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Government Communications Systems

Communications On-The-Move

Overview

The Integrated Multi-Mission Terminal (IMMT) provides a means of communicating on-the-move while consolidating multiple stovepipe communications terminals into a single integrated system.

- Wideband Comm-on-the-Move (up to 45 Mb/s) to UAVs or SATCOM
- Mission coverage from 1.7 GHz to 11 GHz
- Up to five independent and simultaneously controlled communication links from a single control station
- Each established link can be set at a different frequency, modulation type and data rate

System Description

Designed for ground-based and shipboard application, the IMMT's integrated multi-mission capability is revolutionary in tactical communication systems design.

The phased array antenna can be conformably mounted on any communications platform (HMMWV, Bradley, ship, etc.) or remotely staged over thousands of feet away. The IMMT VME-based control processor independently controls all five beams electronically providing hemispheric coverage with no moving parts. Designed to meet the quick react, rapid deployment scenarios of the Joint Tactical Forces, the IMMT requires no set up or alignment time.

Meeting the needs of a mobile deployed force, the IMMT communicates while On-The-Move. The IMMT senses dynamic roll, pitch and yaw while in operation and compensates each of the beam pointing angles to maintain communication link closure. With this fully integrated design, all functions are controlled and statused locally from a laptop PC or remotely through any of the communication links using standard network protocols.

Designed for mission flexibility and adaptability, the IMMT receivers are programmable assemblies housed in standard VME mainframe chassis. Each receiver can be individually real-time configured for any digital modulation format (BPSK, QPSK, OQPSK, 64 QAM) and data rates from 1.2 kb/s to 45 Mb/s. Additional control access is provided via an SNMP interface.

The IMMT control system provides target acquisition and control for all forms of high-capacity communication links. Operator selected acquisition modes include spatial search and command point. Tracking modes available are ephemerous based program track, closed loop Autotrack and manual point. The IMMT has successfully demonstrated its capability via simultaneous SATCOM, Terrestrial Line-of-Site and Ground-to-UAV applications.

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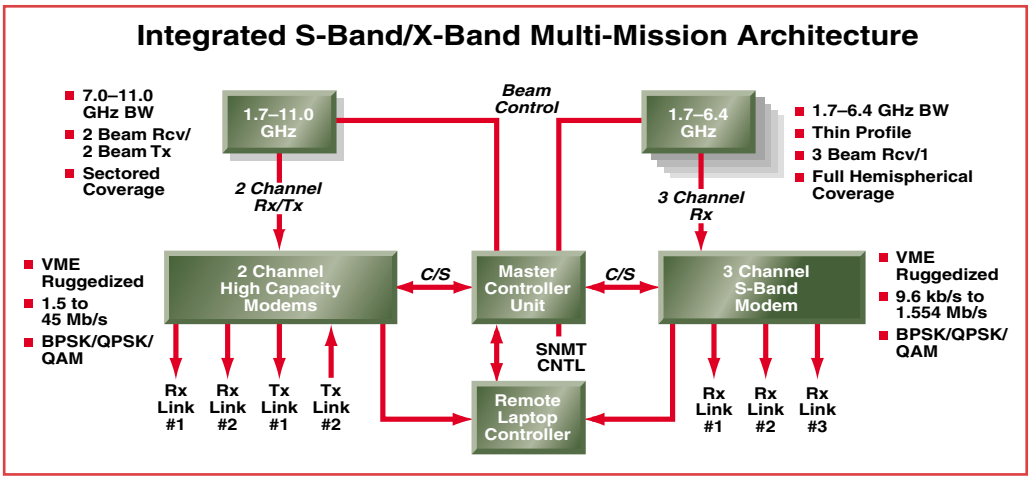
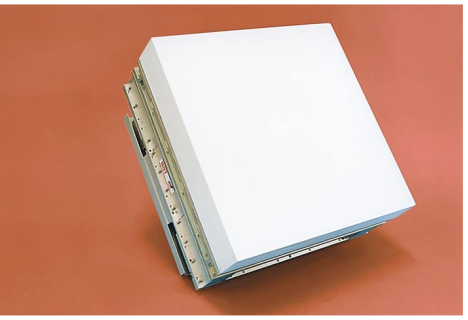
Integrated S-Band/X-Band Multi-Mission Architecture





A two (X/Ku-band) panel array measuring 18 inches on a side provides two full-duplex beams.

A full hemispherical coverage (C/S-band) array measuring 40 inches on a side provides three simultaneous receive beams or one transmit.

IMMT Design Description

The IMMT architecture contains five subsystems. Modular and flexible in design, the system can be delivered with a basic capability set and quickly upgraded when missions needs require more beams, greater bandwidth, or extended spatial coverage with no electrical or software modifications.

The antenna subsystem has two assemblies. For lower frequencies (1.7 to 6.4 GHz) a five panel array cube is employed, where each panel measures 40 inches on a side. The design provides three simultaneous receive beams or one transmit. For higher frequency applications (7 to 11 GHz) a second, smaller array assembly is added. Comprised of two panels with each panel measuring 18 inches on a side, this antenna provides two full-duplex beams. Both antenna assemblies can be provided individually or together and with hemispheric or sectored coverage depending on the mission needs.

The IMMT is controlled by an array control subsystem housed in a single standard 6U VME chassis and laptop computer. Only one controller is required for each antenna assembly. The Array Control Subsystem provides the IMMT Control and Status, panel combining, beam steering, target tracking, and remote control and status via an SNMP interface. The laptop PC provides local control and monitoring.

Dynamic platform compensation for roll, pitch and yaw in on-the-move applications is provided by the Attitude Heading Reference System (AHRS) assembly. The AHRS includes integrated GPS for geolocation.

Two modem assemblies are provided. The high-capacity radio is used for high-band applications. Capable of working up to 45 Mb/s with a large selection of modulation formats (BPSK, QPSK, QAM), the radio contains a high-speed dynamic equalizer to compensate for harsh multipath environments encountered during on-the-move use. One radio is required for each beam.

PARAMETER	PERFORMANCE	
	Lowband Assembly (LNA)	Highband Assembly (LNA)
Rx Frequency	1.7 GHz to 6.4 GHz	7.0 GHz to 11.0 GHz
Polarization	RHCP or LHCP	RHCP or LHCP
G/T	4.0 dB/K min across band	2.0 dB/K across band
Tx Frequency	1.7 GHz to 6.4 GHz	7.0 GHz to 11.0 GHz
Polarization	RHCP or LHCP	RHCP or LHCP
EIRP	73 dBm	70 dBm
Modulation Type	BPSK, SGLS Compatible	SQPSK, BPSK, 16 QAM, 64 QAM
Physical Size	40" x 40" Per Panel	18" x 18" Per Panel
Number of Simultaneous Beams	3, Half duplex	2, Full duplex
Tracking	Cmd Point, Autotrack, Program Track	Cmd Point, Autotrack, Program Track
Data Rates	1.2 kb/s to 1.544 Mb/s	256 kb/s to 155 Mb/s
Spatial Coverage	5 Panels Full Hemispheric, One Panel Sectored Coverage	
Prime Power	115/220 Vac at 50/60 Hz	
On-the-Move Capability (LBA/HBA)	55 mph improved roads, 15 mph unimproved roads	

The programmable wideband modem assembly is used in conjunction with the low-band array assembly. Up to three modems can be housed in a standard VME chassis. The wideband modem assembly provides high-speed data transfer up to 1.544 Mb/s and modulation formats of BPSK, QPSK and SGLS.

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