NASAfacts

NASA Dryden's Contributions to Spaceflight

The Dryden Flight Research Center in California's Mojave Desert is NASA's lead installation for atmospheric flight research. Dryden performs research, development and verification of advanced aerospace technologies for production, prototype or experimental vehicles.

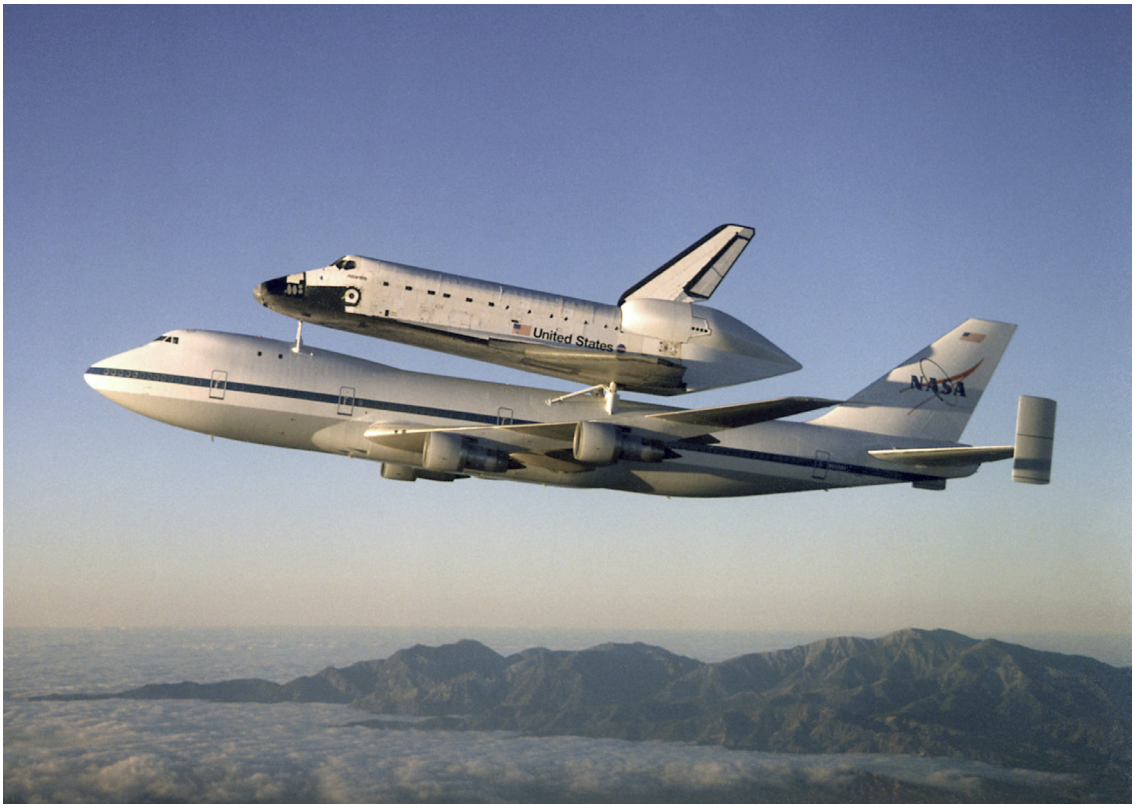
NASA Dryden has played a significant role in NASA's human space flight programs. Dryden's major past and present contributions to America's access to space date from the late 1950s and continue today as NASA embarks on the Constellation program to resume human exploration of the moon and the solar system.

Research with the X-15 rocket plane in the 1960s contributed to space exploration in several areas, including:

- Reaction control systems for attitude control and maneuvering outside the Earth's atmosphere.
- Life support systems, such as practical full-pressure suits for pilot protection.
- Inertial navigation systems for operation in low and high dynamic flight conditions.
- Flight control mechanisms that could control a vehicle in high and low dynamic flight conditions as well as gravity-free environments.

The Lunar Landing Research Vehicle (LLRV) investigated vehicle control and landing capabilities in zero dynamic pressure and near weightlessness, analog fly-by-wire control, and trained astronauts to safely land an unconventional vehicle in those conditions.

The family of wingless lifting bodies flown in the late 1960s and early 1970s enabled us to investigate energy management techniques for atmospheric re-entry and controlled descent to a landing in a vehicle without wings or power.



The F-8 Digital Fly-By-Wire program demonstrated digital computer control of aircraft flight controls, which led to lighter weight, greater redundancy and more precision. The project also flight-validated the computers used in the Shuttle's flight control system, and resolved pilot-induced oscillation tendencies in digital controls through the development of suppression filters.

Research with the triple-sonic YF-12 led to a central airborne performance analyzer that became the basis for vehicle health monitoring system used on the space shuttles.

The space shuttle Approach and Landing Tests validated both the ability of the modified Boeing 747 Shuttle Carrier Aircraft to carry the shuttle and the approach and precision landing of the unpowered shuttle on the main and lakebed runways at Edwards Air Force Base.

Dryden flight-validated the shuttle's solid rocket booster parachute recovery system in the 1980s, and the effectiveness of the shuttle's drag parachute a decade later.

Dryden Loads Laboratory also validated the integrity of the shuttle's structure under intense thermal conditions.

Dryden conducted flight tests of the shuttle's Thermal Protection System, using F-104 and F-15 aircraft to test shuttle TPS tiles under various aerodynamic and atmospheric conditions.

Tests on a modified CV-990 led to improved shuttle tires and brakes, higher crosswind landing limits and resurfacing of the Kennedy runway for better tire wear.

Tests flown on Dryden's F-15B research testbed aircraft in 2005 investigated the trajectory of insulating foam that separates from the shuttle's external tank on ascent.

Dryden has supported numerous space shuttle landings at Edwards, including deservicing and ferry flight operations to return the shuttle to the Kennedy Space Center launch site. Since orbital missions began in 1981, Dryden has been the site of 50 shuttle landings.

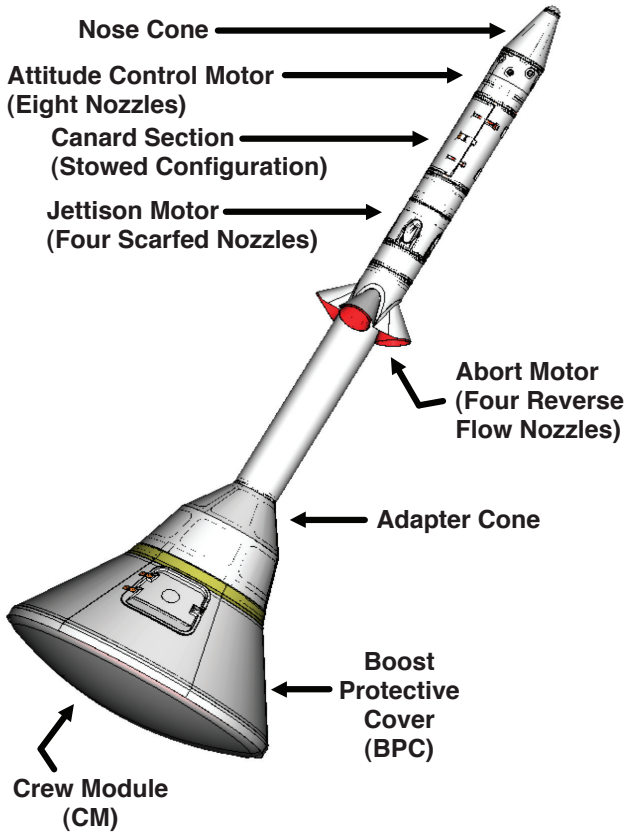
Looking to the future, the same skills that have enabled NASA researchers and pilots to unlock aeronautical secrets for decades are being called upon to accelerate the development of NASA's exploration systems.

NASA Dryden will lead the flight test integration and operations of a system that safely aborts a launch of the Orion Crew Exploration Vehicle if problems develop that are hazardous to the crew.

In addition, Dryden's responsibilities for the Orion vehicle will include:

- Abort test booster procurement
- Flight test article and abort test booster integration
- Flight test article design, assembly, integration and testing
- Independent analysis and oversight of prime contractors' flight test articles

Dryden will also be responsible for preliminary definition and planning for the Orion launch abort systems tests, drop tests, landing and recovery tests, flight re-entry and landing profiles, and range safety requirements and integration.



National Aeronautics and Space Administration

Dryden Flight Research Center
P.O. Box 273
Edwards, CA 93523-0273
Voice 661-276-3449 FAX 661-276-3566
pao@dfrc.nasa.gov

www.nasa.gov

FS-2006-11-091-DFRC