

Shuttle-Derived

ATK is adapting shuttle solid rocket for Delta II-class COTS launcher

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Alliant Techsystems (ATK) is developing a solid-fuel launch vehicle for International Space Station resupply and scientific space missions based on hardware it already has in production in one form or another.

A shortened version of the booster that lifts NASA's space shuttle off the pad forms the rocket's first stage. The second stage is a stock Castor 120 motor already used on the Athena and Taurus commercial launchers, and the third stage is a 30-in.-dia. Castor 30 that ATK has been developing based in part on its Castor 4 target.

Topping off the stack is Lockheed Martin's hydrazine monoprop Orbit Adjust Module, which has flown on the Athena. It would be used for in-space approach and docking.

"We think this is a very low-risk approach to the launch market," says Joel Crook, ATK's launch vehicle program director for advanced programs. "We're building on heritage, not stepping off into the unknown."

Chicago-based PlanetSpace is proposing the ATK vehicle as part of its entry in NASA's Commercial Orbital Transportation System (COTS) to spark develop-

ment of a commercial vehicle to resupply the International Space Station after the shuttle fleet is retired in 2010.

With steel casings and current propellant grain designs, the ATK launcher would be able to deliver some 13,233 lb. to ISS by late 2010, according to a company fact sheet. Composite cases and propellant upgrades could add another 1,562 lb. to its ISS payload capacity.

Backed by investment bank BMO Capital Markets, PlanetSpace already has an unfunded Space Act agreement with NASA that will allow it to compete for any COTS contracts the agency may offer. With the failure of Rocketplane Kistler to meet financial milestones for its funded COTS agreement with the U.S. agency, PlanetSpace and its COTS teammates—which also include Lockheed Martin, United Launch Alliance, Wyle Laboratories and Paragon Space Systems—hope to win some of the unspent government seed money in a second competition (*AW&ST* Nov. 26, 2007, p. 27).

"We've been on this path for some time," Crook says. "The COTS seed money accelerates it, and allows us to address other market uncertainties."

The ATK business case isn't limited to ISS resupply under COTS, but also in-


cludes the portion of the launch market that will open up with Boeing's retirement of the Delta II. The company says its design should provide about 25% better performance than the heavy Delta II variants for geostationary transfer orbit (GTO) missions, and almost 40% better for a translunar injection (TLI).

That works out to 6,160 lb. for the GTO mission, 4,147 for TLI and 2,992 for a Mars science mission, according to ATK.

"Our focus right now is obviously NASA COTS and the associated ISS servicing mission, but as NASA rightly recognizes, the business case is difficult to close without launch services for several different markets," Crook says.

Based on in-house work going back to 1999, ATK already has crafted a loaded first stage that consists of 2.5 segments of the four-segment shuttle booster. The Castor 30 third stage has been in development for about two years, based on elements of both the Castor 120 and Castor 4 designs. That stage has reached the critical design review level, while the shuttle-derived first stage has passed preliminary design review and is "on a path to CDR," Crook says.

PlanetSpace also has a teaming agreement with Space Florida, the state-run spaceport at Cape Canaveral, and ATK is exploring use of facilities there. Crook says the solid-fuel approach simplifies ground-infrastructure requirements.

"We are very confident we can provide a competitive offering in this class of launch vehicle," he says. "We're not basing this on PowerPoint designs. It's pretty hard data." 



ATK's new Delta II-class vehicle would combine, from left, a shortened shuttle booster, a Castor 120, a proposed Castor 30 and Lockheed Martin's Orbital Adjust Module.