Experimental Mid-Tier Acquisition (xMA)

A Continuously Competitive Portfolio Pipeline Ecosystem

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xMA Concept

What it is:
- A portfolio-based pipeline approach for certain classes of systems
- A more risk-tolerant approach to continuously fielding capability
- An attempt to “try something different” vice current methods
- Based on collected scar tissue of two acquisition experts

What is it not:
- A “rapid” or “accelerated” approach for a single program
- A one-size-fits-all approach for every class of systems
The Challenges...

Augustine’s Law
• Exponentially increasing unit costs and decreasing quantities – partly due to risk aversion and “too big to fail” programs

Lack of Strategic Agility
• Long development and fielding cycle times not responsive to changing threats and operational priorities

Poor Technology Insertion
• Unable to integrate new technologies in weapon systems in a timely or effective manner
The Opportunity Space…

- **High-end Single-Use**
- **Low-end Single-Use**
- **Experimental Mid-Tier Space**
  - **Commodity Limited Role**
  - 100’s of Lifetime Hours
  - 10’s of Lifetime “Sorties”
- **Exquisite High-End Multi-Role**
  - Years of Lifetime

Exquisiteness
Complexity
Lifespan
## Potential Use Cases...

<table>
<thead>
<tr>
<th>Unmanned Aircraft</th>
<th>Small Satellites</th>
<th>Autonomous Boats</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Unmanned Aircraft" /></td>
<td><img src="image2" alt="Small Satellites" /></td>
<td><img src="image3" alt="Autonomous Boats" /></td>
</tr>
</tbody>
</table>

Continuous competition for commodity families of systems
# Current versus xMA Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Current</th>
<th>xMA Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Multi-role</td>
<td>Limited-role</td>
</tr>
<tr>
<td>Quantity</td>
<td>Low, Exquisite</td>
<td>Higher, Commodity</td>
</tr>
<tr>
<td>Time to Field</td>
<td>Slow</td>
<td>Rapid, Fail Fast, Continuous Pipeline</td>
</tr>
<tr>
<td>Lifespan</td>
<td>Decades</td>
<td>Months</td>
</tr>
<tr>
<td>Performance</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Management</td>
<td>Episodic, Programs</td>
<td>Pipeline, Portfolio</td>
</tr>
<tr>
<td>Costs (Unit, O&amp;S)</td>
<td>High</td>
<td>Lower</td>
</tr>
<tr>
<td>Industrial Base</td>
<td>Narrowing</td>
<td>Growing</td>
</tr>
</tbody>
</table>

Challenge entrenched strategies to explore new opportunities
## Car Industry Analogy

<table>
<thead>
<tr>
<th>Attribute</th>
<th>xMA Approach</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Limited-role</td>
<td>Sedan, Truck, Van, etc</td>
</tr>
<tr>
<td>Quantity</td>
<td>Higher, Commodity</td>
<td>Thousands/Year</td>
</tr>
<tr>
<td>Time to Field</td>
<td>Rapid, Fail Fast, Continuous Pipeline</td>
<td>Major Model Changes – 5-7 years; Yearly Continuous Upgrades</td>
</tr>
<tr>
<td>Lifespan</td>
<td>Months</td>
<td>5-15 Years</td>
</tr>
<tr>
<td>Performance</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Vendor Base</td>
<td>Grow to Many</td>
<td>Many – Ford, GM, Honda, BMW, etc</td>
</tr>
<tr>
<td>Costs (Unit, O&amp;S)</td>
<td>Lower</td>
<td>Affordable</td>
</tr>
</tbody>
</table>

While not an exact analogy, we should learn from commodity industries
Detailed Concept Component Explanations
Experimental Mid-Tier Acquisition (xMA)  
A Continuously Competitive Portfolio Pipeline Ecosystem

Commodity Models

- Novel Delivery Approaches  
- Rethink Maintenance & Training  
- Fleet Performance

Balanced Force Mix

- Low/Mid End  
- Limited Roles  
- Value of Quantity

Commodity Systems Engineering

- Limited Life Designs  
- Fleet Performance  
- Own Parts of Tech Baseline

Iterative Design

- Build  
- Test  
- Fail Fast  
- Rapid Learning

Rapid Production

- Quick Short Runs  
- Additive Manufacturing  
- Dynamic Tooling

Business Functional Innovation

- Milestone Appropriations  
- Multi-year Production  
- Warranties

- New Entrants  
- Product Family  
- Vendor Base

Better Industry Participation

- Balanced Force Mix: Iteratively define and prioritize requirements  
- MDAP: Deliver ASAP  
- Commodity Models: Minimum Viable Product  
- Continuous Competition  
- Short Programs: Challenges  
- Split Buys: Milestone Appropriations

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Experimental Operational Concepts

Commodity Models
- Novel Delivery Approaches
- Rethink Maintenance & Training
- Fleet Performance

Balanced Force Mix
- Low/Mid End
- Limited Roles
- Value of Quantity

Capstone Capability Needs

Portfolio ICD

- Minimum Viable Product
- Deliver ASAP
- Iteratively define and prioritize requirements

Operations

Technical

Business

MDAP

MDAP

Commodity Systems Engineering
- Limited Life Designs
- Fleet Performance
- Own Parts of Tech Baseline

Iterative Design
- Build
- Test
- Experiment

Rapid Production
- Fail Fast
- Rapid Learning
- Quick Short Runs
- Additive Manufacturing
- Dynamic Tooling

Business Functional Innovation
- Milestone Appropriations
- Multi-year Production
- Warranties

Vendors

- Short Programs
- Challenges
- Split Buys

Continuous Competition

A: $
B: $
C: $

New Entrants
- Product Family
- Vendor Base

Better Industry Participation

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### Balanced Force Mix

<table>
<thead>
<tr>
<th>Low/Mid-End</th>
<th>Limited Roles</th>
<th>Value of Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploit limited-use and limited-life systems as adjuncts to exquisite systems</td>
<td>From compromised multi-role systems to simpler, purpose-built, limited mission roles</td>
<td>Regain mass quantity to enable near-peer conflict over large geographic areas</td>
</tr>
</tbody>
</table>

**History of near-peer conflict says we need quality and quantity**
Commodity Operating Models

### Appropriate Disaggregation
Consider novel ways for physically generating and delivering distributed effects over a distance.

### Fleet Performance
Plan, wargame & assess some ops around attritable commodity fleet tactics & performance.

### Commodity Logistics
Adopt munitions-like maintenance, modern V-C-L training, and use Reserves for many stored assets.

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Marry non-traditional operating models with fleet-level effects.
## Commodity Operating Models: Commodity Logistics Methods

<table>
<thead>
<tr>
<th>Reserve Model</th>
<th>Modern Training</th>
<th>Minimal Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage Reserves and keep most assets in positioned storage (ala munitions model)</td>
<td>Maximize virtual and constructive with some live sortie generation and operating events</td>
<td>One-tier wartime maintenance with field re-use, minimal spares, and additive manufacturing</td>
</tr>
</tbody>
</table>

Use O&S savings to buy significantly more quantity
Capstone Capability Needs

**Portfolio ICDs**
Frame a broad capability gap for a portfolio area that can cover multiple individual programs

**Minimum Viable Product Approach**
Get capability in the hands of users ASAP then iterate design based on feedback and functionality

**Dynamic Capability Management**
Iteratively define and prioritize remaining requirements via backlogs, small docs

Explore more dynamic approach than large, static CDDs
Experimental Technical Approaches

Commodity Models

Novel Delivery Approaches • Rethink Maintenance & Training • Fleet Performance

Capstone Capability Needs

Portfolio ICD

Minimum Viable Product

1
2
3
n
Iteratively define and prioritize requirements

Deliver ASAP

Business Functional Innovation

Milestone Appropriations • Multi-year Production • Warranties

Limited Life Designs • Fleet Performance • Own Parts of Tech Baseline

Iterative Design

Build
Test
Experiment
Fail Fast • Rapid Learning

Rapid Production

Quick Short Runs • Additive Manufacturing • Dynamic Tooling

Business

Operations

Technical

xMA

Vendor Base

New Entrants • Product Family

Better Industry Participation

A: $
B: $
C: $

Continuous Competition

Short Programs • Challenges • Split Buys

Limited Roles • Low/Mid End

Value of Quantity

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### Commodity Systems Engineering

**Limited Life Designs**
Exploit different part of design space, build for tens of sorties and hundreds of hours

**Fleet Performance**
Design and assess performance at the fleet and mixed-force-levels, avoid exquisite single systems

**Selective Owning of Technical Baseline**
Use industry design families for structure and propulsion; DoD controls interfaces, C2 & payload standards

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Balanced force mix benefits realized by commodity engineering
Iterative Designs

Iterative Build
Enable industry partners to iteratively improve their product lines over multiple fast programs/models

Fail Fast
Reduce risk through multiple rapid trials and failures – not more process and more oversight

Rapid Learning
No “big bang” designs, expect failure to get innovation; continuous and rapid builds to learn faster

Build fast, fail fast, learn fast – with continuous competition
Modern Manufacturing

<table>
<thead>
<tr>
<th>Short/Intense Production Runs</th>
<th>Additive Manufacturing</th>
<th>Dynamic Tooling</th>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Lower production costs by “buying out” a production run in a shorter timeframe</td>
<td>Leverage burgeoning commercial capability for rapid, non-scale &amp; dispersed additive manufacturing</td>
<td>From model-based systems engineering to rapid prototype to iterative design to mass customization</td>
</tr>
</tbody>
</table>

Modern manufacturing tools enable fast, iterative efforts
Experimental Business Models

Commodity Models
- Novel Delivery Approaches
- Rethink Maintenance & Training
- Fleet Performance

Capstone Capability Needs

Portfolio ICD

Minimum Viable Product

Iteratively define and prioritize requirements

Business Functional Innovation

Milestone Appropriations

Multi-year Production

Warranties

Vendor Short Programs

Challenges

Split Buys

Continuous Competition

A: $

B: $

C: $

Better Industry Participation
Portfolio Continuous Competition

Shorter, Frequent Programs

Provide many chances to compete – continuous efforts reduce industry risk

Fly-offs and Challenge-ins

Reward fly-off results – but also allow vendors to self-fund and challenge back in

Production Split Buys

Promote production performance with multiple vendors and yearly split buys

Keep vendors sharp via continuous competition at portfolio level
## Better Industry Participation

<table>
<thead>
<tr>
<th>Entice Non-traditional Entrants</th>
<th>Leverage Product Family Investments</th>
<th>Industrial Base Health a Key Decision Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial performance deals – not compliance contracts – target non-DoD vendors</td>
<td>Take advantage of vendor product family investments – don’t try to control every system specification</td>
<td>Carry multiple vendors – select investment in new entrants – winners sit out next competition</td>
</tr>
</tbody>
</table>

Specific focus on enabling new vendor involvement & investment
## Business Functional Innovation

<table>
<thead>
<tr>
<th><strong>Milestone Appropriations</strong></th>
<th><strong>Intense Multi-year Production</strong></th>
<th><strong>Clawback Warranties</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully appropriate upfront for each phase to drive funding stability – hold program managers accountable to budget</td>
<td>Don’t have lingering production runs – build rapidly at most efficient rate and move on to next program competitions</td>
<td>Use warranties to mitigate less intense testing – free systems or spares if systems don’t live up to promised capability</td>
</tr>
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Use business tools to incentivize different behaviors
“One way to avoid obsolescence problems in sustainment is to buy things in smaller quantities, and to treat them as expendables, when they are no longer supportable. It is ok to throw old things away”
Way Ahead
Conclusions

▪ More of the status quo won’t break Augustine’s Law
  – Instead, reduce risk through continuous pipeline approaches

▪ Novel approaches won’t come from within “the system”
  – Requires senior leader championing for risky and new methods

▪ Commodity mindset enables new DoD approaches
  – Side Benefit: Promote new workforce culture

▪ Experimentation also applies to “Big A” acquisition
  – FY16 – 18 NDAAAs provide openings for change
## What it takes to enable xMA innovation…

<table>
<thead>
<tr>
<th>Experimental Concepts</th>
<th>Free-Thinking Performers</th>
<th>Senior Champions</th>
</tr>
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<tbody>
<tr>
<td>Apply novel strategic resourcing concepts in operations, technical and business areas</td>
<td>Combine dynamic portfolio leader with visionary operational partner with risk-tasking business staff</td>
<td>Provide top-cover, resources, short chain-of-command, and a permission-less environment</td>
</tr>
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History of near-peer conflict says we need quality and quantity
Next Steps…

- Pick an operational area suitable for mid-tier approaches

- Find senior champions to support xMA experimentation
  - From Operations, Resourcing and Acquisition communities

- Charter a high-performance pilot team in an xMA environment

- Conduct experiments to test and refine xMA

xMA approach can be an adjunct acquisition ecosystem
We didn't win World War II just with good technology, we won through continuous development (with fast failures) and mass production of commodity systems.