

NASA tests rocket modem using Globalstar satellites
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Imagine a day when self-diagnostic tools allow future rockets to phone home with vital information about their condition, location and performance. NASA engineers hope that day comes sooner than later and believe the technology could replace expensive ground systems, reducing the cost of space flight.

A Flight Modem shown with ruler for scale. Photo: NASA

The "Flight Modem," being developed at the NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, VA, allows a rocket or any other flight vehicle to communicate with ground controllers without the traditional and costly equipment typically associated with flight missions.

"Accessing space is costly, and it represents a major impediment for both government and industry exploration and research," said Jay Pittman, Advanced Range Technology Initiative (ARTI) engineer at Wallops. "The flight modem and innovations like it could reduce or even eliminate some of the costs associated with ground-based tracking-systems operations and maintenance."

The Flight Modem, located aboard the rocket, basically acts like a cell phone and places a call, through orbiting satellites, to ground controllers. The modem can relay the position of the rocket and may one day also provide information on the performance and health of the vehicle and its payload.

An artist's concept of the Globalstar satellite constellation. Photo: Globalstar

A prototype system, costing less than \$2,500 and based on off-the-shelf components, was flown in early February aboard a Nike-Orion suborbital rocket from Kiruna, Sweden. At launch, the modem, which weighed less than three pounds, phoned home via the Globalstar Communications satellite constellation. Engineers are now analyzing the system's performance.

"This is really a breakthrough for us," said Dwayne Morgan, lead engineer on the Flight Modem. "The data looked even better than we hoped. What this means is that it may be possible to track and communicate with our launch vehicles on demand, at very low systems and mission operations costs."

"Our goal in ARTI is to revolutionize the way we support tracking and commanding an in-flight expendable launch vehicle. The performance of the Flight Modem prototype system during the first flight test showed we are on the right track," Morgan said.

Pittman said, "When perfected, the Flight Modem could become a pervasive presence in aircraft and launch vehicle activities and the basis for development of applications that haven't even been thought of yet. We could imagine science or even commercial aircraft 'phoning in' data for analysis from anywhere in the world and from any kind of platform. The cost is so low and the concept so simple it is hard to predict where and how this technology will be used."