Vera C. Rubin Observatory
Data Management

Community Science Use Cases

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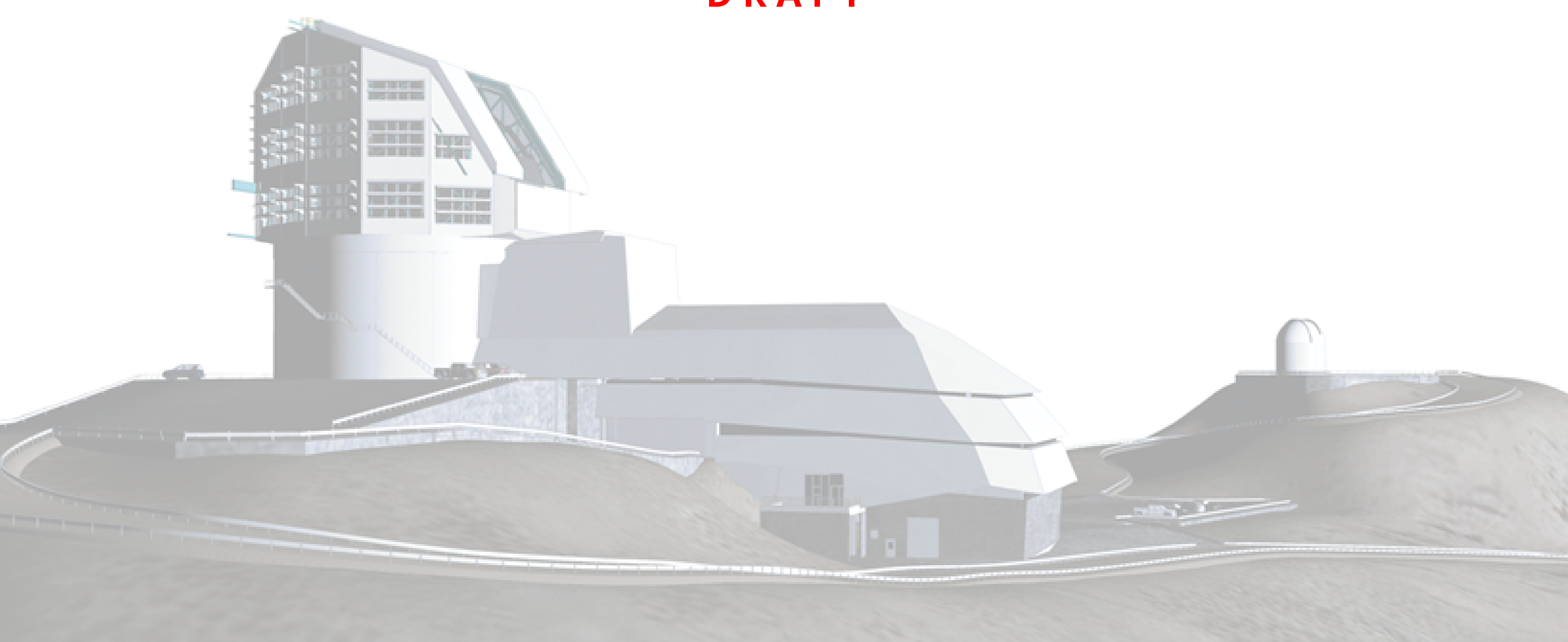

Abstract

User profiles and analysis and support use cases (workflows) for Rubin community science.

Change Record

Version	Date	Description	Owner name
1	2021-03-05	Released.	Melissa Graham
2	2023-04-19	Add user profiles.	Andrés A. Plazas Malagón
3	2025-01-21	Reorganize document (SP-1758).	Melissa Graham, Andrés A. Plazas Malagón
4	2025-05-02	Incorporate JC feedback (SP-1905).	Jeff Carlin, Andrés A. Plazas Malagón, Melissa Graham

Document source location: `https://github.com/rubin-observatory/rtn-002`

Contents

Community Science Use Cases

1 Introduction

The contents of this document are under development and are subject to change.

The Community Science Team (CST) in the Rubin System Performance department maintains this set of user profiles and use cases to capture the range of anticipated needs regarding scientific analyses with the Rubin software and data products.

This document guides the development of a process to scientifically validate user-facing resources for scientific analysis, such as the Rubin Science Platform (RSP), documentation, tutorials, and activities. To "scientifically validate" the RSP means to confirm that the RSP's functionality meets the scientific needs of its users, and that users are able to do their science with the RSP's tools. This document also guides the development of Rubin's Model for Community Science [RTN-004].

User profiles are designed to represent the diverse user community of the RSP: different experience and expertise backgrounds, scientific motivations, and accessibility needs.

Analysis use cases are designed to represent the variety of types of analysis that users will do with the RSP, such as subsetting, visualization, model fitting, and reprocessing. These use cases help to define the limitations of the RSP as well, and identify analysis that requires external resources (independent data access centers; IDACs).

Support use cases are designed to provide workflow examples of Rubin's issue resolution process, to illuminate how users report problems and get support, and how staff from across Rubin participate in user support. These use cases include, e.g., trouble with scientific analysis, instrumentation faults, software bugs.

2 User Profiles

2.1 Students

2.1.1 Unsupervised

Description: A student working independently (or ”unaccompanied undergraduate”) might be seeking to gain research experience on their own. This could be due to challenges in finding a local advisor or a desire to build research skills in preparation for applying to graduate school. Alternatively, they might have an advisor who has given them a project outline and pointed them at the Rubin resources to self-onboard, but who is not walking them through the learning experience and may have little Rubin experience themself. Students in this profile might be looking to change fields into astronomy.

Experience: None to a few astronomy undergraduate courses. None to some experience with Python and JupyterLab. Probably no experience with Portal- or Application Programming Interface (API)-like interfaces. Might have some experience in a related field like physics or computer/data science.

Needs: Beginner-level tutorials that demonstrate basic coding and astronomy concepts. Documentation with links to basic astronomy explanations. Ideas for what kinds of analysis to do with the Rubin data. They might strongly prefer a way to get help from their peers. Professional development resources and guidance on paper-writing.

2.1.2 Supervised

Description: Supervised undergrad and graduate students with advisors that are well-versed in the Rubin data products and services. They are working on an analysis for a well-defined project that will yield publishable results.

Experience: At least a few astronomy courses at the upper-undergrad and graduate levels. Currently enrolled in a university or college astronomy program. Has experience with Python and JupyterLab. Might have experience with Portal- or API-like interfaces.

Needs: Tutorials and documentation at all levels that are specific to LSST data access and analysis. They might prefer a way to get help from their peers. Professional development resources and guidance on paper-writing.

2.2 Professional scientists

The following use profiles are all variations on the profile of an active, publishing astronomer. This includes postdoctoral fellows, research scientists, faculty, and retired professionals.

2.2.1 Occasional user

Description: Astronomers whose main area of research is not necessarily ground-based optical astronomy, but they're looking for LSST data to augment other data. They are querying for LSST data for tens to hundreds of catalog objects, a few times a year or less.

Experience: They might have limited Astronomical Data Query Language (ADQL) experience and little exposure to the basics of ground-based optical photometry measurements and errors.

Needs: To Table Access Protocol (TAP)-query and download their small subset of table data. To remote-query (via API) for cross-matches to their objects of interest. Little storage space and limited computational resources. Clear table schema and a variety of ADQL recipes with descriptions.

2.2.2 Moderate user

Description: Astronomers who frequently use ground-based optical astronomy data, either on its own or together with other data. They are querying LSST data for thousands to millions of catalog objects and/or interacting with the images. They use the RSP regularly, logging in at least once a month to work on their ongoing projects. They are probably working in small groups.

Experience: They are experienced with the RSP and Python, and have a good general understanding of the Rubin LSST data products.

Needs: Moderate storage space and compute resources for analysis of catalog and image data. Intermediate- and advanced-level tutorials of RSP functionality (butler, Firefly). Creation of paper-ready data visualizations.

2.2.3 Heavy user

Description: Astronomers who frequently (or solely) use the Rubin LSST data for their research. They are querying millions to billions of catalog objects and interacting with images at high volume, including image reprocessing. They use the RSP frequently, logging in several times a week to work on their LSST analysis. They are working in small to large groups or collaborations.

Experience: They are experienced with the RSP, Python, and the LSST Science Pipelines. They have a deep understanding of the Rubin system and its data products.

Needs: A large amount of storage space that is also accessible to their collaborators. A large amount of computational resources for image reprocessing and the creation of user-generated data products. Advanced-level tutorials of RSP and Science Pipelines functionality. Creation of paper-ready data visualizations, and publishing derived data products.

2.3 Users with disabilities

These user profiles would be intersectional with one of the profiles above.

2.3.1 Users with visual disabilities

Description: This includes colorblind, low-vision, and blind users. Anyone with a low visual acuity that impacts their ability to use the graphical user interfaces of the RSP. The most common colorblindness is to be unable to differentiate between red and green.

Needs: Rubin resources that use high-contrast colors and colorblind-friendly plots. This applies to, e.g., default syntax highlighting, user interfaces, and tutorials. Documentation, tutorials, and data interfaces that work well with custom software such as screenreaders. Data sonification code packages and the ability to generate sounds from the RSP.

2.3.2 Deaf or hard-of-hearing users

Description: Users with partial or no hearing.

Needs: Written transcripts for recorded presentations. A way to get support via a text-based interface.

2.3.3 Users with physical disabilities

Description: Anyone who interacts with the RSP by speech, or with a single tool (e.g., mouse or keyboard only).

Needs: Interfaces that can be navigated with voice commands, or mouse- or keyboard-only.

2.3.4 Neurodivergent users

Description: This includes users with, e.g., autism, ADHD, dyslexia. Also includes users with social anxiety.

Needs: Dyslexia-friendly fonts, uncluttered interfaces. Documentation written in short, clear sentences and arranged in short paragraphs. Confidential support interfaces and one-on-one Q&A opportunities.

3 Analysis Use Cases

These analysis use cases represent general things that users want to do in the Rubin Science Platform, using specific scientific examples. They are not 1:1 related to the user profiles above, although some of the more advanced analysis use cases, for example, would be much more likely to be done by a heavy user.

The analysis use cases progress from "simple" to "more complicated". These cases, along with those in DMTN-086, will serve as the basis for usability tests and the CST's process for science validation of the RSP.

3.1 Rubin Science Platform

3.1.1 Portal

P-101: User interface cone search on the object catalog, review the results overplotted on the Hierarchical Progressive Survey (HiPS) map.

P-102: Astronomical Data Query Language (ADQL) search with column constraints, followed by the creation of plots based on the retrieved data in the results view.

P-103: Data discoverability via e.g., schema and HiPS browsing.

P-201: Extraction of image cutouts from LSST image archives based on user-defined coordinates, spatial dimensions, and filters.

P-202: View, rerun, and refine previous ADQL queries. Save, organize, and share queries for reproducibility and collaboration.

P-203: Upload user-defined tables. Perform LSST table queries based on the uploaded tables (e.g., joins, cross-match).

P-204: Extract and view time-series photometry by sky coordinate or object identifier.

P-205: Compare direct, template, and difference images at a particular sky position.

P-301: Identification of LSST images that spatially and/or temporally overlap user-defined coordinates and timeframes. Enable visualization and interaction with these images, including zooming, panning, rescaling, performing pixel statistics, and adding markup. Generate and save publication-quality plots and images for analysis and presentation.

3.1.2 Notebook

N-100: Explore and analyze images by loading a specific observation using the LSST data butler. Use basic visualization tools, such as color mapping and zoom functions, to examine image details. Identify and measure properties of individual sources (e.g., stars or galaxies) within the image to enable further analysis or classification.

N-101: Develop and utilize custom statistical measures or algorithms to detect and characterize specific astronomical objects, such as supernovae or quasars.

N-102: Reprocess data using the LSST Science Pipelines with modified configuration parameters to suit specific research needs.

N-103: Utilize advanced plotting libraries like Matplotlib and Bokeh to create publication-quality figures.

N-201: Query the LSST databases (e.g., Prompt Products Database) to generate cutout images (on the order of tens of thousands) for target candidates of specific astronomical objects of interest (e.g., lensed AGNs).

N-202: Implement and apply algorithms to detect and characterize transient or variable phenomena, integrating external packages for computational support when needed (e.g., to identify microlensing events).

N-203: Identify and analyze patterns of data quality degradation or observational interference, such as satellite streaks, and develop models to assess their impact on science (e.g., on Solar System science) and optimize observational strategies.

N-301: Fit light curves for selected objects by applying an initial pre-selection function to filter candidates based on user-defined criteria, such as object features or custom metrics. Pass the light curves of the selected objects to a fitting function to obtain best-fit parameters for each object for e.g., detailed modeling of variable or transient events.

N-302: Run and compare different object-finding algorithms (e.g., galaxy clusters), assessing their performance using custom-defined metrics. Utilize batch processing resources for computationally intensive tasks.

3.1.3 API

A-101: Explore LSST catalogs and metadata using basic API queries, and cross-match catalogs from LSST and other surveys.

A-102: Run ADQL queries on the LSST datasets to explore tables and produce visualizations via an interactive graphical users interface (GUI).

A-201: Verify the consistency of observables across multiple datasets and perform statistical checks (for example, for multiple dark energy probes).

A-202: Extract photometric data for sources and apply different algorithms for deblending, variability estimation, and source property analysis (e.g., for AGN variability).

A-301: Query galaxy shapes, positions, and photo-z catalogs to measure two-point correlation functions with external packages (*e.g.*, Treecorr). Use the results for modeling and parameter sampling with access to batch resources.

A-302: Cross-match LSST coadd data from multiple data releases with ancillary datasets, potentially incorporating single-alert matches via broker streams. Publish all cross-match results as User Generated Data Products (UGDPs) for broad community use, including applications in Solar System science, cosmology, transients, and more.

3.1.4 Multi-aspect

M-201: Create exploratory plots and diagrams in the Portal to identify trends or interesting subsets, then use the Notebook Aspect for computationally intensive analyses and catalog queries.

3.2 Independent Data Access Centers (IDACs) and other computational facilities

I-201 Use GPU resources available at IDACs to train machine-learning algorithms (e.g., for galaxy classification) using PSF model parameters derived from LSST coadd PSF images.

I-202: Use high-performance computing resources and co-located datasets from external projects at IDACs to run object-finding algorithms (e.g., to identify galaxy clusters) independently developed by a science collaboration (e.g., algorithms developed by LSST DESC at NERSC).

I-301 Leverage direct access to coadd and shear catalogs at NERSC or other supercomputing facilities to perform high I/O workflows, such as iterative analyses across large datasets. Use parallelized HPC pipelines to compute two-point correlation functions, analyze tomographic data, calibrate photo-z measurements, and calculate covariances. For example, this functionality can support weak lensing and galaxy clustering studies to estimate cosmological parameters and constrain cosmological models.

3.3 Alert Brokers

B-101: Use alert brokers to filter and prioritize LSST alerts in real-time based on user-defined criteria, such as brightness, location, or changes in brightness.

B-102: Set up watchlists within an alert broker to track objects of interest, receiving real-time notifications when they are detected in LSST data.

B-201: Cross-match real-time alerts with external catalogs to distinguish new discoveries from known objects. Use the results to refine classifications or notify researchers of objects requiring follow-up.

B-202: Classify transient objects using photometric light curves, applying machine-learning algorithms or predefined classification schemes.

4 Support Use Cases

4.1 S-000: Template

Issue origin and description

A brief description of the support use-case.

Success scenario(s)

For this use-case, what would be considered a successful resolution.

Success workflow

The series of steps, and who takes them, to resolve the issue, in sequential order.

Alternative success scenario

If another acceptable outcome could be considered a success, even if it is not the main use case.

Failure scenario(s)

The unacceptable outcome that would be a failure to support the user or resolve the issue.

Risks

The risks to community science.

Related information (optional)

Priority: *The relative priority of this support use case.*
Timeframe: *The targeted timescale from trigger to success.*
Frequency: *The anticipated frequency of occurrence.*

Preconditions for success

List the components of user support that had to exist for success.

4.2 S-001: Generic community self-help using CST resources

Issue origin and description
User posts a request for help in the Forum's Support category.

Success scenario(s)
The community helps the user with no intervention from Rubin staff.

Success workflow
Step 1. A user makes a post in the Forum detailing their issue.
Step 2. Community members reply with suggestions.
Step 3. The user solves their issue and marks their post solved.

Alternative success scenario
The community cannot solve the issue and the SP-CST addresses it instead.

Failure scenario(s)
The reported issue remains unresolved.

Risks
If the community cannot solve the issue, this creates more work for the CST.
If the CST misses or cannot solve the issue, use of the Forum will decrease.
If users are unable to get support for science, LSST will be less impactful.

Related information (optional)
Priority: High
Timeframe: Days
Frequency: High

Preconditions for success

The Rubin Community Forum had to exist.

Users must be comfortable posting their questions to the Forum.

The community must be actively engaged in helping answer questions.

4.3 S-002: Generic CST-provided help

Issue origin and description

User posts a request for help with a simple camera issue in the Forum's Support category.

Success scenario(s)

A CST member posts a solution within a couple of days.

Success workflow

Step 1. A user makes a post in the Forum detailing their issue.
Step 2. A CST member responds within 24 hours to affirm the issue is being addressed.
Step 3. The CST member reaches out in the staff Slack space to camera team members.
Step 4. The CST member compiles responses from the camera team and posts a response.
Step 5. The user confirms their question is answered and marks the solution.

Alternative success scenario

A community member solves the issue before a Rubin staff member.
The CST member finds the answer in camera team documentation and posts it.

Failure scenario(s)

The reported issue remains unresolved.

Risks

If the CST misses or cannot solve the issue, use of the Forum will decrease.
If users are unable to get support for science, LSST will be less impactful.

Related information (optional)

Priority: High
Timeframe: Days
Frequency: High

Preconditions for success

The Rubin Community Forum had to exist.

The Forum has to be used by community members.

The CST member had to liaise internally with camera team members (or relevant documentation had to exist).

4.4 S-003: A Camera Fault Requires Modification of the Alert Production Pipeline

Issue origin and description

A fault in one of the Raft Electronics Boards (in a sensor) causes an abnormally high number of DIASource detections for that sensor. Most of these detections are flagged as artifacts by the real/bogus algorithm and do not become Alerts, but some are not flagged and are released.

Success scenario(s)

The sensor anomaly is resolved by modifying the Alert Production (AP) pipeline, ensuring that bogus DIASources are no longer released as Alerts.

Success workflow

Step 1. Rubin Observatory Operations team monitors verification and validation outputs during the night.
Step 2. Night staff notice an anomalous spike in the number of DIASources detected.
Step 3. Night staff run diagnostics to isolate the excess DIASources to a single sensor, identify the underlying fault, and determine that the hardware cannot be quickly or easily fixed (i.e., the sensor will need to be replaced).
Step 4. Night staff summarize their findings for the SP-VV Lead Scientist.
Step 5. The SP-VV team runs further diagnostics and coordinates with Data Production (DP) to plan a fix.
Step 6. DP implements the fix (e.g., retraining the real/bogus characterization).
Step 7. SP-VV and DP coordinate with the CST to summarize the issue, the fix, and potential science impacts for the community.

Alternative success scenarios

The sensor anomaly is fixed with hardware such that a software fix might not be necessary. If a significant number of the anomalous DIASources were released as Alerts, the SP-VV team coordinates with the CST to prepare a public statement describing the fault and its impact on the Alert stream. This statement is posted to the Community Forum and sent to a community brokers email list.

Failure scenario(s)
Bogus DIASources from the faulty sensor continue to be released as Alerts, undermining the reliability of the alert stream.

Risks
If the fault is not addressed, the continued release of bogus DIASources may erode trust in the alert system.
Additional workload for the CST and DP teams to mitigate the downstream effects of the faulty alerts.
Science users may waste time and resources investigating bogus alerts.

Related information (optional)
Priority: High
Timeframe: Identify the scope of the issue within one day; apply a fix to the AP within a week.
Frequency: Low

Preconditions for success
The Rubin Observatory is in operations.
Verification and validation outputs are actively monitored by the Operations team.
Communication channels (e.g., Slack, Community Forum) are established between SP-VV, CST, and DP teams.

4.5 S-004: Large Queries - Community Self-Help Using CST Resources

Issue origin and description

A user posts a request for help on the Rubin Community forum regarding issues in executing large queries on a Rubin data product.

Success scenario(s)

The user receives assistance and gains a clear path toward solving their issue, including understanding their resource needs or improving their query execution.

Success workflow

Step 1. A user makes a post on the Rubin Community forum detailing their issue (e.g., problems with querying the Object catalog from the latest data release, and their Jupyter Notebook will not run).
Step 2. Other users and an SP-CST member respond to the post with advice about improving the query or addressing their problem.
Step 3. Through the discussion thread, it is identified that the user requires additional computational resources to execute their query.
Step 4. The user applies to the Resource Allocation Committee for access to additional processing resources, enabling them to successfully execute their query.

Alternative success scenario

Step 4 Alteration: The SP-CST adds this particular query issue to documentation or tutorials on handling large queries to avoid similar issues in the future.
Step 4 Alteration: The SP-CST advises the user on alternate resources (e.g., IDACs or LINCC services) that are particularly well adapted to handling the user's specific query.

Failure scenario(s)

The user is unable to solve their issue, either due to the lack of adequate support or inability to secure the necessary resources.

Risks

Users may lose confidence in the Rubin Science Platform if they are unable to resolve their queries effectively.
Increased workload for the CST if such issues become frequent without proper documentation or guidance.

Without additional resource allocation in certain cases, users may not be able to complete large queries, impacting their scientific productivity.

Related information (optional)
Priority: Low
Performance Target: A few days at most
Frequency: Likely frequent

Preconditions for success
Users have access to the Rubin Science Platform Notebook Aspect.
Training tutorials for query execution in the Notebook Aspect are available and accessible to users.
The Rubin Community forum is actively monitored by the SP-CST and other community members.
A functional Resource Allocation Committee exists for handling additional resource requests.

4.6 S-005: Science Platform Issue - A Help Desk Submission

Issue origin and description

A user submits a Help Desk ticket regarding an issue they encountered in the Rubin Science Platform (RSP). The CST is responsible for determining whether the issue is a user error or an actual bug and taking appropriate steps to resolve it.

Success scenario(s)

The ticket is resolved by either: (1) solving a user issue that is not actually a bug, or (2) identifying the bug and providing detailed information to the RSP development team. While the ultimate goal is fixing the bug, providing a short-term workaround for the user is a critical success factor for the CST.

Success workflow

Step 1. CST confirms that the reported bug is reproducible.
Step 2. CST communicates the details of the bug to the RSP development team.
Step 3. CST provides a short-term workaround to the user, if possible.
Step 4. RSP developers investigate and fix the bug.
Step 5. A new version of the RSP, incorporating the fix, is rolled out.

Alternative success scenario

The CST determines that the issue is not a bug but rather a misunderstanding or error by the user. In this case, the CST provides clarification or instructions to help the user resolve their issue.

Failure scenario(s)

The bug cannot be reproduced, and no workaround is available.
The issue persists without a resolution, potentially affecting the robustness of the RSP.

Risks

Users may lose confidence in the RSP if bugs are not addressed promptly or if no workarounds are provided.
The lack of timely fixes may lead to broader disruptions in the community's ability to use the platform effectively.

Recurrent or unresolved bugs may increase the CST and RSP development teams' workload.

Related information (optional)
Priority: Most cases are likely to be low priority.
Performance Target: Resolution within days to weeks, depending on the issue complexity.
Frequency: Infrequent

Preconditions for success
The RSP is operational and actively used by the community.
A functional ticketing system is in place to track and manage Help Desk submissions.
Communication channels between the CST and RSP development teams (e.g., JIRA, Slack) are active and effective.

4.7 S-006: Survey Strategy Alteration for Photometric Redshifts

Issue origin and description

The DESC photo-z and weak lensing working groups determine that their projected photometric redshift (photo-z) statistics fall short of the LSST Science Requirements Document (SRD) year 10 target values for photo-z quality. The DESC spokesperson communicates this issue formally to the SP-CST lead via email.

Success scenario(s)

A year's worth of new data improves the photo-z statistics as expected, enabling the DESC photo-z and weak lensing working groups to project that 10-year survey data will meet the SRD requirements.

Success workflow

Step 1. The DESC determines that there is an issue with the photo-zs and communicates it to the SP-CST.
Step 2. SP-CST creates an issue ticket and assigns it to the Community Scientist with expertise in cosmology, adding relevant watchers from the SP Survey Scheduling Team (SP-SST), Data Production Algorithms and Pipeline Team (DP-AP), and Observatory Operations Observatory Science Team (OO-OS).
Step 3. A meeting is organized with DESC scientists, SP-CST, SP-SST, DP-AP, OO-OS representatives, and members of the Survey Cadence Optimization Committee (SCOC) to decide on the next steps. It is decided to perform simulations of a cadence that increases cumulative exposure times in the u and y bands.
Step 4. The SP-SST publishes a Community post describing the issue and the planned actions and responds to the DESC spokesperson.
Step 5. The SP-SST generates OpSim results with standard metrics.
Step 6. The DESC and other science collaborations evaluate the simulations to determine the impact on weak lensing and photo-z issues, as well as on other science cases, and submit reports back to the SCOC.
Step 7. The SCOC meets (approximately 6 months later) and decides to recommend a u-band focus for year 9 to the Directorate. A written summary of their discussion is provided to the SP-CST.
Step 8. The SCOC written summary is made publicly available by the SP-CST.
Step 9. The issue ticket is closed.

Alternative success scenario

The simulations and discussions result in a different cadence modification being proposed, which still leads to the photo-z statistics improving to meet SRD requirements.

Failure scenario(s)

The photo-z statistics remain insufficient, and the SRD photo-z requirements are not met. The photo-z statistics become the leading systematic limiting weak lensing cosmology results, restricting the precision of cosmological parameters.

Risks

Delays in addressing the issue could result in further data collection that does not contribute to improving photo-z statistics.
Ineffective cadence modifications could negatively impact other science goals.
Persistent photo-z issues could erode the community's confidence in Rubin's ability to meet its science requirements.

Related information (optional)

Priority: High priority but not particularly urgent.
Performance Target: The issue should be resolved within one year of ticket creation.
Frequency: Issues affecting wide-field cadence are likely to arise every couple of years.

Preconditions for success

The Rubin Observatory is in full operations.
DESC has received sufficient data (e.g., year 3 data) to analyze and provide feedback.
The SP-SST, DP-AP, and SCOC are prepared to respond to cadence-related feedback from science collaborations.

4.8 S-007: A Science-Driven Modification to a Data Product

Issue origin and description

A manuscript is published in the literature that highlights an issue with Rubin Observatory Data Release products. This paper is brought to the attention of a CST member, who passes it along to the Community Scientist and Science Collaboration with the relevant expertise.

Success scenario(s)

The Data Release Production (DRP) team implements and tests an algorithmic change that resolves the issue, improving detection efficiency or data quality without adversely affecting other scientific data products.

Success workflow

Step 1. A manuscript is published in the literature highlighting a systematic offset in the detection efficiency of nuclear transients in different types of host galaxies.
Step 2. The issue is brought to the attention of a CST member, who creates an Issue Ticket assigned to the Community Scientist(s) and Science Collaboration(s) with the relevant expertise (e.g., time-domain science and the TVS SC).
Step 3. The Community Scientist and other relevant parties investigate the issue and identify a possible cause in the DM pipelines.
Step 4. The ticket is discussed with DM developers, who identify potential improvements to mitigate the issue and consider the side effects of implementing those changes.
Step 5. DM developers implement the code changes on a ticket branch, and the relevant CST and/or TVS-SC members verify that the new algorithm reduces or removes the systematic offsets while not adversely affecting other pipeline outputs.
Step 6. The changes are merged into the Science Pipelines, and a metric is defined to monitor the issue in future pipeline and DRP releases.
Step 7. The CST member documents the mitigation process and demonstrates its outcome in a public-facing document (e.g., a DM Tech Note or similar), and the issue is closed.

Alternative success scenario

Altered Step 5.1: Relevant CST and/or TVS-SC members test the new algorithm to assess whether it improves the formerly low detection efficiencies in certain types of host galaxies. During this verification, it is discovered that the changes that were made (e.g., lowering detection thresholds near resolved galaxies) adversely affected other scientific data products.
Altered Step 5.2: It is decided that it is not acceptable to sacrifice the data quality of other

pipeline products to solve this issue with galactic transients. As an alternative, a method is devised that does not require new or altered measurements, but instead uses existing measurements such as offset from the nearest galaxy, color, morphology, etc. to derive a classification scheme that more accurately captures the subtlety of identifying transients in galaxy nuclei.

Failure scenario(s)

A solution is not identified, or it is determined that implementing a solution would compromise other aspects of data quality.

The systematic offset in nuclear transient occurrence rates with galaxy host types remains unresolved.

Risks

Persistent issues with specific scientific use cases may reduce community confidence in Rubin Observatory data products.

Alterations to the pipelines could unintentionally degrade other data products if not properly tested.

A lack of sufficient monitoring metrics could result in the issue re-emerging in future data releases.

Related information (optional)

Priority: Not urgent, but it is important to address emergent scientific issues. The level of effort required depends on the frequency of such issues.

Performance Target: 1-3 months.

Frequency: 4-8 times per year (likely clustered after data releases).

Preconditions for success

A Data Release has been made, and sufficient time has passed for scientists to conduct research and publish findings.

The CST, DRP team, and relevant science collaborations are ready to address emergent issues.

Communication channels (e.g., email, Slack) are established for efficient coordination.

4.9 S-008: Correcting Misconceptions Regarding Functionality

Issue origin and description

A team of CST members leads an RSP/Rubin data training workshop, and becomes aware of a common misconception or misuse regarding RSP functionality via interaction with the attendees.

Success scenario(s)

The relevant documentation and tutorials are updated and this issue is not encountered in the future.

Success workflow)

Step 1. A CST member opens an Issue Ticket and describes the scenario, including contact information for attendees.
Step 2. Work proceeds by CST members to generate more appropriate documentation and tutorials that demonstrate how to use the relevant functionality.
Step 3. The new materials are released and are circulated back to the original attendees.

Alternative success scenario

Alternative step 2: For the cases where the opportunity to update the functionality itself, to make its use more intutitive, is possible, CST members will propose this to Rubin developers and then also update relevant documentation and tutorials.

Failure scenario(s)

Users perpetuate the misconception or misues of the RSP functionality.

Risks

Persistent issues will reduce efficient RSP use.

Preconditions for success

CST members must be in attendance at relevant workshops.
The CST understands RSP functionality well enough to spot misuse.

A References

[DMTN-086], Slater, C., 2018, *Next-to-the-Database Processing Use Cases*, Data Management Technical Note DMTN-086, Vera C. Rubin Observatory, URL `https://dmtn-086.lsst.io/`

[RTN-004], Team, T.C.E., the Operations Executive Team, 2022, *Guidelines for Community Participation in Data Preview 0*, Technical Note RTN-004, Vera C. Rubin Observatory, URL `https://rtn-004.lsst.io/`

B Acronyms

Acronym	Description
ADQL	Astronomical Data Query Language (IVOA standard)
AGN	Active Galactic Nuclei
AP	Alert Production
API	Application Programming Interface
B	Byte (8 bit)
CST	Community Science Team
DESC	Dark Energy Science Collaboration
DM	Data Management
DP	Data Production
DRP	Data Release Production
GPU	Graphics Processing Unit
GUI	Graphical User Interface
HPC	High Performance Computing
LINCC	LSST Interdisciplinary Network for Collaboration and Computing
LSST	Legacy Survey of Space and Time (formerly Large Synoptic Survey Telescope)
NERSC	National Energy Research Scientific Computing Center
OS	Operating System
OpSim	Operations Simulation
PSF	Point Spread Function
RSP	Rubin Science Platform
RTN	Rubin Technical Note
SC	Science Collaboration

SCOC	Survey Cadence Optimization Committee
SP	System Performance
SRD	LSST Science Requirements; LPM-17
SST	Subsystem Science Team
TAP	Table Access Protocol (IVOA standard)
TVS	Transients and Variable Stars Science Collaboration
photo-z	photometric redshift