Robotic and Autonomous Systems Strategy

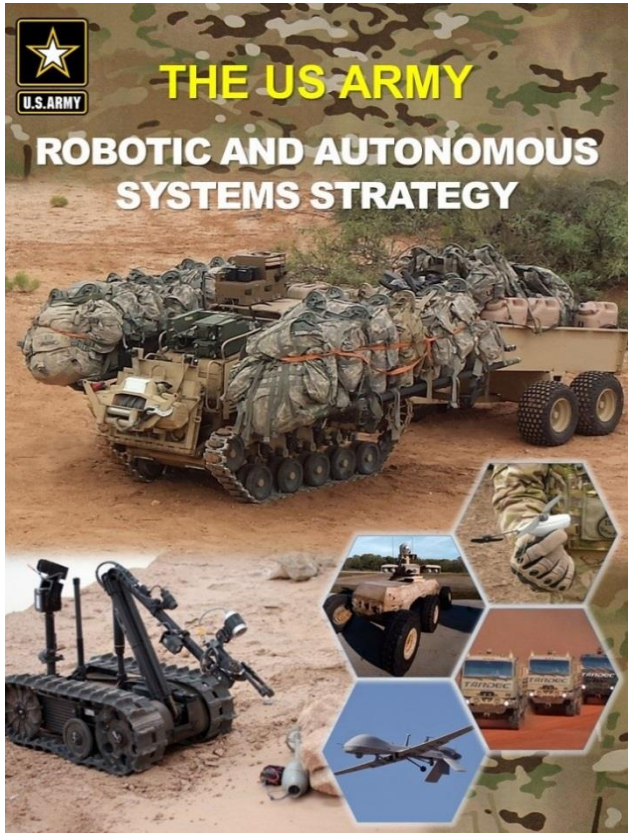
Army Capabilities Integration Center (ARCIC)

23 MAR 2017
MAJ Mike Dvorak
ARCIC Robotics Branch

Agenda

1) Robotic and Autonomous Systems Strategy Overview
2) Robotic Wingman
3) Small UAS
4) Common Operating Environment

Robotic and Autonomous Systems Strategy



Objective Capabilities: Over the next 25 years, RAS supports the Army to:

1. Increase situational awareness
2. Lighten the Warfighters' physical and cognitive workloads
3. Sustain the force with improved distribution, throughput, and efficiency
4. Facilitate movement and maneuver
5. Protect the force

Endstate: Increase combat effectiveness of the future force and maintain overmatch against enemies.

Capability Objectives: Over the next 25 years, RAS supports the Army to:

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Near-Term (2016-2020)

Increase Situational Awareness: Soldier Borne Sensor

Lighten Soldier Load: Squad Multipurpose Equipment Transport

Improve Sustainment: Leader-Follower Semi-Automated Resupply

Facilitate Maneuver: Husky Mounted Detection System / Light Flail

Protect the Force: Counter-Improvised Explosive Device (C-IED)

Mid-Term (2021-2030)

Increase Situational Awareness: Swarming Unmanned Aircraft System

Lighten Soldier Load: Exoskeleton

Improve Sustainment: Fully-Automated Convoy Operations

Facilitate Maneuver: Unmanned Combat Vehicles and Advanced Payloads

Far-Term (2031-2040)

Increase Situational Awareness: Autonomous Recon Systems + Warrior Suit

Improve Sustainment: Autonomous Cargo Delivery Aircraft

Facilitate Maneuver: Improved Unmanned Combat Vehicle

The RAS Strategy is located at:
http://www.arcic.army.mil/app_Documents/RAS_Strategy.pdf

The RAS Strategy prioritizes investments over time, enabling the Army to maintain overmatch and win in a complex world.

Robotic Wingman

Robotic Wingman Draft Plan

S&T development phase

Robotic Wingman (2016-2023)
- M113 or HMWWV
- Teleoperation technology+

Program of Record-1

Semi-Autonomous Robotic Wingman (2023-2035)
- Existing combat vehicles used
- Increase in semi-autonomous capability:
  - Leader-Follower,
  - Waypoint Navigation,
  - Obstacle Detection/Avoidance

Program of Record-2

Autonomous Robotic Wingman (2035-2045)
- Purpose built platform
- Fully autonomous navigation capability (teleoperated weapons)

Platform requirements/challenges: Autonomous off-road mobility, obstacle detection and avoidance

Lethal Payload requirements/challenges: external power, self-reload, switch ammo, greater ammo storage

Semi-autonomous weapons station to manage latency and delays

Abrams Lethality Enabler (ALE)

Augment Loader with UGV role

UAVs

Future Demo

UGVs

Demonstration:

What: Abrams Lethality Enabler Experiment

When: Summer 2017

Where: Fort Benning, GA

Why: Assessing augmentation of loader with UGV roles

Robotic Wingman - JCTD

S&T Demonstrator - TARDEC , ARDEC, ONR 30

← Phase 1: AUG ‘17 – Fort Benning

M113 Demonstrator (Phase 2)

Wingman Payload objectives/challenges

- Situational delay vs. latency (need semi-autonomy)
- Sensor field of view (few cameras vs. more eyes, Soldiers and buddy-teams)
- Data/target sharing (UxS, sensors, e.g. LRAS3)
- Network connection (local then global)

Wingman platform objectives/challenges

- Obstacle detection and avoidance; dynamic obstacles; dust, negative obstacles, water and brush/vegetation
- Haptic feedback, driver warnings, reverse-driving
- Dynamic operations; semi-autonomous capabilities
- Speed limited to control & sensors (20-25~ mph); stability control

Small UAS

Army Unmanned Aircraft Systems

Group 5

Air Force has Group 5 (Global Hawk)

Group 4

Gray Eagle

Group 3

Shadow

Group 2

Army has no Group 2

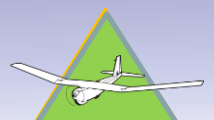
Group 1

Puma

Raven

Echelon of Employment

Capabilities:



Battalion/Company:
PUMA POR/Funded

- 15 lbs
- 10km range
- 2.0 hrs flight

Company/Platoon:
RAVEN POR/Funded

- 4.5 lbs
- 10km range
- 1.5 hr flight

Platoon:
Short Range Micro (SRM)
Unfunded POR

- 3 lbs
- 3km range
- 30 minutes flight

Squad:
Soldier Borne Sensor (SBS)

- ~3 ounces
- 900M (T) 1200M (O)
- 20 minutes

Command and Control

PUMA
RAVEN
SRM

SBS

PLT capability is unfunded; no "perch, hover, stare capability"

*Hunter UAS is getting divested

Small UAS

1) Current POR

Short-Range
Micro UAS

2) Air-Ground combo

Rooster by Roboteam

Pegasus by Robotic Research

3) Tethered UAS

Tethered UAS by Sky Sapience

What is a Common Operating Environment?

FROM:
- **Single Purpose HW/SW**


Comms


GPS/Location


Weather


Pictures


Sharing Data


Schedule

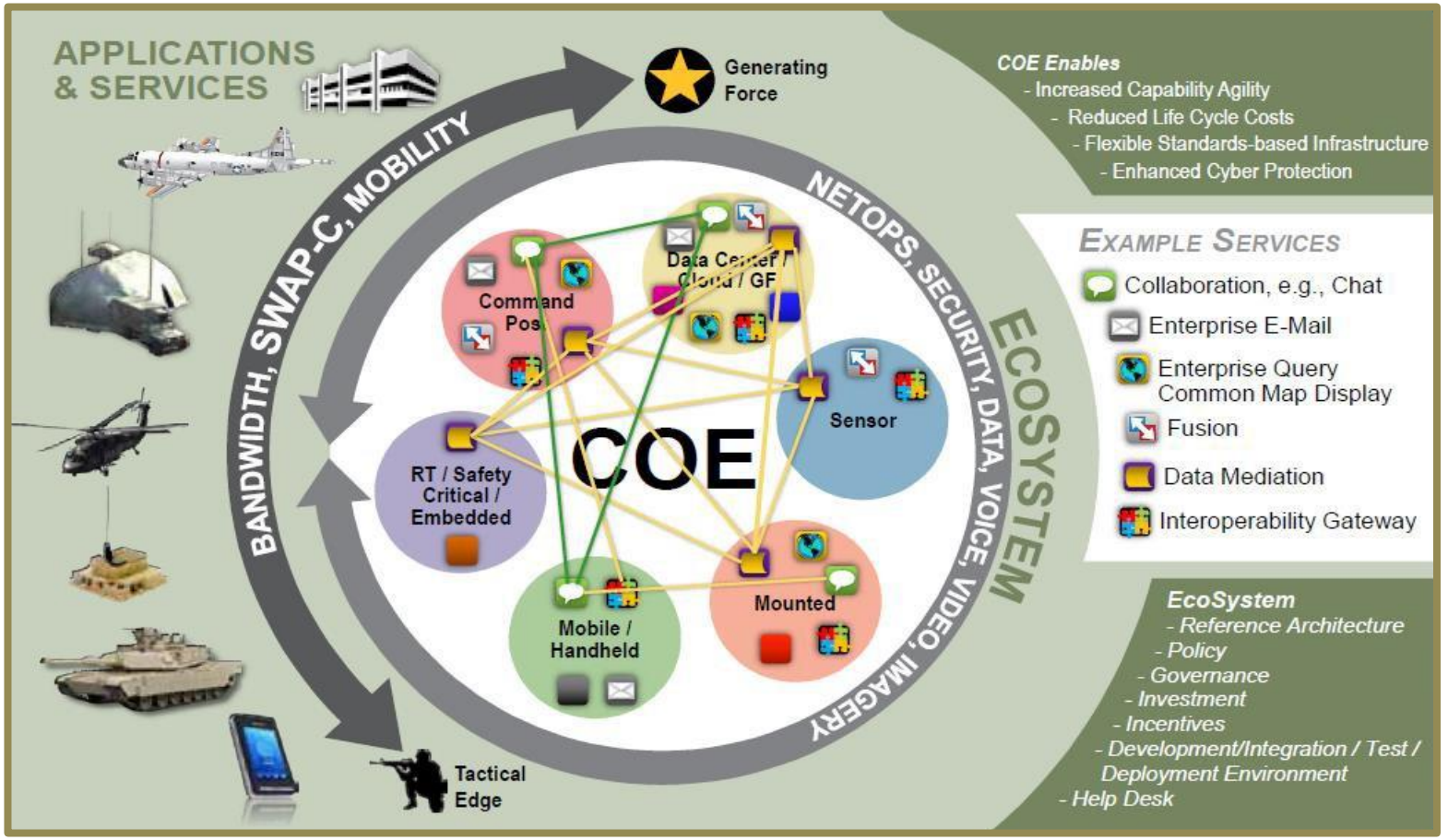

Maps

Army Model

TO:
- **A Rich Set of Warfighter Apps** (e.g. Intel, Intel)
- **Common Software Baseline**
- **Converged onto Common Suite of HW Devices**

COE standards converge hardware associated to currently stovepiped systems into a ***common infrastructure,*** *allowing the Army to deliver warfighting capabilities as software apps, more rapidly.* ***Soldiers can work more efficiently.***

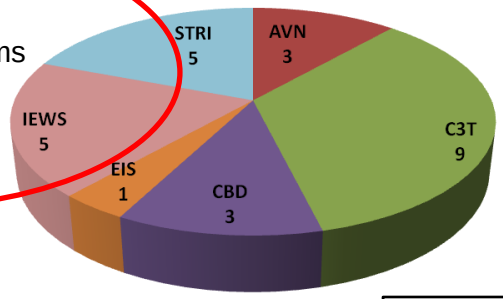
The Army's Common Operating Environment



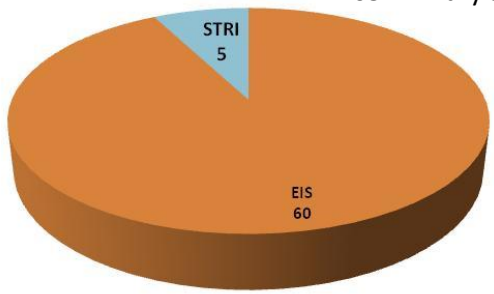
The Common Operating Environment is not a system or Program of Record (PoR), rather, COE technologies and standards bring stovepiped systems onto a common foundation to allow the Army to deliver warfighting capabilities as software applications.

COE Binning / MC Focus Areas

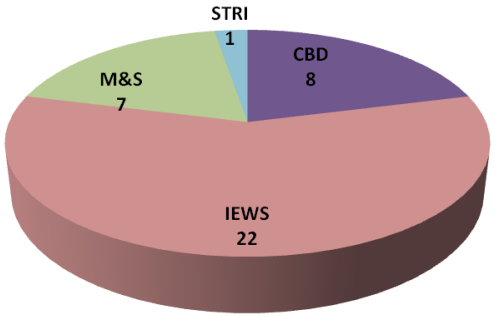
CP CE
26 Primary Systems



DC/C/GF
65 Primary Systems

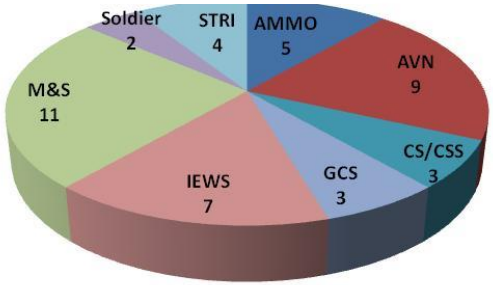


Sensor
38 Primary Systems

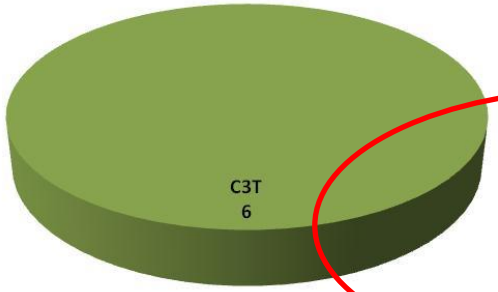


Relationships/Dependencies
- Schedules
- Interoperability
- Resourcing
- Services
- Performance

RTSCE
44 Primary Systems



M/HH
10 Primary Systems
Focused on Mission Command

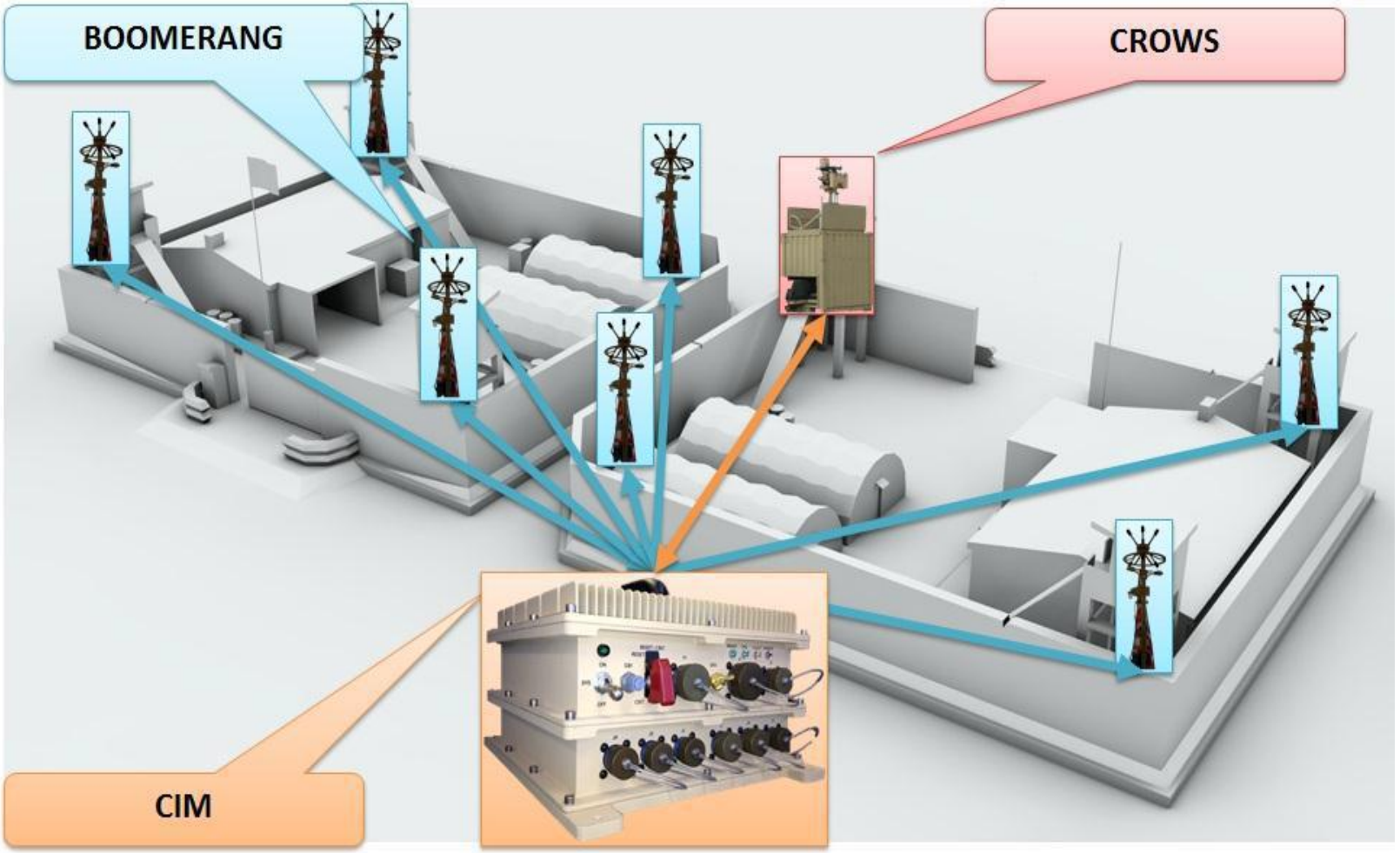


Mounted
6 Primary Systems

Data based on 28 August 2014 TAB Approved System Migration Binning List

Example capability under test: Flexible Fire Control System (F2CS)

- **Focus Assessment Emphasis:** **F2CS capability to integrate with multiple sensors, and multiple remote weapons (BOOMERANG, CROWS, JACCS, SGS, RAID, CERBERUS)**



Questions?