



Joint Program Executive Office Joint Tactical Radio System

Software Defined Radio (SDR) '10 Technical Conference



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JPEO JTRS



Outline

- ▶ **JTRS Intro / Product Lines**
- ▶ Operational Environment / Technical Roadmap
- ▶ Enterprise Business Model
- ▶ Software Communication Architecture Next
- ▶ Summary



NED Program Overview

Mission

Deliver portable, interoperable, mobile ad hoc networking waveforms and network enterprise services to enhance tactical warfighting capabilities.

Description

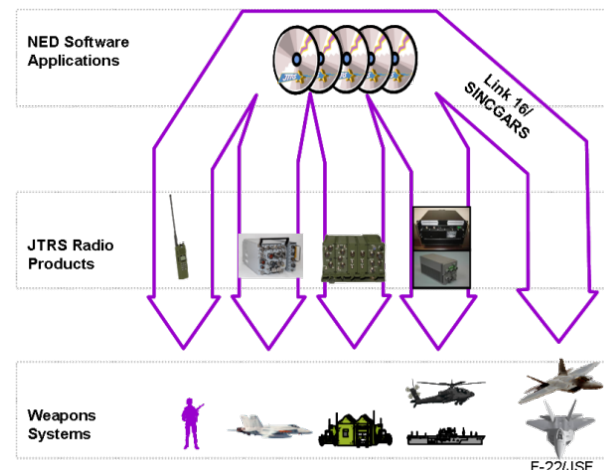
- **14 Current Force Waveforms:** Bowman VHF, COBRA, EPLRS, Have Quick II, HF SSB/ALE, HF 5066, Link 16, SINCGARS, UHF DAMA SATCOM 181/182/183/184, UHF LOS, VHF LOS
- **3 Networking Waveforms:**
 - Wideband Networking Waveform (WNW)
 - Soldier Radio Waveform (SRW)
 - Mobile User Objective System (MUOS) - Red Side Processing
- **Network Enterprise Services (NES):**
 - JTRS WNW Network Manager (JWNM)
 - JTRS Enterprise Network Manager (JENM)
 - Soldier Radio Waveform Network Manager (SRWNM)
 - Enterprise Network Services (ENS) Phase 1

Contractor

- WNW/JWNM/JENM Prime: Boeing
- SRW/SRWNM Prime: ITT
- MUOS Prime: Lockheed Martin

Status/Schedule FY 10-13

- ✓ Current Force WF/SRW FQTs: Completed prior to FY10
- ✓ HF FQT: Completed 1QFY10
- ✓ WNW FQT: Completed 1QFY10
- ✓ SRW Delta FQT on HMS: Completed 1QFY10
- ✓ JWNM FQT: Completed 2QFY10
- SRWNM FQT: Completes 2QFY11
- ENS Phase 1 (SoftINC) FQT: Completes 3QFY11
- ENS Phase 1 (TDC) FQT: Completes 3QFY11
- MUOS FQT: Completes 4QFY11
- JENM Phase 2 FQT: Completes 2QFY12





GMR Program Overview

Mission

The objective of the JTRS GMR acquisition is to acquire multi-band, multi-mode, software reprogrammable JTRS equipment to satisfy Army, Marine Corps, and Air Force vehicular digitization and tactical communications requirements. The need for a software reprogrammable radio, such as JTRS GMR, is documented in the JTRS Mission Needs Statement (MNS), dated 21 August 1997.

Description

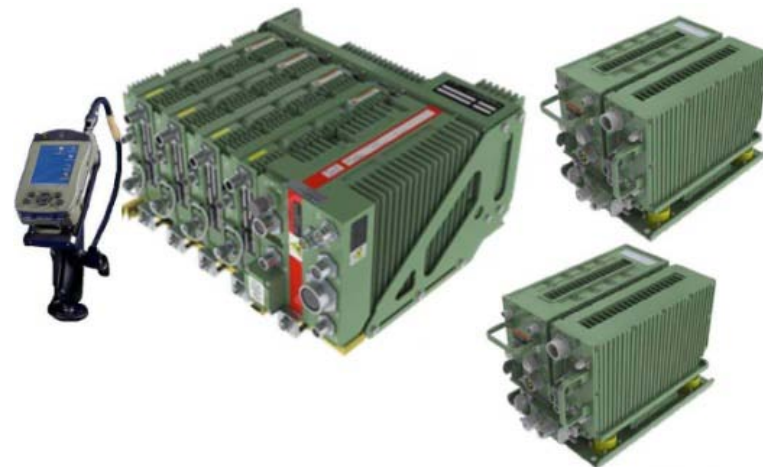
- GMR provides mobile internet capability, Mobile Ad-Hoc Network (MANET), and interoperability with current force radios through simultaneous and secure voice, data and video communications. It supports Battle Command, sensor-to-shooter, sustainment and survivability applications in full range of military operations on vehicular platforms.
- 2, 3 & 4 Channel variants: WNW, SRW, SINCGARS, HF, UHF SATCOM, EPLRS
- Routing and Retransmission
- Stored Waveforms: 10
- Type 1 & 2 programmable encryption; Multi-level security

Contractor

- Prime: The Boeing Company
- Subs:
 - Rockwell Collins
 - BAE Systems, Inc
 - Northrop Grumman
 - SAIC

Status/Schedule FY 10-13

- ✓ Production Qualification Test (PQT): Completes 4QFY10
- ✓ Security Verification Test (SVT): Completes 4QFY10
- ✓ System Integration Test (SIT): Completes 4QFY10
- Milestone C Decision: 1QFY11
- Low Rate Initial Production (LRIP) Award: 2QFY11
- Limited User Test (LUT): Completes 3QFY11
- NSA Certification: 4QFY11
- Multi-Service Operational Test & Evaluation (MOTE): Completes 1QFY13
- Initial Operational Capability (IOC): 1QFY13
- Full Rate Production In process Review (FRP IPR): 1QFY13



AN/VRC-107



HMS Program Overview

Mission

Develop and produce affordable networking tactical radio systems that meet the Handheld, Manpack, and Small Form Fit (SFF) requirements of the Army, Marine Corps, Navy, Air Force and SOCOM and are interoperable with specified radios in the current forces. JTRS Handheld, Manpack, and Small Form Fit (HMS) is executing the System Design and Development (SDD) phase for next generation communications devices, specifically warrior and embedded applications of the HMS radio sets. JTRS HMS is a Joint ACAT 1D Program.

Description

- Scalable and modular Software Communications Architecture (SCA) compliant, enable net-centric operations, operate multi-band and multi-mode, and deliver reliable, secure tactical communications
- AN/PRC-154 Rifleman Radio (RR) (1 Channel Type 2): SRW
- AN/PRC-155 Manpack (MP) (2 Channel Type 1): SRW, SINCGARS, EPLRS, HF, UHF SATCOM, MUOS, Bowman
- Small Form Fit (SFF): SRW and various legacy WF mixes

Contractor

- Prime:
 - General Dynamics
- Subs:
 - Thales
 - Rockwell Collins
 - BAE Systems

Status/Schedule FY 10-12

- ✓ BCT Integration Exercise completed 3QFY10
- ✓ RR 5W EDM deliveries start 4QFY10
- Type 2 SVT 2QFY11
- RR VCD 2QFY11
- Milestone C (RR) 4QFY11
- RR LRIP Deliveries 2QFY12
- MP LUT 3QFY11
- Type 1 SVT 3QFY11
- Type 1 SVT 2QFY12 (MUOS)
- LRIP IPR (MP) 2QFY12





AMF Program Overview

Mission

The Airborne Maritime Fixed Station (AMF) Joint Tactical Radio System (JTRS) provides a joint and legacy networking capability for the Army, Air Force and Navy.

Description

AMF JTRS consists of two form factors for our air, land and sea battle forces. The Small Airborne (SA) JTR set is a two channel communications and networking device designed for use with aircraft. The Maritime/Fixed Station (MF) JTR set is a four or eight channel device designed for both the ground and sea domain. Both network radios will be capable of supporting the following waveforms: WNW, SRW, MUOS & Link 16 for SA; and MUOS and UHF SATCOM for MF.

Contractor

- Prime: Lockheed Martin
- Subs:
 - General Dynamics
 - BAE Systems, Inc.
 - Northrop Grumman
 - Raytheon

Status/Schedule FY 10-13

- ✓ Critical Design Review 1QFY10
- ✓ Risk Reduction pre-Engineering Development Model (EDM) to Army 4QFY10
- ✓ Initial Hardware Software Demonstration (IHSD) SA 4QFY10
- Milestone C Decision: 3QFY12
- Low Rate Initial Production (LRIP-SA) Award: 1QFY12
- Low Rate Initial Production (LRIP-M/F) Award: 3QFY12
- Full Rate Production In Process Review (FRP SA & M/F): 4QFY14
- Initial Operational Capability (IOC): 4QFY14



AN/URC-147
Maritime / Fixed Station



AN/ZRC-2
Small Airborne



MIDS Program Overview

Mission

The MIDS program objective is to produce a wireless, jam-resistant and secure information system providing TACAN and Link-16 to Airborne, Ground, and Maritime warfighting platforms. It provides real-time information and situational awareness via digital and voice communications at an affordable cost. The MIDS program includes MIDS-Low Volume Terminal (LVT) full rate production and MIDS JTRS operational testing. MIDS JTRS is a “form fit function” replacement for MIDS-LVT and adds three additional channels for JTRS waveforms as requested by the warfighters.

Description

- MIDS JTRS is an ECP to the MIDS-LVT Production Program
- Migrate MIDS-LVT to 4-Channel JTRS Radio Core Terminal
 - Pre-Planned Product Improvement to MIDS-LVT
 - Link-16, TACAN, J-Voice and 200W L-16 Power Amp
 - 3 additional SCA programmable channels for JTRS Waveforms
- International Participation: Technical Data Package (TDP) delivery to all MIDS Nations (FR, IT, GE, SP)

Contractor

- Primes: ViaSat and DataLink Solutions, LLC (DLS) (Rockwell Collins and BAE Systems, Inc)

Status/Schedule FY 10-13

- ✓ Completed Government First Article Qualification Testing (GFAQT): 1QFY10
- ✓ Completed Contractor First Article Qualification Testing (CFAQT): 1QFY10
- ✓ Received Limited Production and Fielding (LP&F) DAB Decision: 1QFY10
- ✓ Achieved NSA Certification: 2QFY10
- ✓ Completed DT Flight Test: 3QFY10
- ✓ DT/OT Transition Report Issued: 3QFY10
- ✓ AOTR Report Issued: 3QFY10
- ✓ TRL 7 Achieved
- ✓ Completed Initial Operational Test & Evaluation (IOT&E): 4QFY10 -1QFY11
- Planned Initial Operational Capability (IOC): 2QFY11
- Planned Full Production and Fielding (FP&F): 2QFY11



MIDS JTRS: JTRS compliant Form-Fit-Function replacement for MIDS-LVT



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Why Do Warfighters Need Continuing Innovation?

Ever-Changing Threats

**Increasingly
Sophisticated
Adversaries**

Extreme & Hostile Environments

Leaner Defense Budgets Ahead



A Complex and Evolving Environment

“The United States faces a complex and uncertain security landscape in which the pace of change continues to accelerate” QDR, Feb 2010

China Criticized for Anti-Satellite Missile Test *Destruction of an Aging Satellite Illustrates Vulnerability of U.S. Space Assets.* *Washington Post, Jan 19 2007*

Assured Data & Communications



Prevent, Deter & Prevail



Defend the US & support Civil Authorities



Force Protection: Counter-IED



**Insurgents Hack U.S. Drones
\$26 Software is Used to Breach Key Weapons in Iraq; Iranian Backing Suspected.** *Wall Street Journal, Dec 17, 2009*

**Marines Embark on Haiti Response Mission
About 2,000 North Carolina-based Marines making final preparation to...provide disaster-relief efforts.**

American Forces Press Service Jan 15, 2010

Build Security Partnerships



Succeed in-Counterinsurgency, Stability & Counterterrorism

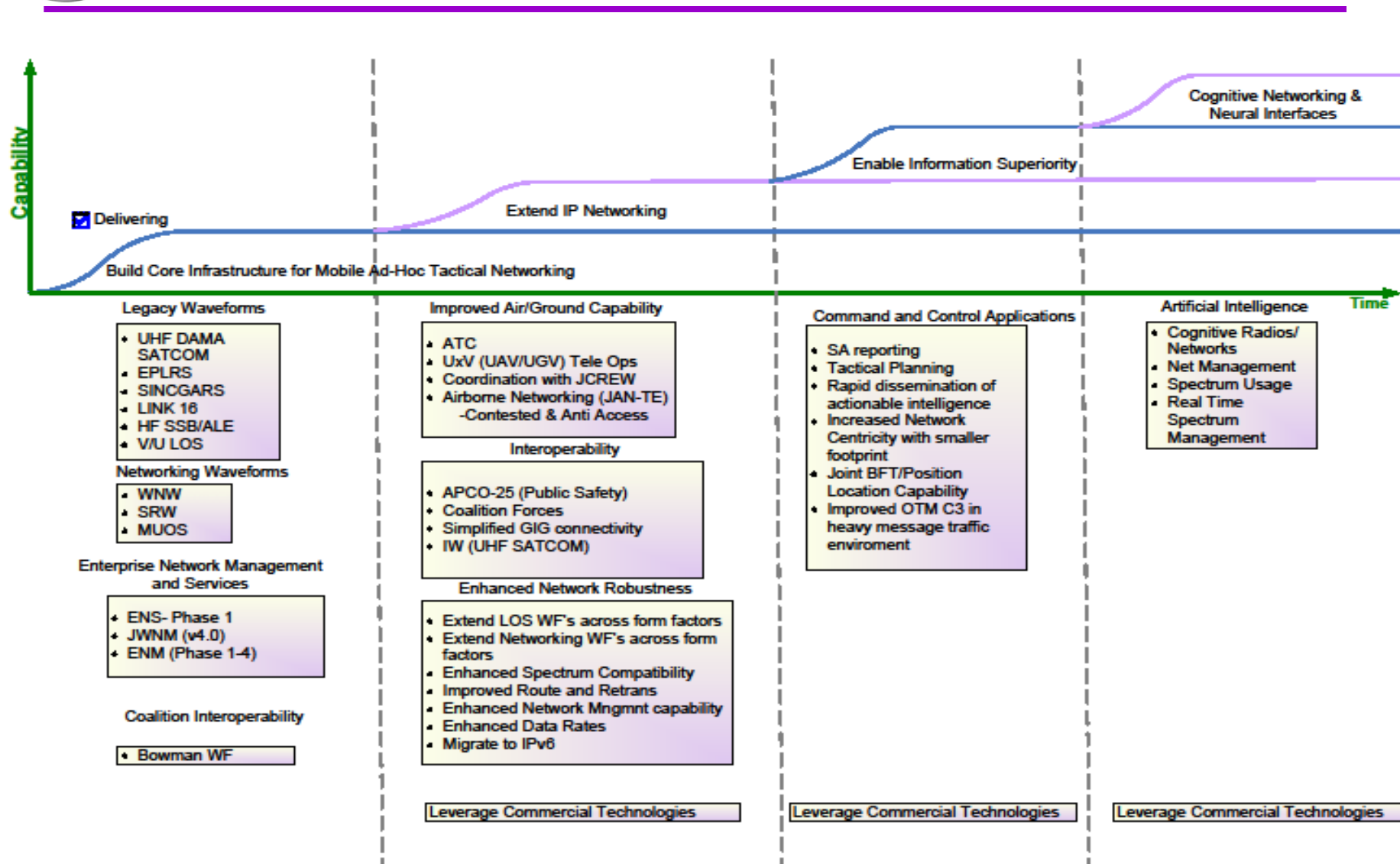


**IED attacks in Afghanistan more lethal
Attacks on U.S. and allied forces with makeshift bombs in Afghanistan are 50% more lethal than three years ago.** *USA Today, Mar 19, 2010*

Global Partnership Works to Increase African Maritime Safety *American Forces Press Service, May 21, 2009*



Notional JTRS Roadmap





JTRS Applications: Beyond Communications

▶ Much more than “voice radio”

▶ Enhanced Capability

- Navigation
- Cyber-hardening
- Self Contained Wireless Networking

▶ Joint Supportability

- Reduced Manning
- Streamline Training
- Improved Logistics Support
- RAM

▶ Interoperability



JTRS Technology Insertion Opportunities

- ▶ SCA improvements/evolution
- ▶ Joint/Coalition/First Responder communications and interoperability
- ▶ Next Gen MANET and network management of MANETs at the tactical edge
- ▶ User interfaces of the future
- ▶ Small fuel cells or...
- ▶ Significant improvements in battery technology (80 hour battery)
- ▶ Lower procurement & maintenance cost



Emerging Commercial Capabilities

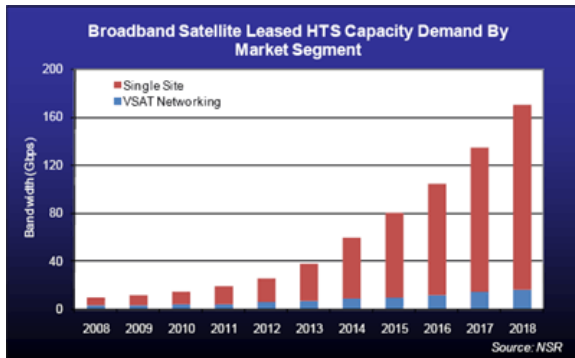
Increasing array of Commercial Satellite Broadband Systems

- Ka-band satellites can dramatically lower the cost per bit of delivering a satellite service
- Touted as “can deliver service anywhere” which is increasing customer demand
- Touted as “single best technology for point-to-multipoint content delivery” which is increasing demand
- Industry promises of 15 Gbps
- Demand supplemented by need for wireless backhaul systems

Satellite Technology Feature Article

August 04, 2010

Growth in Wireless Industry Drives Satellite Backhaul



Multiple COTS smartphone/PDA's

- Resistive touch screens work with any input device, including gloved fingers
- Some are NSA certified
 - Up to TS voice and SECRET data
 - Type 1 and non Type 1 encryption
- Interfaces included: GSM, CDMA, WI-FI, CDMA
- Meet MIL-STD 810F
- Some are HAIPE compliant “out of the box”
- Some are VOIP compliant
- Some run on popular OS's such as the Android Based Joint Common User Environment



How does JPEO JTRS leverage and partner with commercial technologies?



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Effectiveness and Cost Savings for the Warfighter: the JTRS Enterprise Business Model

Open Standards

- Software Communications Architecture (SCA) based
- Application Program Interfaces (APIs)

Common Shared Software

- Government Purpose Rights (GPR) for all software
- JTRS Information Repository (IR)
- Software in Service Support
- Lower barriers of entry for industry

Competition in Production

- Full and open SDD
- Qualify at least 2 sources for all production
- Compete in lots, in bulk from all Services

Drives down unit costs through competitive acquisition strategies in production

Enables industry to offer alternative solutions to DoD

Provides a more affordable P3I approach through reduced reliance on proprietary & restricted data rights

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Software Communications Architecture





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SCA Next

- ▶ **Benefits the warfighter**
 - Smaller radios
 - Longer battery life
 - Faster bootup
 - Better interface with external applications
- ▶ **Enables technology**
 - Optional CORBA
 - Lightweight components
 - Flexible OE requirements
- ▶ **Reduces development resources**
 - Budget
 - Schedule
- ▶ **Reduces test and certification time**
 - Reduce number of requirements
 - Increase use of automated testing





SCA Next

- ▶ **Focus is on Open Software Communications**
- ▶ **Architecture (SCA) Standards**
 - Baseline was SCA V2.2.2 and extensions
- ▶ **Radio API's are specified external to the SCA**
- ▶ **Backwards Compatible**
 - Preserve existing investments

Backwards Compatibility of Applications is an Overarching Tenet



SCA Profiles

- ▶ **Full SCA Profile:** A plug-and-play profile that supports full registry interfaces for registering and unregistering components to domain and device manager components.
 - Radio platforms where the hardware modules are plug-and-play for dynamic configuration.
- ▶ **Medium SCA Profile:** Not a full plug-and-play profile, only supports the registry interfaces for registering components to domain and device manager components, and device manager components are not releasable.
 - Suited for radio platforms where the hardware modules are a static configuration.
- ▶ **Lightweight Profile:** Does not support registry interfaces for domain and device manager components, and device manager component.
 - Suited for single channel radios.



SCA Next Way Forward

- ▶ **Establish clear objectives**
- ▶ **Publish the SCA Next Draft Specification**
 - SCA Next Specification is a draft document open for comment
 - <http://sca.jpeojtrs.mil/scanext.asp>
 - Encourage SCA Product Developers to prototype changes
 - Need Developer Feedback
- ▶ **Finalize SCA Next by 1 Jan 2012**

Internationally Developed Open Specification



JPEO JTRS

Questions?