JASC Delivers First Variable Guide Vane Actuator System For LibertyWorks YJ102R Engine

September 2007—JASC has delivered the first Variable Guide Vane Actuator (VGVA) system for the Rolls-Royce LibertyWorks YJ102R engine. The YJ102R will power the RATTLRS quick-strike technology demonstrator vehicle developed by Lockheed Martin for the U.S Navy. The JASC Variable Guide Vane Actuator is used to adjust the angle of the engine's guide vanes and will operate throughout the vehicle's speed envelope, ranging from subsonic launch to speeds greater than Mach 3.

Pictured during Fleet Week 2006, a mock up of the RATTLRS vehicle and the YJ102R engine (which will power the RATTLRS vehicle) are on display. Noteworthy in the vehicle's overall shape is the design heritage drawn from the SR-71's engine nacelles and moveable inlet spike. Image courtesy ONR

When traveling above Mach 2, friction between the air and the vehicle generates high temperatures requiring the use of non-traditional materials and techniques. The same holds true for components mounted on and around the RATTLRS engine. The extreme temperatures the VGVA will be exposed to required JASC to develop an innovative solution. This design involved the use of a multi-piston, actuator as well as the electronic controller used to position the actuator.

Several factors were key to JASC's success in developing the VGVA. One was the high-fidelity system modeling JASC performed early in the design phase that was used to validate the overall design's performance. Another factor was the creation of a bench test rig to develop and evaluate a variety of algorithms to determine the best control solution for static and dynamic positioning of the actuator.