C4ISTAR: ENABLING WARFIGHTERS

C4ISTAR is a very wide subject. In this section, we look first at some initiatives that promise to make significant improvements to the warfighter now or in the very near future, and then at some which are further off. The US Objective Gateway will, it is claimed, provide warfighters with an order of magnitude increase in connectivity and capability. Solutions to the challenges of battlefield opacity will enable us to understand, decide and act better and faster. ISTAR assets will provide more and better information. But can we use this information to derive the firm base on which to make decisions? Force multipliers will only force multiply if the training remains abreast of developments. Is it time to refocus our C4ISTAR training and, if so, how?

Objective Gateway: Information to the Battlefield's Edge

*by **Lieutenant General Michael Peterson***

Michael Peterson is the Chief of Warfighting Integration and Chief Information Officer of the US Air Force. Here he describes the development of Objective Gateway, which will provide warfighters with an order of magnitude increase in connectivity and capability in a totally digital battlespace.

As the modern warfighter moves further into the Information Age – flying and fighting in cyberspace – the demand grows for instant access to an ever increasing amount of critical information. Military forces are transitioning to a network-centric infrastructure emphasising machine-to-machine interfaces and on-demand information access. For military air forces, this requires moving from the current voice and tactical data link (TDL) systems built for combat execution to a robust, high-speed, internet-like information service.

Development of Objective Gateway

The US Air Force Command and Control & Intelligence, Surveillance and Reconnaissance Center (AFC2ISRC), located at Langley Air Force Base, Virginia, in partnership with the Electronics Systems Center, located at Hanscom Air Force Base, Massachusetts, is leading the way in this transition. Together, they are guiding the development of air and ground companion initiatives to dramatically increase information-sharing capabilities and build an Internet Protocol (IP) backbone for the air operations portion of the Global Information Grid (GIG).

The Battlefield Airborne Communications Node (BACN) and its ground counterpart, the Rapid Attack Information Dissemination Execution Relay (RAIDER), are key developmental efforts leading up to the Objective Gateway system. When fielded, Objective Gateway will project networking technologies to the forward edge of the battlefield and create a high-capacity backbone for combatant commanders, providing a force multiplier that will help offset force reductions while bringing new and affordable communications capabilities to the warfighter. When compared to today's low-bandwidth TDL networks (~2.4–130 Kbps), the Objective Gateway architecture will provide a high-capacity IP network with data rates ranging from 2 Mbps to well over 274 Mbps in future years. This high-capacity capability will extend down to the soldier/airman level – from the 'first tactical mile' to the 'tactical edge'. Objective Gateway will respond to theatre priorities dynamically, connect current Tactical Data Networks (TDN) to evolving high-capacity terrestrial GIG IP networks, while also bridging disparate voice systems.

Today's deployed warriors live in a bandwidth-constrained environment without such conveniences as chat, email, voicemail and text messaging. During the terrorist attacks in London, everyday citizens with cell phone cameras augmented the official remote security cameras and assisted officials in tracking down suspects in record time. The Objective Gateway architecture brings this concept, and much more, to the battlefield by demonstrating the art of the possible. Using Common Data Link (CDL)-based networked terminals, the Objective
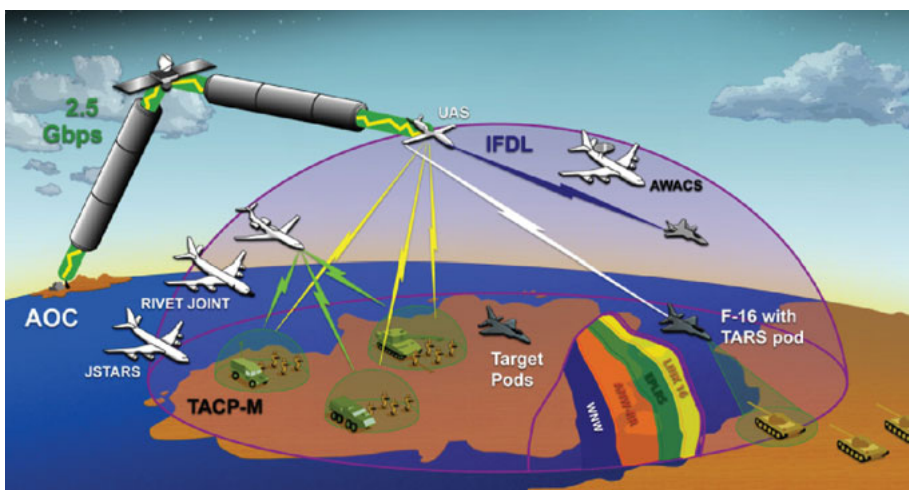
RAIDER provides a connection point for BACN to the terrestrial GIG and supports ground forces on the Tonopah Range

Gateway architecture will provide a significant increase in connectivity from the Air and Space Operations Center (AOC) to the tactical edge.

In recent CDL testing, two Multi-Platform Common Data Link (MP-CDL)-equipped aircraft and one ground unit demonstrated bandwidth of 137 Mbps at a distance of over 200 nautical miles. To test capacity, the network was stressed by streaming data such as multiple video tele-conferences, email exchanges, a cable television broadcast, 8 Mbps of high-definition streaming video, and a typical TDL picture to various players simultaneously. An Advanced CDL (A-CDL) waveform was also tested and demonstrated a 274 Mbps exchange between two aircraft with ranges greater than those seen using the MP-CDL waveform. The Objective Gateway architecture will also provide high-capacity data storage by fielding secure forward tactical servers (FTS) across the battlefield. These servers will act as local access points similar to wireless LANs found in many homes today.

Objective Gateway's tailorable payload will also allow rapid response in support of multiple operations simultaneously. Communications relay/bridging, TDN gateway and IP Server functions will provide transparent connectivity for the warfighter. The current host for the airborne component of the Objective Gateway is anticipated to be a high-flying, long-loiter-time, unmanned aerial system that will be able to operate closer to contested airspace, providing approximately 33,000 square miles of coverage. Combined with the highly mobile vehicle mounted ground stations that provide local access, battlefield

information flow and management will fundamentally change.

The RAIDER Spiral

The AFC2ISRC is working hand-in-hand with US Joint Forces Command in Norfolk, Virginia, on the development of the current spiral of RAIDER. The system's capabilities will enable the Objective Gateway to provide ground warfighters with critical communications capabilities as well as a ground access point to the 'terrestrial GIG' for the airborne warfighters linking back through the Airborne Objective Gateway component. In its current configuration, RAIDER is housed in a highly mobile wheeled vehicle with an attached shelter, a self-contained power generator, environmental controls for the crew, and a 10m deployable mast antenna to gain added range in line-of-sight (LOS) operations.

'During the terrorist attacks in London, everyday citizens with cell phone cameras augmented the official remote security cameras'

Just a few of RAIDER's current capabilities include: multiple tactical LOS radio systems; SATCOM; Link-16; Situational Awareness Datalink; Joint Range Extension; and a GSM cellular base station. While still only in the developmental stage, RAIDER has continued to demonstrate the art-of-the-possible during recent tests and exercises. As American forces continue their fight in the Global War on Terror, these tailorable capabilities will become increasingly relevant and will be a key enabler in maintaining a fresh flow of information into the battlespace.

Demonstrating Worth

In April 2006, BACN and RAIDER demonstrated their capabilities during Joint Expeditionary Force Experiment 2006 (JEFX 06), a biennial exercise held at Nellis Air Force Base, which is designed to showcase promising new military

The NASA WB-57 with the BACN payload on the ramp at Miramar MCAS, California, during JEFX 06

technologies. During JEFX 06, BACN and RAIDER prototypes proved their worth in a live-fly environment by connecting non-interoperable platforms, generating and distributing an improved air picture, and providing time-sensitive data to disadvantaged ground forces. Also at JEFX 06, BACN was flown on a NASA WB-57 platform showcasing the capabilities at high altitude. The payload is now being installed on a commercial aircraft for further testing and development. Spiral development of these two programmes will add increased capabilities starting in fiscal year 2007.

While traditional radios will likely continue to play a vital role in the passing of information, the new way of doing business will depend on passing digital information. BACN and RAIDER are key technology demonstrators to any future plan for a totally digital battlespace and demonstrate an order of magnitude increase in capacity while showcasing the potential of the Objective Gateway programme. Together, BACN and RAIDER act as local access points for both mounted and dismounted warfighters who are often geographically separated from traditional sources of information. Small teams operating at the battlefield's edge in LOS of the airborne asset will now be able to leverage the wealth of information available, gaining battlespace awareness of assets in their immediate vicinity.

The Objective Gateway architecture will provide warfighters with an order of magnitude increase in connectivity and capability. The combination of high-capacity transport and storage of data, dynamic control, security and affordability will provide our warriors with a decisive advantage at the tip of the spear. In a very real way, BACN and RAIDER, as the development spirals of Objective Gateway, are moving the Air Force's TDN to the GIG. ■