NASA, Boeing Sign X-37 Vehicle Agreement

NASA and Boeing today completed negotiations on a $173 million cooperative agreement to develop an experimental space plane called the X-37, which will serve as a test bed for new reusable launch vehicle technologies.

The reusable vehicle (formerly known as the Future-X Pathfinder) can be ferried into orbit by the Space Shuttle or launched by an expendable rocket. It will be unpiloted, autonomously operated and capable of speeds up to Mach 25 while demonstrating aircraft-like operations. The design, based on the Boeing space maneuver vehicle, will incorporate advanced technologies and processes from throughout the company.

"X-37 will serve as a test bed for 41 airframe, propulsion and operations technologies designed to make space transportation and operations significantly more affordable," said Ron Prosser, vice president of Advanced Space for Boeing Phantom Works.

"Our success in this program will position the Boeing Reusable Space Systems business unit to pursue new markets as they develop," he said. "Potential new commercial and military reusable space vehicle market applications for these technologies range from on-orbit satellite repair to a next-generation of totally reusable launch vehicles."

Prosser said the technologies developed and demonstrated on X-37 will eventually make routine, safe, low-cost access to space possible with high reliability, fast turnaround and minimal operational crews. "We view this program as a significant step toward achieving NASA's goal of lowering costs to $1,000 per pound to orbit."

"Our goal is to make space travel as available, affordable and reliable as aircraft travel," said Rick Stephens, vice president and general manager of Boeing Reusable Space Systems. "X-37 will help us attain these goals and advance development of a commercial two-stage-to-orbit reusable capability."

The government/industry team will share the cost of the program roughly 50/50. The government's share includes $16 million from the Air Force to demonstrate additional technologies needed to improve future military spacecraft.

The X-37 concept permits testing of a wide variety of experiments and technologies, including a highly durable, high-temperature thermal protection system; storable, non-toxic liquid propellants; and important new aerodynamic features, all of which are applicable to reusable space vehicles. The vehicle's modular design will also allow testing of both current and future technologies within the same vehicle, providing long-term cost savings.

The vehicle is 27.5 feet long with a wingspan of 15 feet. It has an experiment bay seven feet long and four feet in diameter. Its shape is a 120 percent-scale derivative of the X-40A, an unpowered Air Force vehicle also designed and built by Boeing, which was released from a helicopter and glide-tested in 1998. The X-40A, which lacks the X-37's advanced thermal protection materials, rocket engine, experiment bay and other spacecraft systems, will be drop-tested from a B-52 carrier plane to reduce risk prior to expanded testing with the X-37.

The unpiloted X-37 will be NASA's first reusable launch vehicle demonstrator to fly in both orbital and reentry environments. NASA's X-33 and X-34 technology demonstrators are suborbital.

After the X-37 is deployed into orbit, it will remain in orbit up to 21 days, performing a variety of experiments before re-entering the atmosphere and landing.

"We broke the mold to win this competition," said Dave Manley, Boeing Phantom Works X-37 program manager. "Through Phantom Works, we are able to apply best practices and approaches from across Boeing -- in this case, rapid prototyping, lean manufacturing, avionics, and three-dimensional modeling and simulation -- to help us improve the affordability, quality and performance of this product. Our goal is to develop a concept vehicle with significantly fewer parts and more capabilities than prior vehicles, at a fraction of the cost."

The X-37 government team, led by the Marshall Space Flight Center, Huntsville, Ala., also includes NASA's Ames Research Center, Mountain View, Calif.; Kennedy Space Center, Fla.; Goddard Space Flight Center, Greenbelt, Md.; Langley Research Center, Hampton, Va.; and Dryden Flight Research Center and the U.S. Air Force Flight Test Center, Edwards Air Force Base, Calif.

Rapid prototyping of the X-37 will be conducted at Boeing facilities in Southern California and St. Louis. Assembly, integration, checkout and test are planned at the Boeing X-vehicle production facilities in Palmdale and Seal Beach, Calif. The first unpowered drop test of the vehicle from a B-52 is planned for fall 2001 at Edwards Air Force Base, Calif. Two orbital tests are planned for 2002.

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