Unmanned Systems Integrated Roadmap

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UMS Integrated Roadmap 2009

- **The Purpose is to project a future vision and path forward for how unmanned systems *could be* developed and employed by the DoD across the next 25 years in accordance with Strategic Planning Guidance, and a capability-based focus.**
- **The Roadmap:**
  - **Recommends intermediate states of advancement along the way to achieving a vision of unmanned systems supporting multiple capability/mission areas**
  - **Identifies Strengths, Opportunities, Challenges, and Risks associated with achieving the proposed future vision**
  - **Recommends actions that can capitalize on the strengths and opportunities, and mitigate the challenges and risks**
  - **Is responsive to plans, concerns, and issues of DoD Services and organizations as well as Statute and Congressional Intent**

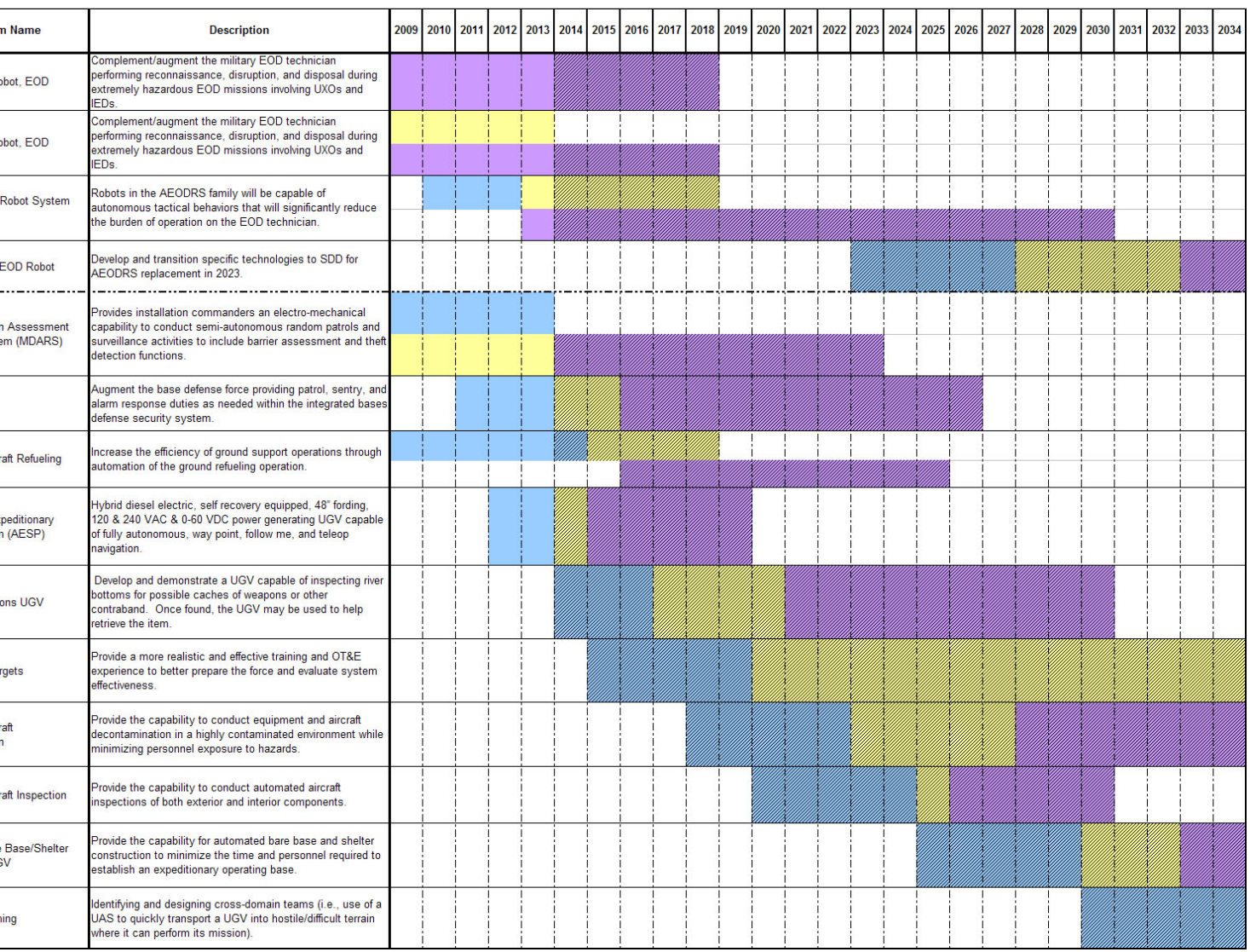
Roadmapping Methodology

- **Craft Potential Future Vision**
  - **Joint Capability Area Mapping**
    - **Depicts programmed Systems & projects systems beyond POM thru 2034**
  - **System Performance Envelope Evolution**
    - **Depicts the evolution of increased performance to achieve mission accomplishment**
  - **Identify Technology Enablers**
    - **Depicts key technologies leading to mission accomplishment and performance increases**

Roadmapping Methodology

- **Map the Road for achieving that proposed vision:**
  - **Goals & Objectives**
    - **Depicts recommendations that if pursued will implement strategy of development & employment of unmanned systems across Capability Areas**
  - **Conduct Strengths, Opportunities, Challenges & Risks Analysis**
    - **Assessment of what DoD can leverage to achieve vision**
    - **Assessment of challenges & risks to be mitigated in achieving vision**
  - **Recommend Actions Leading to Vision Achievement**
    - **Based on vision, goals & objectives, and analysis, recommends actions DoD can pursue to achieve development and employment of UMS across next 25 years**

Sample Mapping: Means to Capabilities



RDT&E = / PROC = / In Inventory =	Domain	JCAs	System Name	Description
All Systems	Ground	BA, P, BP	MK 1 MOD 0 Robot, EOD	Complement/augment the military EOD technician performing reconnaissance, disruption, and disposal during extremely hazardous EOD missions involving UXOs and IEDs.
		BA, P, BP	MK 2 MOD 0 Robot, EOD	Complement/augment the military EOD technician performing reconnaissance, disruption, and disposal during extremely hazardous EOD missions involving UXOs and IEDs.
		BA, P, BP	Advanced EOD Robot System (AEODRS)	Robots in the AEODRS family will be capable of autonomous tactical behaviors that will significantly reduce the burden of operation on the EOD technician.
		BA, P, BP	Next Advanced EOD Robot	Develop and transition specific technologies to SDD for AEODRS replacement in 2023.
		BA, P, C2	Mobile Detection Assessment Response System (MDARS)	Provides installation commanders an electro-mechanical capability to conduct semi-autonomous random patrols and surveillance activities to include barrier assessment and theft detection functions.
		BA, FA, P, L, BP	Defender	Augment the base defense force providing patrol, sentry, and alarm response duties as needed within the integrated bases defense security system.
		L	Automated Aircraft Refueling	Increase the efficiency of ground support operations through automation of the ground refueling operation.
		FA, P, L	Autonomous Expeditionary Support Platform (AESP)	Hybrid diesel electric, self recovery equipped, 48" fording, 120 & 240 VAC & 0-60 VDC power generating UGV capable of fully autonomous, way point, follow me, and teleop navigation.
		BA	Riverine Operations UGV	Develop and demonstrate a UGV capable of inspecting river bottoms for possible caches of weapons or other contraband. Once found, the UGV may be used to help retrieve the item.
		FS, CM&S	Autonomous Targets	Provide a more realistic and effective training and OT&E experience to better prepare the force and evaluate system effectiveness.
		P, L	Automated Aircraft Decontamination	Provide the capability to conduct equipment and aircraft decontamination in a highly contaminated environment while minimizing personnel exposure to hazards.
		L	Automated Aircraft Inspection	Provide the capability to conduct automated aircraft inspections of both exterior and interior components.
		P, L	Automated Bare Base/Shelter Construction UGV	Provide the capability for automated bare base and shelter construction to minimize the time and personnel required to establish an expeditionary operating base.
		BA, FA, P, L	UAS-UGV Teaming	Identifying and designing cross-domain teams (i.e., use of a UAS to quickly transport a UGV into hostile/difficult terrain where it can perform its mission).

Performance Envelope

	2009 Evolutionary Adaptation	2015 Revolutionary Adaptation	2034
Commands	Physical Human Machine Interfaces	Scripted Voice Command/Hand Signals	Natural Language Understanding
Collaboration	Individual System	Teaming w/in Domain Collaboration Across Domains	Teamed Collaboration
Frequency	Constrained RF	Frequency Hopping	Multi-Frequency Communications
Mission Complexity	Operator Controlled		Autonomous Adaptive Tactical Behaviors
Environmental Capability	Limited Environmental Difficulty	Expanded Environmental Difficulty	All-Weather Environmental Difficulty
Product Line	Mission Package Product Line Dependent		Product Line Independent
OPSEC	Signature High		Signature Low
Operational Control	1 Operator / Platform	1 Operator / Domain	1 Operator / Team
Bandwidth	Limited	Advanced Bandwidth Management	Autonomous Bandwidth
Mission Endurance	Hours	Days Months	Years
Maintenance	Operator		Automated
Awareness	Sensor Data	Situational Awareness	Actionable Information

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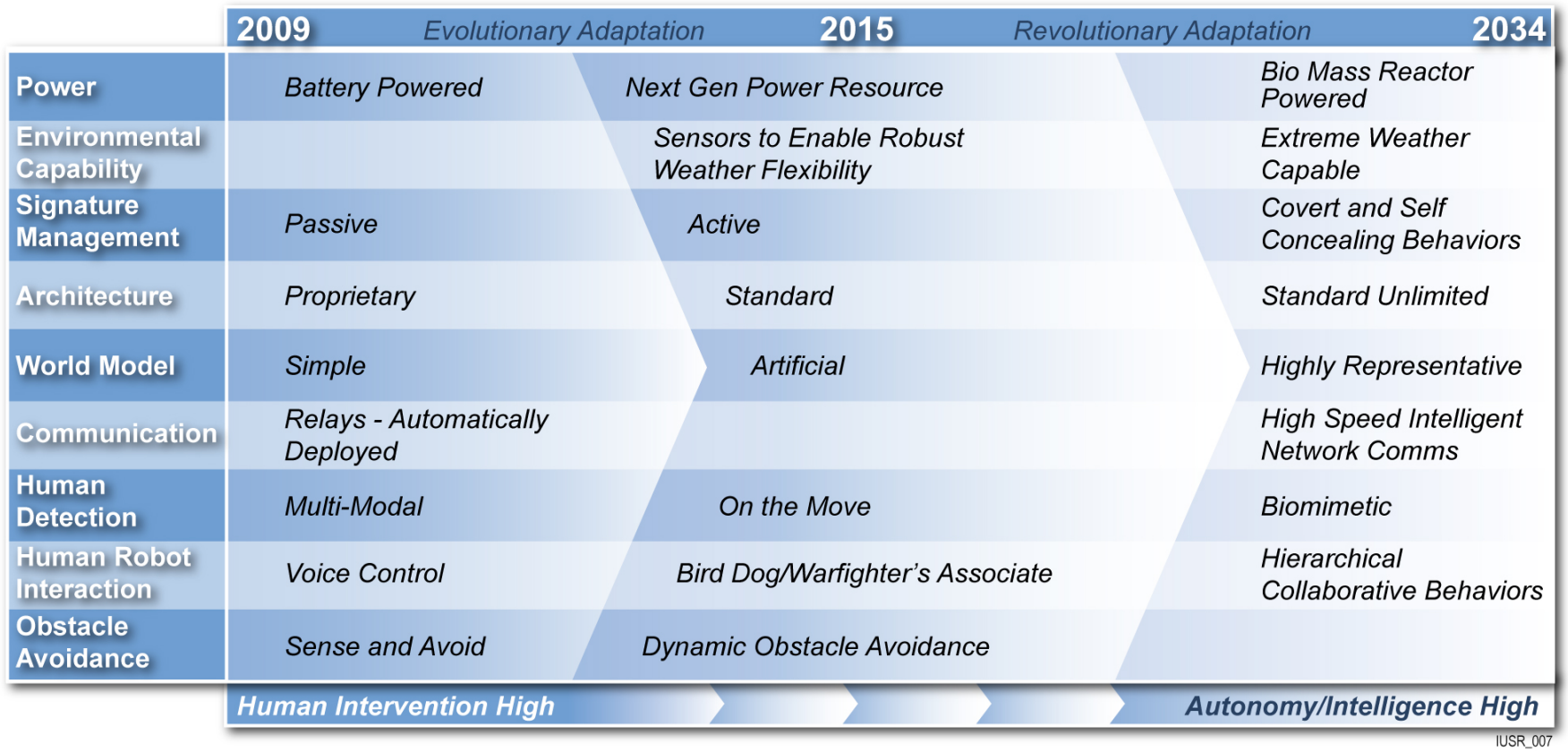
Technology Enablers



JROCM

THE JOINT STAFF
WASHINGTON, D.C. 20318-8000

JOINT REQUIREMENTS OVERSIGHT COUNCIL

JROCM 045-09
16 March 2009

MEMORANDUM FOR: UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS

Subject: FY 2009-2034 Department of Defense Unmanned Systems Integrated Roadmap

1. The Joint Requirements Oversight Council (JROC) has reviewed and endorses the FY 2009-2034 Department of Defense Unmanned Systems Integrated Roadmap.

2. The JROC requests that the Services, Combatant Commanders, and other Department of Defense organizations utilize this Roadmap as they develop and employ unmanned systems and provide feedback and input for future updates to this Roadmap.

JAMES E. CARTWRIGHT
General, United States Marine Corps
Vice Chairman
of the Joint Chiefs of Staff

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