



Posturing DoD for Mosaic Warfare: Final Briefing

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Project Overview

Motivation

DARPA has an ambitious vision of Mosaic warfare

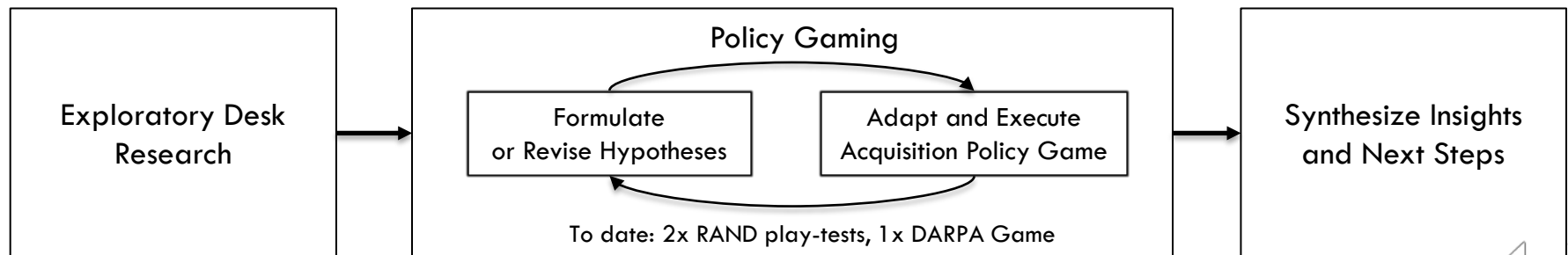
The Mosaic vision

- is conceived by STO leadership as a
 - warfighting concept
 - means to accelerate capability development & fielding
- depends on DARPA advancing multiple technologies
- is inherently more challenging to “transition” than a program

Research Questions

1. Are DoD’s existing requirements, resourcing and acquisition systems compatible with fielding a Mosaic? Are those management systems compatible with envisioned increases in time-effectiveness?
2. If not, what are viable alternatives to the existing management systems?

Research Approach: Embrace Policy Gaming as Means to Experiment with Acquisition Models



How did we conceptualize Mosaic?

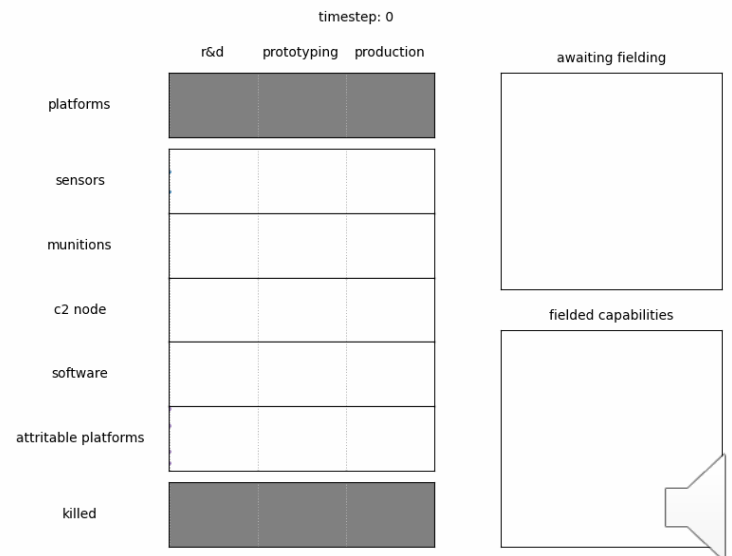
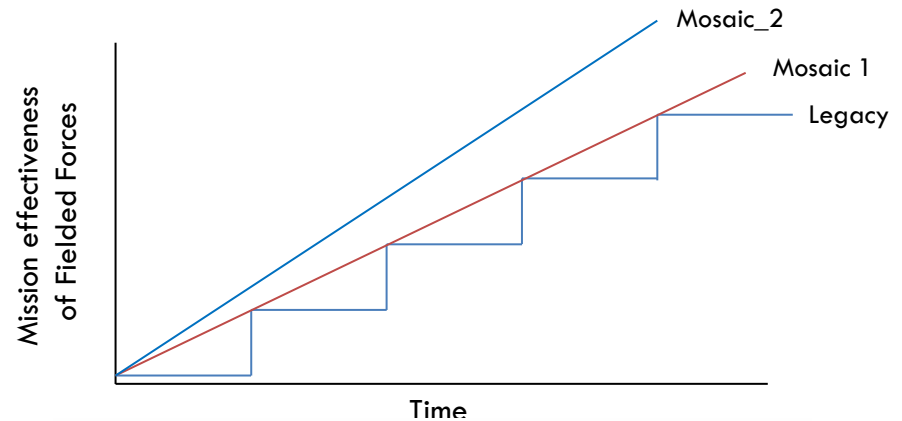
Heterogenous, fractionated capabilities, dynamically composed on tactical timelines



- Heterogenous: more diverse
- Fractionated: functionally simpler
- Composable: architecturally uncommitted to specific kill chains until mission execution

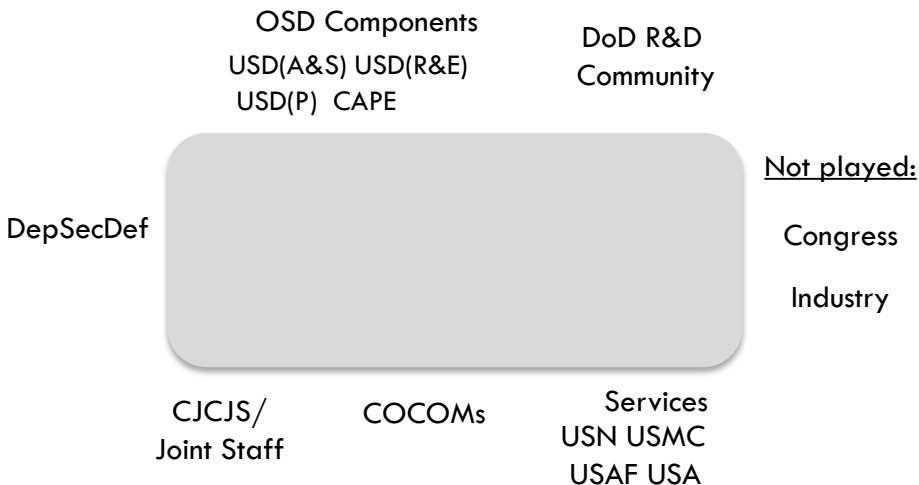
DevOps + Systems of Systems

A means to dramatically increase time-effectiveness



Concept: Gain insight by requiring DoD reps to make decisions within, live with consequences of a Mosaic world

Players inhabit the roles of DoD decision-makers



Force Planning Scenario w/in an Acquisition Scenario

Acquisition Scenario

- 2028 to 2032
- Strategic Continuity (DoD committed to priorities of 2018 NDS)
- Overall military competition between U.S. & China is contested
- U.S. has advanced new JWC but remains committed to a post-Cold War force structure
- DARPA in collaboration w/ USAF & USN R&D demo initial ASuW Mosaic
- SecDef and Congress note success, move to institutionalize a Mosaic

Force Planning Scenario

- 2035
- Chinese invasion of Taiwan
- Mission: ASuW

A three half-day virtual event

	Half Day 1: Mosaic in Today's System	Half Days 2&3: Mosaic in an Alternative Model
Goal of exercise	Identify conditions under which today's requirements, resourcing & acquisition systems support a Mosaic model	Exercise an alternative to today's management systems to assess viability & identify improvements
Role of participants	Experienced professionals and analysts	Role playing DoD stakeholders

Players' Backgrounds Reflect Assigned Roles

Players in RAND Play-test I and II

- Former DoD officials on RAND staff, e.g.
- Retired O6, Navy rep for JCIDS
 - Retired Acting Director CAPE
 - Former USD(ATL) Staff member
 - Former Navy Dir for Analysis, NAVAIR

Players in DARPA Game

- DARPA STO Leadership & Staff
- Retired OPNAV N81
- Former USD(ATL) Staff member
- Senior Advisor to USD(A&S)



JMO Model Addressed Some Challenge, Surfaced Other Issues, and Raised Questions for Further Exploration (1/3)

Requirements

- ✓ Presumption that a requirement must precede resourcing
- ✓ Presumption of a static requirement that must be satisfied prior to fielding
- ☐ Can Mosaic build support w/o a requirement to serve as an agreed-upon benchmark for progress?

← Addressed by JMO role in defining needs; not explored explicitly in game

Resourcing

- ✓ 2-year budgeting cycle requires clairvoyance on needs, limits flexibility to adapt
- ✓ Reprogramming takes time, expends political capital

← Addressed by JMO flexible funding model; players note Congress has finite patience

Technology Transition

- ✓ Difficulty in maintaining enterprise-view of tech pipeline

← Addressed by JMO pipeline (portfolio) management function; players note implementation challenges

Acquisition Oversight

- ✓ Program-centric paradigm predisposes focus on program cost, schedule, performance outcomes
- ✓ Ten ACAT-III tiles may add up to an ACAT-I Mosaic
- ☐ Need for a compelling measure of merit to guide Mosaic oversight
- ☐ How to measure Mosaic value prop of adaptability to the unknown?

← Players discuss multiple metrics; RAND work suggests time-effectiveness, or throughput

← Addressed by JMO mission orientation, pipeline mgmt function

- ✓ Issue w/ Existing System Addressed by JMO Model
- ✗ Issue w/ Existing System *Unaddressed or Reinforced* by JMO Model
- ☐ New Issue or Question



JMO Model Addressed Some Challenge, Surfaced Others (2/3)

Source selection & contracting

- ✓ Quick decisions risk protests from losing bidders, adding delay
- ✓ Contract negotiations take time
- ✓ Seemingly increasing throughput in contract actions
- ❑ Risk in managing industrial base dominated by small players, changing demand signals
- ❑ Players saw value in an explicit “keep warm” contracting option
- ❑ Intellectual property

← Addressed by pre-approved vendor pool, contracting vehicle; players see virtue and risks

System Engineering & Integration

- ✗ Mosaic defers integration risks from tile to Mosaic ← assumed away in game
- ❑ Seamless mission integration (interoperability) does not resolve platform (physical) integration

Test & Evaluation

- ✓ Mosaic would compete with regular programs for scarce T&E infrastructure
- ✓ Programs pay for T&E → T&E competes for resources w/ upgrades, procurement...
- ✓ Static threats would preclude testing one of Mosaic’s value proposition
- ❑ What is the baseline for T&E, given myriad potential kill chains?
- ❑ How to square legal requirement and timelines for OT&E with Mosaic timelines?
- ❑ Does T&E need to merge with training and TTP development? And with requirements?

← Addressed by JMO stewardship of dedicated T&E infrastructure

- ✓ Issue w/ Existing System Addressed by JMO Model
- ✗ Issue w/ Existing System Unaddressed or Reinforced by JMO Model
- ❑ New Issue or Question



JMO Model Addressed Some Challenge, Surfaced Others (3/3)

Fielding & Sustainment (“Ilities”)

- X Limited capacity of Service & COCOM to uptake new capabilities
- X Sequential nature of requirements, T&E and TTP development
- ☐ Services, COCOMs and JMO were able to reach consensus on fielding
- ☐ Mosaic elevates the importance of near-continuous reveal-conceal decision-making
- ☐ Risk that heterogeneity at the mission-level scales unsustainably to chaos at the global-level

← Not resolved by JMO; players emphasize potential for Service backlash

Governance

- ✓ The Institution Will Fight Back: Need to protect enduring DoD equities & interests
- ✓ Mosaic value proposition is greatest in a Joint context; but Joint context is hardest
- ☐ Peace-time vs. Wartime Modes of Governance
- ☐ Will AI play politics? Service reps to appeal to their own competing AI
- ☐ JMO introduce seams b/w Service and JMO responsibilities (e.g., enablers vs. platforms)
- ☐ Transitioning to Mosaic may be as hard if not harder than maintaining one in steady state
- ☐ What is the end-game for JMO; should the JMO sunset?

← the JMO & Institution resolved tensions; Services saw JMO as a bill-payer; natural value alignment with COCOM

New functions: Pipeline Management and Continuous Mosaic Testing

- ✓ Issue w/ Existing System Addressed by JMO Model
- X Issue w/ Existing System *Unaddressed or Reinforced* by JMO Model
- ☐ New Issue or Question



Summary and Next Steps: DARPA and Mosaic

Summary

- Nothing inherent to DoD's existing requirements, resourcing or acquisition system inhibits development & fielding of fractionated, heterogenous & composable forces
- Yet existing governance model and management systems likely do not align with the Mosaic vision of fielding capability on operational time scales
- Proposed JMO concept addressed key challenges, but introduces new challenges
- Vast space of potential alternative governance models and management systems, subject to trade-offs, not optimality
- Risk: Mosaic becomes an end, not a means

Next Steps

- Continue to experiment w/ alternative governance systems & management systems using table-top exercises for low-cost prototyping
- When considering governance alternatives
 - Acknowledge enduring DoD needs for management controls for risk management & resource allocation,
 - Acknowledge Service and COCOM equities via Title 10
 - Embrace mission-centrality in requirements, resourcing and acquisition
 - Embrace throughput (time-effectiveness) as a Mosaic measure of merit
 - Define measure of merit that embrace uncertainty, Mosaic value proposition of adaptability
- Develop a simulation of the Mosaic pipeline, and use it to identify policy levers and bottlenecks that will inhibit realization of a Mosaic





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Five Assumptions Guided Focus on Acquisition Implications

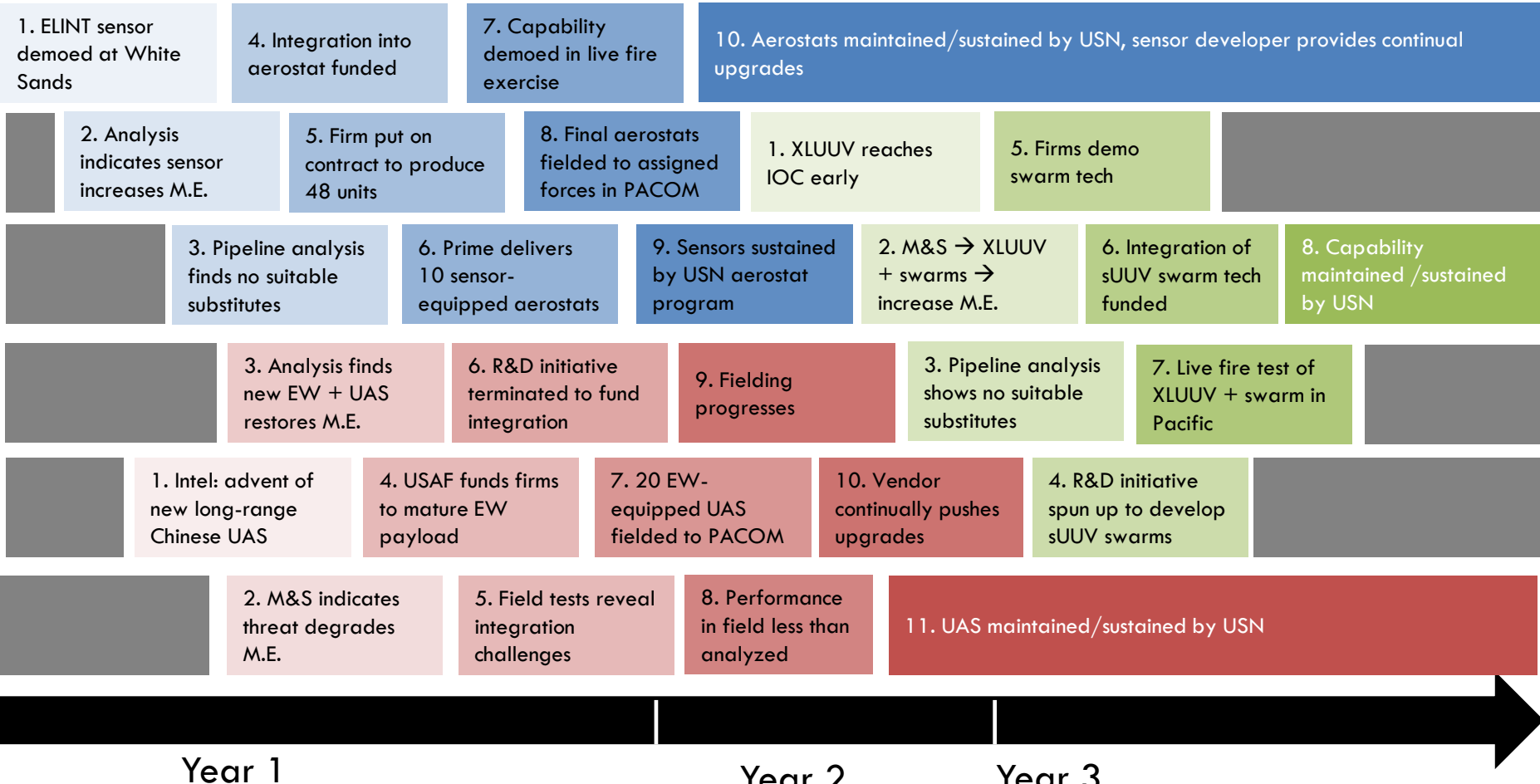
1. Technical interoperability between and within Mosaic elements is seamless
2. A Mission Capability Compiler has been advanced and demonstrated to a degree that its recommendations are viewed as credible by DoD leadership, staff & USGOV stakeholders
3. OSD, the Joint Staff, the Services, and COCOMs will maintain authorities, interests, missions & top-level priorities as derived from Title 10
4. DoD has embraced the Mosaic concept & successfully transitioned to an initial Mosaic force
5. The scope of Mosaic acquisition is limited to enablers (sensors, munitions, C2 nodes, attritable/expendable platforms, etc.) leaving major platform acquisition to Services.

Game Explores A Set of “Vignettes” That Instantiate Mosaic Acquisition

Capability Thread “A”

Capability Thread “B”

Capability Thread “C”



Year 1

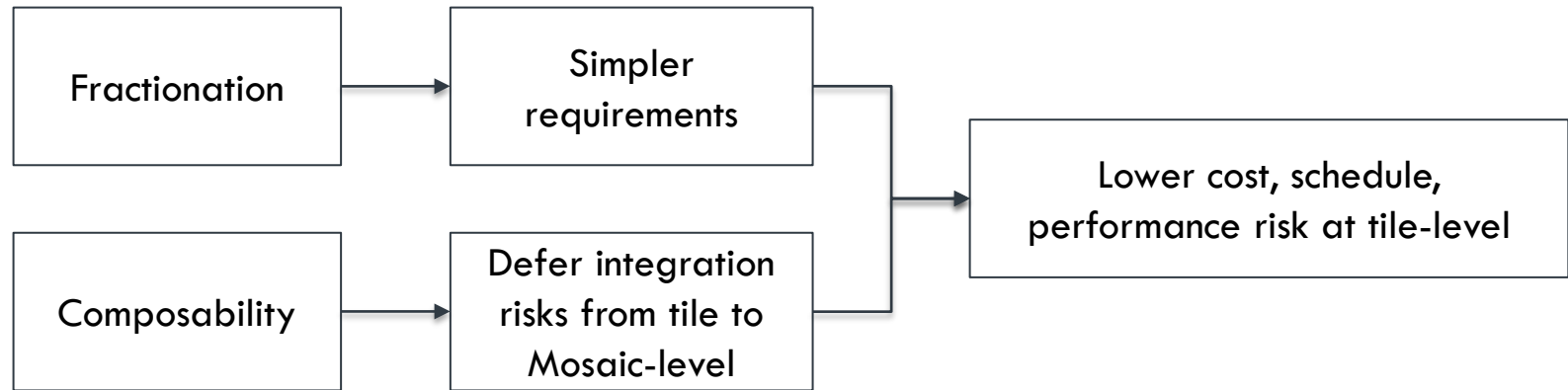
Year 2

Year 3

Time

*Placement of steps along time axis for graphical purposes only. No information is conveyed in width or precise placement of individual steps.

"Why not, let's try it": The logic of Mosaic may promote faster, cheaper, more responsive acquisition at the tile-level, regardless of the model



Thus, enabling various virtuous cycles

Faster schedules → more responsive to threat → less requirements creep

Faster adaptation → shorter services lives → less cost, time to design & build-in sustainability

Lower risks (cost) → less onerous oversight by OSD & Congress → faster schedules

Simpler requirements → expanded performer base → increased competition, innovation

In game(s), players tended to translate simpler requirements, lower costs into willingness to experiment, take risks

We Experimented with an Alternative Model

Consolidate authority for requirements, resourcing & acquisition in Joint Mission Office (JMO)

Reports to SecDef

Embraces mission-centricity in all things, elevating parallel development philosophy to the mission-level

- Publish an annual prioritized list of ASuW capability needs
- Assesses all Service investments in ASuW capabilities in the Western Pacific
- Advise SecDef annually on programmatic changes to support Mosaic Warfare.
- Manage and competitively allocate funds for Services or Agencies to develop, produce, or sustain ASuW enablers
- Resource and manage a Joint ASuW test & evaluation (T&E) range and virtual ASuW T&E environment
- Establish, promulgate and ensure Service compliance with Mosaic compatibility policy
- Establish, manage and administrate contracts of a pre-approved vendor pool
- By exception, initiate and oversee new R&D programs for ASuW Mosaic enablers

Promote oversight & protect institutional equities

- Limit JMO responsibility:

Mission: ASuW	Theater: INDOPACOM	Capability: Enablers	Forces: Assigned Forces
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- Sustain Service and COCOM responsibilities under Title 10 for major platforms, execution, operations...
- Require Service, COCOMs and JMO concurrence before fielding new capability (each have veto-power)

Allocate fully fungible funding to JMO (Congress)

We Create a Faux-DoD Instruction to Instantiate the JMO



Faux-DoD Instruction - Page 1

ASuW Joint Mission Office (JMO)

Mission: The ASuW JMO shall ensure the Joint Force's continual ability to execute the ASuW mission set given a dynamic threat environment and evolving capability space.

The ASuW JMO shall, inter alia:

- Publish an **annual prioritized list** of ASuW capability needs
- **Assesses all Service investments** in ASuW capabilities in the Western Pacific with regard to Mosaic readiness.
- Advise the Secretary of Defense annually on programmatic changes to support Mosaic Warfare.
- **Manage and allocate**, via a competitive process, a fund to support the Services or Defense Agencies to develop, produce, operate or sustain ASuW enablers
- Resource and manage a **Joint ASuW test & evaluation (T&E) range** and virtual ASuW T&E environment
- Establish, promulgate and ensure Service compliance with Mosaic compatibility policy
- Establish, manage and administrate contracts of a **pre-approved vendor pool**
- By exception, initiate and oversee **new R&D programs** for ASuW Mosaic enablers
- Initiate, set terms, and select winners of competitions in Mosaic prize competitions



Faux-DoD Instruction - Page 2

The Institution: Services, COCOMs, etc

The Services shall, inter alia:

- Retain full responsibility (under Title 10) for development, production, operation and sustainment of non-enablers.
- By default, retain responsibility to execute development, production, operation and sustainment of enablers.
- Retain responsibility for defining "ility" requirements for all programs.
- Jointly with JMO and INDOPACOM, , annually approve new ASuW capabilities for fielding to assigned forces.

INDOPACOM shall:

- Create, in conjunction with the ASuW JMO, concepts of operation (CONOPS), concepts of employment (CONEMPs), and tactics, techniques and procedures (TTPs) for capabilities acquired by JMO.
- Jointly with JMO and Services, approve new ASuW capabilities for fielding to assigned forces.

The Secretary of Defense shall:

- Determine, in conjunction with the Deputy Secretary of Defense and the Vice Chairman of the Joint Chiefs of Staff, the high-level mission set of the ASuW JMO.
- Appoint Directors of JMO based on CJCS nominations.

Choice of Acquisition Model Subject to Trade-offs

