



Impact

SBIR Topic

Number:

AF01-273

Title:

Anechoic Chamber Simulation Tool Using Integrated FDTD and SBR Ray Tracing

Contract

Number:

F04611-02-C-0033

Company Name:

Remcom, Inc.,
State College, PA

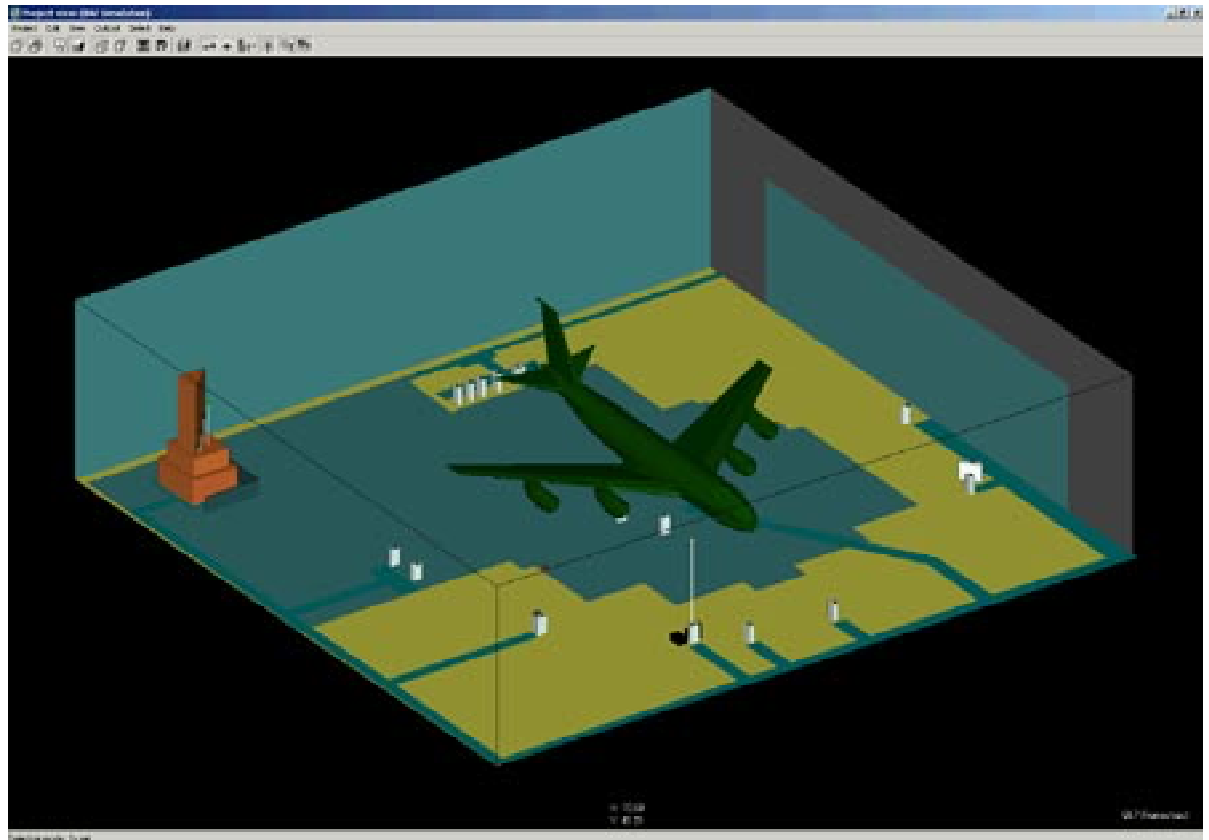
Technical

Project

Organization:

Air Armament Center,
412 TW/EWD

An example of Air Force supported SBIR technology that met topic requirements and is being commercialized by the small business partner.



Software Tools Enhance Analytical and Computational Capabilities of the Air Force's Primary Anechoic Chamber Facility

- **Sophisticated anechoic chamber testing is vital to the development of the Air Force airborne electronic warfare**
- **SBIR supported development of a suite of software tools provides engineer new analytical and computational capabilities for systems testing and evaluation**

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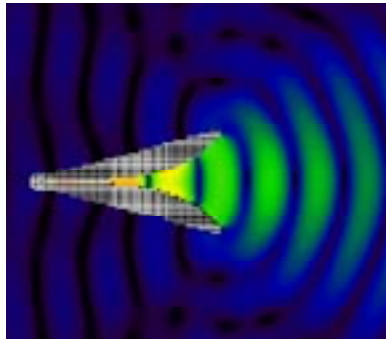
Air Force Requirements

The ever-increasing demand from secure battlespace communications, covert detection, reconnaissance and jamming technologies continues to push requirements for sophisticated and versatile airborne EW systems. As the dependence on airborne systems for military operations grows and airborne warfare technology is integrated into the emerging global military command and control architecture, the cost and complexity of managing and controlling these systems must be bounded. This demand falls squarely on the shoulders of the Air Force electromagnetics and spectrum management systems designers for a wide range of technology areas covering electromagnetics, antennas, modes of diversity, interference mitigation, and overall system performance. Clearly the need for testing and simulation for the performance and interoperability of these systems is paramount. The Benefield Anechoic Facility (BAF) at Edwards AFB is a primary source for this testing and simulation in the USAF. Anechoic chambers are used to create a realistic electromagnetic environment to perform live testing of systems and subsystems.

The Air Force staff at the BAF was searching for software analysis tools to aid in the prediction and analysis of the complicated measurements made in the anechoic chamber. This software would allow a simulation of the entire measurement process to be run to minimize the aircraft downtime and maximize chamber usability. The same dynamic technology atmosphere that drives the measurements also drives changes and enhancements to the anechoic facility itself. This software system would also allow BAF management to make the most effective use of funds while still satisfying the new requirements.

SBIR Technology

The BAF is funding new Anechoic Chamber Analysis Tools technology development programs. One such program is Remcom's Small Business Innovation Research Program (SBIR) project aimed at



producing a suite of software tools that give the BAF engineers and technicians the insight they were looking for and help them take advantage of the latest computational technologies.

Using SBIR Phase I and II contracts Remcom is developing a system that greatly enhances the BAF analytical and computational strength. Accurate analysis of electromagnetic anechoic chambers is a challenging problem. The geometry

is complicated and includes multiple antenna radiators, systems under test (SUT), supporting structures, and absorber. Furthermore the frequency range is extensive, traversing a broad range from 50 MHz to 18 GHz. For the large chamber (264 x 250 x 70 feet) of the Benefield Anechoic Facility (BAF) this means the chamber size in wavelengths varies over a very large range over which different calculation methods must be applied for good accuracy.

Air Force Transition Impact

The SBIR supported development of new software tools will greatly enhance the analytical and computational capabilities of the Air Force's primary anechoic chamber facility.

Company Benefit

1. Remcom has been successful in transitioning this new technology to commercial and DoD contractor sales.
2. Remcom started the Phase II SBIR in May, 2002. This project has already extended its Wireless InSite software to general high frequency analysis, resulting in a new Remcon product which is called XGTD. Remcom is combining their two products, XFDTD and Wireless InSite, to provide electromagnetic analysis over a very wide frequency range. This capability is expected to lead to significant commercial sales.
3. Remcom has several companies interested in adding additional funding to matching Air Force funds for follow-on upgrade contracts.



U.S. AIR FORCE

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