

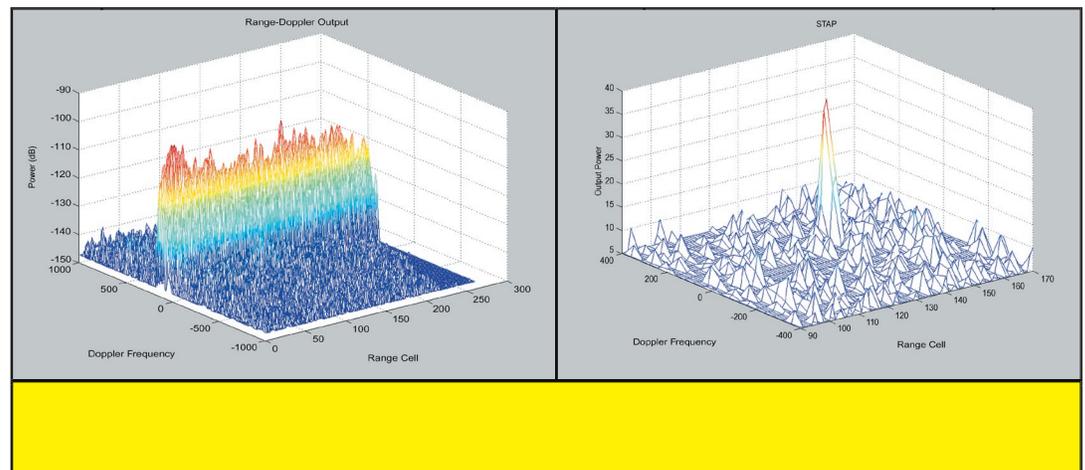


Air Force Research Laboratory | AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

RESEARCH LABORATORY SPACE-TIME ADAPTIVE PROCESSING



The Research Laboratory Space-Time Adaptive Processing (RLSTAP) Algorithm Development Tool, a radar system modeling and analysis tool, generates high-fidelity radar data for evaluation of radar system performance for advanced airborne and space-based radar platforms. RLSTAP can process and evaluate measured radar data and simulate airborne, spaceborne, or ground-based multi-channel radar data in jamming and clutter environments.

In addition, RLSTAP combines measured and simulated radar data, develops and evaluates new space-time adaptive processing algorithms, and assesses the performance of advanced radar systems and advanced signal processing technologies. This new technology allows for advanced concept exploration that realistically predicts operational performance. RLSTAP evaluates innovative concepts and proposals, providing significant risk reduction.



Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

The Sensors Directorate's Radar Signal Processing Branch, led by Mr. Douglas Lynch and located at the Rome Research Site in Rome, New York, created RLSTAP. The extensive capability of RLSTAP is highly adaptive to new requirements and is a cost-effective modeling vehicle for many new programs. The technology transfer to Operational Systems is user friendly and has multiple modes. RLSTAP highlights design deficiencies prior to building hardware, thus reducing design and development time. It allows users to process experimental data and diagnose unanticipated results.

Among the many applications, directorate engineers can use RLSTAP to evaluate proposed systems such as Joint Surveillance and Target Attack Reconnaissance System, Airborne Warning and Control System, F-22, Joint Strike Fighter, Unmanned Air Vehicles, Space Based Radar (SBR), Discoverer II, and the FOPEN (FOilage PENetration) Radar Electronic Support Measures Synergy for Targeting System. In addition, Defense Advanced Research Projects Agency/Special Projects Office will use it to model various jamming techniques and jammer mitigation algorithms.

Created in conjunction with CAESoft Corporation of Garland, Texas, RLSTAP interfaces well with other software including MATLAB (a math software) and CAESoft Phased Array Antenna Simulation. It has the capability to import antenna patterns generated by third party software.

Background

Prior to the development of the RLSTAP Algorithm Development Tool, the testing process was expensive and labor-intensive. Technology was not available to test advanced signal processing techniques without the construction of hardware systems flown on test aircraft. The cost of flight testing could exceed \$10,000 per hour.

RLSTAP integrates and extends the capabilities of previous and ongoing programs. Broad application to both government and private sectors was demonstrated to include Airborne Moving Target Indication, Ground Moving Target Indication, SBR, and Synthetic Aperture Radar Systems; Multichannel and Multiple Coherent Processing Interval; Tracking and Bistatics; Advanced Jammers and Electronic Counter-Countermeasures; Site Specific Clutter; and Aircraft Interaction Effects.

RLSTAP provides modularity; high fidelity; multiple platform types; the capability to use look-up tables to import data; active and passive system analysis; polarization; and wide bandwidth, using monostatic and bistatic analysis capable of adapting to user needs.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-SN-14)