

# Innovation

**SBIR Topic Number:**  
AF06-317

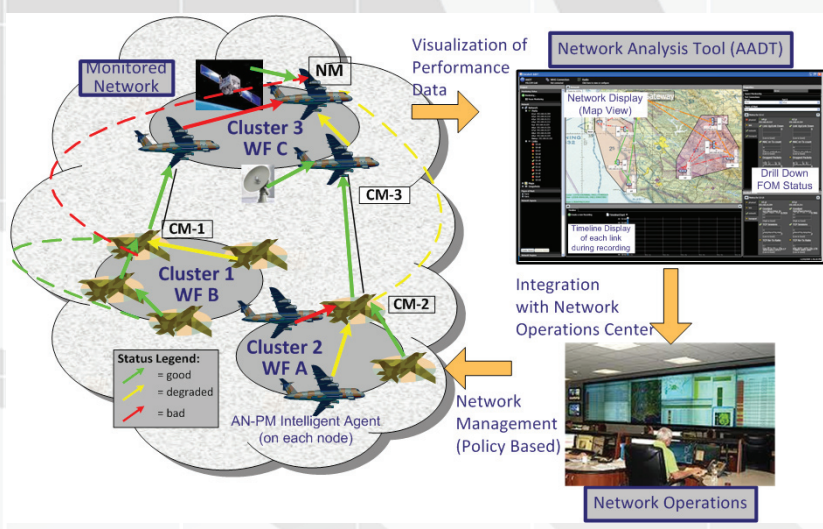
**SBIR Title:**  
Automated Analysis of Datalink Transmissions

**Contract Number:**  
FA9302-08-C-0002

**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.



**Conceptual Diagram of Automated Analysis of Datalink Transmissions (AADT) and Airborne Network Performance Monitoring (AN-PM) Agents monitoring an Airborne Network with improved mechanisms for network data collection to reduce network overhead.**

## Automated Analysis of Datalink Transmissions

- The focus of this SBIR topic is to build a prototype of an automated tool for collecting and analyzing over-the-air data in a Joint Tactical Radio System (JTRS) test environment
- The Automatic Analysis of Datalink Transmissions (AADT) tool automates the collection and correlation of test data from multiple sources, including various platforms participating in disparate networks operating both new and legacy waveforms
- The tool allows the operator to select test data sources, select waveforms and missions, import pretest configuration data, select parameters of interest, make ad-hoc modification of Figure of Merit (FoM) rules, and present visualization options
- The AADT tool may be configured to monitor the network performance of various types of commercial and military wireless networks, as well as to analyze routing and forwarding between Internet Protocol (IP)-based and Tactical Data Link (TDL) subnets through a gateway

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## Air Force Requirement

The U.S. military's next-generation radio system, Joint Tactical Radio System (JTRS), is based on Software Defined Radios that will enable one radio to communicate with several radio networks. This could include a Link-16 tactical datalink, a Single Channel Ground and Airborne Radio System (SINCGARS) network, or one of the Internet Protocol (IP)-based networks [Soldier Radio Waveform (SRW), Wideband Networking Waveform (WNW)] developed for the JTRS program. The large size of networks and the amount of data collected from distributed nodes presents a unique challenge to Developmental Test and Evaluation (DT&E) testers – how to ascertain network status and how to correlate events to debug problems.

Verifying datalink transmissions by manually comparing input signals with output signals is a time-consuming process and limits the amount of analysis which can be done on any given test. The focus of this SBIR topic is to build a prototype of an automated tool for collecting and analyzing over-the-air data in a JTRS test environment.

## SBIR Technology

The Automatic Analysis of Datalink Transmissions (AADT) tool automates the collection and correlation of test data from multiple sources, including various platforms participating in disparate networks operating both new and legacy waveforms. The tool will also allow the data collection and analysis of multiple channels on platform systems under test and will support automated analysis of data routing and forwarding between disparate waveforms and platforms.

AADT is a PC-based software product used to verify the interoperability of JTRS and other IP-based radio platforms in the emerging Network Centric Warfare (NCW) environment. The AADT tool monitors the network performance of a tactical airborne network using Simple Network Management Protocol (SNMP) polling and other data collection mechanisms.

The AADT tool shows the Network Summary, Connectivity, Signal Quality, Network Trend Analysis, Network Utilization, Tactical Analysis, Adherence to Network Design and Drill Down for additional levels of detailed quality of service (QoS) data. The tool allows the operator to select test data sources, select waveforms and missions, import pretest configuration data, select parameters of interest, make ad-hoc modification

of Figure of Merit (FoM) rules, and present visualization options.

A more efficient data collection mechanism, developed under the Air Force Airborne Network Performance Monitoring (AN-PM) SBIR project AF071-072, uses Intelligent Agents as the mechanism to push data via a bandwidth efficient hierarchy of agents to AADT. The AADT tool is used to determine the quality status of network communications and to debug errors in the radios, protocols, waveforms, and network configurations that are under test. The status of individual wireless links is indicated by a simple Good/Green- Degraded/ Yellow-Bad/Red scale based on a FoM calculated for each link.

Furthermore, AADT can be used in conjunction with the DataSoft WNW Host Simulator (WHS) (Air Force SBIR project AF05-312) to study the effects of both valid and invalid messages injected into a network. The AADT tool may be configured to monitor the network performance of various types of commercial and military wireless networks, as well as to analyze routing and forwarding between IP-based and Tactical Data Link (TDL) subnets through a gateway.

## Potential Application

Development of feasible and effective performance management for airborne radio frequency (RF) networks will meet the immediate need of the Air Force Electronic Systems Center (ESC) to research and design airborne networking technology, as well as meet a long-term need for innovation in performance monitoring. The AN-PM Intelligent Agent will guarantee high-quality performance in many large, dynamic, multihop RF networks – military or civilian. The AN vision of a seamless "internet in the sky" is shared with commercial endeavors, enabling the development of decentralized air traffic control and high-mobility vehicular networks.

## Company Impact

This SBIR project enabled DataSoft to productize the work as DANA™ (DataSoft Advanced Network Analyzer) in our suite of tools for network testing, monitoring and performance improvement. DANA™, when used with the WHS commercial tool, SATRN™ and the AN-PM commercial tool, SWARM™ creates a powerful family of tools for emerging IP-based wireless network test, performance management and monitoring.

DataSoft provides flexible hardware and software tools for the development, test and operation of broadband wireless communications systems. Our technology helps customers reduce development costs and improve their time-to-market.



# SBIR/STTR

Air Force SBIR Program  
AFRL/XP  
1864 4th Street  
Wright-Patterson AFB OH 45433

AF SBIR/STTR Program Manager: Augustine Vu  
Website: [www.afsbirsttr.com](http://www.afsbirsttr.com)  
Comm: (800) 222-0336  
Fax: (937) 255-2219  
e-mail: [afrl.xppn.dl.sbir.hq@wpafb.af.mil](mailto:afrl.xppn.dl.sbir.hq@wpafb.af.mil)

