HET Users Committee
Meeting Minutes 2022 May 09

Present: UC Members: **W. Cochran, W. Kollatschny, M. Fabricius**, **D. Fox**,
                          J. Chisholm, C.Morley
              Ex-Officio: **G. Zeimann, G. Hill**, **H. Lee, S. Janowiecki**
              Guests: **N. Drory**

The entirety of the meeting was primarily devoted to extensive discussion of the **HET Auto-Scheduler Project** with HETUC guest Niv Drory.   A subcommittee of the UC (G. Hill, C. Morley and S. Mahadevan) has been meeting with the AutoScheduler group to provide UC input to the project.   This subcommittee produced a draft statement concerning HET AutoScheduling, and the UC considered this statement in detail at this meeting. After extensive discussion, the UC endorsed the statement by a unanamous vote. This final version of this statement will be distributed to the HET Board, and is attached to these minutes.

The HET Users Committee will continue to work with the HET Auto-Scheduler Project to work through these and other issues as they arise.

HET Users Committee Statement
on the HET Auto-Scheduler Project

Summary: A sub-committee of the HET User's Committee (Gary Hill, Caroline Morley, and Suvrath Mahadevan) has had several very helpful interactions and exchanges of information with the team working on the HObS Scheduler. ***The plans for development have been discussed in the Users Committee and have our full support.*** Specifically, we agree that the development should proceed incrementally, allowing experience with the tools on sky and also for the PIs and TACs to make adaptations as the system proceeds. In addition, we recommend that the priority system remain as it has for the past decades and that a system of modified priorities be developed and implemented in consultation with the Users Committee, TACs and PIs. The Users Committee will assist the team in developing the rules desired to maximize the science impact of the telescope. As a first step towards unifying the sky/telescope conditions metrics that impact scheduling choices we recommend moving away from the Photometric/Spectroscopic (P/S) definition of sky transparency to utilize numerical values and to add the telescope illumination projected for the observation. The primary mirror illumination is not currently taken into account explicitly and can have a significant effect on the delivered number of photons. Adopting such a system can occur independently of the larger Scheduler improvements and will provide an opportunity to improve the system and train all parties (staff, TACs, PIs) in the change. More detail on these general recommendations is provided below:

1. Development of auto scheduling to proceed incrementally. Avoid large perturbations to procedures and operations. Introduction of automation transparently and step by step to assist night staff. Tool should offer added-value to the night staff from the beginning and with every feature we evolve.
2. Leave the current TAC process as is. The sentiment here is that the priority system has been used for >2 decades and there is not a strong driver to alter it. This does not preclude modifying phase II to improve communication of PI desires to the system.
3. To assist in scheduling decision making (by humans or machine), we need a finer grained view of priority. We suggest a measure we will call "urgency", (or 1/opportunity), very roughly sketched as $(\text{\#tracks} / \text{\#objects})^{-1} * p(\text{weather constraints}) * \text{boost\_factor}$. The latter "boost" term will be based upon considerations that are akin to the current definitions of "modified priorities". We will, however, develop a modernized version of the same philosophy after reviewing what factors we wish to account for. The UC will be a major contributor to this effort. Key questions include whether P2 targets with limited availability should be modified to exceed P1 targets in priority; how long are we willing to wait for a high-priority target, and how many targets can it overrule; the question of cost vs urgency. Factors from the TAC process, such as emphasizing student projects or potentially the ranking of proposals could also influence the "boost". Since numerous factors can "boost" priority, the reason for a given target being elevated should be apparent and part of the data collected for each observation.
4. We propose a somewhat finer grained version of the "photometric / spectroscopic / non-spectroscopic" definition of transparency constraints, allowing PIs to request a minimum (numerical) value for the product of the transparency and integrated pupil illumination. These are to include the effects of transparency and track mirror illumination.
5. Scheduling algorithms to be based on near-term optimization for the time being. Look ahead of <2 hours seems ideal given our current experiments; allow RA to construct longer schedules if useful for planning. Long term goal can be a less myopic system that optimizes scheduling over weeks, months, or even a whole trimester if it is deemed necessary at some point in the future.