Physical Science Laboratory

0813 0100 NMSU Capability Statement Presentation NanoSat Lab

August 2019
Physical Science Laboratory
The Beginning

- Dr. James Van Allen contacted NMSU for War Department support (1946)
- Established in Physics Department to support V-2 rocket exploitation at WSPG—students provide data reduction support
PSL Overview

Multi-disciplined, aerospace- and defense-oriented scientific and technical organization

Facilities

- HQ located on NMSU campus
  - Controlled Access building
  - CONUS & OCONUS work locations
- Laboratory and production areas
- SCIF Compatible Space
  - Dedicated Labs and Production space
- UAS Flight Test Site at the Las Cruces, NM airport

Today’s Domain Expertise

- 70 years in aerospace domain
- Modern electronic battlefield
- Provide IC solutions
- Information Sciences and Security Systems

Staff/Credentials

- Primarily applied HW/SW experts
- Variety of engineering, software, technologists, and scientists focused on user needs
- Access to on-campus faculty (with clearances)
- About 200 staff and temporary members, many with unique subject matter expertise
PSL Research Foci

Aligned around two major research foci

• Information Sciences and Security Systems
  – Infrastructure/Security
  – Systems Development and Integration
  – Modeling & Simulation (Information Modeling & Threat Analysis)
  – Electronic Countermeasures & Electronic Warfare
  – Cyber Security

• 21st Century Aerospace
  – Unmanned Aircraft Systems - FAA Approved UAS Flight Test Site
  – RDT&E Flight Operations
  – Missiles, Ballistic & Telemetry Systems
  – Operation and Test Support Services
  – Lighter-Than-Air Platforms
  – Engineering, Demonstrations, & Human Factors

Applicable skills and experience across all our business units!
PSL Capabilities

*Concept Design, Develop, Integrate, Test, and Demo*

PSL provides vehicle aviation and avionics system development and operational support for programs involving a wide variety of weapon development, target/evaluation, and scientific research platforms:

- Aircraft and Helicopters
- Unmanned Aircraft Systems
- RV/Decoy Suites
- Sensor and payload integration
- Spacecraft
- Rockets and Missiles
- Lighter than Air and Balloon Systems
- Ground Support and Target Systems
OPERATIONAL and TEST SUPPORT SERVICES

• Mission Planning and Operations
  – Operational Requirement documentation
  – Data product definition and distribution plans
  – Security and safety plans
  – Test/launch coordination and annotation

• Vehicle Systems
  – Flight systems integration and testing
  – Pyrotechnic systems preparation and handling
  – Land lines and umbilicals (copper and fiber optic)
  – Ground Support Equipment operation

• Telemetry ground stations
  – Receiving and recording
  – Real-time TM, television, and position displays
  – Data distribution systems (fiber optic & microwave)
  – Encryption and classified data systems
  – Equipment maintenance and configuration

• Post-mission data reduction and analysis support
  – Rapid post-mission data product processing and Data archival services
**FAA Approved UAS Flight Test Site**

**Leading FTS for NAS Integration of UAS**
- Long-term facility Certificate of Authorization
- 18 years of UAS FTS Ops and Flight Testing
- FAA-approved processes
- One of 7 FAA Approved UAS Test Sites

**15,000 Square Miles of Airspace**
- Exceptional Weather and Visibility
- Sparsely Populated
- Adjoins WSMR call-up area
- Terrain varies from desert to alpine forest

**Enabling flight testing for any USG or industry user**

**Facilities and Assets**
- 15,000 sq. ft. hangar
- Portable hangar and logistics support for remote operations
- Multiple UAS classes; Predator surrogate
- Chase aircraft
NMSU Airspace Experience

- NMSU performed special-use airspace throughout the U.S. and world with NASA for High-Altitude Ballooning for 30 years
- UAS airspace support of DoD, DHS, other U.S. Government efforts
- 18 years of UAS experience in NAS; 11 years of weekly flights in non-segregated airspace (airports and other)
- 365 days of flight test weather/year
- Excellent UAS safety record and FAA teaming history
- COA experience in multiple states; flight operations in multiple state and international locations
- CONUS and OCONUS flight operations
- Experience with many different small and large UAS systems
High Altitude Balloons

- Large, heavy payloads (up to 8,000 lbs)
- Near space environment (110,000-160,000 ft)
- Quick response
- Mobile, world wide operations
- Low cost
- Payloads can be re-flown
- Reasonable educational track for graduate students
Lighter Than Air – High Altitude Balloons

• PSL’s 25+ years of management and operation of the NASA balloon program affords a wealth of technical and personal expertise unavailable anywhere else

• PSL has the key skills and capabilities in all aspects of high altitude balloons:
  • High altitude balloon design and analysis
  • Flight payload thermal analysis
  • Balloon flight support systems
  • Balloon launch operations
  • Launch and launch support equipment design & operation

• PSL’s other business areas provide complimentary services/expertise that can be applied as needed
PSL Summary

• Applied research and engineering laboratory
• Domain expertise and aerospace and modern electronic battlefield
• Customers are primarily DoD, NASA, prime contractors, and industry
• Unique expertise in EW to include countermeasures for IED
• Unique expertise related to UAS, BVLOS, counter UAS, and special testing requirements
• Other unique expertise in support of the warfighter, IC, and national security
• Electronic and Mechanical prototyping capabilities, system design and integration, and RF & Antenna Capabilities
• Ability to integrate technical capabilities to achieve and push state-of-the-art solutions for customers