Scheduling for the Rubin Observatory Legacy Survey of Space and Time

R. Lynne Jones,[1] Peter Yoachim,[1] Ribeiro Tiago,[2] and Željko Ivezić[1]

[1]*University of Washington, Dept. of Astronomy, Box 351580, Seattle, WA 98195, USA*
[2]*LSST Project Office, 950 N. Cherry Ave., Tucson, AZ 85719, USA*

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ABSTRACT

This is a paper about the brains of the LSST scheduler (the feature based scheduler), how it works, how we've determined the survey strategy, and how well we expect the survey strategy to do in reaching the LSST survey goals. It will also cover how we evaluate the survey strategy during operations, on yearly, monthly and daily timescales.

1. INTRODUCTION

- Overview of the general requirements for the LSST scheduling 'brain' (autonomous, reconfigurable, responsive to conditions, etc)

- What is our general approach for the scheduler algorithms (vs. other approaches) and why was the Markov-Decision style Feature Based Scheduler chosen?

- Outline sections in remainder of paper

2. SURVEY STRATEGY GOALS

Lynne

- SRD and four primary science themes - how do they drive scheduling?

- These primary goals require 80-90% of the survey time, so what is the starting point for deciding on the rest of the time?

- Outline community driven process for determining survey strategy

3. FEATURE BASED SCHEDULER

Peter

- Basic outline of scheduler code - track 'features' and calculate rewards/goals using basis functions, combine basis functions to choose pointing for a 'survey'

- Combine various surveys, including scripted surveys that allow us to add more rigid requirements

- Different kinds of surveys, including greedy / blob / scripted

- When do you split between scripted survey and general survey, when between blob and greedy, why do we have surveys for each filter

- Within the greedy and blob surveys, what are the basis functions we are currently using?

- How would you modify the scheduler to add more?

- How do the scripted surveys work? When do they trigger? How would you add an optimizer?

4. CREATING SIMULATED POINTING HISTORIES

Peter/Tiago/Lynne

- Running the FBS brain within the Operations Simulation environment

- What are the telescope model, and weather models? Where do they get their inputs? How does this translate into operations? (reference ptsn-007)

5. EVALUATING THE LONG-TERM SURVEY STRATEGY

Lynne/Peter

- Range of survey strategies studied in the simulations

- Metrics used to evaluate broad science themes

- Metrics used to evaluate all science themes, including options for smaller level optimization of the survey strategy

- Refer to report to the SCOC

6. EVALUATING SURVEY PROGRESS

Lynne/Peter

- Evaluate survey progress on short term (daily/ weekly), quarterly and twice-yearly timescales

- Metrics for evaluating survey progress on short terms and comparing to expected performance

- Process for adjusting scheduler to account for short-term variations if needed (when will it be needed?)

- Metrics for evaluating survey progress on quarterly/yearly timescales and comparing to expected performance

- Process and types of adjustments possible for quarterly/yearly timescales, how does it involve the SCOC?

7. CONCLUSIONS

review and add thoughts on future changes

APPENDIX

A. REFERENCES

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B. ACRONYMS

Acronym	Description
DAQ	Data Acquisition System
DM	Data Management
EPO	Education and Public Outreach
LSST	Legacy Survey of Space and Time (formerly Large Synoptic Survey Telescope)
SRD	LSST Science Requirements; LPM-17