



Call for Membership of Topical Teams for the Voyage 2050 long-term plan in the ESA Science Programme

1 INTRODUCTION

The Science Programme of the European Space Agency (ESA) relies on long-term planning of its scientific priorities. The first long-term plan, Horizon 2000, was the result of an exercise started in 1983, and it was followed by an extension, Horizon 2000 Plus, that resulted in the initiation of the Gaia and BepiColombo missions. The successive planning exercise, Cosmic Vision¹ was started in 2004, and is the current basis against which the content of the Science Programme is set.

Cosmic Vision is the result of a bottom-up process that began with a consultation of the broad scientific community. The plan, which comprises a variety of missions and extends up to 2035, defines the wide-ranging and ambitious scientific questions to be addressed by missions in the ESA Science Programme.

The next planning cycle of the ESA Science Programme, Voyage 2050, is now underway. Through the present Call the Director of Science invites the broad scientific community to apply for membership of Topical Teams. The task of these Teams will be to analyse White Papers (submitted in response to a separate Call) and to report their findings to a Senior Committee.

2 STRUCTURE OF THE ESA SCIENCE PROGRAMME

The Science Programme implements a regular cadence of missions of various sizes whose goal is to address the science topics defined in the long-term plan. Missions are proposed by the science community in response to open calls for missions and follow a thorough competitive, peer-reviewed process before being proposed to the Science Programme Committee (SPC) for selection first and later adoption (the SPC decision to proceed to the implementation phase).

¹ Described in ESA BR-247, <https://www.esa.int/esapub/br/br247/br247.pdf>

The current Cosmic Vision planning cycle extends to 2035 and includes four types of missions:

- Large (L) missions are flagship, ESA-led missions, with a planning cost for ESA of 1000-1200 M€ (around 2 annual budgets). They can include international contributions. The cadence of L missions is typically one every 7-8 years. The L missions in the Cosmic Vision plan are: JUICE (L1), Athena (L2), and LISA (L3).
- Medium (M) missions are flexible missions, either ESA-led or partner-led, with a planning cost for ESA of 550-600 M€ (around 1 annual budget). The cadence of M missions is typically one every 4-5 years. The M missions in the Cosmic Vision plan are: Solar Orbiter (M1), Euclid (M2), PLATO (M3), and ARIEL (M4), while for the M5 slot three candidates (EnVision, SPICA, and Theseus) are under study (with a selection planned in 2021).
- Smaller missions include a variety of categories, with an ESA planning cost of 50 to 150 M€. CHEOPS and SMILE are examples of this.
- Missions of Opportunity² are modest-sized contributions to partner-led missions, with an ESA cost limited to ca. 50 M€.

ESA Science Missions are in all cases implemented as partnerships with the Member States, that supply most or all of the scientific payloads and/or elements of the scientific ground system. Mission elements funded by Member States are an essential contribution for the success of the missions, and their financial value is not reflected in the figures above.

Information on the portfolio of missions in the ESA Science Programme can be accessed at: <http://sci.esa.int/home/51459-missions>.

3 THE VOYAGE 2050 PROCESS

The Director of Science is consulting the broad scientific community to establish the next long-term plan, Voyage 2050, for the ESA Science Programme. This follows on the previous long-term plans (including the extant Cosmic Vision plan, described above), and will be the basis upon which space science missions in ESA are defined in the time frame from approximately 2035 up to 2050.

3.1 Structure of the future Science Programme

The ESA Science Programme in the decades until 2050 will be comprised of a mixture of mission types, with three Large (L) missions and six to seven Medium (M) missions being envisaged, as well as a number of smaller programme elements (including Missions of Opportunity). This is similar to the structure of the current Science Programme described in Section 2.

² An overview of Missions of Opportunity can be found here: <http://sci.esa.int/cosmic-vision/59977-missions-of-opportunity/>

In keeping with the bottom-up, peer-reviewed nature of the Science Programme, the definition of the next plan relies on open community input and on broad peer review. The community input will be gathered through a Call for White Papers — issued in parallel to this Call — while the peer review of this input will take place through a two-tiered committee structure, with a Senior Committee of 13 European scientists (see Appendix 1) supported by a number of Topical Teams.

3.2 Senior Committee

The Director of Science has appointed the Senior Committee to guide the Voyage 2050 process. This Committee, composed of scientists working in institutions in ESA Member States, is tasked to:

1. Recommend to the Director of Science the three science themes of the three L missions that will be part of the plan.
2. Identify a number of high-impact science themes that could be implemented through an M mission during the plan's time span. The actual M missions will be decided through open calls for missions issued in due time to retain flexibility in the Science Programme. However, the early identification of themes of interest will help the Agency in, e.g., developing key technologies.
3. Identify a number of science themes for which the technology is not sufficiently mature to allow their implementation in the time frame up to 2050, but that might become fruitful areas of investigation in the future should the technology become sufficiently mature. These themes will be used to guide the Agency's investment in longer-term technology development.

Following receipt of the White Papers submitted in response to a separate Call the Senior Committee and the Topical Teams will work through the second half of 2019 and the first half of 2020, issuing their recommendations to the Agency in mid 2020. The Agency intends to publish the final report describing the Voyage 2050 plan toward the end of 2020.

3.3 Topical Teams

The Senior Committee will be supported in its work by a number of Topical Teams. Each Topical Team will be composed of between 10 and 20 scientists with the task of analysing the White Papers. The Topical Teams will provide the Senior Committee with an evaluation of the strengths and weaknesses of each White Paper, together with a broad assessment of the “state of the field” (current and projected) in their scientific domain, and an assessment of whether the received White Papers cover satisfactorily the range of topics that might be usefully addressed with space missions in the time frame until 2050.

3.4 Public consultation

In parallel, the Agency is consulting the broad European public, inviting the public to share their views on the questions that Voyage 2050 should address. The details of the public consultation can be found at <http://sci.esa.int/discovering-our-universe>.

4 TOPICAL TEAM MEMBERSHIP

Scientists working in ESA Member States are invited to apply to be a member of one of the Topical Teams through this open Call. The Topical Teams will be appointed by the Director of Science after the evaluation and recommendations of the Senior Committee. The number of Topical Teams and the scientific themes covered will be set by the Senior Committee, and may be expanded or altered after the White Paper submission deadline.

It is intended to have a mix of experience represented in each Topical Team, and early career scientists are specifically encouraged to apply.

Scientists with interest in any topic in space science and in the relevant technologies are welcome to apply. Space science is defined here in a broad sense, including the observation of the Universe, planetary science, solar science, study of the space environment, and scientific experiments that can be carried out from a spacecraft.

4.1 Eligibility

Any scientist with a PhD working in an institution located in an ESA Member State is eligible for membership in the Topical Teams. Retired (emeriti) colleagues are also eligible to apply.

Contact Scientists of Voyage 2050 White Papers are ineligible to be members of a Topical Team. Co-authors of White Papers are eligible to be members of the Topical Teams, but must declare a conflict of interest when evaluating the Paper(s) of which they are a co-author. They will not participate in any discussion of these Papers.

4.2 Contents of the application

Applications for membership of Topical Teams should consist of three parts:

1. A cover page (that should include the applicant's contact information);
2. A curriculum vitae, of maximum 2 pages;
3. A motivation statement, of maximum 2 pages.

The curriculum vitae should include all information about the applicant's career that the applicant wishes to be considered for the opportunity to be a member of a Topical Team.

The motivation statement should explain why the applicant considers himself/herself suited for membership of a Topical Team. The application should not contain a list of publications, but rather it should explicitly list in the motivation statement his/her five "notable achievements" that in the applicant's opinion make him/her particularly suited for consideration. These might be specific publications the applicant has authored, responsibility in the development of a scientific instrument, responsibility in science policy, etc.

The applicant should also select and include in the motivation letter the keywords from the list in Appendix 2 that he/she feels best describe his/her scientific expertise. The applicant is also free to include additional keywords if the listed keywords do not sufficiently describe

his/her scientific expertise. The keywords chosen by the applicants will help the Senior Committee in allocating scientists to the Topical Teams.

Applicants are advised to read the *Call for White Papers* for further information about the Voyage 2050 process.

Additional information about Voyage 2050 and the Calls can be found online at: <https://cosmos.esa.int/voyage-2050>

4.3 Submitting applications

Applications will be accepted exclusively in PDF format, with a maximum file size of 5 MB, using the interface available at:

<https://www.cosmos.esa.int/web/voyage-2050/call-for-topical-team-members>

The deadline for submission of applications in response to the present Call is given in Section 6. The submission deadline will be implemented strictly and proposers are invited to submit their proposals well in advance of the deadline. Applications received after the deadline will not be considered. Applications that exceed the page limit or that do not respect the structure described above in Section 4.2 will not be considered.

5 OPEN WORKSHOP

The Agency intends to hold an open workshop at which the White Papers will be presented. Members of the Topical Teams will be expected to attend this workshop, planned to be held in October 2019. Further details about the workshop will be announced separately.

6 DEADLINES AND SCHEDULE

Activity	Date
Call for Membership of Topical Teams issued	4 March 2019
Deadline for receipt of applications	6 May 2019, 12:00 (noon) CEST
Topical Team members appointed	July 2019
Workshop to present White Papers	October 2019
Topical Teams report to Senior Committee	February 2020

7 FURTHER INFORMATION AND CONTACT POINTS

Requests for further information should be addressed to:

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Appendix 1: Composition of the Senior Committee

Name	Affiliation
Linda Tacconi (Chair)	Max Planck Institute for Extraterrestrial Physics, Garching, Germany
Chris Arridge (Co-Chair)	Lancaster University, United Kingdom
Alessandra Buonanno	Max Planck Institute for Gravitational Physics, Potsdam, Germany
Mike Cruise	Retired, United Kingdom
Olivier Grasset	University of Nantes, France
Amina Helmi	University of Groningen, Netherlands
Luciano Iess	Sapienza University of Rome, Italy
Eiichiro Komatsu	Max Planck Institute for Astrophysics, Garching, Germany
Jérémy Leconte	CNRS/Bordeaux University, France
Jorrit Leenaarts	Stockholm University, Sweden
Jesús Martín-Pintado	Spanish Astrobiology Center (CAB), Madrid, Spain
Rumi Nakamura	Space Research Institute, Austrian Academy of Sciences, Austria
Darach Watson	University of Copenhagen, Denmark

Appendix 2: Keywords for the Topical Teams

active galaxies	astrobiology	astrochemistry
atmospheres	black holes	beyond the Standard Model
biomarkers	CHON cycles	compact objects
cosmic microwave background	cosmic dust	dark ages
dark energy	dark matter	dark universe
exobiology	exoplanets	galactic structure
galactic dynamics	galaxy clusters	galaxy formation and evolution
gravitation and General Relativity	gravity	heliophysics
intergalactic medium	intermediate and giant planets	interstellar matter
ionosphere	large-scale structure	magnetosphere
magnetospheric physics	Milky Way	non-thermal processes
origins	planet formation	planetary evolution
planetary interiors	planetary resurfacing	planetary rings
planetary science	planetary surfaces	plasma physics
primitive bodies	protoplanetary disks	Quantum Mechanics and microphysics
small solar system bodies	solar dynamics	solar physics
solar system	solar wind	space environments
space plasma physics	space weather research	spacetime, inertia and the vacuum
star formation	star-planet interactions	stars
surface interaction	terrestrial planets	Titan
waves and particles	weakly interacting particles	