

## Joint Precision Airdrop System (JPADS) Software Engineering Laboratory

The Joint Precision Airdrop System (JPADS) is a high altitude capable, precision guided airdrop system capable of delivering payloads between 250 and 10,000 pounds. The system provides GPS guided autonomous control of a parafoil which leads to reduced ground load dispersion to increase accuracy of the payload delivery to a preprogrammed Impact Point (IP).



Figure 1 - Parachute packed on top of AGU (left); Modular AGU (middle); JPADS in flight (right)

The Armament SEC supports PM Force Sustainment Systems (PM FSS) by providing software engineering expertise to all aspects of the JPADS program. In the first few months of supporting PM FSS, Armament SEC personnel were able to mitigate software related risk that resulted in a program cost reduction in millions of dollars. Since FY12, conservative estimates suggest that the Armament SEC has helped PM FSS avoid several years of cost and effort overruns.

The Armament SEC was able to assist the prime software developer in creating a complete Software Engineering Data Package (SEDP) which allows US government personnel unlimited data rights and the documentation necessary to sustain the system for its entire life cycle. Currently, the Armament SEC supports the prime software contractor in all phases of software development, and prepares software specific type classification and material release certifications to PM FSS such as a Software Supportability Statement, Software Quality and Suitability Statement, and Software Safety Confirmation.

The JPADS Software Engineering Laboratory (SEL) is used to verify and validate contractor software deliverables using Hardware-in-the-Loop and Software-in-the-Loop simulations. The laboratory is an exact copy of the contractor's development environment that allows the Armament SEC to mitigate risk by ensuring all software deliverables meet the specifications they have been developed to. The JPADS SEL includes:

- Spreadbench Autonomous Guidance Units (AGU) that allow simulation testing of multiple software baselines concurrently (image to right)
- Modular Autonomous Guidance Unit (MAGU), (top middle image)
- GPS Repeater to test GPS capabilities



Figure 2 - Spreadbench AGU

Armament SEC personnel have also proposed innovations that have improved software and terrain update capabilities in the field through website cloud resources, consolidated multiple software baselines into one supportable product line through strong configuration management and baselining procedures, and facilitated electronics depot support for the transition from prime hardware contractor to US government sustainment. As future software changes are processed, the Armament SEC will ensure that the JPADS program is fully sustainable well into the future.

### Point of Contact

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