# The Synergy of Networkcentric Technologies, GIS, and the Distributed Common Ground System's Integration Backbone (AF DCGS Block 10.2)

The past several years have proved the need for persistent intelligence, surveillance, and reconnaissance (ISR) for U.S. armed forces. They require real-time information to gain decision superiority and dominate the battle space.

The Air Force's (AF) major ISR system, largely made up of legacy components and known as the Distributed Common Ground System (DCGS), recently struck a major evolutionary milestone. The Electronic System Center's Intelligence Surveillance and Reconnaissance Integration System Program Office awarded the AF DCGS Block 10.2 upgrade contract to an industry team of major companies led by the Raytheon Corporation.
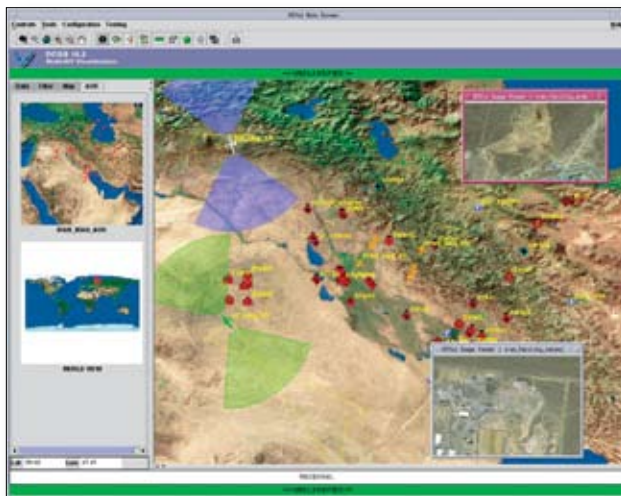
The AF DCGS 10.2 upgrade of the Air Force ISR DCGS System will enable networkcentric operations using the DCGS Integration Backbone (DIB) for the U.S. armed forces as each service develops its own system.

DIB can trace its lineage from the Chairman's Joint Vision 2020, Defense Planning Guidance, Quadrennial Defense Review and Service modernization and transformation efforts.

The Department of Defense (DoD) envisions DCGS as a globally integrated, distributed, and collaborative information technology enterprise. AF DCGS Block 10.2 will provide continuous, on-demand intelligence to achieve full-spectrum dominance so that American and Coalition forces can change the mission objectives in hours, minutes, or even seconds. The environment provides physical and electronic distribution of ISR data, processes, and systems.

The Raytheon-led team is working shoulder to shoulder with the U.S. Air Force to transform the current tasking, processing, exploitation, and dissemination (TPED)-based DCGS system into the task, post, process, and use (TPPU) model.

Current ISR systems feed data into platformcentric "stove-piped" tasking, processing, exploitation, and dissemination systems operating independently of each other. Because of this partitioning, commonality and interoperability are restricted between the services, which limits their ability to operate in a joint and coalition environment. AF DCGS Block 10.2 overcomes these obstacles.

With the introduction of the AF DCGS Block 10.2 DIB capabilities, current intelligence data is posted to the network for immediate use by analysts and war fighters and is integrated with other assets to produce situational awareness of the battle space.

ISR knowledge is presented to users in many ways, primarily through the use of a commercial Web-based architecture and technologies and integration, via the DIB, of multiple intelligence systems into a single, worldwide networkcentric enterprise, thus enabling interoperability and improved collection and delivery of ISR data. AF DCGS Block 10.2 Web-based technologies will transform ISR into an integrated element of DoD command and control systems.

The AF DCGS Block 10.2 DIB system's open architecture was developed so that any node or workstation within the Air Force DCGS organization can share intelligence across a worldwide network.

Access to the enterprise tools is a point and click away from any Air Force user's fingertips via the centralized Air Force DCGS portal. It is fully customizable according to the user's preferences and performance functions.

The Web-based ISR product developed for AF DCGS Block 10.2 to visually share and manage the federated data of the battle space is Multi-Int Visualization (MiViz). MiViz is purely browser based and was created in concert with the subject matter experts of the Air Force. Each provided priceless inputs into the development and use of the final product.

MiViz is a completely DIB-enabled product composed of enterprise-optimized source code and enterprise-enabled COTS geographic information system (GIS) software from ESRI. MiViz extensively employs ESRI® MapObjects®—Java™ and ArcXML™ to interface to the plethora of mapping server functions provided by ArcIMS® and ArcSDE®. This architecture is bounded by WebLogic Server® to expose all National Geospatial-Intelligence Agency (NGA) GIS products (CADRG, VMap, CIB, DTED, etc.) and ESRI GIS functions and analysis tools to users of the enterprise.

Interactive mapping functions provided by MapObjects—Java (e.g., pan and zoom) can be used without modifications out of the box. MapObjects acetate data layers are employed to create the extensive overlay system architected into the MiViz product. MiViz enhanced filtering features, along with acetate layers, allow the user to efficiently manage and filter all battle space data and optimize the displayable real estate quickly and efficiently.

Another AF DCGS Block 10.2 DIB- and GIS-enabled tool is the Meta Data Query Service. The Meta Data Query Service is a search engine designed for quick, efficient searching of metadata across the entire ISR enterprise. Data is retrieved via compound queries combining contextual, temporal, and geospatial criteria. Raytheon's chief systems engineer for AF DCGS Block 10.2, Stephen Yates, described it once as being like "Google® with a clearance."

The many interactions during the development process between software developers and subject matter experts (SMEs) and the use of enterprise-based ESRI GIS and DIB products have culminated in a powerful set of user tools—MiViz, Meta Data Query, and other Web-based products—which are easily learned and used by anyone. The intuitive point-and-click actions propel the user into completion of activities with decisive strokes.

As each service's DCGS system adopts DIB, intelligence data will be shared seamlessly across the entire ISR family of systems. Raytheon is currently working with the other services and government agencies, assisting them in deploying, employing, and architecting their systems with the DIB infrastructure, thereby facilitating the vision of future interconnectivity and sharing of all data across one DoD C4ISR enterprise.

From space to ground to under the sea, AF DCGS Block 10.2 is the foundation of the global ISR enterprise and will provide significant automation and data-sharing enhancements.

The AF DCGS Block 10.2 upgrade significantly enhances the speed at which war fighters can receive and share critical ISR information and improves the ability of the Air Force and its sister services to share that data, in real time, through a high-speed network.

The DIB enterprise is composed of a global network of fixed and mobile ground processing systems for ISR data collected from multiple sources including high-flying manned and unmanned aerial vehicles such as the U2, Predator, and Global Hawk. The system's primary function is to receive intelligence feeds from multiple sources at a common ground station where they are processed, stored, correlated, exploited, and disseminated to air operations centers (AOCs) and many other war fighting nodes to enable time-critical targeting.

The concept of AF DCGS Block 10.2 involves a federation of core sites, regional centers, forward operating locations, data relay sites, and elements of AOCs through the use of the DIB.