SAND2019-4349PE

New Mexico Research Spotlight Forum

4/17/2019 Advancing Resilience for Space Systems

Satellite Command and Control Resilience

PRESENTED BY:

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ABOUT YOURSELF

Education
- BSEE from UIUC in 1999
- MSEE from USC in 2001

Employment
- TRW/Northrop Grumman Space Technology from 1999-2004
- Sandia National Labs, 2004 – Present
- > 15 years experience in space systems

Research Areas
- Modulation classification
- Protocol discovery
- RF fingerprinting
- Emitter geolocation
- Signal disambiguation

Keywords:

Machine learning, conditional random fields, emitter identification

CURRENT WORK IN ADVANCING RESLIENCE FOR SPACE SYSTEMS

Lab-directed R&D (LDRD)

- Conceptual payload development for space-based sensor to monitor command signals to US spacecraft
  - Identify emitters and classify interferers (RF fingerprinting, modulation, protocol, etc.)
  - Future work on disambiguating signals to operate through

Air Force Satellite Control Network (AFSCN) Resilience Project for US Air Force Academy Operational Research (OR) Capstone Project

- Working with an OR senior project on generating metrics for satellite resiliency in AFSCN communication with satellites

RESEARCH NEEDS

Looking for interested parties in working on:

- Modulation classification
- RF fingerprinting
- Signal separation and disambiguation

- Software defined radio work using GNU Radio