reviews. Laserlab-Europe has solved this challenge with an external moderator coordinating the proposal review process, allowing at the same time smooth procedures and the fair and transparent evaluation of scientific excellence. Consequently, we have adapted this concept for RIANA.
- ③ **RIANA runs a centralized user office.** The concept of a centralized user office as a single access point for users has proven to be useful in Laserlab-Europe, ReMade@ARI, and other projects. Compared to user offices at the infrastructures as in traditional access and in NFFA, the centralized user office streamlines administrative processes, which is both cost-efficient and simple for the users.
- ④ **RIANA supports users with a group of specialized Junior Scientists.** Having assessed the range of obstacles hindering impact generation from RI access, the challenge of analysing big and complex data has been identified as the most severe obstacle. Consequently, the concept of specialized Junior Scientists that form a distributed Smart Science Cluster has been developed within ReMade@ARI. We are convinced that this concept of specialized Junior Scientists is well suited to support users analysing data and have adapted it for RIANA for maximum impact generation from granted RI access.
- ⑤ **RIANA supports industry with industrial contact officers.** Often enough, scientists and industry representatives do not speak the same language. Industrial contact officers can translate, which is needed for fruitful collaboration and maximum impact from RI access. Within LEAPS facilities, such industrial contact officers or liaison officers have been proven to be highly successful and play an important role in projects such as LEAPS-INNOV<sup>32</sup>. Within RIANA, we adapt this concept to all research infrastructures such that smaller RI and industrial users can equally profit from it.
- ⑥ **RIANA offers distinct access routes for proprietary and non-proprietary users.** While most European projects offer some access routes for academic and industrial users, the access routes for industrial users are particularly challenging in such a large consortium due to interests of users and infrastructures conflicting with TA rules and legislation. In fact, not the criterion “industrial” but “proprietary” is delicate. In RIANA, we present a novel approach for proprietary users that satisfies the interests of users and infrastructures simultaneously and is compatible with TA rules and legislation.

For non-proprietary users, RIANA follows a similar approach as ReMade@ARI with the requirement of access to at least two infrastructures. On the one hand, this approach avoids parallel (and potentially competing) access structures to normal access schemes at the facility level, on the other hand, it fosters cross-disciplinary collaboration, which is a key objective of RIANA.

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<sup>31</sup> <https://remade-project.eu/>

<sup>32</sup> <https://www.leaps-innov.eu/>

- ⑦ **RIANA demands FAIR data for maximum impact beyond a specific user project.** Not because it is a formal requirement of this call, but because it is the deepest conviction of the consortium, the principle of FAIR data is implemented at the core of RIANA. Consequently, the corresponding task is led by LEAPS with vast experience from initiatives including PaNOSC<sup>33</sup>/ExPaNDS<sup>34</sup> to implement the FAIR principle into practical solutions.
- ⑧ **RIANA truly enables stakeholders to steer the ship.** We are well aware of the risk of a misfit between the desired access by potential users and the access offered by the RI. While we have carefully evaluated the requests of the nanoscience and nanotechnology community preparing the RIANA proposal, such a misfit cannot be categorically excluded, even more, as the requested access may evolve over time. To counteract this risk, a Nano Strategy Board is installed as essential part of the project management. The most relevant stakeholders will be represented there, and rather than being a pro-forma advisory board, the NSB obtains power to actually steer RIANA through its strategic role in the process of allocating funding that is put aside for that purpose (1 000 000 € for TA to RI and 5 Junior Scientist positions).
- ⑨ **RIANA offers the full nanochain from a single provider.** In contrast to most projects that offer a rather narrow range of techniques targeting specific applications, RIANA covers the full nanochain. It includes high-power computing to simulate nanostructures, synthesis to fabricate nanomaterials, processing to structure nanoobjects and alter material properties, characterization to evaluate properties, and analysis to extract the most valuable information from the data. And all that from a single access provider for the first time in an all-inclusive approach.

The RIANA approach of offering RI access is tailored to the needs of researchers in nanoscience and nanotechnology from academia and industry who are the key stakeholders of the project. Their interest in RIANA is expressed in numerous letters of intent that can be grouped as follows:

- ✓ 56 RI with their user communities in nanoscience and nanotechnology
- ✓ User consortia such as AMI2030
- ✓ Intermediary companies such as Biomimetic and CR Competence AB
- ✓ Numerous SMEs interested in RIANA Innovation Services
- ✓ Prime overseas institutes such as Argonne National Laboratory (USA) with the Advanced Photon Source (APS) and the Center for Nanoscale Materials (CNM) and the Brookhaven National Laboratory (USA)

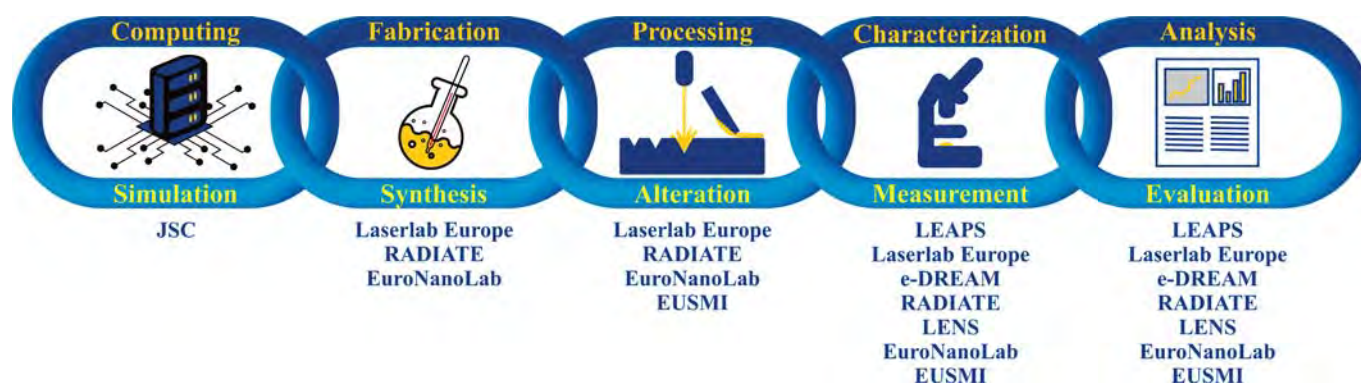


Figure 3: RIANA encompasses the entire process chain in nanoscience research and nanotechnology from the targeted simulation of nanomaterials and structures to their synthesis and manufacturing, to material characterization, and to the analysis supported by experts.

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<sup>33</sup> Photon and Neutron Open Science Cloud, <https://www.panosc.eu/>

<sup>34</sup> European Open Science Cloud (EOSC) Photon and Neutron Data Service, <https://expands.eu/>

## 1.2 Methodology

### 1.2.1 Slim organization for maximum impact

Targeting maximum impact in view of the objectives described in Chapter 1.1, the organizational structure of RIANA is kept slim with the following work packages:

- WP 1: Management**
- WP 2: Customised access to Science Service**
- WP 3: Customised access to Research Infrastructure**
- WP 4: Customised access to Innovation Service**
- WP 5: Training and education**
- WP 6: Outreach, dissemination, and impact**

At the core of the RIANA project, WP 2 – 4 offer customized access. Herein, WP 3 contains all access to RI with WP 2 & 4 offering customized science support and innovation support focused on academic and industrial users, respectively, boosting the impact of RI access from the selection of appropriate measurement methods to the dissemination of results. Work packages 1 takes care of smooth project administration and ethics, and WP 5 & 6 support access with a focus on the long run through training/education and outreach activities. For the contextual work-package overview, we refer to the following Chapters in Chapter 1.2 (WP 1 – 4), to Chapter 2.1 for WP 5, and to Chapter 2.2 for WP 6. A detailed description of the work packages and the tasks therein is given in Chapter 3.

The EC contribution to the RIANA project funding is distributed among the six WPs to direct the EC funding as efficiently as possible towards users benefiting from RI access with enhanced user profit in line with the INFRA-SERV call and the goals specified in section 1.1. **Consequently, 12.5 M€. / 14.5 M€ are devoted WP 2 – 4 for access to scientific service, RI, and innovation.**

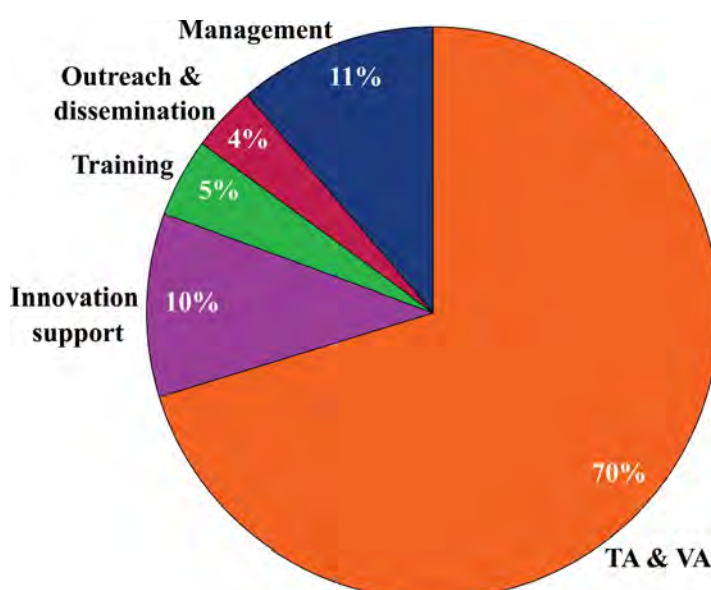
In addition to the EC funding, **at least the same amount of funding is additionally contributed in-kind by the partners of the RIANA consortium:** access to RI is offered at a discount rate covering in average about 1/3 of the real unit costs (RI offering access cover 2/3), and science support is enabled by in-kind offers of the science-support hosts adding 50% PM.

Figure 5: The RIANA budget of total 14 496 953 € is invested for the greatest benefit of users:

- 10 182 421 €: Provision of transnational and virtual access
- 1 504 467 €: Innovation Service to support TRL increase of academic and industrial users
- 645 293 €: Training
- 536 883 €: Outreach & dissemination
- 1 627 889 €: Management including operation of a centralized user office and proposal processing with single-entry point



Figure 4: The structure of work packages is kept slim for efficient access provision for maximum impact.



## 1.2.2 Customized access through single provider: efficient and effective

Entirely oriented towards customized RI provision that matches the actual needs of users in the fields of nanoscience and nanotechnology, RIANA has come up with an effective scheme for RI access.

- ① **Single-entry point:** The centralized RIANA user office operates a landing page that serves at the same time as single-entry point for all access modes to all facilities and services. A well-organized webpage introduces explains different techniques and links to further information from available catalogues such as <https://www.wayforlight.eu/> or <https://www.nffa.eu/> and from the facilities. For prospective users, three prominent buttons are particularly relevant: **Pre-proposal submission**, **Proposal submission**, and **Helpdesk** to either submit a pre-proposal or full proposal, or to request support of any kind.
- ② **Pre-proposal:** The concept of an informal pre-proposal allows to formulate an idea as a low-barrier entry point for users that are less experienced in RI access and do not have the expertise yet to write a competitive proposal. Upon submitting a pre-proposal, the Science or Innovation Service connects the users to Junior / Senior Scientists or Industry Contact Officers who will discuss access opportunities matching the needs of the users, and support them in view of an attractive proposal. The submission of a pre-proposal is not mandatory for experienced users, but several submission / feedback cycles are possible, just as users wish: the customer is king.
- ③ **Full proposal:** The proposal submitted by the users shall justify the RI access and additional support through the Science and Innovation Services. Following the concept of a continuous call, proposals can be submitted anytime. In the interest of focusing on nanoscience and nanotechnology rather than on administration and proposal writing, the structure of the proposals follow a concise template of 3 pages.

Access conditions through RIANA	
RIANA offers customized access to users in nanoscience and nanotechnology through two distinct routes:	
Non-proprietary users	Proprietary users
<i>Typical user</i>	
Academic	Industrial
<i>Access conditions</i>	
(i) TA rules (ii) At least 2 distinct infrastructures requested (iii) Users agree to publish results	(i) TA rules (ii) Access being requested by an SME (iii) Users do not have to publish results
<i>Access reimbursement to infrastructure</i>	
Flat rate corresponding to a fraction of the costs	Full costs, of which RIANA covers the same flat rate as for non-proprietary access, and the users cover the difference to the full costs
<i>Access reimbursement to users</i>	
(i) Travel / accommodation / subsistence is reimbursed for up to two users per trip.	(i) Travel / accommodation / subsistence is reimbursed for up to two users per trip. (ii) Lump sum of 1 000 € is reimbursed for successful proposals by SMEs (iii) Up to 10 000 € are reimbursed for support of SMEs by intermediaries
The two routes share the concept of a continuous call, a central user office, and a moderated proposal review panel. The extra Science and Innovation Service accompanying RI access in RIANA enables inexperienced users to conduct sophisticated experiments and the transfer from conventional in-person access to on-line service.	

Table 1: Comparison of the two access routes for non-proprietary and proprietary users through RIANA.

④ **Proposal evaluation:** Submitted full proposals run through a two-step evaluation.

(a) *Technical feasibility check:* First, each proposal is technically evaluated in form of a “feasibility check” by the installation responsables. Beyond technical feasibility, the technical evaluation includes safety considerations. As it takes place at the prospective installations where experiments shall be performed, these installations are identified beforehand by the Joint Access Node, see ⑤ (a). The outcome of the technical evaluation from each installation is ternary: *accepted*

*accepted with constraints*  
*not accepted.*

(b) *Scientific evaluation:* Second, the content of each proposal is evaluated in a peer-review process by at least 3 independent reviewers. These reviewers are selected by a moderator from a pool of reviewers that are proposed by the RI offering access and approved by the Executive Board. The outcome of the scientific evaluation is a *numeric score between 0 (worst) and 10 (best)*

and is constituted of the average score of all reviewers.

As part of the scientific evaluation, reviewers evaluate also the suitability of access as on-line service (either remote access or full service) or whether in-person access is preferable.

If either the result of the technical evaluation is “not accepted” or the score from the scientific evaluation is below the threshold defined by the Executive Board, the proposal is rejected, otherwise it is granted access. In any case, feedback is given to the proposer from both, technical and scientific evaluation.

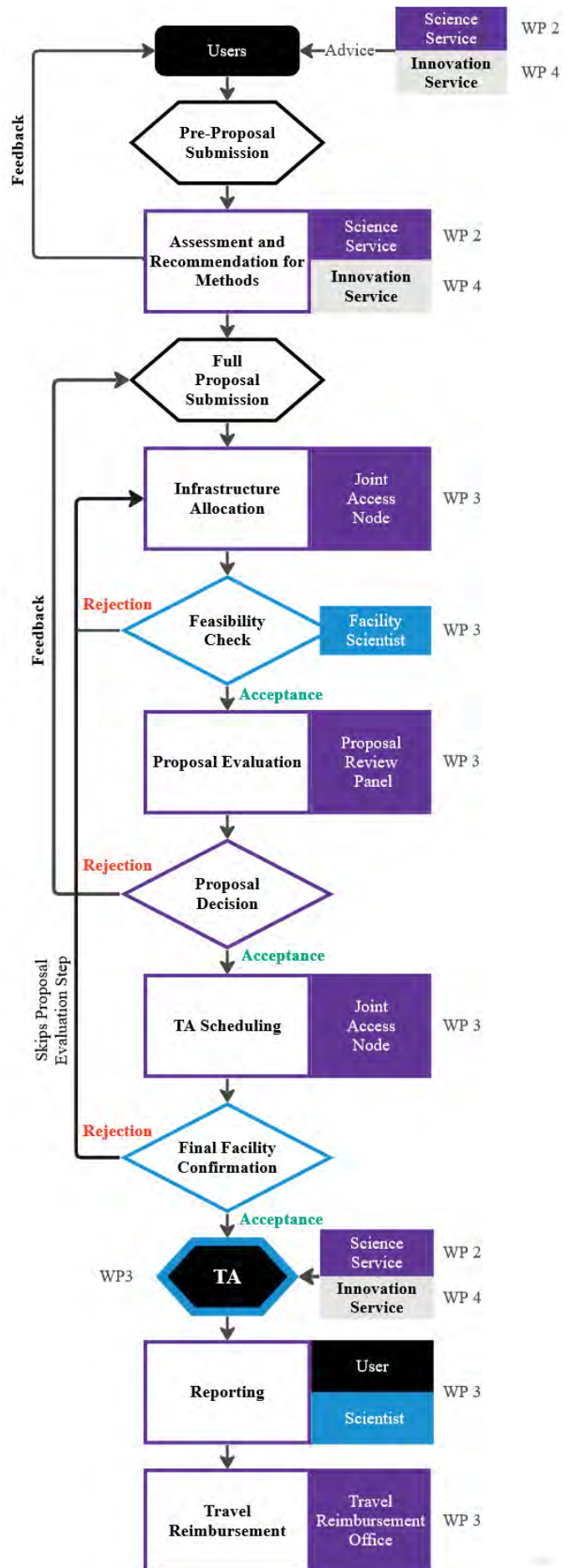


Figure 6: Workflow of user proposals within RIANA. For explanations we refer to the text in Chapter 1.2 and the description of work package 3 in Chapter 3.

⑤ **TA scheduling:** The TA scheduling is a three-step process in close collaboration between the Joint Access Node (JAN) of RIANA that is associated with the central user office, and the user offices / contact persons at requested facilities.

- (a) *Infrastructure allocation:* Although the users may propose the use of certain infrastructures and installations, the JAN is in charge of the allocation of installations to balance the availability and technical capability of installations for optimum RI access.
- (b) *TA scheduling:* Upon proposal approval, TA for RI access is scheduled by the JAN together with the local user office at the facility and the contact person for the installation, whenever possible considering also scheduling wishes of the users.

At latest during TA scheduling, a RIANA contact person – typically a Junior Scientist, but can be also a Senior Scientist or Industry Contact Officer – is assigned to each proposal to tie up a *customized package of access to the Science and Innovation Services* beyond access to the RI.

The infrastructure granting access decides after consulting with the RIANA contact person and the user about the access mode – on-line service or in-person access.

- (c) *Final facility approval:* While the final infrastructure approval is only a pro-forma step in most cases, it is necessary as RIANA does not formally have the right to grant RI access but only infrastructures have. This distinction can be relevant in rare cases when a proposal contradicts national legislation or infrastructure regulation, or scheduling is unacceptable at an installation, e.g. due to infrastructure shutdown. In this sense, the final infrastructure approval implies a veto right of infrastructures.

⑥ **TA provision:** Matching the needs of the users, customized TA is provided according to the tied-up package including:

- (a) *Customized access to RI* [WP 3]
- (b) *Customized access to Science* [WP 2]
- (c) *Customized access to Innovation* [WP 4]

These access modes will be explained in more detail below

⑦ **TA conclusion:** After the TA provision, the users are not left alone, but RIANA offers close follow-up at several levels:

- (a) *Reporting:* Both the users and the assigned RIANA contact person are asked to provide a short report to reflect the RIANA approach and evaluate the impact of the conducted research and development.
- (b) *User reimbursement:* The centralized user office handles the reimbursement of the users for travel, accommodation, and subsistence as soon as it has received the user report.
- (c) *Follow-up:* The customized RIANA support does not end with the access to RI, but the RIANA contact person follows up with the users. Follow up activities may include the support with data analysis in view of timely open-access publications, data handling according to the FAIR principles, evaluation of innovation potential and impact, and finally the guidance towards the submission of further proposals within the RIANA access schemes and beyond – all under the premise to serve users to make most out of RI access.

Note that this INFRA-SERV call does only allow SMEs as industrial users to be subsidized. Larger companies will be advised concerning different access options and directed towards infrastructures that can offer access upon a bilateral agreement.

### 1.2.3 Customized TA and VA to RI

Based on the concepts of access provision described above with distinct access routes for proprietary and non-proprietary access and a streamlined procedure from the continuously open call for proposals to the customized access package, the RIANA consortium has committed to provide access to the following infrastructures:

Acronym beneficiary	Acronym infrastructure	Costs reimbursed (€/h)	Access offered (h)	Number of projects (.)	Number of users (.)	Number of Junior Scientists (.)
<b>GRAND TOTAL</b>			<b>35 748</b>	<b>185</b>	<b>812</b>	<b>21</b>
<b>LEAPS</b>		<b>195</b>	<b>6 108</b>	<b>60</b>	<b>120</b>	<b>5</b>
ESRF	ESRF	*	480	5	10	-
DESY	PETRA III	195	1 200	12	24	1
SOLARIS JU	SOLARIS	195	1 200	12	24	1
SOLEIL	SOLEIL	195	936	9	18	1
ALBA-CELLS	ALBA	195	912	9	18	1
ULUND	MAX IV	195	600	6	12	1
ELETTRA	ELETTRA	160	240	2	4	-
DESY	FLASH	195	120	1	2	-
ELETTRA	FERMI	195	240	2	4	-
STICHTING RADBOUD UNIVERSITEIT	FELIX	195	120	1	2	-
EUROPEAN XFEL	EuXFEL	*	60	1	2	-
<b>Laserlab Europe</b>		<b>125</b>	<b>6 400</b>	<b>64</b>	<b>128</b>	<b>**</b>
IZF	CALT	125	520	5	10	-
CNRS	CELIA	125	320	3	6	-
UKRI	CLF	125	520	5	10	-
CLPU	CLPU	125	160	2	4	-
UCM	CLUR	125	160	2	4	-
POLIMI	CUSBO	125	480	5	10	-
FZU	HILASE	125	520	5	10	-
INFLPR RA	CETAL	125	480	5	10	-
LENS	LENS	125	480	5	10	-
CEA	LIDYL	125	240	2	4	-
ULUND	LLC	125	520	5	10	-
CNRS	LP3	125	480	5	10	-
MUT	IOE	125	480	5	10	-
UC	CLL	125	520	5	10	-
FORTH	ULF	125	520	5	10	-
<b>e-DREAM</b>		<b>97.5</b>	<b>6 400</b>	<b>65</b>	<b>130</b>	<b>4</b>
AREA	AREA	97.5	880	9	18	1
FZJ	ER-C	97.5	1 680	17	34	1
ICN2	ICN2	97.5	880	9	18	1
NTNU	NTNU	97.5	400	4	8	-
UANTWERPEN	UAntwerp	97.5	1 680	17	34	1
ZFE	ZFE	97.5	880	9	18	-

Table 2: Transnational (TA) and virtual access (VA) offered within RIANA at the infrastructures distributed across the networks with the costs charged to the project, estimated number of projects and users, as well as the number of Junior Scientists offering Science Service.

\* The infrastructures ESRF and EuXFEL are legally not allowed to charge RIANA for TA. These most advanced X-ray sources demand particularly strong user support, which is reflected in 3 extra PM for user support within RIANA.

\*\* The access within Laserlab-Europe covers too many different fields to be served by few Junior Scientists. Therefore, extra support by scientists distributed across the infrastructures is reflected in higher unit costs charged to the project (still lower than real costs).



<i>Acronym beneficiary</i>	<i>Acronym infrastructure</i>		<i>Costs reimburse d (€/h)</i>	<i>Access offered (h)</i>	<i>Total reimbursed (€)</i>
<b>RADIATE</b>			<b>127,5</b>	<b>6.400</b>	<b>816.000</b>
HZDR	IBC	h	127,5	570	72.675
UAM	CMAM	h	127,5	460	58.650
UMCG	AGOR	h	127,5	390	49.725
KU Leuven	IMBL	h	127,5	370	47.175
GSI	GSI	h	127,5	390	49.725
Atomki	ATL	h	127,5	280	35.700
UU	UTL	h	127,5	700	89.250
RBI	AF	h	127,5	460	58.650
JSI	MIC	h	127,5	290	36.975
IST	LATR	h	127,5	450	57.375
CNRS	CIRIL/GANIL	h	127,5	370	47.175
USE	CNA	h	127,5	390	49.725
CNRS	SAFIR	h	127,5	370	47.175
NPI CAS	LT	h	127,5	540	68.850
JYU	AccLab	h	127,5	370	47.175
<b>LENS</b>			<b>315</b>	<b>960</b>	<b>302.400</b>
FZJ	MLZ	h	315	960	302.400
<b>EuroNanoLab</b>			<b>60</b>	<b>6.480</b>	<b>388.800</b>
BUT	CzechNanoLab	h	60	432	25.920
CNR	IMM Bologna	h	60	432	25.920
CNR	IMM Agrate	h	60	432	25.920
CNR	IMM Lecce	h	60	432	25.920
CNR	IMM Roma	h	60	432	25.920
CNR	NANOTEC Lecce	h	60	432	25.920
FBK	FBK	h	60	432	25.920
INRIM	PIQUET	h	60	432	25.920
POLITO	PIQUET	h	60	432	25.920
POLIMI	POLIFAB	h	60	432	25.920
UKaunas	MNAAPC	h	60	432	25.920
IMT	MINAFAB	h	60	432	25.920
UTartu	UTartu	h	60	432	25.920
INESC MN	MicroNanoFabs@P1	h	60	432	25.920
ISSP UL	ISSP UL	h	60	432	25.920
<b>EUSMI</b>			<b>40</b>	<b>3.000</b>	<b>120.000</b>
AMU	AMU	h	40	600	24.000
FZJ	IBI-4	h	40	600	24.000
CNRS	INFRANALYTICS	h	40	600	24.000
FORTH	SMI	h	40	600	24.000
CSIC	BDS-Lab	h	40	600	24.000
<b>Super Computing</b>			<b>CPUh</b>	<b>5 000 000 h<sub>CPU</sub></b>	<b>100.000</b>
FZJ	JSC	CPUh	0,02	5 000 000 h <sub>CPU</sub>	100.000
<b>Reserve for customization of TA during project: 1 000 000 €</b>					<b>1.000.000</b>
DESY	TNA Reserve	h	195	5.128	1000000

This table with 35 748 h TA, 5 000 000 h<sub>CPU</sub> VA, and 21 Junior Scientists offering Science Service for 185 projects and 812 users is a very conservative lower limit of access that is planned within RIANA:

- + *For flexibility realizing customizability in access provision, there is an additional reserve of 1 000 000 €:*
  - This amount is not yet allocated to any infrastructure but parked at the coordinator (DESY)
  - The RIANA general assembly decides on the allocation of the reserve upon proposal of the Nano Strategy Board
  - The reserve may be used not only for TA of current beneficiaries, but also for TA at world-class instruments such as at Argonne and Brookhaven National Laboratories in the USA.
  - Based on the average TA costs committed to in the table above, the reserve corresponds to **8443 h TA or 50 000 000 h<sub>CPU</sub> VA in addition to the committed 35 748 h TA, 5 000 000 h<sub>CPU</sub> VA.**
- + *For flexibility realizing customizability in Science Service, there is a reserve of 5 Junior Scientists:*
  - These Junior Scientist positions are not included in the 1 000 000 € reserve and not yet allocated to any infrastructure but parked at the coordinator (DESY).
  - The extra support through the Science and Innovation Service makes the difference to normal TA and VA and boosts the impact of TA and VA in direct response to learnings from earlier projects.
- + *The number of installations offered within RIANA exceeds the number of infrastructures by far*
  - Most infrastructures operate several installations. Some of them are explicitly mentioned in Chapter 3, but this list is not exhaustive: customized access is deep in the mindset of RIANA, which includes access to many more installations that are available at the infrastructures on request.
  - Especially large installations such as X-ray or neutron sources only charge access to their main installations such as beamlines, but TA includes more installations, e.g. for sample preparation and pre-characterization.
- + *The number of projects at each installation is based on 100 h TA per project*
  - In average, 2.2 installations are expected to be accessed per project. Conservatively estimated, the total number of projects being served corresponds to the summed number of projects divided by 2.2.
  - The average number of TA hours per installation is expected to be smaller than 100 h such that a greater number of projects is expected to be effectively served within RIANA **beyond the estimate of 185 projects.**
- + *The number of users is based on 2 users per visit*
  - While the funding will be capped at 2 users per visit, the home institute of users may pay for additional users travelling to the RI offering access. Furthermore, remote control has been implemented at many RI during the pandemic, and user support by the Science and Innovation Services is not limited to the travelling users. **Consequently, the reach of RIANA is far beyond the conservative estimate of 812 users.**

#### WP 3 in a nutshell – Customized access to Research Infrastructures

At the very core of the RIANA project and with 6 678 929 € funding by far the heaviest work package, WP 3 contains the customized access to research infrastructures with the operation of central user office, single-entry point, and review of the user proposals. It is organized as follows:

Task 3.1: Coordination of facility access with single-entry point  
 Task 3.2: Review process  
 Task 3.3: Joint Access Node  
 Task 3.4: User travel reimbursement office



## 1.2.4 Customized access to Science Service

Research infrastructures that offer access to external users – as in the RIANA proposal – are at a pivotal point in history: in the past, the infrastructures have been very complicated to use, experiments have been cumbersome and time consuming. Hence, users have primarily been specialists for the use of certain infrastructures, and most research output has been generated by so-called power users.

This is changing now: as the infrastructures are getting every more complicated and the throughput is ever increased, detailed knowledge of infrastructure is delegated to staff, and users “only” operate the RI at a higher level. This enables users to focus on their actual research topic and advance their field irrespective of the technicality of RI.

Not all RI are at the same level of conversion – just two examples:

*Electron microscopy* is very far in the conversion – standard imaging with modern Scanning Electron Microscopes (SEM) is today simpler than the utilization of light microscopes. Users can utilize such SEM as standard characterization tools without needing to understand all the details of the instruments. On the other hand, electron microscopy specialists can focus on the development of new techniques and offer access to them as a service.

*X-ray microscopy* has just started the conversion: while the throughput has tremendously increased and will continue to increase with diffraction-limited storage rings becoming more readily available during the RIANA project, neither the RI staff nor the users are prepared for that.

Whether in electron or X-ray microscopy or any other RI available within RIANA: there is a gap arising between staff specialized in techniques and users specialized in their science. This gap challenges RI as entire community and puts the outcome very generally at risk: on the one hand, staff scientists are overworked and frustrated not being able to keep up with the user requests, and users cannot optimally profit from RI access lacking expertise and time to dig deeper into the techniques. It is a shame how many data sets – even of high quality – are abandoned due to this gap, which is the worst-case scenario in view of impact generation.


This gap is recognized, and with RIANA we propose a similar approach as the project ReMade@ARI is pioneering. Convinced that this is the way to go, we courageously go ahead and develop further the concept of Science Service offered to users. Consequently, we propose to hire a large team of 21 Junior Scientists that will form a support team distributed over the RI offering access. They constitute the core of the RIANA Science Service and carry the main work load to fill the gap between instrument specialists and users. Their expertise is well balanced to match the predicted user requests, and 5 of 21 Junior Scientists are not yet allocated (neither to an infrastructure nor to a field of expertise), allowing for flexible adjustments according to the user requests while the project is running already. The allocation of the “reserve” Junior Scientists is part of the strategic decisions of the General Assembly upon recommendation of the Nano Strategy Board.

Strictly following the concept of a customized service matching the actual needs of users, the tasks of the Junior Scientists are not pre-defined in detail – they will be defined on a user-project base according to the needs. Hereby, the first contact is crucial that is organized in Task 2.1: prospective (or current) users can access the pool of Junior Scientists any time through a prominent link on the RIANA webpage or by email; this contact is formless for minimum entrance barrier. Similarly, users can submit a pre-proposal to discuss an idea for RI access informally prior to the submission of an actual proposal. To avoid any conflicts of interest, Junior Scientists are entirely decoupled from any review activity of proposals as shown in the proposal workflow (Fig. 6). This strict separation of powers allows Junior Scientists to side with users offering Science Service without users fearing any evaluation.

When the Science Service coordinator receives a request for Science Service, one of the Junior Scientists is assigned to be in charge of the request. But rather than an anonymous ticket-system, the assigned Junior Scientist will follow up with that user and provide Science Service to the needs with the involvement of further Junior Scientists as needed.

The personal follow-up of user projects by Junior Scientists has important impact beyond the science support sought by users. In the larger picture, RIANA (and with that, the European Commission) has a leverage arm to promote values and convert them into practical actions. In particular, Junior Scientists foster DEI, apply the FAIR principle, respect intellectual property, and promote open science, offer a pool of expertise for training, and directly increase the impact of user’s research by supporting data analysis and dissemination for effective outcome from RI access.

With respect to on-line service that often requires greater staff effort than in-person access, the Junior Scientists are the missing piece of the puzzle: they relieve stress on the infrastructure staff while enabling the best possible user support. Hence, RIANA directly improves the infrastructure services and develops their on-line services with Junior Scientists integrated in the access procedures.

WP 2 in a nutshell – Customized access to Science Service	
<p>Access to the best RI is useless if there is no adequate support to make best use of sophisticated RI. WP 2 takes care of the Science Service: at its core, a team of 21 Junior Scientists employed through RIANA is dedicated to offer Science Service, supporting users with any respect from the choice of techniques to data analysis. They are backed by Senior Scientists at each facility offering access. The Science Service is organized as follows:</p> <p>Task 2.1: Coordination of Science Service</p> <p>Task 2.2: Access to Science Service through Junior Scientists</p> <p>Task 2.3: Access to Science Service through Senior Scientists</p>	

Although the Junior Scientists cover a great breadth techniques and applications, they cannot cover everything. Therefore, they are backed by Senior Scientists from each RI offering access. This network of Senior Scientists (“Expert network”) commits less work on a daily base. The role of the Senior Scientists is more that of mentors: they connect RIANA to the already existing research activities at the research infrastructures, they act as facilitators and trigger ideas for new research in nanoscience and nanotechnology. Ultimately, the senior scientists act also as instrument contact and enable users to perform successful experiments.

In the preparation of this proposal, we have thoroughly discussed the question whether the position of a Junior Scientist is attractive for skilled young scientists. We are convinced that it is actually more attractive than conventional postdoc positions based on the following considerations: (i) Junior Scientists can pursue their own research within 1/3 of their contractual time (this fraction of the salary is paid by the host as in-kind contribution),

(ii) they are promoted to the forefront of several disciplines including techniques on the one hand and a variety of applications on the other hand, and (iii) they are supported to collaborate with diverse user groups, which opens career paths for them for post-RIANA times and includes the possibility to co-author publications of the users or to change horizontally research directions.

As these lines are being written, the recruiting of Junior Scientists for ReMade@ARI is being concluded in time with highly talented and motivated people hired. At the same time, the first call for projects has been launched, and the first user requests to connect with Junior Scientists have been received already. This experience shows that the positions are indeed attractive and that the concept of Junior Scientist does match actual user requests.

### 1.2.5 Customized access to Innovation Service

Even more than for academic users, there is a gap between specialized RI staff and industrial users. Yet, the developments of RI towards more standardization and greater throughput is of particular interest to industrial users. In fact, it is in their core interest to have access to research infrastructures as a commodity with a service as all-inclusive package.

We are not there yet, at least not the majority of RI, but RIANA takes a big step in this direction. With WP 4, RIANA has tied a package to support customized access for industrial users. This Innovation Service stands on five pillars:

#### **Pillar I: RI access route for proprietary users**

As outlined in the flowchart (Fig. 6), the access route for proprietary users follows very much the standard route for non-proprietary users. Few aspects have specifically designed for industrial users – and academic users profit from the resulting slim procedures as well. Most importantly, a continuous call with scheduling as fast as possible meets the request of timely access for industry far better than semi-annual calls for proposals.

The main difference between the access routes concern the access costs: while users that agree in principle to publish results of their research (whether industrial or academic, we refer to them as “non-proprietary” users) are granted access for free, this is not the case for proprietary users. On the one hand, such a heavily subsidized access is incompatible with legislation and/or regulations of participating RI, on the other hand, we consider it legitimate to ask for cost contribution from users that do not publicly share their research results. For further details of the two access routes, we refer to Tab. 1.

#### **Pillar II: Platform of Industrial Contact Officers**

In analogy to Science Service for academic users, Innovation Service is offered to industrial users. The Innovation Service consists of a customized package of services matching the specific needs of industrial users for innovation. The Platform of Industrial Contact Officers (PICO) is the most important part of the Innovation Service with a considerable amount of person months distributed in a similar way as Junior Scientists across the network. Each of the 7 networks hosts an Industrial Contact Officer; those networks with established interconnection between the RI and industry (e.g. through industry liaison officers) help those networks without such interconnections to build them up and employ an Industrial Contact Officer (ICO).

While the obvious task of ICOs is the provision of Innovation Service to industrial users, it is not limited to that: academic users may develop solutions with great innovation potential through their RI access. The ICO offers Innovation Service to academic users as well to interconnect them to industrial partners targeting the further development of their ideas and TRL increase. With this purpose, non-proprietary proposals are – upon approval by the proposers – continuously and systematically screened for their innovation potential (Task 4.4).

#### **Pillar III: Repeatability, verifiability, and comparability**

While academic users typically strive for the utmost performance of an RI and they are happy with once-in-a-lifetime results, other values are more relevant for industrial users. Absolute measurements rely on highest degree of *repeatability*, the unambiguous interpretation with a good track of measurements demands *verifiability*, and *comparability* of the results is critical to detect variations in the industrial processes not only within a measurement series but across measurement campaigns over years.

RIANA strengthens repeatability, verifiability, and comparability together with industrial partners, e.g. implementing standard operating procedures.


#### **Pillar IV: Interoperability**

Standardization is not only needed for operating procedures, but also for sample transfer and sample mounting, in particular for delicate nanostructures that need to be conserved and measured in specific environments. A technical solution will be commissioned and integrated at RI in a collaboration between users from applied science and

EuXFEL – the RI where most fundamental research is performed: a solution that is compatible with the most constrained RI environment and satisfies users from applied science simultaneously will match the needs of many users between these two extremes.

### Pillar V: Pilot cases

All support offer is useless if the users are not aware of it. RIANA will actively promote RI access also to prospective industrial users, and many companies have declared already interest. In addition, RIANA will demonstrate the capabilities of RI access bases on industry-oriented pilot cases in two distinct fields: one on laser processing for surface functionalization, and one on high-throughput operando battery characterization by synchrotron X-ray diffraction.

WP 4 in a nutshell – Customized access to Innovation Service	
<p>As nanoscience and technology is a key factor in highly innovative technologies, access to RI and innovation support for SMEs is an essential building block of RIANA and addressed in WP 4. To foster industrial research and technological development through customized access to Innovation Service, the following tasks have been defined:</p> <p>Task 4.1: Platform of Industrial Contact Officers – PICO</p> <p>Task 4.2: Enabling industrial innovation</p> <p>Task 4.3: Industry-oriented pilot cases</p> <p>Task 4.4: Outreach and screening of access cases of industrial interest</p> <p>Task 4.5: Customized access for SMEs</p> <p><i>The main goal of most industrial search is to increase the Technology Readiness Level (TRL), and RIANA offers the key to unlock the potential of innovation from access to research infrastructures.</i></p>	

### 1.2.6 Safety in nanoscience and nanotechnology

For the RIANA consortium, safety is at the origin of the key for all activities advancing nanoscience and nanotechnology as illustrated in Fig. 2. Hence, it is key at literally all levels:

- ✓ *at the level of the access chain* from simulations to fabrication, processing, characterization, and analysis,
- ✓ *at the level of application areas* from healthcare & medicine to construction, energy, transportation, home & personal care, packaging, agriculture, and textiles,
- ✓ *at the level of nanostructures* from coatings to spintronics, 2D materials, pollutants, patterning, drug delivery, catalysts, plastics, self-assembly, wires/tubes, colloids, and all other nanomaterials and -structures,
- ✓ *at the level of all networks*, whether they exploit X-rays, lasers, electron-beams, ion beams, neutron beams or focus on clean room techniques, study soft matter, or offer computing resources,
- ✓ *for all individuals being involved in RIANA* whichever role they may have.

But what does that mean? We distinguish two layers, where safety is critical as described in the following.

## Safety in the process of research and development

Fortunately, Europe's research infrastructures have an extremely well-developed safety culture with safety policies and regulations in place that effectively ensure a safe working environment both for researchers and for the surrounding. Furthermore, regulations concern specific risks related to nanomaterials and -structures wherever nanoscience or nanotechnology research is performed. Depending on the type of work, circumstances, and allowed research objects, the regulations differ one from another at the RI level. However, all RIANA infrastructures offering access have in common that they are strongly committed to reinforce safety measures in their infrastructures both internally and from external users.

RIANA goes even further and adapts the concept of “*Stop Work Authority*” that empowers and obligates every person – visitors just like employees – to stop any activity that they deem to have placed them, others, or the environment in immediate danger.

### Safety of research outcome

Beyond the process of R&D, R&D activities on nanomaterials can have a tremendous impact on possible health and environmental risks – both towards negative and positive sides. In RIANA, we are strongly committed to evaluate safety risks early in the R&D process and to take measures to impede those activities with a negative effect on safety and to promote those activities with a positive effect.

These measures are deeply implemented in the RIANA structure and include:

- ✓ *Safety as evaluation criterium for user projects:* given that most advances in R&D will be performed by users, we steer the research directions towards enhanced safety of nanomaterials and their use and reducing possible health and environmental risks. The most effective steering happens at the level of reviewing the user proposals: safety is an explicit evaluation criterion to be scored by the reviewers. **As a direct consequence, research with a positive impact on safety is more likely to be performed than research with none or a negative impact.**
- ✓ *Safety as research topics in networks:* while all networks within RIANA strive for safety in the impact of their research activities, the consortium deliberately encompasses the networks EUSMI and EuroNanoLab that have a strong research focus on safety of nanomaterials itself.
- ✓ *Safety as special expertise of a Junior Scientist:* all Junior Scientists employed within RIANA have a focus expertise as listed in the work description of Task 2.3. One of them is not a technical expertise, but expertise in safety and safety as a research topic. This Junior Scientist is hosted by AMU that has already a strong background in safety of nanomaterials and research therein. The organizational structure of the Junior Scientists as a distributed Science Service provider ensures that the safety expertise does not stay with AMU but is shared with the entire RIANA network, partners, and users.

Together, these measures ensure the outcome of enhanced safety of R&D activities on nanomaterials and their use, reducing possible health and environmental risks.

## 1.2.7 Beyond the gender dimension: diversity, equity, and inclusion

One could argue that Diversity, Equity, and Inclusion (DEI) in general and the gender dimension in particular would be unproblematic at research infrastructures based on the following four observations:

- ✓ *Objectivity* is agreed upon all people involved in research and development for the sake of scientific and technological progress.
- ✓ *Multiplicity of opinions* and interpretations with fair discussions thereof is truly appreciated in the scientific discourse.
- ✓ *Diversity* among users of RI users and employees is a natural consequence of RI offering access to users in an international competitive environment and being agnostic about origin, gender, and any other dimension that is unrelated to the purpose of research and development.
- ✓ *A Gender Equality Plan* is in place by each beneficiary of RIANA.

In this sense, *equality* is well established. Yet, this is only half the truth and contrasts with the objective of DEI established in real research environments. As a matter of fact,

- ❑ The RIANA coordinator is a (not so) old, white, straight man who is privileged by origin and socioeconomic status.
- ❑ Although the RIANA consortium succeeded in a more balanced gender distribution than average in nanoscience and nanotechnology research communities, men are still overrepresented.
- ❑ Neither working at RI with user support nor accessing RI as a user is particularly compatible with family life and a commensurate work-life balance.

This is not acceptable, and with RIANA we have it in our hand to contribute to a change of mindset and reality for researchers to be not only at the forefront of their discipline but to act as role models in society.

It has been found<sup>35</sup> that “...Graduate schools are the major path to producing a diverse and inclusive scientific workforce” in science, technology, engineering, and math (STEM) disciplines, but also that “graduate school experiences can mirror inequities in other areas of the society and potentially work against achieving this goal.” To effectively foster DEI, it was further suggested<sup>36</sup> to “seek out training and education about DEI,” to “promote and amplify individuals ... by inviting them to speak during seminar series and conferences,” to “ensure that there is diversity in panels, committees, seminars, ..., and leadership positions,” and to “involve students in decision making and value their opinions” given that “there is often more diversity at the student level than at the faculty level.”

What action does RIANA take to foster diversity, equity and inclusion? As individuals, RIANA members are committed to DEI by

- ✓ *Promoting equity* pro-actively, e.g. in the hiring processes of RIANA scientists, in the selection process for decision-making committees (in particular the RIANA Executive Board, the RIANA Nano Strategy Board, the RIANA Junior Scientist Board, and the Senior Scientist Board), and inviting female researchers to share their experiences in the RIANA seminars.
- ✓ *Making room* and fostering breaks aiming for a safe atmosphere and respectful discourse, to listen to the opinions of those that remain too often unheard and not only to those that shout the loudest.
- ✓ *Supporting individuality* to match the needs of individuals beyond their nominal role within RIANA, be it to provide mentorship adapted to someone’s needs or to find creative solutions to combine job and family.

Such a mentoring approach – both for RI access providers and users – adapted to the needs of each individual fosters diversity, equity, and inclusion in a greater context. Beyond the individual level, RIANA commits to fostering DEI on the structural level:

- ✓ *A dedicated Ethics Officer* actively fosters DEI within the RIANA consortium and supports and surveys appointments. Administratively, the Ethics Officer is appointed by and reports to the Executive Board within Task 1.5 (Ethics).
- ✓ *RIANA learns from other EU projects.* Rather than reinventing the wheel trying out new ways to foster DEI, we seek to rely on proven concepts; most networks and facilities within RIANA have task forces and regulations in place to foster DEI. As RIANA consortium, we closely collaborate with these task forces and implement their recommendations in practice. Furthermore, the EU project ReMade@ARI involves in WP 2 political scientists (Dr. Katharina C. Cramer and Nicolas Rüffin) to reflect on the project structures and

What means “Diversity”, “Equity”, and “Inclusion” in the context of RIANA?	
With DEI, we mean:	
<i>Diversity:</i>	mutual enrichment through differences
<i>Equity:</i>	fairness to satisfy the needs of every individual
<i>Inclusion:</i>	embracing everybody without imposing criteria whatsoever
However, these definitions are of limited relevance. The crucial question is: what do those mean with DEI that are discriminated, that are underprivileged, or that are excluded? As consortium, we listen to those that are discriminated or less privileged and promote their rights.	

evaluate the impact, not only with respect to the external project goals but also to the internal well-being of project partners, notably of the Junior Scientists. These evaluations have just started at the time of writing these lines, and we are in close contact with WP 2 of ReMade@ARI to directly adapt their findings.

<sup>35</sup> <https://doi.org/10.1073/pnas.2020508118>

<sup>36</sup> <https://doi.org/10.1091/mbc.E20-09-0575>

- ✓ *Junior Scientists offer a leverage arm to foster DEI in STEM.* They are in a particularly critical phase in their scientific career. While Junior Scientists may fit in some cases the established job description of postdocs between PhD studies and a (hopefully) permanent position, the concept of Junior Scientists goes beyond postdocs: with the purpose of fostering DEI, it is flexible to accommodate various job models, be it to enable parents working part time or remotely, or to employ people with unconventional career fighting ageism.
- ✓ *RIANA fosters DEI through training and dissemination.* Whether in seminars, conferences, or any other activity of WP 5 (Training and education) and WP 6 (Outreach, dissemination and impact), DEI fostering is systematically implemented and RIANA representatives act as role models, in particular for women in STEM.
- ✓ *RIANA fosters DEI in user projects* by prioritizing proposals with participation and leadership of underrepresented minorities.

Within RIANA, we listen and strive for a new generation of researchers for more EU project coordinators from discriminated, underprivileged, or underrepresented communities.

## 1.2.8 Ethics

Ethics is the heart beating in the RIANA body and the driving force for joint research beyond individual research interests. In this sense, *value-driven research* is the more relevant category than fundamental or applied research.

Value-driven research is incorporated in RIANA at several levels:

### Ethical motivation: addressing global and European challenges

At the *global* level, the United Nations Sustainable Development Goals serve as blueprint for peace and prosperity and as action call by all countries for the benefit of humanity and environment. These goals are our intrinsic motivation for research in nanoscience and nanotechnology.



Figure 7: The United Nations Sustainable Development Goals (<https://sdgs.un.org/>) serve as global action plan for humanity and a hospitable planet. RIANA translates these goals into targeted actions in the field of Nanoscience and Nanotechnology.

At the *European* level, initiatives such as the European Green Deal emphasize the need to act and bundle forces, fully aligned with the UN SDG. The European Commission has turned the overarching goals into 5 *specific EC missions: concrete solutions for our greatest challenges* within the Horizon Europe research and innovation programme for the years 2021 – 2027.<sup>37</sup> The 5 missions are:

- (i) Cancer: improve the lives of more than 3 million people by 2030
- (ii) Adaptation to Climate Change: support at least 150 European regions and communities to become climate resilient by 2030
- (iii) Restore our Ocean and Waters by 2030
- (iv) 100 Climate-Neutral and Smart Cities by 2030
- (v) A Soil Deal for Europe: 100 living labs and lighthouses to lead the transition towards healthy soils by 2030

RIANA is our way to pursue the 5 missions of the EC through targeted research in nanoscience and nanotechnology.

### Ethical conduction of research

While the *research object* is at the centre of the targeted research described above, the *research subject* is equally important for the ethical conduction of research. This includes:

- (i) Fostering DEI as described in Chapter 1.2.7.
- (ii) Treating RIANAers from prospective users to consortium members as adorable humans with individual backgrounds, looking at the persons behind reports with PM, TA, and VA. This means, within RIANA we make solutions possible that suit individual needs, be it to organize specific training or to accommodate unconventional working hours.
- (iii) Upholding highest ethical values in the pursuit of research.

<sup>37</sup> <https://data.europa.eu/doi/10.2777/500470>



- (iv) Ethical dissemination of data following the FAIR principle and, whenever possible, open science as detailed in the next Chapter and the description of Task 1.5 and Task 6.3.

### Driving ethical research

Europe is setting standards for ethical conduct in research that are implemented in regulations and policies from the level of the EC to the infrastructure and individuals, and RIANA is committed to not only follow but to drive them. Consequently, Task 1.5 is dedicated to ethics with an external ethics advisor, and ethics plays an important role at all levels of the RIANA governance with the Nano Strategy Board and the General Assembly steering the ship to (re-) align the project with the overarching ethics goals, the Executive Board and the Coordinator taking decisions at the operational level, and all RIANA members and users acting as role models carrying the ideas of ethical research out into the world.

#### WP 1 in a nutshell – Management

The organization and steering of the RIANA project are rooted in WP 1 and covers three parties: First the consortium led by the project management, second an external Nano Strategy Board that ensures that the stakeholders' (i.e., users') opinion is considered in the overarching strategy, third Junior and Senior Scientists Boards that interconnect the scientist and the management level, and fourth an external ethics advisor who will contribute her/his expertise. To leave a lasting impact of the project, a NANO Roadmap will be developed based on the expertise within the consortium and the users. Work package 1 is organized as follows:



Task 1.1 Project management

Task 1.2 Nano Strategy Board

Task 1.3 Junior and Senior Scientists Boards

Task 1.4 Roadmap of the nanoscience and nanotechnology at European RIs

Task 1.5 Ethics

## 1.2.9 FAIR data & open science

### Open science at RIANA research infrastructures

The large research infrastructures that are well represented within the RIANA consortium have taken a leading role in open science from early on. Whether originally driven by conviction or directly in the interest of scientific advancement, open science is today a reality in the communities of accelerator- or nuclear-reactor based research, and it is actively nurtured: only through open exchange of ideas, technical concepts, and staff it is possible to advance the research infrastructures themselves with new generation infrastructures ever outperforming their predecessor.

A historic comparison may underline the success of open science. The community of accelerator-based X-ray sources has arisen from particle physics, the prime example for a research field practicing open science. For these sources, the peak brilliance serves as figure of merit. Since the 1960's, the peak brilliance of X-ray sources has increased by incredible 20 orders of magnitude<sup>38</sup> – corresponding to an exponential increase far greater than the famous Moore's law<sup>39</sup> - but in contrast to Moore's law, the exponential increase of the X-ray source brilliance is still ongoing.

This part of history tells us that open science is highly successful as concept for the ethical conduction and dissemination of research. Only thanks to their tremendous increase of brilliance, modern X-ray sources can be used as analytical research infrastructure in general and as Swiss army knife to tackle challenges in nanoscience and nanotechnology.

This is not the end of the story. On the one hand, we have observed trends that even research in accelerator-based X-ray sources is carried away from the concept of open science the more applied the research topic, the higher the Technology Readiness Level (TRL). As RIANA consortium, we counteract this trend by fostering collaboration and networks among the infrastructures and among the users, and the training of young scientists through RIANA offers a leverage arm to promote open science.

On the other hand, the example above concerned infrastructures that operate accelerator-based X-ray sources. They are organized in the LEAPS network – one of 7 networks of RIANA. In other networks, open science is implemented at various levels. It is not by coincidence that those tasks related to open science – in particular Task 1.5 (Ethics) and Task 6.3 (FAIR data) – are led by LEAPS facilities. The large RIANA consortium offers the unique possibility to learn from each other, to spread good practice among the networks, among the infrastructures, and among individuals.

<sup>38</sup> <https://doi.org/10.1038/nphoton.2016.251>

<sup>39</sup> <https://dx.doi.org/10.1126/science.aam9744>

## **Agnostic approach as welcome culture**

Providing access to research infrastructures for external users is arguably the most challenging aspect of open science: how shall interested people – be they from academia, industry, or public – become RI users if they don't know about the offer? How shall they write a competitive proposal if they are not familiar with the experimental techniques or community-specific conventions?

With RIANA, we pursue an agnostic approach: the professional origin or experience is of no relevance. Whoever seeks access for research or development in nanoscience or nanotechnology is welcome to ask for support. This concept is very much in analogy to fostering DEI at the personal level, fights professional ageism, and enables stakeholders from the entire society to become users of research infrastructures.

With RIANA, we set the entrance barrier as low as possible: through a helpdesk that will be prominently advertised on the RIANA webpage, users can approach us to get support of any kind, be it related to technicalities of proposal submission, scientific questions related to certain techniques, or any other business related to access to research infrastructures. Behind this helpdesk, there will be a team of administrative (WP 3), scientific (WP 2), and industrial staff (WP 4) that are ready to offer customized support. And already before, we actively reach out to unexperienced users (WP 6) and train a new generation of young scientists (WP 5) for sustainable impact beyond the project duration.

In RIANA, we are convinced that the brightest ideas is realized and the greatest impact is reached with a maximized diversity of the user community.

## **Findability of data/research outputs**

All publications – not limited to peer-reviewed publications but including data sets, software, theses, etc. – will be assigned digital object identifiers (doi).<sup>40</sup> While the larger RI or the network they are embedded in offer trusted institutional repositories themselves, others may rely on public or domain repositories.

RIANA also encourages the consequent use of a persistent digital identifier (ORCID)<sup>41</sup> for the unambiguous attribution of publications to their author.

Further facilitating the findability, RIANA not only lists publications on the RIANA webpage but also promotes their connection to OpenAIRE.<sup>42</sup>

## **Accessibility of data/research outputs**

Publications of users resulting (in part) from access through RIANA is strongly encouraged to be consequently published following the gold open access standard.

For data, time-embargoed access will be the default accessibility scheme. The details of this access vary among the RI offering access through RIANA, and for technical reasons, we will follow the scheme of the infrastructure. In many cases, the provision of meta data is more critical than the actual access to the data such that the provided data are of use to other people than the experimenters. While the development of concepts for meta-data storage are beyond the scope of RIANA, we closely follow up with the infrastructures and related projects for the provision of meta data such as ICAT<sup>43</sup> provided by PaNdata.<sup>44</sup>

## **Interoperability and reusability of data / research outputs**

Several members of the RIANA consortium are very active in the promotion of standards to facilitate the interoperability of data and research output between research infrastructures following the European Charter for Access to Research Infrastructures.<sup>45</sup> Within RIANA, best-practice approaches to foster interoperability are shared between the partners and networks. The cross-network support groups such as the Junior and Senior Scientists and the PICO who are in charge of Science and Innovation Service are ideal to foster interoperability.

On a more technical level, open data formats including bare text/csv or containers such as HDF5 / NeXus are commonly used at the RI of RIANA, and python has emerged to the dominant programming language for high-level applications such as for data analysis by users. In all these cases, the RIANA consortium closely follows the

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<sup>40</sup> <https://www.doi.org/>

<sup>41</sup> <https://orcid.org/>

<sup>42</sup> <https://www.openaire.eu/>

<sup>43</sup> <https://www.esrf.fr/ICAT>

<sup>44</sup> <http://pan-data.eu/>

<sup>45</sup> <https://data.europa.eu/doi/10.2777/524573>

development at the RI and supports further standardization, e.g. through joint software developments that are naturally supported by Junior Scientists using Git and repositories derived therefrom such as GitHub / GitLab.

Whenever possible, research output including data, texts, and figures, will be published under Creative Common licenses (by default CC-BY 4.0) and the licenses derived from there.<sup>46</sup> In agreement with common use to share developed software within the research community, their publication under permissive licenses such as BSD, MIT, or Apache is encouraged by RIANA. Exceptions apply for the extension of existing software that is incompatible with permissive licenses, or software that has been developed with the goal of commercial exploitation, e.g. to found a spin-off facilitating RI access to match the need of industrial users.

### **Technical implementation of open science and FAIR data principles**

Data resulting from provided user access is generated, stored, and analysed in most cases at the RI where experiments are performed. Given the diversity of RI in the RIANA consortium with very diverse amount and complexity of data, we have decided to follow that route of distributed data in contrast to centralized data management in the interest of highest efficiency and slim structures. Hence, the practical implementation of FAIR data principles is at the level of RI that have policies implemented with open science and FAIR data as guiding principles, and RIANA emphasizes the FAIR principle and open science by supporting the RI in practical aspects. This includes the data management plan but also follow-up on data sets and publications one-to-one with users in the framework of Science Service.

A Junior Scientists will be assigned to each user, reinforcing the FAIR principles. She/he is familiar with the technical data aspects in the relevant community and closely collaborate with WP 6 on the application of FAIR principles.

### **FAIR data for proprietary users**

In some cases, there is a conflict of interest between the societal interest in research results to be publicly available, and the interest of users to protect their data. This is particularly the case for SMEs that have a legitimate interest to protect their intellectual property, which is also in the interest of Europe supporting local industry. To enable the RI access for such SMEs, RIANA offers the “proprietary access route” in parallel to the “non-proprietary access route”. While FAIR data principles apply to all non-proprietary users, proprietary users may withhold results, but RIANA strives to make at least part of the data publicly available, e.g., in the form of reports.

### **Machine learning and artificial intelligence**

Machine-learning and artificial intelligence are utilized at many RI facilities and an active field of research both for experiment control and data analysis. Correspondingly, they are an integral part of the user experience for access provided through RIANA. However, these developments are not being pursued as RIANA tasks themselves.

## **1.2.10 Data management**

Through the institutional policies of the RIANA infrastructures and in accordance with a RIANA data management plan (DMP), open science and data management will apply. The RIANA DMP will be established and continuously updated in WP 1, and give guidance to the RIANA beneficiaries while respecting their policies. Data produced by the project will be treated according to the policies on the sites generated. The DMP will assure that the data will be compliant with the FAIR principles. The DMP will also define preservation and curation of the scientific data.

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<sup>46</sup> <https://creativecommons.org/about/cclicenses/>

## 2 IMPACT

In all modesty, the primary goal of RIANA is not to generate impact as a project itself through new developments or research. This honour is entirely with users of research infrastructures, and the role of RIANA is the role of a facilitator and catalyst to boost the impact of users.

Europe has all ingredients needed for excellent research in nanoscience and nanotechnology:

- + **Europe’s research infrastructures are worldwide outstanding.**  
From this pool, RIANA unites those RI that are best suited to tackle great challenges through research and development in nanoscience and nanotechnology.
- + **Europe’s researchers are worldwide outstanding.**  
Thanks to excellent education systems and a strong commitment of the EC, Europe hosts an enormous pool of talented scientists that are keen to exploit Europe’s research infrastructures.

However, there are gaps between the users and the research infrastructures as we have laid out in Chapter 1:

- **Europe’s research infrastructures and researchers are partially disconnected.**

The mission of RIANA is to close these gaps,

- interconnecting infrastructures and researchers,
- enabling users to thrive, and
- boosting the impact of users.

In this sense, RIANA acts primarily as service provider to make optimum use of the research infrastructures in view of the societal challenges declared in the 17 UN sustainable development goals and the 5 EU missions. For maximum efficacy as a catalyst, the impact boost through RIANA relies on the following three service pillars:

- ① **Customized access to research infrastructures**
- ② **Customized access to Science Service**
- ③ **Customized access to Innovation Service**

### 2.1 Project’s pathways towards impact

#### 2.1.1 Expected outcome: significance and key performance indicators

As argued in Chapter 1, RIANA strives for maximum impact on global challenges such as climate change or health; the effective impact on these aspects is not assessed in key performance indicators within the project duration, yet they may give a qualitative impression on the RIANA approach for impact generation.

Expected outcome	Performance by RIANA	Key performance indicators (KPI)
<b>Enabling research and innovation on innovative nanoscience and nanotechnology applications</b> to support European scientific and industrial competitiveness, including on innovative solid state, biological and soft materials, needed for the green and digital transition	RIANA enables highly customized fast access to a broad variety of RIs covering the whole range of techniques starting from computing, fabrication, processing characterization to analyse data to do research in any nanoscience/technology application of in academia and industry (WP 3). This variety of infrastructure allows to study any kind of materials. Different to the normal curiosity driven access provision of the RIs RIANA is strategically oriented on research with a high impact towards emerging social challenges being addressed by nanoscience and nanotechnology, see Chapter 1.1. The consortium members are specifically selected to match the user communities of solid state as well as biological and soft materials.	<b>&gt; 35 000 h access to RI</b> <b>&gt; 5 000 000 hCPU</b> computation time <b>&gt; 100 publications</b> <b>&gt; 100 theses</b>
<b>Cross-fertilisation and transfer of knowledge</b> and technologies across diverse scientific	RIANA as a network of RI networks integrates for the first time this very diverse set of RIs via a central Scientific and Innovation Service allowing user proposal from all scientific fields (WP 2 & WP 4). Successful	<b>&gt; 800 users</b> visiting RI in foreign countries

disciplines and material classes	cross-discipline knowledge transfer is a must and will be channelled on the management level by the two boards of Junior and Senior Scientists and the Nano Science Board (WP 1). Furthermore, the training program (WP 5), in particular the internal regular webinar, will enable cross fertilisation and knowledge transfer.	<p><b>&gt; 185 projects</b> combining at least 2 distinct techniques</p> <p><b>&gt; 69 research infrastructures</b> offering access</p> <p><b>7 networks</b> of RI</p>
<b>Wider access for academic and industrial researchers</b> to enhanced and further integrated RI services for fostering the application of nanoscience and nanotechnology to address emerging socio-economic needs	RIANA provides a wide access to at least 69 RIs by a single-entry point (WP 3). An intensive scientific and innovation service (WP 2 & WP 4) will help users to choose the best techniques and will allow also unexperienced users to use the most advanced RIs in Europe. Industrial user will receive even more customized support (WP 4). The RIANA consortium agreed on evaluation criteria for the user proposals (Chapter 1.1) prioritising beside other projects with high socio-economic impact.	<b>21 Junior Scientists</b> provide Science Service
<b>Enhanced competitiveness of European industry</b> in the field through access to the broadest spectrum of advanced research tools	RIANA will support users from industry (mainly SME) by innovation exports (PICO, WP 4) as well as by companies (SMEs) specialised to act as mediator between RI and industry to accelerate the use of the large portfolio of cutting-edge techniques offered by RIANA.	<p><b>&gt; 10 Industrial Contact Officers</b> provide Innovation Service</p>
<b>Positioning the top-level research infrastructures in the field as reliable innovation partners</b> for world-wide researchers and European innovators	RIANA is a consortium of large-scale RIs already well used from researchers world-wide and medium to small scale RIs well recognized in Europe. The latter will benefit from RIANA to reach out to world-wide researchers by the international outreach activities (WP 6) and the comprehensive innovation service.	<b>&gt; 33 innovative projects with SMEs</b>
<b>Enhanced safety of R&amp;D activities on nanomaterials and their use</b> , reducing possible health and environmental risks	All RIANA infrastructures have distinct safety procedures every user has to follow. Within the feasibility check, health and environmental safety is a critical check point to be passed (Chapter 1.1), and safety is a key evaluation criterion in proposal scoring by reviewers. RIANA will ensure that nanosafety experts are part of the Proposal Review Panel. Overall, this will raise the awareness for environmental risks by nanomaterials on the user and facility side. Furthermore, RIANA will employ a Junior Scientist dedicated to safety of R&D activities on nanomaterials and their use.	<p><b>1 Junior Scientist</b> responsible for nanosafety employed</p> <p><b>&gt; 2 nanosafety experts</b> in proposal review panel</p>
<b>Increased resilience of the society</b> by the provision of customised and timely RI services enhancing and increasing society's long-term problem-solving capacity and evidence-based policy making	Establishing and developing further the new approach of providing TA to a breadth of RIs via a single-entry point and highly customized services, the RIs of RIANA proof their ability to solve society's problems. As proven during the Covid-19 pandemic, fast and customized access to analytical RI and services is indispensable for evidence-based policy making; this is also the case for nanoscience-related policies, (NANO Roadmap, Task 2.1.4).	<p><b>&gt; 40% reduction of time</b> from idea to results</p> <p><b>&gt; 50% increase of usage</b> of multi-disciplinary techniques</p>
<b>More diverse, equitable, inclusive</b> research community that shall be representative of the entire society	RIANA appoints a dedicated Ethics Officer responsible to actively foster DEI within the RIANA consortium and to support and survey appointments. RIANA is in close contact with DEI task forces and implements learnings from other EU projects, in particular from ReMade@ARI	<p><b>1 officer</b> in charge of DEI</p> <p><b>Higher fraction of women / diverse</b> compared to average RI</p>

	where social scientists reflect on project structures and well-being of project partners.	
<b>Further develop on-line services</b> to improve the service provision by research infrastructures.	RIANA enables inexperienced users to conduct sophisticated experiments and establishes the transfer from conventional in-person access to on-line service. The suitability evaluation for on-line service is integrated in the proposal workflow and Junior Scientists enable standardized data analysis solutions that are interoperable between RIs, which is critical for the efficient provision of on-line services.	<b>Higher fraction of on-line service</b> compared to RI access outside of RIANA
<b>Wider expected impact</b>		
<b>Societal impact</b>	Decrease of harm through nanotechnologies/materials	
<b>Scientific impact</b>	Increase recognition of analytical RIs in ERA, in particular in the nanoscience community across all disciplines	
<b>Networking impact</b>	Cross disciplinary knowledge in European RI landscape by network of RI networks	

Table 3: Expected outcome, RIANA performance and key performance indicators.


### 2.1.2 Sustainable long-term impact through training & education

The transfer from short-term to long-term impact of RIANA is somewhat straight forward at the level of scientific outcome and innovation, as publications are durable and innovations in the perpetual interest of the innovator. It is much harder to maintain a long-term impact of RIANA in the soft skills, in the procedural achievements of access to RI, in the networking.

In RIANA, we face this challenge by investment in people through training and education. Of particular importance with that respect are the Junior Scientists both as trainee and as trainer: at an early career stage, they act as multipliers further enhancing the long-term impact, and as highly specialised scientists at the forefront of their discipline they can kick-start others in their field.

Training and education activities in RIANA include:

- A staff exchange program to train Junior Scientists off their comfort zone and to foster truly cross-disciplinary collaborations
- A user-training program including pre-RI-access training visits for most effective use of valuable RI access
- A horizontal training program including tutorial webinars and training schools for RI staff as well as interested users
- RIANA user meetings to interconnect users among themselves and nurture collaborations

WP 5 in a nutshell – Training and education	
Training and education are the leverage arm exploited to guarantee a long-term impact of RIANA, implementing sustainability of the project by investing in people. Training and education targets three main groups: Junior Scientists, facility staff, and users will be offered training on topics including nanoscience applications, nanotechnology research infrastructures, and other aspects that are relevant to foster the career of young scientists such as intellectual property rights. WP 5 is organized in three tasks: Task 5.1: Internal training within RIANA Task 5.2: External training to academic and industrial users Task 5.3: Horizontal training and educational actions	

### 2.1.3 Enabling innovation: customized to the needs of industrial stakeholders

Compared to other fields of science, nanoscience and nanotechnology are young fields, and the general technology readiness level is less advanced. This means that the innovation potential is greater, fostering the TRL increase is more important, and more support is needed to nurture innovation from initial ideas to commercial products. No matter how advanced the TRL of user projects is, RIANA strives to support its increase.

The needs of industrial users are distinct from those of academic users; not so much in terms of actual RI access – this is accounted for through two parallel access routes for proprietary and non-proprietary users – but more in terms of the support needed to accompany the RI access.

In analogy to customized Science Service supporting academic users in WP 2, WP 4 has been set up for customized Innovation Service matching the individual needs of industrial users accessing RI.

The Platform of Industrial Contact Officers (PICO) is at the core of Innovation Service and the most powerful instrument to support innovation: distributed across all 7 networks, they

- Speak the language of both industry and RI
- Reach out to prospective users to enable innovation through RI access
- Screen proposals of academic users interested in innovation
- Interconnect industrial users to intermediaries and RI for timely and successful RI access
- Develop measurement campaigns with industrial users for result-driven RI access
- Provide guidance on cost analysis for commercial RI access beyond RIANA
- Direct companies that are not eligible to RI access through RIANA to RI for bilateral collaborations

In summary, the PICO can become a sustainable network of Industrial Contact Officers embracing RIs without industry access so far that enables Innovation Service customized to the needs of industrial stakeholders across all RIANA networks with impact beyond the project duration.

## 2.1.4 Proactive thwarting of potential barriers to expected outcomes

There are certain risks at a scale beyond the scope and influence of the RIANA project but with potentially tremendous impact on the outcome. Under the impression of the past few years, two catastrophes have suddenly brought that back to our minds – namely, the Covid-19 pandemic and Russia's attack on Ukraine. Both have had a lasting impact not only on the scientific landscape and will have tremendous impact far beyond the RIANA project duration. Within that project, there is little one can do in view of the global dimension.

However, there are two less disruptive risks that still have the potential to threaten expected outcomes in very general.

### 1. Safety issues related to nanomaterials and nanostructures

As a matter of fact, the same functionality of nanomaterials and -structures that is of scientific interest and offers pathways to their exploitation can often cause harm in unintended applications. In RIANA, we are very aware of potential safety issues and have measures in place to mitigate them at several levels as laid out in Chapter 1.2.6. This includes the scoring of safety issues in the proposal evaluation and the employment of a specialist for safety related to nanomaterials. However, not all safety issues can be foreseen, especially if they are visible only on the long run and in a complex interplay of biological systems.

### 2. Presumed safety issues related to nanomaterials and nanostructures

If this second point seems to be close to the first, this is a misconception. Here, we mean the risk of societal acceptance of nanomaterials and -structures due to presumed safety issues, irrespective of whether there is a real risk or not. It has not much to do with science but with individual risk perception, with esoterism, and with general scepticism against science. We take that risk serious – too often, not the best but the best-conceived solution to a problem is realized. We thwart it by proactive information about risks, by proactive research about risks, and by public education.

In RIANA, we anticipate these risks and proactively thwart them – if not for the benefit for RIANA, at least for the sake of future projects.

## 2.2 Measures to maximise impact – communication, dissemination, exploitation

### 2.2.1 Strategy for communication, dissemination, and exploitation


First and foremost, we shall clarify who shall be addressed by any strategy for communication, dissemination, and exploitation. In RIANA, we have identified the following target groups:

- ① **The stakeholders forming the user community are the main target group.** Who are these stakeholders? They may be affiliated to any academic institution or SME. Their origin is of minor relevance, although the focus lies on researchers with European affiliation, and the majority of research infrastructures to which

access will be offered are within Europe for practical reasons.<sup>47</sup> However, neither the origin of users nor the location of RI is constrained to Europe. *Ultimately, we strive for the world’s best RI access in nanoscience and nanotechnology research, wherever that needs to be, for whoever has the brightest research idea.*

- ② **The RIANA consortium itself is the second target group.** A good strategy for introverted communication is not only crucial for an effective project flow and ultimately impact generation, but also for the dissemination and exploitation of the project outcome: as a network of networks with uncounted researchers from diverse fields that are keen to advance nanoscience and nanotechnology, the RIANA consortium is ideally suited to disseminate outcomes and support the exploitation.
- ③ **Last but not least, the public is the third target group.** The public values research in nanoscience and nanotechnology and allocates public funding to it through the EC. This commitment deserves our appreciation, and we strive to give something back to the public. Something means: knowledge gain in the form of publications (from articles targeting scientific communities or public social media), helpdesk to channel questions from the public to experts, insights to tackle societal challenges such as the UN Sustainable Development Goals or the EC missions, or innovative ideas for socio-economic prosperity. Particular attention is paid to the safety dimension of nanotechnology as introduced in Chapter 1.2.6 of this proposal: the safety expertise in our networks – a research topic on its own in RIANA – is not only available as a resource to the public, but safety aspects are proactively communicated to the public as integral part of outreach and dissemination activities (WP 6).

For a specific description of targeted measures to maximise impact through communication, dissemination, and exploitation beyond the presentation in this Chapter, we refer to the description of work in WP 6, and for an elaborate strategy we refer to the dissemination, exploitation and communication plan and its update that are defined as deliverables D6.1 and D6.3.

WP 6 in a nutshell – Outreach, dissemination, and impact	
<p>WP 6 is responsible to interconnect RIANA and the community of nanoscience and nanotechnology researchers: first by fostering the dialog with the user community, later by follow-up with users upon access, and finally by disseminating the results to a wide audience for maximum impact, targeting the academic equally as the industrial communities and the public. WP 6 is organized in four tasks:</p> <p>Task 6.1. Outreach to European nanoscience and nanotechnology community</p> <p>Task 6.2: Webpage and dissemination of project results</p> <p>Task 6.3: Promotion of FAIR data management</p> <p>Task 6.4: Evaluation of generated impact</p>	

## 2.2.2 Communication

### Internal communication

Working together with over 55 partners, a smooth internal communication is mandatory to a smooth operation of the project. By regular short meetings between the task leaders, to update each other on upcoming tasks and milestones, a cooperative and efficient management of the project will be realized. On a larger scale, the annual meetings of the consortium will foster the internal communication and strengthen the working relationship between the members.

At the annual meetings, the Nano Strategy Board will directly represent the stakeholders and add the users’ perspective to strategic decisions. Bringing all the parties together is a key step into enabling a constructive communication path.

### External communication

As a large network, RIANA, will profit from the already existing dissemination channels of its consortium members to gain a direct link to the majority of the user groups. In the interest of a slim project with funding effectively directed to RI access, new content will only be generated where necessary and otherwise linked to existing webpages such as <https://www.wayforlight.eu/>, <https://www.nffa.eu/>, <https://www.ionbeamcenters.eu/>, etc. (this avoids also the duplication of existing structures – too often, webpages of expired projects are abandoned with outdated information).

On top of this foundation, *the RIANA webpage will serve as the main bi-directional communication channel.* On the one hand, the RIANA consortium will use it to promote the RI access and to explain the accessible techniques and

<sup>47</sup> To be precise: User teams where all or the majority of users work in third countries can be supported as long as the cumulative access provided to them is below 20% of the total amount of units of access provided under the grant.



infrastructures. On the other hand, the *heart of the webpage is the single-entry point for users* with access to the preproposal and proposal submission system and the helpdesk.

The website will be the online face of RIANA to which outreach activities will direct the attention of interested parties. By integrating established social media platforms like *Twitter, LinkedIn, TikTok, and YouTube*, a wide audience will be targeted: the primary audience will be prospective users from academia and industry, but the RIANA webpage with the easily digestible information about techniques, training videos, and last but not least outcome in the form of publications and reports will be of interest to a broad public.

### 2.2.3 Dissemination

#### Visibility

In the process of writing the RIANA proposal, the consortium has developed already a trademark specifically for this project that is shown on the proposal title page and the footer, highlighting that RIANA is key for R&D in nanoscience and nanotechnology. The proposal follows already a draft style including this logo.

Upon project implementation, the style will be adapted and extended to various presentation formats including online presence (webpage), booths, posters, and presentations as part of the communication and management strategy, and the logo can be adapted to convey the message as the example in Fig. 2 illustrates.

#### Outreach

As access provider, the focus of RIANA is not to generate own research results but to enable users to generate results with utmost impact. Hence, these results are primarily owned by the users, and we understand it as our task to support users beyond RI access with Science Service and Innovation Service to boost the impact of users' RI access. RIANA communication and dissemination tasks include:

- Generation and dissemination of materials such as presentations, posters, booths, leaflets about the portfolio of techniques and RI with access offer
- Organisation of user-oriented events in the beginning of the project in addition to the RIANA user meetings
- Open desk available through the RIANA webpage as landing point for any people (citizen, journalists, researchers)
- Educational activities and training schools
- Active promotion of RI access at conferences, through presence in online networks, and dissemination through the wide network channels of the RIANA consortium that are already in close contact with RI users in the field of nanoscience and nanotechnology

#### Dissemination of project outcome

These activities above heavily oriented towards outreach, but RIANA dissemination activities concern at least as much the dissemination of the project outcome, namely the research findings of the users. In RIANA, Junior Scientists that are individually assigned to each user project are in charge of these aspects with support of WP 6:

- Close follow-up with users to catch difficulties in their project from early on, hereby increasing the success rate of user projects
- Hands-on support of users from experiment planning to the timely dissemination of the results
- Guidance of users towards ethical publishing following the principles of open science, FAIR data, and open access publications
- Dissemination of user projects and results therefrom through RIANA

Finally, the key findings of the project at the metalevel emerge to the NANO Roadmap that is developed under the lead of the RIANA Nano Strategy Board to outline a path for future research in nanoscience and nanotechnology.

### 2.2.4 Exploitation

The development of a NANO Roadmap has been mentioned above already and makes the link between dissemination and exploitation of results. With a strong focus services offered to users targeting innovation, the exploitation of results from RI access is naturally a core business of RIANA. It is mainly organized in WP 4 and includes:

- The creation and operation of PICO – a Platform of Industrial Contact Officers
- The outreach and systematic screening of academic RIANA user projects for innovation and exploitation
- The active interconnection between RI and industry by Industrial Contact Officers (ICO) targeting innovation
- The realization of industry-oriented pilot cases that exploit RI techniques by increasing their TRL

- The provision of customized Innovation Service to SMEs targeting the exploitation of their innovations

## 2.2.5 Intellectual property

With respect to proprietary vs. non-proprietary research, the main purpose of RIANA is to offer access to RI for maximum societal impact. We are convinced that open science is best suited for that in most cases. Consequently, we foster open science and prioritize non-proprietary research. RIANA does not primarily strive to generate intellectual property (IP) and takes a passive role.

However, there are cases, where IP aspects are relevant:

- In the case of access provision to SMEs through the proprietary access route, the generation of IP is likely in the interest of the user. IP rules need to be clearly defined prior to access provision in a respective agreement between all involved partners. With the Innovation Service in WP 4, RIANA has the network and expertise to deal with IP related aspect, and the Industrial Contact Officers are in charge of that for specific user projects. Specifically, the Industrial Contact Officers will advise researchers, SMEs, and entrepreneurs on the one hand and access providers on the other hand about the possibilities to conduct proprietary research without disclosing IP to the access provider.
- Users may generate protectable IP during RI access provided by RIANA, and members of the RIANA consortium, in particular Junior Scientists, may contribute substantially to the invention such that the invention needs to be treated as a jointly owned invention. Such situations are regulated in the Consortium Agreement following the DESCA model. The result protection and patent filing are in the responsibility of the invention owners. IP rules with the respective paragraphs of the Consortium Agreement will be mandatory to be accepted by each user upon registration in the RIANA portal.
- Proposals submitted by users can contain IP of users that has to be shared within selected members of the RIANA consortium such as reviewers, infrastructure contacts, Junior Scientists, and management. Therefore, persons involved in the proposal handling will have to sign a non-disclosure agreement (NDA), for which templates from earlier projects (e.g., CALIPSOplus) will be adapted.

Finally, it is a matter of fact that IP is of high relevance for young researchers. Therefore, we plan to offer training about IP, open science, and ownership of ideas in general within WP 5 to Junior Scientists.

## 2.2.6 Performance indicators

Although the relevance of soft indicators for the project impact shall not be underestimated, RIANA management will carefully track hard performance indicators as measure of the project impact through dissemination, exploitation, and communication.

Specifically, the performance indicators for communication with RIANA involvement include:

- ✓ Number of peer-reviewed publications including their impact factor
- ✓ Number of theses
- ✓ Number of patents and licenses
- ✓ Number of scientific posters and conference papers
- ✓ Number of scientific conference presentations
- ✓ Number of attendees at scientific presentations
- ✓ Number of clicks on training videos
- ✓ Number of followers on social media platforms
- ✓ Number of social media posts/tweets, re-tweets, and tags

For the first part, the RIANA management will do the bookkeeping with inputs from WP 6 and the Junior Scientists that are assigned to each proposer.

For the second part, the RIANA website and communication channels such as social media accounts will carefully be monitored using web tools to analyse visitor traffic, geographic origin, timeliness of communication activities, to ultimately measure the impact.

In addition, statistics about offered access to RI will obviously serve as performance indicators. Beyond the pure access statistics, the following performance indicators are directly related to the communication and impact of outreach:

- ✓ Number of submitted pre-proposals
- ✓ Number of submitted proposals
- ✓ Number of proposals in application areas
- ✓ Number of Innovation Services provided
- ✓ Number of Science Services provided

All performance indicators will be summarized and analysed based on RI-PATH approach for the yearly GA meeting to enable the Nano Strategy Board to take steering actions, and they will be included in the final report on impact by Task 6.4.

## 2.3 Summary

Specific needs	Expected results	D & E & C measures
Improve connection of RIs and research community of nanoscience/ technology	Enhanced awareness of RIs in the European nanoscience/technology community	RIANA presence at high level nano conferences (WP 6); nano targeted training schools & user meetings (Tasks 5.2 & 5.3); researchers voice through NSB (Task 1.2); NANO Roadmap
Enable unexperienced users from diverse scientific disciplines exploiting sophisticated techniques at large scale RIs	Comprehensive hands-on service from proposal writing & experiments, through to data analysis; mentoring by senior scientists	RIANA Science Service (Task 2.2) and pre-access training opportunities (Task 5.2.2) as well as the overall external and horizontal training activities
Faster & easier access to multidisciplinary and most advanced RIs	Continuously open single entry for proposal to use multiple techniques along the RIANA chain placed all over Europe and beyond	Continuously open single-entry point for proposals; Science and Innovation Services; fast centralized review process & user office & JAN to manage the access
Enhance Innovation in nanoscience/ technology	Enhanced number of user projects from industry and from academia with higher TRL (3-5)	Customized access support for users from industry; Priority on projects enhancing the TRL level of their nanoscience/technology; Screen user proposals from academia on innovation potential and provide innovation expertise by experts (PICO); pilot cases for nanoapplications

Table 4a: Summary of the specific needs, the expected results, dissemination & exploitation & communication measures, target groups, outcome, and impact. (continuation next page)

Target Groups	Outcome	Impact
Junior & senior nanoscience/technology researchers in academia and industry from Europe and AC	Enhanced use of RIANA RIs and better customized scientific services at RIs for nanoscience/technology;	Reach out to 8 000 nanoscience / technology researchers; provide access to 812 users;
New users from academia and industry and existing users who are not experienced in using other RI techniques	Enhanced transfer of knowledge and technologies across disciplines and material classes	400 users having used one or more techniques of RIANA for the first time; Reach out to new scientific fields
New and experienced scientific users from academia and industry	Foster nanoscience / nanotechnology application to address emerging socio-economic needs; enhance competitiveness of European research; enhanced cross disciplinary cooperation between RIs in Europe	Reduce the time from project idea to results by 30%; enhance use of multidisciplinary techniques by 50%
SMEs and nanoscience / nanotechnology researchers from industry overall and academia	Enhance competitiveness of European industry; increase awareness for innovation of academic users and RI staff; strengthen European SMEs acting as knowledge mediator between industry and large-scale RIs in Europe	> 30 experiments by SME > 15 projects mediated by knowledge provider SMEs (intermediaries)

Table 4b: (continuation from previous page) Summary of the specific needs, the expected results, dissemination & exploitation & communication measures, target groups, outcome, and impact.

### 3 QUALITY AND EFFICIENCY OF THE IMPLEMENTATION

#### 3.1 Workplan – work packages, deliverables

The project RIANA will be implemented through six work packages (WP), as shown in Table 3.1a. The PMs shown correspond to those requested for reimbursement by EC funding only, see also Table 3.1b. However, in order to realize the activities, RIANA beneficiaries will contribute through additional PMs supported by their own resources. To ensure a wide integration and involvement of the network infrastructures, work packages WP 2 to WP 6 have a leader and a co-leader for the WPs themselves (bold in Table 3.1b) as well as for individual tasks (underlined in Table 3.1b). WP 1 will manage the overall coordination of RIANA. WP 2 to WP 4 will drive the customized access to nanoscience and nanotechnology service, infrastructure and innovation. WP 5 will cover training and education and WP 6 will manage the dissemination and exploitation of results, in particular data, with strong support by the WP leaders. The interlink between the six work packages is already shown (Fig. 4) and discussed in Chapter 1.2.1.

The Gantt chart in Fig. 9 gives an overview of the time line and duration of the individual tasks of the WPs and shows the distribution of the 31 deliverables and 21 milestones over the four-year period of RIANA.

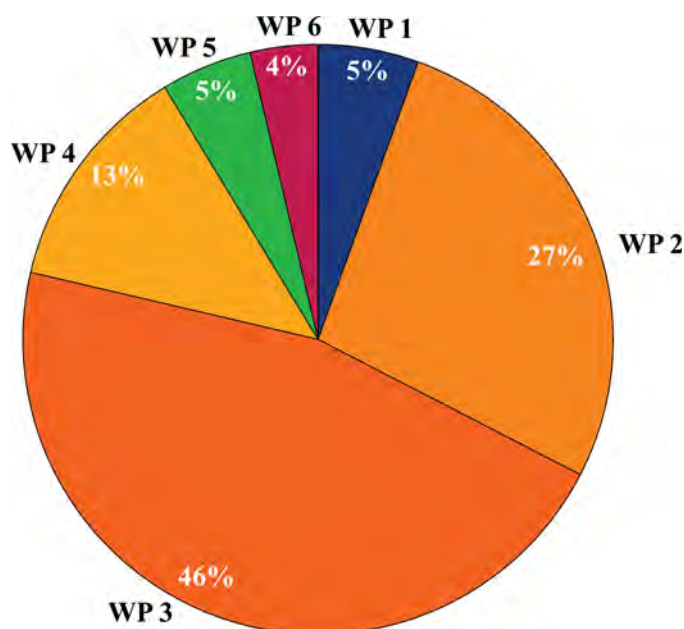


Figure 8: 86.2% of the total RIANA budget are allocated to customized access to science service, access to RI, and access to innovation service in WP 2 – 4. The total budget distribution among the six WPs is as follows:

WP 1:	799 145 €
WP 2:	3 924 111 €
WP 3:	6 678 929 €
WP 4:	1 834 467 €
WP 5:	723 418 €
WP 6:	536 883 €



### Financial management of TA expenses

The consortium agreed to attribute a unique value of unit cost per hour to be accounted for in the project budget. The value is in all cases significantly lower than the real unit cost per hour of each facility implying a relevant commitment by partners through in-kind contribution to the project. The agreed unit cost approximates in average 35% of the real unit cost. The total amount of TA provided by the consortium is 35 748 h and the amount of VA 5 000 000 h<sub>CPU</sub>.

**Table 3.1g: Subcontracting costs items**

For each participant describe and justify the tasks to be subcontracted (please note that core tasks of the project should not be sub-contracted).

1/ DESY		
	Cost (€)	Description of tasks and justification
Subcontracting	264 000	Promotion of SMEs for measurement time, materials and services. Up to 24 SMEs will receive measurement time. Per SME 11 k€ are estimated - 1 k€ for covering the access costs for the SME; 10 k€ for the contractual commitment of intermediary companies (Task 4.5)

2/ FZJ		
	Cost (€)	Description of tasks and justification
Subcontracting	25 000	External advice and support for the implementation of the impact assessment (Task 6.4) by expert involved in the proposal writing phase

20/ LLE-AISBL		
	Cost (€)	Description of tasks and justification
Subcontracting	32 000	Fee for external Selection Panel Chair (not identified yet)

For all subcontracts we confirm that process of selecting subcontractors will be and has already been compliant with all applicable institutional and national rules and regulations on public procurement and that subcontracting will be awarded ensuring best value for money (or if appropriate the lowest price) and that there is no conflict of interests (compliant with art 9.3. of GA).

**Table 3.1h: Purchase costs items**

The tables below show the purchase costs for those participants that exceed 15% of the personnel costs for that participant Note: We have no equipment costs foreseen. We have indicated all purchase costs, therefore we have not listed any remaining purchase cost which are below 15% of the personnel costs.

Note for consumables:

Single consumables per junior scientist with the highest values include:

- Gas supply for in-situ experiments (up to 3 k€)
- Sample holders to match user-provided sample form factor to instrument layout (typically machining and 3D printing of metals, up to 3 k€)
- Chemicals (such as ultra-pure standards, colloids of nanoparticles) required to support user experiments (up to 3 k€)



<b>1/ DESY</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	240 500	Travel costs 6 Junior Scientist (70 k€, WP 2; 1 JS = approx. 3 travels per year); Travel costs for 15 Junior Scientist for distribution (112,5k€, WP2; 1 JS = approx. 3 travels per year) Travel costs Nano Strategy Board (36 k€, WP 1; 15 members, 1 meeting per year), Travels costs Project Management (20 k€, WP 1; 2 people, 2-3 travels per year), Travel costs PICO (2 k€, WP 4; 1 PICO 1-2 travels per year)
<b>Other goods, works and services</b>	191 000	Organisation of kick-off, 4 Annual Meetings (100 k€, WP 1); Consumables for 21 Junior Scientist (73 k€, WP 2); Website design & host (10 k€, WP 6), Audit costs (4 k€, WP 1); Fees for workshops, software licenses for data analysis (4 k€, WP 4)
<b>Total</b>	<b>431 500</b>	

<b>3/ ULUND</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	17 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year); Central travel costs for WP leader and task leader (10 k€, WP 3; 1 person = 2-3 travels per year)
<b>Other goods, works and services</b>	69 500	Access Management Portal (65 k€, WP 3); Consumables for 1 Junior Scientist (3 k€, WP 2); Audit costs (1.5 k€, WP 2)
<b>Total</b>	<b>87 000</b>	

<b>5/ ALBA-CELLS</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	9 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year); Travel costs PICO (2 k€, WP 4, 1 PICO 1-2 travels per year)
<b>Other goods, works and services</b>	7 000	Consumables for 1 Junior Scientist (3 k€, WP 2); Consumables, cryogenics, fees for workshops, software licenses for data analysis, chemicals (4 k€, WP 4)
<b>Total</b>	<b>16 500</b>	

<b>6/ FORTH</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	13 000	Travel costs to GA meetings, RIANA schools and events (8 k€, WP 5, 1-2 persons 1-2 travels per year); Travel costs PICO (5 k€, WP 4, 1 PICO 1-2 travels per year)
<b>Other goods, works and services</b>	116 500	50 pre-access training visits, 1 week each (62.5 k€, WP 5; 50 persons for one week, per person 1,25k€ travel costs and accommodation; 2 user meetings (50 k€, WP 5, approx. 100 participants each); Consumables, cryogenics, fees for workshops, software licenses for data analysis, chemicals, audit costs (4 k€, WP 4; highest consumable: 3k€)
<b>Total</b>	<b>129 500</b>	

7/ HZDR		
	Cost (€)	Justification
Travel and subsistence	13 500	Travel costs for 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year); Travel costs PICO (4 k€, WP 4, 1 PICO 1-2 travels per year); Travel costs for workshops and meetings (2 k€, WP 5, 1 person 1 travel per year)
Other goods, works and services	49 000	21 bidirectional staff exchanges (21 k€, WP 5); 21 invited speakers (21 k€, WP 5); Consumables for 1 Junior Scientist (3 k€, WP 2); Consumables, cryogenics, fees for workshops, software licenses for data analysis, chemicals, audit costs (4 k€, WP 4)
<b>Total</b>	<b>62 500</b>	

8/ UAM		
	Cost (€)	Justification
Travel and subsistence	47 500	Centralised travel costs for all activities of WP 6 beneficiaries (40 k€, WP 6, participating in conferences, exhibition booth, WP leader outreach, 1-2 activities per year); Travel and subsistence for 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year);
Other goods, works and services	76 000	Producing of video, leaflet and poster (25 k€, WP 6); Organisation for 3 user-oriented events (24 k€, WP 6); Participation in 6 conferences with booth (24 k€, WP 6); Consumables for 1 Junior Scientist and audit costs (3 k€, WP 2)
<b>Total</b>	<b>123 500</b>	

10/ ESRF		
	Cost (€)	Justification
Travel and subsistence	2 000	Travel costs PICO (2 k€, WP 4, 1 PICO 1-2 travels per year)
Other goods, works and services	54 000	Costs for consumables, cryogenics and chemicals for task 4.3.2 (50 k€, WP 4); Costs for workshops, software and audit (4 k€, WP 4)
<b>Total</b>	<b>56 000</b>	

11/ CNRS		
	Cost (€)	Justification
Travel and subsistence	57 000	RIANA beneficiaries participating in training schools (48 k€, WP 5, 3 schools à 32 participants); Travel costs task leader (5 k€, WP 3); Travel costs task leader (4 k€, WP 5):
Other goods, works and services	100 000	Organising of 3 training schools and audit (100 k€, WP 5)
<b>Total</b>	<b>157 000</b>	

12/ INFLPR		
	Cost (€)	Justification
Travel and subsistence	2 000	Travel costs to workshops and meetings, participation of Innovation contest (2 k€, WP 2)

<b>Other goods, works and services</b>	21 000	Organising of 2 innovation-contests (21 k€, WP 5)
<b>Total</b>	23 000	

<b>13/ POLIMI</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	2 000	Travel costs PICO (2 k€, WP 4)
<b>Other goods, works and services</b>	4 000	Consumables, cryogenics, fees for workshops, software licenses for data analysis, chemicals(4 k€, WP 4)
<b>Total</b>	6 000	

<b>15/ UC</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	2 000	Travel costs for workshops and meetings (2 k€, WP 5)
<b>Other goods, works and services</b>	10 000	Webinars and data storage costs (10 k€, WP 5)
<b>Total</b>	12 000	

<b>16/ RBI</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	7 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year)
<b>Other goods, works and services</b>	65 000	Professional support for dissemination actions and webpage (50 k€, WP 6); Participation at 3 conferences with a booth for project result dissemination (12 k€, WP 6); Consumables for 1 Junior Scientist (3 k€, WP 2)
<b>Total</b>	72 500	

<b>17/ SOLARIS</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	7 500	Travel costs 1 Junior Scientist (7,5k€, WP 2, 1 JS = approx. 3 travels per year)
<b>Other goods, works and services</b>	3 000	Consumables for 1 Junior Scientist (3 k€, WP 2)
<b>Total</b>	10 500	

<b>20/ LLE-AISBL</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel and subsistence</b>	480 200	Travel costs for 792 users (475.2 k€, WP 3), Travel costs for task leader (5 k€, WP 3)
<b>Other goods, works and services</b>		-
<b>Total</b>	480 200	

21/ ICN2		
	Cost (€)	Justification
Travel and subsistence	3 750	Travel costs 1 Junior Scientist (3.75 k€, WP 2, 1 JS = approx. 3 travels per year)
Other goods, works and services	1 500	Consumables for 1 Junior Scientist (1,5 k€, WP 2)
<b>Total</b>	<b>5 250</b>	

25/ KTU		
	Cost (€)	Justification
Travel and subsistence	7 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year)
Other goods, works and services	3 000	Consumables for 1 Junior Scientist (3 k€, WP 2)
<b>Total</b>	<b>10 500</b>	

26/ IMT		
	Cost (€)	Justification
Travel and subsistence	7 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year)
Other goods, works and services	3 000	Consumables for 1 Junior Scientist (3 k€, WP 2)
<b>Total</b>	<b>10 500</b>	

29/ AMU		
	Cost (€)	Justification
Travel and subsistence	7 500	Travel costs 1 Junior Scientist (7,5 k€, WP 2, 1 JS = approx. 3 travels per year)
Other goods, works and services	3 000	Consumables for 1 Junior Scientist (3 k€, WP 2)
<b>Total</b>	<b>10 500</b>	

**Table 3.1i: Other costs categories items**

The tables below declare for each participant costs under other costs categories irrespective of the percentage of personnel costs. Only costs for transnational access are foreseen.

1/ DESY		
	Cost (€)	Justification
Transnational access	1 257 400	Access cost on the basis of UC (257.4 k€) including the 1 M€ reserve

2/ FZJ		
	Cost (€)	Justification
Transnational access	490 200	Access cost on the basis of UC
Virtual access	100 000	Virtual Access cost on the basis of UC

3/ ULUND		
	Cost (€)	Justification
Transnational access	182 000	Access cost on the basis of UC

4/ CNR		
	Cost (€)	Justification
Transnational access	129 600	Access cost on the basis of UC

4.1/ FBK		
	Cost (€)	Justification
Transnational access	25 920	Access cost on the basis of UC

4.2/ INRIM		
	Cost (€)	Justification
Transnational access	25 920	Access cost on the basis of UC

4.3/ POLITO		
	Cost (€)	Justification
Transnational access	25 920	Access cost on the basis of UC

5/ ALBA-CELLS		
	Cost (€)	Justification
Transnational access	177 840	Access cost on the basis of UC

6/ FORTH		
	Cost (€)	Justification
Transnational access	89 000	Access cost on the basis of UC

7/ HZDR		
	Cost (€)	Justification
Transnational access	72 675	Access cost on the basis of UC

8/ UAM		
	Cost (€)	Justification
Transnational access	58 650	Access cost on the basis of UC

9/ AREA		
	Cost (€)	Justification
Transnational access	85 800	Access cost on the basis of UC

11/ CNRS		
	Cost (€)	Justification
Transnational access	218 350	Access cost on the basis of UC

12/ INFLPR		
	Cost (€)	Justification
Transnational access	60 000	Access cost on the basis of UC

13/ POLIMI		
	Cost (€)	Justification
Transnational access	85 920	Access cost on the basis of UC

15/ UC		
	Cost (€)	Justification
Transnational access	65 000	Access cost on the basis of UC

16/ RBI		
	Cost (€)	Justification
Transnational access	58 650	Access cost on the basis of UC

17/ SOLARIS		
	Cost (€)	Justification
Transnational access	234 000	Access cost on the basis of UC

18/ SOLEIL		
	Cost (€)	Justification
Transnational access	182 520	Access cost on the basis of UC

19/ FELIX		
	Cost (€)	Justification
Transnational access	23 400	Access cost on the basis of UC

20.1/ IZF		
	Cost (€)	Justification
Transnational access	65 000	Access cost on the basis of UC

20.2/ CLPU		
	Cost (€)	Justification
Transnational access	20 000	Access cost on the basis of UC

20.3/ UCM		
	Cost (€)	Justification
Transnational access	20 000	Access cost on the basis of UC

20.4/ FZU		
	Cost (€)	Justification
Transnational access	65 000	Access cost on the basis of UC

20.5/ LENS		
	Cost (€)	Justification
Transnational access	60 000	Access cost on the basis of UC

20.6/ CEA		
	Cost (€)	Justification
Transnational access	30 000	Access cost on the basis of UC

20.8/ MUT		
	Cost (€)	Justification
Transnational access	60 000	Access cost on the basis of UC

<b>20.9/ UKRI</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	65 000	Access cost on the basis of UC

<b>21/ ICN2</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	85 800	Access cost on the basis of UC

<b>22/ NTNU</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	39 000	Access cost on the basis of UC

<b>23/ UANTWERPEN</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	163 800	Access cost on the basis of UC

<b>24/ BUT</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>25/ KTU</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>26/ IMT Bucharest</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>27/ UTARTU</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>28/ INESC MN</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>29/ AMU</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	24 000	Access cost on the basis of UC

<b>30/ ISSP UL</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	25 920	Access cost on the basis of UC

<b>31/ CSIC</b>		
	<b>Cost (€)</b>	<b>Justification</b>
<b>Transnational access</b>	24 000	Access cost on the basis of UC

32/ ELETTRA		
	Cost (€)	Justification
Transnational access	85 200	Access cost on the basis of UC

33/ ZFE		
	Cost (€)	Justification
Transnational access	85 800	Access cost on the basis of UC

34/ Atomki		
	Cost (€)	Justification
Transnational access	35 700	Access cost on the basis of UC

35/ GSI		
	Cost (€)	Justification
Transnational access	49 725	Access cost on the basis of UC

36/ IST		
	Cost (€)	Justification
Transnational access	57 375	Access cost on the basis of UC

37/ JSI		
	Cost (€)	Justification
Transnational access	36 975	Access cost on the basis of UC

38/ JYU		
	Cost (€)	Justification
Transnational access	47 175	Access cost on the basis of UC

39/ KU Leuven		
	Cost (€)	Justification
Transnational access	47 175	Access cost on the basis of UC

40/ NPI CAS		
	Cost (€)	Justification
Transnational access	68 850	Access cost on the basis of UC

41/ USE		
	Cost (€)	Justification
Transnational access	49 725	Access cost on the basis of UC

42/ UU		
	Cost (€)	Justification
Transnational access	89 250	Access cost on the basis of UC

43/ UMCG		
	Cost (€)	Justification
Transnational access	49 725	Access cost on the basis of UC



## 3.2 Capacity of participants and consortium as a whole

The ARIE network comprising European networks with a focus on large-scale research infrastructures has formed the initial start of the RIANA consortium that was extended towards nanoscience and nanotechnology with further European networks to offer unique access to the most advanced European research infrastructures along the whole process chain (Fig. 3): LEAPS (synchrotron- and free-electron-laser based photon sources), Laserlab-Europe (laser sources), e-DREAM (electron microscopy), RADIATE (ion sources), LENS (neutron sources), EuroNanoLab (clean rooms), EUSMI (soft matter analytics & high-power computing). Figure 3 shows the specific expertise of the RIs related to nanoscience and nanotechnology research. Task 3.3 gives detailed description of the individual research infrastructures providing access under the umbrella of RIANA. Figure 1 shows how the 69 infrastructures offering TA from the project start of RIANA are well distributed across Europe. RIANA proudly welcomes several partners from widening countries in its consortium. In addition to beneficiaries, RIANA closely collaborates with intermediary SMEs that offer additional service for industrial RI users and act as extension of RIANA both in coverage and in sustainable service provision beyond the RIANA project duration.

Access offered by RIANA is facing the challenge of availability of access to certain techniques: many of them are already overbooked or techniques demanded by users are not covered in sufficient redundancy. Therefore, each RI network offers TA to more than one infrastructure of their kind within RIANA, see table 3.1k. Furthermore, RIANA foresees to provide access to RIs outside the consortium (see Task 3.3.8) to ensure high flexibility and to provide most suitable installations to the nanoscience and nanotechnology community – including the Argonne National Laboratory where the world’s brightest X-ray nanoprobe will start operation 2025.

RIANA beneficiaries are well integrated in the world-wide RI community. The RIANA networks comprise centres of scientific and technological excellence, delivering services, data and know-how to a growing and diverse user community of more than 45 000 researchers in academia and industry across a wide range of scientific domains. There is deep knowledge and expertise in specific topics such as nanoscience and nanotechnology – also but not limited to underpin the research necessary for the HE missions and EU priorities, driving solutions for EU citizens.<sup>48</sup> Furthermore, RIANA is in contact with the European Joint Research Centre Nanobiotechnology Laboratory that shall be included as a partner for access upon RIANA approval (as the JRC are mentioned in the call, they are not part of the proposal itself).

There are RIANA beneficiaries that are also partners in the EU projects NFFA EUROPE Pilot and ReMade@ARI. RIANA will tremendously profit from the experience made within those two EU funded projects. On the other hand, NFFA (via CNR & ESRF) is even part of the consortium with a crucial role of industry support and networking, but not offering access as a network to avoid conflicts of interest with their ongoing EU-funded project NFFA EUROPE Pilot. Concerning the complementarity to the TA by NFFA and by ReMade@ARI in the field of circular economy, RIANA will not support user proposals already funded by the NFFA or ReMade@ARI. This can easily be ensured as the coordinator of NFFA (CNR) is WP leader in RIANA, and the user offices (Task 3.1) and the user travel reimbursement office (Task 3.4) for RIANA and ReMade@ARI are managed by the same organisations ULUND and LLE-AISBL.

Many beneficiaries have industrial contact officers in place or even a department taking care of industry technology transfer and exploitation of research results (e.g. all LEAPS and LENS RIs). The platform of industrial contact officers (PICO) within WP 4 will cultivate a close contact to industry in the field of nanoscience and nanotechnology. Beyond industrial users, PICO will support academic users fostering the exploitation of project results with respect to innovation and TRL increase.

All infrastructures of RIANA operate on the basis of “open science” and promote the FAIR principles in data management. Following the Horizon Europe rules, all RIANA beneficiaries have a Gender Equality Plan in place. In addition, a DEI (Diversity, Equality, Inclusion) Officer (see Task 1.1) will advise the consortium and monitor DEI aspects in all disciplines throughout the whole project (see Chapter 1.2).

DESY as the coordinator of RIANA has a long history in managing successful EU funded projects. Under Horizon 2020, DESY was involved in 67 projects, in 22 of them related to research infrastructures, in 5 of them as coordinator.

<sup>48</sup> [ARIE-MISSIONS-PosPaper-FINAL-RELEASE\\_09.2020.pdf \(lens-initiative.org\)](#)

## **4 ETHICS SELF-ASSESSMENT**

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An external ethics advisor is foreseen to advise the EU project RIANA in all data protection and ethics related issues. The ethics advisor will be appointed by RIANA's General Assembly. Affiliated partners will perform the tasks as the other partners in the RIANA consortium do. No ethical dimension with respect to objectives, methodology, impact of this project is foreseen due to their participation. S. Page 26, 43.

## ESTIMATED BUDGET FOR THE ACTION

Forms of funding	Estimated eligible <sup>1</sup> costs (per budget category)													Estimated EU contribution <sup>2</sup>			Maximum grant amount <sup>6</sup>
	Direct costs						Indirect costs			Total costs	EU contribution to eligible costs		Requested EU contribution				
	A. Personnel costs		B. Subcontracting costs		C. Purchase costs		D. Other cost categories				E. Indirect costs <sup>3</sup>	Funding rate % <sup>4</sup>		Maximum EU contribution <sup>5</sup>			
A.1 Employees (or equivalent)	A.2 Natural persons under direct contract	A.3 Seconded persons	A.4 SME owners and natural person beneficiaries	B. Subcontracting	C.1 Travel and subsistence	C.2 Equipment	C.3 Other goods, works and services	C.4 Internally invoiced goods and services	D.3 Transnational access to research infrastructure unit costs	D.4 Virtual access to research infrastructure unit costs			E. Indirect costs		Funding rate % <sup>4</sup>	Maximum EU contribution <sup>5</sup>	Requested EU contribution
a1	a2	a3	a3	b	c1	c2	c3	d2	d3	d4	e	U	g = f * U%	h	m		
1 - DESY	1 547 645.00	0.00	0.00	0.00	240 500.00	0.00	191 000.00	0.00	1 257 400.00	0.00	494 786.25	100	3 995 331.25	3 995 331.25	3 995 331.25		
2 - FZJ	590 777.00	0.00	0.00	0.00	31 000.00	0.00	14 000.00	0.00	490 200.00	100 000.00	158 944.25	100	1 409 921.25	1 409 921.25	1 409 921.25		
3 - ILLUD	403 242.00	0.00	0.00	0.00	17 500.00	0.00	69 500.00	0.00	182 000.00	0.00	122 560.50	100	794 802.50	794 802.50	794 802.50		
4 - CNR	268 037.00	0.00	0.00	0.00	9 000.00	0.00	8 000.00	0.00	129 600.00	0.00	71 259.25	100	485 896.25	485 896.25	485 896.25		
4.1 - FBK	10 106.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	2 526.50	100	38 552.50	38 552.50	38 552.50		
4.2 - INRIM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	0.00	100	25 920.00	25 920.00	25 920.00		
4.3 - POLITO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	0.00	100	25 920.00	25 920.00	25 920.00		
5 - ALBA-CELLS	153 000.00	0.00	0.00	0.00	9 500.00	0.00	7 000.00	0.00	177 840.00	0.00	42 375.00	100	389 715.00	389 715.00	389 715.00		
6 - FORTH	180 000.00	0.00	0.00	0.00	13 000.00	0.00	116 500.00	0.00	89 000.00	0.00	77 375.00	100	475 875.00	475 875.00	475 875.00		
7 - HZDR	287 200.00	0.00	0.00	0.00	13 500.00	0.00	49 000.00	0.00	72 675.00	0.00	87 425.00	100	509 800.00	509 800.00	509 800.00		
8 - UAM	202 500.00	0.00	0.00	0.00	47 500.00	0.00	76 000.00	0.00	58 650.00	0.00	81 500.00	100	466 150.00	466 150.00	466 150.00		
9 - AREA	216 772.00	0.00	0.00	0.00	8 750.00	0.00	5 500.00	0.00	85 800.00	0.00	57 755.50	100	374 577.50	374 577.50	374 577.50		
10 - ESRF	202 500.00	0.00	0.00	0.00	2 000.00	0.00	54 000.00	0.00	64 625.00	0.00	64 625.00	100	323 125.00	323 125.00	323 125.00		
11 - CNRS	43 637.50	0.00	0.00	0.00	57 000.00	0.00	100 000.00	0.00	218 350.00	0.00	50 159.38	100	469 146.88	469 146.88	469 146.88		
11.1 - U. Bordeaux	42 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10 500.00	100	52 500.00	52 500.00	52 500.00		
11.2 - ILLIe	3 127.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	781.88	100	3 909.38	3 909.37	3 909.37		
12 - INFLEPR RA	26 410.00	0.00	0.00	0.00	2 000.00	0.00	21 000.00	0.00	60 000.00	0.00	12 352.50	100	121 762.50	121 762.50	121 762.50		
13 - POLIMI	32 400.00	0.00	0.00	0.00	2 000.00	0.00	4 000.00	0.00	85 920.00	0.00	9 600.00	100	133 920.00	133 920.00	133 920.00		
14 - EUROPEAN XFEL	113 850.00	0.00	0.00	0.00	2 000.00	0.00	4 000.00	0.00	0.00	0.00	29 962.50	100	149 812.50	149 812.50	149 812.50		
15 - UC	10 000.00	0.00	0.00	0.00	2 000.00	0.00	10 000.00	0.00	65 000.00	0.00	5 500.00	100	92 500.00	92 500.00	92 500.00		
16 - RRI	115 650.00	0.00	0.00	0.00	7 500.00	0.00	65 000.00	0.00	58 650.00	0.00	47 037.50	100	293 837.50	293 837.50	293 837.50		
17 - SOLARIS JU	78 300.00	0.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	234 000.00	0.00	22 200.00	100	345 000.00	345 000.00	345 000.00		
18 - SOLEIL	178 300.00	0.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	182 520.00	0.00	47 200.00	100	418 520.00	418 520.00	418 520.00		
19 - FELIX / RU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23 400.00	0.00	0.00	100	23 400.00	23 400.00	23 400.00		
20 - LLE-AISBL	0.00	0.00	0.00	0.00	480 200.00	0.00	0.00	0.00	0.00	0.00	120 050.00	100	632 250.00	632 250.00	632 250.00		
20.1 - IZF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65 000.00	0.00	0.00	100	65 000.00	65 000.00	65 000.00		
20.2 - CLPU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	0.00	100	20 000.00	20 000.00	20 000.00		
20.3 - UCM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20 000.00	0.00	0.00	100	20 000.00	20 000.00	20 000.00		
20.4 - FZU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65 000.00	0.00	0.00	100	65 000.00	65 000.00	65 000.00		
20.5 - LENS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60 000.00	0.00	0.00	100	60 000.00	60 000.00	60 000.00		

Forms of funding	Estimated eligible <sup>1</sup> costs (per budget category)											Estimated EU contribution <sup>2</sup>		
	Direct costs						Indirect costs					EU contribution to eligible costs		Maximum grant amount <sup>4</sup>
	A. Personnel costs		B. Subcontracting costs		C. Purchase costs		D. Other cost categories			Total costs	Funding rate % <sup>5</sup>	Requested EU contribution		
A.1 Employees (or equivalent)	A.4 SME owners and natural person beneficiaries	B. Subcontracting	C.1 Travel and subsistence	C.2 Equipment	C.3 Other goods, works and services	D.2 Internally invoiced goods and services	D.3 Transitional access to research infrastructure unit costs	D.4 Virtual access to research infrastructure unit costs	E. Indirect costs <sup>3</sup>				E. Indirect costs	
a1	a2	a3	b	c1	c2	c3	d2	d3	d4	e	f = a + b + c1 + c2 + c3	g = f * U %	h	m
20.6 - CEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30 000.00	100	30 000.00	30 000.00
20.7 - FVB-MBI	182 400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45 600.00	228 000.00	100	228 000.00	228 000.00
20.8 - MIT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60 000.00	100	60 000.00	60 000.00
20.9 - UKRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65 000.00	100	65 000.00	65 000.00
21 - ICN2	50 500.00	0.00	0.00	3 750.00	0.00	1 500.00	0.00	85 800.00	0.00	13 937.50	155 487.50	100	155 487.50	155 487.50
22 - NTNU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39 000.00	0.00	0.00	39 000.00	100	39 000.00	39 000.00
23 - UAANTWERPEN	219 600.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	163 800.00	0.00	57 525.00	451 425.00	100	451 425.00	451 425.00
24 - BIT	6 668.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	1 667.00	34 255.00	100	34 255.00	34 255.00
25 - KTU	55 342.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	25 920.00	0.00	16 460.50	108 222.50	100	108 222.50	108 222.50
26 - IMT Bucharest	45 000.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	25 920.00	0.00	13 875.00	95 295.00	100	95 295.00	95 295.00
27 - UTARTU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	0.00	25 920.00	100	25 920.00	25 920.00
28 - INESCIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	0.00	25 920.00	100	25 920.00	25 920.00
29 - AMU	85 230.00	0.00	0.00	7 500.00	0.00	3 000.00	0.00	24 000.00	0.00	23 937.50	143 687.50	100	143 687.50	143 687.50
30 - ISSP UL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25 920.00	0.00	0.00	25 920.00	100	25 920.00	25 920.00
31 - CSIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24 000.00	0.00	0.00	24 000.00	100	24 000.00	24 000.00
32 - ELETTRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85 200.00	0.00	0.00	85 200.00	100	85 200.00	85 200.00
33 - ZFE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85 800.00	0.00	0.00	85 800.00	100	85 800.00	85 800.00
34 - Atomki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35 700.00	0.00	0.00	35 700.00	100	35 700.00	35 700.00
35 - GSI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49 725.00	0.00	0.00	49 725.00	100	49 725.00	49 725.00
36 - IST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57 375.00	0.00	0.00	57 375.00	100	57 375.00	57 375.00
37 - ISI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36 975.00	0.00	0.00	36 975.00	100	36 975.00	36 975.00
38 - JYU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47 175.00	0.00	0.00	47 175.00	100	47 175.00	47 175.00
39 - KU Leuven	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47 175.00	0.00	0.00	47 175.00	100	47 175.00	47 175.00
40 - NPI CAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68 850.00	0.00	0.00	68 850.00	100	68 850.00	68 850.00
41 - USE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49 725.00	0.00	0.00	49 725.00	100	49 725.00	49 725.00
42 - UU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89 250.00	0.00	0.00	89 250.00	100	89 250.00	89 250.00
43 - UMCG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49 725.00	0.00	0.00	49 725.00	100	49 725.00	49 725.00
<b>Σ consortium</b>	5 350 214.00	0.00	0.00	321 000.00	993 700.00	814 000.00	0.00	5 128 560.00	100 000.00	1 789 478.51	14 496 952.51		14 496 952.51	14 496 952.51

<sup>1</sup> See Article 6 for the eligibility conditions. All amounts must be expressed in EUR (see Article 2.1 for the conversion rules).

<sup>2</sup> The consortium remains free to decide on a different internal distribution of the EU funding (via the consortium agreement, see Article 7).

<sup>3</sup> Indirect costs already covered by an operating grant (received under any EU funding programme) are ineligible (see Article 6.3). Therefore, a beneficiary/affiliated entity that receives an operating grant during the action duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant, unless they can demonstrate that the operating grant does not cover any costs of the action. This requires specific accounting tools. Please immediately contact us via the EU Funding & Tenders Portal for details.

<sup>4</sup> See Data Sheet for the funding rates(s).

<sup>5</sup> This is the theoretical amount of the EU contribution to costs, if the reimbursement rate is applied to all the budgeted costs. This theoretical amount is then capped by the 'maximum grant amount'.

<sup>6</sup> The 'maximum grant amount' is the maximum grant amount decided by the EU. It normally corresponds to the requested grant, but may be lower.

<sup>7</sup> See Annex 2a 'Additional information on the estimated budget' for the details (units, cost per unit).

<sup>8</sup> See Data Sheet for the flat-rate.

## **ANNEX 2a**

### **ADDITIONAL INFORMATION ON UNIT COSTS AND CONTRIBUTIONS**

#### **SME owners/natural person beneficiaries without salary** (Decision C(2020) 7115<sup>1</sup>)

Type: unit costs

Units: days spent working on the action (rounded up or down to the nearest half-day)

Amount per unit (daily rate): calculated according to the following formula:

$$\begin{aligned} &\{\text{EUR } 5\,080 / 18 \text{ days} = \mathbf{282,22}\} \\ &\text{multiplied by} \\ &\{\text{country-specific correction coefficient of the country where the beneficiary is established}\} \end{aligned}$$

The country-specific correction coefficients used are those set out in the Horizon Europe Work Programme (section Marie Skłodowska-Curie actions) in force at the time of the call (see [Portal Reference Documents](#)).

#### **HE and Euratom Research Infrastructure actions**<sup>2</sup>

Type: unit costs

Units<sup>3</sup>: see (for each access provider and installation) the unit cost table in Annex 2b

Amount per unit\*: see (for each access provider and installation) the unit cost table in Annex 2b

\* Amount calculated as follows:

For trans-national access:

$$\frac{\text{average annual total trans-national access costs to the installation (over past two years<sup>4</sup>)}}{\text{average annual total quantity of trans-national access to the installation (over past two years<sup>5</sup>)}}$$

For virtual access:

$$\frac{\text{total virtual access costs to the installation (over the last year<sup>6</sup>)}}{\text{total quantity of virtual access to the installation (over the last year<sup>7</sup>)}}$$

#### **Euratom staff mobility costs**<sup>8</sup>

##### **Monthly living allowance**

Type: unit costs

<sup>1</sup> Commission [Decision](#) of 20 October 2020 authorising the use of unit costs for the personnel costs of the owners of small and medium-sized enterprises and beneficiaries that are natural persons not receiving a salary for the work carried out by themselves under an action or work programme (C(2020)7715).

<sup>2</sup> [Decision](#) of 19 April 2021 authorising the use of unit costs for the costs of providing trans-national and virtual access in Research Infrastructure actions under the Horizon Europe Programme (2021-2027) and the Research and Training Programme of the European Atomic Energy Community (2021-2025).

<sup>3</sup> Unit of access (e.g. beam hours, weeks of access, sample analysis) fixed by the access provider in proposal.

<sup>4</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>5</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>6</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>7</sup> In exceptional and duly justified cases, the granting authority may agree to a different reference period.

<sup>8</sup> [Decision](#) of 15 March 2021 authorising the use of unit costs for mobility in co-fund actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit\*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

\* Amount calculated as follows from 1 January 2021:  
 {EUR 4 300 multiplied by  
 country-specific correction coefficient\*\* of the country where the staff member is seconded}<sup>9</sup>

\*\*Country-specific correction coefficients as from 1 January 2021<sup>10</sup>

EU-Member States<sup>11</sup>

Country / Place	Coefficient (%)
Bulgaria	59,1
Czech Rep.	85,2
Denmark	131,3
Germany	101,9
Bonn	95,8
Karlsruhe	98
Munich	113,9
Estonia	82,3
Ireland	129
Greece	81,4
Spain	94,2
France	120,5
Croatia	75,8
Italy	95
Varese	90,7
Cyprus	78,2
Latvia	77,5
Lithuania	76,6
Hungary	71,9
Malta	94,7
Netherlands	113,9
Austria	107,9
Poland	70,9
Portugal	91,1
Romania	66,6
Slovenia	86,1

<sup>9</sup> Unit costs for living allowances are calculated by using a method of calculation similar to that applied for the secondment to the European Commission of seconded national experts (SNEs).

<sup>10</sup> ⚠ For the financial statements, the amount must be adjusted according to the actual place of secondment. The revised coefficients were adopted in the Decision authorising the use of unit costs for the Fusion Programme co-fund action under the Research and training Programme of the European Atomic Energy Community 2021-2025. They are based on the 2020 Annual update of the remuneration and pensions of the officials and other servants of the European Union and the correction coefficients applied thereto (OJ C 428, 11.12.2020) to ensure purchasing power parity. The revised coefficient are applied as from 1 January 2021 through an amendment to the grant agreement.

<sup>11</sup> No correction coefficient shall be applicable in Belgium and Luxembourg.

Slovakia	80,6
Finland	118,4
Sweden	124,3

Third countries

Country/place	Coefficient (%)
China	82,2
India	72,3
Japan	111,8
Russia	92,7
South Korea	92,3
Switzerland	129,2
Ukraine	82,3
United Kingdom	97,6
United States	101,4 (New-York) 90,5 (Washington)

**Mobility allowance**

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: EUR 600 per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

**Family allowance**

Type: unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: EUR 660 per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

**Education allowance**

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit\*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

\*Amount calculated as follows from 1 January 2021:  
{EUR 283.82 x number of dependent children<sup>12</sup>}

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<sup>12</sup> For the estimated budget (Annex 2): an average should be used. (⚠ For the financial statements, the number of children (and months) must be adjusted according to the actual family status at the moment the secondment starts.)



**ANNEX 2b**

**ADDITIONAL INFORMATION ON CUSTOMISED UNIT COSTS AND CONTRIBUTIONS**

**RIANA Research Infrastructure actions**<sup>1</sup>

Unit cost table (Transnational access to research infrastructure unit cost and virtual access to research infrastructure unit cost)<sup>2</sup>

<i>Short Name Access Provider</i>	<i>Short Name infrastructure/installation</i>	<i>Unit of access</i>	<i>Amount per Unit (€/h)</i>	<i>Estimated Number of Units</i>	<i>Total Unit Costs (€)</i>
<b>GRAND TOTAL</b>				<b>35,748</b>	<b>5,228,560</b>
<b>LEAPS</b>			<b>195</b>	<b>6,108</b>	<b>1,077,360</b>
ESRF	ESRF	h	*	480	0
DESY	PETRA III	h	195	1,200	234,000
SOLARIS	SOLARIS	h	195	1,200	234,000
SOLEIL	SOLEIL	h	195	936	182,520
ALBA-CELLS	ALBA	h	195	912	177,840
ULUND	MAX IV	h	195	600	117,000
ELETTRA	ELETTRA	h	160	240	38,400
DESY	FLASH	h	195	120	23,400
ELETTRA	FERMI	h	195	240	46,800
FELIX	FELIX	h	195	120	23,400
EuXFEL	EuXFEL	h	*	60	0
<b>Laserlab Europe</b>			<b>125</b>	<b>6,400</b>	<b>800,000</b>
IZF	CALT	h	125	520	65,000
CNRS	CELIA	h	125	320	40,000
UKRI	CLF	h	125	520	65,000
CLPU	CLPU	h	125	160	20,000
UCM	CLUR	h	125	160	20,000
POLIMI	CUSBO	h	125	480	60,000
FZU	HILASE	h	125	520	65,000
INFLPR	CETAL	h	125	480	60,000
LENS	LENS	h	125	480	60,000
CEA	LIDYL	h	125	240	30,000
ULUND	LLC	h	125	520	65,000
CNRS	LP3	h	125	480	60,000
MUT	IOE	h	125	480	60,000
UC	CLL	h	125	520	65,000
FORTH	ULF	h	125	520	65,000

<sup>1</sup> [Decision](#) of 19 April 2021 authorising the use of unit costs for the costs of providing trans-national and virtual access in Research Infrastructure actions under the Horizon Europe Programme (2021-2027) and the Research and Training Programme of the European Atomic Energy Community (2021-2025).

<sup>2</sup> Data from the Table on estimated costs/quantity of access to be provided that is part of the proposal and Annex 1.

<b>e-DREAM</b>			<b>97.5</b>	<b>6,400</b>	<b>624,000</b>
AREA	AREA	h	97.5	880	85,800
FZJ	ER-C	h	97.5	1,680	163,800
ICN2	ICN2	h	97.5	880	85,800
NTNU	NTNU	h	97.5	400	39,000
UAntwerp	UAntwerp	h	97.5	1,680	163,800
ZFE	ZFE	h	97.5	880	85,800

<i>Acronym beneficiary</i>	<i>Acronym infrastructure</i>		<i>Costs reimburse d (€/h)</i>	<i>Access offered (h)</i>	<i>Total reimburse d (€)</i>
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<b>RADIATE</b>			<b>127.5</b>	<b>6,400</b>	<b>816,000</b>
HZDR	IBC	h	127.5	570	72,675
UAM	CMAM	h	127.5	460	58,650
UMCG	AGOR	h	127.5	390	49,725
KU Leuven	IMBL	h	127.5	370	47,175
GSI	GSI	h	127.5	390	49,725
Atomki	ATL	h	127.5	280	35,700
UU	UTL	h	127.5	700	89,250
RBI	AF	h	127.5	460	58,650
JSI	MIC	h	127.5	290	36,975
IST	LATR	h	127.5	450	57,375
CNRS	CIRIL/GANIL	h	127.5	370	47,175
USE	CNA	h	127.5	390	49,725
CNRS	SAFIR	h	127.5	370	47,175
NPI CAS	LT	h	127.5	540	68,850
JYU	AccLab	h	127.5	370	47,175

<b>LENS</b>			<b>315</b>	<b>960</b>	<b>302,400</b>
FZJ	MLZ	h	315	960	302,400

<b>EuroNanoLab</b>			<b>60</b>	<b>6,480</b>	<b>388,800</b>
BUT	CzechNanoLab	h	60	432	25,920
CNR	IMM Bologna	h	60	432	25,920
CNR	IMM Agrate	h	60	432	25,920
CNR	IMM Lecce	h	60	432	25,920
CNR	IMM Roma	h	60	432	25,920
CNR	NANOTEC Lecce	h	60	432	25,920
FBK	FBK	h	60	432	25,920
INRIM	PIQUET	h	60	432	25,920
POLITO	PIQUET	h	60	432	25,920
POLIMI	POLIFAB	h	60	432	25,920
UKaunas	MNAAPC	h	60	432	25,920
IMT	MINAFAB	h	60	432	25,920
UTartu	UTartu	h	60	432	25,920
INESC MN	MicroNanoFabs@PT	h	60	432	25,920
ISSP UL	ISSP UL	h	60	432	25,920

<b>EUSMI</b>			<b>40</b>	<b>3,000</b>	<b>120,000</b>
AMU	AMU	h	40	600	24,000
FZJ	IBI-4	h	40	600	24,000
CNRS	INFRANALYTICS	h	40	600	24,000
FORTH	SMI	h	40	600	24,000
CSIC	BDS-Lab	h	40	600	24,000

<b>Super Computing</b>			<b>CPUh</b>	<b>5 000 000 h<sub>CPU</sub></b>	<b>100,000</b>
FZJ	JSC	CPU h	0.02	5 000 000 h <sub>CPU</sub>	100,000

<b>Reserve for customization of TA during project: 1 000 000 €</b>					<b>1,000,000</b>
DESY	TNA Reserve	h	195	5,128	1000000

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**FORSCHUNGSZENTRUM JULICH GMBH (FZJ)**, PIC 999980470, established in WILHELM JOHNEN STRASSE, JULICH 52428, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Petra INSBERG with ECAS id ninsbepe signed in the Participant

2023.12.15 10:31:28 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**LUNDS UNIVERSITET (ULUND)**, PIC 999901318, established in Paradisgatan 5c, LUND 22100, Sweden,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Marqit Nothnaal with ECAS id n00dxo65 signed in the Participant

2023.11.29 17:07:00 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)**, PIC 999979500, established in PIAZZALE ALDO MORO 7, ROMA 00185, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Giancarlo PANACCIONE with ECAS id npanacca signed in the

2023.12.04 12:20:07 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**CONSORCIO PARA LA CONSTRUCCION EQUIPAMIENTO Y EXPLOTACION DEL LABORATORIO DE LUZ SINCROTRON (ALBA-CELLS)**, PIC 999917226, established in CARRER DE LA LLUM 2-26, CERDANYOLA DEL VALLES BARCELONA 08290, Spain,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Caterina BISCARI with ECAS id nbiscaca signed in the Participant

2023.11.28 15:06:39 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**IDRYMA TECHNOLOGIAS KAI EREVNAS (FORTH)**, PIC 999995893, established in N PLASTIRA STR 100, IRAKLEIO 70013, Greece,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Nektarios TAVERNARAKIS with ECAS id ntaverne signed in the

2023.12.08 12:36:56 CET



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV (HZDR)**, PIC 999470541,  
established in BAUTZNER LANDSTRASSE 400, DRESDEN 01328, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Barbara SCHRAMM with ECAS id nschrabr signed in the Participant

2023.11.27 16:21:39 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIVERSIDAD AUTONOMA DE MADRID (UAM)**, PIC 999861354, established in CALLE EINSTEIN 3 CIUDAD UNIV CANTOBLANCO RECTORADO, MADRID 28049, Spain,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Daniel JAQUE GARCÍA with ECAS id njaquedl signed in the Participant

2023.11.28 10:03:50 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE (AREA)**, PIC 999549887, established in PADRICIANO 99, TRIESTE 34149, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Anna Sirica with ECAS id n00bzsac signed in the Participant Portal

2023.12.15 12:46:45 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**EUROPEAN SYNCHROTRON RADIATION FACILITY (ESRF)**, PIC 999484121, established in 71 AVENUE DES MARTYRS, GRENOBLE 38000, France,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Claudine DARGENT with ECAS id n00avczj signed in the Participant

2023.11.27 18:52:03 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (CNRS)**, PIC 999997930,  
established in RUE MICHEL ANGE 3, PARIS 75794, France,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Louiza Sanchez with ECAS id n00856n8 signed in the Participant

2024.01.10 09:48:37 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA LASERILOR PLASMEI SI RADIATIEI (INFLPR RA)**, PIC 999499253, established in Atomistilor 409, Magurele / Ilfov 077125, Romania,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Nicolae Cristian MIHAIL ESCU with ECAS id nmihailn signed in the

2023.11.28 10:48:33 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**POLITECNICO DI MILANO (POLIMI)**, PIC 999879881, established in PIAZZA LEONARDO DA VINCI 32, MILANO 20133, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between** DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) **and** the **European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Lamberto Duò with ECAS id n0032e1t signed in the Participant

2023.11.28 16:48:01 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**EUROPEAN X-RAY FREE-ELECTRON LASERFACILITY GMBH (EUROPEAN XFEL)**,  
PIC 974524469, established in HOLZKOPPEL 4, SCHENEFELD 22869, Germany,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Nicole Elleuche with ECAS id n0026iaq signed in the Participant

2023.12.18 12:25:28 CET



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIVERSIDADE DE COIMBRA (UC)**, PIC 997826391, established in PACO DAS ESCOLAS, COIMBRA 3004-531, Portugal,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

João Ramalho Santos with ECAS id n00cfe9 signed in the Participant

2023.11.27 21:51:56 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**RUDER BOSKOVIC INSTITUTE (RBI)**, PIC 999875031, established in Bijenicka cesta 54, ZAGREB 10000, Croatia,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

David SMITH with ECAS id nsmithcw signed in the Participant Portal

2023.11.27 18:20:54 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIWERSYTET JAGIELLONSKI (SOLARIS JU)**, PIC 999642716, established in UL GOLEBIA 24, KRAKOW 31-007, Poland,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Piotr Kustrowski with ECAS id n003ay1m signed in the Participant

2023.12.11 19:52:04 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**SYNCHROTRON SOLEIL SOCIETE CIVILE (SOLEIL)**, PIC 998721507, established in L ORME DES MERISIERS, SAINT AUBIN 91190, France,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Jean DAILLANT with ECAS id ndaillje signed in the Participant Portal

2023.11.28 09:33:52 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**STICHTING RADBOUD UNIVERSITEIT (FELIX / RU)**, PIC 999992110, established in HOUTLAAN 4, NIJMEGEN 6525 XZ, Netherlands,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Siibrand de Iona with ECAS id n008cae8 signed in the Participant

2023.11.30 14:11:32 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**LASERLAB-EUROPE AISBL (LLE-AISBL)**, PIC 901479686, established in RUE DU TRÔNE 98, BRUSSELS 1050, Belgium,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Sylvie JACQUEMOT with ECAS id njacqusv signed in the Participant

2023.11.27 18:18:24 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA (ICN2)**, PIC 999606923, established in CAMPUS DE LA UAB EDIFICI Q ICN2, CERDANYOLA DEL VALLES 08193, Spain,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

PABLO ORDEJON RONTOME' with ECAS id nordepab signed in the

2024.01.03 16:32:36 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU (NTNU)**, PIC 999977851, established in HOGSKOLERINGEN 1, TRONDHEIM 7491, Norway,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Tor GRANDE with ECAS id ngrandto signed in the Participant Portal

2023.11.27 17:39:26 CET



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIVERSITEIT ANTWERPEN (UANTWERPEN)**, PIC 999902870, established in PRINSSTRAAT 13, ANTWERPEN 2000, Belgium,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Herman VAN GOETHEM with ECAS id nqoeherm signed in the

2023.11.27 18:00:15 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**VYSOKE UCENI TECHNICKE V BRNE (BUT)**, PIC 999873091, established in ANTONINSKA 548/1, BRNO STRED 601 90, Czechia,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Ladislav Janíček with ECAS id n0094r7p signed in the Participant

2023.11.30 09:40:27 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**KAUNO TECHNOLOGIJOS UNIVERSITETAS (KTU)**, PIC 999844961, established in K DONELAICIO 73, KAUNAS LT-44029, Lithuania,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Eugenijus Valatka with ECAS id n002cprq signed in the Participant

2023.11.29 15:21:41 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INSTITUTUL NATIONAL DE CERCETAREDEZVOLTARE PENTRU MICROTEHNOLOGIE (IMT Bucharest)**, PIC 999617690, established in EROU IANCU NICOLAE STREET 32B, VOLUNTARI 077190, Romania,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Miron Adrian DINESCU with ECAS id ndinesmi signed in the

2023.12.04 10:16:52 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**TARTU ULIKOOL (UTARTU)**, PIC 999895013, established in ULIKOOLI 18, TARTU 50090, Estonia,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Siret Rutiku with ECAS id n00a2iti signed in the Participant Portal

2023.12.04 14:46:19 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INESC MICROSISTEMAS E NANOTECNOLOGIAS - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES PARA OS MICROSISTEMAS E AS NANOTECNOLOGIAS (INESC MN)**, PIC 998133590, established in RUA ALVES REDOL 9, LISBOA 1000 029, Portugal,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Susana CARDOSO DE FREITAS with ECAS id ncardsus signed in the

2023.11.27 21:41:31 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIWERSYTET IM. ADAMA MICKIEWICZA W POZNANIU (AMU)**, PIC 999886865,  
established in ULICA HENRYKA WIENIAWSKIEGO 1, POZNAN 61 712, Poland,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Przemyslaw WOJTASZEK with ECAS id nwojtapr signed in the

2023.11.27 22:06:11 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**LATVIJAS UNIVERSITATES CIETVIELU FIZIKAS INSTITUTS (ISSP UL)**, PIC 999852139,  
established in KENGARAGA IELA 8, RIGA LV-1063, Latvia,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Andris ANSPOKS with ECAS id nanspadr signed in the Participant



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS (CSIC)**, PIC 999991722, established in CALLE SERRANO 117, MADRID 28006, Spain,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

2023.11.29 10:06:42 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**ELETTRA - SINCROTRONE TRIESTE SCPA (ELETTRA)**, PIC 999589851, established in SS 14 KM 163.5 AREA SCIENCE PARK, BASOVIZZA TRIESTE 34149, Italy,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Alfonso FRANCIOSI with ECAS id nfranalf signed in the Participant

2023.11.28 09:33:14 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**VEREIN ZUR FORDERUNG DER ELEKTRONENMIKROSKOPIE UND FEINSTRUKTURFORSCHUNG (ZFE)**, PIC 988302058, established in STEYRERGASSE 17, GRAZ 8010, Austria,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Gerald KOTHLEITNER with ECAS id nkothlge signed in the Participant

2023.12.19 11:48:16 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**ATOMMAGKUTATO INTEZET (Atomki)**, PIC 999869890, established in BEM TER 18/C, DEBRECEN 4026, Hungary,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Zsolt DOMBRÁDI with ECAS id ndombrzs signed in the Participant

2023.11.27 16:25:44 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**GSI HELMHOLTZZENTRUM FUR SCHWERIONENFORSCHUNG GMBH (GSI), PIC 999995214, established in PLANCKSTRASSE 1, DARMSTADT 64291, Germany,**

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Paolo GIUBELLINO with ECAS id ngiubpol signed in the Participant

2023.11.27 20:39:54 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INSTITUTO SUPERIOR TECNICO (IST)**, PIC 999992983, established in AVENIDA ROVISCO PAIS 1, LISBOA 1049 001, Portugal,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Rogério COLAÇO with ECAS id ncolarog signed in the Participant

2023.11.28 20:05:27 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**INSTITUT JOZEF STEFAN (JSI)**, PIC 999971837, established in Jamova 39, LJUBLJANA 1000, Slovenia,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Boštjan Zalar with ECAS id n005e0r1 signed in the Participant Portal

2023.11.28 17:40:37 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**JYVASKYLAN YLIOPISTO (JYU)**, PIC 999842245, established in SEMINAARINKATU 15, JYVASKYLA 40100, Finland,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Mikko MÖNKKÖNEN with ECAS id nmoenkmi signed in the

2023.12.14 12:02:34 CET



**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**KATHOLIEKE UNIVERSITEIT LEUVEN (KU Leuven)**, PIC 999991334, established in OUDE MARKT 13, LEUVEN 3000, Belgium,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Elke LAMMERTYN with ECAS id nlammeel signed in the Participant

2023.11.28 09:40:48 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**USTAV JADERNE FYZIKY AV CR (NPI CAS), PIC 999969412, established in Husinec - Řež 130, REZ - PRAHA 25068, Czechia,**

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Ondřej Svoboda with ECAS id n002ifon signed in the Participant

2023.11.27 16:19:07 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UNIVERSIDAD DE SEVILLA (USE)**, PIC 999862518, established in CALLE S. FERNANDO 4, SEVILLA 41004, Spain,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Julián MARTÍNEZ FERNÁNDEZ with ECAS id ngarcimw signed in the

2023.11.28 13:59:43 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**UPPSALA UNIVERSITET (UU)**, PIC 999985029, established in VON KRAEMERS ALLE 4, UPPSALA 751 05, Sweden,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Per ABRAHAMSSON with ECAS id nabrahap signed in the Participant

2023.12.09 10:05:50 CET

**ANNEX 3**

**ACCESSION FORM FOR BENEFICIARIES**

**ACADEMISCH ZIEKENHUIS GRONINGEN (UMCG)**, PIC 999914801, established in HANZEPLEIN 1, GRONINGEN 9713 GZ, Netherlands,

**hereby agrees**

**to become beneficiary**

**in Agreement No 101130652 — RIANA** ('the Agreement')

**between DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY (DESY) and the European Research Executive Agency (REA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Prof. Dr. A.G.J. van der Zee with ECAS id nlcrloke signed in the

2023.11.29 09:21:01 CET



## **SPECIFIC RULES**

### **CONFIDENTIALITY AND SECURITY (— ARTICLE 13)**

#### **Sensitive information with security recommendation**

Sensitive information with a security recommendation must comply with the additional requirements imposed by the granting authority.

Before starting the action tasks concerned, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task. The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary.

For requirements restricting disclosure or dissemination, the information must be handled in accordance with the recommendation and may be disclosed or disseminated only after written approval from the granting authority.

#### **EU classified information**

If EU classified information is used or generated by the action, it must be treated in accordance with the security classification guide (SCG) and security aspect letter (SAL) set out in Annex 1 and Decision 2015/444<sup>1</sup> and its implementing rules — until it is declassified.

Deliverables which contain EU classified information must be submitted according to special procedures agreed with the granting authority.

Action tasks involving EU classified information may be subcontracted only with prior explicit written approval from the granting authority and only to entities established in an EU Member State or in a non-EU country with a security of information agreement with the EU (or an administrative arrangement with the Commission).

EU classified information may not be disclosed to any third party (including participants involved in the action implementation) without prior explicit written approval from the granting authority.

### **ETHICS (— ARTICLE 14)**

#### **Ethics and research integrity**

The beneficiaries must carry out the action in compliance with:

- ethical principles (including the highest standards of research integrity)

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<sup>1</sup> Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

and

- applicable EU, international and national law, including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols.

No funding can be granted, within or outside the EU, for activities that are prohibited in all Member States. No funding can be granted in a Member State for an activity which is forbidden in that Member State.

The beneficiaries must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- aim at human cloning for reproductive purposes
- intend to modify the genetic heritage of human beings which could make such modifications heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed)
- intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer, or
- lead to the destruction of human embryos (for example, for obtaining stem cells).

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the granting authority.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity<sup>2</sup>.

This implies compliance with the following principles:

- reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources
- honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way

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<sup>2</sup> European Code of Conduct for Research Integrity of ALLEA (All European Academies).



- respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment
- accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts

and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices including ensuring, where possible, openness, reproducibility and traceability and refrain from the research integrity violations described in the Code.

Activities raising ethical issues must comply with the additional requirements formulated by the ethics panels (including after checks, reviews or audits; see Article 25).

Before starting an action task raising ethical issues, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task, notably from any (national or local) ethics committee or other bodies such as data protection authorities.

The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary, which shows that the documents cover the action tasks in question and includes the conclusions of the committee or authority concerned (if any).

## **VALUES (— ARTICLE 14)**

### **Gender mainstreaming**

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action and, where applicable, in line with the gender equality plan. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

## **INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS — ACCESS RIGHTS AND RIGHTS OF USE (— ARTICLE 16)**

### **Definitions**

Access rights — Rights to use results or background.

Dissemination — The public disclosure of the results by appropriate means, other than resulting from protecting or exploiting the results, including by scientific publications in any medium.

Exploit(ation) — The use of results in further research and innovation activities other than those covered by the action concerned, including among other things, commercial exploitation such as developing, creating, manufacturing and marketing a product or process, creating and providing a service, or in standardisation activities.

Fair and reasonable conditions — Appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

FAIR principles — ‘findability’, ‘accessibility’, ‘interoperability’ and ‘reusability’.

Open access — Online access to research outputs provided free of charge to the end-user.

Open science — An approach to the scientific process based on open cooperative work, tools and diffusing knowledge.

Research data management — The process within the research lifecycle that includes the organisation, storage, preservation, security, quality assurance, allocation of persistent identifiers (PIDs) and rules and procedures for sharing of data including licensing.

Research outputs — Results to which access can be given in the form of scientific publications, data or other engineered results and processes such as software, algorithms, protocols, models, workflows and electronic notebooks.

### **Scope of the obligations**

For this section, references to ‘beneficiary’ or ‘beneficiaries’ do not include affiliated entities (if any).

### **Agreement on background**

The beneficiaries must identify in a written agreement the background as needed for implementing the action or for exploiting its results.

Where the call conditions restrict control due to strategic interests reasons, background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries or target countries set out in the call conditions and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from it in the agreement on background — unless otherwise agreed with the granting authority.

### **Ownership of results**

Results are owned by the beneficiaries that generate them.

However, two or more beneficiaries own results jointly if:

- they have jointly generated them and
- it is not possible to:
  - establish the respective contribution of each beneficiary, or
  - separate them for the purpose of applying for, obtaining or maintaining their protection.

The joint owners must agree — in writing — on the allocation and terms of exercise of their joint ownership (**‘joint ownership agreement’**), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement or consortium agreement, each joint owner may grant non-exclusive licences to third parties to exploit the jointly-owned results (without any right to sub-license), if the other joint owners are given:

- at least 45 days advance notice and
- fair and reasonable compensation.

The joint owners may agree — in writing — to apply another regime than joint ownership.

If third parties (including employees and other personnel) may claim rights to the results, the beneficiary concerned must ensure that those rights can be exercised in a manner compatible with its obligations under the Agreement.

The beneficiaries must indicate the owner(s) of the results (results ownership list) in the final periodic report.

### **Protection of results**

Beneficiaries which have received funding under the grant must adequately protect their results — for an appropriate period and with appropriate territorial coverage — if protection is possible and justified, taking into account all relevant considerations, including the prospects for commercial exploitation, the legitimate interests of the other beneficiaries and any other legitimate interests.

### **Exploitation of results**

Beneficiaries which have received funding under the grant must — up to four years after the end of the action (see Data Sheet, Point 1) — use their best efforts to exploit their results directly or to have them exploited indirectly by another entity, in particular through transfer or licensing.

If, despite a beneficiary's best efforts, the results are not exploited within one year after the end of the action, the beneficiaries must (unless otherwise agreed in writing with the granting authority) use the Horizon Results Platform to find interested parties to exploit the results.

If results are incorporated in a standard, the beneficiaries must (unless otherwise agreed with the granting authority or unless it is impossible) ask the standardisation body to include the funding statement (see Article 17) in (information related to) the standard.

### **Additional exploitation obligations**

Where the call conditions impose additional exploitation obligations (including obligations linked to the restriction of participation or control due to strategic assets, interests, autonomy or security reasons), the beneficiaries must comply with them — up to four years after the end of the action (see Data Sheet, Point 1).

Where the call conditions impose additional exploitation obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) grant for a limited period of time specified in the request, non-exclusive licences — under fair and reasonable conditions — to their results to legal entities that need the results to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

### Additional information obligation relating to standards

Where the call conditions impose additional information obligations relating to possible standardisation, the beneficiaries must — up to four years after the end of the action (see Data Sheet, Point 1) — inform the granting authority, if the results could reasonably be expected to contribute to European or international standards.

### **Transfer and licensing of results**

#### Transfer of ownership

The beneficiaries may transfer ownership of their results, provided this does not affect compliance with their obligations under the Agreement.

The beneficiaries must ensure that their obligations under the Agreement regarding their results are passed on to the new owner and that this new owner has the obligation to pass them on in any subsequent transfer.

Moreover, they must inform the other beneficiaries with access rights of the transfer at least 45 days in advance (or less if agreed in writing), unless agreed otherwise in writing for specifically identified third parties including affiliated entities or unless impossible under the applicable law. This notification must include sufficient information on the new owner to enable the beneficiaries concerned to assess the effects on their access rights. The beneficiaries may object within 30 days of receiving notification (or less if agreed in writing), if they can show that the transfer would adversely affect their access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

#### Granting licences

The beneficiaries may grant licences to their results (or otherwise give the right to exploit them), including on an exclusive basis, provided this does not affect compliance with their obligations.

Exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights.

#### Granting authority right to object to transfers or licensing — Horizon Europe actions

Where the call conditions in Horizon Europe actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated with Horizon Europe, and
- the granting authority considers that the transfer or licence is not in line with EU interests.

Beneficiaries that intend to transfer ownership or grant an exclusive licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with ethical principles and security considerations.

The granting authority may request additional information.

If the granting authority decides to object to a transfer or exclusive licence, it must formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information it has requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

#### Granting authority right to object to transfers or licensing — Euratom actions

Where the call conditions in Euratom actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive or non-exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated to the Euratom Research and Training Programme 2021-2025 and
- the granting authority considers that the transfer or licence is not in line with the EU interests.

Beneficiaries that intend to transfer ownership or grant a licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the results, the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with

ethical principles and security considerations (including the defence interests of the EU Member States under Article 24 of the Euratom Treaty).

The granting authority may request additional information.

If the granting authority decides to object to a transfer or licence, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

*Limitations to transfers and licensing due to strategic assets, interests, autonomy or security reasons of the EU and its Member States*

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security reasons, the beneficiaries may not transfer ownership of their results or grant licences to third parties which are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the granting authority.

The request must:

- identify the specific results concerned
- describe in detail the new owner and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or license on the strategic assets, interests, autonomy or security of the EU and its Member States.

The granting authority may request additional information.

**Access rights to results and background**

*Exercise of access rights — Waiving of access rights — No sub-licensing*

Requests to exercise access rights and the waiver of access rights must be in writing.

Unless agreed otherwise in writing with the beneficiary granting access, access rights do not include the right to sub-license.

If a beneficiary is no longer involved in the action, this does not affect its obligations to grant access.

If a beneficiary defaults on its obligations, the beneficiaries may agree that that beneficiary no longer has access rights.

#### Access rights for implementing the action

The beneficiaries must grant each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

- informed the other beneficiaries that access to its background is subject to restrictions, or
- agreed with the other beneficiaries that access would not be on a royalty-free basis.

The beneficiaries must grant each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

#### Access rights for exploiting the results

The beneficiaries must grant each other access — under fair and reasonable conditions — to results needed for exploiting their results.

The beneficiaries must grant each other access — under fair and reasonable conditions — to background needed for exploiting their results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its background is subject to restrictions.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

#### Access rights for entities under the same control

Unless agreed otherwise in writing by the beneficiaries, access to results and, subject to the restrictions referred to above (if any), background must also be granted — under fair and reasonable conditions — to entities that:

- are established in an EU Member State or Horizon Europe associated country
- are under the direct or indirect control of another beneficiary, or under the same direct or indirect control as that beneficiary, or directly or indirectly controlling that beneficiary and
- need the access to exploit the results of that beneficiary.

Unless agreed otherwise in writing, such requests for access must be made by the entity directly to the beneficiary concerned.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

#### Access rights for the granting authority, EU institutions, bodies, offices or agencies and national authorities to results for policy purposes — Horizon Europe actions

In Horizon Europe actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, EU institutions, bodies, offices or agencies for developing, implementing and monitoring EU policies or programmes. Such access rights do not extend to beneficiaries' background.

Such access rights are limited to non-commercial and non-competitive use.

For actions under the cluster 'Civil Security for Society', such access rights also extend to national authorities of EU Member States for developing, implementing and monitoring their policies or programmes in this area. In this case, access is subject to a bilateral agreement to define specific conditions ensuring that:

- the access rights will be used only for the intended purpose and
- appropriate confidentiality obligations are in place.

Moreover, the requesting national authority or EU institution, body, office or agency (including the granting authority) must inform all other national authorities of such a request.

*Access rights for the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy — Euratom actions*

In Euratom actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy for developing, implementing and monitoring Euratom policies and programmes or for compliance with obligations assumed through international cooperation with non-EU countries and international organisations.

Such access rights include the right to authorise third parties to use the results in public procurement and the right to sub-license and are limited to non-commercial and non-competitive use.

*Additional access rights*

Where the call conditions impose additional access rights, the beneficiaries must comply with them.

**COMMUNICATION, DISSEMINATION, OPEN SCIENCE AND VISIBILITY (— ARTICLE 17)**

**Dissemination**

*Dissemination of results*

The beneficiaries must disseminate their results as soon as feasible, in a publicly available format, subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests.

A beneficiary that intends to disseminate its results must give at least 15 days advance notice to the other beneficiaries (unless agreed otherwise), together with sufficient information on the results it will disseminate.



Any other beneficiary may object within (unless agreed otherwise) 15 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the results may not be disseminated unless appropriate steps are taken to safeguard those interests.

#### Additional dissemination obligations

Where the call conditions impose additional dissemination obligations, the beneficiaries must also comply with those.

### **Open Science**

#### Open science: open access to scientific publications

The beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results. In particular, they must ensure that:

- at the latest at the time of publication, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository for scientific publications
- immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and
- information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication.

Beneficiaries (or authors) must retain sufficient intellectual property rights to comply with the open access requirements.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication.

Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

#### Open science: research data management

The beneficiaries must manage the digital research data generated in the action ('data') responsibly, in line with the FAIR principles and by taking all of the following actions:

- establish a data management plan ('DMP') (and regularly update it)

- as soon as possible and within the deadlines set out in the DMP, deposit the data in a trusted repository; if required in the call conditions, this repository must be federated in the EOSC in compliance with EOSC requirements
- as soon as possible and within the deadlines set out in the DMP, ensure open access — via the repository — to the deposited data, under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC 0) or a licence with equivalent rights, following the principle ‘as open as possible as closed as necessary’, unless providing open access would in particular:
  - be against the beneficiary’s legitimate interests, including regarding commercial exploitation, or
  - be contrary to any other constraints, in particular the EU competitive interests or the beneficiary’s obligations under this Agreement; if open access is not provided (to some or all data), this must be justified in the DMP
- provide information via the repository about any research output or any other tools and instruments needed to re-use or validate the data.

Metadata of deposited data must be open under a Creative Commons Public Domain Dedication (CC 0) or equivalent (to the extent legitimate interests or constraints are safeguarded), in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: datasets (description, date of deposit, author(s), venue and embargo); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the dataset, the authors involved in the action, and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for related publications and other research outputs.

#### Open science: additional practices

Where the call conditions impose additional obligations regarding open science practices, the beneficiaries must also comply with those.

Where the call conditions impose additional obligations regarding the validation of scientific publications, the beneficiaries must provide (digital or physical) access to data or other results needed for validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication).

Where the call conditions impose additional open science obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) immediately deposit any research output in a repository and provide open access to it under a CC BY licence, a Public Domain Dedication (CC 0) or equivalent. As an exception, if the access would be against the beneficiaries’ legitimate interests, the beneficiaries must grant non-exclusive licenses — under fair and reasonable conditions — to legal entities that need the research output to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

#### **Plan for the exploitation and dissemination of results including communication activities**

Unless excluded by the call conditions, the beneficiaries must provide and regularly update a plan for the exploitation and dissemination of results including communication activities.

## **SPECIFIC RULES FOR CARRYING OUT THE ACTION (— ARTICLE 18)**

### **Implementation in case of restrictions due to strategic assets, interests, autonomy or security of the EU and its Member States**

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security, the beneficiaries must ensure that none of the entities that participate as affiliated entities, associated partners, subcontractors or recipients of financial support to third parties are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless otherwise agreed with the granting authority.

The beneficiaries must moreover ensure that any cooperation with entities established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) does not affect the strategic assets, interests, autonomy or security of the EU and its Member States.

### **Recruitment and working conditions for researchers**

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers<sup>3</sup>, in particular regarding:

- working conditions
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and all participants involved in the action are aware of them.

### **Specific rules for access to research infrastructure activities**

#### **Definitions**

Research Infrastructures — Facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields. This definition includes the associated human resources, and it covers major equipment or sets of instruments; knowledge-related facilities such as collections, archives or scientific data infrastructures; computing systems, communication networks, and any other infrastructure, of a unique nature and open to external users, essential to achieve excellence in research and innovation. Where relevant, they may be used beyond research, for example

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<sup>3</sup> Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).

for education or public services, and they may be ‘single-sited’, ‘virtual’ or ‘distributed’<sup>4</sup>:

When implementing access to research infrastructure activities, the beneficiaries must respect the following conditions:

- for transnational access:

- access which must be provided:

The access must be free of charge, transnational access to research infrastructure or installations for selected user-groups.

The access must include the logistical, technological and scientific support and the specific training that is usually provided to external researchers using the infrastructure. Transnational access can be either in person (hands-on), provided to selected users that visit the installation to make use of it, or remote, through the provision to selected user-groups of remote scientific services (e.g. provision of reference materials or samples, remote access to a high-performance computing facility).

- categories of users that may have access:

Transnational access must be provided to selected user-groups, i.e. teams of one or more researchers (users).

The majority of the users must work in a country other than the country(ies) where the installation is located (unless access is provided by an international organisation, the Joint Research Centre (JRC), an ERIC or similar legal entity).

Only user groups that are allowed to disseminate the results they have generated under the action may benefit from the access (unless the users are working for SMEs).

Access for user groups with a majority of users not working in a EU Member State or Horizon Europe associated country is limited to 20% of the total amount of units of access provided under the grant (unless a higher percentage is foreseen in Annex 1).

- procedure and criteria for selecting user groups:

The user groups must request access by submitting (in writing) a description of the work that they wish to carry out and the names, nationalities and home institutions of the users.

The user groups must be selected by (one or more) selection panels set up by the consortium.

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<sup>4</sup> See Article 2(1) of the Horizon Europe Framework Programme Regulation 2021/695.

The selection panels must be composed of international experts in the field, at least half of them independent from the consortium (unless otherwise specified in Annex 1).

The selection panels must assess all proposals received and recommend a short-list of the user groups that should benefit from access.

The selection panels must base their selection on scientific merit, taking into account that priority should be given to user groups composed of users who:

- have not previously used the installation and
- are working in countries where no equivalent research infrastructure exist.

It will apply the principles of transparency, fairness and impartiality.

Where the call conditions impose additional rules for the selection of user groups, the beneficiaries must also comply with those.

- other conditions:

The beneficiaries must request written approval from the granting authority for the selection of user groups requiring visits to the installations exceeding 3 months (unless such visits are foreseen in Annex 1).

In addition, the beneficiaries must:

- advertise widely, including on a their websites, the access offered under the Agreement
- promote equal opportunities in advertising the access and take into account the gender dimension when defining the support provided to users
- ensure that users comply with the terms and conditions of the Agreement
- ensure that its obligations under Articles 12, 13, 17 and 33 also apply to the users
- keep records of the names, nationalities, and home institutions of users, as well as the nature and quantity of access provided to them

- for virtual access:

- access which must be provided:

The access must be free of charge, virtual access to research infrastructure or installations.

‘Virtual access’ means open and free access through communication networks to digital resources and services needed for research, without selecting the users to whom access is provided.

The access must include the support that is usually provided to external users.

Where allowed by the call conditions, beneficiaries may in justified cases define objective eligibility criteria (e.g. affiliation to a research or academic institution) for specific users.

- other conditions:

The beneficiaries must have the virtual access services assessed periodically by a board composed of international experts in the field, at least half of whom must be independent from the consortium (unless otherwise specified in Annex 1). For this purpose, information and statistics on the users and the nature and quantity of the access provided, must be made available to the board.

The beneficiaries must advertise widely, including on a dedicated website, the access offered under the grant and the eligibility criteria, if any.

Where the call conditions impose additional traceability<sup>5</sup> obligations, information on the traceability of the users and the nature and quantity of access must be provided by the beneficiaries.

These obligations apply regardless of the form of funding or budget categories used to declare the costs (unit costs or actual costs or a combination of the two).

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<sup>5</sup> According to the definition given in ISO 9000, i.e.: “Traceability is the ability to trace the history, application, use and location of an item or its characteristics through recorded identification data.” The users can be traced, for example, by authentication and/or by authorization or by other means that allows for analysis of the type of users and the nature and quantity of access provided.



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