

Gemini Science Committee

Meeting Resolutions
Meeting #3, October 1993

RESOLUTION 3.1:

The GSC express its strong concern about the continued delay in access to Mauna Kea, and the resulting serious implications for the Project schedule and instrumentation budget.

RESOLUTION 3.2:

At present, the Gemini Science Requirements gives no detailed specifications for image quality at optical and near-ultraviolet wavelengths at the f/16 focus other than the general requirements for adaptive optics. The GSC recommends as a goal that the telescopes not degrade the optical and near-ultraviolet encircled energy image quality provided by an optically perfect telescope, without wide field correctors, operating in good atmospheric seeing conditions with wavefront tilt corrections, by more than 15% of the encircled energy diameters. At 0.31 microns, this implies that 50% of the encircled energy should fall within a 0.13 arcsec diameter, while 85% of the encircled energy should fall within 0.27 arcsec. At 0.55 microns, the corresponding diameters are 0.12 (50% encircled energy) and 0.24 arcsec (85%). For comparison at 2.2 microns this corresponds to encircled energy diameters of diameters are 0.10 arcsec (50%) and 0.21 arcsec (85%).

The infrared image quality requirements outlined in the Science Requirements Document are the highest priority requirements. The GSC recommends that Optical and UV specifications for the F/16 focus should be considered desirable goals, and charges the Project to develop a more detailed specification of the UV performance, including a more complete atmospheric model that accounts for UV atmospheric scattering, prior to the final polishing specification being fixed.

RESOLUTION 3.3:

The GSC accepts the A & G concepts outlined by the A & G Working Group and recommends that the current concept for the Instrument Support Structure (ISS) can be carried to the PDR stage. However, the GSC also recommends that multiple uses of each side of the ISS be examined further, and that consideration be given to quick access to the interior of the ISS for maintenance and that the handling of instruments be considered further.

RESOLUTION 3.4:

The GSC recognizes the potential scientific gains from advanced AO systems on Gemini outlined by the AO Working Group. Given the rapid changes in technology available for adaptive optics systems and the AO Working Groups recommendation for a phased implementation of these capabilities, the GSC recommends that the Project undertake a design study in collaboration with the Canadian Project Office to investigate the compatibility of the proposed natural guide star AO system for use with laser beacons. Note that at the previous GSC meeting a resolution was passed which stated “Given the ban of laser guide stars on Mauna Kea, the Adaptive Optics Working Group should continue to pursue the use of natural guide stars for the initial AO implementation.”

RESOLUTION 3.5:

The GSC endorses the detector procurement approach recommended by the Optical Imager and CCD working group, and requests that a more detailed budget be developed, in consultation with the Gemini Instrumentation Group, for each of the specific capabilities

listed in the final report of this group. The Gemini Instrument Group should also further define the role of the acquisition camera within the current ISS concept.

RESOLUTION 3.6:

The GSC supports the recommendations made by the Infrared Camera working group, which includes the choice of a 1024 x 1024 array with the following image scales:

	Pixel Sizes (arcsec)	FOV's
1-2.4 micron	0.02; 0.08	20.5; 82
3-5 micron	0.042; 0.1	43; 102

and prioritizes the capabilities for the design study to be as follows: (1) 1024 x 1024 arrays.

The GSC also encourages the project to investigate further innovative approaches for procuring a 10 micron imager.

RESOLUTION 3.7:

The GSC supports the basic priorities outlined in the final report of the Infrared Spectrograph working group, in which a moderate resolution spectrograph with the following specifications is given the highest priority:

REQUIREMENTS:

Wavelength	0.9 - 5.5 micron
Detector	1024 x 1024
Pixel scales	0.05 + 0.15 arcsec/pixel
Slit Length	at least 50 arcsec
Optimum resolutions	2000 and 8000
Polarizing Prism?	Yes - MgF2

GOALS:

Slit length	150 arcsec
Resolving power	15000 - 30000
Cross-dispersed?	Yes
Multiobject?	Yes (0.9 - 2.5 microns only)

The goals of supplying cross dispersion and multi-object capability are highly desirable, although detailed costing will be required to determine if these are practical.

RESOLUTION 3.8:

The GSC recommends that the highest priority for the use of the High Resolution Optical Spectrograph (HROS) be at the Cassegrain focus with the overall through-put of this mode, particularly in the UV, being the high scientific priority. A spectral resolution of 100,000 is desirable, but resolutions covering the range 30,000 - 80,000 would be acceptable if this choice is required to achieve high throughput and the necessary stability at Cassegrain. The capability should also exist for observations with a spectral resolution of 120000 in the high-resolution pier laboratory, with a goal of being able to implement this mode at Cassegrain.

Whether these capabilities can be incorporated into a single instrument or require different instruments should be the subject of a detailed design study.

RESOLUTION 3.9:

The GSC recognizes that the wide-field option described in the final report of the Optical and Ultraviolet Multi-object Spectroscopy working group would simultaneously satisfy much of the needs for high spectral and spatial resolution spectroscopy. The specifications set by the working group for the Wide Field mode are:

Field Size	7 arcmin diameter
Image scale	0.1 arcsec/pixel
Wavelength range	370 – 1100 nm
Minimum/nominal slit	0.2/0.5 arcsec
Spectral resolution	1000-10000

OV should be balanced against the costs of developing the high spatial-resolution option, given the anticipated low cost of an instrument that would fill this niche. The specifications set for the high spatial resolution mode are:

Field Size	2 arcmin diameter
Image scale	0.04 arcsec/pixel
Wavelength range	370 - 1100 nm (no AO) 500 - 1100 nm (with AO)
Minimum/nominal slit	0.1/0.25 arcsec
Spectral resolution	300 - 4000

The GSC regards extending the UV performance of this instrument as its third priority.

RESOLUTION 3.10:

The Cerro Pachon telescope promises to provide unique observations, and will be one of the main research tools for astronomers in the partner South American countries. The GSC recognizes that there is currently a discrepancy between the initial instrumentation capabilities of the two telescopes, and recommends that the project continue to pursue innovative means of procuring instrumentation for the Cerro Pachon facility.

RESOLUTION 3.11:

The GSC recommends that the Gemini Instrument Group, in conjunction with the Project Scientist Team and National Project Offices, develop an instrumentation procurement plan incorporating:

- (1) scientific priorities;
- (2) instrument working group recommendations;
- (3) design studies (as necessary);
- (4) budgets;
- (5) work schedules; and
- (6) allocation of work packages.

This plan would be submitted to the GSC by April 1994 and to the Gemini Board of Directors by May 1994.