

***Solar Orbiter* Payload Studies**

Call for “Letters of Interest”

Dear Colleagues,

Ideas for an ESA *Solar Orbiter* mission were first discussed at the workshop "A Crossroads for European Solar and Heliospheric Physics", held on Tenerife in March 1998. Following a pre-assessment study carried out in ESTEC in 1999, the mission was proposed to ESA in the framework of the F2/F3 Call for Ideas in 2000. Based on the results of the pre-assessment, and a further “delta” assessment study conducted between April and June 2000, the mission was approved in October 2000 by ESA’s Science Programme Committee for launch in the 2008-2013 time-frame.

The main goal of the ESTEC studies conducted to date was to assess the feasibility (both technical and financial) of placing a 3-axis stabilised platform in a Sun-centred orbit with perihelion near 0.2 AU, and with maximum possible inclination to the solar equator, given the constraints of a Flexi-mission. The Science Team defined a set of instruments for the mission, together with representative system-level requirements; however, detailed payload studies were not carried out.

The “strawman” payload defined for the purpose of the *Solar Orbiter* assessment studies comprises two instrument packages: a suite of solar remote-sensing instruments, and a suite of in-situ particles and fields instruments. The remote sensing package comprises a Visible-light Imager and Magnetograph, an EUV Imager and Spectrometer, an EUV Imager, a UV/visible-light Coronagraph, and a Radiometer. The in-situ package consists of a Solar Wind Plasma Analyser, a Radio and Plasma Wave Analyser, a Magnetometer, a Radio Sounding experiment, an Energetic Particle Detector, a Dust Detector, a Neutral Particle Detector, and a Solar Neutron Detector. While representative, these “strawman” packages may evolve in the course of the mission definition studies.

It is foreseen that the actual scientific payload would be provided by nationally funded Principal Investigators, to be selected via the usual ESA mechanism of an Announcement of Opportunity. International participation is encouraged, and *Solar Orbiter* is being discussed in the framework of the International Living With a Star programme. Further information concerning the mission and the strawman payload can be found in the *Solar Orbiter* Assessment Study Report (ESA-SCI(2000)6).

The *Solar Orbiter* Payload Working Group(s)

Given the technical and financial constraints associated with the *Solar Orbiter*, it is essential that the scientific payload be implemented in a highly focused, innovative, and cost-effective manner. This requires, for example, that key technologies requiring significant development be identified as early as possible. To this end, ESA intends to set up one or more Working Groups comprising members of the scientific community with expertise in instrumentation of the kind envisaged for *Solar Orbiter*. ESA therefore invites members of the scientific community to express their interest in this type of activity and provide suggestions on how to tackle and solve the technical problems related to the *Solar Orbiter* payload. Note that the working group membership will be decided by ESA and participation will be supported financially by ESA.

It is likely that two (or more) separate Working Groups will be established. These could include the following:

1. “Remote-sensing Instrumentation Working Group”

As described above, the present “strawman” payload comprises a set of imaging and spectroscopic instruments to perform high-resolution solar observations during the near-Sun parts of each orbit. It will be the task of the Working Group to arrive at a full definition of the instruments needed to achieve the primary scientific goals of the *Orbiter* mission, including detailed spacecraft interfaces. In the course of this work, the Working Group will be expected to address potential problem areas arising as a result of the extreme thermal and radiation environment that will be encountered by optical surfaces during the mission (e.g., ~25 solar constants thermal load), and to identify necessary technological developments. Other aspects to be studied include the implementation of advanced data compression techniques, and the need for highly autonomous instrument operation. A key consideration will be the limited spacecraft resources available (in particular power and weight). At the end of its activities, the Working Group will be expected to prepare a report describing the remote-sensing instrumentation design, including detailed recommendations for further technological developments.

2. “In-situ Instrumentation Working Group”

The particles and fields instruments needed to carry out the in-situ observations face different constraints from the remote-sensing package. Satisfying the viewing requirements of particle detectors on a 3-axis stabilised platform is always difficult; the extreme thermal environment on *Solar Orbiter* will make this even more challenging. The placement of the radio and plasma wave antennas and magnetometers faces a similar problem. As in the case of the other Working Group(s), it will be the task of this Working Group to arrive at a full definition of the instruments needed to achieve the primary scientific goals of the *Orbiter* mission, including detailed spacecraft interfaces. The Working Group will also be expected to address problem areas specific to the in-situ instruments, and to identify necessary technological developments. A key consideration will be the limited spacecraft resources available (in particular power and weight). At the end of its activities, the Working Group will be expected to prepare a report describing the in-situ instrumentation design, including detailed recommendations for further technological developments.

Organisation

The Payload Working Group(s) will be appointed by ESA, and will be co-Chaired by one of the ESA Study Scientists and a designated member of the respective Payload Working Group (“Lead Scientist”). Regular meetings of the Lead Scientists and ESA representatives will also be organised in order to guarantee co-ordination between the activities of the two groups. Joint meetings of the two working groups or of some selected members may also be organised.

Format of the solicited Letters

Letters of Interest should be accompanied by supporting information, including a short Curriculum Vitae, a detailed description of the proposer's expertise in the area of interest, and the proposed contribution to the Working Group. This supporting information should not exceed **two** A4 pages in 10pt font. The Letters of Interest and supporting information should be submitted either by e-mail (in PDF or MS Word format), or as hard copy, and should be sent to:

R. G. Marsden
Research and Scientific Support Department of ESA
ESTEC, SCI-SO
P.O. Box 299
2200 AG Noordwijk
The Netherlands
e-mail: Richard.Marsden@esa.int

with copies to:

B. Fleck
Research and Scientific Support Department of ESA
NASA/Goddard Space Flight Center
Mail Code 682.3
Greenbelt, MD 20771
USA
e-mail: bfleck@esa.nascom.nasa.gov

M. Coradini
European Space Agency
8-10 rue Mario Nikis
F-75738 Paris Cedex 15
France
e-mail: Marcello.Coradini@esa.int

Deadlines

The planned deadlines for the Call for Letters of Interest is as follows:

Release of Call for Letters of Interest:	1 November, 2001
Letters of Interest due:	15 December, 2001
Notification to Working Group members:	early 2002

Further information

Further information can be obtained from:

M. Coradini
Solar System Missions Coordinator, ESA HQ
Tel/fax: +33 1 5369 7555
e-mail: Marcello.Coradini@esa.int

R. G. Marsden, *Solar Orbiter* Study Scientist, ESA/ESTEC
Tel/fax: +31 71 565 3583/4697
e-mail: Richard.Marsden@esa.int

B. Fleck, *Solar Orbiter* Study Scientist, ESA/GSFC
Tel/fax: +1 301 286 4098/0264
e-mail: bfleck@esa.nascom.nasa.gov

Information about *Solar Orbiter* can be found at the following web addresses:
<http://www.sci.esa.int/home/solarorbiter/index.cfm>
http://solarsystem.estec.esa.nl/projects/solar_orbiter.htm