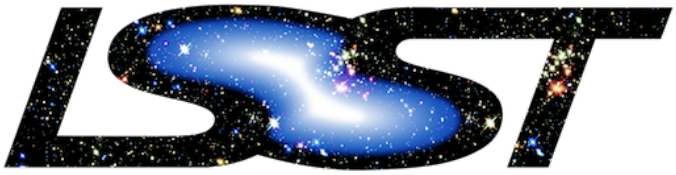

LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST)

Call for White Papers on LSST Cadence Modifications

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and the LSST Science Advisory Committee

Document-XXX

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D R A F T

Abstract

The LSST community is invited to play a key role in the refinement of LSST's Observing Strategy by submitting white papers that will describe proposed modifications of the current baseline cadence.

Change Record

Version	Date	Description	Owner name
1	2018-06-30	First released version.	Željko Ivezić

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Call for White Papers on LSST Cadence Modifications

1 Introduction

General context... evolving science, cadence...

The Large Synoptic Survey Telescope is designed to provide an unprecedented optical imaging dataset that will support investigations of our Solar System, Galaxy and Universe, across half the sky and over ten years of repeated observation. LSST is constructing a flexible scheduling system that can respond to the unexpected and be re-optimized. A basic implementation of LSST's 10-year survey (simulations of the observing strategy or "cadence") can deliver on a wide range of science. However, exactly how the LSST observations will be taken is not yet finalized. Indeed, it is anticipated tha the observing strategy will continue to be refined and optimized during operations.

The Community is playing a key role in the refinement of LSST's Observing Strategy by developing and analyzing metrics for simulated observing strategies. An open github community[1] is where this work is being assembled. How the detailed performance of the anticipated science investigations is expected to depend on small changes to the LSST observing strategy is explored in a living dynamically-evolving community white paper (the first version was published as arXiv:1708.04058 in August 2017). The main lessons learned from the first version are: 1) The Project should implement, analyze and optimize the rolling cadence idea (driven by supernovae, asteroids, short timescale variability), and 2) The Project should execute a systematic effort to further improve the ultimate LSST cadence strategy (e.g. sky coverage optimization, u band depth, special surveys, Deep Drilling Fields).

Through the end of construction and commissioning, this community Observing Strategy White Paper will remain a living document that is the vehicle for the community to communicate to the LSST Project regarding the Wide-Fast-Deep and mini-survey observing strategies. The LSST Project Scientist, Željko Ivezić, will synthesize and act on the results presented in this paper, with support from the Science Advisory Committee and Survey Strategy Committee. He is responsible for cadence optimization efforts and is the formal liaison between the community and the LSST Scheduler and Operations Simulation teams.

[1] https://github.com/LSSTScienceCollaborations/ObservingStrategy

1.1 Motivation for this white paper call

We have tools, we are close to first light...

Given the"living" white paper, explain why we need more white papers...

1.2 Timeline

Deadline, what will happen when afterwards...

Produce, analyze and document a set of Observing Strategies and present to the SAC for a final strategy recommendation (in 2020) to begin the survey.

2 How to submit a white paper?

We need to provide a tex template...

Acknowledgments: this document has greatly benefited from discussions between the LSST Project Science Team, the LSST Science Advisory Committee and Kem Cook, Phil Marshall, Steve Ridgway, Daniel Rothchild, Peter Yoachim and numerous other members of the LSST Science Collaborations.

A Examples of Current Open Cadence Questions

Summarize issues addressed in the living Observing Strategy White Paper, including "The top 10 questions"...

1) WFD

different bands in pairs of visits?

dithering?

rolling cadence properties (RA vs. Dec rolling)

area vs. coverage tradeoff

B Cadence Constraints Imposed by the LSST System

B.1 Hardware Constraints

Per LSST Document SPT-494 (from Dec 15, 2017), by the camera team:

For planning observations and in-dome calibration exposures, there is interest in the relevant engineering constraints on filter exchanges, beyond what is captured in requirements. As the system is not yet completely built and characterized, the following represents our current understanding, based on the design and on engineering judgement. As such, some of the details should be considered preliminary and subject to change. Expanded ranges could be possible if there are strong scientific motivations along with sufficient resources during operations.

The filter change mechanism is designed to undergo a total of 100,000 changes over its lifetime. Each filter is designed to support up to 30,000 changes over its lifetime.

A maintenance cycle is anticipated, and this would nominally occur after 10,000 changes or one year, whichever is reached first. The actual need will be informed by experience during Integration & Test and commissioning.

During a given observing night, the system could support as many changes involving the 5 filters loaded in the carousel as desired, without any practical limitation beyond the two-minute change interval (which consists of 90 seconds for the exchange plus up to 30 seconds to put the camera into the required orientation).

Filter loader operations (swapping a filter in the carousel) will be done during daytime. The system is designed for 3000 loads over its lifetime.

B.2 Software Constraints

C Supplementary Materials

C.1 Useful publications and documents

C.2 Useful websites

C.3 Useful slide collections

D Communicating with LSST

The Observing Strategy white paper, and calls for DDF and mini-survey white papers, are the main mechanisms for providing scientific input about cadence. Željko Ivezić (ivezic at astro.washington.edu) is the point of contact.

The LSST Science Advisory Committee (SAC) is charged with collecting and delivering community input to the Project. Strategic and political issues should be communicated via SAC (chair: Michael Strauss, strauss at astro.princeton.edu).

Join a science collaboration — a Data Management liaison is assigned to each Science Collaboration. Can utilize lsstc.slack.com.

Open and archived discussions with the team (especially Data Management and Education and Public Outreach) on community.lsst.org.