NASA SBIR 2008 Phase I Solicitation

O2.02 Ground Test Facility Instrumentation

Lead Center: SSC

Participating Center(s): GRC, MSFC

Ground testing of propulsion systems continues to be critical in meeting NASA's strategic goals. Advanced ground testing technologies and capabilities are crucial to the development, qualification, and flight certification of rockets engines. The ability to quickly and efficiently perform ground system certification greatly impacts all space programs. Proposals are sought in the following areas:

Instrumentation and Smart Sensors

Innovative network enabled sensors/instruments capable of providing data, a measure of the quality of the data, and a measure of their health are needed. Sensors may be wired or wireless. Smart instruments/sensors that enable improved rocket test operations must provide many of the following characteristics: simplify and standardize the configuration and maintenance of sensor systems; reduce integration time and errors; expedite fault identification, isolation, assessment, and recovery; facilitate reuse; contribute to improved system integration, decrease cabling mass; decrease costs associated with cable/connector fabrication; distribute computing resources; improve reliability and availability; reduce mean-time to recovery after a failure.

Current challenges include: computational power within the sensor to extract features of interest; full implementation of IEEE 1451 family of Smart Sensors and Actuators Standards (plug & play functionality); miniaturization; ease of adding/modifying software for continued evolution of the â€œsmart/intelligentâ€ capabilities.

Integrated Failure Detection, Isolation, and Recovery (IFDIR)

Innovative technologies are needed to enable implementation of affordable, modular, and evolvable IFDIR, including architectures, taxonomies, and ontologies; standards for interoperability; integration software environments; algorithms, approaches, and strategies for anomaly detection, diagnosis, prognosis; user interfaces for integrated awareness of system health and readiness for operations. IFDR must be achieved in the context of comprehensive and continuous vigilance.

Major challenges include software environments for integration, adherence to standards for interoperability, and validated algorithms/approaches/strategies for anomaly detection.