



DoD Unmanned Systems Integrated Roadmap

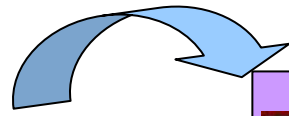
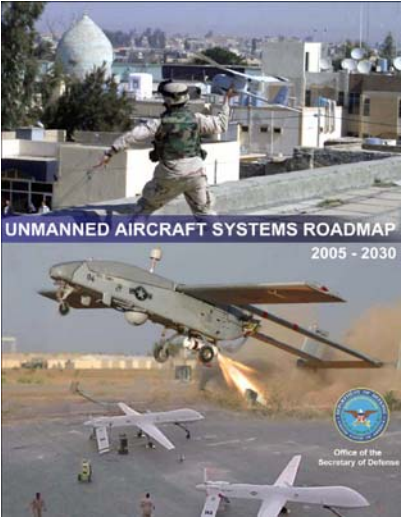
**Presented at the AUVSI Unmanned Systems
Program Review 2008**

28 February 2008

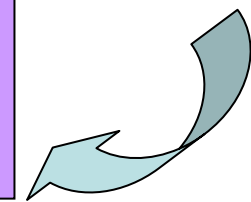
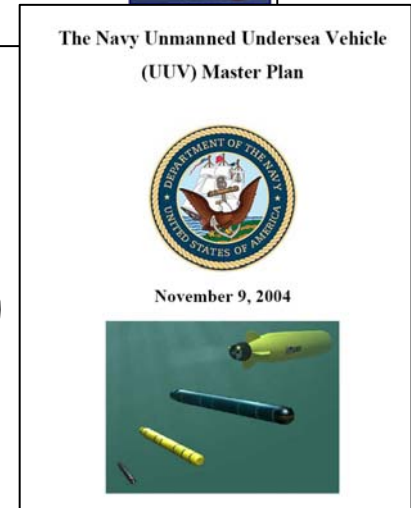
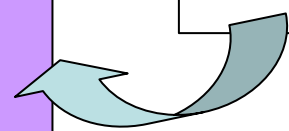
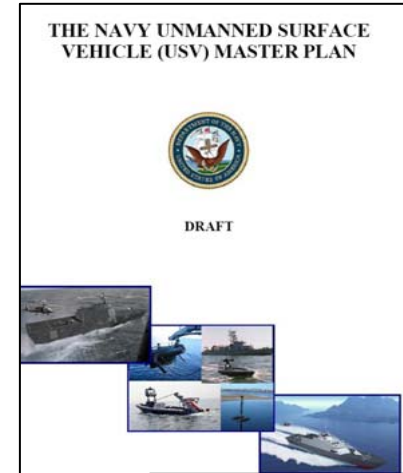
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Integrated Unmanned Systems Roadmap



Integrated Unmanned Systems Roadmap





Public Law 109-364 SEC 941



REPORT. – Not later than 120 days after the date of the enactment of this Act, the Secretary shall submit to the congressional defense committees a report containing –

- the policy required by subsection (a); and an **implementation plan** for the policy that includes –
 - a strategy and schedules for the replacement of manned systems with unmanned systems in the performance of the mission identified in the policy pursuant to subsection (b)(1);
 - establishment of programs to address technical, operational, and production challenges, and gaps in capabilities, with respect to unmanned systems; and
 - an assessment of progress towards the goals identified for the subset of unmanned air and ground systems established in section 220 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (as enacted into law by Public Law 106-398; 114 Stat. 1654A-38).

UNMANNED SYSTEMS DEFINED. – In this section, the term “unmanned systems” consists of unmanned aerial systems, unmanned ground systems, and unmanned maritime systems.



Roadmap Introduction



The Unmanned Systems Integrated Roadmap is a master plan that describes the intended future state of the Unmanned Systems Product Line Portfolios and the actions to be undertaken to achieve that future state.

The Roadmap will serve to inform future decision making associated with the management of the Unmanned System Portfolios as they provide needed capabilities to the joint Warfighter.



Purpose



- The Purpose of the Unmanned Systems Integrated Roadmap is to project a future vision for how unmanned systems will be developed, acquired, and sustained as part of the materiel employed by the DoD.
- The Roadmap will:
 - Identify recommended intermediate states of advancement along the way to achieving that vision
 - Identify Strengths, Weakness, Opportunities, Challenges, and Risks associated with achieving that future vision
 - Identify those actions and responsible organizations that will capitalize on the strengths and opportunities, and mitigate the challenges and risks
 - Be responsive to plans, concerns, and issues of DoD, Services and organizations as well as Statute and Congressional Intent



Scope



The Scope of the Roadmap will address:

- The 3 Product Line Portfolios:
 - Unmanned Aircraft Systems
 - Unmanned Ground Vehicles
 - Unmanned Maritime Systems (Surface and Undersea)
- from 2009 – 2034
- technology development, standardization, interoperability, joint acquisition, policy

The Roadmap will not address:

- detailed operational concepts for employing unmanned systems
- operational requirements for unmanned systems



Addressing Capability Needs via Unmanned “Means” (notional)



2009

2034

<p>JCA 1- Battlespace Awareness</p>	<p>RECONNAISSANCE-UAS</p> <p>MAN-PORTABLE EOD-UGV</p> <p>GLOBAL HAWK-UAS</p> <p>SIGINT COLLECTION-UAS</p> <p>INFORMATION OPERATIONS-UUS</p>
<p>JCA 4- Force Application</p>	<p>TACTICAL STRIKE-UAS</p> <p>MINE WARFARE-USV</p> <p>PENETRATING STRIKE-UAS</p> <p>INTEGRATED STRIKE-UAS</p> <p>TIME CRITICAL STRIKE-UUS</p>
<p>JCA 5- Protection</p>	<p>MARITIME PATROL-UUS</p> <p>HULL UUV LOCALIZATION SYSTEM-UUV</p> <p>ACTIVE RANGE CLEARANCE-UGV</p> <p>MINE NEUTRALIZATION-UGV</p> <p>MULE-UGV</p> <p>SUGV-UGV</p> <p>COUNTERAIR-UAS</p>
<p>JCA 6- Logistics</p>	<p>CONVOY OPERATIONS-UGV</p> <p>AERIAL REFUELING-UAS</p> <p>MANUEVER SUPPORT & SUSTAINMENT-UGV</p> <p>MULE-UGV</p> <p>AIRLIFT-UAS</p>



Unmanned Systems Performance Evolution (notional)



2009 Evolutionary Adaptation 20?? Revolutionary Adaptation 2034

Human Intervention High

Autonomy /Intelligence High

Individual System		Teaming w/in Domain		Collaboration across domains		Teamed Collaboration	
Spectrum Constrained RF				Spectrum Independent - Hopping			
Mission Endurance in hours			Mission Endurance in days		Mission Endurance in weeks		
Mission Complexity – operator controlled			Route Planning		Obstacle Avoidance		Adaptive Tactical Behaviors
Limited Environmental Difficulty					Expanded Environmental Difficulty		
Mission Package Product Line Dependant					Product Line Independent		
OPSEC – Signature High					OPSEC – Signature Low		
Operational Control N:1		1:1	1:# w/in Domain		1:# across domains		1:# Teamed



Strengths & Opportunities to Capitalize on in Achieving Vision



- UAS have strong presence in force structure, maritime and ground domain can leverage lessons learned
- Standards not very mature or established...can evolve to meet needs of unmanned community
- Industry very willing to assist DoD in shaping future vision...opportunity for win-win between DoD and industry
- Strong academic capability in US Universities to tap for technology development
- Strong, supportive Congressional interest
- Other Government Agency and International partnering
- Strong COCOM/Service level support for emerging UMS based upon their performance in OIF/OEF
- International UMS R&D is significant and may provide DoD advantages in achieving vision through strategic agreements/partnerships
- Other...



Challenges & Risks to Mitigate in Achieving Vision



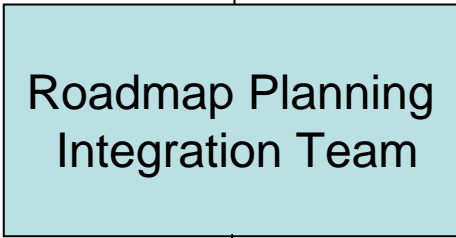
- No current common vision across DoD for development and acquisition of unmanned systems
- Coordination across current activities/domains is not robust (often stakeholders unaware of each other's efforts)
- Trust of unmanned systems is still in infancy especially in ground and maritime domains...stronger in air domain, but still unable to fly in US Airspace
- Lack of robustness among 2nd and 3rd tier suppliers in industrial base
- Integration of Command and Control of Unmanned systems within existing and future Battle Command systems not well understood
- Spectrum Crowding



Planning Organization (placeholder)



Senior Council populated by PSA, DDRE, Joint Staff, Services GO/SES



Integration Team populated by PSA Domain reps, DDRE, Joint Staff, Other DoD Orgs, Service HQs at 06 level



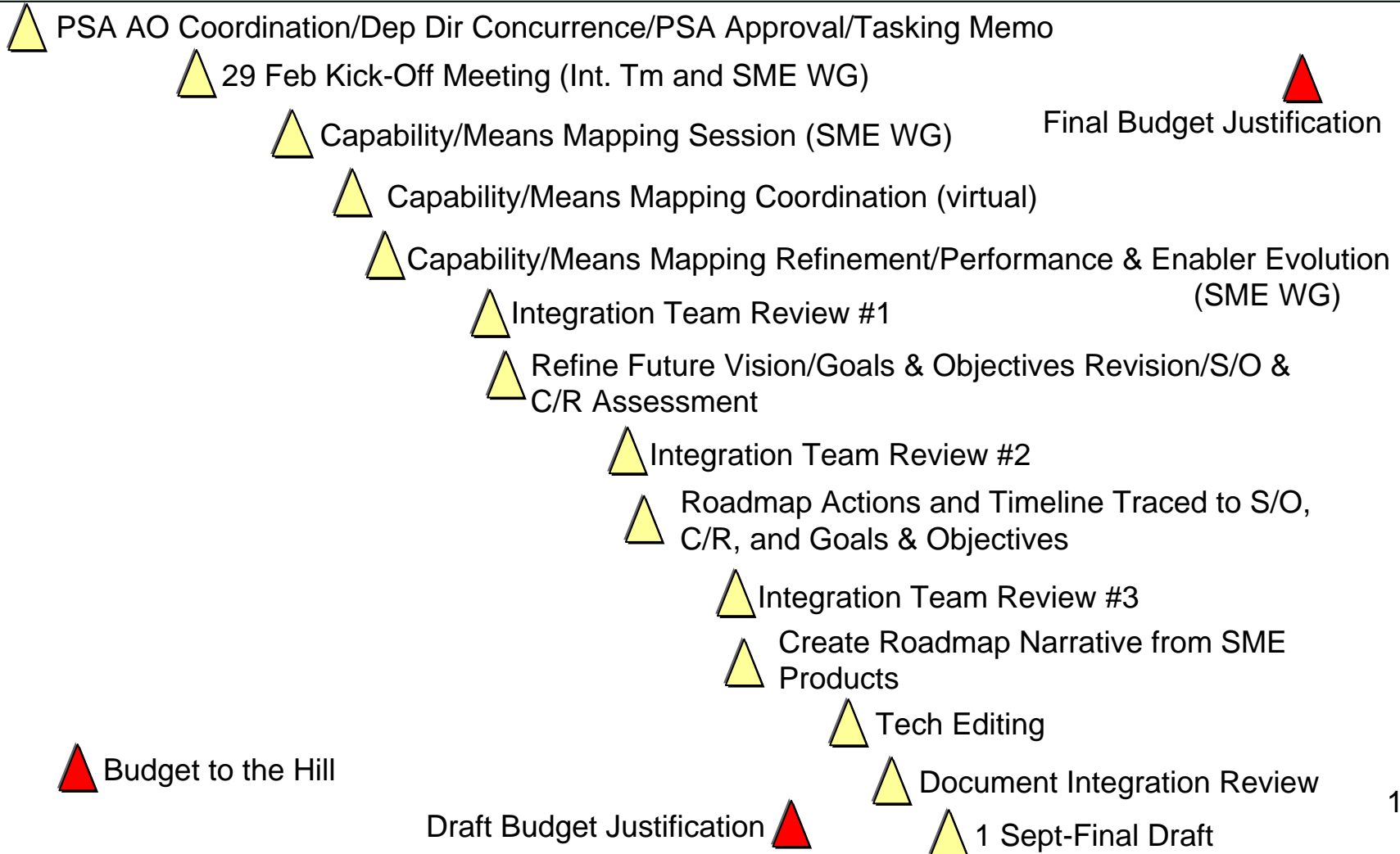
Working Groups populated by Subject Matter Experts from DoD labs, Program Offices, other as needed



Roadmap “Battle Rhythm” FY08-FY09



Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec

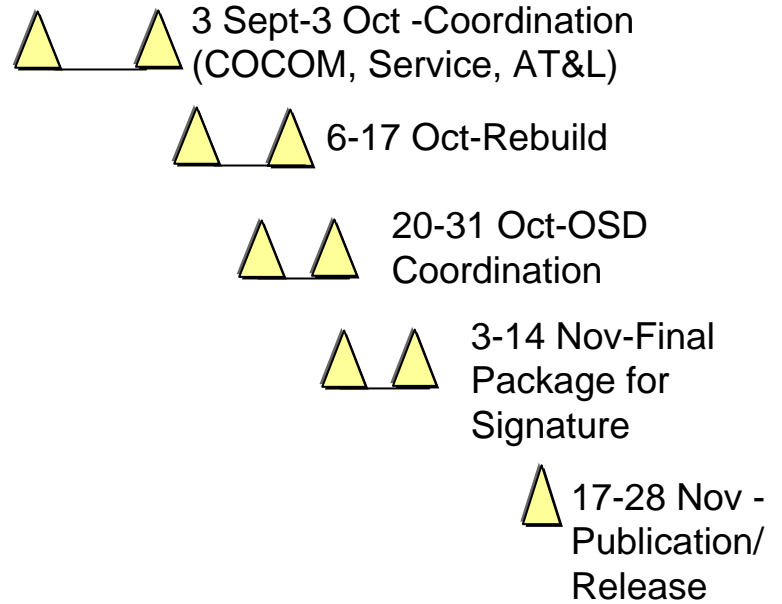




Roadmap “Battle Rhythm” FY08-FY09 (continued)



Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec



Appropriations

Authorizations



Wrap Up



- The Services will provide reps in each domain to contribute to plan development, coordination and approval
- DoD organizations (Joint Staff, DDR&E, JIEDDO, DTRA, TSWG, UASCOE, etc.) will provide reps to contribute to plan development
- OUSD (AT&L) PSA/ has the lead for organizing, administering, editing, coordinating, and publishing the Roadmap
- Though not a funding document, may be used to support future POMs