Endeavour Mission Is First Flight For Space Shuttle Main Engine Upgraded For Increased Safety And Reliability

The Space Shuttle Endeavour (STS-89) mission to Mir is the maiden flight for the latest and most significant reliability upgrades to the Space Shuttle Main Engine (SSME) since the beginning of the program.

Endeavour is the first flight for the Block IIA SSME designed and developed by Rocketdyne Propulsion & Power -- a part of The Boeing Company -- for the NASA Marshall Space Flight Center. Among other system improvements, Boeing engineers at Rocketdyne in Canoga Park, Calif. developed a Large Throat Main Combustion Chamber (LTMCC) that reduces overall engine system pressures and temperatures.

"The upgraded technology found in the LTMCC increases engine reliability, safety and operability," said John Plowden, SSME Division Director and Program Manager at Boeing-Canoga Park. "With all of the upgrades, the Block IIA engine will provide better than twice the reliability factor of its predecessor. The Block IIA engine is part of our continuing commitment to building and improving the finest, safest propulsion system in the world."

Since its conception as the only reusable liquid-fuel rocket engine in history, the Space Shuttle Main Engine has compiled an impressive record of success:

- STS-89 will be the 89th flight boosted by the three-engine SSME system -- 33 different engines have been used -- There have been 267 engine flights

In addition to the LTMCC, other major changes included in the Block IIA are the redesigned low-pressure turbo-pumps, high-specific impulse main injectors, and system improvements to sensors, valves and controller software.

"It all adds up to a system that provides a much greater margin of safety and reliability while incorporating a design philosophy of simplification and a dramatic reduction in cycle time and cost," said Dan Hausman, SSME Product Team Manager and Site Director for KSC Launch Operations. "All of this is essential at a time when the Shuttle program is about to take on the heavy-lifting required for assembly of the International Space Station. Upgrades to SSME will help the program meet a commitment to flight safety, on-time launches and 100-percent mission success."

In addition to supporting NASA Marshall Space Flight Center directly with the design, manufacture and support of the main engines for the Space Shuttle program, Rocketdyne Propulsion & Power is providing the electric power distribution system for the International Space Station, produces propulsion systems for the Atlas and Delta launch vehicles and is designing and developing the propulsion systems to power the X-33, a subscale prototype of the Reusable Launch Vehicle, and the next generation Evolved Expendable Launch Vehicle.

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