Aerodynamic decelerators

In a particularly busy year, the aerodynamic decelerators community touched a broad range of disciplines and attained several major milestones.

**DOD airdrop programs**

Airdrop systems such as JPADS (Joint Precision Airdrop System) have saved lives and had an enormous impact on current operations, while the push for increased accuracy, higher reliability, larger and lower payload weights, and lower cost systems continues. JPADS encompasses a family of systems being created through numerous efforts, partners, and funding sources. All efforts are managed and executed by a joint team from the NSRDEC (Army Natick Soldier Research Development and Engineering Center), Product Manager Force Sustainment Systems, Air Force Air Mobility Command, Deputy Under Secretary of Defense for Advanced Systems and Concepts, Joint Forces Command, Transportation Command, Marine Corps, Special Operations Command, and others.

The JPADS family consists of "self-guided" cargo parachute systems, a common mission planning and weather system, and navigation aids for Military Free Fall parachute systems. The 700-2,400-lb variant entered Milestone B in March; the 5,000-10,000-lb variant transitioned from a very successful advanced concept technology demonstration to a formal Program of Record (POR), with MS-B approved in August. The formal Capability Development Document for both increments was approved by the Joint Requirements Oversight Council in March. The 2-klb POR is developing the Firefly system from Airborne Systems of North America and will be entering developmental testing by year's end. The 10-klb system will be shown after the submission of this annual report.

The USAF and USA have been using JPADS for the past year, with over 100 airdrops being conducted in Afghanistan and Iraq. The JPADS Mission Planner developed by the Product Manager Airdrop Systems and Concepts, Joint Forces Command, Transportation Command, and Marine Corps, Special Operations Command, and others.

The JPADS Mission Planner provides computed aerial release point calculations for updating missions to the SCREAMER system, which has been used in Afghanistan since 2006. Numerous Special Operations and airdrop programs have been documented, and JPADS has been used extensively to support special operations in the near future because of the MSL parachute demonstrated positive impact and rapidly increased accuracy and technology readiness level.

The Low Cost Airdrop System is a strategic parachute system that explored and fielded a parachute system at Mach 2.2 low-cost, one-time-use, very-low-inflation load trajectory system weighing less than 50 lb. This system was fielded to theater assets and Balloon Launched IBDs being used extensively to support small units with enormous success. Systems are being used as low as 150 ft above ground level, and thousands of pounds of supplies have been airdropped.

NSRDEC is executing a 30,000-lb Technology Objective and has demonstrated a large size of the MSL parachute and is scheduled to be demonstrated to the international audience in October.

NSRDEC executed a Precision Airdrop Technology Conference and Demonstration (PACTCAD) in October at the Army Yuma Proving Ground. PACTCAD 2007 demonstrated five different systems utilizing five aircraft with four drops over three days. More than 140 cargo and paratroopers were dropped, with weights ranging from 100 lb to 30,000 lb, for a total of over 300 drops. Numerous Special Operations and free-fall systems were demonstrated.

NATO was a sponsor of PACTCAD 2007 and the NSRDEC continues to support the NATO Precision Airdrop Capability Working Group (PADS-30) in developing PADS concepts and working with PAD systems being developed for Special Operations Forces.

**Mars Science Laboratory (MSL)**

The Mars Science Laboratorys special mission to Mars has been airdropped. Numerous parachute systems, a common mission objective, have been demonstrated in Afghanistan and Iraq.

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**AEROSPACE SCIENCES**

**by the AIAA Aerodynamic Decelerator Systems Technical Committee**