

# GNAO AOB RfP Q&As

Updated: 03/09/2020

The following questions were sent via the [GNAO\\_AOB\\_RFP@gemini.edu](mailto:GNAO_AOB_RFP@gemini.edu) email, answers below each question.

---

## **Question 1:**

*You mention in the Common Requirements Document that the software interface to the Observatory is through the Gemini Instrument Application Programmer Interface (GIAPI), which is a C library. But you also make mention in AOB Requirements 9.1.5 that EPICS device drivers are required to drive mechanisms. If we plan on using the GIAPI interface rather than EPICS, is there any issue with using our own mechanism interface software?*

## **Answer 1:**

The Common Requirements Document is a Reference Document for Gemini Science Instruments in general, not an Applicable Document which is contractually binding. The AOB Specification and Statement of Work supersede any control content of the Common Requirements Document.

The contractor is not expected to provide any mechanism control software or EPICS interfaces, only the commercial device controllers required to position the mechanisms (GNAO-AOB-RFP-002 Sections 6.3.5.1 and 9.1) and the Wavefront Sensor Controllers required to implement basic WFS control (GNAO-AOB-RFP-002 Section 9.3). Gemini will provide a basic AOB System Controller which will implement EPICS interfaces and all control functions above the individual contractor supplied controller interface level, as necessary for assembly, integration and test at the contractor's facility (GNAO-AOB-RFP-001 Section 8). The contractor is only responsible for meeting requirements at the manufacturer's interface level.

Gemini is in the process of defining a set of preferred control and monitoring components for use in all GNAO subsystems. These preferred components will meet the requirements for all GNAO subsystems; have existing, robust, EPICS drivers; and provide ethernet based interfaces. If the AOB contractor team has any recommendations for control solutions based on previous experience, we welcome that input. It is expected that the list of preferred components will be available before design work starts on the AOB.

---

## **Question 2:**

*The following is stated in the SOW: The Contractor shall integrate and test the specified optomechanical interfaces and hardware using the GNAO team supplied device control system and RTC.*

- a. Will the RTC and the control system be delivered to the Contractor for integration at its facility or will the integration and test be done at the Gemini facilities?*

# GNAO AOB RfP Q&As

Updated: 03/09/2020

## Answer a:

Gemini will supply the contractor with a basic AOB System Controller and RTC adequate for testing to the contractor supplied interfaces. These will be provided to the contractor at their facility as required by the contractor's integration and test schedule. All assembly, integration, and testing of the AOB (except closed loop operation as described in Answer 2b below) will be done at the contractor's facility.

- b. It is understood from this statement that it is the interfaces between the AOB and the GNAO team supplied components that will need to be tested. Who will then be responsible for the closed-loop testing prior to delivery?*

## Answer b:

It is not expected that the contractor perform closed-loop testing prior to delivery since this level of testing relies on the delivery and performance of the RTC as well as the AOB mechanisms. For the purposes of this contract, testing at the contractor's facility shall be limited to the AO System Component interfaces. Closed loop testing shall be the responsibility of Gemini. Should it be possible to perform closed loop testing prior to delivery without compromising the delivery schedule, this would be arranged by Gemini as additional work to the basic contract.

- c. Will Gemini make a sensor available to the Contractor to test the Science Path performances or does it need to be provided by the Contractor?*

## Answer c:

The contractor should plan to have an IR image sensor/camera, required to perform science path test performances. "Renting" such a camera from the AOB contractor team (if they have one) could be an option. The GNAO team could also try to use in-house resources and temporarily provide such camera to the AOB contractor team. Options can be negotiated later, depending on potential availability of an IR camera at the contractor facility or through Gemini Observatory.

- d. Please confirm that the AOS system controller identified in Fig. 1 of the Specification document is the responsibility of Gemini and that it corresponds to the "GNAO team supplied device control system". If it is, please confirm if any models will be made available to the AOB contractor for interface testing prior to the delivery of the final unit.*

## Answer d:

The AOS System Controller identified in Fig. 1 is the responsibility of Gemini. Gemini will supply the contractor with control hardware and software (the "GNAO team supplied device control system") adequate for integration and test of the AOB, as described in answer 2a above. The controllers provided will not be the final, fully functional, AOS and RTC System Controllers, since these will implement functions outside the scope of the AOB. Integration of the AOB with the fully functional system controllers will be done at the Gemini facility after delivery, and will be the responsibility of Gemini.

# GNAO AOB RfP Q&As

Updated: 03/09/2020

---

## **Question 3:**

*There is also this statement in the following paragraph of the SOW: During the Realization Phase, in order to allow the Contractor to characterize, test and verify the system, the GNAO Team will provide a version of the RTC System Controller, adequate to test interfaces and support the integration activities of the AOB with the RTC System software*

- *Can you give more details on the "version of the RTC System Controller" that will be delivered? Is this the same unit as the one discussed in the previous paragraph or a different unit delivered earlier? If it is a different unit, who will be responsible to produce it? There doesn't seem to be an associated deliverable in the RTC RFP.*

## **Answer 3:**

Gemini will supply the contractor with an RTC that implements, at a minimum, the input and output interfaces required to communicate with the contractor supplied AO hardware and the software/ operator interfaces for testing them. This RTC will be adequate to allow the contractor to verify that the AO devices supplied meet specification. Development of this RTC is the responsibility of Gemini, delivery will depend on the contractor's integration and test schedule.

---

## **Question 4:**

*Our understanding is that the RTC and the AOS system controller provided by Gemini will be integrated in the AOB? If they are, what are the volume, mass, and heat dissipation budgets from these units that we should assume?*

## **Answer 4:**

If possible, the GNAO team would like to have both the RTC and AOS System Controllers decoupled from the AOB and located outside of the AOB assembly. The preferred option would be to use fibers going from the AO bench towards a server located somewhere in the computer room. However, this setup will strongly depend on the design and technology adopted. This remains an open question that shall be solved in collaboration between the sub-system teams during the PD stage.

---

## **Question 5:**

*Will GCAL be available for the calibration of the science instruments? If so, why does GNAO have to provide a spectral calibration source for the science instrument? What are the functionalities that the GNAO sources need to provide that are not available with GCAL?*

## **Answer 5:**

# GNAO AOB RfP Q&As

Updated: 03/09/2020

GCAL will not be available (the side port #4 - the AO port - cannot see GCAL, because there is the AO fold in the way). The AOB team should provide means to calibrate the science instrument, feb by GNAO.

---

**Question 6:**

*Can you confirm that the LGS WFS path in requirement 9.2.11 and 9.2.12 refers to the path between the LGS beamsplitter and the LGS SH WFS?*

**Answer 6:**

The relevant requirements as written are: "The optical aberrations in the LGS WFS path shall lead to a maximum spot displacement of 0.5" and "The pupil magnification error in the LGS WFS path shall be less than 0.5%."

The stated requirements assume that the science field has a flat wavefront. So the requirement refers to the difference between the path to the LGS and the path to the science instrument, including the effect of the dichroic beamsplitters.

---

**Question 7:**

*Can you confirm that the SFS WFS is not optional and needs to be delivered with the AOB? We understand that GeMS now uses one of the Peripheral WFS from the A&G unit. Is this approach suitable for GNAO?*

**Answer 7:**

Yes, the SFS is mandatory. Please note that the Peripheral WFS (P1) cannot be used. The P1 solution could work but is not ideal because the star used is much further away outside of the AO technical field. P1 also does not see the effect of the DMs. So It is much preferable to use a star within the AO technical field.

---

**Question 8:**

*Requirement 11.3. Please confirm that the expected redundancy is the use of a primary and an auxiliary power supply. In case of failure, the primary is powered down and the auxiliary is powered up.*

**Answer 8:**

Yes, This is correct.

---

**Question 9:**

## GNAO AOB RfP Q&As

Updated: 03/09/2020

*There is a discrepancy between the description of the IIV&V Acceptance Review and the Final On-site Acceptance Review described in section 6.3.1.5 and section 6.3.1.6, and the ones defined in section 10.3 of the SOW. Please confirm that it is the definition in 6.3.1.5 and 6.3.1.6 that applies.*

**Answer 9:**

Please disregard the descriptions of the IIV&V and Final Acceptance Reviews given in the Appendix 10.3. The correct definitions of these reviews are given in Sections 6.3.1.5 and 6.3.1.6.