TOPIC NUMBER: N07-010, N132-096

SBIR INVESTMENT:
$1,730,677

PHASE III FUNDING:
$42,837,000.03

ADVANCED PROGNOSTIC AND HEALTH MANAGEMENT (PHM) AND MODEL BASED PROGNOSTIC USEFUL LIFE REMAINING CAPABILITIES FOR AIRCRAFT TACTICAL INFORMATION AND COMMUNICATION SYSTEMS

Frontier Technology Inc. (FTI) developed prognostic and health management (PHM) technology that detects system abnormalities prior to failures.

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THE CHALLENGE

The Navy released two SBIR topics related to data analysis. Topic N07-010 sought the development, demonstration, and application of advanced prognostic models for communication, navigation, and identification systems and their subsystem components. The advanced prognostic models needed to have the ability to monitor system performance, provide early detection of abnormal concerns, diagnose failing components, analyze impact and recommend remedial action before a service interruption. Topic N132-096 sought the development of a software toolset that could extract and transform data from different database systems, and convert it into data packages that create model specific input files and build metrics that support future modeling, simulation, and analysis tasks, as the current method of data transformation was manually intensive.

THE TECHNOLOGY

Leveraging the technologies developed under these two SBIR topics, Frontier Technology Inc. (FTI) developed a prognostic and health management (PHM) technology that interfaces with established electronics systems. A condition-based maintenance plus (CBM+) software toolset evolved from this PHM technology. FTI's CMB+ provides automation in the form of interfaces, reusable workflows, and data validation. The toolset automates the extraction and conversion of large amounts of data for input into a suite of analysis applications and data visualizations. This analytics capability provides an operational framework to implement CMB+ strategies by detecting system abnormalities prior to failures.

THE TRANSITION

Naval Air Warfare Center Aircraft Division (NAWCAD) awarded a basic ordering agreement (BOA) for the technology developed under these two SBIR topics to FTI. From the BOA, FTI was awarded an SBIR Phase III contract for the Global Energy Information System (GENISYS). The GENISYS suite collects and consolidates processes and presents energy information that, when combined with environmental and mission data, provides the information necessary for stakeholders to make informed decisions on energy security usage availability and efficiency. Additionally, FTI was awarded an SBIR Phase III contract from the BOA for a CMB+ software toolset: Training Health Monitoring System (THMS). THMS will be used by the Ship Organic Repair Capability Assist Team (SORCAT) to provide onboard support to determine the effectiveness of the Navy Afloat Maintenance Training Strategy (NAMTS) program.

THE NAVAL BENEFIT

FTI's CMB+ technology monitors system performance and provides early detection of failing components and abnormal conditions, recommending remedial action before the system shuts down. This optimizes operations and mission readiness. The data analytics software toolset that is part of this system reduces analysis time and improves the quality of results, thereby decreasing overall cost.

THE FUTURE

The Navy is using FTI's decision analytics to provide support within decision making, specifically research analysis, operational effectiveness and logistics support for Navy ship missions. Moreover, FTI's artificial intelligence/machine learning decision analysis tools support a broad scope of work across the DoD, including the Air Force, Army, Missile Defense Agency (MDA) and Space Force.