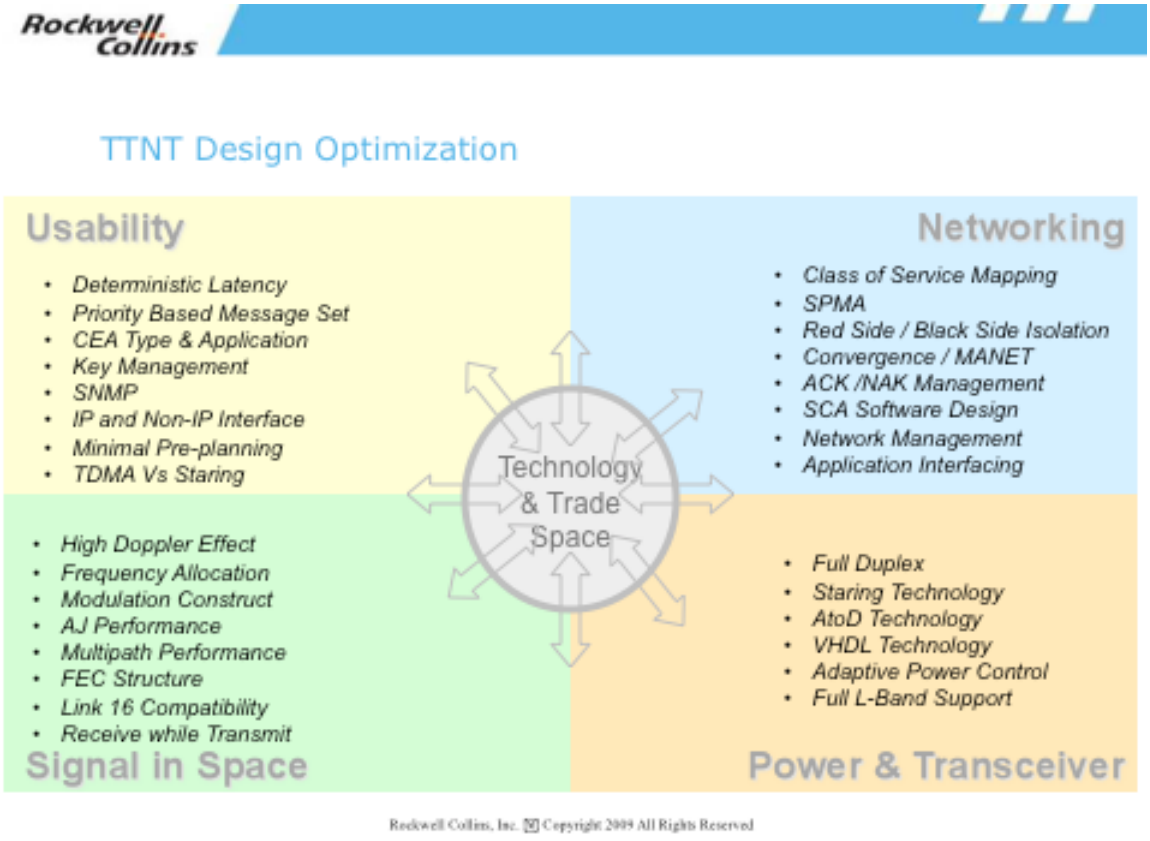
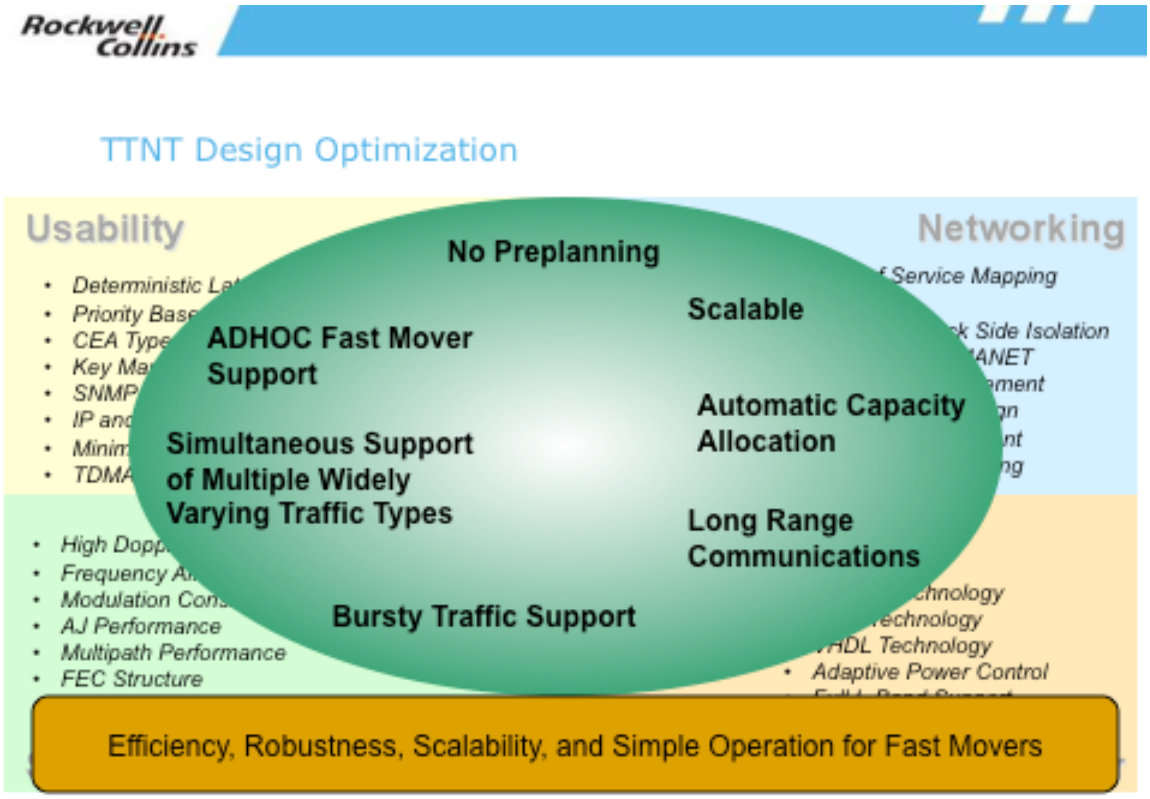
Tactical Targeting Network Technology and Connectivity

Provided by Rockwell Collins

Tactical Targeting Network Technology (TTNT) is a waveform technology based on the Joint Airborne Network-Tactical Edge (JAN-TE) capabilities document that was derived from the Time Sensitive Target Networking Technology (TSTNT) requirements of the Tactical Data Link Transformation (TD-L) Capability Document (CDD). These capabilities document outlined the need for a high throughput, anti-jam, low latency, quick net join, waveform for IP connectivity to the Global Information Grid for fast movers.





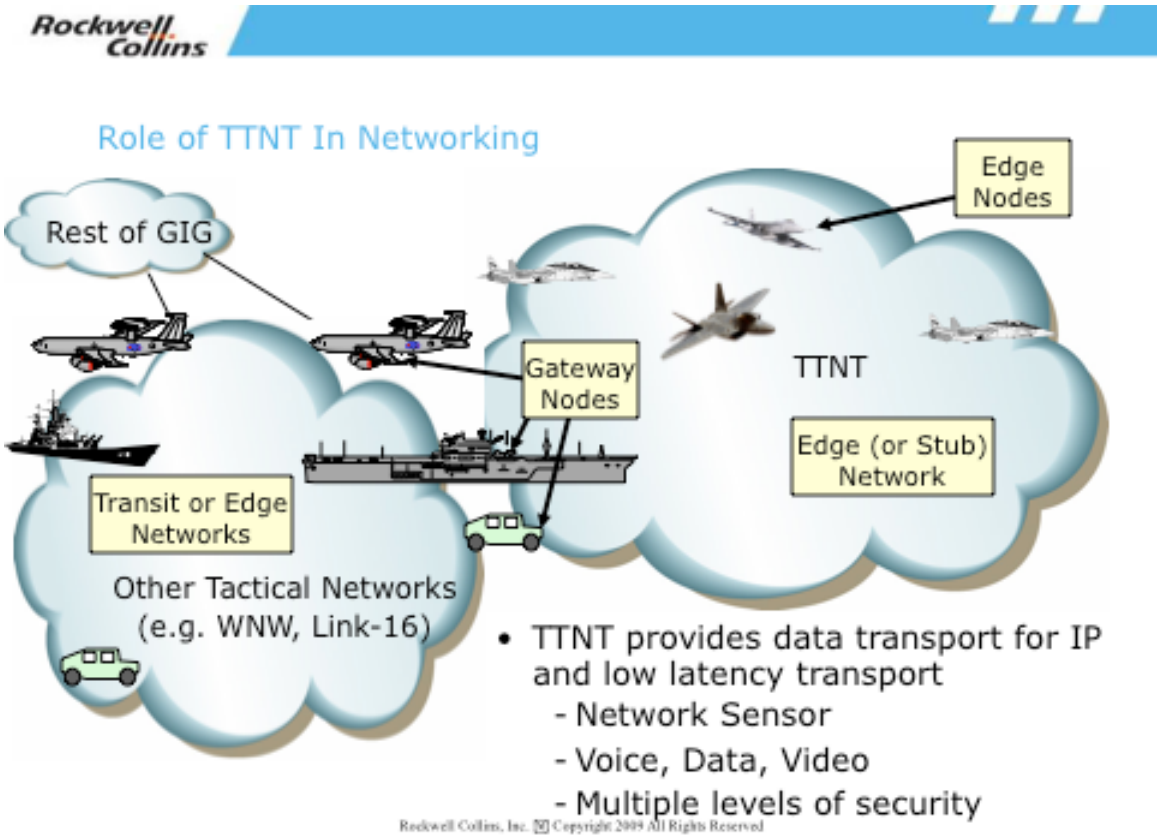
March 31, 2006 the Office of the Under Secretary of Defense issued a memorandum declaring TTNT as the initial JAN-TE waveform. In December of that same year the Joint Tactical Radio Systems(JTRS) JPEO released a document that mandated the integration of TTNT into the MIDS-JTRS Radio.

TTNT has been demonstrated to be a viable, mature solution to satisfy the Department of Defense's Airborne Networking requirements. With over 8 years of government investment, 1000's of hours of flight demonstration on virtually every airborne platform in the Air Force and Navy, TTNT is considered to be TRL 7, has Stage 4 frequency allocation typically reserved for production equipment, has NSA and JTRS involvement, has completed development of transceiver and power amplifier components, and a MIDS JTRS "hooks" assessment.

TTNT has been funded through DARPA and AFRL, beginning in 2001, passing through Phases 1,2, 3 and Phase T. The current contract vehicle, TTNT System Modernization, will take the TTNT waveform from Critical Design Review through Final Qualification Testing. Following FQT the TTNT waveform will be submitted to the JTRS Information Repository for use in the JTRS waveform library. Recently Task Order 14 has been awarded on the System Modernization contract vehicle, to complete TTNT waveform development. Additionally, a new $49.9M contract vehicle for continued TTNT development and test was awarded by the Air Force Research Laboratory in September

of 2009. This contract vehicle will enable platforms and programs integrating TTNT into their systems a means to provide funding for flight demonstration and system test.

TTNT is a wireless IP networked waveform that compliments Time Division Multiple Access waveforms like Link 16 in scenarios where broad dissemination of data is important and/or when timeliness and accuracy of data delivery are most important. Using Statistical Priority Multiple Access, TTNT is full duplex at the link layer, offering efficient, robust, scalable, simplistic operation for fast movers (up to Mach 8), as well as for nodes that benefit from the information that the Airborne Network collects such as ISR assets, C2 nodes, and gateway systems.



The chief benefits of TTNT include no network preplanning. TTNT uses Statistical Priority Multiple Access which allows for dynamic net join and exit, scalability, and automatic network capacity allocation. Multi-level traffic prioritization and class of service messaging ensures the delivery of key data, on time. This flexibility allows for simultaneous support of multiple widely varying traffic types, bursty traffic support, and line of sight long-range communications, tested at well over 300 nm.

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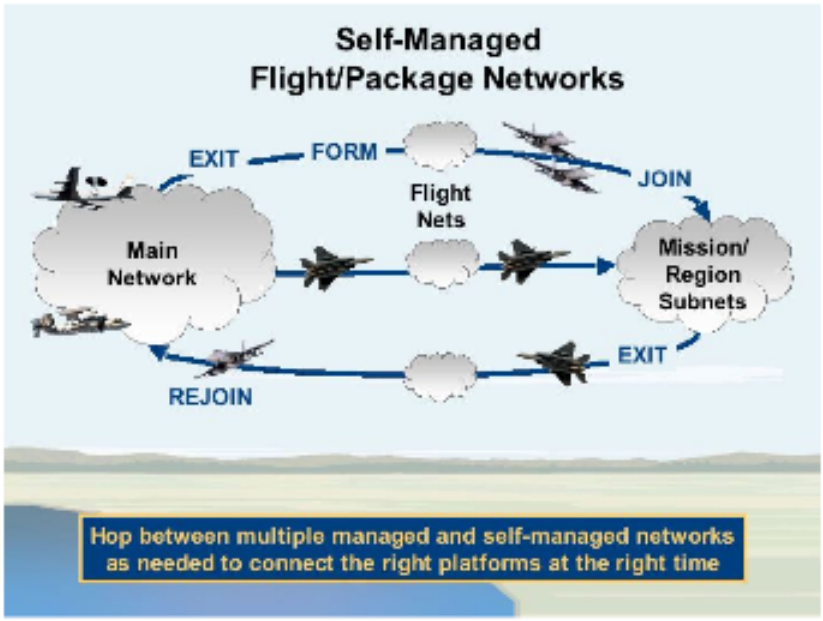
Mobile Ad-Hoc Networking



Application development for TTNT takes advantage of commercial network protocols like SNMP, proving to be cost effective and efficient for systems integrators. The UCAS-D program uses TTNT on the X-47B prototype Unmanned Combat Air Vehicle developed by Northrop Grumman.

”When we first integrated our system with TTNT, we threw away 80 percent of the software we had written for older systems, like Link-16. Software development was incredibly rapid too – it only took us one month to get IP applications up and running, compared to three years we spent trying to make the software work on a legacy system. TTNT’s performance also allows us to run safety-of-flight applications over the network – something we’ve not been able to do before,” said Colby.

TTNT’s role in networking includes transit or edge networks, gateway nodes, and stub networks serving as a data transport for IP and low latency transport for network sensor data, voice, video and transport of data that has multiple levels of security.

TTNT has been and continues to be used in operationally relevant tests utilizing the prototype hardware developed in Phase 3 of the TTNT contract. Executing in JEFX 04, 06, 08, 09 and slated for 2010, Red Flag exercises, multiple Empire Challenge experiments, as well as C4ISR and Bold Quest, TTNT has been integrated on virtually every type of aircraft including B1, B-52, F-18, E-2C, AWACS, F-16. F-22, Apache, F-

15 E1, Battlefield Air Communication Node (BACN), as well as Ground Mobile Gateway, Future Combat Systems vehicles, and Tactical Operations Centers.

The Intelligence, Surveillance, and Reconnaissance Task Force stood up by Secretary of Defense Robert Gates, in April 2008, to ensure that everything possible is being done to provide ISR data to today's War Fighter, is planning on using TTNT technology is a CONUS operationally relevant demonstration in March of 2010. TTNT will fill the mission need to provide a secure, ad hoc mesh network infrastructure, to support the timely transport of ISR data to geographically separated command structures.

TTNT is important because the current networking infrastructure is based on technology developed 30 years ago and does not keep time with the delivery of the sensor data and ISR data that our 5th generation air vehicles are capable of collecting. TTNT is mature, robust, and poised for transition to production.

Scenarios for the operation of TTNT:

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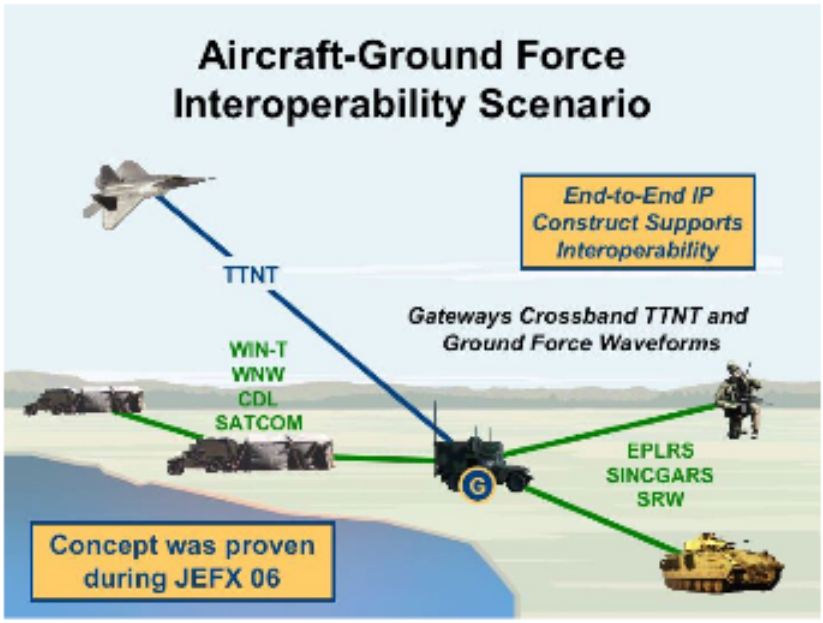
Scenarios



Scenarios (continued)