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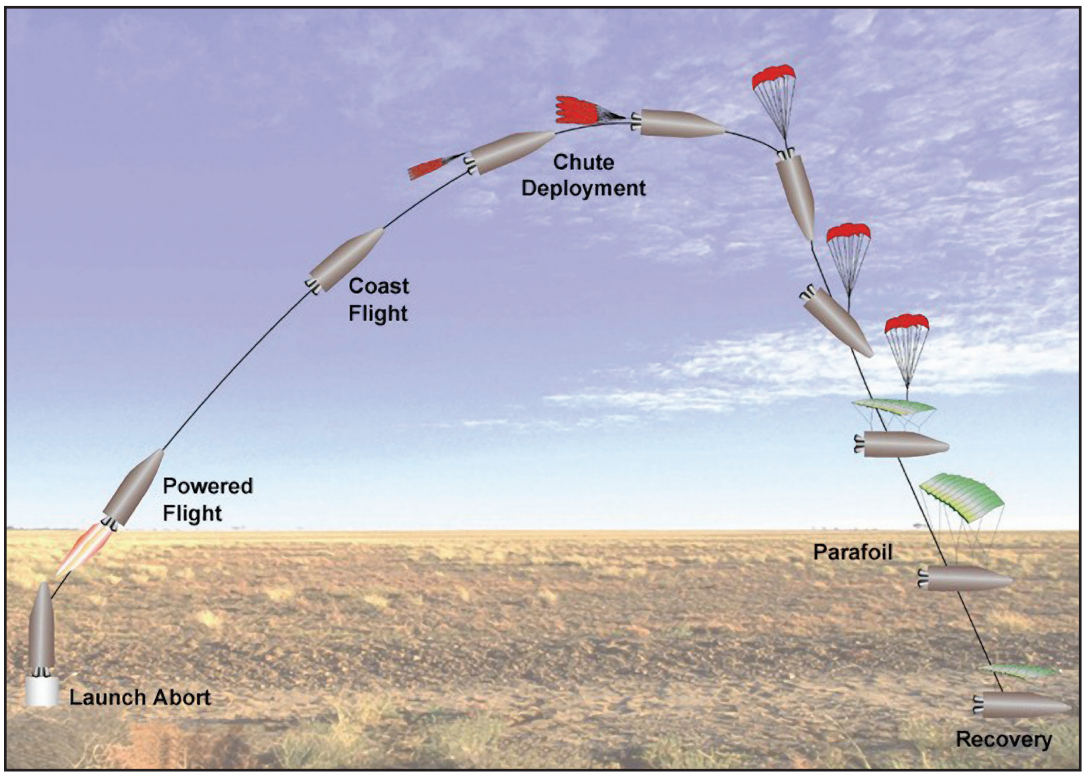
Pad Abort Demonstrator To Test Crew Escape Technologies



Pad Abort Demonstrator Flight Profile

NASA's Orbital Space Plane (OSP) -- a new crew transfer and rescue system for the International Space Station -- will need its own abort system to protect crew members in the event of a launch pad emergency. Designers will evaluate potential crew escape design approaches and technologies by using a Pad Abort Demonstrator (PAD).

The PAD will be a full-scale, reusable system incorporating crew escape and survival systems, subsystems and components using current technologies – all designed to protect and safeguard crew members regardless of which OSP concept is selected to be built.

Demonstrators, such as the PAD, play a critical role in demonstrating critical technologies and operations and will help NASA achieve its goals of establishing safe, reliable, affordable access to space. Designers will use the PAD test bed to validate analytical models and try out crew escape technologies for the Orbital Space Plane.

The demonstrator will use fully instrumented space-age crash test dummies in its crew cabin to measure acceleration and motion resulting from forces generated during various mission events, such as testing of the crew escape propulsion systems, vehicle escape trajectory maneuvers,

parachute deployment and landing techniques. Video cameras also will monitor and record the dummies movements during testing to evaluate crew restraint systems.

The PAD will be approximately 34 feet long, have a diameter of 10-15 feet and weigh approximately 15 tons on the launch pad. A crew module at the front of the demonstrator will include two seats. The demonstrator will be built with a steel core structure and an outer fiberglass aerodynamic shell.

During tests, the first of which is scheduled for 2005 at the Army's White Sands Missile Range (WSMR) near Las Cruces, N.M., the vehicle will be propelled to an altitude of approximately 7,000 feet by four liquid oxygen and ethanol fueled engines. The engines, developed by the Rocketdyne division of The Boeing Company in Canoga Park, Calif., will provide a total of 200,000 pounds of thrust. Other on-board technologies will include a recovery system and avionics and software to control the demonstrator's flight from the launch pad to the landing and recovery site.

Once the demonstrator is launched and escapes the area around the launch pad, a drogue – a small parachute used as a pilot for a larger parachute – will be deployed to stabilize and slow the demonstrator. After the demonstrator reaches its highest altitude, or apogee, it will begin to fall back to the ground. At 4,000 feet, the main parachute, a 7,500-square-foot parafoil, will be deployed to allow the demonstrator to float safely to the ground.

The demonstrator will be capable of accommodating upgrades to test additional launch pad abort techniques now in development to improve crew safety and survivability. In addition, its basic configuration can be adapted to support future testing of escape scenarios.

In November 2002, the Lockheed Martin Corporation of Denver, Colo., was awarded a $53-million-dollar contract to develop the PAD, a reusable test vehicle that provides the capability to test and demonstrate technologies in a launch pad abort situation.

A preliminary design review is scheduled in September 2003 to evaluate the vehicle demonstrator design. The preliminary design review is conducted when the vehicle design is approximately 50 percent complete and the vehicle drawings are approximately 10 percent complete. In September 2003, wind tunnel testing is planned for the aero-shell design in the Lockheed LTV facilities in Grand Prairie, Texas. In November 2003, the main propulsion system thrusters will begin testing at NASA's Marshall Space Flight Center in Huntsville, Ala. A critical design review, held when the vehicle design and drawings are approximately 90 percent complete, is scheduled for February 2004. The demonstrator is scheduled for three demonstration flights in 2005 and four demonstration flights in 2006 at the WSMR.

The Pad Abort Demonstrator government team, led by NASA's Johnson Space Center in Houston, also includes NASA's Marshall Space Flight Center, NASA's White Sands Test Facility near Las Cruces, N.M.; the U. S. Army's Yuma Proving Grounds near Yuma, Ariz.; and the U.S. Army's White Sands Missile Range.

For more information on flight demonstrators and the Orbital Space Plane program, visit the OSP web site at:
http://www.ospnews.com

For more information and electronic images on the PAD and other NASA activities, contact the Marshall Media Relations Department at (256) 544-0034 or visit Marshall's News Center on the web at:
http://www.msfc.nasa.gov/news

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