

Announcement of Opportunity
for membership in the
Gaia Science Team

1 March 2007

1 General information

1.1 Participation in the Gaia programme

The scientific community is invited to participate in the Gaia programme by responding to the present Announcement of Opportunity (AO), which solicits proposals for membership in the Gaia Science Team (GST). The present AO defines the context and conditions which will allow a scientist from an institution in an ESA Member State to respond.

The Gaia Science Management Plan (SMP, ESA/SPC(2006)45) defines the top-level scientific management of the Gaia mission and describes the respective roles of all parties involved. The SMP is an applicable document and as such has been included in this AO. Where and when relevant, the SMP takes precedence over the text of the present AO.

In addition to participation in the GST, the community has also been solicited to participate in the Gaia data processing effort. The relative AO for selection of a major part of the Gaia Data Processing and Analysis Consortium (DPAC) was closed on December 11, 2006, and a single proposal has been received. Selection of the proposing consortium by the Science Program Committee is currently planned to take place in May 2007. The selection of the Gaia Science Team members in response to the present Announcement of Opportunity is currently planned to take place at the same time. Should the selection of the DPAC consortium, for whatever reason, be delayed, the Science Directorate reserves the right to delay the selection of the Gaia Science Team, to ensure consistency between the two processes.

1.2 The Gaia mission

This summary provides a brief description of the top level scientific objectives of Gaia as well as of the Gaia mission, satellite, mission operations, and data processing ground segment.

Scientific Objectives: Gaia is a space astrometry, photometry and spectroscopy mission, a broad survey project which will address one of the most difficult yet deeply fundamental challenges in modern astronomy, namely the understanding of the structure, formation and history of the Milky Way. Extra-solar planets, minor solar system bodies, stellar astrophysics, general relativity (and more) also figure prominently in Gaia's science case, as described extensively in http://www.rssd.esa.int/SA/GAIA/docs/info_sheets/IN_science_topics_section.pdf. Gaia follows, for its astrometric measurements, the principles of Hipparcos, and it will create an extraordinarily precise three-dimensional map of about one billion stars throughout our Galaxy and beyond. In the process, it will map their three-dimensional motions, which encode the origin and subsequent evolution of the Galaxy. Through comprehensive photometric and spectroscopic classification, it will provide the detailed physical properties of each star observed, characterising their luminosity, temperature, gravity, and elemental composition. Using on-board object detection, Gaia will survey more than one billion stars at the micro arc-seconds level accuracy, complete to 20th magnitude, with extensive multi-colour multi-epoch photometry and spectroscopic measurements.

Mission and Satellite: The space segment is characterised by

- a 3-axis stabilized satellite, operated at the Lagrange point L2
- systematic scanning of the sky at a constant angular velocity according to a well-defined scanning law
- a high-stability payload which systematically and repeatedly measures the astrometric, photometric and spectroscopic properties for some 1 billion celestial objects
- on-board detection of each object brighter than a given signal-to-noise ratio at the observation epoch
- a commensurate telemetry rate of some 1–5 Mbps.

Mission Operations Ground Segment: The mission operations ground segment is composed of the Mission Operations Centre (MOC) located at ESOC, and the associated ground stations and communication links. The Mission Operations Centre is responsible for all spacecraft mission operations, including: spacecraft status monitoring; payload health monitoring; spacecraft control; mission planning of spacecraft and payload activities; orbit determination and control; attitude determination and control; on-board software maintenance; and transmission of the raw satellite data to the data processing ground segment.

Data Processing Ground Segment: The data processing ground segment comprises a single processing pipeline leading directly to the intermediate and final mission products. The underlying principles of the data processing have been developed by the Gaia scientific community over several years. The task will be undertaken by the Gaia Data Processing and Analysis Consortium, a collaboration between a substantial and broad scientific community and the ESA Gaia Science Operations Centre (SOC).

The responsibilities of the various Gaia elements are described in further detail in the SMP and summarised in the following section.

1.3 Responsibilities

ESA assumes full responsibility for the overall Gaia project; it is responsible for overall mission design, procurement of the satellite including all scientific instruments; testing and validation, launch, and all interactions with the satellite during orbital operations.

The ultimate responsibility for all scientific aspects of Gaia rests with the ESA Research and Scientific Support Department which, for this purpose, delegates this responsibility to the Gaia Project Scientist.

The scientific responsibility for the data processing and analysis as undertaken by the DPAC is delegated to the DPAC executive, where ESA's project scientist is present as an observer. The DPAC forms an integral part of the Gaia mission and requires very significant national contributions.

1.4 The Announcement of Opportunity for membership in the Gaia Science Team

The purpose of the present AO is to solicit proposals for membership in the GST. As described in Sec. 2.3 of the present AO, the role of the GST is to provide ESA with independent advice and support on all scientific aspects of the Gaia mission.

2 Role, composition and responsibilities of the Gaia Science Team

2.1 General

The GST has been in place since acceptance of the mission by ESA in 2000 (replacing the Science Advisory Group for the preceding study phase). The GST currently comprises 12 members of the European scientific community, selected with respect to their specific expertise in the key scientific, technical, and data analysis aspects of the mission (astrometry, photometry, and spectroscopy). Following the provisions of the SMP, the composition of the Science Team is to be revised when the mission moves from design to development phase, with the Preliminary Design Review, marking this transition, foreseen for June 2007. The present AO concerns the selection of the new GST.

The GST will advise on the scientific preparation and exploitation of the mission. In this role, it will advise ESA, and in particular the Project Scientist, on all matters regarding Gaia science. The GST will be consulted on all issues related to the scientific performance of the Gaia mission. Its responsibilities are described in detail in Sec. 2.3. In addition to the Project Scientist and to the chair of the DPAC executive who are permanent members of the GST, the GST is composed of seven scientists who will be selected through the present AO.

2.2 Composition of the Gaia Science Team

The GST will include the following members:

- The ESA Project Scientist as chair (already in place)
- The "DPAC executive chair" (ex officio)
- Two "astrometry scientists"
- Two "photometry scientists"
- Two "radial velocity spectrometer scientists"
- One "data analysis scientist"

The ESA Project Manager, payload manager and SOC development manager have standing invitations to attend all meetings and participate in all activities of the Gaia Science Team. Additional experts can be invited (ad hoc) by the Project Scientist to attend specific GST meetings as the need arises.

The present AO concerns the positions of two astrometry scientists, of two photometry scientists, of two radial velocity spectrometer scientists and of one data analysis scientist, for a total of seven positions. These members are selected for a renewable three year period.

2.3 Responsibilities of the Gaia Science Team

The Gaia Science Team advises ESA, through the Project Scientist, on all top-level science performance, science policy and science organization aspects of the mission, including the activities of the Data Processing and Analysis Consortium. The GST will convene a few times (typically 4) per year. At the meetings, the GST will be presented with detailed information on all aspects of the Project, its current status and plans of future activities. The GST may collectively issue recommendations to ESA and the DPAC, if deemed appropriate, to maximize the scientific return of Gaia.

The Gaia Science Team will be involved, through the Project Scientist and Project Team as appropriate, in:

- acting as a focus for the interest of the broader scientific community in Gaia
- maximising the scientific return within the programmatic and financial constraints of the mission
- advising on the satellite, payload, calibration, ground segment developments, and operations
- proposing and endorsing data rights and publication policy (in agreement with the general policy set in the SMP), and monitoring its implementation
- overseeing the timely development of the on-ground data processing
- overseeing the creation and delivery of the final data products to the broader scientific community
- promoting public awareness, education, and outreach aspects.

3 Application and selection procedure

3.1 Requirements

The AO for membership in the GST is open to qualified scientists affiliated with institutions from ESA Member States. GST members will be selected on their expertise and the excellence of their proposals, but also ensuring that they are, to a reasonable degree, independent from DPAC management activities.

Proposals from applicants in any branch of astronomy will be considered, although applicants will have to show specific expertise and proven track record related to the position for which they are applying. Applicants will have to demonstrate their capability and interest to make a significant personal contribution to the Gaia programme, both during the development and the operational phases. Additionally, applicants will have to demonstrate that they can devote a sufficient fraction of their time to the fulfillment of their duties. All proposals for GST membership are individual, and should not be presented as representing a team or a working group.

Successful applicants are expected to have a keen interest and proven track record in at least one of the scientific fields to which Gaia will make a significant contribution. Applicants for the positions of astrometry, photometry and radial velocity scientists are expected to have a good understanding of the aspects of the Gaia instruments relevant to the position they are applying for and to their stated scientific interests, as well as of the impact of instrumental issues on the science return from the mission¹. Applicants for the position of data analysis scientist are expected to have a good understanding of the data analysis approach being implemented for Gaia² and of the impact of data analysis issues on the mission's science return.

To discharge their responsibilities as listed under Sec. 2.3 members of the GST are expected to:

- Attend the meetings of the GST, and take an active role in its activities.
- Participate in the major reviews of the Gaia programme, concentrating on the aspects which may have an impact on the science return.
- Establish and maintain close contact, through the Project Scientist, with the development of the Gaia programme.

Members of the GST are initially nominated for a three year term; before the end of the three year term each member of the GST will produce a report detailing his/her activity. Following evaluation of the activity during his/her term, ESA may decide to extend the appointment for a further three year term, potentially throughout the whole GST lifetime. Positions in the GST which should become vacant for whatever reason would be filled following an ad hoc AO.

¹Details of the instrumental design of Gaia are available at http://www.rssd.esa.int/SA/GAIA/docs/info_sheets/IN_spacecraft_and_payload_section.pdf

²See http://www.rssd.esa.int/SA/GAIA/docs/info_sheets/IN_accuracy_section.pdf

3.2 Financial aspects

ESA will fund the attendance to GST meetings for members of the GST selected through the present AO (travel expenses and a per diem will be paid). No other activities will be funded by ESA. Members of the GST are expected to procure their own funding (likely through national funding sources) for all other activities related to their responsibilities in the GST.

3.3 Further information

Requests for further information and clarification should be sent, by email, to the Gaia Project Scientist, T. Prusti, at the email address below. General information of the mission can be found at <http://www.rssd.esa.int/Gaia>.

3.4 Proposal submission procedure

Proposals must be submitted by email, in PDF format, to gaia-gst-ao@rssd.esa.int. In addition, a 1 page cover letter, signed by the applicant and by his/her head of Institute should be sent, together with a hard copy of the proposal itself, to the addresses indicated below.

3.5 Proposal content and format

The proposal must clearly address how the candidate intends to fulfill his/her responsibilities within the framework of the role of the GST described in Sec. 2.3. It must include details about which of the activities the candidate intends to concentrate his/her contribution and what amount of time is planned to be dedicated to each activity. The proposal must contain a statement about which position (or positions) within the GST the candidate is applying for. Candidates may submit an application stating their interest in more than one position.

The scientific and technical expertise of the candidate in the areas which will be addressed, as well as his/her “track record”, should be described, addressing the points covered in Sec. 3.1.

Proposals must have a maximum length of 6 A4 pages, with a minimum font size of 11 pt, and must be written in English. A Curriculum Vitae should be appended in the proposal, as well as the proposer’s name, position, affiliation, full address and contact information.

Proposals in electronic formats other than PDF, or received after the deadline, will not be considered in the selection process.

3.6 Selection procedure and criteria

Proposals for membership in the GST will be reviewed by a joint committee comprising members of ESA’s Astronomy Working Group (AWG) and ESA experts (including the Gaia Project Scientist). On the basis of their evaluation a recommendation will be produced by the AWG. Based on the AWG recommendation the Space Science Advisory Committee (SSAC) will make a recommendation to the Director of the ESA Science Programme. The overall criterion for the selection is that ESA will select the candidates who will be most useful in each of the roles.

The following specific criteria will be used (in no particular order) in assessing and evaluating individual proposals:

- Experience of the proposer in one or more of the areas and tasks described in Sec. 2.3 above.
- Merit of the proposer in general as well as specific contributions to the Gaia mission.
- Demonstrated availability of time and resources and commitment of the applicant.
- Capability to work fruitfully within the proposed team structure.

3.7 Appointment procedure and duration

Based on the SSAC recommendation the Director of the ESA Science Programme will nominate the members of the GST, informing the Science Programme Committee (SPC). The successful candidates will be appointed as members of the GST for a fixed, renewable period of three years.

3.8 Addresses for submission of the paper copy of the proposals

The paper copy of the proposal with the signed cover letter must be sent to:

Fabio Favata
Astronomy and Fundamental Physics Missions Coordinator
ESA HQ, SCI-CAI
8–10 rue Mario Nikis
75738 Paris Cedex 15
France

and a copy to:

Timo Prusti
Gaia Project Scientist
ESA/ESTEC, SCI-SA
Keplerlaan 1
2201 AZ Noordwijk
The Netherlands

Further inquiries can be addressed to:

Timo.Prusti@rssd.esa.int
tel: +31-71-565 4794
fax: +31-71-565 4690

4 Schedule and deadlines

- Announcement of Opportunity issue: 1 March 2007
- Proposal due date: 4 April 2007
- Foreseen appointment of the successful candidates: May 2007
- Foreseen first meeting of the newly appointed GST: September 2007

Note: the deadline for the submission of the proposals will be at 15:00 UT of the day indicated above (4 April 2007).