Boeing To Study Liquid Fly Back Shuttle Boosters For NASA

The Boeing Company today announced it will conduct a study for NASA on the feasibility of replacing the solid rocket boosters (SRBs) used to launch America's Space Shuttle with an upgraded liquid-fueled booster system that autonomously returns to the Shuttle launch site.

The $1 million, 7-1/2-month vehicle definition study for a Liquid Fly Back Booster (LFBB) system is being conducted by Boeing for NASA's Marshall Space Flight Center (MSFC) in Huntsville, Ala. The Boeing Space Systems Division, Downey, Calif., is leading the effort, with support from Boeing facilities in Seattle, Huntsville and Canoga Park, Calif.

John McLuckey, Boeing Defense & Space Group executive vice president, called LFBB the single most significant upgrade under consideration for the Shuttle system.

"The LFBB will allow our nation to substantially increase the safety of the Space Shuttle while at the same time significantly reducing Shuttle operations costs and increasing system performance," McLuckey said. "It's an idea whose time has come."

Boeing Space Systems Division President Robert G. Minor said Boeing is ideally suited to develop LFBB.

"Boeing has extensive expertise in reusable launch vehicle design, systems integration, development and integration of propulsion systems for human space transportation, and production of large aerostructures and thermal protection systems--all of which are directly applicable to the success of LFBB," Minor said. "We look forward to working with NASA to demonstrate the viability of this technology, one whose benefits we believe will prove to be too compelling to ignore."

Boeing LFBB Program Director Ira Victer said LFBB will use liquid propellants and will be fully throttleable and capable of safe shutdown. SRBs, which use a solid propellant, cannot be turned off once ignited. "The result is a booster system more tolerant of engine failure and less likely to require mission aborts," Victer said. "In addition, hazardous booster operations in NASA's Kennedy Space Center (KSC) Vehicle Assembly Building are eliminated, since LFBB fueling operations would occur on the launch pad, much the way the Shuttle's external tank is loaded today."

Beyond improving safety, LFBB would provide other important benefits:

- Reduced Shuttle operations costs and corresponding reductions in payload costs per pound to orbit. Savings of up to $500 million a year are predicted at current flight rates, with more at higher rates.
- Increased performance. LFBB can loft additional weight to the International Space Station.
- Growth options. By substituting an expendable second stage for the Shuttle orbiter, LFBB could loft significant cargo to low Earth orbit. Such capacity will be required for future lunar and planetary missions.

A key objective of the LFBB study will be to minimize changes to the Shuttle orbiters, external tank and KSC Shuttle ground launch infrastructure. Boeing plans to conduct trade studies to determine an optimal LFBB configuration.

In an LFBB launch scenario, the LFBB system separates from the Shuttle orbiter and external tank at an altitude of approximately 198,000 feet - about 40 seconds later than the current SRBs. LFBB then follows a descent trajectory to an altitude of approximately 25,000 to 30,000 feet, at which time jet engines start and the computer-controlled system flies back to KSC's Shuttle Landing Facility, touching down at jet airplane speeds.

The Boeing Rocketdyne Division, Canoga Park, Calif.; Pratt & Whitney, West Palm Beach, Fla.; and Aerojet Propulsion Division, Sacramento, Calif., will support Boeing in defining LFBB engine concepts.

Two Huntsville firms - Qualis Corporation and Control Dynamics, a division of bd Systems - also will assist Boeing in the study. Qualis will develop an LFBB aeroheating model and conduct thermal analyses, while Control Dynamics will develop LFBB guidance, navigation and control requirements from LFBB separation through landing.

Initial results of the Boeing vehicle definition study and a similar study contract awarded to Lockheed Martin are expected in September, with a final report due to NASA in December. NASA then will decide whether to proceed with a preliminary design phase that would begin in early 1998, followed by a design and development phase. If LFBB proceeds to development, a first flight could occur as early as the 2002 time frame.

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Link: NASA http://www.nasa.gov/