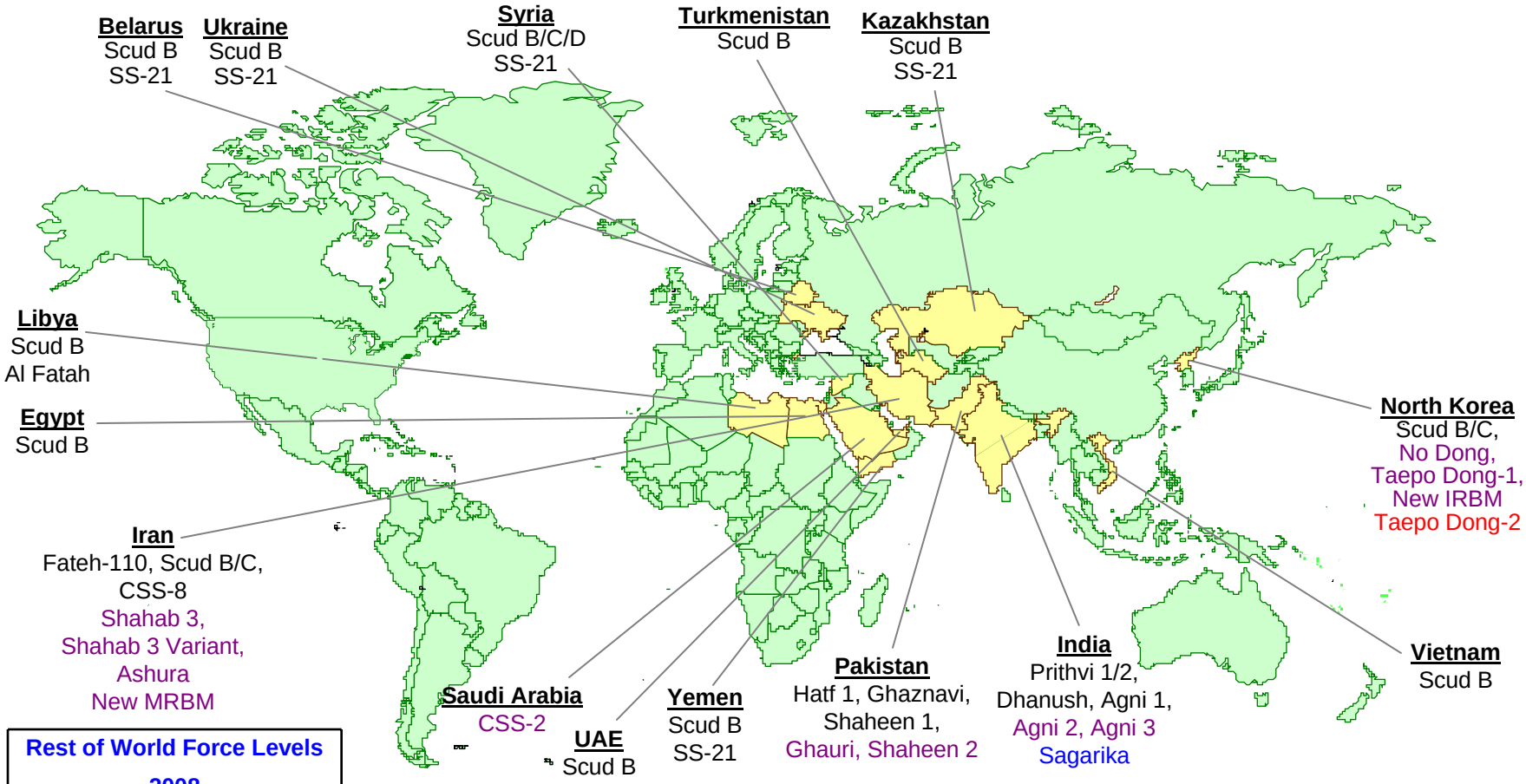
Ballistic Missile Defense Overview For Aerospace Industries Association

10 SEP 09

LTG Patrick J. O'Reilly, USA
Director
Missile Defense Agency

Foreign Ballistic Missile Programs 2009



Rest of World Force Levels 2008	
SRBM	5,500
MRBM	350
IR/ICBM	<40
Totals	5,900

"Current trends indicate that adversary ballistic missiles, with advanced liquid- or solid-propellant propulsion systems, are becoming more flexible, mobile, survivable, reliable and accurate while also presenting longer ranges."
LTG Michael Maples, Director, DIA

Sources: OSD, Proliferation: Threat and Response, 2001; NASIC, Ballistic and Cruise Missile Threat, 2003, 2006; DIA Annual Threat Assessment, 2007, 2008 DIA/MSIC Message 2009281441SS(U)

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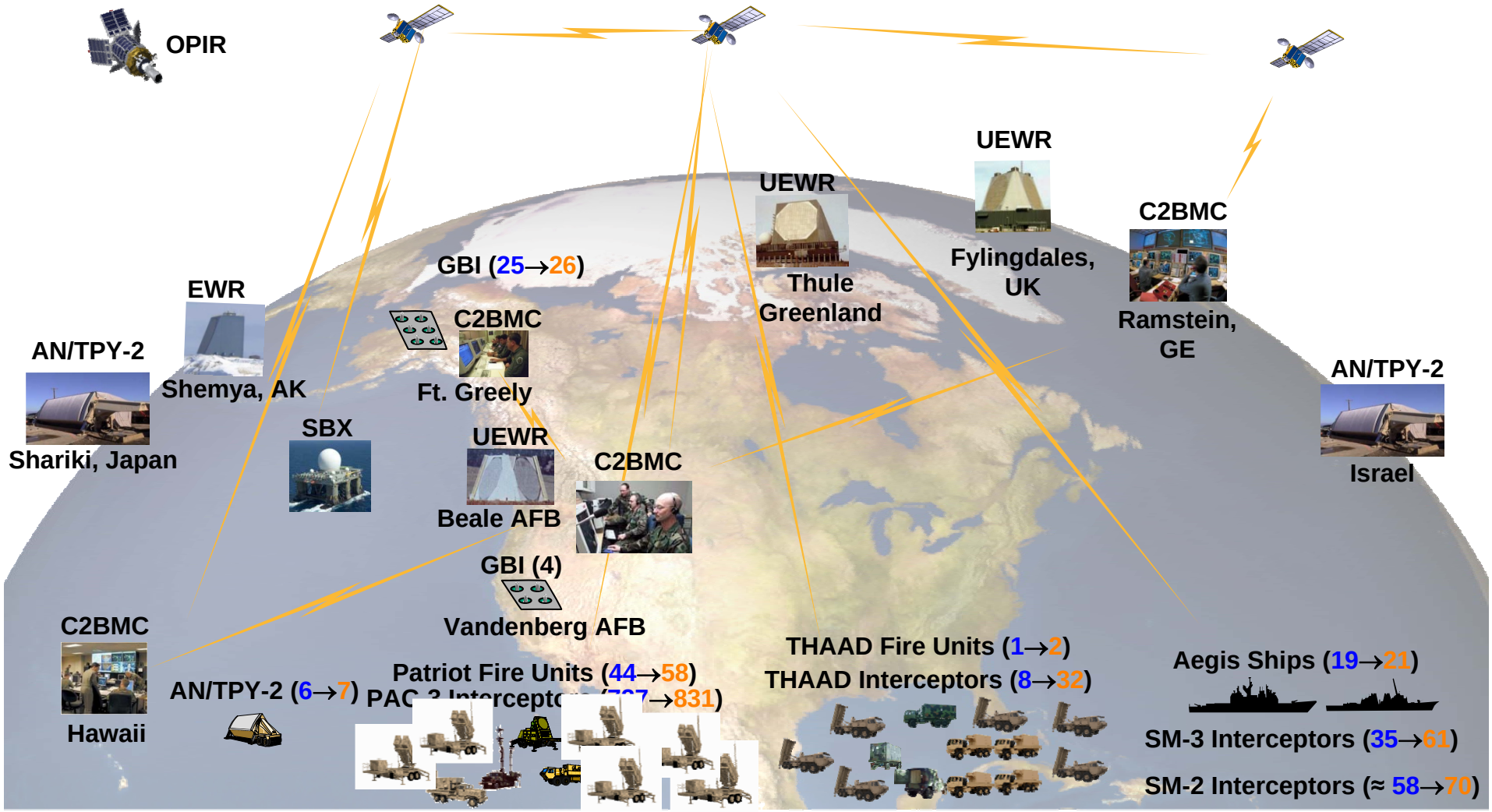
FY10 Program Strategy: The Four Focus Areas Of Missile Defense

TY$ in Millions	FY10
Development	4,162.4
Test	1,458.0
Fielding	1,491.1
Sustainment	714.9
Total	7,826.4

1. Enhance missile defense to defend deployed forces, allies and friends against theater threats
   - Field more THAAD and SM-3 interceptors
   - Begin conversion of 6 additional Aegis ships
2. Continue a viable homeland defense against rogue state threats beyond 2030
   - Maintain Ground-Based Midcourse capability
   - Complete emplacement of 26 GBIs at Ft. Greely and 4 at VAFB
   - Complete procurement of 14 GBIs
     - Backfill oldest GBIs
     - Refurbish and test removed GBIs
     - Maintain 4 operational spares
3. Prove missile defense works
   - Implement event-oriented Integrated Master Test Plan to complete data collection
   - Expand flight and ground tests to demonstrate capability against MRBMs, IRBMs, and ICBMs
4. Develop technologies to hedge against future threat growth
   - Leverage emerging early intercept technologies to increase operational effectiveness and efficiency
   - Provide precision tracking from space
   - Demonstrate Airborne Laser shoot-down capability against in-flight missile

System Configuration
End Of FY 2009 → End Of FY 2010

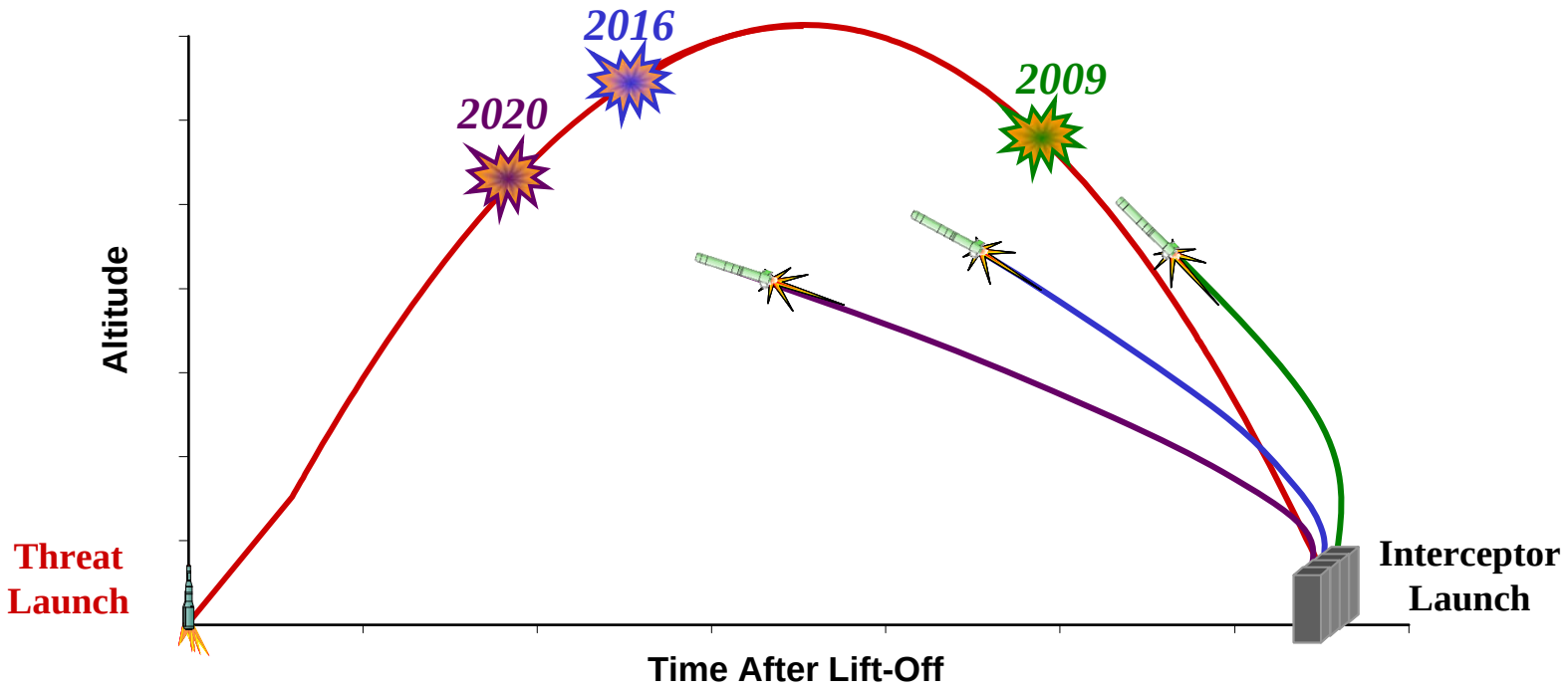


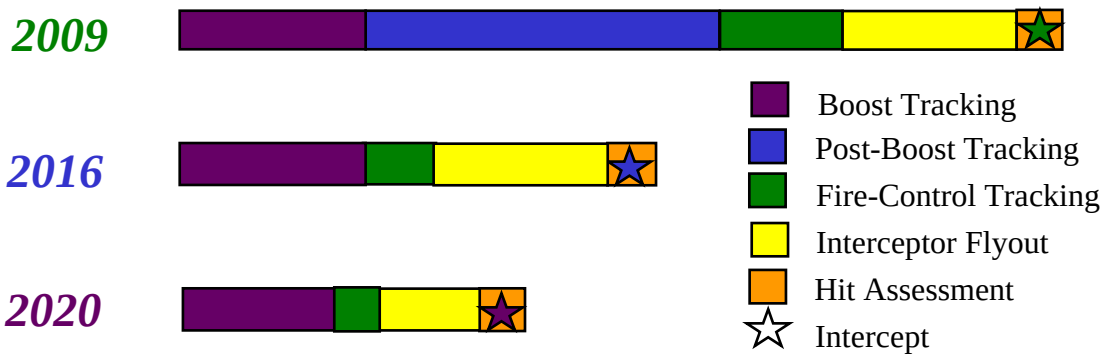
C2BMC = Command, Control And Battle Management Network
EWR = Early Warning Radar
OPIR = Overhead Persistent Infrared

SBX = Sea-based X-Band Radar
SM-2 = Standard Missile-2 Terminal Interceptor
SM-3 = Standard Missile-3 Interceptor

UEWR = Upgraded Early Warning Radar
THAAD = Terminal High Altitude Area Defense

Early Intercept Strategy





Benefits of Early Intercept

1. **Large Raid Handling**
2. **Shoot-Look-Shoot**
3. **Hedge Against Advanced Threats**
4. **Constrained Countermeasure Deployments**

New Missile Defense Initiatives

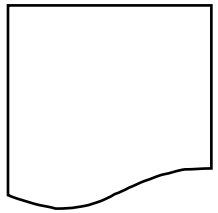
Precision Tracking Satellite System Planning

Airborne Infrared System To Support BMD

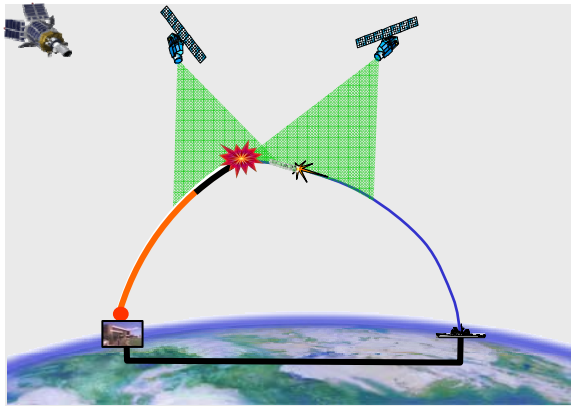
Transportable VLS

Land-Based SM-3

Risk Reduction For Extended Range THAAD

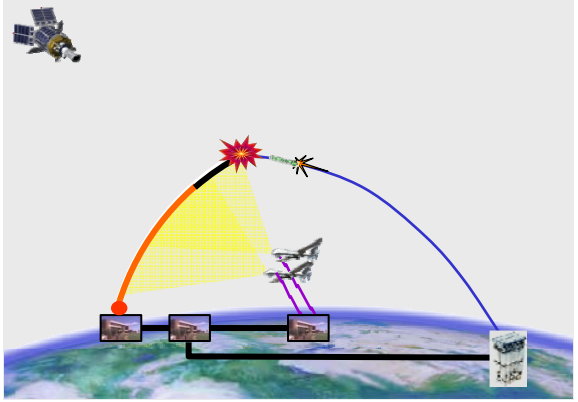


Other SAP



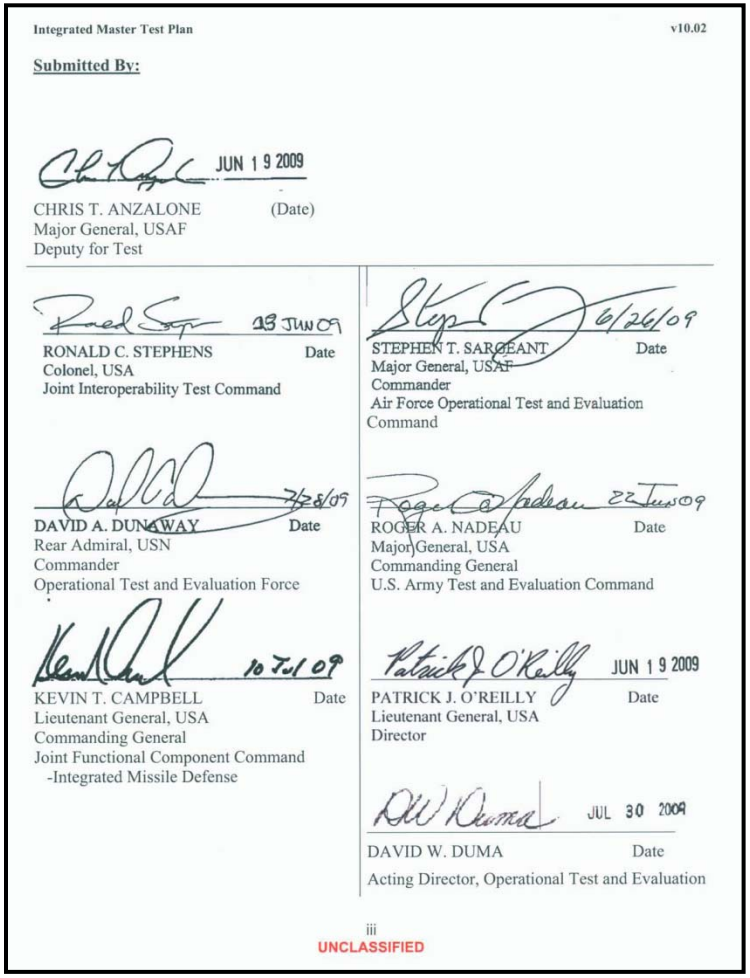
Engage on STSS Demo Satellites

Engage on Airborne Infrared (sea-based SM-3)



Engage on Airborne Infrared (land-based SM-3)

Integrated Master Test Plan Content



Integrated Master Test Plan v10.02

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- **Phase I Test Requirements**
  - 100 Approved Critical Engagement Conditions / Empirical Measurement Events
  - 23 Performance Assessment Objectives
  - 9 Critical Operational Objectives (COI)
- **Phase II and III**
  - 88 flight tests (59 intercept tests)
  - 66 ground tests
  - 12 Performance Assessments
  - 166 total tests from FY10-20 in Integrated Master Test Plan
- **Additionally**
  - 48 Combatant Commanders Exercises and Wargames

Expanded Scope of Integrated Master Test Plan FY10-FY15

Measuring BMDS Test Data Collection

Element or System (# of CEC & EME)	Prior Years	FY10	FY11	FY12	FY13	FY14	FY15	FY16-20
[1]Aegis BMD (20)	1.5%	8%	17%	35%	57%	82%	97%	100%
C2BMC (7)	15%	31%	42%	55%	68%	83%	92%	100%
GMD (13)	18%	44%	59%	66%	77%	81%	83%	100%
THAAD (23)	14%	28%	42%	54%	69%	89%	97%	100%
Sensors (22)	34%	41%	76%	81%	85%	96%	98%	100%
System (15)	1%	16%	32%	50%	60%	73%	85%	100%

[1] Aegis BMD 4.0.1 Baseline; Aegis BMD 3.6.1 Baseline is 100% in prior years

Critical Engagement Conditions (CEC)

Test points identified to efficiently capture data to resolve known modeling and simulation uncertainties that limit performance prediction accuracy (maximize insight into predictive modeling and simulation capability)

Empirical Measurement Events (EME)

Test points identified to efficiently collect data that is not modeled or modeled at high fidelity or test points beyond Critical Engagement Conditions collections required to achieve high modeling confidence for integrated capabilities over all engagement conditions

International Activity Highlights

R&D Cooperative Efforts

- **UK:** Fylingdales UEWR, Joint Project Arrangements for Cooperative Projects
- **Italy:** MEADS partner
- **Denmark:** Upgrade Thule Early Warning Radar
- **Australia:** Advanced technology cooperation
- **Japan:** Forward-based X-Band radar siting, 21" Missile Development
- **Czech Republic:** Agreed to host midcourse radar; some RDT&E cooperation

- **NATO:** Completed tasking to explore architectures to supplement European Site. Working with ALTBMD to demonstrate connectivity between NATO and U.S. systems
- **Kuwait:** Expressed interest in missile defense
- **Saudi Arabia:** Requested BMD requirements analysis

Foreign BMD Projects / Interests

- **Netherlands:** PAC-3, Maritime BMD Cooperation
- **France:** Cooperative project potential
- **Poland:** Agreed to host Ground Based Interceptors, potential RDT&E cooperation
- **India:** Discussions on RDT&E
- **Russia:** Strategic cooperation /transparency dialogue
- **United Arab Emirates:** Request for THAAD
- **Israel:** Arrow Deployed, Arrow System Improvement Program; development of short-range BMD, Upper Tier program
- **ROK:** Missile Defense discussions
- **Germany:** MEADS partner, laser cross-link technology
- **Ukraine:** Conducting a missile defense project; RDT&E agreement being staffed
- **Bahrain:** Request for BMD requirements analysis
- **Qatar:** Expressed interest in missile defense

GBI 20 Year Lifecycle Management Options

Fleet Management		
Operational GBIs	30	44
Operational Spares	4	6
Refurb	3*	4*
Unscheduled Maintenance	1*	2*
Total Operational	**34**	**50**
Test Program		
GBIs	15***	15***
Stockpile Reliability Program – Flight Test	5	5
Ground Test (Test Limited Life Components During Refurb)	partial	partial
Total Test	**20**	**20**
TOTAL	**54**	**70**
ON CONTRACT	**-47**	**-47**
ADDITIONAL GBIs REQUIRED	**7**	**23**
Purchase Cost**	**$490M**	**$1.610B**

* Not additive, included in operational spares
** Does not include Operational & Support costs of additional 16 missiles
*** New proposed test program