ESA F-class mission

Comet Interceptor

Science Team Consortium Agreement

Version 4

1 July 2021

I. Change log

28.04.2020	First version.
13.05.2020	Second version: update to national Co-PI list details; section 11.4. SWT changed to Science Steering Committee throughout. Typo corrected in 6.5.
23.06.2020	Third version: added new role appointees to Section 11. Target identification team rewording for consistency.
01.02.2021	Affiliations of Theme Leads/Deputies updated.
01.07.2021	Fourth version: Some titles corrected; EnVisS PI and Co-PI updated.

II. List of acronyms

CI	Comet Interceptor
Co-I	Co-Investigator
Co-PI	Co-Principal Investigator
DNC	Dynamically New Comet
ESA	European Space Agency
JAXA	Japan Aerospace Exploration Agency
LPC	Long Period Comet
LPSC	Lunar and Planetary Science Conference
LSST	Vera C. Rubin Observatory's *Legacy Survey of Space and Time*
NPMC	National Programme Manager Committee
PDS	Planetary Data Service
PI	Principal Investigator
PSA	Planetary Science Archive
RID	Review Item Discrepancy
SSC	Science Steering Committee
SWT	Science Working Team
TBC	To Be Confirmed
TBD	To Be Determined

Instruments:

CoCa	Comet Camera
DFP	Dust, Fields and Plasma
DISC	Dust Impact Sensor and Counter
COMPLIMENT	COMetary Plasma Light InstruMENT
DAPU	Dust Analyzer and Processing Unit
FGM	Flux Gate Magnetometer
LEES	Low-Energy Electron Spectrometer
SCIENA	Solar wind and Cometary Ions and Energetic Neutral Atoms
EnVisS	Entire Visible Sky
HI	Hydrogen Imager
MANiaC	Mass Analyzer for Neutrals in a Coma
MIRMIS	Modular Infrared Molecules and Ices Sensor
OPIC	Optical Periscope Imager for Comets
PS	Plasma Suite
WAC/NAC	Wide/Narrow Angle Camera

1. Introduction

This document describes the structure of the science team for the ESA F-class mission Comet Interceptor (hereafter CI; also referred to as Comet-I in some ESA documents), and the roles and responsibilities of science team members. It describes the management structure within the science team, and how these roles interface with ESA and national funding agencies. The document defines who will have data access and under what conditions, and the rules and responsibilities governing publication of results.

This document governs the science team collaboration, it is not an ESA mission document. There will also be an ESA Science Management Plan document, which will describe the interaction between the agency and the science team once the mission moves from the study phase into the implementation phase, and in particular will describe the funding and management of instrument teams, their interaction with national agencies, and data access policies. The ESA Science Management Plan may supersede elements of this science team document.

2. Brief introduction to Comet Interceptor

This section is intended as a high-level summary only, it doesn't replace the evolving ESA documentation (e.g. Science Requirements and Mission Requirements Documents, eventually the 'red book' that will be the primary description of the mission). Details of the mission may change; only the general concept is described below.

CI is the first F-class mission selected by ESA. It will launch as a secondary payload with the Ariel space telescope, expected in 2028, and be delivered with Ariel into a halo orbit around the Sun-Earth L2 Lagrangian point. It will wait there for a to-be-determined period of time (up to ~3 years) before departing for a yet-to-be-discovered long period comet (LPC) from the Oort Cloud. If possible, the target will be a 'Dynamically New' comet (DNC) making its first approach to the inner Solar System since its formation, or even an interstellar comet from another star system. Following a cruise of up to 2 years, it will perform a high-speed flyby encounter of the comet. At the comet, the main spacecraft (A) will pass at relatively large distance (likely to be around 1000 km) from the nucleus, while released probes (B1, supplied by JAXA, and B2, built by ESA) will be sent to make closer approaches to the comet. The two B spacecraft will transmit data to spacecraft A for later transmission to Earth, along with data collected by the payload elements on A. The B spacecraft are expected to be expendable and will operate for only a short period at the comet. All data transmission from spacecraft A is expected to be completed within 6 months of the flyby.

3. Team structure

CI will have a common science team (not a *Rosetta*-like model of separate teams per instrument). The science team will consist of Co-Is, associate scientists, instrument team members (who may also be Co-I/associate scientists), and supporting ground-based observers (who may also be Co-I/associate scientists). Data from all instruments will belong to the mission, and all Co-Is will have data rights to all of it. Science team membership is contingent on agreeing to the rules within this document, including the code of conduct and publication policy, to ensure a fair and cooperative approach to the study and publication of the scientific data, and to ensure fair credit/authorship is given to all. There will be a simple and common approach to apply to be part of the science team (described in section 7 below), which will apply to everyone. Those making a substantial contribution will be designated Co-Is. There will be a larger group of associated scientists, who are also part of the science team and are governed by these rules, but do not have direct data access.

Within the Co-I team there will be 'national Co-PIs', whose role is to coordinate with their respective national funding agencies, on behalf of all contributions to the mission from their country. These contributions can be, but are not limited to, instrument hardware, engineering teams, support for scientific exploitation, and, where appropriate, funding other named roles or science contributions.

Each instrument will be built and operated by an instrument team, led by a responsible instrument PI. Instrument team members will be those who have a specific role in hardware development – there will not be 'science' Co-Is associated with individual instruments, only the mission level science team. Instrument team members can also be mission science Co-Is, but they don't have to be (e.g. people with a technical rather than science role). Instrument team members who are not Co-Is are still members of the CI science team, and are still governed by the code of conduct and publication policy. They will have direct access to the data from their own instrument only, for engineering purposes.

As the mission does not yet have a target, and because the fly-by will be very short, a significant contribution to this mission will come from ground-based observations. There will be an overlap between the observing team and wider science team, although not all observers will be Co-Is / associated scientists. Some will be, depending on the level of their contribution and/or other roles in the mission.

There will be a small team tasked with identification of suitable targets for the mission, who will make recommendations to the project management. This team comprises observers linked to the surveys expected to find the target (especially the Vera C. Rubin Observatory's *Legacy Survey of Space and Time*, LSST) and those who will carry out follow-up observations to characterise possible targets, as well as modellers and dynamicists who will assess the feasibility of each newly-discovered comet as a mission target.

The overlap between these various groups within the mission team is illustrated in Fig. 1.

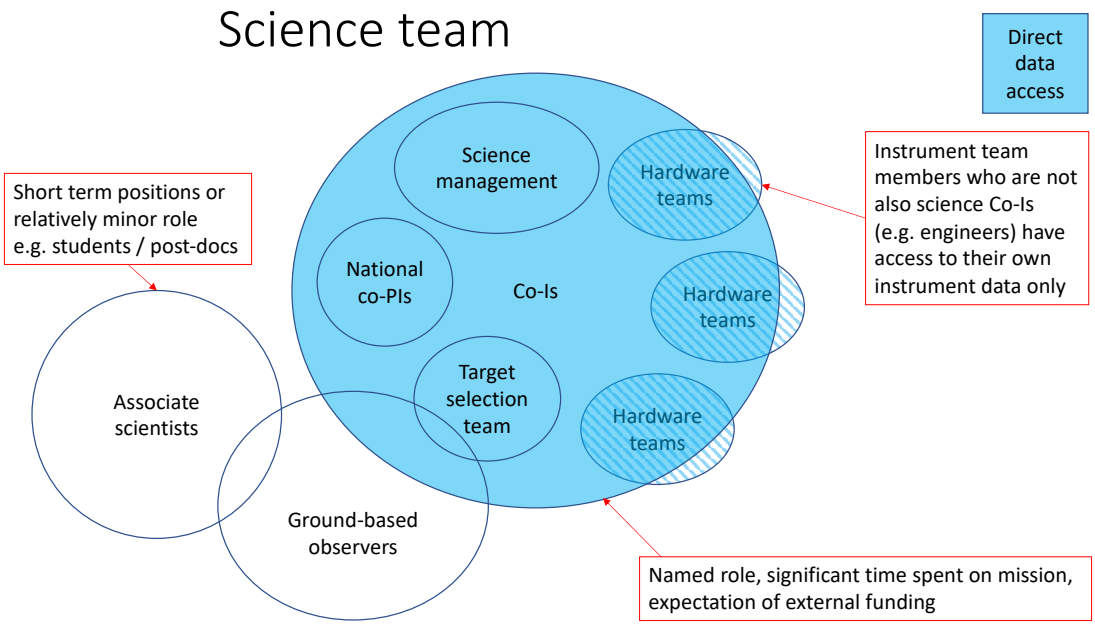

Figure 1. Venn diagram showing interaction and overlap of various groups within the science team.

4. Management and decision making

As a 'fast' mission, with a short development timescale and a small budget, ESA has stressed the need for simple interfaces. In terms of management structure, this means a more 'PI-led' approach, similar to smaller NASA missions. This is different from the model usually adopted for large ESA planetary missions, with largely independent instrument teams, each with their own PI, where decisions are made collectively by a Science Steering Committee (SSC).

There are still instrument PIs responsible for the delivery and operation of each instrument, who, together with the management group (Mission Science Lead and deputy, and science operations coordinator; see below), target identification team chair (see section 6.4), science theme coordinators (see section 6.6.3), and the ESA appointed study/project scientist, form the SSC. The SSC will hold regular telecons (nominally every 2 weeks) to address scientific and technical issues and advise the Mission Science Lead, but **mission level science decisions will ultimately be made by the Mission Science Lead**. Through this structure, the Mission Science Lead will be advised by the rest of the team, but a single point for executive decisions is appropriate for a fast and relatively small mission.

At the instrument level, each instrument PI will be responsible for decisions about delivery and safe operation of their respective instruments. Decisions about science operations will be made at a mission level, as a fast fly-by requires a coordinated plan for all instruments. In addition to the Mission Science Lead and deputy, there will be a named science operations coordinator who will manage the development of a coordinated plan, in consultation with the instrument teams and advised by the SSC and, through them, the wider science team.

The management structure is illustrated in fig 2. Individual roles are described in detail in section 6.

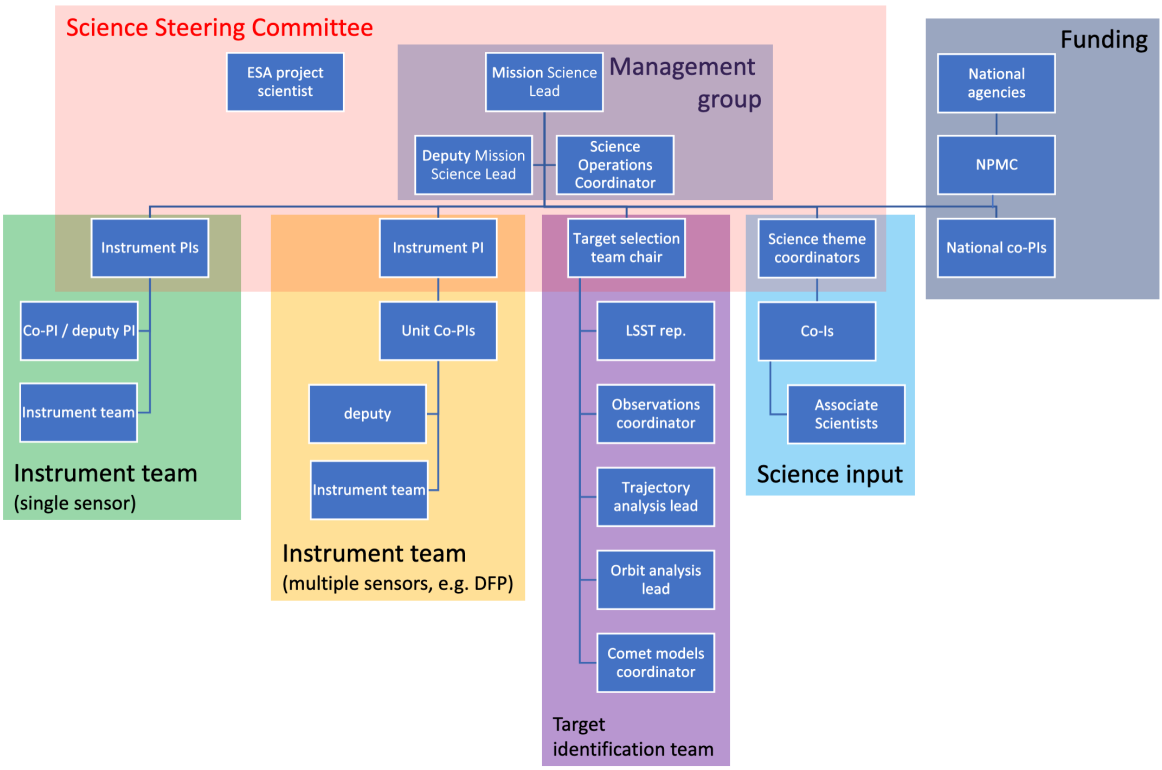

Figure 2. Organisation chart, decision making structure

5. Funding and agency interaction

CI follows the usual ESA model for planetary missions in terms of funding: the ESA budget pays for the spacecraft and most of the operations, while national funding agencies pay for the payload. As most instruments have contributions from more than one country, and several countries contribute to more than one instrument, there will be designated single contact points for the agencies within the science team. These roles (National Co-PIs) will interact with their respective agencies through the agency-appointed 'national programme manager'. For the F-class mission, ESA will convene a 'national programme managers committee' (NPMC) that will decide on instrument funding, especially during the early phases (0 and A), including what instrument development work will be funded directly by ESA.

National Co-PIs have a responsibility to coordinate bids for adequate funding for all elements of the mission that are agreed to be funded by their respective country, irrespective of whether or not they are directly involved with each instrument. They should work closely with instrument PIs, the management group, and others with named roles in Annex 1 to achieve this.

Interactions with ESA and JAXA on scientific matters will be through the Mission Science Lead and management group. ESA staff (study team, or later operations team) may contact instrument PIs or their delegated responsible team members directly for required information, especially when a rapid response is required, but the Mission Science Lead and management group should be kept in copy in all interactions.

Note that instrument funding and the organisation of this will be described in the ESA Science Management Plan document, and agreed there with relevant agencies. This may eventually differ from the scheme described here; in this case the ESA document is definitive.

6. Roles

Roles are described here. For named roles, see Annex 1 for a list of who currently holds these. Roles are expected to continue throughout the mission with the same named person, although individuals can be replaced as necessary, should the named person no longer be willing or able to continue in their role, or in case of serious breaches of the code of conduct. Appointments and, if necessary, replacements will be managed by the Mission Science Lead.

6.1. Mission Science Lead and Deputy

The Mission Science Lead (and deputy) have overall responsibility for all science team decisions, and form the primary ESA and JAXA point of contact with the science team. Responsibilities include: chairing SSC meetings, key mission level science decisions (e.g. major scientific design trades, eventual choice of target); interaction with ESA on technical/operational decisions; the appointment and management of the science team; approval of mission timeline and the share of resources between instruments for the comet encounter; approval of the publication plan for primary mission papers.

6.2. Science Operations Coordinator

The science operations coordinator leads science planning and harmonisation across teams to build a single operations plan for the flyby. This includes balancing different scientific priorities from the whole science team (primarily based on input from the science theme coordinators), interacting with the instrument teams on necessary resources (e.g. data volume, power) and operational requirements/constraints, and aligning plans between the three spacecraft. The operations timeline for the flyby will be based on inputs from the whole science team, through the SSC. Final decisions on the timeline will be made by the Mission Science Lead and ESA project management, following the advice of the science operations coordinator.

6.3. Instrument teams

6.3.1. PI and deputy

For each instrument (CoCa, MANiaC, MIRMIS, DFP, EnVisS, OPIC, HI, PS, NAC/WAC), there will be a single instrument PI with overall responsibility for hardware delivery and operation of instrument. Instrument packages with multiple independent sensors (e.g. DFP) will have a hierarchical structure (described in section 6.3.2 below), but still have a single responsible instrument PI. Some instruments may have instrument Co-PI roles (e.g. MIRMIS, EnVisS), but each must have a single responsible instrument PI for executive decisions. Instrument PIs may also have deputies, who are authorised to make decisions in the absence of the instrument PI. Any instrument PI with an expected retirement date before the expected end of mission (expected to be ~2033, but may be delayed/extended) should have a named successor (probably, but not necessarily, their deputy) who will be aware of all major decisions and issues and capable of taking over at an agreed date with minimal interruption to instrument delivery/operations (see Annex 2). The instrument PI represents the instrument team within the SSC, and must have sufficient technical and scientific oversight of the whole instrument

and its subsystems to do so. The instrument PI may delegate responsibility for attending SSC meetings as necessary, but there will be only *one person* representing each team in the SSC, to keep meetings manageable.

Each instrument PI is responsible, in coordination with mission level national Co-PIs, for securing the necessary funding to build and operate their respective instruments, in collaboration with any international partners in their instrument consortium. The Mission Science Lead and management group, and through them ESA project management, should be kept informed about all instrument funding discussions.

Instrument PIs are responsible for appointing and managing instrument teams, and for securing the necessary funding for the team. All instrument team members must also sign up to this management plan, in particular agreeing to the code of conduct and the publication policy, by filling in the team membership application form (see below), even if they do not expect to have a scientific role in the mission. The Mission Science Lead and management group should be kept informed of all changes to instrument team personnel. Every instrument team is required to provide an organigram of its structure, which is reviewed at a minimum of every 6 months.

6.3.2. Unit Co-PI

For some instruments that are composed of more than one unit (in particular the DFP package) there are named responsible people for each sub-unit (sensor), denoted unit Co-PIs. The management of these multi-sensor packages is expected to be hierarchical, with the unit Co-PI performing the role of the instrument PI, with responsibilities as described above, for their sensor. Communication between unit Co-PIs and the Mission Science Lead and management group should be through the instrument PI; where direct communication is used, e.g. in case a rapid response is required, the instrument PI should always be kept in copy.

6.3.3. Instrument team member

Named instrument team members are people with defined management, hardware, software or operations roles in delivering the instrument. Instrument teams are expected to be small, and only include those directly funded to perform these named roles. Instrument team members have a primarily technical role and are not necessarily mission science team Co-Is, although in many cases (where they also have a scientific interest in the mission) they will be. There will be no 'science' instrument team members without technical roles directly appointed within instrument teams – all science Co-Is are appointed at mission level and belong to the mission team as a whole, whether or not they also have technical roles as instrument team members.

6.4. Target identification team

6.4.1. Chair

The target identification team chair coordinates this team, reports to the SSC and wider science team, and is the interface to the Mission Science Lead and management group, and through them ESA and JAXA (in particular for keeping ESA and JAXA informed of possible targets, and reporting back on results of any ESA feasibility studies about possible targets).

6.4.2. LSST representative

It is expected that the LSST will be the most likely survey to discover the CI target comet. The LSST representative on the target team provides a link with the survey team, providing access to any proprietary LSST data products useful in characterising possible targets, updating the CI team on any relevant LSST issues (e.g. survey delays), and providing the LSST project input (through the LSST Solar System Science Collaboration or direct to the project, as appropriate) on any requests/results from CI relevant to the survey.

6.4.3. Follow up observations' coordination

Following potential target discovery, additional observations will be required to better characterise its orbit and activity level, etc., both before target selection and afterwards (during the cruise and simultaneous with CI observations during the flyby period). Time is expected to be secured on a range of telescopes for these observations. The observations coordinator leads observing teams at non-survey facilities, coordinating proposals for telescope time and sharing of results of these observations with the wider science team. Proposals will be led by a diverse selection of people depending on expertise and telescope access. There are expected to be a large number of comet observers included in the campaign, many of whom will only participate in occasional observations and not necessarily be part of the mission science team (although some will also have a mission role). The observations coordinator will provide the link between the observing team and the mission science team.

6.4.4. Trajectory design

The trajectory analysis lead will coordinate first assessment (within the science team) of whether or not candidate comets are feasible for CI (based on available delta-v, expected launch/depart dates, and the resulting encounter geometry). This task will be done first within the science team – promising candidate comets may then be studied in more detail by ESA, but it is not expected that ESA will routinely study every new possible comet (TBC). This task may involve the development of new first look tools to filter LSST discoveries, or the use of existing tools on an individual comet basis (the optimal approach is to be assessed by the trajectory analysis lead).

6.4.5. Orbit analysis

The orbit analysis lead will coordinate astrometric measurements and improvements in orbit fitting (including non-gravitational forces assessment), providing input for assessment of whether a comet is likely to be a DNC or a returning LPC.

6.4.6. Modelling coordination

Observational inputs will need to be combined with models to make predictions about comet survival / evolution / activity level at around 1 au. Various models will be needed; input and use of different models will be coordinated by the comet models coordinator.

6.5. National Co-PIs

One responsible person for each country involved will be named as national Co-PI (including countries without any hardware involvement). National Co-PIs have the responsibility for the coordination of efforts to secure necessary funding for **all** national contributions from the

appropriate agency. This includes: hardware and instrument team funding for all instruments supported by that country (not only instruments in which the national Co-PI may have involvement); support for other people with named roles in this list; science team members in the country (where funded directly for CI work from national agencies). National Co-PIs are expected to interact with instrument PIs and other directly funded team members in their countries to understand funding needs, and the ESA/agency appointed national programme manager for CI to ensure appropriate funds come from agencies.

6.6. Science team

6.6.1. Co-Investigators - Co-Is

Mission Co-Is are science team members with substantial responsibilities / contributions to the mission. Co-Is are not necessarily associated with individual instruments, but have stated interests/contributions in some area of the mission. Substantial contributions to the mission could be scientific, operations-based, or in contribution to instrumentation. Co-Is are not funded by the mission, and are expected to have clear funding for their own contribution from a relevant agency/institution, at an appropriate level for their expected work on the mission. Co-Is have access to data from all instruments (from all three spacecraft) and the right to publish work derived from this data, subject to the publication policy described below. Co-I status is expected to be permanent once approved, although individuals can resign if they are no longer associated with the mission, or Co-I status can be withdrawn by the Mission Science Lead in cases of serious breaches of the code of conduct.

6.6.2. Associate scientists

Those with either less time to dedicate to the mission, or temporary association with the science team, may be associate scientists. Associate scientists do not have direct access to mission data, but may work on data and publish results in collaboration with a named Co-I. Associate scientists working with the mission are part of the science team and subject to the rules and responsibilities included in this document; the named Co-I to whom they are associated should be the first point of contact for both data access and any management issues. PhD students and postdocs on short-term funding may be associate scientists of the science team while active in the mission, until the end of their funding. The default procedure will be that their membership of the science team will end when their studentship or post ends, but can be extended with the agreement of the Mission Science Lead. Associate scientists whose involvement is not based on a short-term contract (e.g. more senior scientists with a relatively minor role in the mission but permanent contracts) will be associated to the mission for a period of 3 years at a time, which can be renewed / extended with the agreement of the Mission Science Lead.

6.6.3. Science theme coordinators

Within different scientific topics, science theme coordinators will be nominated from and by the Co-Is working in these areas, and appointed by the Mission Science Lead based on team nominations/elections. The list of topics is to be defined; expected to be 3 or 4 broad themes, not necessarily those listed in the sign-up form or used to organise the ESA Science Requirements Document. The role of these coordinators will be to organise discussion and report on scientific priorities for measurements with different instruments in addressing their respective science themes. This will be used to prioritise different questions and, potentially, instrument options during the study phase, and plans for operations. Science theme

coordinators will communicate priorities for their areas of interest to the management group, in particular to the science operations coordinator, to inform operations planning. Science theme coordinators will also have a role in organising working groups within the science team on various topics, leading to coordinated analysis and publication of results.

7. Appointment of team members

The composition of each instrument team is the responsibility of the relevant instrument PI, who, along with the relevant national Co-PIs, is also responsible for coordinating and supporting efforts to secure funding for their team members. The instrument PIs may appoint instrument team members. All instrument team members must also agree to the code of conduct and publication policy by applying for full science team membership. Instrument PIs must keep the Mission Science Lead and management group informed about instrument team appointments. For instrument team members who are also scientists, these individuals may also be appointed science team Co-I or associate scientist level, as appropriate; in most cases an instrument contribution would be sufficient for Co-I status. It is expected that any scientist who is an instrument team member, and funded by a national agency for a significant instrument role, will also be a mission Co-I and benefit from access to data from all instruments.

Application for membership of the mission science team will follow a single procedure for everyone, whether also part of an instrument team or not. This application will be common for Co-I level involvement (a substantial contribution to the mission), associate scientist level (a smaller contribution, and/or students/post-docs temporarily associated with the mission), or for purely technical instrument roles (simply agreeing to code of conduct and publication policy). Note that the distinction between Co-I and associate scientist is based on contribution to the mission only, and does not depend on seniority (post-docs can, in principle, be Co-Is if their contribution is substantial). The same procedure will apply throughout the mission, including for any 'guest investigators' joining late in the mission (potentially even after the fly-by) to join in data analysis and interpretation. Decisions on appointment to the team, and the appropriate level, will be made by the Mission Science Lead. Appointment to the mission team does not come with any funding from the mission or national agencies; science team members need to specify the source of their (proposed) funding as part of their application.

The application will be via a simple web form, that allows potential team members to describe their proposed contribution to the mission, available here:

www.cometinterceptor.space/membershipform

Anyone in the comet science community can apply to be part of the science team. Appointments will be made on the basis of:

- need within the team for proposed expertise and/or effort;
- expected contribution to the scientific success of the mission;
- relevant experience and record of the applicant;
- coherent case, including clear funding plan for proposed work;
- fit with the existing team in a collaborative approach.

All else being equal, those who have been part of the team since the first proposal stage will take priority over newer applicants in case of apparent duplication of existing contributions. The overall balance of the team, considering e.g., science areas, nationality, seniority, gender, etc., are to be taken into account in all appointments.

The application procedure contains a requirement to agree to these terms, including the code of conduct and publication policies below. Team membership can be revoked for breaches of these; the Mission Science Lead's decision will be final in these matters.

The status of associate scientist or Co-I can also be revoked if an individual is no longer playing an active role in the team, if they leave the field of cometary research, or by mutual agreement.

8. Code of Conduct

The CI team is made up of members from around the globe with a diverse set of skills, personalities, perspectives, backgrounds, and experiences. We value the participation and contributions of every member of the team, and we have a shared responsibility in maintaining the team as a positive, inclusive, supportive, and successful community. Accordingly, all team members are expected to abide by the following Code of Conduct.

As members of the CI science team,

- We pledge to treat all people with equity and respect, providing a harassment- and bullying-free environment, regardless of sex, sexual orientation and/or gender identity, disability, physical appearance, body size, age, race, nationality, ethnicity, and religion. We will not tolerate racism, sexism, homophobia, transphobia, and other kinds of bias— whether these behaviours are overt or subtle. In particular, sexual language and imagery, sexist, racist, or otherwise exclusionary jokes and statements are not appropriate.
- We acknowledge that including people with a variety of opinions and backgrounds will only serve to enrich our team. In particular, discussions and debates will be done with respect, taking proactive measure to ensure that all participants are heard and feel confident that they can freely express their opinions.
- We pledge to welcome questions and answer them respectfully. We will criticize ideas, not people; striving to model behaviours that encourage productive debate and disagreement.
- We will follow the publication policy below for all dissemination of material from the team.
- We pledge to help the entire team follow the Code of Conduct, and to not remain silent when we see violations of the code of conduct.

This Code of Conduct applies to all team situations and interactions online and offline, in person meetings, emails, mailing lists, forums, social media, social events associated with the mission, group interactions, and one-on-one interactions. Team members who are asked to stop their harassing behaviour are expected to comply immediately.

Any issues related to the Code of Conduct can be brought to the confidential attention of any members of the management group.

This code of conduct has been adapted from the LSST Solar System Science Collaboration one (http://lsst-sssc.github.io/codeofconduct.html).

9. Publication policy

9.1. Scientific Results

CI publications fit into four categories:

- Key papers
- Regular papers
- Non-refereed contributions
- Public communication

These have decreasingly strict publication rules. However, all publications should follow the same guiding principles: Give credit to anyone who contributed; always include / acknowledge the relevant instrument team(s) and funding agencies; notify anyone in the science team with an interest in the topic early in the analysis/writing; be open to contributions from team members and consider their comments. Authorship on papers should be fair, appropriate, and inclusive, but listing everyone who ever thought about the subject is a disservice to those who made significant contributions.

A standard acknowledgement text to use on all papers and extended (e.g. LPSC-like) abstracts will be defined in agreement with the relevant funding agencies, and must be used. It will be specified here in a future version of this document once written (and probably also in the ESA Science Management Plan document).

9.1.1. Papers

Key papers are expected to be mission description papers ahead of launch (TBC exact timing) and initial key results from the comet fly-by. Subsequent papers, or any additional papers before the fly-by addressing target selection and characterisation, instrument issues, or cruise-phase science, if possible, will be regular papers. It is expected that these will include a detailed instrument description paper for each instrument, authored by each instrument team. Should there be any additional fly-by targets, separate sets of key papers on these results will be planned.

Key papers describing initial results can be expected to be submitted to a special issue of a suitable journal around 3 months after relevant data from the fly-by has been made available to the science team. The details of this issue (number of papers, timing, etc.) will be negotiated by the Mission Science Lead, ESA, JAXA, and the journal(s) closer to the time. These papers will include the full science team as authors, including all Co-Is and active associate scientists, and all instrument team members. The organisation of these papers, including identifying lead authors, will be agreed in advance with the team, with discussion led by the mission management group and science theme coordinators within the SSC. Authorship will include a lead author group who have contributed significantly to the detailed results presented and paper writing, and a second (alphabetical) list of the full science team,

acknowledging all contributions to the mission. The agreed list of key papers, and their lead author groups, will fairly reflect the full range of science results, and also the contributions of team members and their respective national funding bodies across the full duration of the mission.

Regular papers do not need to include the full science team, and should instead include those who contribute directly to the results described. All Co-Is should be given the opportunity to contribute; the full team should be kept informed of individual publication plans and research (see below). The relevant instrument team must be offered co-authorship on any paper based on data from a given instrument; it will benefit everyone if this offer is made early in the work on any paper.

Planned work and publications must be discussed within the science team from the earliest stage, in particular with the science theme coordinators, to avoid duplication of effort and to identify collaborations in similar areas. Early sharing of draft manuscripts within the team is encouraged, as is constructive feedback on these from the wider team; where possible, complete manuscripts should be shared with the team for feedback at least two weeks before submission. In any case, draft papers must be shared **at least a week before submission** with instrument teams and any others being offered authorship on the basis of contribution to the mission as a whole rather than the specific paper in question: by default, these should include the management group and the relevant science theme coordinator(s). Other Co-Is not contributing directly to a given paper, but wishing to claim authorship on the basis of relevant past contribution to the mission, should e-mail the corresponding author with a short (few sentences) justification requesting this. All reasonable requests should be accepted. In the event of disagreement between the corresponding author and any Co-I on this, the Mission Science Lead's decision will be final.

Collaborators from outside of the team can be included as authors on regular papers where they have contributed expertise not available within the team. External collaborators should not be invited to participate in papers where they duplicate or replace expertise that can already be found within the team, unless the relevant experts within the team have first been offered the opportunity to provide it and have declined. Science theme coordinators and the mission management group should be consulted before inviting external collaborators to participate in papers.

The wider ground-based observing team supporting the mission (i.e. those observers who make occasional observations and are not also Co-Is or associate scientists) will only be included on papers making use of the data they provide.

Authorship summary:

Paper type	Lead authors	Other authors
Key	Pre-fly-by agreed list reflecting contribution throughout mission	All other Co-Is, active associate scientists, and other instrument team members

Regular	Significant direct contribution to the analysis and/or paper	Relevant instrument team(s), management group, relevant science theme coordinator(s). Other Co-Is only on the basis of reasonable request.

Timeline summary:

Key papers:

- **Before fly-by**: Agreement between SSC and Mission Science Lead on list of key papers and lead author groups for each, ensuring fair balance and credit. Agreement between management/agencies/journal(s) on special issue plan. Plan communicated to full team.
- **Fly-by to +2 months** (exact timing may vary depending on when data is received on ground): Lead author groups work on analysis + writing
- **+2 months**: papers shared with rest of science team for discussion, contribution, feedback
- **+3 months**: papers submitted
- **Hopefully soon after that…**: papers accepted, published together in special issue with accompanying press coverage. Results will be embargoed until publication.

Regular papers:

- **At initial idea** (may be before or after fly-by): Very rough outline of planned paper (few sentence e-mail) sent to relevant science theme coordinator(s)
- **Within 1 week** of this e-mail: science theme coordinator identifies other team members who may contribute, and synergies/clashes with other proposed papers, agrees initial plan and contributing team with lead author. Plan communicated to SSC at next telecon, added to list of planned papers.
- **Analysis and paper writing:** Contributing team gets on with it, preferably quickly, especially for the initial wave of papers after the fly-by. Science theme coordinator kept informed of progress, especially in the case of any significant delays, or changes to the contributing team. Team members may join or leave the contributing team during the process; the principles of being open to collaboration and authorship fairly reflecting the work done should be respected.
- **Submission -2 weeks** (or earlier): Draft paper should be circulated around team (at least Co-I list, optionally the full science team) for feedback, making clear the proposed submission date. Team members are encouraged to provide constructive feedback a reasonable amount of time ahead of the proposed submission date; significant feedback contributions should be rewarded with co-authorship.
- **Submission -1 week** (or earlier): If not already done in previous step, draft must be circulated to others outside the lead authorship group (those listed in table above) in order for them to have the opportunity to decline or request authorship if they wish.
- **Submission**: should not take place (for fly-by results) before key papers are submitted, and preferably accepted. Science theme coordinator(s) should be informed when paper submitted.
- **On acceptance**: papers should be published to arXiv etc. to ensure open access (or on publication if journal rules demand it). Science theme coordinator(s) should be informed when paper accepted.

To make life easier for paper writing, we will maintain a list of all team members and their affiliations (in plain text and LaTeX formats) for copy/paste into manuscripts. Team members should inform the management group of any change in their affiliation.

9.1.2. Conference presentations

In general, conference presentations need only include the presenting and directly contributing authors; authors are encouraged to add 'and the CI team' where appropriate. For larger conferences where multiple CI abstracts may be expected, coordination of submitted abstracts through the science theme coordinators and mission management group is encouraged. Presentations are to be reported to the Mission Science Lead for inclusion in the mission presentation list.

9.1.3. Public talks, media etc.

Public presentations of the CI mission and results should acknowledge anyone directly involved in the relevant results and the rest of the team where appropriate. Public talks and reports in traditional media plus social media posts should not present unpublished work or internal team discussions without the permission of the Mission Science Lead and the relevant author(s) of the unpublished result(s). Public talks are to be reported to the Mission Science Lead for inclusion in the mission outreach activities list.

During mission Phase A/B, the Twitter account @cometintercept will be the primary social media outlet for core messages and mission updates, agreed by management. No individual instrument team Twitter / other social media accounts are to be activated during these stages of the mission. Individual team members, and occasionally their institutions' formal accounts, may post updates about activities related to the mission, as long as they follow the above guidelines. Information should never be released to the public via private social media accounts, but information already made public through official releases / publications can be 'shared'. Discretion is advised in sharing semi-public information, e.g. results presented at open scientific conferences ahead of publication; relevant embargoes must be respected. A revision of the social media strategy will take place after adoption of the mission by ESA, guided by the mission social media plans of ESA and JAXA.

The website www.cometinterceptor.space will provide longer-term primary information on the mission. Its usage will also be reviewed around the time of ESA mission adoption.

10. Data processing and Archiving

Details of data access and release will be agreed with ESA, JAXA and national agencies and described in the ESA Science Management Plan. The following describes the processing and sharing of data within the team, based on what was originally proposed, but this may change. The ESA document takes precedence over anything written here.

All mission data will be processed and served to all team members via the operations centre. This means that instrument teams need to have delivered final, science grade, pipelines for processing raw data to useful products to the data centre well in advance (at least 1 year) of the fly-by. In order that the science team can make use of diverse data sets directly, bearing in mind that all Co-Is will have access to all data, these pipelines should be well documented

and produce user friendly data products, to the standard that is typically expected of archived data (PDS4 standards compliant). This will also have the advantage that it will greatly simplify delivery of the data set to the PSA archive. Instrument teams will also be responsible for any subsequent delta calibration/fixes/RID corrections during the archiving process, but this approach should mean that these are minimal.

11. Annex 1 – Named roles

11.1. Management group

Role	Name	Institute, Country
Mission Science Lead	Geraint Jones	Mullard Space Science Laboratory, University College London, UK
Mission Deputy Science Lead	Colin Snodgrass	University of Edinburgh, UK
Science Operations Coordinator	Cecilia Tubiana	Max Planck Institute for Solar System Research, Germany

11.2. Target identification team

Role	Name	Institute, Country
Chair	Colin Snodgrass	University of Edinburgh, UK
LSST representative	Meg Schwamb	Queen's University Belfast, UK
Observations coordinator	Matthew Knight	United States Naval Academy, USA
Trajectory design lead	Joan Pau Sanchez Cuartielles	Cranfield University, UK
Orbit Analysis lead	Marco Micheli	ESA NEO Coordination Centre
Comet models coordinator	Aurelie Guilbert-Lepoutre	CNRS/Université de Lyon, France

11.3. Instrument PIs (and deputies / Co-PIs)

Instrument	Role	Name	Institute, Country
CoCa	PI	Nicolas Thomas	University of Bern, Switzerland
	Deputy-PI	Antoine Pommerol	University of Bern, Switzerland
DFP	PI	Hanna Rothkaehl	CBK PAN, Warsaw, Poland
- DISC	Unit Co-PI	Vincenzo Della Corte	INAF-IAPS, Rome, Italy
	Deputy Unit Co-PI	Alessandra Rotundi	Dip. di Scienze e Tecnologie, Università di Napoli "Parthenope"
- FGM (A)	Unit Co-PI	Uli Auster	TU Braunschweig, Germany
- FGM (B)	Unit Co-PI	Marina Galand	Imperial College London, UK
	Deputy Unit Co-PI	Martin Volwerk	Space Research Institute, Austrian Academy of Sciences, Graz, Austria
- LEES	Unit Co-PI	Nicolas Andre	IRAP, France
	Deputy Unit Co-PI	Lubomir Prech	Charles University, Czech Republic
- COMPLIMENT	Unit Co-PI	Pierre Henri	CNRS (LPC2E, Orléans & Lagrange, Nice), France
	Deputy Unit Co-PI	Niklas Edberg	IRF-Uppsala, Sweden
	Deputy Unit Co-PI	Johan De Keyser	BIRA, Belgium

- SCIENA	Unit Co-PI	Hans Nilsson	IRF-Kiruna, Sweden
- DAPU	Unit Co-PI	Ivana Kolmasova	IAP, Praque, Czech Rep
- PSU	Unit Co-PI	Marek Morawski	CBK PAN, Warsaw, Poland
EnVisS	PI	Vania Da Deppo	CNR-IFN, Padova, Italy
	Co-PI	Luisa Lara	Instituto de Astrofisica de Analucia, Granada, Spain
HI	PI	Kazuo Yoshioka	The University of Tokyo, JP
MANIAC	PI	Martin Rubin	University of Bern, Switzerland
	Deputy-PI	Peter Wurz	University of Bern, Switzerland
MIRMIS	PI	Neil Bowles	University of Oxford, UK
	Co-PI	Antti Näsilä	VTT Technical Research Centre of Finland
OPIC	PI	Mihkel Pajusalu	Tartu Observatory, University of Tartu, Estonia
PS	PI	Satoshi Kasahara	The University of Tokyo, JP
	Deputy-PI	Ayako Matsuoka	Kyoto University, JP
WAC/ NAC	PI	Shingo Kameda	Rikkyo University, JP
	Deputy-PI	Naoya Sakatani	Rikkyo University, JP

11.4. National Co-PIs

Countries contributing hardware or another significant contribution to the mission has a national mission Co-PI. Other countries and corresponding Co-PIs may be added to this list in future if a significant contribution is forthcoming.

Country	Name	Institute
Austria	Martin Volwerk	Space Research Institute, Austrian Academy of Sciences
Belgium	Johan de Keyser	Royal Belgian Institute for Space Aeronomy
Czechia	Ivana Kolmasova	IAP, Praque
Estonia	Mihkel Pajusalu	Tartu Observatory, University of Tartu
Finland	Jaan Praks	Aalto University
France	Pierre Henri	CNRS (LPC2E, Orléans & Lagrange, Nice)
Germany	Jean-Baptiste Vincent	DLR Berlin
Hungary	Akos Kereszturi	CSFK, Konkoly Astronomical Institute
Italy	Alessandra Rotundi	Dip. di Scienze e Tecnologie, Università di Napoli “Parthenope”
Japan	Ryu Funase	Institute of Space and Astronautical Science, The University of Tokyo
Poland	Hanna Rothkaehl	CBK PAN, Warsaw
Spain	Luisa Lara	Instituto de Astrofisica de Analucia
Sweden	Hans Nilsson	IRF-K
Switzerland	Nicolas Thomas	University of Bern
UK	Geraint Jones	Mullard Space Science Laboratory, University College London
USA	Geronimo Villanueva	NASA Goddard

11.5. Science theme coordinators

Theme	Name	Institute
Nucleus	Lead: Mohamed Ramy El-Maarry	Khalifa University, Abu Dhabi
	Deputy: Rosita Kokotanekova	European Southern Observatory
Near Environment	Lead: Jean-Baptiste Vincent	Deutsches Zentrum für Luft- und Raumfahrt, Berlin, Germany
	Deputy: Fiorangela La Forgia	University Parthenope of Naples, Italy
Far Environment	Lead: Jessica Agarwal	Technische Universität Braunschweig, Germany
	Deputy: Cyril Simon Wedlund	Institut für Weltraumforschung, Graz, Austria

12. Annex 2 – succession planning

For any instrument PI, or other named role in Annex 1, with an expected retirement / end of contract date before the end of mission, a named successor and hand-over date must be given. These are listed below.

Role	Current holder (Name)	Successor (Name + Institute)	Hand over date
CoCa PI	Nicolas Thomas	Antoine Pommerol, U. Bern.	…
…	…		…