



LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST)  
Data Management

# LDM-503-8 Spectrograph Data Acquisition Test Plan and Report

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DMTR-121

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## Abstract

This is the test plan and report for LDM-503-8 (Spectrograph Data Acquisition), an LSST level 2 milestone pertaining to the Data Management Subsystem.

## Change Record

Version	Date	Description	Owner name
1.0	2019-02-18	Test Plan LVW-P32 approved	Michelle Butler
2.0	2019-12-24	Test campaign completed and reviewd in DM-17131	Michelle Butler

*Document curator:* Michelle Butler

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# LDM-503-8 Spectrograph Data Acquisition Test Plan and Report

## 1 Introduction

### 1.1 Objectives

To acquire data from the spectrograph instrument along with proper headers and transfer all data to NCSA for further viewing in LSP.

### 1.2 System Overview

The spectrograph instrument is the first device to have real data for viewing and evaluation. Early spectrograph data will undergo human inspection to determine whether it is suitable for further processing; if it is not, it will be deleted. Therefore the image data will be sent to NCSA for further viewing through the LSST Science Platform (LSP). If further processing is desired, the image will be ingested into the DBB along with its metadata/provenance for further processing. Version 1.0 of this test will have data written from the spectrograph directly to a local disk on the ATS storage server which is co-located and directly connected to the spectrograph instrument. Data will be copied from that local disk on the ATS storage server to NCSA and a ButlerG2 (or G3) ingest process completed so that the LSP can access the image data. This test was run with Butler/G2. Version 2.0 of this test, when the spectrograph is on the summit, will be that all data from the spectrograph will be written to the L1 handoff system, which will be at the BDC (base data center). The L1 handoff system will have the OODS(Observatory Operations Data Service) service and the DBB(Data BackBone) service in place. The DBB service will transfer the data to NCSA and be responsible for generating metadata/provenance data from image headers. The DBB will be responsible to ingest the image file into the correct ButlerG2 (or G3) repository, and DBB repository. The L1 handoff system through the OODS will enable quick access to images that were just created and keep 30 days worth of cached images for scientists to view as needed via the LSP instance on the summit.

## 1.3 Applicable Documents

LDM-294 Data Management Organization and Management

LDM-503 DM Test Plan

LDM-148 Data Management System Design

LSE-400 Header Service

## 1.4 Document Overview

This document was generated from Jira, obtaining the relevant information from the LVV-P32 Jira Test Plan and related Test Cycles ( LVV-C56 ).

Section 1 provides an overview of the test campaign, the system under test (Data Management), the applicable documentation, and explains how this document is organized. Section 2 describes the configuration used for this test. Section 3 describes the necessary roles and lists the individuals assigned to them. including all relevant information that fully describes the test campaign.

Section 4 provides a summary of the test results, including an overview in Table 2, an overall assessment statement and suggestions for possible improvements. Section 5 provides detailed results for each step in each test case.

The current status of test plan LVV-P32 in Jira is **Completed** .

## 1.5 References

[1] **[LSE-400]**, Lim, K.T., 2019, *Header Service Interface*, LSE-400, URL <https://lse-400.lsst.io>

[2] **[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>

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

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

## 2 Test Configuration

### 2.1 Data Collection

Observing is not required for this test campaign.

### 2.2 Verification Environment

Verification environment will be the ATS storage server attached to the spectrograph. The OS is Centos 6.\* running latest security patches. A Cron script is used to move to images on ATS storage server to NCSA. IP tables and port verifications are used for data transfer to NCSA. The receiving end at NCSA file systems is a file system available with the DTN protocol configured and set up. NCSA verification scripts including ButlerG\* ingests are run.

### 2.3 Entry Criteria

Image data taken by the spectrograph.

### 2.4 Exit Criteria

Image data from spectrograph viewable by LSP at NCSA.

### 3 Personnel

The personnel involved in the test campaign are shown in the following table.

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Test Plan (LVV-P32) owner:		<b>Michelle Butler</b>	
LVV-C56 owner:		<b>Michelle Gower</b>	
<b>Test Case</b>	<b>Assigned to</b>	<b>Executed by</b>	<b>Additional Test Personnel</b>
LVV-T454	Michelle Butler	Michelle Butler	Michelle Gower, Htut-Khine, SRP

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## 4 Test Campaign Overview

### 4.1 Summary

Test Plan <b>LVV-P32: LDM-503-8 Spectrograph Data Acquisition</b>			Completed
Test Cycle <b>LVV-C56: LDM-503-8 Enable spectrograph data viewable by LSP.</b>			Done
test case	status	comment	issues
LVV-T454	Pass	executed with no problems.	

Table 2: Test Campaign Summary

### 4.2 Overall Assessment

The test worked well, and data has been flowing from the AT-archiver in Tucson to the LDF ever since. There have been some hiccups in the ingestion process due to the stack changing, but have been fixed with releases of the stack in following weeks. This is how data is brought to NCSA from the test stand in Tucson on a daily basis. The specific time it was run for this test was 8/20 and the stack version is w\_2019\_33. All the files from the Tucson test stand are ingested and placed in this path: /lstdata/offline/teststand/auxTel/L1Archiver/storage/ The data flow right now is done by Rsync, but will be switched out to something that will immediately transmit a file without cron when the image file is created, but that won't be until Feb 2020. All the files have all been re-ingested this week with stack W\_2019\_50: creating new sqllite repos for all images. (12/17/2019)

### 4.3 Recommended Improvements

There is no need for the image to be examined before it's ingested into the LDF. There are too many images at this time to evaluate them at that rate, and many want to see the image quickly. Having the image examined by the science staff before it's ingested could be a long delay. It would be better that the science staff examine the images after they have been ingested and on the LDF.



## 5 Detailed Test Results

### 5.1 Test Cycle LVV-C56

Open test cycle *LDM-503-8 Enable spectrograph data viewable by LSP.* in Jira.

LDM-503-8 Enable spectrograph data viewable by LSP.

Status: Done

Image data needs to be created and available for transfer to NCSA. The data will be transferred to NCSA and made available to scientists for viewing and verification.

#### 5.1.1 Software Version/Baseline

The transfer of the file does not use versions, but the ingest of the files into Butler/G2 requires the weekly stack and the LSSTobj environment. All files from the Tucson test stand are transferred to NCSA in this fashion and then ingested. Files are ingested with the “current” weekly when the file is transferred at the time. For example image file: AT\_O\_20190820\_000001-ats-wfs\_ccd.fits was ingested with W\_2019\_33, and can be found in the file system on the LSP: /lsstdata/offline/teststand/auxTel/L1Archiver/gen2repo/raw/2019-08-20/2019082000001-det000.fits. As an update to this test; All files as of (12/17/2019) have been reingested with w\_2019\_50. This fixed some problems with some of the DB fields in the sqlite repos.

#### 5.1.2 Configuration

ATS system connected to spectrograph DAQ is required to have well formed image data. Well formed means “good” image and correct headers (LSE-400).

#### 5.1.3 Test Cases in LVV-C56 Test Cycle

##### 5.1.3.1 Test Case LVV-T454 - LDM-503-8 Enable LSP viewing of spectrograph data.

Open *LW-T454* test case in Jira.

- Acquire spectrograph image data, transfer that data to NCSA, ingest data into a Butler (G2 or G3 when available), and enable viewing of data on LSP.

**Preconditions:**

Data must be well formed on Spectrograph data archiving system (ATS). Well-formed means “good image” and correct headers. (LSE-400)

Execution status: **Pass**

Final comment:

executed with no problems.

Detailed steps results:

Step	Step Details
1	<p>Description</p> <p>Have data on the ATS archiver system from the spectrograph.</p> <p>-----</p> <p>Expected Result</p> <p>Well formed files on the ATS system that need to be transferred to NCSA for further analysis</p> <p>-----</p> <p>Actual Result</p> <p>-----</p> <p>Status: <b>Pass</b></p>
2	<p>Description</p> <p>A first few iterations is the human runs script to transfer data to NCSA through secure pipeline. after the process is unchanging/solid, a cronjob starts up data “sync” process.</p> <p>-----</p> <p>Expected Result</p> <p>Data is transferred to NCSA, and is located in NCSA file systems.</p> <p>-----</p> <p>Actual Result</p> <p>-----</p> <p>Status: <b>Pass</b></p>

---

### 3 Description

All files transferred have a ButlerG2 (or G3 when ready) ingest process.

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#### Expected Result

files now can be accessed by Butler access methods

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#### Actual Result

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Status: **Pass**

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### 4 Description

LSP processes can now view spectrograph generate files

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#### Expected Result

LSP jupyter notebooks can view spectrograph files.

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#### Actual Result

from the terminal window on the LSP:

```
$ ls
```

```
AT_O_20190820_000001-ats-wfs_ccd.fits
```

```
AT_O_20190820_000005-ats-wfs_ccd.fits
```

```
AT_O_20190820_000009-ats-wfs_ccd.fits
```

```
AT_O_20190820_000002-ats-wfs_ccd.fits
```

```
AT_O_20190820_000006-ats-wfs_ccd.fits
```

```
AT_O_20190820_000010-ats-wfs_ccd.fits
```

```
AT_O_20190820_000003-ats-wfs_ccd.fits
```

```
AT_O_20190820_000007-ats-wfs_ccd.fits
```

```
AT_O_20190820_000011-ats-wfs_ccd.fits
```

```
AT_O_20190820_000004-ats-wfs_ccd.fits
```

```
AT_O_20190820_000008-ats-wfs_ccd.fits
```

```
AT_O_20190820_000012-ats-wfs_ccd.fits
```

```
[mbutler@lsst-dev01 2019-08-20]$ pwd
```

```
/lsstdata/offline/teststand/auxTel/L1Archiver/storage/2019-08-20
```

This is just the listing of the files transferred and can be used as a user wishes.

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Status: **Pass**

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## A Acronyms used in this document

<b>Acronym</b>	<b>Description</b>
ATS	Auxiliary Telescope Spectrograph (obsolete) now LATISS
BDC	Base Data Center
DAQ	Data Acquisition System
DB	DataBase
DBB	Data Back Bone
DM	Data Management
DMS	Data Management Subsystem
DMS-REQ	Data Management System Requirements prefix
DMTR	DM Test Report
DTN	Data Transfer Node
LDF	LSST Data Facility
LDM	LSST Data Management (Document Handle)
LSE	LSST Systems Engineering (Document Handle)
LSP	LSST Science Platform
LSST	Large Synoptic Survey Telescope
LVV	LSST Verification and Validation (Jira project)
NCSA	National Center for Supercomputing Applications
OODS	Observatory Operations Data Service
OS	Operating System

## B Traceability

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<b>Test Case</b>	<b>VE Key</b>	<b>VE Summary</b>
LWV-T454	LWV-140	DMS-REQ-0309-V-01: Raw Data Archiving Reliability

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