Successes and Lessons Learned During Development of NOAA's Next Generation GOES-R Ground System

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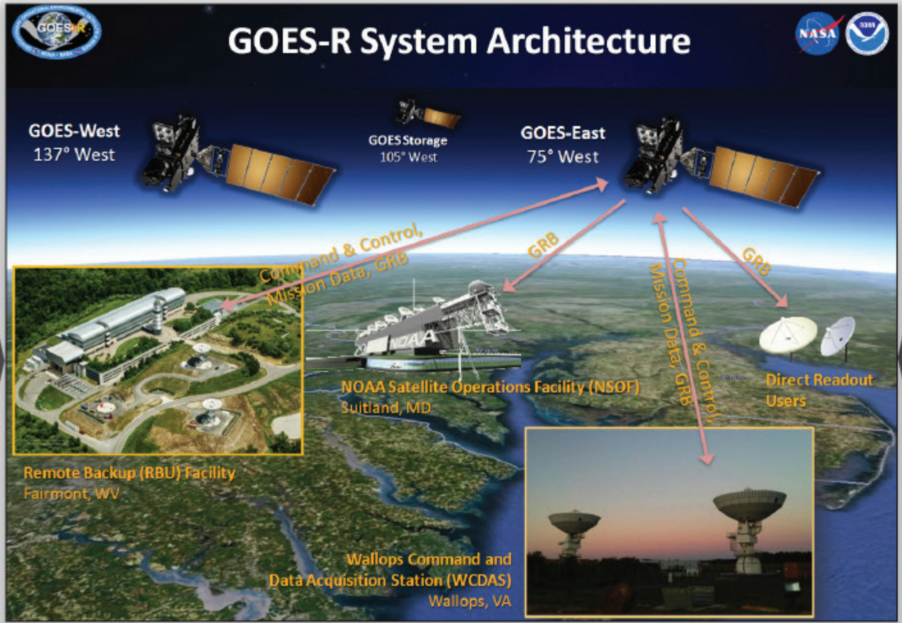
HARRIS

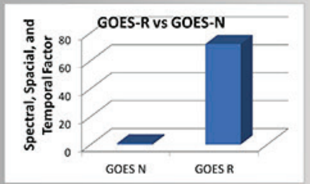
- **Emphasis on Mission Partnership and Collaboration**
- **Actively Resolve I/F Issues with AWG and Flight Partners**
- **Early AWIPS and PDA Product Interface Testing**
- **Focus to Meet Mission Readiness Activities**

- 3 sites, no single point of failure, high availability
- Security – high impact (NIST SP 800-53, 800-82)
- 6 16.4-meter X, L, S tri-band antennas
- 4 9.1-meter L-band receipt antennas
- 5 GRB simulators, 8 raw data recorders
- 147 integrated OTS products
- 5.2M LOC (835k custom, 270k script, 4M test)
- 259 racks, 90 miles of rack interconnection cables
- 392 workstations, 5.8 PB of storage
- High throughput product precedent processing with 215 single precision TFLOPS (110 double precision)

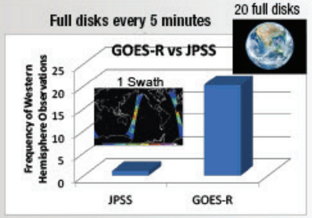
An easily scalable and extensible Enterprise Ground System



60x more data for the user



Full disks every 5 minutes



- GOES-R processes >10x more data and provides this data 6x more often than current system.
- Users will receive more than 60x data than from current system

- GOES-R processes the entire Western Hemisphere 20x in the time JPSS observes 1 swath around the world

Receives critical solar flux data in 1.8 seconds from GOES-R to protect critical infrastructure

Receives continuous pipeline of KPP sectorized image tiles as instrument data is processed by the GOES-R Ground Segment

Meeting NESDIS's goal of timely delivery of environmental data to protect our nation's economy, security, and quality of life

Requirements

- > 30,000 requirements results in significant verification overhead, but ensured thorough engineering and testing
- Online modeling tool that is shared by all team members is key to building an integrated UML Model
- Modeling increases design quality and reduces interface issues
- Do not derive low-level requirements for OTS – it is better to have early OTS prototyping

Development

- WBS and org structure leaned toward 4 separate/stove-piped efforts – functional organization would have been more optimal
- Flexibility key – changed from Water Fall to Capability Based Builds to accommodate the complex interchange between flight and ground development
- Froze PG GFP baseline at the right time to ensure mission success
- Do not underestimate OTS integration effort
- Apply appropriate level of lab resource management to effectively balance prototype efforts, development, and CM control

Integration/Test

- Factory testing from unit to CSCI to element to segment level was critical prior to site delivery
- Site DITL testing was highly successful
- Incremental release I&T and deployment allowed 3 site infrastructure deploy/test ahead of mission management and product capability
- Dedicated and talented staff were essential to working tough schedules
- Need to proactively establish plans to develop system knowledge for I&T staff

Delivery

- Flexibility is key – changed from big bang releases to incremental releases
- Small MM release to support MOST efforts, but no small PC release to support DOST efforts
- Need to proactively establish plans to develop system knowledge for site maintenance staff

Validation

- Retained SMEs to support Government validation efforts
- Utilized exercises to train ops and sustainment staff (e.g., fault insertion)
- Utilized exercises to redline SOPS
- Seamlessly executed Ground Readiness Team (GRT) deployment process for updating builds/patches
- Developed Factory Testbed that mimics site configuration to improve anomaly resolution and patch checkout