

## Battle Control System – Fixed (BCS-F)

### Executive Summary

- The Battle Control System – Fixed (BCS-F) is used in North American Aerospace Defense (NORAD) air defense sectors (ADS) and regional air operations centers (RAOC) to provide surveillance, identification, and control of U.S. and Canadian airspace.
- The Air Force and Combatant Commander Northern Command (NORTHCOM) approved the merging of the Southeast ADS and Northeast ADS into a single Eastern ADS located at the previous Northeast site.
- NORTHCOM approved fielding BCS-F Spiral 2 at the Western ADS and Eastern ADS.
- The National Capital Region (NCR) Integrated Air Defense System (IADS), established after 9-11, underwent baseline testing.

### System

- BCS-F is a tactical air battle management command and control system.
- BCS-F is intended to replace the legacy AN/FYQ-93 and the NORAD Contingency Suite. The NORAD Contingency Suite is a system that was put in place after 9-11 to help with the increased operator workload. However, BCS-F (the system of record) provides the mainland U.S. ADS and Hawaii and Alaska RAOC with common commercial off-the-shelf hardware and an open architecture software configuration.
  - Spirals 1 and 2, developed through September 2007, have satisfied many of the BCS-F requirements. These spirals relied upon a 9-11 contingency system to do much of the over land analysis.
  - Spiral 3 will transition to a Linux operating system and use the Solipsys Tactical Display Framework. This spiral will eliminate the need for the contingency system. Additionally, this spiral will share much of the software used on a similar ground-based system, BCS-Mobile.
- Each BCS-F system requires some customization due to the different interfaces required at each of the sites.



- BCS-F is a bi-national program with Canada.
- The NCR IADS was established after 9-11 to coordinate air defense of the NCR. In addition to the civilian aviation system, it added Sentinel radars and optical/infrared sensors for detection and identification of air traffic. The NCR IADS includes both pedestal-mounted Stingers and ground-based Advanced Medium-Range Air-to-Air Missiles for defense.

### Mission

- NORAD forces and Homeland Defense forces use BCS-F to monitor and control U.S. and Canadian airspace.
- Forces use the BCS-F to monitor air traffic in and approaching U.S. airspace, and to pass information regarding air traffic onto air defense and national command authorities.
- The Air Force uses the BCS-F to control air defense assets, including fighters, to intercept and identify potential air threats to U.S. airspace.
- The NCR IADS is charged with defending the NCR from air threats.

### Activities

- The BCS-F team conducted Spiral 2 software load periods for Interim Contractor Support (ICS) Builds 1 and 2 at the Eastern and Western ADS facilities. Builds, or software repairs, fix system deficiencies between spirals.
- BCS-F Spiral 2 ICS Build 3 system fix is undergoing contractor and developmental testing, with a software load period scheduled for November 2007 at the Eastern and Western ADS facilities.
- NORTHCOM approved the BCS-F Spiral 2 fielding at the Western and Eastern ADS facilities.
- While the BCS-F program has been working on developing a Spiral 3 Test and Evaluation Master Plan (TEMP), it has not been submitted for DOT&E approval.
- BCS-F Spiral 3 has begun contractor testing with observation by government testers.
- The Air Force and the Army conducted baseline and certification testing of the NCR IADS. This testing included both the developmental and operational testing and

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evaluation, Information Assurance certification testing, and interoperability certification testing.

- The NCR IADS testing is ongoing and is scheduled to conclude with an Operational User Evaluation (OUE) in November 2007.

## Assessment

- The current Operational Requirements Document was developed prior to 9-11, with annex updates dated February 20, 2003. Therefore, the Air Force needs to review and update their test planning documents for DOT&E review and approval.
- DOT&E's emerging results are that the testing was adequate to demonstrate that the BCS-F Spiral 2 is an improvement over the legacy air defense command and control software, the FYQ-93, but not as effective as the current NORAD Contingency Suite for the Western and Northeastern ADS facilities.
  - Deficiencies include human-machine interface immaturities (the ability to connect to the NCR Sentinel radar network); a remote display system being delivered to higher headquarters locations; operator handbook updates; and displaying flight plans generated by the Federal Aviation Administration.
  - Testers also experienced workstation and server failures.
- Spiral 2 testing was accomplished without a DOT&E-approved TEMP or Operational Test Plan, as testing was conducted during a transition to DOT&E oversight. The BCS-F program

has been adjusting to OSD oversight since becoming an Acquisition Category-1 program in March 2006.

- BCS-F Spiral 3 operational testing may be delayed due to the lack of an approved TEMP. The program development is hindered by an inability to develop and maintain a stable acquisition, testing, and fielding schedule.
- Ongoing development of the Spiral 2 ICS builds place the BCS-F Spiral 3 schedule at risk.
  - The program has provided DOT&E a plan for managing the parallel development and testing of two separate Spirals.
  - Scarce test resources and personnel place Spiral 3 efforts at risk if Spiral 2 continues at its current pace.

## Recommendations

- Status of Previous Recommendations. The Air Force has not updated its test planning documentation. The Air Force needs to update the Operational Requirements Document (ORD) to reflect changes in BCS-F's mission requirements (FY06). The Air Force should reconsider funding upgrades to the NORAD Contingency Suite if BCS-F is the objective system for the ADS and RAOC facilities, while keeping the NCS in-place at both the Western and Northeastern ADS facilities until Spiral 3 is fielded (FY06).
- FY07 Recommendations. The Air Force must:
  1. Expedite the completion of Spiral 3 TEMP to avoid jeopardizing program progress.
  2. Develop a plan for managing the parallel development and testing of two separate Spiral 2 and 3 efforts.