



## Global Hawk High-Altitude, Long-Endurance Science Aircraft



NASA Global Hawk No. 871 cruises over California's Mojave Desert. The aircraft, the first Global Hawk built in the Advanced Concept Technology Demonstrator program, is equipped to fly high-altitude, long-endurance environmental science flights. (NASA/Lori Losey)

NASA's Dryden Flight Research Center operates two developmental-model Northrop Grumman Global Hawk unmanned aircraft for high-altitude, long-duration Earth science missions. Acquired from the U.S. Air Force, these autonomously flown aircraft are the first and sixth built under the original Global Hawk Advanced Concept Technology Demonstrator development program sponsored by the Defense Advanced Research Projects Agency.

The ability of the Global Hawk to autonomously fly long distances, remain aloft for extended periods of time and carry large payloads brings a new capability to the science community for measuring, monitoring and observing remote locations of Earth not feasible or practical with piloted aircraft, most other robotic or remotely operated aircraft, or space satellites.

The aircraft's 11,000-nautical-mile range and 32-hour endurance, together with satellite and line-of-site communication links to the ground control station, allow for eventual worldwide operation. Dedicated satellite communication links provide researchers with direct access to their onboard instrument packages during missions. Researchers have the ability to monitor instrument function from the ground control station and evaluate selected data in real time.

Northrop Grumman Aerospace Systems, Rancho Bernardo, Calif., and NASA Dryden created a partnership to operate Global Hawk missions from Dryden. NASA and Northrop Grumman share use of the ground control station, maintenance facilities and the NASA Global Hawk aircraft.

NASA's Science Mission Directorate sup-

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ports NASA research activities on the aircraft. The Science Mission Directorate has teamed with the National Oceanic and Atmospheric Administration and the Department of Energy to investigate unmanned aircraft systems, specifically the Global Hawk, for Earth observation research.

Initial operational capability for Global Hawk science missions from NASA Dryden was achieved in 2010. A portable ground control station is now operational, making deployments and missions possible worldwide. The Hurricane and Severe Storm Sentinel multi-year study beginning in 2012 will be the first deployment opportunity for two NASA Global Hawks that will operate temporarily from NASA's Wallops Flight Facility in Wallops Island, Va.

The 44-foot-long Global Hawk has a wingspan of more than 116 feet, a height of 15 feet, and a gross takeoff weight of 26,750 pounds, including a 1,500-pound payload capability. A single Rolls-Royce AE3007H turbofan engine powers the aircraft. The distinctive V-tail, engine cover, aft fuselage and wings are constructed primarily of graphite composite materials. The center fuselage is constructed of conventional aluminum, while various fairings and radomes feature fiberglass composite construction.

NASA has an additional Advanced Technology Demonstrator, the seventh Global Hawk built, and two Block 10 aircraft transferred from the U.S. Air Force. These aircraft are being used to provide parts for the flying Global Hawks and could be used for future missions.



Flight crew and scientists occupy the Global Hawk Operations Center at NASA Dryden during the Genesis and Rapid Intensification Processes hurricane study in the fall of 2010. (NASA/Tom Tschida)

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