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CERDEC
US ARMY – RDECOM

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Future C4ISR Technologies on Ground Platforms

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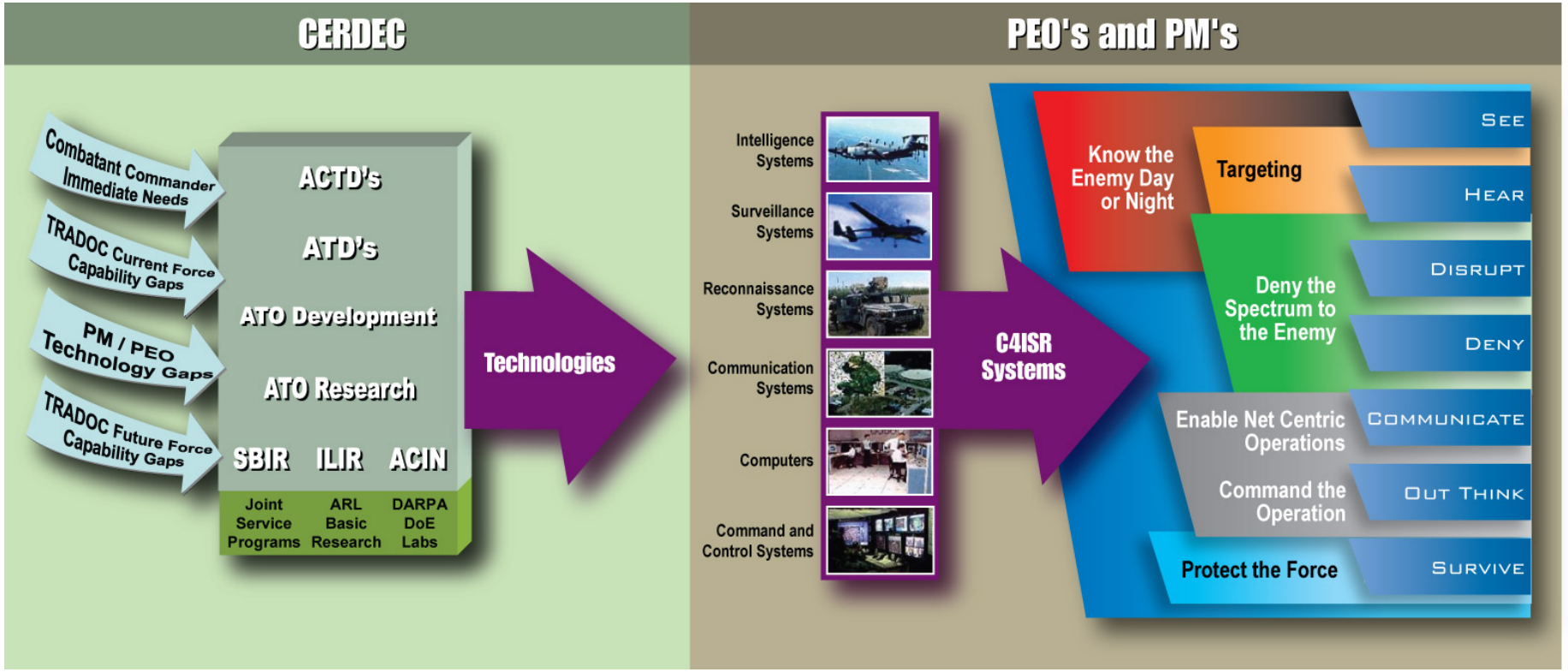
CERDEC Mission



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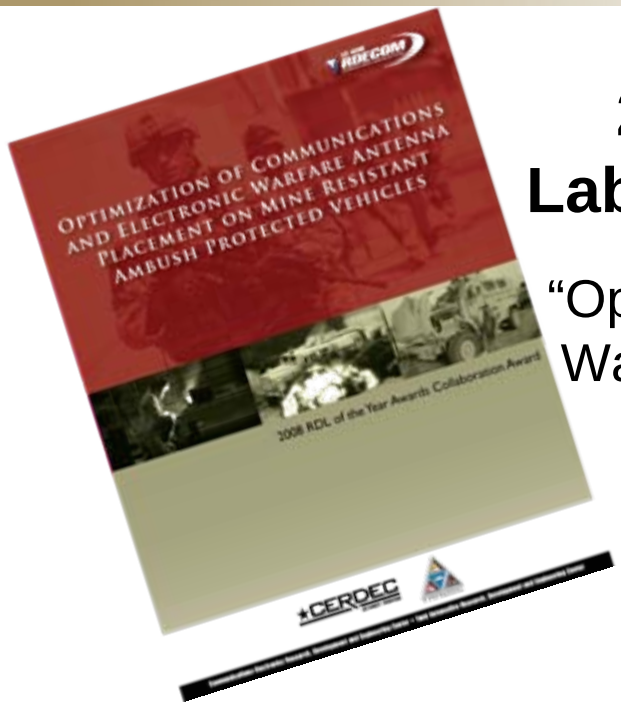


TARDEC

2008 Research and Development Lab of the Year for Collaboration Team

"Optimization of Communications and Electronic Warfare Antenna Placement on Mine Resistant Ambush Protected (MRAP) Vehicles "

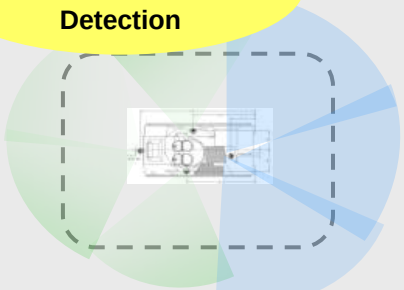
Current Collaborative Efforts

- Improved Mobility and Operational Performance through Autonomous Technologies (IMOPAT) Army Technology Objective (ATO)
- Embedded Platform Antenna Systems (EPAS)
- In-Dash Concept
- C4ISR Integration

CERDEC Urban Sensor Suite
Part of TARDEC IMOPAT ATO-D

Closed Hatch Hemispherical Vision Integrated with Threat Cueing, Video Capture, and Slew to Cue Interrogation

Improved Driving and Threat Detection



High Frontal Resolution Closed Hatch Hemispherical Vision

Sensors, System Processor, Controls and Displays

Target Handoff via Virtual Pointer

Virtual Pointer in Weapon Sight for target handoff between Dismounts and SUGV

SUGV with SWIR Zoom

Threat Cueing & Image Capture

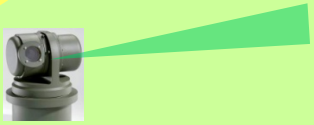
Acoustic Gunfire Detection

Improved local SA and operator cueing

360° Video Recording with tagging

Motion Based Cueing for Pop Up/Close-In Target Detection

Non-Lethal Suppression

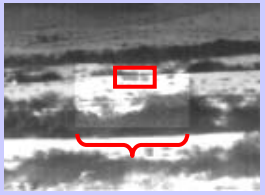


Separate ,Steerable, Stabilized Gimbal (automatic & manual modes)

Slew to Cue via High Resolution Imager (Enhanced CROWS)

Rapid Slew to Cue from 360° Vision to High Resolution Imager

NFOV for Interrogation and Optics Detection

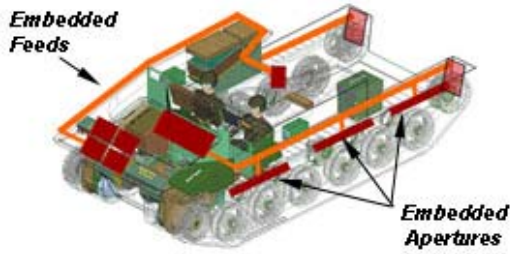


WFOV Inset into 360° Vision With Touch Screen GUI

Enabler for Improved Closed Hatch Survivability and Lethality

FOCUSED.

CERDEC Support Through Embedded Platform Antenna Systems (EPAS) Program



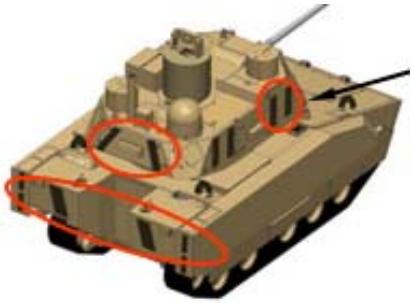
- ***Antennas on Armor***
- ***Structural Radiators***
- ***Multifunction Apertures***

Today:
Antennas compete for limited topside platform space. Typical installation result in adverse antenna interactions, distortions to radiation patterns and high visual signatures.

EPAS Concept:
Vehicle platform design is modified to facilitate embedded feed systems and distributed antenna apertures at optimized locations to reduce antenna interactions, pattern distortions and visual signatures. Optimized aperture/feed locations determined through modeling and simulation.

WARFIGHTER PAYOFFS:

- ***Enhanced Multifunctional Communications/Sensor Performance***
- ***Increased Survivability due to Elimination of Visual Signature***
- ***Reduced Antenna Attrition and Logistics***



Results:
Embedded multifunction apertures optimally distributed around platform to support communications, CIED Jamming, direction finding, and sensors.

In-Dash Concept / Status

Joint Effort Between TARDEC & CERDEC

- **Leverage Military / Commercial vehicular technologies to equip tactical vehicles with a common power/digital backbone**
- **Meet vehicle mission variant requirements by plugging "B-Kit" component systems into the existing "A-Kit" power and data infrastructure**
- **Eliminate duplicative systems resources by embracing pre-production design of power, data, and the C4 distribution backbone**
- **Provide migration path to future force C4ISR architectures**
- **Validate the requirements for a more cost effective and responsive process to integrate C4/RSTA with host vehicles**

Concept:

- Embedded data bus for plug and play C4ISR
- Modular rapidly reconfigurable C4ISR mission equipment packages for vehicle interchangeability
- Embedded conformal antennas
- Enhanced vehicular power generation systems and power management for C4ISR
- Integrated high capacity high efficiency environmental control systems with noise abatement controls
- Vehicle electronic multi-spectral stealth technologies

Status:

- Developing low-cost, quick-reaction prototype to refine tenets of concept-metrics will include manpower and mission re-configuration time

TARDEC

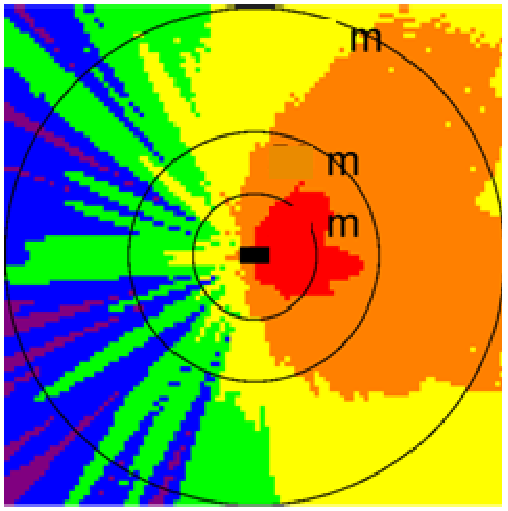
Integrate Existing and Prototype Electronics and Sensors Into Currently Existing Tactical Vehicle and Optimize Performance and Interoperability

Modeling and Simulation: Efficient Upfront M&S is used to solve cosite interference and antenna blockage problems PRIOR to integration to save time and money in later testing and debugging

EMI/EMC: Smart Electromagnetic Interference and Compatibility Analysis PRIOR to integration

FDTD Full-Wave Solution

GTD Incorporating Earth Ground



- RDECOM R&D ***Program of Record*** Chartered in 2006
- Provides a ***relevant environment*** to assess emerging technologies in a C4ISR ***System-of-Systems***
- Conducts technical Live, Virtual, and Constructive ***technology demonstrations***
- ***Mitigate risk*** for FCS Concepts and Future Force technologies
- Opportunities for ***acceleration of technology insertion*** into the Current Force
- Offers ***Continuous*** and ***Persistent Evaluations***
- Venue for ***validation of Technology Readiness Levels***
- Provides a ***Technology Transition venue***

Collaboration Breeds Success

- **Apply System of Systems Integration Principles Early**
- **Expand Relationships to Optimize C4ISR Technologies for Ground Platforms**
- **Leverage our Collective Strengths with our Industry Partners**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Questions?
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