

ESA Contract No. 4000143826/24/NL/IB/ab

with

Institute of Plasma Physics of the CAS, v.v.i.

Deployable Telescope for Small Satellites

CONTRACT

Between:

The EUROPEAN SPACE AGENCY,
(hereinafter called the “Agency” or “ESA”),

having its seat at: 8-10 rue Mario Nikis, CS 45741, 75738 Paris CEDEX 15, France,
represented by its Director General, [REDACTED],

acting through its establishment:

The European Space Research and Technology Centre (ESTEC),
located at: Keplerlaan 1,
2201 AZ Noordwijk,
The Netherlands,

of the one part,

and:

Institute of Plasma Physics of the CAS, v.v.i. - Dept. Centre TOPTEC,
(hereinafter called the “Contractor” or “TOPTEC”),

whose registered office is at:
U Slovanky 2525/1a,
182 00 Prague 8,
Czech Republic

represented by its Director of the Institute, Prof.RNDr, Radomír Pánek, Ph.D.,

of the other part,

the following has been agreed between the Agency and the Contractor, hereinafter also referred to individually as “Party” and collectively as the “Parties”:

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DEFINITIONS

“Advance Payment”

means a payment foreseen in the Contract intended to provide the Contractor 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 Contractor 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.

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

- 1.1 The Contractor, as further described in the Statement of Work in **APPENDIX 1** hereto, undertakes to perform “Deployable Telescope for Small Satellites” (all hereafter referred to as the “Work”) and to deliver all the items listed in ARTICLE 2 of 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;
 - b) **APPENDIX 1** hereto: the Agency’s Statement of Work, reference EOP-FMO/2023-12-136/NL/fc, issue 1, revision 1, dated 5 December 2023;
 - c) The signed Minutes of the Negotiation Meeting held on 7 March 2024, reference DEPLOY-MIN-TOP-0001-240307, dated 7 March 2024, not attached hereto but known to both Parties;
 - d) The Contractor’s RFP Response, reference 240117-001, revision 5, dated 17 January 2024, not attached hereto but known to both Parties.
- 1.3 General Terms of Execution
- 1.3.1 The Contractor’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 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. Failing an attempt towards an amicable settlement, all disputes shall be finally settled in accordance with the Rules of Arbitration of the International Chamber of Commerce by one (1) or three (3) arbitrators designated in conformity with such Rules. The Arbitration Tribunal shall sit in Prague, Czech Republic. The Tribunal’s award shall be final, binding on the Parties and no appeal shall lie against it. The enforcement of the award shall be governed by the rules of procedure in force in the state/country in which the award is to be executed.
- 1.3.4 The Contractor shall be fully responsible towards the Agency for the proper execution of the Work, including any subcontract agreed hereunder. Subcontracts other than those specified in Article 3.1 below are expressly excluded.

The conditions of the subcontracts shall secure for the Agency any rights granted to it under the terms of this Contract.

The Subcontractor shall have the same rights and obligations in relation to the work to be performed under the subcontract that the Contractor has agreed in relation to the Work performed under the present Contract.

Notwithstanding the normal communication lines within the consortium, and the overall responsibility of the Contractor to ensure proper and timely placing of subcontracts and

processing of payments throughout the consortium, the Contractor shall ensure that the below provisions are duly reflected in all subcontracts entered into for the purpose of this Contract:

Should any Subcontractor encounter serious difficulties in the process leading to: timely payment of due invoices (i.e. related to a milestone already achieved) to be made by the Subcontractor's direct customer (i.e. not ESA), or contractual coverage of activities already kicked-off, the said Subcontractor may directly contact the Agency at: indirectpayments@esa.int

In doing so, such Subcontractor shall attach the Standard Contact Form, available at: <https://esastar-publication.sso.esa.int/supportingDocumentation> properly filled in or provide the same information in the body of the email.

In case any Subcontractor has SME status, as per the definition of SMEs given by the European Commission:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003H0361&from=EN>, the Contractor shall ensure that the relevant subcontract foresees an automatic grant of a 35% Advance Payment.

The Contractor shall have the responsibility of obtaining the self-certification of the Subcontractor('s)(s') SME status as per certification model provided in the tender documentation.

- 1.3.5 Any publicity material prepared by the Contractor related to an activity performed by the Contractor in the context of this Contract shall acknowledge that the activity is/was carried out "under a programme of, and funded by, the European Space Agency". 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.
- 1.3.6 The Contractor shall, in accordance with the Agency's Policy on the Prevention, Detection and Investigation of Fraud, to the extent allowed by applicable national law, 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. The Contractor shall ensure that this provision is duly reflected in all subcontracts entered into for the purpose of this Contract.

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 Agency's possession.
- 2.1.2 Should it seem likely that the originally specified delivery date(s) may be exceeded, the Contractor shall immediately notify the Agency in writing and provide a detailed justification for the delay.
- 2.1.3 No price adjustment in favour of the Contractor will be applicable for the period of delay in delivery.

Penalties for late delivery do not apply, and similarly they will not apply in the subcontract(s) that may be placed by the Contractor.

Should the Agency conclude that the delays in delivery have impaired the intended objectives of the Work, the provisions of Article 5.7 below shall apply.

- 2.1.4 The Contractor 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 Agency reserves the right to return the affected items at the Contractor's expenses.

Should in the execution of this Contract a need arise to provide the Agency with information which is subject to export control laws and regulations, the Contractor shall be responsible to ensure in all cases that such information is passed on to the Agency 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 Contractor shall report to the Agency the Force Majeure event and its immediate consequences within one (1) week after its occurrence. The Contractor 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 Contractor shall not be considered at default and its obligations under the Contract shall be suspended during the Force Majeure event. The Contractor shall make reasonable efforts to mitigate the impact on the schedule and the performance of its contractual obligations.

Force Majeure event at Subcontractor's level shall be considered a case of Force Majeure for the performance of the Contractor's obligations, if the Contractor proves that the delay in the delivery of the equipment or works covered by the subcontract due to the Force Majeure event had an unavoidable impact on the final delivery dates stipulated in the Contract.

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 Agency.

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 5.8.2 and 5.8.4. No other payments, compensation or indemnities shall be due by the Agency to the Contractor.

2.2 Acceptance and Rejection

The acceptance by the Agency of the deliverables shall be declared upon verification, by the Agency, that the Work has been performed in compliance with the Agency's requirements and that the required results have been achieved. The said deliverables shall be considered as accepted in the absence of an explicit reaction in respect to the same, by the Agency, within one (1) calendar month counting from the time of submission for acceptance. The provisions of Article 5.8 below shall apply in this respect.

2.3 Deliverable Documents

The Contractor shall, during the performance of this Contract, deliver all documentation and reports specified in **APPENDIX 1**, in the format and quantities specified therein.

These shall be sent to the Agency's Technical Officer mentioned in Article 5.1 unless otherwise specified, in accordance with the following specific provisions:

- 2.3.1 The draft versions of the final documents 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 18 March 2025.

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 draft versions of 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 specified in Article 5.1.1 a) of the Contract.

- 2.3.2 The Contract Closure Documentation (**APPENDIX 1**, Annex B) 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).

2.4 Other Deliverables

2.4.1 Software

The Contractor shall deliver the models specified in section 3.5 of **APPENDIX 1** to the Agency's Technical Officer in the format(s) required by **APPENDIX 1**, not later than 15 April 2025.

ARTICLE 3. PRICE

3.1 The total price of this Contract amounts to:

239,552 EUR
(Two Hundred and Thirty-Nine Thousand Five Hundred and Fifty-Two Euro),

broken down per Contractor and Subcontractor as follows:

Company Name	ESA Entity Code	Type P/Prime; SI/Subco Indirect	Country (ISO Code)	Total Amount in Euro
Institute of Plasma Physics of the CAS, v.v.i.	1000013073	P	CZ	139,581
Elya Solutions s.r.o.	1000024513	SI	CZ	99,971

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 Contractor in the performance of this Contract.

The Agency may decide that certain items produced or purchased under the Contract during its implementation (see ARTICLE 7 below) shall become ESA Fixed Assets. Such items shall be identified as becoming ESA Fixed Assets by means of a Contract Change Notice.

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 Contractor 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 Agency.
- 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 5 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 Contractor'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 submission via esa-p to ESA of the required documents and fulfilment of the requirements specified in Articles 4.1.1 – 4.1.3 below¹. Only upon fulfilment of these requirements shall the Agency regard the invoice as due.

Requirements to be fulfilled:

4.1.1 Advance Payment:

- Advance Payment Request (“APR”) (if any): to be submitted after signature of this Contract by both Parties. The Advance Payment constitutes a debt of the Contractor to the Agency until it has been set-off against subsequent milestone(s) as shown in Article 4.2 here below.

4.1.2 Progress Payment(s)²:

- Milestone Achievement Confirmation (“MAC”) (hereinafter referred to as “confirmation”) with supporting documentation, as necessary, submitted by the Contractor and attached in esa-p. The supporting documentation shall justify the actual achievement of the milestone(s) as defined in the Payment Plan specified in Article 4.2 here below; and
- Invoice.

4.1.3 Final Settlement:

- Confirmation submitted by the Contractor with supporting documentation as necessary attached in esa-p. The supporting documentation shall justify the actual achievement of the milestone(s) as defined in the Payment Plan specified in Article 4.2 here below; and
- Invoice; and
- Delivery, and acceptance by the Agency, 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 B.

Payments shall be made according to the provisions hereunder:

- #### 4.1.4
- The Agency shall credit the account of the Contractor to the Contractor’s benefit and to the benefit of the Contractor’s Subcontractor. The Contractor shall be responsible for approving or rejecting, within ten (10) Days of receipt, the relevant Subcontractors’ invoice(s) and related supporting documents (e.g. MACs, Cost Reports). The Contractor shall also be responsible for paying the accounts of its Subcontractor, for this Contract, in accordance with the applicable law and normal commercial practice. The Contractor shall indemnify the Agency against any claims arising from such Subcontractor, caused by the Contractor’s failure to pay the Subcontractor.

¹ This is reflected in esa-p as “30 days upon receipt by ESA, in esa-p, of both the confirmation and the invoice”, see in esa-p GUIDE Frequently Asked Questions & Answers for Suppliers at:

http://esa-p-help.sso.esa.int/FAQ_for_Suppliers.pdf.

² For detailed information on how to submit and approve confirmations, invoices and APR in esa-p, you may consult the following two Quick Guides:

http://esa-p-help.sso.esa.int/Quick_Guide_How_to_submit_a_Confirmation_or_Invoice_or_APR.pdf
http://esa-p-help.sso.esa.int/Quick_Guide_How_to_approve_a_Confirmation_or_Invoice_or_APR.pdf.

The Contractor shall supply to the Agency, upon request, evidence of the payment(s) made to its Subcontractor.

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

- 4.1.5 In the event that the achievement of a milestone is delayed but the milestone is partially met at the milestone planning date foreseen, the Agency 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.
- 4.1.6 When releasing the payment for a given milestone, if applicable, the Agency's payment shall be made after due deduction of the corresponding off-set of the Advance Payment(s) as per the conditions of Article 4.2 here below.

In case of partial payment(s), the Agency shall deduct from the corresponding invoice(s) relative to the same milestone any outstanding amount of the Advance Payment(s) still to be off-set.

- 4.1.7 All invoices shall be submitted to the Agency in electronic form through the esa-p on-line system.
- a) The Contractor shall ensure that the APR (if any), all confirmations and all invoices are submitted for payment exclusively through the Agency's esa-p system. If the Contractor has no access to the Agency's esa-p system at the time of signature of this Contract, an immediate request for an esa-p user account shall be made by the Contractor to the ESA Helpdesk (mail to: esait.Service.Desk@esa.int), specifying a contact name, the company name and the ESA Contract Number.
 - b) In cases where the Agency's esa-p system is inoperative at the moment of submission of the confirmation, the Contractor may submit the confirmation by email to the Agency's Technical Officer mentioned in Article 5.1.1a) of this Contract. A template confirmation form can be obtained upon request to esait.Service.Desk@esa.int.
 - c) The Contractor undertakes to complete confirmations and invoices, and to strictly adhere to the instructions (including those for billing taxes and duties, where applicable) contained in esa-p.

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

In the case of invoices submitted by the Contractor which are free of VAT, reference shall be made to the number indicated on the VAT Exemption Form which the Agency provided to the Contractor when forwarding the present Contract for signature. On invoices submitted via esa-p, the number shall be put in the respective field "VAT Exemption Number".

- 4.1.8 Payments shall be made by the Agency in EURO to the account specified by the Contractor. Such account information shall clearly indicate the IBAN (International Bank Account Number) and BIC/SWIFT (Bank Identification Code). The Parties agree that payments shall be considered as effected by the Agency on time if the Agency's orders of payment reach the Agency's bank within the payment period stipulated in Article 4.1 above.
- 4.1.9 Any special charges related to the execution of payments shall be borne by the Contractor.
- 4.1.10 Any questions concerning the operation of esa-p shall be addressed to the ESA Helpdesk (mail to: esait.Service.Desk@esa.int).

4.1.11 Any questions concerning the latest status of due invoices can be addressed to the ESA Payment Officer (mail to: esa.payment.officer@esa.int).

4.2 The following Payment Plan is agreed for this Contract:

Milestone (MS) Description	Schedule Date	Payments from ESA to (Prime) Contractor (in Euro)	Country (ISO code)
Progress (MS 1): Upon successful Design Key Point Review and the Agency's acceptance of all related deliverable items.	15 July 2024	31,000	CZ
Progress (MS 2): Upon successful Detailed Design Review (DDR) and the Agency's acceptance of all related deliverable items.	15 January 2025	101,697	
Final Settlement (MS 3): 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.	15 April 2025	106,855	
TOTAL		239,552	

Advance Payment and other Financial Conditions:

Prime (P)	Company Name	ESA Entity Code	Country (ISO code)	Advance Payment (in Euro)	Offset against	Offset by Euro	Condition for release of the Advance Payment
P	TOPTEC	1000013073	CZ	34,990	MS 2 MS 3	17,495 17,495	Upon signature of the Contract by both Parties

For information purposes only, distribution by the Prime Contractor of ESA's payments between the Prime Contractor and the Subcontractor:

Milestone	TOPTEC	CZ	Elya Solutions s.r.o.	CZ
MS 1	31,000		0	
MS 2	46,997		54,700	
MS 3	61,584		45,271	
TOTAL	139,581		99,971	

For information purposes only, distribution by the Prime Contractor of ESA's Advance Payments between the Prime Contractor and the Subcontractor:

For information purposes only:							
Amounts in Euro for Contractor and Subcontractor							
Prime (P) or (SI)	Company Name	ESA Entity Code	Country (ISO code)	Advance Payment (in Euro)	Offset against	Offset by Euro	Condition for release of the Advance Payment
P	TOPTEC	1000013073	CZ	-	-	-	Upon signature of the Contract by both Parties
SI	Elya Solutions s.r.o.	1000024513	CZ	34,990	MS 2 MS 3	17,495 17,495	Upon signature of the Contract by both Parties

ARTICLE 5. SPECIFIC PROVISIONS

5.1 Approval / Representatives of the Parties during Contract Execution

For the purpose of this Contract, the authorised representative of the Agency's Director General is Ms Juliette Lambin, Head of Future Missions and Architecture Department.

5.1.1 The Agency's representatives are:

- a) [REDACTED] (EOP-FMO) for technical matters or a person duly authorised by him/her (the "Technical Officer").

All correspondence for technical matters shall be addressed as follows:

	To:	With copy to:	
Name	[REDACTED]	[REDACTED]	[REDACTED] (Octagon for ESA)
Telephone No.	[REDACTED]	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]	[REDACTED]
Mail address	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands

- b) [REDACTED] (CIC-CEO) for contractual and administrative matters or a person duly authorised by her (the "Contracts Officer").

All correspondence for contractual and administrative matters (with the exception of invoices as mentioned in ARTICLE 4 above) shall be addressed as follows:

	To:	With copy to:	
Name	[REDACTED]	[REDACTED] (Octagon for ESA)	[REDACTED]
Telephone No.	[REDACTED]	[REDACTED]	[REDACTED]
Email Address	[REDACTED]	[REDACTED]	[REDACTED]
Mail address	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands	ESA ESTEC Keplerlaan 1 2201 AZ Noordwijk The Netherlands

- c) Personal Data Protection matters shall be addressed to the ESA Data Protection Officer at the following email address:

dpo@esa.int

5.1.2 Contractor's Representatives:

All correspondence for the Contractor shall be addressed as follows:

Institute of Plasma Physics of the CAS, v.v.i. - Dept. Centre TOPTEC,
U Slovanky 2525/1a,
182 00 Prague 8,
Czech Republic

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]
Mail Address	Sobotecká 1660 51101 Turnov Czech Republic

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

The Parties agree that digital 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.

5.2 Infringement of the Law – Infringement of Third-Party Rights

5.2.1 The Agency shall not be responsible if the Contractor infringes the laws or statutes of its country or of any other country whatsoever.

5.2.2 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 Contractor 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 Contractor 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 5.7.4 hereunder, if the infringement cannot be avoided.

Notwithstanding the above, the Contractor shall indemnify the Agency 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 Agency or from a modification or combination of the deliverables due hereunder made by the Agency after their acceptance.

5.3 Liabilities

5.3.1 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:

5.3.1.1 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.

5.3.1.2 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.

5.3.2 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.

5.4 Customer Furnished Items (CFI)

It is not foreseen that the Agency will provide any items to the Contractor.

5.5 Items Made Available by the Agency

It is not foreseen that the Agency will make any items available to the Contractor.

5.6 Agency's Rights in Case of Contractor's Under-Performance

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

5.6.2 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 Agency reserves the right to terminate this Contract by giving written notice by registered mail.

5.6.3 Should the Contractor fail to obtain an export authorisation from the competent national authority, the Agency shall have the right to terminate this Contract without further notice.

5.6.4 Termination of this Contract as specified above shall entail no compensation being due to the Contractor 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 Agency.

5.7 Termination without fault of the Contractor

5.7.1 The Agency 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 Agency without fault of the Contractor, the Contractor shall, on receipt of the Agency'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.

5.7.2 Subject to the Contractor conforming with the instructions referred in Article 5.8.1, the Agency shall take over from the Contractor at a fair and reasonable price all finished parts not yet delivered to the Agency, all unused and undamaged material, bought-out components and items in the course of manufacture in the possession of the Contractor and properly obtained by or supplied to the Contractor for the performance of the Contract, except such materials, bought-out components and items in the course of manufacture as the Contractor shall, with the agreement of the Agency, elect to retain.

5.7.3

- a) The Agency shall indemnify the Contractor against such part of any loss of profit as is attributable to the termination of the Contract and against any damage resulting from the termination of the Contract, in particular against any commitments, liabilities or expenditure which are reasonably and properly chargeable by the Contractor and are related to the Contract, in so far as the said commitments, liabilities or expenditure would otherwise, subject to the conditions stated in Article 5.6.1, represent a loss by the Contractor by reason of the termination of the Contract.
- b) The amount of compensation payable under Article 5.8.3a) shall be fixed on the basis of evidence produced by the Contractor and accepted by the Agency. It shall take account of the proportion of the Contract completed and shall be consistent with the provisions of Article 5.8.4

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

5.8 Changes to this Contract

5.8.1 The Agency reserves the right at any time to request a change to the requirements covered by this Contract. The Agency may also accept changes proposed by the Contractor. The requesting Party shall communicate all change requests to the other Party in writing through the Parties' Representatives indicated in Article 5.1 above.

- 5.8.2 The cost impact relative to any change resulting from a request, by the Agency, to modify the requirements covered by this Contract shall be borne by the Agency. The Contractor shall be responsible for the consequences and shall bear the cost of any other change.
- 5.8.3 When responding to a change request issued by the Agency or as a means to propose changes to the Agency, the Contractor 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.
- 5.8.4 Upon evaluation and acceptance by the Agency 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 Agency shall inform the Contractor accordingly, together with the reasons for the rejection.

ARTICLE 6. INTELLECTUAL PROPERTY RIGHTS

6.1 Information to be provided by the Contractor – Protection of information.

6.1.1 Information, data, reports and results arising from Work performed under this Contract shall be delivered to the Agency. The Agency shall have the right to make such information, data, reports and results available to the Participating States and any Persons and Bodies under their jurisdiction, to use on the terms set forth in the following clauses.

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

6.1.3 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.

6.1.4 The obligations provided in Articles 6.1.2 and 6.1.3 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; or
- is required to be circulated by law or order of a court of competent jurisdiction.

6.2 Ownership and Use of Intellectual Property Rights

6.2.1 Ownership of Intellectual Property Rights

The Contractor 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 Contractor shall as soon as possible report to the Agency any results arising from such a Work which may in its opinion be protected as Registered Intellectual Property Rights and state whether it intends to apply for such protection. At the Contractor’s specific request in order to allow for filing of patent applications, the Agency shall not disclose any relevant information and results for a period of twelve (12) months from the date it was reported to the Agency.

The Contractor shall subsequently inform the Agency 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 Agency with all details on that application. The Agency shall have an irrevocable right to use the information used in that application, for its own requirements on the terms set out in Article 6.2.2 below but, unless agreed otherwise with the Contractor, the Agency shall not disclose such information until publication of the registration application.

6.2.2 Use of Intellectual Property Rights

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

- a) the Agency, Participating States and Persons and Bodies, to use on a free of charge, worldwide licence, with the right to disseminate and/or to grant sub-licences, for the Agency's Own Requirements.

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.

- b) Participating States as well as any Persons and Bodies under their jurisdiction, to use on "favourable conditions" (i.e. more favourable for the purchaser than market conditions but still allowing reasonable profit for the seller) for the Participating States' Own Public Requirements.
- c) Academic and research institutions within the Participating States to use on a free licence without the right to grant sub-licences, for their own scientific research purposes, excluding commercial purposes and providing the Contractor agrees such use is not contrary to its Legitimate Commercial Interests.

6.3 Background Intellectual Property.

6.3.1 Background Intellectual Property - Definition

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

- a) has not been generated under contract with the Agency either prior to or during execution of this Contract, and
- b) is relevant to the Work carried out under this Contract, and
- c) the Contractor uses to achieve the objectives of this Contract, and
- d) is delivered to the Agency to enable it to use, operate, copy, distribute and sublicense the deliverable items due under this Contract as specified in the Agency'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.

6.3.2 Use of Background Intellectual Property

The Contractor 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 Contractor 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 Contractor shall grant to the Agency, and/or ensure that the Agency be granted, all the necessary rights in this respect.

6.4 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 6.3 for the benefit of ESA shall be deemed granted through signature of the present Contract and without the need to implement a separate licence.

6.5 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 Contractor to any entity in a non-Member State 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 7. MANAGEMENT AND CONTROL OF INVENTORY ITEMS/FIXED ASSETS UNDER THE CONTRACT

The following provisions apply to any items other than those items which fall within the scope of ARTICLE 2 of the Contract.

The Contractor shall specify, record, manage and control any and all customer items and ESA Fixed Assets under construction (reference is made to Article 3.1 above) that are subject to this Contract. Such items are:

- i. items produced or purchased under the Contract, including electronic components, special jigs, tools, test equipment, which are paid for under the Contract with an individual or batch value (value of group of items) in the national currency equivalent to or above five thousand (5,000) Euro;
- ii. if any, items identified as becoming ESA Fixed Assets in ARTICLE 3 above or in a subsequent CCN;
- iii. Items Made Available by the Agency, if any (see Article 5.5 of the Contract).

The Contractor shall operate an inventory control system ("Inventory Control System") of all the above-mentioned items and shall mark them as falling under this Article of the Contract.

The Inventory Control System shall:

- record the existence, location, operational status and condition of all inventory items, and
- record the value and estimated life duration of all inventory items, and
- record changes in inventory value, and
- enable financial reconciliation to be made and status reports to be prepared for incorporation of the relevant data into the Agency's annual financial accounts.

The Contractor shall, as part of the Inventory Control System, maintain an Inventory/Fixed Asset Record (in an electronic tool of its choice) which shall, as a minimum, contain the information as shown in **APPENDIX 3** to this Contract.

The Inventory/Fixed Asset Record shall be kept updated by the Contractor. It shall be made available to the Agency upon request but as a minimum yearly during the execution of the Contract (and at completion of each Project Phase as per ECSS-M-ST-10 if applicable). A final consolidated record shall be submitted with the final contractual deliverables as foreseen in **APPENDIX 2** to this Contract.

If the Inventory/Fixed Asset Record also includes any of those items which fall within the scope of ARTICLE 2 of the Contract, these items are to be clearly set apart.

Items, for which no place of delivery has been identified in ARTICLE 2 of this Contract, are subject to the following provisions:

Upon completion of the Work specified in the Contract, the Agency shall take decisions regarding the final destination and final ownership of each item listed in the Inventory/Fixed Asset Record. The Agency shall be free to choose amongst the following options with respect to the final destination and final ownership of such items:

- a) the right to claim delivery to the Agency and transfer of ownership (the latter if applicable) - with issue of appropriate instructions concerning packing and shipment (at the Contractor's expense);

- b) the right to claim or retain ownership and to negotiate with the Contractor a loan agreement if the Contractor is interested in keeping and using an item, with loan conditions making the Contractor responsible for the custody, the delayed delivery and the risks involved (at the Contractor's expenses).
- c) the right to extend the custody of an item to the Contractor and to postpone its delivery to the Agency and the associated transfer of ownership – on conditions to be negotiated;
- d) the renunciation of any rights to claim delivery and to claim transfer of ownership, leaving the item definitively in the possession and in the ownership of the Contractor, with or without financial compensation for the Agency (e.g., repurchase by the Contractor) and with or without special instruction,
- e) the right to request the Contractor to dispose of an item on conditions to be negotiated.

Should the Agency decide to transfer an ESA Fixed Asset to a Third Party or to dispose of the Fixed Asset, the Contractor shall provide the full inventory information of the Fixed Asset to the Agency and complete the transfer or disposal forms to be provided by the Agency upon request by the Contractor. The information to be given by the Contractor in the forms shall be agreed with the Agency.

The decisions taken by the Agency shall lead to instructions or negotiations, as the case may be, and the results shall be recorded in the relevant sections of the Contract Closure Documentation (CCD) as found in Annex A to **APPENDIX 1** to the Contract. The CCD shall not be finalised and signed before disposition of all items has been given by the Agency and recorded in the documentation.

Digitally signed by the Parties to this Contract,

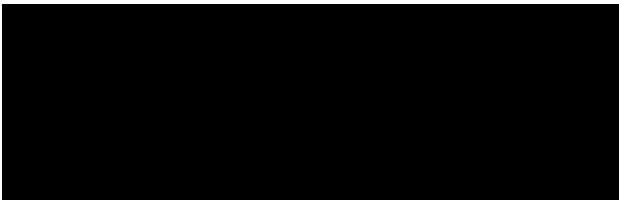
In:

In:Noordwijk.....

On:

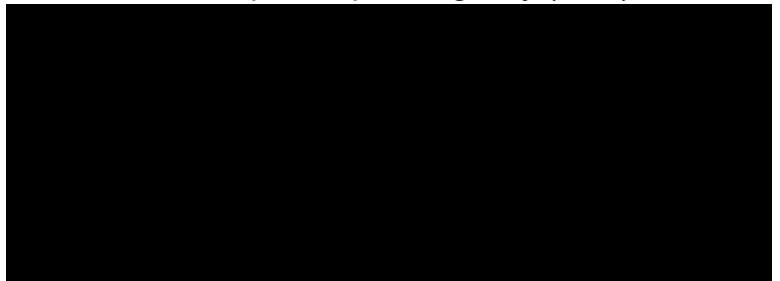
On:13/05/2024.....

For Institute of Plasma Physics
of the CAS, v.v.i.



Radomír Pánek
Director of the Institute

For the European Space Agency (ESA)



Head of Future Missions and Architecture
Department

APPENDIX 1
STATEMENT OF WORK



ESA ESTEC
Keplerlaan 1
2201 AZ Noordwijk
The Netherlands

EXPRO STATEMENT OF WORK ESA EXPRESS PROCUREMENT – EXPRO

DEPLOYABLE TELESCOPE FOR SMALL SATELLITES- EXPRO

Prepared by	ESA
Document Type	SOW - Statement of Work
Reference	EOP-FMO/2023-12-136/NL/fc
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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 the “Deployable Telescope for Small Satellites”, which serves as a foundational step towards enhancing Earth observation missions with small satellites.

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

ECSS standards are available for downloads at:
<https://ecss.nl/standards/ecss-cd-download/>

1.2.1. Applicable Documents (ADs)

N/A

1.2.2. Reference Documents (RDs)

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

Number	Document
[RD 1]	Technologies for large ultra-stable optical missions: current perspectives and developments at ESA https://doi.org/10.1117/12.2529320
[RD 2]	ECSS-E-HB-11A, Technology Readiness Level (TRL) guidelines
[RD 3]	ECSS-M-ST-10C Rev.1, Project planning and implementation
[RD 4]	ECSS-M-ST-80C, Risk Management
[RD 5]	ECSS-E-ST-10-06C, Technical requirements specification
[RD 6]	ECSS-Q-ST-10C Rev.1, Product Assurance Management
[RD 7]	ECSS-M-ST-60C, Cost and Schedule Management
[RD 8]	ECSS-M-ST-10-01C, Organization and Conduct of Reviews

Number	Document
[RD 9]	ECSS-Q-ST-20C Rev 2, Quality Assurance
[RD 10]	ECSS-Q-ST-60C Rev 3, Electrical, Electronic and Electromechanical (EEE) Components
[RD 11]	ECSS-Q-ST-70C Rev 2, Materials, Mechanical Parts, and Processes
[RD 12]	ARC-STD-8070.1 NASA AMES Technical Standard for Space Flight System Design and Environment Test
[RD 13]	SSMS Vega-C User's Manual Sept. 2020 v4 https://www.arianespace.com/wp-content/uploads/2020/10/SSMS-Vega-C-UsersManual-Issue-1-Rev0-Sept2020.pdf
[RD 14]	ESSB-HB-E-003, ESA Pointing Error Engineering Handbook http://peet.estec.esa.int/files/ESSB-HB-E-003-Issue1(19July2011).pdf

1.3. Acronyms and Abbreviations (alphabetical order)

- AD: Applicable Document
- BB: Breadboard
- BOL: Beginning of Life
- DDR: Detailed Design Review
- DKP: Design Key Point Review
- DT: Deployable Telescope
- EO: Earth Observation
- EOL: End of Life
- FR: Final Review
- FRpt: Final Report
- IR: Infrared
- KOM: Kick-off Meeting
- MAIT: Manufacturing, Assembly, Integration, and Test
- MS: Milestone
- PRn: Progress Review Meetings
- TRB: Test Review Board
- TRL: Technology Readiness Level
- RD: Reference Document
- SoW: Statement of Work
- SS: Sun-Synchronous
- STOP: Structural-Thermal-Optical-Performance
- UV: Ultra-Violet
- v#: Version number
- WFE: Wave Front Error

1.4. Background and Objective(s)

1.4.1. Background

The creation of precision deployable telescopes is a cutting-edge and challenging endeavour anticipated to drive forthcoming space missions. Envisioned for diverse applications across Earth observation (EO) in the infrared (IR), visible, and ultraviolet (UV) spectrums, deployable telescopes necessitate a foundation of highly stable and precise configurations upon deployment.

Deployment optimization stands as a crucial means to economize costs, particularly when deploying telescopes instead of launching them in their final configurations. Unlike large space structures, which are generally volume-constrained during launch, deployable telescopes (DT) exploit the available payload capacity of launch vehicles. Deployable telescopes are limited in use as the deployment process necessitates intricate considerations and systematic trade-offs, particularly in achieving the precise movement of structural parts to tight tolerances after deploying across broad distances.

The innovation of deployable telescopes bears significant potential in enhancing Earth observation capabilities for applications on small satellites, specifically in two areas: high-resolution imaging and LiDAR waveform altimeters for vegetation sampling. High-resolution imaging through deployable optics addresses the critical convergence of spatial and temporal resolution for various Earth observation applications. High resolution imaging finds application across urban climate monitoring, civil security, crisis management, and other Earth observation data-driven services. The inclusion of LiDAR in deployable telescopes presents an opportunity to amplify collecting area and cost efficiency. LiDAR waveform altimeters finds application in surface topography surveying, including tree canopy identification.

A number of configurations have been explored for deployable telescopes for Earth observation applications. These designs can loosely be categorized as either deployable along the optical axis or using segmented apertures. Although both configurations have their advantages and disadvantages, the segmented aperture strategy has seen the most amount of interest in recent years. Deployable telescope designs face challenges associated with temperature gradients typical of EO orbits and the inherent thermomechanical complexities in their design. Maintaining a desirable wavefront error (WFE) while ensuring reliable deployment is a significant challenge. Thus, in addition to optimizing optical design, it is crucial to explore further studies on thermal and mechanical repeatability and stability. These components play a key role in achieving both the required optical performance and deployment reliability.

Deployable telescope technology and their use in both Astronomy and Earth observation is a pivotal subject among ESA R&D developments. Key multi-disciplinary characteristics such as, active optics and high-accuracy pointing have enabled new advancements and trends in the field. Current DT perspectives [RD1] are primarily applied to large mirrors but have notable overlap with DT used on small satellites. This intersection of these domains can be a useful input to future developments.

1.4.2. Objective(s) of the Activity

This study will primarily focus on the comprehensive analysis and refinement of a deployable telescope, addressing critical design requirements and overcoming constraints associated with in-orbit deployable optical systems. It aims to amalgamate lessons learned from current deployable telescope missions and utilize this knowledge to extend the design and functionality to small satellites.

The primary output of the study shall be a candidate deployable telescope design for storage (in a folded state) and use within a 3U-6U satellite. Throughout this study, implementation strategies will be identified and evaluated, facilitating a meticulous trade-off analysis to ascertain an optimal implementation concept. The chosen deployment concept will be refined to enhance its design robustness and shall explore the performance degradation within its operational environment and over the course of its expected lifetime. A comparison to a classical non-deployable telescope shall be made to assess the benefits of the proposed DT concept.

Deployable telescope design for small satellites is the focal point of this study, and the objectives are itemized as follows.

- Objective 1: To define the trade-off and preliminary design of the DT for small satellites focused on EO applications with:
 - Survey the opto-mechanical deployment strategies and trade-offs for possible deployment, stabilization, and active optical control techniques relevant to EO scenario [a] for small satellites (Annex A).
 - Formulate preliminary optical and mechanical design of the DT.
- Objective 2: To define a detailed opto-mechanical design of the DT with:
 - Formulate detailed design of the DT.
 - Perform Structural, Thermal, Optical & Performance Analysis of the DT.
- Objective 3: To conclude findings, extend design and define the inputs needed for future developments with:
 - Conclude study findings, define recommendations for future breadboard (BB) activities, extend DT applicability to EO scenario [b] (see Annex A), and create a technology development roadmap.

2. WORK TO BE PERFORMED

2.1. Work Logic

The work is organised by a set of tasks and are directly correlated to the study objectives.

- Review, survey, trade-off and preliminary design is divided into 2 tasks, and shall achieve the study Objective 1.
- Detailed design & analysis is divided into 2 tasks, and shall achieve the study Objective 2.
- Study conclusions for EO scenarios, future breadboard testing and roadmap definition is defined within 1 task and shall achieve the study Objective 3.

The proposed work logic for workflow is presented in the diagram in Figure 1.

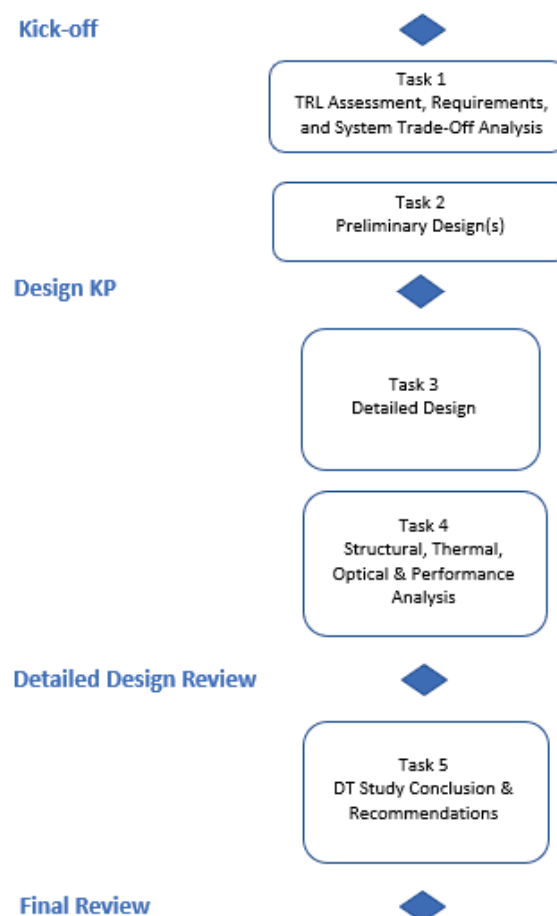


Figure 1: Work logic for Deployable Telescope for Small Satellites Tasks

2.2. Tasks

The work of each of the tasks for the deployable telescope for small satellites design study is described in detail in the following subsections. Given the intended focus on EO applications, the Contractor shall perform the Tasks 1 to Task 4 for the scenario [a] and extend their design to scenario [b] in Task 5, as described below.

2.2.1. Task 1: TRL Assessment, Requirements, and System Trade-Off Analysis

- Input
 - SoW
 - KOM minutes
- Task description

The Contractor shall begin by examining the applicable EO scenarios defined in Annex A, to ensure a good understanding of the intended EO applications. Next, the Contractor shall focus on [a] EO High Resolution Imaging Scenario (Annex A), and define and justify requirement consolidation, if needed.

For EO scenario [a], the Contractor shall identify the system drivers and key technical requirements and define a trade-off. Next, a flow down from the proposed EO scenario to the DT requirements shall be defined and captured in D2. Finally, the Contractor shall survey suitable solutions applicable to DT for small satellites and correlate them to the trade-off and requirements determined in the previous step. A TRL assessment and design critical points shall be included in the evaluation.

Among the general requirements, the Contractor shall give a particular attention to identifying the image quality targeted and the trade-off associated with achieving this target.

- Output / Approval conditions
 - D1: Current State of the Art, TRL Assessment and System Trade-Off Report
 - D2: Deployable Telescope Requirements (v1)

Following the completion of Task 1, results shall be used as inputs to Task 2.

2.2.2. Task 2: Preliminary Design(s)

- Input
 - D1: Current State of the Art, TRL Assessment and System Trade-Off Report
 - D2: Deployable Telescope Requirements (v1)

- Task description

Following an initial design trade-off, the Contractor shall define a DT Preliminary Design(s). Throughout this task, the preliminary design and objectives shall be prepared by the Contractor and included in D3. A description of the modeling performed shall be detailed in D4. Maintaining a focus on EO scenario [a], the Contractor, shall achieve this by delving into the following.

- Establish the margin philosophy, specifically with respect to the opto-mechanical performance budgets.
 - Propose different baseline concepts which respond to the specified EO application [a] and match the proposed margin philosophy.
 - Consolidate trade-off analysis and correlate key development areas to the proposed baseline concepts.
 - Select a baseline DT configuration and define preliminary performance and error budgets.
 - Establish high-level operational concept for the selected DT for deploying the mirrors.
 - Formulate a strategy for alignment once the mirrors are deployed (include expected stability, reliability, and failure tolerance).
- Output / Approval conditions
 - D3: Preliminary DT Design Report
 - D4: Analysis Report (v1)
 - MM1: Optical Model (v1)
 - MM2: Performance Model (v1)

Following the completion of Task 2, results shall be presented to the Agency at the Design Key Point (DKP) review, prior to the start of Task 3.

2.2.3. Task 3: Detailed Design

- Input
 - Successful completion of DKP
 - D3: Preliminary DT Design Report
- Task description

The Contractor shall confirm the baseline design selected for the DT in D5, and shall highlight potential manufacturing strategies in D6. The Contractor, shall complete the intended task by the following.

- Refine the selected DT baseline design by modeling the optical and mechanical layout and their interfacing.
- Refine the deployment and alignment strategies for the selected DT baseline.
- Refine the selected baseline by defining the power and thermal stability concepts during operation.

- Refine optical requirements budget, with a specific emphasis on sensitivities to misalignments and their impact on telescope performance.
- Refine mechanical requirements budget, with a specific emphasis on deployment stability, repeatability and response, and their impact on telescope performance.
- Refine thermal stability requirements budget, with a specific emphasis on telescope positioning accuracies.
- Perform trade-off to achieve an optimal performance balance, including (but not necessarily limited to) the thermal, optical, and mechanical aspects.
- Propose strategies for minimizing straylight.
- Estimate, for the selected baseline, DT survivability to launch loads of Vega-C [RD13].
- Estimate, for the selected baseline, DT survivability to thermal loads.
- Estimate, for the selected baseline, DT operational performance at BOL and EOL.
- Compare the selected baseline DT design to a classical non-deployable telescope.
- Identify manufacturing process and strategies intended for DT development, include an estimated build timeline and key manufacturing considerations (i.e.: tolerances). Preliminary MAIT flow shall be described in D6.
- Output / Approval conditions
 - D5: DT Detailed Design Report
 - D6: Development and Verification Plan for Pre-Developments (v1)

Following the completion of Task 3, conclusions shall be used as inputs to Task 4. Results shall be presented to the Agency at the Detailed Design Review (DDR).

2.2.4. Task 4: Structural, Thermal, Optical, and Performance Analysis

- Input
 - D5: DT Detailed Design Report
- Task description

The Contractor shall carry out the following analysis on the results derived from the DT detailed design. A description of the modeling performed for the detailed analysis shall be described in D4 (v2).

 - Structural analysis to prove the structural integrity of the system against the mechanical environment during launch (i.e.: non-deployed state).
 - Structural analysis to prove the structural integrity of the system against the thermal environment in the deployed state.
 - Thermal analysis, not limited to, but with an emphasis on in-orbit thermal cycling and temperature gradients.
 - Optical analysis and tolerances, not limited to, but with an emphasis on WFE analysis and image quality, and their correlation to thermal stability and mechanical repeatability.

- Performance analysis of the proposed deployable telescope.
- Estimate of straylight
- Output / Approval conditions
 - D4: Analysis Report (v2)
 - MM1: Optical Model (v2)
 - MM2: Performance Model (v2)
 - MM3: Structural Model
 - MM4: Thermal Model

Following the completion of Task4, results shall be presented to the Agency at the Detailed Design Review (DDR).

2.2.5. Task 5: Deployable Telescope Instrument Study Conclusion

- Input
 - Successful completion of DDR
 - All Ds and MoM from the preceding Tasks
- Task description

The Contractor shall identify critical design points that are suitable for BB testing and provide recommendations for future developments. The recommendations identified for breadboard testing shall have a clear rationale, with the aim to verify critical design points or raise TRL. The Contractor shall submit the BB development recommendation as an update to D6, and shall include the following.

- Identify critical components/assemblies that need breadboarding.
- Define BB development strategy, including the intended rationale.
- Consolidate BB development with corresponding DT TRL assessment.
- Update key DT manufacturing strategy drafted in Task 3 and correlate to the proposed BB activities.

Finally, the Contractor shall update DT requirements formulated at the start of the activity (D2) and produce in D7, the conclusions of the activity, including the following.

- Summarize the findings of the activity.
- Assess the design requirements targeted for the [a] EO High Resolution Imaging Scenario (see Annex A), and their applicability to future developments.
- Analyse and propose whether the selected DT design could be retrofitted for use in the [b] EO Lidar Waveform for Vertical Distribution of Vegetation Scenario (see Annex A). Identify future changes needed to DT for use in the LiDAR scenario.
- A roadmap for the future development of deployable telescopes for small satellites with EO applications.

- Output / Approval conditions
 - D2: Deployable Telescope Requirements (v2)
 - D6: Development and Verification Plan for Pre-Developments (v2)
 - D7: Study Conclusion and Recommendations on Future Development

Following the completion of Task 5, results shall be presented to the Agency shall be presented to the Agency at the Final Review.

3. AGENCY UNDERTAKINGS

N/A

4. REQUIREMENTS FOR MANAGEMENT, REPORTING, MEETINGS AND DELIVERABLES

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

4.1. Management

4.1.1. General

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

The Contractor's nominated Project Manager shall be responsible for the management, execution of the work to be performed and, in the case of a consortium, for the coordination and control of the consortium's work (including the submission of the deliverables to the Agency).

4.2. Reporting

4.2.1. 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 five (5) days after the meeting concerned.

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

4.2.2. 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.).

4.2.3. 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.

4.2.4. 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.

4.2.5. Technical Documentation

As they become available and not later than the dates in the schedule, 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.

4.3. Meetings

Progress Meetings can take place as appropriate between review meetings.

The final presentation shall take place 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).

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. Should the Contractor wish to invite Third Party(ies) to meetings, the prior approval of the Agency shall be sought.

Meeting title	Date	Location
Kick-off Meeting	T0	Telecon
Design Key Point Review	T0+3M	ESTEC
Detailed Design Review	T0+9M	Contractor's premises
Final Presentation/Final Review	T0+11M	ESTEC
Close-out	T0+12M	Telecon/Contractor's premises
Progress meetings	as required	Telecon

4.4. Deliverable Items

In addition to the documents to be delivered according to section 4.2 here above, the following items shall also be delivered.

Delivery requirements for documentation is such that they are electronic searchable, indexed and not encrypted PDF and native (WORD) file to be delivered to the ESA Technical Officer.

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.

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	Event	Definition	e-copy to DMS
DMS (Data Management System) address: tecdms@esa.int . (or others as applicable for other ESA Directorate) Please note that all finalised (i.e. reviewed and approved by ESA in their final version) documents resulting from a technology Contract shall be electronically sent by the Contractor to D/TEC's Data Management System (DMS) using the e-mail address tecdms@esa.int . This applies not only to the final documentation such as the Final Report or Summary Report but to all approved output documents (TNs, Progress Reports, etc.).				
D1	Current State of the Art, TRL Assessment and System Trade-Off Report	DKP	no
D2	Deployable Telescope Requirements	DKP (v1) FR (v2)	no
D3	Preliminary DT Design Report	DKP		
D4	Analysis Report	DKP (v1) DDR (v2)	no
D5	DT Detailed Design Report	DDR	...	no
D6	Development and Verification Plan for Pre-Developments	DDR (v1) FR (V2)	...	no
D7	Study Conclusion and Recommendations on Future Development	FR		no
TDP	Technical Data Package	Final Review	TDP consists of the final versions of all approved technical documents, delivered during the execution of the activity.	yes
FP	Final Presentation	Final Review		yes
ESR	Executive Summary Report	Final Review	ESR concisely summarises the findings of the Contract. It shall be suitable for non-experts in the field and should also be appropriate for publication. For this reason, it shall not exceed five (5) pages of text and ten (10) pages in total (one thousand five hundred (1500) to three thousand (3000) words).	yes
FRpt	Final Report		<p>The FRpt 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.</p> <p>The FR is a mandatory deliverable, due upon completion of the work performed under the</p>	yes

			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 CCD is a 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 CCD.	Yes

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

Item Identifier	Title	Milestone	Quantity to be delivered / Delivery Media	Remarks
M1	Optical Model	DKP (v1) DDR (v2)	...	Format to be agreed with the Agency by KO.
M2	Performance Model	DKP (v1) DDR (v2)	...	Format to be agreed with the Agency by KO.
M3	Structural Model	DDR	...	Format to be agreed with the Agency by KO.
M4	Thermal Model	DDR	...	Format to be agreed with the Agency by KO.

5. SCHEDULE AND MILESTONES

5.1. Duration

The duration of the work for the workflow of the Deployable Telescope for small satellites **shall not exceed [12] months** from kick-off to end of the activity (delivery of the draft Final Report).

5.2. Milestones

The following technical milestones for the workflow shall apply:

- MS1 – DT Design Key Point Review (T0+3 months)
 - Completion of Tasks 1 & 2
- MS2 – DT Detailed Design Review (T0+9 months)
 - Completion of Tasks 3 & 4
- MS3 – DT Final Review (T0+11 months)
 - Completion of Task 5
- MS4 – Contract Close-out (T0+12 months)
 - Completion of Final Report and CCD.

5.3. Reviews

The following reviews shall be held:

- See the task description, study logic and task timeline

ANNEX A. Preliminary Mission Requirements for EO Scenarios

Given that the scope of the study is intended for small satellites, a 3U-6U limit is imposed as a design constraint on the volume of the proposed satellite design. Design solutions for a DT shall consider the [a] EO High Resolution Imaging scenario. An assessment of the DT design selected shall be performed to determine whether the DT can be retrofitted for the [b] EO LiDAR Waveform for Vertical Distribution of Vegetation Scenario.

Table A 1: EO Application Scenarios [a] & [b], relevant to DT for small satellites

[a] EO High Resolution Imaging Scenario				
ID	Requirement	Value	Unit	Additional Info
a.01	Orbit Altitude	450	km	
a.02	Orbit Type	Noon-Midnight SS		
a.03	Off-Nadir Pointing	0	deg	
a.04	Non-Operational Temperature Range	-40 to 65	degC	see [RD16]
a.05	Swath	> 1	km	
a.06	Primary Telescope Diameter	≥ 300	mm	
a.07	PAN Band Central Wavelength	580	nm	
a.08	PAN Band Bandwidth	200	nm	
a.09	PAN Band Spatial Resolution on Ground	1.8	m	Native, no post processing
a.10	Detector Selection	Limited to available COTS		
a.11	Un-binned SNR @ Ref Radiance (without TDI)	≥ 100		Ref Radiance = 114 [Wm ² sr ⁻¹ um ⁻¹]
a.12	Optical MTF at Nyquist	> 30	%	Including defocus, aberrations, and manufacturing tolerances.
a.13	System MTF at Nyquist	> 15	%	
a.14	Lifetime of Mission	5	years	
[b] EO Lidar Waveform for Vertical Distribution of Vegetation Scenario				
ID	Requirement	Value	Unit	Additional Info
b.01	Orbit Altitude	450	km	
b.02	Orbit Type	Dawn-dusk SS		
b.03	Off-Nadir Pointing	3	deg	
b.04	Non-Operational Temperature Range	-40 to 65	degC	see [RD16]
b.05	Swath	≥ 1.8	km	
b.06	Primary Telescope Diameter	≥ 550	mm	
b.07	Operational Wavelength	850	nm	
b.08	Laser Beam Footprint on Ground	30	m	
b.09	Time Limit for Optical Alignment	< 3	ms	Equivalent to min period between successive measurements. Derived from b.01, b.03.
b.10	Time Window Limit for Optical Stability	≥ 7	ms	Equivalent to max time duration of a coherent measurement. Derived from b.01, b.08, b.14. see [RD18]
b.11	Lifetime of Mission	5	years	
Additional Details are below, for EO Scenario [b], included for informational purposes				
b.12	Laser Power Emitted	10mJ/pulse		
b.13	Laser Pulse Duration	16	ns	FWHM
b.14	Laser Pulse Repetition Rate (PRF)	242	Hz	
b.15	Detector Selection	Si-APD		
b.16	Digitizer Bandwidth	1	GHz	
b.17	Vertical Pulse Averaging	None		
b.18	Cloud Coverage Fraction	0	%	Assume no clouds

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

Contract Closure Documentation
for
ESA Contract No. 4000XXXXXX/23/NL/IB/ab
Deployable Telescopes for Small Satellites Design Study,
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> and Total Contract Value <i>(in case of co-funding; state if not applicable)</i>	EUR EUR										
Broken down as follows:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Original Contract Price</td><td style="width: 70%;">XXX EUR (XXX EUR)</td></tr> <tr> <td>and original Contract Value <i>(in case of co-funding; state if not applicable)</i></td><td>EUR</td></tr> <tr> <td>CCN x to n</td><td>EUR in total</td></tr> <tr> <td>Work Order x to n</td><td>EUR in total</td></tr> <tr> <td>Call-Off Order x to n</td><td>EUR in total</td></tr> </table>	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
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 ⁽¹⁾	Property of	Rights granted / Specific Conditions ⁽²⁾ IPR
Documentation							
Hardware							
Software			(Delivery in Object code / Source code?)				
Other							

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

¹ 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.)

² e.g. IPR constraints, deliverable containing proprietary background information (see also Table 2.1.3 below)

[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 (³)	Other comments

³ 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*):

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

<input type="checkbox"/>	1	Earth Observation
<input type="checkbox"/>	2	Science
<input type="checkbox"/>	3	Human Spaceflight and Exploration
<input type="checkbox"/>	4	Space Transportation
<input type="checkbox"/>	5	Telecommunications
<input type="checkbox"/>	6	Navigation
<input type="checkbox"/>	7	Generic Technologies and Techniques
<input type="checkbox"/>	8	Security
<input type="checkbox"/>	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.

The above statements provided in the various sections of this Annex B “Layout for Contract Closure Documentation” for ESA Contract No. **4000xxxxxx/xx/XX/XXX/xxx** *[insert the corresponding contract number]* have been made after due verifications.

The Contractor furthermore certifies that all its obligations with regard to Fixed Assets, if any, have been fulfilled.

If required by ESA, an updated version shall be provided for incorporating amendments requested by ESA.

Name of Contractor:
[insert Contractor name]

Authorised signatory:

[insert Authorised signatory full name]

[signature of the Authorised signatory]

Date:
[insert date]


APPENDIX 2

CONTRACT CHANGE NOTICE

For submission of a change, the Contractor 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 the ESA 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 Contractor shall, on request of the Agency, 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.: 4000143826/24/NL/IB/ab	
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

INVENTORY/FIXED ASSET RECORD

1.1. Content of electronic Inventory/Fixed Asset Record

The Contractor shall establish an electronic Inventory/Fixed Asset Record with, as a minimum, the following information:

For all items:

- Contract number/subcontract number, if applicable;
- unique item number;
- confirmation that the item has been marked with the unique item number;
- description of item;
- part number/serial number/type code;
- quantity;
- system/subsystem;
- property owner;
- manufacturer;
- classification (category – see section 1.2 below);
- acquisition value (i.e. original purchase price or price at Contract signature as applicable);
- date of purchase or production (“in service date” if not corresponding with date of purchase/production);
- in-service date;
- foreseen useful life (to be agreed with ESA);
- physical location (e.g. facility, building, room);
- entity responsible for care and custody;
- related WBS code or other identifier (to be coordinated with the Agency);
- description and date of any change to the property item;
- planned method of disposal (if applicable).

In addition to the above, the following information shall be added to those items that are identified as becoming ESA Fixed Assets in Article 3 of the Contract, as applicable:

- Acquisition value
 - revision of this value as a result of change(s) to the asset;
- Impairment report of each ESA Fixed Asset remaining in the custody of the Contractor after its acceptance by ESA (using the template that will be provided by the Agency upon announcement by the Contractor that the item has been impaired);
- date of acceptance by ESA (planned date of acceptance);
- foreseen handling after ESA's acceptance (e.g. transfer to ESA, continuing in custody of the Contractor).

1.2. Classification of Inventory/Fixed Assets items

For the purpose of Inventory/Fixed Asset Control, items shall be classified into five (5) categories, according to the source and intended use of the items, as follows:

Source/Purpose	Supplier-acquired Items	Customer-furnished Items
Consumable items (e.g. parts, materials, supplies)	Class 1	Class 2
Capital items/production support equipment and tools (e.g. instruments, jigs, fixtures)	Class 3	Class 4
Items purchased by the supplier or his lower tier suppliers on their own account but amortised under the Contract	Class 5	

Note 1: Consumable items are parts, materials, supplies, components, modules, minor expendable tools, assemblies, units and subsystems, which through the production process lose their identity and are absorbed directly or indirectly by the system/product to be provided under the Contract.

Note 2: Consumable items are in principle not capitalised per item; however, before consumption they are identified as assets of the Agency under the collective term "Consumable".

Note 3: Capital items/production support equipment and tools are jigs, fixtures, devices, apparatus, instruments, machines, installations, technical facilities, buildings, computer programmes, documentation, models, samples or any other item, which, after their use in or in conjunction with the production process under the Contract, are expected to have a residual utility or other value for the Agency.

Note 4: Capital items have a useful life of more than one (1) year and are identified as individual items in the supplier's and its lower tier suppliers' list of Agency's assets.