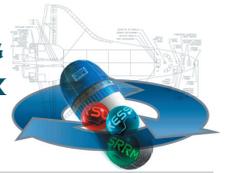


RESILIENT SYSTEM TECHNOLOGIES

ENGINEERING
FOR COMPLEX
SYSTEMS



CHALLENGES

Resilient Systems and Technology (RST) is a product that ECS is developing to help NASA develop and test the feasibility of resiliency technologies for human rated systems. ECS will accomplish this goal by addressing inadequate state assessment and brittle control strategies. The development of RST will also help NASA motivate and enhance student education through demonstrations & applications of ECS unique technologies & research.

OBJECTIVES

The ultimate goal of the RST product is to produce resilient vehicle systems capable to carry out a system-level self-assessment and perform real-time adaptive control based on hazards encountered. The intelligent vehicle envisioned will be capable of planning and executing its mission, managing its health and scheduling its own repairs. Development and implementation of safe communications/interactions of the system with humans (on board or on the ground) is critical to the success of intelligent systems and operations.

CUSTOMERS & COLLABORATORS

- Codes M and R
- Space Station
- Boeing
- US Air Force

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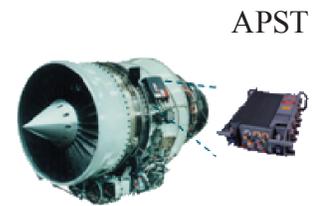
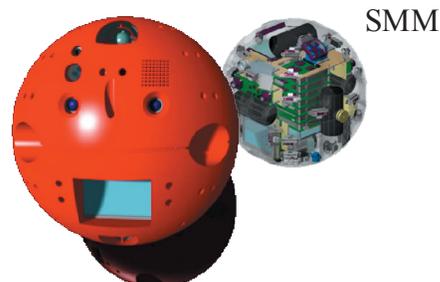
RST supports technologies required to design, build, test, operate and maintain future resilient systems. It develops integrated autonomous operations and low-level adaptive flight control technologies to direct actions that enhance the safety and success of complex missions despite component failures, degraded performance, operator errors, and environment uncertainty. Inherent in this endeavor is monitoring, management, and ultimately control, integrating high-level reasoning and autonomous capabilities with multiple subsystem controllers. RST has three sub-products:

- Spacecraft Mobile Monitor (SMM), maturing mobile robotic environmental monitoring systems that interact with both humans and avionics software to improve environmental fault detection, isolation, & recovery as well as enhancing the crew's productivity via mobile IT capabilities
- Autonomous Propulsion System Technologies (APST) develops advanced engine control and diagnostic software to maximize engine performance to meet mission needs
- Adaptive Flight Control Integration (AFCI) integrates and assesses neural net flight controllers for aircraft avionics resiliency capabilities
- Intelligent Vehicle Health Management (IVHM) for X34/X37

TECHNOLOGIES USED

RST will:

- develop adaptive operations and control strategies
- provide system intelligence to enable reconfiguration or adaptation in response to unanticipated events
- develop intelligent diagnostic technology to allow reliable, accurate, and autonomous assessments of system state
- develop testbeds to verify/validate the integrated software/physical system packages.



IVHM X34/X37



AFCI

