Moving Toward Advanced Weapons: Precision Strike Weapons Pacing the Threat

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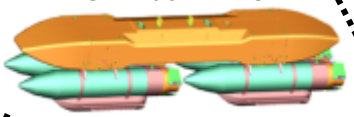
NAVAIR

Precision Strike Weapons

SDB II / JMM BRU



BRU-33

AERO-7B

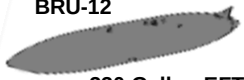
LAU-115

BRU-12

M299

BRU-55

BRU-41



330 Gallon EFT

SDB II/ JMM BRU

ACAT ID / III

AAE/FC

LAU-127FA

BRU-11

LAU-7EA

BRU-14

BRU-32

BRU-38

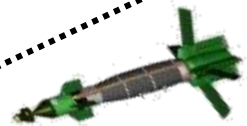
JSOW

JSOW-A JSOW-C JSOW C-1

ACAT IC

LRASM

ACAT IC (P)

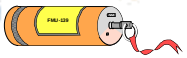


LGB/ DMLGB

JDAM

ROCKEYE/GATOR

ELGTR

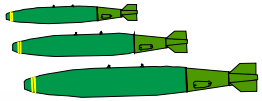


Fuzes

DAW

ACAT IV

LJDAM (DAMTC)



GP Bombs

Practice Bombs

LCDB

Components
Cones, Fins
Lugs, Cables

CAD/PAD JPO

4W69 Parachute Rel Cart

JAU-13 Initiator

MK 109 CJRM

M193 Fire Ext Cart

CCU-45

JAU-22

FMS

International
39
Countries
259 Cases

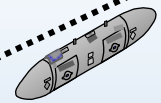
SLAM-ER/ Harpoon

FMS

Harpoon Block II
Lot 86

USN

Harpoon 1C
Sustainment
Mission Planning



DATA LINK POD

SLAM ER

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**

Lawmakers: Sequestration is here to stay

By Andrew Tilghman, Staff writer 2:21 p.m. EST March 5, 2015

Several influential Republicans and Democrats have bluntly told top P
known as sequestration are unlikely to change anytime soon, suggesti
budget cuts may hit the military again this fall.

"Even though I believe in miracles, it is h
will be the law of th

Middle East Updates / U.S., allies conduct air strikes in Syria, Iraq against ISIS

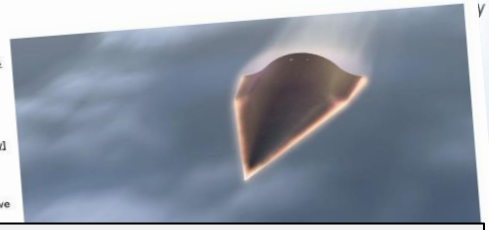
Breaking Defense

STRATEGY & POLICY

'We've Got To Wake Up': Frank Kendall Calls For Defense Innovation

By SYDNEY J. FREEDBERG JR.
on August 06, 2014 at 4:30 PM

WASHINGTON: "We've been complacent," Frank Kendall said. For decades, the Pentagon's top weapons buyer said yesterday, the US has assumed its forces will be better equipped than any foe, but that's increasingly in doubt: "Our technological superiority is very much at risk, there are people designing systems [specifically] to defeat us in a very thoughtful and strategic way, and we've got to wake up, frankly."



"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

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

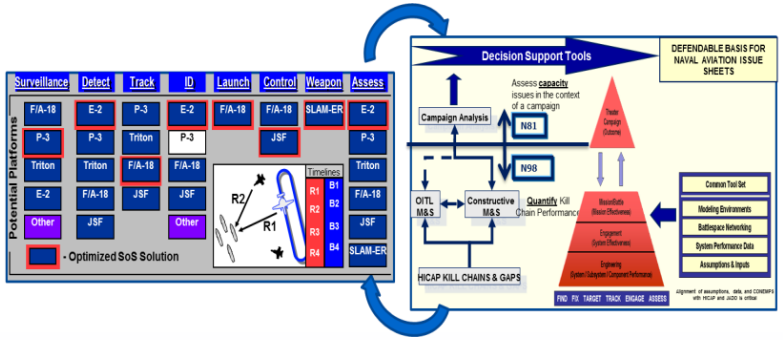
- Blue System Performance against MTB
- Capability, Affordability, Timeline tradespace analysis.
- Role Based System of System (SoS) Requirements Defined and Allocated to Programs of Record

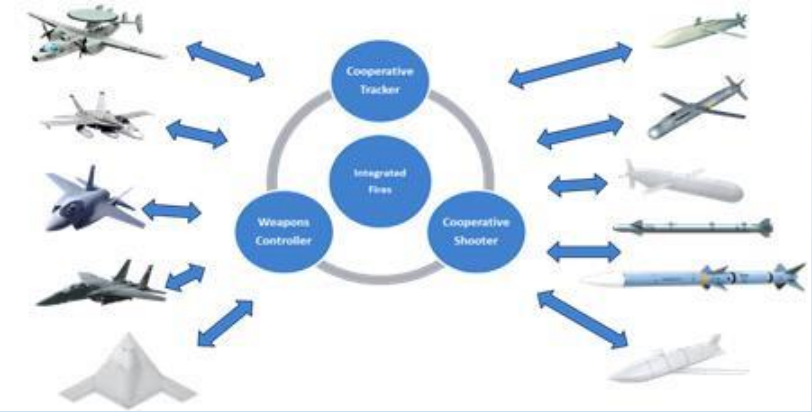
Role Based Implementation

- 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

Video

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

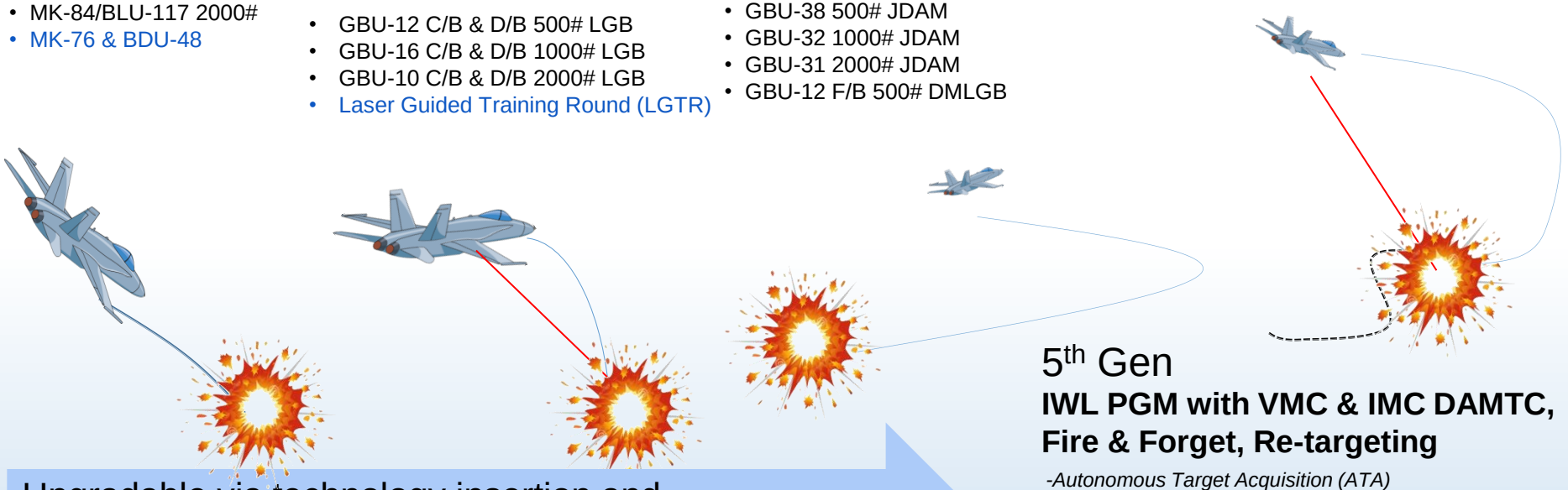
- GBU-38 500# JDAM
- GBU-32 1000# JDAM
- GBU-31 2000# JDAM
- GBU-12 F/B 500# DMLGB

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



Upgradable via technology insertion and procurement of modern, modular subcomponents
Current Weapons - Every Warhead is Valuable

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

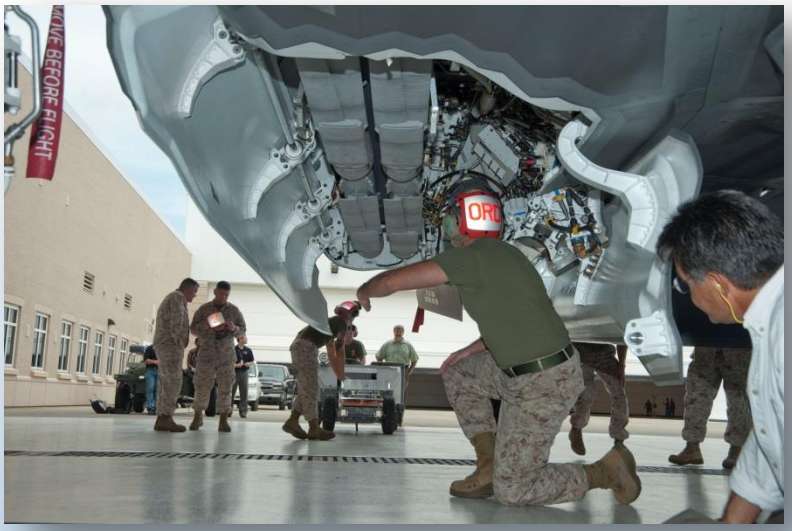
4th Generation: Laser JDAM

- **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

US Navy Harpoon

USN Harpoon (Block IC)

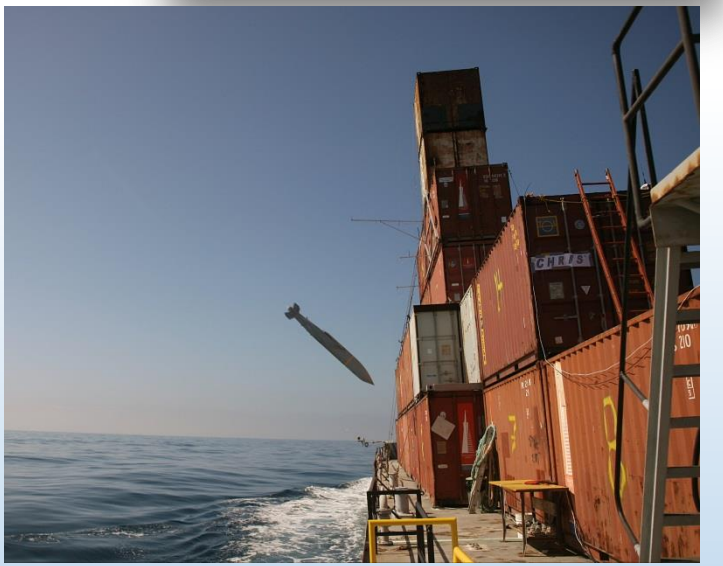
- Active Radar Homing Seeker
- Sea Skimming Flight Profile
- 65 nmi Range
- Over 7,000 Harpoon fielded in 30 Countries since1977
- Still one of the most effective and capable OASuW weapons in the world

USN PACOM Urgent Operational Need: Increasing surface threat standoff is rapidly diminishing Harpoon advantages as USN OASuW Weapon

JSOW C-1

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

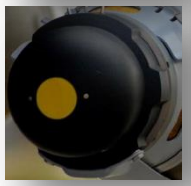
The Third Offset Strategy: Unmanned Systems and Weapons

Defense Innovation Initiative Technologies

Unmanned

- Robotics
- Autonomous Systems
- Miniaturization
- Big Data
- Advanced Manufacturing

Weapons


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