LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST)

LSST Data Management Acceptance Test Specification

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LDM-639

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Abstract

This document describes the detailed acceptance test specification for the LSST Data Management System.

Change Record

Version	Date	Description	Owner name
	2018-06-18	Initial docgen from Jira. Updated author list, added sections 1 and 2	DocGen: G. Comoretto, Finalize: L. Guy
	2018-06-22	Improve test case specifications	DocGen: G. Comoretto, Finalize: L. Guy
	2018-07-13	Review test cases	W.M. Wood-Vasey
	2018-07-16	Update the Introduction and Approach sections.	L. Guy

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Contents

LSST Data Management Acceptance Test Specification

1 Introduction

This document is intended to specify the acceptance test procedures for the LSST Data Management System. It is a work in progress; the current version provides Test Cases covering $\sim 35\%$ of the requirements. It does not yet provide full Test Plans for comprehensive testing nor identify the fraction of each requirement covered by the existing Test Cases.

This document will be updated as work continues on completing Test Cases, Test Plans, and requirements coverage.

1.1 Objectives

This document describes the test cases required to validate the Data Management System requirements described in the LSST DM Subsystem Requirements document LSE-61. It identifies test cases and procedures for the tests as well as the pass/fail criteria for each test.

A full description of the LSST Data Management System is provided in the Data Management System Design document, LDM-148 with the science requirements detailed in the LSST Science Requirements Document LPM-17.

1.2 Scope

This document provides the acceptance test plan for the whole Data Management System (DMS), as described by the Data Management System Requirements in LSE-61.

1.3 Applicable Documents

LPM-17	LSST Science Requirements Document
LDM-148	LSST Data Management System Design
LDM-294	LSST DM Organization & Management
LDM-503	LSST DM Test Plan
LSE-61	LSST DM Subsystem Requirements
LSE-163	LSST Data Products Definition Document
LDM-151	LSST DM Science Pipelines Design
LSE-180	Level 2 Photometric Calibration for the LSST Survey
LSE-30	LSST Observatory System Specifications

1.4 References

[1] **[LSE-30]**, Claver, C.F., The LSST Systems Engineering Integrated Project Team, 2018, *Observatory System Specifications (OSS)*, LSE-30, URL https://ls.st/LSE-30

[2] **[LSE-61]**, Dubois-Felsmann, G., Jenness, T., 2018, *LSST Data Management Subsystem Requirements*, LSE-61, URL https://ls.st/LSE-61

[3] **[LPM-17]**, Ivezić, Ž., The LSST Science Collaboration, 2018, *LSST Science Requirements Document*, LPM-17, URL https://ls.st/LPM-17

[4] **[LSE-180]**, Jones, L., 2013, *Level 2 Photometric Calibration for the LSST Survey*, LSE-180, URL https://ls.st/LSE-180

[5] **[LSE-163]**, Jurić, M., et al., 2017, *LSST Data Products Definition Document*, LSE-163, URL https://ls.st/LSE-163

[6] **[LDM-148]**, Lim, K.T., Bosch, J., Dubois-Felsmann, G., et al., 2018, *Data Management System Design*, LDM-148, URL https://ls.st/LDM-148

[7] **[LDM-294]**, O'Mullane, W., Swinbank, J., Jurić, M., DMLT, 2018, *Data Management Organization and Management*, LDM-294, URL https://ls.st/LDM-294

[8] **[LDM-503]**, O'Mullane, W., Swinbank, J., Jurić, M., Economou, F., 2018, *Data Management Test Plan*, LDM-503, URL https://ls.st/LDM-503

[9] **[LDM-151]**, Swinbank, J.D., et al., 2017, *Data Management Science Pipelines Design*, LDM-151, URL https://ls.st/LDM-151

2 Approach

This document describes the acceptance tests for the integrated Data Management System, with a focus on whether the data products and functionality provided satisfy the requirements described in LSE-61.

The requirements from LSE-61 are extracted into the Jira "LSST Verification and Validation" Project, managed through the Jira Test Management Plugin system. Each LSE-61 requirement leads to a "LSST Verification and Validation" (LVV) Element. Each LVV Element comprises one or more more Test Cases. Each Test Case describes a Test Script to be executed, the coverage, pre-conditions, configuration, test results, and other details as specified by LDM-503. Test Scripts may have common set up and analysis steps. The Jira system allows for these steps to be shared by other Test Scripts. This improves clarity and consistency across all Test Cases.

In this document, each Test Case is listed here with the LVV Element it tests, a summary of the Test Items exercised by the Test Case, and the detailed steps to be executed by the Test Case. Shared steps between Test Scripts have been explicitly written out to appear fully in each Test Case.

2.1 Features to be tested

All top-level requirements for the LSST Data Management System described in LSE-61 are to be tested, including

- Data Products
- Alert, Calibration and Data Release Production
- LSST science pipeline software and middleware
- LSST facilities including the data archive, base, summit, and the communications between them to accept science and engineering data

2.2 Features not to be tested

This document does not describe facilities for periodically generating or collecting key performance metrics (KPMs), except insofar as those KPMs are incidentally measured as part of executing the documented test cases.

2.3 Pass/fail criteria

The results of all tests will be assessed using the criteria described in LDM-503 §4.

Note that when executing pipelines, tasks, or individual algorithms, any unexplained or unexpected errors or warnings appearing in the associated log or on screen output must be described in the documentation for the system under test. Any warning or error for which this is not the case must be filed as a software problem report and filed with the DMCCB.

2.4 Suspension criteria and resumption requirements

Refer to individual test cases where applicable.

2.5 Naming convention

LVV : Is the label for the "LSST Verification and Validation" project in Jira.

LVV-XXX : Are Verification Elements, where XXX is the Verification Element identifier. Each Verification Element has at least one Test Case.

LVV-TYYY : Are Test Cases. Each Test Case is associated with a Verification Element, where YYY is the Test Case identifier.

The Verification Elements are drawn from LSE-61 requirements which have names of the form DMS-REQ-ZZZZ.

3 Test Cases Summary

Jira Id	Test Name
LVV-T120	Verify implementation of Software framework for Level 3 catalog processing
LVV-T121	Verify implementation of Software framework for Level 3 image processing
LVV-T123	Verify implementation of Access Controls of Level 3 Data Products
LVV-T125	Verify implementation of Simulated Data
LVV-T126	Verify implementation Image Differencing
LVV-T127	Verify implementation of Provide Source Detection Software
LVV-T128	Verify implementation Provide Astrometric Model
LVV-T129	Verify implementation of Provide Calibrated Photometry
LVV-T130	Verify implementation of Enable a Range of Shape Measurement Approaches
LVV-T132	Verify implementation of Pre-cursor, and Real Data
LVV-T133	Verify implementation of Provide Beam Projector Coordinate Calculation Software
LVV-T134	Verify implementation of Provide Image Access Services
LVV-T135	Verify implementation of Provide Data Access Services
LVV-T136	Verify implementation of Data Product and Raw Data Access
LVV-T137	Verify implementation of Data Product Ingest
LVV-T143	Verify implementation of Provide Pipeline Construction Services
LVV-T144	Verify implementation of Task Specification
LVV-T148	Verify implementation of Unique Processing Coverage
LVV-T149	Verify implementation of Catalog Queries
LVV-T150	Verify implementation of Maintain Archive Publicly Accessible
LVV-T151	Verify implementation of Catalog Export Formats
LVV-T152	Verify implementation of Keep Historical Alert Archive
LVV-T154	Verify implementation of Raw Data Archiving Reliability
LVV-T155	Verify implementation of Un-Archived Data Product Cache
LVV-T157	Verify implementation Level 1 Data Product Access
LVV-T158	Verify implementation Level 1 and 2 Catalog Access
LVV-T159	Verify implementation of Regenerating Data Products from Previous Data Releases
LVV-T160	Verify implementation of Providing a Precovery Service

Jira Id	Test Name
LVV-T161	Verify implementation of Logging of catalog queries
LVV-T163	Verify implementation of Data Access Services
LVV-T164	Verify implementation of Operations Subsets
LVV-T165	Verify implementation of Subsets Support
LVV-T168	Verify design of Data Access Services allows Evolution of the LSST Data Model
LVV-T169	Verify implementation of Older Release Behavior
LVV-T170	Verify implementation of Query Availability
LVV-T171	Verify implementation of Pipeline Availability
LVV-T172	Verify implementation of Optimization of Cost, Reliability and Availability
LVV-T173	Verify implementation of Pipeline Throughput
LVV-T174	Verify implementation of Re-processing Capacity
LVV-T180	Verify implementation of Data Management Unscheduled Downtime
LVV-T181	Verify implementation of Summit Facility Data Communications
LVV-T182	Verify implementation of Prefer Computing and Storage Down
LVV-T183	Verify implementation of DMS Communication with OCS
LVV-T184	Verify implementation of Summit to Base Network
LVV-T185	Verify implementation of Summit to Base Network Availability
LVV-T186	Verify implementation of Summit to Base Network Reliability
LVV-T187	Verify implementation of Summit to Base Network Secondary Link
LVV-T188	Verify implementation of Summit to Base Network Ownership and Operation
LVV-T189	Verify implementation of Base Facility Infrastructure
LVV-T190	Verify implementation of Base Facility Co-Location with Existing Facility
LVV-T191	Verify implementation of Commissioning Cluster
LVV-T192	Verify implementation of Base Wireless LAN (WiFi)
LVV-T193	Verify implementation of Base to Archive Network
LVV-T194	Verify implementation of Base to Archive Network Availability
LVV-T195	Verify implementation of Base to Archive Network Reliability
LVV-T196	Verify implementation of Base to Archive Network Secondary Link
LVV-T197	Verify implementation of Archive Center
LVV-T198	Verify implementation of Archive Center Disaster Recovery
LVV-T199	Verify implementation of Archive Center Co-Location with Existing Facility
LVV-T200	Verify implementation of Archive to Data Access Center Network

Jira Id	Test Name
LVV-T201	Verify implementation of Archive to Data Access Center Network Availability
LVV-T202	Verify implementation of Archive to Data Access Center Network Reliability
LVV-T204	Verify implementation of Access to catalogs for external Level 3 processing
LVV-T205	Verify implementation of Access to input catalogs for DAC-based Level 3 processing
LVV-T207	Verify implementation of Access to images for external Level 3 processing
LVV-T208	Verify implementation of Access to input images for DAC-based Level 3 processing
LVV-T212	Verify implementation of No Limit on Data Access Centers

4 Test Cases

4.1 LVV-T120 - Verify implementation of Software framework for Level 3 catalog processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.1.1 Test Items

Verify that user-driven Level 3 processing can be consistently applied to all records in a catalog.

4.1.2 Requirements

- LVV-53 - DMS-REQ-0125-V-01: Software framework for Level 3 catalog processing

4.1.3 Test Script

Step 1
Execute representative processing on DR in PDAC, observe recognition of and recovery from failures

4.2 LVV-T121 - Verify implementation of Software framework for Level 3 image processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.2.1 Test Items

Verify that user-specified Level 3 processing can be applied to the desired set of images.

4.2.2 Requirements

- LVV-56 - DMS-REQ-0128-V-01: Software framework for Level 3 image processing

4.2.3 Test Script

Step 1
Execute representative processing on DR in PDAC, observe recognition of and recovery from failures

4.3 LVV-T123 - Verify implementation of Access Controls of Level 3 Data Products

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.3.1 Test Items

This test touches upon the interface between the following areas: IT Security, Identity Management, LSP Portal, and Parallel Distributed Database. The purpose is to show that access to user generated data products (previously Level 3) can have a variety of access restrictions varying from single-user, a list, a named group, or open access.

4.3.2 Requirements

- LVV-171 - DMS-REQ-0340-V-01: Access Controls of Level 3 Data Products

4.3.3 Precondition

4.3.4 Test Script

Step 1
Configure representative access controls in PDAC, observe proper restrictions

4.4 LVV-T125 - Verify implementation of Simulated Data

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.4.1 Test Items

Verify that the DMS can inject simulated data into data products for testing.

4.4.2 Requirements

- LVV-6 - DMS-REQ-0009-V-01: Simulated Data

4.4.3 Test Script

Step 1
Delegate to AP and DRP

4.5 LVV-T126 - Verify implementation Image Differencing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Eric Bellm

4.5.1 Test Items

Verify that the DMS can performance image differencing from single exposures and coadds.

4.5.2 Requirements

- LVV-14 - DMS-REQ-0032-V-01: Image Differencing

4.5.3 Test Script

Step 1
Delegate to AP and DRP

4.6 LVV-T127 - Verify implementation of Provide Source Detection Software

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.6.1 Test Items

Alert Production, Data Release Production, Science Algorithms

4.6.2 Requirements

- LVV-15 - DMS-REQ-0033-V-01: Provide Source Detection Software

4.6.3 Test Script

Step 1
Delegate to AP and DRP

4.7 LVV-T128 - Verify implementation Provide Astrometric Model

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.7.1 Test Items

Verify that an astrometric model is available for Objects and DIAObjects.

4.7.2 Requirements

- LVV-17 - DMS-REQ-0042-V-01: Provide Astrometric Model

4.7.3 Test Script

Step 1
Delegate to AP and DRP

4.8 LVV-T129 - Verify implementation of Provide Calibrated Photometry

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.8.1 Test Items

Verify that the DMS provides photometry calibrated in AB for all measured objects and sources.

4.8.2 Requirements

- LVV-18 - DMS-REQ-0043-V-01: Provide Calibrated Photometry

4.8.3 Test Script

Step 1
Delegate to AP and DRP

4.9 LVV-T130 - Verify implementation of Enable a Range of Shape Measurement Approaches

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.9.1 Test Items

Verify that multiple shape measurement algorithms can be used.

4.9.2 Requirements

- LVV-21 - DMS-REQ-0052-V-01: Enable a Range of Shape Measurement Approaches

4.9.3 Test Script

Step 1
Delegate to AP and DRP

4.10 LVV-T132 - Verify implementation of Pre-cursor, and Real Data

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.10.1 Test Items

Demonstrate that pixel-oriented data from astronomical imaging cameras (precursor or otherwise) can be processed using LSST Science Algorithms and organized for access through the Data Butler Access Client.

4.10.2 Requirements

- LVV-127 - DMS-REQ-0296-V-01: Pre-cursor, and Real Data

4.10.3 Test Script

Step 1
Execute AP and DRP on non-LSST data

4.11 LVV-T133 - Verify implementation of Provide Beam Projector Coordinate Calculation Software

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.11.1 Test Items

Science Primitives

4.11.2 Requirements

- LVV-182 - DMS-REQ-0351-V-01: Provide Beam Projector Coordinate Calculation Software

4.11.3 Test Script

Step 1
Delegate to CPP

4.12 LVV-T134 - Verify implementation of Provide Image Access Services

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Gregory Dubois-Felsmann

4.12.1 Test Items

Verify that images can be identified and that images and image cut-outs can be retrieved using the network interfaces - primarily IVOA standards-based - and Python APIs provided for image access by science users.

4.12.2 Requirements

- LVV-27 - DMS-REQ-0065-V-01: Provide Image Access Services

4.12.3 Precondition

Testing requires the establishment of running services such as SIAv2 and SODA to which the tests can be applied.

4.12.4 Test Script

Step 1
Delegate to LSP

4.13 LVV-T135 - Verify implementation of Provide Data Access Services

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.13.1 Test Items

This is a composite requirement in the SysML model.

4.13.2 Requirements

- LVV-60 - DMS-REQ-0155-V-01: Provide Data Access Services

4.13.3 Test Script

Step 1
Delegate to LSP

4.14 LVV-T136 - Verify implementation of Data Product and Raw Data Access

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.14.1 Test Items

Verify that available data products can be listed and retrieved.

4.14.2 Requirements

- LVV-129 - DMS-REQ-0298-V-01: Data Product and Raw Data Access

4.14.3 Test Script

Step 1
Delegate to LSP

4.15 LVV-T137 - Verify implementation of Data Product Ingest

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.15.1 Test Items

Verify that data products can be ingested.

4.15.2 Requirements

- LVV-130 - DMS-REQ-0299-V-01: Data Product Ingest

4.15.3 Test Script

Step 1
Delegate to DBB

4.16 LVV-T143 - Verify implementation of Provide Pipeline Construction Services

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.16.1 Test Items

This is a composite requirement in the SysML model

4.16.2 Requirements

- LVV-62 - DMS-REQ-0158-V-01: Provide Pipeline Construction Services

4.16.3 Test Script

Step 1
Delegate to Middleware

4.17 LVV-T144 - Verify implementation of Task Specification

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Kian-Tat Lim

4.17.1 Test Items

Verify that the DMS provides the ability to define a new or modified pipeline task without recompilation.

4.17.2 Requirements

- LVV-136 - DMS-REQ-0305-V-01: Task Specification

4.17.3 Test Script

Step 1
Inspect software architecture. Verify that there exists Tasks that can be run and configured without re-complication.

Step 2
Verify that an example science algorithm can be run through one of these Tasks. Three examples from different areas: source measurement, image subtraction, and photometric-redshift estimation.

4.18 LVV-T148 - Verify implementation of Unique Processing Coverage

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.18.1 Test Items

Verify that a user-specified criterion can be used to process each record in a table exactly once.

4.18.2 Requirements

- LVV-138 - DMS-REQ-0307-V-01: Unique Processing Coverage

4.18.3 Test Script

Step 1
Execute representative processing, observe lack of duplicates or missing rows even in the presence of failures

4.19 LVV-T149 - Verify implementation of Catalog Queries

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.19.1 Test Items

Verify that SQL can be used to query catalogs.

4.19.2 Requirements

- LVV-33 - DMS-REQ-0075-V-01: Catalog Queries

4.19.3 Test Script

Step 1
Delegate to LSP

4.20 LVV-T150 - Verify implementation of Maintain Archive Publicly Accessible

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.20.1 Test Items

Verify that prior data releases remain accessible.

4.20.2 Requirements

- LVV-34 - DMS-REQ-0077-V-01: Maintain Archive Publicly Accessible

4.20.3 Test Script

Step 1
Observe access to prior DR on tape

4.21 LVV-T151 - Verify implementation of Catalog Export Formats

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.21.1 Test Items

Verify that catalog data is exportable in a variety of community-standard formats.

4.21.2 Requirements

- LVV-35 - DMS-REQ-0078-V-01: Catalog Export Formats

4.21.3 Test Script

Step 1
Delegate to LSP

4.22 LVV-T152 - Verify implementation of Keep Historical Alert Archive

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Eric Bellm

4.22.1 Test Items

Verify that the DMS preserves and makes accessible an Alert Archive for reference and for false alert analyses

4.22.2 Requirements

- LVV-37 - DMS-REQ-0094-V-01: Keep Historical Alert Archive

4.22.3 Test Script

Step 1
Simulated alert stream, load Alert DB, observe access to Alert DB

4.23 LVV-T154 - Verify implementation of Raw Data Archiving Reliability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.23.1 Test Items

Verify that raw images are reliably archived.

4.23.2 Requirements

- LVV-140 - DMS-REQ-0309-V-01: Raw Data Archiving Reliability

4.23.3 Test Script

Step 1
Analyze sources of loss or corruption after mitigation to compute estimated reliability

4.24 LVV-T155 - Verify implementation of Un-Archived Data Product Cache

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.24.1 Test Items

Demonstrate that the DMS provides low-latency storage for at least I1CacheLifetime (30 days) to keep prompt processing pre-covery images on hand.

4.24.2 Requirements

- LVV-141 - DMS-REQ-0310-V-01: Un-Archived Data Product Cache

4.24.3 Test Script

Step 1
Delegate to DBB

4.25 LVV-T157 - Verify implementation Level 1 Data Product Access

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.25.1 Test Items

Verify that Level 1 Data Products are accessible by science users.

4.25.2 Requirements

- LVV-143 - DMS-REQ-0312-V-01: Level 1 Data Product Access

4.25.3 Test Script

Step 1
Delegate to LSP

4.26 LVV-T158 - Verify implementation Level 1 and 2 Catalog Access

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.26.1 Test Items

Verify that Data Release Products are accessible by science users.

4.26.2 Requirements

- LVV-144 - DMS-REQ-0313-V-01: Level 1 & 2 Catalog Access

4.26.3 Test Script

Step 1
Delegate to LSP

4.27 LVV-T159 - Verify implementation of Regenerating Data Products from Previous Data Releases

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Simon Krughoff

4.27.1 Test Items

Show that un-archived data products from previous data releases can be generated using through the LSST Science Platform.

4.27.2 Requirements

- LVV-167 - DMS-REQ-0336-V-01: Regenerating Data Products from Previous Data Releases

4.27.3 Test Script

Step 1
Delegate to LSP

4.28 LVV-T160 - Verify implementation of Providing a Precovery Service

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Gregory Dubois-Felsmann

4.28.1 Test Items

Verify that a technical capability to perform user-directed precovery analyses on difference images exists and that it is exposed through the LSST Science Platform. Verified by testing against precursor datasets.
(Involves: LSP Portal, MOPS and Forced Photometry)

4.28.2 Requirements

- LVV-172 - DMS-REQ-0341-V-01: Providing a Precovery Service

4.28.3 Precondition

1. DECam HiTS data could be an appropriate set for this activity.
2. Precovery pipelines for follow-on to alert processing must exist and be made available as a containerized version within the Science Platform.
3. Determine limitations over which general precovery is supported. I would suggest that precovery services be limited to current (or last two) DRP campaigns with the possible addition of including non-DRP products to encompass observations over the preceding year (does this then require means to re-generate PVIs from Alert Production in addition to DRP?)
4. Could re-use elements of LVV-T80 where quasars are used to test faint object detection.

4.28.4 Test Script

Step 1
Run Precovery within follow-on Alert Production (i.e. daily post-processing on 30 day store).

Step 2

Within Science Platform, initiate request to perform precovery for a list of sources over same period (and longer). Include among the sources for precovery quasars from LVV-T80.

Step 3

Examine the results. Compare the results for the period where there is overlap with precovery run... and quasar photometry with those from LVV-T80 to verify user service performs as production services.

4.29 LVV-T161 - Verify implementation of Logging of catalog queries

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.29.1 Test Items

Demonstrate logging of queries of LSST databases. Logged queries are globally available to DB administrators but otherwise private excepting the user that made the query.

4.29.2 Requirements

- LVV-176 - DMS-REQ-0345-V-01: Logging of catalog queries

4.29.3 Test Script

Step 1

Delegate to LSP

4.30 LVV-T163 - Verify implementation of Data Access Services

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.30.1 Test Items

Demonstrate that Data Access Services are capable of scaling to serve data from nDRTot (11) data releases over a surveyYears (10) year survey.

4.30.2 Requirements

- LVV-190 - DMS-REQ-0364-V-01: Data Access Services

4.30.3 Test Script

Step 1
Delegate to LSP

4.31 LVV-T164 - Verify implementation of Operations Subsets

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.31.1 Test Items

Demonstrate that Data Access Services are designed such that subsets of a Data Release may be retained and served (made available) after a Data Release has been superseded. (Data Backbone, Managed Database, LSP Portal, LSP JupyterLab, LSP Web APIs, Parallel Distributed Database)

4.31.2 Requirements

- LVV-191 - DMS-REQ-0365-V-01: Operations Subsets

4.31.3 Test Script

Step 1
Delegate to LSP

4.32 LVV-T165 - Verify implementation of Subsets Support

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Lupton

4.32.1 Test Items

Verify that the DMS can provide designated subsets of previous Data Releases.

4.32.2 Requirements

- LVV-192 - DMS-REQ-0366-V-01: Subsets Support

4.32.3 Test Script

Step 1
Delegate to LSP

4.33 LVV-T168 - Verify design of Data Access Services allows Evolution of the LSST Data Model

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.33.1 Test Items

Verify that the design of the Data Access Services are able to accommodate changes/evolution of the LSST data model from one release to another.

4.33.2 Requirements

- LVV-195 - DMS-REQ-0369-V-01: Evolution

4.33.3 Test Script

Step 1
Delegate to LSP

4.34 LVV-T169 - Verify implementation of Older Release Behavior

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Gregory Dubois-Felsmann

4.34.1 Test Items

Verify that the components of the data access system are technically capable of handling data releases beyond the two for which full services are required. DMS-REQ-0364 requires that up to 11 be supported. Verified by inspection, i.e., by determination that the system design and implementation contain the necessary features to support this number of releases, and by direct test in a synthetic test environment with multiple releases.
(Involves: Data Backbone, Managed Database, LSP Portal, LSP JupyterLab, LSP Web APIs, Par-

allel Distributed Database)

4.34.2 Requirements

- LVV-196 - DMS-REQ-0370-V-01: Older Release Behavior

4.34.3 Test Script

Step 1
Delegate to LSP

4.35 LVV-T170 - Verify implementation of Query Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.35.1 Test Items

Verify that queries continue to be successfully executable over time.

4.35.2 Requirements

- LVV-197 - DMS-REQ-0371-V-01: Query Availability

4.35.3 Test Script

Step 1
Delegate to LSP

4.36 LVV-T171 - Verify implementation of Pipeline Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.36.1 Test Items

Demonstrate that Data Management System pipelines are available for use without disruptions of greater than productionMaxDowntime (24 hours). This requires a regimented change control process and testing infrastructure for all pipelines and their underlying software services, and regimented management and monitoring of compute and networking resources. The list of services covered by this test include: Image and EFD Archiving, Prompt Processing, OCS Driven Batch, Telemetry Gateway, Alert Distribution, Alert Filtering, Batch Production, Data Backbone, Compute/Storage/LAN, Inter-Site Networks, and Service Management and Monitoring.

4.36.2 Requirements

- LVV-5 - DMS-REQ-0008-V-01: Pipeline Availability

4.36.3 Test Script

Step 1
Analyze sources of downtime after mitigation to compute estimated reliability; observe unscheduled downtime of developer, integration, and pre-production systems

4.37 LVV-T172 - Verify implementation of Optimization of Cost, Reliability and Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.37.1 Test Items

In matters of cost, system reliability (functioning properly at a given time) has precedence over system availability (ability to use the system at a given time). The optimization may be outside the realm of direct testing as it is more of a system provisioning guideline but on its face it demands that the Data Management System include failure reporting, regimented change control, acceptance testing, maintenance and monitoring.

4.37.2 Requirements

- LVV-64 - DMS-REQ-0161-V-01: Optimization of Cost, Reliability and Availability in Order

4.37.3 Test Script

Step 1
Analyze resource management policy

4.38 LVV-T173 - Verify implementation of Pipeline Throughput

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.38.1 Test Items

Demonstrate that the Alert Production Pipeline is capable of processing nRawExpNightMax (2800) science exposures within a (24-nightDurationMax) 12 hour period and issue alerts in offline batch mode.

4.38.2 Requirements

- LVV-65 - DMS-REQ-0162-V-01: Pipeline Throughput

4.38.3 Test Script

Step 1
Execute single-day operations rehearsal, observe data products generated in time

4.39 LVV-T174 - Verify implementation of Re-processing Capacity

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.39.1 Test Items

Verify that the DMS has sufficient processing, storage, and network to reprocess all data within "drProcessingPeriod" (1 year) while maintaining full Prompt Processing capability.

4.39.2 Requirements

- LVV-66 - DMS-REQ-0163-V-01: Re-processing Capacity

4.39.3 Test Script

Step 1
Analyze sizing model; execute DRP, observe scaling

4.40 LVV-T180 - Verify implementation of Data Management Unscheduled Downtime

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.40.1 Test Items

This applies only to downtime that would prevent the collection of survey data. Verification means that analysis has occurred to identify likely hardware failures that would prevent survey operations and that mitigations that minimize the downtime to less than DMDowntime (1 day/year) are in place. Known systems that fall in this category include: Image and EFD Archiving, Observatory Operations Data, Telemetry Gateway, Data Backbone, Managed Database, Inter-Site Networks, and Service Management and Monitoring.

4.40.2 Requirements

- LVV-149 - DMS-REQ-0318-V-01: Data Management Unscheduled Downtime

4.40.3 Test Script

Step 1
Analyze likely hardware failures with mitigations to compute estimated unplanned downtime

4.41 LVV-T181 - Verify implementation of Summit Facility Data Communications

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.41.1 Test Items

Demonstrate data acquisition, archiving and transfer from summit to base, along with monitoring systems exist and perform adequately.

4.41.2 Requirements

- LVV-71 - DMS-REQ-0168-V-01: Summit Facility Data Communications

4.41.3 Test Script

Step 1
Delegate to Networks

4.42 LVV-T182 - Verify implementation of Prefer Computing and Storage Down

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.42.1 Test Items

Only build compute or storage facilities at the summit that are justified by operational need or to prevent loss of data during networking downtimes.

4.42.2 Requirements

- LVV-72 - DMS-REQ-0170-V-01: Prefer Computing and Storage Down

4.42.3 Test Script

Step 1
Analyze design

4.43 LVV-T183 - Verify implementation of DMS Communication with OCS

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Gregory Dubois-Felsmann

4.43.1 Test Items

Verify that the DMS at the Base Facility can receive commands from the OCS and send command responses, events, and telemetry back. Verified by Early Integration activities and during AuxTel commissioning.

4.43.2 Requirements

- LVV-146 - DMS-REQ-0315-V-01: DMS Communication with OCS

4.43.3 Test Script

Step 1
Delegate to IIP

4.44 LVV-T184 - Verify implementation of Summit to Base Network

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.44.1 Test Items

Monitor transfer time of crosstalk corrected images and all related metadata from summit to base and verify that time per exposure is less than summToBaseMaxTransferTime (2 seconds).

4.44.2 Requirements

- LVV-73 - DMS-REQ-0171-V-01: Summit to Base Network

4.44.3 Test Script

Step 1
Delegate to Networks

4.45 LVV-T185 - Verify implementation of Summit to Base Network Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.45.1 Test Items

Monitor summit to base networking and verify that the mean time between failures is less than summToBaseNetMTBF (90 days) over 1 year.

4.45.2 Requirements

- LVV-74 - DMS-REQ-0172-V-01: Summit to Base Network Availability

4.45.3 Test Script

Step 1
Delegate to Networks

4.46 LVV-T186 - Verify implementation of Summit to Base Network Reliability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.46.1 Test Items

Monitor Summit to Base networking and verify that the mean time to repair is less than summToBaseNetMTTR (24 hours) over a 1-year period.

4.46.2 Requirements

- LVV-75 - DMS-REQ-0173-V-01: Summit to Base Network Reliability

4.46.3 Test Script

Step 1
Delegate to Networks

4.47 LVV-T187 - Verify implementation of Summit to Base Network Secondary Link

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.47.1 Test Items

A secondary transfer method (redundant fiber network, microwave link, or transportable medium) between Summit and Base capable of transferring 1 night of raw data (nCalibExpDay + nRawExpNightMax = 450 + 2800 = 3250 exposures) within summToBaseNet2TransMax (72 hours).

4.47.2 Requirements

- LVV-76 - DMS-REQ-0174-V-01: Summit to Base Network Secondary Link

4.47.3 Test Script

Step 1
Delegate to Networks

4.48 LVV-T188 - Verify implementation of Summit to Base Network Ownership and Operation

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.48.1 Test Items

Verify that the Summit to Base communications link is owned and operated by LSST and/or the operations entity.

4.48.2 Requirements

- LVV-77 - DMS-REQ-0175-V-01: Summit to Base Network Ownership and Operation

4.48.3 Test Script

Step 1
Delegate to Networks

4.49 LVV-T189 - Verify implementation of Base Facility Infrastructure

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.49.1 Test Items

Verify that the (a) planned infrastructure and (b) as-built infrastructure for the Base Facility satisfies the needs for data transfer and buffering, a copy of the Archive Facility, and support for Commissioning.

4.49.2 Requirements

- LVV-78 - DMS-REQ-0176-V-01: Base Facility Infrastructure

4.49.3 Test Script

Step 1
Analyze design and sizing model

4.50 LVV-T190 - Verify implementation of Base Facility Co-Location with Existing Facility

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.50.1 Test Items

Verify that the Base Facility is located at an existing known supported facility.

4.50.2 Requirements

- LVV-80 - DMS-REQ-0178-V-01: Base Facility Co-Location with Existing Facility

4.50.3 Test Script

Step 1
Analyze design

4.51 LVV-T191 - Verify implementation of Commissioning Cluster

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.51.1 Test Items

Verify that the Commissioning Cluster has sufficient Compute/Storage/LAN at the Base Facility to support Commissioning.

4.51.2 Requirements

- LVV-147 - DMS-REQ-0316-V-01: Commissioning Cluster

4.51.3 Test Script

Step 1
Analyze design and budget

4.52 LVV-T192 - Verify implementation of Base Wireless LAN (WiFi)

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.52.1 Test Items

Verify (a) plannned and (b) as-built wireless network at the Base Facility supports minBaseWiFi bandwidth.

4.52.2 Requirements

- LVV-183 - DMS-REQ-0352-V-01: Base Wireless LAN (WiFi)

4.52.3 Test Script

Step 1
Delegate to Networks

4.53 LVV-T193 - Verify implementation of Base to Archive Network

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.53.1 Test Items

Verify that the Base Facility can transfer a full image+metadata to the Archive Center in baseToArchiveMaxTransferTime.

4.53.2 Requirements

- LVV-81 - DMS-REQ-0180-V-01: Base to Archive Network

4.53.3 Test Script

Step 1
Delegate to Networks

4.54 LVV-T194 - Verify implementation of Base to Archive Network Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.54.1 Test Items

Verify Network uptime between Base Facility and Archive Facility.

4.54.2 Requirements

- LVV-82 - DMS-REQ-0181-V-01: Base to Archive Network Availability

4.54.3 Test Script

Step 1
Delegate to Networks

4.55 LVV-T195 - Verify implementation of Base to Archive Network Reliability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.55.1 Test Items

Verify uptime of the Base Facility to Archive Facility network.

4.55.2 Requirements

- LVV-83 - DMS-REQ-0182-V-01: Base to Archive Network Reliability

4.55.3 Test Script

Step 1
Delegate to Networks

4.56 LVV-T196 - Verify implementation of Base to Archive Network Secondary Link

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.56.1 Test Items

Verify the performance of a secondary network link meets needs for operations support and catching up after outages.

4.56.2 Requirements

- LVV-84 - DMS-REQ-0183-V-01: Base to Archive Network Secondary Link

4.56.3 Test Script

Step 1
Delegate to Networks

4.57 LVV-T197 - Verify implementation of Archive Center

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.57.1 Test Items

Verify that the Archive Center is sufficiently provisioned to support prompt processing, DRP, and data access needs.

4.57.2 Requirements

- LVV-85 - DMS-REQ-0185-V-01: Archive Center

4.57.3 Test Script

Step 1
Analyze design and sizing model

4.58 LVV-T198 - Verify implementation of Archive Center Disaster Recovery

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.58.1 Test Items

Verify disaster recovery plan for Archive Center.

4.58.2 Requirements

- LVV-86 - DMS-REQ-0186-V-01: Archive Center Disaster Recovery

4.58.3 Test Script

Step 1
Analyze design; simulate storage failure, observe restore from disaster recovery

4.59 LVV-T199 - Verify implementation of Archive Center Co-Location with Existing Facility

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.59.1 Test Items

Verify the Archive Center is located at an existing supported facility.

4.59.2 Requirements

- LVV-87 - DMS-REQ-0187-V-01: Archive Center Co-Location with Existing Facility

4.59.3 Test Script

Step 1
Analyze design

4.60 LVV-T200 - Verify implementation of Archive to Data Access Center Network

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.60.1 Test Items

Verify sufficient bandwidth between Archive Center and Data Access Centers of at least archToDacBandwidth.

4.60.2 Requirements

- LVV-88 - DMS-REQ-0188-V-01: Archive to Data Access Center Network

4.60.3 Test Script

Step 1
Delegate to Networks

4.61 LVV-T201 - Verify implementation of Archive to Data Access Center Network Availability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.61.1 Requirements

- LVV-89 - DMS-REQ-0189-V-01: Archive to Data Access Center Network Availability

4.61.2 Test Script

Step 1
Delegate to Networks

4.62 LVV-T202 - Verify implementation of Archive to Data Access Center Network Reliability

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.62.1 Test Items

Verify the reliability of the Archive to Data Access Center communications.

4.62.2 Requirements

- LVV-90 - DMS-REQ-0190-V-01: Archive to Data Access Center Network Reliability

4.62.3 Test Script

Step 1
Delegate to Networks

4.63 LVV-T204 - Verify implementation of Access to catalogs for external Level 3 processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Kian-Tat Lim

4.63.1 Test Items

Verify that catalog export, and maintenance/validation tools for Level 3 products to outside of the Data Access Centers.

4.63.2 Requirements

- LVV-50 - DMS-REQ-0122-V-01: Access to catalogs for external Level 3 processing

4.63.3 Test Script

Step 1
Execute bulk distribution of DRP catalogs

Step 2
Observe correct transfer and use of maintenance/validation tools

4.64 LVV-T205 - Verify implementation of Access to input catalogs for DAC-based Level 3 processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Robert Gruendl

4.64.1 Test Items

Verify that data products are available at the Data Access Centers for use in Level 3 processing.

4.64.2 Requirements

- LVV-51 - DMS-REQ-0123-V-01: Access to input catalogs for DAC-based Level 3 processing

4.64.3 Test Script

Step 1
Load Prompt and DR catalogs into PDAC, observe access via LSP

4.65 LVV-T207 - Verify implementation of Access to images for external Level 3 processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Kian-Tat Lim

4.65.1 Test Items

Verify that bulk distribution of images, and accompanying maintenance/validation tools for Level 3 image products to outside of the Data Access Centers.

4.65.2 Requirements

- LVV-54 - DMS-REQ-0126-V-01: Access to images for external Level 3 processing

4.65.3 Test Script

Step 1
Execute bulk distribution of DRP images

Step 2
Observe correct transfer and use of maintenance/validation tools

4.66 LVV-T208 - Verify implementation of Access to input images for DAC-based Level 3 processing

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Kian-Tat Lim

4.66.1 Test Items

Verify that prompt processing and DRP products are available at the DACs for Level 3 processing at the DACs.

4.66.2 Requirements

- LVV-55 - DMS-REQ-0127-V-01: Access to input images for DAC-based Level 3 processing

4.66.3 Test Script

Step 1
Load Prompt and DR images into PDAC

Step 2
Observe access via LSP

4.67 LVV-T212 - Verify implementation of No Limit on Data Access Centers

Version	Status	Priority	Verification Type	Critical Event	Owner
1	Draft	Normal	Test	False	Colin Slater

4.67.1 Test Items

Verify that additional Data Access Centers can be set up.

4.67.2 Requirements

- LVV-95 - DMS-REQ-0197-V-01: No Limit on Data Access Centers

4.67.3 Test Script

Step 1
Analyze design; instantiate and load simulated DAC, observe correct functioning

5 Requirements Traceability

Requirements	Test Cases
LVV-5 - DMS-REQ-0008-V-01: Pipeline Availability	LVV-T171
LVV-6 - DMS-REQ-0009-V-01: Simulated Data	LVV-T125
LVV-14 - DMS-REQ-0032-V-01: Image Differencing	LVV-T126
LVV-15 - DMS-REQ-0033-V-01: Provide Source Detection Software	LVV-T127
LVV-17 - DMS-REQ-0042-V-01: Provide Astrometric Model	LVV-T128
LVV-18 - DMS-REQ-0043-V-01: Provide Calibrated Photometry	LVV-T129
LVV-21 - DMS-REQ-0052-V-01: Enable a Range of Shape Measurement Approaches	LVV-T130
LVV-27 - DMS-REQ-0065-V-01: Provide Image Access Services	LVV-T134
LVV-33 - DMS-REQ-0075-V-01: Catalog Queries	LVV-T149
LVV-34 - DMS-REQ-0077-V-01: Maintain Archive Publicly Accessible	LVV-T150
LVV-35 - DMS-REQ-0078-V-01: Catalog Export Formats	LVV-T151
LVV-37 - DMS-REQ-0094-V-01: Keep Historical Alert Archive	LVV-T152
LVV-50 - DMS-REQ-0122-V-01: Access to catalogs for external Level 3 processing	LVV-T204
LVV-51 - DMS-REQ-0123-V-01: Access to input catalogs for DAC-based Level 3 processing	LVV-T205
LVV-53 - DMS-REQ-0125-V-01: Software framework for Level 3 catalog processing	LVV-T120
LVV-54 - DMS-REQ-0126-V-01: Access to images for external Level 3 processing	LVV-T207
LVV-55 - DMS-REQ-0127-V-01: Access to input images for DAC-based Level 3 processing	LVV-T208

Requirements	Test Cases
LVV-56 - DMS-REQ-0128-V-01: Software framework for Level 3 image processing	LVV-T121
LVV-60 - DMS-REQ-0155-V-01: Provide Data Access Services	LVV-T135
LVV-62 - DMS-REQ-0158-V-01: Provide Pipeline Construction Services	LVV-T143
LVV-64 - DMS-REQ-0161-V-01: Optimization of Cost, Reliability and Availability in Order	LVV-T172
LVV-65 - DMS-REQ-0162-V-01: Pipeline Throughput	LVV-T173
LVV-66 - DMS-REQ-0163-V-01: Re-processing Capacity	LVV-T174
LVV-71 - DMS-REQ-0168-V-01: Summit Facility Data Communications	LVV-T181
LVV-72 - DMS-REQ-0170-V-01: Prefer Computing and Storage Down	LVV-T182
LVV-73 - DMS-REQ-0171-V-01: Summit to Base Network	LVV-T184
LVV-74 - DMS-REQ-0172-V-01: Summit to Base Network Availability	LVV-T185
LVV-75 - DMS-REQ-0173-V-01: Summit to Base Network Reliability	LVV-T186
LVV-76 - DMS-REQ-0174-V-01: Summit to Base Network Secondary Link	LVV-T187
LVV-77 - DMS-REQ-0175-V-01: Summit to Base Network Ownership and Operation	LVV-T188
LVV-78 - DMS-REQ-0176-V-01: Base Facility Infrastructure	LVV-T189
LVV-80 - DMS-REQ-0178-V-01: Base Facility Co-Location with Existing Facility	LVV-T190
LVV-81 - DMS-REQ-0180-V-01: Base to Archive Network	LVV-T193
LVV-82 - DMS-REQ-0181-V-01: Base to Archive Network Availability	LVV-T194
LVV-83 - DMS-REQ-0182-V-01: Base to Archive Network Reliability	LVV-T195
LVV-84 - DMS-REQ-0183-V-01: Base to Archive Network Secondary Link	LVV-T196
LVV-85 - DMS-REQ-0185-V-01: Archive Center	LVV-T197
LVV-86 - DMS-REQ-0186-V-01: Archive Center Disaster Recovery	LVV-T198
LVV-87 - DMS-REQ-0187-V-01: Archive Center Co-Location with Existing Facility	LVV-T199
LVV-88 - DMS-REQ-0188-V-01: Archive to Data Access Center Network	LVV-T200
LVV-89 - DMS-REQ-0189-V-01: Archive to Data Access Center Network Availability	LVV-T201
LVV-90 - DMS-REQ-0190-V-01: Archive to Data Access Center Network Reliability	LVV-T202
LVV-95 - DMS-REQ-0197-V-01: No Limit on Data Access Centers	LVV-T212
LVV-127 - DMS-REQ-0296-V-01: Pre-cursor, and Real Data	LVV-T132

Requirements	Test Cases
LVV-129 - DMS-REQ-0298-V-01: Data Product and Raw Data Access	LVV-T136
LVV-130 - DMS-REQ-0299-V-01: Data Product Ingest	LVV-T137
LVV-136 - DMS-REQ-0305-V-01: Task Specification	LVV-T144
LVV-138 - DMS-REQ-0307-V-01: Unique Processing Coverage	LVV-T148
LVV-140 - DMS-REQ-0309-V-01: Raw Data Archiving Reliability	LVV-T154
LVV-141 - DMS-REQ-0310-V-01: Un-Archived Data Product Cache	LVV-T155
LVV-143 - DMS-REQ-0312-V-01: Level 1 Data Product Access	LVV-T157
LVV-144 - DMS-REQ-0313-V-01: Level 1 & 2 Catalog Access	LVV-T158
LVV-146 - DMS-REQ-0315-V-01: DMS Communication with OCS	LVV-T183
LVV-147 - DMS-REQ-0316-V-01: Commissioning Cluster	LVV-T191
LVV-149 - DMS-REQ-0318-V-01: Data Management Unscheduled Downtime	LVV-T180
LVV-167 - DMS-REQ-0336-V-01: Regenerating Data Products from Previous Data Releases	LVV-T159
LVV-171 - DMS-REQ-0340-V-01: Access Controls of Level 3 Data Products	LVV-T123
LVV-172 - DMS-REQ-0341-V-01: Providing a Precovery Service	LVV-T160
LVV-176 - DMS-REQ-0345-V-01: Logging of catalog queries	LVV-T161
LVV-182 - DMS-REQ-0351-V-01: Provide Beam Projector Coordinate Calculation Software	LVV-T133
LVV-183 - DMS-REQ-0352-V-01: Base Wireless LAN (WiFi)	LVV-T192
LVV-190 - DMS-REQ-0364-V-01: Data Access Services	LVV-T163
LVV-191 - DMS-REQ-0365-V-01: Operations Subsets	LVV-T164
LVV-192 - DMS-REQ-0366-V-01: Subsets Support	LVV-T165
LVV-195 - DMS-REQ-0369-V-01: Evolution	LVV-T168
LVV-196 - DMS-REQ-0370-V-01: Older Release Behavior	LVV-T169
LVV-197 - DMS-REQ-0371-V-01: Query Availability	LVV-T170