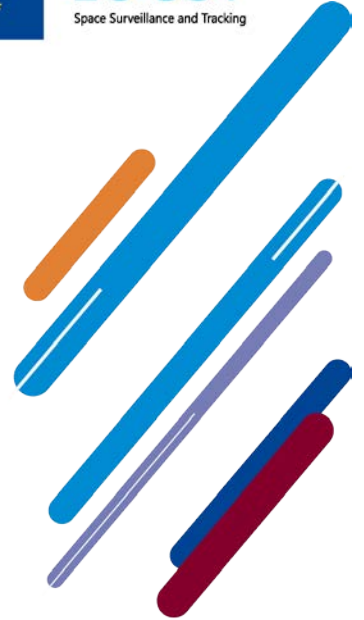




PROGRAMME OF THE
EUROPEAN UNION



EU SST
Space Surveillance and Tracking



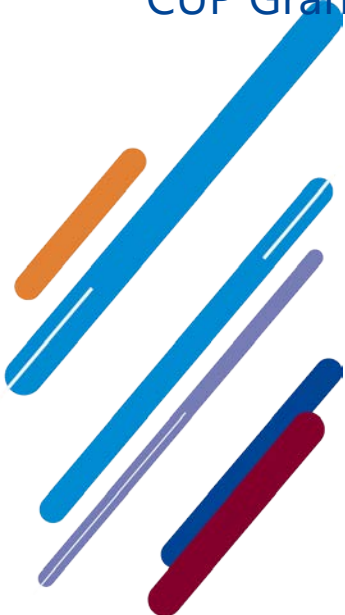
Development of Innovative optical commercial sensors

Call for Proposals

Financial Support to Third Parties

Cascading Grant - Grant Agreement EUSST2023-26
Subcontract ID S2.2_03

CUP Grant EUSST2023-26GA:F83C23002620006



#EUSpace



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Applicable and Reference Documents

Table 1: Applicable documents

Reference	Document title
[AD-1]	<i>Innovative Commercial Sensors - Statement of works</i>
[AD-2]	<i>Annex 1 - Proposal Template</i>
[AD-3]	<i>Annex 3 - Sub Grant Agreement Template</i>
[AD-4]	<i>Annex 2 - Financial / Budget forms</i>
[AD-5]	
[AD-6]	

Table 2: Reference documents

Reference	Document title
RD-1	REGULATION (EU, Euratom) 2018/1046 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 July 2018 on the financial rules applicable to the general budget of the Union) (Art. 204)
RD-2	DECISION No 541/2014/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 establishing a Framework for Space Surveillance and Tracking Support
RD-3	REGULATION (EU) 2021/696 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme
RD-4	Italian Law No. 241 of 7 August 1990, Article 12

Abbreviations and Acronyms

Table 3: List of used abbreviations

Acronym	Description
AP	Autonomous Products
ASI	Agenzia Spaziale Italiana
CAT	Sensor Category
CC	Calibration Campaign
CoE	Evaluation Committee
COM	(European) Commission
COOC	Coordination Committee
EC	European Commission
ECSS	European Cooperation for Space Standardisation
KPI	Key Performance Indicators
[MR]	Measurements Rate



MS	Milestone
[N]	Noise
[O2]	Objects observed per hour
[O3]	Objects uniquely observed by a sensor per hour in a 48h period
Op	Operational assessment
REA	Research Executive Agency
[RN1]	Responsiveness
SEC	Security Committee
SST	Space Surveillance and Tracking
STC	Steering Committee
TBC	To be confirmed
TBD	To be discussed
TN	Technical Note
[TL]	Timeliness
YOR	Yearly Operations Review



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1 Introduction

1.1 Overview

This is a call for proposals for projects in order to finance the development of **sensors or upgrades of sensors** owned by EU companies, through financial support to third parties (cascade funding)¹ under the EUSST23-26 grant of the EU SST Partnership.

This call is managed by the Italian Space Agency (ASI), on behalf of the EU SST Partnership.

Interested parties are invited to read carefully this call for proposals in order to ensure that applications when submitted are complete and compliant with the call for proposal's terms and conditions.

1.2 Context

For the last decades, the number of objects in orbit has highly increased, encouraging the provision of services related to achieving space surveillance and tracking (SST) activities such as, conjunctions and re-entry, analysis and fragmentation detections.

In 2014, the "Decision of the European Parliament and the Council Establishing a Space Surveillance and Tracking Support Framework" n°541/2014/EU [RD-2] ("SST Decision" hereinafter), established the SST Support Framework 'to contribute to ensuring the long-term availability of the European and national space infrastructure, facilities and services which are essential for the safety and security of the economies, societies and citizens in Europe.'

The EU SST activities were carried out by the SST Cooperation under successive projects of the SST Support Framework funded by both the Copernicus, Galileo and Horizon 2020 programs.

This consortium used a sensors network (composed of on-ground optical sensors, tracking and surveillance radars and laser stations) to locate space objects (spacecraft or debris), in order to determine latest orbits first, predict future trajectories then, and finally, assess consequences and risks on environment (in orbit by means of a conjunction analysis, on earth using a re-entry analysis).

¹ Cascade funding (otherwise called Financial Support to third parties) is an instrument foreseen in art 204 of the REGULATION (EU, Euratom) 2018/1046 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 July 2018 on the financial rules applicable to the general budget of the Union [RD-1]

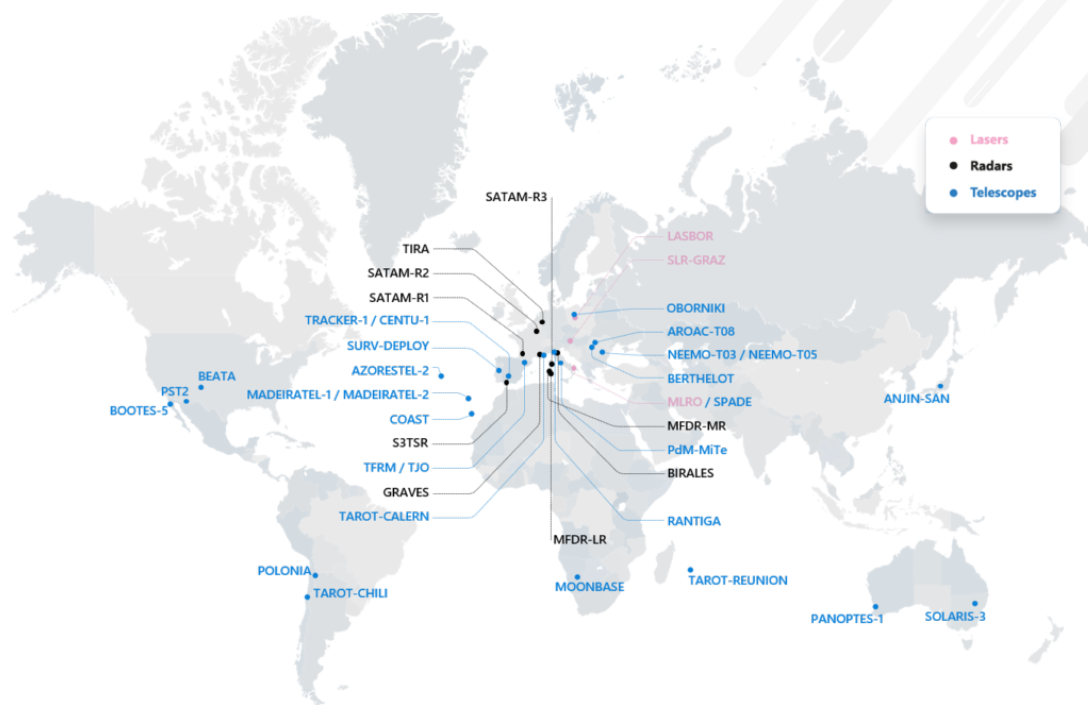


Figure 1: EU SST Sensors Network (July 2022)

In 2021, the European Parliament and the Council adopted Regulation (EU) 2021/696 ('Space Regulation') [RD-3]. Building on the SST Support Framework, the Space Regulation, stressing the importance of further developing the performance and autonomy of SST sub-component capabilities, elevates Space Situational Awareness (SSA), of which SST is a crucial part, to a full-fledged component of the EU Space Programme akin to Copernicus and Galileo. Pursuant to the Space Regulation, the European Commission adopted an Implementing Decision ('SST Implementing Act') which outlines the rules and procedures for the participation of EU Member States in the SST sub-component and through the conclusion of a Partnership Agreement.

Building on its good operating results, the initial consortium has since 11th November 2022 turned into a Partnership in which 15 delegations (Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Latvia, Netherlands, Poland, Portugal, Romania, Spain and Sweden) cooperate to improve EU SST operating results and science around space situational awareness².

The current activities of the EU SST Partnership are funded under both the Space Program of the European Union as Horizon Europe: this partnership comprises an operational side on one hand, and a R&D side on the other hand, which combine into a strong cooperation, as R&D activities are performed as well as long-term development strategy.

² The EU SST Partnership is constituted by the following EU SST constituting national entities : Austrian Research Promotion Agency (FFG), Ministry of Transport of the Czech Republic (MDCR), Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Air Command Denmark (ACD), Centro para el Desarrollo Tecnológico y la Innovación (CDTI), Finnish Meteorological Institute (FMI), Centre National d'Etudes Spatiales (CNES), National Observatory of Athens (NOA), Agenzia Spaziale Italiana (ASI), Ministry of Education and Science of the Republic of Latvia (IZM), Ministry of Economic Affairs and Climate Policy (MEZK), Polish Space Agency (POLSA), Ministry of National Defense (GP SST), Agenția Spațială Română (ROSA) and Swedish National Space Agency (SNSA)



A part of the EU SST activities implementing the EUSST2023-26 grant under the Space Program of the European Union, will be dedicated to promote and support commercial data providers (radars, optical sensors and passive ranging sensors, laser ranging and other suitable sensor types) either on-ground or space based located.

In order to increase the quality and quantity of the population of the EUSST Database and the Catalogue and the provision of services, EU SST will thereby **contribute to the funding of the development of innovative commercial sensors through cascade funding (Financial Support to Third Parties)**. The main objective herein is to increase the proportion of commercial data up to 50% by 2026.

Hereto the EU SST Partnership is opening **calls for proposals offering cascade funding opportunities for the development of innovative commercial sensors** :

- **Innovative commercial sensors (ID S.2.2_04)**, managed by the French space agency CNES
- **Innovative optical commercial sensors (ID S.2.2_03)**, managed by the Italian space agency ASI.

The present call is therefore issued by ASI as Procurement Agency on behalf of the EU SST Partnership, in accordance with the rules laid down by the European Commission for Cascading Grants, according to the rules imposed by Grant EUSST2023-26GA and in compliance with Article 12 Law No. 241 of 7 August 1990 [RD-4].

2 Scope of the call

This call for project proposals covers one topic : **Financing of sensors or upgrades of sensors owned by EU companies.**

Excluded from the scope of this call are projects for new radar solutions and space based solutions. Proposals for the development of **new radar solutions and space based solutions** shall be submitted in response to the dedicated call for proposals issued by CNES (ID S.2.2_04).

EU SST Partnership intends to act as a public investor for innovative commercial sensors owned by the industry and start-ups, under specific criteria of industrial co-funding (minimum of 55%), in order to acquire, as an anchor customer, future data coming from those newly built commercial sensors at best conditions for the first years (virtuous circle). The selected commercial sensors to be funded have to be of the interest for the EUSST Partnership and for the EU SST ecosystem, but as well for the tendering industry and start-ups. The EU SST Partnership has preliminarily identified the needs from the perspective of the Service Provision, taking into account the gap analysis performed by the architecture studies.

As proposed in the partnership, a part of the operating activities for the coming three years will be dedicated to promote and support commercial data providers (radars, optical sensors and passive ranging sensors, laser ranging and other suitable sensor types) either on-ground or space based located. The main objective is to increase the proportion of commercial data from current 5% up to 50%, provided there is added value, by the end of the partnership (30th June 2026). Setting up the conditions for commercial support is supported by an exchange with the European Union Industry and Start-up Forum (EISF).



As detailed in the attached Statement Of Works, this call is dedicated to co-fund the development of new optical solutions implemented by the European industry by supporting:

- Already existing and operational sensor / network of sensors upgrades intending to improve performances (accuracy, detection capabilities, timeliness, ...)
- Development of a new cross-technology based sensor
- Improving an already existing and operational sensor / network of sensors, thanks to cross-technology features
- Deployment of sensors outside European VLA
- Development of solutions to decrease the price of data.

The present notice does not constitute a contractual proposal or purchase order. It does not bind ASI to take any action, to sign any contract, to remunerate any activity carried out, or to reimburse any expenses incurred as a result thereof. This notice does not entitle and/or constitute entitlement to any rights and/or claims whatsoever.

Proposals must take into account the contractual requirements as set out in the attached Subgrant Agreement template, that includes as well the European Commission's provisions on Cascading Grants, also contained in the Grant Agreement EUSST2023-26GA.

The present procedure is conducted electronically, through the telematic platform accessible from the following link: https://app.albofornitori.it/alboeproc/albo_asi.

Applications sent on paper or by other means than those indicated in this notice will not be considered admissible. The constraints of the telematic platform must be respected when submitting proposals. Further information on the requirements for using the telematic platform can be found in the user guide: https://app.albofornitori.it/alboeproc/albo_asi?locale=en

The person in charge of the procedure is Eng. Roberto Formaro: roberto.formaro@asi.it

3 Documentation

The applicable documents for the present Call are detailed below:

- This Call for Proposal;
- Innovative Commercial Sensors - Statement of Works
- Annex 1 Proposal Template
- Annex 2 Budget Form;
- Annex 3 Subgrant Agreement template;
- Annex 4A Participant Conditions assessment form
- Annex 4B Appendix on Eligibility and Participating Conditions
- Annex 5: Declaration of Honour
- Annex 6: Model for data fee Agreement

For the purposes of participation in this Call for Proposals, the documents referred above are required to be completed and submitted as described in section 6.4.



The Call documents are available on the institutional website at the following link:

<https://www.asi.it/bandi>

N.B: Participation in the procedure referred to in this call for proposals implies full and unconditional acceptance of all the conditions and clauses contained in the full documentation of the procedure and in all related documents.



4 Applicants

The nature of the applicants shall be either:

- A Start-Up;
- A Small and Medium Enterprise (SME)³;
- A Large Enterprise (LE).

Other entities (public entities, research entities or others) may be implicated only as sub-contractors, according to the Annex 5 of the Grant EUSST2023-26GA.

4.1 Single Applicant

Applications submitted by a single applicant are admissible.

The single applicant shall be the (future) owner of the sensor to be upgraded or of the new sensor.

4.2 Co-applicant(s)

Applications submitted by multiple applicants are admissible.

If the proposal is submitted by a group of several co-applicants they will form a consortium and will become consortium members. The consortium members (multi-beneficiaries/subgrantees) should nominate amongst them a lead organization, referred to as the "Coordinator".

The coordinator shall be the (future) owner of the new sensor or of the sensor to be upgraded.

The coordinator submits the application on behalf of the consortium and will be the intermediary for all communication between the co-beneficiaries/subgrantees and the granting authority as well as responsible for supplying all documents and information to the granting authority in due time upon request.

³ For the definition, see Commission Recommendation 2003/361/EC: micro, small or medium-sized enterprise (SME) are enterprises

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



Joint participation as a Consortium will have to be subsequently formalised with the conclusion of a Consortium Agreement among participants.

Participation in the competition is allowed only once as an individual Beneficiary/Subgrantee and as Prime Beneficiary/Subgrantee of a Consortium. In the event of infringement, all proposals involved shall be excluded from the competition at the sole discretion of ASI.

Applicants must be in good standing with previous ASI funding.

The coordinator and all co-applicants forming the consortium must satisfy the eligibility criteria under the paragraph 4.4 "Participation conditions".

4.3 Subcontractors

Subcontracting refers to contracts concluded for the externalization of specific tasks or activities which form part of the project. Core activities of the project shall not be externalized.

The subgrantees must award the subcontract to the bid offering best value for money or the lowest price (as appropriate), avoiding conflicts of interests and keep the relevant documentation for the event of an audit.

The subgrantees remain solely responsible for the implementation of the project. Subcontracting is not allowed among the co-applicants in the project.

Subcontracting of specific tasks or activities (i.e. the externalization) which form part of the project must be clearly stated in the proposal. It is however not necessary to have already selected subcontractors at the time the proposal is submitted. Subcontractors must at all times satisfy the eligibility criteria under the following paragraph "Participation conditions".

4.4 Participation conditions

In order to protect the essential security interest of the European Union and its Member States, financial support shall be granted only to economic operators, or shall involve only economic operators (whatever their position in the subcontracting chain) which shall fulfil the following three cumulative conditions:

- a) being legal entities **established in an EU Member State with their executive management structures established in that EU Member State**. Economic operators are considered to be established in the EU when they are formed in accordance with the law of an EU Member State, and have their central administration, registered office and principal place of business in an EU Member State (if legal persons) or they are nationals of one of the EU Member States (if natural persons).

'Executive management structure' means the body of the legal entity appointed in accordance with national law and which, where applicable, reports to the chief executive officer or any other person having comparable decisional power, and which is



empowered to establish the legal entity's strategy, objectives and overall direction, and oversees and monitors management decision-making;

- b) committing to **carry out all relevant activities in one or more EU Member States** ; and
- c) **not being subject to control by a third country or third country entity**. For the purpose of this paragraph, 'control' means the ability to exercise a decisive influence over a legal entity directly or indirectly through one or more intermediate legal entities.

These participation conditions shall be integrated in the clause of the tenders for subcontracts, call for grants, etc. and shall be met by the operators throughout the whole duration of the resulting period during which financial support to third parties is provided. In case of any changes related to the compliance with these participation conditions, the economic operator, which is involved in financial support to third parties, shall inform the ASI about the changes without delay.

The check shall be made before contract signature, and no contract shall be signed without confirmation by the European Commission that the entity complies with the participating conditions defined in this paragraph. The outcome of the Commission's assessment shall be communicated to the requestor thereafter.

Participating conditions are applicable to the whole contractual chain and all **sub-contracting levels** should be compliant except:

- COTS providers of unspecialised hardware and software
- Non-sensitive activities such as communication and outreach activities, expert guidance on standardisation activities.

Eligibility conditions must be fulfilled not only at signature of any sub-grant or contract, but throughout the entire duration of its execution. In case of any changes related to the compliance with these participation conditions, the economic operator, which was awarded a subcontract, or is involved in a subcontract, shall inform the granting authority about the changes without delay.

To assess the compliance of the applicants (and other entities contributing to the project), a completed Participant Conditions assessment form (Annex 4) shall be included in the proposal for each entity subject to the eligibility and participation conditions. Additional instructions on how to complete this Annex are provided. **For entities not carrying out critical or security sensitive activities, as a minimum Section 1 and Section 2 of Annex 4 are to be completed.**

Verification of the fulfilment of the requirement set out in paragraph 4.4 will be carried out by the European Commission.

NB: In the event of changes in the fulfilment of these conditions of participation, the economic operator to which financial support has been granted, or which is involved in financial support to third parties, must inform of the changes ASI, which will inform the European Commission.

Failure by the Subgrantee to meet the requirement set out in section 4.4 shall result in its exclusion from the procedure, or in the termination of the financing agreement or, in the case



of participation in Teams of Applicants, in the obligation to replace the Team member. Failure by the subcontractor to meet the requirement shall entail the obligation to replace the subcontractor.

All participants must undertake to comply with all the requirements set out in the present Call for Proposals and the attached documents.

Applicants not meeting the above requirements will be excluded.

4.5 Exclusion criteria

Exclusion criteria are specified in the standard **Declaration of Honour (Annex 5)** of this call for proposals and apply to all applicants.

To prove compliance with the exclusion criteria above all applicants must sign and submit a Declaration of Honour (Annex 5). Please note that if deemed necessary, the successful applicants may be required to provide supporting documents related to the content of the Declaration of Honour before the respective sub-grant can be signed.

5 Funding

5.1 Maximum budget

The total amount made available by ASI for the co-financing of the project submitted under this call for proposals is a maximum total of € 4,000,000.00 (outside the scope of VAT).

In the event of the availability of a further budget made available also by the Partnership EU SST, by CNES or by the European Commission for the present call for proposals, the eligible project proposals may be ranked in proportion to the available budget and taking into account the principle of consistency of the eligible proposals with the strategies of ASI, the Partnership EU SST and CNES.

The above-mentioned maximum amount to be borne by ASI will be equal to a maximum of 45% of the total estimated cost of the project. The remaining 55% (or more) of the project cost will constitute the co-financing share to be borne by the Subgrantees.

The Subgrantees will have to co-finance the projects according to the modalities foreseen in this Call for Proposals.

The maximum duration of the project may not exceed 24 months from the kick-off date and in any case the project cannot end later than 30 MARCH 2026, unless the Grant EUSST2023-26GA is extended, in which case an extension of the project end date will be possible.



5.2 Eligible costs

ASI will finance each selected project according to the funding limit of 45% of the total amount of the project and according to the modalities provided for in the Grant Agreement EUSST2023-26, and referred to in the Subgrant Agreement template (Art. 6).

The sub-grant funding is calculated on the basis of a detailed estimated budget indicating clearly the costs that are eligible for funding. Amounts are to be indicated in euro.

5.2.1 Criteria of costs eligibility

Eligible costs of the sub-grant are Costs actually incurred by the sub-grantee which meet all the following criteria:

- (i) they must be actually incurred by the subgrantee
- (ii) they are incurred during the duration of the project, as indicated in the specific sub-grant agreement,
- (iii) they must be declared under one of the budget categories set out in Article 8.2 and Annex 2 to the Contract
- (iv) they must be incurred in connection with the action and necessary for its implementation
- (v) they must be identifiable and verifiable, in particular recorded in the subgrantee's accounts in accordance with the accounting standards applicable in the country where the subgrantee is established and with the subgrantee's usual cost accounting practices
- (vi) they must comply with the applicable national law on taxes, labour and social security and
- (vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency.

In addition, for direct cost categories (e.g. personnel, travel & subsistence, subcontracting and other direct costs) only costs that are directly linked to the action implementation and can therefore be attributed to it directly are eligible. They must not include any indirect costs (i.e. costs that are only indirectly linked to the action, e.g. via cost drivers) which have to be reported separately with a percentage of 7% on all direct costs.

The starting date of cost eligibility can not be prior to the date of the contract signature. Costs eligible for (co-)financing may not have been incurred prior to this date.

No sub-grant may be awarded retroactively and a proposal for projects that have already been completed will be rejected. A proposal for projects that have already started will be assessed on a case-by-case basis (in this case, no costs can be reimbursed for activities that took place before the project starting date/).

The end date of cost eligibility can not be later than **31/03/2026**.



In addition to any other cost which do not fulfil the conditions set out above, the following costs shall not be considered eligible:

- return on capital or return generated by an investment
- debt and debt service charges
- provisions for future losses or debts
- interest owed
- doubtful debts
- currency exchange losses
- bank costs charged by the subgrantees bank for transfers from ASI
- costs declared by the subgrantees in the framework of another action receiving a grant financed from the EU budget (including grants awarded by a Member State and financed from the EU budget and grants awarded by the European Commission or other EU bodies than the EUSPA for the purpose of implementing the EU budget) including the RRF.
- contributions in kind from third parties
- excessive or reckless expenditure
- deductible VAT
- participation by any staff of the EUSST partnership members or (European Union) institutions

Please note that the exact scope of the eligibility of costs is defined in the Sub-Grant Agreement attached, which will be signed by the successful applicant(s).

5.3 No-profit rule

Financial support may not have the purpose or effect of producing a profit for the subgrantee within the framework of the project. For this purpose, profit is defined as a surplus of the receipts over the eligible costs incurred by the subgrantees, when the request is made for payment of the balance. Where such a surplus occurs, ASI is entitled to recover the percentage of the profit corresponding to the contribution to the eligible costs actually incurred by the subgrantees to carry out the action.

5.4 Co-financing of the Subgrantee

The subgrantees must contribute to the implementation of the project for a minimum of 55% of the eligible costs, either by way of their own resources or by financial contribution from third parties.

Co-financing of the action may take the form of:

- the awarded sub-grantees own resources,
- income generated by the project,



- financial contributions from third parties.

These resources or contributions may not include EU directly or indirectly managed budget funds, Recovery and Resilience Facility (RRF) funds included.

In no circumstances shall the same costs be financed twice by the EU budget.

The financial proposal shall clearly indicate the origin of the co-financing of the applicants.

A proposal with an EU co-financing beyond the above-mentioned maximum will not be eligible.

6 Proposal Submission

Below is provided a list of the documentation that applicants will have to produce when submitting the proposal.

The declarations referred to in the administrative documentation and the technical and economic documentation must be digitally signed by the legal representative of the company or by its proxy (in which case a copy of the relevant notarial power of attorney -GENERAL OR SPECIAL- or other document evidencing powers of representation must be attached).

6.1 Administrative documentation

The administrative documentation shall respect the following format attached to the call:

- Annex 4A: Participant Conditions assessment form
- Annex 5: Declaration of Honour

6.2 Technical documentation

The technical proposal shall contain all the elements presented in the attached:

- Annex 1 – Proposal template.

6.3 Budget information

The estimated budget of the co-funded project has to be attached to the application form following the template provided in the following attached document:



- Annex 2 of the Call for proposals.

6.4 Submission deadline and validity of the proposal

The submission of project proposals must take place no later than 12:00 on 25th March 2024 via the telematic platform at the following address:

https://app.albofornitori.it/alboeproc/albo_asi

All documentation must be produced in English.

The proposal shall bind the participant for 180 days (validity period of the proposal) from the expiry of the submission deadline, unless an extension is requested by ASI and communicated on the dedicated website section.

In the event that the evaluation procedure is still ongoing after the 180 days, ASI may request the Proposers to confirm the validity of the proposal until the date to be indicated by ASI.

Failure to respond to ASI's request will be considered as a waiver of the Applicant's participation in this procedure.

7 Evaluation and selection process

7.1 Evaluation Committee

ASI will appoint a Committee for the evaluation (hereinafter referred to as „Committee” or 'CoE') of the proposals received, composed of three members who are experts in the specific sector to which the call refers.

The CoE may be assisted by a secretarial resource and a maximum of four experts from the EU SST Partnership for the sole purpose of supporting the technical evaluation of proposals.

The CoE will evaluate the projects submitted for all Phases as described in paragraph 7.2.

The members of the Committee must not have any impeding causes for appointment. To this end, they shall make an appropriate declaration to ASI.

7.2 Selection Process



7.2.1 Phase 1: Assessment of subjective requirements

Proposals will be subjected to an evaluation to verify that they meet the subjective requirements for participation set out in section 4.

Such verification will be carried out in a confidential session by the Evaluation Committee appointed by ASI pursuant to paragraph 7.1:

Admissibility requirements:

1. The proposal must be submitted before the deadline (see section 6.4), electronically via ASI submission portal.
2. The proposal must be complete and contain all the requested information according to the list of documents in section 3 of this Call for Proposals. The proposal including annexes and supporting documents must be submitted using the format thereto provided in the Call for Proposals.

Eligibility criteria:

3. Regarding the applicant(s): only with reference to par. 4.1; 4.2

The verification of the fulfilment of the requirement set out in paragraph 4.4 will be carried out by the European Commission, through the issue of a mandatory and binding evaluation.

Proposals accepted following the above-mentioned preliminary evaluation will be eligible for evaluation under Phase 2.

7.2.2 Phase 2: Preliminary assessment of the project proposal and economic proposal and formulation of recommendations

The preliminary evaluation of the project proposals will be carried out by the Evaluation Committee.

The Evaluation Committee will carry out the preliminary evaluation of the project proposal and the economic proposal, in order to make recommendations to the proposers.

The recommendations will focus on:



- The formulation of the technical proposal with regard to:
 - technical and programmatic feasibility in adherence to the objectives of the call;
 - added value of the sensor within the EU SST network.
- The formulation of the economic proposal with regard to:
 - share of industrial co-financing;
 - economic and management reliability of the proposed industrial organisation.

7.2.3 Phase 3: Submission of final proposals

ASI will send the recommendations made by ASI Evaluation Committee to the participants, inviting them to submit the Final Proposal within the deadline of **20 days** from the receipt of the invitation, according to the modalities indicated in this call and specified in the invitation notice.

7.2.4 Phase 4: Final proposals evaluation

The Committee will evaluate the final technical proposal, awarding the technical score according to the following criteria:

EVALUATION CRITERIA		SUBCRITERION	MAX SCORE SUBCRITERION	MAX SCORE
1	<i>Coherence with the strategic objectives of the initiative</i>			20
2	<i>Valorization of existing know-how/heritage</i>	<i>use of previous experience in the field</i>	10	20
		<i>synergetic use of scientific and engineering expertise</i>	8	
		<i>optimisation of previous investments</i>	2	
3	<i>Content of the proposal</i>	<i>originality of technical objectives as a methodological approach</i>	15	30
		<i>Technical merit of the proposal with regard to the optimization of the EU SST network</i>	15	
4	<i>Feasibility and clarity of the proposal</i>	<i>Feasibility of the proposed implementation plan</i>	5	10
		<i>Clarity of presentation of the project and proposed objectives</i>	5	



5	<i>Adequacy of the proposing team</i>	<i>Complementary composition and expertise of the proposing team</i>	3	5
		<i>Clarity in the role of actors in the proposed project</i>	2	
6	<i>Evaluation of the economic proposal</i>	<i>Industrial co-financing and synergy of the project with the participants' business model</i>	15	15
	TOTAL			100

The Members of the Evaluation Committee will express their judgement individually, for each of the items indicated in the table above, using the following rating scale:

0 - the proposal does not meet the requirement in question or cannot be judged due to missing or incomplete information, or: the proposal meets the requirement in question but is assessed as insufficient.

- 1 - poor
- 2 - fair
- 3 - good
- 4 - very good
- 5 - excellent

The actual score awarded will be calculated as follows:

$$P = P_{\text{MAX}} \times P_{\text{COMM}} / P_{\text{MAX CDV}}$$

Where:

P_{MAX} : maximum score per item

P_{COMM} : sum of the scores awarded by each commissioner

$P_{\text{MAX CoE}}$: Maximum score attributable by the CoE

A provisional ranking will be drawn up on the basis of the technical scores.

At the end of Phase 3, the CoE will draw up a ranking of the shortlisted projects, based on the score obtained.

The ranking list, approved by ASI, will be valid for 36 months and in any case until 30 June 2026 (unless the Grant Agreement is extended) and will be published on the ASI website.

ASI reserves the right to use the ranking list for the entire period of its validity and in any case until 30 June 2026 (unless the Grant Agreement is extended) in the event of strategic interest for the Agency and in the event of availability of the necessary financial resources, as indicated in Chapter 5.



ASI reserves the right to ask additional documentation to ensure a homogeneous and complete evaluation. The reply to the request for clarifications must be made **within maximum 10 working days from receipt of the request.**

8 Terms of funding and financial reporting

For awarded projects, the final payment will be based on the final financial report and supporting documents due at the end of the project, taking into account any previous pre-financing and interim payment(s).

The reporting and payment arrangements are fixed in the Sub-Grant Agreement (See [AD-3]).

The method of financial reporting is explicitly set out in Art. 20 of the Subgrant Agreement template.

Activities shall be reported by means of audited financial statements (drawn up as per ANNEX 2 to the Contract) submitted as part of the periodic technical and financial report by the subgrantees in correspondence with the contractual events identified in the Contract.

9 Intellectual Property Rights

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

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

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



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

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

These rights of use are extended to the European Commission.

If materials or documents are subject to moral rights or third-party rights (including intellectual property rights or rights of natural persons on their image and voice), the subgrantees must ensure that they comply with their obligations under this Agreement (in particular, by obtaining the necessary licenses and authorizations from the rights holders concerned).

The rules on intellectual property rights are contained in Art. 15 of the Subgrant Agreement template, to which reference is made.

10 Obligations toward the European Commission

Subgrantees must ensure for them and their subcontractors compliance with all the contractual obligations included in the Subgrant Agreement template, including, but not limited to, the obligations contained in the following articles of the Subgrant Agreement template:



- Art. 9 Participation conditions
- Art. 11 Conflict of interest
- Art. 12 Confidentiality and security
- Art. 16.2 Visibility — European flag and funding statement
- Article 18.1 Information requests
- Article 19 Keeping records and supporting documents
- Art. 15 “Intellectual property rights (IPR) – background and results – access rights and rights of use”
- Art. 24 “Checks, reviews, audits and investigations”

11 Data Processing

Pursuant to Regulation (EU) 2016/679 of 27 April 2016, the personal data provided will be processed exclusively for the purposes of participation in this selection procedure, as well as for any subsequent fulfilment of the project proposals selected; they will be processed by the persons appointed for this purpose using procedures, including computerised procedures, in the manner and within the limits, including time limits, necessary to pursue the aforesaid purposes, plus a further period of ten years as a maximum term in the event of any litigation. The personal data in question may also, in accordance with the laws in force, be subject to access by any counter interested parties, as well as by judicial and control bodies.

The provision of this data is necessary to verify the requirements for participation in the procedure; therefore, in case of refusal of provision of such data, participation to the call will be forbidden.

The interested party has the rights set out in Articles 15 et seq. of the aforementioned Regulation, which include the right to access the personal data concerning him/her, the right to have his/her data rectified, erased or limited in the manner and in the cases set out therein, and the right to object to their processing for reasons relating to his/her particular situation. These rights may be exercised vis-à-vis ASI, which is the Data Controller of the processed data, by contacting the Italian Space Agency - Data Protection Officer, via del Politecnico snc, 00133 Rome or at the e-mail address rpd@asi.it. The interested party also has the right to lodge a complaint with the supervisory authority, the “Garante per la protezione dei dati personali”, at the address available on its institutional website.

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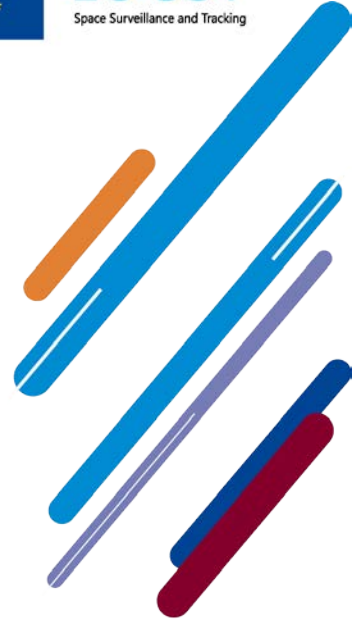
Luca Vincenzo Maria Salamone



PROGRAMME OF THE
EUROPEAN UNION

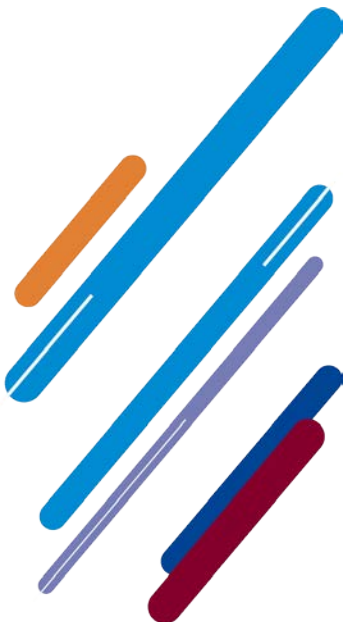


EU SST
Space Surveillance and Tracking



Innovative Commercial Sensors

Statement of works



#EUSpace



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Applicable and Reference Documents

Table 1: Applicable documents

Reference	Document title
[AD-1]	<i>CCSDS 503.0-B-2 : Tracking Data Message</i>
[AD-2]	<i>CCSDS 502.0-B-2 : Orbit Data Message</i>
[AD-3]	<i>EU SST_ICD_0001_2-3SST2018-20 : D4.3 – Coordinated Scheduling Interface Definitions</i>
[AD-4]	<i>EU SST Database Interface Control Document (ICD)</i>
[AD-5]	<i>Passive Ranging ICD</i>
[AD-6]	<i>CALL FOR PROPOSALS</i>

Abbreviations and Acronyms

Table 2: List of used abbreviations

Acronym	Description
AP	Autonomous Products
CAT	Sensor Category
CC	Calibration Campaign
COM	(European) Commission
COOC	Coordination Committee
EC	European Commission
ECSS	European Cooperation for Space Standardisation
KPI	Key Performance Indicators
[MR]	Measurements Rate
MS	Milestone
[N]	Noise
[O2]	Objects observed per hour
[O3]	Objects uniquely observed by a sensor per hour in a 48h period
Op	Operational assessment
REA	Research Executive Agency
[RN1]	Responsiveness
SEC	Security Committee
SST	Space Surveillance and Tracking
STC	Steering Committee
TBC	To be confirmed
TBD	To be discussed
TN	Technical Note
[TL]	Timeliness
YOR	Yearly Operations Review







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1 Introduction

1.1 Context

For the last decades, the number of objects in orbit has highly increased, encouraging the provision of services related to achieving space surveillance and tracking (SST) activities such as, conjunctions and re-entry, analysis and fragmentation detections.

The “Decision of the European Parliament and the Council Establishing a Space Surveillance and Tracking Support Framework” n°541/2014/EU [RD-2] (“SST Decision” hereinafter) was adopted on April 16th, 2014, establishing the SST Support Framework ‘to contribute to ensuring the long-term availability of the European and national space infrastructure, facilities and services which are essential for the safety and security of the economies, societies and citizens in Europe’

After an initial phase of EU SST activities carried out in 2016 and 2017 by the SST Cooperation within the frame of the SST2015 projects (1SST2015, 2SST2015 and 3SST2015), a second phase of EU SST activities was performed from the second half of 2017 to the end of 2020 under the SST16-17 projects (1SST16-17 and 2-3SST16-17). The last EU SST activities in the frame of the SST Decision are being carried out within the frame of:

- The 1SST2018-20 project “First funding line in Working Programme 2018, 2019 and 2020 for the further development of a European SST Service provision function” under the Copernicus and Galileo funding scheme. Operational activities are within the scope of 1SST2018-20. The project has started on the 30th of March 2019 and is planned to end on the 30th of June 2023 for an overall duration of 51 months
- The 2-3SST2018-20 project “Second funding line in Work Programme 2018 - 2020 for the further development of a European SST Service provision function” under the H2020 funding scheme. The project has started on the 1st of January 2020 and will end on the 30th of June 2023

This consortium were using a sensors network (composed of on-ground optical sensors, tracking and surveillance radars and laser stations) to locate space objects (spacecraft or debris), in order to determine latest orbits first, predict future trajectories then, and finally, assess consequences and risks on environment (in orbit by means of a conjunction analysis, on earth using a re-entry analysis).

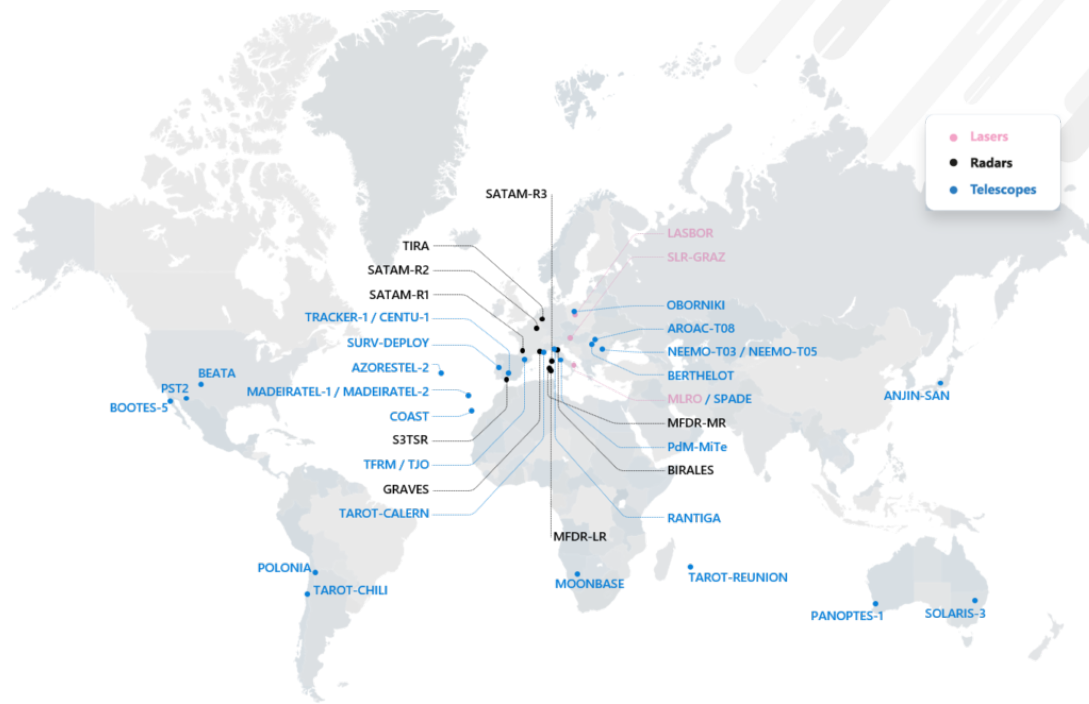


Figure 1: EU SST Sensors Network (July 2022)

Thanks to the good operating results, since 11th November 2022, this consortium has been turned to a 15 delegations Partnership (Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Latvia, Netherlands, Poland, Portugal, Romania, Spain and Sweden) working together in order to improve EU SST operating results and science around space situational awareness.

An operative side on one hand, and a R&D side on the other hand, which are working both in a strong cooperation, as R&D activities are performed as long-term development strategy, comprise this partnership.

1.2 Scope of the call

This note aims to define the eligible criteria and rules related to the EU SST investment in innovative commercial data solutions.

1.3 Outline of the activity

1.3.1 Activity informative details

As proposed in the partnership, a part of the operating activities for the next three years will be dedicated to promote and support commercial data providers (radars, optical sensors and passive ranging sensors, laser ranging and other suitable sensor types) either on-ground or space based located. The main objective is to increase the



proportion of commercial data from current 5% up to 50%, provided there is added value, by the end of the partnership (30th June 2026). Setting up the conditions for commercial support is supported by an exchange with the European Union Industry and Start-up Forum (EISF).

The aim of this document is to describe the activities related to the 4 Meuros Cascading Grant assigned to the Italian Space Agency, dedicated to co-fund the development of new optical solutions implemented by the European industry by supporting:

- Already existing and operational sensor / network of sensors upgrades intending to improve performances (accuracy, detection capabilities, timeliness, ...)
- Development of a new cross-technology based sensor
- Improving an already existing and operational sensor / network of sensors, thanks to cross-technology features
- Deployment of sensors outside European VLA
- Development of solutions to decrease the price of data

This contract will be divided in two different phases:

- **Phase 1: Working period**

This stage starts once the application is granted and the contract is signed. During this step, the activities described in the Work Breakdown Structure (See 2.1) are performed. This phase shall not begin after 1st of June 2025 and ends automatically 1 month prior the end of the contract.

- **Phase 2: Validation period**

This stage starts after the end of the Phase 1, once the sensor(s) is(are) upgraded and ready to provide data to EU SST, for 1 month.

During this step, the Contractor will provide data to EU SST in order to assess the quality and viability of the co-funded sensor, to be qualified TRL-8/9.

Note: All data exchanged during this period are free of any charges.



1.3.2 Main objectives

The overall main objectives are described below.

- It is not mandatory for a single project to cover all main objectives
- a single project must cover at least one of the main objectives

OBJ-1 LEO Detection capabilities

the effort shall be focused on project offering to detect and catalogue objects smaller than 10cm (high priority), and between 10-50cm (medium priority) in LEO.

OBJ-2 MEO Detection capabilities

the effort shall be focused on project offering to detect and catalogue objects smaller than 35cm in MEO

OBJ-3 GEO Detection capabilities

the effort shall be focused on project offering to detect and catalogue objects smaller than 35cm in GEO

OBJ-4 Transversal technology

the effort shall be focused on project offering transverse solution for all far VLAs (such as optical + radar combination).

OBJ-5 Location Diversification

the effort shall be focused on project offering deployment of sensor in the following VLA:

- a) Asia;
- b) Pacific Ocean;



1.3.3 Sensor lifecycle

According to the current procedures, the lifecycle for sensors in EU SST networks once operational is composed by three different stages:

- **Integration stage:** During this stage, the provider is implementing EU SST ICD to connect, declare the operational parameters and observation strategy. A pre-operational campaign assessment is performed, confirming:
 - o The communication is established
 - o The measurement files are provided correctly
 - o The general statistics meet the declared ones.

Once successful, the sensor is officially integrated and allowed to provide “Operational” data used internally to EU SST.

- **Operational stage:** During this stage, the sensor is providing measurements according to a routine data provision way (for surveillance) or answering to specific and punctual needs (for observation requests, namely tasking requests).

In order to ensure high quality of data, the sensor is periodically (every 6 months) assessed in line with an assessment campaign composed by the technical assessment on one hand, and the operational assessment on the other hand. Since the technical assessment is focused on the quality of the data thanks to well-tracked objects data comparison process (see 8.4), the operational assessment campaign is focused on operational metrics such (delay to provide measures to EU SST – namely timeliness; number of measurements shared, number of tracks shared, number of objects covered, answers to tasking requests, etc).

- **Maintenance stage:** As a cyber-physical device, in order to address any failures or upgrades, a sensor can be declared in maintenance. EU SST shall be warned a couple of months prior (in case of scheduled maintenance), or as soon as an issue is raised. In case of the maintenance has an impact in performances of the sensor, in order to be Operational again, once the maintenance is complete, the provider requests for an extra technical assessment (namely *Flash Calibration*).

Note that this technical assessment is mandatory to be allowed to provide operational data to EU SST.



2 Work Packages

2.1 Overview

As described in the Figure 2, the project is conducted following six already identified tasks:

- Task 1: Design
- Task 2: Manufacturing and Purchase
- Task 3: Transport
- Task 4: Construction, installation and integration
- Task 5: Commissioning and validation
- Task 6: Management

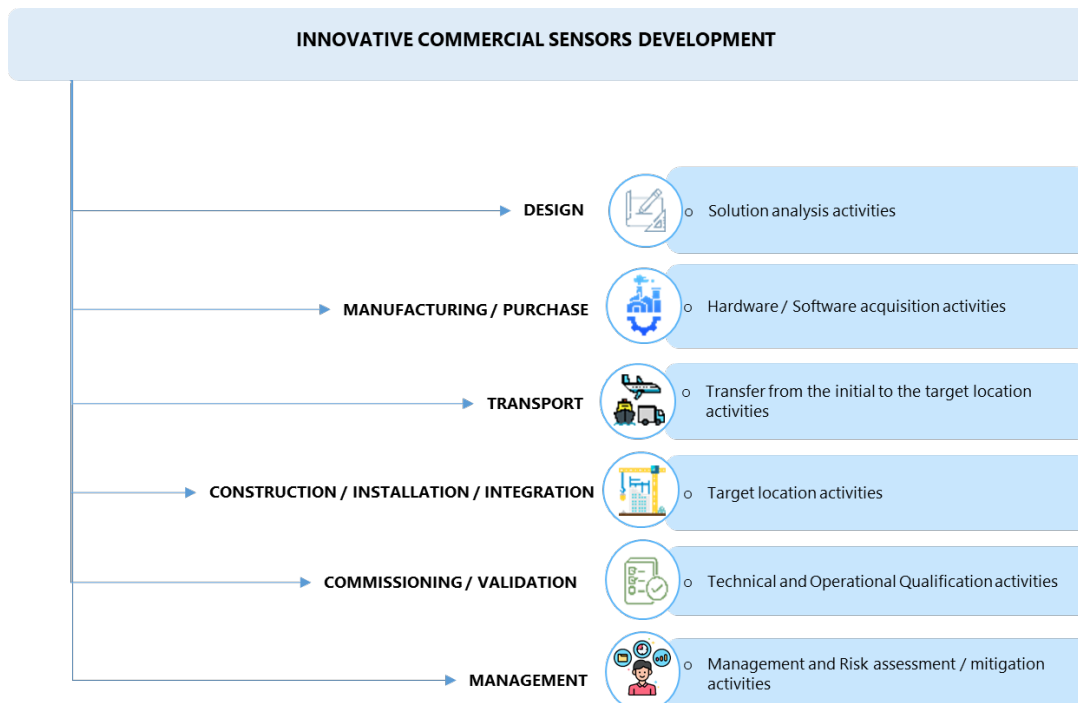


Figure 2 : Work Breakdown structure

Meanwhile the Management is obvious and described above, find details about the five other tasks below.

2.2 Task 1: Design

2.2.1 Outline

This task includes all activities related to define the target solution, meaning:



- Providing technical details and report describing the solution (including hardware and software performance analysis)
- Hardware benchmark and tests
- Algorithms definition

2.2.2 Input

N/A

2.2.3 Output

The output of the activity is at least:

- The list of required devices with technical justifications
- The algorithms design at top level
- The acquisition method for each device or software involved (Manufactured or Purchased)
- The design documents

2.3 Task 2: Manufacturing / Purchase

2.3.1 Outline

This task includes all activities related to build or buy (when it is needed) hardware and software identified in 2.2.

This task does not include additional analysis which would be purchased to refine the design or analysis performed in the task 2.2.

During this task, the contractor is expected to report to the Contractor Authority:

- An up-to-date acquisition schedule;
- An up-to-date Risk register regarding the timeline;
- Mitigation strategy in case of risk once identified.

2.3.2 Input

At least, the output listed in 2.2.3 are considered.

2.3.3 Output

At least:

- The required devices and software



- The acquisition schedule

2.4 Task 3: Transport

2.4.1 Outline

This task includes all activities related to transfer each part of the solution, from the manufacturing to the target facility. It includes also trip achieved by the experts.

The schedule is expected to be defined by the contractor and maintained up-to-date overall the duration of the contract.

2.4.2 Input

N/A

2.4.3 Output

At least:

- An up-to-date transport schedule
- An up-to-date Risk register regarding the timeline;
- Mitigation strategy in case of risk once identified.

2.5 Task 4: Construction / Installation / Integration

2.5.1 Outline

This task includes all activities related to host the sensor into its final location, meaning:

- Terrain acquisition
- Facility building (e.g. shelter)
- Deployment of the sensor

2.5.2 Input

N/A



2.5.3 Output

At least:

- An up-to-date construction schedule;
- A weekly progress report
- An up-to-date Risk register regarding the timeline;
- Mitigation strategy in case of risk once identified.

2.6 Task 5: Commissioning / Validation

2.6.1 Outline

This task includes all activities related to evaluate the sensor meaning:

- Tests performed in test environment;
- Tests performed in real conditions;
- Tests performed in the final location once the sensor is deployed;
- Assessment Campaign participation and supervised by EU SST.

2.6.2 Input

N/A

2.6.3 Output

At least:

- Tests report
- Calibration campaign status
- Mitigation strategy in case of risk once identified.



3 Specifications

DATA-REQ-1 Objectives compliancy

The Contractor shall be compliant with at least, one of the objectives detailed in 0.

DATA-REQ-2 Output TRL

The output TRL shall be higher or equal to 8 at the end of the contract.

3.1 Phase 0: Selection period

DATA-REQ-3 Project details for technical evaluation

The Contractor shall provide in the application form an exhaustive description of the project, detailing the expected benefits and outputs at the end of the working period.

DATA-REQ-4 System details for technical evaluation

The Contractor shall provide in the application form the technical characteristics of the system in use as described in 8.3.

DATA-REQ-5 Expected quality of the data

The Contractor shall provide in the application form the expected quality of the data once the project is achieved.

DATA-REQ-6 Thresholds inheritance

The details expressed in both DATA-REQ-5 shall be compliant with the related thresholds covered by DATA-REQ-56.

DATA-REQ-7 Work package content description

The Contractor shall detail each activity expected to be achieved within the work packages detailed in 2.

DATA-REQ-8 Work package calendar

The Contractor shall detail, for each work package, a tentative calendar for each activities, and potential connection between some activities (if any).

DATA-REQ-9 Subcontractors list

The Contractor shall detail, for each work package:

- The list of subcontractors involved



- The perimeter related to each subcontractor involved
- The budget related to each subcontractor involved

DATA-REQ-10 **Initial Risk register**

The Contractor shall detail in the application form, the risks register related to each activity, work package, and the overall packages.

3.2 Phase 1: Working period

DATA-REQ-11 **Termination date**

The Contractor shall end the working period by 30th May 2026 at the latest.

DATA-REQ-12 **Duration**

The Contractor shall take at least 12 months.

DATA-REQ-13 **Process implementation**

The Contractor shall implement the process detailed in 2.

DATA-REQ-14 **Reporting implementation**

In addition to DATA-REQ-13, the Contractor shall implement to reporting process as described in 5.

3.3 Phase 2: Validation period

3.3.1 Integration process

DATA-REQ-15 **Connectivity implementation duration**

The Contractor shall implement the adaptation to be integrated to the EU SST within 2 weeks at maximum posterior to the start of Phase 2.

DATA-REQ-16 **Pre-operational campaign**

Once connected, the Contractor shall answer to the observation requests within the 2 weeks, in order to:

- Be calibrated according to the Technical Performance Assessment Process (See 8.4).
- Check the connection is working properly.

EU SST will send the final answer within 2 weeks from the last measurement epoch.

DATA-REQ-17 **Pre-operational failure**



In case of failure, the Contractor shall perform improvement and send the data within 2 weeks since the rejection by the EU SST. In case of 2-times in a row failure, the contract will be interrupted.

Note: In case of weather event, a waiver can be requested to extend once the weather conditions are good to operate the sensor.

3.3.2 Operational phase

DATA-REQ-18 **Duration**

Once integrated, the Contractor shall provide overall data acquired during 1 month posterior to the integration without any restrictions.

3.3.3 Eligible data

DATA-REQ-19 **Eligible data**

Once completed, the contractor shall be able to provide at least, one of the following data to EU SST:

- a) Tracks (See DATA-REQ-21) related to non-natural objects orbiting the Earth;
- b) Physical data (e.g. resolute images of the target) of non-natural objects orbiting the Earth.

DATA-REQ-20 **Correlation process**

If applicable, the Contractor shall explain, at the high-level, the correlation process and sources within the application form.

DATA-REQ-21 **Track definition**

The Contractor shall consider a track as a set of measurements, associated to a same object, and delimited by the “mean track duration” parameter defined in 8.3.

Common requirements

DATA-REQ-22 **Measurements definition**

The measurement shall comply with the following table:



Nature	Type of parameter	Radar	Optical	Passive Ranging	Space based
Data	Epoch	MANDATORY			
	Celestial coordinates	MANDATORY		OPTIONAL**	MANDATORY**
	Range	MANDATORY*	N/A	OPTIONAL**	MANDATORY**
	Range rate	MANDATORY*	N/A	OPTIONAL**	MANDATORY**
	TDOA / FDOA value	N/A	N/A	MANDATORY**	MANDATORY**
Meta data	Participants	MANDATORY			
	Corrections applied	MANDATORY			
	Biases	MANDATORY			
	Frequency	MANDATORY	N/A	MANDATORY	MANDATORY**
	Wavelength	N/A	MANDATORY	N/A	MANDATORY**
	Frame	MANDATORY			
	Timescale	MANDATORY			
Meteorological information	Pressure in hPa	REQUESTED			N/A
	Humidity in %	REQUESTED			N/A
	Temperature in K	REQUESTED			N/A
	Slant Total Electron Count in TECU	REQUESTED			N/A
	TROPO_DRY in m	REQUESTED			N/A
	TROPO_WET in m	REQUESTED			N/A
Additional information	RCS	OPTIONAL			OPTIONAL*
	Power Received / Power	OPTIONAL	N/A	OPTIONAL	OPTIONAL*



	Emitted ratio				
	Signal to noise ratio	OPTIONAL	N/A	MANDATORY	OPTIONAL* *
	Magnitude	N/A	OPTIONAL	N/A	OPTIONAL* *
	Sensor ephemeris	N/A			MANDATORY

* Range is mandatory for Ranging radars meanwhile Range Rate is mandatory for Doppler radars

** For space based solutions, the nature of the expectation (mandatory or not) depends on the technology behind. The inheritance rule is applied.

For Passive Ranging solutions, the nature of the expectation (mandatory or not) depends on the technology behind.

*** If available due to cross-technology solutions or obtained thanks to an internal process

DATA-REQ-23 Other measurements definition

If DATA-REQ-22 is not applicable, the Contractor shall detail the content of the data.

DATA-REQ-24 Media corrections

The measurements shall be provided without media corrections (see [AD-1]).

DATA-REQ-25 Additional corrections

In case other data corrections than media corrections (See DATA-REQ-24) are involved (such as time bias, ...):

- a) Applied corrections shall be explicitly mentioned in the file according to the related format;
- b) Nature of corrections shall be frozen at the beginning of the activity;
- c) Any changes shall be reported to EU SST and approved thanks to the evaluation process before being used.

DATA-REQ-26 Environment data

The Contractor shall provide the following environment data for each measurement:

- a) Pressure in hPa
- b) Humidity in %
- c) Temperature in K
- d) Slant Total Electron Count in TECU



- e) TROPO_DRY in m
- f) TROPO_WET in m

Space based additional data

DATA-REQ-27 Sensor ephemeris

In case of space-based data, the ephemeris of the sensor shall be provided with each set of measurements and containing:

- The frame used to express state vectors;
- The epoch (and the time scale) of state vectors;
- The state vectors;
- The frame used to express the covariance;
- The covariance for each state vector.

DATA-REQ-28 Ephemeris interval

The ephemeris shall cover the complete interval of the measurements.

DATA-REQ-29 Ephemeris time step

The ephemeris shall contain for each measurement epoch, the information described by DATA-REQ-27.

DATA-REQ-30 Ephemeris format

The ephemeris shall be compliant with the CCSDS-OEM standard (See [AD-2]).



3.3.4 Measurement Exchange protocol

DATA-REQ-31 Data format

The data shall be compliant with either:

- a) CCSDS-TDM format for radars and optical data (See [AD-1]);
- b) Specific format defined by an ICD for others. Any change in the ICD during the period of work shall be firstly approved by EU SST.

DATA-REQ-32 TDM metadata constraints

The TDM shall be structured as follow:

- Sensor identification : Station ID as declared in the EU SST Database meaning <MS>_<NAME>_<CONFIG>
- Target identification : NORAD ID or International Designator only

Nominal Operating procedure

This procedure is the main way to exchange data between the Contractor and EU SST.

Note the EU SST Database interface will change in 2024. The EU SST will be provided early during the contract to let the Contractor anticipate the transition, to be fully operational once the upgrade is expected.

DATA-REQ-33 Data sharing

The Contractor shall share data to the EU SST according to the applicable ICDs (0 and 0).

DATA-REQ-34 EU SST database ICD implementation

The Contractor shall implement the ICDs related to the EU SST database (See [AD-4]).

DATA-REQ-35 EU SST request ICD implementation

The Contractor shall implement the ICDs related to the EU SST On-demand Requests system (COPLA – Coordinated Scheduler) (See [AD-4]).

DATA-REQ-36 EU SST ICDs upgrade

The Contractor shall implement modifications in its system once new EU SST ICD is released, accordingly to the schedule communicated by EU SST.

DATA-REQ-37 EU SST Procedure upgrade

The Contractor shall implement modifications in its system once new EU SST Procedure is released.



Safe Operating procedure

This mode is defined for redundancy, in case of the provider is unable to join the EU SST interface.

In that case, the [TL] threshold won't be used to assess the data is valid or not.

DATA-REQ-38 Backup solution

The Contractor shall provide an online solution to host data in case of failure within the Operating mode.

DATA-REQ-39 API

The Contractor shall develop an API related to the backup solution.

DATA-REQ-40 ICD related to the Backup API

The Contractor shall provide and maintain the documentation related to the API involved.



3.3.5 Performance assessment

Description

The EU SST will assess the performances of the Contractor during the validation phase, in order to ensure a high level of quality, thanks to the established procedure (See 8.4). This evaluation will be performed either:

- a) According to a calibration procedure involving specific objects;
- b) By comparing residuals observed regarding the final products.

See DATA-REQ-42 for thresholds.

Besides, effective added value of the Contractor to the EU SST shall be assessed by the EU SST, in order to compare performance of the Contractor regarding all the other sensors / candidates.

Requirements

DATA-REQ-41 Calibration campaign participation

The Contractor shall participate to a calibration campaign at the end of the working period, according to the established procedure (See 8.4.1).

DATA-REQ-42 Technical Reference thresholds

The Contractor shall be compliant to the technical thresholds defined in 8.4.1.

Note: For your perfect information, please find here under a recap of the technical thresholds

Symbol	[N] (arcsec, m)	[BD] (ms)
MEO, GEO Telescopes	$\leq 2 (+0.1, -0)$ arcsec	$\leq 70 (+3.5, -0)$
LEO Tracking Telescopes	$\leq 30 (+1.5, -0)$ arcsec	
Surveillance Radars	$\leq 100 (+5, -0)$ m, or $\leq 4 (+0.2, -0)$ m/s*	NA
Tracking Radars	$\leq 50 (+2.5, -0)$ m, or $\leq 2 (+0.1, -0)$ m/s	
Tracking Lasers	$\leq 5 (+0.25, -0)$ m	

Table 3 : Noise thresholds per type of sensor

DATA-REQ-43 Noise thresholds inheritance

In case the measurement type is not explicitly mentioned in the table defined by DATA-REQ-42, the thresholds defined for the subjacent technology are used.

For example:



- *Passive Ranging measurement refers to "Tracking radar threshold";*
- *SBSS optical measurement refers to "Surveillance telescope threshold"*

DATA-REQ-44 Thresholds update

The thresholds defined in DATA-REQ-42 and can be reevaluated overall the contract by EU SST solely.

DATA-REQ-45 Procedure upgrade

The procedure described in 8.4 can be reevaluated by EU SST throughout the contract.

DATA-REQ-46 Data exchange protocol

The procedure described in 8.4 can be reevaluated by EU SST throughout the contract.



4 Eligible criteria

4.1.1 Legal governance

DATA-REQ-47 Eligible structure

The nature of the Contractor shall be either:

- a) A Start-Up;
- b) A Small and Medium Enterprise (SME);
- c) A Large Enterprise (LE)
- d) A consortium

DATA-REQ-48 Origin

The Contractor shall be a European company located in a European country, accordingly to the ownership form.

DATA-REQ-49 Consortium composition

In case that the Contractor is a consortium, all members shall be compliant DATA-REQ-47 and DATA-REQ-48.

DATA-REQ-50 Consortium legal representative

In case that the Contractor is a consortium, a unique legal representative shall be identified, speaking in the name of all the members.

4.1.2 Technology maturity

DATA-REQ-51 Input Technical Readiness Level related to Hardware development

The Technical Readiness Level (TRL) related to the hardware to be developed at the time the application is submitted shall be higher or equal to 6 (See 8.1 for more details).

DATA-REQ-52 Input Technical Readiness Level related to Software development

The Technical Readiness Level (TRL) related software to be developed at the time the application is submitted shall be higher or equal to 4 (See 8.1 for more details).

DATA-REQ-53 Technical Readiness level evaluation

The Technical Readiness Level (TRL) shall be evaluated according to ISO-1290:2013.



4.1.3 Sensor(s)

DATA-REQ-54 Sensor ownership

The Contractor shall be the owner of its sensor(s).

DATA-REQ-55 Sensor ownership in case of consortium

For Consortium only, the primary legal representative shall own the sensor(s) related to this contract.

DATA-REQ-56 Location restriction

For optical sensors in European VLA, the Contractor shall provide additional details contributing to demonstrate the added value of the sensor such as (non-exhaustive list):

- LEO capabilities;
- High dedication leading to high contribution;
- High reactivity;
- Large field of view;
- Number of observable objects in same slot



4.2 Quality / Assurance

DATA-REQ-57 Risk Management Document

The Risk Management Strategy (RMS) shall be detailed in a document.

Note: ISO-31000 compliancy would be better.

DATA-REQ-58 Risk Management Document Upgrade

The Contractor shall maintain the Risk Management Strategy (RMS) document during the period of work, and submit it at each evolution.

DATA-REQ-59 Quality and Assurance Plan Definition

The Quality and Assurance Plan (QAP) shall be provided at the time the application is submitted.

Note: ISO-90001 compliancy would be better.

DATA-REQ-60 Quality And Assurance Plan Upgrade

The Contractor shall maintain the Quality and Assurance Plan (QAP) during the period of work and submitted at each evolution.

DATA-REQ-61 Maintenance reporting

All maintenance (scheduled or not) shall be reported by the Contractor to the EU SST. Impact of this maintenance (such as potential risk on the quality) shall be mentioned.

DATA-REQ-62 End of maintenance calibration

At the end of the maintenance, the Contractor shall schedule a calibration campaign accordingly to the procedure (See 8.4).



5 Reporting

5.1 Kick-Off Meeting (KOM)

DATA-REQ-63 Meeting content

Once the contract is signed, the Contractor shall schedule a Kick-Off meeting within 15 days posterior to the signature, presenting:

- The work packages content (including activities)
- The work packages calendar
- The risk related to each work package (including risks related to each activity)
- The budget repartition
- The overall calendar

DATA-REQ-64 Organization

The Contractor shall organize the meeting by proposing both In-person and Remote solutions.

DATA-REQ-65 Deliverables

The Contractor shall provide the following deliverables within 1 week posterior to the meeting:

- A minute of meeting (MoM).
- The presentations shall be provided at the end of the meeting.

DATA-REQ-66 Attendees

The attendees will be (at least):

- The Contractor
- EU SST (both Technical and Contractual delegates)
- The European Commission delegates

5.2 Intermediate Review Meeting (IR)

DATA-REQ-67 Meeting content

Every 3 months, the Contractor shall schedule an Intermediate Review Meeting presenting:

- The status of activities currently in progress
- The risks related to activities currently in progress
- The up-to-date roadmap of the activated work packages



- The up-to-date roadmap of the overall project until termination

DATA-REQ-68 Organization

The Contractor is free to organize this meeting with either:

- a) In-person solution
- b) Remote solution
- c) Both

DATA-REQ-69 Deliverables

The Contractor shall provide the following deliverables within 1 week posterior to the meeting:

- A minute of meeting (MoM).
- The presentations shall be provided at the end of the meeting.

DATA-REQ-70 Attendees

The attendees will be (at least):

- The Contractor
- The EU SST technical delegates

5.3 Critical Intermediate Review Meeting (CIR)

DATA-REQ-71 Meeting content

Every 6 months, the Contractor shall schedule a Critical Review Meeting presenting:

- The status of activities currently in progress
- The risks related to activities currently in progress
- The up-to-date overall risks register
- The up-to-date roadmap of the activated work packages
- The up-to-date roadmap of the overall project until termination
- The up-to-date financial monitoring report

DATA-REQ-72 Organization

The Contractor is free to organize this meeting with either:

- d) In-person solution
- e) Remote solution
- f) Both

DATA-REQ-73 Deliverables



The Contractor shall provide the following deliverables within 1 week posterior to the meeting:

- A minute of meeting (MoM).
- The presentations shall be provided at the end of the meeting.
- The Step-by-step report containing:
 - o Details related to the achieved works
 - o The remaining works
 - o Un up-to-date roadmap for the activities, work packages and overall project
 - o Un up-to-date risks register
 - o Un up-to-date financial monitoring report.

DATA-REQ-74 Attendees

The attendees will be (at least):

- The Contractor
- The EU SST (both Technical and Contractual parts)
- The European Commission delegates

5.4 Pre Final Acceptance Review Meeting (PreFAR)

DATA-REQ-75 Meeting content

At the end of the Phase 1, the Contractor shall schedule the Pre Acceptance Review Meeting presenting:

- The works achieved
- The remaining works
- The up-to-date overall risks register
- The up-to-date roadmap of the activated work packages
- The up-to-date roadmap of the overall project until termination
- The up-to-date financial monitoring report
- The overall status of the project

DATA-REQ-76 Organization

The Contractor shall organize the meeting by proposing both In-person and Remote solutions.

DATA-REQ-77 Deliverables

The Contractor shall provide the following deliverables within 30 days prior to the meeting:



- The presentations shall be provided at the end of the meeting.
- The Step-by-step report containing:
 - o Details related to the achieved works
 - o The remaining works
 - o Un up-to-date roadmap for the activities, work packages and overall project
 - o Un up-to-date risks register
 - o Un up-to-date financial monitoring report.

DATA-REQ-78 Attendees

The attendees will be (at least):

- The Contractor
- EU SST (both Technical and Contractual delegates)
- The European Commission delegates

DATA-REQ-79 Closure milestone for Phase 1

The acceptance of the PreAR’s conclusions by EU SST and the European Commission is leading to close the Phase 1 of the contract.

5.5 Final Acceptance Review Meeting (FAR)

DATA-REQ-80 Meeting content

At the end of the Phase 2, the Contractor shall schedule the Final Acceptance Review Meeting presenting:

- The works achieved
- The remaining works
- The up-to-date overall risks register
- The up-to-date roadmap of the activated work packages
- The up-to-date roadmap of the overall project until termination
- The up-to-date financial monitoring report
- The overall status of the project

DATA-REQ-81 Organization

The Contractor shall organize the meeting by proposing both In-person and Remote solutions.

DATA-REQ-82 Deliverables

The Contractor shall provide the following deliverables within 30 days prior to the meeting:

- The presentations shall be provided at the end of the meeting.



- The Step-by-step report containing:
 - o Details related to the achieved works
 - o The remaining works
 - o Un up-to-date roadmap for the activities, work packages and overall project
 - o Un up-to-date risks register
 - o Un up-to-date financial monitoring report.

DATA-REQ-83 Attendees

The attendees will be (at least):

- The Contractor
- EU SST (both Technical and Contractual delegates)
- The European Commission delegates

DATA-REQ-84 Closure milestone for Phase 2

The acceptance of the FAR's conclusions is leading to close the Phase 2 of the contract.



6 Financial terms

6.1 Main requirements

DATA-REQ-85 Co-funded rate

The Contractor shall provide at least 55% of the total cost of the project (thanks to own funds), meaning EU SST will contribute up to 45% of the total cost at maximum.

DATA-REQ-86 Eligible activities

The eligible activities are defined in the main body of the attached ASI Call for Proposal [AD-6].

DATA-REQ-87 Eligible costs

The eligible costs are defined in the main body of the attached ASI Call for Proposal [AD-6].

DATA-REQ-88 SBSS restrictions

For SBSS projects, the following costs are not eligible:

- Cost related to the satellite launch
- Cost related to the Ground Segment developments

6.2 Payment milestones

6.2.1 Phase 1: Working Period

DATA-REQ-89 Frequency

The reimbursement of the eligible costs, not already claimed by the Contractor, is achieved by EU SST every 6 months.

DATA-REQ-90 Payment acceptance conditions

The payment is granted only if:

- The last CIR (or PreAR) has been scheduled and achieved properly.
- EU SST (both Technical and Contractual delegates) has approved the results of the last CIR (or PreAR).
- The European Commission delegates have approved the results of the last CIR (or PreAR).



6.2.2 Phase 2: Validation Period

DATA-REQ-91 **Frequency**

The reimbursement of the last eligible costs, not already claimed by the Contractor and honoured by EU SST are made at the end of the closure of the Phase 2.

DATA-REQ-92 **Payment acceptance conditions**

The last payment is unlocked after a formal approval of the FAR conclusion (See 5.3), meaning:

- The data have been received and assessed by EU SST.
- The FAR has been scheduled and achieved properly.
- The EU SST (both Technical and Contractual delegates) has approved the results of the FAR.
- The European Commission delegates have approved the results of the FAR.



6.3 Contract interruption conditions

DATA-REQ-93 Critical Intermediate Review GO/NOGO

In case of internal failure, or risks continuously growing leading to compromise the achievement of the project, the NOGO status can be requested at the end of the CIR either by EU SST or European Commission. In such case, the contract is broken.

DATA-REQ-94 Pre Acceptance Review GO/NOGO

In case of internal failure, or risks continuously growing leading to compromise the achievement of the project, the NOGO status can be requested at the end of the PreAR either by EU SST or European Commission. In such case, the contract is broken.

DATA-REQ-95 Final Acceptance Review GO/NOGO

In case of internal failure, or risks continuously growing leading to compromise the achievement of the project, the NOGO status can be requested at the end of the FAR either by EU SST or European Commission. In such case, the contract is broken.



7 Communications

7.1 Technical discussions

The communication between the Contractor and the Contractor Authority regarding the technical aspects detailed into this document shall be monitored by the following EU SST technical expert:

Elena Vellutini
Elena.vellutini@asi.it

7.2 Contractual discussions

The communication between the Contractor and the Contractor Authority regarding the administrative aspects detailed into this document shall be monitored by the following Contractor Authority team leader:

Elena Vellutini
Elena.vellutini@asi.it

7.3 Procurement discussions

The communication between the Contractor and the Contractor Authority regarding the procurement aspects shall be monitored by the following purchasing department officer:

Vanessa Viti
Vanessa.viti@asi.it



8 Appendices

8.1 Technical Readiness Level definition

TRL	Definition
TRL9	Actual system “flight proven” through successful mission operations.
TRL8	Actual system completed and “flight qualified” through test and demonstration.
TRL7	System prototype demonstration in a space environment.
TRL6	System/Subsystem model or prototype demonstration in a relevant environment (ground or space).
TRL5	Component and/or breadboard validation in relevant environment.
TRL4	Component and/or breadboard validation in laboratory environment.
TRL3	Analysis and experimental critical function and/or characteristic proof-of-concept.
TRL2	Technology concept and/or application formulated.
TRL1	Basic principles observed and reported.

8.2 List of KPIs monitored to assess the quality and the contribution of sensors to EU SST

Type	ID	Names	Definition	Thresholds	Metrics	Inputs data Source	Applicability	Considerations
QUALITY MEASUR.	[N]	Noise	<p>Measurement noise is defined as the root mean square (RMS) observation residuals.</p> <p>Measurement noise is generally assimilated to a Gaussian (normal) distribution. In this way, the interval centred on the mean with semi-amplitude of $1 - \sigma$ comprises 68.27% of residuals data</p>	<p>≤ 2.0 arcsec telescopes</p> <p>≤ 30 arcsec telescopes tracking exclusively LEO objects</p> <p>≤ 50m tracking range radars</p> <p>≤ 2m/s tracking range rate radars</p> <p>≤ 100m survey range radars</p> <p>≤ 4m/s survey range rate radars</p> <p>≤ 50 tracking lasers</p>	<p><i>Angular:</i></p> <p>as angular measurements are defined in spherical coordinates, the standard deviation will be computed to:</p> <ul style="list-style-type: none"> $ra \cdot \cos(dec)$, or equivalently $az \cdot \cos(el)$, where ra=right ascension, dec=declination, az=azimuth and el=elevation, dec or equivalently el <p><i>Range and Range rate:</i></p> <p>Obtained as direct results from measurements</p> <p>Results expressed as Half round-trip light time or 1-way equivalent</p>	Calibration Campaign	All sensors	The lower the noise the shorter difference between precise value and observation. RMS of the observation residuals, for every component. Angular components are compressed into a single value (total astrometric error) Thresholds mainly inspired on the implementing decision
	[B]	Bias	For telescopes difference in time between sensor measurements respect a well-known precise orbit	No Threshold	Telescopes: [B] is computed with an OD approach minimizing the residuals (ms)	Calibration Campaign	Telescopes	Specific calibration campaign or equivalent data Telescopes every four months since 2020
	[BD]	Bias Drift	The time drift of the telescopes	$ [BD] \leq 70$	Difference between [B] (Time Bias) associated to the current calibration campaign and the [B] Time Bias) associated to the currently declared in operations. In case no [B] declared in operations the value 0.0 ms will be taken as a reference	Calibration Campaign	Telescopes	Time Bias [B] has to be stable along the time so [BD] should tend to zero
	[OR]	Outliers Rejected	Percentage of measurements rejected by assessment teams due to lack of	<p>$\leq 10\%$</p> <p>If $5\% \leq [OR] \leq 10\%$ & $[N] <$ Threshold. Special analysis will be carried out to assess the</p>	Number of measurements rejected/Number of measurements fulfilling the CC requirements Rejection criteria:	Calibration Campaign	AI sensor	The lower the number the value, the more consistent the data.

Type	ID	Names	Definition	Thresholds	Metrics	Inputs data Source	Applicability	Considerations
			consistency with the rest of measurements shared	impact of the outliers. In case that the assessment with the outliers has a result $[N] > \text{Threshold}$, the outliers will be included in the computation	Average Mean of the residuals $\pm 5\sigma$ Sample SD			
DATA SHARING	[TN]	Track Noise	Noise of the compressed track, computed from the noise of the individual measurements and the number of measurements contained in the track	No Threshold	$TN = [N] / \sqrt{([M] / [T])}$ [N] Noise of the individual measurement y [M] number measurements. [T] number of tracks	EUSST DB Data shared and Calibration Campaign	All sensors	The lower the noise, the better the track. Exclusive for telescopes (it is also used in the architecture studies as telescopes added value for Tracklet accuracy).
	[TD]	Track Duration	Mean track duration. Average duration of all shared tracks	No Threshold	Sum for all tracks (Track last observation epoch- Track first observation epoch)/ [T]	EUSST DB Data shared	All sensors	Interdependent, they can be seen as the inverse of each other.
	[T]	Number of tracks	Tracks as defined in Definitions section corresponding to a sensor	No Threshold	Straightforward recount from TDMs	EUSST DB Data shared	All sensors	Both are strongly dependent on the definition of the track Longer track duration could mean less time for other tracks, and so fewer tracks, and similarly vice versa.
	[M]	Number of measurements	Measurements as defined in Definitions section corresponding to a sensor	No Threshold	Straightforward recount from TDMs	EUSST DB Data shared	All sensors	Both parameters are positively influenced by the frequency of observations and the FoV.
	[MR]	Measurements rate	Number of measurements as defined in Definitions section per operational time	≥ 21 telescopes performing tracking ≥ 24 telescopes performing only survey ≥ 12 tracking radars ≥ 250 survey radars ≥ 19 tracking lasers	Straightforward recount from TDMs measurements / Effective dedication declared time (h)	EUSST DB Data shared	All sensors	Other factor is surveillance strategy. [MR] same as before per unit of time

Type	ID	Names	Definition	Thresholds	Metrics	Inputs data Source	Applicability	Considerations
	[TL]	Timeliness	Delay of provision of measurements	≤48 h >90% data shared	Time between the end of the tracks shared and sharing. In the EUSST DB, this is "Inserted time" – "End time"	EUSST DB Data shared	All sensors	It is computed as the time by which 90% of the data has been shared. To give a statistically complete picture, it is complemented with the % of data shared in 48h/24h
	[O1]	Different Objects observed	Number of different Objects observed by a sensor	No Threshold	Total number of different objects observed	EUSST DB Data shared	Surveillance Sensors	Value is very dependent on the observation strategy. Only observed objects correlated against a public source
	[UT]	Useful Time Percentage	Time actually dedicated to EUSST with respect to that declared	No Threshold	Ratio from Sum (direct) for all tracks (Track last observation epoch- Track first observation epoch)/ originally foreseen to EU SST eventually allocated in actual operations	EUSST DB Data shared	All sensors	Actual availability used by sensor with respect to the commitment. Statistic does not account for the time while sensors are operating but not obtaining results: 1)repositioning time is not considered. 2)Setting for first observation is not considered 3) for tracks overlapped in the time, the operational time is not aggregated
	[RO1]	Un Robustness to operate	Time actually dedicated to maintenance-repairs with respect to that declared to EUSST	No Threshold	Time operational maintenance or technical shutdown (only declarative) with respect to the time committed in the grant	EUSST DB Data shared	All sensors	Time a sensor has been off operations due to a shutdown.

Type	ID	Names	Definition	Thresholds	Metrics	Inputs data Source	Applicability	Considerations
								This parameter cannot be obtained from the operational data and it is declarative (consistent to KPI)
	[RN1]	Responsiveness capability	Capability to react positively to request in monitored TR	≥7.0%telescopes performing tracking, ≥4.0%tracking radars and tracking lasers	Number of times that measurements are provided to a TR, divided by the number of HIE. For sensors declared as a contributors to the Mission Support TR, it will be taken into account for the computation of the parameter.	EUSST DB Data shared	Sensors that perform tracking	Dependent on the TR features. Some events are not observable from some locations. The overlap of TR impact on the availability The more TR covered, more meaningful the statistics is.
	[O2]	Different Objects observed every hour	Average number of different objects observed by a sensor per hour	≥7 objects/hour survey telescopes ≥65objects/hour surveillance radars	Average of number of different objects observed per interval of 1 hour. The whole operational period is divided in N intervals of 1 hour. For each interval i, the number of different objects observed by the sensor is computed $O2 = \frac{\sum_{i=1}^N o_i}{N}$	EUSST DB Data shared	Surveillance Sensors	Rapidity of the sensor for acquiring different objects. A measurement of the sensor rapidity : FoV and Repositioning
	[O3]	Unique objects observed every hour	Average number of different objects observed exclusively by a sensor per hour	≥0.1 objects/hour surveillance telescopes ≥11 objects/hour for surveillance radars	Average of number of objects uniquely observed by a sensor per interval of 48 hours. The whole operational period is divided in N intervals of 48 hours. For each interval i, the number of different objects observed exclusively by the sensor is computed: eoi $O3 = \frac{\sum_{i=1}^N eoi}{N}$	EUSST DB Data shared	Surveillance Sensors	When this parameter value is high, it means that the sensor observes objects that would not be observed by the network without it. A low value means that the sensor observes objects redundantly (because of a close location, for example). This parameter cannot



Type	ID	Names	Definition	Thresholds	Metrics	Inputs data Source	Applicability	Considerations
								<p>be computed for each sensor independently.</p> <p>We need the information of all the sensors at the same time to be able to determine the exclusive observations: one object observed by only one sensor within the interval.</p>

8.3 Parameter description details

8.3.1 Sensor description form

Parameter	Unit	Explanation
MS	-	Member State. Please use ISO 3166-1
Name	-	Name of the sensor with respect to naming convention: <MS ISO 3166-1>_<Sensor name>_<configuration> (e.g. PL_BEATA, FR_TAROT-CALERN, ES_TFRM-PB, IT_SPADE).
Declared dedication		Percent of time contributed to EU SST.
Operational experience	-	Description of operational experience on SST (including references)
Constrains in data policy	-	Possible exclusions of the sensor work (e.g., data restrictions, object restrictions) - description about exclusion
Use	-	Surveillance, Tracking, Both (for sensors that can do surveillance and tracking)
Location	degree / meter	Longitude, Latitude, Altitude above MSL; ECEF coordinates (min precision: at least 7 digits for Lat./Lon. and 3 digits for altitude)
VLA	-	Groups sensors in similar geographical areas that would potentially see similar region of the GEO belt. To be consistent with the architecture, and facilitate the simulation assessments
Potential dedication	-	Maximum time hypothetically a sensor could be working for EUSST
Mount	-	Type: <AzEl Eq X-Y>
	[deg/s]	Max angular Vel angle 1
	[deg/s]	Max angular Vel angle 2
	[deg/s ²]	Max angular Acc angle 1
	[deg/s ²]	Max angular Acc angle 2
Responsiveness	[h]	Preparation hours - Time elapsed from the reception of a request and the sensor being ready to perform the measurement

	-	Processing - Time elapsed from the observation to the availability of the processed data
Format data sharing	-	User input (EU SST requires: CCDS TDM, CRD)
Point of contact	-	Point of contact for the sensor to clarify information
Comments	-	To clarify the data introduced in the Almanac fields, to add information (expected upgrades), etc.
Owner	-	Entity that has ownership of the SST sensor

8.3.2 Observation process description form

- **For optical based sensors:**

Parameter	Unit	Explanation
MS	-	Member State. Please use ISO 3166-1
Name	-	Name of the sensor with respect to naming convention: <MS ISO 3166-1>_<Sensor name>_<configuration> (e.g. PL_BEATA, FR_TAROT-CALERN, ES_TFRM-PB, IT_SPADE).
Mode	-	The mode ID of the configuration
FOV	deg ²	The field of view dimensions.
Wavelength	meter	The mean wavelength of the signal
Limiting magnitude	-	The highest observable magnitude*.
Exposure Time	Second	The exposure time per image
Image per area	-	The number of image per shot
Pointing duration	Second	The time between two shots (for surveillance)
Measure accuracy	deg	The estimated accuracy for measurements

Mean track duration	Second	The mean duration of a track
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* In case of magnitude is function as Elevation, please fill the following table instead.
The elevation step used is up to the Contractor.

Elevation (°)	Limiting magnitude
0	12
...	13
90	14

- **For radar based sensors:**

Parameter	Unit	Explanation
MS	-	Member State. Please use ISO 3166-1
Name	-	Name of the sensor with respect to naming convention: <MS ISO 3166-1>_<Sensor name>_<configuration> (e.g. PL_BEATA, FR_TAROT-CALERN, ES_TFRM-PB, IT_SPADE).
Mode	-	The mode ID of the configuration
FOV	deg ²	The field of view dimensions.
Frequency	Hz	The frequency of the signal
RCS@1000km	m ²	The minimum radar cross section of a target observed at 1000km range.
Measure Per Track	-	The minimum number of measurement per track
Measurement period	s	The duration between two measures in a track

Measure accuracy	meter / meter/second / second / Hz	The estimated accuracy for measurements, depending on the case : <ul style="list-style-type: none"> - Range value : precision expressed in meter - Radial velocity : Precision expressed in meter/second - TDOA : Precision expressed in second - FDOA : Precision expressed in Hz.
Mean track duration	Second	The mean duration of a track

- **Contribution to services:**

Parameter	Unit	Explanation
MS	-	Member State. Please use ISO 3166-1
Name	-	Name of the sensor with respect to naming convention: <MS ISO 3166-1>_<Sensor name>_<configuration> (e.g. PL_BEATA, FR_TAROT-CALERN, ES_TFRM-PB, IT_SPADE).
Mode	-	The mode ID of the configuration
Services contribution	-	Select which case are compliant with your system. <ul style="list-style-type: none"> - CA : YES/NO - RE : YES/NO - FG : YES/NO

8.4 Sensor Assessment Process

The following procedure aims to define the manner to evaluate the operational performance of a sensor. As an output, the status of the sensor (meaning “Operational” or “Not-Operational”) will be determined.

This categorization procedure is based on both subjacent assessment process:

- A technical assessment aiming to estimate the measurement accuracy (See 8.4.1)
- An operational results based assessment process aiming to evaluate the reactivity of the sensor and the contribution to EU SST (See 8.4.2)

8.4.1 Technical Assessment process

Eligible calibration data

In order to calibrate, EU SST is requesting for well-known objects observation campaigns. These objects are selected thanks to different criteria such as:

- Their location
- Their observability
- The accuracy of ephemeris available

In addition, in order to make the assessment relevant and representative, EU SST has been established some rules driving observation campaigns as described below.

For each sensor, the observation campaign shall be performed considering the following rules:

- Telescopes:
 - o Maximum duration (between the first and last measurements): 14 days
 - o Minimum number of objects with at least 50 measurements (35 for LEO): 3
 - o Minimum number of total measurements: 130 (LEO) 200 (MEO/GEO)
- Radars:

- Maximum duration (between the first and last measurements): 14 days
- Number of tracks belonging to different passes: 5
- Minimum total tracks duration: 6 minutes

Eligible targets

8.4.1.1.1 LEO Targets

Object Name	SP3c Code	ILRS ID	NORAD ID	Altitude [km]	Inclination °
Larets	L59	304206	27944	691,00	98,20
CryoSat-2	L12	1001301	36508	720,00	92,00
SARAL	L46	1300901	39086	814,00	98,55
Sentinel-3A	L74	1601101	41335	814,50	98,18
Sentinel-3B	L75	1803901	43437	814,50	98,65
Stella	L56	9306102	22824	815,00	99,00
HY-2C	L69	2006601	46469	957,00	66,00
HY-2D	L78	2104301	48621	971,00	66,00
Starlette	L55	7501001	7646	1000,00	50,00
Jason-3	L39	1600201	41240	1336,00	66,00
Sentinel-6A	L40	2008601	46984	1355,90	66,04
LARES	L60	1200601	38077	1450,00	69,50

8.4.1.1.2 MEO /GEO Targets

Object Name	SP3c Code	ILRS ID	Norad ID	Altitude [km]	Inclination °
Galileo-210	E01	1603002	41550	23220	56
Galileo-211	E02	1603001	41549	23220	56



Object Name	SP3c Code	ILRS ID	Norad ID	Altitude [km]	Inclination °
Galileo-212	E03	1606902	41860	23220	56
Galileo-213	E04	1606903	41861	23220	56
Galileo-214	E05	1606904	41862	23220	56
Galileo-207	E07	1606901	41859	23220	56
Galileo-208	E08	1507902	41174	23220	56
Galileo-209	E09	1507901	41175	23220	56
Galileo-101	E11	1106001	37846	23220	56
Galileo-102	E12	1106002	37847	23220	56
Galileo-202	E14	1405002	40129	23220	56
Galileo-201	E18	1405001	40128	23220	56
Galileo-103	E19	1205501	38857	23220	56
Galileo-104	E20	1205502	38858	23220	56
Galileo-215	E21	1707901	43055	23220	56
Galileo-204	E22	1501702	40545	23220	56
Galileo-205	E24	1504501	40889	23220	56
Galileo-216	E25	1707902	43056	23220	56
Galileo-203	E26	1501701	40544	23220	56
Galileo-217	E27	1707903	43057	23220	56
Galileo-206	E30	1504502	40890	23220	56

Procedure

Step	Action
#1	The Contractor shall schedule acquisition campaign within the 6 months period it has been notified by the EU SST considering the constraints described in 0
#2	Once data are available, the Contractor shall push them to the EU SST database (See DATA-REQ-33) <u>with the “Calibration” flag</u>

Step	Action
#3	The EU SST calibrate the sensor according to bias / noise internal estimation procedure to provide the final report
#4	In case the calibration fails, the sensor is turning to Non-Operational. The Contractor shall request for flash calibration to the EU SST.

8.4.2 Contribution to EU SST Assessment process

Description

The assessment is made thanks to the overall data received during the computation period by computing, among the list of KPIs detailed in 8.2, a restricted list of KPIs.

The computation period is covering the 6 past months to the final evaluation.

Evaluation criteria

In order to assess the contribution of sensors to EU SST, the following KPIs are considered.

	Data sharing		Contribution to services	
	Meas. rate	Timelines	Responsiveness	Objects /h
Symbol	[MR]	[TL]	[RN1]	[O2]
Sensors involved	All		Tracking capabilities	Survey capabilities
Source	EUSST DB			
Computation responsible	KPI WG (MS Assessment Teams as a backup)			

Table 4 : Contribution to EU SST assessment parameters



8.4.3 Exhaustive list of KPIs and thresholds

Category	Quality			Data sharing		Contribution to services			
	Name	Noise	Bias Drift	Rejected Meas.	Meas. rate	Timeliness	Object /hour	Responsiveness	Unique objects per hour
Symbol	[N] (arcsec, m or m/s)	[BD] (ms)	[OR] (%)	[MR] (mea/h)	[TL] (h & %)	[O2] (obj/h)	[RN1] (%)	[O3] (obj/h)	AP
Tracking Telescopes.	≤ 2.0 arcsec ≤ 30 arcsec+	≤70**	≤ 10% if 5%≤ [OR] ≤ 10% special analysis	≥21	≤48 h >90% data	N/A	≥7.0%	N/A	≥ 1.34%
Surveillance Telescopes	≤ 2.0 arcsec	≤70**		≥24		≥7	≥7.0%*	≥0.1	≥ 6.51%
Tracking Radars	Range ≤ 50m or Range rate ≤2m/s	N/A		≥12		N/A	≥4.0%	N/A	≥ 0.94%
Surveillance Radars	Range ≤100m or Range rate ≤4m/s	N/A		≥250		65	N/A	11	≥ 10.87%
Tracking Lasers	≤5m	N/A		≥19		N/A	≥4.0%	N/A	0,0%

Table 5 : Exhaustive list of KPIs and thresholds used to determine the category of the sensor

8.5 On-operation data quality process

In addition to the calibration campaign, in order to support sensors and ensuring a high level of quality, a continuous or regular update of the noise parameter is defined.

To do so, the process will request (thanks to COPLA) in a monthly basis, measurements of reference objects to assess the noise of the measures coming from the sensors. At the end of the month, the evaluation leads to the following conclusion:

- If the measurement noise is compliant with threshold, all data received are considered valid (and paid).
- All received data are rejected (and not paid) otherwise.

Step	Action
#1	During the first part of the month (15days maximum), COPLA is requesting for measurements of reference objects (in addition to operational requests).
#2	During the second part of the month (15days maximum), the assessment team is evaluating the noise thanks to 8.4.1.
#3	The assessment is then assessing the operational KPIs of the sensors to consider valid data.
#4	At the end of the month, a report is written and shared to both EU SST and related commercial data providers to summarize the amount of valid data

Note: In order to ensure an unbiased evaluation, the measurements are rescaled to 1Hz.