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

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 platform-centric “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, CIIB, 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 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.