DOCUMENT

Announcement of Opportunity

Solar Orbiter Payload

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European Space Agency
Agence spatiale européenne

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DISTRIBUTION

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Annex 4: Science Management Plan (SMP), SCI-S/2007/157, 15 October 2007

Annex 5: Solar Orbiter Experiment Interface Document part A (EID-A), SOL-EST-IF-00050 issue 1 revision 0 dated 09/10/2007

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1 GENERAL INFORMATION

1.1 Summary and Scope

The European Space Agency (ESA) solicits proposals of scientific investigations for the Solar Orbiter mission. This Announcement of Opportunity (AO) is open to scientists from the Member States of ESA and other communities with which reciprocity or specific agreements exist, in particular scientists from the United States, due to the programmatic context of the NASA Solar Sentinels mission (see below). For US scientists a parallel SMEX "Mission of Opportunity" AO and a dedicated "Focused Opportunity Solar Orbiter" Small Explorer (SMEX) AO are meant to cater for US contributions to Solar Orbiter.

Solar Orbiter is the next solar-heliospheric mission in the Science Programme of ESA. It has recently been redefined as part of a joint ESA-NASA programme called Heliophysical Explorers that comprises ESA's Solar Orbiter and NASA's Solar Sentinels as a highly synergetic programme. The Solar Orbiter mission is devoted to solar and heliospheric physics and will provide unprecedented close-up and high-latitude observations of the Sun. The mission will be carried out as an ESA-led mission open to the worldwide science community.

The Solar Orbiter baseline configuration consists of a 3-axis stabilised, single element spacecraft that will be launched from Cape Canaveral on an Atlas V (or Delta IV with a Soyuz-Fregat 2-1B from Centre Spatial Guyanais, Kourou (CSG) as a possible backup). The foreseen launch date is mid-2015.

1.2 Proposal Information Package

The Proposal Information Package (PIP) contains, in addition to this AO, the following documents:

- Solar Orbiter Science Requirements Document (Sci-RD)
- Joint Science and Technology Definition (JSTDT) Report for the ESA/NASA Heliospheric Explorers programme
- Payload Definition Document (PDD)
- Draft Science Management Plan (SMP)
- Experiment Interface Document - Part A (EID-A)
- Solar Orbiter Environmental Specification
- Mission Analysis
- EID-B template

- Cost template
- VIM Filter Performance Tables
- Heat Shield & System Study Final Presentations

A more detailed summary of the mission overview, proposal selection procedure and a recapitulation of the investigators' duties and responsibilities can be found in the draft SMP. It should be noted that due to the programmatic urgency of this AO, the SMP is not yet formally approved by the ESA Science Programme Committee (SPC).

The proposal shall clearly identify a Principal Investigator (PI) and a Lead Funding Agency (see definitions below) for the proposed instrument. Responses will clearly need to spell out the character and level of participation together with the nature of the management structure and financial commitments within each instrument consortium. The proposals shall comply with the scientific and operational objectives of the mission and with the programme definition and constraints. The core scientific objectives are now defined in the Solar Orbiter/Solar Sentinels Joint Science and Technology Definition (JSTDT) Report. Proposals addressing additional objectives as defined in the somewhat wider original Solar Orbiter Science Requirements Document (Sci-RD) will, nevertheless, still be considered, provided the appropriate resource envelopes are not exceeded.

The optimised Reference Payload as defined in the Payload Definition Document (PDD) has been developed as a partnership between ESA and the international science community. This was done primarily in the framework of the Solar Orbiter Payload Working Group, and subsequently it was amended to satisfy also some additional requirements outlined in the JSTDT report. In case of any unclarity in the description of scientific measurement requirements due to the multiplicity of documents, the JSTDT report supersedes both the Sci-RD and PDD.

After receipt of the responses to this AO a Payload Review Committee (PRC) will perform a full review of all AO responses and recommend the final consolidated payload with a view to optimising the overall scientific return within the available resources. Agency staff will assist the PRC in their task with respect to technical, programmatic and financial matters. A proposal may be amended after discussions between the proposing consortium and the PRC or ESA.

1.3 Responsibilities of Funding Agencies

1.3.1 Lead Funding Agency

The national funding agency of the country of the proposing PI is considered as the Lead Funding Agency for the instrument. The PI is expected to take full responsibility

for the development and timely delivery of the instrument. All proposals in response to this AO shall therefore be submitted by a PI, with full transparency to the corresponding Lead Funding Agency, and shall include a Letter of Commitment (LOC) from this agency, which eventually will be replaced by a final and formal Multi-Lateral Agreement (MLA), before final adoption of the Solar Orbiter mission by SPC. In the case of U.S. investigators, the LOC will be replaced at this stage with a NASA statement that the investigation has been submitted to NASA and declared compliant as a candidate to the applicable AO process.

1.3.2 Other Funding Agencies

National funding agencies representing other members in an instrument consortium (e.g. Co-PIs or Co-Is, see 1.4 below or the draft SMP for detailed definitions of such functions) shall guarantee the funding of the respective Co-PI/Co-I contribution by a formal interagency agreement with the Lead Funding Agency. Copies of draft interagency agreements shall be submitted to ESA as an annex to the LOC.

1.4 Responsibility of Instrument Consortia

Each proposing instrument consortium shall be headed by a single person, designated as the Principal Investigator (PI). The PI is the single-point formal interface to the ESA Project Office.

In some exceptional circumstances and particularly with respect to agencies of non-member states, a Co-PI may be appointed. Co-PIs are expected to provide a substantial contribution to the development of the instrument. A Co-PI will have similar rights as a PI, but the PI will remain the formal single-point interface to the Project Office.

Members of each PI-led instrument consortium may be proposed as Co-Investigators (Co-Is). Each Co-I should have a well-defined role either with regard to hardware/software delivery or with regard to scientific support of the investigations within the instrument consortium. The PI-led instrument consortium may review the status of its members regularly and implement changes if required. The Lead Funding Agency will however not change during the development of the instrument.

The responsibilities of PIs/Co-PIs and Co-Is are further detailed in the SMP.

Specific Provisions for Principal Investigators

The PI shall nominate an Experiment Manager with appropriate hardware, software and procurement expertise, and establish with her/her/him an efficient management scheme, especially if several institutes provide subassemblies or subsystems.

The EID-A defines the technical and programmatic requirements (including management and control procedures), and specifies in detail the interface and planning applicable to the instrument. The EID-B is the reference control document for detailed definition of all experiment interfaces; it shall be submitted to a formal configuration and change control once agreed and signed by all parties.

For U.S.-led instruments, the EID-A-specified Instrument Preliminary Design Review and Instrument Critical Design Review will be merged with NASA's Initial Confirmation Review and Confirmation Review, respectively.

1.5 Contact with ESA

Before submission of proposals, requests for further information and clarification should be addressed to:

M. Coradini
ESA/HQ (D/SCI)
8-10 rue Mario Nikis
75738 Paris
France
Email: marcello.coradini@esa.int

with copies to:

R. Marsden
ESTEC (SCI-SM)
P.O. Box 299
2200 AG Noordwijk
The Netherlands
Email: Richard.Marsden@esa.int

Ph. Kletzkine
ESTEC (SCI-PS)
P.O. Box 299
2200 AG Noordwijk
The Netherlands
Email: Philippe.Kletzkine@esa.int

In case proposers identify the need to clarify technical or programmatic matters with the Agency, written questions should be sent to the Solar Orbiter Project Office, addressed to: Philippe.Kletzkine@esa.int with a copy to: Marcello.Coradini@esa.int and Richard.Marsden@esa.int.

The questions and their answers will be made available to all participants in the AO process.

1.6 ESA Technology Development Activities

1.6.1 List of Technology Development Activities

Following assessment studies run up to 2006, a list of desirable payload-related technology development activities for the time frame 2006-2009 was established as follows:

- Active Pixel Sensors for Solar Orbiter (activity SO-DE-01)
- Multi-Purpose Charge Sensitive Amplifier & TOF ASIC (activity SO-DE-02)
- Polarisation Module Package (activity SO-DE-03)
- Heat Rejecting Entrance Window (activity SO-OP-01)
- Fabry-Perot Filter for VIM (activity SO-OP-02)

Of these, two have been initiated, namely the Active Pixel Sensors for Solar Orbiter (activity SO-DE-01) and the Heat Rejecting Entrance Window (activity SO-OP-01). Their current status is reported below. The other activities are under re-consideration and preparation, and may be undertaken, modified or deleted.

1.6.2 Active Pixel Sensor Activities

The following detector activity has been initiated under SO-DE-01:

LUPA4000 electro-optical characterization

- *Goal:* existing LUPA-4000 CMOS imager (Cypress) has been identified as a possible detector candidate for the visible imager VIM on board Solar Orbiter. This contract will study in details the electro-optical properties of the device and its degradation with respect to TID (Total Ionizing Dose) and SEE.
- *Status:* proposals received and under evaluation.
- *Planning:* the activity is 8 month long.

In addition, the following activities relevant to Solar Orbiter have been undertaken:

BOLD (Blind to Optical Light Detectors)

- *Goal:* Development of a hybrid detector sensitive between 10 to 120 nm and with high intrinsic rejection to optical light; based on GaN/AlN hybridized to Si CMOS circuitry.
- Company: IMEC (B), CNSR/CHREA (F), ROB (B)
- *Status:* First layer deposition trials have been tested at Bessy PTB and more recently in SCI-PAI labs under EUV illumination with encouraging results.
- *Planning:* next PM 22/11/2007. Completion: mid 2008 with a demonstrator.

CMOS imager with EUV detection capability

- *Goal:* provide a serious backup to BOLD between 15 and 80 nm and potentially at Lyman-Alpha too. Baseline is to use the back-thinning technology already

employed for CCD to reach EUV sensitivity for CMOS imagers. The aim of the contract is to secure the technology so that it would be accessible to instruments such as EUI.
- *Status:* SOW writing and review of instrument radiometric requirements.
- *Planning:* The activity duration is expected to be 12-18 months.

CZT detectors for STIX
- *Goal:* perform p+ radiation sensitivity tests on CZT detectors
- *Status:* procurement of CZT single diodes, fabricated with European substrates, initiated and radiation facility planned.
- *Planning:* results to be expected in Q1 2008.

1.6.3 Heat Rejecting Entrance Window Activities

This activity has completed qualification review and is nearing completion. The status of the item and its main characteristics are reported in Annex 10.

Proposers who intend to make use of this technology or a derivative, e.g. for an instrument that would benefit from a similar item with different passband wavelengths, will be expected to take over the development and procurement of the item. ESA welcomes but does not require any proposer to make use of this development.

2 CONTENTS OF THE PROPOSAL

The proposal shall respond to the science and mission objectives and programme constraints described in the PIP, and shall provide all requested information to permit a complete evaluation against the criteria listed in Section 4.1.2 of the SMP. The proposal must be written in English; it consists of the following parts:

Part I:	Scientific and Technical Plan
Part II:	Experiment Interface Document - Part B (EID-B)
Part III:	Engineering Plan
Part IV:	PA (Product Assurance) Plan
Part V:	Management Plan
Part VI:	Instrument Financial Plan, LOC from the Lead Funding Agency and Draft Interagency Agreements

2.1 Part I: Scientific and Technical Plan

The proposals shall comply with the scientific and operational objectives of the mission and with the programme definition and constraints. The core scientific objectives are now defined in the Solar Orbiter/Solar Sentinels Joint Science and Technology Definition (JSTDT) report, and in a somewhat wider view also in the original Solar Orbiter Science Requirements Document (Sci-RD).

Part I shall not exceed 40 single-spaced type-written A4 pages, with a character size not smaller than 10 points, including illustrations without reduction, but excluding cover page, executive summary and table of contents. Part I of the response to this AO shall contain the following:

- Cover page
- Executive summary (3 pages)
- Table of contents
- Scientific objectives
- Instrument performance
- Instrument technical description and design
- Summary of experiment interfaces
- Test and calibration plan
- System level AIV (Assembly, Integration and Verification)
- Flight operations concept
- Data reduction, scientific analysis and archival support

Each item is detailed hereafter.

2.1.1 Cover Page

The cover page includes:

- The title of the proposal
- The names, addresses, telephone (office, alternative and portable) and fax numbers, and e-mail addresses of the PI and Co-Is
- The name of the Lead Funding Agency together with the associated contact person with name, addresses, telephone (office, alternative and portable) and fax numbers, and e-mail addresses
- The names of other funding agencies associated with the proposal
- The ftp address at which the proposal can be found in electronic form

2.1.2 Executive Summary

The executive summary includes the title of the proposal and outlines the following aspects within a 3-page limit, annex not included:

- Objective of the proposal and its compliance with those indicated in the JSTDT report and, where relevant, the Sci-RD
- Overall performance of the instrument(s) required to fulfil the anticipated goals
- Instrument operations and scientific analysis
- Summary of required spacecraft resources and compliance with allocated resources
- Management scheme
- Summary of the financial status
- Possible departure from the constraints stated in the PDD
- Requirements imposed on other instruments or spacecraft subsystems
- Annex: Instrument data sheet

If the proposal violates any of the constraints described in the PDD, a clear statement about each violation, together with its justification, shall be included in the summary. Each violation shall be further detailed in the appropriate sections. The instrument requirements are summarised in a tabular form. The template of this table is included in the EID-B template appearing as Annex 8 to this AO.

2.1.3 Scientific Objectives

This section shall clearly describe the scientific investigation and the overall capability of the instrument, in the light of the investigators' objectives and global mission goals as defined particularly in the JSTDT and, where relevant, also in the Sci-RD. The overall performance of the instrument under nominal orbit conditions will be described and

compared, if relevant, to that of similar instruments described in the PDD, flown on other spacecraft or planned for future missions. Possible synergies with laboratory studies and ground- or space-based observations should be discussed. It is important to list any assumptions required to achieve the science objectives. In particular details affecting performance and as a result the science objectives related to the following need to clearly indicated:

- Solar Orbiter spacecraft performance
- Solar Orbiter orbit
- Other Solar Orbiter payload elements
- Ground segment

Expected results should be outlined and discussed, as far as possible, in both qualitative and quantitative terms. If the proposal contains any violation of the technical or programmatic constraints, the scientific justification should be given in this section.

2.1.4 Instrument Performance

A detailed analysis of the proposed instrument performance is required, including sensitivities and supported by instrument simulations. All assumptions made in this performance analysis shall be provided. In addition, it shall also be stated which degradation in performance is expected if key instrument characteristics turn out to be unachievable during the instrument development programme. Performance simulations must also include evaluations as a function of spacecraft orbital position. Details associated with instrument performance milestones within the instrument development should be indicated and the milestones also incorporated in the instrument development plan (cf. Part III). Instrument performances must be evaluated, not only for the baseline design, but also for options including potentially proposed back-up designs for cases where technology still has to be developed for the baseline.

2.1.5 Technical Description and Design

This section shall include a comprehensive design description of the proposed instrument, including resource budgets. In the response to this AO, the potential PI has the flexibility to propose, with rationale, an interface, that he/she believes, should be the optimum.

An instrument may use elements that are common to a number of other instruments. Such common elements may be provided by partners in a consortium providing payload packages, e.g. the power supply for a number of in-situ instruments/sensors may be shared. The interface between the proposed instrument and the spacecraft must be clearly specified and justified based on practical considerations such as test and integration requirements. The various functional operating modes shall be clearly identified and their rationale explained. In particular any operating modes, which place different requirements on scientific operations and data analysis, shall be described.

Detailed information on the instrument software should be given in the EID-B, to be completed and submitted as Part II of the proposal.

The proposal shall clearly identify the elements that will be delivered by the instrument consortium. It shall also identify any remaining or common elements not proposed to be provided by the consortium as well as the party that is expected to deliver these elements. The instrument proposal shall provide a complete performance and interface specification of all of above elements, including those to be delivered by third parties. In other words, the full chain of the instrument scientific acquisition shall be specified. The instrument level development cycle, technology preparation and functional verification shall be described in the proposal, in particular, the concept with interfacing to the common elements. A detailed description of the intended instrument development plan shall be provided as Part III of the response to this AO.

A payload boom which extends on the anti-Sun side of the spacecraft is presently foreseen to accommodate payload instruments. This boom is to be PI provided, potentially as a common element between several instruments, and will need to comply with the spacecraft requirements as expressed in the EID-A.

Proposals requiring "within reach" technological developments should provide an explicit back-up strategy in case the technology development is not available in time. In addition, the assumptions related to the needs of the instrument for specific payload technology developments currently underway for the Solar Orbiter mission within ESA must be specified. A list and description of payload technology items under development specifically for the Solar Orbiter mission can be found in section 1.6 above and in Annex 10. In summary the current status and availability of the proposed technologies in a baseline design shall be defined together with the risk associated in any assumption of developing technologies.

New advanced technologies should be clearly described and identified as alternative options. The impact of these options upon scientific return, interfaces, schedule, etc. should be explained together with an assessment of the associated risk. The extent to which the design utilises space qualified and space experienced hardware shall be stated. Again a detailed description of the intended technology developments must form part of the Engineering Plan to be provided as Part III of the response to this AO.

2.1.6 Summary of Experiment Interfaces

The mechanical, optical, thermal, power, data, EMC (Electromagnetic Cleanliness/compatibility) and operational interfaces either to the spacecraft or to other assumed third party provided equipment must be summarised here and specified in detail in the EID-B. Assumptions related to this third party equipment with respect to the interfaces shall be clearly indicated. It is expected that these interfaces will need to

be iterated with the Solar Orbiter Project Office during the proposal-writing period and matured after selection.

2.1.7 Test and Calibration Plan

This section shall describe all test and calibration (ground/pre-launch, cruise and in-orbit) plans and procedures deemed necessary to verify the instrument is functioning correctly to achieve the scientific goals. The test and calibration plan shall be provided as a function of the instrument development schedule and include the relevant details associated with the various instrument models.

The requirement and availability of suitable test and calibration facilities (e.g. vacuum, thermal-vacuum, optical beams, computer etc.) either in-house or in industry shall be clearly indicated. The ground test and check-out equipment to be supplied with each instrument shall be described. Assumptions with respect to test facilities or equipment under ESA's responsibility shall be indicated.

Any test requirements needed during the cruise phase must be justified fully in this section. Details of the specific tests and calibrations required during the science operations phase including procedures and timelines are required. Assumptions and requirements related to instrument cross-calibrations or tests/calibrations requiring data from other instruments must be clearly specified.

2.1.8 System Level AIV

This section shall describe the compliance of the instrument qualification flow with the project provided pre-launch Verification Programme Requirements (chapter 5 of EID-A) and the Spacecraft system level AIV (Assembly, Integration and Verification) flow, from which the characteristics of the instrument models that are to be delivered are derived. Instrument characteristics that do not comply should be identified together with any special requirement. The mechanical and electrical ground support equipment (MGSE and EGSE) as well as any additional calibration equipment shall be identified and described in the Annex of the EID-B (see template). Special services required at system level or at launch site shall be identified giving technical justification for it.

2.1.9 Flight Operations Concept

The operational concept of the proposed instrument shall be described. Details (e.g. frequency of calibrations, mode changes etc.) should be provided. Any specific requirement for flight operations support should also be identified. The instrument consortium is required to support the Mission and Science Operations Centres (MOC/SOC) through all mission phases. Specifically the following details should be provided:

- The level and nature of the support to the definition of the science operations pre-launch and during the cruise phase

- The level and nature of the expert support at the MOC and SOC during payload commissioning and critical operations
- The level and nature of the expert support provided for the preparation of the instrument operation timelines prior to and during the science operations phase
- The level and nature of the expert support for monitoring and optimisation of instrument performance prior to and during the science operations phase

2.1.10 Data Reduction, Scientific Analysis and Archival support

A data reduction and scientific analysis plan shall be provided. This plan shall adequately address the technical, managerial and programmatic issues. The level of resources allocated to each of the following phases of the programme shall be indicated.

- Pre-launch data reduction preparations
- Support to the SOC
- Cruise phase developments
- Operations phase
- Science analysis
- Archival phase

It is required that the PI complies with the scientific data policy of the agency as defined in the SMP. Any non-compliance shall be identified and substantiated in this section. Specifically, the resources and the approaches necessary to conduct the following activities shall be addressed:

- Delivery of raw, calibrated, and high level data, including relevant calibration products and/or software for such data production, to the Solar Orbiter ESA scientific data archive, as they become available from the data reduction and dissemination process
- Provision to ESA with unlimited access to all processed and analysed data for public relation purposes
- Provision of summaries of the main scientific results at regular intervals
- Provision of inputs for the definition and implementation of the science operations planning, and data handling and archiving concepts
- The level and nature of the support of the definition and implementation of the Solar Orbiter ESA scientific data archive, as part of the pre-launch tasks

2.2 Part II: Experiment Interface Document - Part B (EID-B)

The purpose of the Experiment Interface Document - Part B (EID-B) is to formalise the instrument consortium response to the technical and programmatic requirements. After selection, the EID-B will be maintained and updated at regular intervals, and will become essentially a contractual document between the ESA Project Office and the selected PI led consortium. This document shall be arranged according to the template

provided as annex to this AO and will provide, as a minimum, information on the following topics:

- Technical instrument description
- Interface requirements and resource allocations:
  - Budgets
  - Mechanical-optical
  - Thermal
  - Electrical
  - Data handling
  - Electromagnetic compatibility
  - Software
- Description of ground support equipment as an annex

Complementary inputs not required within the standard EID-A format may be added at the discretion of the PI with a technical justification, which will be assessed in the frame of the proposal evaluation process. Although there may be some duplication of information, the purpose of Part II is mainly to provide factual data on all aspects of the proposed instrument, whereas discussion, justification and risk assessment, etc. are provided in Part I.

2.3 Part III: Engineering Plan

Part III describes in detail the engineering plan and must contain the following details:

- Overall design, development and verification plan
- Technology development plan required to achieve the instruments science objectives
- Within this plan the following issues need to be addressed:
  - Identification of all required technology developments
  - Current status of each technology development item
  - Assumed source of funding for each technology development item. The assumed source of funding shall be identified within Part VI “Financial Plan” of the proposal.
- Instrument back-up development plan should some technology developments not be successful
- Instrument model philosophy

2.4 Part IV: PA Plan

Part IV describes in detail the instrument PA (Product Assurance) plan and must contain the details as described in the EID-A:

- Product assurance
- Quality assurance
- Safety assurance
- Dependability assurance
- Parts and materials
- Software product assurance
- Cleanliness and contamination control

2.5 Part V: Management Plan

The management plan should cover all aspects of the proposed investigation for the entire duration of the mission. The PI must show how he/she will establish an efficient and effective management scheme that must include an Instrument Development Manager. The contribution of each institution must be clearly indicated and the responsibilities of each participant described in detail. It is essential to provide a clear management plan, which is adequate with respect to the instrument complexity and the interfaces within the instrument consortium. Emphasis should be placed on a simple management scheme with as few interfaces as necessary.

Organization charts must contain the names of all partners: PI, Co-Is, Instrument Development Manager, and all key personnel. The PI will show, in particular, how he/she will participate in the overall activities. The fraction of time available for the investigation shall be given for each individual throughout the instrument development cycle and the following mission phases

- Instrument development phase
- Science operations phase
- Data reduction and scientific analysis
- Archival phase

For all personnel the qualifications and experience of the team must be clearly indicated along with the fraction of time to be spent on the project.

Furthermore the management plan shall contain all information related to the compliance of management requirements as laid down in EID-A chapter 7. These requirements address the subjects

- Project phasing and planning control including reporting to ESA
- Reviews
- Configuration management
- Deliverable items
- Instrument schedules

The PI is expected to describe his/her compliance to these requirements and their expected implementation.

2.6 Part VI: Instrument Financial Plan

The PI and Co-Is shall include separate sections for their own resource provision with the detail of estimated resources for each activity subdivided into the following topics:

- Technology development, including funding of a back-up development plan (this must also indicate the assumptions with respect to payload technology development conducted within ESA)
- Instrument development
- External test and calibration campaigns (where facility costs are incurred)
- Science operations
- Data reduction and science analysis
- Archival phase

For estimating the necessary resources the following details are required:

- Internal manpower resources (FTEs) and associated costs
- Additional manpower resources (FTEs) provided to support the development but not costed within the project
- Other internal institute resources costed against the proposal
- External contracts
- Capital equipment costs required in the development of the instrument
- Total funding requirements

These details must be provided as a function of the complete instrument development cycle timeline for each contributing party (PI and Co-I) as well as for the total overall development. In addition for the single instrument as proposed in response to this AO the total provisions required from national sources for funds and manpower shall be provided and justified. The Co-I-supported authorities for these resources shall be identified and the current status of their applications indicated as well as the level of agreement between them and the Lead Funding Agency. The estimated instrument development cost shall be summarised in tabular form.

An Excel cost template as Annex 9 to this AO has been provided for convenience and can be used for identification of the financial cost according to above requirements. The specific labels and numbers in the template are examples only.

2.7 Letter of Commitment

This Announcement of Opportunity calls for the identification of both a Principal Investigator as well as a Lead Funding Agency. The PI is responsible for the submission of a complete proposal that must include a Letter of Commitment from the Lead Funding Agency. The intention is that this response to the AO will not only establish the technical character and maturity level of the instrument, but also the nature of the management structure and financial commitment. It is on the basis of this LOC that the final formal agreement with the Lead Funding Agency will be established by ESA together with all other participating agencies in the form of a Multi-Lateral Agreement (MLA). It is only after signature of the MLA that the Solar Orbiter mission will be formally adopted by the SPC.

In the case of U.S. investigators, the LOC will be replaced at this stage with a NASA statement that the investigation has been submitted to NASA and declared compliant as a candidate to the applicable AO process.

It should be noted that the financial status of the PI team will be guaranteed by the Lead Funding Agency. The Lead Funding Agency will be considered responsible vis-à-vis ESA for all financial matters related to the selected investigations. Co-I teams are required via their national funding agencies to seek agreement with the Lead Funding Agency. The Lead Funding Agency is expected to provide the majority element of the funding for the respective instrument and to have prime science and industrial responsibility through the PI and Instrument Manager.

The national funding agency representing a Co-PI or Co-I shall guarantee the funding of the respective Co-PI/Co-I contribution by a formal interagency agreement with the Lead Funding Agency. Copies of draft interagency agreements shall be submitted to ESA as annex to the LOC.

3 SUBMISSION OF THE PROPOSAL

The proposal shall be submitted by the PI in electronic form to the addresses listed below. ESA also requests the provision of three hardcopy versions as well as 21 copies on CDs (or DVDs) for distribution to the review team. Part VI of the proposal (Financial Plan) shall be delivered on separate CDs (6 copies) at the same addresses.

All pages must be numbered, and all sheets printed on both sides, whenever appropriate. All parts must be bound separately.

The proposal must be received not later than:

15 January 2008

The PI shall inform the addressees by e-mail about:

- The mailing date of the hardcopy versions of the proposal
- The ftp address at which the electronic version can be found

ESA will confirm by e-mail the reception of the hardcopy versions of the proposal. Either the PI or the Lead Funding Agency should notify ESA if confidentiality is required for Part VI (Financial Plan).

Addresses for Proposal submission	**Hardcopy**	**CD**
Marcello Coradini ESA/HQ (D/SCI) 8-10 rue Mario Nikis 75738 Paris Cedex 15 France Marcello.Coradini@esa.int	1 complete set	1
Richard Marsden ESA/ESTEC (SCI-SM) P.O. Box 299 2200 AG Noordwijk The Netherlands Email: Richard.Marsden@esa.int	1 complete set	1 + 1 (part VI)
Philippe Kletzkine ESTEC (SCI-P) P.O. Box 299 2200 AG Noordwijk The Netherlands Email: Philippe.Kletzkine@esa.int	1 complete set	20 + 5 (part VI)

Each hardcopy must consist of the following elements:

- Cover Letter and Executive Summary (within part I)
- Part I: Scientific & Technical Plan
- Part II: Experiment Interface Document (EID-B)
- Part III: Engineering Plan
- Part IV: PA Plan
- Part V: Management Plan
- Part VI: Instrument Financial Plan, LOC from the Lead Funding Agency and Draft Interagency Agreements

ACRONYMS

AIV	Assembly, Integration and Verification
AO	Announcement of Opportunity
Co-I	Co-Investigator
Co-PI	Co-Principal Investigator
D/SCI	Directorate of the Scientific Programme
EID	Experiment Interface Document
EID-A	Experiment Interface Document - Part A
EID-B	Experiment Interface Document - Part B
EGSE	Electrical Ground Support Equipment
EMC	Electromagnetic Cleanliness/compatibility
ESA	European Space Agency
FM	Flight Model
FTE	Full Time Equivalent (man years)
JSTDT	Joint Science and Technology Definition Team
LOC	Letter Of Commitment by Lead Funding Agency
MGSE	Mechanical Ground Support Equipment
MLA	Multi-Lateral Agreement
MOC	Mission Operations Centre
PDD	Payload Definition Document
PI	Principal Investigator
PIP	Proposal Information Package
P/L	Payload
PRC	Payload Review Committee
RSSD	Research and Scientific Support Department
Sci-RD	Solar Orbiter Science Requirements Document
SMP	Science Management Plan
SOC	Science Operations Centre
SolO	Solar Orbiter
SPC	Science Programme Committee