Friendly reminders – CoC & Covid

Project & Community Workshop 2022
8-12, August 2022 | The Ritz-Carlton, Dove Mountain | Tucson, AZ

Agenda | Resources | Travel & Venue | Code of Conduct | COVID-19
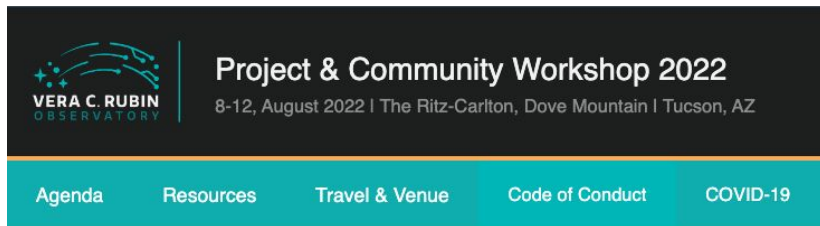
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Code of Conduct

Harassment and unprofessional conduct (including the use of offensive language) of any kind is not permitted at any time and should be reported.

Rubin Observatory adheres to the principles of kindness, trust, respect, diversity, and inclusiveness in order to provide a learning environment that produces rigor and excellence.

Handshakes OK — Fold Here
Elbow/Fist Bump OK — Fold Here
I Need My Space — Fold Here

Check name-tags for these contact comfort level stickers.

Thank you for masking indoors!

Use the confidential email rubin2022-covid@lists.lsst.org to request a test, report your test results, or ask questions.

Reporting bullying, harassment, or aggression.

The Rubin 2022 Organizing Committee has appointed designated contacts:

- Ranpal Gill (rgill@lsst.org)
- Andrew Connolly (ajc@astro.washington.edu)
- Melissa Graham (mlg3k@uw.edu)

Contact via email, Slack, or the Community Forum.

Friendly reminders - virtual participation

Virtual participants should be muted when they're not speaking.

In-person participants should speak into the room microphone(s), or the chair should repeat all questions into the microphone, so that the virtual participants can hear what is said.

In the Rubin2022_PCW Slack Space, all participants can use the session's channel for Q&A and discussion.

The channel name convention is, e.g.: #day1-mon-slot3a-intro-to-rubin

In BlueJeans, virtual participants should:

use the BlueJeans "raise hand" feature and wait for the moderator to call on you before speaking

or

use the BlueJeans chat functionality to ask questions or make comments.
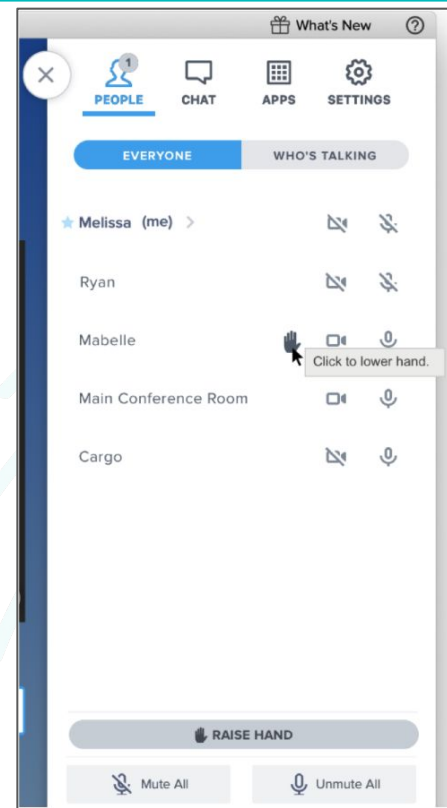
Session Format & Logistics

Session Chairs: Bob Blum & Leanne Guy,

Slack Channel: #day2-tue-slot4b-early-science

Monitoring slack for questions: Phil Marshal (?)

Zoom Raise Hand: Please raise your hand in zoom to ask a question. You will be called upon to unmute and ask your question by the chair.

BlueJeans Chat: **Will not be monitored**.

Scribes: <>, anyone who would like to add notes

Notes : Shared google doc (anyone with link can edit)

Definition of Early Science

Early Science is defined as any science enabled by Rubin for its community through and including the first data release, Data Release 1 (DR1)

The Early Science Program is motivated by the desire to provide the community with science-ready data products up to DR1. Under nominal planning it includes:

- **Data Preview 1 (DP1)**: based on ComCam data, Mar 2024–Jul 2024*

- **Data Preview 2 (DP2)**: based on LSSTCam data, Dec 2024 – Mar 2025*

- **Data Release 1 (DR1)**: based on the first 6 months of LSST data, Oct 2025 – Jan 2026*

- **Alerts**: at reduced scale and fidelity, facilitated by commissioning templates and incremental template generation in Year 1 ‡

‡ Due to the need for Data-Release-derived templates, Alert Production cannot run at full scale nor full fidelity during commissioning and year one.

* Indicates a range of possible release dates for the data release based on project uncertainty
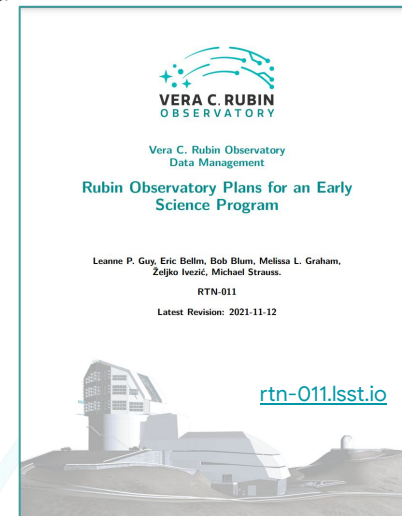
RTN-011: Roadmap for Early Science

Leanne

[RTN-011: Plans for Early Science](#) is the guiding document for Early Science with Rubin. It is a living document that will evolve over the course of the pre-operations period.

- Provides the plans for a Early Science Program

- Outlines the strategy for obtaining observations during commissioning to enhance Early Science

- Describes plans to implement incremental template generation to augment alert production in the early phases of the survey.

Feedback from this session will be incorporated into RTN-011 and a new version issued by end August

VERA C. RUBIN OBSERVATORY

Vera C. Rubin Observatory
Data Management

Rubin Observatory Plans for an Early Science Program

Leanne P. Guy, Eric Bellm, Bob Blum, Melissa L. Graham, Željko Ivezić, Michael Strauss.

RTN-011

Latest Revision: 2021-11-12

rtn-011.lsst.io

Cite as

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Data Release Schedule and Contents

Bob

Rubin Baseline Data Release Scenario	Jun 2021	Jun 2022	Mar 2024 - Jul 2024	Dec 2024 - Mar 2025	Oct 2025 - Jan 2026	Oct 2026 - Jan 2027	Nov 2027 - Jan 2028	Oct 2028 - Jan 2029
	DP0.1	DP0.2	DP1	DP2	DR1	DR2	DR3	DR4
Data Product	DC2 Simulated Sky Survey	Reprocessed DC2 Survey	ComCam On-Sky Data	LSSTCam On-Sky Data	LSST First 6 Months Data	LSST Year 1 Data	LSST Year 2 Data	LSST Year 3 Data
Raw images	☑	☑	☑	☑	☑	☑	☑	☑
DRP Processed Visit Images and Visit Catalogs	☑	☑	☑	☑	☑	☑	☑	☑
DRP Coadded Images	☑	☑	☑	☑	☑	☑	☑	☑
DRP Object and ForcedSource Catalogs	☑	☑	☑	☑	☑	☑	☑	☑
DRP Difference Images and DIASources	☐	☑	☑	☑	☑	☑	☑	☑
DRP ForcedSource Catalogs including DIA outputs	☐	☑	☑	☑	☑	☑	☑	☑
PP Processed Visit Images	☐	☐	☐	☑	☑	☑	☑	☑
PP Difference Images	☐	☐	☑	☑	☑	☑	☑	☑
PP Catalogs (DIASources, DIAObjects, DIAForcedSources)	☐	☐	☑	☑	☑	☑	☑	☑
PP Alerts (Canned)	☐	☐	☑	☑	☑	☑	☑	☑
PP Alerts (Live, Brokered)	☐	☐	☐	☑	☑	☑	☑	☑
PP SSP Catalogs	☐	☐	☑	☑	☑	☑	☑	☑
DRP SSP Catalogs	☐	☐	☐	☐	☑	☑	☑	☑

Early Science ⟶ RDO-011

Credit: Phil Marshall

Science Verification View of Commissioning

ComCam

Electro-optical Testing at Level 3	In-dome Engineering	On-sky Engineering	System Optimization	remove ComCam, install LSSTCam
		~3 months	~1 month	
biases, darks, flats	suite of in-dome calibration	pointing, AOS testing sky flats, dithering around bright stars, airmass scans	20-year LSST WFD equivalent depth, synthesizing LSSTCam FoV, prioritizing LSST DDF	

LSSTCam

Electro-optical Testing at Level 3	In-dome Engineering	On-sky Engineering	System Optimization	Science Validation Survey(s)
		~3 months	~1-2 months	~1-2 months
biases, darks, flats	suite of in-dome calibration	pointing, AOS sky flats, dithering around bright stars, airmass scans	20-year LSST WFD equivalent depth in fields for extragalactic, Galactic, and Solar System science, ~100 deg^2 in multiple bands with dense temporal sampling	Menu includes increased coverage of LSST DDFs Pilot LSST WFD survey, ~1000 deg^2 in multiple bands to 1-2 year LSST equivalent depth Astrophysical targets / ToO

Early Science

** from Science Verification and validation session

Key Milestones

Project Key Milestones

Project status : https://www.lsst.org/about/project-status

29-Sep-2022	TMA Contract Complete
30-Sep-2022	EPO Construction Finish
20-Mar-2023	COMP: Camera Pre-Ship Review at SLAC
28-Mar-2023	Dome Complete
17-May-2023	3-Mirror Optical System Ready for Testing
19-Jul-2023	Engineering First Light w/ComCam
05-Sep-2023	Camera Ready for Full System AI&T
14-Feb-2024	System First Light
11-Jun-2024	Test report: Final Pipelines Delivery
11-Jun-2024	Mini-Survey 2 Complete
18-Jun-2024	Operation Readiness Review Complete

Operations Key Milestones

2021-06-30	Deliver Data Preview 0.1 (DP0.1) (L1-RO-0040)	
2022-06-30	Complete Delivery of Data Preview Zero (L1-RO-0050)	
Mar 2024 - Jul 2024	Complete Delivery of Data Preview One (DP1) (L1-RO-0060)	(= Optical testing on TMA complete + 6 months)
Jun 2024 - Oct 2024	("Survey"/"Full") Operations Begins (L1-RO-0100)	(= Operation Readiness Review Complete + 1 day)
Jun 2024 - Nov 2024	Survey Start (L1-RO-0110)	(= ("Survey"/"Full") Operations Begins + 1 months)
Dec 2024 - Mar 2025	Complete Delivery of Data Preview Two (DP2) (L1-RO-0070)	(= Mini-Survey 2 Complete + 6 months)
Oct 2025 - Jan 2026	Complete Delivery of Data Release One (DR1) (L1-RO-0120)	(= Survey Start + 12 months)

Early Science Scenarios

Bob

The success and nature of Early Science depends on what the state of the system following commissioning. We consider three scenarios to ensure Early Science:

- **Plan A:** Science Verification is completely successful, move quickly to start the LSST-WFD survey, process SV images into DP2, and prepare for DR1;

- **Plan B**: Early Science Observing (3-6 months) that is different to regular survey operations because on–sky time in Commissioning was reduced, leading to few science-ready data products before the LSST begins. DP2 and DR1 content and timing TBD, but we will aim to stay as close to the Plan A schedule as possible;

- **Plan C**: Further shakedown of operations procedures and data taking is required even though the Rubin System can capture and produce science-quality data. DP2 and DR1 content and timing TBD, but correspondingly delayed.

Each option (A, B, or C) will include alert processing and generation of some type.

Early Science and the SCOC

Bob

- SCOC aim to deliver their Phase 2 recommendations for the baseline cadence in Dec. 2022. See: SCOC Handout and SCOC Information.

- The SCOC will continue to solicit input from the community on many aspects of the LSST cadence, including the Early Science observing strategy, see SCOC v2.0 and 2.1 simulations review timeline

- Considerations for Early Science:

  - **Plan A**: Start the survey with the baseline cadence and alert production based on commissioning templates and incrementally generated templates in year 1.

  - **Plan B/C**: Communicate to the SCOC what we need to do (for survey readiness) and work with the survey scheduling team and SCOC to 1) understand the relationship to the LSST cadence and 2) optimize early science.

Alert Generation in Year 1

Leanne

> **To maximize the opportunities for Early Science, Rubin will incrementally generate templates during Commissioning and year 1 using the best images available and covering as much sky in as many filters as possible.**

- **Commissioning Data Templates**: Build templates, where possible, from all science-quality commissioning data before the start of year one, and use them to generate alerts during year one

- **Year One Data Templates**: Build templates progressively from data obtained during year one (e.g., on a weekly or monthly timescale), and use them to generate alerts during year one, either instead of, or in addition to using commissioning data to build templates.

See: [DMTN-107](): Options for Alert Production in LSST Operations Year 1

Incremental Template Generation

Leanne

- DM has committed to constructing a system capable of building Image Differencing Templates outside of Data Release Processing:
  - **1.4.5 Template Coadds ID: DMS-REQ-0280 (Priority: 1b)**
    Specification: The DMS shall periodically create Template Images in each of the u,g,r,i,z,y passbands. Templates may be constructed as part of executing the Data Release Production payload, or by a separate execution of the Template Generation payload. Prior to their availability from Data Releases these coadds shall be created incrementally when sufficient data passing relevant quality criteria is available.

- To enable artifact rejection, templates in year 1 will be built with at least three images (five in subsequent years.)

- Templates are not necessarily built from the first N images that are collected,

- Once a template is produced for a sky position and filter it will not be replaced until the next Data Release to avoid repeated baseline changes.

Community Input to Early Science

Leanne

- **Plan A**: A strategy for template generation in the early phases of the survey which balances a tradeoff between various factors such as smaller area with multiple filters vs a single filter over a large area, must be devised. It will not be possible to survey the whole sky in all filters and generate templates by the end of the commissioning period.

- **Plan B/C**: In addition to template generation, we will need to devise an observing strategy for Early Science Observing. Should this be the LSST cadence, the construction SV observing plan or something different?

- Different science drivers naturally lead to different prioritization strategies
  - Milky way science would prefer templates that cover the galactic plane,
  - Time domain science prefes templates in multiple bands vs. single band for a larger area.
  - SN, transient and variable star science prefer templates for all bands in the Deep Drilling Fields.

Timeline for Early Science Decisions

Bob

- Very dependent on commissioning

    - e.g. if a significant part of the Science Verification surveys were descoped or reduced due to lack of schedule contingency, that would likely put us into Plan B,

    - e.g if we got no Science Verification data at all, that would likely put is into Plan C.

- Will know a lot in a year and will check in every few months.

- Track the celebratory milestones page : DMTN-232

Science   Early Science   all tags   **Latest**   Top   Bookmarks   My Posts

+ New Topic   🔔

Topic	Replies	Views	Activity
Rubin Observatory Plans for an Early Science Program technote	2	186	Nov '21
🏆 **About the Early Science category**	0	483	Aug '21
Science-driven prioritization of sky templates during commissioning plans commissioning, observingstrategy	17	846	Mar '20

There are no more Early Science topics. Ready to start a new conversation?

Questions and Answers

Advance Question: What is Early Science

What is early science defined as?

- Any science enabled by Rubin for its community through and including the first data release, Data Release 1 (DR1)

Is this all of year 1 observing?

- No, Early Science includes the first 6 months of LSST data, which will be released one year after the start of Operations as Data Release 1 (DR1)

Is this possible special observing surveys in the first six months?

- Possibly, if we don't get the SV surveys done in the commissioning period (and are in Plan B or C as a result)

Advance Question: Incremental Templates

rtn-011.lsst.io states that plans have been revised to include the generation of incremental templates in year 1. Has the ability to create and handle incremental templates been incorporated into the Rubin codebase?

- No, not yet. The requirement to be able to build templates outside of Data Release Processing has been added to the Data Management Requirements.

- Functionality to coadd arbitrary input images does exist; what is needed is an algorithm for selecting those inputs, and some tooling to make this easy to do operationally.

If not, what is the timeline for this work to be completed?

- Start of the LSSTCam Science Verification surveys, ~mid 2024

Advance Question: Timeline for decisions

What is the current timeline for early science considerations/decisions?

- Concrete plans for Early Science depend strongly on how we emerge from commissioning. We have defined a range of scenarios to cover all possible commissioning outcomes. We expect to be able to provide more details in about a year.

How does the SCOC recommendations on cadence and early science plans play into this?

- We will work together with the SCOC to maximize Early Science while not doing something that would be problematic for the survey cadence.

Backup Slides

Early Science Data Products

Prompt Data Products

Alerts: Alert packet containing: alertId, DIASource, DIAObject or SSObject, previous 12 months of detections, science/template/difference image cutouts

Images: Single visit images, difference images, template

Catalogs: DIASource, DIAObject, SSObject, ForcedSource.

Prompt Products Database Timescale
The prompt products database, containing the prompt catalogs will be updated on a 24hr timescale.

Static Science Data Products
DR data products from DP1 and 2 based on commissioning Science verification data, and DR1 based on the first 6 months of data.

Definitions
Source = A detection in an image with SNR>5
Object = Sources associated by coordinate
DIA = Difference Image Analysis
DIASource = A detection in a difference image with SNR>5
DIAObject = DIASources associated by coordinate
SSObject = Solar System Object
Template = Transient-free image