NASA SBIR 2006 Phase I Solicitation

X9.02 Innovative Booster Engine Manufacturing, Components, and Health Management

Lead Center: MSFC

The goal of this subtopic is the development of innovative components, manufacturing techniques, health management systems, and design and analysis tools for boost propulsion. Although solid or hybrid rocket propulsion is specifically emphasized, compelling proposals related to liquid engine boost propulsion are also invited. Technologies that would contribute to increased mass fraction and decreased sensitivity to manufacturing and handling effects are particularly welcome, as are those that would reduce the time, cost, and complexity associated with designing and manufacturing large booster rockets. Specific areas of interest include:

- Concepts for solid or hybrid propulsion systems and related components that would lead to increased payload mass fraction over current solid rocket motors;

- Concepts for solid or hybrid auxiliary propulsion systems that can be throttled to provide enhanced vehicle maneuverability;

- Health management technologies, including embedded sensors and modeling methodologies, that would improve the ability to monitor the reliability of solid or hybrid rockets during manufacturing, handling, and flight;

- Manufacturing techniques that allow for reductions in the cost and schedule required to fabricate and test solid or hybrid rockets;

- Propulsion system concepts, components, and fabrication processes designed to reduce the production costs of liquid propellant rocket engines for large expendable boosters;

- Improved design and analysis tools that enhance the engineering evaluation of advanced chemical propulsion system concepts;

- Test data that provides for validation of existing design and analysis tools; and

- New propellant ingredients or formulations that would increase the propellant specific impulse while maintaining a Department of Transportation Class 1.3 hazard classification. Proposals that would experimentally synthesize and characterize new ingredients, or formulate and demonstrate new propellants, are highly encouraged, whereas proposals that rely heavily on the screening of potential new ingredients by quantum chemistry or other computational and theoretical methods are discouraged.
Proposals that address more than one of these items are highly encouraged.