

Fundamental Elements Industry Days Workshop:

Developing cutting-edge devices for connectivity

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Agenda



Introduction to FE R&D funding
How to prepare your application
Participation and evaluation
Guidelines to fill in the financial proposal
Scope of the Call for proposal
Q&A

Introduction



This webinar aims to present an overview of the **Open call for proposal** of the **Second FE programme** underlying the **scope** of the call, the **objectives** as well as the the **foreseen results** in terms of technologies readiness of the solutions and their **benefits** to the related **market segment**. Details on the budget and the planned maximum number of projects to be awarded is also provided.

An overview of the main **Financial and Legal rules** to bear in mind for the correct submission of the proposal is also presented, helping the participants during the submission process.

Fundamental Elements 2 - continues the successful work of FE1



New development of receivers, antennas and enabling users technology:



Continue to be **driven by user needs** and **oriented for a commercial use**:

- Priorities on specific segments driven by market needs, consultation with Users, with MS, with Industry/Academia
- Clear-cut from prototype receiver developments needed to leverage new services



Operational **implementation of current differentiators**:

- E.g. OSNMA and HAS, multi frequency



Prepare for commercial implementation of **new differentiators**:

- Early Warning Service, CAS, ARAIM, ...



Develop **emerging, disruptive technologies**:

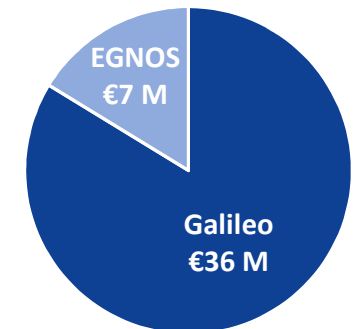
- E.g. leveraging Machine Learning and Artificial Intelligence



Explore **synergies with other space systems** on user technology:

- E.g. Copernicus, SatCom

Allocated EC budget for FE2
€43* million
2021-2027



* Indicative budget

Proposal submission - forms



| FORM | CONTENT | SINGLE APPLICANT/ CO-ORDINATOR | CO-APPLICANT(S) | Affiliated entity(ies) | |
|------------------------------|------------------------|-----------------------------------|-----------------|---------------------------|----------------------|
| A1 | CONSORTIUM COMPOSITION | X | | |] ADMIN PROPOSAL |
| A2 | COORDINATOR PROFILE | X | | | |
| A3 | CO-APPLICANT PROFILE | | X | | |
| A4 | DECLARATION OF HONOUR | X | X | X | |
| A5 | FINANCIAL CAPACITY | X | X | X | |
| FIF and supporting documents | | X | | | |
| LEF and supporting documents | | X | X | X | |
| | | | | |] TECHNICAL PROPOSAL |
| B1 | TECHNICAL PROPOSAL | X | | | |
| B2 | OPERATIONAL CAPACITY | X | X | | |
| | | | | |] FINANCIAL PROPOSAL |
| C1 | PRELIMINARY BUDGET | X | X | X | |

Means of submission (CfP section 17.1)



Proposal can be submitted in 2 ways:

1. In a paper version
2. In electronic version

Paper submission:

- Regular paper submission
- At least 2 copies of electronic storage devices (USB) containing the full set of documents

Electronic submission:

- Submission only electronically on at least 3 storage devices (USB, CD-ROM, DVD) containing full set of documents
- Paper print-out of the hashes of the submitted files (in the form of algorithm MD5, SHA-256 or higher)

Signature (CfP section 17.2)



Only **A4 form** is required to be submitted with original signature.

2 ways to sign:

- Blue ink on paper -> submission on paper (see slide above)
- Qualified Electronic Signature (QES)

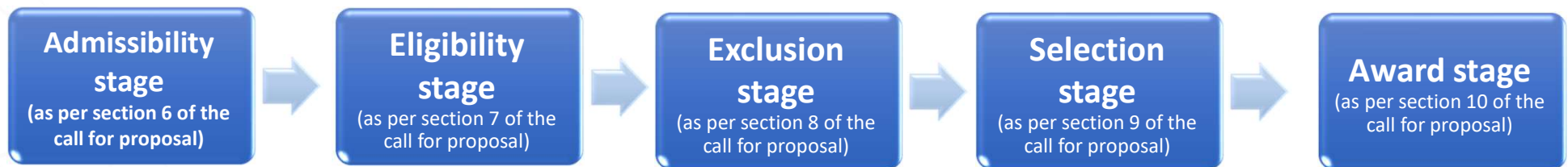
QES:

- Only QES within the meaning of Regulation (EU) No 910/2014 (eIDAS Regulation) will be accepted
- Recommended to check here: <https://ec.europa.eu/digital-building-blocks/DSS/webapp-demo/validation>

Evaluation process



Assessment of the call for proposal is done in sequential stages:



- Deadline
- Submission set
- Language
- Max. rate of co-financing

- Eligible applicants (EU MS, Switzerland, Norway)
- Structure of the consortium (at least 2 entities)

- Applicants not in exclusion situation – see for A4
- Misrepresented information
- Involved in preparation of the call
- Are Restricted Person

- Financial capacity
- Operational capacity

- Award criteria

EU funding



Non-cumulative award

Each action may give rise to the award of only one grant from the budget to any partner

Non-retroactivity

No grant may be awarded **retrospectively** for actions already completed

Non-profit rule

Where a profit is made, **EUSPA is entitled to recover the percentage of the profit**

Subcontracting

- ✓ Subcontracting shall **in no case cover core activities**
- ✓ The proposal should clearly **specify the activities that will be subcontracted** and the corresponding **costs must be indicated in the estimated budget**
- ✓ Subcontracting is **not allowed among the beneficiaries** of the proposal

Co-financing

EU financing **may not cover 100% of the total costs** of the action. It may take the form of:

- ✓ Partner's own resources
- ✓ Income generated by the action
- ✓ Contribution from third partners

Balanced budget

The estimated budget of the action is to be attached in excel format to the application form following the model provided in the Form C1. It must have revenue and expenditure in balance. The amounts must be expressed in Euro with maximum two decimals.

Applicants (and affiliated entities) with general accounts in a currency other than the euro must convert costs incurred in another currency into euro at the average of the daily exchange rates published in the C series of Official Journal of the European Union, determined over the corresponding reporting period.

Financial support to third parties

The applications for this action may not envisage provision of financial support to third parties.

Eligible costs and payments

Eligible direct costs:

- Cost of personnel working under direct contract
- Costs of natural persons working under a contract with the beneficiaries other than an employment contract
- Unit costs of owners of SMEs who do not receive a salary or natural persons who do not receive a salary
- Cost of travel and related subsistence allowance
- Costs for equipment and other assets specifically procured for the action (only depreciation costs if assets not procured specifically, but directly used for the action), costs for equipment not procured specifically but used directly for the action in proportion to the usage for the action and only during its duration as depreciation costs
- Only depreciation for equipment which is strictly necessary for the purposes of carrying out the action can be charged as direct costs. This thus excludes any computer equipment, office material, furniture, etc. that the applicant needs for his daily activities and that will be normally covered by indirect costs.
- Only the portion of the equipment's depreciation corresponding to the duration of the project and the rate of actual use for the purposes of the project can be taken into account by EUSPA.
- Cost of consumable and supplies
- Costs arising directly from requirements imposed by the grant agreement (dissemination, audits)
- Duties, taxes and charges (ex: non-deductible VAT)

Eligible indirect costs:

A flat-rate amount of 7% of the total eligible direct costs of the action excluding subcontracting costs, (beneficiary's general administrative costs which can be regarded as chargeable to the action/project.)

Non-eligible costs:

- 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 beneficiary's bank for transfers from the EUSPA
- Costs declared by the beneficiaries 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 EUSPA for the purpose of implementing the EU budget); in particular, indirect costs shall not be eligible under a grant for an action awarded to a beneficiary which already receives an operating grant financed from the EU budget during the period in question
- Contributions in kind from third parties
- Excessive or reckless expenditure
- Deductible VAT
- Participation by any staff of the European Union institutions in the action
- Costs incurred during the suspension of the implementation of the action
- Cost categories explicitly excluded in the work programme/call.

Subcontracting, equipment and leasing/rental costs

- **Subcontracting** - When the tasks in B1 cannot be done by the consortium
- **Specific Principle:** May only cover a **limited part of the action** and can **not** cover the **core activities**
- **Purchase of equipment** – When achieving the objectives of the action requires the purchase of equipment or the use of equipment already owned by the Beneficiary which is subject to depreciation
- **Leasing or rental costs** – When achieving the objectives of the action requires the use of equipment which is leased or rented
- **Common Principles:**
 - Stated in the proposal (Form C1 and B1)
 - Best value for money or the lowest price
 - No Conflict of Interest
 - Necessary for implementation
 - The Legal Entities signing the Grant Agreement must be the ones who are procuring, implementing and incurring the costs related to the Subcontract, Equipment or Leasing/Rent. **The Grant Agreement does not extend to affiliated entities (Holding Groups, Mother/Sister Companies, Spin-offs), unless they are identified separately as Co-Applicants or Affiliated Entities.**
- **Specific cases**
 - Subcontracting, leasing/renting and purchase of equipment among beneficiaries is not possible
 - Subcontracting, leasing/renting or purchasing equipment from affiliated entities is not possible except in very specific conditions, where the Applicant can prove that the above principles are respected

Admin package – overview of forms

Form A4 & Form A5

FORM A4. DECLARATION OF HONOUR

(TO BE SUBMITTED BY ALL APPLICANTS – INCLUDING AFFILIATED ENTITIES)

- It serves to check the exclusion and selection criteria
- To be filled and submitted by **ALL applicants**
- Generic text used by EU institutions and agencies.
- Consider starting early enough collecting all the evidences; since might be time consuming
- Supporting evidence may be required on the basis of a risk assessment that will be conducted by the EUSPA – possibility for the potential beneficiaries to start collecting all evidence early enough to be assessed by the applicants
- Evidence submitted in another procedure (procurement or grant) less than 12 months before the award of the grant can be re-used (no need of submitting new documents)

FORM A5. FINANCIAL CAPACITY

(TO BE SUBMITTED BY ALL APPLICANTS – INCLUDING AFFILIATED ENTITIES)

Admin package – overview of forms

Form A5: Financial capacity (1/2)

- Filled in with figures from your annual accounts for last 3 years (plus audit report for the last 3 years to be submitted if requested contribution is above 750K EUR) – given the complexity it is recommended to be filled in by a professional accountant / auditor
- EUSPA calculates ratios (e.g. profitability, indebtedness, financial independence)
- Used to assess your financial viability

**Not applicable to:
public bodies, international organisations, natural persons receiving educational support or persons in need, persons or entities receiving interest rate rebates and guarantee fee subsidies for the purpose of reinforcing financial capacity**

Admin package – overview of forms

Form A5: Financial capacity (2/2)

If outcome of the check is not satisfactory and in any other case EUSPA can:

- request further information
- propose a grant agreement without pre-financing
- propose a grant agreement with a lower percentage of a pre-financing;
- propose a grant agreement with a pre-financing covered by a bank guarantee
- reject the application

Admin package – overview of forms



Form C1: Estimated budget

| | | | | |
|--|--|---|--------------------------------------|-----------------------------|
| Funding rate of the action (F. Rate) | <p>The Consortium/Single Applicant must choose a funding rate up to the maximum 70%, which applies to all applicants and to the coordinator regardless of their legal form.</p> <p>Applications must respect the maximum rate for EU co-financing (see Admissibility Requirements)</p> | | | |
| Estimated eligible costs of the action and EU contribution (Table 1) | | | | |
| | Estimated eligible direct costs (EUR) | Estimated eligible indirect costs (EUR) | Total estimated eligible costs (EUR) | Total EU contribution (EUR) |
| | A | B | C = A + B | D = (F. rate) x C |
| Direct eligible costs (Membering of categories as in "Eligible Costs for the grants" section 12.2 of the Call for Proposals - apply the rules detailed thereafter) | | declared on the basis of flat rate of 7% of 1. + 2. without costs of subcontractors, costs of third parties not working on beneficiary premises, and cost of financial support to 3rd parties | | |
| 1. PERSONNEL COSTS | | | | |
| 1.1 Personnel under direct empl. contract | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.2 Personnel under other than under empl. contract (in-house consultants) | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.3 Unit costs of owners of SMEs who do not receive a salary or natural persons who do not receive a salary | 0.00 | 0.00 | 0.00 | 0.00 |
| Sub-total for cost category 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2. OTHER DIRECT COSTS | | | | |
| 2.1 Travel costs | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.2 Costs for equipment and other assets procured for the action | Not applicable in this call for proposals | | | |
| 2.2 a) Costs for equipment and other assets procured for the action: Full purchase costs | Not applicable in this call for proposals | | | |
| 2.2 b) Costs for equipment and other assets procured for the action: Depreciation costs | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.3 Costs for equipment or other assets not procured but used for the action (depreciation costs) | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.4 Costs for rental or lease of equipment or other assets only to the portion of use and limited to the duration of the action | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.5 Costs for use of technical facilities or laboratories | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.6 Costs for consumables and supplies | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.7 Costs arising directly from requirements imposed by the grant agreement | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.8 Costs entailed by subcontracts as described in the proposal | 0.00 | Not applicable | 0.00 | 0.00 |
| 2.9 costs of financial support to third parties | Not applicable in this call for proposals | | | |
| 2.10 Duties, taxes and charges paid by the beneficiary | 0.00 | 0.00 | 0.00 | 0.00 |
| Sub-total for cost category 2 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total direct eligible costs | 0.00 | | | |
| Total indirect eligible costs | | 0.00 | | |
| Total eligible costs | | | 0.00 | |
| 5. Total EU contribution | | | | 0.00 |

Connectivity - Scope of the Call for Proposal (1)



Foreseen result

- Unified hybrid user terminal **capable to support TN and NTN** communication together **with GNSS, and Galileo in particular, and LEO satellite** signals in order to support joint Data & PNT services, reaching TRL 7.

Objectives

1) From communication perspective: the Terminal shall support TN and NTN communication signals utilizing

- **Multi-layered multi-band Terrestrial Network and Non-Terrestrial Network infrastructures:**
 - **Mandatory:** As a minimum the Terminal shall be able to access TN (i.e. 5G) and one LEO NTN infrastructure.
 - **Optional:** As an option NTN multi-constellation access can be considered, including additional LEO, Medium Earth Orbit (MEO) and Geostationary orbit (GSO) satellites as well as compatibility with aerial Base Stations (i.e. High-Altitude Platforms).
- **One or more use cases** out of: critical communications (i.e. crisis management), aerial and maritime communications for surveillance or transportation, support for massive IoT application and terminals, or other clearly defined use cases.
- **Terminal design (NTN access):**
 - **Mandatory:** the user terminal for communication purposes shall be designed according to the use case, hence considering mobile, nomadic and fixed terminals. The solution shall consider at least very-small-aperture terminals (VSAT) technology or Electronic Steerable Antennas
 - **Optional:** As an option, applicants may consider both a VSAT technology and Electronic Steerable Antennas at the same time. Interfaces to allow connection with additional handheld or IoT devices can be considered as well.
- **Communication standards:** TN cellular communication protocols (e.g., 5G) and the new NTN included in 3GPP standardization activities (release 17).

Indicative #of projects: up to 4
Maximum budget: **3.0M€**
EU co-financing rate: **70%**
Deadline: **15 September 2023**

More info at:

<https://www.euspa.europa.eu/newsroom/webinars>



Connectivity - Scope of the Call for Proposal (2)



Objectives

2) From Navigation perspective: The Terminal shall support and process signals from GNSS and LEO for PNT purposes utilizing:

- Standard GNSS processing with the addition of **Quasi-pilot signals processing**, as presented in [RD8], [RD-9]. Specific configurations for the Quasi-Pilot signal to be considered (with the corresponding specifications) will be provided to the awarded beneficiaries during the project execution.
- LEO-PNT processing (i.e. LEO-based signals that can be used for PNT purposes).



The following two objectives (3) and (4) are optional

3) From communication to navigation perspective (COM2NAV): The Terminal can support and process communication signals to provide localization services according to several wireless communication methods and using NTN satellite communication as Signals of Opportunity (SoP) processing.

4) From navigation to communication perspective (NAV2COM): considering GNSS and all other PNT functions, the Terminal can exploit positioning, ranging and time synchronization to improve data acquisition task by channel estimation, beam alignment, medium access control, routing, and network optimization.

Indicative #of projects: up to 4
Maximum budget: **3.0M€**
EU co-financing rate: **70%**
Deadline: **15 September 2023**

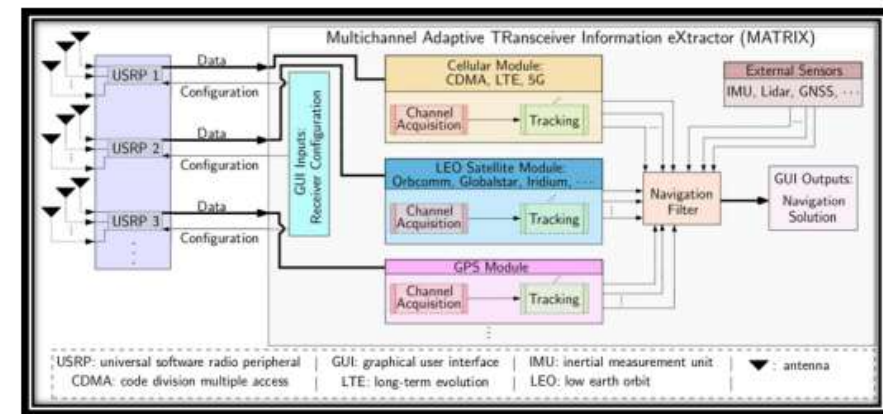
More info at:

<https://www.euspa.europa.eu/newsroom/webinars>



Modular architecture of the terminal

- The unified hybrid user Terminal **can be based on a generalized modular architecture** allowing to combine GNSS and dedicated PNT signals (i.e. LEO-PNT) with communication signals including cellular communication standards (e.g. UMTS or LTE) and upcoming TN and NTN satellite communication protocols when available in the market.
- **Flexible SDR technology** allowing to cope with different supported signals, frequency bands and software upgradeability concepts (Universal Software Radio Peripheral, metadata/metasignals, etc.) can be used. A baseline architecture of an integrated NAV and COM2NAV task are provided in the diagram, identifying the minimum PNT module that shall be considered.
- **The architecture shall optimize the integration of the different modules** considering functional and SW synergies. The HW implementation can be based on accelerated modules (FPGA), novel GPU driven solutions and System-On-Chip (SoC) platforms. For the PNT different use cases, different customizations are expected. IoT application can use Galileo quasi-pilot enabled snapshot approach [RD-10] for intermittent devices and power saving.
- Regarding **Quasi-Pilot signals** that improve TTFF: “Galileo programme is considering the addition of dedicated signals components, particularly suitable for connected/low power tracking devices. An option that is being considered for Galileo 2nd generation is that of the so-called Quasi-Pilot (QP) signals.”



Source: <https://ece.osu.edu/aspin/research>

Tasks and core activities



1

Task 1: Technology and Application selection: Describe the selected application(s) for the integration of GNSS enabled capability with new signals provided by TN and NTN infrastructures, justifying the choices made (in terms of market sizing, revenues, technological breakthrough, commonalities between different applications, etc.), and describing which are the hardware (HW) and software (SW) features that would be developed. In particular, the applicant shall describe the market segment selected (i.e. IoT, aviation and drones, automotive, or any other), application, use case and the type of signals included (i.e. GNSS, LEO-PNT, LEO NTN, 5G TN, etc.).

2

Task 2: Design and development: Based on the previous task, the applicant shall design and develop the proposed SW and HW solutions considering the application(s) selected, resulting in a Terminal as defined above – the applicant shall provide to EUSPA two prototypes of the fully fledged device.

3

Task 3: Test, verification and validation: The applicant shall define use cases and tests to verify the expected performance related to:

1. the capacity of the Terminal to jointly process GNSS (including Galileo Quasi-Pilot signals), LEO-PNT, TN and NTN signals in order to provide improved navigation and communication services, i.e. PNT and data transfer capabilities, associated to the target application;
2. if applicable, demonstrate synergies in the joint exploitation of all involved infrastructures, i.e. NAV2COM and COM2NAV;
3. the capacity to reuse HW and SW mechanism to process different signals and data sources with possibility to optimize the terminal design reducing cost, complexity, size and power consumption.

4

Task 4: Exploitation and dissemination: Definition of a business plan; definition of a proper dissemination plan (including set of appropriate tools and timing of approaching the right stakeholders); running a demonstration, validating the operational concept and involving the necessary stakeholders.

Core activities

For the purpose of this call the following **activities are considered core to the project:**

- Management and coordination;
- User requirements definition;
- Design and development of terminal architecture;
- Testing and validation plan definition;
- Business strategy definition and implementation;
- Final demonstration.

Suggested planning for the submission of the deliverables



| Deliverable | KOM | SRR | PDR | CDR | TRR | FR |
|---|-----|-----|-----|-----|-----|----|
| Project Management Plan | X | X | X | X | X | X |
| Application selection and user requirements document | | X | X | | | X |
| System/device requirements document | | X | X | | | X |
| Preliminary architecture document | | | | X | | X |
| Detailed architecture and Design Justification File | | | X | X | | X |
| Test plan, cases and procedures | | | | X | | X |
| Test report | | | | | X | X |
| Device prototypes and operations manual | | | | | | X |
| Business Plan | | | X | | | X |
| Dissemination Plan | | X | | | | X |
| Report on recommendations for Galileo QP improvements to support market needs | | | | X | | X |
| Demonstration material | | | | | X | X |
| Dissemination material | | | | X | X | X |

Award criteria



| AWARD CRITERIA | MAX. SCORE |
|--|------------|
| 1. Relevance of the proposal to the objectives of the call, credibility of the proposed approach and innovation level of the solution proposed; | 50 |
| <i>Relevance of the selected target application(s) and market segment(s) for the proposed Terminal.</i> | 15 |
| <i>Relevance and quality of the proposed technologies and specific hardware solution in the Terminal to be implemented in terms of innovation to cope with the main challenges identified. Proposal with solutions meeting the optional objectives will be preferred and advantaged.</i> | 25 |
| <i>Effectiveness of the methodology for testing, verification and validation of the proposed solution.</i> | 10 |
| 2. Impact in terms of economic and public benefits derived from the proposal | 20 |
| <i>Scope and expected benefits for the target market and society as a whole</i> | 10 |
| <i>Effectiveness, coherence and viability of the business plan including plan for the commercialisation of the results, management of IPR and business risk assessment</i> | 10 |
| 3. Credible and effective dissemination plan for the results in the best interest of the European Union | 10 |
| 4. Coherence and effectiveness of the work plan and appropriateness of the allocation of tasks and resources | 20 |
| <i>Appropriateness of the management structure and effectiveness of the work plan, including risks</i> | 10 |
| <i>Appropriateness and justification of the level of the effort involved and its distribution within the proposed tasks and consortium participants, including complementarity of the proposed resources' skills</i> | 10 |
| Maximum total score | 100 |

IMPORTANT NOTE: If a total score lower than **60** points or a score lower than **60%** for any of the **above four criteria** is obtained, the proposal will not be evaluated further and will be rejected.

Connectivity call: Timetable



| Stages | | Date/time or indicative period |
|--------|--|--------------------------------|
| a) | Publication of the call | 31 May 2023 |
| b) | Deadline for request for clarifications | 18 August 2023 |
| c) | Publication of the clarifications | 1 September 2023 |
| d) | Deadline for submitting applications | 15 September 2023 |
| e) | Evaluation period | September – November 2023 |
| f) | Information to applicants on the outcome of the evaluation | December 2023 |
| g) | Signature of the Grant Agreement | January 2024 |

Indicative duration of the action under grant agreement: **two years**

Starting date for the action is the first day of the month following the signature of the Grant Agreement.

Any questions?

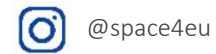
Note: All the Q&A (including not answered) will be published as clarifications (by 1 September 2023)



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