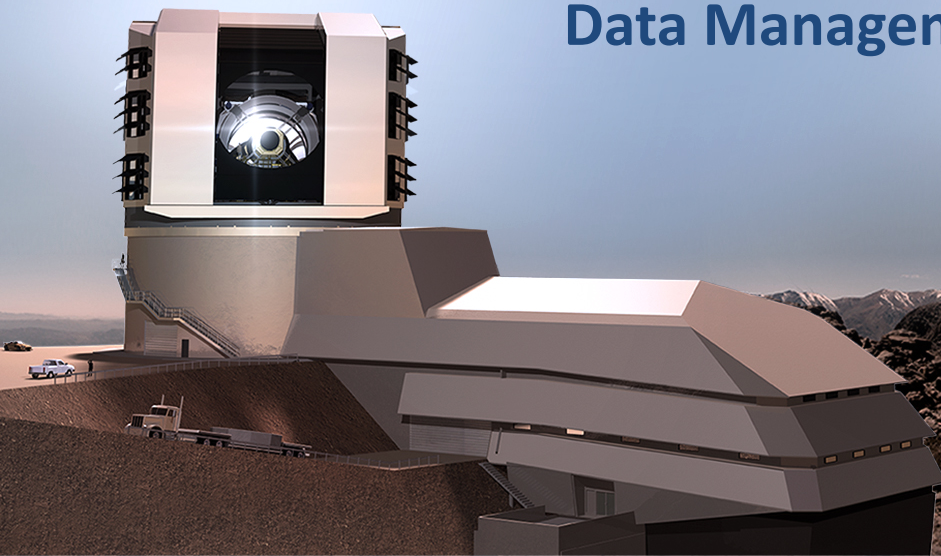


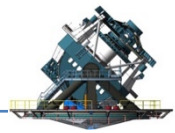


# LSST Networks and Base Center

Jeffrey Kantor  
Sr. Manager

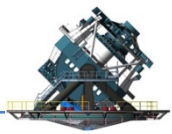
Data Management Leadership Team Meeting  
June 4 - 6, 2019



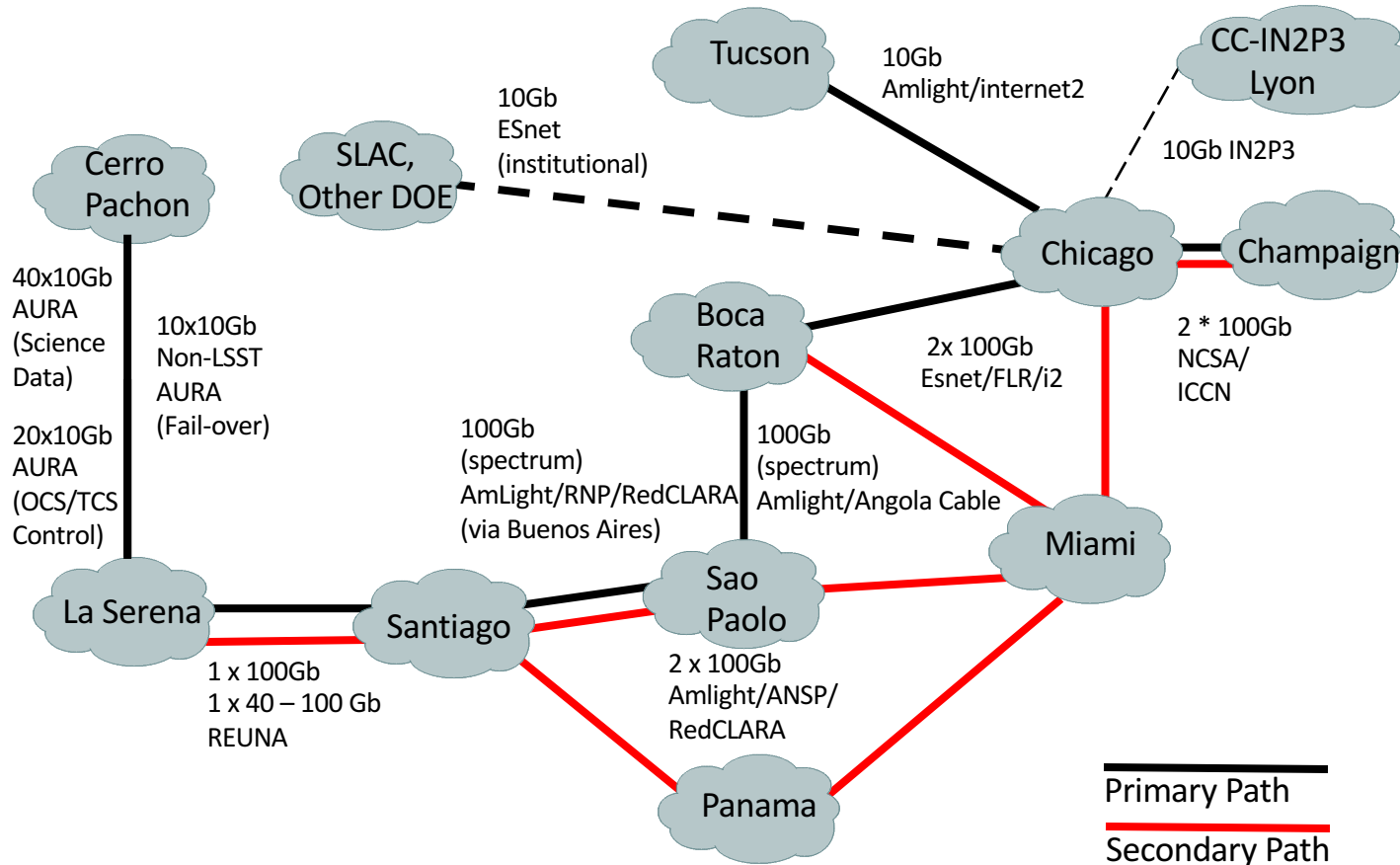


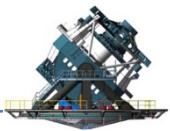
# Networks and Path Diversity between Sites and Centers





# LSST Long Haul Network Links (Baseline FY21)





# ESNet for LSST

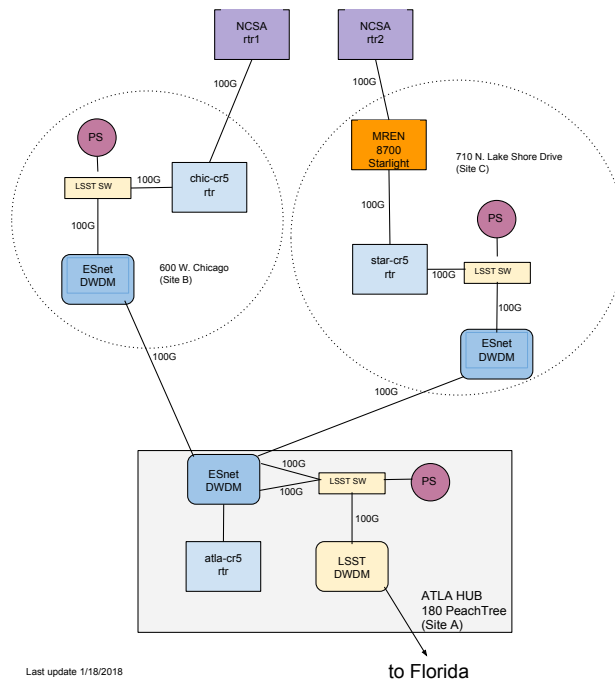


ESnet6 Optical Footprint: Add/Drops  
Wave options Atla-Chic



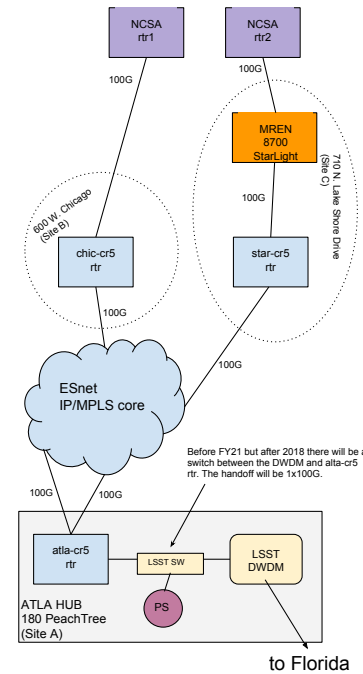
Ciena\_Map v12  
p1d 9/30/2016

## FY20 (2 x 20 Gbps)



Last update 1/18/2018

## FY21+ (2 x 100 Gbps)





# End-to-End Network Bandwidth Evolution



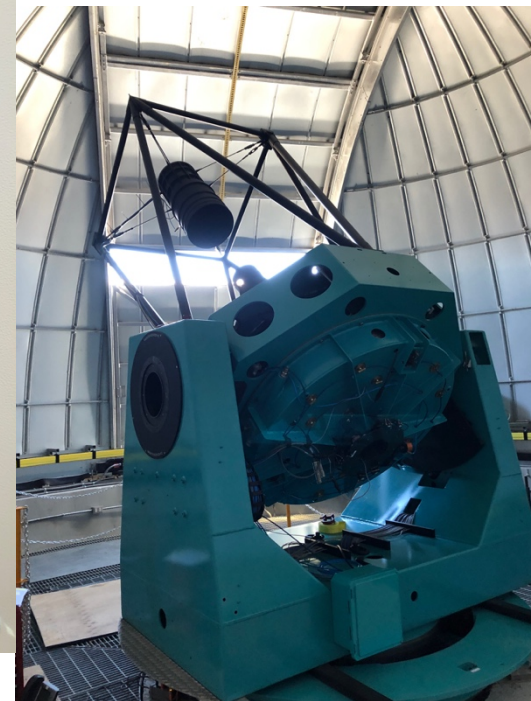
<b>BASELINE FINISH</b>	<b>PROJECTED FINISH</b>	<b>END-TO-END B/W, Cerro Pachon - La Serena</b>	<b>END-TO-END B/W, La Serena - NCSA</b>	<b>Bandwidth Achieved through Demonstration</b>
6/11/15	6/11/15	0.5 Gbps	Max: 1G Best Effort	0.5 Gbps (operational)
3/27/18	6/30/18	2 x 100 (shared AURA DWDM)	Max: 20G Best Effort	46Gbps (LSST First Light demo)
11/30/18, 7/3/19	7/3/19	6 x 100 (dedicated LSST DWDM) + 2 x 100 (shared AURA DWDM)	Max: 20G Best Effort	80Gbps (LSST SC18 demo)
7/3/19	1/1/20	6 x 100 (dedicated LSST DWDM) + 2 x 100 (shared AURA DWDM)	Max: 40G Best Effort	0
7/6/20	7/6/20	6 x 100 (dedicated LSST DWDM) + 2 x 100 (shared AURA DWDM)	Max: 140G Best Effort	0
7/2/21	7/2/21	6 x 100 (dedicated LSST DWDM) + 2 x 100 (shared AURA DWDM)	Max Dedicated: 200G dedicated up to NCSA. 300G at NCSA. Burst: 100G	0

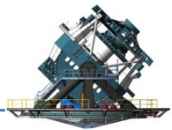
Note: LSST internet, web, voice, video go over AURA circuits, which are shared, and are currently limited by 1G Firewalls in LS and 10 Gbps internet2 links in the US. This will be improved by the end of FY19 by the move to 10 G firewalls in LS.





# Calibration Hill

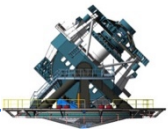




# Base Data Center



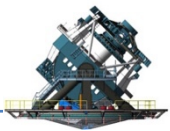




# Summit – Base Fiber Post Improvements





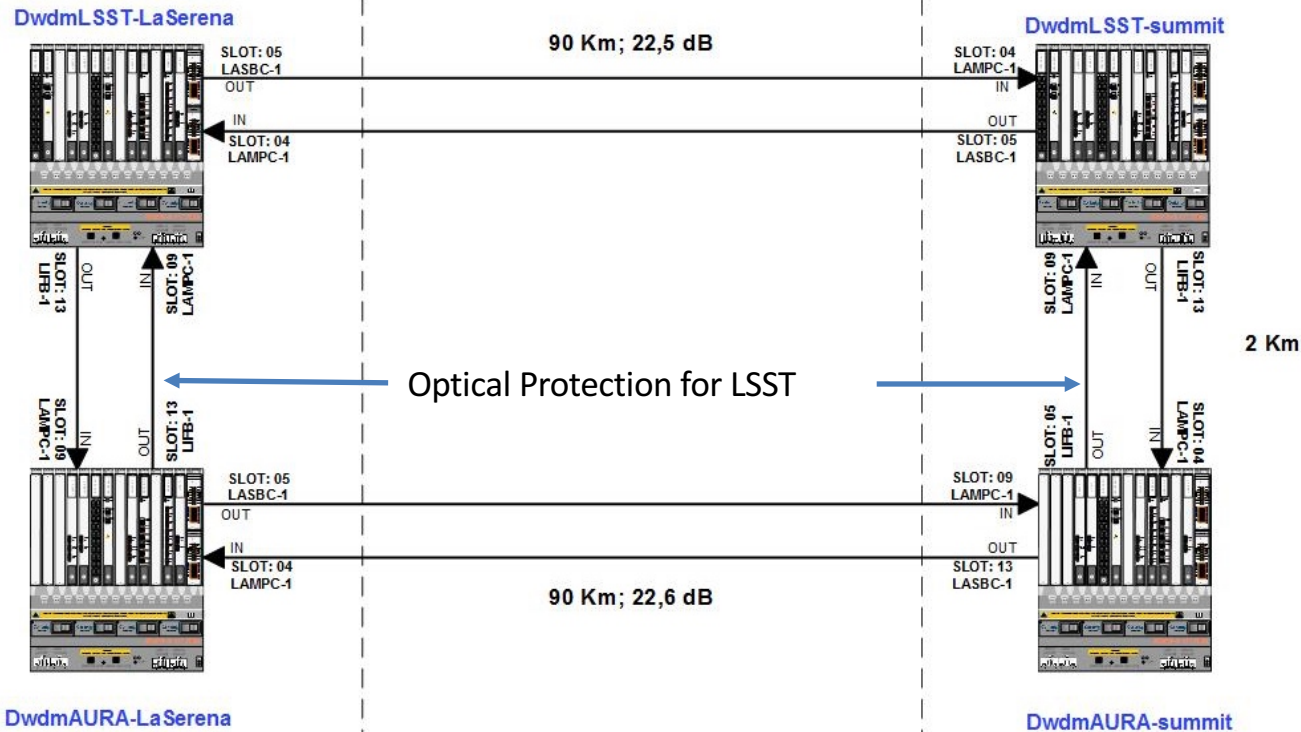


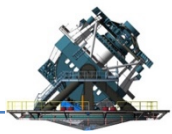
# AURA/LSST DWDM



BDC

SUMMIT



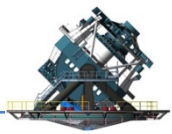


# Recent Accomplishments



- Installed 2 rows of racks, fibers, PDUs, outlets in Base Data Center (enough for FY19)
- Started installing cabling in BDC offices and Base Office Building first floor
- Rerouted fibers on recinto to support move out of existing computer room to BDC
- Installed and tested LSST DWDM system from the Summit to Base
- Moved AURA and Reuna DWDM racks from the existing computer room to the BDC
- Installed switches for AuxTel, DIMMs, All Sky Camera
- Configured and tested Call Manager for new VOIP system
- Supported successful test controlling AuxTel Dome and Pointing
- Procured transceivers and modules to modify the LSST 10x10G to 100G link between La Serena and Santiago
- Moved all CP and CT tenants onto new backup microwave system (Ubiquiti and Cambium)
- Completed repairs on Summit – Base Fiber posts
- Finalized procurement terms for ESnet service
  - AURA and DOE contracts working on executing formal contract
  - Atlanta – Chicago
  - FY20 2 x 20 Gbps, FY21 2 x 100 Gbps

NOTE: Several items were accomplished with assistance from CISS

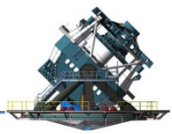


## Work in Progress



- Continuing to install networks in areas of summit
  - Dependent on electrical team to run conduits, trays
  - Access is limited by TS AIV milestones (e.g. first and third floors, dome/pier)
- Continuing support of AuxTel team, DIMM testing
- Continuing to install cabling in Base Office Building
- Continuing to install a new in-house microwave backup system which will provide 400Mb bandwidth for all tenants
- Preparing for lots of server install on summit and base this summer
- See DM monthly reports for more details on all the work going on



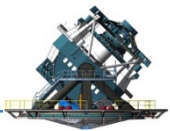


## FY19 Remaining Major Activities



- Complete Summit Network cabling, access switches, Wi-Fi, VOIP (all FY)
- Summit server installations (NFS, IDM/AA, Bro, EAS/ECS, M2, ...) (all FY)
- Support DIMM testing (June - July)
- Activation of Spectrum Link (June)
- Move servers from existing computer room to BDC (June - July)
- Cable Base offices, rooms, install access switches, Wi-Fi, VOIP (June - August)
- Base DM Server installations (July - September)
- Implementation of FY20 2 x 20 Gbps ESNet (September)

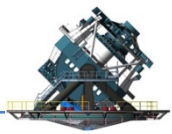
Details in [JIRA IT Project](#)



# Network Delayed Milestones



- **DMTC-8100-2530 Data Passing Test Report — Complete**
  - Due 2018-10-25
  - Work continues, with completion expected in May 2019. Ciena DWDM equipment is installed. Critical path not impacted.
- **DLP-464 Networking for normal Base Center operations for ComCam scale**
  - Due 2018-11-30
  - Pending the full occupancy of, and stable power and cooling in the Base Data Center (a Telescope & Site team deliverable). Currently projected date is end of May, 2019. Critical path not impacted.
- **IT-718-M Base Center Full Occupancy**
  - Due 2019-02-12
  - Pending the full occupancy of in the Base Data Center (a Telescope & Site team deliverable). Currently projected date is end of May, 2019.
- **DMTC-8000-0870 Report on functional fiber, including uptime, 1st year functional milestone**
  - Due 2019-03-22
  - Completed move of REUNA DWDM into new Base Data Center and retesting of links, expected completion of milestone after continued usage, expected June, 2019. Critical path not impacted.

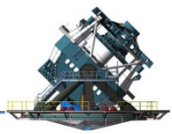


## Open Discussion on Deliveries and Visits to Chile



- What I have heard about follows...
- What don't I know?
- <https://confluence.lsstcorp.org/display/SYSENG/Summit+-+Base+IT-related+Deliveries+and+Visits>





- Andres Villalobos departed May 31, opened replacement requisition
- Luis Corral relocating to Santiago June 8, continues full-time with LSST, remote work arrangement, 1 week in LS out of 6
- Julio Constanzo on paternity leave in August, Ron Lambert and CISS will be there to cover this during most of August, including LSST 2019 meeting week
- Hiring plans
  - IT System Engineer/Admin (Andres Villalobos replacement)
  - IT Network Engineer
  - IT User Support/Help Desk Engineer
  - IT Team Leader in La Serena