Project Name:		
OBS09-006: GeMS phase 3-4-5		
Business objective served by this project		
Provide a wide field adaptive optics facility to GS, serving GSAOI and F2		
Project Manager/Leader:	Project Sponsor:	PDS Version/Date:
Maxime Boccas	Gustavo Arriagada	19 October 2010

Project Description

Issue Statement:

GeMS is the Gemini MCAO System and specifically the Gemini South Adaptive Optics facility. It consists of a suite of systems that create a 50W laser beam, project it onto the sky to form 5 Laser Guide Stars in the mesospheric sodium layer, measure the atmospheric turbulence at 3 elevations of 0, 4.5 and 9km from a total of 8 guide stars (5 artificial and 3 natural), and provide a real-time near-IR corrected wavefront with high, uniform and low distortion image quality over a 1 arcmin field of view to any suitable instruments installed on the telescope.

Project Objective Statement (POS):

The project is the continuation of ENG08-031 (GeMS phase 1 and 2, ending on Dec 30, 2010) and is divided into 3 phases:

- Phase 3: Integration at CP lab and on telescope. This includes the completion of the Beam Transfer Optics (all functionalities and alignment), of the 589 laser alignment to meet all specifications needed for propagation to the sky, and of Canopus final integration and vaildation after trasnport to the summit.
- Phase 4: Technical commissioning (Part 1). This includes both the LGSF technical commissioning (laser+BTO) and the first 3 runs of GeMS technical commissioning (Canopus and some top-level checkout with GSAOI).
- Phase 5: LGSF/Canopus shutdown and end of tech commissioning (Part 2). This includes all the required long-term upgrades to the laser (better safety for remote operation, and better relibaility), and to Canopus (improvement to some sub-systems like NGSWFS throughput , ADCs, etc…)

Project Flexibility:

Flexibility Matrix	Least Flexible	Moderately Flexible	Most Flexible
Scope		X	
Schedule	X		
Resources		X	

Major Deliverables:

- Finish 589 laser commissioning to meet all specs obtained at LMCT during FAT in February 2010
- Commission LGSF facility to deliver reliably the LGS constellations anywhere in the usable sky for Canopus.
- Execute the technical commissioning tasks scheduled for the first 3 runs of GeMS (including top-level performance and first-light images with GSAOI)
- Execute laser and Canopus shutdown tasks between June and October and resume night-time technical and science commissioning by November 2011.

Assumptions:

- ENG08-032 is completed by Dec 31, 2010. The list of resources and tasks to complete this projects were distributed to group managers on Oct 15-17.
- 589 laser alignment completes successfully by Dec 20th, 2010.
- Resources and ISS ports are available to install both Canopus and GSAOI on telescope during the first half of January, and keep them mounted together until March 20th.

IS and IS NOT:

Decribe what the project **is** and what the project **is not**, you can have as many **is** or **is not** as you want.

- **IS:** all the engineering steps required at Cerro Pachon to assemble all the sub-systems on the telescope and perform technical commissioning.
- **IS:** verify top-level performance of GeMS on the sky and provide subsystems upgrades needed (performance and reliability-wise) for the next several years of operations.
- **IS NOT:** the full science commissioning (withGSAOI) which is described in project OBS09-006B

Strategy and Resources

Milestones and Stages:

GeMS top-level Milestones (GM) are as follow:

- Phase 3: integration at CP lab and on telescope
    - GM 1: BTO ready for laser: DEC 21
    - GM 2: laser system aligned and reday for BTO: JAN 4
    - GM3: Canopus installation on telescope: JAN 6
    - GM4: GSAOI installation on telescope: JAN 14
- Phase 4: Technical commissioning Part 1
    - GM5: LGSF ready for technical commissioning run #1: JAN 18
    - GM6: LBBS commissioned: FEB 17
    - GM7: LGSF commissioning run #2: FEB 23
    - GM8: GeMS tech commissioning run #1: MAR 18
    - GM9: GeMS tech commissioning run #2: APR 18
    - GM10: GeMS tech commissioning run #3: MAY 17
- Phase 5: LGSF/Canopus shutdown and tech commissioning Part 2
    - GM11: start LGSF/Canopus shutdown: MAY 25
    - GM12: end shutdown and resume tech commissioning run #4: OCT 19

Estimated Costs:

- Supplies and materials: $90,000 for NGSWFS throughput ($75,000 for new APD packaging, $15,000 for new opto-mechanical components like parabola, pyramid, fibers), $15,000 for miscellaneous electromechanical shutdown upgrades for Canopus, $35,000 for laser shutdown upgrades
- Equipment : None

- Resources :

Resource > Project > Task	Total
Various	**1197**
Gelys Trancho	615
Patricio Gonzalez	7
#Admin Assistant	120
Sofia Paez	24
Monica Araya	24
#ENG Contractor	368
#ISG Technician	8
Rodrigo Sandoval	8
Andrew Flach	22
Science	**4260**
Francois Rigaut	1781
Chad Trujillo	195
Benoit Neichel	1626
Julian Christou	80
Markus Hartung	61
Michelle Edwards	25
#Astronomer GS	199
#SSA GS	293
MEG	**421**
Gaston Gausachs	248
#Draftman DraftmanGS	80
Chas Cavedoni	56
Stacy Bombino	20
Fabian Collao	16
EIG	**1727**
Ramon Galvez	876
Vanessa Montes	229
Herman Diaz	104
#Electronic EngineerGS	420
Alejandro Gutierrez	97
SWG	**2215**
Arturo Nunez	32
Roberto Rojas	288
Shane Walker	128
Matthieu Bec	984
#SWHL EngineerGS	656
Nicolas Barriga	128
OSG	**5745**
Celine D Orgeville	1699
Maxime Boccas	1214
Vincent Fesquet	1823
Tomislav Vucina	971
Richard Oram	38
Site	**255**
#Mechanical TechnicianCP	120
Claudio Araya	39
Diego Maltes	15
Hector Figueroa	32
Laridan Jeria	15
Paul Collins	33
Total: hours	**15819**
Total: FTE	**9.2**

- Spares : new DM common to DM0 and DM4.5: $400,000, Laser spares band 2: $27,000 ($14,000 in optics and $13,000 in electronics), miscellaneous BTO/Canopus spares: $10,000

- Contracts: LBBS and AOM CC SW with OSL, LTCS with Doug Summers, LGSWFS documentation with tOSC

Core Team Members (see Guidelines for Developing New Projects document):

- Project Manager: Maxime Boccas
- Project Scientist: Francois Rigaut
- Instrument scientist: Benoit Neichel
- Systems Engineer: Gelys Trancho
- Canopus Lead: Matthieu Bec
- LGSF Lead: Celine d'Orgeville

Extended Core Team Members:

- EIG: Ramon for Canopus, Vanessa for BTO and LBBS, Rolando for laser, Stan and Rolando for LIS
- MEG: Gaston for Canopus, Fabian for BTO
- OSG: Vincent and Tomislav for Laser, Maxime for Canopus, Maxime and Tomislav for BTO
- SWG: Roberto and Arturo for BTO, Matthieu for LBBS and Myst, Shane and Javier for HLSW
- Site: Diego and day crew for installations on telescope

Dependencies that require coordination:

- Strong dependency to ENg08-032 as far as dates

Risks and Issues:

- Canopus transport to summit. Risk is misalignment of optics requiring more lab time.
- Canopus DM0: 100% of actuators not passing AT after repair, or new failures before March 2011. Risk: impact on performance during commissioning.
- No contingency left in ENG08-031 to complete by Dec 31st, 2010. Most core people out for 2 weeks end of December. Risk: Canopus installation on telescope not occurring on Jan 6th, 2011. Later during the summer, resource availability will be scarce due to vacations.
- 1319 laser amplifier is complex to align, task will start Nov 3rd. Risk is delay in delivery of laser to BTO
- HLSW readiness milestones have been postponed many times and is currently set to Jan 1st 2011, leaving no contingency for usage once Canopus and GSAOI are on telescope. HLSW resources seem to be in conflict with other projects.
- Active coordination for day-time engineering tasks between Canopus and GSAOI between Jan 15 and March 15, 2011, without conflict with daily operations. Risk: functionalities and calibrations not ready by 1st run on March 20.

Supplemental Resources:

- Science staff to support GSAOI