

# 38<sup>th</sup> Symposium on Engineering in Astronomy

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*Abstract:*

*Maintenance is a critical part of any systems prolonged success. Subaru Telescope is now 20 years old and in greater need of maintenance everyday. This presentation will cover reoccurring and new works efforts to keep Subaru Telescope operational and observing every night. Recurring works include lateral guide roller (LGR) rebuilds, shutter systems maintenance, snow removal, and dome exterior repair. LGR rebuilds is not only composed of maintenance to the rollers, but also resurfacing to the rail upon which it is guided. Subaru Telescope exterior is composed of aluminum paneling that expands and contracts during extreme temperature changes of the summit. This results in the original screws pulling out of the aluminum paneling. The entire exterior of the dome is planned to be redone with a rivet system to prevent this from reoccurring.*

My main focus of this presentation was to emphasis the necessity of maintenance for successful observations. I accomplished this by describing maintenance works that we as daycrew do as a large part of our job. The presentation was started with photos of our facilities in varying states of aging. Cracked paint, torn floor panels, and rusted rails shows how things have begun to degrade.

I first covered lateral guide roller maintenance. I explained how we disassemble the rollers, clean them, regrease, and reassemble them back together. Then we aligned the system. The rail that the rollers guide on and the bogie wheels run on also needs to be maintained in order to prevent carbon buildup and slipping of the dome. This work has become routine in order to prevent any problems from happening in the future. Of course we still run into unexpected work such as cracks in the rail or water damage to the electronics. Shutter maintenance is another routine works that follow the same pattern as the LGRs.

In addition to routine maintenance I also covered facility upgrades including: waterproofing the dome, dome exterior repair, safety corrections, and incorporating a summit machine shop. Due to the greater need of maintenance as Subaru Telescope ages, it was deemed more efficient and cost effective to install a summit machine shop. New development construction of infrastructure for Prime Focus Spectrograph(PFS) was also showcased.

I ended my presentation highlighting another of our routine maintenances, snow removal. Snow in Hawaii is often overlooked. However, it is critical to our operations to remove the snow from the dome and emergency exits for our operations.

After the presentations of the symposium, we were divided up into different discussion groups and presented with a task to discuss how we can continue to keep the telescope in continued operation in the future. From my group discussions we agreed on these three areas to focus on:

1. Cross-train staff with other groups/divisions, and also with new workers.  
Regular cross-training sessions with different groups and divisions prepares the staff member to fill in whenever there is a shortage of trained personnel. This helps to build teamwork and develop each staff member to become more productive.
2. Each staff to communicate what is going on to inform all the necessary people involved.  
Record and document the situation to have a reference in the future if the situation occurs again.
3. Priorities of Tasks.  
Management and supervisors to review staff work priorities, ensuring that they are in line with the overall operational goals of the organization.

Attending the 38<sup>th</sup> Symposium on Engineering in Astronomy in Mitaka, Japan was a both a great cultural and professional experience for me. Although most of the presentations were in Japanese, the graphs, charts and pictures helped to understand the presentations. Summary interpretations by my co-workers also helped a lot. I was fortunate enough to be able to tour the facilities of NAOJ Advanced Technology Center (ATC) and get to see the machine shop, laboratories and some of the ongoing projects.

Before departing Japan, fellow Subaru co-worker Sato-san was kind enough to escort Lucio Ramos and myself into Tokyo area to see Akihabara, Tsukiji Market area, Asakusa and the Tokyo Skytree. It was a lot for just one day and not much time available, but I am glad I got to see all that I did.

The transit system with buses, trains and subways was an experience in itself.

Thank you for the opportunity to do a presentation in Japan, share work experiences with other members and organizations of NAOJ, and the chance to experience some the culture of Japan. I hope to do it again someday and would definitely recommend it to anyone else who is given the opportunity.

Thank you for letting me share daycrews maintenance work at Subaru Telescope. Aloha from Robin Spencer summit mechanical technician daycrew 1.