

**PATHFINDER IS A SOLAR-POWERED RESEARCH AIRCRAFT
WHICH REPRESENTS AN ENGINEERING ACCOMPLISHMENT**



- ◆ Imagine a vehicle that could stay aloft for a week or more powered only by sunlight.
- ◆ Imagine a vehicle that is no more than a flying wing, maneuvering without rudders, fins, tails or other control surfaces typical of conventional aircraft.
- ◆ Imagine an aircraft that flies without an onboard human pilot, but instead is controlled remotely from a ground station.

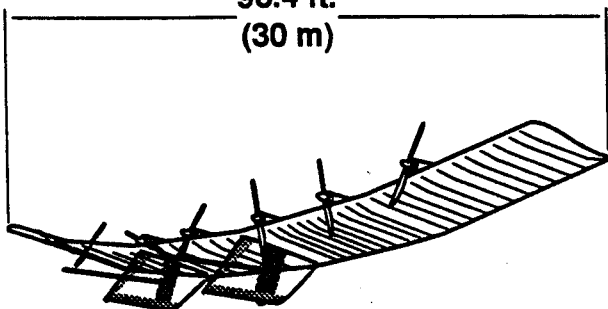
At the NASA Dryden Flight Research Center, Edwards, Calif., imagination has become a reality, and that reality is Pathfinder.

Pathfinder, designed and built by AeroVironment Inc., Monrovia, Calif., is a lightweight, remotely piloted, solar-powered aircraft weighing less than 600 pounds. The upper surface of the aircraft's 100-foot wing is covered almost completely by thin solar panels, which collect sunlight. Pathfinder converts energy from the sun into electricity, which turns six small motors with propellers. Slowing down or speeding up these individual propellers allows Pathfinder to make turns, since it does not have the control surfaces of typical aircraft.

A NASA-industry alliance team is evaluating Pathfinder in a program to develop technologies necessary to operate unpiloted aircraft at altitudes as high as 100,000 feet on environmental sampling missions lasting a week or longer. The evaluation program, called ERAST— Environmental Research Aircraft and Sensor Technology — will examine technologies like solar power,

Pathfinder

98.4 ft.
(30 m)

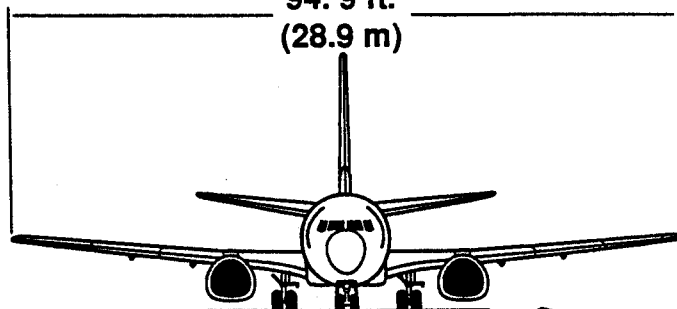


Gross weight
530 lbs (221 kg)



Boeing 737-400

94.9 ft.
(28.9 m)



Maximum takeoff weight
138,500 lbs (62,879 kg)



lightweight materials, avionics, sensor technology, aerodynamics and other forms of propulsion suitable for extreme altitudes. The NASA Office of Aeronautics at NASA Headquarters, Washington, D.C. is sponsoring the ERAST program.

High Flyer

In 1995, Pathfinder made several flights at Dryden in a effort to determine the vehicle's maximum altitude as it was configured at that time. On Sept. 11, 1995, the aircraft reached an altitude of 50,500 feet, setting a new altitude record for a solar-powered aircraft. The National Aeronautic Association presented the NASA-industry team with an award for one of the "10 Most Memorable Record Flights" of 1995.

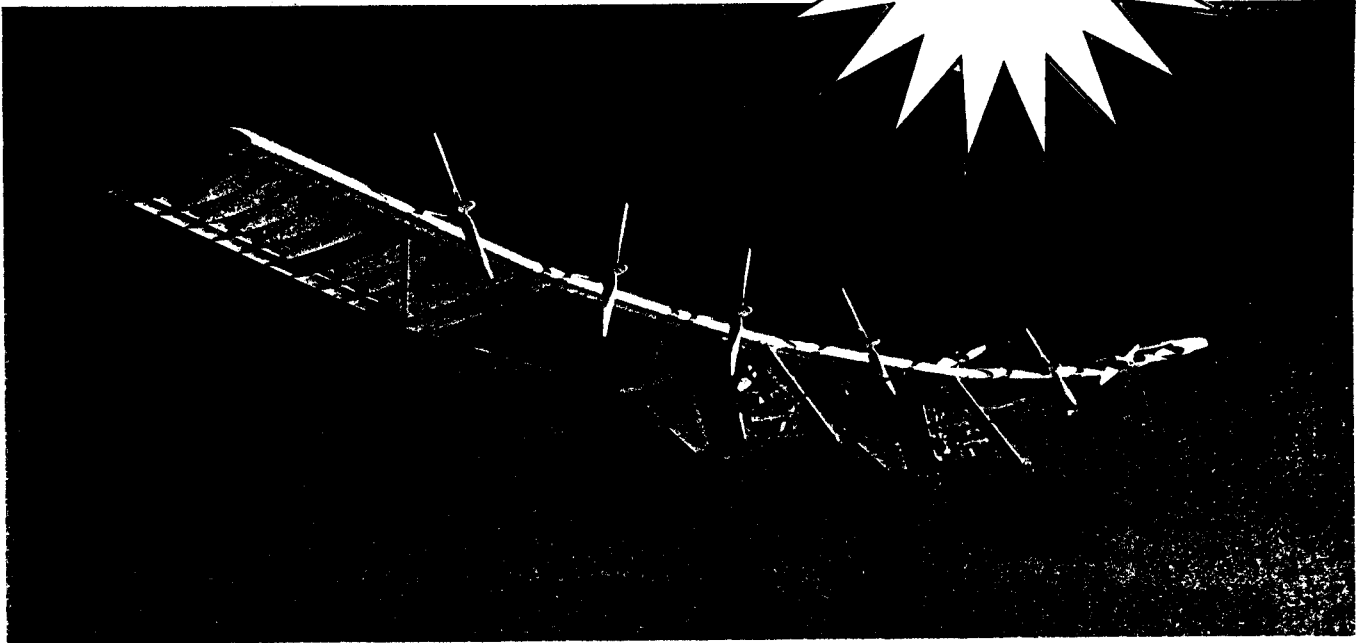
In November 1996 Pathfinder made a successful low-level checkout flight at Dryden to verify new systems onboard the vehicle. The aircraft is slated to make a series of high-altitude flights in early 1997 from the Pacific Missile Range Facility at Barking Sands, Kauai, Hawaii.

Keeping Tabs on the Environment

Pathfinder is a proof-of-concept vehicle for two more prototype solar-powered aircraft — Helios and Centurion — which currently are under development at AeroVironment Inc. Both vehicles would have a wingspan of about 200 feet. Helios, an ultralong-duration vehicle, would use an energy storage system to power the aircraft at night. The solar cells would power the vehicle during the day and recharge the energy storage system. Duration of such a flight could be several weeks to months. Centurion, an ultrahigh-altitude vehicle that could reach altitudes of 100,000 feet or higher, does not have an energy storage system, and thus would operate only during the day.

High-altitude, long-duration solar-powered vehicles could be used for a variety of monitoring purposes. NASA is especially interested in the vehicles' potential ability to study the upper atmosphere without disturbing it. The slower a vehicle flies, the greater its ability to capture samples of the atmosphere without altering them. In addition, such vehicles could spend long periods of time over the ocean monitoring storm developments to provide more accurate predictions of hurricanes. The same capability could be used to monitor forests and other large remote expanses to provide early warning of crop damage or fires for example. Another use for this kind of capability is to serve as a surrogate satellite when coverage is not available.

Pathfinder



Aircraft Specifications

- ◆ Wingspan: 98.4 ft. (30 m.)
- ◆ Width: 8 ft. (2.4 m.)
- ◆ Gross weight: 530 lbs. (221 kg.)
- ◆ Payload: approximately 50 lb. (22.7 kg.)
- ◆ Airspeed: 15.7 miles per hour (7 m./ sec.)
- ◆ Power: solar array 2,800 - 8,000 watts
- ◆ Motors: 6 electric motors, 1.5 kW maximum each
- ◆ Manufacturer: AeroVironment Inc., Monrovia, Calif.
- ◆ Materials: state-of-the-art composites, plastics and foam

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