



Contribution ID: 510

Type: Oral presentation

The Large Synoptic Survey Telescope Data Acquisition System

Tuesday 12 June 2018 16:10 (20 minutes)

The Large Synoptic Survey Telescope Camera (LSSTCam) will be the largest digital camera ever constructed for astronomy. Containing 189 16-megapixel science sensors, it will produce volumes and rates of data more commonly found in large particle physics detectors than astronomical instruments. However, there are features that make the design of the LSSTCam DAQ uniquely challenging.

The 142 high-speed serial links must penetrate a cryostat in limited space. Client machines will connect to an Ethernet, extended with a Dense Wavelength Division Multiplexing (DWDM) 100 km. The image data must be buffered for multiple days within the DAQ system allowing operations to proceed in the absence of a connection to the base facility. Each of the 3.2-gigapixels will be read out with 18-bit accuracy. When observing, an image will be acquired every 15 seconds. The image will be transferred in no more than 2 seconds. This results in a peak data rate of 3.6 gigabytes/second. The core portion of the DAQ hardware is a 14-slot ATCA shelf containing 112 processing nodes, 288 channels of 3.125 Gbps serial links, 240 solid state drives, and 112 external 10G Ethernet connections for client machines. Prototypes of all hardware have been built and are in use by LSSTCam subsystems for development. Construction of the production system is ongoing.

Minioral

Yes

Description

General DAQ

Speaker

John Gregg Thayer

Institute

SLAC

Country

USA

Author: THAYER, John Gregg (SLAC National Accelerator Laboratory (US))

Co-author: HUFFER, Michael

Presenter: THAYER, John Gregg (SLAC National Accelerator Laboratory (US))

Session Classification: Emerging Technologies