

SSSC 2nd SCOC workshop Post Reflections

Baseline 2.0 Simulation: Overall, the SSSC supports the recommendations in the draft cadence report and the suite of simulations to explore further refinements of the LSST cadence. We ask the SCOC to use our decision tree outlined in our Cadence Note for evaluating the simulated 1.5-1.7 simulations when considering the v2.0 simulations. We have some concern over the slight decrease in Solar System detections in Baseline 2.0. This may be due to the change in low galactic latitude coverage within the WFD. We note that the MAF Solar System detection estimates do not account for stellar crowding in the galactic plane, so the metric is overly optimistic in these regions. We ask the scheduler team to work with the SSSC to investigate the cause of this, to better understand how future changes/tweaks to the 2.0 cadence will further impact the number of faint Solar System detections.

Revised Footprint: The SSSC is happy with the revised footprint. The Northern Ecliptic Spur (NES) continues to be our highest priority request. We have yet to explore the simulations with varying NES observations as the MAF Solar System metrics are still being run. We plan to provide feedback in January via our SCOC liaison.

Micro-Surveys - We fully understand the reasoning behind implementing in Year 2 the micro-surveys, such as the Near-Sun Twilight NEO Survey. We are pleased that the Solar System twilight micro-survey is being further explored by the SCOC. We strongly advocate for including this twilight survey in the final cadence. We note that any fraction of observing time that can be dedicated to this will produce niche science (see the SSSC Cadence Note).

TOO Programs and “Nano-Surveys” - We encourage the SCOC and Rubin Operations to officially develop and announce the process for the user community to apply for TOO observations and “nano-surveys”, time requests for niche observing projects requiring much less than 0.3% of observing time (less time than the micro-surveys). We highlight one such example that the SSSC supports, the Solar System “Deep Drilling Fields” using 40 hours over the ten year LSST baseline (see Trilling et al. 2018; <https://arxiv.org/abs/1812.09705>).

Extra Observing Time/Snaps: We continue to advocate for 1x30s snaps. If there is time found to be gained back for observing due to improved overhead times or the switch to single snaps, we recommend distributing the extra time between those regions of the footprint with lower visits than the main WFD such as the microsurveys/”nano-surveys”, and the deep drilling fields.

Deep Drilling Fields (DDFs) – The SSSC does not have strong preferences on most decisions related to the DDFs. We do support the Euclid Deep Field South being added as a fifth DDF field. We note that the COSMOS field is the closest to the ecliptic plane with an ecliptic latitude of -9.39° . This DDF will enable the Solar System Community to stack and shift observations to probe planetesimal sizes deeper than the WFD. We advocate for observing this field for longer than 2 years to enable secure orbit characterization of moving object detections found in deep stacking of the yearly images.

LSST Solar System Discoveries Past the First 2 Years: Near Earth Objects (NEOs) are always brighter and thus easier to discover when they approach the vicinity of the Earth. This strong effect, coupled with the steep size distribution of NEOs, means that Rubin will continue to discover more small NEOs throughout the survey lifetime. A non-negligible number of Main Belt asteroids, Jupiter Trojans, Kuiper Belt Objects and Centaurs e.g. on inclined orbits that were just beyond the reach of LSST fields in the first years will also become detectable later in the survey. This is in addition to comets entering the inner Solar System and unique objects such as interstellar objects or Earth Trojans. These populations are not included in current MAF Solar System discovery metrics, but detections of these populations scale with sky coverage.