

**Announcement of Opportunity No. N231805**  
**Ground Layer Adaptive Optics (GLAO) - Feasibility Studies**  
**Gemini Observatory**  
**Issued: 19 December 2003**  
**Proposals Due: 31 March 2004**

The Association of Universities for Research in Astronomy, Inc. (AURA), acting as the operator of the Gemini Observatory, announces the opportunity to conduct feasibility studies of a Ground Layer Adaptive Optics (GLAO) system that may be used at Gemini early in the next decade.

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 feasibility studies for the GLAO, and proposals will be due on the date given above. The total funding available for these studies is USD 200,000, 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 feasibility study contract so that there are competing teams. It is anticipated that the feasibility study phase will start in April 2004 and be completed approximately eight months later. The studies will include optical, mechanical, electronic, and software design elements, as well as an evaluation of the scientific applications for a GLAO system, at the level needed to demonstrate the technical and scientific viability of such a facility. Performance modeling of the proposed GLAO configuration on Gemini will be needed, based on statistically significant atmospheric turbulence data. The studies will also be used to help define a fixed cost for completing the system.

Funding to build the GLAO system, subsequent to the completion of the feasibility studies, has not been secured yet. A commitment to build a GLAO system for Gemini will not be made until the results of the other (ExAOC, HRNIRS, and WFMOS) studies are evaluated and funding options for all proposed new Gemini instrumentation are better defined.

### **GLAO Description**

The GLAO science case requires the GLAO system to nominally feed either a wide field (~10 arcmin) NIR imager or deployable-IFU spectrometer capable of 16 simultaneous IFU observations across the GLAO field. Neither the imager nor the spectrometer are part of this feasibility study – they are mentioned to illustrate the type of instrumentation a GLAO system might feed. Given the novel mass and space constraints, interface requirements, and potentially the top-end handling procedures (assuming the proposed GLAO system uses an adaptive secondary), assessments of the technical feasibility for a GLAO system must rely upon close interaction with the Observatory.

The baseline performance requirements for the GLAO system includes –

**Wavelength Range:** system transmits a corrected beam from ~0.6 – 2.5  $\mu\text{m}$

**Field of View:** ~10 arcmin diameter

**Delivered PSF FWHM:** ~0.2 arcsec, J-band,  $V = 0.5''$  seeing. If modeling by study teams indicates this specification is not feasible (e.g. because of the vertical distribution of turbulence), the emphasis on the design should be put on system field of view instead of angular resolution.

**PSF FWHM Uniformity:** ~10 mas rms across 10 arcmin field of view, J-band, for  $V = 0.5''$  seeing

**Comments:** Particular points to be addressed in this study include:

- Use of a deformable secondary mirror vs a dedicated AO optical relay
- Optimum conjugation altitude, variable or fixed.
- Trade between field of view and angular resolution
- Possibility of reconfiguration of the instrument to trade resolution for field of view depending on the science program
- Use of Laser Guide Stars vs Natural Guide Stars
- Use of Rayleigh vs Sodium Guide Star

Teams interested in participating in feasibility studies should give careful consideration to the science applications planned for the GLAO system and provide as part of their study reports independent assessments of the scientific feasibility of key research (e.g., “first light”) with GLAO. Gemini requires this scientific component of the feasibility studies because the anticipated cost and risk of a GLAO system is expected to be large and a thorough examination of the key [science applications](#) possible with such an instrument is prudent, before a commitment to build it is made.

### **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 feasibility studies of the GLAO.

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:

AURA-Gemini Observatory  
950 N. Cherry Ave  
Tucson Arizona 85719 USA  
Attn: Andrew Flach, Gemini Contracts Manager  
Phone: 520-318-8410  
Fax: 520-318-8590

Email: [aflach@gemini.edu](mailto:aflach@gemini.edu)

Please reference "RFP No. N231805 - GLAO" in your letter of interest.