LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST)
Data Management

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.

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Contents

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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.

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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] **[LDM-554]**, Dubois-Felsmann, G., Ciardi, D., Mueller, F., Economou, F., 2018, *Science Platform Requirements*, LDM-554, URL https://ls.st/LDM-554

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

[5] **[LSE-131]**, Jacoby, S., Emmons, B., Selvy, B., 2017, *Interface between Data Management and Education and Public Outreach*, LSE-131, URL https://ls.st/LSE-131

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

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

[8] **[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

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

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

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

1.5 Acronyms

Acronym	Description
AP	Alerts Production
C	Specific programming language (also called ANSI-C)
CPP	C++ Programming language
DAC	Data Access Center
DB	DataBase
DBB	Data BackBone
DM	Data Management
DMCCB	DM Change Control Board
DMS	Data Management Sub-system
DR	Data Release
DRP	Data Release Production
EFD	Engineering Facilities Database
IT	Integration Test
IVOA	International Virtual-Observatory Alliance
K	Kelvin; SI unit of temperature
LAN	Local Area Network
LDM	LSST Data Management (handle for controlled documents)
LPM	LSST Project Management (Document Handle)
LSE	LSST Systems Engineering (Document Handle)
LSP	LSST Science Platform
LSST	Large Synoptic Survey Telescope
M	Mega; SI units prefix for 1E6
MOPS	Moving Object Pipeline System
OCS	Observatory Control System

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PDAC	Prototype Data Access Center
S	Strip (CCD chip along-scan coordinate identifier in focal plane)
SODA	SCOS ORATOS Distributed Access
SQL	Structured Query Language
STS	System Test Specification
W	Watt; SI unit of power
p	pico; SI units prefix for 1E-12

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

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- 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

Test Id	Test Name
LVV-T23	Verify implementation of Storing Approximations of Per-pixel Metadata
LVV-T24	Verify implementation of Computing Derived Quantities
LVV-T25	Verify implementation of Denormalizing Database Tables
LVV-T26	Verify implementation of Maximum Likelihood Values and Covariances
LVV-T27	Verify implementation of Data Availability
LVV-T28	Verify implementation of Measurements in catalogs
LVV-T29	Verify implementation of Raw Science Image Data Acquisition
LVV-T30	Verify implementation of Wavefront Sensor Data Acquisition
LVV-T31	Verify implementation of Crosstalk Corrected Science Image Data Acquisition
LVV-T32	Verify implementation of Raw Image Assembly
LVV-T33	Verify implementation of Raw Science Image Metadata
LVV-T34	Verify implementation of Guider Calibration Data Acquisition
LVV-T35	Verify implementation of Nightly Data Accessible Within 24 hrs
LVV-T36	Verify implementation of Difference Exposures
LVV-T37	Verify implementation of Difference Exposure Attributes
LVV-T38	Verify implementation of Processed Visit Images
LVV-T39	Verify implementation of Generate Photometric Zeropoint for Visit Image
LVV-T40	Verify implementation of Generate WCS for Visit Images
LVV-T41	Verify implementation of Generate PSF for Visit Images
LVV-T42	Verify implementation of Processed Visit Image Content
LVV-T43	Verify implementation of Background Model Calculation
LVV-T44	Verify implementation of Documenting Image Characterization
LVV-T45	Verify implementation of Prompt Processing Data Quality Report Definition
LVV-T46	Verify implementation of Prompt Processing Performance Report Definition
LVV-T47	Verify implementation of Prompt Processing Calibration Report Definition
LVV-T48	Verify implementation of Exposure Catalog
LVV-T49	Verify implementation of DIASource Catalog
LVV-T50	Verify implementation of Faint DIASource Measurements

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Test Id	Test Name
LVV-T51	Verify implementation of DIAObject Catalog
LVV-T52	Verify implementation of DIAObject Attributes
LVV-T53	Verify implementation of SSObject Catalog
LVV-T54	Verify implementation of Alert Content
LVV-T55	Verify implementation of DIAForcedSource Catalog
LVV-T56	Verify implementation of Characterizing Variability
LVV-T57	Verify implementation of Calculating SSObject Parameters
LVV-T58	Verify implementation of Matching DIASources to Objects
LVV-T59	Verify implementation of Regenerating L1 Data Products During Data Release Processing
LVV-T60	Verify implementation of Publishing predicted visit schedule
LVV-T61	Verify implementation of Associate Sources to Objects
LVV-T62	Verify implementation of Provide PSF for Coadded Images
LVV-T63	Verify implementation of Produce Images for EPO
LVV-T64	Verify implementation of Coadded Image Provenance
LVV-T65	Verify implementation of Source Catalog
LVV-T66	Verify implementation of Forced-Source Catalog
LVV-T67	Verify implementation of Object Catalog
LVV-T68	Verify implementation of Provide Photometric Redshifts of Galaxies
LVV-T69	Verify implementation of Object Characterization
LVV-T70	Verify implementation of Coadd Source Catalog
LVV-T71	Verify implementation of Detecting extended low surface brightness objects
LVV-T72	Verify implementation of Coadd Image Method Constraints
LVV-T73	Verify implementation of Deep Detection Coadds
LVV-T74	Verify implementation of Template Coadds
LVV-T75	Verify implementation of Multi-band Coadds
LVV-T76	Verify implementation of All-Sky Visualization of Data Releases
LVV-T77	Verify implementation of Best Seeing Coadds
LVV-T78	Verify implementation of Persisting Data Products
LVV-T79	Verify implementation of PSF-Matched Coadds
LVV-T80	Verify implementation of Detecting faint variable objects
LVV-T81	Verify implementation of Targeted Coadds

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Test Id	Test Name
LVV-T82	Verify implementation of Tracking Characterization Changes Between Data Releases
LVV-T83	Verify implementation of Bad Pixel Map
LVV-T84	Verify implementation of Bias Residual Image
LVV-T85	Verify implementation of Crosstalk Correction Matrix
LVV-T86	Verify implementation of Illumination Correction Frame
LVV-T87	Verify implementation of Monochromatic Flatfield Data Cube
LVV-T88	Verify implementation of Calibration Data Products
LVV-T89	Verify implementation of Calibration Image Provenance
LVV-T90	Verify implementation of Dark Current Correction Frame
LVV-T91	Verify implementation of Fringe Correction Frame
LVV-T92	Verify implementation of Processing of Data From Special Programs
LVV-T93	Verify implementation of Level 1 Processing of Special Programs Data
LVV-T94	Verify implementation of Special Programs Database
LVV-T95	Verify implementation of Constraints on Level 1 Special Program Products Generation
LVV-T96	Verify implementation of Query Repeatability
LVV-T97	Verify implementation of Uniqueness of IDs Across Data Releases
LVV-T98	Verify implementation of Selection of Datasets
LVV-T99	Verify implementation of Processing of Datasets
LVV-T100	Verify implementation of Transparent Data Access
LVV-T101	Verify implementation of Transient Alert Distribution
LVV-T102	Verify implementation of Solar System Objects Available Within Specified Time
LVV-T103	Verify implementation of Generate Data Quality Report Within Specified Time
LVV-T104	Verify implementation of Generate DMS Performance Report Within Specified Time
LVV-T105	Verify implementation of Generate Calibration Report Within Specified Time
LVV-T106	Verify implementation of Calibration Images Available Within Specified Time
LVV-T107	Verify implementation of Level-1 Production Completeness
LVV-T108	Verify implementation of Level 1 Source Association

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Test Id	Test Name
LVV-T109	Verify implementation of SSObject Precovery
LVV-T110	Verify implementation of DIASource Precovery
LVV-T111	Verify implementation of Use of External Orbit Catalogs
LVV-T112	Verify implementation of Alert Filtering Service
LVV-T113	Verify implementation of Performance Requirements for LSST Alert Filtering Service
LVV-T114	Verify implementation of Pre-defined alert filters
LVV-T115	Verify implementation of Calibration Production Processing
LVV-T116	Verify implementation of Associating Objects across data releases
LVV-T117	Verify implementation of DAC resource allocation for Level 3 processing
LVV-T118	Verify implementation of Level 3 Data Product Self Consistency
LVV-T119	Verify implementation of Provenance for Level 3 processing at DACs
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-T122	Verify implementation of Level 3 Data Import
LVV-T123	Verify implementation of Access Controls of Level 3 Data Products
LVV-T124	Verify implementation of Software Architecture to Enable Community Re-Use
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-T131	Verify implementation of Provide User Interface Services
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

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Test Id	Test Name
LVV-T137	Verify implementation of Data Product Ingest
LVV-T138	Verify implementation of Bulk Download Service
LVV-T139	Verify implementation of Provide Pipeline Execution Services
LVV-T140	Verify implementation of Production Orchestration
LVV-T141	Verify implementation of Production Monitoring
LVV-T142	Verify implementation of Production Fault Tolerance
LVV-T143	Verify implementation of Provide Pipeline Construction Services
LVV-T144	Verify implementation of Task Specification
LVV-T145	Verify implementation of Task Configuration
LVV-T146	Verify implementation of DMS Initialization Component
LVV-T147	Verify implementation of Control of Level-1 Production
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-T153	Verify implementation of Provide Engineering and Facility Database Archive
LVV-T154	Verify implementation of Raw Data Archiving Reliability
LVV-T155	Verify implementation of Un-Archived Data Product Cache
LVV-T156	Verify implementation of Regenerate Un-archived Data Products
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
LVV-T161	Verify implementation of Logging of catalog queries
LVV-T162	Verify implementation of Access to Previous Data Releases
LVV-T163	Verify implementation of Data Access Services
LVV-T164	Verify implementation of Operations Subsets
LVV-T165	Verify implementation of Subsets Support
LVV-T166	Verify implementation of Access Services Performance
LVV-T167	Verify Capability to serve older Data Releases at Full Performance

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Test Id	Test Name
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-T175	Verify implementation of Temporary Storage for Communications Links
LVV-T176	Verify implementation of Infrastructure Sizing for “catching up”
LVV-T177	Verify implementation of Incorporate Fault-Tolerance
LVV-T178	Verify implementation of Incorporate Autonomics
LVV-T179	Verify implementation of Compute Platform Heterogeneity
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

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Test Id	Test Name
LVV-T199	Verify implementation of Archive Center Co-Location with Existing Facility
LVV-T200	Verify implementation of Archive to Data Access Center Network
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-T203	Verify implementation of Archive to Data Access Center Network Secondary Link
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-T206	Verify implementation of Federation with external catalogs
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-T209	Verify implementation of Data Access Centers
LVV-T210	Verify implementation of Data Access Center Simultaneous Connections
LVV-T211	Verify implementation of Data Access Center Geographical Distribution
LVV-T212	Verify implementation of No Limit on Data Access Centers
LVV-T376	Verify the Calculation of Ellipticity Correlations
LVV-T377	Verify Calculation of Photometric Performance Metrics
LVV-T378	Verify Calculation of Astrometric Performance Metrics
LVV-T385	Verify Retrieval of a CCD-sized image from a coadd

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4 Test Cases

4.1 LVV-T23 - Verify implementation of Storing Approximations of Per-pixel Metadata

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

4.1.1 Verification Elements

- LVV-157 - DMS-REQ-0326-V-01: Storing Approximations of Per-pixel Metadata

4.1.2 Test Items

Test Items

Show that the compressed form depth and mask maps adequately represents the exact version of the same information.

4.1.3 Predecessors

4.1.4 Environment Needs

4.1.4.1 Software

4.1.4.2 Hardware

4.1.5 Input Specification

Test data: A data repository containing a full DRP data reduction of the HSC PDR dataset-.

4.1.6 Output Specification

4.1.7 Test Procedure

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Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Create the coadd pixel level depth map for the HSC PDR dataset from step 1.
	Test Data	No data.
	Expected Result	
3	Description	Generate compressed representation of the pixel level depth map.
	Test Data	No data.
	Expected Result	
4	Description	Create the coadd pixel level mask map for the HSC PDR dataset from step 1.
	Test Data	No data.
	Expected Result	
5	Description	Generate compressed representation of the mask map.
	Test Data	No data.
	Expected Result	
6	Description	Sample randomly from both the pixel level and compressed depth maps. Compare the distribution of depths sampled from the pixel level depth map to that sampled from the compressed representation.

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Step	Description, Input Data and Expected Result	
	Test Data	No data.
	Expected Result	
7	Description	Divide the mask planes into two groups: INFO and BAD. BAD flags are any that would cause a particular pixel to be excluded from processing: e.g. EDGE, SAT, BAD. Sample masks from both the pixel level mask map and the compressed mask map. For each sample, compute sum(mask_pixel xor mask_compressed). Produce the distribution of the number of bits that differ between the samples. Repeat for both the INFO flags and the BAD flags.
	Test Data	No data.
	Expected Result	

4.2 LVV-T24 - Verify implementation of Computing Derived Quantities

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.2.1 Verification Elements

- LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities

4.2.2 Test Items

To confirm that common derived quantities (apparent magnitude, FWHM in arcsec, ellipticity) are available to an end-user by, e.g., ensuring a color-color diagram is easy to construction, fitting functions to derived data, or generating other common scientific derivatives.

4.2.3 Predecessors

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4.2.4 Environment Needs

4.2.4.1 Software

4.2.4.2 Hardware

4.2.5 Input Specification

Example data set (e.g., non-LSST or LSST commissioning) loaded into the Science Platform in a format consistent with the DPDD.

4.2.6 Output Specification

4.2.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Constructing color-color diagram and and fitting stellar locus in Science Platform.
	Test Data	No data.
	Expected Result	
2	Description	Invite three members of commissioning team to create color-color diagram from coadd catalogs based on merged coadd reference catalog.
	Test Data	No data.
	Expected Result	
3-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
3-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
3-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.

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Step	Description, Input Data and Expected Result	
	Test Data	
	Expected Result	
4	Description	Load into DPDD+Science Platform
	Test Data	No data.
	Expected Result	

4.3 LVV-T25 - Verify implementation of Denormalizing Database Tables

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

4.3.1 Verification Elements

- LVV-163 - DMS-REQ-0332-V-01: Denormalizing Database Tables

4.3.2 Test Items

Verify that commonly useful views of data are easy to obtain through the Science Platform.

4.3.3 Predecessors

4.3.4 Environment Needs

4.3.4.1 Software

4.3.4.2 Hardware

4.3.5 Input Specification

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4.3.6 Output Specification

4.3.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Take 20 sampled queries and determine which are easily done on views and which require complicated joins. Discuss the complicated ones and determine if any could be simplified by adding additional views.
	Test Data	No data.
	Expected Result	
2	Description	List the available views in the database.
	Test Data	No data.
	Expected Result	
3	Description	Connect to the Science Platform's portal query interface.
	Test Data	No data.
	Expected Result	

4.4 LVV-T26 - Verify implementation of Maximum Likelihood Values and Covariances

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.4.1 Verification Elements

- LVV-164 - DMS-REQ-0333-V-01: Maximum Likelihood Values and Covariances

4.4.2 Test Items

- Check that all measurements in source and object schemas include columns containing uncertainties, including covariances between jointly-measured quantities.

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- Check that all model-fit measurements in source and object schemas include columns that report goodness-of-fit.
- Check that most sources and objects with successful measurements report finite uncertainty values for those measurements.
- Check that most sources and objects with successful model-fit measurements report finite goodness-of-fit values.

4.4.3 Predecessors

4.4.4 Environment Needs

4.4.4.1 Software

4.4.4.2 Hardware

4.4.5 Input Specification

4.4.6 Output Specification

4.4.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that maximum likelihood and covariant quantities are provided. Test and manually inspect that they are reasonable (finite, appropriately normed).
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	

4.5 LVV-T27 - Verify implementation of Data Availability

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

4.5.1 Verification Elements

- LVV-177 - DMS-REQ-0346-V-01: Data Availability

4.5.2 Test Items

Determine if all required categories of raw data (specifically enumerated: raw exposures, calibration frames, telemetry, configuration metadata) can be located through the Science Platform and are available for download. Verify through (1) administrative review; (2) checking with precursor data; (3) checking on early data feeds from the Summit such as from AuxTel and ComCam.

4.5.3 Predecessors

4.5.4 Environment Needs

4.5.4.1 Software

4.5.4.2 Hardware

Draft

4.5.5 Input Specification

4.5.6 Output Specification

4.5.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Pass a set of HSC data through (equal in size to the first public data release) the data backbone through ingest and provide interface
	Test Data	No data.
	Expected Result	
2	Description	Track the ingestion of AuxTel data during one month in 2018-2019 and verify delivery and test download.
	Test Data	No data.
	Expected Result	
3	Description	Invite two reviewers to review that plan that seems reasonable to expect the archiving and provision of raw data
	Test Data	No data.
	Expected Result	

4.6 LVV-T28 - Verify implementation of Measurements in catalogs

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

4.6.1 Verification Elements

- LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs

4.6.2 Test Items

Verify that source measurements in catalogs are in flux units.

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4.6.3 Predecessors

4.6.4 Environment Needs

4.6.4.1 Software

4.6.4.2 Hardware

4.6.5 Input Specification

4.6.6 Output Specification

4.6.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that each of the single-visit, coadd, and difference image catalogs from HSC reprocessing and HiTS reprocessing (which may be the first source of regular difference images) provide measurements in flux units.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘
	Test Data	and any errors or failures reported.

Draft

Step	Description, Input Data and Expected Result
	Expected Result
2-3 from LVV-T18	Description: A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
2-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result
2-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result
3-1 from LVV-T12	Description: The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data
	Expected Result
3-2 from LVV-T12	Description: A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
3-3 from LVV-T12	Description: For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result

4.7 LVV-T29 - Verify implementation of Raw Science Image Data Acquisition

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

4.7.1 Verification Elements

- LVV-8 - DMS-REQ-0018-V-01: Raw Science Image Data Acquisition

4.7.2 Test Items

Verify acquisition of raw data from L1 Test Stand DAQ while simulating all modes

4.7.3 Predecessors

4.7.4 Environment Needs

4.7.4.1 Software

4.7.4.2 Hardware

4.7.5 Input Specification

4.7.6 Output Specification

4.7.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest raw data from L1 Test Stand DAQ, simulating each observing mode
	Test Data	No data.
	Expected Result	
2	Description	Observe image metadata is present and queryable
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result

4.8 LVV-T30 - Verify implementation of Wavefront Sensor Data Acquisition

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

4.8.1 Verification Elements

- LVV-9 - DMS-REQ-0020-V-01: Wavefront Sensor Data Acquisition

4.8.2 Test Items

Verify successful ingestion of wavefront sensor data from L1 Test Stand DAQ while simulating all modes.

4.8.3 Predecessors

4.8.4 Environment Needs

4.8.4.1 Software

4.8.4.2 Hardware

4.8.5 Input Specification

4.8.6 Output Specification

4.8.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest wavefront sensor data from L1 Test Stand DAQ while simulating all modes
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
2	Description	Observe wavefront sensor data and metadata archived
	Test Data	No data.
	Expected Result	

4.9 LVV-T31 - Verify implementation of Crosstalk Corrected Science Image Data Acquisition

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

4.9.1 Verification Elements

- LVV-10 - DMS-REQ-0022-V-01: Crosstalk Corrected Science Image Data Acquisition

4.9.2 Test Items

Verify successful ingestion of crosstalk corrected data from L1 Test Stand DAQ while simulating all modes.

4.9.3 Predecessors

4.9.4 Environment Needs

4.9.4.1 Software

4.9.4.2 Hardware

4.9.5 Input Specification

Draft

4.9.6 Output Specification

4.9.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Inject signals of different relative strength
	Test Data	No data.
	Expected Result	
2	Description	Apply Camera cross-talk correction
	Test Data	No data.
	Expected Result	
3	Description	Verify that DMS sytem can import the cross-talk corrected images
	Test Data	No data.
	Expected Result	
4	Description	Verify that images are corrected for crosstalk
	Test Data	No data.
	Expected Result	

4.10 LVV-T32 - Verify implementation of Raw Image Assembly

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

4.10.1 Verification Elements

- LVV-11 - DMS-REQ-0024-V-01: Raw Image Assembly

Draft

4.10.2 Test Items

Delegate to Prompt Services (Ingest raw data from L1 Test Stand DAQ, observe image and metadata output)

4.10.3 Predecessors

4.10.4 Environment Needs

4.10.4.1 Software

4.10.4.2 Hardware

4.10.5 Input Specification

4.10.6 Output Specification

4.10.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest data from L1 Camera Test Stand DAQ
	Test Data	No data.
	Expected Result	
2	Description	Simulate all different modes
	Test Data	No data.
	Expected Result	
3	Description	Verify that a raw image is constructed in correct format
	Test Data	No data.
	Expected Result	
4	Description	Verify that a raw image is constructed with correct metadata
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result
	Expected Result

4.11 LVV-T33 - Verify implementation of Raw Science Image Metadata

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

4.11.1 Verification Elements

- LVV-28 - DMS-REQ-0068-V-01: Raw Science Image Metadata

4.11.2 Test Items

Verify successful ingestion of raw data from L1 Test Stand DAQ and that image metadata is present and queryable.

4.11.3 Predecessors

4.11.4 Environment Needs

4.11.4.1 Software

4.11.4.2 Hardware

4.11.5 Input Specification

4.11.6 Output Specification

4.11.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Verify that time of exposure start/end, site metadata, telescope metadata, and camera metadata are stored in DMS system.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T29	Description	Ingest raw data from L1 Test Stand DAQ, simulating each observing mode
	Test Data	
	Expected Result	
2-2 from LVV-T29	Description	Observe image metadata is present and queryable
	Test Data	
	Expected Result	
3-1 from LVV-T32	Description	Ingest data from L1 Camera Test Stand DAQ
	Test Data	
	Expected Result	
3-2 from LVV-T32	Description	Simulate all different modes
	Test Data	
	Expected Result	
3-3 from LVV-T32	Description	Verify that a raw image is constructed in correct format
	Test Data	
	Expected Result	
3-4 from LVV-T32	Description	Verify that a raw image is constructed with correct metadata
	Test Data	
	Expected Result	

Draft

4.12 LVV-T34 - Verify implementation of Guider Calibration Data Acquisition

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

4.12.1 Verification Elements

- LVV-96 - DMS-REQ-0265-V-01: Guider Calibration Data Acquisition

4.12.2 Test Items

Verify successful
1. Ingestion of calibration frames from L1 Test Stand DAQ
2. Execution of CPP payloads
3. Availability of observe guider calibration products

4.12.3 Predecessors

4.12.4 Environment Needs

4.12.4.1 Software

4.12.4.2 Hardware

4.12.5 Input Specification

4.12.6 Output Specification

4.12.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest calibration frames from L1 Test Stand DAQ
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2	Description	Execute CPP payloads
	Test Data	No data.
	Expected Result	
3	Description	Observe guider calibration products
	Test Data	No data.
	Expected Result	

4.13 LVV-T35 - Verify implementation of Nightly Data Accessible Within 24 hrs

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

4.13.1 Verification Elements

- LVV-4 - DMS-REQ-0004-V-01: Time to L1 public release_1

4.13.2 Test Items

Test Items

Verify that
1. Alerts are available within OTT1
2. Level 1 Data Products are available within L1PublicT
3. Solar System Object orbits are available within L1PublicT of the updated calculations completion on the following night.

4.13.3 Predecessors

Draft

4.13.4 Environment Needs

4.13.4.1 Software

4.13.4.2 Hardware

4.13.5 Input Specification

4.13.6 Output Specification

4.13.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Time processing of data starting from (pre-ingested) raw files until an alert is available for distribution; verify that this time is less than OTT1.
	Test Data	No data.
	Expected Result	
2	Description	Time processing of data starting from (pre-ingested) raw files until the required data products are available in the Science Platform. Verify that this time is less than L1PublicT.
	Test Data	No data.
	Expected Result	
3	Description	Run MOPS on 1 night equivalent of LSST observing worth of precursor data and verify that Solar System Object orbits can be updated within 24 hours.
	Test Data	No data.
	Expected Result	
4-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
4-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.
	Test Data	
	Expected Result	
4-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
4-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
4-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	
5-1 from LVV-T217	Description	
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
5-2 from LVV-T217	Description	Start a consumer that monitors the full stream and logs a deserialized version of every Nth packet: `kubectl create -f consumerall-deployment.yaml`
	Test Data	
	Expected Result	Runs without error
5-3 from LVV-T217	Description	`Start a producer that reads alert packets from disk and loads them into the Kafka queue:` `kubectl create -f sender-deployment.yaml`
	Test Data	
	Expected Result	Runs without error
5-4 from LVV-T217	Description	Determine the name of the consumer pod with kubectl get pods Examine output log files. kubectl logs <pod name> The packet log should show deserialized alert packets with contents matching the input packets.
	Test Data	
	Expected Result	Similar to {'alertId': 12132024420, 'l1dbId': 71776805594116, 'diaSource': {'diaSourceId': 73499448928374785, 'ccdVisitId': 2020011570, 'diaObjectId': 71776805594116, 'ssObjectId': None, 'parentDiaSourceId': None, 'midPointTai': 59595.37041, 'filterName': 'y', 'ra': 172.24912810036074, 'decl': -80.64214929176521, 'ra_decl_Cov': {'raSigma': 0.0003428002819418907, 'declSigma': 0.00027273103478364646, 'ra_decl_Cov': 0.000628734880592674}, 'x': 2979.08837890625, 'y': 3843.328857421875, 'x_y_Cov': {'xSigma': 0.6135467886924744, 'ySigma': 0.77132648229599, 'x_y_Cov': 0.0007463791407644749}, 'apFlux': None, 'apFluxErr': None, 'snr': 0.3665165007114410 4, 'psFlux': 7.698232025177276e-07, 'psRa': None, 'psDecl': None, 'ps_Cov': None, 'psLnL': None, 'psChi2': None, 'psNdata': None, 'trailFlux': None, 'trailRa': etc.

Draft

Step	Description, Input Data and Expected Result	
5-5 from LVV-T217	Description	Determine the name of the alert sender pod with kubectl get pods Examine output log files. kubectl logs <pod name> Verify that alerts are being sent within 40 seconds by subtracting the timing measurements.
	Test Data	
	Expected Result	Similar to kubectl logs sender-7d6f98586f-nhwfj visit: 1570. time: 1530588618.0313473 visits finished: 1 time: 1530588653.5614944 visit: 1571. time: 1530588657.0087624 visits finished: 2 time: 1530588692.506188 visit: 1572. time: 1530588696.0051727 visits finished: 3 time: 1530588731.5900314
6	Description	Record time between completion of MOPS processing and availability of the updated SSObject catalogue through the Science Platform; verify this time is less than L1PublicT.
	Test Data	No data.
	Expected Result	

4.14 LVV-T36 - Verify implementation of Difference Exposures

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

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4.14.1 Verification Elements

- LVV-7 - DMS-REQ-0010-V-01: Difference Exposures

4.14.2 Test Items

Verify successful creation of a
1. PSF-matched template image for a given Processed Visit Image
2. Difference Exposure from each Processed Visit Image

4.14.3 Predecessors

4.14.4 Environment Needs

4.14.4.1 Software

4.14.4.2 Hardware

4.14.5 Input Specification

4.14.6 Output Specification

4.14.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Demonstrate successful creation of a template image from HSC PDF and DECAM HiTS data. Demonstrate successful creation of a Difference Exposure for at least 10 other images from survey, ideally at a range of arimass. In particular, HiTS has 2013A u-band data. While the Blanco 4-m does have an ADC, there are still some chromatic effects and we should demonstrate that we can successfully produce Difference Exposures and templates for diferent airmass bins.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	

Draft

Step	Description, Input Data and Expected Result
	Expected Result
2-2 from LVV-T18	Description: The alert generation processing will be executed using the verification cluster: "'bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl "'
	Test Data: and any errors or failures reported.
	Expected Result
2-3 from LVV-T18	Description: A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
2-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result
2-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result

4.15 LVV-T37 - Verify implementation of Difference Exposure Attributes

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

4.15.1 Verification Elements

- LVV-32 - DMS-REQ-0074-V-01: Difference Exposure Attributes

4.15.2 Test Items

Verify that for each Difference Exposure the DMS stores
1. The identify of the input exposures and related provenance information
2. Metadata attributes of the subtraction, including the PSF-matching kernel used.

4.15.3 Predecessors

4.15.4 Environment Needs

4.15.4.1 Software

4.15.4.2 Hardware

4.15.5 Input Specification

4.15.6 Output Specification

4.15.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	For each of HSC PDR and DECAM HiTS data: set up three different templates and run subtractions on 10 different images from at least two different filters. Verify that we can recover the provenance information about which template was used for each subtraction, which input images were used for that template, and that we can successfull extract the PSF matching kernel.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported.
	Test Data	
	Expected Result	
2-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	

Draft

4.16 LVV-T38 - Verify implementation of Processed Visit Images

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

4.16.1 Verification Elements

- LVV-29 - DMS-REQ-0069-V-01: Processed Visit Images

4.16.2 Test Items

Verify that the DMS
1. Successfully produces Processed Visit Images, where the instrument signature has been removed.
2. Successfully combines images obtained during a standard visit.

4.16.3 Predecessors

4.16.4 Environment Needs

4.16.4.1 Software

4.16.4.2 Hardware

4.16.5 Input Specification

4.16.6 Output Specification

4.16.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Process HSC data, DECAM data. Verify that Processed Visit Images are generated at correct size and with significant instrumental artifacts removed.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2	Description	Run camera test stand data through full acquisition+backbone+ISR.
	Test Data	No data.
	Expected Result	
3	Description	Run simulated LSST data with calibrations through prompt processing system and inspect Processed Visit images to verify that they have been cleaned of significant artifacts and are of the correct, shape, and described orientation.
	Test Data	No data.
	Expected Result	

4.17 LVV-T39 - Verify implementation of Generate Photometric Zeropoint for Visit Image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.17.1 Verification Elements

- LVV-12 - DMS-REQ-0029-V-01: Generate Photometric Zeropoint for Visit Image

4.17.2 Test Items

Verify that Processed Visit Image data products produced by the DRP and AP pipelines include the parameters of a model that relates the observed flux on the image to physical flux units.

4.17.3 Predecessors

4.17.4 Environment Needs

4.17.4.1 Software

Draft

4.17.4.2 Hardware

4.17.5 Input Specification

4.17.6 Output Specification

4.17.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.18 LVV-T40 - Verify implementation of Generate WCS for Visit Images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.18.1 Verification Elements

- LVV-13 - DMS-REQ-0030-V-01: Absolute accuracy of WCS

4.18.2 Test Items

Verify that Processed Visit Images produced by the AP and DRP pipelines include FITS WCS accurate to specified “astrometricAccuracy” over the bounds of the image.

4.18.3 Predecessors

4.18.4 Environment Needs

4.18.4.1 Software

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4.18.4.2 Hardware

4.18.5 Input Specification

4.18.6 Output Specification

4.18.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.19 LVV-T41 - Verify implementation of Generate PSF for Visit Images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.19.1 Verification Elements

- LVV-30 - DMS-REQ-0070-V-01: Generate PSF for Visit Images

4.19.2 Test Items

Verify that Processed Visit Images produced by the DRP and AP pipelines are associated with a model from which one can obtain an image of the PSF given a point on the image.

4.19.3 Predecessors

4.19.4 Environment Needs

4.19.4.1 Software

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4.19.4.2 Hardware

4.19.5 Input Specification

4.19.6 Output Specification

4.19.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.20 LVV-T42 - Verify implementation of Processed Visit Image Content

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.20.1 Verification Elements

- LVV-31 - DMS-REQ-0072-V-01: Processed Visit Image Content

4.20.2 Test Items

Verify that Processed Visit Images produced by the DRP and AP pipelines include the observed data, a mask array, a variance array, a PSF model, and a WCS model.

4.20.3 Predecessors

4.20.4 Environment Needs

4.20.4.1 Software

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4.20.4.2 Hardware

4.20.5 Input Specification

4.20.6 Output Specification

4.20.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.21 LVV-T43 - Verify implementation of Background Model Calculation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.21.1 Verification Elements

- LVV-158 - DMS-REQ-0327-V-01: Background Model Calculation

4.21.2 Test Items

Verify that Processed Visit Images produced by the DRP and AP pipelines have had a model of the background subtracted, and that this model is persisted in a way that permits the background subtracted from any CCD to be retrieved along with the image for that CCD.

4.21.3 Predecessors

LVV-T15
LVV-T19

4.21.4 Environment Needs

4.21.4.1 Software

4.21.4.2 Hardware

4.21.5 Input Specification

4.21.6 Output Specification

4.21.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.22 LVV-T44 - Verify implementation of Documenting Image Characterization

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.22.1 Verification Elements

- LVV-159 - DMS-REQ-0328-V-01: Documenting Image Characterization

4.22.2 Test Items

Verify that the persisted format for Processed Visit Images and associated instrument-signature-removal data products is documented.

4.22.3 Predecessors

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4.22.4 Environment Needs

4.22.4.1 Software

4.22.4.2 Hardware

4.22.5 Input Specification

4.22.6 Output Specification

4.22.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Alert Production
	Test Data	No data.
	Expected Result	

4.23 LVV-T45 - Verify implementation of Prompt Processing Data Quality Report Definition

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

4.23.1 Verification Elements

- LVV-39 - DMS-REQ-0097-V-01: Level 1 Data Quality Report Definition

4.23.2 Test Items

Verify that the DMS produces a Prompt Processing Data Quality Report. Specifically check absolute value and temporal variation of
1. Photometric zeropoint
2. Sky brightness

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3. Seeing
4. PSF
5. Detection efficiency

4.23.3 Predecessors

4.23.4 Environment Needs

4.23.4.1 Software

4.23.4.2 Hardware

4.23.5 Input Specification

4.23.6 Output Specification

4.23.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest raw data from L1 Test Stand DAQ, execute AP, load Prompt QC, observe telemetry and report
	Test Data	No data.
	Expected Result	

4.24 LVV-T46 - Verify implementation of Prompt Processing Performance Report Definition

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

4.24.1 Verification Elements

- LVV-41 - DMS-REQ-0099-V-01: Level 1 Performance Report Definition

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4.24.2 Test Items

Verify that the DMS produces a Prompt Processing Performance Report. Specifically check that the number of observations that describe each of the following:
1. Successfully processed, recoverable failures, unrecoverable failures.
2. Archived
3. Result in science.

This is testing more the processing rather than the observatory system.

4.24.3 Predecessors

4.24.4 Environment Needs

4.24.4.1 Software

4.24.4.2 Hardware

4.24.5 Input Specification

4.24.6 Output Specification

4.24.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal, observe report
	Test Data	No data.
	Expected Result	

4.25 LVV-T47 - Verify implementation of Prompt Processing Calibration Report Definition

Version	Status	Priority	Verification Type	Owner

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1	Draft	Normal	Test	Eric Bellm

4.25.1 Verification Elements

- LVV-43 - DMS-REQ-0101-V-01: Level 1 Calibration Report Definition

4.25.2 Test Items

Verify that the DMS produces a Prompt Processing Calibration Report. Specifically check that this report is capable of identifying when aspects of the telescope or camera are changing with time.

4.25.3 Predecessors

4.25.4 Environment Needs

4.25.4.1 Software

4.25.4.2 Hardware

4.25.5 Input Specification

4.25.6 Output Specification

4.25.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal, observe report
	Test Data	No data.
	Expected Result	

4.26 LVV-T48 - Verify implementation of Exposure Catalog

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.26.1 Verification Elements

- LVV-97 - DMS-REQ-0266-V-01: Exposure Catalog

4.26.2 Test Items

Verify that the DMS creates an Exposure Catalog that includes
1. Observation datetime, exposure time
2. Filter
3. Dome, telescope orientation and status
4. Calibration status
5. Airmass and zenith
6. Environmental information
7. Per-sensor information

4.26.3 Predecessors

4.26.4 Environment Needs

4.26.4.1 Software

4.26.4.2 Hardware

4.26.5 Input Specification

4.26.6 Output Specification

4.26.7 Test Procedure

Step	Description, Input Data and Expected Result
	Description Verify that Exposure Catalogs contained required elements
1	

Draft

Step	Description, Input Data and Expected Result	
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	

4.27 LVV-T49 - Verify implementation of DIASource Catalog

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

4.27.1 Verification Elements

- LVV-100 - DMS-REQ-0269-V-01: DIASource Catalog

4.27.2 Test Items

Verify that the DMS produces a Source catalog from Difference Exposures with the required attributes.

4.27.3 Predecessors

4.27.4 Environment Needs

4.27.4.1 Software

4.27.4.2 Hardware

4.27.5 Input Specification

4.27.6 Output Specification

4.27.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that products are produced for DIASource catalog
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.
	Test Data	

Draft

Step	Description, Input Data and Expected Result
	Expected Result
2-3 from LVV-T18	Description: A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
2-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result
2-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result

4.28 LVV-T50 - Verify implementation of Faint DIASource Measurements

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

4.28.1 Verification Elements

- LVV-101 - DMS-REQ-0270-V-01: Faint DIASource Measurements

4.28.2 Test Items

Verify that the DMS can produces DIASources measurements for sources below the nominal S/N cutoff that satisfy additional criteria.

4.28.3 Predecessors

4.28.4 Environment Needs

4.28.4.1 Software

4.28.4.2 Hardware

4.28.5 Input Specification

Input Data
DECam HiTS data.

4.28.6 Output Specification

4.28.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	As an example of selecting with constrains, Re-run source detection as an afterburner to select isolated sources (defined as more than 2 arcseconds away from any other objects in the single-image-depth catalog) that are fainter than the fiducial transSNR cut.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.

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Step	Description, Input Data and Expected Result
	Test Data
	Expected Result
2-3 from LVV-T18	Description: A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
2-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result
2-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result

4.29 LVV-T51 - Verify implementation of DIAObject Catalog

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

4.29.1 Verification Elements

- LVV-102 - DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource

4.29.2 Test Items

Verify that the DIAObject includes a unique ID, identifiers for nearest stars and nearest galaxies, and probability of matching to static Object.

4.29.3 Predecessors

4.29.4 Environment Needs

4.29.4.1 Software

4.29.4.2 Hardware

4.29.5 Input Specification

4.29.6 Output Specification

4.29.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that DIAObjects have diaNearbyObjMaxStar and diaNearbyObjMaxGalaxies that point to the Object catalog and are within dianNearbyObjRadius; the probability of association; and the required DIAObject properties.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T21	Description	The DM Stack shall be initialized using the loadLSST script (as described in LVV-T17 - AG-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T21	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T21	Description	DIASource records will be accessed by querying the Butler, then examined interactively at a Python prompt.
	Test Data	
	Expected Result	
3-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).

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Step	Description, Input Data and Expected Result
3-2 from LVV-T18	Test Data
	Expected Result
	Description: The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.
	Test Data
	Expected Result
3-3 from LVV-T18	Description: A “Data Butler” will be initialized to access the repository.
	Test Data
	Expected Result
3-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data
	Expected Result
3-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result
4-1 from LVV-T22	Description: The DM Stack shall be initialized using the loadLSST script (as described in LVV-T17 - AG-00-00).
	Test Data

Draft

Step	Description, Input Data and Expected Result
	Expected Result
4-2 from LVV-T22	Description sqlite3 or Python's sqlalchemy module will be used to access the Level 1 database.
	Test Data
	Expected Result

4.30 LVV-T52 - Verify implementation of DIAObject Attributes

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

4.30.1 Verification Elements

- LVV-103 - DMS-REQ-0272-V-01: DIAObject Attributes

4.30.2 Test Items

Verify that the DMS provides summary attributes for each DIAObject, including periodicity measures.

4.30.3 Predecessors

4.30.4 Environment Needs

4.30.4.1 Software

4.30.4.2 Hardware

4.30.5 Input Specification

4.30.6 Output Specification

Draft

4.30.7 Test Procedure

Step	Description, Input Data and Expected Result
1-1 from LVV-T18	Description: The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00). Test Data: Expected Result:
1-2 from LVV-T18	Description: The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported. Test Data: Expected Result:
1-3 from LVV-T18	Description: A “Data Butler” will be initialized to access the repository. Test Data: Expected Result:
1-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty. Test Data: Expected Result:
1-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries. Test Data: Expected Result:

Draft

4.31 LVV-T53 - Verify implementation of SSObject Catalog

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

4.31.1 Verification Elements

- LVV-104 - DMS-REQ-0273-V-01: SSObject Catalog

4.31.2 Test Items

Verify that the DMS produces a catalog of Solar System Objects identify from Moving Object Processing.
Verify that the SSObject catalog includes orbital elements and additional related quanitites.

4.31.3 Predecessors

4.31.4 Environment Needs

4.31.4.1 Software

4.31.4.2 Hardware

4.31.5 Input Specification

4.31.6 Output Specification

4.31.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Run the MOPS pipeline on the Prompt Products database.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).

Draft

Step	Description, Input Data and Expected Result	
	Test Data	
	Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported.
	Test Data	
	Expected Result	
2-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	
3	Description	Inspect SSObject catalog and verify the presence of the required elements (LVV-104).
	Test Data	No data.

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Step	Description, Input Data and Expected Result
	Expected Result

4.32 LVV-T54 - Verify implementation of Alert Content

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

4.32.1 Verification Elements

- LVV-105 - DMS-REQ-0274-V-01: Alert Content

4.32.2 Test Items

Verify that the DMS creates an Alert for each detected DIASource
Verify that this Alert is broadcasted using community protocols
Verify that the context of the Alert packet match requirements.

4.32.3 Predecessors

4.32.4 Environment Needs

4.32.4.1 Software

4.32.4.2 Hardware

4.32.5 Input Specification

4.32.6 Output Specification

4.32.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.
	Test Data	
	Expected Result	
1-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
1-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
1-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	
2-1 from LVV-T217	Description	
	Test Data	

Draft

Step	Description, Input Data and Expected Result
2-2 from LVV-T217	**Description** Start a consumer that monitors the full stream and logs a deserialized version of every Nth packet: `kubectl create -f consumerall-deployment.yaml`
	Test Data
	Expected Result Runs without error
2-3 from LVV-T217	**Description** Start a producer that reads alert packets from disk and loads them into the Kafka queue: `kubectl create -f sender-deployment.yaml`
	Test Data
	Expected Result Runs without error

2-4 from LVV-T217	**Description** Determine the name of the consumer pod with
	`kubectl get pods`
	Examine output log files.
	`kubectl logs <pod name>`
	The packet log should show deserialized alert packets with contents matching the input packets.

	Test Data
	Expected Result Similar to {'alertId': 12132024420, 'l1dbId': 71776805594116, 'diaSource': {'diaSourceId': 73499448928374785, 'ccdVisitId': 2020011570, 'diaObjectId': 71776805594116, 'ssObjectId': None, 'parentDiaSourceId': None, 'midPointTai': 59595.37041, 'filterName': 'y', 'ra': 172.24912810036074, 'decl': -80.64214929176521, 'ra_decl_Cov': {'raSigma': 0.0003428002819418907, 'declSigma': 0.00027273103478364646, 'ra_decl_Cov': 0.000628734880592674}, 'x': 2979.08837890625, 'y': 3843.328857421875, 'x_y_Cov': {'xSigma': 0.6135467886924744, 'ySigma': 0.77132648229599, 'x_y_Cov': 0.0007463791407644749}, 'apFlux': None, 'apFluxErr': None, 'snr': 0.3665165007114410 4, 'psFlux': 7.698232025177276e-07, 'psRa': None, 'psDecl': None, 'ps_Cov': None, 'psLnL': None, 'psChi2': None, 'psNdata': None, 'trailFlux': None, 'trailRa': etc.

Draft

Step	Description, Input Data and Expected Result	
2-5 from LVV-T217	Description	Determine the name of the alert sender pod with kubectl get pods Examine output log files. kubectl logs <pod name> Verify that alerts are being sent within 40 seconds by subtracting the timing measurements.
	Test Data	
	Expected Result	Similar to kubectl logs sender-7d6f98586f-nhwfj visit: 1570. time: 1530588618.0313473 visits finished: 1 time: 1530588653.5614944 visit: 1571. time: 1530588657.0087624 visits finished: 2 time: 1530588692.506188 visit: 1572. time: 1530588696.0051727 visits finished: 3 time: 1530588731.5900314
3	Description	Examine the serialized alert packets to confirm the presence of the required elements (LVV-105).
	Test Data	No data.
	Expected Result	

4.33 LVV-T55 - Verify implementation of DIAForcedSource Catalog

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

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4.33.1 Verification Elements

- LVV-148 - DMS-REQ-0317-V-01: DIAForcedSource Catalog

4.33.2 Test Items

Verify that the DMS produces a DIAForcedSource Catalog and that the catalog contains measured fluxes for DIAObjects.

4.33.3 Predecessors

4.33.4 Environment Needs

4.33.4.1 Software

4.33.4.2 Hardware

4.33.5 Input Specification

4.33.6 Output Specification

4.33.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result
1-2 from LVV-T18	Description: The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported. Test Data Expected Result
1-3 from LVV-T18	Description: A “Data Butler” will be initialized to access the repository. Test Data Expected Result
1-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty. Test Data Expected Result
1-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries. Test Data Expected Result

4.34 LVV-T56 - Verify implementation of Characterizing Variability

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

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4.34.1 Verification Elements

- LVV-150 - DMS-REQ-0319-V-01: Characterizing Variability

4.34.2 Test Items

Verify that the variability characterization in the DIAObject catalog includes data collected within previous “diaCharacterizationCutoff” period of time.

4.34.3 Predecessors

4.34.4 Environment Needs

4.34.4.1 Software

4.34.4.2 Hardware

4.34.5 Input Specification

4.34.6 Output Specification

4.34.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that the issued alerts contain measurements during the diaCharacterizationCutoff.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported.
	Test Data	
	Expected Result	
2-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	

4.35 LVV-T57 - Verify implementation of Calculating SSObject Parameters

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

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4.35.1 Verification Elements

- LVV-154 - DMS-REQ-0323-V-01: Calculating SSObject Parameters

4.35.2 Test Items

Verify that the DMS database provides functions to compute phase angles and magnitudes in LSST bands for every SSObject.

4.35.3 Predecessors

4.35.4 Environment Needs

4.35.4.1 Software

4.35.4.2 Hardware

4.35.5 Input Specification

4.35.6 Output Specification

4.35.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Computer the phase angle, reduced and absolute asteroid magnitudes for objects identified in SSObject Catalog
	Test Data	No data.
	Expected Result	
2-1 from LVV-T53	Description	Run the MOPS pipeline on the Prompt Products database.
	Test Data	
	Expected Result	
2-2 from LVV-T53	Description	
	Test Data	

Draft

Step	Description, Input Data and Expected Result
	Expected Result
2-3 from LVV-T53	Description: Inspect SSObject catalog and verify the presence of the required elements (LVV-104).
	Test Data
	Expected Result

4.36 LVV-T58 - Verify implementation of Matching DIASources to Objects

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

4.36.1 Verification Elements

- LVV-155 - DMS-REQ-0324-V-01: Matching DIASources to Objects

4.36.2 Test Items

Verify that a cross-match table is available between DIASources and Objects.

4.36.3 Predecessors

4.36.4 Environment Needs

4.36.4.1 Software

4.36.4.2 Hardware

4.36.5 Input Specification

4.36.6 Output Specification

Draft

4.36.7 Test Procedure

Step	Description, Input Data and Expected Result
1-1 from LVV-T18	Description: The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00). Test Data: Expected Result:
1-2 from LVV-T18	Description: The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported. Test Data: Expected Result:
1-3 from LVV-T18	Description: A “Data Butler” will be initialized to access the repository. Test Data: Expected Result:
1-4 from LVV-T18	Description: For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty. Test Data: Expected Result:
1-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries. Test Data: Expected Result:

Draft

Step	Description, Input Data and Expected Result	
2	Description	Verify that a cross-match table between the Prompt DIASources and DRP Objects is available.
	Test Data	No data.
	Expected Result	
3-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
3-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
3-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	

4.37 LVV-T59 - Verify implementation of Regenerating L1 Data Products During Data Release Processing

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

4.37.1 Verification Elements

- LVV-156 - DMS-REQ-0325-V-01: Regenerating L1 Data Products During Data Release Processing

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4.37.2 Test Items

Verify that the Prompt Processing data products are regenerated during DRP.

4.37.3 Predecessors

4.37.4 Environment Needs

4.37.4.1 Software

4.37.4.2 Hardware

4.37.5 Input Specification

4.37.6 Output Specification

4.37.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute DRP
	Test Data	No data.
	Expected Result	
2	Description	Observe production of difference image data products
	Test Data	No data.
	Expected Result	

4.38 LVV-T60 - Verify implementation of Publishing predicted visit schedule

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

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4.38.1 Verification Elements

- LVV-184 - DMS-REQ-0353-V-01: Publishing predicted visit schedule

4.38.2 Test Items

Verify that a predict-visit schedule can be published by the OCS.

4.38.3 Predecessors

4.38.4 Environment Needs

4.38.4.1 Software

4.38.4.2 Hardware

4.38.5 Input Specification

4.38.6 Output Specification

4.38.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	
	Test Data	No data.
	Expected Result	

4.39 LVV-T61 - Verify implementation of Associate Sources to Objects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

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4.39.1 Verification Elements

- LVV-16 - DMS-REQ-0034-V-01: Associate Sources to Objects

4.39.2 Test Items

Verify that each Source record contains an ID that associates it with a best guess at the Object it corresponds to.

4.39.3 Predecessors

4.39.4 Environment Needs

4.39.4.1 Software

4.39.4.2 Hardware

4.39.5 Input Specification

4.39.6 Output Specification

4.39.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that sources have objects
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
3	Description	Verify that objects list sources that seem reasonably near them.
	Test Data	No data.
	Expected Result	

4.40 LVV-T62 - Verify implementation of Provide PSF for Coadded Images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.40.1 Verification Elements

- LVV-20 - DMS-REQ-0047-V-01: Provide PSF for Coadded Images

4.40.2 Test Items

Verify that all coadd images produced by the DRP pipelines include a model from which an image of the PSF at any point on the coadd can be obtained.

4.40.3 Predecessors

4.40.4 Environment Needs

4.40.4.1 Software

4.40.4.2 Hardware

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4.40.5 Input Specification

Fully covered by preconditions for LVV-T16.

4.40.6 Output Specification

4.40.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T16	Description	The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00)
	Test Data	
	Expected Result	
1-2 from LVV-T16	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T16	Description	For each combination of tract/patch/filter, the PVI will be retrieved from the Butler, and the existence of all components described in Test items section §4.6.2 will be verified.
	Test Data	
	Expected Result	
1-4 from LVV-T16	Description	Scripts from the pipe_analysis package will be run on every visit to check for the presence of data products and make plots
	Test Data	
	Expected Result	
1-5 from LVV-T16	Description	Ten patches will be chosen at random and inspected by eye for unmasked artifacts.
	Test Data	
	Expected Result	
2	Description	Select Objects classified as point sources on 10 different coadd images (including all bands). Evaluate the PSF model at the positions of these Objects, and verify that subtracting a scaled version of the PSF model from the coadd image yields residuals consistent with pure noise.
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result
	Expected Result

4.41 LVV-T63 - Verify implementation of Produce Images for EPO

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

4.41.1 Verification Elements

- LVV-45 - DMS-REQ-0103-V-01: Produce Images for EPO

4.41.2 Test Items

This test will verify that the DRP pipelines produce the image data products called out in LSE-131. Currently this is limited to a color all-sky HiPS map. This will be verified (1) by inspection of pipeline configurations and (2) in operations rehearsals on precursor data. The production of a usable HiPS map will be verified by browsing it with community tools.

4.41.3 Predecessors

4.41.4 Environment Needs

4.41.4.1 Software

4.41.4.2 Hardware

4.41.5 Input Specification

In order for an operational test to be successful, as a precondition the inputs to that production must exist. For the only currently mandated image data production in LSE-131, a color all-sky HiPS map down to 1 arcsecond resolution, the prerequisite inputs to that are the single-filter coadds in the bands required by the yet-to-be-specified color prescription.

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4.41.6 Output Specification

4.41.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that a HiPS image map covering the LSST survey area, with a limiting depth yielding 1 arcsecond resolution, has been produced matching the color prescriptions provided by EPO (in updates to LSE-131 which are expected to be made "once ComCam data is available").
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
3	Description	Place the image map in a location accessible to a Firefly and an Aladin Lite client, ideally with the client running in the EPO data systems environment.
	Test Data	No data.
	Expected Result	
4	Description	Use Firefly to manually explore the image map at the largest scales to verify coverage of the entire sky. Sample in various locations to confirm the 1 arcsecond maximum depth. Confirm using Aladin Lite that the format of the image map is supported by this common community tool.
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
5	Description	Verify programmatically, perhaps both by sampling a variety of locations, and by counting the tiles created at the 1-arcsecond-resolution depth, that the map is complete and meets its specifications.
	Test Data	No data.
	Expected Result	
6	Description	Apply an IVOA-community HiPS service validation tool, if available, to the service location.
	Test Data	No data.
	Expected Result	
7	Description	Verify that the HiPS map created is in a location accessible to the EPO data systems.
	Test Data	No data.
	Expected Result	

4.42 LVV-T64 - Verify implementation of Coadded Image Provenance

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.42.1 Verification Elements

- LVV-46 - DMS-REQ-0106-V-01: Coadded Image Provenance

4.42.2 Test Items

Verify that all coadd data products produced by the DRP pipelines are associated with provenance information that includes the set of input epochs contributing to that coadd as well as any additional information needed to exactly produce that coadd.

4.42.3 Predecessors

4.42.4 Environment Needs

4.42.4.1 Software

4.42.4.2 Hardware

4.42.5 Input Specification

4.42.6 Output Specification

4.42.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Query and verify provenance of input images, and software versions that went into producing stack.
	Test Data	No data.
	Expected Result	
3	Description	Test re-generating 10 different coadds tract+patches based on the provenance image given

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Step	Description, Input Data and Expected Result	
	Test Data	No data.
	Expected Result	

4.43 LVV-T65 - Verify implementation of Source Catalog

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.43.1 Verification Elements

- LVV-98 - DMS-REQ-0267-V-01: Source Catalog

4.43.2 Test Items

Verify that all Sources produced by the DRP pipelines contain the entries listed in DMS-REQ-0267.

4.43.3 Predecessors

4.43.4 Environment Needs

4.43.4.1 Software

4.43.4.2 Hardware

4.43.5 Input Specification

4.43.6 Output Specification

4.43.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	

4.44 LVV-T66 - Verify implementation of Forced-Source Catalog

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.44.1 Verification Elements

- LVV-99 - DMS-REQ-0268-V-01: Forced-Source Catalog

4.44.2 Test Items

Verify that all ForcedSources produced by the DRP pipelines contain fluxes measured on difference and direct single-epoch images, associated uncertainties, an Object ID, and a Visit ID.

4.44.3 Predecessors

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4.44.4 Environment Needs

4.44.4.1 Software

4.44.4.2 Hardware

4.44.5 Input Specification

4.44.6 Output Specification

4.44.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: ‘‘‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl ‘‘‘ and any errors or failures reported.
	Test Data	
	Expected Result	
1-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
1-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.

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Step	Description, Input Data and Expected Result	
	Test Data	
	Expected Result	
1-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data	
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
3	Description	Verify that there exist entries in the forced-photometry table for all coadd objects for the PVIs on which the object should appear.
	Test Data	No data.
	Expected Result	
4	Description	Verify that there exist entries in a forced-photometry table for each image for all DIAObjects.
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result
	Expected Result

4.45 LVV-T67 - Verify implementation of Object Catalog

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.45.1 Verification Elements

- LVV-106 - DMS-REQ-0275-V-01: Object Catalog

4.45.2 Test Items

Verify that the DRP pipelines produce an Object catalog derived from detections made on both coadded images and difference images and measurements performed on coadds and possibly overlapping single-epoch images.

4.45.3 Predecessors

4.45.4 Environment Needs

4.45.4.1 Software

4.45.4.2 Hardware

4.45.5 Input Specification

Input Data

DECam HiTS data (raw science images and master calibrations)
HSC “RC2” data (raw science images and master calibrations)

Draft

4.45.6 Output Specification

4.45.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	load LSST DM Stack
	Test Data	No data.
	Expected Result	
2	Description	Run the single-frame processing and self-calibration steps of the DRP pipeline.
	Test Data	No data.
	Expected Result	
3	Description	Load data into DRP database
	Test Data	No data.
	Expected Result	
4	Description	Verify that the injected simulated objects are recovered at a rate consistent with their S/N *when not blended with each other or real objects*, and that flags indicating how each Object was detected are consistent with their properties: • static objects should be detected in coadds only (not difference images) • static-position/variable-flux objects should be detected in coadds and possibly difference images • transient objects should be detected in difference images only • stars with significant proper motions may be detected in either coadds or difference images • solar system objects should be detected in difference images only.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
5	Description	Insert simulated sources into all single-frame images, including: • static objects (e.g. galaxies), including some too faint to be detectable in single-epoch images; • objects with static positions that are sufficiently bright and variable that they should be detectable in single-epoch difference images; • transient objects that appear in only a few epochs; • stars with significant proper motions and parallaxes, some below the single-epoch detection limit • simulated solar system objects with orbits that can be constrained from just the epochs in the test dataset
	Test Data	No data.
	Expected Result	
6	Description	Run all remaining DRP pipeline steps.
	Test Data	No data.
	Expected Result	

4.46 LVV-T68 - Verify implementation of Provide Photometric Redshifts of Galaxies

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.46.1 Verification Elements

- LVV-19 - DMS-REQ-0046-V-01: Provide Photometric Redshifts of Galaxies

4.46.2 Test Items

Verify that Object catalogs produced by the DRP Pipeline include photometric redshift information.

4.46.3 Predecessors

4.46.4 Environment Needs

4.46.4.1 Software

4.46.4.2 Hardware

4.46.5 Input Specification

Input Data
HSC Public Data Release (raw science images, master calibrations)
Assorted public spectroscopic catalogs and high-accuracy photometric redshift catalogs in the HSC PDR footprint.

4.46.6 Output Specification

4.46.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Run DRP processing steps through (at least) final galaxy photometry measurements.
	Test Data	No data.
	Expected Result	
2	Description	Train photometric redshift algorithm(s) on spectroscopic and high-accuracy photometric redshift catalogs.
	Test Data	No data.
	Expected Result	
3	Description	Load into DRP Database
	Test Data	No data.
	Expected Result	
4	Description	Inspect database to verify that photometric redshifts are present for all objects
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
5	Description	Estimate photometric redshifts for all Objects generated by DRP processing.
	Test Data	No data.
	Expected Result	

4.47 LVV-T69 - Verify implementation of Object Characterization

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.47.1 Verification Elements

- LVV-107 - DMS-REQ-0276-V-01: Object Characterization

4.47.2 Test Items

Verify that Object catalogs produced by the DRP pipeline include all measurements listed in DMS-REQ-0276.

4.47.3 Predecessors

4.47.4 Environment Needs

4.47.4.1 Software

4.47.4.2 Hardware

4.47.5 Input Specification

4.47.6 Output Specification

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4.47.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Precursor data, execute DRP, load results, observe catalog contents
	Test Data	No data.
	Expected Result	

4.48 LVV-T70 - Verify implementation of Coadd Source Catalog

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.48.1 Verification Elements

- LVV-108 - DMS-REQ-0277-V-01: Coadd Source Catalog

4.48.2 Test Items

Verify that the DRP pipelines produce a CoaddSource catalog.

4.48.3 Predecessors

4.48.4 Environment Needs

4.48.4.1 Software

4.48.4.2 Hardware

4.48.5 Input Specification

4.48.6 Output Specification

4.48.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Verify that there exists a catalog of merged sources.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	

4.49 LVV-T71 - Verify implementation of Detecting extended low surface brightness objects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.49.1 Verification Elements

- LVV-180 - DMS-REQ-0349-V-01: Detecting extended low surface brightness objects

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4.49.2 Test Items

Verify that low-surface brightness objects (including those whose PSF S/N is lower than the detection threshold) are detected in coadds.

4.49.3 Predecessors

4.49.4 Environment Needs

4.49.4.1 Software

4.49.4.2 Hardware

4.49.5 Input Specification

Input Data
HSC "RC2" data (raw science images and master calibrations)

4.49.6 Output Specification

4.49.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	load LSST DM Stack
	Test Data	No data.
	Expected Result	
2	Description	Run the single-frame processing and self-calibration steps of the DRP pipeline.
	Test Data	No data.
	Expected Result	
3	Description	Insert simulated low-surface-brightness galaxies (with exponential profiles) consistently into all calibrated single-epoch images.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
4	Description	Run all remaining DRP pipeline steps.
	Test Data	No data.
	Expected Result	
5	Description	Load data into DRP database
	Test Data	No data.
	Expected Result	
6	Description	Verify that the injected simulated objects are recovered at a rate consistent with their S/N and true profile *when not blended with each other or real objects.*
	Test Data	No data.
	Expected Result	

4.50 LVV-T72 - Verify implementation of Coadd Image Method Constraints

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.50.1 Verification Elements

- LVV-109 - DMS-REQ-0278-V-01: Coadd Image Method Constraints

4.50.2 Test Items

Verify the implementation of how Coadd images are created.

4.50.3 Predecessors

4.50.4 Environment Needs

4.50.4.1 Software

Draft

4.50.4.2 Hardware

4.50.5 Input Specification

4.50.6 Output Specification

4.50.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Verify that coadds were created following specification
	Test Data	No data.
	Expected Result	

4.51 LVV-T73 - Verify implementation of Deep Detection Coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

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4.51.1 Verification Elements

- LVV-110 - DMS-REQ-0279-V-01: Deep Detection Coadds

4.51.2 Test Items

Verify that the DRP pipelines produce a suite of per-band coadded images that are optimized for depth.

4.51.3 Predecessors

4.51.4 Environment Needs

4.51.4.1 Software

4.51.4.2 Hardware

4.51.5 Input Specification

4.51.6 Output Specification

4.51.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify through inspection that per-filter coadds exist for each tract+patch possible
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
3	Description	Verify through inspection that the images used to generate those coadds met specified conditions
	Test Data	No data.
	Expected Result	
4	Description	Visually inspect a subset of the coadds to verify that they visually appear reasonable and to be from good quality data.
	Test Data	No data.
	Expected Result	

4.52 LVV-T74 - Verify implementation of Template Coadds

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

4.52.1 Verification Elements

- LVV-111 - DMS-REQ-0280-V-01: Template Coadds

4.52.2 Test Items

Verify that the DMS can produce Template Coadds for DIA processing.

4.52.3 Predecessors

Draft

4.52.4 Environment Needs

4.52.4.1 Software

4.52.4.2 Hardware

4.52.5 Input Specification

4.52.6 Output Specification

4.52.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: “‘bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl “‘ and any errors or failures reported.
	Test Data	
	Expected Result	
1-3 from LVV-T18	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
1-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.

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Step	Description, Input Data and Expected Result
	Test Data
	Expected Result
1-5 from LVV-T18	Description: DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.
	Test Data
	Expected Result

4.53 LVV-T75 - Verify implementation of Multi-band Coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.53.1 Verification Elements

- LVV-112 - DMS-REQ-0281-V-01: Multi-band Coadds

4.53.2 Test Items

Verify that the DRP pipelines produce multi-band coadds for detection purposes.

4.53.3 Predecessors

4.53.4 Environment Needs

4.53.4.1 Software

4.53.4.2 Hardware

4.53.5 Input Specification

Draft

4.53.6 Output Specification

4.53.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2-1 from LVV-T16	Description	The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00)
	Test Data	
	Expected Result	
2-2 from LVV-T16	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T16	Description	For each combination of tract/patch/filter, the PVI will be retrieved from the Butler, and the existence of all components described in Test items section §4.6.2 will be verified.
	Test Data	
	Expected Result	
2-4 from LVV-T16	Description	Scripts from the pipe_analysis package will be run on every visit to check for the presence of data products and make plots
	Test Data	
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2-5 from LVV-T16	Description	Ten patches will be chosen at random and inspected by eye for unmasked artifacts.
	Test Data	
	Expected Result	
3	Description	Verify that deep detection coadds exist based on all filters.
	Test Data	No data.
	Expected Result	

4.54 LVV-T76 - Verify implementation of All-Sky Visualization of Data Releases

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

4.54.1 Verification Elements

- LVV-160 - DMS-REQ-0329-V-01: All-Sky Visualization of Data Releases

4.54.2 Test Items

Show that it's possible to produce large area visualizations from Data Release data products.

4.54.3 Predecessors

4.54.4 Environment Needs

4.54.4.1 Software

4.54.4.2 Hardware

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4.54.5 Input Specification

Input Data
Dataset of perhaps ~100 square degrees. The first HSC Public Data Release will be used for this test. Larger (in sky area) datasets should be identified for further testing.

4.54.6 Output Specification

4.54.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Run all sky tile generation task to produce the data products necessary for serving the all sky visualization.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
3	Description	Manually perform, and log (including timing where applicable), the following steps against that all sky visualization application. At all steps take special care to note any missing or un-rendered image tiles: 1. Navigate to the all sky viewer and log the URL, browser and version. 2. Zoom to native pixel display (1 image pixel per display pixel) 3. Zoom to fit the full PDR footprint 4. Zoom to 1/4x native resolution 5. Pan to eastern edge of the footprint. 6. Pan to western edge of the footprint. 7. Navigate to the middle of the footprint. 8. Zoom to max magnification
	Test Data	No data.
	Expected Result	

4.55 LVV-T77 - Verify implementation of Best Seeing Coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.55.1 Verification Elements

- LVV-161 - DMS-REQ-0330-V-01: Best Seeing Coadds

4.55.2 Test Items

Verify that the DRP pipelines produce a suite of per-band coadds with input images filtered to optimize the size of the effective PSF on the coadd.

4.55.3 Predecessors

4.55.4 Environment Needs

4.55.4.1 Software

Draft

4.55.4.2 Hardware

4.55.5 Input Specification

4.55.6 Output Specification

4.55.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Explicitly create a coadd for a specified seeing range in each filter.
	Test Data	No data.
	Expected Result	
3	Description	Verify that these coadds exist.
	Test Data	No data.
	Expected Result	

4.56 LVV-T78 - Verify implementation of Persisting Data Products

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

4.56.1 Verification Elements

- LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products

4.56.2 Test Items

Verify that per-band deep coadds and best-seeing coadds are present, kept, and available.

4.56.3 Predecessors

4.56.4 Environment Needs

4.56.4.1 Software

4.56.4.2 Hardware

4.56.5 Input Specification

Precursor data from HSC PDR.

4.56.6 Output Specification

4.56.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Produce some relevant coadds and store them in the Archive
	Test Data	No data.
	Expected Result	
2	Description	Examine the data retention policies for those products
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result
	Expected Result

4.57 LVV-T79 - Verify implementation of PSF-Matched Coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.57.1 Verification Elements

- LVV-166 - DMS-REQ-0335-V-01: PSF-Matched Coadds

4.57.2 Test Items

Verify that the DRP pipelines produce PSF matched coadds.

4.57.3 Predecessors

4.57.4 Environment Needs

4.57.4.1 Software

4.57.4.2 Hardware

4.57.5 Input Specification

4.57.6 Output Specification

4.57.7 Test Procedure

Step	Description, Input Data and Expected Result
1-1 from LVV-T12	Description: The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00). Test Data:

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Step	Description, Input Data and Expected Result	
	Expected Result	
1-2 from LVV-T12	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2	Description	Verify that PSF-matched coadds were created.
	Test Data	No data.
	Expected Result	

4.58 LVV-T80 - Verify implementation of Detecting faint variable objects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.58.1 Verification Elements

- LVV-168 - DMS-REQ-0337-V-01: Detecting faint variable objects

4.58.2 Test Items

To verify that the Data Release Production pipeline will be able to detect faint sources with long-term variability (e.g., quasars, proper motion stars) via, e.g., shorter timescale coadds (month to a few months).

4.58.3 Predecessors

4.58.4 Environment Needs

4.58.4.1 Software

4.58.4.2 Hardware

4.58.5 Input Specification

Input Data such as:
DECam HiTS data.
Gaia catalog of faint moving objects.
Catalog of spectroscopically confirmed quasars.
(Alternative: input data injected with faint variable sources).

4.58.6 Output Specification

4.58.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Identify 100 objects from Gaia with proper motions high enough to have detectably moved during HSC observations.
	Test Data	No data.
	Expected Result	
2	Description	Measure reported proper motion of these objects in DM Stack processing. Verify that it is consistent with Gaia objects.
	Test Data	No data.
	Expected Result	
3	Description	Identify 100 quasars from color-space or existing extragalactic spectroscopic catalog.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
4	Description	Measure lightcurves of these quasars. Determine if structure function is reasonable (may require at least a year to determine if the structure function of 100 quasars is "reasonable").
	Test Data	No data.
	Expected Result	
5-1 from LVV-T18	Description	The DM Stack and Alert Processing packaged shall be initialized as described in LVT-T17 (AG-00-00).
	Test Data	
	Expected Result	
5-2 from LVV-T18	Description	The alert generation processing will be executed using the verification cluster: "'bash python ap_verify/bin/prepare_demo_slurm_files.py # At present we must run a single ccd+visit to handle ingestion before # parallel processing can begin ./ap_verify/bin/exec_demo_run_1ccd.sh 410915 25 ln -s ap_verify/bin/demo_run.sl ln -s ap_verify/bin/demo_cmds.conf sbatch demo_run.sl "' and any errors or failures reported.
	Test Data	
	Expected Result	
5-3 from LVV-T18	Description	A "Data Butler" will be initialized to access the repository.
	Test Data	
	Expected Result	
5-4 from LVV-T18	Description	For each of the expected data products types (listed in §4.2.2) and each of the expected units (PVIs, catalogs, etc.), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
5-5 from LVV-T18	Description	DIAObjects are currently only stored in a database, without shims to the Butler, so the existence of the database table and its non-empty contents will be verified by directly accessing it using sqlite3 and executing appropriate SQL queries.

Draft

Step	Description, Input Data and Expected Result	
	Test Data	
	Expected Result	
6	Description	(Alternative: if faint variable source can be injected into the input data, test to see if they are recovered).
	Test Data	No data.
	Expected Result	(This Alternative would enable us not only to tell if faint variable objects are detected, but exactly which kinds, how faint, and with what efficiency.)

4.59 LVV-T81 - Verify implementation of Targeted Coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.59.1 Verification Elements

- LVV-169 - DMS-REQ-0338-V-01: Targeted Coadds

4.59.2 Test Items

Verify that small sections of any coadd produced by the DRP pipelines can be retained, even if the full coadd is not.

4.59.3 Predecessors

4.59.4 Environment Needs

4.59.4.1 Software

4.59.4.2 Hardware

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4.59.5 Input Specification

4.59.6 Output Specification

4.59.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Remove DR from disk
	Test Data	No data.
	Expected Result	
2	Description	Observe retention of designated coadd sections
	Test Data	No data.
	Expected Result	
3	Description	Observe accessibility of designated coadd sections via simulated DAC LSP instance
	Test Data	No data.
	Expected Result	

4.60 LVV-T82 - Verify implementation of Tracking Characterization Changes Between Data Releases

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jim Bosch

4.60.1 Verification Elements

- LVV-170 - DMS-REQ-0339-V-01: Tracking Characterization Changes Between Data Releases

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4.60.2 Test Items

Verify that small-area subsets of a DR can be retained when most of that DR is retired, for comparison with future DRs.

4.60.3 Predecessors

4.60.4 Environment Needs

4.60.4.1 Software

4.60.4.2 Hardware

4.60.5 Input Specification

4.60.6 Output Specification

4.60.7 Test Procedure

Step	Description, Input Data and Expected Result	
1-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
1-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
1-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
2-1 from LVV-T13	Description	The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00).
	Test Data	

Draft

Step	Description, Input Data and Expected Result
	Expected Result
2-2 from LVV-T13	Description A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
2-3 from LVV-T13	Description Scripts from the pipe_analysis package will be run on every visit to check for the presence of data products and make plots.
	Test Data
	Expected Result
3-1 from LVV-T14	Description The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00).
	Test Data
	Expected Result
3-2 from LVV-T14	Description A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result
3-3 from LVV-T14	Description Scripts from the pipe_analysis package will be run on every tract to check for the presence of data products and make plots
	Test Data
	Expected Result
4-1 from LVV-T15	Description The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00).
	Test Data
	Expected Result
4-2 from LVV-T15	Description A "Data Butler" will be initialized to access the repository.
	Test Data
	Expected Result

Draft

Step	Description, Input Data and Expected Result	
4-3 from LVV-T15	Description	For each processed CCD, the PVI will be retrieved from the Butler, and the existence of all components described in section Test Items (§4.6.2) will be verified.
	Test Data	
	Expected Result	
4-4 from LVV-T15	Description	Scripts from the pipe_analysis package will be run on every visit to check for the presence of data products and make plots
	Test Data	
	Expected Result	
4-5 from LVV-T15	Description	Five sensors will be chosen at random from each of two visits and inspected by eye for unmasked artifacts.
	Test Data	
	Expected Result	
5-1 from LVV-T16	Description	The DM Stack shall be initialized using the loadLSST script (as described in LVV-T10 - DRP-00-00)
	Test Data	
	Expected Result	
5-2 from LVV-T16	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
5-3 from LVV-T16	Description	For each combination of tract/patch/filter, the PVI will be retrieved from the Butler, and the existence of all components described in Test items section §4.6.2 will be verified.
	Test Data	
	Expected Result	
5-4 from LVV-T16	Description	Scripts from the pipe_analysis package will be run on every visit to check for the presence of data products and make plots
	Test Data	
	Expected Result	
5-5 from LVV-T16	Description	Ten patches will be chosen at random and inspected by eye for unmasked artifacts.
	Test Data	

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
6	Description	Prepare a second DRP run -> DPDD with different configuration parameters for this second test Data Release.
	Test Data	No data.
	Expected Result	
7	Description	Stage subset of products from first test Data Release to separate storage.
	Test Data	No data.
	Expected Result	
8	Description	Scientifically compare the results of the subset of that region of sky to those in the second test Data Release comparing the results of the DRP Scientific Verification tests.
	Test Data	No data.
	Expected Result	

4.61 LVV-T83 - Verify implementation of Bad Pixel Map

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

4.61.1 Verification Elements

- LVV-22 - DMS-REQ-0059-V-01: Bad Pixel Map

4.61.2 Test Items

Verify that the DMS can produce a map of detector pixels that suffer from pathologies.

4.61.3 Predecessors

Draft

4.61.4 Environment Needs

4.61.4.1 Software

4.61.4.2 Hardware

4.61.5 Input Specification

4.61.6 Output Specification

4.61.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.62 LVV-T84 - Verify implementation of Bias Residual Image

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

4.62.1 Verification Elements

- LVV-23 - DMS-REQ-0060-V-01: Bias Residual Image

4.62.2 Test Items

Verify that DMS can construct a bias residual image that corrects for temporally-stable bias structures.
Verify that DMS can do this on demand.

4.62.3 Predecessors

4.62.4 Environment Needs

4.62.4.1 Software

4.62.4.2 Hardware

4.62.5 Input Specification

4.62.6 Output Specification

4.62.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.63 LVV-T85 - Verify implementation of Crosstalk Correction Matrix

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

4.63.1 Verification Elements

- LVV-24 - DMS-REQ-0061-V-01: Crosstalk Correction Matrix

4.63.2 Test Items

Verify that the DMS can generate a cross-talk correction matrix from appropriate calibration data.
Verify that the DMS can measure the effectiveness of the cross-talk correction matrix.

4.63.3 Predecessors

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4.63.4 Environment Needs

4.63.4.1 Software

4.63.4.2 Hardware

4.63.5 Input Specification

4.63.6 Output Specification

4.63.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.64 LVV-T86 - Verify implementation of Illumination Correction Frame

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

4.64.1 Verification Elements

- LVV-25 - DMS-REQ-0062-V-01: Illumination Correction Frame

4.64.2 Test Items

Verify that the DMS can produce an illumination correction frame calibration product.
Verify that the DMS can determine the effectiveness of an illumination correction and determine how often it should be updated.

4.64.3 Predecessors

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4.64.4 Environment Needs

4.64.4.1 Software

4.64.4.2 Hardware

4.64.5 Input Specification

4.64.6 Output Specification

4.64.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.65 LVV-T87 - Verify implementation of Monochromatic Flatfield Data Cube

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

4.65.1 Verification Elements

- LVV-26 - DMS-REQ-0063-V-01: Monochromatic Flatfield Data Cube

4.65.2 Test Items

Verify that the DMS can generate a calibration image/cube that corrects for pixel-to-pixel wavelength-dependent detector response.
Verify that the DMS can measure the effectiveness of this monochromatic flatfield data cube.

4.65.3 Predecessors

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4.65.4 Environment Needs

4.65.4.1 Software

4.65.4.2 Hardware

4.65.5 Input Specification

4.65.6 Output Specification

4.65.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.66 LVV-T88 - Verify implementation of Calibration Data Products

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

4.66.1 Verification Elements

- LVV-57 - DMS-REQ-0130-V-01: Calibration Data Products

4.66.2 Test Items

Verify that the DMS can produce and archive the required Calibration Data Products: cross talk correction, bias, dark, monochromatic dome flats, broad-band flats, fringe correction, and illumination corrections.

4.66.3 Predecessors

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4.66.4 Environment Needs

4.66.4.1 Software

4.66.4.2 Hardware

4.66.5 Input Specification

4.66.6 Output Specification

4.66.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.67 LVV-T89 - Verify implementation of Calibration Image Provenance

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

4.67.1 Verification Elements

- LVV-59 - DMS-REQ-0132-V-01: Calibration Image Provenance

4.67.2 Test Items

Verify that the DMS records the required provenance information for the Calibration Data Products.

4.67.3 Predecessors

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4.67.4 Environment Needs

4.67.4.1 Software

4.67.4.2 Hardware

4.67.5 Input Specification

4.67.6 Output Specification

4.67.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Precursor data, execute CPP, observe provenance
	Test Data	No data.
	Expected Result	

4.68 LVV-T90 - Verify implementation of Dark Current Correction Frame

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

4.68.1 Verification Elements

- LVV-113 - DMS-REQ-0282-V-01: Dark Current Correction Frame

4.68.2 Test Items

Verify that the DMS can produce an dark correction frame calibration product.
Verify that the DMS can determine the effectiveness of a dark correction and determine how often it should be updated.

4.68.3 Predecessors

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4.68.4 Environment Needs

4.68.4.1 Software

4.68.4.2 Hardware

4.68.5 Input Specification

4.68.6 Output Specification

4.68.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.69 LVV-T91 - Verify implementation of Fringe Correction Frame

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

4.69.1 Verification Elements

- LVV-114 - DMS-REQ-0283-V-01: Fringe Correction Frame

4.69.2 Test Items

Verify that the DMS can produce an fringe-correction frame calibration product.
Verify that the DMS can determine the effectiveness of the fringe-correction frame and determine how often it should be updated.

4.69.3 Predecessors

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4.69.4 Environment Needs

4.69.4.1 Software

4.69.4.2 Hardware

4.69.5 Input Specification

4.69.6 Output Specification

4.69.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

4.70 LVV-T92 - Verify implementation of Processing of Data From Special Programs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.70.1 Verification Elements

- LVV-151 - DMS-REQ-0320-V-01: Processing of Data From Special Programs

4.70.2 Test Items

For a simulated night of observing that includes some special program observations, show that the SP observations are reduced using their designated reconfigured pipelines (i.e., that the image metadata is sufficient to trigger the processing and include all other relevant images in the processing).

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4.70.3 Predecessors

4.70.4 Environment Needs

4.70.4.1 Software

4.70.4.2 Hardware

4.70.5 Input Specification

A variety of imaging data from Special Programs, including these scenarios:
(1) Special Programs data that can be processed by the Prompt pipeline (i.e., standard visits)
(2) Special Programs data that requires 'real-time' (~24) processing with a reconfigured pipeline (e.g., DDF imaging sequence)
(3) Special Programs data that can (should) be processed by the Data Release pipeline (e.g., North Ecliptic Spur standard visits)

4.70.6 Output Specification

4.70.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	(1) Special Programs data that can be processed by the Prompt pipeline (i.e., standard visits). Check that all images with the header keyword for SP were processed by the Prompt pipeline. Check that the Prompt pipeline's data products – DIASource, DIAObject catalogs and the Alerts – contain items flagged with their origin as that SP.
	Test Data	No data.
	Expected Result	
2	Description	(2) Special Programs data that requires 'real-time' (~24) processing with a reconfigured pipeline (e.g., DDF imaging sequence) Check that all images with the header keywords for a given SP were processed by their reconfigured pipeline. Check that the pipeline's data products have been updated, and passed their QA.
	Test Data	No data.
	Expected Result	

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Step	Description, Input Data and Expected Result	
3	Description	(3) Special Programs data that can (should) be processed by the Data Release pipeline (e.g., North Ecliptic Spur standard visits). SP data would be added manually to the DRP processing. Check that the DRP's data products – Source, Object, CoAdds – contain items flagged as originating in that SP.
	Test Data	No data.
	Expected Result	

4.71 LVV-T93 - Verify implementation of Level 1 Processing of Special Programs Data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.71.1 Verification Elements

- LVV-152 - DMS-REQ-0321-V-01: Level 1 Processing of Special Programs Data

4.71.2 Test Items

Execute multi-day operations rehearsal. Observe whether Prompt Processing data products generated in time and confirm whether processing has completed before the start of the next simulated night.

4.71.3 Predecessors

4.71.4 Environment Needs

4.71.4.1 Software

4.71.4.2 Hardware

Draft

4.71.5 Input Specification

Imaging data obtained under a Special Program: for example, a sequence of consecutive images of a deep drilling field.

4.71.6 Output Specification

4.71.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	If imaging data for a Special Program that requires processing with the Prompt pipeline was obtained the previous night, check that there exist DIASources/Objects/Alerts with flags that they originated from the Special Program.
	Test Data	No data.
	Expected Result	
2	Description	If imaging data for a Special Program that requires prompt processing with a reconfigured pipeline was obtained the previous night, check that the relevant data products have been updated.
	Test Data	No data.
	Expected Result	

4.72 LVV-T94 - Verify implementation of Special Programs Database

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.72.1 Verification Elements

- LVV-153 - DMS-REQ-0322-V-01: Special Programs Database

4.72.2 Test Items

To confirm that data products from Special Programs are based solely on images obtained as part of SP via, e.g., metadata queries. To confirm that the SP data products can be joined

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to Prompt and DRP products by attempting to do so via, e.g., coordinate table joins, and attempting to e.g., find the faint counterparts in a Deep Drilling stack to variables with no Object detections in the DRP coadds.

4.72.3 Predecessors

4.72.4 Environment Needs

4.72.4.1 Software

4.72.4.2 Hardware

4.72.5 Input Specification

Databases created by reconfigured pipelines for processing Special Programs data (e.g., DIAObject/DIASource catalogs for a Deep Drilling Field).

4.72.6 Output Specification

4.72.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	SP data product: DDF DIAObjects catalog Non-SP data product: WFD DIAObjects catalog Test: join the two catalogs by coordinate (e.g., to get a longer time baseline for variable stars in the DDF)
	Test Data	No data.
	Expected Result	
2	Description	SP data product: DDF Objects catalog Non-SP data product: WFD DIAObjects catalog Test: join the two catalogs by coordinate to identify faint host galaxies of transients found in WFD
	Test Data	No data.
	Expected Result	

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4.73 LVV-T95 - Verify implementation of Constraints on Level 1 Special Program Products Generation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Melissa Graham

4.73.1 Verification Elements

- LVV-175 - DMS-REQ-0004-V-01: Time to L1 public release

4.73.2 Test Items

Execute single-day operations rehearsal. Observe Prompt Processing data products generated in time. Confirm that data from Special Programs is processed with the same latency as required for main survey data: release of public data within L1publicT and Alerts within OTT1.

4.73.3 Predecessors

4.73.4 Environment Needs

4.73.4.1 Software

4.73.4.2 Hardware

4.73.5 Input Specification

Data from a Special Program that is appropriate for the Prompt pipeline (i.e., a Deep Drilling type series of standard visits from a non-crowded field).

4.73.6 Output Specification

4.73.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1-1 from LVV-T35	Description	Time processing of data starting from (pre-ingested) raw files until an alert is available for distribution; verify that this time is less than OTT1.
	Test Data	
	Expected Result	
1-2 from LVV-T35	Description	Time processing of data starting from (pre-ingested) raw files until the required data products are available in the Science Platform. Verify that this time is less than L1PublicT.
	Test Data	
	Expected Result	
1-3 from LVV-T35	Description	Run MOPS on 1 night equivalent of LSST observing worth of precursor data and verify that Solar System Object orbits can be updated within 24 hours.
	Test Data	
	Expected Result	
1-4 from LVV-T35	Description	
	Test Data	
	Expected Result	
1-5 from LVV-T35	Description	
	Test Data	
	Expected Result	
1-6 from LVV-T35	Description	Record time between completion of MOPS processing and availability of the updated SSObject catalogue through the Science Platform; verify this time is less than L1PublicT.
	Test Data	
	Expected Result	

4.74 LVV-T96 - Verify implementation of Query Repeatability

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

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4.74.1 Verification Elements

- LVV-122 - DMS-REQ-0291-V-01: Query Repeatability

4.74.2 Test Items

Verify that prior queries can be rerun with identical results, or with new additional data for live (Alert Production) databases.

4.74.3 Predecessors

4.74.4 Environment Needs

4.74.4.1 Software

4.74.4.2 Hardware

4.74.5 Input Specification

4.74.6 Output Specification

4.74.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Select and download (deterministic) random subsample of records from Data Release Object and Source tables.
	Test Data	No data.
	Expected Result	
2	Description	Select and download random subsample of PPDB DIAObject and DIASource tables.
	Test Data	No data.
	Expected Result	
3	Description	As appropriate, wait for some amount of non-trivial database usage to occur, such as Prompt Processing ingestion or ingestion of other DRP database tables.
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
4	Description	Re-run the queries in steps 1 and 2 and verify that the resulting data are identical.
	Test Data	No data.
	Expected Result	

4.75 LVV-T97 - Verify implementation of Uniqueness of IDs Across Data Releases

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

4.75.1 Verification Elements

- LVV-123 - DMS-REQ-0292-V-01: Uniqueness of IDs Across Data Releases

4.75.2 Test Items

Load multiple DRs and PPDB, observe uniqueness of IDs

4.75.3 Predecessors

4.75.4 Environment Needs

4.75.4.1 Software

4.75.4.2 Hardware

4.75.5 Input Specification

4.75.6 Output Specification

Draft

4.75.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load multiple DRs and PPDB
	Test Data	No data.
	Expected Result	
2	Description	Observe uniqueness of IDs
	Test Data	No data.
	Expected Result	

4.76 LVV-T98 - Verify implementation of Selection of Datasets

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

4.76.1 Verification Elements

- LVV-124 - DMS-REQ-0293-V-01: Selection of Datasets

4.76.2 Test Items

Load DR, observe retrieval of representative datasets

4.76.3 Predecessors

4.76.4 Environment Needs

4.76.4.1 Software

4.76.4.2 Hardware

4.76.5 Input Specification

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4.76.6 Output Specification

4.76.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load DR
	Test Data	No data.
	Expected Result	
2	Description	Observe retrieval of single PVI with metadata
	Test Data	No data.
	Expected Result	
3	Description	Observe retrieval of multiple PVIs with metadata
	Test Data	No data.
	Expected Result	
4	Description	Observe retrieval of coadd patch with metadata
	Test Data	No data.
	Expected Result	
5	Description	Observe retrieval of subset of rows in each catalog
	Test Data	No data.
	Expected Result	

4.77 LVV-T99 - Verify implementation of Processing of Datasets

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

Draft

4.77.1 Verification Elements

- LVV-125 - DMS-REQ-0294-V-01: Processing of Datasets

4.77.2 Test Items

Execute AP and DRP, simulate failures, observe correct processing

4.77.3 Predecessors

4.77.4 Environment Needs

4.77.4.1 Software

4.77.4.2 Hardware

4.77.5 Input Specification

4.77.6 Output Specification

4.77.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute AP and DRP
	Test Data	No data.
	Expected Result	
2	Description	Simulate failures
	Test Data	No data.
	Expected Result	
3	Description	Observe correct processing
	Test Data	No data.
	Expected Result	

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4.78 LVV-T100 - Verify implementation of Transparent Data Access

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

4.78.1 Verification Elements

- LVV-126 - DMS-REQ-0295-V-01: Transparent Data Access

4.78.2 Test Items

Test Items

Observe dataset retrieval from multiple LSP instances

4.78.3 Predecessors

4.78.4 Environment Needs

4.78.4.1 Software

4.78.4.2 Hardware

4.78.5 Input Specification

4.78.6 Output Specification

4.78.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Observe dataset retrieval from multiple LSP instances
	Test Data	No data.
	Expected Result	

Draft

4.79 LVV-T101 - Verify implementation of Transient Alert Distribution

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

4.79.1 Verification Elements

- LVV-3 - DMS-REQ-0002-V-01: Transient Alert Distribution

4.79.2 Test Items

Precursor or simulated data, execute AP, observe distribution to simulated clients using standard protocols

4.79.3 Predecessors

4.79.4 Environment Needs

4.79.4.1 Software

4.79.4.2 Hardware

4.79.5 Input Specification

Obtain precursor or simulated data

4.79.6 Output Specification

4.79.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute AP
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
2	Description	Observe distribution to simulated clients using standard protocols
	Test Data	No data.
	Expected Result	

4.80 LVV-T102 - Verify implementation of Solar System Objects Available Within Specified Time

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

4.80.1 Verification Elements

- LVV-36 - DMS-REQ-0089-V-01: Solar System Objects Available Within Specified Time

4.80.2 Test Items

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

4.80.3 Predecessors

4.80.4 Environment Needs

4.80.4.1 Software

4.80.4.2 Hardware

4.80.5 Input Specification

4.80.6 Output Specification

4.80.7 Test Procedure

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Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal
	Test Data	No data.
	Expected Result	
2	Description	Observe data products generated in time
	Test Data	No data.
	Expected Result	

4.81 LVV-T103 - Verify implementation of Generate Data Quality Report Within Specified Time

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

4.81.1 Verification Elements

- LVV-38 - DMS-REQ-0096-V-01: Generate Data Quality Report Within Specified Time

4.81.2 Test Items

Verify that the DMS can generate a nightly Data Quality Report within dqReportComplTime

4.81.3 Predecessors

4.81.4 Environment Needs

4.81.4.1 Software

4.81.4.2 Hardware

4.81.5 Input Specification

Draft

4.81.6 Output Specification

4.81.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal
	Test Data	No data.
	Expected Result	
2	Description	Observe data quality report is generated on time and with correct contents
	Test Data	No data.
	Expected Result	

4.82 LVV-T104 - Verify implementation of Generate DMS Performance Report Within Specified Time

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

4.82.1 Verification Elements

- LVV-40 - DMS-REQ-0098-V-01: Generate DMS Performance Report Within Specified Time

4.82.2 Test Items

Verify that the DMS can generate a nightly Perfomance Report within perfReportComplTime

4.82.3 Predecessors

4.82.4 Environment Needs

4.82.4.1 Software

Draft

4.82.4.2 Hardware

4.82.5 Input Specification

4.82.6 Output Specification

4.82.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal
	Test Data	No data.
	Expected Result	
2	Description	Observe performance report is generated on time and with correct contents
	Test Data	No data.
	Expected Result	

4.83 LVV-T105 - Verify implementation of Generate Calibration Report Within Specified Time

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

4.83.1 Verification Elements

- LVV-42 - DMS-REQ-0100-V-01: Generate Calibration Report Within Specified Time

4.83.2 Test Items

Verify that the DMS can generate a night Calibration Report in both human-readable and machine-parseable forms.

4.83.3 Predecessors

4.83.4 Environment Needs

4.83.4.1 Software

4.83.4.2 Hardware

4.83.5 Input Specification

4.83.6 Output Specification

4.83.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal
	Test Data	No data.
	Expected Result	
2	Description	Observe calibration report is generated on time and with correct contents
	Test Data	No data.
	Expected Result	

4.84 LVV-T106 - Verify implementation of Calibration Images Available Within Specified Time

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

4.84.1 Verification Elements

- LVV-58 - DMS-REQ-0131-V-01: Time allowed to process calibs

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4.84.2 Test Items

Execute single-day operations rehearsal, observe data products generated

4.84.3 Predecessors

4.84.4 Environment Needs

4.84.4.1 Software

4.84.4.2 Hardware

4.84.5 Input Specification

4.84.6 Output Specification

4.84.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal
	Test Data	No data.
	Expected Result	
2	Description	Observe data products generated
	Test Data	No data.
	Expected Result	

4.85 LVV-T107 - Verify implementation of Level-1 Production Completeness

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

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4.85.1 Verification Elements

- LVV-115 - DMS-REQ-0284-V-01: Level-1 Production Completeness

4.85.2 Test Items

Verify that the DMS successfully processes all images of sufficiently quality for processing are eventually processed even after connectivity failures.

4.85.3 Predecessors

LVV-T284

4.85.4 Environment Needs

4.85.4.1 Software

4.85.4.2 Hardware

4.85.5 Input Specification

4.85.6 Output Specification

4.85.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Ingest raw data while simulating failures and outages, observe eventual recovery
	Test Data	No data.
	Expected Result	

4.86 LVV-T108 - Verify implementation of Level 1 Source Association

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

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4.86.1 Verification Elements

- LVV-116 - DMS-REQ-0285-V-01: Level 1 Source Association

4.86.2 Test Items

Verify that the DMS associates DIASources into a DIAObject or SSObject.

4.86.3 Predecessors

4.86.4 Environment Needs

4.86.4.1 Software

4.86.4.2 Hardware

4.86.5 Input Specification

4.86.6 Output Specification

4.86.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP
	Test Data	No data.
	Expected Result	

4.87 LVV-T109 - Verify implementation of SSObject Precovery

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

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4.87.1 Verification Elements

- LVV-117 - DMS-REQ-0286-V-01: SSObject Precovery

4.87.2 Test Items

Verify that the DMS associates additional DIAObjects (both forward and back in time) with objects classified as SSObjects.

4.87.3 Predecessors

4.87.4 Environment Needs

4.87.4.1 Software

4.87.4.2 Hardware

4.87.5 Input Specification

4.87.6 Output Specification

4.87.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP
	Test Data	No data.
	Expected Result	

4.88 LVV-T110 - Verify implementation of DIASource Precovery

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

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4.88.1 Verification Elements

- LVV-118 - DMS-REQ-0287-V-01: Max look-back time for precovery

4.88.2 Test Items

Verify that DMS performs forced photometry for new DIAObjects at all available images within the precoveryWindow.

4.88.3 Predecessors

4.88.4 Environment Needs

4.88.4.1 Software

4.88.4.2 Hardware

4.88.5 Input Specification

4.88.6 Output Specification

4.88.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal, observe data products generated in time
	Test Data	No data.
	Expected Result	

4.89 LVV-T111 - Verify implementation of Use of External Orbit Catalogs

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

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4.89.1 Verification Elements

- LVV-119 - DMS-REQ-0288-V-01: Use of External Orbit Catalogs

4.89.2 Test Items

Verify that the DMS can make use of external catalogs to improve identification of SSObjects.

4.89.3 Predecessors

4.89.4 Environment Needs

4.89.4.1 Software

4.89.4.2 Hardware

4.89.5 Input Specification

4.89.6 Output Specification

4.89.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP
	Test Data	No data.
	Expected Result	

4.90 LVV-T112 - Verify implementation of Alert Filtering Service

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

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4.90.1 Verification Elements

- LVV-173 - DMS-REQ-0342-V-01: Alert Filtering Service

4.90.2 Test Items

Verify that user-defined filters can be used to generate a basic alert filtering service.

4.90.3 Predecessors

4.90.4 Environment Needs

4.90.4.1 Software

4.90.4.2 Hardware

4.90.5 Input Specification

4.90.6 Output Specification

4.90.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Simulated alert stream, observe ability to define filters and proper filter results
	Test Data	No data.
	Expected Result	

4.91 LVV-T113 - Verify implementation of Performance Requirements for LSST Alert Filtering Service

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

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4.91.1 Verification Elements

- LVV-174 - DMS-REQ-0343-V-01: Number of full-size alerts

4.91.2 Test Items

Verify that the DMS alert filter service supports specified number of brokers.

4.91.3 Predecessors

4.91.4 Environment Needs

4.91.4.1 Software

4.91.4.2 Hardware

4.91.5 Input Specification

4.91.6 Output Specification

4.91.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Simulated alert stream, observe ability to support specified load
	Test Data	No data.
	Expected Result	

4.92 LVV-T114 - Verify implementation of Pre-defined alert filters

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

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4.92.1 Verification Elements

- LVV-179 - DMS-REQ-0348-V-01: Pre-defined alert filters

4.92.2 Test Items

Verify that users of the Alert Filtering service can use a predefined set of filters.

4.92.3 Predecessors

4.92.4 Environment Needs

4.92.4.1 Software

4.92.4.2 Hardware

4.92.5 Input Specification

4.92.6 Output Specification

4.92.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Simulated alert stream, observe predefined filter existence and proper filter results
	Test Data	No data.
	Expected Result	

4.93 LVV-T115 - Verify implementation of Calibration Production Processing

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

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4.93.1 Verification Elements

- LVV-120 - DMS-REQ-0289-V-01: Calibration Production Processing

4.93.2 Test Items

Execute CPP on a variety of representative cadences

4.93.3 Predecessors

4.93.4 Environment Needs

4.93.4.1 Software

4.93.4.2 Hardware

4.93.5 Input Specification

4.93.6 Output Specification

4.93.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute CPP on a variety of representative cadences
	Test Data	No data.
	Expected Result	
2	Description	Observe lack of failures and expected data products
	Test Data	No data.
	Expected Result	

4.94 LVV-T116 - Verify implementation of Associating Objects across data releases

Draft

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

4.94.1 Verification Elements

- LVV-181 - DMS-REQ-0350-V-01: Associating Objects across data releases

4.94.2 Test Items

Load DR, observe queryable association

4.94.3 Predecessors

4.94.4 Environment Needs

4.94.4.1 Software

4.94.4.2 Hardware

4.94.5 Input Specification

4.94.6 Output Specification

4.94.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load DR
	Test Data	No data.
	Expected Result	
2	Description	Observe queryable association
	Test Data	No data.
	Expected Result	

Draft

4.95 LVV-T117 - Verify implementation of DAC resource allocation for Level 3 processing

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

4.95.1 Verification Elements

- LVV-47 - DMS-REQ-0119-V-01: DAC resource allocation for Level 3 processing

4.95.2 Test Items

Verify that compute time and storage space allocations can be granted to science users.

4.95.3 Predecessors

4.95.4 Environment Needs

4.95.4.1 Software

4.95.4.2 Hardware

4.95.5 Input Specification

4.95.6 Output Specification

4.95.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Create a test user account for the Science Platform.
	Test Data	No data.
	Expected Result	
2	Description	Set the LSP resource allocations for the test user to very low values.
	Test Data	No data.

Draft

Step	Description, Input Data and Expected Result	
	Expected Result	
3	Description	Initiate example batch jobs and notebook sessions that will exceed the specified resource limits.
	Test Data	No data.
	Expected Result	Quota error.
4	Description	Transfer sufficient data volumes into the user workspace and MyDB tables that would exceed the resource quotas.
	Test Data	No data.
	Expected Result	Quota error.
5	Description	Reset the user resource quotas to normal values.
	Test Data	No data.
	Expected Result	
6	Description	Initiate the same example batch jobs and notebook sessions that previously caused an error.
	Test Data	No data.
	Expected Result	Successful notebook and batch job execution.
7	Description	Transfer the same data volumes into the user workspace and MyDB tables that previously caused an error.
	Test Data	No data.
	Expected Result	Successful data transfer.

4.96 LVV-T118 - Verify implementation of Level 3 Data Product Self Consistency

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

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4.96.1 Verification Elements

- LVV-48 - DMS-REQ-0120-V-01: Level 3 Data Product Self Consistency

4.96.2 Test Items

Verify that user-driven Level 3 processing is conducted on consistent sets of input data.

4.96.3 Predecessors

4.96.4 Environment Needs

4.96.4.1 Software

4.96.4.2 Hardware

4.96.5 Input Specification

4.96.6 Output Specification

4.96.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute representative processing on DR in PDAC, observe consistency
	Test Data	No data.
	Expected Result	

4.97 LVV-T119 - Verify implementation of Provenance for Level 3 processing at DACs

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

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4.97.1 Verification Elements

- LVV-49 - DMS-REQ-0121-V-01: Provenance for Level 3 processing at DACs

4.97.2 Test Items

Verify that provenance information is recorded and accessible for user-generated Level 3 products.

4.97.3 Predecessors

4.97.4 Environment Needs

4.97.4.1 Software

4.97.4.2 Hardware

4.97.5 Input Specification

4.97.6 Output Specification

4.97.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute representative processing on DR in PDAC, observe provenance recording
	Test Data	No data.
	Expected Result	

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

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

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4.98.1 Verification Elements

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

4.98.2 Test Items

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

4.98.3 Predecessors

4.98.4 Environment Needs

4.98.4.1 Software

4.98.4.2 Hardware

4.98.5 Input Specification

4.98.6 Output Specification

4.98.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute representative processing on DR in PDAC, observe recognition of and recovery from failures
	Test Data	No data.
	Expected Result	

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

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

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4.99.1 Verification Elements

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

4.99.2 Test Items

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

4.99.3 Predecessors

4.99.4 Environment Needs

4.99.4.1 Software

4.99.4.2 Hardware

4.99.5 Input Specification

4.99.6 Output Specification

4.99.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute representative processing on DR in PDAC, observe recognition of and recovery from failures
	Test Data	No data.
	Expected Result	

4.100 LVV-T122 - Verify implementation of Level 3 Data Import

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

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4.100.1 Verification Elements

- LVV-121 - DMS-REQ-0290-V-01: Level 3 Data Import

4.100.2 Test Items

Verify that the Science Platform can ingest data from community-standard file formats.

4.100.3 Predecessors

4.100.4 Environment Needs

4.100.4.1 Software

4.100.4.2 Hardware

4.100.5 Input Specification

4.100.6 Output Specification

4.100.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Use the Science Platform catalog upload tool to ingest a small example FITS table.
	Test Data	No data.
	Expected Result	
2	Description	Use the Science Platform catalog upload tool to ingest a small example CSV table.
	Test Data	No data.
	Expected Result	
3	Description	Use the Science Platform catalog upload tool to ingest a large FITS table that needs to be spatially-sharded in the database.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
4	Description	Perform example queries on each of the three tables to verify that all data is present.
	Test Data	No data.
	Expected Result	Data returned in the queries is identical to the data uploaded.

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

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

4.101.1 Verification Elements

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

4.101.2 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.

4.101.3 Predecessors

4.101.4 Environment Needs

4.101.4.1 Software

4.101.4.2 Hardware

4.101.5 Input Specification

Draft

4.101.6 Output Specification

4.101.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Configure representative access controls in PDAC, observe proper restrictions
	Test Data	No data.
	Expected Result	

4.102 LVV-T124 - Verify implementation of Software Architecture to Enable Community Re-Use

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

4.102.1 Verification Elements

- LVV-139 - DMS-REQ-0308-V-01: Software Architecture to Enable Community Re-Use

4.102.2 Test Items

Show that the LSST software is capable of being executed in multiple contexts: single user instance, batch processing, continuous integration.
Also show that the algorithms are can be reconfigured and, if desired, completely replaced at run time.

4.102.3 Predecessors

4.102.4 Environment Needs

4.102.4.1 Software

4.102.4.2 Hardware

4.102.5 Input Specification

4.102.6 Output Specification

4.102.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Using curated test datasets for multiple precursor instruments, verify and log that the prototype DRP pipelines execute successfully in three contexts: 1. The CI system 2. On a single user system: laptop, desktop, or notebook running in the Notebook aspect of the LSP. 3. Project workflow system.
	Test Data	No data.
	Expected Result	
2-1 from LVV-T12	Description	The DM Stack shall be initialized using the loadLSST script (as described in DRP-00-00).
	Test Data	
	Expected Result	
2-2 from LVV-T12	Description	A “Data Butler” will be initialized to access the repository.
	Test Data	
	Expected Result	
2-3 from LVV-T12	Description	For each of the expected data products types (listed in Test Items section §4.3.2) and each of the expected units (PVIs, coadds, etc), the data product will be retrieved from the Butler and verified to be non-empty.
	Test Data	
	Expected Result	
3	Description	Run subset of full DRP from previous step on an individual node. Was this organizationally easy? Did the performance scale appropriately?
	Test Data	No data.
	Expected Result	
4	Description	Re-run aperture correction on subset. Verify that same results as DRP run are achieved.
	Test Data	No data.

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Step	Description, Input Data and Expected Result	
	Expected Result	
5	Description	Re-run photometric redshift estimation algorithm on subset coadd catalogs. Verify that same results are achieved as from full DRP.
	Test Data	No data.
	Expected Result	
6	Description	Using a template testing notebook in the Notebook aspect of the LSP, verify and log the following: 1. Individual pipeline steps (tasks) are importable and executable on their own. this is not comprehensive, but demonstrative. 2. Individual pipeline steps may be overridden by configuration. 3. Users can implement a custom pipeline step and insert i into the processing flow via configuration.
	Test Data	No data.
	Expected Result	

4.103 LVV-T125 - Verify implementation of Simulated Data

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

4.103.1 Verification Elements

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

4.103.2 Test Items

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

4.103.3 Predecessors

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4.103.4 Environment Needs

4.103.4.1 Software

4.103.4.2 Hardware

4.103.5 Input Specification

4.103.6 Output Specification

4.103.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

4.104 LVV-T126 - Verify implementation Image Differencing

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

4.104.1 Verification Elements

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

4.104.2 Test Items

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

4.104.3 Predecessors

Draft

4.104.4 Environment Needs

4.104.4.1 Software

4.104.4.2 Hardware

4.104.5 Input Specification

4.104.6 Output Specification

4.104.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

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

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

4.105.1 Verification Elements

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

4.105.2 Test Items

Alert Production, Data Release Production, Science Algorithms

4.105.3 Predecessors

Draft

4.105.4 Environment Needs

4.105.4.1 Software

4.105.4.2 Hardware

4.105.5 Input Specification

4.105.6 Output Specification

4.105.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

4.106 LVV-T128 - Verify implementation Provide Astrometric Model

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

4.106.1 Verification Elements

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

4.106.2 Test Items

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

4.106.3 Predecessors

Draft

4.106.4 Environment Needs

4.106.4.1 Software

4.106.4.2 Hardware

4.106.5 Input Specification

4.106.6 Output Specification

4.106.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

4.107 LVV-T129 - Verify implementation of Provide Calibrated Photometry

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

4.107.1 Verification Elements

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

4.107.2 Test Items

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

4.107.3 Predecessors

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4.107.4 Environment Needs

4.107.4.1 Software

4.107.4.2 Hardware

4.107.5 Input Specification

4.107.6 Output Specification

4.107.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

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

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

4.108.1 Verification Elements

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

4.108.2 Test Items

Verify that multiple shape measurement algorithms can be used.

4.108.3 Predecessors

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4.108.4 Environment Needs

4.108.4.1 Software

4.108.4.2 Hardware

4.108.5 Input Specification

4.108.6 Output Specification

4.108.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to AP and DRP
	Test Data	No data.
	Expected Result	

4.109 LVV-T131 - Verify implementation of Provide User Interface Services

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

4.109.1 Verification Elements

- LVV-63 - DMS-REQ-0160-V-01: Provide User Interface Services

4.109.2 Test Items

Verify the availability and functionality of the broad range of user interface services called for in the requirement, as applied to both Nightly and DRP data. This will primarily be done by verifications performed at the LSST Science Platform level, based on the requirements in LDM-554; however, a high-level set of tests corresponding to the DMS-REQ-0160 requirement are defined below.

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4.109.3 Predecessors

4.109.4 Environment Needs

4.109.4.1 Software

4.109.4.2 Hardware As noted in Verification Configuration, the systems required to carry out the tests include both an "inside" test execution platform - the ability to execute test notebooks within the Science Platform Notebook Aspect - and an "outside" test execution platform with connectivity to the Science Platform instance under test that is comparable to that available to offsite science users.

4.109.5 Input Specification

1. Testing this requirement relies on a set of data products meeting the data model implied by the DPDD existing in a deployment of the Science Platform and its underlying database and file services.
   (a) In particular, both image and catalog data products are required.
   (b) From the specific language of the underlying requirement, it appears clear that coadded data products are required, but in practice single-epoch data products should be included in the test as well.
2. Depending on when this requirement is tested, the tests may involve either or both of precursor data and LSST commissioning data. The use of the latter is ultimately essential to ensure that the tests are performed with as LSST-like a dataset as possible.

4.109.6 Output Specification

4.109.7 Test Procedure

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Step		Description, Input Data and Expected Result
1	Description	**Establishment of test coordinates:** Establish sky positions and surrounding regions (e.g., cones or polygons), field sizes, filter bands, and temporal epochs for the tests that are consistent with the known content of the test dataset, whether precursor or LSST commissioning data. Establishing sky positions should include pre-determining the corresponding LSST "tract and patch" identifiers. If the plan to not keep all calibrated single-epoch images on disk is still in place at the time of the test, identify for use in the test both images that are, and are not, on disk. Establish target image boundaries, projections, and pixel scales to be used for resampling tests. Ensure that at least some of these test conditions include coadded image boundaries that cross tract and patch boundaries, and single-epoch image boundaries that cross focal plane raft boundaries.
	Test Data	No data.
	Expected Result	
2	Description	**Butler image access:** From within the Notebook Aspect, verify that coadded images for the identified regions of sky and filter bands are accessible via the Butler. Verify that the same images are available whether obtained by direct reference to the previous established tract/patch identifiers or by the use of LSST stack code for retrieving images based on sky coordinates. From within the Notebook Aspect, verify that single-epoch raw images for the selected locations and times are available. Verify that calibrated images (PVIs) for the selected locations and times are available; depending on the details of the test dataset, verify that PVIs still on disk can be retrieved immediately. Verify that lists or tables of image metadata, not just individual images, can be retrieved. E.g., a list of all the single-epoch images covering a selected sky location.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
3	Description	**Programmatic PVI re-creation:** From within the Notebook Aspect, verify that the recreation on demand of a PVI can be performed. Ideally, this should be done as follows: • Verify that recreation of a PVI that *is* still available works and that it reproduces the original PVI exactly (except for provenance metadata that must be different) or within the reasonable ability of processing systems to do so (e.g., taking into account that the original calibration and the recreation may have run on different CPU architectures). • The test conditions should ensure the verification that a recreation was actually performed, i.e., that the still-available PVI was not returned instead. • Note that it does not appear to be a requirement that *at Butler level* recreation on demand of PVIs is a completely transparent process. If this *is* decided to be a requirement, the test must also verify that it has been satisfied. If it is *not* a requirement, verify that adequate documentation on the PVI-recreation process (e.g., the SuperTasks and configuration to be used) is available.
	Test Data	No data.
	Expected Result	
4	Description	**Butler catalog access:** From within the Notebook Aspect, verify that all the catalog data products described in the DPDD can be retrieved for the coordinates selected above via the Butler. (This test should include access to SSObject data, but the details of how such a test would depend on the coordinate selections require additional thought.)
	Test Data	No data.
	Expected Result	
5	Description	**LSST-stack-based resampling/reprojection:** Verify the availability of software in the LSST stack, and associated documentation, that permits the resampling of LSST images to different pixel grids and projections. Exercise this capability for the test conditions selected in Step 1 above. Perform photometric and astrometric tests on the resulting resampled images to provide evidence that the transformations performed were correct to the accuracy supported by the data.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
6	Description	**Comment:** The following API Aspect test steps should be carried out on the required "offsite-like" test platform, to ensure that their success does not reflect any privileged access given to processes inside the Data Access Center or other Science Platform instance. However, at least a small sampling of them should *also* be carried out *within* the Science Platform environment, i.e., in the Notebook Aspect, and the results compared.
	Test Data	No data.
	Expected Result	
7	Description	**API Aspect image access:** Using IVOA services such as the Registry and ObsTAP, from the "offsite-like" test platform, verify that the existence of the classes of image data products foreseen in the DPDD can be determined. Verify that ObsTAP and/or SIAv2 can be used to find the same images and lists of images for the established test coordinates that were retrieved via the Butler in Step 2 above. Verify that the selected images are retrievable from the Web services. Verify that the retrieved images are identical in their pixel content and metadata. The tests must include both coadded and single-epoch images.
	Test Data	No data.
	Expected Result	
8	Description	**API Aspect image transformations:** Verify that image cutouts and resamplings can be performed via the IVOA SODA service, and that the results are identical to those obtained for the same parameters from the LSST-stack-based tests in Step 5. (The requirements for supported reprojections, if any, in the SODA service have not been established at the time of writing.)
	Test Data	No data.
	Expected Result	
9	Description	**API Aspect catalog data access:** Verify that the IVOA Registry, RegTAP, TAP_SCHEMA, and other relevant mechanisms can be used to discover the existence of all the catalog data products foreseen in the DPDD. Using the IVOA TAP service, verify that all the catalog data products foreseen in the DPDD can be retrieved for the coordinates determined in Step 1. Verify that their scientific content is the same as when they are retrieved via the Butler.
	Test Data	No data.
	Expected Result	

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Step	Description, Input Data and Expected Result	
10	Description	**Portal Aspect data browsing:** Verify that the Portal Aspect can be used to discover the existence of all the data products foreseen in the DPDD. Verify that the UI permits locating the data for the coordinates selected in Step 1 by visual means, e.g., by zooming and panning in from an all-sky view. Verify that the UI permits locating the data by typing in coordinates as well.
	Test Data	No data.
	Expected Result	
11	Description	**Portal Aspect image access:** Verify that the Portal Aspect allows both the retrieval of "original" image data, i.e., in its native LSST pixel projection and with full metadata, as well as retrieval of on-demand UI cutouts of coadded image data for selected locations.
	Test Data	No data.
	Expected Result	
12	Description	**Portal Aspect catalog query and visualization:** Verify that the Portal Aspect allows graphical querying of DPDD catalog data, both coadded and single-epoch, for selected regions of sky and/or with selected properties, and supports the visualization of the results (including histogramming, scatterplots, time series, table manipulations, and overplotting on image data). (Note that the Science Platform requirements, LDM-554, lay out a detailed set of requirements on the selection and visualization of catalog data.)
	Test Data	No data.
	Expected Result	
13	Description	**Comment:** The Portal Aspect tests below should be carried out from a web browser on an "offsite-like" test platform, to ensure that no privileged access provided to intra-data-center clients is relied upon.
	Test Data	No data.
	Expected Result	
14	Description	**Portal Aspect data download:** Verify that data identified and/or visualized in the Portal Aspect can be downloaded to the remote system running the web browser in which the Portal is displayed, as well as to the User Workspace.
	Test Data	No data.

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Step	Description, Input Data and Expected Result
	Expected Result

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

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

4.110.1 Verification Elements

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

4.110.2 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.

4.110.3 Predecessors

4.110.4 Environment Needs

4.110.4.1 Software

4.110.4.2 Hardware

4.110.5 Input Specification

4.110.6 Output Specification

4.110.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Execute AP and DRP on non-LSST data
	Test Data	No data.
	Expected Result	

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

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

4.111.1 Verification Elements

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

4.111.2 Test Items

Science Primitives

4.111.3 Predecessors

4.111.4 Environment Needs

4.111.4.1 Software

4.111.4.2 Hardware

4.111.5 Input Specification

4.111.6 Output Specification

4.111.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Delegate to CPP
	Test Data	No data.
	Expected Result	

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

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Gregory Dubois-Felsmann

4.112.1 Verification Elements

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

4.112.2 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.

4.112.3 Predecessors

4.112.4 Environment Needs

4.112.4.1 Software

4.112.4.2 Hardware

4.112.5 Input Specification

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

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4.112.6 Output Specification

4.112.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Inspect that the following test cases have been executed and passed: LVV-T803, LVV-T810, LVV-T811, LVV-T812. The requirement is fully satisfied by lower-level LSP test cases.
	Test Data	No data.
	Expected Result	Test cases LVV-T803, LVV-T810, LVV-T811, LVV-T812 passed without blocking issues.

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

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

4.113.1 Verification Elements

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

4.113.2 Test Items

This is a composite requirement in the SysML model.

4.113.3 Predecessors

4.113.4 Environment Needs

4.113.4.1 Software

4.113.4.2 Hardware

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4.113.5 Input Specification

4.113.6 Output Specification

4.113.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.114.1 Verification Elements

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

4.114.2 Test Items

Verify that available data products can be listed and retrieved.

4.114.3 Predecessors

4.114.4 Environment Needs

4.114.4.1 Software

4.114.4.2 Hardware

4.114.5 Input Specification

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4.114.6 Output Specification

4.114.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.115 LVV-T137 - Verify implementation of Data Product Ingest

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

4.115.1 Verification Elements

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

4.115.2 Test Items

Verify that data products can be ingested.

4.115.3 Predecessors

4.115.4 Environment Needs

4.115.4.1 Software

4.115.4.2 Hardware

4.115.5 Input Specification

4.115.6 Output Specification

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4.115.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to DBB
	Test Data	No data.
	Expected Result	

4.116 LVV-T138 - Verify implementation of Bulk Download Service

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

4.116.1 Verification Elements

- LVV-131 - DMS-REQ-0300-V-01: Bulk Download Service

4.116.2 Test Items

Bulk Download

4.116.3 Predecessors

4.116.4 Environment Needs

4.116.4.1 Software

4.116.4.2 Hardware

4.116.5 Input Specification

A large dataset (at least a few TB) must be available.
Requires identity management to confirm bulk download use.

Draft

While this can be tested and shown to work using LSST DAC, Chilean DAC, and IN2P3 end-points, this should also be tested to demonstrate expected throughput for outside users (e.g. FNAL, NERSC sites could be tested).

4.116.6 Output Specification

4.116.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Setup large transfer request and examine the data transfer rates achieved.
	Test Data	No data.
	Expected Result	
2	Description	Test should be repeated while observing in firehose mode (with LSSTCam) during science verification to ensure that bulk transfer does not compromise normal nightly operations.
	Test Data	No data.
	Expected Result	

4.117 LVV-T139 - Verify implementation of Provide Pipeline Execution Services

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Robert Lupton

4.117.1 Verification Elements

- LVV-61 - DMS-REQ-0156-V-01: Provide Pipeline Execution Services

4.117.2 Test Items

Batch Production, Workload and Orchestration

4.117.3 Predecessors

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4.117.4 Environment Needs

4.117.4.1 Software

4.117.4.2 Hardware

4.117.5 Input Specification

4.117.6 Output Specification

4.117.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify subsidiary requirements
	Test Data	No data.
	Expected Result	

4.118 LVV-T140 - Verify implementation of Production Orchestration

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

4.118.1 Verification Elements

- LVV-133 - DMS-REQ-0302-V-01: Production Orchestration

4.118.2 Test Items

Demonstrate use to orchestration software to perform real-time and batch production on LSST compute platform(s).

4.118.3 Predecessors

Draft

4.118.4 Environment Needs

4.118.4.1 Software

4.118.4.2 Hardware

4.118.5 Input Specification

4.118.6 Output Specification

4.118.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Batch Production
	Test Data	No data.
	Expected Result	

4.119 LVV-T141 - Verify implementation of Production Monitoring

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

4.119.1 Verification Elements

- LVV-134 - DMS-REQ-0303-V-01: Production Monitoring

4.119.2 Test Items

Demonstrate monitoring capabilities that give real-time view of pipeline execution and production systems usage/load.

4.119.3 Predecessors

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4.119.4 Environment Needs

4.119.4.1 Software

4.119.4.2 Hardware

4.119.5 Input Specification

4.119.6 Output Specification

4.119.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Observe monitoring during DRP execution
	Test Data	No data.
	Expected Result	

4.120 LVV-T142 - Verify implementation of Production Fault Tolerance

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

4.120.1 Verification Elements

- LVV-135 - DMS-REQ-0304-V-01: Production Fault Tolerance

4.120.2 Test Items

Demonstrate production systems report faults in pipeline executions and that system is able to recover. Where recovery can mean the ability to provide production artifacts for examination, return production elements ready for subsequent use, and/or reset and repeat production attempts.

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4.120.3 Predecessors

4.120.4 Environment Needs

4.120.4.1 Software

4.120.4.2 Hardware

4.120.5 Input Specification

4.120.6 Output Specification

4.120.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute AP and DRP, simulate failures, observe correct processing
	Test Data	No data.
	Expected Result	

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

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Robert Lupton

4.121.1 Verification Elements

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

4.121.2 Test Items

This is a composite requirement in the SysML model.

Draft

4.121.3 Predecessors

LVV-T144, LVV-T148, LVV-T145

4.121.4 Environment Needs

4.121.4.1 Software

4.121.4.2 Hardware

4.121.5 Input Specification

4.121.6 Output Specification

4.121.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Verify that all predecessor Test Cases making up this composite requirement have successfully passed testing.
	Test Data	No data.
	Expected Result	

4.122 LVV-T144 - Verify implementation of Task Specification

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

4.122.1 Verification Elements

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

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4.122.2 Test Items

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

4.122.3 Predecessors

4.122.4 Environment Needs

4.122.4.1 Software

4.122.4.2 Hardware

4.122.5 Input Specification

4.122.6 Output Specification

4.122.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Inspect software architecture. Verify that there exist Tasks that can be run and configured without re-compilation.
	Test Data	No data.
	Expected Result	
2	Description	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.
	Test Data	No data.
	Expected Result	

4.123 LVV-T145 - Verify implementation of Task Configuration

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

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4.123.1 Verification Elements

- LVV-137 - DMS-REQ-0306-V-01: Task Configuration

4.123.2 Test Items

Verify that the DMS software provides configuration control to define, override, and verify the configuration for a DMS Task.

4.123.3 Predecessors

4.123.4 Environment Needs

4.123.4.1 Software

4.123.4.2 Hardware

4.123.5 Input Specification

4.123.6 Output Specification

4.123.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Inspect software design to verify that one can define the configuration for a Task.
	Test Data	No data.
	Expected Result	
2	Description	Run a Task with a known invalid configuration. Verify that the error is caught before the science algorithm executes.
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
3	Description	Run a simple task with two different configurations that make a material difference for a Task. E.g., specify a different source detection threshold. Verify that the configuration is different between the two runs through difference in recorded provenance and in results.
	Test Data	No data.
	Expected Result	

4.124 LVV-T146 - Verify implementation of DMS Initialization Component

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

4.124.1 Verification Elements

- LVV-128 - DMS-REQ-0297-V-01: DMS Initialization Component

4.124.2 Test Items

Demonstrate that the DMS can be initialized in a safe state that will not allow data corruption/loss.

4.124.3 Predecessors

4.124.4 Environment Needs

4.124.4.1 Software

4.124.4.2 Hardware

4.124.5 Input Specification

4.124.6 Output Specification

Draft

4.124.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Power-cycle all DM systems at each Facility, observe recovery
	Test Data	No data.
	Expected Result	

4.125 LVV-T147 - Verify implementation of Control of Level-1 Production

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

4.125.1 Verification Elements

- LVV-132 - DMS-REQ-0301-V-01: Control of Level-1 Production

4.125.2 Test Items

Demonstrate that the DMS can control all Prompt Processing across DMS facilities.

4.125.3 Predecessors

4.125.4 Environment Needs

4.125.4.1 Software

4.125.4.2 Hardware

4.125.5 Input Specification

4.125.6 Output Specification

4.125.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Observe existence and capability of Prompt DMCS
	Test Data	No data.
	Expected Result	

4.126 LVV-T148 - Verify implementation of Unique Processing Coverage

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

4.126.1 Verification Elements

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

4.126.2 Test Items

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

4.126.3 Predecessors

4.126.4 Environment Needs

4.126.4.1 Software

4.126.4.2 Hardware

4.126.5 Input Specification

4.126.6 Output Specification

4.126.7 Test Procedure

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Step	Description, Input Data and Expected Result	
1	Description	Execute representative processing, observe lack of duplicates or missing rows even in the presence of failures
	Test Data	No data.
	Expected Result	

4.127 LVV-T149 - Verify implementation of Catalog Queries

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

4.127.1 Verification Elements

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

4.127.2 Test Items

Verify that SQL can be used to query catalogs.

4.127.3 Predecessors

4.127.4 Environment Needs

4.127.4.1 Software

4.127.4.2 Hardware

4.127.5 Input Specification

4.127.6 Output Specification

4.127.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.128.1 Verification Elements

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

4.128.2 Test Items

Verify that prior data releases remain accessible.

4.128.3 Predecessors

4.128.4 Environment Needs

4.128.4.1 Software

4.128.4.2 Hardware

4.128.5 Input Specification

4.128.6 Output Specification

4.128.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Observe access to prior DR on tape
	Test Data	No data.
	Expected Result	

4.129 LVV-T151 - Verify implementation of Catalog Export Formats

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

4.129.1 Verification Elements

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

4.129.2 Test Items

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

4.129.3 Predecessors

4.129.4 Environment Needs

4.129.4.1 Software

4.129.4.2 Hardware

4.129.5 Input Specification

4.129.6 Output Specification

4.129.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.130.1 Verification Elements

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

4.130.2 Test Items

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

4.130.3 Predecessors

4.130.4 Environment Needs

4.130.4.1 Software

4.130.4.2 Hardware

4.130.5 Input Specification

4.130.6 Output Specification

4.130.7 Test Procedure

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Step	Description, Input Data and Expected Result	
1	Description	Simulated alert stream, load Alert DB, observe access to Alert DB
	Test Data	No data.
	Expected Result	

4.131 LVV-T153 - Verify implementation of Provide Engineering and Facility Database Archive

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

4.131.1 Verification Elements

- LVV-44 - DMS-REQ-0102-V-01: Provide Engineering & Facility Database Archive

4.131.2 Test Items

Demonstrate Engineering and Facilities Data (images, associated metadata, and observatory environment and control data) are archived and available for public access within L1PublicT (24 hours).

4.131.3 Predecessors

4.131.4 Environment Needs

4.131.4.1 Software

4.131.4.2 Hardware

4.131.5 Input Specification

4.131.6 Output Specification

Draft

4.131.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal, observe data products generated in time
	Test Data	No data.
	Expected Result	

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

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

4.132.1 Verification Elements

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

4.132.2 Test Items

Verify that raw images are reliably archived.

4.132.3 Predecessors

4.132.4 Environment Needs

4.132.4.1 Software

4.132.4.2 Hardware

4.132.5 Input Specification

4.132.6 Output Specification

4.132.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Analyze sources of loss or corruption after mitigation to compute estimated reliability
	Test Data	No data.
	Expected Result	

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

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

4.133.1 Verification Elements

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

4.133.2 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.

4.133.3 Predecessors

4.133.4 Environment Needs

4.133.4.1 Software

4.133.4.2 Hardware

4.133.5 Input Specification

4.133.6 Output Specification

4.133.7 Test Procedure

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Step	Description, Input Data and Expected Result	
1	Description	Delegate to DBB
	Test Data	No data.
	Expected Result	

4.134 LVV-T156 - Verify implementation of Regenerate Un-archived Data Products

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

4.134.1 Verification Elements

- LVV-142 - DMS-REQ-0311-V-01: Regenerate Un-archived Data Products

4.134.2 Test Items

Not all of the ancillary data products produced by a data release will be archived permanently. These ancillary products have been promised as accessible to the community. Show that these products can be produced from an archived data release after the fact.

4.134.3 Predecessors

4.134.4 Environment Needs

4.134.4.1 Software

4.134.4.2 Hardware

4.134.5 Input Specification

4.134.6 Output Specification

Draft

4.134.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Run a small DRP processing job and download unarchived data products.
	Test Data	No data.
	Expected Result	
2	Description	Wait for (or force) a processing stack change so that the subsequent re-processing will be forced to use an older software build.
	Test Data	No data.
	Expected Result	
3	Description	Using provenance information from the products in Step 1, request a re-processing and compare results with previously unarchived products.
	Test Data	No data.
	Expected Result	

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

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

4.135.1 Verification Elements

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

4.135.2 Test Items

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

4.135.3 Predecessors

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4.135.4 Environment Needs

4.135.4.1 Software

4.135.4.2 Hardware

4.135.5 Input Specification

4.135.6 Output Specification

4.135.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.136.1 Verification Elements

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

4.136.2 Test Items

Verify that Data Release Products are accessible by science users.

4.136.3 Predecessors

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4.136.4 Environment Needs

4.136.4.1 Software

4.136.4.2 Hardware

4.136.5 Input Specification

4.136.6 Output Specification

4.136.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.137.1 Verification Elements

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

4.137.2 Test Items

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

4.137.3 Predecessors

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4.137.4 Environment Needs

4.137.4.1 Software

4.137.4.2 Hardware

4.137.5 Input Specification

4.137.6 Output Specification

4.137.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

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

4.138.1 Verification Elements

- LVV-172 - DMS-REQ-0341-V-01: Max elapsed time for precovery results

4.138.2 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)

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4.138.3 Predecessors

4.138.4 Environment Needs

4.138.4.1 Software

4.138.4.2 Hardware

4.138.5 Input Specification

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.

4.138.6 Output Specification

4.138.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Run Precovery within follow-on Alert Production (i.e. daily post-processing on 30 day store).
	Test Data	No data.
	Expected Result	
2	Description	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.
	Test Data	No data.
	Expected Result	

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Step	Description, Input Data and Expected Result	
3	Description	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.
	Test Data	No data.
	Expected Result	

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

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

4.139.1 Verification Elements

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

4.139.2 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.

4.139.3 Predecessors

4.139.4 Environment Needs

4.139.4.1 Software

4.139.4.2 Hardware

4.139.5 Input Specification

4.139.6 Output Specification

Draft

4.139.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.140 LVV-T162 - Verify implementation of Access to Previous Data Releases

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

4.140.1 Verification Elements

- LVV-189 - DMS-REQ-0363-V-01: Access to Previous Data Releases

4.140.2 Test Items

Verify this high-level requirement, which states that the other data access requirements, for images and catalogs, all must be satisfied for multiple data releases. Verified by inspection, i.e., by determining that the data access system components, from middleware through APIs to user interfaces, are designed to support data from multiple releases, as well as by direct testing using a synthetic test environment containing multiple releases.
(Involves: Data Backbone, Managed Database, LSP Portal, LSP JupyterLab, LSP Web APIs, Parallel Distributed Database)

4.140.3 Predecessors

4.140.4 Environment Needs

4.140.4.1 Software

4.140.4.2 Hardware

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4.140.5 Input Specification

Requires two or more (fake) releases within DAC (or PDAC) with common area/observations (preferably with some differing results but could use metadata identifying provenance).

4.140.6 Output Specification

4.140.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	From Science Platform initiate request for image and catalog products from one of the two release sets.
	Test Data	No data.
	Expected Result	
2	Description	From Science Platform re-issue the same request but specifying the alternate/earlier release set.
	Test Data	No data.
	Expected Result	
3	Description	Compare results and identify differences that are germaine to the relevant Data Release Sets are found.
	Test Data	No data.
	Expected Result	

4.141 LVV-T163 - Verify implementation of Data Access Services

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

4.141.1 Verification Elements

- LVV-190 - DMS-REQ-0364-V-01: Total number of data releases

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4.141.2 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.

4.141.3 Predecessors

4.141.4 Environment Needs

4.141.4.1 Software

4.141.4.2 Hardware

4.141.5 Input Specification

4.141.6 Output Specification

4.141.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.142 LVV-T164 - Verify implementation of Operations Subsets

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

4.142.1 Verification Elements

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

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4.142.2 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)

4.142.3 Predecessors

4.142.4 Environment Needs

4.142.4.1 Software

4.142.4.2 Hardware

4.142.5 Input Specification

4.142.6 Output Specification

4.142.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.143 LVV-T165 - Verify implementation of Subsets Support

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

Draft

4.143.1 Verification Elements

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

4.143.2 Test Items

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

4.143.3 Predecessors

4.143.4 Environment Needs

4.143.4.1 Software

4.143.4.2 Hardware

4.143.5 Input Specification

4.143.6 Output Specification

4.143.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.144 LVV-T166 - Verify implementation of Access Services Performance

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

Draft

4.144.1 Verification Elements

- LVV-193 - DMS-REQ-0367-V-01: Access Services Performance

4.144.2 Test Items

Demonstrate monitoring of Data Access Services that give real and long-time views of system performance and usage.

4.144.3 Predecessors

4.144.4 Environment Needs

4.144.4.1 Software

4.144.4.2 Hardware

4.144.5 Input Specification

4.144.6 Output Specification

4.144.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.145 LVV-T167 - Verify Capability to serve older Data Releases at Full Performance

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

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4.145.1 Verification Elements

- LVV-194 - DMS-REQ-0368-V-01: Implementation Provisions

4.145.2 Test Items

Verify that implementation of the data access services do not preclude serving all older Data Releases with the same performance requirements as current Data Releases. Note that it is an operational consideration whether sufficient compute and storage resources would actually be provisioned to meet those requirements.

4.145.3 Predecessors

4.145.4 Environment Needs

4.145.4.1 Software

4.145.4.2 Hardware

4.145.5 Input Specification

4.145.6 Output Specification

4.145.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

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

Version	Status	Priority	Verification Type	Owner

Draft

1	Draft	Normal	Test	Robert Gruendl

4.146.1 Verification Elements

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

4.146.2 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.

4.146.3 Predecessors

4.146.4 Environment Needs

4.146.4.1 Software

4.146.4.2 Hardware

4.146.5 Input Specification

4.146.6 Output Specification

4.146.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.147 LVV-T169 - Verify implementation of Older Release Behavior

Version	Status	Priority	Verification Type	Owner

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1	Draft	Normal	Test	Gregory Dubois-Felsmann

4.147.1 Verification Elements

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

4.147.2 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, Parallel Distributed Database)

4.147.3 Predecessors

4.147.4 Environment Needs

4.147.4.1 Software

4.147.4.2 Hardware

4.147.5 Input Specification

4.147.6 Output Specification

4.147.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.148 LVV-T170 - Verify implementation of Query Availability

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

4.148.1 Verification Elements

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

4.148.2 Test Items

Verify that queries continue to be successfully executable over time.

4.148.3 Predecessors

4.148.4 Environment Needs

4.148.4.1 Software

4.148.4.2 Hardware

4.148.5 Input Specification

4.148.6 Output Specification

4.148.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to LSP
	Test Data	No data.
	Expected Result	

4.149 LVV-T171 - Verify implementation of Pipeline Availability

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.149.1 Verification Elements

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

4.149.2 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.

4.149.3 Predecessors

4.149.4 Environment Needs

4.149.4.1 Software

4.149.4.2 Hardware

4.149.5 Input Specification

4.149.6 Output Specification

4.149.7 Test Procedure

Draft

Step	Description, Input Data and Expected Result	
1	Description	Analyze sources of downtime after mitigation to compute estimated reliability; observe unscheduled downtime of developer, integration, and pre-production systems
	Test Data	No data.
	Expected Result	

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

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

4.150.1 Verification Elements

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

4.150.2 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.

4.150.3 Predecessors

4.150.4 Environment Needs

4.150.4.1 Software

4.150.4.2 Hardware

4.150.5 Input Specification

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4.150.6 Output Specification

4.150.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze resource management policy
	Test Data	No data.
	Expected Result	

4.151 LVV-T173 - Verify implementation of Pipeline Throughput

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

4.151.1 Verification Elements

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

4.151.2 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.

4.151.3 Predecessors

4.151.4 Environment Needs

4.151.4.1 Software

4.151.4.2 Hardware

4.151.5 Input Specification

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4.151.6 Output Specification

4.151.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal, observe data products generated in time
	Test Data	No data.
	Expected Result	

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

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

4.152.1 Verification Elements

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

4.152.2 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.

4.152.3 Predecessors

4.152.4 Environment Needs

4.152.4.1 Software

4.152.4.2 Hardware

4.152.5 Input Specification

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4.152.6 Output Specification

4.152.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze sizing model; execute DRP, observe scaling
	Test Data	No data.
	Expected Result	

4.153 LVV-T175 - Verify implementation of Temporary Storage for Communications Links

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

4.153.1 Verification Elements

- LVV-67 - DMS-REQ-0164-V-01: Temporary Storage for Communications Links

4.153.2 Test Items

Demonstrate that storage capacity is present and usable to prevent data loss if networking is interrupted between summit and base, base and archive, or archive and DAC. The requirement is to have storage necessary to hold tempStorageReIMTTR (200%) of the expected raw data that would arrive during the Mean Time to Repair (summToBaseNetMTTR = 24 hours, baseToArchNetMTTR = 48 hours, archToDacNetMTTR = 48 hours). This scale is further set by nCalibExpDay + nRawExpNightMax = 450 + 2800 = 3250 exposures/day.

4.153.3 Predecessors

4.153.4 Environment Needs

4.153.4.1 Software

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4.153.4.2 Hardware

4.153.5 Input Specification

4.153.6 Output Specification

4.153.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze sizing model and network/storage design
	Test Data	No data.
	Expected Result	

4.154 LVV-T176 - Verify implementation of Infrastructure Sizing for “catching up”

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

4.154.1 Verification Elements

- LVV-68 - DMS-REQ-0165-V-01: Infrastructure Sizing for “catching up”

4.154.2 Test Items

Demonstrate Data Management System has sufficient excess capacity (compute infrastructure) to process one night’s data (2800 exposures) within 24 hours while also maintaining nightly Alert Production (note this is very similar to LVV-T173).

4.154.3 Predecessors

4.154.4 Environment Needs

4.154.4.1 Software

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4.154.4.2 Hardware

4.154.5 Input Specification

4.154.6 Output Specification

4.154.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute single-day operations rehearsal including catch-up after failure, observe data products generated in time
	Test Data	No data.
	Expected Result	

4.155 LVV-T177 - Verify implementation of Incorporate Fault-Tolerance

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

4.155.1 Verification Elements

- LVV-69 - DMS-REQ-0166-V-01: Incorporate Fault-Tolerance

4.155.2 Test Items

Demonstrate that Data Management Systems have features that prevent data loss. Includes: MD5SUM/checksum verification for data transfer; RAID to eliminate single-point disk failures; multi-site and tape for disaster recovery of raw data; multiple site (and tape?) for backup/recovery of Data Release products; DB transaction logging and backup to maintain DB integrity. (Note: storage to prevent loss in case of networking failures is covered in LVV-T175).

4.155.3 Predecessors

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4.155.4 Environment Needs

4.155.4.1 Software

4.155.4.2 Hardware

4.155.5 Input Specification

4.155.6 Output Specification

4.155.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design; execute single-day operations rehearsal including failures, observe recovery without loss of data
	Test Data	No data.
	Expected Result	

4.156 LVV-T178 - Verify implementation of Incorporate Autonomics

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

4.156.1 Verification Elements

- LVV-70 - DMS-REQ-0167-V-01: Incorporate Autonomics

4.156.2 Test Items

Demonstrate that production systems monitor and report faults. Where possible fault mitigation can include re-start, re-submission, or return of partial products for triage.

4.156.3 Predecessors

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4.156.4 Environment Needs

4.156.4.1 Software

4.156.4.2 Hardware

4.156.5 Input Specification

4.156.6 Output Specification

4.156.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design; execute single-day operations rehearsal including failures, observe automated recovery and continuation of processing
	Test Data	No data.
	Expected Result	

4.157 LVV-T179 - Verify implementation of Compute Platform Heterogeneity

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

4.157.1 Verification Elements

- LVV-145 - DMS-REQ-0314-V-01: Compute Platform Heterogeneity

4.157.2 Test Items

Demonstrate that production results are the same (within machine accuracy) when production occurs on different platforms (OS, kernel, hardware provisioning).

4.157.3 Predecessors

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4.157.4 Environment Needs

4.157.4.1 Software

4.157.4.2 Hardware

4.157.5 Input Specification

4.157.6 Output Specification

4.157.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Configure heterogeneous cluster, execute AP+DRP+LSP, observe correct functioning
	Test Data	No data.
	Expected Result	

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

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

4.158.1 Verification Elements

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

4.158.2 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 Archiv-

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ing, Observatory Operations Data, Telemetry Gateway, Data Backbone, Managed Database, Inter-Site Networks, and Service Management and Monitoring.

4.158.3 Predecessors

4.158.4 Environment Needs

4.158.4.1 Software

4.158.4.2 Hardware

4.158.5 Input Specification

4.158.6 Output Specification

4.158.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze likely hardware failures with mitigations to compute estimated unplanned downtime
	Test Data	No data.
	Expected Result	

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

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

4.159.1 Verification Elements

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.159.2 Test Items

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

4.159.3 Predecessors

4.159.4 Environment Needs

4.159.4.1 Software

4.159.4.2 Hardware

4.159.5 Input Specification

4.159.6 Output Specification

4.159.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

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

4.160.1 Verification Elements

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.160.2 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.

4.160.3 Predecessors

4.160.4 Environment Needs

4.160.4.1 Software

4.160.4.2 Hardware

4.160.5 Input Specification

4.160.6 Output Specification

4.160.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design
	Test Data	No data.
	Expected Result	

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

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

4.161.1 Verification Elements

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.161.2 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.

4.161.3 Predecessors

4.161.4 Environment Needs

4.161.4.1 Software

4.161.4.2 Hardware

4.161.5 Input Specification

4.161.6 Output Specification

4.161.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to IIP
	Test Data	No data.
	Expected Result	

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

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

4.162.1 Verification Elements

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.162.2 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).

4.162.3 Predecessors

4.162.4 Environment Needs

4.162.4.1 Software

4.162.4.2 Hardware

4.162.5 Input Specification

4.162.6 Output Specification

4.162.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.163.1 Verification Elements

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

4.163.2 Test Items

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

4.163.3 Predecessors

4.163.4 Environment Needs

4.163.4.1 Software

4.163.4.2 Hardware

4.163.5 Input Specification

4.163.6 Output Specification

4.163.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.164.1 Verification Elements

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

4.164.2 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.

4.164.3 Predecessors

4.164.4 Environment Needs

4.164.4.1 Software

4.164.4.2 Hardware

4.164.5 Input Specification

4.164.6 Output Specification

4.164.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.165.1 Verification Elements

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

4.165.2 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).

4.165.3 Predecessors

4.165.4 Environment Needs

4.165.4.1 Software

4.165.4.2 Hardware

4.165.5 Input Specification

4.165.6 Output Specification

4.165.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

Version	Status	Priority	Verification Type	Owner

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

1	Draft	Normal	Test	Robert Gruendl

4.166.1 Verification Elements

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

4.166.2 Test Items

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

4.166.3 Predecessors

4.166.4 Environment Needs

4.166.4.1 Software

4.166.4.2 Hardware

4.166.5 Input Specification

4.166.6 Output Specification

4.166.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

4.167 LVV-T189 - Verify implementation of Base Facility Infrastructure

Version	Status	Priority	Verification Type	Owner

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

1	Draft	Normal	Test	Robert Gruendl

4.167.1 Verification Elements

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

4.167.2 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.

4.167.3 Predecessors

4.167.4 Environment Needs

4.167.4.1 Software

4.167.4.2 Hardware

4.167.5 Input Specification

4.167.6 Output Specification

4.167.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design and sizing model
	Test Data	No data.
	Expected Result	

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.168.1 Verification Elements

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

4.168.2 Test Items

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

4.168.3 Predecessors

4.168.4 Environment Needs

4.168.4.1 Software

4.168.4.2 Hardware

4.168.5 Input Specification

4.168.6 Output Specification

4.168.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design
	Test Data	No data.
	Expected Result	

4.169 LVV-T191 - Verify implementation of Commissioning Cluster

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.169.1 Verification Elements

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

4.169.2 Test Items

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

4.169.3 Predecessors

4.169.4 Environment Needs

4.169.4.1 Software

4.169.4.2 Hardware

4.169.5 Input Specification

4.169.6 Output Specification

4.169.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design and budget
	Test Data	No data.
	Expected Result	

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.170.1 Verification Elements

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

4.170.2 Test Items

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

4.170.3 Predecessors

4.170.4 Environment Needs

4.170.4.1 Software

4.170.4.2 Hardware

4.170.5 Input Specification

4.170.6 Output Specification

4.170.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.171.1 Verification Elements

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

4.171.2 Test Items

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

4.171.3 Predecessors

4.171.4 Environment Needs

4.171.4.1 Software

4.171.4.2 Hardware

4.171.5 Input Specification

4.171.6 Output Specification

4.171.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

Draft

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

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

4.172.1 Verification Elements

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

4.172.2 Test Items

Verify Network uptime between Base Facility and Archive Facility.

4.172.3 Predecessors

4.172.4 Environment Needs

4.172.4.1 Software

4.172.4.2 Hardware

4.172.5 Input Specification

4.172.6 Output Specification

4.172.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

Draft

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

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

4.173.1 Verification Elements

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

4.173.2 Test Items

Verify uptime of the Base Facility to Archive Facility network.

4.173.3 Predecessors

4.173.4 Environment Needs

4.173.4.1 Software

4.173.4.2 Hardware

4.173.5 Input Specification

4.173.6 Output Specification

4.173.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

Draft

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

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

4.174.1 Verification Elements

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

4.174.2 Test Items

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

4.174.3 Predecessors

4.174.4 Environment Needs

4.174.4.1 Software

4.174.4.2 Hardware

4.174.5 Input Specification

4.174.6 Output Specification

4.174.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

Draft

4.175 LVV-T197 - Verify implementation of Archive Center

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

4.175.1 Verification Elements

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

4.175.2 Test Items

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

4.175.3 Predecessors

4.175.4 Environment Needs

4.175.4.1 Software

4.175.4.2 Hardware

4.175.5 Input Specification

4.175.6 Output Specification

4.175.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design and sizing model
	Test Data	No data.
	Expected Result	

Draft

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

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

4.176.1 Verification Elements

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

4.176.2 Test Items

Verify disaster recovery plan for Archive Center.

4.176.3 Predecessors

4.176.4 Environment Needs

4.176.4.1 Software

4.176.4.2 Hardware

4.176.5 Input Specification

4.176.6 Output Specification

4.176.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design; simulate storage failure, observe restore from disaster recovery
	Test Data	No data.
	Expected Result	

Draft

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

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

4.177.1 Verification Elements

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

4.177.2 Test Items

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

4.177.3 Predecessors

4.177.4 Environment Needs

4.177.4.1 Software

4.177.4.2 Hardware

4.177.5 Input Specification

4.177.6 Output Specification

4.177.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design
	Test Data	No data.
	Expected Result	

Draft

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

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

4.178.1 Verification Elements

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

4.178.2 Test Items

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

4.178.3 Predecessors

4.178.4 Environment Needs

4.178.4.1 Software

4.178.4.2 Hardware

4.178.5 Input Specification

4.178.6 Output Specification

4.178.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

Draft

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

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

4.179.1 Verification Elements

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

4.179.2 Test Items

4.179.3 Predecessors

4.179.4 Environment Needs

4.179.4.1 Software

4.179.4.2 Hardware

4.179.5 Input Specification

4.179.6 Output Specification

4.179.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

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

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

4.180.1 Verification Elements

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

4.180.2 Test Items

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

4.180.3 Predecessors

4.180.4 Environment Needs

4.180.4.1 Software

4.180.4.2 Hardware

4.180.5 Input Specification

4.180.6 Output Specification

4.180.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Delegate to Networks
	Test Data	No data.
	Expected Result	

4.181 LVV-T203 - Verify implementation of Archive to Data Access Center Network Secondary Link

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

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

4.181.1 Verification Elements

- LVV-91 - DMS-REQ-0191-V-01: Archive to Data Access Center Network Secondary Link

4.181.2 Test Items

Inter-Site Networks

4.181.3 Predecessors

4.181.4 Environment Needs

4.181.4.1 Software

4.181.4.2 Hardware

4.181.5 Input Specification

4.181.6 Output Specification

4.181.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Take primary network link down
	Test Data	No data.
	Expected Result	
2	Description	Observe operations support over secondary link
	Test Data	No data.
	Expected Result	

Draft

Step	Description, Input Data and Expected Result	
3	Description	Bring primary network link back up
	Test Data	No data.
	Expected Result	
4	Description	Observe catch-up capability over secondary link
	Test Data	No data.
	Expected Result	

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

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

4.182.1 Verification Elements

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

4.182.2 Test Items

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

4.182.3 Predecessors

4.182.4 Environment Needs

4.182.4.1 Software

4.182.4.2 Hardware

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.182.5 Input Specification

4.182.6 Output Specification

4.182.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute bulk distribution of DRP catalogs
	Test Data	No data.
	Expected Result	
2	Description	Observe correct transfer and use of maintenance/validation tools
	Test Data	No data.
	Expected Result	

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

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

4.183.1 Verification Elements

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

4.183.2 Test Items

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

4.183.3 Predecessors

4.183.4 Environment Needs

4.183.4.1 Software

Draft

4.183.4.2 Hardware

4.183.5 Input Specification

4.183.6 Output Specification

4.183.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load Prompt and DR catalogs into PDAC, observe access via LSP
	Test Data	No data.
	Expected Result	

4.184 LVV-T206 - Verify implementation of Federation with external catalogs

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

4.184.1 Verification Elements

- LVV-52 - DMS-REQ-0124-V-01: Federation with external catalogs

4.184.2 Test Items

Verify that LSST-produced data can be combined with external datasets.

4.184.3 Predecessors

4.184.4 Environment Needs

4.184.4.1 Software

4.184.4.2 Hardware

4.184.5 Input Specification

4.184.6 Output Specification

4.184.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load external catalog into PDAC (using VO if possible), observe federation with other catalogs via LSP
	Test Data	No data.
	Expected Result	

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

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

4.185.1 Verification Elements

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

4.185.2 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.

4.185.3 Predecessors

4.185.4 Environment Needs

4.185.4.1 Software

4.185.4.2 Hardware

Draft

4.185.5 Input Specification

4.185.6 Output Specification

4.185.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Execute bulk distribution of DRP images
	Test Data	No data.
	Expected Result	
2	Description	Observe correct transfer and use of maintenance/validation tools
	Test Data	No data.
	Expected Result	

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

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

4.186.1 Verification Elements

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

4.186.2 Test Items

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

4.186.3 Predecessors

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.186.4 Environment Needs

4.186.4.1 Software

4.186.4.2 Hardware

4.186.5 Input Specification

4.186.6 Output Specification

4.186.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Load Prompt and DR images into PDAC
	Test Data	No data.
	Expected Result	
2	Description	Observe access via LSP
	Test Data	No data.
	Expected Result	

4.187 LVV-T209 - Verify implementation of Data Access Centers

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Analysis	Kian-Tat Lim

4.187.1 Verification Elements

- LVV-92 - DMS-REQ-0193-V-01: Data Access Centers

Draft

4.187.2 Test Items

Verify that the Data Access Centers are provisioned with computing resources necessary to support end-user access to LSST Data Products.

4.187.3 Predecessors

4.187.4 Environment Needs

4.187.4.1 Software

4.187.4.2 Hardware

4.187.5 Input Specification

4.187.6 Output Specification

4.187.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design
	Test Data	No data.
	Expected Result	

4.188 LVV-T210 - Verify implementation of Data Access Center Simultaneous Connections

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

4.188.1 Verification Elements

- LVV-93 - DMS-REQ-0194-V-01: Data Access Center Simultaneous Connections

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4.188.2 Test Items

Verify that the each DAC can support at least dacMinConnections simultaneously

4.188.3 Predecessors

4.188.4 Environment Needs

4.188.4.1 Software

4.188.4.2 Hardware

4.188.5 Input Specification

4.188.6 Output Specification

4.188.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Simulate data access to PDAC
	Test Data	No data.
	Expected Result	
2	Description	Observe scaling
	Test Data	No data.
	Expected Result	

4.189 LVV-T211 - Verify implementation of Data Access Center Geographical Distribution

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Analysis	Kian-Tat Lim

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.189.1 Verification Elements

- LVV-94 - DMS-REQ-0196-V-01: Data Access Center Geographical Distribution

4.189.2 Test Items

Verify that the DACs are geographically distribution to provide low-latency access to data-rights community.

4.189.3 Predecessors

4.189.4 Environment Needs

4.189.4.1 Software

4.189.4.2 Hardware

4.189.5 Input Specification

4.189.6 Output Specification

4.189.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design
	Test Data	No data.
	Expected Result	

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

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

Draft

4.190.1 Verification Elements

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

4.190.2 Test Items

Verify that additional Data Access Centers can be set up.

4.190.3 Predecessors

4.190.4 Environment Needs

4.190.4.1 Software

4.190.4.2 Hardware

4.190.5 Input Specification

4.190.6 Output Specification

4.190.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	Analyze design; instantiate and load simulated DAC, observe correct functioning
	Test Data	No data.
	Expected Result	

4.191 LVV-T376 - Verify the Calculation of Ellipticity Correlations

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Leanne Guy

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4.191.1 Verification Elements

- LVV-3404 - DMS-REQ-0362-V-01: Median residual PSF ellipticity correlations on 5 arcmin scales

4.191.2 Test Items

4.191.3 Predecessors

4.191.4 Environment Needs

4.191.4.1 Software

4.191.4.2 Hardware

4.191.5 Input Specification

4.191.6 Output Specification

4.191.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	
	Test Data	No data.
	Expected Result	

4.192 LVV-T377 - Verify Calculation of Photometric Performance Metrics

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Leanne Guy

Draft

4.192.1 Verification Elements

- LVV-3401 - DMS-REQ-0359-V-01: RMS photometric repeatability in uzy

4.192.2 Test Items

4.192.3 Predecessors

4.192.4 Environment Needs

4.192.4.1 Software

4.192.4.2 Hardware

4.192.5 Input Specification

4.192.6 Output Specification

4.192.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	
	Test Data	No data.
	Expected Result	

4.193 LVV-T378 - Verify Calculation of Astrometric Performance Metrics

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Leanne Guy

4.193.1 Verification Elements

- LVV-3402 - DMS-REQ-0360-V-01: Median astrometric error on 20 arcmin scales

DRAFT NOT YET APPROVED – The contents of this document are subject to configuration control by the LSST DM Change Control Board. – DRAFT NOT YET APPROVED

4.193.2 Test Items

4.193.3 Predecessors

4.193.4 Environment Needs

4.193.4.1 Software

4.193.4.2 Hardware

4.193.5 Input Specification

4.193.6 Output Specification

4.193.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	
	Test Data	No data.
	Expected Result	

4.194 LVV-T385 - Verify Retrieval of a CCD-sized image from a coadd

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Leanne Guy

4.194.1 Verification Elements

- LVV-3394 - DMS-REQ-0377-V-01: Min number of simultaneous single-CCD coadd cutout image users

4.194.2 Test Items

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4.194.3 Predecessors

4.194.4 Environment Needs

4.194.4.1 Software

4.194.4.2 Hardware

4.194.5 Input Specification

4.194.6 Output Specification

4.194.7 Test Procedure

Step	Description, Input Data and Expected Result	
1	Description	
	Test Data	No data.
	Expected Result	

Draft

5 Verification Elements

In this section are documented all Verification Elements related to the test cases in the above section 4.

5.1 DMS-REQ-0334-V-01: Persisting Data Products

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection
- Jira Issue: LVV-165 (https://jira.lsstcorp.org/browse/LVV-165)
- Status: Not Covered
- Verification Level: SL
- **Description**: Produce some relevant coadds and store them in the Archive. Examine the data retention policies for those products.
- Requirement: DMS-REQ-0334
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.2 DMS-REQ-0267-V-01: Source Catalog

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-98 (https://jira.lsstcorp.org/browse/LVV-98)
- Status: Not Covered

Draft

- Verification Level: SL
- **Description**: First L2 requirement. Can be done with precursor data. At minimum two visits of the same field and filter and one coadd.
- Requirement: DMS-REQ-0267
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.3 DMS-REQ-0268-V-01: Forced-Source Catalog

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-99 (https://jira.lsstcorp.org/browse/LVV-99)
- Status: Not Covered
- Verification Level: SL
- **Description**: With the precursor data verify that forced source table is created from all calibrated exposures.
- Requirement: DMS-REQ-0268
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.4 DMS-REQ-0275-V-01: Object Catalog

- Component:
  - DM
- Assignee: Jim Bosch

Draft

- Verification Methos: Demonstration
- Jira Issue: LVV-106 (https://jira.lsstcorp.org/browse/LVV-106)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data spread across multiple epochs. Must contain SSObjects and DIASources. Must be coaddable. Can be single filter. Must verify Object catalog
- Requirement: DMS-REQ-0275
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.5 DMS-REQ-0279-V-01: Deep Detection Coadds

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-110 (https://jira.lsstcorp.org/browse/LVV-110)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data. Multi filter. System should automatically trigger co-add processing and filter out poor data. Timescale for this should be configurable. Add more data and verify coadd has been changed.
- Requirement: DMS-REQ-0279
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

Draft

5.6 DMS-REQ-0294-V-01: Processing of Datasets

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-125 (https://jira.lsstcorp.org/browse/LVV-125)
- Status: Not Covered
- Verification Level: HL
- **Description**: This requirement needs clarification and is impossible to verify as written.
- Requirement: DMS-REQ-0294
- Parent Requirements:
  - OSS-REQ-0120: 06 Consistency
  - OSS-REQ-0119: 07 Completeness
  - OSS-REQ-0118: 05 Consistency and Completeness
  - OSS-REQ-0117: 04 Automated Production

5.7 DMS-REQ-0326-V-01: Storing Approximations of Per-pixel Metadata

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Inspection
- Jira Issue: LVV-157 (https://jira.lsstcorp.org/browse/LVV-157)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Generate a coadd and inspect the output file to verify that parametrized forms of are available.
- Requirement: DMS-REQ-0326
- Parent Requirements:
  - OSS-REQ-0391: 01 Data Product Conventions

5.8 DMS-REQ-0331-V-01: Computing Derived Quantities

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Inspection
- Jira Issue: LVV-162 (https://jira.lsstcorp.org/browse/LVV-162)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verify that derived quantities have been stored in the database. The exact list of items is TBD.
- Requirement: DMS-REQ-0331
- Parent Requirements:
  - OSS-REQ-0391: 01 Data Product Conventions

5.9 DMS-REQ-0332-V-01: Denormalizing Database Tables

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection

Draft

- Jira Issue: LVV-163 (https://jira.lsstcorp.org/browse/LVV-163)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that some tables have been denormalized. This requirement needs some more explicit phrasing.
- Requirement: DMS-REQ-0332
- Parent Requirements:
  - OSS-REQ-0133: 01 Level 2 Data Products

5.10 DMS-REQ-0333-V-01: Maximum Likelihood Values and Covariances

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Inspection
- Jira Issue: LVV-164 (https://jira.lsstcorp.org/browse/LVV-164)
- Status: Not Covered
- Verification Level: SL
- **Description**: Inspect the tables and show that maximum likelihood values and covariances have been calculated.
- Requirement: DMS-REQ-0333
- Parent Requirements:
  - OSS-REQ-0391: 01 Data Product Conventions

Draft

5.11 DMS-REQ-0346-V-01: Data Availability

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Test
- Jira Issue: LVV-177 (https://jira.lsstcorp.org/browse/LVV-177)
- Status: Not Covered
- Verification Level: SL
- **Description**: Retrieve a coadd. Query its provenance and retrieve all the information required to recreate that coadd locally. In theory we could then rereduce the data and compare it to the original coadd.
- Requirement: DMS-REQ-0346
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility
  - OSS-REQ-0167: 01 Data Archiving
  - OSS-REQ-0313: 12 Telemetry Database Retention

5.12 DMS-REQ-0069-V-01: Processed Visit Images

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-29 (https://jira.lsstcorp.org/browse/LVV-29)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Use simulated raw data in format from DMS-REQ-0024. Run end-to-end test for one visit. Check that Processed Visit images have been created in expected format.
- Requirement: DMS-REQ-0069
- Parent Requirements:
  - OSS-REQ-0129: 04 Exposures (Level 1)

5.13 DMS-REQ-0010-V-01: Difference Exposures

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-7 (https://jira.lsstcorp.org/browse/LVV-7)
- Status: Not Covered
- Verification Level: SL
- **Description**: No requirement for quality of difference processing. No requirement this is tested as part of a full L1 end to end test. Just requires a processed image and a template: demonstrate that a difference exposure is created.
- Requirement: DMS-REQ-0010
- Parent Requirements:
  - DMS-REQ-0011: Produce Difference Sources
  - DMS-REQ-0033: 04 Provide Source Detection Software
  - OSS-REQ-0129: 04 Exposures (Level 1)

5.14 DMS-REQ-0269-V-01: DIASource Catalog

- Component:

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  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-100 (https://jira.lsstcorp.org/browse/LVV-100)
- Status: Not Covered
- Verification Level: SL
- **Description**: Assume this is verified by performing a difference image processing and checking that reasonable data automatically appears in the DIASource table. Verify against DPDD.
- Requirement: DMS-REQ-0269
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)
  - DMS-REQ-0270: 06 Faint DIASource Measurements

5.15 DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-102 (https://jira.lsstcorp.org/browse/LVV-102)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run multiple visits through image differencing. Run association pipeline. Verify that DIASources are correctly associated with DIAObjects and DIAObjects correctly associated with Objects. Can use precursor data. Associated element (LVV-9743) satisfies the radius within which an Object is considered coincident with a DIASource. Associated element (LVV-9742) satisfies the maximum number of stars that can be associated with a DIASource.

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- Requirement: DMS-REQ-0271
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.16 DMS-REQ-0347-V-01: Measurements in catalogs

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection
- Jira Issue: LVV-178 (https://jira.lsstcorp.org/browse/LVV-178)
- Status: Not Covered
- Verification Level: SL
- **Description**: Inspect the schema for each table and ensure that measurement columns use appropriate units.
- Requirement: DMS-REQ-0347
- Parent Requirements:
  - OSS-REQ-0391: 01 Data Product Conventions

5.17 DMS-REQ-0018-V-01: Raw Science Image Data Acquisition

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Test
- Jira Issue: LVV-8 (https://jira.lsstcorp.org/browse/LVV-8)
- Status: Not Covered

Draft

- Verification Level: SL
- **Description**: This requires a DAQ and OCS. We test in all known operating, calibration, and engineering modes. We verify that the pixels are the same as provided by the DAQ client library. We do not take responsibility for corruption between the DAQ and the client. Set up lab to simulate the summit.
- Requirement: DMS-REQ-0018
- Parent Requirements:
  - OSS-REQ-0114: 02 Acquisition of Science Sensor data

5.18 DMS-REQ-0020-V-01: Wavefront Sensor Data Acquisition

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Test
- Jira Issue: LVV-9 (https://jira.lsstcorp.org/browse/LVV-9)
- Status: Not Covered
- Verification Level: SL
- **Description**: Simulated camera DAQ acquiring wavefront data. Data backbone archiving the data. The final sentence in the discussion is negated by DMS-REQ-0265.
- Requirement: DMS-REQ-0020
- Parent Requirements:
  - OSS-REQ-0316: 01 Wavefront Sensor Data

5.19 DMS-REQ-0022-V-01: Crosstalk Corrected Science Image Data Acquisition

- Component:
  - DM

Draft

- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Test
- Jira Issue: LVV-10 (https://jira.lsstcorp.org/browse/LVV-10)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verify that DMS can accept cross talk corrected exposure data from the camera.
- Requirement: DMS-REQ-0022
- Parent Requirements:
  - OSS-REQ-0114: 02 Acquisition of Science Sensor data
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

5.20 DMS-REQ-0024-V-01: Raw Image Assembly

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-11 (https://jira.lsstcorp.org/browse/LVV-11)
- Status: Not Covered
- Verification Level: SL
- **Description**: Requires a simulated DAQ and OCS. Files are verified against the relevant DM specification for raw metadata content and pixel values.
- Requirement: DMS-REQ-0024
- Parent Requirements:
  - OSS-REQ-0114: 02 Acquisition of Science Sensor data
  - OSS-REQ-0129: 04 Exposures (Level 1)

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5.21 DMS-REQ-0068-V-01: Raw Science Image Metadata

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Test
- Jira Issue: LVV-28 (https://jira.lsstcorp.org/browse/LVV-28)
- Status: Not Covered
- Verification Level: SL
- **Description**: This is a more specific restatement of DMS-REQ-0024. Can be done with simulated camera DAQ and OCS. Compare against ICD. Test that the metadata placed on the OCS middleware by the simulated OCS is the same as that stored in the image metadata.
- Requirement: DMS-REQ-0068
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - DMS-REQ-0320: 01 Processing of Data From Special Programs
  - DMS-REQ-0066: Keep Exposure Archive
  - OSS-REQ-0171: 05 Engineering and Facilities Data

5.22 DMS-REQ-0265-V-01: Guider Calibration Data Acquisition

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-96 (https://jira.lsstcorp.org/browse/LVV-96)
- Status: Not Covered

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- Verification Level: SL
- **Description**: Needs a simulated DAQ for guider and data backbone. Does not say whether data are archived or not.
- Requirement: DMS-REQ-0265
- Parent Requirements:
  - OSS-REQ-0194: 06 Calibration Exposures Per Day

5.23 DMS-REQ-0308-V-01: Software Architecture to Enable Community Re-Use

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-139 (https://jira.lsstcorp.org/browse/LVV-139)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a processing run (of limited size) can be performed on a desktop and archive centre. Are we meant to be verifying “high throughput”?
- Requirement: DMS-REQ-0308
- Parent Requirements:
  - OSS-REQ-0121: 08 Open Source, Open Configuration

5.24 DMS-REQ-0002-V-01: Transient Alert Distribution

- Component:
  - DM
- Assignee: Eric Bellm

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- Verification Methos: Demonstration
- Jira Issue: LVV-3 (https://jira.lsstcorp.org/browse/LVV-3)
- Status: Not Covered
- Verification Level: SL
- **Description**: With precursor data, do L1 processing and issue alerts to a standards-based broker.
- Requirement: DMS-REQ-0002
- Parent Requirements:
  - OSS-REQ-0184: 08 Transient Alert Publication
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

5.25 DMS-REQ-0004-V-01: Time to L1 public release_1

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-4 (https://jira.lsstcorp.org/browse/LVV-4)
- Status: Not Covered
- Verification Level: SL
- **Description**: This is 3 distinct requirements. OTT1 can be tested with simulated data. L1 Data Products can be created with precursor data but requires that we include some "worst case" datasets (in terms of density and night length). SSObject orbit determination can be done to a certain extent with simulated data. Will need to be verified again during commissioning. Associated element (LVV-9740) satisfies the latency of reporting transients. Associated element (LVV-9803) satisfies the availability of Solar System Object orbits.
- Requirement: DMS-REQ-0004

Draft

- Parent Requirements:
  - No parents specified

5.26 DMS-REQ-0074-V-01: Difference Exposure Attributes

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-32 (https://jira.lsstcorp.org/browse/LVV-32)
- Status: Not Covered
- Verification Level: SL
- **Description**: Demonstrate that all the noted information can be retrieved from the database system. Requirement needs to be adjusted as PSF matching kernel might not exist.
- Requirement: DMS-REQ-0074
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - DMS-REQ-0066: Keep Exposure Archive

5.27 DMS-REQ-0029-V-01: Generate Photometric Zeropoint for Visit Image

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-12 (https://jira.lsstcorp.org/browse/LVV-12)
- Status: Not Covered

Draft

- Verification Level: SL
- **Description**: Check that a zeropoint is present in output data files from DMS-REQ-0069. Does not check that the value is reasonable.
- Requirement: DMS-REQ-0029
- Parent Requirements:
  - DMS-REQ-0090: Generate Alerts
  - OSS-REQ-0056: 01 System Monitoring & Diagnostics
  - OSS-REQ-0152: 10 Level 1 Photometric Zero Point Error

5.28 DMS-REQ-0030-V-01: Absolute accuracy of WCS

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Test
- Jira Issue: LVV-13 (https://jira.lsstcorp.org/browse/LVV-13)
- Status: Not Covered
- Verification Level: SL
- **Description**: See Nidever/Economou document Section 3.2. Note terminology in this requirement is not consistent with LSR. Can be tested with existing survey data. Also needs to be tested with real LSST data. Associated element ([LVV-9741 | https://jira.lsstcorp.org/browse/LVV-9741]) satisfies the minimum number of available astrometric standards per CCD.
- Requirement: DMS-REQ-0030
- Parent Requirements:
  - DMS-REQ-0090: Generate Alerts
  - DMS-REQ-0104: Produce Co-Added Exposures
  - OSS-REQ-0149: 09 Level 1 Catalog Precision
  - OSS-REQ-0162: 01 Level 2 Catalog Accuracy

Draft

5.29 DMS-REQ-0070-V-01: Generate PSF for Visit Images

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-30 (https://jira.lsstcorp.org/browse/LVV-30)
- Status: Not Covered
- Verification Level: SL
- **Description**: Can be checked with any test data. No requirement on accuracy. Just test that a PSF model can be retrieved from any location in the Processed Visit.
- Requirement: DMS-REQ-0070
- Parent Requirements:
  - OSS-REQ-0056: 01 System Monitoring & Diagnostics
  - DMS-REQ-0116: Extended Object Shape Parameters

5.30 DMS-REQ-0072-V-01: Processed Visit Image Content

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-31 (https://jira.lsstcorp.org/browse/LVV-31)
- Status: Not Covered
- Verification Level: SL
- **Description**: Take output from DMS-REQ-0069 and compare against the processed visit ICD.

Draft

- Requirement: DMS-REQ-0072
- Parent Requirements:
  - OSS-REQ-0129: 04 Exposures (Level 1)
  - DMS-REQ-0066: Keep Exposure Archive

5.31 DMS-REQ-0327-V-01: Background Model Calculation

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Test
- Jira Issue: LVV-158 (https://jira.lsstcorp.org/browse/LVV-158)
- Status: Not Covered
- Verification Level: SL
- **Description**: Process a visit. Retrieve that visit from the output repository and verify that a background model is available.
- Requirement: DMS-REQ-0327
- Parent Requirements:
  - OSS-REQ-0056: 01 System Monitoring & Diagnostics

5.32 DMS-REQ-0328-V-01: Documenting Image Characterization

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Inspection
- Jira Issue: LVV-159 (https://jira.lsstcorp.org/browse/LVV-159)

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- Status: Not Covered
- Verification Level: SL
- **Description**: Verify existence of documentation. Compare file contents with document descriptions.
- Requirement: DMS-REQ-0328
- Parent Requirements:
  - OSS-REQ-0391: 01 Data Product Conventions

5.33 DMS-REQ-0097-V-01: Level 1 Data Quality Report Definition

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-39 (https://jira.lsstcorp.org/browse/LVV-39)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run multiple visits through the L1 pipeline (can start with raw data files), check that report is created. The report is a dynamic UI as well as a static document.
- Requirement: DMS-REQ-0097
- Parent Requirements:
  - OSS-REQ-0131: 06 Nightly Summary Products
  - DMS-REQ-0096: 10 Generate Data Quality Report Within Specified Time

Draft

5.34 DMS-REQ-0099-V-01: Level 1 Performance Report Definition

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-41 (https://jira.lsstcorp.org/browse/LVV-41)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run multiple visits through the L1 pipeline (can start with raw data files; optimally an entire night), check that report is created. The report is a dynamic UI as well as a static document.
- Requirement: DMS-REQ-0099
- Parent Requirements:
  - DMS-REQ-0098: 11 Generate DMS Performance Report Within Specified Time
  - OSS-REQ-0131: 06 Nightly Summary Products

5.35 DMS-REQ-0101-V-01: Level 1 Calibration Report Definition

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-43 (https://jira.lsstcorp.org/browse/LVV-43)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Using precursor and simulated calibration data, run the L1 calibration pipeline and check report. The report is dynamic and triggers alerts if calibrations go out of range. Check a static report is created.
- Requirement: DMS-REQ-0101
- Parent Requirements:
  - OSS-REQ-0131: 06 Nightly Summary Products
  - DMS-REQ-0100: 12 Generate Calibration Report Within Specified Time

5.36 DMS-REQ-0266-V-01: Exposure Catalog

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Inspection
- Jira Issue: LVV-97 (https://jira.lsstcorp.org/browse/LVV-97)
- Status: Not Covered
- Verification Level: SL
- **Description**: This requires a database table to be created with the relevant columns and for those columns to be verified. Also show that the data stored in the table is appropriate.
- Requirement: DMS-REQ-0266
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.37 DMS-REQ-0270-V-01: Faint DIASource Measurements

- Component:
  - DM

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- Assignee: Eric Bellm
- Verification Methos: Undefined
- Jira Issue: LVV-101 (https://jira.lsstcorp.org/browse/LVV-101)
- Status: Not Covered
- Verification Level: SL
- **Description**: We first need to define some criteria. Then we need to work out whether this is an after burner, triggered after processing, or something directly integrated into L1 processing and triggered automatically.
- Requirement: DMS-REQ-0270
- Parent Requirements:
  - OSS-REQ-0166: 13 Alert Completeness and Purity

5.38 DMS-REQ-0285-V-01: Level 1 Source Association

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-116 (https://jira.lsstcorp.org/browse/LVV-116)
- Status: Not Covered
- Verification Level: SL
- **Description**: How is this not just DMS-REQ-0271 rewritten? Is “clusters” important here? Night of precursor L1 data processing should result in DIAObject and SSObject association.
- Requirement: DMS-REQ-0285
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

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- OSS-REQ-0160: 12 Level 1 Difference Source - Difference Object Association Quality
- OSS-REQ-0159: 11 Level 1 Moving Object Quality

5.39 DMS-REQ-0272-V-01: DIAObject Attributes

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-103 (https://jira.lsstcorp.org/browse/LVV-103)
- Status: Not Covered
- Verification Level: SL
- **Description**: Compare contents of table populated in DMS-REQ- 0271 with DPDD.
- Requirement: DMS-REQ-0272
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.40 DMS-REQ-0273-V-01: SSObject Catalog

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-104 (https://jira.lsstcorp.org/browse/LVV-104)
- Status: Not Covered
- Verification Level: HL

Draft

- **Description**: We might be able to demonstrate this by providing calculated positions of known asteroids to MOPS and then checking the SSObject table. Better, use data from precursor surveys. Also use full simulations with injected asteroids. Final verification requires a mini-survey of LSST.
- Requirement: DMS-REQ-0273
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.41 DMS-REQ-0274-V-01: Alert Content

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-105 (https://jira.lsstcorp.org/browse/LVV-105)
- Status: Not Covered
- Verification Level: SL
- **Description**: Interpret this as a full end to end test of L1, rather than the ability to publish alerts from a DIASources catalog. Compare contents of DIASources catalog with contents of alert stream.
- Requirement: DMS-REQ-0274
- Parent Requirements:
  - OSS-REQ-0128: 03 Alerts

5.42 DMS-REQ-0317-V-01: DIAForcedSource Catalog

- Component:
  - DM

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- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-148 (https://jira.lsstcorp.org/browse/LVV-148)
- Status: Not Covered
- Verification Level: SL
- **Description**: From precursor data reduced with difference imaging, calculate forced sources and insert into table. Verify content of table against DPDD.
- Requirement: DMS-REQ-0317
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.43 DMS-REQ-0319-V-01: Characterizing Variability

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-150 (https://jira.lsstcorp.org/browse/LVV-150)
- Status: Not Covered
- Verification Level: SL
- **Description**: Using a DIAObject database populated with a simulated 2 year history, run a simulated image through the alert production system and test that the issued alerts use the correct range of data for characterization.
- Requirement: DMS-REQ-0319
- Parent Requirements:
  - OSS-REQ-0126: 01 Level 1 Data Products

Draft

5.44 DMS-REQ-0323-V-01: Calculating SSObject Parameters

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-154 (https://jira.lsstcorp.org/browse/LVV-154)
- Status: Not Covered
- Verification Level: SL
- **Description**: Use the APIs to calculate the required parameters for a sample of different categories of SSObjects.
- Requirement: DMS-REQ-0323
- Parent Requirements:
  - OSS-REQ-0126: 01 Level 1 Data Products

5.45 DMS-REQ-0324-V-01: Matching DIASources to Objects

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-155 (https://jira.lsstcorp.org/browse/LVV-155)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do a mini data release production run, search for an Object and request the associated DIASources.
- Requirement: DMS-REQ-0324

Draft

- Parent Requirements:
  - OSS-REQ-0126: 01 Level 1 Data Products

5.46 DMS-REQ-0325-V-01: Regenerating L1 Data Products During Data Release Processing

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-156 (https://jira.lsstcorp.org/browse/LVV-156)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do a mini data release production run and show that L1 data products were regenerated.
- Requirement: DMS-REQ-0325
- Parent Requirements:
  - OSS-REQ-0135: 03 Uniformly calibrated and processed versions of Level 1 Data Products

5.47 DMS-REQ-0353-V-01: Publishing predicted visit schedule

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Test
- Jira Issue: LVV-184 (https://jira.lsstcorp.org/browse/LVV-184)
- Status: Not Covered

Draft

- Verification Level: SL
- **Description**: Use simulated schedule and test that an external unauthenticated user can retrieve the information.
- Requirement: DMS-REQ-0353
- Parent Requirements:
  - OSS-REQ-0378: 11 Advanced Publishing of Scheduler Sequence

5.48 DMS-REQ-0034-V-01: Associate Sources to Objects

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-16 (https://jira.lsstcorp.org/browse/LVV-16)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data. Different filters, sky positions and epochs. L2 processing. Verify object association.
- Requirement: DMS-REQ-0034
- Parent Requirements:
  - DMS-REQ-0081: Produce Object Catalog
  - OSS-REQ-0339: 03 Level 2 Source-Object Association Quality

5.49 DMS-REQ-0278-V-01: Coadd Image Method Constraints

- Component:
  - DM
- Assignee: Jim Bosch

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- Verification Methos: Demonstration
- Jira Issue: LVV-109 (https://jira.lsstcorp.org/browse/LVV-109)
- Status: Not Covered
- Verification Level: SL
- **Description**: This is like DMS-REQ-0279 but specifically for overlapping spatial visits and describing HOW it should be done. Verify that the images are on the required output grid.
- Requirement: DMS-REQ-0278
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.50 DMS-REQ-0047-V-01: Provide PSF for Coadded Images

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-20 (https://jira.lsstcorp.org/browse/LVV-20)
- Status: Not Covered
- Verification Level: SL
- **Description**: From a coadd, request the PSF from every pixel. Does not require that the PSF varies.
- Requirement: DMS-REQ-0047
- Parent Requirements:
  - OSS-REQ-0153: 02 World Coordinate System Accuracy
  - DMS-REQ-0041: Measure Intrinsic Ellipticities of Small Galaxies
  - OSS-REQ-0136: 04 Co-added Exposures
  - OSS-REQ-0316: 01 Wavefront Sensor Data

Draft

5.51 DMS-REQ-0103-V-01: Produce Images for EPO

- Component:
  - EPO
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-45 (https://jira.lsstcorp.org/browse/LVV-45)
- Status: Not Covered
- Verification Level: SL
- **Description**: Requirement is too vague and open-ended. Might include healpix RGB multi-scale images. Might just be coadds? Is generation under control of EPO for "on demand" generation? Or are they part of DRP? This requirement needs to be removed and replaced with real requirements from EPO.
- Requirement: DMS-REQ-0103
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.52 DMS-REQ-0106-V-01: Coadded Image Provenance

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-46 (https://jira.lsstcorp.org/browse/LVV-46)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Given a coadd downloaded from the archive. Request provenance information. Regenerate coadd. Compare download with newly created coadd. Can this use the L3 system?
- Requirement: DMS-REQ-0106
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - DMS-REQ-0104: Produce Co-Added Exposures

5.53 DMS-REQ-0046-V-01: Provide Photometric Redshifts of Galaxies

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Inspection
- Jira Issue: LVV-19 (https://jira.lsstcorp.org/browse/LVV-19)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verify that the Object table has a photometric redshift for each object.
- Requirement: DMS-REQ-0046
- Parent Requirements:
  - OSS-REQ-0133: 01 Level 2 Data Products
  - DMS-REQ-0040: Enable BAO Analysis

5.54 DMS-REQ-0276-V-01: Object Characterization

- Component:
  - DM
- Assignee: Jim Bosch

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- Verification Methos: Inspection
- Jira Issue: LVV-107 (https://jira.lsstcorp.org/browse/LVV-107)
- Status: Not Covered
- Verification Level: SL
- **Description**: For each object in DMS-REQ-0275 verify that the characterization measures are defined.
- Requirement: DMS-REQ-0276
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.55 DMS-REQ-0277-V-01: Coadd Source Catalog

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-108 (https://jira.lsstcorp.org/browse/LVV-108)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data. Do a miniDRP and verify that a source catalog is created at that threshold. It's not clear why we have a requirement for a transient internal catalog.
- Requirement: DMS-REQ-0277
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)
  - DMS-REQ-0267: 02 Source Catalog

Draft

5.56 DMS-REQ-0349-V-01: Detecting extended low surface brightness objects

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Test
- Jira Issue: LVV-180 (https://jira.lsstcorp.org/browse/LVV-180)
- Status: Not Covered
- Verification Level: SL
- **Description**: From a suitable dataset, using LSST code, post process it and detect low surface brightness objects.
- Requirement: DMS-REQ-0349
- Parent Requirements:
  - OSS-REQ-0133: 01 Level 2 Data Products

5.57 DMS-REQ-0280-V-01: Template Coadds

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-111 (https://jira.lsstcorp.org/browse/LVV-111)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data. Not obvious this has to be demonstrated with all filters. Is "periodic" manual or automated? Much like DMS-REQ-0279 with different constraints. Demonstrate that templates are created with appropriate bins.

Draft

- Requirement: DMS-REQ-0280
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.58 DMS-REQ-0281-V-01: Multi-band Coadds

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-112 (https://jira.lsstcorp.org/browse/LVV-112)
- Status: Not Covered
- Verification Level: SL
- **Description**: Like DMS-REQ-0279 with different constraints.
- Requirement: DMS-REQ-0281
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.59 DMS-REQ-0329-V-01: All-Sky Visualization of Data Releases

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Test
- Jira Issue: LVV-160 (https://jira.lsstcorp.org/browse/LVV-160)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Test that generated images can be displayed in all sky tool. The exact details of that format are TBD.
- Requirement: DMS-REQ-0329
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.60 DMS-REQ-0330-V-01: Best Seeing Coadds

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Test
- Jira Issue: LVV-161 (https://jira.lsstcorp.org/browse/LVV-161)
- Status: Not Covered
- Verification Level: SL
- **Description**: Using a suitable test dataset, form a query specifying a seeing range and submit a job to create a coadd from the resulting images.
- Requirement: DMS-REQ-0330
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

5.61 DMS-REQ-0335-V-01: PSF-Matched Coadds

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Inspection

Draft

- Jira Issue: LVV-166 (https://jira.lsstcorp.org/browse/LVV-166)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do a mini data release production. Demonstrate that a PDF-matched coadd was created and inspect the archive to confirm that the file is not present.
- Requirement: DMS-REQ-0335
- Parent Requirements:
  - OSS-REQ-0133: 01 Level 2 Data Products

5.62 DMS-REQ-0337-V-01: Detecting faint variable objects

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Test
- Jira Issue: LVV-168 (https://jira.lsstcorp.org/browse/LVV-168)
- Status: Not Covered
- Verification Level: SL
- **Description**: Given a suitable dataset, process it in such a way as to detect more faint sources.
- Requirement: DMS-REQ-0337
- Parent Requirements:
  - OSS-REQ-0136: 04 Co-added Exposures

Draft

5.63 DMS-REQ-0338-V-01: Targeted Coadds

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Inspection
- Jira Issue: LVV-169 (https://jira.lsstcorp.org/browse/LVV-169)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show procedure for persisting cutouts from a coadd. Show user interface for retrieving the history of cutouts for a specific location.
- Requirement: DMS-REQ-0338
- Parent Requirements:
  - LSR-REQ-0040: 15 Data Quality Monitoring
  - OSS-REQ-0136: 04 Co-added Exposures

5.64 DMS-REQ-0339-V-01: Tracking Characterization Changes Between Data Releases

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-170 (https://jira.lsstcorp.org/browse/LVV-170)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show procedure for selecting samples for long term persistence. Demonstrate that some data can be moved from a data release to a separate store.

Draft

- Requirement: DMS-REQ-0339
- Parent Requirements:
  - LSR-REQ-0040: 15 Data Quality Monitoring

5.65 DMS-REQ-0059-V-01: Bad Pixel Map

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-22 (https://jira.lsstcorp.org/browse/LVV-22)
- Status: Not Covered
- Verification Level: SL
- **Description**: 32bits is a minimum requirement. To verify we need to check that it is at least 32-bit. The product is an image file in unspecified format. (May want an additional requirement that these data can also be visualized directly on a web page as part of SUIT). Request the map for any date, compare with camera team understanding.
- Requirement: DMS-REQ-0059
- Parent Requirements:
  - OSS-REQ-0271: 15 Supported Image Types
  - DMS-REQ-0058: Correct for Instrument Sensitivity Variation
  - OSS-REQ-0129: 04 Exposures (Level 1)

5.66 DMS-REQ-0060-V-01: Bias Residual Image

- Component:
  - DM
- Assignee: Jim Bosch

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- Verification Methos: Demonstration
- Jira Issue: LVV-23 (https://jira.lsstcorp.org/browse/LVV-23)
- Status: Not Covered
- Verification Level: SL
- **Description**: Can be done with simulated raw calibration data. Need to define whether "as-needed" is manual trigger or automation. Can this be done with the camera in the lab?
- Requirement: DMS-REQ-0060
- Parent Requirements:
  - DMS-REQ-0055: Correct for Camera Bias Structure
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0046: 05 Calibration

5.67 DMS-REQ-0061-V-01: Crosstalk Correction Matrix

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-24 (https://jira.lsstcorp.org/browse/LVV-24)
- Status: Not Covered
- Verification Level: SL
- **Description**: Needs commissioning data to determine "as-needed" timeline. Can demonstrate algorithms prior to commissioning by taking darks in the lab.
- Requirement: DMS-REQ-0061
- Parent Requirements:
  - DMS-REQ-0056: Correct for Camera Crosstalk
  - OSS-REQ-0349: 07 Data Release Production Crosstalk Correction

Draft

5.68 DMS-REQ-0062-V-01: Illumination Correction Frame

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-25 (https://jira.lsstcorp.org/browse/LVV-25)
- Status: Not Covered
- Verification Level: HL
- **Description**: Needs a real camera during commissioning and data taken in the correct mode. Can possibly be done prior to commissioning with simulated data.
- Requirement: DMS-REQ-0062
- Parent Requirements:
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0046: 05 Calibration
  - DMS-REQ-0058: Correct for Instrument Sensitivity Variation

5.69 DMS-REQ-0063-V-01: Monochromatic Flatfield Data Cube

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-26 (https://jira.lsstcorp.org/browse/LVV-26)
- Status: Not Covered
- Verification Level: HL
- **Description**: Needs a real camera during commissioning and data taken in the correct mode. Possibly can be done with simulated data and lab measurements.

Draft

- Requirement: DMS-REQ-0063
- Parent Requirements:
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0046: 05 Calibration
  - DMS-REQ-0058: Correct for Instrument Sensitivity Variation
  - DMS-REQ-0057: Correct for Detector Fringing

5.70 DMS-REQ-0130-V-01: Calibration Data Products

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-57 (https://jira.lsstcorp.org/browse/LVV-57)
- Status: Not Covered
- Verification Level: SL
- **Description**: For every calibration mode, prove that the data can be processed. Can be done with simulated data and that from the auxilliary telescope. Will need to be redone with real LSST camera data.
- Requirement: DMS-REQ-0130
- Parent Requirements:
  - DMS-REQ-0076: Keep Science Data Archive
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0194: 06 Calibration Exposures Per Day
  - OSS-REQ-0129: 04 Exposures (Level 1)

Draft

5.71 DMS-REQ-0132-V-01: Calibration Image Provenance

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-59 (https://jira.lsstcorp.org/browse/LVV-59)
- Status: Not Covered
- Verification Level: SL
- **Description**: Can be done with precursor or simulated data. Verify that provenance information is present.
- Requirement: DMS-REQ-0132
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - OSS-REQ-0123: 01 Reproducibility
  - DMS-REQ-0130: 01 Calibration Data Products

5.72 DMS-REQ-0282-V-01: Dark Current Correction Frame

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-113 (https://jira.lsstcorp.org/browse/LVV-113)
- Status: Not Covered
- Verification Level: SL
- **Description**: Can demonstrate dark processing with camera in lab and with simulated dark data.

Draft

- Requirement: DMS-REQ-0282
- Parent Requirements:
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0046: 05 Calibration

5.73 DMS-REQ-0283-V-01: Fringe Correction Frame

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-114 (https://jira.lsstcorp.org/browse/LVV-114)
- Status: Not Covered
- Verification Level: HL
- **Description**: Needs a real camera during commissioning and data taken in the correct mode. Can possibly be done prior to commissioning with simulated data.
- Requirement: DMS-REQ-0283
- Parent Requirements:
  - OSS-REQ-0271: 15 Supported Image Types
  - OSS-REQ-0046: 05 Calibration

5.74 DMS-REQ-0320-V-01: Processing of Data From Special Programs

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Demonstration

Draft

- Jira Issue: LVV-151 (https://jira.lsstcorp.org/browse/LVV-151)
- Status: Not Covered
- Verification Level: SL
- **Description**: Fo a simulated night of observing that includes some special program observations, show that the special programs observations are reduced using a specialized recipe.
- Requirement: DMS-REQ-0320
- Parent Requirements:
  - LSR-REQ-0075: 09 Survey Time Allocation
  - LSR-REQ-0121: 04 Data Products for Special Programs
  - LSR-REQ-0122: 03 Processing Data from Special Programs
  - OSS-REQ-0392: 02 Data Products Handling for Special Programs

5.75 DMS-REQ-0321-V-01: Level 1 Processing of Special Programs Data

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Test
- Jira Issue: LVV-152 (https://jira.lsstcorp.org/browse/LVV-152)
- Status: Not Covered
- Verification Level: SL
- **Description**: Process some representative special programs style data and demonstrate that a full night could be reduced in time.
- Requirement: DMS-REQ-0321
- Parent Requirements:
  - OSS-REQ-0392: 02 Data Products Handling for Special Programs

Draft

5.76 DMS-REQ-0322-V-01: Special Programs Database

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Demonstration
- Jira Issue: LVV-153 (https://jira.lsstcorp.org/browse/LVV-153)
- Status: Not Covered
- Verification Level: SL
- **Description**: Process some special program simulated data and demonstrate that the products appear in distinct databases.
- Requirement: DMS-REQ-0322
- Parent Requirements:
  - OSS-REQ-0392: 02 Data Products Handling for Special Programs

5.77 DMS-REQ-0004-V-01: Time to L1 public release

- Component:
  - DM
- Assignee: Melissa Graham
- Verification Methos: Test
- Jira Issue: LVV-175 (https://jira.lsstcorp.org/browse/LVV-175)
- Status: Not Covered
- Verification Level: SL
- **Description**: With suitable special program test data, process it in L1 mode within OTT1 seconds. Associated element (LVV-9744) satisfies the latency of reporting optical transients.

Draft

- Requirement: DMS-REQ-0004
- Parent Requirements:
  - DMS-REQ-0003: Create and Maintain Science Data Archive
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

5.78 DMS-REQ-0291-V-01: Query Repeatability

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-122 (https://jira.lsstcorp.org/browse/LVV-122)
- Status: Not Covered
- Verification Level: SL
- **Description**: Can be verified prior to commissioning with processed precursor test data along with a defined set of queries. Query on previous DR run is verified to work even when newer DR is the default.
- Requirement: DMS-REQ-0291
- Parent Requirements:
  - OSS-REQ-0181: 06 Data Products Query and Download Infrastructure

5.79 DMS-REQ-0292-V-01: Uniqueness of IDs Across Data Releases

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-123 (https://jira.lsstcorp.org/browse/LVV-123)

Draft

- Status: Not Covered
- Verification Level: SL
- **Description**: Simple: Inspect the ID generation code and confirm that DR number is encoded in each ID. Better: With carefully selected precursor data, do multiple DRP runs and verify that IDs are not reused.
- Requirement: DMS-REQ-0292
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.80 DMS-REQ-0293-V-01: Selection of Datasets

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-124 (https://jira.lsstcorp.org/browse/LVV-124)
- Status: Not Covered
- Verification Level: SL
- **Description**: Demonstrate that composites can be assembled in the butler for a reasonable sampling of dataset types.
- Requirement: DMS-REQ-0293
- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access
  - OSS-REQ-0118: 05 Consistency and Completeness

Draft

5.81 DMS-REQ-0295-V-01: Transparent Data Access

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-126 (https://jira.lsstcorp.org/browse/LVV-126)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a file stored at NCSA can also be obtained from IN2P3 and the Chilean DAC. Can be done with test DRP data.
- Requirement: DMS-REQ-0295
- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access

5.82 DMS-REQ-0089-V-01: Solar System Objects Available Within Specified Time

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-36 (https://jira.lsstcorp.org/browse/LVV-36)
- Status: Not Covered
- Verification Level: SL
- **Description**: Reduce some L1 data covering a large enough epoch to determine orbits. Then reduce an entire night of L1 data, run dayMOPS, determine orbit updates, wait for public information to be updated. Was it less than L1PublicT?

Draft

- Requirement: DMS-REQ-0089
- Parent Requirements:
  - DMS-REQ-0004: 01 Nightly Data Accessible Within 24 hrs
  - DMS-REQ-0086: Produce Orbit Catalog
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

5.83 DMS-REQ-0096-V-01: Generate Data Quality Report Within Specified Time

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-38 (https://jira.lsstcorp.org/browse/LVV-38)
- Status: Not Covered
- Verification Level: SL
- **Description**: Reduce a night of L1 data. Wait for report to appear. Is it on time? Is it human-readable? "Machine-readable" is a database table or a text file. The clock begins when Prompt Processing ends in the morning.
- Requirement: DMS-REQ-0096
- Parent Requirements:
  - OSS-REQ-0131: 06 Nightly Summary Products

5.84 DMS-REQ-0098-V-01: Generate DMS Performance Report Within Specified Time

- Component:
  - DM
- Assignee: Simon Krughoff

Draft

- Verification Methos: Demonstration
- Jira Issue: LVV-40 (https://jira.lsstcorp.org/browse/LVV-40)
- Status: Not Covered
- Verification Level: SL
- **Description**: Reduce a night of L1 data. Wait for report to appear. Is it on time? Is it human-readable? Is the text file machine readable?
- Requirement: DMS-REQ-0098
- Parent Requirements:
  - OSS-REQ-0131: 06 Nightly Summary Products

5.85 DMS-REQ-0100-V-01: Generate Calibration Report Within Specified Time

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-42 (https://jira.lsstcorp.org/browse/LVV-42)
- Status: Not Covered
- Verification Level: SL
- **Description**: Reduce a night of L1 data and day time calibrations. Wait for report to appear. Is it on time? Is the timeline mainly driven by day time calibrations?
- Requirement: DMS-REQ-0100
- Parent Requirements:
  - OSS-REQ-0131: 06 Nightly Summary Products

Draft

5.86 DMS-REQ-0131-V-01: Time allowed to process calibs

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-58 (https://jira.lsstcorp.org/browse/LVV-58)
- Status: Not Covered
- Verification Level: SL
- **Description**: With calibration observation data that requires the most processing, ensure that it can be processed and stored on the correct timescale. Simulate a "worst possible" night's observing and inspect the daily operations plan. Associated element ([LVV-9745|https://jira.lsstcorp.org/browse/LVV-9745]) satisfies the number of calibs to be processed in the allotted time.
- Requirement: DMS-REQ-0131
- Parent Requirements:
  - OSS-REQ-0046: 05 Calibration
  - OSS-REQ-0021: 02 Base Site
  - OSS-REQ-0194: 06 Calibration Exposures Per Day
  - DMS-REQ-0130: 01 Calibration Data Products

5.87 DMS-REQ-0284-V-01: Level-1 Production Completeness

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-115 (https://jira.lsstcorp.org/browse/LVV-115)

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- Status: Not Covered
- Verification Level: SL
- **Description**: With simulated data backbone and DAQ, take data, disable network, continue taking data, put network back, check archive.
- Requirement: DMS-REQ-0284
- Parent Requirements:
  - OSS-REQ-0052: 04 Summit Data Buffer

5.88 DMS-REQ-0286-V-01: SSObject Precovery

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-117 (https://jira.lsstcorp.org/browse/LVV-117)
- Status: Not Covered
- Verification Level: SL
- **Description**: Carefully craft an input dataset from precursor data that ensures that precovery will only be triggered later in the processing. Check that precovery occurs and object association is done.
- Requirement: DMS-REQ-0286
- Parent Requirements:
  - OSS-REQ-0159: 11 Level 1 Moving Object Quality

5.89 DMS-REQ-0287-V-01: Max look-back time for precovery

- Component:
  - DM

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- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-118 (https://jira.lsstcorp.org/browse/LVV-118)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor or simulated L1 data covering precoveryWindow plus a few days. Detect DIASource towards end of window, ensure, at minimum, precoveryWindow forced photometry is performed. Associated element ([LVV-9747|https://jira.lsstcorp.org/browse/LVV-9747]) satisfies the lifetime of cached L1 data products. Associated element (LVV-9746) satisfies the time in which L1 data products shall be publicly released.
- Requirement: DMS-REQ-0287
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.90 DMS-REQ-0288-V-01: Use of External Orbit Catalogs

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-119 (https://jira.lsstcorp.org/browse/LVV-119)
- Status: Not Covered
- Verification Level: SL
- **Description**: Either demonstrate an external catalog being used in MOPS, or show the code that would use the external catalog. Former preferred.
- Requirement: DMS-REQ-0288
- Parent Requirements:
  - OSS-REQ-0159: 11 Level 1 Moving Object Quality

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5.91 DMS-REQ-0342-V-01: Alert Filtering Service

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-173 (https://jira.lsstcorp.org/browse/LVV-173)
- Status: Not Covered
- Verification Level: SL
- **Description**: In simulated L1 system, register a simple filter and verify that the filter triggers for the correct alerts.
- Requirement: DMS-REQ-0342
- Parent Requirements:
  - LSR-REQ-0025: 09 Transient Filtering

5.92 DMS-REQ-0343-V-01: Number of full-size alerts

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Test
- Jira Issue: LVV-174 (https://jira.lsstcorp.org/browse/LVV-174)
- Status: Not Covered
- Verification Level: SL
- **Description**: In simulated L1 system, register numBrokerUsers distinct filter codes and verify that they receive the expected throughput. Additional element ([LVV-9748|https://jira.lsstcorp.or 9748]) satisfies the constraint on the number of simultaneous users.

Draft

- Requirement: DMS-REQ-0343
- Parent Requirements:
  - OSS-REQ-0193: 05 Alerts per Visit
  - OSS-REQ-0184: 08 Transient Alert Publication

5.93 DMS-REQ-0348-V-01: Pre-defined alert filters

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-179 (https://jira.lsstcorp.org/browse/LVV-179)
- Status: Not Covered
- Verification Level: SL
- **Description**: Create a filter from a restricted set of predefined filters.
- Requirement: DMS-REQ-0348
- Parent Requirements:
  - LSR-REQ-0026: 10 Predefined Transient Filters

5.94 DMS-REQ-0289-V-01: Calibration Production Processing

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Inspection
- Jira Issue: LVV-120 (https://jira.lsstcorp.org/browse/LVV-120)
- Status: Not Covered

Draft

- Verification Level: SL
- **Description**: Vague. DM needs to be able to take any calibration data and reduce them. This requirement does not cover decisions on when to take calibrations. Show that CPP is in place and can reduce data.
- Requirement: DMS-REQ-0289
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility
  - OSS-REQ-0170: 04 Calibration Data

5.95 DMS-REQ-0350-V-01: Associating Objects across data releases

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Test
- Jira Issue: LVV-181 (https://jira.lsstcorp.org/browse/LVV-181)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do two mini data release production runs on a single dataset that covers a shared area multiple times. Query the second data release's Object table and request an association with the previous data release. Do this with the previous data release being inaccessible.
- Requirement: DMS-REQ-0350
- Parent Requirements:
  - No parents specified

Draft

5.96 DMS-REQ-0119-V-01: DAC resource allocation for Level 3 processing

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-47 (https://jira.lsstcorp.org/browse/LVV-47)
- Status: Not Covered
- Verification Level: SL
- **Description**: Create L3 instance. Submit a number of L3 processing jobs and demonstrate that prioritization and resource allocation happens correctly when limits are set lower than normal.
- Requirement: DMS-REQ-0119
- Parent Requirements:
  - OSS-REQ-0143: 05 Resource Allocation

5.97 DMS-REQ-0120-V-01: Level 3 Data Product Self Consistency

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-48 (https://jira.lsstcorp.org/browse/LVV-48)
- Status: Not Covered
- Verification Level: SL
- **Description**: This verification is hard. All you can do is inspect the APIs to ensure that missed DRs can not happen without being explicit, and ensure that the butler can be configured to access a specific DR.

Draft

- Requirement: DMS-REQ-0120
- Parent Requirements:
  - OSS-REQ-0120: 06 Consistency
  - OSS-REQ-0118: 05 Consistency and Completeness

5.98 DMS-REQ-0121-V-01: Provenance for Level 3 processing at DACs

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-49 (https://jira.lsstcorp.org/browse/LVV-49)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that an API exists for reading and writing provenance information in a L3 environment.
- Requirement: DMS-REQ-0121
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance

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

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-53 (https://jira.lsstcorp.org/browse/LVV-53)

Draft

- Status: Not Covered
- Verification Level: SL
- **Description**: I don't entirely understand this requirement.
- Requirement: DMS-REQ-0125
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - DMS-REQ-0120: 04 Level 3 Data Product Self Consistency
  - OSS-REQ-0121: 08 Open Source, Open Configuration

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

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-56 (https://jira.lsstcorp.org/browse/LVV-56)
- Status: Not Covered
- Verification Level: SL
- **Description**: I don't entirely understand this requirement.
- Requirement: DMS-REQ-0128
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - DMS-REQ-0120: 04 Level 3 Data Product Self Consistency
  - OSS-REQ-0121: 08 Open Source, Open Configuration

Draft

5.101 DMS-REQ-0290-V-01: Level 3 Data Import

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-121 (https://jira.lsstcorp.org/browse/LVV-121)
- Status: Not Covered
- Verification Level: SL
- **Description**: Requires a fixed list of import formats. L3 user uploads catalog into L3 system and can then do queries upon it.
- Requirement: DMS-REQ-0290
- Parent Requirements:
  - OSS-REQ-0140: 02 Production

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

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Test
- Jira Issue: LVV-171 (https://jira.lsstcorp.org/browse/LVV-171)
- Status: Not Covered
- Verification Level: SL
- **Description**: Create some L3 data products. Adjust permissions and show that retrieval fails if permissions are not suitable.
- Requirement: DMS-REQ-0340

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- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access
  - OSS-REQ-0187: 09 Information Security
  - OSS-REQ-0142: 04 Access

5.103 DMS-REQ-0009-V-01: Simulated Data

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-6 (https://jira.lsstcorp.org/browse/LVV-6)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that artificial sources can be injected into data streams and recovered. Show that processing of simulated data recovers sources to the completeness required.
- Requirement: DMS-REQ-0009
- Parent Requirements:
  - OSS-REQ-0353: 15 Difference Source Spuriousness Threshold - Transients
  - DMS-REQ-0007: Pipeline Infrastructure
  - OSS-REQ-0351: 13 Difference Source Spurious Probability Metric
  - OSS-REQ-0354: 16 Difference Source Spuriousness Threshold - MOPS

5.104 DMS-REQ-0032-V-01: Image Differencing

- Component:
  - DM

Draft

- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-14 (https://jira.lsstcorp.org/browse/LVV-14)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verified as part of L1 processing.
- Requirement: DMS-REQ-0032
- Parent Requirements:
  - OSS-REQ-0121: 08 Open Source, Open Configuration
  - OSS-REQ-0129: 04 Exposures (Level 1)

5.105 DMS-REQ-0033-V-01: Provide Source Detection Software

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-15 (https://jira.lsstcorp.org/browse/LVV-15)
- Status: Not Covered
- Verification Level: SL
- **Description**: Given reference (possible simulated) difference images and coadd images, generate catalog and compare with known values.
- Requirement: DMS-REQ-0033
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)
  - OSS-REQ-0137: 05 Catalogs (Level 2)
  - OSS-REQ-0121: 08 Open Source, Open Configuration
  - DMS-REQ-0080: Difference Sources Available within 24 hours

Draft

5.106 DMS-REQ-0042-V-01: Provide Astrometric Model

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-17 (https://jira.lsstcorp.org/browse/LVV-17)
- Status: Not Covered
- Verification Level: SL
- **Description**: Precursor data covering a range of epochs and show that proper motion and parallax has been calculated. The requirement does not specify an accuracy for these calculations.
- Requirement: DMS-REQ-0042
- Parent Requirements:
  - OSS-REQ-0153: 02 World Coordinate System Accuracy
  - OSS-REQ-0149: 09 Level 1 Catalog Precision
  - OSS-REQ-0160: 12 Level 1 Difference Source - Difference Object Association Quality
  - OSS-REQ-0162: 01 Level 2 Catalog Accuracy

5.107 DMS-REQ-0043-V-01: Provide Calibrated Photometry

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-18 (https://jira.lsstcorp.org/browse/LVV-18)
- Status: Not Covered
- Verification Level: SL

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- **Description**: Test with precursor data and show that AB magnitudes are calculated. This functional requirement does not include a test that these magnitudes are accurate.
- Requirement: DMS-REQ-0043
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)
  - OSS-REQ-0275: 02 Calibration Processing Performance Allocations
  - OSS-REQ-0137: 05 Catalogs (Level 2)

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

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-21 (https://jira.lsstcorp.org/browse/LVV-21)
- Status: Not Covered
- Verification Level: SL
- **Description**: Demonstrate that the results of multiple shape models are available from Sources, Objects and ForcedSources and that this information can be obtained simultaneously using data from multiple exposures.
- Requirement: DMS-REQ-0052
- Parent Requirements:
  - OSS-REQ-0137: 05 Catalogs (Level 2)

5.109 DMS-REQ-0160-V-01: Provide User Interface Services

- Component:
  - DM

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- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-63 (https://jira.lsstcorp.org/browse/LVV-63)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that the SUI can handle these queries and interactions. Need to be more explicit on resampling/re-project. Healpix?
- Requirement: DMS-REQ-0160
- Parent Requirements:
  - OSS-REQ-0057: 01 Image Visualization

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

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-127 (https://jira.lsstcorp.org/browse/LVV-127)
- Status: Not Covered
- Verification Level: SL
- **Description**: Proven by reducing precursor data.
- Requirement: DMS-REQ-0296
- Parent Requirements:
  - No parents specified

Draft

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

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Test
- Jira Issue: LVV-182 (https://jira.lsstcorp.org/browse/LVV-182)
- Status: Not Covered
- Verification Level: SL
- **Description**: Convert some coordinates using the transformation code and compare with expectations.
- Requirement: DMS-REQ-0351
- Parent Requirements:
  - OSS-REQ-0383: 09 Beam Projector Coordinate Relationship

5.112 DMS-REQ-0065-V-01: Provide Image Access Services

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-27 (https://jira.lsstcorp.org/browse/LVV-27)
- Status: Not Covered
- Verification Level: SL
- **Description**: Could be verified by DMS-REQ-0298. Demonstrate that SIA can be used to retrieve image data.

Draft

- Requirement: DMS-REQ-0065
- Parent Requirements:
  - OSS-REQ-0180: 05 Data Products Query and Download Availability
  - OSS-REQ-0176: 01 Data Access
  - OSS-REQ-0181: 06 Data Products Query and Download Infrastructure
  - DMS-REQ-0066: Keep Exposure Archive

5.113 DMS-REQ-0155-V-01: Provide Data Access Services

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Undefined
- Jira Issue: LVV-60 (https://jira.lsstcorp.org/browse/LVV-60)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Undefined
- Requirement: DMS-REQ-0155
- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration

Draft

- Jira Issue: LVV-129 (https://jira.lsstcorp.org/browse/LVV-129)
- Status: Not Covered
- Verification Level: SL
- **Description**: Some of this is handled by the SUI requirement (DMS-REQ-0160). A key demonstration is to run a test suite that does each of the requests in turn and verifies against reference results.
- Requirement: DMS-REQ-0298
- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access

5.115 DMS-REQ-0299-V-01: Data Product Ingest

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration
- Jira Issue: LVV-130 (https://jira.lsstcorp.org/browse/LVV-130)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verify by running a mini-DRP (L1 and L2) and running the ingest phase and checking that all items appear in the archive.
- Requirement: DMS-REQ-0299
- Parent Requirements:
  - OSS-REQ-0141: 03 Storage
  - OSS-REQ-0004: 04 The Archive Facility

Draft

5.116 DMS-REQ-0300-V-01: Bulk Download Service

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-131 (https://jira.lsstcorp.org/browse/LVV-131)
- Status: Not Covered
- Verification Level: SL
- **Description**: Demonstrate that data can be downloaded in bulk. Can be shown within the data centre. Better to show that it can be done between NCSA and IN2P3.
- Requirement: DMS-REQ-0300
- Parent Requirements:
  - OSS-REQ-0178: 03 Data Distribution

5.117 DMS-REQ-0156-V-01: Provide Pipeline Execution Services

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Undefined
- Jira Issue: LVV-61 (https://jira.lsstcorp.org/browse/LVV-61)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Undefined
- Requirement: DMS-REQ-0156
- Parent Requirements:

Draft

  - OSS-REQ-0117: 04 Automated Production
  - OSS-REQ-0037: 07 Observatory Control System Definition

5.118 DMS-REQ-0302-V-01: Production Orchestration

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-133 (https://jira.lsstcorp.org/browse/LVV-133)
- Status: Not Covered
- Verification Level: SL
- **Description**: Send simulated or precursor observations to processing system at the correct rate and check that the system configures itself properly.
- Requirement: DMS-REQ-0302
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility
  - OSS-REQ-0038: 08 Scope of Control
  - OSS-REQ-0117: 04 Automated Production

5.119 DMS-REQ-0303-V-01: Production Monitoring

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-134 (https://jira.lsstcorp.org/browse/LVV-134)
- Status: Not Covered

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- Verification Level: SL
- **Description**: For test in DMS-REQ-0302 verify that status GUI functions as expected.
- Requirement: DMS-REQ-0303
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility
  - OSS-REQ-0038: 08 Scope of Control
  - OSS-REQ-0034: 01 System Control

5.120 DMS-REQ-0304-V-01: Production Fault Tolerance

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-135 (https://jira.lsstcorp.org/browse/LVV-135)
- Status: Not Covered
- Verification Level: SL
- **Description**: For test in DMS-REQ-0302 introduce a “Chaos monkey” to randomly take down processing nodes (including coordinator). Check that system recovers on its own.
- Requirement: DMS-REQ-0304
- Parent Requirements:
  - OSS-REQ-0117: 04 Automated Production

5.121 DMS-REQ-0158-V-01: Provide Pipeline Construction Services

- Component:
  - DM

Draft

- Assignee: Robert Lupton
- Verification Methos: Undefined
- Jira Issue: LVV-62 (https://jira.lsstcorp.org/browse/LVV-62)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Aggregate of LVV-137 (DMS-REQ-0306), LVV-136 (DMS-REQ-0305), LVV-138 (DMS-REQ-0307).
- Requirement: DMS-REQ-0158
- Parent Requirements:
  - No parents specified

5.122 DMS-REQ-0305-V-01: Task Specification

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Inspection
- Jira Issue: LVV-136 (https://jira.lsstcorp.org/browse/LVV-136)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that task code is configurable and can consist of multiple subtasks chained together.
- Requirement: DMS-REQ-0305
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - OSS-REQ-0121: 08 Open Source, Open Configuration

Draft

5.123 DMS-REQ-0306-V-01: Task Configuration

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-137 (https://jira.lsstcorp.org/browse/LVV-137)
- Status: Not Covered
- Verification Level: SL
- **Description**: Configurations are tested as they are loaded. Show that the configuration system passes unit tests.
- Requirement: DMS-REQ-0306
- Parent Requirements:
  - OSS-REQ-0122: 03 Provenance
  - OSS-REQ-0121: 08 Open Source, Open Configuration

5.124 DMS-REQ-0297-V-01: DMS Initialization Component

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-128 (https://jira.lsstcorp.org/browse/LVV-128)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that all components of the DMCS (this applies to compute services, storage services, and access services) can be initialized properly.

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- Requirement: DMS-REQ-0297
- Parent Requirements:
  - OSS-REQ-0041: 11 Subsystem Activation
  - OSS-REQ-0122: 03 Provenance
  - OSS-REQ-0307: 12 Subsystem Initialization
  - OSS-REQ-0121: 08 Open Source, Open Configuration

5.125 DMS-REQ-0301-V-01: Control of Level-1 Production

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-132 (https://jira.lsstcorp.org/browse/LVV-132)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run a test night of L1 data.
- Requirement: DMS-REQ-0301
- Parent Requirements:
  - OSS-REQ-0044: 01 Standard Operating States

5.126 DMS-REQ-0307-V-01: Unique Processing Coverage

- Component:
  - DM
- Assignee: Jim Bosch
- Verification Methos: Demonstration

Draft

- Jira Issue: LVV-138 (https://jira.lsstcorp.org/browse/LVV-138)
- Status: Not Covered
- Verification Level: SL
- **Description**: Similar to DMS-REQ-0125. I don't know how to control this. Is an iterator interface enough to verify this?
- Requirement: DMS-REQ-0307
- Parent Requirements:
  - OSS-REQ-0120: 06 Consistency
  - OSS-REQ-0118: 05 Consistency and Completeness

5.127 DMS-REQ-0075-V-01: Catalog Queries

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-33 (https://jira.lsstcorp.org/browse/LVV-33)
- Status: Not Covered
- Verification Level: SL
- **Description**: Using a TAP service, send an ADQL query and verify that the results are as expected.
- Requirement: DMS-REQ-0075
- Parent Requirements:
  - DMS-REQ-0076: Keep Science Data Archive
  - OSS-REQ-0176: 01 Data Access

Draft

5.128 DMS-REQ-0077-V-01: Maintain Archive Publicly Accessible

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-34 (https://jira.lsstcorp.org/browse/LVV-34)
- Status: Not Covered
- Verification Level: SL
- **Description**: For a system with 3 precursor data releases. Verify that queries can be performed on the 2 active DRs and that the DR1 can be downloaded in bulk. No requirement for DR1 to be queryable.
- Requirement: DMS-REQ-0077
- Parent Requirements:
  - DMS-REQ-0076: Keep Science Data Archive
  - OSS-REQ-0186: 10 Access to Previous Data Releases

5.129 DMS-REQ-0078-V-01: Catalog Export Formats

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-35 (https://jira.lsstcorp.org/browse/LVV-35)
- Status: Not Covered
- Verification Level: SL
- **Description**: Using TAP server, form ADQL query and verify that results can be retrieved in the specified formats.

Draft

- Requirement: DMS-REQ-0078
- Parent Requirements:
  - DMS-REQ-0076: Keep Science Data Archive
  - OSS-REQ-0176: 01 Data Access

5.130 DMS-REQ-0094-V-01: Keep Historical Alert Archive

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-37 (https://jira.lsstcorp.org/browse/LVV-37)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that alerts go into the L1 live database. Show that it is generated and inspect access policies, retention policies, and disaster recovery scheme. Can not demonstrate that we are keeping it updating for the entire survey.
- Requirement: DMS-REQ-0094
- Parent Requirements:
  - DMS-REQ-0092: Alert Attributes
  - OSS-REQ-0128: 03 Alerts

5.131 DMS-REQ-0102-V-01: Provide Engineering & Facility Database Archive

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration

Draft

- Jira Issue: LVV-44 (https://jira.lsstcorp.org/browse/LVV-44)
- Status: Not Covered
- Verification Level: SL
- **Description**: DM-only demonstration: use an EFD clone, manually set some values in it, show that the values appear in the DM version of the EFD and are publically queryable. Commissioning demonstration: With a test EFD being populated in real-time by OCS tasks in a simulated summit environment, demonstrate that the values are public within 24 hours.
- Requirement: DMS-REQ-0102
- Parent Requirements:
  - OSS-REQ-0132: 07 Engineering and Facility Database Archive

5.132 DMS-REQ-0309-V-01: Raw Data Archiving Reliability

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-140 (https://jira.lsstcorp.org/browse/LVV-140)
- Status: Not Covered
- Verification Level: SL
- **Description**: Simulated DAQ. Send data to archiver. Ensure that no data are lost. For a short test we should never lose data. Verify that all data are present. No timescale for that specified. Can not check data corruption rates so must do so by inspection of networking and archiving systems. DAQ does not send checksums so we can never guaranteee that the archived data matched the camera readout. We can use checksums to verify that the data have not changed since we received it.
- Requirement: DMS-REQ-0309
- Parent Requirements:
  - OSS-REQ-0111: 02 Science Image Archiving Reliability

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-141 (https://jira.lsstcorp.org/browse/LVV-141)
- Status: Not Covered
- Verification Level: SL
- **Description**: For the earlier test of L1 processing system with mulitple epochs, verify that (1) unarchived products are persisted and (2) they are found during precovery.
- Requirement: DMS-REQ-0310
- Parent Requirements:
  - OSS-REQ-0130: 05 Catalogs (Level 1)

5.134 DMS-REQ-0311-V-01: Regenerate Un-archived Data Products

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-142 (https://jira.lsstcorp.org/browse/LVV-142)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run a small processing job. Download the unarchived data products. From information in the provenance of those data products, request a new processing and compare. Required that the baseline software is updated before this test is performed so that the provenance system is forced to use an older build.

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- Requirement: DMS-REQ-0311
- Parent Requirements:
  - OSS-REQ-0129: 04 Exposures (Level 1)

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

- Component:
  - DM
- Assignee: Eric Bellm
- Verification Methos: Demonstration
- Jira Issue: LVV-143 (https://jira.lsstcorp.org/browse/LVV-143)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do a real-time L1 test run. Demonstrate that an end-user can see the L1 database being updated live.
- Requirement: DMS-REQ-0312
- Parent Requirements:
  - OSS-REQ-0185: 07 Transient Alert Query
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

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

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection
- Jira Issue: LVV-144 (https://jira.lsstcorp.org/browse/LVV-144)

Draft

- Status: Not Covered
- Verification Level: SL
- **Description**: Can only really be demonstrated when the 3rd data release is created. This could be done using precursor survey data by demonstrating that DR1 is deleted and moved to tape when DR3 is released. It may be that for commissioning we can only show this by inspection of release policy document.
- Requirement: DMS-REQ-0313
- Parent Requirements:
  - OSS-REQ-0186: 10 Access to Previous Data Releases

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

- Component:
  - DM
- Assignee: Robert Lupton
- Verification Methos: Demonstration
- Jira Issue: LVV-167 (https://jira.lsstcorp.org/browse/LVV-167)
- Status: Not Covered
- Verification Level: SL
- **Description**: Generate a data product on demand using an old version of the software. The general problem of demonstrating that a DR1 product generated at the time of DR1 is reproducible at the time of DR11 is hard to verify.
- Requirement: DMS-REQ-0336
- Parent Requirements:
  - LSR-REQ-0049: 04 Data Product Archiving

Draft

5.138 DMS-REQ-0341-V-01: Max elapsed time for precovery results

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Test
- Jira Issue: LVV-172 (https://jira.lsstcorp.org/browse/LVV-172)
- Status: Not Covered
- Verification Level: SL
- **Description**: Submit precovery request and compare results with expected values. Associated element ([LVV-9749|https://jira.lsstcorp.org/browse/LVV-9749]) satisfies the minimum number of precovery service connections that must be supported.
- Requirement: DMS-REQ-0341
- Parent Requirements:
  - OSS-REQ-0126: 01 Level 1 Data Products

5.139 DMS-REQ-0345-V-01: Logging of catalog queries

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection
- Jira Issue: LVV-176 (https://jira.lsstcorp.org/browse/LVV-176)
- Status: Not Covered
- Verification Level: SL
- **Description**: Do some queries as different users. Examine the log and show that the correct information is present.

Draft

- Requirement: DMS-REQ-0345
- Parent Requirements:
  - OSS-REQ-0134: 02 Level 2 Data Product Availability

5.140 DMS-REQ-0363-V-01: Access to Previous Data Releases

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Undefined
- Jira Issue: LVV-189 (https://jira.lsstcorp.org/browse/LVV-189)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0363
- Parent Requirements:
  - OSS-REQ-0186: 10 Access to Previous Data Releases

5.141 DMS-REQ-0364-V-01: Total number of data releases

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-190 (https://jira.lsstcorp.org/browse/LVV-190)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!

Draft

- **Description**: There shall be at least *nDRTot = 11[integer]* data releases over the course of the survey. Associated element ([LVV-9750|https://jira.lsstcorp.org/browse/LVV-9750]) addresses the length of the planned survey.
- Requirement: DMS-REQ-0364
- Parent Requirements:
  - OSS-REQ-0396: 11 Data Access Services

5.142 DMS-REQ-0365-V-01: Operations Subsets

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-191 (https://jira.lsstcorp.org/browse/LVV-191)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0365
- Parent Requirements:
  - OSS-REQ-0398: 12 Operations Subsets

5.143 DMS-REQ-0366-V-01: Subsets Support

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined

Draft

- Jira Issue: LVV-192 (https://jira.lsstcorp.org/browse/LVV-192)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0366
- Parent Requirements:
  - OSS-REQ-0400: 13 Subsets Support

5.144 DMS-REQ-0367-V-01: Access Services Performance

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-193 (https://jira.lsstcorp.org/browse/LVV-193)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0367
- Parent Requirements:
  - OSS-REQ-0394: 14 Access Services Performance

5.145 DMS-REQ-0368-V-01: Implementation Provisions

- Component:
  - DM
- Assignee: Robert Gruendl

Draft

- Verification Methos: Undefined
- Jira Issue: LVV-194 (https://jira.lsstcorp.org/browse/LVV-194)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0368
- Parent Requirements:
  - OSS-REQ-0399: 15 Implementation Provisions

5.146 DMS-REQ-0369-V-01: Evolution

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-195 (https://jira.lsstcorp.org/browse/LVV-195)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0369
- Parent Requirements:
  - OSS-REQ-0395: 16 Evolution

Draft

5.147 DMS-REQ-0370-V-01: Older Release Behavior

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-196 (https://jira.lsstcorp.org/browse/LVV-196)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0370
- Parent Requirements:
  - OSS-REQ-0397: 17 Older Release Behavior

5.148 DMS-REQ-0371-V-01: Query Availability

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Undefined
- Jira Issue: LVV-197 (https://jira.lsstcorp.org/browse/LVV-197)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**:
- Requirement: DMS-REQ-0371
- Parent Requirements:
  - OSS-REQ-0401: 18 Query Availability

Draft

5.149 DMS-REQ-0008-V-01: Pipeline Availability

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Analysis
- Jira Issue: LVV-5 (https://jira.lsstcorp.org/browse/LVV-5)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Hard to test how often the system crashes. Show that a night can be processed without crashes is good. Show that with "chaos monkey" the system recovers. Report statistics on processing precursor data. True up time statistics can only be obtained post commissioning.
- Requirement: DMS-REQ-0008
- Parent Requirements:
  - No parents specified

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-64 (https://jira.lsstcorp.org/browse/LVV-64)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Inspect resource management policies that devote resources to production catch-up (when required) over end users.
- Requirement: DMS-REQ-0161
- Parent Requirements:
  - No parents specified

5.151 DMS-REQ-0162-V-01: Pipeline Throughput

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-65 (https://jira.lsstcorp.org/browse/LVV-65)
- Status: Not Covered
- Verification Level: SL
- **Description**: From a night's worth of test data. Simulate a night at the fastest observing cadence and worst case source density, and ensure the processing is complete before the next night would have started (for the longest observing night).
- Requirement: DMS-REQ-0162
- Parent Requirements:
  - OSS-REQ-0020: 02 Usable Observing Time
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

5.152 DMS-REQ-0163-V-01: Re-processing Capacity

- Component:
  - DM
- Assignee: Robert Gruendl

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- Verification Methos: Analysis
- Jira Issue: LVV-66 (https://jira.lsstcorp.org/browse/LVV-66)
- Status: Not Covered
- Verification Level: SL
- **Description**: For simulated LSST-scale data, run a mini DRP and verify that the resources available for DR1 are sufficient when scaled up.
- Requirement: DMS-REQ-0163
- Parent Requirements:
  - OSS-REQ-0134: 02 Level 2 Data Product Availability

5.153 DMS-REQ-0164-V-01: Temporary Storage for Communications Links

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Undefined
- Jira Issue: LVV-67 (https://jira.lsstcorp.org/browse/LVV-67)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Must define “mean time to repair” the network. Temporary storage will soon be at the summit and should be sized according to the MTTR value.
- Requirement: DMS-REQ-0164
- Parent Requirements:
  - DMS-REQ-0162: 04 Pipeline Throughput

Draft

5.154 DMS-REQ-0165-V-01: Infrastructure Sizing for "catching up"

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-68 (https://jira.lsstcorp.org/browse/LVV-68)
- Status: Not Covered
- Verification Level: SL
- **Description**: Verify that we have 150% L1 compute capacity available (or 200% depending on DMS-REQ-0162)
- Requirement: DMS-REQ-0165
- Parent Requirements:
  - OSS-REQ-0052: 04 Summit Data Buffer
  - OSS-REQ-0051: 03 Summit-Base Connectivity Loss
  - DMS-REQ-0162: 04 Pipeline Throughput
  - OSS-REQ-0050: 02 Summit Power Grid Loss

5.155 DMS-REQ-0166-V-01: Incorporate Fault-Tolerance

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-69 (https://jira.lsstcorp.org/browse/LVV-69)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: For active infrastructure: Run "chaos monkey" tool to randomly bring down processes. Shutdown entire VMs during ingestion or data transfer. Power down entire switches on a rack. Check that all expected data products were archived correctly. For archive infrastructure: show that data are replicated at different sites and that we can tell if data become corrupt.
- Requirement: DMS-REQ-0166
- Parent Requirements:
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

5.156 DMS-REQ-0167-V-01: Incorporate Autonomics

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-70 (https://jira.lsstcorp.org/browse/LVV-70)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run L2 and L1 data processing with simulated/precursor data. Run "chaos monkey" tool to randomly bring down processes. Shutdown entire VMs during processing. Power down entire switches on a rack. Check that all expected data products were archived correctly with no loss. Will list all failure modes that we can think of and test against them. Include test for Byzantine failures.
- Requirement: DMS-REQ-0167
- Parent Requirements:
  - DMS-REQ-0166: 09 Incorporate Fault-Tolerance

Draft

5.157 DMS-REQ-0314-V-01: Compute Platform Heterogeneity

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-145 (https://jira.lsstcorp.org/browse/LVV-145)
- Status: Not Covered
- Verification Level: SL
- **Description**: Run L1 demonstration tests on a cluster that is made up of different hardware configurations (at least 2). The operating systems running the processing (from VMs?) can differ. Show document containing minimum hardware specification.
- Requirement: DMS-REQ-0314
- Parent Requirements:
  - OSS-REQ-0177: 02 Data Access Environment
  - OSS-REQ-0124: 02 Software Development Standards

5.158 DMS-REQ-0318-V-01: Data Management Unscheduled Downtime

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-149 (https://jira.lsstcorp.org/browse/LVV-149)
- Status: Not Covered
- Verification Level: SL

Draft

- **Description**: Identify likely hardware failures and identify mitigations to minimize down-time caused by those failures. If the failure is critical infrastructure at NCSA, show that we can redirect data backbone archiving to IN2P3.
- Requirement: DMS-REQ-0318
- Parent Requirements:
  - OSS-REQ-0373: 04 Unscheduled Downtime Subsystem Allocations

5.159 DMS-REQ-0168-V-01: Summit Facility Data Communications

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-71 (https://jira.lsstcorp.org/browse/LVV-71)
- Status: Not Covered
- Verification Level: SL
- **Description**: Simulated DAQ/OCS simulating the summit acquisition environment. Show that data from EFD and camera are accepted and transferred off site. Requirement should be adjusted to reflect data transfer to archive center.
- Requirement: DMS-REQ-0168
- Parent Requirements:
  - OSS-REQ-0002: 02 The Summit Facility

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

- Component:
  - DM
- Assignee: Robert Gruendl

- Verification Methos: Inspection
- Jira Issue: LVV-72 (https://jira.lsstcorp.org/browse/LVV-72)
- Status: Not Covered
- Verification Level: SL
- **Description**: Agree that we have minimized compute and storage at summit.
- Requirement: DMS-REQ-0170
- Parent Requirements:
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

5.161 DMS-REQ-0315-V-01: DMS Communication with OCS

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-146 (https://jira.lsstcorp.org/browse/LVV-146)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a component exists and that it can communicate with the OCS at the (simulated) summit.
- Requirement: DMS-REQ-0315
- Parent Requirements:
  - OSS-REQ-0003: 03 The Base Facility

Draft

5.162 DMS-REQ-0171-V-01: Summit to Base Network

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-73 (https://jira.lsstcorp.org/browse/LVV-73)
- Status: Not Covered
- Verification Level: LL
- **Description**: Test in sequence (both DAQ and Control sides unless noted):ISO OSI Layer 1 Physical (fibers with test data from OTDR, AURA does test)ISO OSI Layer 2 Data Link (DWDM equipment, line cards, with test data from multi-channel/lightwave/channel analyzer, Installer does test, AURA certify)ISO Layer 3 minimal (DWDM with 2 x 10 Gbps ethernet port client cards with test data from 4 windows test boxes, 2 on each side, Installer does test, AURA certify, can repeat as part of #4 with DAQ)ISO Layer 3 full (22 x 10 Gbps ethernet ports on DAQ side with test data from DAQ test stand, AURA, Camera DAQ team do test). Transfer data between summit and base over uninterrupted 1 day period.
- Requirement: DMS-REQ-0171
- Parent Requirements:
  - OSS-REQ-0003: 03 The Base Facility
  - OSS-REQ-0127: 02 Level 1 Data Product Availability

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Analysis

- Jira Issue: LVV-74 (https://jira.lsstcorp.org/browse/LVV-74)
- Status: Not Covered
- Verification Level: LL
- **Description**: This requirement needs the network link to be active for a calculated amount of time (at least 1 week) without failure. May require modeling if failures are rare. More statistics will be acquired during commissioning.
- Requirement: DMS-REQ-0172
- Parent Requirements:
  - OSS-REQ-0373: 04 Unscheduled Downtime Subsystem Allocations
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-75 (https://jira.lsstcorp.org/browse/LVV-75)
- Status: Not Covered
- Verification Level: LL
- **Description**: Disconnect, reconnect and recover transfer of data between summit and base, after disconnecting fiber at an intermediate location between summit and base
- Requirement: DMS-REQ-0173
- Parent Requirements:
  - OSS-REQ-0373: 04 Unscheduled Downtime Subsystem Allocations
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

Draft

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-76 (https://jira.lsstcorp.org/browse/LVV-76)
- Status: Not Covered
- Verification Level: LL
- **Description**: Transfer data between summit and base on primary equipment (LSST Summit - Base) over uninterrupted 1 day period. Simulate outage by disconnecting fiber from equipment on primary and verify that network fails over to secondary equipment (AURA Summit - Base) Demonstrate transfer of data at or exceeding rates specified in LDM-142 between summit and base over secondary equipment uninterrupted 1 day period. Restore connection between fiber and primary equipment, verify that network recovers to primary. Transfer data between summit and base on primary equipment (LSST Summit - Base) over uninterrupted 1 day period.
- Requirement: DMS-REQ-0174
- Parent Requirements:
  - DMS-REQ-0173: 03 Summit to Base Network Reliability
  - OSS-REQ-0049: 01 Degraded Operational States
  - DMS-REQ-0172: 02 Summit to Base Network Availability

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection

- Jira Issue: LVV-77 (https://jira.lsstcorp.org/browse/LVV-77)
- Status: Not Covered
- Verification Level: LL
- **Description**: Inspect construction and operations contracts and Indefeasible Rights to Use (IRUs).
- Requirement: DMS-REQ-0175
- Parent Requirements:
  - DMS-REQ-0173: 03 Summit to Base Network Reliability
  - OSS-REQ-0036: 02 Local Autonomous Administration of System Sites
  - DMS-REQ-0172: 02 Summit to Base Network Availability

5.167 DMS-REQ-0176-V-01: Base Facility Infrastructure

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-78 (https://jira.lsstcorp.org/browse/LVV-78)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that the base facility has sufficient resources.
- Requirement: DMS-REQ-0176
- Parent Requirements:
  - OSS-REQ-0003: 03 The Base Facility

Draft

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-80 (https://jira.lsstcorp.org/browse/LVV-80)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that the base facility is co-located.
- Requirement: DMS-REQ-0178
- Parent Requirements:
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order
  - OSS-REQ-0006: 01 Sites

5.169 DMS-REQ-0316-V-01: Commissioning Cluster

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-147 (https://jira.lsstcorp.org/browse/LVV-147)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that the SE commissioning cluster exists. Check the budget spent on it and compare with AP budget. Verify that DM are not supporting the installation.
- Requirement: DMS-REQ-0316

Draft

- Parent Requirements:
  - No parents specified

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Test
- Jira Issue: LVV-183 (https://jira.lsstcorp.org/browse/LVV-183)
- Status: Not Covered
- Verification Level: SL
- **Description**: At Base Facility, connect to WiFi, test connection speed, and retrieve a file from the Internet.
- Requirement: DMS-REQ-0352
- Parent Requirements:
  - OSS-REQ-0003: 03 The Base Facility

5.171 DMS-REQ-0180-V-01: Base to Archive Network

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-81 (https://jira.lsstcorp.org/browse/LVV-81)
- Status: Not Covered
- Verification Level: LL

Draft

- **Description**: Transfer data between base and archive over uninterrupted 1 day period.
- Requirement: DMS-REQ-0180
- Parent Requirements:
  - OSS-REQ-0053: 05 Base-Archive Connectivity Loss
  - OSS-REQ-0055: 06 Base Updating from Archive
  - DMS-REQ-0162: 04 Pipeline Throughput

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-82 (https://jira.lsstcorp.org/browse/LVV-82)
- Status: Not Covered
- Verification Level: LL
- **Description**: Transfer data between base and archive over uninterrupted 1 week period.
- Requirement: DMS-REQ-0181
- Parent Requirements:
  - OSS-REQ-0053: 05 Base-Archive Connectivity Loss
  - DMS-REQ-0162: 04 Pipeline Throughput
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM

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- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-83 (https://jira.lsstcorp.org/browse/LVV-83)
- Status: Not Covered
- Verification Level: LL
- **Description**: Disconnect, reconnect and recover transfer of data between summit and base, after disconnecting fiber at an intermediate location between base and archive
- Requirement: DMS-REQ-0182
- Parent Requirements:
  - OSS-REQ-0053: 05 Base-Archive Connectivity Loss
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-84 (https://jira.lsstcorp.org/browse/LVV-84)
- Status: Not Covered
- Verification Level: LL
- **Description**: FOR EACH SEGMENT (LS - SCL, SCL - FL, FL - CHI, CHI - CHMPGN): Transfer data between base and archive on primary links over uninterrupted 1 day period. Simulate outage by disconnecting fiber on primary and verify that network fails over to secondary links. Transfer data between base and archive over secondary equipment uninterrupted 1 day period. Restore connection on primary link verify that network recovers to primary. Transfer data between base and archive on primary links over uninterrupted 1 day period.

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- Requirement: DMS-REQ-0183
- Parent Requirements:
  - DMS-REQ-0181: 02 Base to Archive Network Availability
  - DMS-REQ-0182: 03 Base to Archive Network Reliability
  - OSS-REQ-0049: 01 Degraded Operational States

5.175 DMS-REQ-0185-V-01: Archive Center

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-85 (https://jira.lsstcorp.org/browse/LVV-85)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that sufficient resources exist. Show that AP, DRP and L3 systems can be run simultaneously.
- Requirement: DMS-REQ-0185
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility
  - DMS-REQ-0163: 06 Re-processing Capacity

5.176 DMS-REQ-0186-V-01: Archive Center Disaster Recovery

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration

Draft

- Jira Issue: LVV-86 (https://jira.lsstcorp.org/browse/LVV-86)
- Status: Not Covered
- Verification Level: SL
- **Description**: Inspect plan for disaster recovery. Trigger fake data loss event and demonstrate that data are recovered.
- Requirement: DMS-REQ-0186
- Parent Requirements:
  - OSS-REQ-0176: 01 Data Access
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Inspection
- Jira Issue: LVV-87 (https://jira.lsstcorp.org/browse/LVV-87)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that NCSA is NSF funded or that SLAC is DOE funded.
- Requirement: DMS-REQ-0187
- Parent Requirements:
  - OSS-REQ-0022: 04 Archive Site
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-88 (https://jira.lsstcorp.org/browse/LVV-88)
- Status: Not Covered
- Verification Level: LL
- **Description**: Transfer data between archive and both DACs over uninterrupted 1 day period.SL - Analyze the network and show that data acquired by a simulated DAQ/EFD can be transferred within the required time.HL - Demonstrate with the real system during commissioning.
- Requirement: DMS-REQ-0188
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-89 (https://jira.lsstcorp.org/browse/LVV-89)
- Status: Not Covered
- Verification Level: LL
- **Description**: Transfer data between archive and DACs over uninterrupted 1 week period.

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- Requirement: DMS-REQ-0189
- Parent Requirements:
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-90 (https://jira.lsstcorp.org/browse/LVV-90)
- Status: Not Covered
- Verification Level: LL
- **Description**: Disconnect, reconnect, and recover transfer of data between archive and DACs, after disconnecting fiber at an intermediate location between archive and DACs
- Requirement: DMS-REQ-0190
- Parent Requirements:
  - DMS-REQ-0161: 02 Optimization of Cost, Reliability and Availability in Order

5.181 DMS-REQ-0191-V-01: Archive to Data Access Center Network Secondary Link

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-91 (https://jira.lsstcorp.org/browse/LVV-91)

Draft

- Status: Not Covered
- Verification Level: LL
- **Description**: FOR EACH SEGMENT (LS - SCL, SCL - FL, FL - CHI, CHI - CHMPGN): Transfer data at between archive and DACs on primary links over uninterrupted 1 day period. Simulate outage by disconnecting fiber on primary and verify that network fails over to secondary links. Transfer data at between archive and DACs over secondary equipment uninterrupted 1 day period. Restore connection on primary link verify that network recovers to primary. Transfer data between archive and DACs on primary links over uninterrupted 1 day period.
- Requirement: DMS-REQ-0191
- Parent Requirements:
  - DMS-REQ-0189: 02 Archive to Data Access Center Network Availability
  - DMS-REQ-0190: 03 Archive to Data Access Center Network Reliability

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

- Component:
  - DM
- Assignee: Simon Krughoff
- Verification Methos: Demonstration
- Jira Issue: LVV-50 (https://jira.lsstcorp.org/browse/LVV-50)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a catalog can be exported. Verify that content matches the archive values. Demonstrate that catalog export will work with multiple data releases.
- Requirement: DMS-REQ-0122
- Parent Requirements:
  - OSS-REQ-0180: 05 Data Products Query and Download Availability
  - OSS-REQ-0140: 02 Production

Draft

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

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-51 (https://jira.lsstcorp.org/browse/LVV-51)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a L3 job can access L1 and L2 catalogs.
- Requirement: DMS-REQ-0123
- Parent Requirements:
  - OSS-REQ-0140: 02 Production

5.184 DMS-REQ-0124-V-01: Federation with external catalogs

- Component:
  - DM
- Assignee: Gregory Dubois-Felsmann
- Verification Methos: Demonstration
- Jira Issue: LVV-52 (https://jira.lsstcorp.org/browse/LVV-52)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that an external catalog can be combined with L1/2/3 catalogs. Show that the specification document exists. Show that more that at least one community standard is supported.

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- Requirement: DMS-REQ-0124
- Parent Requirements:
  - OSS-REQ-0140: 02 Production
  - DMS-REQ-0125: 06 Software framework for Level 3 catalog processing

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

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-54 (https://jira.lsstcorp.org/browse/LVV-54)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that images can be exported. Similar comments as for DMS-REQ-0122 regarding maintenance and validation tools.
- Requirement: DMS-REQ-0126
- Parent Requirements:
  - OSS-REQ-0180: 05 Data Products Query and Download Availability
  - OSS-REQ-0140: 02 Production

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

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration

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- Jira Issue: LVV-55 (https://jira.lsstcorp.org/browse/LVV-55)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that a L3 job can access L1 and L2 image products.
- Requirement: DMS-REQ-0127
- Parent Requirements:
  - OSS-REQ-0140: 02 Production

5.187 DMS-REQ-0193-V-01: Data Access Centers

- Component:
  - DM
- Assignee: Robert Gruendl
- Verification Methos: Demonstration
- Jira Issue: LVV-92 (https://jira.lsstcorp.org/browse/LVV-92)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that computing, storage and network meet the design goals.
- Requirement: DMS-REQ-0193
- Parent Requirements:
  - OSS-REQ-0004: 04 The Archive Facility

5.188 DMS-REQ-0194-V-01: Data Access Center Simultaneous Connections

- Component:
  - DM
- Assignee: Robert Gruendl

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- Verification Methos: Demonstration
- Jira Issue: LVV-93 (https://jira.lsstcorp.org/browse/LVV-93)
- Status: Not Covered
- Verification Level: SL
- **Description**: Simulate simultaneous connections and show that the minimum number are supported.
- Requirement: DMS-REQ-0194
- Parent Requirements:
  - No parents specified

5.189 DMS-REQ-0196-V-01: Data Access Center Geographical Distribution

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Inspection
- Jira Issue: LVV-94 (https://jira.lsstcorp.org/browse/LVV-94)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that we have at least one DAC in the US and one DAC in Chile.
- Requirement: DMS-REQ-0196
- Parent Requirements:
  - DMS-REQ-0193: 01 Data Access Centers
  - OSS-REQ-0021: 02 Base Site
  - OSS-REQ-0022: 04 Archive Site

Draft

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

- Component:
  - DM
- Assignee: Colin Slater
- Verification Methos: Demonstration
- Jira Issue: LVV-95 (https://jira.lsstcorp.org/browse/LVV-95)
- Status: Not Covered
- Verification Level: SL
- **Description**: Show that we have more than one DAC. Show that adding a new DAC is a documented procedure.
- Requirement: DMS-REQ-0197
- Parent Requirements:
  - DMS-REQ-0193: 01 Data Access Centers
  - OSS-REQ-0021: 02 Base Site
  - OSS-REQ-0022: 04 Archive Site

5.191 DMS-REQ-0362-V-01: Median residual PSF ellipticity correlations on 5 arcmin scales

- Component:
  - DM
- Assignee: Leanne Guy
- Verification Methos: Undefined
- Jira Issue: LVV-3404 (https://jira.lsstcorp.org/browse/LVV-3404)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!

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- **Description**: Median residual PSF ellipticity correlations averaged over an arbitrary field of view for separations less than 5 arcmin shall be no greater than *TE2 = 1.0e-7[arcminuteSeparationCo Associated element DMS-REQ-0362-V-02 (LVV-9780) satisfies the maximum fraction of ellipticity residuals exceeding the outlier limits. Associated element DMS-REQ-0362-V-03 [(LVV-9781)|https://jira.lsstcorp.org/browse/LVV-9781] satisfies the outlier limit on the PSF ellipticity correlation residuals on 5 arcmin scales. Associated element DMS-REQ-0362-V-04 (LVV-9782) satisfies the median residual PSF ellipticity correlations on 1 arcmin scales. Associated element DMS-REQ-0362-V-05 (LVV-9783) satisfies the outlier limit on the PSF ellipticity correlation residuals on 1 arcmin scales.
- Requirement: DMS-REQ-0362
- Parent Requirements:
  - OSS-REQ-0390: 01 Ellipticity Correlations

5.192 DMS-REQ-0359-V-01: RMS photometric repeatability in uzy

- Component:
  - DM
- Assignee: Leanne Guy
- Verification Methos: Undefined
- Jira Issue: LVV-3401 (https://jira.lsstcorp.org/browse/LVV-3401)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: The RMS photometric repeatability of bright non-saturated unresolved point sources in the u, z, and y filters shall be less than *PA1uzy = 7.5 millimagnitudes*. Associated element DMS-REQ-0359-V-02 (LVV-9751) satisfies the requirement on the maximum fraction of sensors with scientifically unusable pixels. Associated element DMS-REQ-0359-V-03 (LVV-9752) satisfies the constraint on maximum fraction of outliers among non-saturated point sources. Associated element DMS-REQ-0359-V-04 (LVV-9753) satisfies the accuracy of zero-point for colors that use the u-band. Associated element DMS-REQ-0359-V-05 (LVV-9754) satisfies the repeatability outlier limit in g, r, and i-bands. Associated element DMS-REQ-0359-V-06 (LVV-9755) satisfies the constraint on

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the accuracy of the transformation from internal to physical photometric scales. Associated element DMS-REQ-0359-V-07 (LVV-9756) satisfies the rms width of the internal photometric zero-point in u-band. Associated element DMS-REQ-0359-V-08 (LVV-9757) satisfies the maximum local significance of imperfect crosstalk corrections. Associated element DMS-REQ-0359-V-09 (LVV-9758) satisfies the repeatability outlier limit in u, z, and y-bands. Associated element DMS-REQ-0359-V-10 (LVV-9759) satisfies the rms photometric repeatability in g, r, and i-bands. Associated element DMS-REQ-0359-V-11 (LVV-9760) satisfies the fraction of zero-point errors that can exceed the outlier limit. Associated element DMS-REQ-0359-V-12 (LVV-9761) satisfies the maximum fraction of unusable pixels per sensor. Associated element DMS-REQ-0359-V-13 (LVV-9762) satisfies the maximum allowable precision in the sky brightness determination. Associated element DMS-REQ-0359-V-14 (LVV-9763) satisfies the rms width of the internal photometric zero-point in g, r, i, z, and y-bands. Associated element DMS-REQ-0359-V-15 (LVV-9764) satisfies the percentage of the image area affected by ghosts that exceed the threshold. Associated element DMS-REQ-0359-V-16 (LVV-9765) satisfies the accuracy of zero-point for colors that do not include the u-band. Associated element DMS-REQ-0359-V-17 (LVV-9766) satisfies the maximum RMS of the ratio of the flux measurement error between resolved/unresolved sources.

- Requirement: DMS-REQ-0359
- Parent Requirements:
  - OSS-REQ-0387: 01 Photometric Performance

5.193 DMS-REQ-0360-V-01: Median astrometric error on 20 arcmin scales

- Component:
  - DM
- Assignee: Leanne Guy
- Verification Methos: Undefined
- Jira Issue: LVV-3402 (https://jira.lsstcorp.org/browse/LVV-3402)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!

- **Description**: Median relative astrometric measurement error on 20 arcminute scales shall be no more than *AM2 = 10 milliarcseconds.* Associated element DMS-REQ-0360-V-02 (LVV-9767) satisfies the maximum fraction of astrometric outliers on 5 arcminute scales. Associated element DMS-REQ-0360-V-03 [(LVV-9768)|https://jira.lsstcorp.org/browse/LVV-9768] satisfies the median astrometric error on 5 arcminute scales. Associated element DMS-REQ-0360-V-04 [(LVV-9769)|https://jira.lsstcorp.org/browse/LVV-9769] satisfies the median astrometric error in absolute positions. Associated element DMS-REQ-0360-V-05 [(LVV-9770)|https://jira.lsstcorp.org/browse/LVV-9770] satisfies the astrometric outlier limit on 20 arcminute scales. Associated element DMS-REQ-0360-V-06 [(LVV-9771)|https://jira.lsstcorp.org/browse/LVV-9771] satisfies the color difference outlier limit relative to r-band. Associated element DMS-REQ-0360-V-07 [(LVV-9773)|https://jira.lsstcorp.org/brows 9773] satisfies the astrometric outlier limit on 5 arcminute scales. Associated element DMS-REQ-0360-V-08 [(LVV-9774)|https://jira.lsstcorp.org/browse/LVV-9774] satisfies the median astrometric error on 200 arcminute scales. Associated element DMS-REQ-0360-V-09 [(LVV-9775)|https://jira.lsstcorp.org/browse/LVV-9775] satisfies the astrometric outlier limit on 200 arcminute scales. Associated element DMS-REQ-0360-V-10 [(LVV-9776)|https://jira.lsst 9776] satisfies the maximum fraction of astrometric outliers on 20 arcminute scales. Associated element DMS-REQ-0360-V-11 [(LVV-9777)|https://jira.lsstcorp.org/browse/LVV-9777] satisfies the maximum fraction of r-band color difference outliers. Associated element DMS-REQ-0360-V-12 [(LVV-9778)|https://jira.lsstcorp.org/browse/LVV-9778] satisfies the RMS difference between separations measured in the r-band and those measured in any other filter. Associated element DMS-REQ-0360-V-13 [(LVV-9779)|https://jira.lsstcorp.org/b 9779] satisfies the maximum fraction of astrometric outliers on 200 arcminute scales.
- Requirement: DMS-REQ-0360
- Parent Requirements:
  - OSS-REQ-0388: 02 Astrometric Performance

5.194 DMS-REQ-0377-V-01: Min number of simultaneous single-CCD coadd cutout image users

- Component:
  - DM
- Assignee: Leanne Guy

- Verification Methos: Undefined
- Jira Issue: LVV-3394 (https://jira.lsstcorp.org/browse/LVV-3394)
- Status: Not Covered
- Verification Level: NO Verification Level Provided!
- **Description**: Minimum number of simultaneous users retrieving a single CCD-sized coadd cutout must be at least *ccdRetrievalUsers = 20.* The associated element DMS-REQ-0377-V-02 [(LVV-9797)|https://jira.lsstcorp.org/browse/LVV-9797] satisfies the additional time constraint. _These requirements should be satisfied together._
- Requirement: DMS-REQ-0377
- Parent Requirements:
  - OSS-REQ-0181: 06 Data Products Query and Download Infrastructure

Draft

A Traceability

A.1 Direct Traceability

	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
1	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products	Not Covered	Colin Slater	LVV-T12	Approved	Jim Bosch
				LVV-T16	Approved	Jim Bosch
				LVV-T78	Draft	Kian-Tat Lim
				LVV-T13	Approved	Jim Bosch
				LVV-T14	Approved	Jim Bosch
				LVV-T15	Approved	Jim Bosch
2	LVV-98 - DMS-REQ-0267-V-01: Source Catalog	Not Covered	Jim Bosch	LVV-T12	Approved	Jim Bosch
				LVV-T65	Draft	Jim Bosch
				LVV-T13	Approved	Jim Bosch
3	LVV-99 - DMS-REQ-0268-V-01: Forced-Source Catalog	Not Covered	Jim Bosch	LVV-T12	Approved	Jim Bosch
				LVV-T66	Draft	Jim Bosch
4	LVV-106 - DMS-REQ-0275-V-01: Object Catalog	Not Covered	Jim Bosch	LVV-T12	Approved	Jim Bosch
				LVV-T67	Draft	Jim Bosch
				LVV-T14	Approved	Jim Bosch
5	LVV-110 - DMS-REQ-0279-V-01: Deep Detection Coadds	Not Covered	Jim Bosch	LVV-T12	Approved	Jim Bosch
				LVV-T16	Approved	Jim Bosch
				LVV-T73	Draft	Jim Bosch
6	LVV-125 - DMS-REQ-0294-V-01: Processing of Datasets	Not Covered	Robert Lupton	LVV-T12	Approved	Jim Bosch
				LVV-T99	Draft	Kian-Tat Lim
7	LVV-157 - DMS-REQ-0326-V-01: Storing Approximations of Per-pixel Metadata	Not Covered	Simon Krughoff	LVV-T23	Draft	Simon Krughoff
8	LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities	Not Covered	Melissa Graham	LVV-T24	Draft	Melissa Graham
				LVV-T21	Approved	Eric Bellm
				LVV-T22	Approved	Eric Bellm
				LVV-T13	Approved	Jim Bosch
				LVV-T14	Approved	Jim Bosch
9	LVV-163 - DMS-REQ-0332-V-01: Denormalizing Database Tables	Not Covered	Colin Slater	LVV-T25	Draft	Colin Slater
10	LVV-164 - DMS-REQ-0333-V-01: Maximum Likelihood Values and Covariances	Not Covered	Jim Bosch	LVV-T26	Draft	Jim Bosch
11	LVV-177 - DMS-REQ-0346-V-01: Data Availability	Not Covered	Gregory Dubois-Felsmann	LVV-T27	Draft	Gregory Dubois-Felsmann
12	LVV-29 - DMS-REQ-0069-V-01: Processed Visit Images	Not Covered	Jim Bosch	LVV-T18	Approved	Eric Bellm
				LVV-T38	Draft	Eric Bellm

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
				LVV-T15	Approved	Jim Bosch
13	LVV-7 - DMS-REQ-0010-V-01: Difference Exposures	Not Covered	Eric Bellm	LVV-T18	Approved	Eric Bellm
				LVV-T36	Draft	Eric Bellm
14	LVV-100 - DMS-REQ-0269-V-01: DIASource Catalog	Not Covered	Jim Bosch	LVV-T18	Approved	Eric Bellm
				LVV-T49	Draft	Eric Bellm
				LVV-T21	Approved	Eric Bellm
15	LVV-102 - DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource	Not Covered	Eric Bellm	LVV-T18	Approved	Eric Bellm
				LVV-T22	Approved	Eric Bellm
				LVV-T51	Draft	Eric Bellm
16	LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs	Not Covered	Colin Slater	LVV-T28	Draft	Colin Slater
				LVV-T21	Approved	Eric Bellm
				LVV-T22	Approved	Eric Bellm
				LVV-T13	Approved	Jim Bosch
				LVV-T14	Approved	Jim Bosch
17	LVV-8 - DMS-REQ-0018-V-01: Raw Science Image Data Acquisition	Not Covered	Robert Gruendl	LVV-T29	Draft	Kian-Tat Lim
18	LVV-9 - DMS-REQ-0020-V-01: Wavefront Sensor Data Acquisition	Not Covered	Gregory Dubois-Felsmann	LVV-T30	Draft	Kian-Tat Lim
19	LVV-10 - DMS-REQ-0022-V-01: Crosstalk Corrected Science Image Data Acquisition	Not Covered	Gregory Dubois-Felsmann	LVV-T31	Draft	Kian-Tat Lim
20	LVV-11 - DMS-REQ-0024-V-01: Raw Image Assembly	Not Covered	Gregory Dubois-Felsmann	LVV-T32	Draft	Kian-Tat Lim
21	LVV-28 - DMS-REQ-0068-V-01: Raw Science Image Metadata	Not Covered	Gregory Dubois-Felsmann	LVV-T33	Draft	Kian-Tat Lim
22	LVV-96 - DMS-REQ-0265-V-01: Guider Calibration Data Acquisition	Not Covered	Gregory Dubois-Felsmann	LVV-T34	Draft	Kian-Tat Lim
23	LVV-139 - DMS-REQ-0308-V-01: Software Architecture to Enable Community Re-Use	Not Covered	Simon Krughoff	LVV-T216	Approved	Eric Bellm
				LVV-T124	Draft	Simon Krughoff
24	LVV-3 - DMS-REQ-0002-V-01: Transient Alert Distribution	Not Covered	Eric Bellm	LVV-T217	Approved	Eric Bellm
				LVV-T101	Draft	Kian-Tat Lim
25	LVV-4 - DMS-REQ-0004-V-01: Time to L1 public release_1	Not Covered	Eric Bellm	LVV-T35	Draft	Eric Bellm
26	LVV-32 - DMS-REQ-0074-V-01: Difference Exposure Attributes	Not Covered	Eric Bellm	LVV-T37	Draft	Eric Bellm
27	LVV-12 - DMS-REQ-0029-V-01: Generate Photometric Zeropoint for Visit Image	Not Covered	Jim Bosch	LVV-T39	Draft	Jim Bosch

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
				LVV-T15	Approved	Jim Bosch
28	LVV-13 - DMS-REQ-0030-V-01: Absolute accuracy of WCS	Not Covered	Jim Bosch	LVV-T40	Draft	Jim Bosch
				LVV-T15	Approved	Jim Bosch
29	LVV-30 - DMS-REQ-0070-V-01: Generate PSF for Visit Images	Not Covered	Jim Bosch	LVV-T41	Draft	Jim Bosch
				LVV-T15	Approved	Jim Bosch
30	LVV-31 - DMS-REQ-0072-V-01: Processed Visit Image Content	Not Covered	Jim Bosch	LVV-T42	Draft	Jim Bosch
				LVV-T15	Approved	Jim Bosch
31	LVV-158 - DMS-REQ-0327-V-01: Background Model Calculation	Not Covered	Robert Lupton	LVV-T43	Draft	Jim Bosch
				LVV-T15	Approved	Jim Bosch
32	LVV-159 - DMS-REQ-0328-V-01: Documenting Image Characterization	Not Covered	Robert Lupton	LVV-T44	Draft	Jim Bosch
33	LVV-39 - DMS-REQ-0097-V-01: Level 1 Data Quality Report Definition	Not Covered	Simon Krughoff	LVV-T45	Draft	Eric Bellm
34	LVV-41 - DMS-REQ-0099-V-01: Level 1 Performance Report Definition	Not Covered	Robert Gruendl	LVV-T46	Draft	Eric Bellm
35	LVV-43 - DMS-REQ-0101-V-01: Level 1 Calibration Report Definition	Not Covered	Robert Lupton	LVV-T47	Draft	Eric Bellm
36	LVV-97 - DMS-REQ-0266-V-01: Exposure Catalog	Not Covered	Jim Bosch	LVV-T48	Draft	Jim Bosch
37	LVV-101 - DMS-REQ-0270-V-01: Faint DIASource Measurements	Not Covered	Eric Bellm	LVV-T50	Draft	Eric Bellm
				LVV-T21	Approved	Eric Bellm
38	LVV-116 - DMS-REQ-0285-V-01: Level 1 Source Association	Not Covered	Eric Bellm	LVV-T22	Approved	Eric Bellm
				LVV-T108	Draft	Eric Bellm
39	LVV-103 - DMS-REQ-0272-V-01: DIAObject Attributes	Not Covered	Eric Bellm	LVV-T22	Approved	Eric Bellm
				LVV-T52	Draft	Eric Bellm
40	LVV-104 - DMS-REQ-0273-V-01: SSObject Catalog	Not Covered	Eric Bellm	LVV-T53	Draft	Eric Bellm
41	LVV-105 - DMS-REQ-0274-V-01: Alert Content	Not Covered	Eric Bellm	LVV-T54	Draft	Eric Bellm
42	LVV-148 - DMS-REQ-0317-V-01: DIAForcedSource Catalog	Not Covered	Eric Bellm	LVV-T55	Draft	Eric Bellm
43	LVV-150 - DMS-REQ-0319-V-01: Characterizing Variability	Not Covered	Eric Bellm	LVV-T56	Draft	Eric Bellm
44	LVV-154 - DMS-REQ-0323-V-01: Calculating SSObject Parameters	Not Covered	Eric Bellm	LVV-T57	Draft	Eric Bellm
45	LVV-155 - DMS-REQ-0324-V-01: Matching DIASources to Objects	Not Covered	Eric Bellm	LVV-T58	Draft	Eric Bellm
46	LVV-156 - DMS-REQ-0325-V-01: Regenerating L1 Data Products During Data Release Processing	Not Covered	Jim Bosch	LVV-T59	Draft	Kian-Tat Lim
47	LVV-184 - DMS-REQ-0353-V-01: Publishing predicted visit schedule	Not Covered	Colin Slater	LVV-T60	Draft	Eric Bellm

Draft

	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
48	LVV-16 - DMS-REQ-0034-V-01: Associate Sources to Objects	Not Covered	Jim Bosch	LVV-T61	Draft	Jim Bosch
49	LVV-109 - DMS-REQ-0278-V-01: Coadd Image Method Constraints	Not Covered	Jim Bosch	LVV-T16	Approved	Jim Bosch
				LVV-T72	Draft	Jim Bosch
50	LVV-20 - DMS-REQ-0047-V-01: Provide PSF for Coadded Images	Not Covered	Jim Bosch	LVV-T16	Approved	Jim Bosch
				LVV-T62	Draft	Jim Bosch
51	LVV-45 - DMS-REQ-0103-V-01: Produce Images for EPO	Not Covered	Gregory Dubois-Felsmann	LVV-T63	Draft	Gregory Dubois-Felsmann
52	LVV-46 - DMS-REQ-0106-V-01: Coadded Image Provenance	Not Covered	Robert Gruendl	LVV-T64	Draft	Jim Bosch
53	LVV-19 - DMS-REQ-0046-V-01: Provide Photometric Redshifts of Galaxies	Not Covered	Jim Bosch	LVV-T68	Draft	Jim Bosch
54	LVV-107 - DMS-REQ-0276-V-01: Object Characterization	Not Covered	Jim Bosch	LVV-T69	Draft	Jim Bosch
55	LVV-108 - DMS-REQ-0277-V-01: Coadd Source Catalog	Not Covered	Jim Bosch	LVV-T70	Draft	Jim Bosch
56	LVV-180 - DMS-REQ-0349-V-01: Detecting extended low surface brightness objects	Not Covered	Jim Bosch	LVV-T71	Draft	Jim Bosch
57	LVV-111 - DMS-REQ-0280-V-01: Template Coadds	Not Covered	Eric Bellm	LVV-T74	Draft	Eric Bellm
58	LVV-112 - DMS-REQ-0281-V-01: Multi-band Coadds	Not Covered	Jim Bosch	LVV-T75	Draft	Jim Bosch
59	LVV-160 - DMS-REQ-0329-V-01: All-Sky Visualization of Data Releases	Not Covered	Simon Krughoff	LVV-T76	Draft	Simon Krughoff
60	LVV-161 - DMS-REQ-0330-V-01: Best Seeing Coadds	Not Covered	Jim Bosch	LVV-T77	Draft	Jim Bosch
61	LVV-166 - DMS-REQ-0335-V-01: PSF-Matched Coadds	Not Covered	Jim Bosch	LVV-T79	Draft	Jim Bosch
62	LVV-168 - DMS-REQ-0337-V-01: Detecting faint variable objects	Not Covered	Melissa Graham	LVV-T80	Draft	Melissa Graham
63	LVV-169 - DMS-REQ-0338-V-01: Targeted Coadds	Not Covered	Robert Lupton	LVV-T81	Draft	Jim Bosch
64	LVV-170 - DMS-REQ-0339-V-01: Tracking Characterization Changes Between Data Releases	Not Covered	Colin Slater	LVV-T82	Draft	Jim Bosch
65	LVV-22 - DMS-REQ-0059-V-01: Bad Pixel Map	Not Covered	Jim Bosch	LVV-T83	Draft	Robert Lupton
66	LVV-23 - DMS-REQ-0060-V-01: Bias Residual Image	Not Covered	Jim Bosch	LVV-T84	Draft	Robert Lupton
67	LVV-24 - DMS-REQ-0061-V-01: Crosstalk Correction Matrix	Not Covered	Jim Bosch	LVV-T85	Draft	Robert Lupton
68	LVV-25 - DMS-REQ-0062-V-01: Illumination Correction Frame	Not Covered	Jim Bosch	LVV-T86	Draft	Robert Lupton
69	LVV-26 - DMS-REQ-0063-V-01: Monochromatic Flatfield Data Cube	Not Covered	Jim Bosch	LVV-T87	Draft	Robert Lupton
70	LVV-57 - DMS-REQ-0130-V-01: Calibration Data Products	Not Covered	Robert Lupton	LVV-T88	Draft	Robert Lupton

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
71	LVV-59 - DMS-REQ-0132-V-01: Calibration Image Provenance	Not Covered	Robert Lupton	LVV-T89	Draft	Robert Lupton
72	LVV-113 - DMS-REQ-0282-V-01: Dark Current Correction Frame	Not Covered	Robert Lupton	LVV-T90	Draft	Robert Lupton
73	LVV-114 - DMS-REQ-0283-V-01: Fringe Correction Frame	Not Covered	Robert Lupton	LVV-T91	Draft	Robert Lupton
74	LVV-151 - DMS-REQ-0320-V-01: Processing of Data From Special Programs	Not Covered	Melissa Graham	LVV-T92	Draft	Melissa Graham
75	LVV-152 - DMS-REQ-0321-V-01: Level 1 Processing of Special Programs Data	Not Covered	Melissa Graham	LVV-T93	Draft	Melissa Graham
76	LVV-153 - DMS-REQ-0322-V-01: Special Programs Database	Not Covered	Melissa Graham	LVV-T94	Draft	Melissa Graham
77	LVV-175 - DMS-REQ-0004-V-01: Time to L1 public release	Not Covered	Melissa Graham	LVV-T95	Draft	Melissa Graham
78	LVV-122 - DMS-REQ-0291-V-01: Query Repeatability	Not Covered	Colin Slater	LVV-T96	Draft	Colin Slater
79	LVV-123 - DMS-REQ-0292-V-01: Uniqueness of IDs Across Data Releases	Not Covered	Colin Slater	LVV-T97	Draft	Kian-Tat Lim
80	LVV-124 - DMS-REQ-0293-V-01: Selection of Datasets	Not Covered	Jim Bosch	LVV-T98	Draft	Kian-Tat Lim
81	LVV-126 - DMS-REQ-0295-V-01: Transparent Data Access	Not Covered	Robert Gruendl	LVV-T100	Draft	Kian-Tat Lim
82	LVV-36 - DMS-REQ-0089-V-01: Solar System Objects Available Within Specified Time	Not Covered	Eric Bellm	LVV-T102	Draft	Kian-Tat Lim
83	LVV-38 - DMS-REQ-0096-V-01: Generate Data Quality Report Within Specified Time	Not Covered	Simon Krughoff	LVV-T103	Draft	Kian-Tat Lim
84	LVV-40 - DMS-REQ-0098-V-01: Generate DMS Performance Report Within Specified Time	Not Covered	Simon Krughoff	LVV-T104	Draft	Kian-Tat Lim
85	LVV-42 - DMS-REQ-0100-V-01: Generate Calibration Report Within Specified Time	Not Covered	Robert Lupton	LVV-T105	Draft	Kian-Tat Lim
86	LVV-58 - DMS-REQ-0131-V-01: Time allowed to process calibs	Not Covered	Robert Lupton	LVV-T106	Draft	Kian-Tat Lim
87	LVV-115 - DMS-REQ-0284-V-01: Level-1 Production Completeness	Not Covered	Robert Lupton	LVV-T107	Draft	Eric Bellm
88	LVV-117 - DMS-REQ-0286-V-01: SSObject Precovery	Not Covered	Eric Bellm	LVV-T109	Draft	Eric Bellm
89	LVV-118 - DMS-REQ-0287-V-01: Max look-back time for precovery	Not Covered	Eric Bellm	LVV-T110	Draft	Eric Bellm
90	LVV-119 - DMS-REQ-0288-V-01: Use of External Orbit Catalogs	Not Covered	Eric Bellm	LVV-T111	Draft	Eric Bellm
91	LVV-173 - DMS-REQ-0342-V-01: Alert Filtering Service	Not Covered	Eric Bellm	LVV-T112	Draft	Eric Bellm
92	LVV-174 - DMS-REQ-0343-V-01: Number of full-size alerts	Not Covered	Eric Bellm	LVV-T113	Draft	Eric Bellm
93	LVV-179 - DMS-REQ-0348-V-01: Pre-defined alert filters	Not Covered	Eric Bellm	LVV-T114	Draft	Eric Bellm
94	LVV-120 - DMS-REQ-0289-V-01: Calibration Production Processing	Not Covered	Robert Lupton	LVV-T115	Draft	Kian-Tat Lim

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
95	LVV-181 - DMS-REQ-0350-V-01: Associating Objects across data releases	Not Covered	Colin Slater	LVV-T116	Draft	Kian-Tat Lim
96	LVV-47 - DMS-REQ-0119-V-01: DAC resource allocation for Level 3 processing	Not Covered	Colin Slater	LVV-T117	Draft	Colin Slater
97	LVV-48 - DMS-REQ-0120-V-01: Level 3 Data Product Self Consistency	Not Covered	Robert Gruendl	LVV-T118	Draft	Colin Slater
98	LVV-49 - DMS-REQ-0121-V-01: Provenance for Level 3 processing at DACs	Not Covered	Robert Gruendl	LVV-T119	Draft	Colin Slater
99	LVV-53 - DMS-REQ-0125-V-01: Software framework for Level 3 catalog processing	Not Covered	Simon Krughoff	LVV-T120	Draft	Colin Slater
100	LVV-56 - DMS-REQ-0128-V-01: Software framework for Level 3 image processing	Not Covered	Simon Krughoff	LVV-T121	Draft	Colin Slater
101	LVV-121 - DMS-REQ-0290-V-01: Level 3 Data Import	Not Covered	Colin Slater	LVV-T122	Draft	Colin Slater
102	LVV-171 - DMS-REQ-0340-V-01: Access Controls of Level 3 Data Products	Not Covered	Simon Krughoff	LVV-T123	Draft	Robert Gruendl
103	LVV-6 - DMS-REQ-0009-V-01: Simulated Data	Not Covered	Jim Bosch	LVV-T125	Draft	Robert Lupton
104	LVV-14 - DMS-REQ-0032-V-01: Image Differencing	Not Covered	Eric Bellm	LVV-T126	Draft	Eric Bellm
105	LVV-15 - DMS-REQ-0033-V-01: Provide Source Detection Software	Not Covered	Jim Bosch	LVV-T127	Draft	Robert Lupton
106	LVV-17 - DMS-REQ-0042-V-01: Provide Astrometric Model	Not Covered	Jim Bosch	LVV-T128	Draft	Colin Slater
107	LVV-18 - DMS-REQ-0043-V-01: Provide Calibrated Photometry	Not Covered	Jim Bosch	LVV-T129	Draft	Robert Lupton
108	LVV-21 - DMS-REQ-0052-V-01: Enable a Range of Shape Measurement Approaches	Not Covered	Jim Bosch	LVV-T130	Draft	Colin Slater
109	LVV-63 - DMS-REQ-0160-V-01: Provide User Interface Services	Not Covered	Gregory Dubois-Felsmann	LVV-T131	Draft	Gregory Dubois-Felsmann
110	LVV-127 - DMS-REQ-0296-V-01: Pre-cursor, and Real Data	Not Covered	Simon Krughoff	LVV-T132	Draft	Robert Gruendl
111	LVV-182 - DMS-REQ-0351-V-01: Provide Beam Projector Coordinate Calculation Software	Not Covered	Robert Lupton	LVV-T133	Draft	Robert Lupton
112	LVV-27 - DMS-REQ-0065-V-01: Provide Image Access Services	Not Covered	Gregory Dubois-Felsmann	LVV-T134	Draft	Gregory Dubois-Felsmann
113	LVV-60 - DMS-REQ-0155-V-01: Provide Data Access Services	Not Covered	Gregory Dubois-Felsmann	LVV-T135	Draft	Robert Gruendl
114	LVV-129 - DMS-REQ-0298-V-01: Data Product and Raw Data Access	Not Covered	Robert Gruendl	LVV-T136	Draft	Colin Slater
115	LVV-130 - DMS-REQ-0299-V-01: Data Product Ingest	Not Covered	Jim Bosch	LVV-T137	Draft	Colin Slater
116	LVV-131 - DMS-REQ-0300-V-01: Bulk Download Service	Not Covered	Robert Gruendl	LVV-T138	Draft	Robert Gruendl
117	LVV-61 - DMS-REQ-0156-V-01: Provide Pipeline Execution Services	Not Covered	Robert Gruendl	LVV-T139	Draft	Robert Lupton

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
118	LVV-133 - DMS-REQ-0302-V-01: Production Orchestration	Not Covered	Robert Gruendl	LVV-T140	Draft	Robert Gruendl
119	LVV-134 - DMS-REQ-0303-V-01: Production Monitoring	Not Covered	Robert Gruendl	LVV-T141	Draft	Robert Gruendl
120	LVV-135 - DMS-REQ-0304-V-01: Production Fault Tolerance	Not Covered	Robert Gruendl	LVV-T142	Draft	Robert Gruendl
121	LVV-62 - DMS-REQ-0158-V-01: Provide Pipeline Construction Services	Not Covered	Robert Lupton	LVV-T143	Draft	Robert Lupton
122	LVV-136 - DMS-REQ-0305-V-01: Task Specification	Not Covered	Robert Lupton	LVV-T144	Draft	Kian-Tat Lim
123	LVV-137 - DMS-REQ-0306-V-01: Task Configuration	Not Covered	Robert Lupton	LVV-T145	Draft	Robert Lupton
124	LVV-128 - DMS-REQ-0297-V-01: DMS Initialization Component	Not Covered	Robert Gruendl	LVV-T146	Draft	Robert Gruendl
125	LVV-132 - DMS-REQ-0301-V-01: Control of Level-1 Production	Not Covered	Eric Bellm	LVV-T147	Draft	Robert Gruendl
126	LVV-138 - DMS-REQ-0307-V-01: Unique Processing Coverage	Not Covered	Jim Bosch	LVV-T148	Draft	Colin Slater
127	LVV-33 - DMS-REQ-0075-V-01: Catalog Queries	Not Covered	Colin Slater	LVV-T149	Draft	Colin Slater
128	LVV-34 - DMS-REQ-0077-V-01: Maintain Archive Publicly Accessible	Not Covered	Colin Slater	LVV-T150	Draft	Colin Slater
129	LVV-35 - DMS-REQ-0078-V-01: Catalog Export Formats	Not Covered	Colin Slater	LVV-T151	Draft	Colin Slater
130	LVV-37 - DMS-REQ-0094-V-01: Keep Historical Alert Archive	Not Covered	Eric Bellm	LVV-T152	Draft	Eric Bellm
131	LVV-44 - DMS-REQ-0102-V-01: Provide Engineering & Facility Database Archive	Not Covered	Colin Slater	LVV-T153	Draft	Robert Gruendl
132	LVV-140 - DMS-REQ-0309-V-01: Raw Data Archiving Reliability	Not Covered	Robert Gruendl	LVV-T154	Draft	Colin Slater
133	LVV-141 - DMS-REQ-0310-V-01: Un-Archived Data Product Cache	Not Covered	Robert Gruendl	LVV-T155	Draft	Robert Gruendl
134	LVV-142 - DMS-REQ-0311-V-01: Regenerate Un-archived Data Products	Not Covered	Robert Gruendl	LVV-T156	Draft	Simon Krughoff
135	LVV-143 - DMS-REQ-0312-V-01: Level 1 Data Product Access	Not Covered	Eric Bellm	LVV-T157	Draft	Colin Slater
136	LVV-144 - DMS-REQ-0313-V-01: Level 1 & 2 Catalog Access	Not Covered	Colin Slater	LVV-T158	Draft	Colin Slater
137	LVV-167 - DMS-REQ-0336-V-01: Regenerating Data Products from Previous Data Releases	Not Covered	Robert Lupton	LVV-T159	Draft	Simon Krughoff
138	LVV-172 - DMS-REQ-0341-V-01: Max elapsed time for precovery results	Not Covered	Robert Gruendl	LVV-T160	Draft	Gregory Dubois-Felsmann
139	LVV-176 - DMS-REQ-0345-V-01: Logging of catalog queries	Not Covered	Colin Slater	LVV-T161	Draft	Robert Gruendl
140	LVV-189 - DMS-REQ-0363-V-01: Access to Previous Data Releases	Not Covered	Robert Gruendl	LVV-T162	Draft	Gregory Dubois-Felsmann

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
141	LVV-190 - DMS-REQ-0364-V-01: Total number of data releases	Not Covered	Colin Slater	LVV-T163	Draft	Robert Gruendl
142	LVV-191 - DMS-REQ-0365-V-01: Operations Subsets	Not Covered	Colin Slater	LVV-T164	Draft	Robert Gruendl
143	LVV-192 - DMS-REQ-0366-V-01: Subsets Support	Not Covered	Colin Slater	LVV-T165	Draft	Robert Lupton
144	LVV-193 - DMS-REQ-0367-V-01: Access Services Performance	Not Covered	Colin Slater	LVV-T166	Draft	Robert Gruendl
145	LVV-194 - DMS-REQ-0368-V-01: Implementation Provisions	Not Covered	Robert Gruendl	LVV-T167	Draft	Robert Gruendl
146	LVV-195 - DMS-REQ-0369-V-01: Evolution	Not Covered	Colin Slater	LVV-T168	Draft	Robert Gruendl
147	LVV-196 - DMS-REQ-0370-V-01: Older Release Behavior	Not Covered	Colin Slater	LVV-T169	Draft	Gregory Dubois-Felsmann
148	LVV-197 - DMS-REQ-0371-V-01: Query Availability	Not Covered	Colin Slater	LVV-T170	Draft	Colin Slater
149	LVV-5 - DMS-REQ-0008-V-01: Pipeline Availability	Not Covered	Robert Gruendl	LVV-T171	Draft	Robert Gruendl
150	LVV-64 - DMS-REQ-0161-V-01: Optimization of Cost, Reliability and Availability in Order	Not Covered	Robert Gruendl	LVV-T172	Draft	Robert Gruendl
151	LVV-65 - DMS-REQ-0162-V-01: Pipeline Throughput	Not Covered	Robert Gruendl	LVV-T173	Draft	Robert Gruendl
152	LVV-66 - DMS-REQ-0163-V-01: Re-processing Capacity	Not Covered	Robert Gruendl	LVV-T174	Draft	Robert Gruendl
153	LVV-67 - DMS-REQ-0164-V-01: Temporary Storage for Communications Links	Not Covered	Robert Gruendl	LVV-T175	Draft	Robert Gruendl
154	LVV-68 - DMS-REQ-0165-V-01: Infrastructure Sizing for “catching up”	Not Covered	Robert Gruendl	LVV-T176	Draft	Robert Gruendl
155	LVV-69 - DMS-REQ-0166-V-01: Incorporate Fault-Tolerance	Not Covered	Robert Gruendl	LVV-T177	Draft	Robert Gruendl
156	LVV-70 - DMS-REQ-0167-V-01: Incorporate Autonomics	Not Covered	Robert Gruendl	LVV-T178	Draft	Robert Gruendl
157	LVV-145 - DMS-REQ-0314-V-01: Compute Platform Heterogeneity	Not Covered	Robert Gruendl	LVV-T179	Draft	Robert Gruendl
158	LVV-149 - DMS-REQ-0318-V-01: Data Management Unscheduled Downtime	Not Covered	Robert Gruendl	LVV-T180	Draft	Robert Gruendl
159	LVV-71 - DMS-REQ-0168-V-01: Summit Facility Data Communications	Not Covered	Gregory Dubois-Felsmann	LVV-T181	Draft	Robert Gruendl
160	LVV-72 - DMS-REQ-0170-V-01: Prefer Computing and Storage Down	Not Covered	Robert Gruendl	LVV-T182	Draft	Robert Gruendl
161	LVV-146 - DMS-REQ-0315-V-01: DMS Communication with OCS	Not Covered	Robert Gruendl	LVV-T183	Draft	Gregory Dubois-Felsmann
162	LVV-73 - DMS-REQ-0171-V-01: Summit to Base Network	Not Covered	Robert Gruendl	LVV-T184	Draft	Robert Gruendl
163	LVV-74 - DMS-REQ-0172-V-01: Summit to Base Network Availability	Not Covered	Robert Gruendl	LVV-T185	Draft	Robert Gruendl

Draft

	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
164	LVV-75 - DMS-REQ-0173-V-01: Summit to Base Network Reliability	Not Covered	Robert Gruendl	LVV-T186	Draft	Robert Gruendl
165	LVV-76 - DMS-REQ-0174-V-01: Summit to Base Network Secondary Link	Not Covered	Robert Gruendl	LVV-T187	Draft	Robert Gruendl
166	LVV-77 - DMS-REQ-0175-V-01: Summit to Base Network Ownership and Operation	Not Covered	Robert Gruendl	LVV-T188	Draft	Robert Gruendl
167	LVV-78 - DMS-REQ-0176-V-01: Base Facility Infrastructure	Not Covered	Robert Gruendl	LVV-T189	Draft	Robert Gruendl
168	LVV-80 - DMS-REQ-0178-V-01: Base Facility Co-Location with Existing Facility	Not Covered	Robert Gruendl	LVV-T190	Draft	Robert Gruendl
169	LVV-147 - DMS-REQ-0316-V-01: Commissioning Cluster	Not Covered	Robert Gruendl	LVV-T191	Draft	Robert Gruendl
170	LVV-183 - DMS-REQ-0352-V-01: Base Wireless LAN (WiFi)	Not Covered	Robert Gruendl	LVV-T192	Draft	Robert Gruendl
171	LVV-81 - DMS-REQ-0180-V-01: Base to Archive Network	Not Covered	Robert Gruendl	LVV-T193	Draft	Robert Gruendl
172	LVV-82 - DMS-REQ-0181-V-01: Base to Archive Network Availability	Not Covered	Robert Gruendl	LVV-T194	Draft	Robert Gruendl
173	LVV-83 - DMS-REQ-0182-V-01: Base to Archive Network Reliability	Not Covered	Robert Gruendl	LVV-T195	Draft	Robert Gruendl
174	LVV-84 - DMS-REQ-0183-V-01: Base to Archive Network Secondary Link	Not Covered	Robert Gruendl	LVV-T196	Draft	Robert Gruendl
175	LVV-85 - DMS-REQ-0185-V-01: Archive Center	Not Covered	Robert Gruendl	LVV-T197	Draft	Robert Gruendl
176	LVV-86 - DMS-REQ-0186-V-01: Archive Center Disaster Recovery	Not Covered	Robert Gruendl	LVV-T198	Draft	Robert Gruendl
177	LVV-87 - DMS-REQ-0187-V-01: Archive Center Co-Location with Existing Facility	Not Covered	Robert Gruendl	LVV-T199	Draft	Robert Gruendl
178	LVV-88 - DMS-REQ-0188-V-01: Archive to Data Access Center Network	Not Covered	Robert Gruendl	LVV-T200	Draft	Robert Gruendl
179	LVV-89 - DMS-REQ-0189-V-01: Archive to Data Access Center Network Availability	Not Covered	Robert Gruendl	LVV-T201	Draft	Robert Gruendl
180	LVV-90 - DMS-REQ-0190-V-01: Archive to Data Access Center Network Reliability	Not Covered	Robert Gruendl	LVV-T202	Draft	Robert Gruendl
181	LVV-91 - DMS-REQ-0191-V-01: Archive to Data Access Center Network Secondary Link	Not Covered	Robert Gruendl	LVV-T203	Draft	Kian-Tat Lim
182	LVV-50 - DMS-REQ-0122-V-01: Access to catalogs for external Level 3 processing	Not Covered	Simon Krughoff	LVV-T204	Draft	Kian-Tat Lim
183	LVV-51 - DMS-REQ-0123-V-01: Access to input catalogs for DAC-based Level 3 processing	Not Covered	Colin Slater	LVV-T205	Draft	Robert Gruendl
184	LVV-52 - DMS-REQ-0124-V-01: Federation with external catalogs	Not Covered	Gregory Dubois-Felsmann	LVV-T206	Draft	Colin Slater
185	LVV-54 - DMS-REQ-0126-V-01: Access to images for external Level 3 processing	Not Covered	Robert Gruendl	LVV-T207	Draft	Kian-Tat Lim
186	LVV-55 - DMS-REQ-0127-V-01: Access to input images for DAC-based Level 3 processing	Not Covered	Colin Slater	LVV-T208	Draft	Kian-Tat Lim
187	LVV-92 - DMS-REQ-0193-V-01: Data Access Centers	Not Covered	Robert Gruendl	LVV-T209	Draft	Kian-Tat Lim

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	Verification Elements	VE Status	VE Assignee	Test Cases	TC Status	TC Owner
188	LVV-93 - DMS-REQ-0194-V-01: Data Access Center Simultaneous Connections	Not Covered	Robert Gruendl	LVV-T210	Draft	Kian-Tat Lim
189	LVV-94 - DMS-REQ-0196-V-01: Data Access Center Geographical Distribution	Not Covered	Colin Slater	LVV-T211	Draft	Kian-Tat Lim
190	LVV-95 - DMS-REQ-0197-V-01: No Limit on Data Access Centers	Not Covered	Colin Slater	LVV-T212	Draft	Colin Slater
191	LVV-3404 - DMS-REQ-0362-V-01: Median residual PSF ellipticity correlations on 5 arcmin scales	Not Covered	Leanne Guy	LVV-T376	Draft	Leanne Guy
192	LVV-3401 - DMS-REQ-0359-V-01: RMS photometric repeatability in uzy	Not Covered	Leanne Guy	LVV-T377	Draft	Leanne Guy
193	LVV-3402 - DMS-REQ-0360-V-01: Median astrometric error on 20 arcmin scales	Not Covered	Leanne Guy	LVV-T378	Draft	Leanne Guy
194	LVV-3394 - DMS-REQ-0377-V-01: Min number of simultaneous single-CCD coadd cutout image users	Not Covered	Leanne Guy	LVV-T385	Draft	Leanne Guy

A.2 Reverse Tracebility

	Test Cases	Verification Elements
1	LVV-T12 - DRP-00-10: Data Release Includes Required Data Products	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products LVV-98 - DMS-REQ-0267-V-01: Source Catalog LVV-99 - DMS-REQ-0268-V-01: Forced-Source Catalog LVV-106 - DMS-REQ-0275-V-01: Object Catalog LVV-110 - DMS-REQ-0279-V-01: Deep Detection Coadds LVV-125 - DMS-REQ-0294-V-01: Processing of Datasets
2	LVV-T23 - Verify implementation of Storing Approximations of Per-pixel Metadata	LVV-157 - DMS-REQ-0326-V-01: Storing Approximations of Per-pixel Metadata
3	LVV-T24 - Verify implementation of Computing Derived Quantities	LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities
4	LVV-T25 - Verify implementation of Denormalizing Database Tables	LVV-163 - DMS-REQ-0332-V-01: Denormalizing Database Tables
5	LVV-T26 - Verify implementation of Maximum Likelihood Values and Covariances	LVV-164 - DMS-REQ-0333-V-01: Maximum Likelihood Values and Covariances
6	LVV-T27 - Verify implementation of Data Availability	LVV-177 - DMS-REQ-0346-V-01: Data Availability
7	LVV-T18 - AG-00-05: Alert Generation Produces Required Data Products	LVV-29 - DMS-REQ-0069-V-01: Processed Visit Images LVV-7 - DMS-REQ-0010-V-01: Difference Exposures LVV-100 - DMS-REQ-0269-V-01: DIASource Catalog LVV-102 - DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource
8	LVV-T28 - Verify implementation of Measurements in catalogs	LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs
9	LVV-T29 - Verify implementation of Raw Science Image Data Acquisition	LVV-8 - DMS-REQ-0018-V-01: Raw Science Image Data Acquisition

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	Test Cases	Verification Elements
10	LVV-T30 - Verify implementation of Wavefront Sensor Data Acquisition	LVV-9 - DMS-REQ-0020-V-01: Wavefront Sensor Data Acquisition
11	LVV-T31 - Verify implementation of Crosstalk Corrected Science Image Data Acquisition	LVV-10 - DMS-REQ-0022-V-01: Crosstalk Corrected Science Image Data Acquisition
12	LVV-T32 - Verify implementation of Raw Image Assembly	LVV-11 - DMS-REQ-0024-V-01: Raw Image Assembly
13	LVV-T33 - Verify implementation of Raw Science Image Metadata	LVV-28 - DMS-REQ-0068-V-01: Raw Science Image Metadata
14	LVV-T34 - Verify implementation of Guider Calibration Data Acquisition	LVV-96 - DMS-REQ-0265-V-01: Guider Calibration Data Acquisition
15	LVV-T216 - Installation of the Alert Distribution payloads.	LVV-139 - DMS-REQ-0308-V-01: Software Architecture to Enable Community Re-Use
16	LVV-T217 - Full Stream Alert Distribution	LVV-3 - DMS-REQ-0002-V-01: Transient Alert Distribution
17	LVV-T35 - Verify implementation of Nightly Data Accessible Within 24 hrs	LVV-4 - DMS-REQ-0004-V-01: Time to L1 public release_1
18	LVV-T36 - Verify implementation of Difference Exposures	LVV-7 - DMS-REQ-0010-V-01: Difference Exposures
19	LVV-T37 - Verify implementation of Difference Exposure Attributes	LVV-32 - DMS-REQ-0074-V-01: Difference Exposure Attributes
20	LVV-T38 - Verify implementation of Processed Visit Images	LVV-29 - DMS-REQ-0069-V-01: Processed Visit Images
21	LVV-T39 - Verify implementation of Generate Photometric Zeropoint for Visit Image	LVV-12 - DMS-REQ-0029-V-01: Generate Photometric Zeropoint for Visit Image
22	LVV-T40 - Verify implementation of Generate WCS for Visit Images	LVV-13 - DMS-REQ-0030-V-01: Absolute accuracy of WCS
23	LVV-T41 - Verify implementation of Generate PSF for Visit Images	LVV-30 - DMS-REQ-0070-V-01: Generate PSF for Visit Images
24	LVV-T42 - Verify implementation of Processed Visit Image Content	LVV-31 - DMS-REQ-0072-V-01: Processed Visit Image Content
25	LVV-T43 - Verify implementation of Background Model Calculation	LVV-158 - DMS-REQ-0327-V-01: Background Model Calculation
26	LVV-T44 - Verify implementation of Documenting Image Characterization	LVV-159 - DMS-REQ-0328-V-01: Documenting Image Characterization
27	LVV-T45 - Verify implementation of Prompt Processing Data Quality Report Definition	LVV-39 - DMS-REQ-0097-V-01: Level 1 Data Quality Report Definition
28	LVV-T46 - Verify implementation of Prompt Processing Performance Report Definition	LVV-41 - DMS-REQ-0099-V-01: Level 1 Performance Report Definition
29	LVV-T47 - Verify implementation of Prompt Processing Calibration Report Definition	LVV-43 - DMS-REQ-0101-V-01: Level 1 Calibration Report Definition
30	LVV-T48 - Verify implementation of Exposure Catalog	LVV-97 - DMS-REQ-0266-V-01: Exposure Catalog
31	LVV-T49 - Verify implementation of DIASource Catalog	LVV-100 - DMS-REQ-0269-V-01: DIASource Catalog
32	LVV-T50 - Verify implementation of Faint DIASource Measurements	LVV-101 - DMS-REQ-0270-V-01: Faint DIASource Measurements
33	LVV-T21 - AG-00-20: Scientific Verification of DIASource Catalog	LVV-100 - DMS-REQ-0269-V-01: DIASource Catalog LVV-101 - DMS-REQ-0270-V-01: Faint DIASource Measurements LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities

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	Test Cases	Verification Elements
34	LVV-T22 - AG-00-25: Scientific Verification of DIAObject Catalog	LVV-116 - DMS-REQ-0285-V-01: Level 1 Source Association LVV-102 - DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource LVV-103 - DMS-REQ-0272-V-01: DIAObject Attributes LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities
35	LVV-T51 - Verify implementation of DIAObject Catalog	LVV-102 - DMS-REQ-0271-V-01: Max nearby galaxies associated with DIASource
36	LVV-T52 - Verify implementation of DIAObject Attributes	LVV-103 - DMS-REQ-0272-V-01: DIAObject Attributes
37	LVV-T53 - Verify implementation of SSObject Catalog	LVV-104 - DMS-REQ-0273-V-01: SSObject Catalog
38	LVV-T54 - Verify implementation of Alert Content	LVV-105 - DMS-REQ-0274-V-01: Alert Content
39	LVV-T55 - Verify implementation of DIAForcedSource Catalog	LVV-148 - DMS-REQ-0317-V-01: DIAForcedSource Catalog
40	LVV-T56 - Verify implementation of Characterizing Variability	LVV-150 - DMS-REQ-0319-V-01: Characterizing Variability
41	LVV-T57 - Verify implementation of Calculating SSObject Parameters	LVV-154 - DMS-REQ-0323-V-01: Calculating SSObject Parameters
42	LVV-T58 - Verify implementation of Matching DIASources to Objects	LVV-155 - DMS-REQ-0324-V-01: Matching DIASources to Objects
43	LVV-T59 - Verify implementation of Regenerating L1 Data Products During Data Release Processing	LVV-156 - DMS-REQ-0325-V-01: Regenerating L1 Data Products During Data Release Processing
44	LVV-T60 - Verify implementation of Publishing predicted visit schedule	LVV-184 - DMS-REQ-0353-V-01: Publishing predicted visit schedule
45	LVV-T61 - Verify implementation of Associate Sources to Objects	LVV-16 - DMS-REQ-0034-V-01: Associate Sources to Objects
46	LVV-T16 - DRP-00-35: Scientific Verification of Coadd Images	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products LVV-110 - DMS-REQ-0279-V-01: Deep Detection Coadds LVV-109 - DMS-REQ-0278-V-01: Coadd Image Method Constraints LVV-20 - DMS-REQ-0047-V-01: Provide PSF for Coadded Images
47	LVV-T62 - Verify implementation of Provide PSF for Coadded Images	LVV-20 - DMS-REQ-0047-V-01: Provide PSF for Coadded Images
48	LVV-T63 - Verify implementation of Produce Images for EPO	LVV-45 - DMS-REQ-0103-V-01: Produce Images for EPO
49	LVV-T64 - Verify implementation of Coadded Image Provenance	LVV-46 - DMS-REQ-0106-V-01: Coadded Image Provenance
50	LVV-T65 - Verify implementation of Source Catalog	LVV-98 - DMS-REQ-0267-V-01: Source Catalog
51	LVV-T66 - Verify implementation of Forced-Source Catalog	LVV-99 - DMS-REQ-0268-V-01: Forced-Source Catalog
52	LVV-T67 - Verify implementation of Object Catalog	LVV-106 - DMS-REQ-0275-V-01: Object Catalog
53	LVV-T68 - Verify implementation of Provide Photometric Redshifts of Galaxies	LVV-19 - DMS-REQ-0046-V-01: Provide Photometric Redshifts of Galaxies
54	LVV-T69 - Verify implementation of Object Characterization	LVV-107 - DMS-REQ-0276-V-01: Object Characterization
55	LVV-T70 - Verify implementation of Coadd Source Catalog	LVV-108 - DMS-REQ-0277-V-01: Coadd Source Catalog

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	Test Cases	Verification Elements
56	LVV-T71 - Verify implementation of Detecting extended low surface brightness objects	LVV-180 - DMS-REQ-0349-V-01: Detecting extended low surface brightness objects
57	LVV-T72 - Verify implementation of Coadd Image Method Constraints	LVV-109 - DMS-REQ-0278-V-01: Coadd Image Method Constraints
58	LVV-T73 - Verify implementation of Deep Detection Coadds	LVV-110 - DMS-REQ-0279-V-01: Deep Detection Coadds
59	LVV-T74 - Verify implementation of Template Coadds	LVV-111 - DMS-REQ-0280-V-01: Template Coadds
60	LVV-T75 - Verify implementation of Multi-band Coadds	LVV-112 - DMS-REQ-0281-V-01: Multi-band Coadds
61	LVV-T76 - Verify implementation of All-Sky Visualization of Data Releases	LVV-160 - DMS-REQ-0329-V-01: All-Sky Visualization of Data Releases
62	LVV-T77 - Verify implementation of Best Seeing Coadds	LVV-161 - DMS-REQ-0330-V-01: Best Seeing Coadds
63	LVV-T78 - Verify implementation of Persisting Data Products	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products
64	LVV-T79 - Verify implementation of PSF-Matched Coadds	LVV-166 - DMS-REQ-0335-V-01: PSF-Matched Coadds
65	LVV-T80 - Verify implementation of Detecting faint variable objects	LVV-168 - DMS-REQ-0337-V-01: Detecting faint variable objects
66	LVV-T81 - Verify implementation of Targeted Coadds	LVV-169 - DMS-REQ-0338-V-01: Targeted Coadds
67	LVV-T13 - DRP-00-15: Scientific Verification of Source Catalog	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products LVV-98 - DMS-REQ-0267-V-01: Source Catalog LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities
68	LVV-T14 - DRP-00-25: Scientific Verification of Object Catalog	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products LVV-106 - DMS-REQ-0275-V-01: Object Catalog LVV-178 - DMS-REQ-0347-V-01: Measurements in catalogs LVV-162 - DMS-REQ-0331-V-01: Computing Derived Quantities
69	LVV-T15 - DRP-00-30: Scientific Verification of Processed Visit Images	LVV-165 - DMS-REQ-0334-V-01: Persisting Data Products LVV-29 - DMS-REQ-0069-V-01: Processed Visit Images LVV-158 - DMS-REQ-0327-V-01: Background Model Calculation LVV-12 - DMS-REQ-0029-V-01: Generate Photometric Zeropoint for Visit Image LVV-30 - DMS-REQ-0070-V-01: Generate PSF for Visit Images LVV-13 - DMS-REQ-0030-V-01: Absolute accuracy of WCS LVV-31 - DMS-REQ-0072-V-01: Processed Visit Image Content
70	LVV-T82 - Verify implementation of Tracking Characterization Changes Between Data Releases	LVV-170 - DMS-REQ-0339-V-01: Tracking Characterization Changes Between Data Releases
71	LVV-T83 - Verify implementation of Bad Pixel Map	LVV-22 - DMS-REQ-0059-V-01: Bad Pixel Map
72	LVV-T84 - Verify implementation of Bias Residual Image	LVV-23 - DMS-REQ-0060-V-01: Bias Residual Image
73	LVV-T85 - Verify implementation of Crosstalk Correction Matrix	LVV-24 - DMS-REQ-0061-V-01: Crosstalk Correction Matrix
74	LVV-T86 - Verify implementation of Illumination Correction Frame	LVV-25 - DMS-REQ-0062-V-01: Illumination Correction Frame
75	LVV-T87 - Verify implementation of Monochromatic Flatfield Data Cube	LVV-26 - DMS-REQ-0063-V-01: Monochromatic Flatfield Data Cube

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	Test Cases	Verification Elements
76	LVV-T88 - Verify implementation of Calibration Data Products	LVV-57 - DMS-REQ-0130-V-01: Calibration Data Products
77	LVV-T89 - Verify implementation of Calibration Image Provenance	LVV-59 - DMS-REQ-0132-V-01: Calibration Image Provenance
78	LVV-T90 - Verify implementation of Dark Current Correction Frame	LVV-113 - DMS-REQ-0282-V-01: Dark Current Correction Frame
79	LVV-T91 - Verify implementation of Fringe Correction Frame	LVV-114 - DMS-REQ-0283-V-01: Fringe Correction Frame
80	LVV-T92 - Verify implementation of Processing of Data From Special Programs	LVV-151 - DMS-REQ-0320-V-01: Processing of Data From Special Programs
81	LVV-T93 - Verify implementation of Level 1 Processing of Special Programs Data	LVV-152 - DMS-REQ-0321-V-01: Level 1 Processing of Special Programs Data
82	LVV-T94 - Verify implementation of Special Programs Database	LVV-153 - DMS-REQ-0322-V-01: Special Programs Database
83	LVV-T95 - Verify implementation of Constraints on Level 1 Special Program Products Generation	LVV-175 - DMS-REQ-0004-V-01: Time to L1 public release
84	LVV-T96 - Verify implementation of Query Repeatability	LVV-122 - DMS-REQ-0291-V-01: Query Repeatability
85	LVV-T97 - Verify implementation of Uniqueness of IDs Across Data Releases	LVV-123 - DMS-REQ-0292-V-01: Uniqueness of IDs Across Data Releases
86	LVV-T98 - Verify implementation of Selection of Datasets	LVV-124 - DMS-REQ-0293-V-01: Selection of Datasets
87	LVV-T99 - Verify implementation of Processing of Datasets	LVV-125 - DMS-REQ-0294-V-01: Processing of Datasets
88	LVV-T100 - Verify implementation of Transparent Data Access	LVV-126 - DMS-REQ-0295-V-01: Transparent Data Access
89	LVV-T101 - Verify implementation of Transient Alert Distribution	LVV-3 - DMS-REQ-0002-V-01: Transient Alert Distribution
90	LVV-T102 - Verify implementation of Solar System Objects Available Within Specified Time	LVV-36 - DMS-REQ-0089-V-01: Solar System Objects Available Within Specified Time
91	LVV-T103 - Verify implementation of Generate Data Quality Report Within Specified Time	LVV-38 - DMS-REQ-0096-V-01: Generate Data Quality Report Within Specified Time
92	LVV-T104 - Verify implementation of Generate DMS Performance Report Within Specified Time	LVV-40 - DMS-REQ-0098-V-01: Generate DMS Performance Report Within Specified Time
93	LVV-T105 - Verify implementation of Generate Calibration Report Within Specified Time	LVV-42 - DMS-REQ-0100-V-01: Generate Calibration Report Within Specified Time
94	LVV-T106 - Verify implementation of Calibration Images Available Within Specified Time	LVV-58 - DMS-REQ-0131-V-01: Time allowed to process calibs
95	LVV-T107 - Verify implementation of Level-1 Production Completeness	LVV-115 - DMS-REQ-0284-V-01: Level-1 Production Completeness
96	LVV-T108 - Verify implementation of Level 1 Source Association	LVV-116 - DMS-REQ-0285-V-01: Level 1 Source Association
97	LVV-T109 - Verify implementation of SSObject Precovery	LVV-117 - DMS-REQ-0286-V-01: SSObject Precovery
98	LVV-T110 - Verify implementation of DIASource Precovery	LVV-118 - DMS-REQ-0287-V-01: Max look-back time for precovery
99	LVV-T111 - Verify implementation of Use of External Orbit Catalogs	LVV-119 - DMS-REQ-0288-V-01: Use of External Orbit Catalogs
100	LVV-T112 - Verify implementation of Alert Filtering Service	LVV-173 - DMS-REQ-0342-V-01: Alert Filtering Service

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	Test Cases	Verification Elements
101	LVV-T113 - Verify implementation of Performance Requirements for LSST Alert Filtering Service	LVV-174 - DMS-REQ-0343-V-01: Number of full-size alerts
102	LVV-T114 - Verify implementation of Pre-defined alert filters	LVV-179 - DMS-REQ-0348-V-01: Pre-defined alert filters
103	LVV-T115 - Verify implementation of Calibration Production Processing	LVV-120 - DMS-REQ-0289-V-01: Calibration Production Processing
104	LVV-T116 - Verify implementation of Associating Objects across data releases	LVV-181 - DMS-REQ-0350-V-01: Associating Objects across data releases
105	LVV-T117 - Verify implementation of DAC resource allocation for Level 3 processing	LVV-47 - DMS-REQ-0119-V-01: DAC resource allocation for Level 3 processing
106	LVV-T118 - Verify implementation of Level 3 Data Product Self Consistency	LVV-48 - DMS-REQ-0120-V-01: Level 3 Data Product Self Consistency
107	LVV-T119 - Verify implementation of Provenance for Level 3 processing at DACs	LVV-49 - DMS-REQ-0121-V-01: Provenance for Level 3 processing at DACs
108	LVV-T120 - Verify implementation of Software framework for Level 3 catalog processing	LVV-53 - DMS-REQ-0125-V-01: Software framework for Level 3 catalog processing
109	LVV-T121 - Verify implementation of Software framework for Level 3 image processing	LVV-56 - DMS-REQ-0128-V-01: Software framework for Level 3 image processing
110	LVV-T122 - Verify implementation of Level 3 Data Import	LVV-121 - DMS-REQ-0290-V-01: Level 3 Data Import
111	LVV-T123 - Verify implementation of Access Controls of Level 3 Data Products	LVV-171 - DMS-REQ-0340-V-01: Access Controls of Level 3 Data Products
112	LVV-T124 - Verify implementation of Software Architecture to Enable Community Re-Use	LVV-139 - DMS-REQ-0308-V-01: Software Architecture to Enable Community Re-Use
113	LVV-T125 - Verify implementation of Simulated Data	LVV-6 - DMS-REQ-0009-V-01: Simulated Data
114	LVV-T126 - Verify implementation Image Differencing	LVV-14 - DMS-REQ-0032-V-01: Image Differencing
115	LVV-T127 - Verify implementation of Provide Source Detection Software	LVV-15 - DMS-REQ-0033-V-01: Provide Source Detection Software
116	LVV-T128 - Verify implementation Provide Astrometric Model	LVV-17 - DMS-REQ-0042-V-01: Provide Astrometric Model
117	LVV-T129 - Verify implementation of Provide Calibrated Photometry	LVV-18 - DMS-REQ-0043-V-01: Provide Calibrated Photometry
118	LVV-T130 - Verify implementation of Enable a Range of Shape Measurement Approaches	LVV-21 - DMS-REQ-0052-V-01: Enable a Range of Shape Measurement Approaches
119	LVV-T131 - Verify implementation of Provide User Interface Services	LVV-63 - DMS-REQ-0160-V-01: Provide User Interface Services
120	LVV-T132 - Verify implementation of Pre-cursor, and Real Data	LVV-127 - DMS-REQ-0296-V-01: Pre-cursor, and Real Data
121	LVV-T133 - Verify implementation of Provide Beam Projector Coordinate Calculation Software	LVV-182 - DMS-REQ-0351-V-01: Provide Beam Projector Coordinate Calculation Software
122	LVV-T134 - Verify implementation of Provide Image Access Services	LVV-27 - DMS-REQ-0065-V-01: Provide Image Access Services
123	LVV-T135 - Verify implementation of Provide Data Access Services	LVV-60 - DMS-REQ-0155-V-01: Provide Data Access Services
124	LVV-T136 - Verify implementation of Data Product and Raw Data Access	LVV-129 - DMS-REQ-0298-V-01: Data Product and Raw Data Access
125	LVV-T137 - Verify implementation of Data Product Ingest	LVV-130 - DMS-REQ-0299-V-01: Data Product Ingest
126	LVV-T138 - Verify implementation of Bulk Download Service	LVV-131 - DMS-REQ-0300-V-01: Bulk Download Service

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	Test Cases	Verification Elements
127	LVV-T139 - Verify implementation of Provide Pipeline Execution Services	LVV-61 - DMS-REQ-0156-V-01: Provide Pipeline Execution Services
128	LVV-T140 - Verify implementation of Production Orchestration	LVV-133 - DMS-REQ-0302-V-01: Production Orchestration
129	LVV-T141 - Verify implementation of Production Monitoring	LVV-134 - DMS-REQ-0303-V-01: Production Monitoring
130	LVV-T142 - Verify implementation of Production Fault Tolerance	LVV-135 - DMS-REQ-0304-V-01: Production Fault Tolerance
131	LVV-T143 - Verify implementation of Provide Pipeline Construction Services	LVV-62 - DMS-REQ-0158-V-01: Provide Pipeline Construction Services
132	LVV-T144 - Verify implementation of Task Specification	LVV-136 - DMS-REQ-0305-V-01: Task Specification
133	LVV-T145 - Verify implementation of Task Configuration	LVV-137 - DMS-REQ-0306-V-01: Task Configuration
134	LVV-T146 - Verify implementation of DMS Initialization Component	LVV-128 - DMS-REQ-0297-V-01: DMS Initialization Component
135	LVV-T147 - Verify implementation of Control of Level-1 Production	LVV-132 - DMS-REQ-0301-V-01: Control of Level-1 Production
136	LVV-T148 - Verify implementation of Unique Processing Coverage	LVV-138 - DMS-REQ-0307-V-01: Unique Processing Coverage
137	LVV-T149 - Verify implementation of Catalog Queries	LVV-33 - DMS-REQ-0075-V-01: Catalog Queries
138	LVV-T150 - Verify implementation of Maintain Archive Publicly Accessible	LVV-34 - DMS-REQ-0077-V-01: Maintain Archive Publicly Accessible
139	LVV-T151 - Verify implementation of Catalog Export Formats	LVV-35 - DMS-REQ-0078-V-01: Catalog Export Formats
140	LVV-T152 - Verify implementation of Keep Historical Alert Archive	LVV-37 - DMS-REQ-0094-V-01: Keep Historical Alert Archive
141	LVV-T153 - Verify implementation of Provide Engineering and Facility Database Archive	LVV-44 - DMS-REQ-0102-V-01: Provide Engineering & Facility Database Archive
142	LVV-T154 - Verify implementation of Raw Data Archiving Reliability	LVV-140 - DMS-REQ-0309-V-01: Raw Data Archiving Reliability
143	LVV-T155 - Verify implementation of Un-Archived Data Product Cache	LVV-141 - DMS-REQ-0310-V-01: Un-Archived Data Product Cache
144	LVV-T156 - Verify implementation of Regenerate Un-archived Data Products	LVV-142 - DMS-REQ-0311-V-01: Regenerate Un-archived Data Products
145	LVV-T157 - Verify implementation Level 1 Data Product Access	LVV-143 - DMS-REQ-0312-V-01: Level 1 Data Product Access
146	LVV-T158 - Verify implementation Level 1 and 2 Catalog Access	LVV-144 - DMS-REQ-0313-V-01: Level 1 & 2 Catalog Access
147	LVV-T159 - Verify implementation of Regenerating Data Products from Previous Data Releases	LVV-167 - DMS-REQ-0336-V-01: Regenerating Data Products from Previous Data Releases
148	LVV-T160 - Verify implementation of Providing a Precovery Service	LVV-172 - DMS-REQ-0341-V-01: Max elapsed time for precovery results
149	LVV-T161 - Verify implementation of Logging of catalog queries	LVV-176 - DMS-REQ-0345-V-01: Logging of catalog queries
150	LVV-T162 - Verify implementation of Access to Previous Data Releases	LVV-189 - DMS-REQ-0363-V-01: Access to Previous Data Releases
151	LVV-T163 - Verify implementation of Data Access Services	LVV-190 - DMS-REQ-0364-V-01: Total number of data releases
152	LVV-T164 - Verify implementation of Operations Subsets	LVV-191 - DMS-REQ-0365-V-01: Operations Subsets

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	Test Cases	Verification Elements
153	LVV-T165 - Verify implementation of Subsets Support	LVV-192 - DMS-REQ-0366-V-01: Subsets Support
154	LVV-T166 - Verify implementation of Access Services Performance	LVV-193 - DMS-REQ-0367-V-01: Access Services Performance
155	LVV-T167 - Verify Capability to serve older Data Releases at Full Performance	LVV-194 - DMS-REQ-0368-V-01: Implementation Provisions
156	LVV-T168 - Verify design of Data Access Services allows Evolution of the LSST Data Model	LVV-195 - DMS-REQ-0369-V-01: Evolution
157	LVV-T169 - Verify implementation of Older Release Behavior	LVV-196 - DMS-REQ-0370-V-01: Older Release Behavior
158	LVV-T170 - Verify implementation of Query Availability	LVV-197 - DMS-REQ-0371-V-01: Query Availability
159	LVV-T171 - Verify implementation of Pipeline Availability	LVV-5 - DMS-REQ-0008-V-01: Pipeline Availability
160	LVV-T172 - Verify implementation of Optimization of Cost, Reliability and Availability	LVV-64 - DMS-REQ-0161-V-01: Optimization of Cost, Reliability and Availability in Order
161	LVV-T173 - Verify implementation of Pipeline Throughput	LVV-65 - DMS-REQ-0162-V-01: Pipeline Throughput
162	LVV-T174 - Verify implementation of Re-processing Capacity	LVV-66 - DMS-REQ-0163-V-01: Re-processing Capacity
163	LVV-T175 - Verify implementation of Temporary Storage for Communications Links	LVV-67 - DMS-REQ-0164-V-01: Temporary Storage for Communications Links
164	LVV-T176 - Verify implementation of Infrastructure Sizing for “catching up”	LVV-68 - DMS-REQ-0165-V-01: Infrastructure Sizing for “catching up”
165	LVV-T177 - Verify implementation of Incorporate Fault-Tolerance	LVV-69 - DMS-REQ-0166-V-01: Incorporate Fault-Tolerance
166	LVV-T178 - Verify implementation of Incorporate Autonomics	LVV-70 - DMS-REQ-0167-V-01: Incorporate Autonomics
167	LVV-T179 - Verify implementation of Compute Platform Heterogeneity	LVV-145 - DMS-REQ-0314-V-01: Compute Platform Heterogeneity
168	LVV-T180 - Verify implementation of Data Management Unscheduled Downtime	LVV-149 - DMS-REQ-0318-V-01: Data Management Unscheduled Downtime
169	LVV-T181 - Verify implementation of Summit Facility Data Communications	LVV-71 - DMS-REQ-0168-V-01: Summit Facility Data Communications
170	LVV-T182 - Verify implementation of Prefer Computing and Storage Down	LVV-72 - DMS-REQ-0170-V-01: Prefer Computing and Storage Down
171	LVV-T183 - Verify implementation of DMS Communication with OCS	LVV-146 - DMS-REQ-0315-V-01: DMS Communication with OCS
172	LVV-T184 - Verify implementation of Summit to Base Network	LVV-73 - DMS-REQ-0171-V-01: Summit to Base Network
173	LVV-T185 - Verify implementation of Summit to Base Network Availability	LVV-74 - DMS-REQ-0172-V-01: Summit to Base Network Availability
174	LVV-T186 - Verify implementation of Summit to Base Network Reliability	LVV-75 - DMS-REQ-0173-V-01: Summit to Base Network Reliability
175	LVV-T187 - Verify implementation of Summit to Base Network Secondary Link	LVV-76 - DMS-REQ-0174-V-01: Summit to Base Network Secondary Link
176	LVV-T188 - Verify implementation of Summit to Base Network Ownership and Operation	LVV-77 - DMS-REQ-0175-V-01: Summit to Base Network Ownership and Operation
177	LVV-T189 - Verify implementation of Base Facility Infrastructure	LVV-78 - DMS-REQ-0176-V-01: Base Facility Infrastructure
178	LVV-T190 - Verify implementation of Base Facility Co-Location with Existing Facility	LVV-80 - DMS-REQ-0178-V-01: Base Facility Co-Location with Existing Facility

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	Test Cases	Verification Elements
179	LVV-T191 - Verify implementation of Commissioning Cluster	LVV-147 - DMS-REQ-0316-V-01: Commissioning Cluster
180	LVV-T192 - Verify implementation of Base Wireless LAN (WiFi)	LVV-183 - DMS-REQ-0352-V-01: Base Wireless LAN (WiFi)
181	LVV-T193 - Verify implementation of Base to Archive Network	LVV-81 - DMS-REQ-0180-V-01: Base to Archive Network
182	LVV-T194 - Verify implementation of Base to Archive Network Availability	LVV-82 - DMS-REQ-0181-V-01: Base to Archive Network Availability
183	LVV-T195 - Verify implementation of Base to Archive Network Reliability	LVV-83 - DMS-REQ-0182-V-01: Base to Archive Network Reliability
184	LVV-T196 - Verify implementation of Base to Archive Network Secondary Link	LVV-84 - DMS-REQ-0183-V-01: Base to Archive Network Secondary Link
185	LVV-T197 - Verify implementation of Archive Center	LVV-85 - DMS-REQ-0185-V-01: Archive Center
186	LVV-T198 - Verify implementation of Archive Center Disaster Recovery	LVV-86 - DMS-REQ-0186-V-01: Archive Center Disaster Recovery
187	LVV-T199 - Verify implementation of Archive Center Co-Location with Existing Facility	LVV-87 - DMS-REQ-0187-V-01: Archive Center Co-Location with Existing Facility
188	LVV-T200 - Verify implementation of Archive to Data Access Center Network	LVV-88 - DMS-REQ-0188-V-01: Archive to Data Access Center Network
189	LVV-T201 - Verify implementation of Archive to Data Access Center Network Availability	LVV-89 - DMS-REQ-0189-V-01: Archive to Data Access Center Network Availability
190	LVV-T202 - Verify implementation of Archive to Data Access Center Network Reliability	LVV-90 - DMS-REQ-0190-V-01: Archive to Data Access Center Network Reliability
191	LVV-T203 - Verify implementation of Archive to Data Access Center Network Secondary Link	LVV-91 - DMS-REQ-0191-V-01: Archive to Data Access Center Network Secondary Link
192	LVV-T204 - Verify implementation of Access to catalogs for external Level 3 processing	LVV-50 - DMS-REQ-0122-V-01: Access to catalogs for external Level 3 processing
193	LVV-T205 - Verify implementation of Access to input catalogs for DAC-based Level 3 processing	LVV-51 - DMS-REQ-0123-V-01: Access to input catalogs for DAC-based Level 3 processing
194	LVV-T206 - Verify implementation of Federation with external catalogs	LVV-52 - DMS-REQ-0124-V-01: Federation with external catalogs
195	LVV-T207 - Verify implementation of Access to images for external Level 3 processing	LVV-54 - DMS-REQ-0126-V-01: Access to images for external Level 3 processing
196	LVV-T208 - Verify implementation of Access to input images for DAC-based Level 3 processing	LVV-55 - DMS-REQ-0127-V-01: Access to input images for DAC-based Level 3 processing
197	LVV-T209 - Verify implementation of Data Access Centers	LVV-92 - DMS-REQ-0193-V-01: Data Access Centers
198	LVV-T210 - Verify implementation of Data Access Center Simultaneous Connections	LVV-93 - DMS-REQ-0194-V-01: Data Access Center Simultaneous Connections
199	LVV-T211 - Verify implementation of Data Access Center Geographical Distribution	LVV-94 - DMS-REQ-0196-V-01: Data Access Center Geographical Distribution
200	LVV-T212 - Verify implementation of No Limit on Data Access Centers	LVV-95 - DMS-REQ-0197-V-01: No Limit on Data Access Centers
201	LVV-T376 - Verify the Calculation of Ellipticity Correlations	LVV-3404 - DMS-REQ-0362-V-01: Median residual PSF ellipticity correlations on 5 arcmin scales
202	LVV-T377 - Verify Calculation of Photometric Performance Metrics	LVV-3401 - DMS-REQ-0359-V-01: RMS photometric repeatability in uzy
203	LVV-T378 - Verify Calculation of Astrometric Performance Metrics	LVV-3402 - DMS-REQ-0360-V-01: Median astrometric error on 20 arcmin scales

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	Test Cases	Verification Elements
204	LVV-T385 - Verify Retrieval of a CCD-sized image from a coadd	LVV-3394 - DMS-REQ-0377-V-01: Min number of simultaneous single-CCD coadd cutout image users

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