Integration, Test and Commissioning Results from LSST Commissioning Camera

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ABSTRACT

The Vera C. Rubin Observatory construction project involves assembly, integration, and verification testing phases. Prior to the installation of the 3.2 Gpix LSSTCam, the Rubin Observatory Commissioning Camera (ComCam) will test the functionality and performance of the telescope, facility, and various software and DM/IT infrastructural components, although at a smaller scale than the final LSSTCam configuration which immediately follows this inital 3 month on-sky campaign. During this time, the ComCam observations will verify most of the camera interfaces as well as demonstrate the performance of the Simonyi Telescope Active Optics System.

1. INTRODUCTION

Provide background of LSST, science cases, and provide context for Comcam (system verification, performance characterization, and ICD verification.

2. MECHANICS

Overall layout with solid model (or actual photographs) figures showing the components.

2.1. *cryostat*

The Emony BNL cryostat

2.2. *utility trunk*

The quadbox design

2.3. *sled*

mounting platform for cryostat

2.4. *mass simulator*

physical surrogate for LSSTCam

3. CAMERA, ELECTRONICS

Details on the camera components

3.1. *CCDs*

The sensors

3.2. *Readout Electronics*

The REBs

3.3. *DAQ/CCS*

The data acquisition and camera control systems.

3.4. *cryotels/thermal*

Cryotels, thermal design description

4. OPTICS

description of the T&S components

4.1. *field flattener*

3 lens design

4.2. *filters*

LSSTCam witness samples

4.3. *shutter*

photometric shutter

4.4. *baffle*

light rejecting design

5. REFRIGERATION PATHFINDER

General overview of the refrigeration system

6. INTERNAL PERFORMANCE

overall camera performance (EO testing and internal mechanical tolerance)

6.1. *camera*

shutter, filters, readout time

6.2. *CCDs*

badpix, gain, read noise, CTE

6.3. *optical alignment*

tolerance budget, best measurements, AR coating decision

6.4. *mechanical alignment*

rotator-optics alignment, flexure

7. ON SKY PERFORMANCE

Description of activities while ComCam is installed on the telescope.

7.1. *laser tracker alignment*

positioning precision of the optics, measured flexture.

7.2. *in-dome calibration*

flat field, CBP data.

7.3. *photometric quality*

star photometry in selected fields

7.4. *image quality*

psf image quality in selected fields

8. CONCLUSIONS

take away for an astronomical camera, and evaluating a 8.4m survey telescope

APPENDIX

A. REFERENCES

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B. ACRONYMS

Acronym	Description
BNL	Brookhaven National Laboratory
CBP	Collimated Beam Projector
CCS	Camera Control System
ComCam	The commissioning camera is a single-raft, 9-CCD camera that will be installed in LSST during commissioning, before the final camera is ready.
DAQ	Data Acquisition System
DM	Data Management
ICD	Interface Control Document
IT	Information Technology
LSST	Legacy Survey of Space and Time (formerly Large Synoptic Survey Telescope)
T&S	Telescope and Site