Moving Toward Advanced Weapons: Precision Strike Weapons Pacing the Threat

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The Environment

- Threat is Outpacing US Capability to Operationally Field Technology
- Sequestration and Budget Reality
- Continuing Operations in Iraq, Afghanistan, and Syria
- Growing Focus on Pacific Theater

"It's motivated in part by my continuing concern with technological superiority and the fact that our capabilities in the world are being contested by others — people developing, modernizing, and building systems that threaten our superiority."

- USD(AT&L) Frank Kendall
Integrated Warfighting Capability

The “Kill Chain”
Series of tasks taking place, in a specified order, to produce a desired effect within the battlespace – e.g., the “Capability”

Surveillance
Detect
Commit ID
Track
Engage ID
Launch
Control
Weapon Range & Acquisition
Weapon Lethality
Assess

-- Rarely accomplished by a single platform! --
The kill-effects chain usually involves a System of Systems and is part of the overall Integrated Warfighting Capability
Integrated Warfighting Capability

Mission Technical Baseline
• Statement of Operational Problem
• Timeframe, Threat, Location, Commanders intent / Mission Objectives, Risk, Measures of Success / Desired effects

Integrated Capability Technical Baseline
• Blue System Performance against MTB
• Capability, Affordability, Timeline tradespace analysis.
• Role Based System of System (SoS) Requirements Defined and Allocated to Programs of Record

Role Based Implementation
• System Requirements defined by role: Cooperative Tracker (CT), Weapons Controller (WC), Cooperative Shooter (CS), Weapon (W)
• Eliminates stovepipe implementations
• Enables “plug and play” interoperability

Implementation Technical Standards
• Integrated Fires Roles (CT, WC, CS, W)
• Cooperative Targeting (TDOA, MSR, ICE)
• Communication Interfaces (J11, J14, J28)
• Common reference models to enable consistent implementation of technical standard (NEWCIM)
• Key to Joint Interoperability
Engage Targets
PMA-201 Mission Focus Areas

- Stand Off Precision Strike
- Hardened, Deeply Buried Targets
- Mobile & Relocatable Targets
- Fast Attack Craft (FAC/FIAC)
- Offensive Anti-Surface Warfare
Generations of Direct Attack Weapons

1st Gen
Unguided Free-Fall
- MK-82/BLU-111 500#
- MK-83/BLU-110 1000#
- MK-84/BLU-117 2000#
- MK-76 & BDU-48

2nd Gen
Ballistic Release Point Precision Guided Munition (PGM)
- Weapon falls like UFF and the guidance kit makes minor last minute corrections to improve accuracy using laser designation
- GBU-12 C/B & D/B 500# LGB
- GBU-16 C/B & D/B 1000# LGB
- GBU-10 C/B & D/B 2000# LGB
- Laser Guided Training Round (LGTR)

3rd Gen
In-Weapon Launch Acceptability Region (IWL) PGM
- Weapon uses Inertial Navigation System to fly to the target using pre-planned or designated target-of-opportunity using relative navigation
- GBU-38 500# JDAM
- GBU-32 1000# JDAM
- GBU-31 2000# JDAM
- GBU-12 F/B 500# DMLGB

4th Gen
IWL PGM with VMC Direct Attack Moving Target Capability (DAMTC)
- Proportional navigation / lead-angle guidance relative to laser designation motion is key enabler
- GBU-54 LJDAM
- GBU-49 Lot 5 ↑ EPII

5th Gen
IWL PGM with VMC & IMC DAMTC, Fire & Forget, Re-targeting
- Autonomous Target Acquisition (ATA)
- Weapon Data Links
- Extended Range Wingkits
- Home-on-X
- Stand-in jamming
- (AUR) *GBU-53 SDB II
- DAW roadmap capability

Upgradable via technology insertion and procurement of modern, modular subcomponents
*Current Weapons - Every Warhead is Valuable*
4th Generation: Laser JDAM

- **Direct Attack Moving Target Capability**
  - Modular, Upgradeable Weapon Design
  - Flexible Dual-Mode Sensor
  - Moving Target Capability against High Speed Maneuvering Targets
  - Retains JDAM All Weather GPS Guided accuracy and performance
- **Adjustable Proximity Sensor (APS)** fielded in November 2014, provides flexible LJDAM Height-of-Burst capability
- **Primary USN Direct Attack Weapon Operationally Employed in Theater Today**
- **LJDAM provides Combatant Commanders with exceptional performance and mission flexibility**
  - Engaging Time-Sensitive Targets of Opportunity
  - Fixed and Moving Target Capability
  - Capable Against FAC/FIAC Threat
5th Gen: Small Diameter Bomb (SDB II)

- **Small Diameter Bomb II (GBU-53/B)**
- 250-lb Class, Precision Guided Munition
- Tri-Mode Seeker
- Network Enabled with Dual-Band Datalink
- Standoff Range Capability
- Multi-Effect Warhead
- Capable against Mobile Land & Maritime Targets

- Next Generation Weapon to Support COCOM Need to Kill Mobile and Fixed Targets Through Weather at Extended Ranges
  - Service More Target Aimpoints Per Aircraft
  - SDB-II Enables Real-time Digital CAS
  - DoN & USAF Planned Platforms:
    - F-15E
    - F/A-18 E/F
    - F-35B/C
Offensive Anti-Surface Warfare

Legacy Fielded:
• Harpoon
• SLAM ER

In Development:
• JSOW C-1
• LRASM

The increasing surface threat demands significant increases in range and survivability, as well as complimentary OASuW weapon capabilities.
USN Harpoon (Block IC)

• Active Radar Homing Seeker
• Sea Skimming Flight Profile
• 65 nmi Range
• Over 7,000 Harpoon fielded in 30 Countries since 1977
• Still one of the most effective and capable OASuW weapons in the world

USN PACOM Urgent Operational Need: Increasing surface threat standoff is rapidly diminishing Harpoon advantages as USN OASuW Weapon
JSOW C1 Provides fleet forces with the added capability and flexibility to engage Moving Maritime Targets

- Stand-off, Low Cost, Survivable Glide Weapon
- First Tactical Network Enabled Weapon in USN Inventory
- Adds Strike Common Datalink providing inflight target updates
- Retains Integrated GPS/INS Navigation and Thermal IIR Seeker
- Engage Moving Maritime Targets during Day, Night and All Weather Conditions
- Retains robust capability against Fixed and Relocatable Stationary Land Targets
- JSOW C-1 is currently in operational test
  - Threshold Platform: F/A-18E/F
  - Objective Platform: F-35B/C
OASuW Increment 1 LRASM

• Urgent Operational Need to field advanced OASuW capability in Pacific Theater
• Provide the fleet leap-ahead OASuW technologies in an accelerated timeframe
  • Long Range / Expanded OASuW Engagement Envelope
  • Multi-mode Seeker
  • Autonomous Guidance Algorithms
  • Increased Lethality
  • Reduce reliance on ISR Targeting, Network Links, and GPS Navigation
  • Leveraging mature JASSM-ER airframe

• Utilize an innovative, streamlined, and agile management approach
  • “Pioneer” DoD 5000.02 Model 4 Accelerated Acquisition program
  • DARPA / US Navy Teaming to field early operational capability in 2018
Defense Innovation Initiative Technologies

Robotics
Autonomous Systems
Miniaturization
Big Data
Advanced Manufacturing

Precision Strike Weapon Initiatives

1. Acquisition Innovation / Streamlining / Affordability
2. Integrated Warfighting Capability & Kill Chain Wholeness
3. Network & Communication Technologies
4. Weapon Modularity & Open Architecture
5. Advanced Guidance/Navigation/Seeker Technologies
6. Warheads/Survivability/Lethality
7. Performance/Propulsion Improvements
8. High Fidelity M&S, Live Virtual Constructive Environments
9. Training Technologies / Crew Vehicle Automation

Defense Innovation Initiative & Better Buying Power 3.0
Achieving Dominant Capabilities Through Technical Excellence and Innovation
We are the Third Offset