CASE STUDY:

Electronic Warfare Developmental Test and Evaluation

CLIENT DESCRIPTION:

The Electronic Warfare (EW) Integration Branch (454200D), located at NAVAIR-WD China Lake, California, conducts Developmental Test and Evaluation (DT&E), and provides technical support for Operational Test and Evaluation (OT&E) of EW systems in tactical aircraft and airborne weapons. CTA has supported NAVAIR-WD China Lake in their mission to support the ALR-67(V)3 Program since 1990. The EW Integration Branch conducts developmental testing of EW systems including Radar Warning Receivers (RWR), Self Protection Jammers, and RF Countermeasures (RFCM), in a pseudo-realistic RF threat environment; develops processes and procedures for EW systems employment; assists VX-9 Operational Test and Evaluation Squadron and the Weapons Test Squadron (WTS); trains Navy personnel in installation and troubleshooting of EW systems; and directly supports the fleet.

PROJECT HISTORY/DESCRIPTION:

CTA began supporting the EW Integration Branch's DT&E efforts of the AN/ALR-67(V)3 RWR system in early1990, and has steadily expanded that support as the branch's tasking for EW systems testing has grown. This support has spanned all phases of DT&E and support for OT&E from early test concept development, to formal test planning, test execution, and analysis and reporting of results. Major efforts have included:

- Technical Evaluation (TECHEVAL) of the AN/ALR-67(V)3 RWR system
- Development of the AN/ALM-268 Test Set
- Design and construction of the Electronic Warfare Integration Laboratory
- Anechoic chamber tests of the AN/ALR-67(V)3 Antennas
- Single Polarization Dynamic Range Performance Test of AN/ALR-67 (V)3 system
- On-Site installation and troubleshooting of the AN/ALR-67(V)3 in F/A-18 C/D & E/F aircraft
- Technical support for operational testing of Integrated Defensive Electronic Countermeasures (IDECM) System for the F/A-18 E/F.

PROJECT REQUIREMENTS:

CTA is tasked to support to the EW Integration Branch through a myriad of development, design, manufacture, test and evaluation, and maintenance efforts. CTA personnel are integral members of the ALR-67(V)3 Integrated Product Team (IPT), working hand in hand with government engineers providing support to these systems. Specific tasks include:

- Hardware and software analysis, design, development, integration, testing and evaluation of the ALR-67(V)3, and the ALR-67(V)3 Obsolete Processor Replacement (OPR).
- Development of evaluation requirements (system tests), support verification testing, and conduct testing on the ALR-67 (V)3 Radar Warning Receiver, to include HWIL, MITL, field, and flight test.
- Systems engineering design and mechanical/electrical design packages to build and modify specific laboratory test equipment.

- Design, development, manufacture, and operation of the Electronic Weapons Integration Laboratory (EWIL). The EWIL provides a complete EW integration suite of equipment and executable scenarios and scripts including an integrated RF environment that duplicates such factors as free-space losses and antenna-to-antenna isolation for real-time HWIL testing and data capture of the ALR-67(V)3 and other related defensive systems.

- The EWIL includes the ALQ-126B Anechoic Test Bed, interfaces for the AN/ALQ-165 Jammer, and the AN/ALQ-214 RF Counter Measures self-protection jamming system, including the ALE-50/55 Electronic Decoy subsystems. The EWIL also includes the interfaces and simulations required to support integration and testing of the Interference Blanking Unit (IBU/EIBU), Mission Computer Simulations (MCSim), 1553 Backbones to carry system messages on the EW MUX Bus, Avionics MUX Bus (2), and Avionics MUX Bus (5). Radar Blanking Messages, Inertial Navigation Simulations for dynamic (scenario) profiling, Jammer Assignment Messages, Active Emitter Files, Jammer Blanking Messages and other related system messages such as BIT faults are all typical of the role of the 1553 backbone and its associated bus monitoring sub-systems.

WORK ACCOMPLISHED:

Beginning in 1991 CTA was designated the technical support lead for an integrated government and multi-contractor team to plan and execute the Electronic Warfare Integration Laboratory (EWIL) for NAVAIR-WD at China Lake. This initial effort included specification reviews and revisions, development of the AN/ALM-268 Countermeasures Receiving Set Test Set, Anechoic Chamber Test Fixtures in several variants, major system test plans, and development of the EWIL Critical Item Development Specifications.

During the last twelve years CTA continued to provide day-to-day planning, design evaluation, laboratory development, data collection and analysis for the AN/ALR67(V)3 RWR. During the last 2-year segment of this effort CTA has provided additional services and laboratory development to the EW Integration Branch in support of the Integrated Defensive Electronic Countermeasures (IDECM) System currently in Operational Test and Evaluation at VX-9 at China Lake.

Since the original AN/ALR-67 (V)3 testing, CTA has continued to support the EW Integration Branch during developmental testing of a wide array of EW subsystems being integrated on the FA-18E/F including:

- Link-16 (MIDS)
- AN/ALQ-126B Jammer
- AN/ALQ-214 RF Counter Measures Self Protection Jammer
- AN/ALQ-165 Jammer
- AN/ALE-47 Chaff/Flare Dispensing Sets
- AN/ALE 50-55 Electronic Decoys
- Interference Blanking Unit

BENEFITS TO CLIENT:

The EW Program reached a major milestone with the deployment of FA-18E/F aircraft with VFA-115, embarked in USS Abraham Lincoln, in July 2002. The squadron deployed ahead of original schedule with the AN/ALR-67 (V)3 IDECM Block 1 EW suite installed, combat ready, and surpassed fleet expectations during combat operations in support of Operation Iraqi Freedom. CTA is proud to have supported the EW Integration Branch, VX-9, WTS, and the Navy in contributing to the successful deployment of this new, technologically advanced weapons system that will provide the backbone of Navy Electronic Warfare Systems through the next decade.