

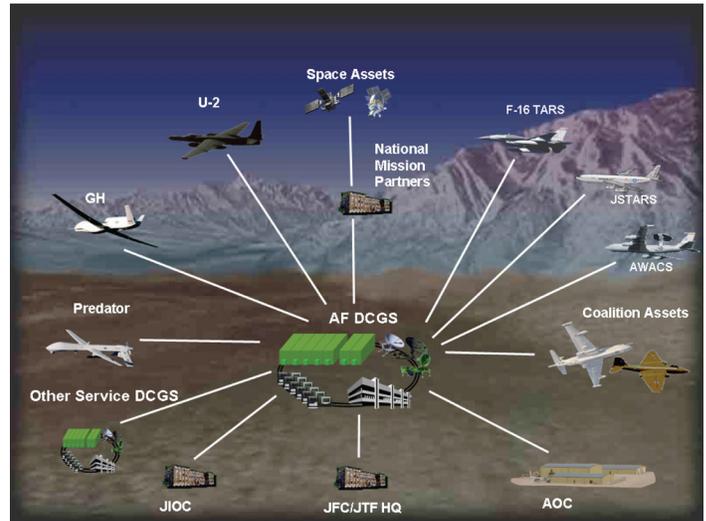
Air Force Distributed Common Ground System (AF DCGS)

Executive Summary

- Air Force intelligence units use the AF DCGS to produce intelligence information from data collected by a variety of sensors on the U-2, RQ-4 Global Hawk, MQ-1 Predator, MQ-9 Reaper, MC-12, and other Intelligence, Surveillance, and Reconnaissance platforms.
- The Air Force 605th Test and Evaluation Squadron completed Phase 1 of a three-phased Force Development Evaluation on the Geospatial Intelligence (GEOINT) Baseline 4.1 in June 2015. While GEOINT Baseline 4.1 did not harm any legacy capabilities, the only notable functional improvement was the ability to ingest synthetic aperture radar data from Global Hawk Block 40.
- The Air Force declared Full Operational Capability in 2009 and moved the program from the development phase into the sustainment phase despite the program's immaturity. In August 2015, the Air Force restructured AF DCGS from four Acquisition Category (ACAT) III programs into seven ACAT III programs. After the Air Force issued the Acquisition Decision Memorandum for the seven programs, it added one additional ACAT III program called DCGS Reference Imagery Transition (DRT), making a total of eight ACAT III programs. These programs lack current and accurate test and evaluation, systems engineering, and requirements documentation.

System

- The AF DCGS, also referred to as the AN/GSQ-272 SENTINEL weapon system, is an intelligence enterprise system that is composed of 27-geographically separated, networked sites, including 5 core sites across the globe.
- AF DCGS provides hardware and software tools for operators to plan, collect, process, exploit, and disseminate Intelligence, Surveillance, and Reconnaissance information. The DCGS Integration Backbone provides the framework that allows sharing of intelligence services and data via web services.
- The Air Force declared AF DCGS to be at Full Operational Capability in 2009, though it is continuing to develop the following four areas, each of which were ACAT III programs: Signal Intelligence (SIGINT) upgrades, GEOINT upgrades, Network Communications, and Data Links. In August 2015, the Air Force restructured AF DCGS from four ACAT III programs into seven ACAT III programs. Subsequent to the decision to transition to seven programs, the Air Force added one additional ACAT III program called DRT, making a total of eight ACAT III programs. Of the eight programs, only two programs—GEOINT Baseline 4.1 and the System Release 3.0—have been operationally tested.
- GEOINT Baseline 4.1 is part of the GEOINT upgrades portion of AF DCGS, is the merger of Bulk Release 10B with several



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

- deficiency corrections, and the integration of Airborne Cueing and Exploitation System-Hyperspectral (ACES-Hy) and Global Hawk Block 40.
- 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 SIGINT Payload low-band sensor, and improves processing, exploitation, and dissemination for high-band sensors.

Mission

- The Air Force uses AF DCGS for Intelligence, Surveillance, and Reconnaissance collection, processing, exploitation, analysis and dissemination.
- Air Force intelligence units use the AF DCGS to produce intelligence information from data collected by a variety of sensors on the U-2, RQ-4 Global Hawk, MQ-1 Predator, MQ-9 Reaper, MC-12, and other Intelligence, Surveillance, and Reconnaissance platforms.
- The Air Force uses AF DCGS to connect to the multi-Service DCGS Integration Backbone, manage requests for sensors, process sensor data, exploit sensor data from multiple sources, and disseminate intelligence products.

Major Contractors

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

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Activity

- From November through December 2014, and in May 2015, the 46th Test Squadron conducted developmental and regression testing on GEOINT Baseline 4.1.
- In June 2015, the 605th Test and Evaluation Squadron conducted Phase 1 of the three-phased Force Development Evaluation at DGS-5 to assess the effectiveness and suitability of GEOINT Baseline 4.1 in support of a fielding decision following all three test phases.
- In May 2015, the 92nd Information Operations Squadron conducted a cybersecurity Cooperative Vulnerability and Penetration Assessment (CVPA) of System Release 3.0 (part of the SIGINT Upgrades program) at DCGS Ground Station – Experimental (DGS-X).
- In June 2015, the 46th Test Squadron conducted a cybersecurity CVPA of GEOINT Baseline 4.1 at DGS-X.
- The Air Force Program Executive Officer for Battle Management signed an Acquisition Decision Memorandum on August 6, 2015, to re-structure the program into seven Acquisition Category III programs: Sensor Integration, GEOINT Transformation, GEOINT Bulk Release 4.1, SIGINT Transformation, System Release 3.0, Infrastructure Transformation, and Multi-Intelligence. After the Acquisition Decision Memorandum, the Air Force added one additional ACAT III program called DRT, making a total of eight ACAT III programs. These programs lack current and accurate test and evaluation, systems engineering, and requirements documentation.
- The eight programs, when combined, exceed the funding threshold for a Major Automated Information System (MAIS) program. The Army and Navy versions of DCGS systems are MAIS programs.
- From September 10 through November 6, 2015, the Air Force Operational Test and Evaluation Center conducted an Operational Utility Evaluation on System Release 3.0. DOT&E will submit a report on the results of testing in early 2016.
- Testing was conducted in accordance with a DOT&E-approved test plan.
- The ability of GEOINT Baseline 4.1 to ingest synthetic aperture radar data from the Global Hawk Block 40 is the only notable functional or performance gain over existing capability. The existing capability supports high- and medium-altitude planning, collection, processing and exploitation, analysis and production, and dissemination.
- Full motion video continues to have problems with freezing and degraded images. A Category 1 Urgent Test Problem Report has been open since June 2014 regarding full motion video software. Full motion video analysts continue to rely on software that is not a part of AF DCGS, and that the Air Force does not plan to continue to provide.
- Usability concerns remain as evidenced in the low System Usability Scale scores, particularly for full motion video operators. Mission processes are complex and poorly documented.
- Training is lacking in quality and frequency, and maintenance documentation and positional checklists are inadequate. The training survey forms indicate some operators and maintainers (19 of 143) did not receive any GEOINT Baseline 4.1 training, while others (10 of 143) specifically said they received training in October 2014, but did not start using GEOINT Baseline 4.1 until May or June 2015 with no refresher training. Analysts also commented that documentation and checklists were missing key information.
- Cybersecurity testing conducted at DGS-X discovered vulnerabilities. The details are classified. The Air Force is working on implementing fixes. Cybersecurity testing of an operational site is planned in FY16-17.

Assessment

- The program continues to lack current requirements and architecture documents, which inhibit the tester's ability to conduct an adequate evaluation.
- The program lacks a rigorous and comprehensive software problem tracking and reporting procedures. The Air Force is working to develop and implement software tracking and reporting via the AF DCGS Enterprise Service Desk.
- Multiple DGS users created ad-hoc DCGS analysis and reporting teams to perform intelligence fusion. These teams significantly enhanced situational awareness by integrating multiple intelligence disciplines. However, the Air Force did not formally resource these teams. Thus, the teams lack personnel, doctrine, training, and material support.

Recommendations

- Status of Previous Recommendations. The Air Force satisfactorily addressed, or made satisfactory progress towards implementing, two of five previous recommendations. The three previous recommendations still outstanding are:
 1. Demonstrate the ability of AF DCGS to operate at anticipated workload levels. This requirement is still being waived by the Program Office prior to testing since much of the enterprise is not yet on a common baseline.
 2. Document the requirements for each delivery for each of the four, now eight, AF DCGS programs and conduct adequate test and evaluation based on a risk assessment in accordance with DOT&E guidelines. Adequate risk assessments have been conducted on all subsequent operational tests; however, requirements documentation is still lacking.
 3. Submit a Test and Evaluation Master Plan (TEMP) for DOT&E approval, which includes an accurate description of AF DCGS requirements, architecture, and interfaces sufficient to justify the test approach. The Program Office is making progress but has not submitted a complete draft TEMP.

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- FY15 Recommendations. The Air Force should:
 1. Consider formally establishing and resourcing the DCGS analysis and reporting team, or a similar all-source fusion component, in each DGS.
 2. Develop and implement a software change request process including tracking of software metrics for problems open and closed by severity and time.
 3. Improve training, documentation, and checklists prior to the next phase of testing.
 4. Document all known cyber vulnerabilities in a plan of action and milestones and track the progress.
 5. Implement the planned new cybersecurity demilitarized zone architecture prior to the next CVPA at an operational site.
 6. Document and review operational processes and simplify where possible to support training and operations.

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