

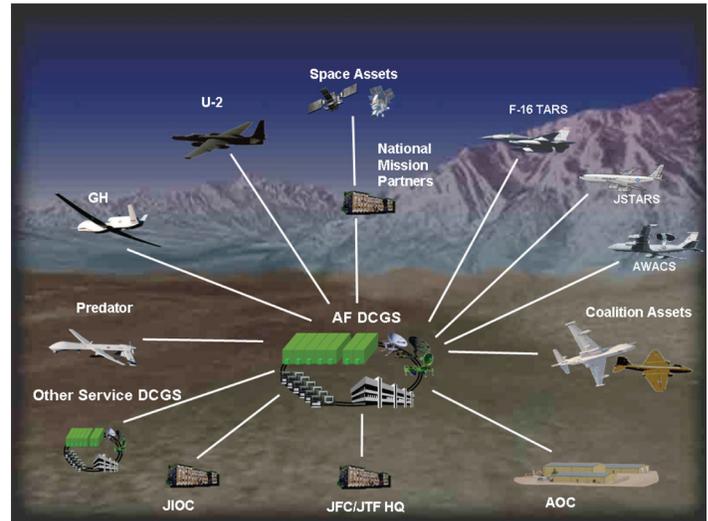
## Air Force Distributed Common Ground System (AF DCGS)

### Executive Summary

- The Air Force 605th Test and Evaluation Squadron (TES) conducted two phases of a Force Development Evaluation (FDE) of the latest version of Air Force Distributed Common Ground System (AF DCGS) (Bulk Release 10B) in January and June 2014. Bulk Release 10B was delivered as a part of a Geospatial Intelligence (GEOINT) update. Key software enhancements of Bulk Release 10B degraded system performance to unacceptable levels, leading the Air Force to turn off the software in order to continue mission operations.
- The Air Force split the AF DCGS program into four Acquisition Category (ACAT) III programs after declaring Full Operational Capability in 2009 and moved the program from the development phase into the sustainment phase despite the program's immaturity. The four ACAT III programs lack appropriate and up-to-date test and evaluation, systems engineering, and requirements documentation.

### System

- AF DCGS is an intelligence enterprise system that includes hardware housed in 5 core sites and 16 distributed sites, with a network that connects them to each other and to other intelligence networks, sensors, and mission command systems.
- The Air Force declared AF DCGS to be at Full Operational Capability in 2009. Since then, the Air Force has treated AF DCGS as if it is in sustainment, even though it is continuing to develop four ACAT III programs: Signal Intelligence (SIGINT) upgrades, GEOINT upgrades, Network Communications, and Data Links.
- The GEOINT upgrade, Bulk Release 10B, introduced a common baseline across the AF DCGS enterprise. A common baseline should allow for easier updates and modifications of the entire enterprise, and provide capabilities to handle new and emerging sensor information and the increased data loads resulting from the growing number of sensors being fielded. After the Bulk Release 10B FDE at DCGS Ground station (DGS)-2, the Air Force renamed the Bulk Release 10B to GEOINT Baseline 4.1.
- The AF DCGS System Release 3.0 is a SIGINT upgrade, which makes SIGINT data and services available to internal and external users; improves operations with the Airborne Signals Intelligence Payload low-band sensor; and improves processing, exploitation, and dissemination for high-band sensors. High-band sensors are used for Electronic Intelligence (collection of pulse and constant wave radars primarily), while low-band refers to Communications



**AOC - Air Operations Center**  
**AWACS - Airborne Warning and Control System**  
**GH - Global Hawk**  
**HQ - Headquarters**  
**JFC - Joint Forces Command**  
**JIOC - Joint Intelligence Operations Center**  
**JSTARS - Joint Surveillance Target Attack Radar System**  
**JTF - Joint Task Force**  
**TARS - Tactical/Theater Airborne Reconnaissance System**

Intelligence (collection of radios of various type and special signals).

- AF DCGS has five core sites located at Langley AFB, Virginia (DGS-1); Beale AFB, California (DGS-2); Osan Air Base, Korea (DGS-3); Ramstein Air Base, Germany (DGS-4); and Hickam AFB, Hawaii (DGS-5). Worldwide, the Air Force has installed AF DCGS at an additional 16 sites: DGS-Experimental at Langley AFB, 7 Air National Guard Sites, and 8 distributed mission sites that include deployable sites to support special requirements.
- The DCGS Integration Backbone (DIB) provides the framework that allows sharing of intelligence services and data via web services. The Army, Navy, Air Force, and intelligence agencies developed and fielded their own versions of DCGS, which provide access to the DIB. Via the DIB, intelligence analysts can search for and download intelligence information and post the intelligence product they produce for others to use.

### Mission

- The Air Force uses AF DCGS to connect to the DIB, manage requests for sensors, process sensor data, exploit sensor data from multiple sources, and disseminate intelligence products.
- The Joint and Combined Force Air Component Commander uses AF DCGS to produce and disseminate Intelligence, Surveillance, and Reconnaissance (ISR) information.

# FY14 AIR FORCE PROGRAMS

- The ISR products support intelligence preparation of the battlespace, predictive battlespace awareness, indications and warning, analysis of enemy courses of action, targeting and weapon selection, mission planning, and execution of air combat missions.

## Major Contractors

- Raytheon – Garland, Texas
- Lockheed Martin – Denver, Colorado
- L-3 Communications – Greenville, Texas

## Activity

- In August and November 2013, the 46th Test Squadron conducted developmental and regression testing on Bulk Release 10B. The system demonstrated major software shortfalls during both of these tests and the 46th Test Squadron recommended against entering the operational test.
- Despite not meeting the operational test entrance criteria (two CAT I and four CAT II software deficiencies), the Air Force Intelligence, Surveillance, and Reconnaissance Agency (AFISRA) approved entrance into operational testing. In January and June 2014, the 605th TES conducted phases 1 and 2 of a two-phase FDE to assess the operational effectiveness and suitability of AF DCGS Bulk Release 10B.
- In accordance with the DOT&E Guidelines for Operational Test and Evaluation of Information and Business Systems, the 605th TES conducted the risk assessment and determined that the FDE plans did not require DOT&E approval of the test plan. The operational test did not include cybersecurity testing by an independent cybersecurity Red Team.
- On August 28, 2014, DOT&E wrote a memorandum to USD(AT&L) summarizing the results of the FDE and outlining concerns with the progress of the program.
- The AF DCGS test and evaluation team is working with DOT&E to update the program's Test and Evaluation Master Plan.
- The 605th TES is working with DOT&E on the test plan for the next round of GEOINT upgrades.
- In August 2014, the 46th Test Squadron conducted developmental and regression testing on System Release 3.0. The system continues to exhibit major software shortfalls. The Air Force delayed the planned Operational Utility Evaluation from June 2014 to July 2015 to allow time for the software to be fixed and demonstrated in a developmental test prior to starting operational testing.

## Assessment

- New software delivered with Bulk Release 10B caused such significant slowdowns in workflow that AFISRA decided to turn off the software in order to continue mission operations. Operators found the system difficult to use, and the software did not meet reliability or availability requirements.
- Although users were able to perform all necessary missions under normal load conditions, performance under heavy loads

could not be determined. Heavier loads are expected in the future when new sensors are deployed and the number of simultaneous external users are increased.

- The system did not meet its reliability requirements because of the critical failures and downtime. While users can execute their missions with AF DCGS, key software enhancements are not maturing. The upcoming FDE will test fixes to some of the software problems observed during previous testing.
- In part because the Air Force placed AF DCGS in the sustainment vice development phase, the program lacks standard acquisition processes and documentation. Specifically, it lacks a strategy for testing and evaluation; documented performance requirements for planned enhancements; accurate software maturity trend information; and an approved system engineering plan including the DOD Architectural Framework products.
- Survivability could not be evaluated due to the lack of an independent cybersecurity test by a certified Red Team.

## Recommendations

- Status of Previous Recommendations. DOT&E previously recommended an appropriate level of testing for the program; the Air Force conducted adequate developmental testing, but did not fix the problems discovered in developmental testing prior to conducting the FDE in FY14.
- FY14 Recommendations. The Air Force should:
  1. In the future, proceed to operational testing only when supported by successful development testing.
  2. Demonstrate the ability of AF DCGS to operate at anticipated workload levels.
  3. Complete a cybersecurity assessment with a certified Red Team, including operationally representative cyber attacks.
  4. Document the Air Force's requirements for each delivery for each of the four programs and conduct adequate test and evaluation based on a risk assessment in accordance with DOT&E guidelines.
  5. Submit a Test and Evaluation Master Plan for DOT&E approval, which includes an accurate description of AF DCGS requirements, architecture, and interfaces sufficient to justify the test approach.