

We report the general progress of Gemini Development Division projects during the stated quarter, including recent information between the quarter end and the document date.

1 Key Projects Overview

Sections 3 and 4 provide project descriptions and acronym definitions for reference.

Project	Past and Upcoming Milestones	Comments
GPI	Jul '15: Operations Handover review (pending document completion) – <i>postponed from April</i>	We are working with the team to finalize the Verification & Commissioning Report, Service and Calibration Manual, and Users Manual. We have a new draft of the Service and Calibration Manual under review. All other remaining GPI work is now under Operations.
GMOS CCDs	Apr '15: First GMOS-N CCD tested and accepted May '15: August installation decision point	Characterization of the first delivered science CCD for GMOS-N is going well and we will make a decision to authorize the remaining CCDs to be shipped in mid-May. The GMOS-N schedule will likely be delayed to concentrate on improving the performance of the GMOS-S installation.
GHOST	Mar '15 Critical Design Stage start Sep '15 Optical Design Review Dec '15 Critical Design Review	The GHOST team successfully concluded their Preliminary Design Stage and has started the Critical Design Stage. We will be presenting an updated timetable and instrument specification summary in the next quarter.
LGSF Feasibility	May '15: Project report and recommendation expected	The team is finishing their final report and will likely recommend purchasing a new laser for GeMS.
GIFS	Apr '15: All kickoff meetings complete May '15: Mid-point visits Sep '15: Team presentations	Four teams have started their feasibility studies. We provide more information at http://www.gemini.edu/sciops/future-instrumentation/gifs-public-announcement
NGS2	Mar '15: Design review at ANU Jul '15: Additional Project Review 2015Q1: Target installation	The March review was a success, giving the team confidence that NGS2 will deliver at least a 1.5 magnitude improvement in limiting magnitude, resulting in significantly increased sky coverage for GeMS.
GRACES	May '15: Start on-sky testing 2015B: GRACES offered to users	We received the new GRACES enclosure and will be installing it and other improvements in April and May, for additional on-sky testing in late May.
A&G Upgrade	On hold	Although the project is on hold for 2015, we plan to complete trade studies for detector and mechanism controller options during the year.
DM0	On hold	We may be able to free up resources to finalize procurement of DM0 later in the year.

2 Additional Activities

IR Detector Controller

This project is still on hold this quarter. Once resumed, the objective would be to build an engineering system that controls the GNIRS/NIRI detectors with a modern controller. We would not work on high end software until 2016, at the earliest. This project is still on hold for the next quarter, pending GMOS-S and GMOS-N CCD optimization and installation work.

Small development project (~\$100,000) Fund

We are preparing a list of possible projects and in 2015Q3 plan to release an open call where proposers can select one of our projects or propose their own.

Systems Engineering

- In support of GIFS and in preparation for the Gen4#3 and Small Projects RfPs, we are updating and organizing our instrument requirement, interface, and specification documents with the aim of making these easily available online to anyone interested.
- We are continuing the internal reorganization of our document management repository with local stakeholders involved to help form requirements.
- We are recruiting a new *Systems Engineer* as an indefinite position and completed recruitment of our *Project and Systems Support Associate*.

Miscellaneous

- We plan to get the Altair real time computer upgrade effort underway later this year.
- The GIFS teams will present their work in progress at the coming Toronto *Future and Science of Gemini Observatory* meeting. The meeting will be a good opportunity for interested stakeholders to provide their own input to desires for the Gen4#3 instrument.

3 Project Description Summaries

These are brief project summaries for reference. Current updates are in section 1.

A&G Upgrade: Upgrade the two telescope A&G units to avoid obsolescence and offer more reliability, less downtime, and higher performance. The key work areas are 1) upgrade the A&G mechanism control systems, and 2) upgrade the PWFS units to enable guiding on fainter stars. This project is on hold in 2015 and expected to resume in 2016 to complete in 2017. *Project Manager: Manuel Lazo.*

DM0: Provide a new deformable mirror for GeMS to replace the failed third deformable mirror. The new mirror will serve as a spare for the two currently used DMs and will eventually be installed as the planned third DM for GeMS. We expect to place this project on hold in 2015, with work completion dependent on vendor delivery time once we restart the project in 2016. *Project Manager: Chad Trujillo.*

Gen4#3: The next new facility instrument for Gemini. We will develop requirement for Gen4#3 after completing the GIFS studies at the end of 2015. We are planning to release the design and build RfP for Gen4#3 in 2016 with the eventual instrument coming to Gemini sometime in the early 2020s. *Project Manager: Stephen Goodsell.*

GHOST: A two-object plus sky, R=50,000 – 75,000 spectrograph with simultaneous wavelength coverage from ~360 – 1000 nm being built for Gemini by the AAO, NRC-H, and ANU. We are expecting to hold the Critical Design Review by early 2016 with delivery to Gemini by 2018. *Project Manager: David Henderson.*

GIFS: Community-lead feasibility studies intended to generate science requirements and ideas for potential feasible instruments. We started four GIFS studies to in 2015Q1 that will complete by the end of the year. *Project Manager: Stephen Goodsell.*

GMOS CCDs: Upgrade the existing detectors and controllers in both GMOS-S and GMOS-N to Hamamatsu fully depleted CCDs with a current generation ARC controller. The goal is to provide good performance with state of the art red quantum efficiency. We installed the GMOS-S CCDs in 2014 and plan to install the GMOS-N CCDs in the second half of 2015. *Project Manager: Manuel Lazo.*

GRACES: Provide high-resolution optical spectroscopy capabilities at Gemini North by running a fiber from Gemini to the ESPaDOnS spectrograph at the CFHT. We completed GRACES stage 1, a proof of concept, in 2014. During 2015, we will make a few improvements to the system to aid operations and increase performance prior to handing over GRACES to Operations as a visitor instrument starting in 2015B. *Project Scientist / Manager: André-Nicolas Chené.*

LGSF Feasibility: We intend to explore replacement options for the GeMS laser at Gemini South. We are exploring the Toptica laser as the primary alternative. The first phase of the project ends with an assessment of whether or not the Toptica laser can work in the GeMS environment with considerations given to its returned power and necessary modifications to our BTO system. If the assessment is positive, we will then start procurement of a new laser and develop and implement plans to integrate it into operations. *Project Manager: Manuel Lazo.*

NGS2: Working with ANU, we intend to replace the NGSWFS of GeMS with a more modern sensor to reduce maintenance requirements and increase sensitivity and, hence, sky coverage. ANU expects to deliver NGS2 in late 2015 and we are planning to commission it in GeMS in 2016. *Project Manager: Vanessa Montes.*

Small Projects: Later in 2015, we will be launching an external call for small projects to provide additional capability to our current instrument suite. Maximum compensation will be \$100,000 per project with some possibility of additional telescope time as well.

4 Acronyms

Common acronyms used in this and other reports.

AAO: Australian Astronomical Observatory

ANU: Australian National University

AOTel: The Adaptive Optics / Telescope group at Gemini, led by Chad Trujillo

ARC: Astronomical Research Cameras Inc. (makers of the “Leach” detector controllers)

A&G: telescope Acquisition and Guiding unit

BTO: Beam Transfer Optics (laser optical path to the launch telescope)

CCD: Charge-Coupled Device (optical image sensor)

CFHT: Canada-France-Hawaii Telescope

DM: Deformable Mirror (GeMS DM0, DM4.5, and DM9 are conjugated at 0, 4.5, and 9 km)

ESPaDOnS: Echelle SpectroPolarimetric Device for the Observation of Stars (a high-resolution spectrograph at CFHT)

GeMS: Gemini Multi-conjugate adaptive optics System

Gen4#3: Generation 4 #3 (next instrument after GHOST and GRACES)

GHOST (formerly, GHOS): Gemini High-resolution Optical SpecTrograph

GIFS: Gemini Instrument Feasibility Study

GMOS: Gemini Multi-Object Spectrograph, an optical imager and spectrograph at Gemini North (-N) and South (-S)

GNIRS: Gemini Near-InfraRed Spectrometer

GPI: Gemini Planet Imager

GRACES: Gemini Remote Access to ESPaDOnS

IR: InfraRed

LGSF: Laser Guide Star Facility

MEMS: MicroElectroMechanical Systems

NGS2: Natural Guide Star New Generation Sensor

NGSWFS: Natural Guide Star WaveFront Sensor

NIRI: Near InfraRed Imager and spectrometer

NRC-H: National Research Council, Herzberg Institute (Canada)

PWFS: Peripheral WaveFront Sensor (inside A&G)

RfP: Request for Proposals