

Italian Space Plane Prototype to Attempt Daring Maneuvers

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Hypersonic space planes may someday fly into space from airport runways, but an Italian aerospace firm first wants to test whether such futuristic vehicles could still pull off high-speed maneuvers during the fiery re-entry into Earth's atmosphere.

The Italian Center for Aerospace Research (CIRA) in Capua, Italy has prepped a new unmanned [prototype space plane](#) called Pollux for a possible flight in March. Pollux would perform several test maneuvers while reaching a top re-entry speed of Mach 1.2.

"We want to fly while re-entering, and we want to reduce the logical gap between aeronautics and space," said Gennaro Russo, CIRA's Space Programs lead and USV (Unmanned Space Vehicles) program manager.

A less-advanced twin to Pollux, the engineless prototype [space vehicle](#) named Castor, successfully flew at transonic speeds between altitudes of about 10 and 6.2 miles (16 to 10 km), and reached a top speed of Mach 1.08, or just above the speed of sound.

Pollux is designed to reach its drop height of about 15 miles (24 km) courtesy of a stratospheric balloon. Upon release, the space vehicle is expected to carry out pre-programmed aeronautic maneuvers where it pulls its nose up, conducts an angle of attack maneuver, a two-bank turn maneuver, and then finish with another nose-up maneuver before opening its parachute at a height of just over 3 miles (5 km).

All those twists and turns would allow the 500 experimental sensors aboard Pollux to record the acceleration, aerodynamic pressures, and strain throughout. That information will go a long way toward helping researchers figure out what maneuvers a hypersonic vehicle could pull off as it comes in for landing from space, researchers said.

"Being able to handle the flight and not simply the drop along a re-entry trajectory, you will be able to select the [landing spaceport](#) regardless of the weather conditions during the re-entry," Russo told *SPACE.com*.

Like its twin Castor, Pollux is a 30-foot (9.1-meter) long flying test vehicle with a wingspan of 13 feet (4 meters), and a weight of 2,910 pounds (1,319 kg). But Pollux has more advanced control systems that allow the unmanned space vehicle to autonomously make its own last-minute tweaks for flight patterns.

Pollux also has a single-stage parachute, rather than the three-stage parachute used by Castor in 2007. Castor's three-stage parachute did not slow it down enough to avoid some damage upon landing two years ago, but Pollux's handlers seem confident that they can better control the newer prototype and slow it down enough to require just the single-stage parachute.

Two experiments are also slated to ride piggy-back aboard Pollux.

The first is a systems-on-a-chip designed by the company Strago Ricerche, which will help gauge accelerations for the flight. **The second is a physics experiment by second grade schools of Italy's Apulia region that will survey atmospheric opacity due to aerosols.**

The flights of Castor and Pollux may also help inform other ongoing efforts to develop space planes. The British company Reaction Engines Limited received initial funding last year from the European Space Agency and British government to begin developing its Skylon space plane concept.

The U.S. Air Force has its own [secretive space plane](#) set for launch later this year.

Russo and CIRA have already begun planning beyond their twin space vehicle prototypes. A hypersonic version that could reach Mach 7 or 8 is on the drawing boards due to collaboration with the University of Queensland and Australia's Department of Defense.