



Call for new science ideas in ESA’s Science Programme

1 PURPOSE OF THE CALL

The process of calls for Medium (M) and Large (L) missions has demonstrated to be effective in selecting, by a bottom-up proposal approach and a peer review selection process, exciting new missions covering a wide range of scientific fields.

Through the present Call the Director of Science solicits from the broad scientific community proposals for the competitive selection of new “Science Ideas”, to be investigated in terms of feasibility and needed technology developments. Therefore, this Call is not intended at replacing future Calls for M or L missions, but aims at stimulating the emergence of new and innovative science ideas based on technologies not yet sufficiently mature, possibly to become potential candidates for future M or L mission Calls in the ESA Science Programme.

The present Call is open to science ideas in all areas of Space Science. No limitations to the science goals addressed are imposed on the proposals.

2 LETTERS OF INTENT AND BRIEFING TO PROPOSERS

Prospective proposers must submit a mandatory Letter of Intent by the deadline indicated in Section 5. Proposals not preceded by a corresponding Letter of Intent will not be considered. Letters of Intent are limited in length to 2 A4 pages (minimum font size 11 pt), and their purpose is to allow ESA to perform an initial assessment of the range of science themes that will be proposed, and to prepare for the evaluation process.

Letters of Intent must contain the following information:

- Proposal title;
- Name and contact information of Lead Proposer;
- Core team members (institutions, scientists) insofar as known/available;
- Brief description of the science idea and measurement concept;
- Any other relevant information (e.g., mission concept, payload/instruments).

It is understood that the proposal’s structure and content may evolve between submission of the Letter of Intent and submission of the actual proposal, e.g., the composition of the

proposing team may evolve and be different in the actual proposal with respect to the Letter of Intent. The Lead Proposer and the proposal’s title identified in the Letter of Intent, however, must remain the same throughout the process.

Letters of Intent may be made available by ESA to national funding agencies and SPC delegations; hence ESA cannot guarantee their confidential treatment.

Any further communication between ESA and the proposing team will only take place through the Lead Proposer.

2.1 Briefing meeting

Following the submission of a Letter of Intent, proposers will be invited to a briefing meeting, currently planned for the date indicated in Section 5, to be held at ESTEC, The Netherlands (TBC). During the briefing meeting, details on the expected proposal content will be discussed. Confirmation of the date and of the logistical details for the briefing meeting will be communicated to the Lead Proposers indicated in the Letters of Intent.

3 PROPOSALS

3.1 Guidelines on proposals content

Considering the nature of the present Call for new “Science Ideas” proposals must focus on a detailed description of the scientific objectives and a clear justification why access to space is essential for the achievement of the proposed objectives. Proposals should describe insofar as possible how the scientific requirements could be translated into requirements for a space mission, its instrumentation and operational approach. Specific focus is expected on the measurement principle and instrumentation concept. The proposals should also describe a mission preliminary concept, insofar as known.

It is not expected that the proposed concepts rely on technologies with high TRL at the time of the proposal submission. Proposers should however identify insofar as possible the key technologies envisaged for the mission/instrumentation and include their assessment of the TRL at the present time for each of them.

Proposals are not required to include cost and schedule plans. However, the proposers are welcome to indicate a tentative cost envelope and a top-level breakdown of costs foreseen. Proposers are also invited to present their views on the roadmap of activities and timeline required for the targeted space mission and a top-level time plan for the study, development and implementation phases.

Proposers are welcome to indicate interest in their proposal outside the ESA Member States and mention other entities that may eventually be interested in its implementation.

3.2 Structure, page limits and submission

The deadline for submission of proposals in response to the present Call is indicated in Section 5. Late submissions will not be considered. Submissions are accepted exclusively in electronic form, in PDF format, using the interface available at <http://www.cosmos.esa.int/web/new-scientific-ideas>. Proposals will be limited in length to

25 A4 pages (not including appendices and bibliography), with a minimum font size of 11 pt, and a maximum file size of 50 Mbytes.

The topics that should be covered in the proposal are:

- Front cover (title page, 1 page, mandatory): must include proposal name and the name of the Lead Proposer. Any other information is optional;
- Back cover (contact information page, 1 page, mandatory): must include the contact information for the Lead Proposer. The proposal must explicitly state the availability of the Lead Proposer to support the study activities;
- Executive summary (1 page, mandatory): must contain a summary of the proposal, allowing the reader to gain a preliminary understanding of the proposal’s content upon reading;
- Science case: should address the scientific rationale for the proposed idea, explaining the broad context, the progress in the relevant field that the proposed idea intends to achieve, the need to perform the relevant measurements from space, the eventual synergy with other facilities (ground- and space-based), etc. It is suggested to assume that the relevant readers will be scientists from other fields of space science, hence not necessarily experts in the field;
- Scientific requirements: should explain how the science is “sized” and what are the scientific requirements to be considered in the measurements concept. It should be understandable by both scientists and engineers;
- Measurements concept: should explain, following on the definition of scientific requirements, what are the measurement/detection concept and requirements and, possibly, the resulting requirements on the mission and the instrumentation.
- Other information: should indicate interest in the proposal within and outside the ESA Member States and mention other entities that may eventually be interested in its implementation;
- Bibliography: not required but encouraged. The list of references can be included as an Annex, thus not counting against the page limit.

ESA may share the proposals with national funding agencies and with SPC delegations, e.g., for the purpose of discussing their commitment, as well as, when applicable, with the other proposed partners. ESA cannot therefore ensure the confidentiality of the submitted material.

4 PROPOSAL EVALUATION

Valid proposals received by the deadline for the present Call will be submitted to a scientific peer review process conducted under the responsibility of the Advisory Structure to the Science Programme. Based on the results of this process, the ESA Director of Science

plans to select a limited number of the science ideas for a preliminary study phase.

5 DEADLINES AND INDICATIVE SCHEDULE

Activity	Date
Release of Call for science ideas	February 9, 2016
Letter of Intent submission deadline	May 9, 2016 (12:00 CEST - noon)
Briefing meeting (ESTEC)	June 8, 2016 (date and place TBC)
Proposal submission deadline	September 14, 2016 (12:00 CEST - noon)
Selection of proposals for study	December 2016 (tentative)

6 BACKGROUND INFORMATION

The ESA Science Programme is based on long-term planning of scientific goals. The *Cosmic Vision* plan (available as ESA BR-247) was established in 2005 on the basis of a bottom-up process that started with a consultation of the broad scientific community and contains the wide-ranging and ambitious scientific questions to be addressed by missions in the ESA Science Programme.

The definition of the actual space missions that will address the science themes in question is based on competitive, peer-reviewed “Calls for Missions”. Through this approach, Solar Orbiter and Euclid were selected in 2011 as the first and second Medium missions (M1 and M2), followed by JUICE, selected in 2012 as the first Large mission (L1) in the *Cosmic Vision* plan. CHEOPS was selected in 2012 as the first Small mission (S1) and PLATO in 2014 for the M3 opportunity. Through a “Call for White Papers” the science themes for the L2 and L3 launch opportunities were selected in 2013: “The hot and energetic Universe” science theme, to be pursued by implementing a large collecting area X-ray observatory, and “The gravitational Universe” science theme, to be pursued by implementing a gravitational wave observatory, with planned launch dates of 2028 and 2034, respectively. The ATHENA mission was then selected in 2014 for the L2 mission opportunity. The call for the implementation of the “M4” Medium mission resulted in 2015 in the selection of ARIEL, THOR and XIPE mission concepts for study, with a planned down selection for the M4 opportunity in 2017. Finally, SMILE was selected in 2015 as the first joint science mission between ESA and the Chinese Academy of Science. The next step will be a call for the Medium-size mission M5, with a planned launch date of 2029-2030 (TBC); the community was invited in 2015 to provide non-binding Statements of Interest (SoI) and the call is planned to be issued during 2016.

In the current plans, the ESA typical cost for an M mission is 550 M€ and 1 B€ for an L mission, including the cost of the mission’s nominal operations. The nominal implementation schedule for an M (L) mission foresees a definition and preparation phase lasting approximately 3.5 (5) years followed by an implementation phase lasting 6-7 (8-9)

years, leading to launch readiness.

Sufficient time is allocated in the Science Programme for the development of the technology required for L missions, in order to allow these ambitious missions to reach the needed maturity (nominally, Technology Readiness Level 5-6 in the ISO scale at mission adoption). For M missions, the available time for developing needed technologies is of the order of 2-3 years and brings de facto to select mission requiring very limited new developments or validations to reach TRL 5/6 at the mission adoption. This approach is robust and has successfully enabled the implementation of a stable Science Programme.