# Precision Strike Annual Review


U.S. AIR FORCE

## *Air Armament Center Perspective*

*War-Winning Capabilities…*

*On Time, On Cost*

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Program Executive Officer for Weapons
Commander, Air Armament Center
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***Integrity - Service - Excellence***


DEFENSE THREAT REDUCTION AGENCY


AFRL MUNITIONS


AIR ARMAMENT CENTER


AFOTEC Det 2


53rd WING


20th SPCS



JOINT FIRES INTEGRATION AND INTEROPERABILITY TEAM


NAVY EOD SCHOOL

COAST GUARD


ARMY RANGERS


ARMY 7th SFG


AFSOC (919th and 1st SOW)


33rd WING

# What AAC Does

## From Concept To Employment

- **Science & Technology w/ AFRL, DTRA and others: Develop the idea and produce a tech demonstration**
- **Product Support w/ Acquisition Organizations: Manage weapon lifecycle development**
- **Conduct Developmental and Operational Test & Evaluation to prove weapon readiness**
- **Sustain and demil the weapon stockpile with ALCs and sister services**
- **Run an installation to support 4 AF MAJCOMs, all DoD services and deployed forces in every combat area**

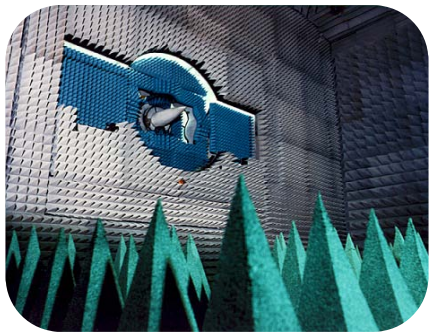
**Arming the Warriors**

Transition Technology To Weapon Systems And Provide War Winning Capabilities On Time, On Cost

# AAC Land and Water Ranges

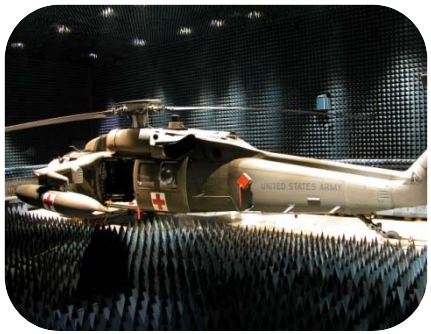

***Largest Element in DoD's MRTFB Structure***

# AAC Strategic Test Assets



Guided Weapons Evaluation Facility (Eglin)

McKinley Climatic Lab (Eglin)



Joint Preflight Integration of Munitions and Electronic Systems (Eglin)

Mobile & Fixed Targets (Eglin)

46th Command and Control Test Squadron (Eglin)

Holloman High Speed Test Track (New Mexico)

National Radar Cross-Section Test Facility (New Mexico)

Landing Gear Test Facility (Ohio)

***Uniquely Relevant National Capability for Future Generations***

# AAC Acquisitions Mission Areas

- Air Dominance
- Long Range Strike
- Direct Attack
- Mobile Targets Defeat
- Hard and Deeply Buried Targets Defeat
- Low Collateral Damage Systems
- Test & Training Systems
- US Southern Command (USSOCOM) Rapid Acquisition

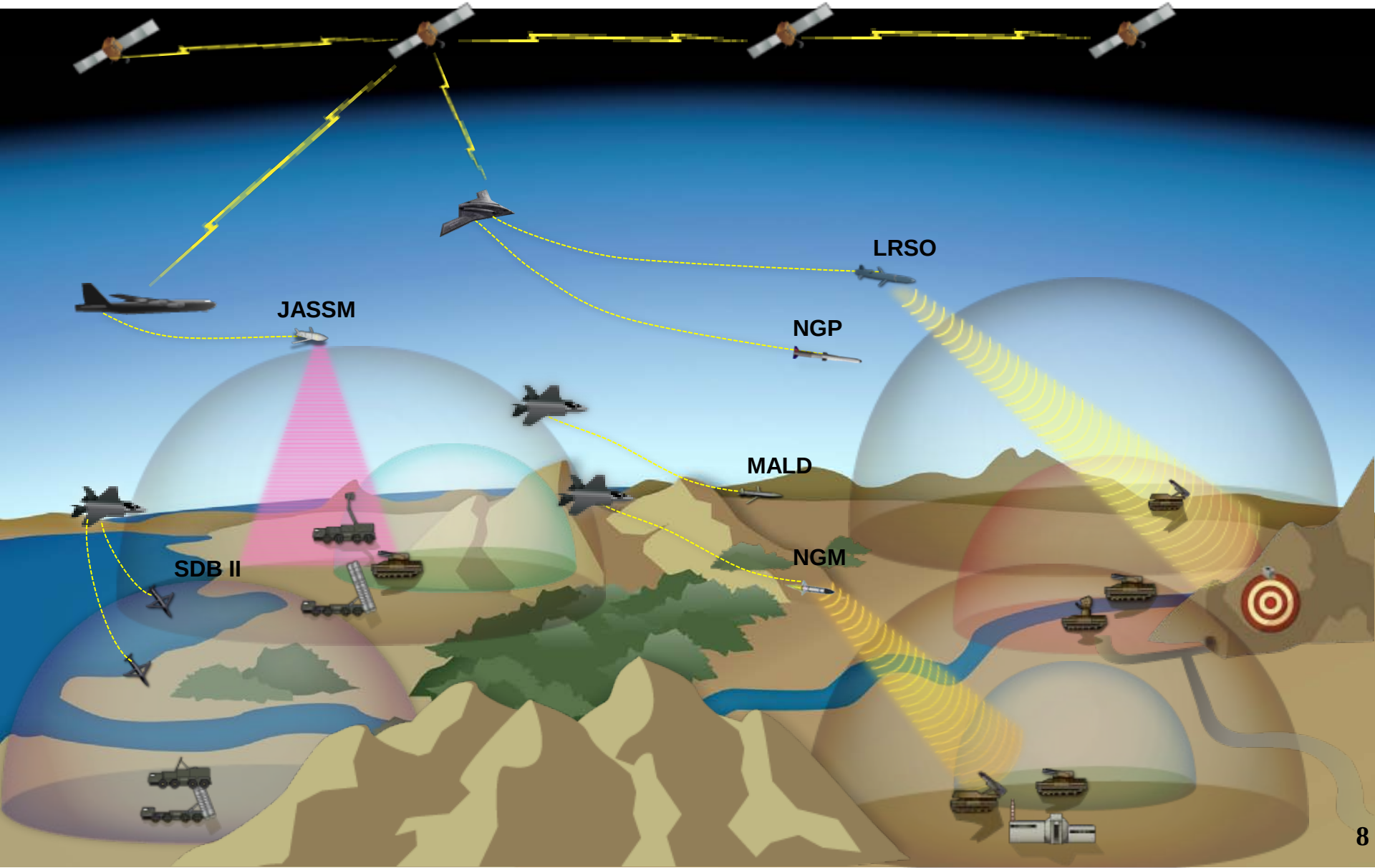
# AAC Acquisition Portfolio

- **Air Dominance**
  - AMRAAM
  - HARM Targeting System
  - AIM-9X
- **Long Range Systems**
  - JASSM
  - JASSM-ER
  - MALD
  - MALD-J
  - MALD-J, Inc II
- **Direct Attack**
  - JDAM
  - Laser JDAM
  - MOP JUON
  - JPF
  - HTVSF
  - B-61 Life Ext Program
- **Capabilities Integration**
  - Acquisition Intelligence
  - Capability Planning MS&A
  - Directed Energy
  - HDBT
  - Intra-theater/Close Controlled Strike
  - Air dominance
  - Long Range Strike
- **Advanced Programs**
  - NGM
  - UAI/WPS/IM
  - Medium Cal Ammo
  - JSF Wpns Integration
  - Rapid Acq Cell
  - PL Mk 82 JUON
- **Test & Training**
  - QF-16
  - QF-4
  - AFSAT
  - CRIIS
  - P5 Combat Training System
- **Miniature Munitions**
  - SDB I
  - SDB II
  - FLM

- **5 ACAT I programs**
- **5 ACAT II programs**
- **2 JUON efforts**

- **$52B Portfolio**
- **30,000+ wpns for OEF/OIF**
- **98 FMS cases**

# AAC Role in Long Range Strike Family of Systems Development (Notional)

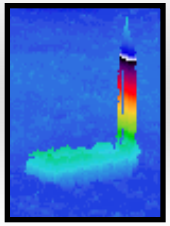


# Long Range Strike Weapon Systems

- Long Range Stand-Off
- Next Generation Missile
- Next Generation Penetrator
- Other Potential Weapons
  - JASSM-ER
  - MALD-J Inc II
  - SDB II
  - Other Legacy Weapons

# Long Range Strike Weapon Technologies

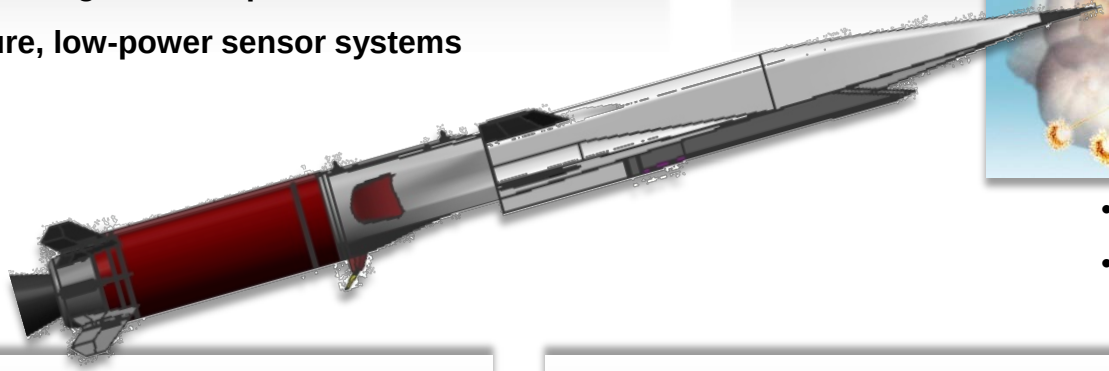
## Advanced Guidance for Surface Targets



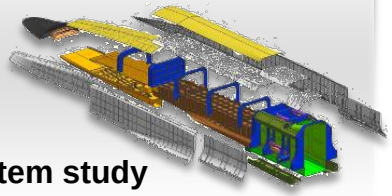
- High temperature sensors and apertures
- Precise sensor pointing through boundary layer
- Millisecond guidance update
- Miniature, low-power sensor systems

## Precision Selectable Effects Warhead

- Tailored blast pulse
- Target coupling



## High Speed Weapon Integration and Demonstration

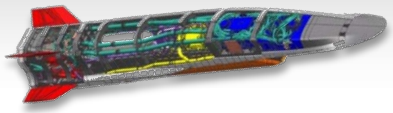


- Platform Integration
- High Speed Dispense
- TRESPAS/TRESPALS2 system study
- Control Surface aerodynamics
- Propulsion and Warhead integration
- Low Cost structure materials

## Efficient High Speed Expendable Propulsion

- Scramjet - Mach 6
- High Mach turbojet – Mach 3+

Engine Ground tests



X-51A flight tests

# Where We are Today

- Tech base exists to support current primes and engine sub-contractors
  - Reassembled core teams of experienced personnel
- IRAD
  - Leverage ongoing industry efforts
  - Re-examining weight/range trade space for nuclear payload
- Lab Efforts
  - Continued improvements: propulsion, materials, payload
- Acq Planning takes advantage of quick ramp-up to develop LRSO
  - AAC released broad agency announcement, May 2010
  - Received 7 concepts

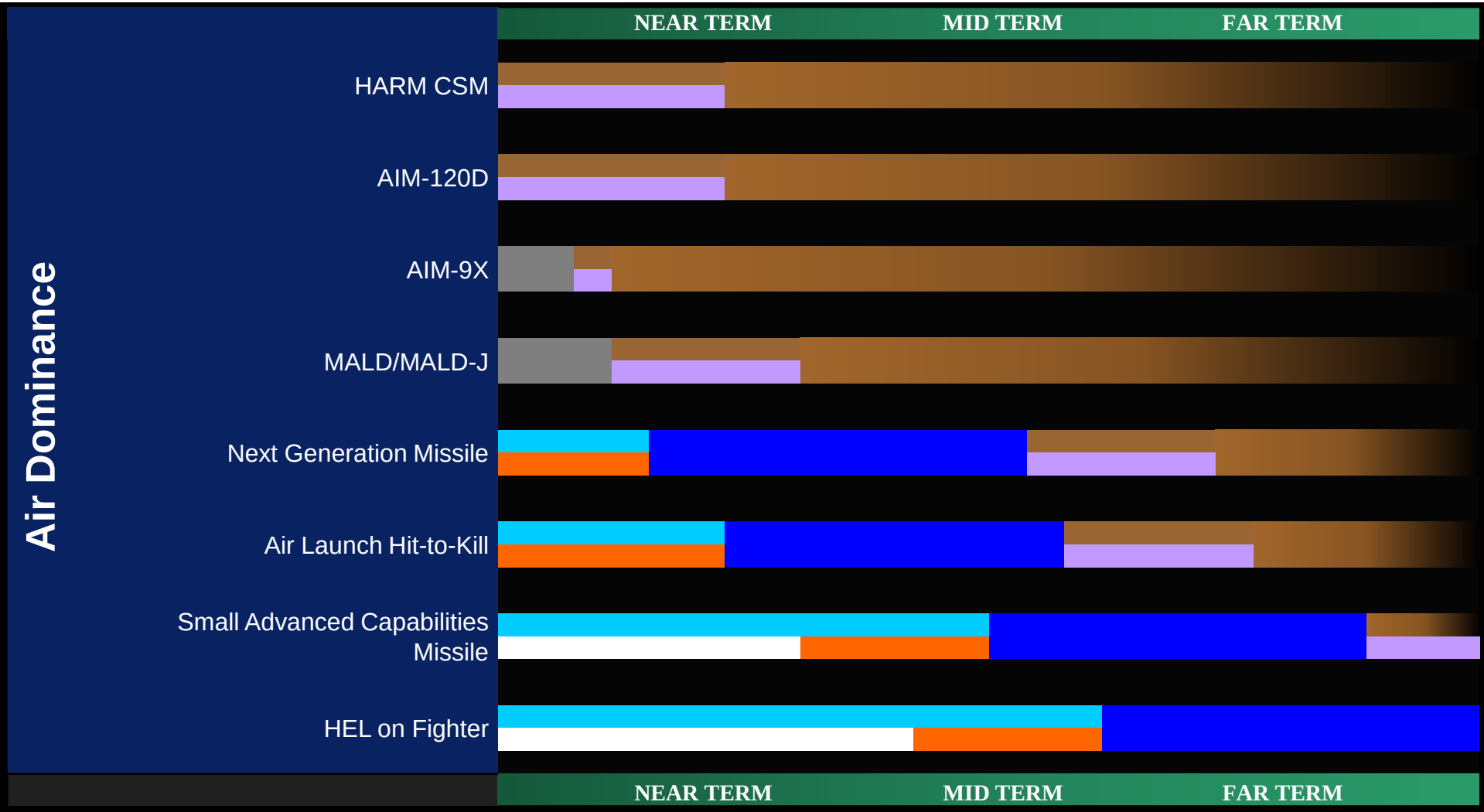
# Air Dominance and Next Gen Missile

Challenges, Future Plans

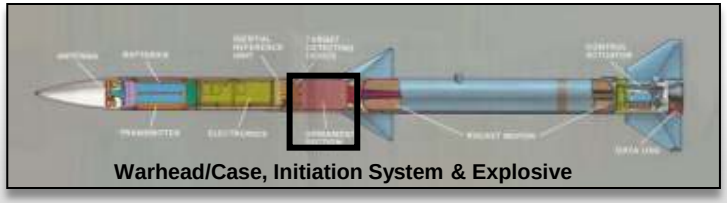
# Next Gen Missile (NGM) Attributes & Supporting Tech

- Internal carriage next generation fighters F-22 & F-35
  - Advanced missile packing of dual role capabilities
- Multi-role (Air-to-Air/Ground)
- Increased kinematics (range and speed)
  - Advanced propulsion system (solid rocket or air breather)
- Prosecute surface targets in all environments

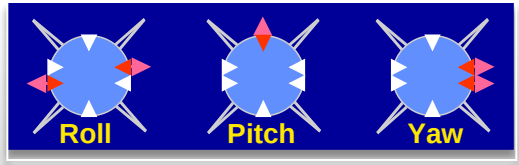
# Air Dominance Weapons Roadmap
## (Notional)



# Air Dominance Technologies

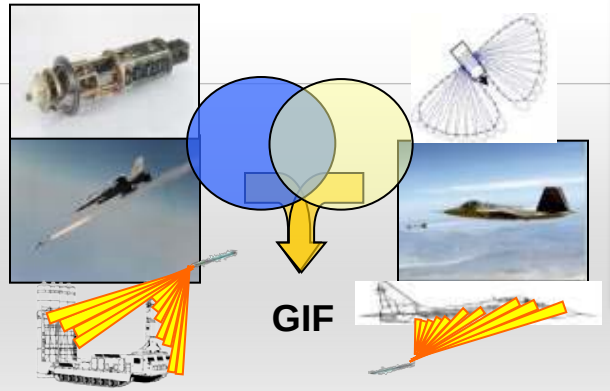



**Adaptable Multi-Point Initiated Mass-Focusing, Enhanced Lethality Warhead**




**High Maneuverability Hybrid Aerodynamic Fin / Reaction-Jet Control System**

**Potential Joint Demonstration**




**Guidance Integrated Fuzing (GIF) Weapon Seeker/Fuzing Integration With Dual-Role Target Set Capability**

**Multi-Pulse Solid Rocket Motor & Other Advanced Propulsion Concepts**

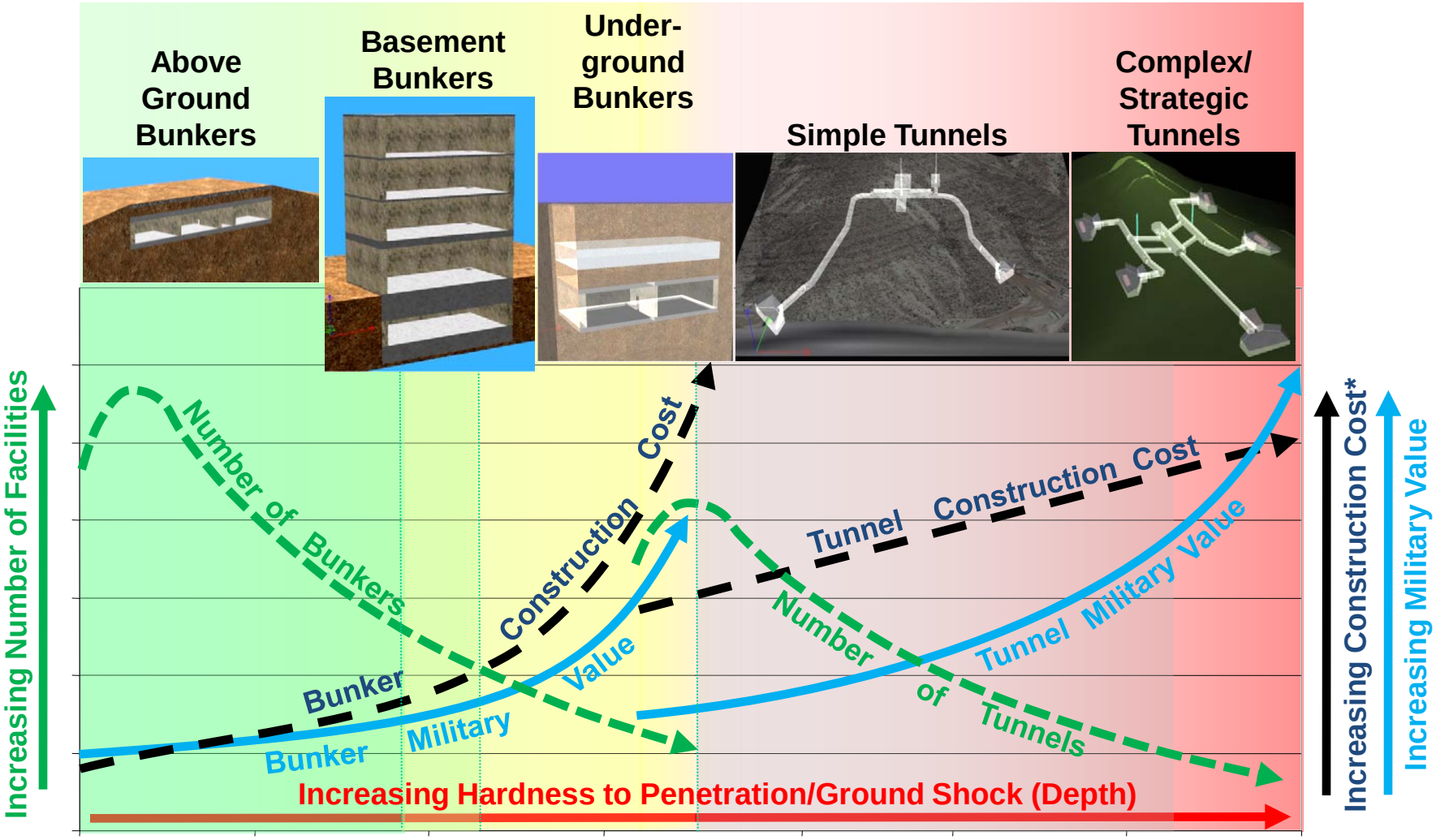


ABW/PA No. 10-01-08-438

# Next Generation Penetrator

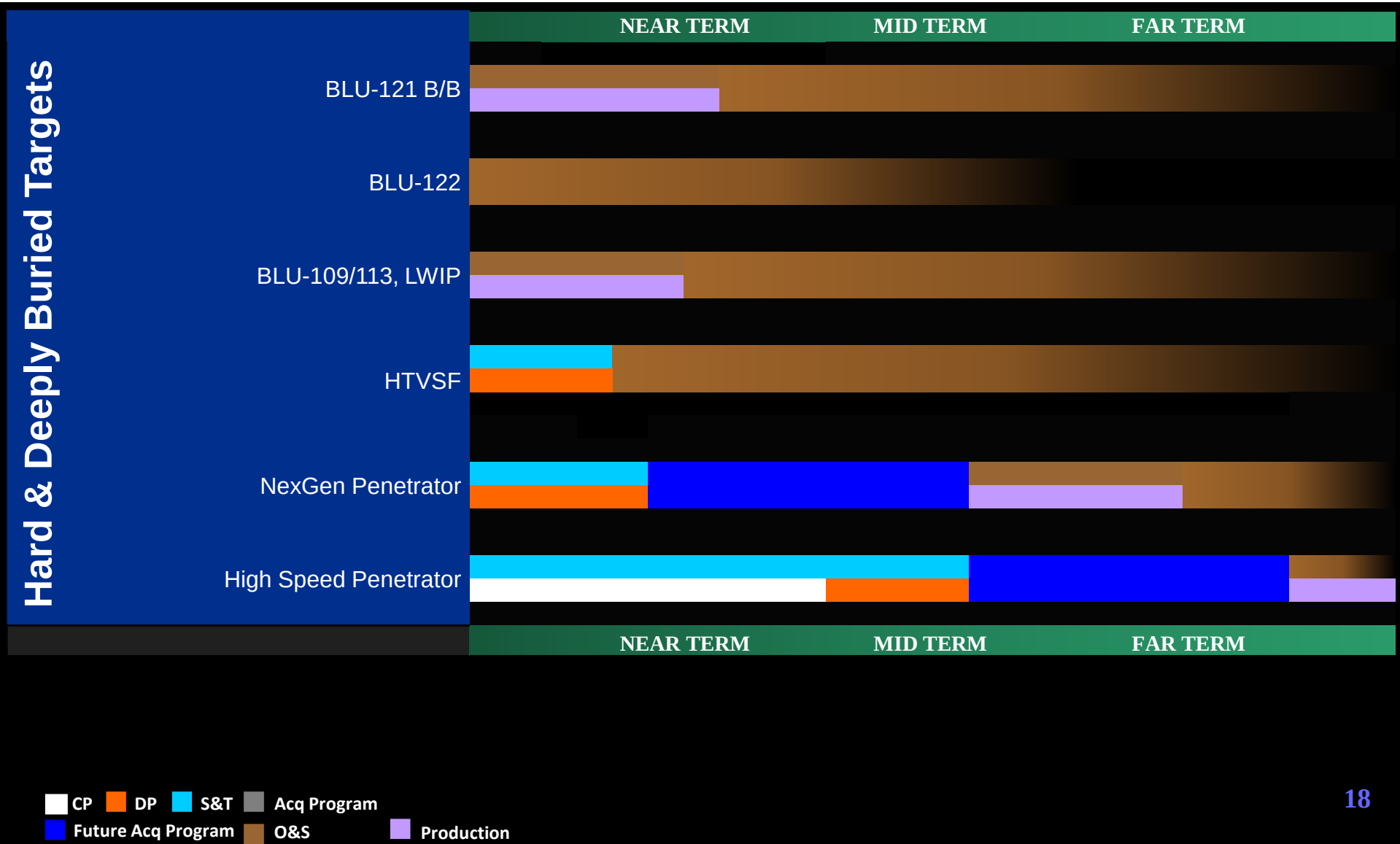
Hardened Deeply Buried Target (HDBT) Defeat for LRS

# HDBT Numbers, Hardness, Cost, Value Comparisons




*Equal mission area used for bunker and tunnel cost comparison

# HDBT Weapons Roadmap
## (Notional)



# Next Generation Penetrator

**Description**

- Analysis of Alternatives for Hard and Deeply Buried Target Defeat
  - Direct attack to long stand-off
  - New systems to P3I of legacy systems
- Potential carriage: New and legacy Fighters/Bombers

**Technology Maturation Areas**

- Next Generation Warhead/Payload Development
- Survivable Fuze and Explosives Development
- Technologies for Precision Strike

# Future Weapon Technology and Industrial Base Needs

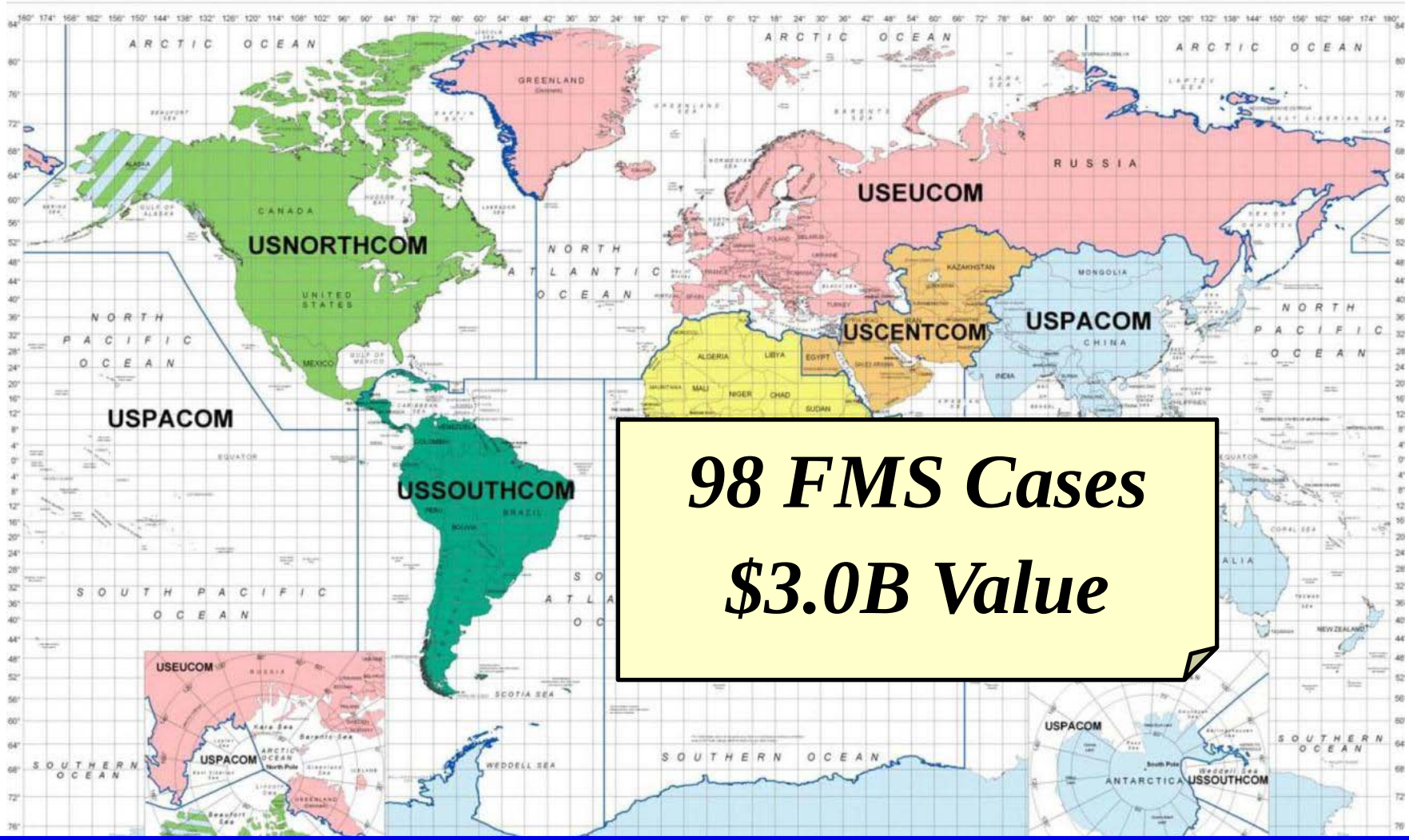
- Penetrator Fuze Survivability and Reliability
  - User HDBT driven requirements
- Warhead Hardening
  - Improvements in HDBT techniques and technologies
- GPS Denied Environment Technologies
  - Current PGMS dependence on GPS technology
- Fuzing
  - Sensing accuracy in all target environments
- Energetic Materials Issues
  - Pre-ignition and insensitive munitions requirements

***We Will Need to Understand Where/How Industry Invests IRAD Money—Government Needs to Offer More Vectors***

# Making Weapons Affordable

- US Department of Defense is working aggressively to reduce development costs
  - Focus areas
    - Emphasizing affordability and control of cost growth
    - Incentivizing productivity and innovation
    - Promotion of real competition
    - Reduction of non-productive processes
- Revamp approach to developmental and operational test
- Find opportunities for international partnering on future developments
- Take advantage of economies of scale
  - FMS partners are key enablers

# Active FMS Portfolio

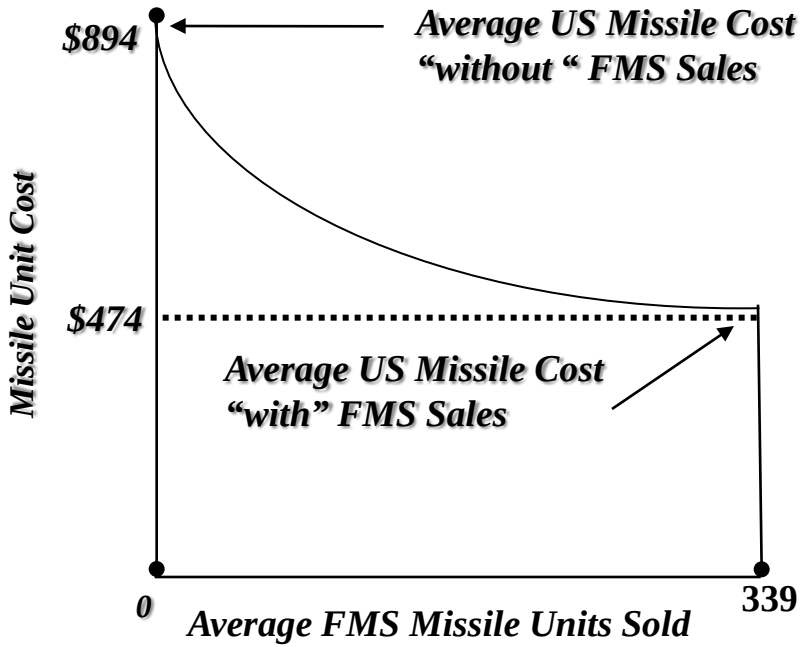



***98 FMS Cases***

***$3.0B Value***

***Interoperability on the battlefield is facilitated***
***Development costs are reduced***

# AMRAAM FMS Sales Benefit




## Results of FMS Sales

- $550M+ cost lift over 11 years
- ~ 1,000 additional USG missiles
- Warfighters and Taxpayers Win!


"First Look, "First Shot, First Kill"

# International Armaments Cooperation

IAC generally includes:

- Research, development, testing and evaluation (RDT&E) of defense technologies, sub-systems, systems or equipment.
- Joint production (including follow-on support) of defense articles or equipment resulting from a cooperative R&D program.
- DoD procurement of foreign equipment, technology, or logistics support.
- Testing of foreign equipment as part of the Foreign Comparative Testing (FCT) program.

# Remaining Interoperable

- Future conflicts will be Joint and fought with coalitions
- Success is enabled by a common framework of technologies and capabilities
- Commonality greatly simplifies combat tactics
  - Air planners utilize common parameters
  - Joint Terminal Air Controller's (JTAC) mission is simplified
  - Common aircrew tactics and procedures
- Interoperability on the battlefield is facilitated by future FMS investment and teaming with international partners
  - JDAM and AMRAAM are leaders in this area
  - Integrated across many air platforms - USAF, Navy, Marines and foreign partners

# Issues, Opportunities, and Challenges

# Opportunities/Challenges

- Tomorrow's threat demands that tomorrow's weapons must have almost all the capabilities of future aircraft systems
  - Sensors, data links, survivability, flexibility, adaptability, etc.
- However, we must balance complexity of weapons we build with the time required to deliver capability
- We must keep next gen weapons developments in sync with next gen platform requirements
  - Adapting weapons to old platforms or integrating old weapons in new platforms is inefficient and wasteful
- Futures weapons must be designed with reliability in mind and weapons contractors must improve manufacturing performance
  - Supplier management needs focus

# Opportunities/Challenges

- Current fuze technology is the weak link for all future weapons
  - Industrial base is crumbling
  - Old mindset that fuzes are “integrated” into weapons must be changed—fuzing must be a system function designed in with a systems engineering approach
- Test systems (drones/ranges/threat systems) are facing very complex requirements
  - Weapons are becoming too smart for the current infrastructure
- Continuing pressure on test infrastructure will slow many programs
- What three wishes for the “Weapons Genie”
  - Conventional explosive fills with the power of “nuclear” materials
  - Design the concept of a fuze out of all weapons
  - Self contained guidance with better accuracy than GPS