



Landsat-9 Project Update

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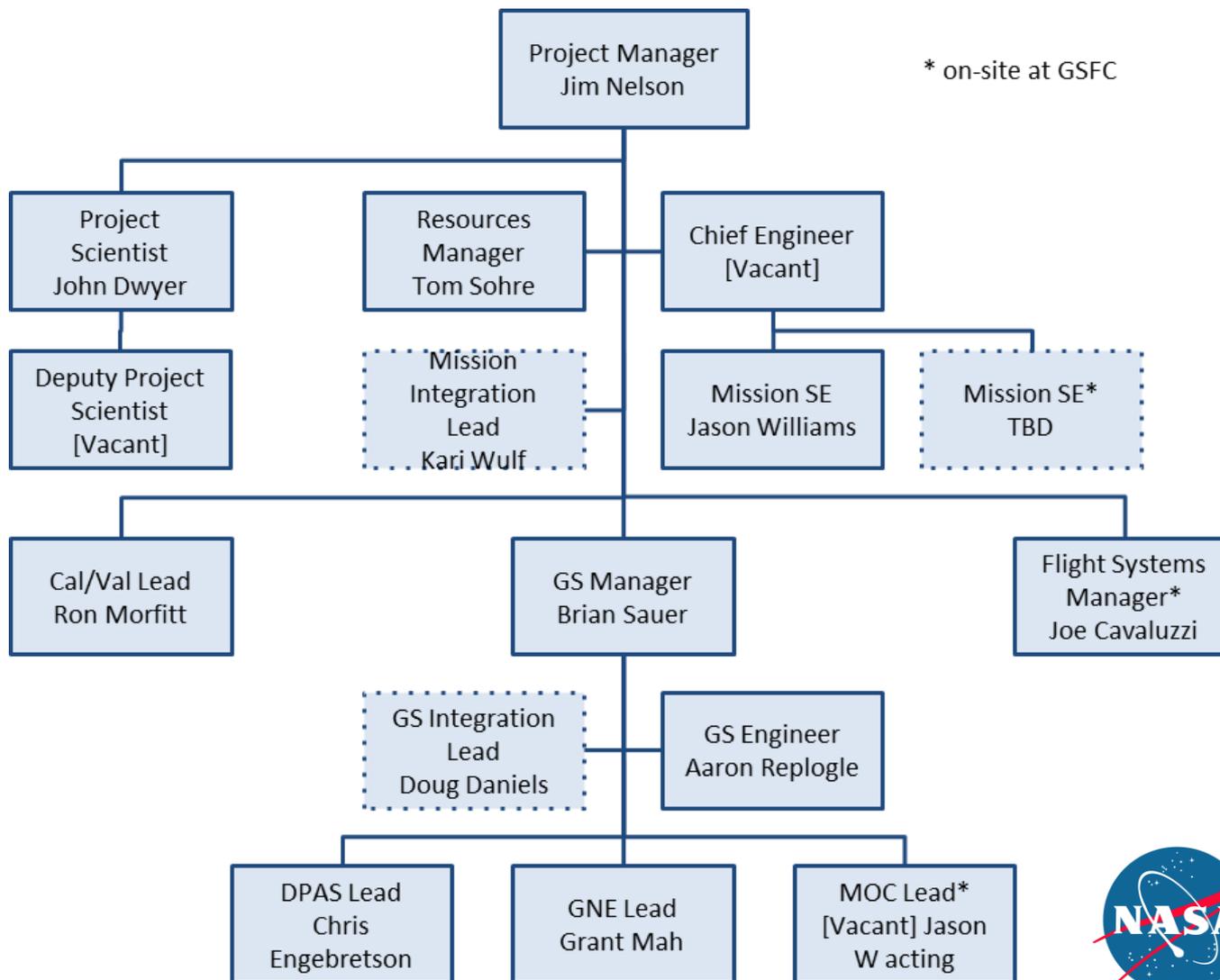


L9 Roles, Responsibilities

- NASA responsible for the Space Segment, Launch, and On-orbit checkout
- USGS responsible for the Ground System (including MOC) and Mission Operations
 - NASA developed MOC with USGS funding for Landsat 8; USGS now assumes that responsibility



USGS L9 Organization





What to Expect from Landsat-9

- Identical requirements as Landsat-8
 - Building to L8 *requirements*, not L8 *performance*
 - In most cases L8 performance will be achieved due to reuse of L8 designs, or through engineering margins
- OLI-2 will be an exact clone of L8 OLI
 - L8 hardware (spare FPM's, mirrors, etc.) to be reused
 - Expect OLI-2 performance to be comparable to L8 OLI
- TIRS upgraded to Class B (5 year design life)
 - Fix L8 scattered radiance issue
 - Tested flight spare lens assembly with 10 micron laser; confirmed source of stray light as side of lens assembly above Lens 3
 - Solution involves making area non-reflective (e.g. ridged insert or aperture stop)
 - Fix encoder electronics issue
 - Likely that problem due to filament growth & shorting
 - Manufacturing issue that requires improved monitoring & QA for TIRS-2
 - L8 Side B encoder electronics show no degradation so far
 - Improve reliability to 5-year design life



Potential L9 Relaxations (for LST Input)



- High-priority acquisitions
 - SMRD - 75 The LDCM observatory shall be capable of collecting up to 5 priority scenes per day.
- Off-nadir acquisitions
 - SMRD - 77 The LDCM observatory shall be capable of collecting image data up to 15 degrees left or right of the orbit plane in lieu of the nadir WRS-2 path as requested.
 - SMRD - 79 The LDCM observatory shall be capable of collecting up to 2 off-nadir intervals per day.
- Both impact spacecraft design (agility, SSR software) and cost
- Neither capability is widely used for Landsat 8
 - Original rationale was emergency response & homeland security
 - Many more assets in orbit now to provide rapid response
 - Lack of use partly due to USGS policy to avoid off-nadir collects in order to maximize global imaging
 - Some benefit (?) of off-nadir looks for coastal/reefs (avoiding sun glint) and polar acquisitions





Landsat 9 Data Coverage

- L9 maintains Level-1 requirement for 400 scenes/day
 - Landsat-8 currently achieves ~725 scenes/day by leveraging margin in SSR & downlink availability
 - Anticipate similar margins for Landsat 9 spacecraft, and thus similar acquisition levels
 - USGS planning for appropriate ground station contact time as well as data processing and storage to handle additional data collections
- Potential 14-bit resolution for OLI-2 data
 - OLI (and OLI-2) data is collected at 14-bit resolution
 - L8 spacecraft truncates to 12-bit
 - Consideration for collecting L9 OLI-2 at full 14-bit resolution
 - Need to understand science application advantages





Looking to the Future (1/2)

- SLI Reduced-Envelope Study examined opportunities for smaller, less expensive VSWIR-TIR instruments
 - Six companies funded to develop design concepts
 - See January LST presentation for recap
- Developing follow-on studies on science impact of compact instrumentation
 - Use WorldView imagery to simulate RER recovery via oversampling and sharpening algorithms
 - DIRSIG simulation of non-telecentric FP designs and science impact of spectral, radiometric non-uniformity
 - Sensitivity of coastal water & vegetation biophysical retrievals to polarization
- Looking for volunteers to help assess science impact



Looking to the Future (2/2)

- Current SLI suggests Landsat 10 launch ~2030
- Next 5-6 years provide a window for evaluating options
 - Community science & application needs
 - Continuity
 - New observations (additional spectral bands, hyperspectral, etc)
 - Ability to merge int'l systems for improved temporal resolution
 - Technology and engineering considerations
 - Smaller instrumentation -> lower costs, higher cadence
 - Additional capabilities (e.g. more spectral resolution/coverage)
- Land community should not be shy about expressing priorities for the next phase of SLI