Robotic and Autonomous Systems (RAS)

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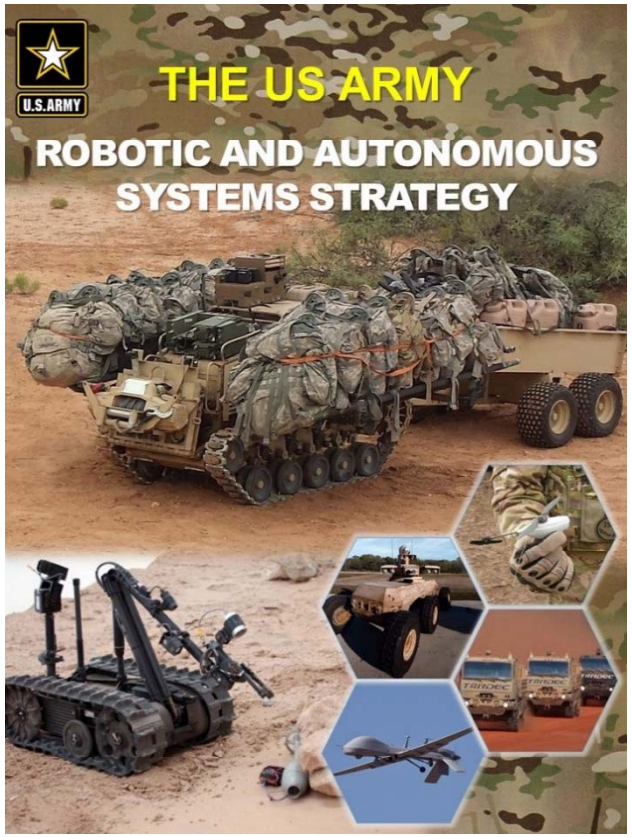
Robotic and Autonomous Systems Strategy



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.

RAS Requirements Status

1. Universal Controller – CPD to be separated from CDD
2. Common Robotic System (Individual) – Approved CDD
3. Common Robotic System (Heavy) – Draft CDD
4. Squad Multi-Purpose Equipment Transport – Draft CDD-AROC JAN'17
5. Leader-Follower Automated Resupply – Draft CDD-AROC-FEB'17
6. Robotic Wingman – need CDD for '19 (FCS; JCTD)
7. Rucksack Portable Unmanned Aerial System – Approved CPD
8. Tethered Unmanned Aerial System – No Document
9. Future Family of Tactical UAS (Group 3) – Draft ICD in DA Staffing

Robotic Wingman

S&T development: platform and payload agnostic

Robotic Wingman (2016-2023)
- **M113 or HMWWV**
- **Uses existing teleoperation technology and other cheap semi-autonomous functions**

Program of Record (Solution TBD)

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 (Solution TBD)

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

Wingman video

Wingman Payload objectives/challenges

- Situational delay vs. latency (need semi-autonomy)
- *Field of view (few cameras vs. cameras, Soldiers and buddy-teams)
- Network connection (local then global)
- Data/target sharing (UxS, sensors, e.g. LRAS3)
- *Target acquisition
- ***RWS System Requirements:***
- Purpose Built Externally Powered Weapon
- Not gas fed w/ recoil
- Remotely Reload
- Increased Stowed Ammo Load and remote type change
- Ethernet Based Architecture

Field of view (soda straw)

Targeting steps:

Scan/Acquire

ID

Track

Decide

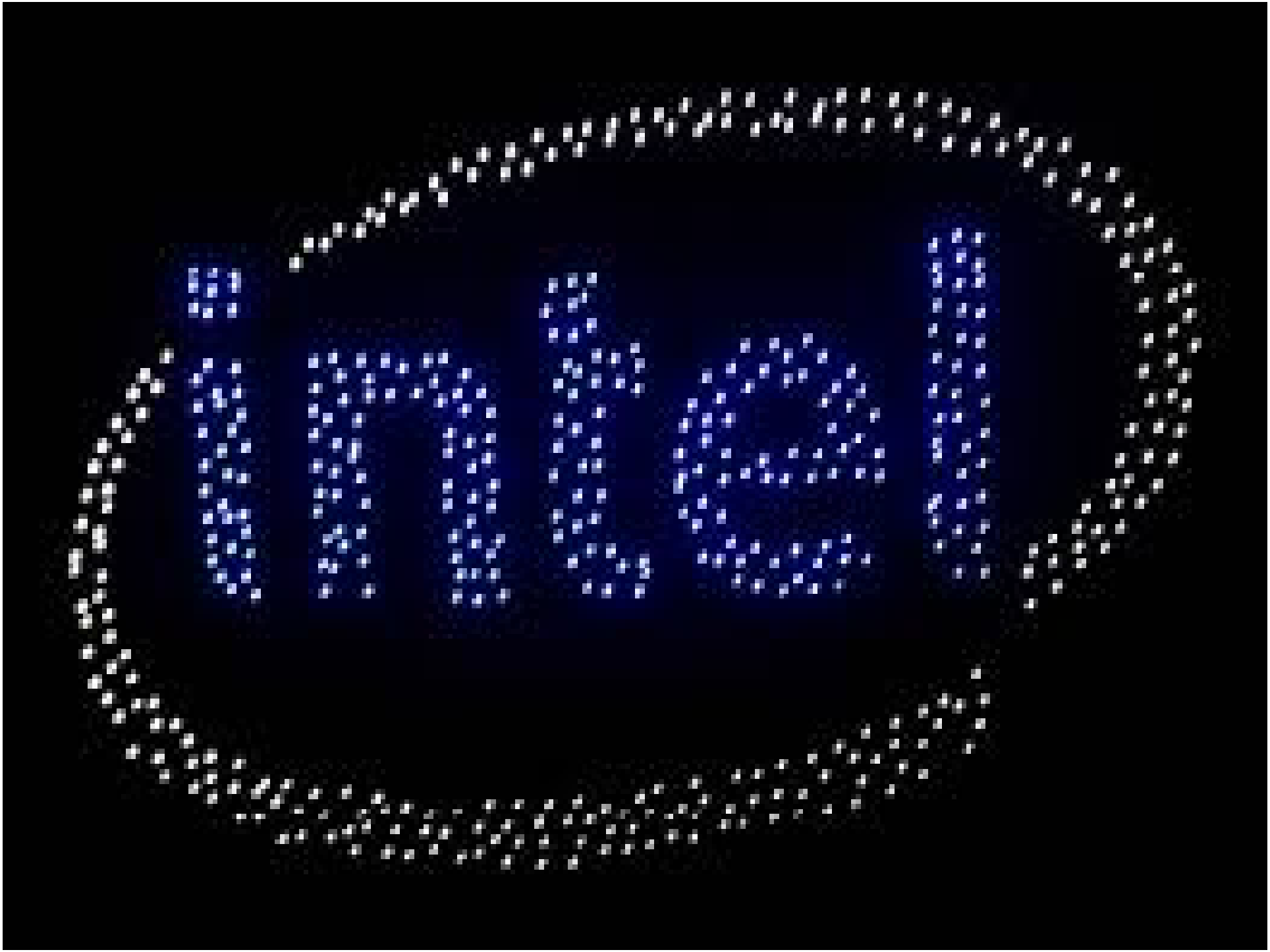
Targeting - 1

Targeting - 2

Data/target sharing
(other sensors, e.g. LRAS3)

Wingman platform objectives/challenges

- Platform objectives/challenges:
- Obstacle detection and avoidance; dynamic obstacles
- Haptic feedback, driver warnings, reverse-driving
- Dynamic operations; semi-autonomous capabilities
- Speed limited to control & sensors (20-25~ mph); stability control
- Humans in the loop (adds delay; need robots capable of reaction)
- Incorporate operator into systems to mitigate shortfalls with autonomy
- Throughput and bandwidth of comm's
- GPS-denied environ.; C2 vehicle as reference (or mapping, dead-reckoning, local comms)
- Operation in EW environments (hacking/tamper, spoofing, jamming)
- System of System teaming - mobility and targeting system together
- Separate platform and payload operator
- Canned and automated maneuvers with a push of the button
- 24/7 all-weather sensors - temperature and weather limitations


BMC

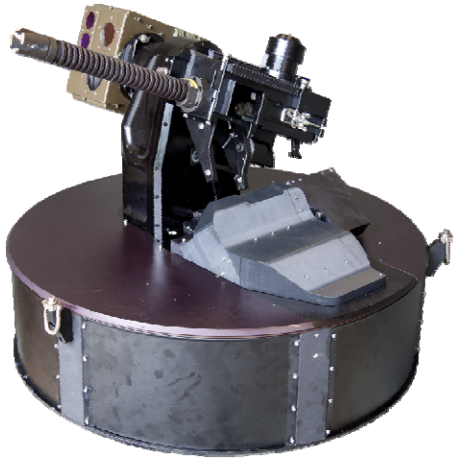
CHIPOTLE
MEXICAN GRILL

amazon
Prime Air

Tactical UAS

Questions?

Remote Weapon System Options



Increasing Caliber

Decreasing Size, Weight

DISTRIBUTION A: Approved for public release; distribution is unlimited.

Army Unmanned Aircraft Systems

Echelon Above Divisions Level

Theater Level RSTA/ISR. FMV, SAR/GMTI, SIGINT, comms & weapons. Assigned to Aerial Exploitation Battalions and the 160th Special Operations Aviation Regiment. Allocated through ISR GFMAP

EAD Gray Eagle

Division Level

Provides organic Division and below RSTA/ISR. FMV, SAR/GMTI, SIGINT, comms & weapons. Allocated to Active Component Divisions and assigned to the Combat Aviation Brigades. Allocated through Request For Forces (RFF)

Div Gray Eagle

Brigade Level

Provides organic RSTA/ISR at Brigade and Below. FMV & comms. Assigned to the Brigade Combat Team, Ranger Regiment, Combat Aviation Brigades and Special Forces Group.

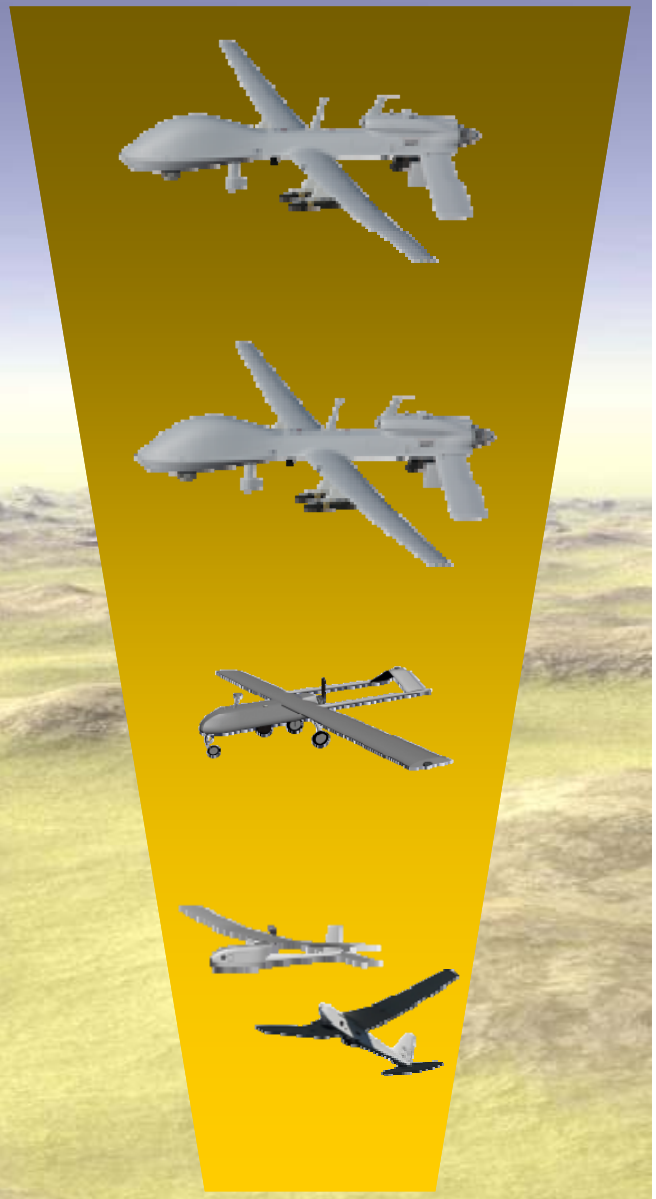
Shadow

Battalion/Company Level

Provides organic RSTA and force protection for the small unit . FMV only.

Raven
RQ-11B

Puma
RQ-21B



RSTA: Reconnaissance, Surveillance and Target Acquisition
ISR: Intelligence, Surveillance & Reconnaissance
*** Gray Eagle acquisition objective is 167 Total (includes school house and attrition)**
**** Shadow acquisition objective is 104 Systems (includes training)**