DAG Diagnostic Review: VideoSAR

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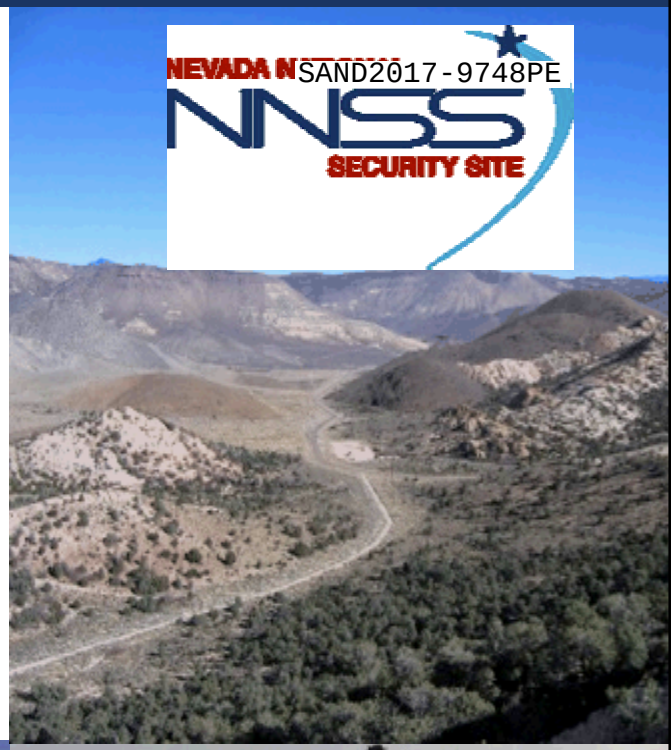

Outline

- Diagnostic System Description
- Project and Interface Requirements
- Readiness
  - Technical (Design, Hardware/Assembly, Qualification/Demonstration)
  - Procedures
  - Authorizations (Work Packages and Airspace)
  - Training
- Risk
  - Failure Mode and Effects Analysis
  - Go/No-Go Criteria on Shot Day
  - Other Risks to Participation

Outline

- Operations
  - Stay Out Zone (Table and Buffer) Access Needs
  - Timeline of Fielding Activities
  - Fielding Team and Number Participating in Stay Out Zone Activities
  - Resources Needed from Execution Team
  - Dry Run and Shot Expectations
  - ES&H Concerns
- Post-Shot Data Deliverable (What and When)
- Lessons Learned from Prior Experiments
  - How have they have been addressed

Diagnostic: System Description

Facility for Advanced RF and Algorithmic Development (FARAD) X-Band, fully-polarimetric synthetic aperture RADAR (SAR):

- 3 GHz RF bandwidth
- 4-inch resolution (spot mode)
- 1-foot resolution (contiguous stripmap)
- Single hardware RX channel
- Fully polarimetric (4:1 multiplex)
- Fielded on a DeHavilland DHC-6 “Twin Otter”
- Fly out of North Las Vegas Airport
- Side-looking sensor, so stand off is greater than 2 km
- Maybe able to loiter up to two hours.

DeHavilland DHC-6 “Twin Otter

Project and Interface Requirements

Quad-corner reflectors tuned to 35-degree grazing angle.

- 3 to 9 tables outside of the safe zone (75 m from ground zero), and near or at seismic sensors locations if possible. SNL employee along with NSTec employee will deploy and GPS the positions of these corner reflectors. Bolin working with Bob White on this.
- Deployed 1-3 days before event.
- Collected same day, or day after event.

Readiness

- Authorizations: Work Packages and Airspace have been worked
- Training: personnel is trained.

Risk

- Airborne platform can fly when the shot tasks place. Risk is clouds that will not allow flight.
- Water attenuates SAR signal, so wet ground may reduce reflected signal.
- Low SAR signal means poor change product.
- Ejecta will create smears/defocused target in image.
- Ejecta smearing may obscure ground beneath it – superposition of targets.
- Airplane cannot loiter forever.

Operations

- Coordinate with OCC, Air/Ground Operations Support: FRM-2087
- Radio contact with ground to collect aperture during shot. Typically use VHF 167.975/167.850
- Use GPS, L1 and L2 bands.
- Floor: 10,000 MSL
- Ceiling: 14,000 MSL
- Need lead-in time to start VideoSAR collect during shot.
- Pilots need to visually locate target - low clouds will prohibit collection.

Post-Shot Data Deliverable

- VideoSAR “movie” imagery, coherence, phase difference map, and dynamic height map.
- Polarimetric SAR scattering changes that are manifested on the surface.