



SAACC Meeting 2021

Rubin Observatory Operations
Overview/Update

*Bob Blum, Rubin Observatory Operations
Director*

26 February 2021 / 12:00 - 14:00 EST



U.S. DEPARTMENT OF
ENERGY

New name and logo

As most of you are aware, the Large Synoptic Survey Telescope project was formally renamed the Vera C. Rubin Observatory through an act of Congress at the beginning of last year.

We did keep the LSST acronym, through the new name for the initial ten-year survey that will be performed by the Rubin Observatory: the Legacy Survey of Space and Time.

We are quite proud to be named after Vera Rubin, a pioneering female astronomer, who made major contributions to our understanding of dark matter. The Rubin Observatory will be the first major national scientific facility named after a woman scientist.

Note that the proper short form of the Vera C. Rubin Observatory is the Rubin Observatory. We (and NSF) strongly discourage the use of acronyms like VRO or VCRO in referring to this facility. We would like to continue to honor Vera by maintaining her name “front and center” in scientific papers that result from this high profile observatory.

We have a new logo!



It's been an interesting year ...

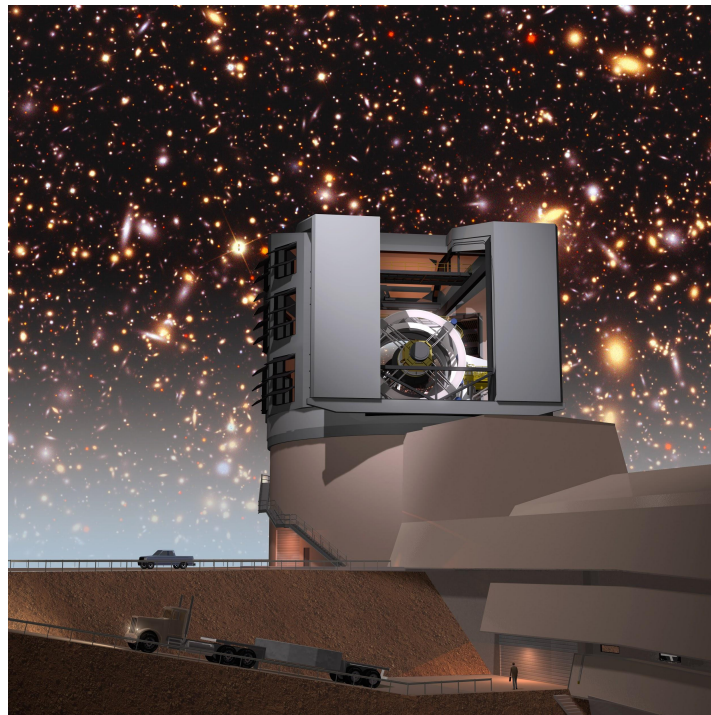
As for nearly everything else in the world, the Covid-19 pandemic has had a major impact on the Rubin Observatory construction project, and so then on operations planning.

We were forced to suspend all activity on the summit facility in Chile in mid-March (2020). Our prime contractors engaged in assembling the dome and telescope mount assembly went home (to Europe in both cases), and getting them back into Chile has been one of the major challenges we have faced in the ensuing months.

Work at SLAC National Accelerator Laboratory on the camera was also impacted. The Lab shut down nearly completely from March until May, and has allowed only a limited number of essential personnel back on site ever since.

Rubin's Legacy Survey of Space and Time

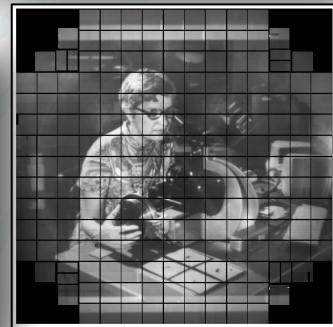
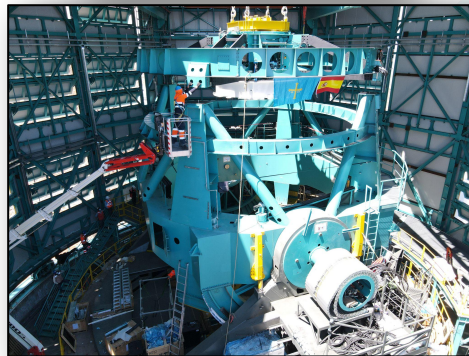
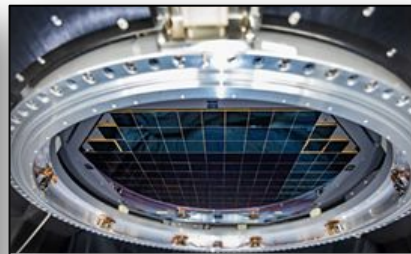
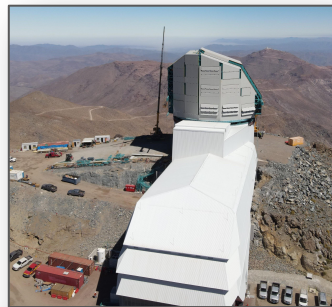
- Unprecedented astronomical survey
- Covers the southern sky every three nights
- Relentless observing for 10 years due to begin in 2023
- 40 billion Objects over the 10 yr LSST
- 20 TB of data per night
- 10 million transient alerts per night served by community brokers
- Annual data releases
- 15 PB final catalog
- 500 PB of image data products
- Data releases have a 2 yr proprietary period
- Serving release data publicly is not yet planned but is almost certain to be enabled by US or overseas in-kind contributions.



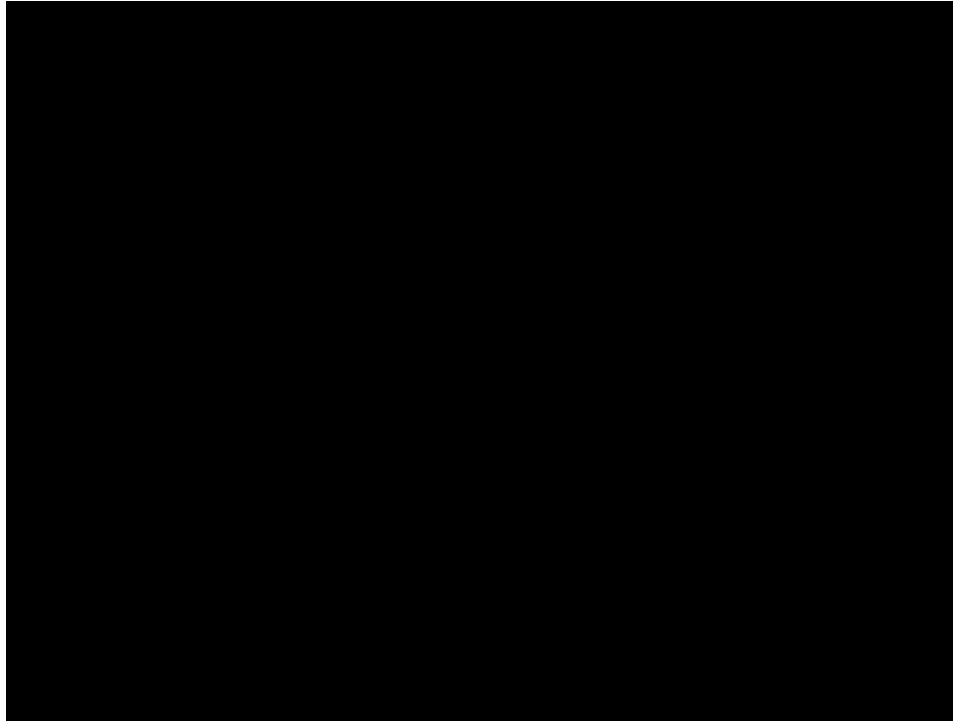
Vera C. Rubin Observatory

Current First light and Survey Schedule

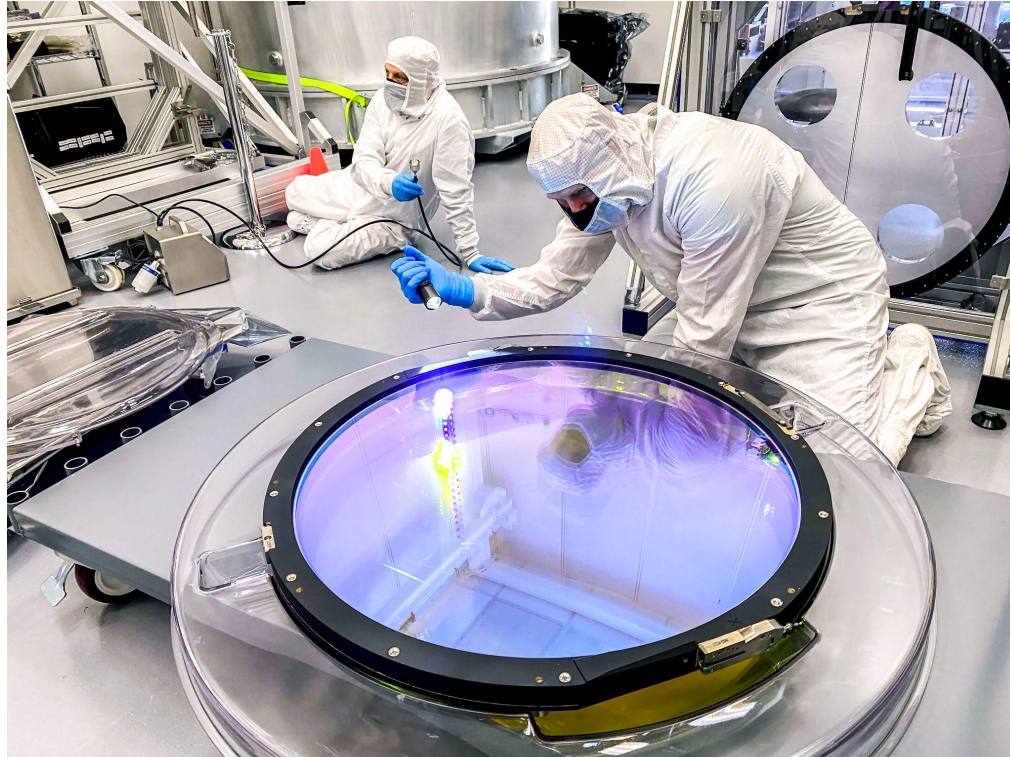
- Engineering First Light ~ November 2022
- LSSTCam first light ~ Early 2023
- Rubin Operations is planning for full survey operations not earlier than October 1, 2023
- Execute 10 year Legacy Survey of Space and Time: 2024 - 2033



Telescope Mount Top End Assembly



Filters arriving at SLAC for final integration



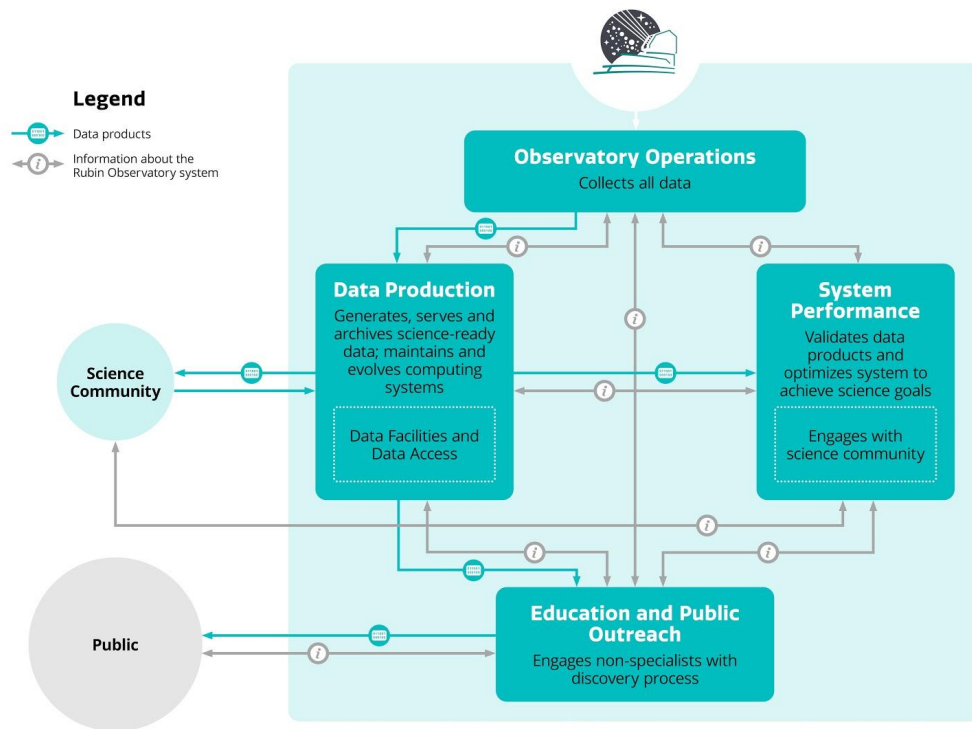
Operations is happening now

- Operations Planning
- Community Engagement
- Data Preview 0 (DP0) announced
- Cadence Studies Ongoing with the Community
- In kind program advancing



Pre Operations in 2021

- Pre Operations is active
- Planning for Operations for Legacy Survey of Space and Time October 2023
- Full survey proposal and detailed plan for Operation this year (check in with us at AAS 239)
- Team ramping up, 100 people (40 FTE) this year at NOIRLab, SLAC, UW, Princeton, NCSA, BNL, FNAL ...
- Data Preview for the community



Community Participation in Data Preview 0

Who: Up to 300 representatives of the science community (plus Rubin Obs. staff).
Data rights holders: astronomers and students in the US & Chile, or named International Contributors.

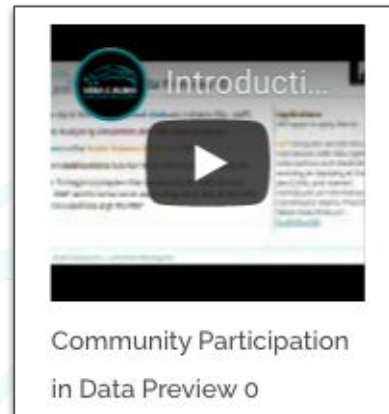
What: Analyzing simulated LSST-like data products.
Five-years, 300 deg², extragalactic & Galactic objects, includes some transients and variables.

Where: In an early version of the Rubin Science Platform (RSP).
The RSP is a web-based software system for data access, query, visualization, and analysis.

When: Applications to open in spring 2021, RSP access starting June 30; advertisements to come.
Join [Community.lsst.org](https://community.lsst.org) or [an email list at lsst.org/scientists](https://lsst.org/scientists) for early notification.

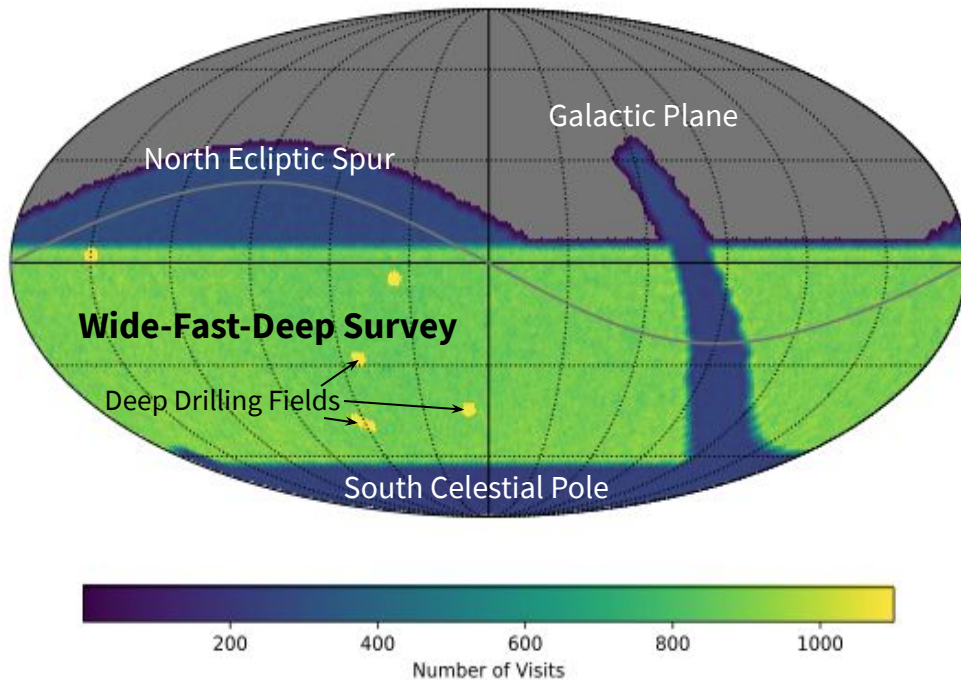
Why: To enable the community to prepare for early science with LSST.
To serve as an early integration test of the LSST science pipelines and the RSP.

How: DPO Info Sessions in the AAS Exhibit Hall (Rubin Observatory booth, NSF Pavilion)
Drop in to the booth's Zoom room: Wed Jan 13, 2pm ET *or* Thu Jan 14, 3pm ET
Find out more about participating in DP0 at lsst.org/clo4618.



https://www.lsst.org/aas237/operations_updates

LSST Survey Strategy Basics



The **Baseline Survey Strategy** was designed to meet the basic requirements to achieve the core science goals of the **Legacy Survey of Space and Time** (LSST; requirements described in [ls.st/srd](https://www.lsst.org/lsst/srd)).

Baseline design elements for the WFD area:

- should cover at least 18000 deg^2
- average of 825 visits per field over 10 years
- same-night same-field re-visit “pairs”

Additional areas covered should include:

- at least 4 deep drilling fields
- the North Ecliptic Spur, the Galactic Plane, and the South Celestial Pole

How to optimize the LSST to maximize scientific return is an open question.

LSST Cadence Optimization

Cadence refers to how often fields are revisited, both within a given night and in between nights, for the Wide-Fast-Deep “Main Survey.” DDFs and other mini surveys have distinct cadences too, and all these are part of an integrated “survey strategy.”

2020: Formation of the LSST Survey Cadence Optimization Committee (SCOC), who is charged to recommend specific survey cadences to be adopted for commissioning, early science, and the 10-year survey.

Apr 15, 2021 Deadline: Submit **Cadence Notes** to the SCOC.

- SCOC requests input from the science community
- primarily regarding 100+ new *Operations Simulation* (OpSim) runs and metrics
- call for Cadence Notes: ls.st/doc-36755
- Initial survey strategy December 2021

Resources

Read: “Survey Strategy and Cadence Choices for the LSST”

ls.st/pstn-051

Read: The Survey Cadence Optimization Committee (SCOC)

ls.st/55y

Watch: The First SCOC-Science Collaborations Workshop (Dec 2020)

<https://ls.st/agenda1>

Participate: Write a Cadence Note for the SCOC.

ls.st/doc-36755

Thank you!

Summit, March 2021

