VERA C. RUBIN OBSERVATORY

U.S. National Science Foundation

U.S. Department of ENERGY | Office of Science

Reminder to turn on recording!

Rubin Science Assembly

Data Preview 0 Review: Thank You DP0 Delegates!!

Thu 23 Jan 2025

Melissa Graham

Today’s Agenda

9:00 am : Announcements

9:10 am ~ 9:40 am: Review of Data Preview 0 and Thank You Delegates!

Open time for sharing comments and questions.

Announcements

Save the date: Rubin Community Workshop 2025

- July 28 - August 1st 2025 @ Marriott University Park in Tucson, AZ
- Fully hybrid: virtual + in-person (250 limit); registration is not open yet.

ComCam commissioning is complete.

- Final update: community.lsst.org/t/9644
- An Interim Report on the ComCam On-Sky Campaign, sitcomtn-149.lsst.io

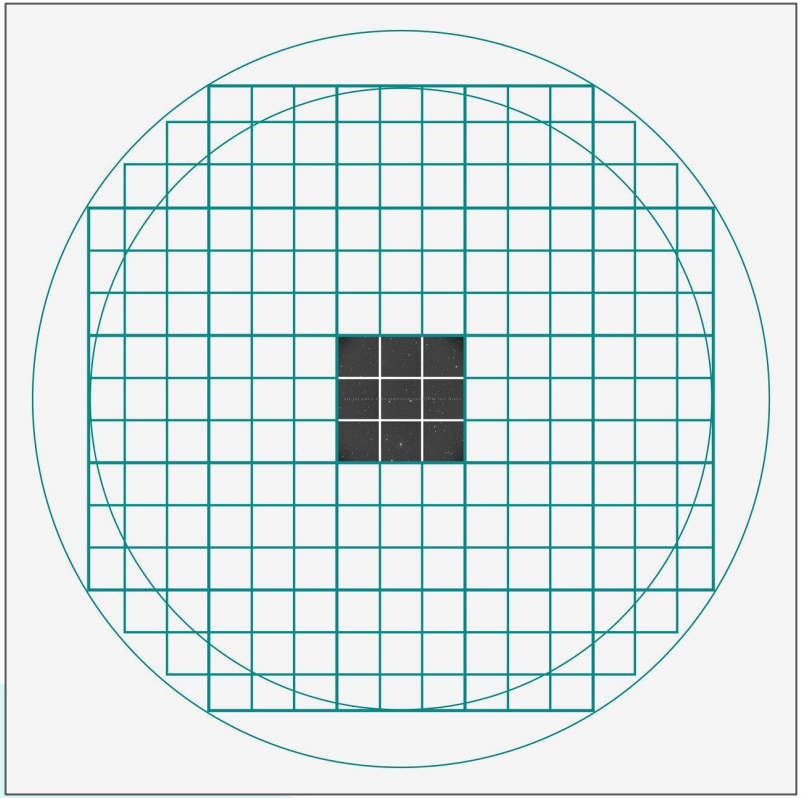
AAS 245 Rubin Town Hall

- Slide deck provides a very nice summary: ls.st/aas245rubin-th
- Includes pictures from ComCam commissioning and a revised Early Science timeline

Upcoming Rubin Science Assemblies

- Thu Feb 6: "**A look forward to Data Preview 1**"
- Thu Feb 20: How to use the Portal Aspect of the RSP
- Mar - May: DP1 preparation sessions by astronomy sub-field

Announcements



https://rubinobservatory.org/news/rubin-completes-comcam-tests

← A shareable ComCam image has been released.

LINCC Frameworks Office Hours

LINCC Frameworks mission is to **enable scientists** by developing scalable and productionised **software/algorithms** in **collaboration** with broader community.

Office Hours provides users an opportunity to learn about or get support for LINCC Frameworks software.

When: Most Thursdays 1pm ET / 10am PT / 7pm CET (see LF Calendar)

Where: Zoom (zoom link)

Website

You can also submit questions via the #lincc-frameworks-qa slack channel and sign up for the LINCC mailing list for more updates (instructions).

LINCC Frameworks Projects

- Catalog storage and analysis (HATS, LSDB)
- Structured data / time series (nested-pandas)
- Photo-Z (supporting DESC's RAIL)
- Shift and stack moving object detection (KBMOD)
- Time series simulation (TDAstro)
- Machine learning support (FIBAD)
- General purpose tools (python project template)

Introduction to the Users Committee

The Rubin Users Committee is charged with:

1. Soliciting feedback from the community about the Rubin data products and Science Platform.
2. Recommending improvements in their twice-yearly reports to the Rubin Operations director.

Charge: rdo-051.lsst.io
Website: lsst.org/scientists/users-committee
Reports: available in the Rubin Community Forum (community.lsst.org/tag/users-committee)
Meetings: two formal meetings per year, which always start with an open community listening session
Contact: via email to RubinObs-Users-Committee@lists.lsst.org or via the Rubin Community Forum (go to Community.lsst.org and send a direct message to the @Users-Committee group)
Feedback: use the Google form at forms.gle/km4VS2r2uYrvJ2w58

The Rubin Users Committee looks forward to hearing from the Rubin science community.

Igor Andreoni	Dominique Boutigny	Alejandra Muñoz Arancibia	Alessandra Corsi
Anupreeta More	Vincenzo Petrecca	Vicki Sarajedini	Matthew Holman
Darryl Seligman	Anja von der Linden	Matthew P. Wiesner	Michael Wood-Vasey

New here? Welcome!

Get an RSP account: rsp.lsst.io

User resources for DP0: dp0.lsst.io

Data Products Definitions Documentation (and tutorials):

- DP0.2 (extragalactic & galactic objects): dp0-2.lsst.io
- DP0.3 (Solar System objects): dp0-3.lsst.io

General information for scientists: rubinobservatory.org/for-scientists

Questions?

- please stay for the Q&A, questions from people new-to-Rubin are always welcome

What is Data Preview 0 (DP0)?

Data Preview 0 is based on simulations created by the science community.

Extragalactic & Galactic Objects

- created by the Dark Energy Science Collaboration (DESC) for their Data Challenge 2 (DC2)
- simulated clusters, galaxies, Type Ia supernovae, and stars (some variable)
- simulated observations over 300 square degrees for 5 years of survey operations in ugrizy
- used for Phase 1 and 2 of DP0 (DP0.1, DP0.2)

Solar System Objects

- created by members of the Rubin Solar System Pipelines and Commissioning teams, with help from the LSST Solar System Science Collaboration
- included all Minor Planets Center objects plus simulated LSST-discovered objects
- simulated catalogs represent 10 years of LSST observations
- used for Phase 3 of DP0 (DP0.3)

What is the Rubin Science Platform (RSP)?

The **Rubin Science Platform (RSP)** is a set of integrated web-based applications and services running at the Rubin Observatory Data Access Centers (DACs).

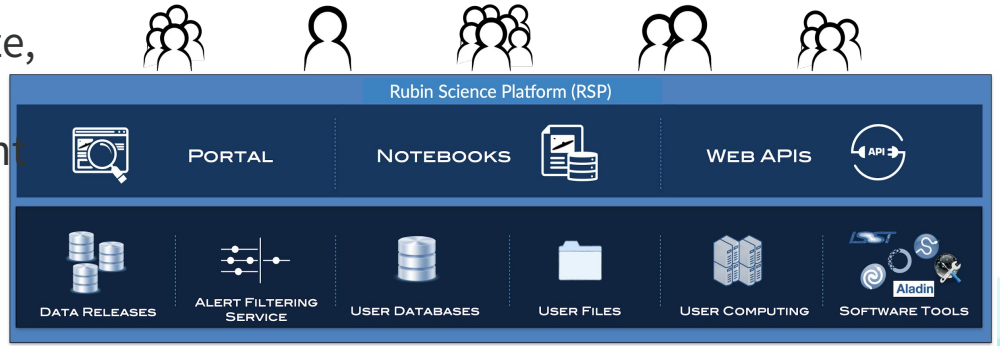
The RSP allows users to bring their analysis *to the data* (i.e., avoid huge downloads).

Portal Aspect
exploratory analysis and visualization of the Rubin archive

Notebook Aspect
in-depth 'next-to-data' analysis and creation of added-value data products

API Aspect
remote access to the Rubin archive via industry-standard APIs

The RSP provides tools to query, visualize, subset, and analyze the full LSST data archives in a stable software environment located next to the data, along with storage space, compute resources, and remote access options.



Goals of Data Preview 0

1. To serve as an early integration test of the Legacy Survey of Space and Time (LSST) Science Pipelines and the Rubin Science Platform (RSP).
2. To enable a limited number of astronomers and students to begin early preparations for science with the LSST.

Goal 1 - Integration Test for Rubin

Achieved over the DP0's three phases.

Phase 1 (DP0.1)

- DESC processed their simulated raw images with the LSST Science Pipelines
- processed images and catalogs were ingested and served by Rubin staff via the RSP

Phase 2 (DP0.2)

- Rubin staff processed the DESC's simulated raw images with the LSST Science Pipelines
- processed images and catalogs were ingested and served by Rubin staff via the RSP

Phase 3 (DP0.3)

- DP0.3 creator team generated the simulated observations and catalogs
- catalogs were ingested and served by Rubin staff via the RSP

Demonstrated Rubin's ability to process, calibrate, and serve LSST-like data to users.

Goal 1 - Integration Test for Rubin

What does it mean to “serve” data?

- To make accessible to users for scientific analysis.

The two main ways that the RSP “serves” data:

1. The data butler
2. The Table Access Protocol (TAP) service

Both of these data access services:

- enable scientifically-motivated queries so that users can retrieve subsets
- return data products in formats designed for scientific analysis

DP0 data is accessible via both the butler and TAP.

Goal 1 - Integration Test for Rubin

Beyond the goal of an integration test, DP0 has aided RSP development.

New and improved user-facing RSP functionality over DP0 includes:

- HiPS maps
- TAP-based image services
- image cutout tools
- user-uploaded tables
- identity management
- Portal Aspect layout

Developments in the LSST Science Pipelines and backend services have proceeded, such as simplification of the butler query methods and the addition of a synthetic source injection package.

Goal 1 - Integration Test for Rubin

Beyond data services, DP0 aided the development of **user-facing resources**.

Documentation
- data products definitions documents
- processing descriptions
- table schema

Tutorials
- 46 and growing (34 DP0.2, 12 DP0.3)
- defined standards (rtn-045.lsst.io)

Support
- Rubin Community Forum
- hundreds of solved Topics over DP0

Engagement
- weekly Rubin Science Assemblies
- monthly “Third Thursdays” (TBC)
- annual Rubin Data Academy

The Rubin Users Committee has released 6 twice-yearly reports since 2022.

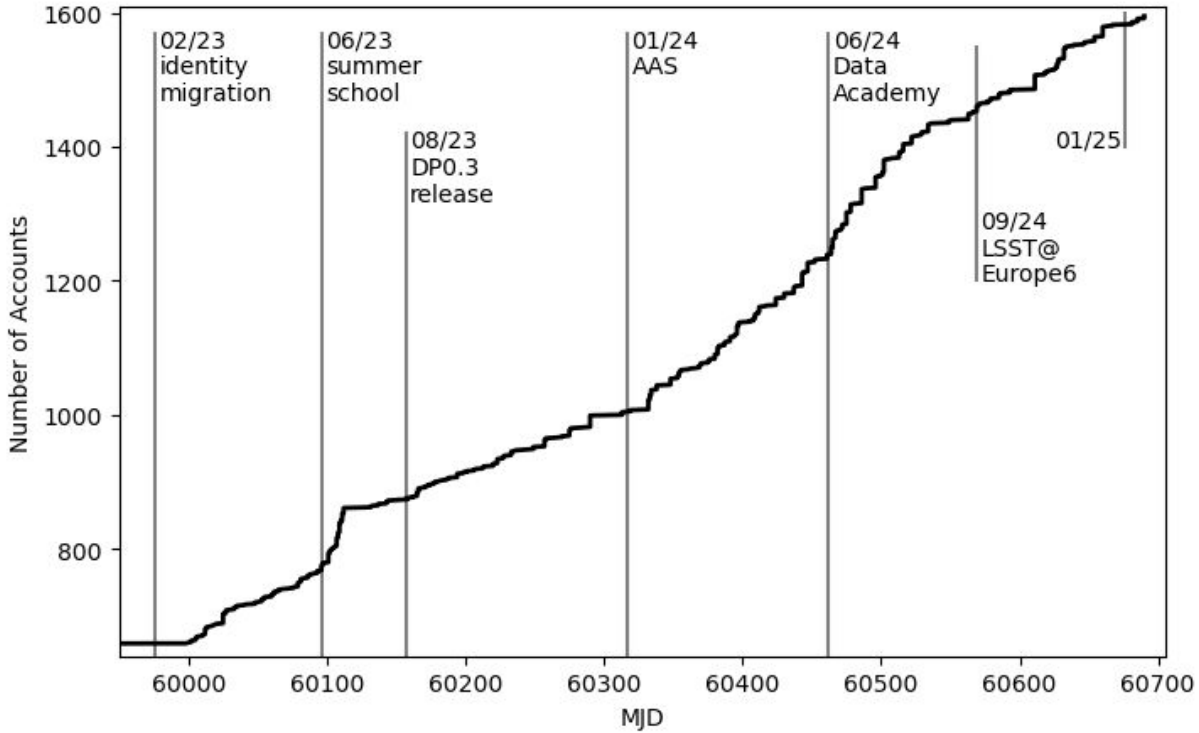
Goal 2 - Science Community Preparation

Number of people who had or have an account in the Rubin Science Platform at data.lsst.cloud.

June 2021 - DP0.1
- 300 initial DP0 delegates

June 2022 - DP0.2
- 300 more DP0 delegates

Feb 2023 - identity migration
- self-signup capabilities



Goal 2 - Science Community Preparation

Engagement activities

- hundreds of participants in virtual events
- ~20 guest speakers during assemblies
- many provided feedback via surveys

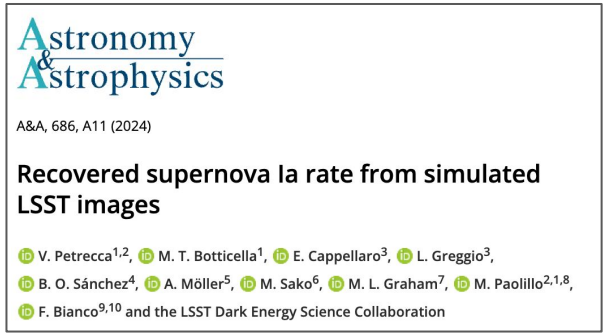
Contributed demos

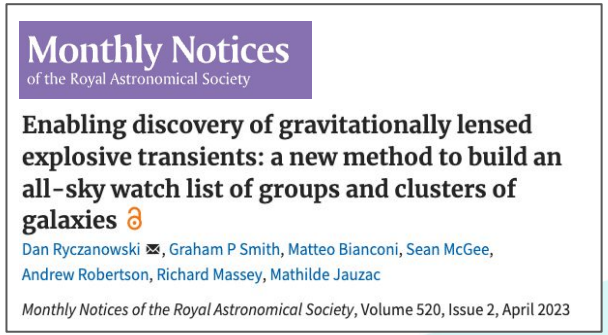
- ~20 people contributed Notebooks to shared repos

Working groups

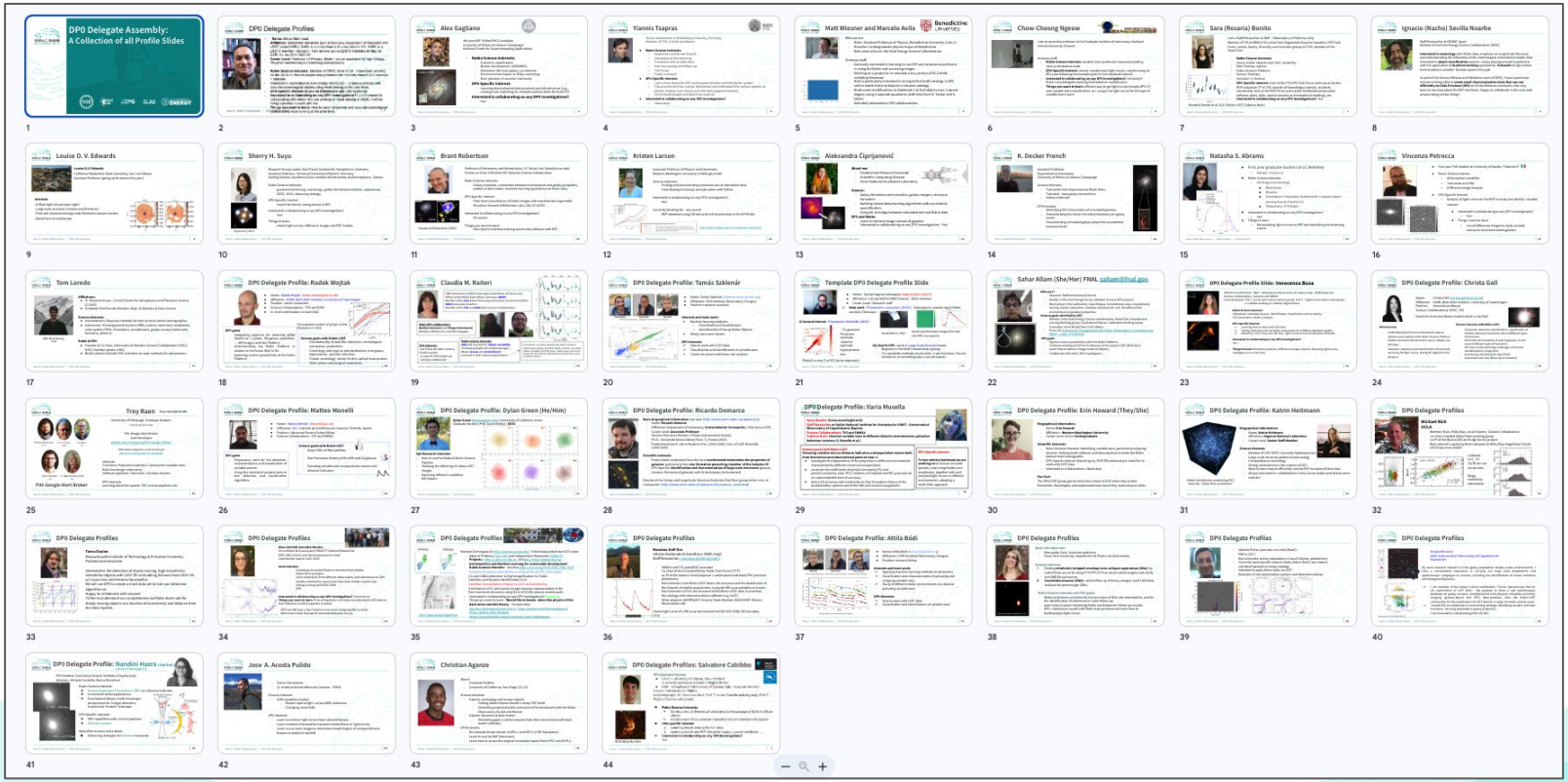
- DP0 served as a catalyst for community-led groups
- PAARE grants for DP0-related work
- new networks of smaller institutions

Journal Articles





Goal 2 - Science Community Preparation



Goal 2 - Science Community Preparation

“Assembly presentations are thorough and relevant, if a bit too fast paced. The tutorial notebooks have been very valuable as a source of platform structure information and processing procedures.”

“This has been a great opportunity for me to learn new skills like ADQL and experiment with many python based astronomy packages.”

“The amount of resources is really great but the flow is almost overwhelming. Its been growing big in short amount of time and ... things may be missed.”

“Notebooks are most useful, because the tutorials are well written and integrated, and writing python code is probably the most likely way I will be interacting with the real LSST data.”

“I would like to know more about how to contribute to my notebook on github. I've used pull requests before, but I'm still afraid that I will embarrass myself. I was hoping that one of the other delegates would go first so I could see what they did.”

“Still feels a little like "drinking from a fire hose" in terms of the amount of info that needs processing. But that may lessen with time and more experience.”

Goal 2 - Science Community Preparation

DP0 did not equally help everyone to prepare.

Learning curve requires time.

- We provide 1-on-1 ‘accelerated onboarding’ sessions for researchers at non-R1/R2 institutes.

Students feel lost when sent to learn.

- “Beginner” resources assume students have basic astronomy and a research advisor.
- We’re developing an “unaccompanied undergrad” user profile.
- We’re starting to develop “course modules” at the upper-undergrad level.

Simulations are limited in the objects they contain.

- Missing most transient and variable types, and there are no AGN.
- No low surface brightness objects, e.g., streams, intracluster light.
- Not fixable with DP0 (there will be no new DP0 simulations).

Looking towards Data Preview 1

Is DP0 over now? Nope, not yet!

The Data Preview 0 datasets remain available (DP0.2, DP0.3).

- documentation and tutorials will be maintained and evolved
- virtual engagement events will continue to be DP0-based
- user support will still be provided for DP0

But, the term "DP0 Delegate" is being retired.

- initially, DP0 participation was limited and required an application (rtn-004.lsst.io)
- "DP0 delegate" represented how selected participants represented their communities
- the term has evolved to mean "everyone with an RSP account and DP0 access"
- going forward, everyone with an RSP account is simply a "user"

Looking towards Data Preview 1

Data Preview 1 will be based on real data from the Commissioning Camera.

- ComCam was on sky Oct-Dec 2025 and obtained a limited number of images.
- DP1 will include raw, processed, and coadded images and associated source catalogs.
- Anticipated release: June/July 2025 (TBD).

Preparing for DP1: upcoming Rubin Science Assemblies.

- In two weeks, an overview of the path to DP1 and what to expect.
- March-May, a “Science Series” of hands-on tutorials by astronomy sub-field.
- At the time of DP1 release there will be virtual onboarding sessions and tutorials.

Publicly available information about commissioning and early science.

- Commissioning Updates in the Forum News category (community.lsst.org/c/news).
- “An Interim Report on the ComCam On-Sky Campaign” (sitcomtn-149.lsst.io).
- “Rubin Observatory Plans for an Early Science Program” (rtn-011.lsst.io).

Thank you DP0 Delegates!

A few messages from Rubin staff expressing their gratitude for the work of DP0 Delegates as early participants.

Know that these sentiments are echoed by the other Rubin departments and teams.

Thank you delegates!

"Having an active and engaged community of DP0 Delegates has given the observatory a huge head start on its preparations for serving and supporting the LSST data. We'll be ready, in part due to your early participation. "

-- Bob Blum and Phil Marshall, Rubin Operations Directorate

"A huge thank you to all the DP0 Delegates who gave their research time to participate in DP0. Your work has enabled us to better understand how the community will do science with LSST data and informed our plans to maximize early science."

-- Leanne Guy, AD, System Performance

"We especially appreciate people bringing their questions and issues with DP0 to our attention via the Rubin Community Forum. That enables us to provide support for science and improve our documentation and tutorials."

-- Rubin Community Science Team (CST)

Delegates “Graduation Ceremony”

Not a cap & gown affair, and we don’t have diplomas for you but… you do go forth with data access!

RSP API Token

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36thisisnotarealtoken…

Comments and questions

In Zoom, raise your hand for a turn to speak, or type in the chat window.

- Share your feedback on Data Preview 0.
- Was there an aspect of DP0 you found particularly useful?
- Do you feel (un)prepared for Data Preview 1?
- Any questions related to the RSP, data access, the simulations, etc.