

CASE STUDY:

FA-18E/F Operational Test and Evaluation

CLIENT DESCRIPTION:

Air Test and Evaluation Squadron Nine (VX-9), located at NAWS China Lake, California, conducts Operational Test and Evaluation (OT&E) of tactical aircraft and airborne weapons. The squadron is under the operational direction of Commander, Operational Test and Evaluation Force (COMOPTEVFOR). As the Navy's Operational Test Agency, COMOPTEVFOR is tasked with providing an independent and objective evaluation of the operational effectiveness and suitability of naval aviation, surface, subsurface, C4I, cryptologic, and space systems in support of Department of Defense and Navy acquisition and fleet introduction decisions. The Chief of Naval Operations (CNO) tasks VX-9 under the authority of COMOPTEVFOR to conduct specified OT&E projects. VX-9 conducts independent operational testing of strike weapons systems including strike aircraft, conventional warfare equipment and electronic warfare equipment, develops tactics and procedures for weapons systems employment, and supports the fleet.

PROJECT HISTORY/DESCRIPTION:

CTA began supporting VX-9's OT&E of the FA-18E/F Super Hornet in 1998, and has steadily expanded that support as the squadron's tasking for FA-18E/F testing has grown. This support has spanned all phases of OT&E from early test concept development, to formal test planning, test execution, and analysis and reporting of results. Major test efforts have included:

- Operational Evaluation (OPEVAL)
- Follow-on Test and Evaluation One (FOT&E 1) and FOT&E 2
- Software Qualification Test (SQT) of System Configuration Set 18E (SCS-18E)
- Operational Testing of Integrated Defensive Electronic Countermeasures (IDECM)
- Operational Assessment (OA) of the Advanced Mission Computer and Displays (AMC&D)
- Developmental Test Assists on multiple systems
- Recently integrated advanced systems on the FA-18E/F

PROJECT REQUIREMENTS:

CTA's OT&E support to VX-9 has required a skilled and knowledgeable staff capable of integrating their technical capabilities with the operational expertise and capabilities resident in the squadron. Successful support has required a staff with:

- Sound engineering and analytical skills
- Thorough knowledge of operational testing processes
- Extensive domain knowledge of test articles, specifically the FA-18E/F aircraft, its systems and associated weapons

- A willingness to work as a team with military personnel in a dynamic and demanding operational environment

During this dynamic, long-term and demanding project, CTA has provided a broad scope of services including:

- Operational concept analysis including analysis of applicable System Threat Assessment Reports (STARs)
- Requirements traceability from the Mission Need Statement (MNS), to the Operational Requirements Document (ORD), to the Test and Evaluation Master Plan (TEMP)
- Test planning including development of the Concept of Operations and Test Plan
- Test operations support including:
 - Flight test engineering
 - Aircraft configuration management
 - Management of aircraft flight clearance process
 - Instrumentation support
 - Application of database tools to manage test data
 - Monitoring laboratory and simulation testing
 - Range and test asset scheduling
 - Data collection from aircraft, ranges and maintenance systems
- Analysis of test data:
 - Air-to-air effectiveness data
 - Air-to-ground effectiveness data
 - Suitability data
 - Reliability data
 - Maintainability data
 - Long term logistics data
- Providing special security for projects, equipment and data requiring additional security protection
- Reporting of test results including Quick Look Reports and Final Reports which form the basis for Navy and DoD acquisition decisions

WORK ACCOMPLISHED:

Beginning in 1998 CTA was designated the technical support lead for an integrated government and multi-contractor team to plan and execute FA-18E/F OPEVAL. This initial effort included TEMP reviews and revisions, development of the FA-18E/F concept of operations document, responsibility for writing major portions of the operational test plan, producing the final test plan document, and building a toolset to support execution, data analysis and final reporting of the OPEVAL. During the OPEVAL test period which included 866 test flights, CTA continued to provide day-to-day flight test planning, data collection and analysis. Subsequent to test operations CTA wrote major sections of the final test report, and assembled and produced the final test report document.

Since OPEVAL, CTA has continued to support the FA-18E/F Program during the first two phases of Follow-on Operational Test and Evaluation (FOT&E). This support role has included the same functions as that performed during OPEVAL, but expanded to a wider array of subsystems and weapons being integrated on the FA-18E/F including:

- ATFLIR
- AMC&D with SCS-H1E
- GBU-24
- JSOW
- PIDS
- IDECM

To accomplish this additional tasking, CTA has developed and maintains a close working relationship with CNO N78 requirements office on traceability of ORD requirements; participates in formal Test Plan Working Groups (TPWGs) and Tactical Training Working Groups (TTWGs); and has placed increased emphasis on review and evaluation of the FA-18E/F Acquisition Logistics Support Plan (ALSP) and the Navy Technical Training Plan (NTTP) for impacts on these plans as the FA-18E/F fleet configuration evolves and changes.

In supporting this test effort CTA has assisted the customer in building internal systems and controls to effectively manage test configurations and data. CTA's analysts developed methods of tracking test flights and test data, developed flight test configuration and data management conventions, and developed plans for distributing flight test data and collecting survey data for subsequent reduction and analysis. CTA has also supported the customer in the development of realistic scenarios to support operational effectiveness and operational suitability testing. CTA monitored flight test operations from range control facilities, and served as a liaison between the range control test conductor and the project pilot. CTA's analysts monitored range instrumentation readiness, assisted with target preparations and coordination, assisted with modeling and simulation accreditation, and ensured maintenance personnel training and aircrew currency were adequate for test.

CTA also provided configuration management for all documentation relevant to the FA-18E/F including the FA-18E/F SCS-18E "Gold Book", the SCS-18E MUX Bus word listings, and the Functional Requirements Document (FRD) for SCS-18E, High Order Language (HOL) H1E and H2E. Because of the varying configurations of test aircraft configurations, CTA developed and manages software configuration listings to assist aircrew in the pre-flight software verification process, minimizing the possibility of violating authorized flight clearance limits.

BENEFITS TO CLIENT:

The FA-18E/F Program reached a major milestone with the deployment of FA-18E aircraft with VFA-115 on USS Abraham Lincoln in July 2002. The squadron deployed ahead of original schedule, fully combat ready and surpassed fleet expectations during that first deployment. CTA is proud to have supported VX-9 and the Navy in contributing to the successful deployment of this new, technologically advanced weapons system that will provide the backbone of Navy carrier aviation through the next decade.