

Contract No. SM220072
between Výzkumný a zkušební letecký ústav, a.s. and
Ústav fyziky plazmatu AV ČR, v.v.i.

QUVIK

ENTERED BY AND BETWEEN

Výzkumný a zkušební letecký ústav, a.s.

whose Registered Office is at:

Beranových 130
199 05, Praha - Letňany
VAT: CZ00010669

represented by [REDACTED], [REDACTED]
[REDACTED]

hereinafter referred to as the "**Customer**"

ON THE ONE HAND

And

Ústav fyziky plazmatu AV ČR, v.v.i.

TOPTEC

se sídlem: Za Slovankou 1782/3, 182 00 Praha 8

IČ: 613 89 021

zřízený podle zákona č. 341/2005 Sb., o veřejných výzkumných institucích

(Ústav fyziky plazmatu AV ČR, v.v.i. (Institute of Plasma Physics CAS, v.v.i.), VAT 613 89 021, having a place of business at Za Slovankou 1782/3, 182 00 Praha 8, Czech Republic),

represented by [REDACTED]

Hereinafter referred to as "**Subcontractor**",

ON THE OTHER HAND

The following has been agreed between the Customer and the Subcontractor, hereinafter individually referred to as a "**Party**" and collectively as the "**Parties**":

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DEFINITIONS

- “Advance Payment”** means a payment foreseen in the Contract intended to provide the Subcontractor with liquidity to allow the initiation of the contractual works.
- “Agency’s Own Requirements”** means the activities and programmes undertaken by the Agency in the field of space research and technology and space applications in accordance with Article V 1(a) and (b) of the European Space Agency Convention.
- “Contract”** means an agreement established in writing the subject of which is any activity carried out to- or for the Agency in exchange of a price or another consideration, including any amendment to such agreement via a Contract Change Notice (“CCN”).
- “Day”** means calendar day.
- “Force Majeure”** means an event which is, unforeseeable, unavoidable and external at the time of Contract signature, occurs beyond the control of the affected Party and renders the performance of the Contract impossible for the affected Party, including but not limited to: Acts of God, Governmental Administrative Acts or omissions, consequences of natural disasters, epidemics, war hostilities, terrorist attacks.
- “Intellectual Property Rights”** means all Registered Intellectual Property Rights, and all unregistered intellectual property rights granted by law without the need for registration with an authority or office including all rights in information, data, blueprints, plans, diagrams, models, formulae and specifications together with all copyright, unregistered trademarks, design rights, data base rights, topography rights, know-how and trade secrets or equivalent rights or rights of action anywhere in the world.
- “Legitimate Commercial Interests”** means an interest the Subcontractor can demonstrate which is important to its ability to commercially exploit Intellectual Property Rights arising from work performed under the Contract for a defined period of time which includes but is not limited to an economic position vis-à-vis a competitor, loss of profits or survival of an undertaking.
- “Member State”** means a State which is Party to the Convention of the European Space Agency in accordance with Articles XX and XXII of the said Convention.

“Participating States”	means a Member or non-Member State participating in a given Agency programme according to Article V.1 (a) and (b) of the European Space Agency Convention.
“Participating State’s Own Public Requirements”	means a public programme in the field of space research and technology and their space applications fully funded or funded to a substantial extent by the Participating State.
“Persons and Bodies”	means any individual, partnership, company, research organisation or legal entity under the jurisdiction of a Participating State which, when relevant, meets the criteria set out in Article II (3) of Annex V to the European Space Agency Convention.
“Progress Payment”	means a payment that is made against: (a) successful achievement, certified in writing by the Agency’s representatives, of a milestone defined in the milestone payment plan of a fixed price contract; (b) cost reports approved by the Agency in a cost reimbursement contract for a period agreed in the Contract.
“Registered Intellectual Property Rights”	means all rights granted by law through registration with an authority or office (whether actually registered or in the form of applications) including all registered patents, utility models, designs, topography rights, domain names and trademarks or equivalent rights and rights of action anywhere in the world.
“Subcontractor”	means the economic operator who is under contract to a Contractor of the Agency to provide supplies or services in support of a Contract placed by the Agency.
“Third Party”	means a natural or legal person not having signed the Contract.

PREAMBLE

Whereas:

The Customer undertakes to perform the activity Quick Ultra-Violet Kilonova surveyor (QUVIK) which has, among other things, the intention measure the brightness evolution of kilonovae in the near-UV band and thus it shall distinguish between different explosion scenarios (all hereafter referred to as the "Work") on the basis of a contract concluded with The EUROPEAN SPACE AGENCY (hereinafter called the "Agency" or "ESA").

"Subcontractor has achieved results that are significant in terms of their usability in the application sphere, working on the project Partnership for Excellence in Super-Precision Optics PRESO (reg. No. CZ.02.1.01 / 0.0 / 0.0 / 16_026 / 0008390).

The Subcontractor is carrying out further research in the framework of the said PRESO project, in the field of mathematical description of optical systems to create a merit function including manufacturing tolerances (hereinafter referred to as "Research").

The results of the Research are well applicable to the Work, and the Contractor is interested in involving the Subcontractor in the Work.

The Contract with ESA allows the Customer to properly execute part of the Work through subcontractors, including the Subcontractor specified in the ESA contract.

Now, therefore, the Parties hereto have agreed as follows:

ARTICLE 1 - SUBJECT OF THE CONTRACT; GENERAL TERMS OF EXECUTION

- 1.1 The Subcontractor undertakes to perform the activity **Quick Ultra-Violet Kilonova surveyor (QUVIK)** (all hereafter referred to as the “Work”) and to deliver all the items listed in Article 2 and Appendix 3 to this Contract.
- 1.2 The Work shall be performed in accordance with the provisions stated in the following documents, listed in order of precedence in case of conflict:
 - a) The specific Articles of this Contract with its PDCC Annex;
 - b) Appendix 1 hereto: the Agency’s Statement of Work, reference ESA-IPL-I-SOW-2020-001, reference issue 1, revision 1, dated 17/09/2020;
 - c) Appendix 3 hereto: Subcontractor contribution to QUVIK mission study
 - d) The Customer’s Updated Proposal, reference 1000032680, not attached hereto but known to both Parties.
 - e) ESA Contract No. 4000138174/22/NL/MH/kdj (ESA’s main contract), not attached hereto but known to both Parties.
- 1.3 General Terms of Execution
 - 1.3.1 The Subcontractor’s own sales conditions shall not apply.
 - 1.3.2 The language of this Contract and of all communications hereunder shall be English. The substantive law according to which this Contract shall be construed is the Law of the Czech Republic.
 - 1.3.3 The Parties shall use their best endeavours to amicably settle any dispute arising out of the Contract.
 - 1.3.4 The Subcontractor shall be fully responsible towards the Customer for the proper execution of the Work.
 - 1.3.5 Any publicity material prepared by the Subcontractor related to an activity performed by the Subcontractor in the context of this Contract shall acknowledge that the activity is/was carried out “Funded through an ESA Contract in the Czech Third Party Framework Project”. It shall display the ESA logo if the Agency so requires. It shall also carry a disclaimer stating that the view expressed in such publications can in no way be taken to reflect the official opinion of the European Space Agency and The Ministry of Transport of the Czech Republic.

- 1.3.6 In the discharge of its obligations under this Contract, the Subcontractor shall additionally comply with the Eligibility Requirements identified in Article 18, paragraphs 2 and 12, of the Procurement Regulations.

This applies at the moment of Contract signature as well as for the whole duration of the Contract.

- 1.3.7 The Subcontractor shall, in accordance with the Agency's Policy on the Prevention, Detection and Investigation of Fraud, cooperate with the Agency's investigation team in any investigation of fraud initiated by the Agency and inform its personnel of their obligation to cooperate accordingly.

ARTICLE 2 - DELIVERY REQUIREMENTS; PLACE AND DATE OF DELIVERY

2.1 General

- 2.1.1 Delivery shall be considered as effected only when the relevant deliverable items are in the Customer's possession.
- 2.1.2 Should it seem likely that the originally specified delivery date(s) may be exceeded, the Subcontractor shall immediately notify the Customer in writing and provide a detailed justification for the delay.
- 2.1.3 No price adjustment in favour of the Subcontractor will be applicable for the period of delay in delivery.

In case of a late delivery by a subcontractor that exclusively causes a failure to complete the Milestone and the subsequent non-payment of the Milestone by ESA, that subcontractor will pay compensation for lost payments in order to cover the contractual Milestone's amount (specified in ESA's main contract) for those partners who have met their obligations in time.

The invoice for pay compensation will be issued by Customer.

Should the Customer conclude that the delays in delivery have impaired the intended objectives of the Work, the provisions of Article 6.5 below shall apply.

- 2.1.4 The Subcontractor shall be responsible for the appropriate marking, packing, package labelling, insurance, freight, carriage and delivery relative to all deliverable items due hereunder and shall bear any cost relative to all of the above. Deliverable items shall furthermore be packed to guard against loss, damage or deterioration during transport and delivery. If found damaged or defective upon delivery, the Customer reserves the right to return the affected items at the Subcontractor's expenses.

Should in the execution of this Contract a need arise to provide the Customer with information which is subject to export control laws and regulations, the Subcontractor shall be responsible to ensure in all cases that such information is passed on to the Customer in strict compliance with the provisions of such export control laws and regulations.

- 2.1.5 In the event of an alleged delay in delivery due to Force Majeure, the Subcontractor shall report to the Customer the Force Majeure event and its immediate consequences within one (1) week after its occurrence. The Subcontractor shall bear the burden of proof for the existence, duration and consequences of Force Majeure, such proof to be provided within one (1) month from the occurrence of the Force Majeure event.

In case of Force Majeure, the Subcontractor shall not be considered at default and its obligations under the Contract shall be suspended during the Force Majeure event. The

Subcontractor shall make reasonable efforts to mitigate the impact on the schedule and the performance of its contractual obligations.

In case of Force Majeure, an extension of the time-limit for execution or a postponement of delivery dates shall be granted in writing by the Customer.

If the delay due to the Force Majeure exceeds three (3) months, the Parties are entitled to terminate the Contract by giving not less than two (2) months' written notice to the other Party, unless the Parties agree to modify the Contract in order to take into account the effects of the Force Majeure.

In case of termination due to Force Majeure, the amount to be paid shall be calculated as per Articles 6.6.2 and 6.6.4. No other payments, compensation or indemnities shall be due by the Customer to the Subcontractor.

2.2 Acceptance and Rejection

The Subcontractor acknowledges that the Customer (VZLÚ) is bound by the contract with ESA in the acceptance of the deliverables. Therefore, if ESA refuses the deliverables due to a defect in the work on the part of the Subcontractor, then the Subcontractor's deliverables is also considered as refused on the day of the delivery by the Subcontractor.

2.3 Deliverable Documents

The Subcontractor acknowledges that the Customer (VZLÚ) is contractually bound to ESA by the following conditions which apply adequately to the Subcontractor. However, the subcontractor does not communicate directly with ESA in this matter:

The Customer shall, during the performance of this Contract, deliver all documentation and reports specified in Appendix 3 and in the Customer's Proposal referred to in Article 1.2d) above, in the format and quantities specified therein.

These shall be sent to the Agency's Technical Officer mentioned in Article 6.1, unless otherwise specified, in accordance with the following specific provisions:

- 2.3.1 The draft versions of the final documents [Final Report and Executive Summary Report] as defined in section 3.5 of Appendix 1 shall be submitted for approval, in electronic format, to the Agency's Technical Officer specified herein, not later than 31.5.2023.

The finalised versions thereof shall be issued not later than four (4) weeks after the approval of the draft versions, as specified in Appendix 1.

At the same time as delivery of the final documents, the Technical Data Package, containing all approved Technical Notes, shall be delivered by email in an electronic searchable, indexed and not encrypted PDF and original (WORD) format to the Agency's Technical Officer.

- 2.3.2 The signed electronic copy of the Contract Closure Documentation (Appendix 1, Annex A) shall be delivered to the Agency's Authorised Representatives not later than the time of submitting the invoice for the Final Settlement (Article 4.1.3 here below).
- 2.3.3 The mathematical model(s) and data resulting from the Work hereunder and as defined in the Project Proposal shall be made available to the Agency's Technical Officer specified herein for inspection, not later than 31.5.2023.

ARTICLE 3 - PRICE

3.1 The total cost of this activity is estimated at:

443,433 EUR

(Four Hundred Forty-Three Thousand Four Hundred Thirty-three Euro),

towards which the Customer's contribution and the total price of this Contract amounts to:

65,874 EUR

(Sixty-five thousand eight hundred seventy-four Euro).

At least 10% of the cost of the activity shall be funded by the Subcontractor through its internal funds and shall not be recharged to the Customer in other contracts nor in the form of overhead.

The abovementioned price is hereby defined as a Firm Fixed Price and, as such, it shall not be subject to any adjustment or revision by reason of the actual costs incurred by the Subcontractor in the performance of this Contract.

3.2 Any amount stated above does not include any value added taxes ("VAT") or import duties in the Member States of the Customer.

3.3 The price is stated as being Delivered Duty Paid ("DDP") for all deliverables, exclusive of import duties and VAT in accordance with the Incoterms[®] 2020, to the addressees mentioned, or referred to, in Article 6 of this Contract. Reference to the Incoterms[®] in this provision is exclusively for the purpose of price definition. The price furthermore includes all costs relative to the Subcontractor's obligations under Article 2.1.4 above.

ARTICLE 4 - PAYMENTS AND INVOICING

4.1 Payments

Payments shall be made within thirty (30) Days of receipt at Customer's Finance Office of the required documents and fulfilment of the requirements specified in Articles 4.1.1 – 4.1.3 below. Only upon fulfilment of these requirements shall the Customer regard the invoice as due.

Requirements to be fulfilled:

4.1.1 Advance Payment: Not applicable

4.1.2 Progress Payments:

- Milestone Achievement Confirmation ("MAC") (hereinafter referred to as "confirmation") with supporting documentation, as necessary, submitted by the Subcontractor. The supporting documentation shall justify the actual achievement of the milestones as defined in the Payment Plan specified in Article 4.2 here below; and
- Invoice.

4.1.3 Final Settlement:

- Confirmation submitted by the Subcontractor with supporting documentation. The supporting documentation shall justify the actual achievement of the milestone as defined in the Payment Plan specified in Article 4.2 here below; and
- Invoice; and
- Delivery, and acceptance by the Customer, of all due items and fulfilment of all other obligations in accordance with the terms of this Contract; and
- Signed Contract Closure Documentation using the template provided in Appendix 1, Annex A.

Payments shall be made according to the provisions hereunder:

4.1.4 The Customer shall credit the account of the Subcontractor to its benefit.

The Customer shall be afforded all the necessary visibility, whether remotely or by means of inspection of the Subcontractor's premises, in order to ascertain the progress of the Work prior to authorising the relevant payment.

4.1.5 If applicable, invoices shall separately show all due taxes and/or duties.

4.1.6 In the event that the achievement of a milestone is delayed but the milestone is partially met at the milestone planning date foreseen, the Customer may, as an exception, effect a payment against an approved confirmation of the partially achieved milestone, not exceeding the value of the Work performed at the date of payment.

4.1.7 Not applicable

4.1.8 All invoices shall be submitted to the Customer in electronic form sent to: [REDACTED]
with copy to [REDACTED]

4.1.9 Payments shall be made by the Customer in EURO to the account specified by the Subcontractor. Such account information shall clearly indicate the IBAN (International Bank Account Number) and BIC/SWIFT (Bank Identification Code).

4.1.10 Any special charges related to the execution of payments shall be borne by the Subcontractor.

4.1.11 Not applicable.

4.1.12 Any questions concerning the latest status of due invoices can be addressed to the VZLU Payment Officer (mail to: [REDACTED] with copy to [REDACTED])

4.2 The following Payment Plan is agreed for this Contract:

Milestone (MS) Description	Schedule Date	Payments from VZLU to (Prime) Subcontractor (in Euro)	Country (ISO code)
Progress Payment (MS 1): Upon successful completion of WP 2xxx and/or successful PRR and acceptance by the Agency of all related deliverable items D2.1 – D2.14.	Kick-off + 7 months	22,795	CZ
Final Settlement (MS 2): Upon the Agency's acceptance of all deliverable items due under the Contract and the Contractor's fulfilment of all other contractual obligations including submission of the Contract Closure Documentation	Kick-off + 12 months	36,492	
TOTAL		59,287	

ARTICLE 5 - ITEMS PRODUCED OR PURCHASED UNDER THE CONTRACT

The following provisions apply to any items which fall within the scope of Article 2 of the Contract.

- 5.1 The title to the property of any items produced or purchased under the Contract, including electronic components, special jigs, tools, test equipment, and which are paid for under the Contract shall remain with the Subcontractor.

ARTICLE 6 - SPECIFIC PROVISIONS

6.1 Approval / Representatives of the Parties during Contract Execution

For the purpose of this Contract, the authorised representative of the Customer are:

[REDACTED]

Project Manager

The Customer's representatives are:

- Technical Officer: [REDACTED] for technical matters, or a person duly authorised;
- Contracts Officer: [REDACTED] for contractual or administrative matters, or a person duly authorised.

6.1.1 All correspondence for the Customer shall be addressed as follows:

Výzkumný a zkušební letecký ústav, a.s.
Beranových 130,
199 05, Praha - Letňany,

a) for technical matters as follows:

	To:	With copy to:
Name	[REDACTED]	[REDACTED]
Telephone No.	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]

b) for contractual and administrative matters as follows:

	To:	With copy to:
Name	[REDACTED]	[REDACTED]
Telephone No.	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]

c) Personal Data Protection matters shall be addressed to the Customer Data Protection Officer at the following email address: [REDACTED]

6.1.2 Subcontractor's Representatives:

The Subcontractor's representatives are:

- Technical Officer: [REDACTED] for technical matters, or a person duly authorised;
- Contracts Officer: [REDACTED]. for contractual or administrative matters, or a person duly authorised.

All correspondence for the Subcontractor shall be addressed as follows:

Ústav fyziky plazmatu AV ČR, v.v.i.

Za Slovankou 1782/3

18200 Prague 8

a) for technical matters as follows:

	To:	With copy to:
Name	[REDACTED]	[REDACTED].
Telephone No.	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]

b) for contractual and administrative matters as follows:

	To:	With copy to:
Name	[REDACTED]	[REDACTED]
Telephone No.	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]

c) Personal Data Protection matters shall be addressed to the Data Protection contact point as follows:

	To:
Name	[REDACTED]
Telephone No.	[REDACTED]
Email Address	[REDACTED]

6.1.3 Communications related to the Contract affecting its terms and conditions shall only bind the Parties, if signed by the Customer's and the Subcontractor's duly Authorised Representatives.

The Parties agree that electronic signature of this Contract shall have the same force and effect as hand-signed originals and shall be binding on both Parties to this Contract.

6.2 Infringement of the Law – Infringement of Third Party Rights

- 6.2.1 The Customer shall not be responsible if the Subcontractor infringes the laws or statutes of its country or of any other country whatsoever.
- 6.2.2 In the event of a reasonable suspicion of infringement of any patent rights and other Intellectual Property Rights of a Third Party, the Work being performed under this Contract shall be stopped immediately. Assessment of the suspicion shall be performed by the Subcontractor and, if confirmed, both Parties shall agree on a new approach to achieve the objectives of this Contract, either by obtaining the applicable licence(s) from the Third Party by the Subcontractor and/or by signing a Contract Change Notice (CCN) agreed upon between both Parties, in order to avoid the infringement. The purpose of the CCN shall be either to (i) restart the Work, if plausible, due under the changed circumstances; or (ii) terminate the Contract, in accordance with Article 6.5.3 hereunder, if the infringement cannot be avoided.

Notwithstanding the above, the Subcontractor shall indemnify the Customer from and against all claims, proceedings, damages, costs and expenses arising from infringement or alleged infringement of any patent rights and other Intellectual Property Rights of a Third Party with respect to the Work under this Contract. This obligation does not extend to infringements resulting from the use of documents, patterns, drawings or items supplied by the Customer or from a modification or combination of the deliverables due hereunder made by the Customer after their acceptance.

6.3 Liabilities

- 6.3.1 Claims between the Parties in respect of damages to staff and goods occurring during the execution of the Contract shall be settled in the following manner:
- 6.3.1.1. Claims for injuries, including death, sustained by the Parties' representatives or employees (staff) by virtue of their involvement in the Contract shall be settled in accordance with the Law governing the Contract.
- 6.3.1.2. Claims for damage caused by one of the Parties to goods owned by the other Party shall be settled in accordance with the Law governing the Contract. Except in case of gross negligence or wilful misconduct, the total aggregate liability of either Party for damage to goods owned by the other Party shall not exceed the amount which is quoted in the Contract as the total Contract price.
- 6.3.2 Except in case of gross negligence and wilful misconduct, the Parties shall not be liable towards each other for consequential damages sustained by the Parties, arising from and during the execution of the Contract. For the sake of clarity and as an example, consequential damages include, but are not limited to: loss of contract, income or revenue; loss of profit or interests; loss of financing; loss of customer; loss of availability and use of

facilities; loss of availability and use of employees' productivity or loss of services of such persons; loss of opportunity; loss of rental expenses.

6.4 Items Made Available by the Customer

It is not foreseen that the Customer will make any items available to the Subcontractor.

6.5 Customer's Rights in Case of Subcontractor's Under-Performance

6.5.1.1 Should any of the results of the Work fail to meet the agreed requirements and/or specifications, the Customer reserves the right to reject such results and require their resubmission following an iteration of the relevant Work by the Subcontractor at no additional charge.

6.5.1.2 Should any of the results of the Work fail to meet any of the agreed requirements and/or specifications to such an extent as to seriously jeopardise the performance of this Contract and/or to defeat its objectives, the Customer reserves the right to terminate this Contract by giving written notice by registered mail.

6.5.2 Should the Subcontractor fail to obtain an export authorisation from the competent national authority, the Customer shall have the right to terminate this Contract without further notice.

6.5.3 Termination of this Contract as specified above shall entail no compensation being due to the Subcontractor other than the amounts corresponding to the milestone payments already made hereunder at the time of serving the termination notice. Any amounts corresponding to Advance Payments not entirely offset hereunder shall remain payable to the Customer.

6.6 Termination without fault of the Subcontractor

6.6.1 The Customer shall have the right at any time to terminate this Contract either wholly or in part by giving written notice by registered mail. In the case of termination of a Contract by the Customer without fault of the Subcontractor, the Subcontractor shall, on receipt of the Customer's instructions, forthwith take the necessary steps to implement them. The Parties shall use their best efforts to mitigate the consequences of the termination. The period to be allowed to implement them shall be agreed between the Parties but shall not exceed three (3) months.

6.6.2 Subject to the Subcontractor conforming with the instructions referred in Article 6.6.1, the Customer shall take over from the Subcontractor at a fair and reasonable price all finished parts not yet delivered to the Customer, all unused and undamaged material, bought-out components and items in the course of manufacture in the possession of the Subcontractor and properly obtained by or supplied to the Subcontractor for the performance of the Contract, except such materials, bought-out components and items in the course of

manufacture as the Subcontractor shall, with the agreement of the Customer, elect to retain.

6.6.3 The Customer shall in no circumstances be liable to pay any sum which, when added to the other sums paid, due or becoming due to the Subcontractor under the Contract, exceeds the total price for the Work set forth in the Contract.

6.7. Changes to this Contract

6.7.1 The Customer reserves the right at any time to request a change to the requirements covered by this Contract. The Customer may also accept changes proposed by the Subcontractor. The requesting Party shall communicate all change requests to the other Party in writing through the Parties' Representatives indicated in Article 6.1 above.

6.7.2 The cost impact relative to any change resulting from a request, by the Customer, to modify the requirements covered by this Contract shall be borne by the Customer. The Subcontractor shall be responsible for the consequences and shall bear the cost of any other change.

6.7.3 When responding to a change request issued by the Customer or as a means to propose changes to the Customer, the Subcontractor shall submit a committing change proposal including a detailed quotation of the effects of the change on the contractual Work, price, schedule, deliverable items and any other contractual terms and conditions.

6.7.4 Upon evaluation and acceptance by the Customer of a change proposal, any amendment to this Contract shall be introduced in the form of a Contract Change Notice (CCN) according to the CCN form attached in Appendix 2. In case of rejection, the Customer shall inform the Subcontractor accordingly, together with the reasons for the rejection.

ARTICLE 7 - INTELLECTUAL PROPERTY RIGHTS

7.1 Information to be provided by the Subcontractor – Protection of information

7.1.1 Information, data, reports and results arising from Work performed under this Contract shall be delivered to the Customer. The Customer shall have the right to make such information, data, reports and results available for the purpose of the Czech Third Party Framework Project and to support the Czech Republic in the ESA's projects where Czech entities take part, to use on the terms set out in the following clauses.

7.1.2 For the purpose of this Contract, "Proprietary Sensitive Information" shall mean information corresponding to business related information (e.g., business plans) and/or Intellectual Property Rights vesting in an entity, the uncontrolled dissemination of which is likely to impair the entity's long-term ability to use and exploit the aforesaid and/or to maintain a competitive advantage.

The Subcontractor shall not mark any (electronic) documentation as Proprietary Sensitive Information, unless agreed in advance with the Customer in writing. Any request from the Subcontractor shall be submitted in writing and accompanied by an appropriate justification.

7.1.3 Neither Party shall disclose any documentation obtained from the other Party, and which both Parties recognise as being Proprietary Sensitive Information without the other Party's previous written authorisation. Without prejudice to the foregoing and limited to the purpose and scope of this Contract, both Parties may circulate such documentation to their employees or collaborators that require the said documentation for the sole purpose of complying with, or inspecting the progress of, this Contract.

7.1.4 The obligations provided in Articles 7.1.2 and 7.1.3 shall not apply to (electronic) documentation which:

- at the time of circulation has already entered in public domain or which after circulation enter in public domain other than through a breach of the Contract;
- at the time of circulation is already known by the receiving Party and is not hindered by any obligation not to circulate;
- is later acquired by the receiving Party from another source and is not hindered by any obligation not to circulate;
- is required to be circulated by law or order of a court of competent jurisdiction.

7.2 Ownership and Use of Intellectual Property Rights

7.2.1 Ownership of Intellectual Property Rights

The Subcontractor shall own all Intellectual Property Rights and have the right to apply for, and to own, any registered Intellectual Property Rights arising from Work performed under this Contract. The Subcontractor shall as soon as possible report to the Customer any results arising from such a Work which may in its opinion be protected as registered Intellectual Property Rights and state whether they intend to apply for such protection. At the Subcontractor's specific request in order to allow for filing of patent applications the Customer shall not disclose any relevant information and results for a period of twelve (12) months from the date it was reported to the Customer. In parallel the Subcontractor shall submit an analogous request to the Czech Third Party Framework Project Committee with copy to the Customer.

The Subcontractor shall subsequently inform the Customer of any application to register such results arising from Work performed under this Contract and within two (2) months of the date of filing, provide the Customer and The Ministry of Transport of the Czech Republic with all details on that application. The Subcontractor hereby grants the Customer and The Ministry of Transport of the Czech Republic an irrevocable right to use the information relative to that application, for their own requirements on the terms set out in Article 7.2.2 below. Nevertheless, unless agreed otherwise with the Subcontractor, the Customer shall not disclose such information until publication of the registration application. In parallel the Subcontractor shall submit an analogous request to the Czech Third Party Framework Project Committee with copy to the Customer.

7.2.2 Use of Intellectual Property Rights

All Intellectual Property Rights arising from Work performed under the Contract shall be available to:

- a) The Ministry of Transport of the Czech Republic, to use on a free, worldwide licence together with the right to grant sublicences for its own needs;
- b) the ESA, to use on a free, worldwide licence for the purpose of the Czech Third Party Framework Project and to support the Czech Republic in the ESA's projects where Czech entities take part. To this extent the Subcontractor undertakes, upon request by ESA, to grant the corresponding free, worldwide licence(s) to the party(ies) indicated by ESA.

For the avoidance of doubt, the term "use" for the purposes of software and/or hardware (design) shall include, but not be limited to, use to operate, integrate, validate, maintain, modify and upgrade items developed under the Contract.

7.3 Background Intellectual Property

7.3.1 Background Intellectual Property - Definition

For the purpose of this Contract, "Background Intellectual Property" means all Intellectual Property, belonging to the Subcontractor or to a Third Party, which:

- a) has not been generated under contract with the Customer either prior to or during execution of this Contract, and
- b) is relevant to the Work carried out under this Contract, and
- c) the Subcontractor uses to achieve the objectives of this Contract, and
- d) is delivered to the Customer to enable it to use, operate, copy the deliverable items due under this Contract as specified in the Customer's requirements, and
- e) is duly identified as such in this Contract.

Conversely, "Foreground Intellectual Property" means all Intellectual Property generated through Work carried out under, or directly or indirectly funded through, this Contract.

7.3.2 Use of Background Intellectual Property

The Subcontractor has confirmed that all results of this Contract (or any part thereof) shall be deemed and treated as not containing any Background Intellectual Property.

Nevertheless should the Subcontractor unilaterally decide to use existing Intellectual Property to achieve the objectives of this Contract, all results of this Contract (or any part thereof) shall be deemed and treated as Foreground Intellectual Property not containing any Background Intellectual Property. The Subcontractor shall grant to the Customer, and/or ensure that the Customer be granted, all the necessary rights in this respect.

7.4 The free licences provided for the benefit of ESA

The free licences provided on Intellectual Property arising from Work performed under this Contract and/or Background Intellectual Property indicated in Article 7.3 for the benefit of The Ministry of Transport of the Czech Republic and ESA shall be deemed granted through signature of the present Contract and without the need to implement a separate licence. Described licences for the benefit of the Customer shall be deemed granted through signature of the present Contract and without the need to implement a separate licence only for the purposes of proper performance of the Work within the current ESA project.

7.5 Transfer outside the ESA Member States

Any transfer of Intellectual Property Rights or any product, process, application or result arising from work performed under the Contract by the Subcontractor to any entity outside the Czech Republic or any international organisation shall comply with all applicable laws including all export control laws, regulations, rules and procedures and any relevant international agreements relating to the export of goods and services.

ARTICLE 8 - VALIDITY OF THE AGREEMENT

Czech Aerospace Research Centre (VZLU) is the obliged entity pursuant to Czech Act No. 340/2015 Coll., on special conditions for the effectiveness of certain contracts, the publication of these contracts on the Contracts Register (Act on Contracts Register). The contract, excluding parts which are subject to commercial confidentiality, will be in accordance with this Act published in the register of contracts. In the agreement and its annexes will be obliterated all parts containing technical data, drawings or any other technical information, personal data of the customer, identification of the customer, financial information, price, trade secrets and classified information.

The contract will enter into force on the date of its signing by both parties and into the efficiency on the date of publication in the register of contracts. VZLU will therefore after its signing by both parties submit the contract to register of contracts for publication.

Electronically signed by the Parties to this Contract,

In: Prague

In: Prague

On:

On:

For Výzkumný a zkušební letecký ústav, a.s.

For Ústav fyziky plazmatu AV ČR, v.v.i.

[Redacted signature]

[Redacted signature]

[Redacted signature]

Personal Data “Controller to Controller” Annex (the “PDCC”) of the European Space Agency (“ESA” or the “Agency”)

This “Controller to Controller” Annex governs the processing of Personal Data exchanged by the Parties, acting as separate Controllers, in the frame of the Contract. Such Annex forms an integral part of the Contract. In case of conflict between the terms and conditions of the Contract and the terms and conditions of this Annex, the terms and conditions of this Annex shall prevail. This Annex survives the expiration or termination of the Contract for as long as the Personal Data are protected by the Data Privacy Regulations.

1. DEFINITIONS

The following specific definitions apply:

(i) “Agreed Territory” (of Processing) means:

- a) ESA Member States, as they are listed in the ESA website at URL: http://www.esa.int/About_Us/Welcome_to_ESA/New_Member_States;
- b) European Union;
- c) countries recognized by the European Commission as ensuring an Adequate Level of Protection of Personal Data under the European Union’s legal framework.

(ii) “Data Privacy Regulations” means respectively:

- a) ESA PDP Framework, i.e. the Personal Data Protection Framework applicable to ESA and available on ESA website at URL: http://www.esa.int/About_Us/Law_at_ESA/Highlights_of_ESA_rules_and_regulations
- b) the Personal Data protection laws and regulations applicable to the Contractor in the Agreed Territory of Processing which provide an Adequate Level of Protection under the ESA PDP Framework (e.g EU Regulations in the field of personal data protection, including but not limited to Regulation (EU) nr. 2016/679).

(iii) “Personnel” means:

- a) with respect to the Contractor: any employee, agent or representative acting under the responsibility of the Contractor or, if subcontracting is permitted, of Contractor’s subcontractors;
- b) with respect to ESA: any employee, agent or representative acting under the responsibility of ESA (e.g. staff members and seconded agents, consultants experts or employees of third parties).

With respect to terms used with capitals in this Annex (e.g. “Controller”, “Personal Data” etc.) but not defined above, reference is made to the definitions set forth in the Data Privacy Regulations applicable according to Article 2 below.

2. GENERAL

2.1 Each Party is individually and separately responsible for complying with the level of protection resulting from its Data Privacy Regulations in relation to Personal Data, being recognised that:

a) the Contractor is governed by the Personal Data protection laws and regulations applicable to the Contractor in the Agreed Territory of Processing, which provide an Adequate Level of Protection under the ESA PDP Framework (e.g. EU Regulations in the field of personal data protection, including but not limited to Regulation (EU) nr. 2016/679).

b) ESA is governed by PDP Framework, i.e. the Personal Data Protection Framework applicable to ESA and available on ESA website at the URL: http://www.esa.int/About_Us/Law_at_ESA/Highlights_of_ESA_rules_and_regulations

2.2. The Parties are considered separate Data Controllers of the Personal Data, with each Party being able to determine the purpose and means of Processing the Personal Data under its control in accordance with its privacy statement.

2.3 The Personal Data exchanged by the Parties in the frame of this Contract will only be processed for:

- a) the performance of the Contract, including implementation, management, monitoring, audits and the fulfilment of the obligations set out in this Annex;
- b) the management of the relationship of the Parties in relation to the Contract, notably for administrative, financial, audit or for communication purposes;
- c) the compliance with any legal or regulatory obligation to which a Party is subject;
- d) the compliance, in case the performance of the Contract requires access to the Parties’ premises, with the health, safety and security requirements, legal or regulatory obligations applicable to the respective Party in such matters.

3. PERSONAL DATA EXCHANGED BY THE PARTIES

In the performance of this Contract each Party may disclose to the other Party data which may qualify as “Personal Data” under its Data Privacy Regulations as follows:

- a) the Agency shall communicate to the Contractor only the Personal Data concerning ESA representatives/contact persons including name, work address, email and telephone numbers;
- b) the Contractor shall communicate to the Agency only:

- (i) Personal Data concerning the Contractor’s representatives/contact persons including name, work address, email and telephone numbers;
- (ii) Personal Data concerning the Contractor’s key Personnel, including title, name, work address, email, telephone numbers, education, professional experience, description of the person’s job and responsibilities and the precise assignment of the person to the activity under the Contract.

4. PARTY’S OBLIGATIONS

4.1 Each Party is individually and separately responsible for complying with the level of protection resulting from its Data Privacy Regulations in relation to Personal Data, including the collection and update of the Personal Data that it communicates to the other Party, the lawfulness and the quality of such Personal Data and for the means by which they were collected. Should the legal basis for the collection of the Personal Data cease to exist or the quality of the Personal Data be affected, the Party will inform the other Party without undue delay.

4.2 The Parties shall preserve the rights and legal remedies of the Data Subject as recognised and protected in the Data Privacy Regulations applicable respectively to each Party. In particular, the Data Controller which disclosed the Personal Data to the other Party will respond to enquiries from Data Subjects and, as the case may be, from any competent authority concerning the data processing of the relevant Personal Data.

4.3 In case the Parties engage Processors to support their internal operations, including the Processing of the Personal Data exchanged, it is the responsibility of that Party to ensure that its Processors assume obligations consistent with the Data Privacy Regulations applicable to the respective Party, in order to guarantee an adequate level of protection of Personal Data.

4.4 The Party having received the other Party's Personal Data under the Contract shall Process such Personal Data only in the Agreed Territory of Processing.

5. DATA RETENTION

5.1 The Parties shall not retain or process the Personal Data exchanged longer than is necessary to carry out the purpose described in Article 2.3 herein, unless required otherwise:

- a) under the Data Privacy Regulations, (e.g. in the frame of audits, inspections and incidents) or
- b) under the Party's statutory obligations.

5.2 The retention period shall be defined in the privacy notices of the Parties.

5.3 All Personal Data must be, effectively destroyed/deleted upon expiration of the retention period, unless conservation of such data is required for compliance with any legal or regulatory obligation to which the Party having received the Personal Data from the other Party is subject.

6. CONFIDENTIALITY

The Parties shall ensure the confidentiality of the Personal Data processed by protecting them against unauthorized or unlawful access, acquisition, use and disclosure, in particular by:

- a) limiting access to the Personal Data of the other Party only to their Personnel, that:
 - are required or authorized to access such Personal Data;
 - have committed themselves to confidentiality or are under a statutory obligation of confidentiality;
 - have received the appropriate Personal Data protection training.
- b) taking into consideration, in terms of IT tools, product, applications, the principles of personal data protection by design and by default.

7. SECURITY

The Parties shall adopt appropriate technical and organizational security measures, giving due regard to the risks inherent in the Processing and to the nature, scope, context and purpose of the Processing, in order to ensure the following as appropriate:

- a) the on-going confidentiality, integrity, availability and resilience of Processing systems and services;
- b) measures to protect Personal Data from accidental, unlawful or unauthorized access, use, destruction, loss, modification or transfer.

8. DATA PROTECTION OFFICER/CONTACT POINT

For any Personal Data protection matters, the Parties shall involve their specific contact points identified in the Contract.

9. TRANSFER

The Party having received the other Party's Personal Data under the Contract shall Process (and have processed by its authorized subcontractors or sub-processors) such Personal Data only in the Agreed Territory of Processing. No transfer of Personal Data outside

the Agreed Territory is allowed without prior written approval of the other Party.

10. SUB-CONTRACTORS

10.1 The Contractor is authorised to disclose Personal Data received from the Agency to its Sub-contractors provided that:

- a) sub-contracting is specifically authorised by Contract and the Sub-contractors are indicated in the Contract;
- b) all the general conditions set forth in this Annex are fulfilled; in particular the Processing of the Personal Data by the Subcontractors is performed for the purpose described in Article 2.3 herein and the Personal Data are not transferred outside the Agreed Territory.

10.2 Disclosure of the Agency's Personal Data to other third Parties requires prior approval of the Agency.

11. PERSONAL DATA BREACHES

11.1 After becoming aware of a Personal Data Protection Breach falling in its area of responsibility, and affecting the Personal Data communicated by the other Party, the Party shall notify the other Party within 48 hours.

11.2 The Parties will provide each other reasonable assistance to facilitate the handling of the Personal Data Breach and accurate information about the breach, in particular (but not only) in case a complaint is, or likely to be, lodged by a Data Subject in relation to the Breach.

12. LAW – DISPUTE RESOLUTION

Concerning Personal Data protection matters, notwithstanding any other provisions on the governing law set forth elsewhere in the Contract, the provisions set forth in the Data Privacy Regulations, as defined herein, will apply as mentioned in Article 2 herein and will prevail in case of conflict. Without prejudice to the foregoing, disputes between the Parties on Personal Data protection matters shall be settled in accordance with Article 1.3.3 of the Contract.

APPENDIX 1

STATEMENT OF WORK



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DOCUMENT

ITT3 - AMBITIOUS PROJECTS FOR CZECH REPUBLIC: PHASE 0/A/B1 STUDIES (ACTIVITY TYPE D) – RE-ISSUE

Prepared by	████████████████████
Reference	ESA-IPL-I-SOW-2020-001
Issue	1
Revision	1
Date of Issue	17/09/2020
Status	Approved
Document Type	SOW

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1 INTRODUCTION

1.1 Scope of the Document

This document describes the activity to be executed and the deliverables required by the European Space Agency in relation to **Ambitious Projects for Czech Republic: Phase 0/A/B1 Studies, Type D**.

It will be part of the Contract and shall serve as an applicable document throughout the execution of the work.

1.2 Applicable and Reference Documents

1.2.1 Applicable Documents (ADs)

The following documents, listed in order of precedence, contain requirements applicable to the activity:

[AD1] ESA-ADMIN-IPOL(2014)2 - Space Debris Mitigation for Agency Projects, ESA, 28 March 2014.

1.2.2 Reference Documents (RDs)

The following documents can be consulted by the Contractor as they contain relevant information:

[RD1] ECSS-M-ST-10C , Project planning and implementation.

[RD2] User Manual – Ariane 6 Multi Launch System (MLS), TBD.

[RD3] Tailored ECSS Engineering Standards for In-Orbit Demonstration CubeSat Projects, TEC-SY/128/2013/SPD/RW.

[RD4] ESA Space Debris Mitigation Compliance Verification Guidelines ESSB-HB-U-002 iss.1 rev.0 19th Feb 2015.

[RD5] User Manual – VEGA Small Spacecraft Mission Service (SSMS), February 2017, version 1.0 (move to No. 1).

[RD6] Bartolomeo User Guide, Issue 1, November 2018.

[RD7] Margin philosophy for science assessment studies, SRE-PA/2011.097/ , 10 Feb 2016.

[RD8] Bartolomeo pricing, <https://www.airbus.com/space/space-infrastructures/bartolomeo.html>

1.3 Acronyms and Abbreviations

AD	Applicable Document
AIV	Assembly Integration & Verification
AOCS	Attitude and Orbit Control System
ATP	Authorisation To Proceed

CAD	Computer Aided Design
ECSS	European Cooperation for Space Standardization
EEE	Electrical, Electronic and Electromechanical
EGSE	Electrical Ground Support Equipment
FDIR	Failure Detection, Isolation and Response
GNC	Guidance, Navigation and Control
GSE	Ground Support Equipment
ICD	Interface Control Document
I/F	Interface
ITT	Invitation To Tender
ITU	International Telecommunications Union
KOM	Kick-Off Meeting
LSP	Launch Service Provider
MAIT	Manufacture, Assembly, Integration and Test
MCS	Mission Control System
MGSE	Mechanical Ground Support Equipment
MRD	Mission Requirements Document
PA	Product Assurance
PFM	Proto-Flight Model
QA	Quality Assurance
QM	Qualification Model
RD	Reference Document
RF	Radio Frequency
SoW	Statement of Work
SRD	System Requirements Document
SW	Software
TBC	To Be Confirmed
TMISIC	Technology Mission* Integrating Scientific and Industrial Capacities
TRL	Technology Readiness Level

1.4 Background and Objective(s)

1.4.1 Background

The Czech Republic has requested ESA to manage the Phase 0/A/B1 study of ‘ambitious projects’ that could then form the basis of a full development under separate contractual cover. In this regard an ‘ambitious project’ is considered to be a development meeting at least one of the following criteria, and preferably more than one:

Type D Projects:

- A space mission with primary purpose of verifying and demonstrating industrial products and/or services (where a secondary scientific objective is also required) up to and including in the operational environment.
- A hosted payload/ flight demonstration for a complex equipment and/or service.

- Development and flight demonstration of a highly complex sub-system for space segment platform.
- Other such developments fitting with the spirit of the above points.

The study shall include the analysis of mission and system functions and requirements for all elements of the mission architecture, including the space segment (i.e. the platform and its payload(s)), launcher, operations and exploitation concept, as well as ground segments.

1.4.2 Objective(s) of the Activity

The activity is focussed on integrating Scientific and Industrial Capacities in Czech Republic, also referred to as: Technology Mission* Integrating Scientific and Industrial Capacities or TMISIC, with the goal of achieving scientific excellence.

The objective of the activity is therefore to cover the Phase 0/A/B1 phases of development of the mission and shall result in demonstrating the feasibility of a proposed baseline design as well as a detailed planning and costing for the remainder of the mission development and operation (Phase B2/C/D and E) sufficient to form the basis of a proposal for that work.

It shall be noted that the term “mission” is used in the SoW not only to denote a self-standing spacecraft (incl. launch and operations) but may also be interpreted as a hosted payload on another mission (but including the relevant share of integration, launch and operations costs).

2 WORK TO BE PERFORMED

2.1 Work Logic

ESA expects the Phases 0, A, and B1 studies to closely follow ECSS-M-ST-10C [RD1]. As such, the studies should cover:

- Generation of mission requirements from the mission statement and flow down to the (sub)system functional, technical, management and PA/QA requirements.
- Identification of the (sub)system concepts to comply with the mission requirements, taking into account also the technical and programmatic constraints for ambitious projects.
- Identification, planning and costing of all activities and resources needed to develop and operate both the space and ground segments of the project up to and including Phase G (Disposal).
- Development of a Make/ Buy plan.
- Assessments of both technical and programmatic risks and risk mitigation.
- Assess the key technical and programmatic risks.

At the end of each Phase there is to be a review which will assess the work performed, identify short comings and provide the approval to continue to the next Phase.

2.1.1 Task 1: PHASE 0 – Mission Analysis and Key Requirement Identification

- **Inputs**
 - Statement of Work
 - Proposal
 - Kick off meeting minutes

- **Task description**

The mission statement and objectives shall be elaborated and expanded to the next lower level. Specifically, this shall include the identification of the key mission needs and requirements, the expected performance, dependability and safety goals, end of life decommissioning and the key mission operating constraints with respect to both the physical and operational environment.

To this end, the contractor shall develop the preliminary technical and scientific requirements specification. This shall include:

- Mission Requirements
- Key Management Requirements
- Key PA/QA requirements

The Contractor shall identify and trade off a number of possible mission concepts (Orbits, Space segment design concepts, end of life strategy, operational strategy and launcher options) covering a trade space of options for at least; lowest risk, lowest cost, best

performance, most return to the Czech republic. From this, the Contractor shall make a proposal to ESA of which mission concept is preferred.

The Contractor shall perform a preliminary assessment of programmatic aspects. This shall include, as a minimum, the preliminary master planning, preliminary costings and a first level make/buy plan (i.e. to sub-system level). These shall also provide inputs to the concepts trade-offs mentioned above. The make/buy plan is intended to show the items to be procured/ developed in Czech Republic and those to be procured from outside the Czech republic. There is a strong preference to minimize the procurement from outside the Czech Republic, in particular, the procurement of systems, subsystems, equipment and services (while components and material shall not be accounted for). However, value for money in terms of potential long term benefit to Czech entities vs development costs shall be taken into account and be the driver of the make/buy trade off in this and following Phases. The Contractor shall make due effort to minimize the procurement of hardware and software components from outside the Czech Republic. A guideline limit of such procurement is 25 % of the flight hardware and software cost (which itself is about 50 % of the mission cost) and all such procurements shall be explicitly justified and priority given to European suppliers. Should items be provided free of charge from other countries, these shall also be listed and a letter of support explaining how it will be financed shall be provided for each such item.

For the purpose of the cost budgets in this Phase, the contractor shall consider the following model of typical cost allocation, this shall be refined by the Contractor during the later Phase A and B1 :

- o Launch 20-25 %
- o MOC (Mission Operations Cost) 10-15 %
- o SOC (Science Operations Cost) 10-15 %
- o Platform 15-20 %
- o Payload 15-20 %
- o Prime 10 %

The Contractor shall perform a preliminary risk assessment, identifying the key schedule, cost, technical and programmatic risks. This shall also provide inputs to the concepts trade off mentioned above.

The Scientific approach and justification shall be further elaborated and referenced to the payload design and the post processing/ analysis needed on ground. All scientific concepts shall be detailed and explained and the advancement on the current state of the art further elaborated.

- **Reviews, Outputs and Approval conditions**

A Mission Definition Review (MDR) shall be held at the end of this task. The MDR is described in section 4.

The deliverables expected are, as a minimum:

- D1.1 Mission statement and objectives
- D1.2 Preliminary Technical Requirements Specification
- D1.3 Mission Concept Description, Trade Off and Justification document
- D1.4 Preliminary Project Master Plan
- D1.5 Preliminary Cost at Completion Budget
- D1.6 Preliminary Make/Buy Plan
- D1.7 Risk Assessment
- D1.8 Core Team Organisation
- D1.9 Science Justification

2.1.2 Task 2: PHASE A – Feasibility

- **Input**
 - Statement of Work
 - MDR Minutes of meeting

- **Task description**

Based on the results of the MDR, the Contractor shall proceed further with the selected Mission Concept.

The Contractor shall establish the preliminary management plan, system engineering plan and product assurance plan for the project. These shall include the margin philosophies to be used throughout the development and the model philosophy to be followed as well as identification of which standards are to be made applicable.

The Contractor shall elaborate mission concept by developing the architecture and conceptual design of the ground system, the operational concept, the space segment platform and the payload. As for the mission concept, trade-offs shall be performed against the identified needs in the requirements document, to determine levels of uncertainty, cost, risk and performance. From this, the preferred technical solution for each element of the mission shall be selected.

Based on the preferred technical solution, the Contractor shall establish the product tree, down to equipment level.

The technical and programmatic feasibility of the strawman design (i.e. the selected system concept and technical solutions) shall be demonstrated by performing sizing analyses and identifying constraints relating to the performance, costs, schedules, organization, launch, operations, production and disposal. The FDIR philosophy shall be established (e.g. all 'critical conditions' for the mission shall be identified, fail operational, fail safe philosophy decided, level of failure tolerance, use of independent hardware, number of FDIR levels, level of on-board autonomy etc.).

The make/buy plan shall be iterated from sub-system to equipment level, following the product tree, with justification.

The Contractor shall identify all critical technologies¹ and propose development and/ or de-risking plans for those.

The contractor shall iterate and elaborate the risk assessment and mitigation measures.

The Contractor shall down select the possible launcher options to the final 2 and gather all the technical requirements and interfaces on those two options for consideration in Phase B.

Based on the elaborated design concepts and risks, the project master plan and cost at completion shall be updated to the next level of detail. This shall include also a detailed planning for the work in Phase B1.

The Contractor shall further elaborate the Technical Requirements for each element of the Mission Concept (i.e. Ground segment and operations, Space segment, Payload).

- **Reviews, Outputs and Approval conditions**

A Preliminary Requirements Review (PRR) shall be held at the end of this task. The PRR is described in section 4.

The following outputs shall be delivered:

- D2.1 Management Plan
- D2.2 PA/QA Plan
- D2.3 Engineering Plan
- D2.4 Mission Concept and Architecture Description (Ground and ops, Space segment, payload)
- D2.5 Mission Concept and Architecture Trade-Off/ Justification Document
- D2.6 Mission Concept and Architecture Feasibility Assessment
- D2.7 Technical Requirements Document (Ground and ops, Space segment, payload)
- D2.8 Product Tree
- D2.9 Project Master Plan (schedule)
- D2.10 Cost at Completion Budget
- D2.11 Make/Buy Plan
- D2.12 Risk Assessment
- D2.13 Launcher Selection, Requirements and Interfaces
- D2.14 Phase B Study Plan
- D2.15 Critical Technology List, Development and Mitigation Plan

¹ Note: Technologies may be 'critical' for various reasons, e.g. technical difficulty, TRL level, schedule, impact of failure/incorrect operation on the mission or single source supply.

2.1.3 Task 3: PHASE B1 – Preliminary Definition

- **Input**
Statement of Work
Phase A outputs
- **Task description**

The Contractor shall further iterate and elaborate the baseline design and demonstrate the expected performances and feasibility. Further, the Contractor shall prepare sufficiently to be able to start the procurement process of the bought in and subcontracted work early in a potential follow on activity.

To this end, the contractor shall elaborate the design of each subsystem, performing analyses, modelling and simulation sufficient to determine the behaviour, performance and sizings. The Contractor shall establish the interface documents controlling the interfaces (both software and hardware) between each main element/ sub-system (e.g. including Payload to Platform, Platform to launcher, Platform to Ground and Ground to users).

The FDIR concept and design shall be elaborated and resulting requirements flown down.

The preliminary budgets (mass, propulsion, pointing, power, communication/link) shall be established, employing the margin philosophy established in Task 2, and demonstrated to be credible.

Technical requirements shall be established for each sub-system as well as for each item to be procured or sub-contracted.

The baseline organisational structure (sub-contractors, suppliers, internal teams) shall be established and related business agreement documents for all key sub-systems (e.g SoW) shall be prepared. The Contractor shall also iterate and confirm the make/buy plan at sub-system level.

Building on the model philosophy, the verification programme shall be determined and elaborated, including all major reviews, analyses and tests. All facilities and tools needed during the design and MAIT (i.e. Phase B2,C/D) shall be identified and preparations made to secure them.

The Contractor shall finalise the detailed project master plan and schedule for Phase B2, C/D and E and shall also finalise the estimated cost at completion and risk assessment. This shall include also the finalization of the product tree, the development of the work breakdown structure and Work Package descriptions and the specification/ documentation tree. All long-lead item procurements required to meet project schedule needs and the planning for their procurement in Phase B2 (i.e. procurement is out of scope of this study) shall be identified and included in the planning.

The make/buy plan shall be augmented with a business case for each technology and know-how to be developed in Czech Republic in the course of the mission implementation.

The Contractor shall prepare a space debris mitigation plan and end of life disposal plan.

The Contractor shall investigate and draw up a plan to satisfy all legal requirements to be compliant with national and international space law for the launch and operation of a spacecraft, this shall include, but not be limited to; registration, frequency band use, insurances, space debris, waiver of claims, export restrictions etc.

- **Reviews, Outputs and Approval conditions**

A System Requirements Review (SRR) shall be held at the end of this task. The SRR is described in section 4.

The following outputs shall be delivered

D3.1 Design Description and Justification Documents (Mission, element, sub-system)

D3.2 Interface Control Documents

D3.3 FDIR Design and Justification

D3.4 Finalised Technical Requirements Document (Ground and ops, Space segment, payload)

D3.5 Procurement Packages (SoW and Technical specifications)

D3.6 Finalised Product Tree and Specification Tree

D3.7 Verification Plan

D3.8 Tools and Facilities List

D3.9 Organisational Structure Document

D3.10 Final Project Master Plan (inc. schedule)

D3.11 Final Cost at Completion Budget

D3.12 Final Make/Buy Plan

D3.13 Final Risk Assessment

D3.14 Final Critical Technology List, Development and Mitigation Plan

D3.15 Legal Requirements and Compliance Plan

3 REQUIREMENTS FOR MANAGEMENT, REPORTING, MEETINGS AND DELIVERABLES

The following are the requirements for Management, Reporting, Meetings and Deliverables applicable to the present activity.

3.1 Management

3.1.1 General

The Contractor shall implement effective and economical management for the project.

His nominated Project Manager shall be responsible for the management and execution of the work to be performed and, in the case of a consortium, for the coordination and control of the consortium's work.

3.1.2 Communications

All communications to the Agency, affecting technical terms and conditions of the activity, shall be addressed in writing to the Agency's representatives nominated in the Contract.

3.2 Access

During the course of the Contract the Agency shall be afforded free access to any plan, procedure, specification or other documentation relevant to the programme of work.

3.3 Reporting

3.3.1 Minutes of Meeting

The Contractor is responsible for the preparation and distribution of Minutes of Meetings held in connection with the Contract. Electronic versions shall be issued and distributed to all participants, to the Agency's Technical Officer and to the Agency's Contracts Officer, not later than ten (10) days after the meeting concerned.

The minutes shall clearly identify all agreements made and actions accepted at the meeting.

3.3.2 Bar-chart Schedule

The Contractor shall be responsible for maintaining the bar chart for work carried out under the Contract, as agreed with the Agency.

The Contractor shall present an up-to-date chart for review at all subsequent meetings, indicating the current status of the Contract activity (WP's completed, documents delivered, etc.).

3.3.3 Progress Reports

Every month, the Contractor shall provide a Progress Report in electronic format to the Agency's representatives, covering the activities carried out under the Contract. This report shall refer to the current activities shown on the latest issued bar chart and shall give:

- Action items completed during the reporting period;
- Description of progress: actual vs schedule, milestones and events accomplished;
- Reasons for slippages and/or problem areas, if any, and corrective actions planned and/or taken, with revised completion date per activity;
- Events anticipated during the next reporting period (e.g. milestones reached);
- Milestone payment status.

3.3.4 Problem Notification

The Contractor shall notify the Agency's representatives (Technical Officer and Contracts Officer) of any problem likely to have a major effect on the time schedule of the work or to significantly impact the scope of the work to be performed.

3.3.5 Technical Documentation

As they become available and not later than the dates in the delivery plan, the Contractor shall submit for the Agency's approval Technical Notes, Task/WP Reports, etc.

Technical documentation to be discussed at a meeting with the Agency shall be submitted electronically two (2) weeks prior to the meeting.

Technical documents from Subcontractors shall be submitted to the Agency only after review and acceptance by the Contractor and shall be passed to the Agency via the Contractor's formal interface to the Agency.

3.4 Meetings

The negotiation meeting shall take place by video- or tele-conference.

Progress Meetings shall be held at approximately two (2)- to three (3)-monthly intervals, by video- or teleconference.

The final presentation shall take place in the Czech Republic, to a public audience, within twelve (12) months of Contract closure. During the course of the activity the Agency will decide on the format for the final presentation (e.g. dedicated meeting, conference, specific event). Preference shall be given to a specific event where technologies related to a specific technology domain or technology theme are presented together.

Additional meetings may be requested either by the Agency or the Contractor.

With due notice to the Contractor the Agency reserves the right to invite Third Party(ies) to meetings to facilitate information exchange.

For each meeting the Contractor shall propose an agenda in electronic form and shall compile and distribute hand-outs of any presentation given at the meeting.

3.5 Deliverable Items

In addition to the documents to be delivered according to section 3.3 here above, the following documentation shall also be delivered.

All documentation deliverables mentioned hereunder (including all their constituent parts) shall also be delivered in electronic form in a format agreed by the Agency (PDF format, the native format and in other exchange formats where relevant).

All the documentation shall be delivered on computer readable media (e.g. USB key) as agreed with the Agency.

The draft version of the documentation shall be sent to the Agency's Technical Officer in electronic format not later than two (2) weeks before the documentation is to be presented. The final version shall be provided in a number of copies specified hereunder.

All documents shall bear the appropriate copyright notice. In all cases, this shall include the title, ESA Contract number, deliverable number, date, status (draft), version and/or revision number. The information shall be repeated consistently in the header or footer of every page.



Documentation

Doc ID	Title	Milestone	No. of copies/format to be delivered to
D1.1	<i>Mission statement and objectives</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.2	<i>Preliminary Technical Requirements Specification</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.3	<i>Mission Concept Description, Trade Off and Justification document</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.4	<i>Preliminary Project Master Plan</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file AND the original Microsoft Project file to be delivered to the ESA Technical Officer.</i>
D1.5	<i>Preliminary Cost at Completion Budget</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.6	<i>Preliminary Make/Buy Plan</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.7	<i>Risk Assessment</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.8	<i>Core Team Organisation</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D1.9	<i>Science Justification</i>	<i>End of Task 1</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D2.1	<i>Management Plan</i>	<i>End of Task 2</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>



D2.2	PA/QA Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.3	Engineering Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.4	Mission Concept and Architecture Description	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.5	Mission Concept and Architecture Trade Off/ Justification Document	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.6	Mission Concept and Architecture Feasibility Assessment	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.7	Technical Requirements Document	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.8	Product Tree	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.9	Project Master Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file AND original Microsoft Project File to be delivered to the ESA Technical Officer.
D2.10	Cost at Completion Budget	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.11	Make/Buy Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.12	Risk Assessment	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.13	Launcher selection, requirements and interfaces	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.



D2.14	Phase B Study Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D2.15	Critical Technology List, Development and Mitigation Plan	End of Task 2	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.1	Design description and justification documents	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.2	Interface Control Documents	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.3	FDIR Design and Justification	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.4	Finalised Technical Requirements Document	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.5	Procurement Packages	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.6	Finalised Product Tree and Specification Tree	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.7	Verification Plan	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.8	Tools and Facilities List	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.9	Organisational Structure Document	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.
D3.10	Final Project Master Plan	End of Task 3	Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file AND original Microsoft Project File to be delivered to the ESA Technical Officer.



D3.11	<i>Final Cost at Completion Budget</i>	<i>End of Task 3</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D3.12	<i>Final Make/Buy Plan</i>	<i>End of Task 3</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D3.13	<i>Final Risk Assessment</i>	<i>End of Task 3</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D3.14	<i>Final Critical Technology List, Development and Mitigation Plan</i>	<i>End of Task 3</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
D3.15	<i>Legal Requirements and Compliance Plan</i>	<i>End of Task 3</i>	<i>Electronic searchable, indexed and not encrypted PDF and OR original (WORD) file to be delivered to the ESA Technical Officer.</i>
TDP	<i>Technical Data Package</i>	<i>Final Review</i>	<i>Electronic searchable, indexed and not encrypted PDF and original (WORD) file to be delivered to the ESA Technical Officer.</i>
AB	<i>Abstract</i>	<i>Final Review</i>	<i>Electronic searchable, indexed and not encrypted PDF and original (WORD) file to be delivered to the ESA Technical Officer.</i>
FP	<i>Final Presentation</i>	<i>Final Review</i>	<i>Electronic file in the form of a slide editor tool file (e.g. PowerPoint or compatible) to be delivered to the ESA Technical Officer.</i>
FR	<i>Final Report</i>	<i>Final Review</i>	<i>Electronic searchable, indexed and not encrypted PDF and original (WORD) file to be delivered to the ESA Technical Officer and Contracts Officer. In addition to the above, one (1) electronic searchable, indexed and not encrypted PDF and original (WORD) file shall be sent to the ESA Information and Documentation Centre – ESTEC Library (email: esa.ids@esa.int).</i>
CCD	<i>Contract Closure Documentation</i>	<i>Contract Closure</i>	<i>Signed electronic copy to be delivered to the ESA Technical Officer with copy to the ESA Contracts Officer.</i>

Definitions of Deliverable Documents

Note: Further details of the expected contents of many of these documents can be found in the relevant ECSS standards.

- D1.1 - Mission Statement and Objectives
 - Finalised Mission statement, high level core objectives needing to be achieved to fulfil the mission statement, Key mission needs/ requirements in terms of performance, dependability, decommissioning and key mission constraints.
- D1.2- Preliminary Technical Requirements Specification
 - First level Requirements needing to be met/achieved for the mission, the management of the mission development programme, PA/QA and Science.
- D1.3- Mission Concept Description, Trade Off and Justification Document.
 - Key high level possible concepts and configurations for the mission (space segment, operations, orbits, launchers, end of life strategy), trade-offs, pros/cons and relative comparison between the concepts. Proposal and justification of a selected mission concept.
- D1.4- Preliminary Project Master Plan
 - First task breakdown and schedule estimation of the end to end mission from Phase B2 to end of life.
 - Identification and explanation of potential critical path.
 - Highlighting key events and dates.
- D1.5- Preliminary Cost at Completion Budget
 - First draft budget of elements making up the final total mission cost.
 - Best case, Worst case and expected budgets per line item.
 - Description of source data/ expected uncertainty or estimation method.
- D1.6- Preliminary Make/Buy Plan
 - First tier/ level identification of major mission elements to be procured outside or Czech Republic. Developed from scratch within Czech republic or procured from existing supplier in Czech Republic. First level is intended to include responsibility for example for payload, s/c, launcher, launch service, MAIT facilities, ground station, operations and data processing chain.
 - Key elements (at any tier level) pre-selected as make for strategical reasons.
 - Any elements provided as free issue from other sources (e.g. other countries) and evidence of their financial support.
 - Justification / reasoning for all decisions.
- D1.7- Risk Assessment
 - Schedule, technical, costs, managerial, scientific and programmatics key risks.
- D1.8 - Core Team Organisation
 - Expected mission development team, responsibilities and organisation (reporting lines).
- D1.9 - Science Justification
 - Explanation of the science end products and goals.
 - Justification of the science case vs world-wide state of the art.
 - Explanation of the scientific principles.

- Data post processing chain and required analyses to arrive to scientific products.
- Key engineering aspects to be considered in realising the payload.
- Constraints the science imposes on the mission/ spacecraft.
- D2.1 - Management Plan
 - See relevant ECSS standard.
- D2.2 - PA/QA Plan
 - See relevant ECSS standard
- D2.3 - Engineering Plan
 - Technical steps to be followed and split of the work between entities.
 - First Work flow logic (mission development to launch).
- D2.4 - Mission Concept and Architecture Description
 - Ground segment, Operations and autonomy, Space segment, payload, science data processing.
- D 2.5 - Mission Concept and Architecture Trade-Off/ Justification Document
 - Supporting evidence to show the options considered and traded off and provide the justification for the selected architectures and high level design.
- D 2.6 - Mission Concept and Architecture Feasibility Assessment
 - Analyses, budgets, simulations to demonstrate the feasibility of the concepts and designs.
- D 2.7 - Technical Requirements Document
 - Ground segment, operations (mission and science), Space segment, payload, science data processing chain.
- D 2.8 - Product Tree
 - See relevant ECSS.
- D 2.9 - Project Master Plan (schedule)
 - Showing all key reviews, events and milestones.
 - Critical path
 - Explanation of schedule and assumptions.
- D 2.10 - Cost at Completion Budget
 - Iteration of D1.5 to next level of detail.
 - Breakdown also shown by mission Phase (e.g. B2, C/D, E...).
- D 2.11 – Make/Buy Plan
 - Iteration of D1.6 to next level of detail (i.e. at least sub-system level).
- D 2.12 - Risk Assessment
 - Iteration of D1.7 taking into account information obtained from increasing design depth and maturity.
- D 2.13 - Launcher selection, requirements and interfaces.
 - Detailed description of selected launcher option, dispenser option with costs and justification.
 - Key dates, timelines, constraints, test and PA/QA requirements imposed by launcher selection on the space segment.
 - Launcher to spacecraft interfaces.
- D 2.14 - Phase B Study Plan

- Detailed plan of the work needed to be performed in Phase B1 and B2. Phase B1 to guide the work of the next task and ensure completeness, Phase B2 to prepare for the next steps.
- D 2.15 - Critical Technology List, Development and Mitigation Plan
 - Identify all critical technologies (due to schedule, complexity, single source, export restrictions, development risk, cost overrun potential or performance). For each detail the development plan (where relevant) and actions to be taken to mitigate the criticality.
- D3.1 – Design Description and Justification Documents (Mission, element, sub-system)
 - Iteration of D2.4/5/6 to the next level of depth.
 - Supporting analyses, budgets and simulations per subsystem.
- D3.2 – Interface Control Documents
 - Interface description and control documents for each key interface. E.g. space to ground, launcher to satellite, service module to payload etc.
- D3.3 – FDIR Design and Justification
 - Identification of all conditions and states that could endanger the payload or mission.
 - Identification of how such conditions can be a) detected, b) recovered from.
 - Identification of minimum needed conditions to be 'safe' (as opposed to operational).
 - Identification of the FDIR strategy (including consideration of redundancy concepts, specific needed sensors for s/c safety, number of FDIR levels/ tiers etc.).
- D3.4 – Finalised Technical Requirements Document (Ground and ops, Space segment, payload)
 - Iterated to sub-system level for each element of the mission.
- D3.5 – Procurement Packages (SoW and Technical specifications).
 - Preparation for the key procurements and sub-contracts that would be needed in Phase B2 and C.
- D3.6 – Finalised Product Tree and Specification Tree
 - See relevant ECSS.
- D3.7 – Verification Plan
 - See relevant ECSS.
- D3.8 – Tools and Facilities List
 - List of the tools and facilities needed for the design, production, assembly, test and operation (including resolving in-flight anomalies).
 - Identification of availability of each, development/ procurement need etc.
- D3.9 – Organisational Structure Document
 - Iteration of D1.8.
- D 3.10 – Final Project Master Plan (inc. schedule)
 - Iteration of D2.9
- D 3.11 – Final Cost at completion budget
 - Iteration of D2.10.

- D 3.12 – Final Make/Buy Plan
 - Iteration of D2.11.
- D 3.13 – Final Risk Assessment
 - Iteration of D2.12.
- D 3.14 – Final Critical Technology List, Development and Mitigation Plan
 - Iteration of D2.15.
- D3.15 – Legal Requirements and Compliance Plan
 - Detailed list of all legal aspects to be addressed prior to launch.
 - Planning of how, when and by whom each of these will be addressed.
 - Potential issues foreseen.

- TDP TECHNICAL DATA PACKAGE
The Technical Data Package consists of the final versions of all approved technical documents, delivered during the execution of the activity.

- AB ABSTRACT
The Abstract, summarises the work performed. It shall be suitable for application at symposiums or technical journals, normally not exceeding three (3) to four (4) pages of text with coloured illustrations or photographs where appropriate.

- FR FINAL REPORT
The Final Report shall provide a complete description of all the work done during the activity and shall be self-standing, not requiring to be read in conjunction with reports previously issued. It shall cover the whole scope of the activity, i.e. a comprehensive introduction of the context, a description of the programme of work and report on the activities performed and the main results achieved.

The Final Report is a mandatory deliverable, due upon completion of the work performed under the Contract. For the avoidance of doubt, “completion of the work performed under the Contract” shall mean the finalisation of a series of tasks as defined in a self-contained Statement of Work.

- CCD CONTRACT CLOSURE DOCUMENTATION
The Contract Closure Documentation is a mandatory deliverable, due at the end of the Contract. Work performed under Contract Change Notices adding new tasks with respect to the original Contract shall require separate Contract Closure Documentation. The contents of the Contract Closure Documentation shall conform to the layout provided in Annex A hereto.

Other Deliverables (Hardware, Software, Models, Data, Algorithms, etc.)

Item Identifier	Title	Milestone	Remarks
MOD1	CAD Model	SRR	
MOD2	Simulator(s) and Model(s) used for the feasibility demonstration(s)	SRR	Any simulators or models developed during the activity to support the feasibility demonstration shall be delivered in a format in which they can be reviewed for correctness.

4 SCHEDULE AND MILESTONES

4.1 Duration

The duration of the work **shall not exceed 12 months** from kick-off to the end of the activity (delivery of Final Report or Hardware or Software).

4.2 Milestones

The following milestones shall apply:

- MDR
- PRR
- SRR

4.3 Reviews

During the study the following reviews will be held:

4.3.1 *Mission Definition Review (MDR)*

- **Input**

Deliverables D1 to D9

- **Description**

The outcome of this review is used to judge the readiness of the project to move into phase A. The primary objectives of this review are:

- a) To freeze the finalised mission statement and objectives
- b) To assess and agree a baseline preliminary mission requirements specification and programmatic aspects (management and PA/QA requirements) to be taken as the baseline for Phase A.
- c) To select a baseline mission concept for Phase A

- **Output**

Authorisation to proceed to Task 2

4.3.2 *Preliminary Requirements Review (PRR)*

- **Input**

Deliverables D2.1 to D2.15

- **Description**

The outcome of this review is used to judge the readiness of the project to move into Phase B. The primary objectives of this to assess and agree the preliminary management, engineering and product assurance plans, to assess and agree the technical requirements specification, to confirm the technical and programmatic feasibility of the selected design concept (Mission design, Platform design concept, Payload design concept, Operations concept and Launcher) and to confirm and agree the development approach (including model philosophy and verification approach).

- **Output**

Authorisation to proceed to Task 3

4.3.3 System Requirements Review (SRR)

- **Input**

Deliverables D3.1 to D3.15

- **Description**

The primary objectives of this review are:

- o Assess and agree the detailed technical requirements specifications for each sub-system.
- o Assess the preliminary design definition and preliminary design of the mission and each sub-system and confirm the feasibility of meeting the mission requirements and mission statement.
- o Assess and agree the preliminary verification plan(including model philosophy).
- o Assess and agree the final development plan and timeline (master GANTT).
- o Release of product tree, work breakdown structure and specification tree.
- o Assess the readiness level of each element of the mission design (TRL).

- **Output**

MoM documenting the *Recommended changes*

ANNEX A. LAYOUT FOR CONTRACT CLOSURE DOCUMENTATION (v2018-10)

Contract Closure Documentation
for
ESA Contract Nr. 4000XXXXXX/21/NL/MH/kdj
“[Title of Activity]”,
hereinafter referred as the “Contract”

Section 1 – Parties, Contract Duration and Financial Information

Contractor		[CONTRACTOR NAME AND COUNTRY]
Subcontractor(s) <i>(state if not applicable)</i>		[NAME AND COUNTRY]
Contract Duration <i>(insert the dates agreed for kick-off and end of Contract)</i>		From: To:
Total Contract Price <i>(including all CCNs, Work Orders, Call of Orders)</i>		EUR
and Total Contract Value <i>(in case of co-funding; state if not applicable)</i>		EUR
Broken down as follows:	Original Contract Price	XXX EUR (XXX EUR)
	and original Contract Value <i>(in case of co-funding; state if not applicable)</i>	EUR
	CCN x to n	EUR in total
	Work Order x to n	EUR in total
	Call-Off Order x to n	EUR in total

Section 2 – Recapitulation of Deliverable Items

2.1 Items deliverable under the Contract

If any of the columns do not apply to the item in question, please indicate “n/a”.

Table 2.1.1 - Items deliverable according to the Statement of Work and Article 2 of the Contract

Type	Ref. No.	Name / Title	Description	Replacement Value (EUR)/ Other	Location ⁽²⁾	Property of	Rights granted / Specific IPR Conditions ⁽³⁾
Documentation							
Hardware							
Software			(Delivery in Object code / Source code?)				
Other							

² In case the item is not delivered to ESA, please indicate the location of the deliverable and the reason for non-delivery (e.g. loan agreement, waiver, future delivery, etc.)

³ e.g. IPR constraints, deliverable containing proprietary background information (see also Table 2.1.3 below)



Table 2.1.2 – Items deliverable under Article 7 of the Contract (if applicable)

The Contractor, after agreement with the Agency with respect to the disposal/transfer of Inventory Items/Fixed Assets under the Contract, shall submit the Inventory/Fixed Asset Record as attachment to the CCD. For each Item/Fixed Asset, the information as requested by Appendix 3 to the Contract shall be provided in the Record.

Table 2.1.3 – Customer Furnished Items and Items made available by the Agency

[Option 1]

There was no Customer Furnished Items or Items made available by the Agency.

[Option 2]

Any Customer Furnished Items and/or Items made available by the Agency to the Contractor and/or its Subcontractor(s) under the Contract, are listed in the following List of Customer Furnished Items and Items made available by the Agency. The following tables certify which of the Items have been returned to the Agency and which of the Items remain in the custody of the Contractor, and/or a Subcontractor(s) and/or a Third Party(ies) for further ESA work or for other purposes.

Customer Furnished Items

Item Name	ESA Inventory Number	Location	Insurance Value	ESA DECISION		
				Confirmation of Receipt	Deliver to ESA or to another entity	Leave at (Sub-) Contractor's Disposal under a loan agreement

Items made available by the Agency

Item Name	ESA Inventory Number	Location	Replacement Value	Deliver to ESA or to another entity	Leave at (Sub-) Contractor's Disposal under a loan agreement



Table 2.1.4 - Background information used and delivered under the Contract (see Article 6.3 of the Contract)

The following background information has been incorporated in the deliverable(s):

Proprietary Information (title, description)	Owner (Contractor / Subcontractor(s)/ Third Party(ies))	Affected deliverable (which documents, hardware, software, etc.)	Description impact on ESA's rights to the deliverable (4)	Other comments

4 if not explicitly stated otherwise, the contractual stipulations shall prevail in case of conflict with the description provided in this table



Section 3 – Statement on Intellectual Property Rights generated under the Contract

[OPTION 1: NO INVENTION]

In accordance with the provisions of the Contract [Contract Number], [Company] hereby certifies both on its own behalf and that of its consortium/Subcontractor(s), that no Intellectual Property Right(s) (as defined in the Contract, under the section 'Definitions') has(ve) been generated in the course of or resulting from work undertaken for the purpose of this Contract.**[END OPTION 1]**

[OPTION 2: INVENTION]

In accordance with the provisions of the Contract [Contract Number], [Company] hereby certifies both on its own behalf and that of its consortium/Subcontractor(s) that the following Intellectual Property Right(s) (as defined in the Contract, under the section 'Definitions') has(ve) been generated in the course of or resulting from work undertaken for the purpose of this Contract:

- Intellectual Property Rights (“IPR”) suitable for registration (i.e. “Registered Intellectual Property Rights” as per definition in the Contract) and their current status (Registered – In the process of being registered – Foreseen for registration – Not foreseen for registration)

.....

Should any Intellectual Property Rights be indicated as being foreseen for registration or in the process of registration, the Contractor undertakes to notify the Agency's Technical Officer when:

- registration of any such IPR(s) is rejected
- registration of any such IPR(s) is obtained (and will provide the registration details)

- Intellectual Property Rights ("IPR") not suitable for registration (i.e. not being "Registered Intellectual Property Rights" as per definition in the Contract)

.....

The Agency’s rights in the Intellectual Property Rights listed above shall be in accordance with the Contract.**[END OPTION 2]**



Section 4 – Output from / Achievements under the Contract

4.1 Technology Readiness Level (TRL)

Indicate the TRL of the technology developed under the Contract using the classification given below (for additional information on definitions, please refer to ECSS-E-AS-11C):

Initial TRL	Planned TRL as activity outcome	Actual TRL at end of activity

1	Basic principles observed and reported
2	Technology concept and/ or application formulated
3	Analytical and experimental critical function and/ or characteristic proof of concept
4	Component and /or breadboard validation in laboratory environment
5	Component and /or breadboard critical function verification in a relevant environment
6	Model demonstrating the critical functions of the element in a relevant environment
7	Model demonstrating the element performance for the operational environment
8	Actual system completed and accepted for flight 'flight qualified'
9	Actual system 'flight proven' through successful mission operations

Note: The TRL shall be assessed by ESA. The Agency’s responsible Technical Officer shall verify TRLs 1-4 while TRLs 5-9 shall be assessed through an ESA-internal formal procedure.

4.2 Achievements and Technology Domain

.....
Provide a concise description (max two hundred (200) words) of the achievements of the Contract and its explicit outcome (including main performances achieved): please refer to the final documentation (e.g. Final Report).

Please indicate the Technology Domain (TD 1 to 25) of the development (please tick off):

1	On-Board Data Systems	14	Life & Physical Sciences
2	Space System Software	15	Mechanisms & Tribology
3	Spacecraft Electrical Power	16	Optics
4	Spacecraft Environment & Effects	17	Optoelectronics
5	Space System Control	18	Aerothermodynamics
6	RF Payload and Systems	19	Propulsion
7	Electromagnetic Technologies and Techniques	20	Structures & Pyrotechnics
8	System Design & Verification	21	Thermal
9	Mission Operations and Ground Data Systems	22	Environmental Control Life Support
10	Flight Dynamics and GNSS	23	EEE Components and Quality
11	Space Debris	24	Materials and Processes
12	Ground Station System & Networking	25	Quality, Dependability and Safety

13	Automation, Telepresence & Robotics	
----	-------------------------------------	--

4.3 Application of the Output/Achievements

Please tick off as appropriate:

Possible use in programme:

.....
Please indicate the service domain (see table) relevant to a possible application

1	Earth Observation
2	Science
3	Human Spaceflight and Exploration
4	Space Transportation
5	Telecommunications
6	Navigation
7	Generic Technologies and Techniques
8	Security
9	Robotic Exploration

Actual use in programme:

.....
Please describe the specific programme and application or mission for which the output of this Contract is or will be used.

4.4 Further Steps/Expected Duration

Please tick off as appropriate:

No further development envisaged.

Further development needed:

.....
Please describe further development activities needed, if any, to reach TRL 5/6 including an estimate of the expected duration and cost.

4.5 Potential Non-Space Applications

.....
Describe any potential non-space applications or products that may benefit from the technology that has been developed. Emphasize potential markets and customers where known.



Describe the principle features of technology that would be required in a technology demonstrator for any identified non-space application. Include an estimate of the resources in time and money that would be required.

<p>The above statements provided in the various sections of this Annex A “Layout for Contract Closure Documentation” for ESA Contract No. 4000xxxxxx/21/NL/MH/kdj <i>[insert the corresponding contract number]</i> have been made after due verifications.</p> <p>The Contractor furthermore certifies that all its obligations with regard to Fixed Assets, if any, have been fulfilled.</p> <p>If required by ESA, an updated version shall be provided for incorporating amendments requested by ESA.</p>	
<p>Name of Contractor: <i>[insert Contractor name]</i></p>	
<p>Authorised signatory: <i>[insert Authorised signatory full name]</i></p>	<p><i>[signature of the Authorised signatory]</i></p>
<p>Date: <i>[insert date]</i></p>	


APPENDIX 2

CONTRACT CHANGE NOTICE

For submission of a change, the Subcontractor shall submit its proposal in the format of a CCN using the cover page included below. The form shall be filled with the following information as a minimum:

- The Contractor's name and Contract number;
- The title of the area affected by the change (Work Package reference, new work, etc.);
- The name of the initiator of the change (Contractor or ESA);
- The description of the change (including Work Package Descriptions, Work Breakdown Structure);
- The reason for the change;
- The price breakdown in Euro (€), if any (breakdown by company, Phase, etc., including PSS A2 and PSS A8 forms);
- The Milestone Payment Plan for the CCN, if any;
- Effect on other Contract provisions;
- Start of Work - end of Work (including contractual delivery dates and overall planning, milestones, etc.);
- A CCN Form, as per the format below, signed by the Contractor's representatives.

The Subcontractor shall, on request of the Customer, provide additional documentary evidence. At the request of either Party, the proposed change may be discussed at a Change Review Board, consisting of both the Contracts Officer and the Technical Officer of each Party.

	DIRECTORATE:	Contractor:
		ESA Contract No.: <i>4000XXXXXX/20/NL/GLC/hh</i>
CONTRACT CHANGE NOTICE No.		DATE:
TITLE OF AREA AFFECTED (WORK PACKAGE ETC):	WP REF:	
	INITIATOR OF CHANGE:	
DESCRIPTION OF CHANGE		
REASON FOR CHANGE		
PRICE BREAKDOWN (Currency)/PRICE-LEVEL		
EFFECT ON OTHER CONTRACT PROVISIONS		START OF WORK
		END OF WORK
CONTRACTOR'S PROJECT MANAGER:	CONTRACTOR'S CONTRACTS OFFICER:	
DATE:	DATE:	
[DISPOSITION RECORD OR OTHER AGREED CONDITION RECORDED WITH THE CCN APPROVAL]		
ESA TECHNICAL OFFICER:	ESA CONTRACTS OFFICER:	
DATE:	DATE:	

APPENDIX 3

Subcontractor contribution to QUVIK mission study

TOPTEC for the QUVIK mission is primarily responsible but not limited to the Payload design. Detailed tasks for specific project phases are listed in below.

Phase 0

WP1100 - led by VZLU

- Cost and completion estimation for payload incl. testing and qualification
- Market research for payload components
- Evaluation of predefined components and suppliers
- Preliminary Make/buy plan for payloads
- Preliminary Make/buy plan for payload GSE

WP1200 - led by MU

- Simulation (ZEMAX) of OTA performance and resulting SNR in different configurations to support mission statement.
- Trade-off for IMU architecture depending on AOCS concepts.

WP1300 - led by VZLU

- Verification of a first level Technical Requirements Specification technical feasibility with respect to possible payload performance.

Phase A

WP2100 - led by VZLU

- Payload-specific PA/QA plan, risk assessment and design schedule support.

WP2200 - led by VZLU

- Definition of Mission Concepts and Architecture Description of Payload and support to science data processing and spacecraft BUS

WP2300 - led by TOPTEC

- Payload modelling (OTA optics, IMU electronics, structure) for technical feasibility assessment
- Initial thermal budget calculation
- Trade-off definition for payload architecture concepts
- Determination of optimal values of payload parameters from the point of view of price/performance
- Identify main GSE necessary for payload engineering

WP2400 - led by VZLU

- Cost and completion calculation for payload incl. testing and qualification
- Evaluation of existing components and suppliers for payload components
- Make/buy plan for payload or payload components
- Make/buy plan for GSE related to payload integration/testing
- Critical Technology List, Development and Mitigation Plan for payload
- Identification of technology development activities to reach TRL 6 for all critical technologies

Phase B1

WP3100 - led by VZLU

- Project plan for payload
- Risk assessment for payload

- Review of Mission Risk mitigation plan

WP3200 - led by VZLU

- Prepare Verification Plan for payload (OTA, IMU)
- List of payload components to Product Tree and Specification Tree

WP3300 - led by TOPTEC

- Detailed payload definition. Definition of payload mechanical and electrical interfaces. Imaging unit system design – top-level control behaviour (i.e., Interface Control Document)
- Optical payload design with tolerance analysis for justification of design parameters.
- Straylight/ghost analysis of OTA optomechanical assembly. Design of measures and definition of requirement for nominal performance
- OTA mechanical design. Description of design and justification.
- Imaging unit design and analysis. Definition of interface properties, data
- Thermal analysis and design. Setting requirement on thermal management.

WP3400 - led by VZLU

- Final cost and completion calculation for payload incl. testing and qualification
- Support to final Make/Buy Plan related to SRR
- Final Critical Technology List, Development and Mitigation Plan related to SRR for payload
- Identification of technology development activities to reach TRL 6 for all critical technologies of payload