



Hardware Convergence

A Game Changing Approach for the Future

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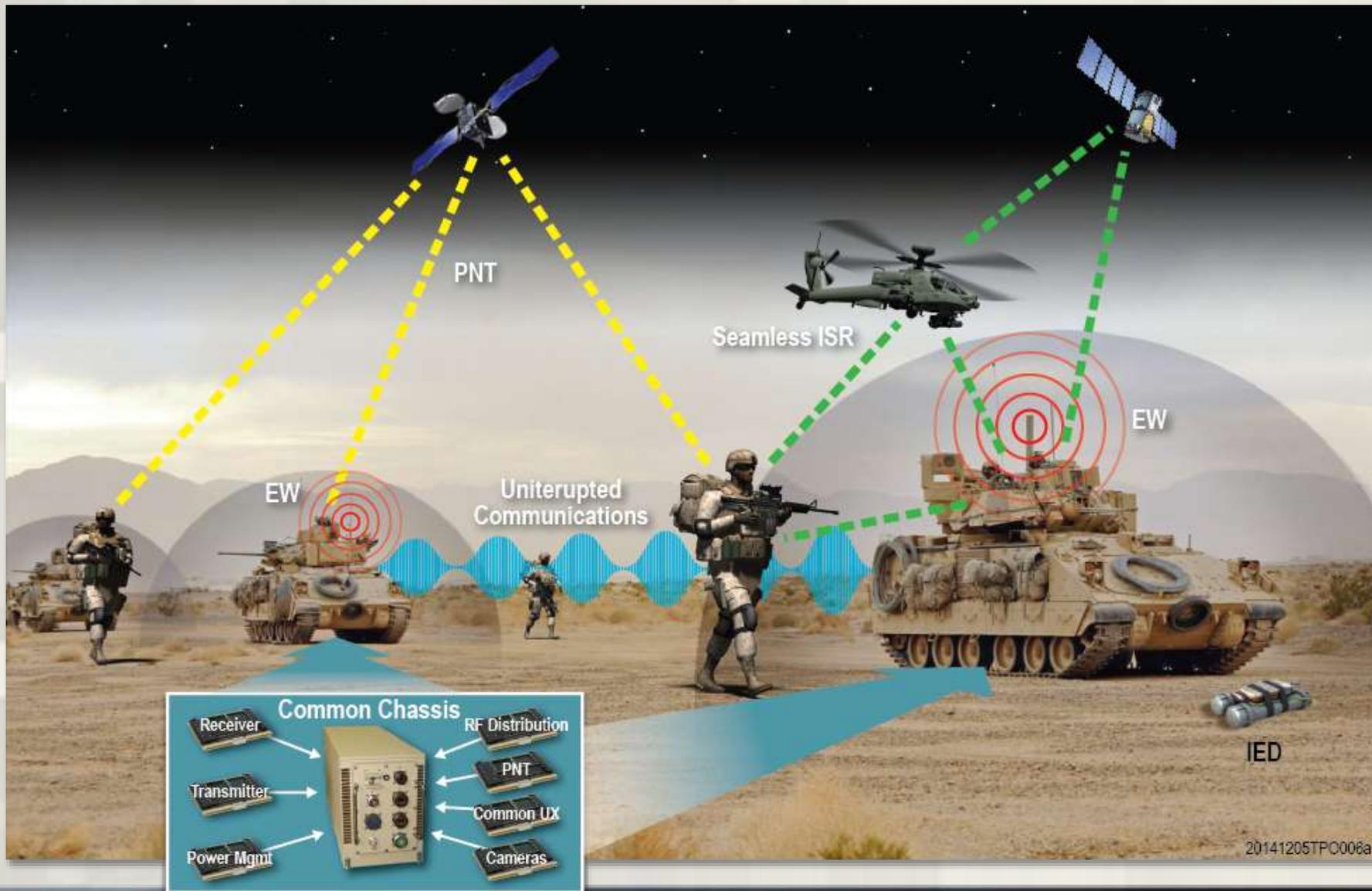
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Army C4ISR Operational View

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Key Tenets for the Next Fight

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- **Rapid technical insertion**
- **Tailored technologies to the environment**
- **Integration**



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Rapidly Changing Operational Environment - Need Adaptability

★ **CERDEC**
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Globally Responsive, Regionally Engaged

USNORTHCOM



USEUCOM

USCENTCOM

USAFRICACOM



USSOUTHCOM



USPACOM



Terrain



Foliage

• Challenge Areas

- Army is expeditionary and will require deployment to various “hot spots” which vary in threat and environment
- It is difficult to adapt RF Applications to adversary and environment (e.g. jungle, desert)
- Extensive use of time consuming manual techniques to organize and reorganize the network (e.g. Unit Task Reorganization)
- Wide frequency band coverage and constantly changing threat space for EW systems

• S&T Investment Areas (FY15-20)

- **Network Simplification** - NETOPS and routing protocols simplify network from an end user perspective
- **Waveform Modularity** – Modularity allows for interchangeable physical layers that provide maximum adaptability based on region and threat.
- **Electronic Protection Techniques** – Focus on adaptive waveforms which allow trading of capacity for robustness, operate in GPS denied regions, and allow EW attack while communicating
- **Technique Development** – Focus on development of efficient and effective methods to limit enemy’s use of RF spectrum while protecting blue force ability to use same spectrum



RF Hardware/Software Convergence Evolution



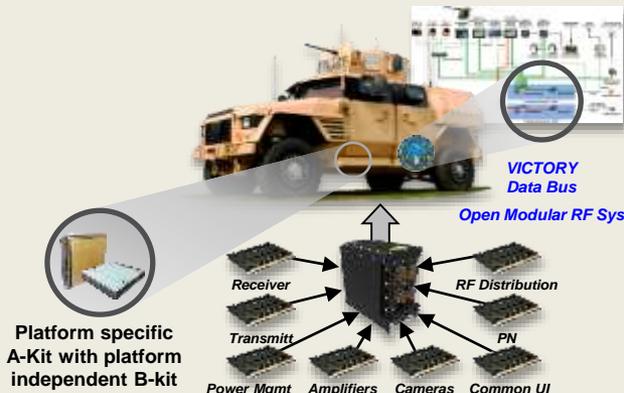
(does not show air and fixed site capabilities)

Today



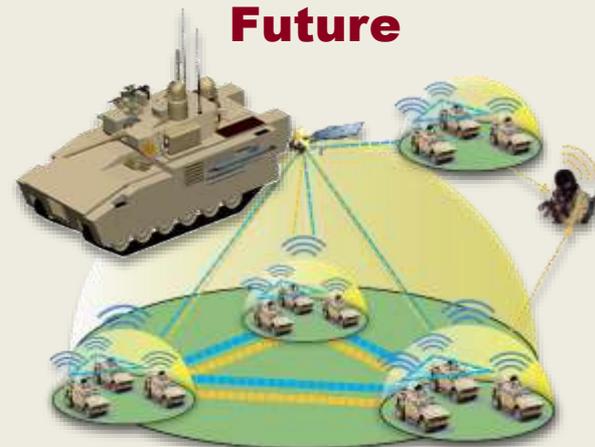
Individual systems with a "bring your own" integration strategy.

Midterm



Evolving towards an architecture that provides an integrated system-of-systems capability across all platforms with the ability to rapidly upgrade

Future

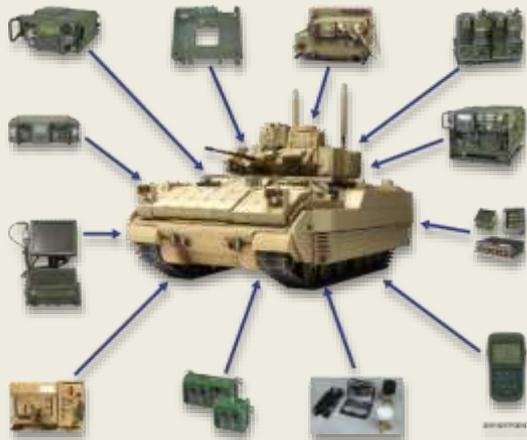


The C4ISR network as a weapon providing collaborative and autonomous Networking solutions across all platforms





Today



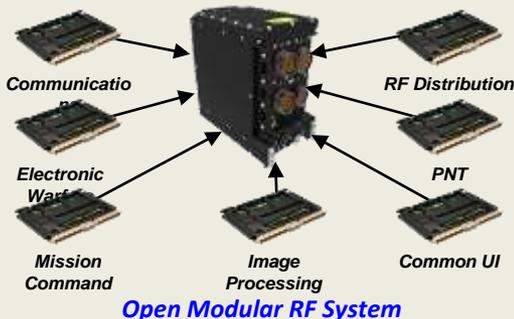
Problem: Individual systems with a “bring your own” integration strategy increase SWaP, integration time and cost in vehicular platforms

Future



Approach: Investing in the midterm HW convergence efforts allow future Modular C4ISR/EW systems to enable collaborative and autonomous Networking solutions across all platforms.

Integrated Amplifier/Antenna



Midterm



Approach: Modular C4ISR/EW system reduces SWaP and allows for faster capability upgrades within vehicular platforms while reducing costs.



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Major Components of Hardware Convergence

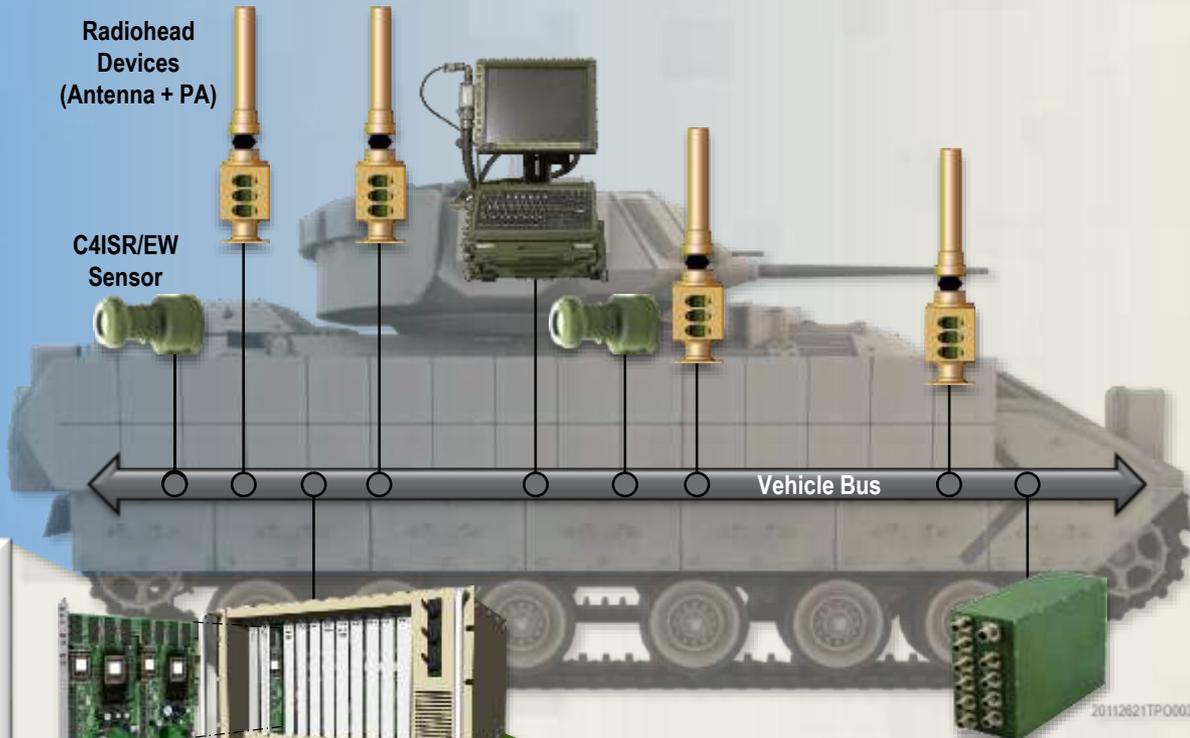


RF Components across the Vehicle

- Modular Radio Open Architecture (MORA) Standard

Radiohead Devices (Antenna + PA)

C4ISR/EW Sensor

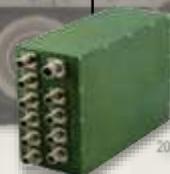


Software Development Environment

- REDHAWK for a common development environment



Software Defined Radios



RF Distribution



"Applications"/Cards

- Electronic Warfare
- Communications
- Mission Command
- PNT



Chassis

- Chassis unique to meet platform requirements
- Security