

# NASA Range Safety Program 2006 Annual Report

## STATUS REPORTS DRYDEN FLIGHT RESEARCH CENTER (DFRC)

The Dryden Flight Research Center, located at Edwards Air Force Base, California, is NASA's primary installation for flight research. Over the past 60 years, projects at Dryden have led to major advancements in the design and capabilities of many civilian and military aircraft. The Center is involved in the following:

- Support of operations for the Space Shuttle
- Development of future access-to-space vehicles
- Conduct of airborne science missions and flight operations
- Development of piloted and uninhabited aircraft test beds for research and science missions

Range Safety operations at Dryden are managed by the Range Safety Office. Under an alliance agreement with the Air Force Flight Test Center, Edwards Air Force Base, the Dryden Center Director established the Range Safety Office to provide independent review and oversight of range safety issues.

The Range Safety Office also supports the Center by providing trained flight termination system engineers, range safety risk analysts, and range safety officers to provide mission and project support. In addition, the office supports the NASA Range Safety Training Program by providing the uninhabited aerial vehicle perspective in the development of range safety courses.

Dryden continues to support the testing of a wide range of uninhabited aerial vehicles and is involved in various other projects that are described below.

### **Altair**

General Atomics Aeronautical Systems' Altair uninhabited aerial vehicle successfully completed several 20 plus hour flights with NASA Ames Research Center and National Oceanic and Atmospheric Administration scientific payloads in October. The purpose of the flights was to demonstrate the feasibility of a high altitude, long endurance uninhabited aerial vehicle to provide real-time data for the detection and surveillance of wildfires in the Western United States.

### **Model-Type Uninhabited Aerial Vehicles**

The Autonomous Soaring Uninhabited Aerial Vehicle Project used RnR Products' Cloud Swift sailplane to demonstrate that using thermal lift could significantly extend the range and endurance of model uninhabited aerial vehicles without a corresponding increase in fuel requirements.

### **Blended Wing Body Low Speed Vehicle**

The blended wing body low speed uninhabited aerial vehicle is a dynamically scaled version of the original concept vehicle. The primary goals of this test and research project are as follows:

- Study the flight and handling characteristics of the blended wing body design

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- Match the vehicle's performance with engineering predictions based on computer and wind tunnel studies
- Develop and evaluate digital flight control algorithms
- Assess the integration of the propulsion system to the airframe

Industry studies suggest that because of its efficient configuration, the blended wing body would consume 20 percent less fuel than jetliners of today while cruising at high subsonic speeds on flights of up to 7,000 nautical miles.

### **Ikhana**

NASA's Ikhana uninhabited aerial vehicle is a General Atomics Predator-B modified to support Earth science missions for the Science Mission Directorate. The aircraft is capable of mission durations in excess of 24 hours at altitudes above 40,000 feet. The aircraft is designed to be disassembled and transported in a large shipping container aboard standard military transports. On-board support systems include a NASA developed airborne research test system, a system that can host research flight control algorithms that test autonomous sensor or autonomous aircraft control concepts.

### **Orion**

The Orion Project is part of the Agency's Constellation Program. The Orion Project consists of the crew module and launch abort system. Dryden is tasked with conducting a series of flight tests to demonstrate proper operations of the launch abort system and the crew module recovery systems in response to abort events initiated on the launch pad and during the initial ascent phase of flight. The abort flight tests will be conducted at the United States Army White Sands Missile Range in New Mexico.

As can be seen in the description of these projects, Dryden Flight Research Center plays a vital role in advancing technology and science through flight. At Dryden, America's leadership in aeronautics and space technology is demonstrated as the Center continues to push the envelope to revolutionize aviation and pioneer aerospace technology.