



SMT IF Upgrade 2006

Engineering Minutes

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An engineering meeting was held Friday, 9 Jun 2006 to discuss plans to reduce the level of staff support required to maintain the cryogenic systems at Mount Graham and Kitt Peak. Attending the meeting were Dr. Lucy Ziurys, Tom Folkers, Martin McColl and Robert Freund. The topics discussed were:

1. general cryogenic maintenance
2. 2/3mm RX Dewar improvements
3. 12-Meter infrastructure improvements
4. 10-Meter infrastructure additions.

Martin informed the group of failures with the Varian turbo-vacuum pump and a backing pump. He estimated the total replacement cost at \$ 12K. He also described his plan to upgrade the 12-Meter compressor plumbing to duplicate the system that is at the SMT. This design has proved itself very useful in supporting the cryogenics operation. He estimated the cost to be \$ 0.5K. There were no objections.

Proposals to improve the operation and performance of the compressor systems on Mount Graham and Kitt Peak during seasonal temperature extremes were discussed. One approach involved adding improvements to the existing compressors to improve cooling during summer and to provide heating during winter. Tom proposed adding a platform to the 12-Meter telescope to hold a modified compressor. He also proposed an enclosure that would regulate temperature for an unmodified compressor. The enclosure and unmodified compressor would be installed on the new platform. A similar enclosure could be installed at the SMT. Tom described a long held plan to cut a ventilation hole near the top of the SMT structure to ventilate the fifth floor.

A decision on the 12-Meter approach would be made after evaluating the situation at the telescope. The compressor situation at the SMT was not resolved. An estimate of \$ 3K was suggested for the 12-Meter telescope modifications and the fabrication of an enclosure.

Martin discussed two methods to improve the thermal performance of the 12-Meter 2/3 mm receiver Dewar. The effectiveness of the super-insulation that is sandwiched between the Dewar can and the radiation shield would be evaluated. Improvements to its installation or the installation of additional layers were proposed as solutions.

The effectiveness of the thin walled 60K radiation shield was questioned. Its thermal resistance could be reduced only by installing a thicker shield. There was concern that a replacement shield might not be ready by summer's end. An alternate installation plan was proposed. If need be, the replacement shield could be installed at the same time as a routine Balzer refrigerator seal replacement, sometime during the winter observing season.

Because sufficient quantity of super-insulation exists, the cost to improve the Dewar insulation will be in time not material. A cost estimate for the replacement of the radiation shield was \$ 3K. The cost was split between material and machine shop time. Both Dewar improvement proposals were accepted.

The performance of the GM and JT refrigerators in the 12-Meter 2/3 mm receiver would again be measured. The results would be compared with previous years and archived to continue our performance tracking.

At the end of the meeting, the approved resolutions were summarized; replace the Varian turbo-vacuum pump, replace the backing pump, install the 12-Meter compressor infrastructure upgrades, modify the 12-Meter telescope to better accommodate the compressor, and improve the super-insulation and replace the radiation shield in the 2/3 mm receiver Dewar. A quick calculation of the costs for the approved projects was estimated at slightly less than \$ 20K, about half the cost being the replacement of the failed equipment.

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