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## Scramjet Flies, But Errantly

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SYDNEY, Australia -- A hypersonic test rocket survived blistering speeds Tuesday in a major trial, but researchers admitted the flight wasn't a complete success because the jet flew off course.

"Although we didn't achieve all that we set out to achieve, we succeeded in gathering valuable data," said project leader Allan Paull of the University of Queensland. "We're encouraged by the fact the payload survived one hell of a wild ride."

The purpose of the flight was to test hypersonic rocketry that could one day attain speeds of Mach 7.6, sufficient for American coast-to-coast flights of only 30 minutes, and New York to Tokyo flights of just two hours. Such speeds would be more than twice the current supersonic record of Mach 3.6 held by the fastest existing air-breathing jet, the SR-71 Blackbird.

While Paull estimates such super-fast hypersonic passenger aviation might not be a reality for 50 years, hypersonic rockets could be used sooner to provide a cheaper, better, faster means to launch commercial payloads into Earth's orbit.

Experts liken breaking the hypersonic barrier of four times the speed of sound in flight to breaking the supersonic barrier of Mach 1, achieved in 1947. Others say such a breakthrough might ultimately rank right up there with the first Wright Brothers flights in 1903. Both of those had to endure a few failures before success was achieved.

Tuesday's problems appeared to have been caused by a "flight anomaly" in a Terrier Orion traditional rocket, which carried the scramjet, short for supersonic combustion ram, aloft. The aim was to carry the scramjet to a height of 300 kilometers, and then let it fall to Earth. But the Terrier Orion malfunction threw the flight off, ultimately by hundreds of kilometers.

A scramjet is an air-breathing, hydrogen-combusting rocket that can reach hypersonic speeds, defined as higher than four times the speed of sound, or Mach 4, roughly 5,200 kilometers per hour. But the process works only if the scramjet can take in air at Mach 1 -- or roughly 1,300 kilometers per hour. During Tuesday's test, the plan was to have the prototype achieve Mach 1 during a long fall back to Earth.

At around 36 kilometers in altitude, the prototype scramjet engine was to be tested to see if elements of hypersonic combustion took place within it, and how well. Results would then be radioed to the ground in the seconds before the test rocket crashed.

Late Wednesday, scientists were still analyzing flight data, and hadn't come to any conclusions about the cause of the mishap, or how well the scramjet technology performed. However, they did know that the scramjet survived most of the fall in good shape, indicating that -- at the very least -- it appeared to have been built tough enough.

Tuesday's rocket failure suggests a jinx hangs over such flights. On June 25, NASA had to destroy a similar rocket and dump it into the Pacific Ocean after a similar mishap in a traditional rocket. Since Edwards Air Force Base lies near the heavily populated Los Angeles basin, flight controllers had to destroy their scramjet in mid-flight.

But Tuesday's test took place in the middle of Australia's Outback, where flight controllers faced no similar worries about hitting people, so they just let the rockets fall.

"Happily, they didn't have to blow up the scramjet like NASA did, and that means they were able to get more data from the flight," said Peter McCutcheon, spokesman for the University of Queensland. "That included checking how well the scramjet survived something like (free-falling from 300 kilometers high)."

"One of the big questions at this point is whether a scramjet can survive what it has to go through (reaching Mach 1) before it has to kick in," he said.

A second test could be scheduled in coming days, pending the outcome of an investigation into the flight mishap.