

Report of IMACS Preship Review Committee

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Harland Epps
Daniel Fabricant: Chair
Robert Fata
Charlie Hull
Matt Johns
Frank Perez
Eric Persson
Mark Phillips
Miguel Roth
Steve Sheckman
Keith Taylor

The IMACS Preship Review Committee met on May 28th at the Carnegie Observatories in Pasadena to review the status of the IMACS instrument. The IMACS instrument team gave a well-prepared and complete account of progress and remaining issues. The Review Committee expressed unanimous praise for the quality of the IMACS design and the obvious competence of the IMACS team. Progress on completing IMACS has been fast paced and well directed, and it is clear that the instrument team is highly motivated. The Review Committee was impressed by the overall project schedule considering the complexity and power of IMACS.

The instrument team described a number of remaining issues that the Committee believes should be addressed before IMACS is shipped to Las Campanas. The Committee has high confidence that the instrument team will be able to address each of these issues promptly, but estimate that the time required to address all of the important issues is of order two months. Because the Committee also believes that these issues would take considerably longer to resolve in the field, our opinion is that the fastest way to complete IMACS is to spend adequate time in the laboratory.

Three of the remaining issues stand out as most significant: (1) eliminating stray light and light leaks, (2) addressing the focus positions of the long and short cameras and verifying that the focus mechanism in the CCD dewar has sufficient range, and (3) developing a safe procedure for switching the CCD dewar between the long and the short cameras.

The stray light and light leak issue is best addressed in the laboratory, since the solution may require work in several areas: baffling stray light, covering illuminated limit switches, shielding or replacing encoders that emit light, and sealing the instrument covers. The light-tight cold room constructed at Santa Barbara Street will be an asset for this work. Making the long and short cameras adequately parfocal may require disassembly of the lens barrels and machining of large spacers. Currently, the disconnection of the Cryo Tiger cooler to move the CCD dewar from the long to the short camera is time consuming and exposes the CCDs to risk since they become the coldest part of the dewar and act as cryopumps for contamination released by the warmer getters.

In addition to these three major issues, a number of smaller issues were raised that should also be resolved before shipping: (4) testing for field distortion possibly introduced by the field lens mount in various gravity orientations, (5) testing the performance of the air actuators at freezing temperatures and below, (6) repairing the dewar focus stage collar, (7) interferometrically testing the gratings and flat mirrors in their mounts, (8) Repotting some of the oil-coupled multipllets, (9) designing safe shipping boxes for the optics.

Four additional issues need prompt resolution, but perhaps could be addressed after shipping: (10) the repolishing and recoating of Lens 5 in the long camera to remove fabrication damage, (11) replacing the flexure-control (“wing”) CCDs and developing an approach to flexure control using these CCDs, (12) making the laser mask cutting machine a reliable tool for the astronomer, with an appropriate user interface, and (13) the thermal management of the spectrograph interior. The Committee was not convinced that it would be advantageous to pressurize the spectrograph with air from the

primary mirror's thermal control system, or to run fans to move air inside the spectrograph.

The instrument team presented an 18 page list of commissioning activities to be accomplished in three assembly/commissioning runs. The Committee strongly recommends that a more detailed plan be laid out with realistic goals set for each run. This plan should include a brief description of the techniques to be used and the team members and telescope staff needed to carry out these activities.

Given the length of time required to commission an instrument of this complexity, the Committee also recommends that astronomers not be scheduled to use IMACS until the commissioning is further along. Premature scheduling raises the pressure on the instrument team and raises unrealistic expectations. The IMACS instrument team is highly motivated and does not require additional pressure to complete the instrument promptly.

The IMACS team presented a list of key spare parts costing perhaps \$30K that could not be purchased because sufficient funds are not available. The Committee recommends that money be found to purchase these spare parts; failure to do so would present an unreasonable risk in the operation of this key Magellan instrument.