Vision

By acquiring, processing, and making available the vast dataset collected with the Vera C. Rubin Observatory, the Legacy Survey of Space and Time will provide the community with the data to address some of the most fundamental questions in astrophysics, advance the field of astronomy, and engage the public in the discovery process.
Mission

Produce an unprecedented astronomical data set for studies of the deep and dynamic universe, make the data widely accessible to a diverse community of scientists, and engage the public to explore the Universe with us.
Rubin’s Vision and Mission Support Science Priorities for the community

Rubin will produce an unprecedented optical survey, the Legacy Survey of Space and Time (LSST).

The depth, breadth, and time domain axes of the survey are aligned with, and will be indispensable in enabling NOIRLab and SLAC science priorities in the 2020s on behalf of and developed with the community.

The Operations Team has a single-minded focus on preparing for Operations and delivering data products to the community. This includes data previews, data releases, and a real time alert stream.
Four Driving Science Themes Define the System and Operations Plan

These science themes were **selected in early 2000’s** in an iterative process that involved both astronomers and engineers, within and outside of the Project, and reflect both aiming for transformative science and a desire to provide requirements for all aspects of the system design (e.g., depth, image quality, temporal sampling, filters).

These science themes **have remained relevant** nearly two decades later and have generated enthusiastic support from over a thousand scientists (NAS Decadal Survey 2010, 2020).

Basic idea behind LSST: **a uniform sky survey and a color movie.**

**LSST in one sentence:**
An unprecedented optical/near-IR survey of half the sky in *ugrizy* bands to a depth of *r~27.5* (36 nJy), based on 825 visits **over a 10-year period**: deep-wide-fast.

90% of observing time will be spent on a uniform survey: every 3-4 nights, the whole observable sky will be scanned twice per night.

**Left:** A 10-year simulation of LSST survey: the number of visits in the gri bands (Aitoff projection of equatorial coordinates)
Rubin Observatory operates as an integrated system with unified management and clear lines of authority.
Key events drive the Rubin Plan

**Current First Light and Survey Schedule**

- Engineering First Light, mid 2023
- LSSTCam First Light, late 2023
- Rubin Operations is planning for full survey operations *April 1, 2024*

These milestones set the timing of releasing key data sets to the community with appropriate uncertainty following from schedule uncertainty of construction and **drive the timing of the Rubin Operations Plan (ROP) deliverables**.
Construction Progress, Operations nears
Construction Progress - Network/Infrastructure

- Installation of Tucson Test Stand (TTS)
- Internal Network Review
- NCSA Test Stand (NTS) dismantled, soon to become Base Test Stand (BTS)
- Backup Link to Summit in progress
- Cybersecurity improvements
Rubin Observatory Operations will prepare the community (and itself) by providing early data for science through Data Previews (DP)

- 3 DPs, DP0 (=DP0.1+DP0.2) is active
- DP1 and DP2 depend on Construction schedule
- DR1 hooked to 6 months of LSST data taking
- Uncertainty in release date grows from DP0 to DR1
- Range of dates for delivery of DPs and DR1 reflects construction plans and contingency
- DPs are a direct activity leading deliberately to Ops readiness by systematic addition of data products and RSP users at each stage.

### Rubin Baseline Data Release Scenario

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Broader Impacts

- Rubin will serve communities that have been underserved in astronomy and astrophysics. The data set and tools are ideal for reaching new audiences. Inclusive Science Platform (see Data Production and System Performance) will engage underserved community.

- Rubin has established a Research Inclusion (RI) Working Group:
  - Rubin and NOIRLab staff, Science Collaborations (SC), LSSTC
  - Current focus is DP0 and Community Engagement
  - RI Postdoc is part of NOIRLab core group. Part of CET, on board July 2022.
  - Implemented through System Performance Community Engagement Team

- EPO, new ways to connect to educators, students, and public

- Open Source algorithms, pipelines and tools (see Data Production)

- Sustainability initiative
Rubin Observatory will execute most ambitious optical survey ever conceived on behalf of the LSST Community.

Uniform, reliable, and science ready data products will be produced end-to-end by the Rubin system/team and provided to the community of science users. **Data previews in the next few years, 3 data releases in FY25+, and a nightly alert stream starting when full survey operations begins.**

The survey will drive discovery throughout NOIRLab Programs and the SLAC managed Dark Energy Science Collaboration.

Rubin Observatory is committed to inclusion of faculty, postdocs, students, and educators who have not been able to participate in astronomy research in the past, either because they are under resourced individually or based at historically underserved institutions in astronomy. The public nature of science ready data products and web based access/tools are ideal to fulfill this commitment.

Hold us to it.