DOE/NV/03624--0770

Small Counter Unmanned Autonomous Systems Testbed (cUAS)

Project Number: NV20-ML-cUAS-PD3TZ

Ping Lee, Asa von Sudderth, David Peters, and John van der Laan

Goals and Objectives

- Establish a benchmark quality cUAS (Counter Unmanned Autonomous Systems) testbed at the NNSS that provides realistic CONOPS to test and evaluate detection and response system performance as measured and demonstrated against small cUAS threats.
- Develop realistic integrated vulnerability assessment, threat scenarios and mitigation option sets to serve as a predicate to cUAS requirement derivatives and solution option sets for CONOPS.
- Conduct low TRL RDT&E efforts that span the cUAS function chain, including detection, identification, tracking and mitigation to investigate a multi-modal remote sensing approach.
- Conduct decision making and rapid response R&D efforts to analyze and generate actionable intelligence from relevant detection data.

Program Vision

- Institute a cUAS testbed and supporting infrastructure at the NNSS that is responsive to DNN/Global Material Protection (NA-21), mission to provide advanced countermeasures against UASs attempting to disrupt the civilian nuclear operations of DNN's international partners:
  - **develop disciplines to prove air space surveillance,**
  - **develop cUAS detection, characterization and neutralization techniques,**
  - **perform advanced technology integration and demonstrations, and**
  - **facilitate the development of a DNN university and international community of cUAS experts for the nuclear nonproliferation community.**

Near Term R&D Focus

- Populate database with current available signatures to identify gaps where R&D efforts should be focused;
- Develop a signatures database framework;
- Initiate rapid algorithm testing, evaluation, and machine learning;
- Fill identified data gaps with NNSS signatures and observables.

National Nuclear Security Administration

NEVADA NATIONAL NNSS SECURITY SITE
Managed and operated by Mission Support and Test Services LLC

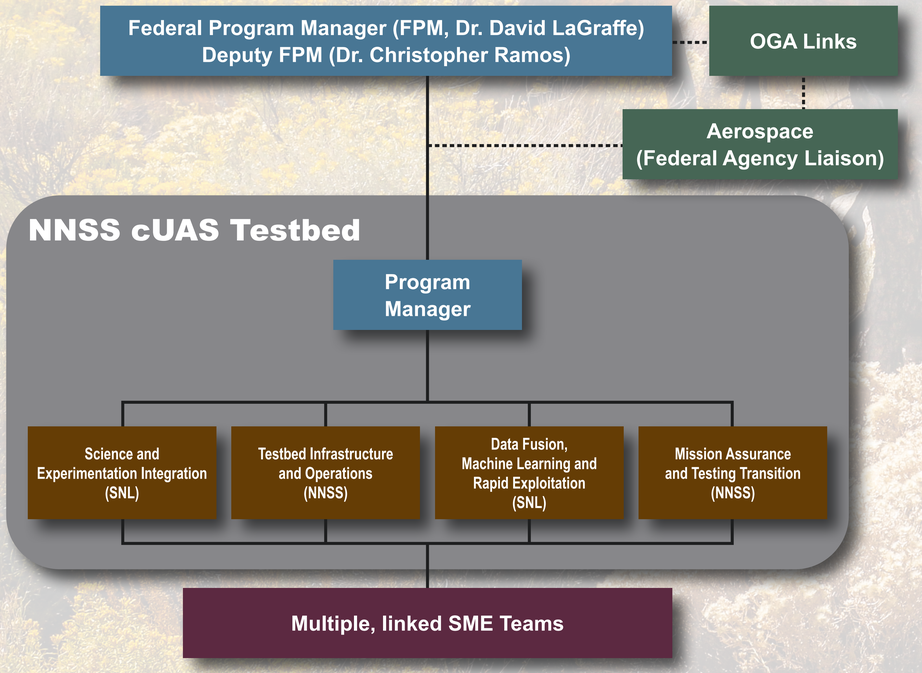
Sandia National Laboratories

Testbed Evaluation Criteria

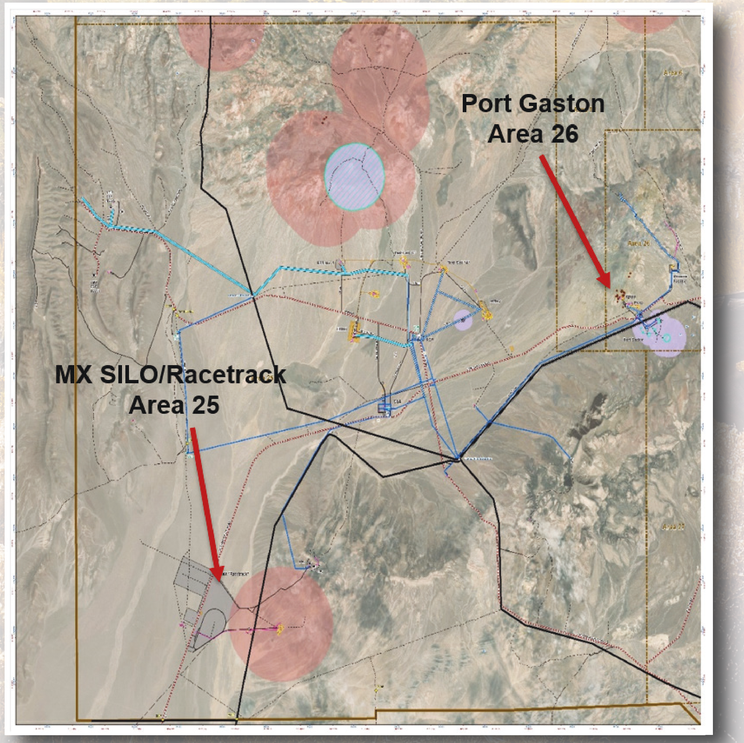
Criteria	Area 26 Port Gaston	Area 25 MX Racetrack	Area 5 NPTec	Paiute Air Mesa
Testbed Infrastructure				
Previous cUAS or UAS Operations	► cUAS, UAS, ► UAS-IEDs ► Detection; ► Concept of Operations; ► Firing fan	► NA-70 cUAS testing ► Maverick Constellation UAS ► 1 100' by 100' cement pad located on the missile solo side	UAS flights	
Facility Manager	Rustin Long	Greg Schmidt	Rustin Long	
Electricity			Beneficial occupancy certification is required	
Water			Beneficial occupancy certification is required	
Telephone				
High-speed fiber-optics				
Wi-Fi				
Cell tower				
Air conditioning			Needs to be replaced	
Bathrooms				

Green = Yes, the site currently has it
Yellow = Maybe the site could have it, if certain conditions were put in place
Red = No, the site doesn't have or it is currently cost prohibitive

cUAS R&D Organizational Structure



Prospective Testbed Locations



Future R&D Opportunities

- Relevance to DNN R&D: A tightly coordinated Line of Effort between DNN/R&D and DNN/GMS to provide advanced countermeasures against UAS attempting to disrupt the civilian nuclear operations of DNN's international partners.
- Scope of R&D:
  - **Involve NA-21 Radiological Security to fully coordinate with the Interagency and ongoing DHS roles.**
  - **Regarding protective measures, broad spectrum for facilities of interest: from earliest part of fuel cycle onward.**
- Joint R&D with select partners (labs; academia) should be pursued.
- R&D must be consistent with needs/concerns documented by the Emerging Threats and Technologies (ETT) Working Group.
- Outcome of R&D: cUAS Testbed and Partners must be beneficial to both the DNN R&D NA-22 and NA-21 missions.

Contact Ping Lee
702.295.4300 ■ leep@nv.doe.gov

This work was done by Mission Support and Test Services, LLC, under Contract No. DE-NA0003624 with the U.S. Department of Energy. DOE/NV/03624--0770.

03200008