

Innovation

SBIR Topic Number:
AF05-312

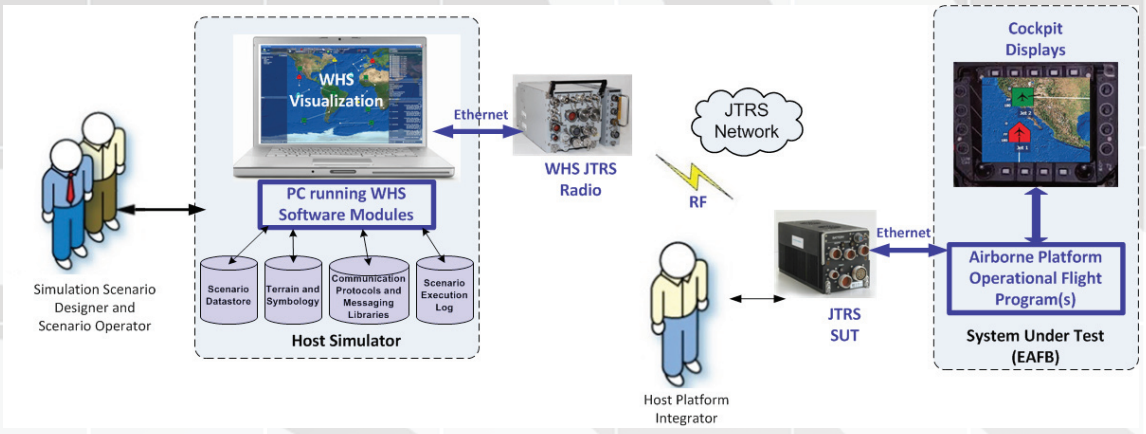
SBIR Title:
Joint Tactical Radio System (JTRS) Wideband Network Waveform (WNW) Host Simulator

Contract Number:
FA9302-07-C-0007

SBIR Company Name:
DataSoft Corporation, Scottsdale, AZ

Technical Project Office:
Air Force Flight Test Center, Edwards AFB, CA

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



WNW Host Simulator (WHS) System Overview: Use the WHS to certify flight readiness by testing new Airborne and Maritime Fixed Station (AMF) JTRS radios, Operational Flight Program (OFF) and WNW interoperability. Verify that communication links in new AMF JTRS radios are successfully integrated into existing Air Force platforms.

Wideband Network Waveform Host Simulator (WHS)

- On large, complex, technologically advanced programs, such as the JTRS, T&E plays a critical role in design, test, and deployment to ensure these systems meet the needs of the warfighter. The T&E challenge is to ensure the AMF JTRS radios and WNW integrate successfully with the airborne platform.
- Using WHS, a JTRS radio is given the various electronic stimuli it needs to “think” it is in flight operation over a geographic area. The JTRS radio and its waveforms are then “operated” in simulated conditions, and the performance and integration with the host platform is measured.
- The primary purpose of the WHS is to provide a simulator that is used for system testing and evaluation as the JTRS and their component platforms, functions, and messages are developed.
- The WHS reduces the risk to flight testing by ensuring the JTRS radio is ready for flight and is properly integrated with the host platform. The WHS can gather test data not possible in a range environment.

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Air Force Requirement

The Joint Tactical Radio System (JTRS) is the next-generation radio system that will replace radio systems onboard military aircraft and in military ground stations. Future systems acquired by the Department of Defense (DoD) must meet the standards for software and hardware configurations set forth by the JTRS Joint Program Office. Moreover, JTRS platforms must have compatible Wideband Network Waveform (WNW) functionality.

On large, complex, technologically advanced programs, such as JTRS, Test & Evaluation (T&E) plays a critical role in design, test, and deployment to ensure these systems meet the needs of the warfighter. The T&E challenge is to ensure the Airborne and Maritime Fixed Station (AMF) JTRS and WNW integrate successfully with the airborne platform. The AMF JTRS is a transformational communications program to modernize the communications systems currently used by the military on fixed and rotary wing aircraft, ground installations, and a wide range of warships and submarines.

The objective of this SBIR topic is to research and develop ground test and diagnostic tools to serve as a computer-based Host Platform Simulator to test the new AMF JTRS radios and WNW.

SBIR Technology

DataSoft developed a prototype WNW Host Simulator (WHS). The WHS can be considered an indoor equivalent to an open-air range in which a JTRS radio terminal is given the various electronic stimuli it needs to “think” it is in flight operation over a geographic area. The JTRS radio and its waveforms are then “operated” in simulated conditions, and its performance and integration with the host platform is measured. Test scenarios are stored so they may be repeated, and logs of message traffic are created so they may be referenced in the event that a system under test fails to respond as required.

The goal is to reduce the risk to flight testing by ensuring the JTRS radio is ready for flight and is properly integrated with the host platform. The WHS can gather test data not possible in a range environment. Benefits associated with the WHS include:

- Use of the WHS prior to flight greatly reduces the risk of incurring non-productive flight test hours.
- The WHS can be used to identify “problem” areas requiring more attention and to troubleshoot and isolate platform issues during integration.

- The WHS can precisely control and repeat test events at a cost far less than an actual flight test.

Developing a simulator to support the JTRS AMF program poses technical, cost, and schedule challenges due to the evolving design of the program and continued development of WNW functionality. DataSoft has devised an innovative approach to significantly reduce this risk and develop a simulator in parallel with the program

Potential Application

The primary purpose of the WHS is to provide a simulator that is used for system testing and evaluation as the JTRS and their component platforms, functions, and messages are developed. The simulator is used to simulate the overall system and the components within it. This will result in identifying problems through all phases of the system development cycle. In particular, it enables customers to identify problems in the design and integration phases that will save substantial time, effort, and cost in the development and implementation phases.

Once the JTRS is in operation, pilots and other users must be trained to use it and the host simulator can be used to supplement this activity. This reduces training expenses due to the configurability and rapid assembly of training scenarios. Other uses for the host simulator include pre-flight testing and operational flight scenario testing.

Company Impact

This SBIR project enabled DataSoft to develop the host simulator technology and to extend the technology to develop a full family of scenario automation tools as a commercial product. The Scenario Automation Tool for Radio Networks (SATRN™) is used to test radio networks in the lab environment before they are deployed. The tool contains a Host Simulator Module, a Radio Lab Automation Scenario Test Module, a Virtual Radio Frequency (RF) Environment Test Module and a Test Execution and Data Management Module.

DataSoft develops, markets, and supports a range of Software Defined Radio (SDR) products and tools for next-generation wireless communications networks. This technology helps networks become flexible, reconfigurable, interoperable, legacy and future compatible, cognitive, and secure.



SBIR/STTR

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