



D/Sci/SV/val/230

Paris, 28 January, 1998

Next Generation Space Telescope

Payload Studies

Call for “Letters of Interest”

Dear Colleagues,

In the spring and summer of 1996, three independent US teams, funded by NASA, studied the feasibility of a large aperture space telescope to follow the Hubble Space Telescope. The scientific goals for the new telescope had been laid out in a report⁽¹⁾ by the “HST & Beyond” Committee, a team of US astronomers set up to consider the needs of the astronomical community after the end of the HST mission foreseen in 2005. The studies concluded that a Next Generation Space Telescope (NGST) is feasible using recent breakthroughs in space technologies. The findings of the teams and the technological roadmap for the successful development of NGST in the coming years are presented in the NGST report⁽²⁾. The NGST project, which is part of NASA’s “Origins” Program is now in the pre-phase A or concept development stage. NASA has awarded contracts for mission architecture studies, instrument studies as well as for technology development, in particular for prototype light-weight optics and detectors. In addition, NASA has established an NGST Study Team, lead by Goddard Space Flight Centre and an Ad-hoc Science Working Group (ASWG). Additional information about the NGST project may be found on NASA’s NGST Web Page (<http://ngst.gsfc.nasa.gov>).

In mid-1996, NASA formally invited ESA to cooperate in the studies initiated in the framework of their “Origins” Program and ESA’s advisory bodies discussed the issue of a possible European involvement in NGST. As a result, the Space Science Advisory Committee (SSAC) recommended to set up an ad-hoc team, the NGST Task Group (NTG), comprising a small number of European astronomers, supported by ESA personnel, to identify areas for possible European involvement in NGST. The NTG⁽³⁾ identified several areas for further study which could, taken together or separately, constitute the backbone of a visible ESA participation in the NGST, compatible with a level corresponding to an F-type mission proposed in the new implementation of ESA’s Horizons 2000 programme. Specifically, the NTG has recommended that ESA initiate the following studies with the aim of further identifying possible ESA contributions to NGST and defining follow-on activities in Europe compatible with the NASA schedule:

1. A study devoted to the specific aspects of low-background orbits
2. A study of a spectrograph with multi-object and integral field capabilities

3. A study devoted to the definition and design of a complete instrument suite.
4. A study of a deployable telescope.

These recommendations were unanimously endorsed by the Space Science Advisory Committee (SSAC) and the Science Programme Committee (SPC).

From a technical and scientific standpoint it is desirable that the studies 3 and 4 are combined into one single **Payload/Telescope study**, encompassing the complete NGST optical train.

ESA's Science Directorate will initiate these studies during the first half of 1998 with the aim to complete them before mid-1999. European Scientific Institutes are encouraged to actively participate in the study for the multi-object spectrograph and in the combined payload/telescope study.

The **spectrograph study** will be procured via a non-restrictive competitive Invitation To Tender (ITT) open to industry and scientific institutes.

The combined **Payload/Telescope study** will also be procured via a non-restrictive competitive ITT and it is envisaged that an industrial prime contractor will have overall responsibility for this study, covering system level and telescope aspects, with scientific institutes participating as sub-contractors responsible for payload definition and design.

In order to assess the interest of the European astronomical community in these studies, candidate participants are hereby invited to submit a "**Letter of Interest**" signifying their interest to participate in either the spectrograph study, the combined payload/telescope study or both.

The "Letter of Interest" must contain the name and affiliation of the candidate participant(s) with full address (telephone, fax and e-mail) and a brief description of the proposed instrument(s). In addition, the letter should also list potential collaborators with their responsibilities and any other information that the proposer(s) may find relevant.

The submitted responses will be used by ESA to define possible payload instrument options and to identify the interested scientific institutes to potential prime bidders in case of the combined payload/telescope study.

It is emphasised that the submission of a Letter of Interest does not guarantee participation in the studies. After release of the ITT's for the studies it will be left to the interested parties to form consortia to submit more complete study proposals.

The Letter of Interest (5 copies) must be sent by **16 February 1998 to:**

Dr. S. Volonte
European Space Agency
Scientific Directorate
8-10 rue Mario Nikis
F-75738 Paris Cedex 15

A brief description of the payload related study objectives and requirements is given in Annex 1. The tentative planning for the ITT/Proposal Phase of the studies is as follows:

Letters of Interest due:	16 February 1998
Release of ITT for spectrograph study:	02 March 1998
Release of ITT for payload/telescope study:	30 March 1998
Proposals for spectrograph study due:	17 April 1998
Proposals for payload/telescope study due:	15 May 1998
Contract award spectrograph study:	01 June 1998
Contract award payload/telescope study:	29 June 1998

Further information can be obtained from:

Dr. S. Volonte, Astronomy Missions Coordinator, ESA HQ

tel/fax: 33 1 5369 7103/7236

email: svolonte@hq.esa.fr

Dr. P. Jakobsen, NGST Study Scientist, Estec

tel/fax: 31 71 565 3614/4690

email: pjakobse@astro.estec.esa.nl

J. Cornelisse, NGST Study Manager, Estec

tel/fax: 31 71 565 3801/5417

email: jcorneli@estec.esa.nl

Yours sincerely,



Dr. S. Volonte

Enc. 1

References

¹ Exploration and the Search for Origins: A Vision for Ultraviolet-Optical-Infrared Space Astronomy, Report of the HST & Beyond Committee, AURA, May 15 1996;

Also available as PDF file at: http://ngst.gsfc.nasa.gov/project/bin/HST_Beyond.PDF

² The Next Generation Space Telescope - Visiting a Time When Galaxies Were Young, Edited by H.S. Stockman, STScI, June 1997;

Also available as PDF file at: <http://opposite.stsci.edu/ngst/initial-study>

³ Next Generation Space Telescope, Report of the NGST Task Group, ESA, October 1997.

Core NGST Requirements and Payload Study Objectives

The NGST core requirements have been established as 1 - 5 micron imaging and spectroscopy, with a goal of wider wavelength coverage from 0.5 to 30 microns. The current yardstick design is an 8 m class telescope optimised for the 1 - 5 micron band.

With these core requirements in mind, the NGST Task Force has evaluated the scientific interest of European astronomers and investigated the potential interest of instrumentation groups and concluded that a spectrograph with multi-object and integral field capabilities would be highly desirable scientifically. Furthermore this is an area where European groups lead technologically. The major objectives of the **spectrograph study** are as follows:

- specify the performance requirements
- perform a trade-off between various concepts
- produce a sufficiently detailed instrument design
- evaluate the performance
- identify technology requirements
- identify risks
- identify options for extending or descoping
- provide an estimate of required resources
- propose follow-on activities and required resources for those

A preliminary high level specification has been established by the NGST Task Group:

- field (high spatial resolution mode): $4 * 4 \text{ arcsec}^2$
- field (low spatial resolution mode): $1 * 1 \text{ arcmin}^2$ ($2 * 2 \text{ arcmin}^2$ desirable)
- wavelength range: core 1 - 5 micron required; larger coverage optional
- spectral resolution: $R = 200$ to $R = 2000$ essential, up to 5000 desirable.

At the present time these requirements have not been frozen and potential participants in the spectrograph study are free to propose different specifications (with rationale).

The major objectives of the combined **Payload/Telescope Study** are:

- define required/desired payload capabilities and performance for the core and possibly the extended wavelength ranges from a European perspective and propose an instrument suite
- define telescope requirements and propose an optical design compatible with the scientific requirements
- produce preliminary designs of instruments, instrument module and telescope and evaluate overall scientific performance

- identify areas in which (unique) European expertise exists
- study in detail specific telescope aspects and/or design specific telescope elements (TBD after first study phase in consultation with NASA)
- propose follow-on activities and required resources for those.

Potential participating scientific institutes would be responsible for the payload related work in this study, i.e. propose instrumentation, design the instruments and evaluate the scientific performance. In particular, the purpose of the payload related part is to elicit innovative concepts from all areas of the astronomical community for NGST scientific instrumentation that may enhance the scientific return and ultimately influence or drive the system-level architecture. Alternate designs, which meet the core scientific requirements or additional instruments which have a strong likelihood of unique scientific results are encouraged. Proposed concepts may range from individual instruments to the full complement of integrated instruments for either the core mission only (1 - 5 micron) or for the extended wavelength range.

As a point of departure, proposed instrument concepts shall be based on one or more of the system architectures outlined in Reference 2 and the "Design Reference Mission" (DRM) as described in Appendix C of Ref. 2 will be used as a benchmark to evaluate observatory performance. Corrections and additions to the DRM may be proposed.
