

Announcement of Opportunity No. N231803
High Resolution Near Infrared Spectrometer (HRNIRS) - Design Studies
Gemini Observatory
Issued: 19 December 2003
Proposals Due: 31 March 2004

The Association of Universities for Research in Astronomy, Inc. (AURA), acting as operator of the Gemini Observatory, announces the opportunity to conduct conceptual design studies of an High Resolution Near Infrared Spectrometer (HRNIRS).

In the near future AURA will be issuing a Request for Proposal to those institutions which submit a letter of interest in response to this announcement of opportunity (see below). This Request for Proposal will seek detailed proposals for conducting design studies for the HRNIRS, and proposals will be due on the date given above. The total funding available for these design studies is \$400,000, which includes funding for both direct and indirect (i.e., the equivalent of overheads) costs. Gemini hopes to use this funding to award more than one design study contract so that there are competing design teams. It is anticipated that the design study phase will start in April 2004 and be completed approximately eight months later. The design studies will include optical, mechanical, electronic, and software design elements, at the conceptual level, as needed to demonstrate the technical viability of the approach used. The studies will also be used to define a fixed cost for completing the instrument.

Subsequent to completion of the design study phase a development program of about five years is envisioned for this instrument, with delivery by the end of 2009. Funding to build the instrument subsequent to the completion of the design studies has not yet been secured. Initial cost estimates for this instrument are USD 24,000,000 and this figure should be used as an upper limit when preparing proposals. A commitment to build an HRNIRS for Gemini will not be made until the results of the other (ExAOC, WFMOS, and GLAO) studies are evaluated and funding options for all proposed new Gemini instrumentation are better defined.

HRNIRS Description

The HRNIRS is expected to provide high resolution 1.1-5.0 μm spectroscopy in two primary modes. One is a single-slit $R\sim 70,000$ mode for use in high resolution/stability applications. The other is an MCAO fed MOS mode at $R\sim 30,000$ to provide high spatial resolution spectroscopy across the ~ 2 arcmin MCAO field of view. The spectrometer must therefore be designed for either seeing limited ($R\sim 70,000$) or MCAO limited ($R\sim 30,000$) point spread functions. Like other facility instruments it will mount on either a side-looking or the up-looking port of the instrument support structure, meet space and mass constraints, and is expected to meet the standard Gemini instrument interfaces for handling, installation, services, control, and data handling. The spectrometer should be delivered with pipeline processing software as part of the instrument package.

The baseline performance requirements for the HRNIRS include –

Wavelength Range: 1.1 – 5.0 μm

Field of View: 2 arcmin (MOS mode)

Spatial Sampling: 0.2" pixels (seeing limited mode) or 0.05" pixels (MCAO-MOS mode)

Spectral Resolution: 70,000 (single slit) and 30,000 (MOS)

Primary Modes:

- Single slit cross-dispersed seeing limited spectrometer with $R \sim 70,000$ spectral resolution and providing 1-shot wavelength coverage of as much of the J+H+K or L+M windows as possible.
- Multi-object MCAO fed cross dispersed spectrometer sampling targets across a 2 arcmin field with ~ 3 arcsec long slits and $R \sim 30,000$ spectral resolution. The 1-shot wavelength coverage should be balanced against detector format, science applications, number of targets in the field, etc. The instrument should be capable of recording simultaneous spectra of at least 15 targets at a time (30 goal).

An absorption cell should be provided as a precision wavelength fiducial with the $R \sim 70,000$ mode, in order to support the HRNIRS [science objectives](#), including low mass planet detections. The instrument should also include a polarimetry mode, noting the availability of the facility polarization unit [GPOL](#) for design study purposes. These design guidelines are intended to focus but not completely constrain the conceptual design activities. Modifications of these guidelines based on scientific, technical, or cost considerations will be considered through the design study phase of the program.

Use of Existing Designs

Gemini in general promotes the use of pre-existing designs when developing new instrumentation. The use of such component designs help reduce costs, deployment times, development risks, and maintenance demands of Gemini's facility instruments. Accordingly detailed mechanical design information about NIRI, GNIRS, GMOS, and possibly other Gemini facility instruments will be made available to interested design teams when Requests for Proposals are distributed. Teams may propose to use alternate designs for any subassembly but will be at a competitive disadvantage in the evaluation process if it is practical to use a pre-existing design from a Gemini facility instrument instead.

Process for Submitting Proposals

Any National Gemini Office (NGO), collaboration of NGO's, institution, or company within any Gemini Partner country is entitled to propose for the development of one or more conceptual designs of this instrument.

Interested parties are asked to submit Letters of Interest to the contact address below. A Request for Proposal will be sent in response to all Letters of Interest received.

Interested teams should not begin work on their proposals until they have received the actual Request for Proposal document, which contains specific instructions regarding the content and format of proposals. Letters of Interest or inquiries should be sent directly via conventional mail or e-mail to:

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Attn: Andrew Flach, Gemini Contracts Manager
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Please reference "RFP No. N231803 - HRNIRS" in your letter of interest.