Small Tactical Terminal (STT) and Integration at the Tactical Edge

November 2013

STT Introduction

- The STT is a new generation of Link 16 and VHF/UHF Data radio that is specifically designed for the tactical edge user
  - Two independent, channels including internal PAs
  - Smaller size/weight/power than comparable radios (~16.5 lbs.)
  - Lower cost than a MIDS LVT
  - Full interoperability with MIDS and IDM/PRC radios and networks
  - Reconfigurable SDR with real-time switching between Link 16 and UHF capability (SCA v2.2.2)
Small Tactical Terminal Applications

The STT was developed to satisfy a wide range of light aviation and mobile needs:
- Forward Air Control (Link 16 or VMF CAS)
- Communication Relay
- UAV Ground control station (UGS)
- Small ISR Aircraft
- Helicopters
- Mobile Air Defense and Command and Control
- Small maritime craft
- Command and Air Defense Protected Mobility Vehicles
- Multiple Network Monitoring and Management

Certification Status (Operational)

- STT KOR-24 Received NSA Certification
  - June 3, 2011
  - Two channels
  - Secret and Below
  - TEMPEST

- EMC Features Approved
  - June 6, 2012
  - DD 1494 Stage 4 Final Review Meeting

- UK Safety Case Approved (Transmit and Fly)
  - August, 2013
  - FCASMS/PT4/GTSC/APP9

Currently Deployed in Australia
Current STT Platform Deployments

- Airborne Communications Node Platforms (Fielded and operational in Afghanistan)
- Tactical Airspace Integration System (TAIS)
- AH-64E Attack Helicopter platform (Blocks 4 and 5)
- Big Safari Program
- BQ Mini ASOC Gateway
- Pod Mounted ISR and Communications Systems
- UAV Ground Stations (UGS)
- Small Platform ISR aircraft
- Mobile Ground Network Management JP2089 (STTIC MR)
- Special OPS (MOJO)
- Special OPS (Man pack)
- Pre-deployment Training (Falcon Aircraft)
- Navy Small Patrol Boat Application
- Plus Others
Two Channels – making the radio better

Why Two Channels

- Size, Weight and Power on disadvantaged platforms requires removal of some functionality to include Link 16
  - STT allows Voice/Data radio to be removed and Link 16 plus Voice/Data Radio to occupy same space

- Missionized Functionality/Flexibility
  - Link 16 Channel can be reassigned to UHF Voice/Data radio when Link 16 function is not required for mission

- Gateway Functionality
  - 2 Channels provides input for data forwarding between narrowband/wideband UHF functions and Link 16
**Channel 1 (Operator Selectable)**

- Link 16: 960-1215 MHz
- Narrowband: 30 - 512MHz
- Wideband: 225-450MHz
- SATCOM: 225-270MHz (RX) and 291-318.3MHz (TX)
- Highband: 512-520MHz, 768-870MHz
- Narrowband: 12.5 and 25kHz
- Wideband: 1.2MHz
- Wideband: ANW2 (Compatibility Mode), ANW2 (30-Node), SRW
- SATCOM: MIL-STD-188-181B, IW, HPW IP, DAMA
- GPS: External PLGR/DAGR Interface
- Plain Text/Cypher Text Voice

*Channel 1 Provides Link 16 or Legacy and Tactical Wideband Interoperability*

**Channel 2 (Operator Selectable)**

- Narrowband: 30 - 512MHz
- Wideband: 225-450MHz
- SATCOM: 225-270MHz (RX) and 291-318.3MHz (TX)
- Highband: 512-520MHz, 768-870MHz
- Narrowband: 12.5 and 25kHz
- Wideband: 1.2MHz
- Wideband: ANW2 (Compatibility Mode), ANW2 (30-Node), SRW
- SATCOM: MIL-STD-188-181B, IW, HPW IP, DAMA
- GPS: External PLGR/DAGR Interface
- Plain Text/Cypher Text Voice

*Channel 2 Provides Legacy and Tactical Wideband Interoperability*
Combined Channel Capability

- **Total SA/C2**
  - Operator gets multiple channels of SA data to create common tactical picture
  - Air Space Deconfliction

- **TDL/Voice workstation/Gateway**
  - Operator always has an extra channel to connect via voice for assistance- set up, confirmation, etc.
  - L16-Legacy and/or L16 and or Tactical WB, VMF and/or JREAP-L16 as well as PT/CT Voice Communications

- **Wideband to Wideband or Narrowband Functionality**
  - When L16 not required both channels can utilize UHF Waveforms providing additional Voice or data capability

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STT Enables Operational Flexibility

Link 16, VMF, SATCOM, SRW, ANW2, Voice (PT/CT)
STT forms a part of the Falcon Family of Radios

Common core technology allows reuse and commonality for the second channel

Interoperable with Current Hand Held and Link 16 Terminals

- 10,000 Deployed MIDS LVT Radios Worldwide
- > 45,000 Falcon III Hand Held and Man Pack radios delivered since 2008
- ANW2 Wideband Networking Deployed in Afghanistan with the AN/PRC-117G
  - Provide secure data to platoon level through extending the SIPR Net
  - Collect and disseminate biometric data
  - Provide wideband data on the move
  - Receive and transmit UAV data throughout the area of operations
- Units fielding radios continuing to find new capabilities and develop TTPs to improve operational effectiveness and efficiency
ANW2 in the STT

- Up to 30 users in a single sub-domain
- 1.2MHz Channel Bandwidth
- Type-1 HAIPE networking encryption
- Self-managing, forms in seconds
- Multi-hop relay of voice and data
- Adaptive data rate up to 2 Mbps
- Range up to 85KM with Skymode
- TCP/IP Acceleration
- Standard networking interfaces and routing protocols

STT as a Radio for a Network Gateway providing Key Interoperability

- STT can act as a Gateway between disparate networks and collect Situational Awareness from each network
- The Host Computer can act as a radio manager and information manager
- STT enhances Sensor-to-shooter networking and machine-to-machine networking
What is the MOJO?

- Portable and sized for vehicles and small boats, the ViaSat Move Out/Jump Off kit is a complete line-of-sight and beyond-line-of-sight communications package for on-the-move and on-the-pause land, air, and maritime applications

- ViaSat’s Move Out/Jump Off is an innovative tactical gateway in a transportable case
  - Simultaneous three-channel communications provides the radio infrastructure for gateway applications in an all-inclusive, compact package
  - The MOJO contains power supply/power conditioner and cooling fans in its ruggedized transport case
MOJO Features

- Simultaneous three-channel line-of-sight communications for air and ground situational awareness, voice, and data (with optional radio)
- Link 16, VHF/UHF, SATCOM, and SINCgars networking and gateway
- EPLARS, SADL, PRC-117F/G and FreeWave capable options
- Onboard computer and router to host data and gateway applications
- Easy attachment to maritime vessels and ground vehicles
- Ruggedized for harsh environments and mobile applications
- Easy-access connectors and integrated power supply for rapid deployment

STTC Mobile Rack(s)

- Single Radio Rack with Host (2 Channel Configuration)
  - L16
  - Data Forwarding
  - PT/CT Voice
  - VLOS
  - SAT J
  - JREAP A, B, C
  - NMS
  - Local or remote Voice
  - Local or remote Control
  - 4U by 480mm approximately 52Kg with Radio

- Dual Radio Rack with Host (4 Channel Configuration)
  - L16 x2
  - Data Forwarding
  - PT/CT Voice
  - VLOS x2
  - SAT J
  - JREAP A, B, C
  - NMS
  - Local or remote Voice
  - Local or remote Control
  - 8U by 480mm approximately 85Kg with Radio
Availability and Acquisition

- NSA Certified and in current operations
  - US and international partners

- NSA and US DOS approved for Direct Commercial Sale (DCS) to Australia
  - Shorter delivery schedule lower cost
  - STTs in country via DCS acquisition

KOR-24A Performance Characteristics

- Frequency: 30 to 512 MHz VHF/UHF
- Range: 960 to 1215 MHz Link 16 (Frequency Remap)
- Transmission: Simplex or half-duplex
- Modes: 16 kbps data, PT or CT
  - L16 TDMA, All Op modes and Enhanced Throughput
- Antenna: UHF: 50 Ω
- Ports: Link-16 (2): 50 Ω
- DC Power: 28 VDC per MIL-STD-704F
- Input: 1.5A Rx, <10A Tx
- Power Output: 250 mW to 5 W (UHF)
  - 63 W (L-16) with 34% TSDF
- Data Interface: Ethernet 10/100baseT
- Dimensions: 5” x 5.6” x 9” (12.7 x 14.2 x 22.9 cm)
  - (W x H x D)
  - +2.43”D Front Panel
  - (Fan Option - add 3” Rear)
- Weight: 16.5 Lbs (7.5 Kg)
- Crypto Modes: KY-57, ANDVT/KYV-5
  - KG-84C, KGR-96, KGV-8,
  - KGV-11

• Two channels operation
• DoD and NATO Secret (Multi-level)
• TEMPEST Certified

NSA Certified June 3, 2011

EMC Features Certified June 6, 2012
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BACKUP CHARTS
Design Overview

- STT is designed to be a low cost, low volume, two channel, data link terminal capable of running Link 16 and UHF LOS Waveforms.
- STT is designed to meet the needs of users who have space and weight constraints but have a need for the information available on Link 16 and/or Tactical UHF Networks.
  - Situational Awareness and Surveillance to the Tactical Edge
  - Command and Control with Disadvantaged Users
  - Friendly Force Tracking and Status Reports
  - Interoperable with JTIDS and MIDS Radios
  - Interoperable with UHF LOS (MIL-STD-188-220 B/C/D) with PRC-117, PRC-152, ARC-210 (RT-1824), Improved Data Modem (IDM)
- Multi-band radio
  - 30 – 512 MHz V/U
  - 960 – 1215 MHz Link 16
- Utilizes the Joint Tactical Radio System (JTRS) Software Communications Architecture (SCA) v2.2.2
- New waveforms as they become available, Soldier Radio Waveform Recently added to Product Baseline
- Implements software programmable encryption for future compatibility.
- MIDS Software Tools and File Formats interface seamlessly with L16 channel

Link 16 at ~1/3 Size, Weight, and Power

- STT (Approximate Size ARC-231 Radio)
  - Size: 252 in³ (4,129 cm³)
  - Weight: 16.5 lbs (7.5 Kg)
  - Power: 114W at full rated transmit (63W at 34% TSDF)
- LVT 1 (Approximate Size ARN-118 TACAN)
  - Size: 1000 in³ (16,387 cm³)
  - Weight: 51.5 lbs (23.4 Kg)
  - Power: 350W at full rated transmit (200W at 70% TSDF)
Small Tactical Terminal
Disadvantaged Platform Integration

Helicopter Capabilities Enhancements

C2 Information
- PPLI J2, 3, 5, 6
- Mission Assignment J12.0
- Threat J15.0
- Imagery J16.0
- Text J28.2

Integration Highlights
- Replaces ARC-231 Backup Data Radio
- Interfaces Directly to Mission Computer
  - Weapons Status
  - Sensor Info
  - Aircraft Status
**Helicopter (Missionized Installation)**

**Integration Highlights**
- 2 Configurable Channels of UHF and Link 16 capability
- Stand Alone Host Computer for simplified I&T, limited interaction with Mission Computer
- Gateway between Link 16 and UHF Data Networks

**STT MultiLink Subsystem**
- Multi Link Processor
- STT/L16 & UHF w/ KGV
- 8 KG – 84 KG
- 11 KG
- 96 KG
- L16 Filters

**Display Processor**
- GPS
- TCP/IP
- Link 16 and UHF
- SST integrated CTL (STTIC)
- Analog or VoIP
- LEGS

**Maintenance (Optional)**
- 1553 Conv
- 1553
- UHF Antenna
- L band Antennas
- Merlin Helicopter

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**Ground Mobile**

**Integration Highlights**
- 4 Configurable Channels of UHF and Link 16 capability
- Stand Alone Host Computer for simplified I&T
- Gateway between Link 16 and UHF Data Networks
- Network Monitoring and Control Capability
- Expandable to SATCOM applications

**Dual STT Radio Rugged Case with Integrated Control Units**
- MultiLink subsystem
- Link 16 and UHF IUP Panel
- Operator Situational Awareness
- GPS
Integration Highlights

- 2 Configurable Channels of UHF and Link 16 capability
- Stand Alone Host Computer for simplified I&T, limited interaction with Mission Computer
- Gateway between Link 16 and UHF Data Networks
- Possible Roll on Roll off Capability for Mission Customization