Gemini Science Committee
Meeting Resolutions
Meeting #4, April 1994
RESOLUTION 4.1:
The GSC endorses the overall approach proposed by the Project to hold two comprehensive open Systems reviews each year. To streamline the review process, the PS's and GSC will define Science Working Groups only for these reviews. The GSC feels that these Working Groups will provide adequate external scientific review of the Project. The open systems reviews will allow the more detailed reviews to be organized in a less formal manner. The GSC encourages the Project to continue to use external representatives where possible on these detailed reviews and would like to receive reports from the PS's on the reviews.

RESOLUTION 4.2:
The GSC endorses the conclusions of the PDR Panel that the design for the Primary Mirror Assembly presented at the PDR will meet the science requirements. The GSC endorses the recommendations of the SWG and the PDR Panel for continuing development of a surface heating system for the Primary Mirror. The GSC believes that this system will be important for ensuring adequate margin in the control of the mirror surface temperature, so that the Gemini image quality requirements can be met under the wide range of temperature conditions that will be experienced at Mauna Kea and Cerro Pachon.

RESOLUTION 4.3:
The GSC recognizes that the image specifications of the Gemini Telescopes place unique demands on the Primary Mirror polishing requirements. Since the Primary mirror is unlikely to be tested in its cell prior to installation in the telescope, the GSC recommends that the Project Scientists create a Working Group to assess and recommend polishing options consistent with the UV and optical imaging goals, as well as the IR imaging requirements, as described in Version 2.0 of the SRD.

RESOLUTION 4.4:
The GSC recommends that the Project proceed with the Secondary Mirror System RFP using the following chopping requirements, as outlined and recommended by the Secondary Mirror Science Working Group:

The current chopping requirements in the SRD of up to 5 Hz chop with amplitude up to ±15 arcsec (80% duty cycle) and up to 10 Hz chop with amplitude up to ±7.5 arcsec (80% duty cycle) should be considered as goals for the Secondary Mirror RFP, with the option of lowering the chopping frequency requirements from 5 Hz to 3 Hz and from 10 Hz to 6 Hz if a substantial savings in cost and/or complexity could be obtained. A chop amplitude of up to ±7.5 arcsec is a requirement.

Moreover, the SRD requirements for nodding should include nodding up to 5 arcsec within 1 second in addition to the current requirement of up to 60 arcsec within 5 seconds.

RESOLUTION 4.5:
The GSC recommends that the proposed model for CCD development, which includes detectors for WFS's, the acquisition cameras, the MOS, and HROS, but not for 8K science imagers, be adopted as the baseline program. The GSC encourages broad participation of the
international communities in this program through collaborative foundry runs, as this may
allow for greater capability of the detectors ultimately delivered to the Gemini Telescopes.

RESOLUTION 4.6:
The GSC recommends that the scientific priorities for the IR imager remain unchanged from
the previous meeting, and endorses the statement of work prepared by the Project. The GSC
reiterates its recommendation that a wide field mode should be explored.

RESOLUTION 4.7:
The GSC sets the following requirements for the IR spectrograph. These are not listed in any
particular order of priority:

1) Wavelength range 0.9-5.5µm
2) Detector Format: 1024x1024
3) Throughput: Maximizing throughput is a critical scientific priority
4) Spectral resolutions: The lowest dispersion mode must allow each atmospheric window
to be covered across the 1024 array (R~2000), and an intermediate dispersion mode must
be provided which allows the observations of key astrophysical lines between the
atmospheric OH lines (R=8000).
5) Pixel scale: should be capable of exploiting 0.1-0.2 arcsec slits with sampling ~ 0.05
arcsec/pixel
6) Slit length: = 50 arcsec
7) Polarizing prism: Yes - MgF2

The following are considered to be desirable options, which will enhance the multiplex
advantage of the spectrograph. With the exception of the first of these, they are not listed in
any particular order:

1) Integral Field Mode (highest optional priority)
2) Cross dispersion or simultaneous wavelength coverage - covering J, H, and K
3) Multi-slit - with particular emphasis on J, H, and K
4) Slit length of 150 arcsec, with a pixel scale of 0.15 arcsec/pixel

In addition, spectral resolutions in the range 15000-30000 are considered to be options.

Recognizing that designs for this instrument will be generated through competition, the GSC
must be represented in the selection process.

RESOLUTION 4.8:
The GSC recommends the procurement of a package consisting of two MOS instruments for
use with the Mauna Kea and Cerro Pachon telescopes. Top priority requirements are identical
for both instruments, although scientific benefits could be gained by optional differences
between the Northern and Southern instruments. Thus the top priority MOS requirements,
listed in no particular order, are:

1) Field Size: that which could be filled with a 4096 CCD (≈ 5:5 arcminutes)
In addition, the GSC identifies several desirable features that are optional. These might be incorporated into the design if resources permit, or identified as upgrade plans for the first generation instruments:

1) Extension of wavelength coverage with priority for the UV to the atmospheric cut-off for the Southern MOS, then to the IR up to 1.6 microns (north), then extending the IR coverage in the southern MOS and, finally the UV coverage in the North MOS, if coatings permit.
2) A high spatial resolution integral field mode to support adaptive optics capabilities at wavelengths longward of 700 nm.

RESOLUTION 4.9:
The GSC recommends that the scientific requirements for the HROS remain unchanged from the previous meeting.

RESOLUTION 4.10:
The GSC strongly encourages the Gemini Project to explore the shared use of the 10-20µm UKIRT spectrometer Michelle. The demonstrated performance of Michelle must take full advantage of the outstanding image quality and low thermal background of the Gemini telescopes at spectroscopic resolutions of 200-30000 in the 8-25µm region.

RESOLUTION 4.11:
The GSC recommends that a mid-infrared imager be part of the first generation instrumentation. The highest priority for this instrument is broad-band 10 micron capability, and it must exploit the high performance, high background characteristics for mid-infrared arrays. This instrument must also meet the following requirements:

1) Plate scale: ~ 0:13 arcsec/pixel (required to sample the telescope diffraction limit at 10µm).
2) Field of View: as set by array
3) Instrument background: ≤1% effective emissivity
4) Throughput: must be high
5) Wavelength range: 5-25µm with extension to 30µm as goal
6) Filter requirements: one cold filter wheel with 20-30 slots for filters, etc.
7) Operating modes; both side- and upward-looking
8) Closed Cycle cooled operation
9) Tip-Tilt correction achieved by sensing in the peripheral guide field.
RESOLUTION 4.12:
Recognizing the absence of high spectral-resolution capabilities for the northern telescope, the GSC recommends that the Project continue to explore the option of providing a fibre-feed to the CFHT Coudé spectrograph.

RESOLUTION 4.13:
After assessing the balance of instrumentation between the Mauna Kea and Cerro Pachon telescopes, and examining preliminary costings for instruments prepared for the Project, the GSC recommends that the Project prepare an instrumentation plan with the following distribution of instruments, which are listed with no particular priority, for the first phase of the Gemini Instrumentation Program.

Mauna Kea:
[Optical Acquisition camera] (recognized not to be a science grade imager)
1 - 5 micron imager
1 - 5 micron spectrograph
Multi-object spectrograph (with imaging capability)
10 micron imager (could be moved to Cerro Pachon)
Fibre-feed to the CFHT

Cerro Pachon:
[Optical Acquisition camera] (see comment above)
Multi-object spectrograph which may have to be a copy of the Mauna Kea MOS (with imaging capability)
HROS

It is understood that a 1 to 5 micron imager will be borrowed from CTIO to commission the Cerro Pachon telescope.

The GSC believes that this plan provides the minimum complement that meets the Gemini Science Requirements Version 2.0, while satisfying the scientific aspirations of all the partner countries. It recognizes that the first years of the Instrumentation Development fund may have to be used to finance this plan.