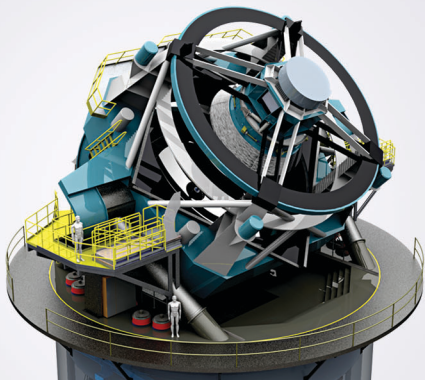
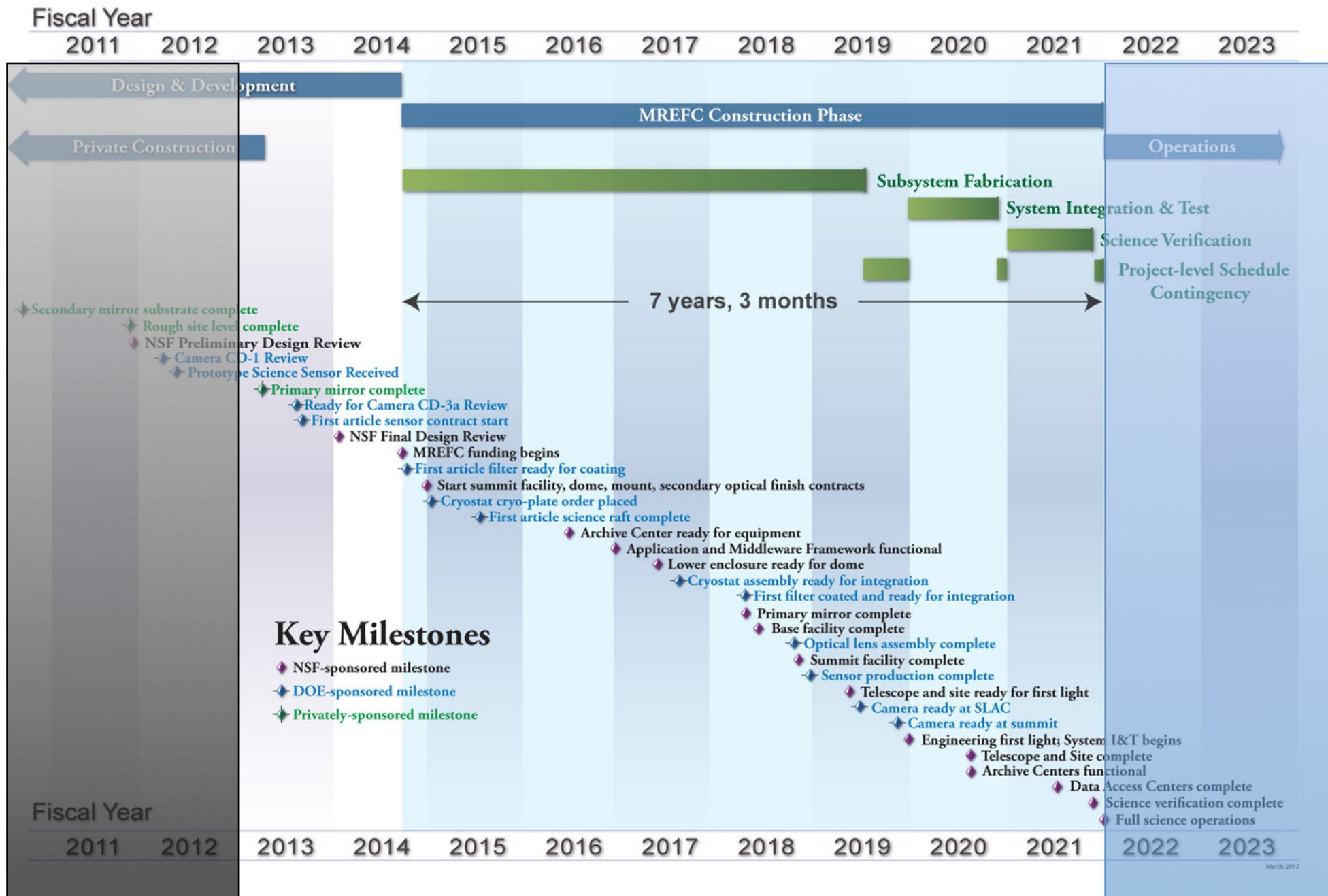




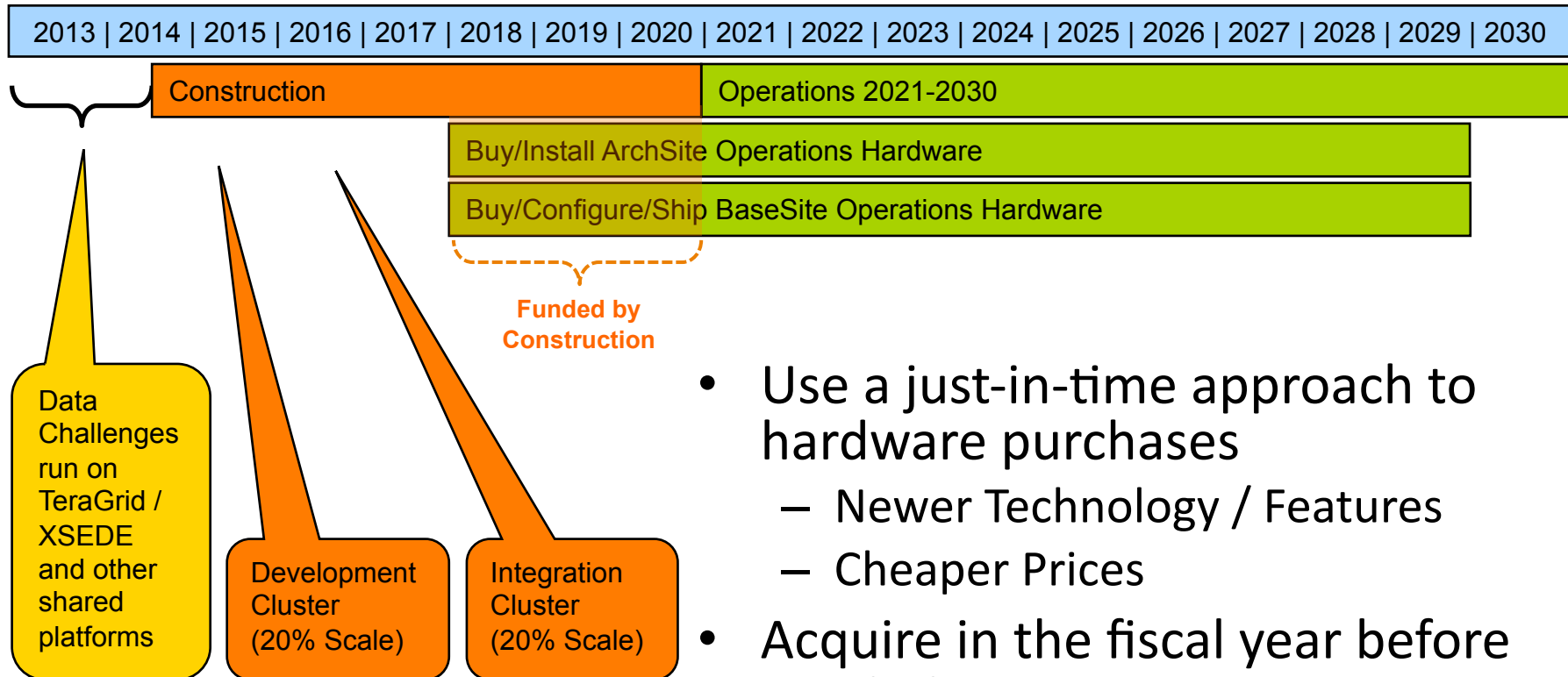
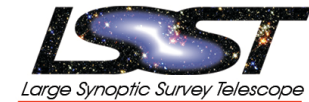
# Large Synoptic Survey Telescope Networks Update

Jeff Kantor  
LSST DM Project Manager





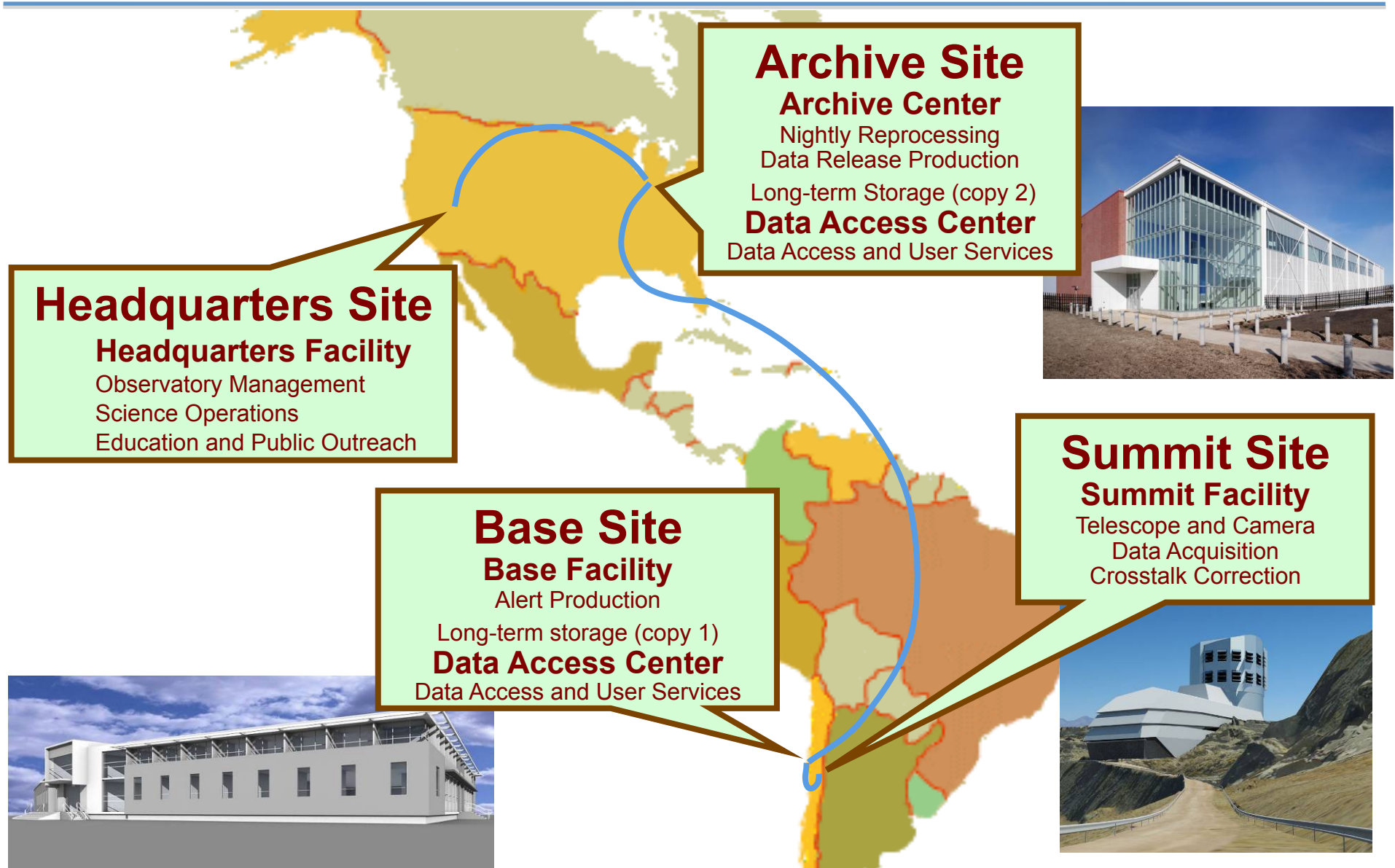
# DM Infrastructure Acquisition Timeline



- Use a just-in-time approach to hardware purchases
  - Newer Technology / Features
  - Cheaper Prices
- Acquire in the fiscal year before needed
- The full Survey Year 1 capacity is also required for the two years of Commissioning

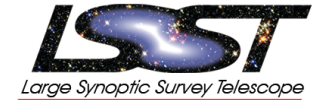
# Data Management Sites and Centers

Large Synoptic Survey Telescope



# Summary of data volumes

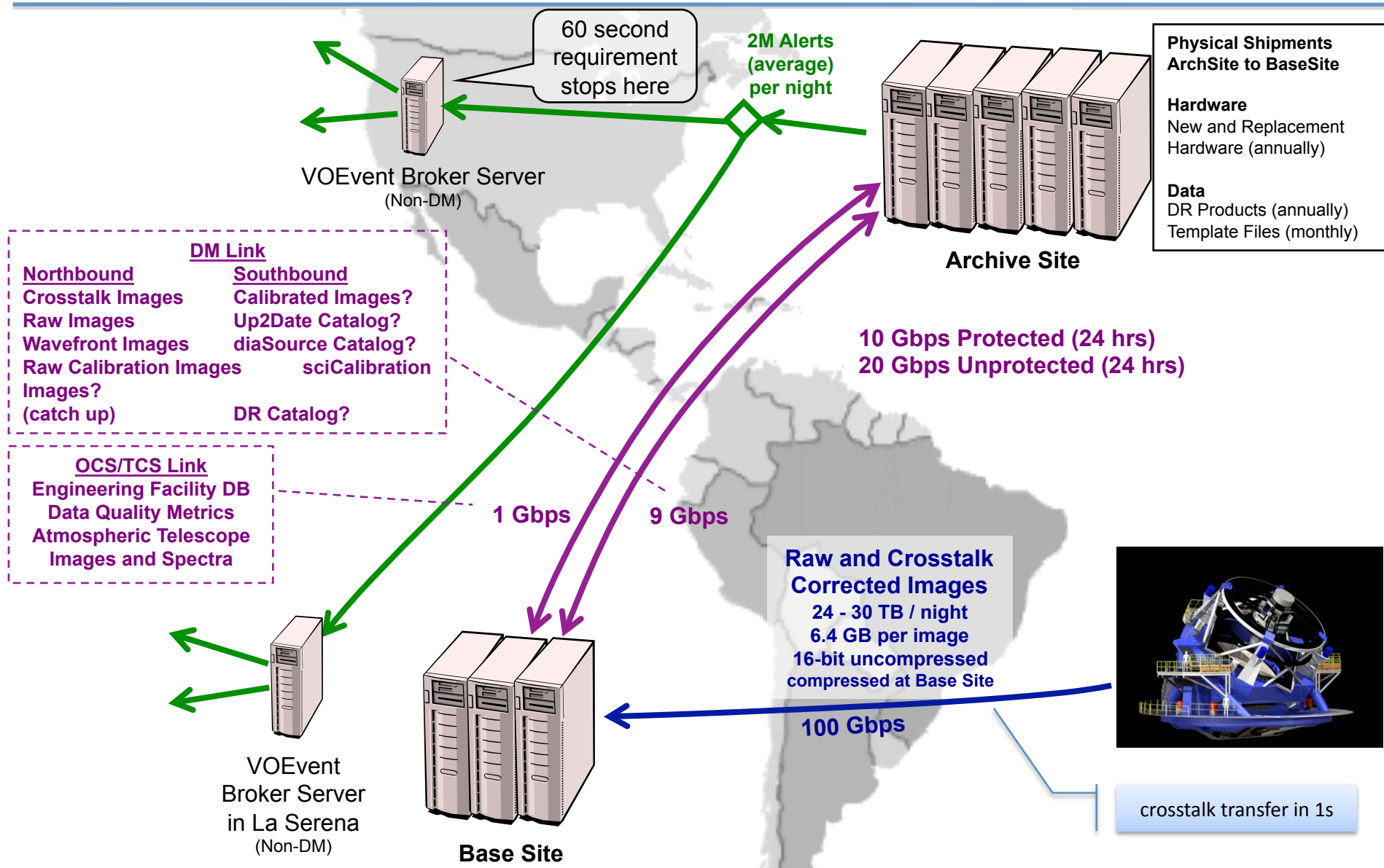
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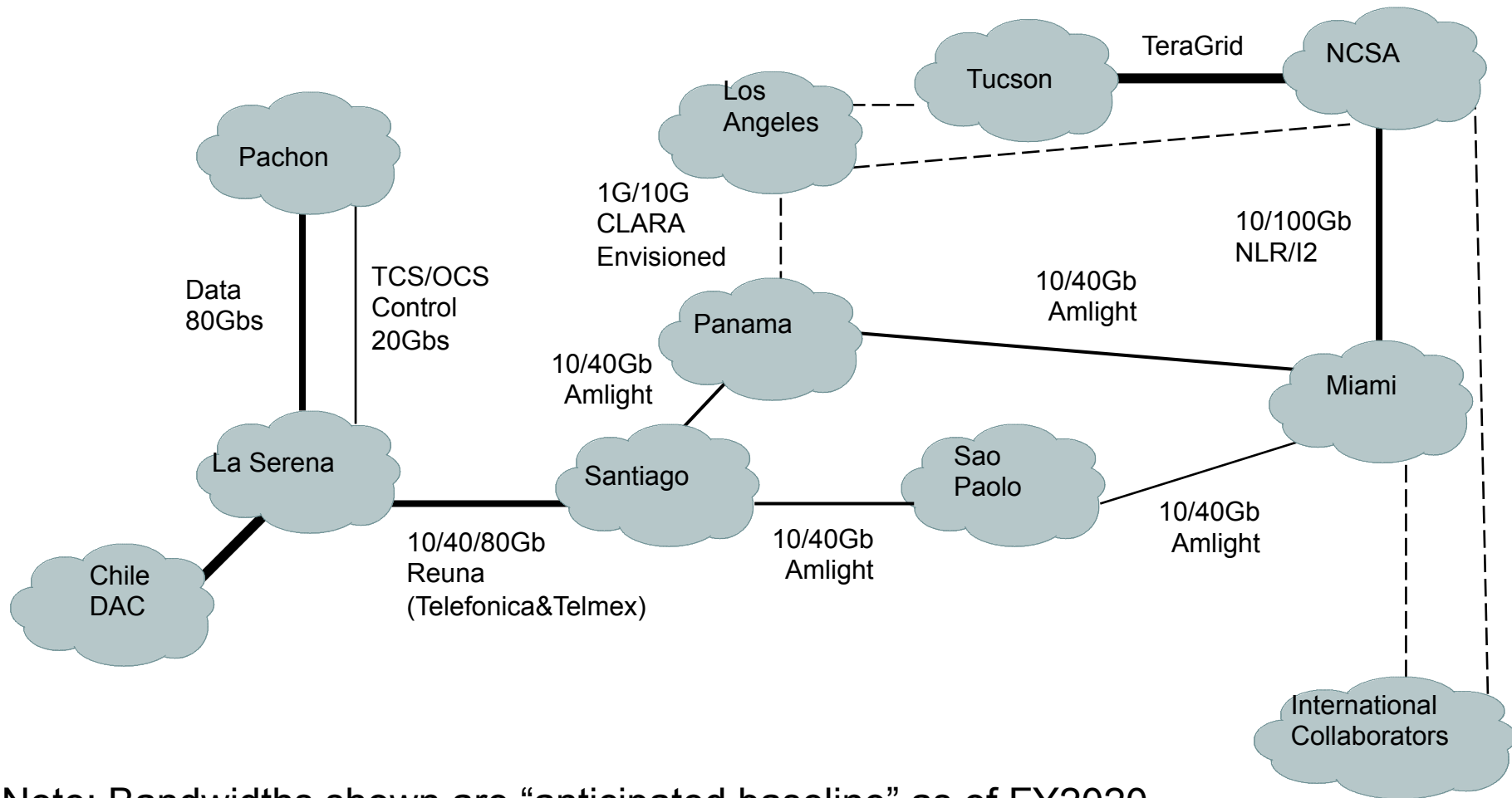
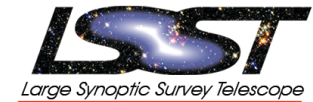
## Science data (nighttime)

- Single-night burst capacity: 2800 exposures
- Extended-period peak volume: 1960 exposures/night
  - For the few weeks around the winter solstice (longest observing nights)
- Annual capacity: 600,000 exposures
  
- Daytime / calibration transfer requirements:
- Single-day capacity: 250 exposures
- Annual capacity: 150,000 exposures
  - This does *\*not\** add with the 600k above; it includes calibrating during cloudy & down days
  
- 24-hour cycle data volume (worst case):
  - 2800 + 250 exposures \* (science + wavefront data)
  - Flattened out over 24 hours, this is 230 MB/s (compare to 360 MB/s above)
  - The 3.2 GB/s two-second peaks for crosstalk-corrected data for alert production are superposed on this “baseband” traffic

# International Data Flows

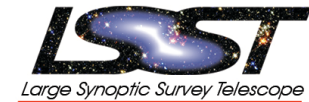


# LSST International Links



Note: Bandwidths shown are “anticipated baseline” as of FY2020

# Network/Bandwidth Deployment

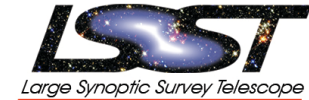


	R&D		Construction						Commissioning		Operations
FISCAL YEAR	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 - 2031
Mountain to Base B/W	0	0		1	1.5	2	100	100	100	100	100
Base to Santiago B/W	0.65	1	1	1	1.5	2	2.5	3	10 - 40	10 - 40	10-40-80
Santiago - MIA B/W	0.65	1	1	1	1.5	2	2.5	3	10 - 40	10 - 40	10-40-80
MIA - NCSA B/W	0.65	1	1	1	1.5	2	2.5	3	10 - 40	10 - 40	10-40-80
NCSA - Tucson B/W	0.65	1	1	1	1.5	2	2.5	2.5	3	3	3
Miami - Tucson B/W	0.65	1	1	1	1.5	2	2.5	2.5	3	3	3
NCSA -Lyon B/W	0	0	10	10	10	10	10	10	100	100	100

- Presumes July 2014 construction start
- Anticipates continued investments by IRNC, South American RENS
- R&D bandwidths are shared with other programs (e.g. DES)



# Long Haul Networks Review



- Just completed external review with network experts
- Presentations and documents posted on LSST web site
  - <https://lsstweb.lsstcorp.org/dm/lhnr>

LSST Corporation  
**Long Haul Network Review**  
February 27 & 28, 2013

Home | Charge to Review Panel | Documents Under Review | Reference Documents | Review Panel | Panel Report and Project Response

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**Navigation**

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**Agenda**

LSST CORPORATION, STEWARD OBSERVATORY ROOM N505A

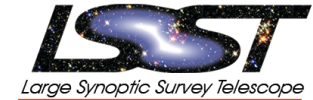
DIAL-IN NUMBER 866-330-1200 / Participant Code: 3964634#  
GOTOMEETING Meeting ID: TBA

All Times Mountain

Wednesday February 27, 2013		
TIME	EVENT	SPEAKER
8:00 AM	Continental Breakfast for All	
9:00 AM	Review Charge and Introductions	Jeff Kantor
9:30 AM	LSST Requirements Driving Network Design	Gregory Dubois-Felsmann
10:00 AM	Break	
10:15 AM	LSST Infrastructure Design Overview - Data Flow	Mike Freemon
11:00 AM	LSST Infrastructure Design Overview continued	Ron Lambert
Noon	Lunch	
1:00 PM	Review Panel Question Preparation	Review Panel
2:00 PM	Free-form Question & Answer Session	Review Panel
4:00 PM	Comments Preparation & Assembly	Review Panel
6:00 PM	Dinner (optional) for All	
Thursday February 28, 2013		
Time	Event	Speaker
8:00 AM	Continental Breakfast for Review Panel	
9:00 AM	Comments Preparation & Assembly	Review Panel
11:00 AM	Debrief	Review Panel
Noon	Adjourn	

# Action Items for Final Design Review

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- Summit – Base Link
  - Revisit trade-off fiber on poles, underground, or both
  - Consider separate wavelength transceivers vs DWDM, or one then the other
  - MTTR, MTBF and Buffer sizing
- Base – Archive Link
  - Path diversity, especially “Pacific side”
  - Fail-over managed by LSST vs. carrier-protected circuits
  - MTTR, MTBF and Buffer sizing
- Utilization and efficiency analysis
  - Validate efficiency % via simulations, test beds
  - Traffic isolation via virtual circuits, OSCARS
- Network Operations Plan
  - Dedicated LSST Network Engineering team in addition to NOCs
  - Diagnostics and monitoring via perfSonar