

British Forces Rely on QinetiQ and Iridium for Monitoring Aircraft and Ground Vehicles in Afghanistan



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Tom Sawyer, Programme Director, QinetiQ

QinetiQ, a U.K. based firm with a well established reputation for ground - breaking research and technological advances, has leveraged commercial off-the-shelf technology to produce an Iridium-based tracking capability to monitor military assets in Afghanistan’s hostile mountainous environment.

Working with Iridium and NAL Research, which supplies the hardware components, QinetiQ developed and fielded the HeATS (Helicopter Tracking System) and GrATS (Ground Asset Tracking System) under an Urgent Operational Requirement from the Ministry of Defence (MOD) for improved tracking and monitoring of aircraft and ground vehicles in Afghanistan. Using Iridium’s global short-burst data (SBD) service the systems have helped to enhance situational awareness,

accelerate the tempo of operations, and improve response time to troops needing assistance in the field, according to Sawyer.

“This is helping to save the lives of soldiers,” Sawyer said. “Because military commanders can see exactly where their helicopters and vehicles are, they can very quickly reassign them when the need arises. If they’ve got an emergency they need to handle, or if they have a casualty who needs to be evacuated, they know where the nearest helicopter or vehicle is and they can react to situations much more quickly than before.”

Coupled with the low latency and global reach of Iridium’s constellation of 66 low-Earth orbiting (LEO) satellites, the QinetiQ system is viewed as a cost-effective solution offering unique asset-tracking capabilities.

Challenge

- Prior to HeATS we had no way of automatically monitoring the helicopters in flight,” Sawyer said. “Once a helicopter was in the air, the only way to get its location was to call it on the radio. HeATS and GrATS provide a secure position-reporting capability for operational assets.”

Solution

- “HeATS and GrATS are based on a light weight, low-power GPS tracking device with an embedded Iridium SBD transceiver that securely transmits regular position updates,” said Dr. Ngo Hoang, president of NAL Research. “The ruggedized tracking device meets rigorous government environmental, shock and vibration specifications for use under difficult field conditions.”

Result

- The position reports, transmitted over Iridium’s satellite constellation and routed through a virtual private network, are protected by encryption. The data messages reach end users within 45 seconds on average.

Results

- System software developed by QinetiQ allows authorised users to track assets on a computerised digital map at field command posts and headquarters.
- “Using the Iridium network, you can pick the entire system up, including the server and take it with you,” Mercer said. “It doesn’t matter where you go. That is unique.”

Why QinetiQ?

- QinetiQ has worked with the MOD on the Iridium-based asset-tracking technology since 2005, initially partnering with the MOD’s Defence Scientific and Technical Laboratory to develop a prototype tracking system for the helicopters. The technology was later extended to cover ground assets as well.

That’s particularly the case for troops operating in Afghanistan’s deep valleys, where mountains disrupt line-of-sight communications systems and often thwart the military’s geostationary satellite communications systems. Iridium’s fast-moving LEO satellites provide full coverage, even in this extremely difficult terrain.

“QinetiQ exploits Iridium’s unique network architecture to optimise the flow of data transmissions from multiple aircraft and vehicles, enabling the company to deliver near real-time latency of data to multiple end users,” said Dan Mercer, Vice President and General Manager for Iridium Operations in Europe, the Middle East, Africa and Russia. In addition, the system, including the computer server that controls it, can be operated from anywhere in the world that has Internet access. The system provides an up-to-date “picture” of operational assets to end users who are using mobile ground receivers or stationed at command-and-control operating centres. In theatre, the picture can also be transmitted to

regional or home-based headquarters. According to Sawyer, another key aspect is the system’s ability, using Iridium’s circuit-switched data service, to send tracking pictures to receivers inside vehicles, even if they lack Web-based infrastructure. “You can imagine in Afghanistan that some of the receivers are in headquarters where there is an Internet connection, but other receivers are in vehicles that can be driving around the desert where there’s no internet or mobile coverage,” Sawyer said. “They’ll still receive the tracking picture.”

The tracking beacons can be moved quickly from one asset to another. Some of the vehicle beacons feature magnetic mounts. “They move these beacons around quite often, so every type of vehicle out there has the ability to be fitted,” Sawyer said. On vehicles, the beacon can be powered by plugging it into a 12V outlet. Others run on “C” cell batteries.

On aircraft, the beacons typically are wired into the power system, but are easily removed. The beacons are quipped with a panic button for use in emergencies. “The concept is if the helicopter gets shot down, you grab the beacon and run,” Sawyer said. “It’s self-contained with its own batteries and becomes a rescue device.”

Importantly, the QinetiQ system is interoperable with a range of Geographic Information System applications and military communications networks. That permits British Defence officials to share information with NATO and coalition forces. It is compatible with the Joint Automated Deep Operation Coordination System (JADOCS). A “go to war” command and-control tool, JADOCS is designed to improve situational awareness across the military decisionmaking process. One key use is for deconfliction of weapons systems, such as to keep aircraft from flying through space where artillery operations

are being staged. The QinetiQ system also works with Tapestry, a distribution management system used by U.S. forces and security contractors operating in Iraq to manage and track containers and for logistics. In addition, the system is compliant with NATO’s Friendly Force Identification network.

Having developed such a robust off-the-shelf system for military use, QinetiQ is now moving to field a commercial variant, which is marketed as the BUSHMAN™ system. Recently, it has been used to track VIPs in regions that lacked cellular telephone infrastructure, and a QinetiQ team participating in a race to the South Pole.

“In partnership with Iridium, QinetiQ has worked steadfastly to meet the urgent, critical needs of the MOD, and we are proud to have a product that not only improves situational awareness, but also saves lives,” Sawyer said. “As we go forward, we are aggressively exploring new markets that can benefit from a reliable, cost-efficient solution to track assets anywhere in the world. That includes defence as well as commercial applications.”



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