

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, below, provide project descriptions and acronym definitions for reference.

Project	Past and Upcoming Milestones	Comments
GPI	Apr '15: Operations Handover review (pending document completion)	We are working with the team to finalize the Verification & Commissioning Report and Users Manual. We continue to address vibration issues with new hardware fixes.
GMOS CCDs	Feb '15: First GMOS-N CCD delivered from Hamamatsu May '15: August installation decision point	Original schedule for GMOS-N CCDs assumed we could reproduce the GMOS-S system. Turns out, we cannot obtain or use the same ARC video boards and their replacements have some issues we are still working through. The team is generating a new baseline schedule now with August 2015 as the optimistic installation date.
GHOST	Dec '14: PDR completed TBC Feb '14: Start of Critical Design Stage	The GHOST team successfully passed PDR and is now working to complete some recommended tasks from the review committee, including reviewing the project schedule to ensure it has enough contingency.
LGSF Feasibility	Jan '15: Project initiated	We will finalize the project charter and plan in 2015Q1.
GIFS	Feb '15: Downselect committee met Mar '15: Start feasibility studies	We received 8 proposals which were evaluated by an independent panel that sent recommendations to the Director in early February. We will shortly begin contract negotiations with the highest ranked teams.
NGS2	Dec '14: First invoice paid to team Feb '15: Contract finalized Mar '15: Design review at ANU	We have been working with the NGS2 team to provide updated requirements and interface documents; this work should conclude in February. The project will present a detailed plan to completion at the March review.
GRACES	Nov '14: STAC and Board approved continuation into next project stage 2015B: GRACES offered to users	GRACES Stage 1 completed successfully, verifying the instrument could become a competitive visiting capability at Gemini North. We have a new agreement with CFHT to operate GRACES and are working with them and NRC-H on small modifications for more efficient operations and increased performance.
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	Tentatively on hold.	We are investigating the impact of putting this project on hold in 2015 to concentrate on LGSF and NGS2 in the AOTel Department.

2 Additional Activities

IR Detector Controller

We are investigating whether we can re-activate this project this year. The objective would be to build an engineering system that controls the GNIRS/NIRI detectors with a modern ARC controller. We would not work on high end software until 2016, at the earliest. We will have a decision for the next report.

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

Our Instrument Program Scientist, working with the Gemini Science staff, has identified 10 possible instrument upgrade studies. By 2015Q2, we will review this list with the STAC and generate requirements for an external RfP to perform the work.

Systems Engineering

- We are implementing our new requirements tool, Jama, with staff training starting in February.
- Working with Information Systems Group, we are restructuring and improving our document management tool. We expect to improve our licensing (serving needed users and reducing costs) in 2015Q1 and complete the restructuring by 2015Q4.
- We are recruiting a new *Systems Engineer* as an indefinite position and a *Project and Systems Support Associate*, a term-limited appointment previously filled by Kayla Hardie.

Miscellaneous

- Ruben Diaz has joined Instrumentation as the *Instrumentation Program Scientist*, splitting his time between this role and regular duties in Operations.
- We are planning for the GIFS teams to make presentations 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 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 RfP for Gen4#3, starting with the Conceptual Design Stage in early 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 expect to start three GIFS studies to in 2015Q1 and complete them 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 2015Q3. *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 the 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.*

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)

GPI: Gemini Planet Imager

LGSWFS: Laser Guide Star WaveFront Sensor

LGSF: Laser Guide Star Facility

MEMS: MicroElectroMechanical Systems

NGS2: Natural Guide Star New Generation Sensor

NGSWFS: Natural Guide Star WaveFront Sensor

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

OIWFS: On-Instrument WaveFront Sensor

PDR: Preliminary Design Review

PMAC: Programmable Multi-Axis Controller

PWFS: Peripheral WaveFront Sensor (inside A&G)

TBC: To Be Confirmed