Missile Defense Program Overview For The National Defense Industrial Association

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Overview

- **Ballistic Missile Threat**
- **Program Update**
- **PB08 Fiscal Realities**
- **European Missile Defense**

Challenges And Uncertainties

- **Emerging Threats**
  - **Now more than 20 countries have a ballistic missile capability**
  - **Future threats difficult to predict but likely to arise – both technical and political surprises**
- **Rogue states view ballistic missiles as a means for gaining or maintaining their own freedom of action**
  - **North Korea uses missiles for coercion, intimidation and deterrence – proliferates to other nations**
  - **Iran views ballistic missiles as element of asymmetric strategy against U.S. and allies – proliferates to both state and non-state actor**

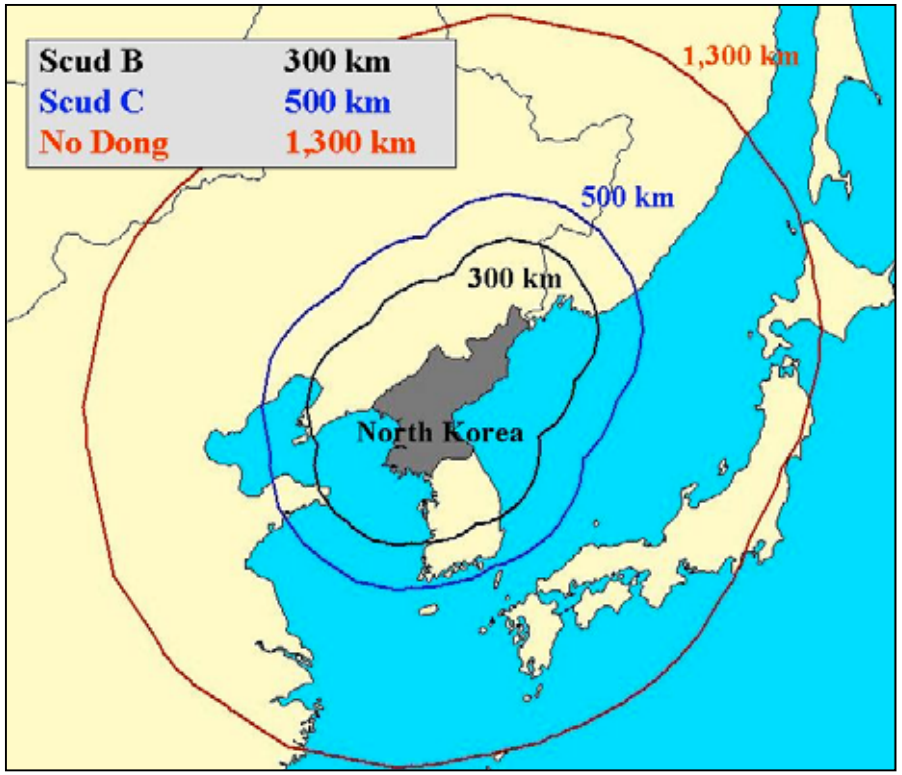
Major Strategic Surprises

- **Taepo Dong-1 launch in August 1998**
- **September 11, 2001 attacks**
- **North Korean missile launches in July 2006, plus nuclear test**
- **Lebanon Crisis in September 2006**
- **Chinese advanced technology demonstration**

North Korean Ballistic Missile Capabilities

- 500 Scuds (300-500 km)

- No Dong (1,300 km)
  - Reaches Japan and all South Korea
  - Scaled-up Scud technology
  - Flight-tested in May 1993 and July 2006



North Korean Ballistic Missile Capabilities

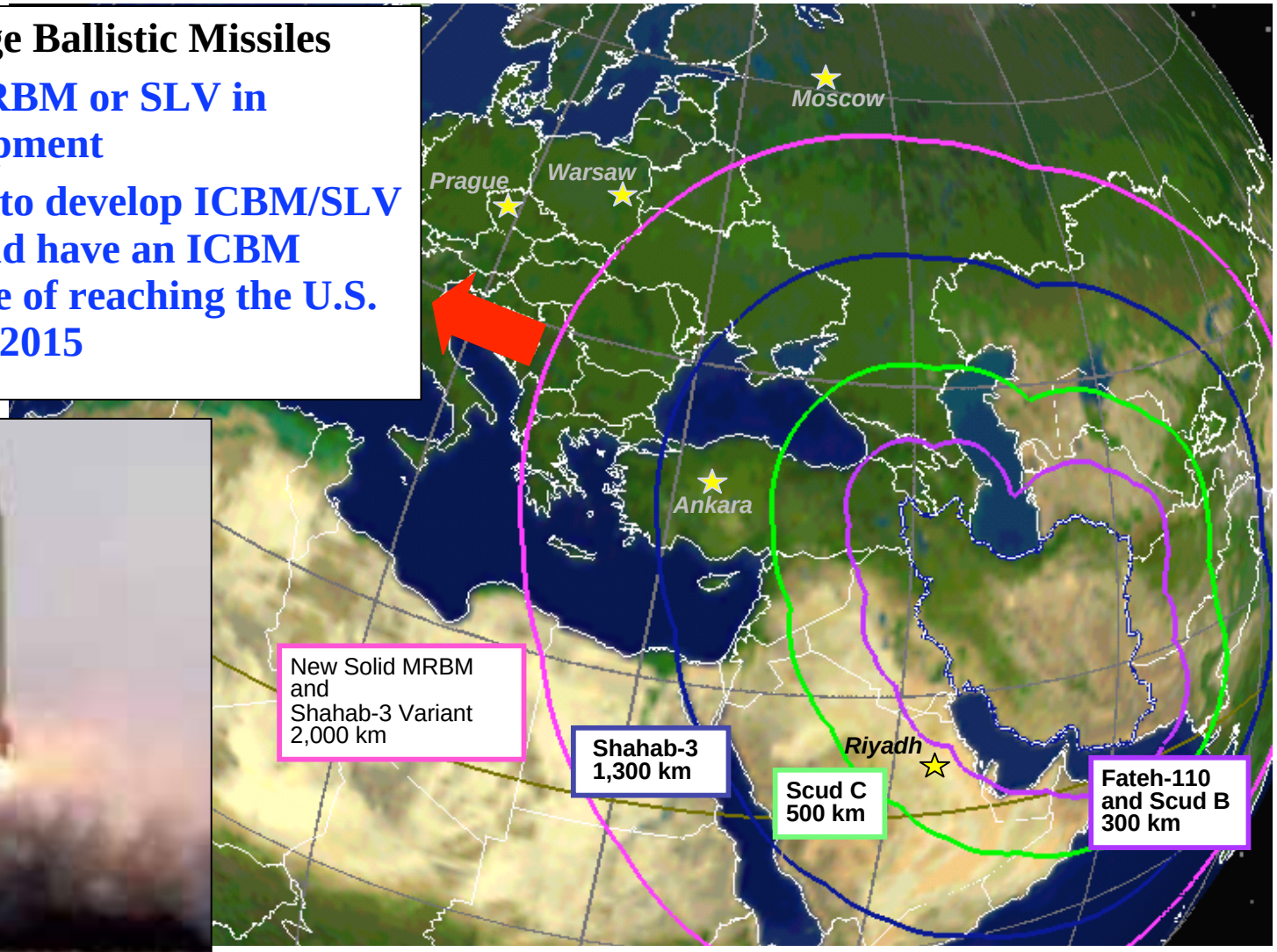
- **Taepo Dong-1 Space Launch Vehicle**
  - **Flight tested 1998**
  - **Third stage failed, but first two stages demonstrated several key technologies required for an ICBM, including stage separation**

- **Taepo Dong-2 SLV/ICBM**
  - **2-stage: 10,000 km**
  - **3-stage: 15,000 km**
  - **4 JUL 06 test failed shortly after launch**

- **North Korea is also developing an intermediate-range ballistic missile, approximately 3,200 km range. This IRBM represents a qualitative improvement in performance**

Iranian Ballistic Missile Threat

- **Long-Range Ballistic Missiles**
  - **New IRBM or SLV in development**
  - **Likely to develop ICBM/SLV … could have an ICBM capable of reaching the U.S. before 2015**



Source: NASIC, B&CM Threat 2006, Jacoby Testimony March 2005

Great Prophet 2

VM308

Ballistic Missile Defense Policy And Mission

Policy

"… The United States plans to begin deployment of a set of missile defense capabilities in 2004. These capabilities will serve as a starting point for fielding improved and expanded missile defense capabilities later."

National Security Presidential Directive / NSPD-23
16 DEC 02

Direction

- **Establish a single program to develop an integrated system under a newly titled Missile Defense Agency**
- **Apply a capability-based requirements process for missile defense**

SecDef Memorandum
Missile Defense Program Direction, 2 JAN 02

Mission

- **Develop an integrated layered Ballistic Missile Defense System**
  - **To defend the United States, its deployed forces, allies and friends**
  - **From ballistic missiles of all ranges**
  - **Capable of engaging them in all phases of flight**

Integrated Ballistic Missile Defense System

Sensors

Defense Support Program

Space Tracking And Surveillance System

Sea-Based Radars

Forward-Based Radar With Adjunct Sensor

Midcourse X-Band Radar

Early Warning Radar

Boost Defense Segment

Midcourse Defense Segment

Terminal Defense Segment

Airborne Laser

Kinetic Energy Booster

Aegis Ballistic Missile Defense / Standard Missile-3

Multiple Kill Vehicle

Ground-Based Midcourse Defense

Terminal High Altitude Area Defense

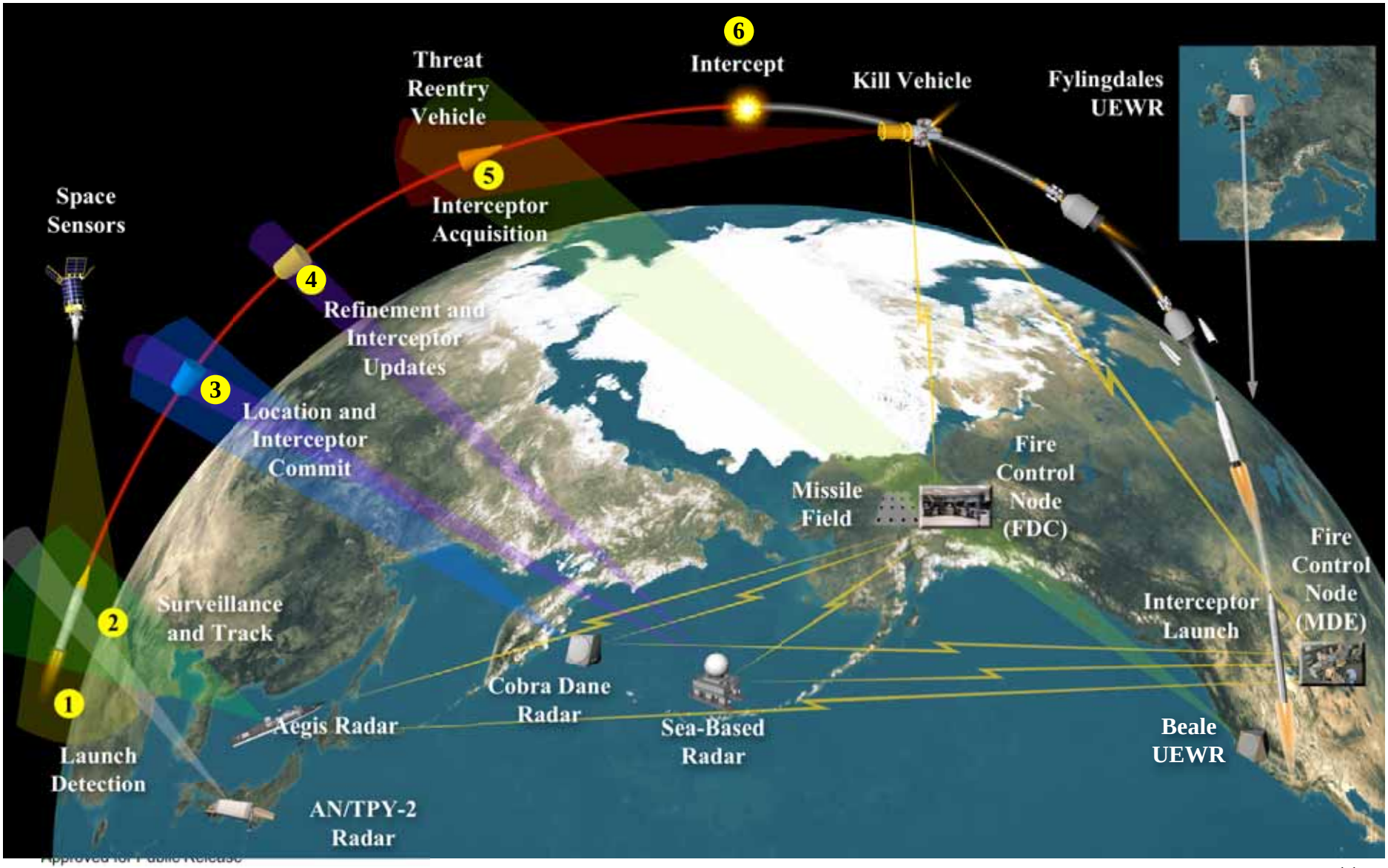
Sea-Based Terminal

Patriot Advanced Capability-3

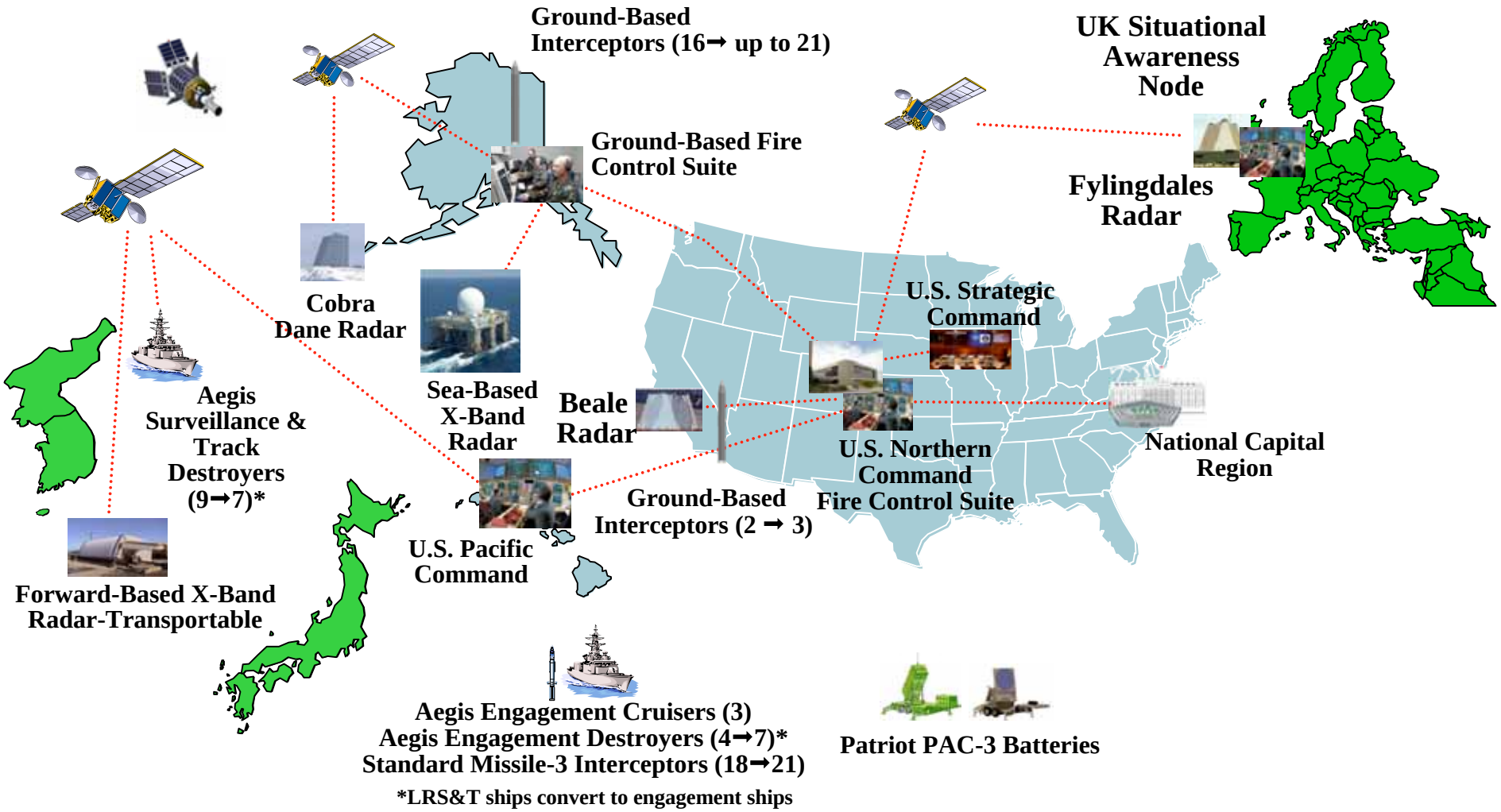
Command, Control, Battle Management & Communications

NMCC USSTRATCOM USNORTHCOM USPACOM EUCOM CENTCOM

An Integrated Approach To Ballistic Missile Defense



System Configuration
End April 2007 ➞ End 2007



None Of This BMD Capability Existed In June 2004

Missile Defense Tests Since 2001

- **Validate Hit-to-Kill technologies (2001-2002)**
  - **4 of 5 long-range intercepts using ground-based interceptor prototypes**
  - **3 of 3 Aegis BMD short-range intercepts**
- **Demonstrate, characterize limited defensive operations (2003-2005)**
  - **Successful Patriot test intercepts and engagements in Operation Iraqi Freedom**
  - **1 of 2 Aegis BMD short-range intercepts**
  - **2 successful long-range booster launches followed by 2 launch aborts (non-systemic problems addressed)**
- **Demonstrate integration, mission assurance, reliability, end-to-end performance (2006 to present)**

Missile Defense Tests

- **14 test successes in last 15 flight tests (with one no test)**
  - **Aegis Standard Missile-3 intercepts separating warheads (November 2005 and June 2006)**
  - **Successful Terminal High Altitude Area Defense (THAAD) intercepts of unitary targets (July 2006, January 2007)**
  - **Successful intercept of target with long-range interceptor (September 2006)**
- **Upcoming tests in 2007**
  - **Two intercept flight tests (1 endo-atmospheric, 1 exo-atmospheric) of THAAD interceptor at Pacific Missile Range Facility against short-range unitary targets**
  - **Five Aegis Standard Missile-3 intercepts against short-and medium-range targets , including engagement by a Japanese destroyer**
  - **Two intercept tests of long-range ground-based interceptors**

24 Hit-to-Kill Intercepts In Low And High Endo-atmosphere, Midcourse And Terminal Exo-atmosphere Since 2001

Aegis FTM-10
22 JUN 06

- **Engages**
  - **Short- to medium-range ballistic missiles**
  - **From the sea**
  - **In midcourse phase of flight**

Terminal High Altitude Area Defense
FTT-06 – 26 JAN 07

- **Engages**
  - **Short- to intermediate-range ballistic missiles**
  - **From the ground**
  - **In terminal phase of flight**

THAAD FTT06 Quicklook

Ground-Based Midcourse Defense
FTG-02 – 1 SEP 06

- **Engages**
  - **Intermediate- to long-range ballistic missiles**
  - **From the ground**
  - **In midcourse phase of flight**

Operational Perspective

- **Warfighters are ready to operate the system when directed**
  - **Operational crews are in-place, trained and certified**
  - **Tactics, Techniques, and Procedures (TTPs) established and used in flight and ground testing whenever possible**
- **System has gone through numerous Operations Capability Demonstrations**
- **Demonstrated we can take the system from development to an operational alert state**
- **Plan to use Concurrent, Test, Training and Operations (CTTO) approach**
  - **Enables continued development and test while allowing warfighters the ability to maintain operational capability and conduct training**

PB08 Fiscal Realities

- **Budgetary pressure on DoD has impacted MDA's PB08**
  - **MDA's budget reduced by $500M per year FY08-13**
  - **Budgetary flexibility is limited**
    - **Fielding and sustainment commitments**
  - **Reduction will affect options for the future and preparations for emerging and maturing rogue nation threats**
- **Sustainment and support costs increasing as assets are fielded**
  - **Approx $1B in out-years**
- **Test program costs are increasing as complexity is added**
  - **Approx $2.0B per year over FYDP**

MDA Historical Fiscal Summary

TY $ in Millions

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total FY06-13
President's Budget 2006	**7,780**	**9,581**	**9,821**	**10,045**	**10,276**	**10,218**			**57,721**
Congressional Actions	(93)	-	-	-	-	-			(93)
PBD 713, PDM III, PBD 717 & Other OSD Adjustments	8	(263)	(285)	(90)	(155)	(345)			(1,130)
President's Budget 2007	**7,695**	**9,318**	**9,536**	**9,956**	**10,121**	**9,873**			**56,498**
FY08-13 POM Controls, Adjustments	-	-	(166)	(137)	(106)	(137)	8,121	8,246	15,820
MDA Wedge Allocation							2,000	2,000	4,000
Congressional Actions	-	71	-	-	-	-	-	-	71
PDM IV - Wedge Adjustment	-	-	(500)	(493)	(494)	(241)	(500)	(500)	(2,728)
PBD 704, PBD 708, & PDM P72	-		29	32	5	5	9	9	89
President's Budget 2008	**7,695**	**9,389**	**8,899**	**9,357**	**9,526**	**9,499**	**9,630**	**9,755**	**73,750**

PB08 Strategic Objectives

- ***Maintain and sustain*** **an initial capability to defend the U.S., allies and our deployed forces against rogue nation attacks**
  - **Homeland defense against long-range missiles from North Korea**
  - **Develop initial defense for deployed forces and allies in regional conflicts**
- ***Close gaps and improve*** **this capability against rogue states**
  - **Expand homeland defense against Iran**
  - **Defeat larger and more complicated attacks (e.g., decoys, multiple warheads)**
  - **Extend deterrence, enhance defenses for deployed forces and allies, and increase international cooperation**
  - **Extend U.S. decision time and complicate enemy planning**
- ***Develop options*** **to dissuade and stay ahead of current and emerging threats**
  - **Leverage technological advantage to increase defense effectiveness**
  - **Build a foundation for global access and response**

Capabilities Through 2013

- **Increased capability against long-range threats**
  - **Up to 54 Ground-Based Interceptors (44 in U.S., 10 in Europe)**
  - **Persistent surveillance and tracking capabilities across western hemisphere and Europe – Alaska, California, Greenland, United Kingdom, Central Europe**
- **Increased capability against regional and asymmetric threats**
  - **18 Aegis engagement ships**
  - **132 Standard Missile-3 interceptors**
  - **4 Terminal High Altitude Area Defense fire units with 96 interceptors**
  - **Up to 100 sea-based Standard Missile-2 terminal interceptors**
- **Greater mobility to address current and surprise threats**
  - **Sea-based X-band radar (Pacific Ocean)**
  - **4 forward-based X-band radars, plus adjunct radar**








Options For The Future

- **Boost Phase Programs**
  - **Continue development of either Airborne Laser or Kinetic Energy Booster program; downselect to one boost program before FY10**
  - **Airborne Laser**
    - **Maintains development program with lethal shoot down in 2009**
  - **Kinetic Energy Booster**
    - **Focus program on development of canisterized fixed-midcourse booster follow-on; booster test flight in 2008**
    - **Maintain options for mobile midcourse booster and for boost phase capability**
- **Space Tracking and Surveillance System**
  - **2 test bed satellites to be launched in 2007**
  - **Follow-on constellation to be launched post-2016 based on lessons learned from test bed satellites**
- **Space Test Bed**
  - **Near-term funding will be used to refine concepts and prepare to conduct focused experiments demonstrating the viability of the concepts**

Major Program Movements
(PB07 To PB08)

- **Kinetic Energy Booster: development of canisterized fixed-midcourse booster follow-on**
  - **Maintain option for mobile midcourse booster**
  - **Maintain option for boost phase capability**
- **Multiple Kill Vehicle: expanded volume kill capability for land and sea, delivers in 2017**
- **Aegis BMD**
  - **Provides 48 additional SM-3 Block IB missiles and BMD Signal Processor (BSP) program**
  - **Funds long lead items for 21" SM-3 Block IIA missiles**
- **Sea-based terminal program initiated**
  - **Near-term: Upgraded Aegis system, 100 modified SM-2s**
  - **Far-term: Upgraded Aegis system, new interceptor**
- **THAAD: Provides 2 additional THAAD fire units (48 missiles)**
- **European Site**
  - **Provides funding for initial capability in 2011, complete in 2013**
  - **European Midcourse Radar: Modifies GBR-P radar and relocates to European site**
- **C2BMC: New command suites at EUCOM and CENTCOM**
- **STSS: Delays Block 12 – Now STSS Follow-on (First Launch 2016-17)**
- **Israeli Cooperation: Funds SRBM defense program (David's Sling)**
- **Advanced Technology: Cancels High Altitude Airship and Micro Satellites**

Baseline Development Program

Airborne Laser

- Over 70 successful laser firings
- Atmospheric compensation and tracking test against target, Summer 2007
- Lethal shootdown 2009

Kinetic Energy Booster

- Successful 1st and 2nd stage static fire
- Booster flight test in 2008
- Operational avail 2014

Multiple Kill Vehicle

- Land- and sea-based volume kill capability
- Flight test in 2013
- Initial capability in 2017

SM-3 Block IIA 21" Interceptor

- Agreement with Japan signed June 2006
- First flight 2014
- Operational avail 2015

Space Tracking and Surveillance System

- Launch 2 demonstration satellites in 2007
- First launch of operational satellite 2016-2018

Sea-Based Terminal

- Far-term program definition in work

Knowledge Points Drive Development Progress

Rationale For Development Of Long-Range Defenses

- **Currently no defenses in European theater to engage intermediate- to long-range ballistic missiles launched from Iran**
- **Mobile sea-based and transportable ground-based missile defenses available today to engage slower, more numerous shorter-range ballistic missiles**
- **The speed and geographic span of a longer-range ballistic missile makes it considerably more difficult to engage**
- **Lead times for long-range missile defense development are significant**

Elements Of A European Long Range Defense

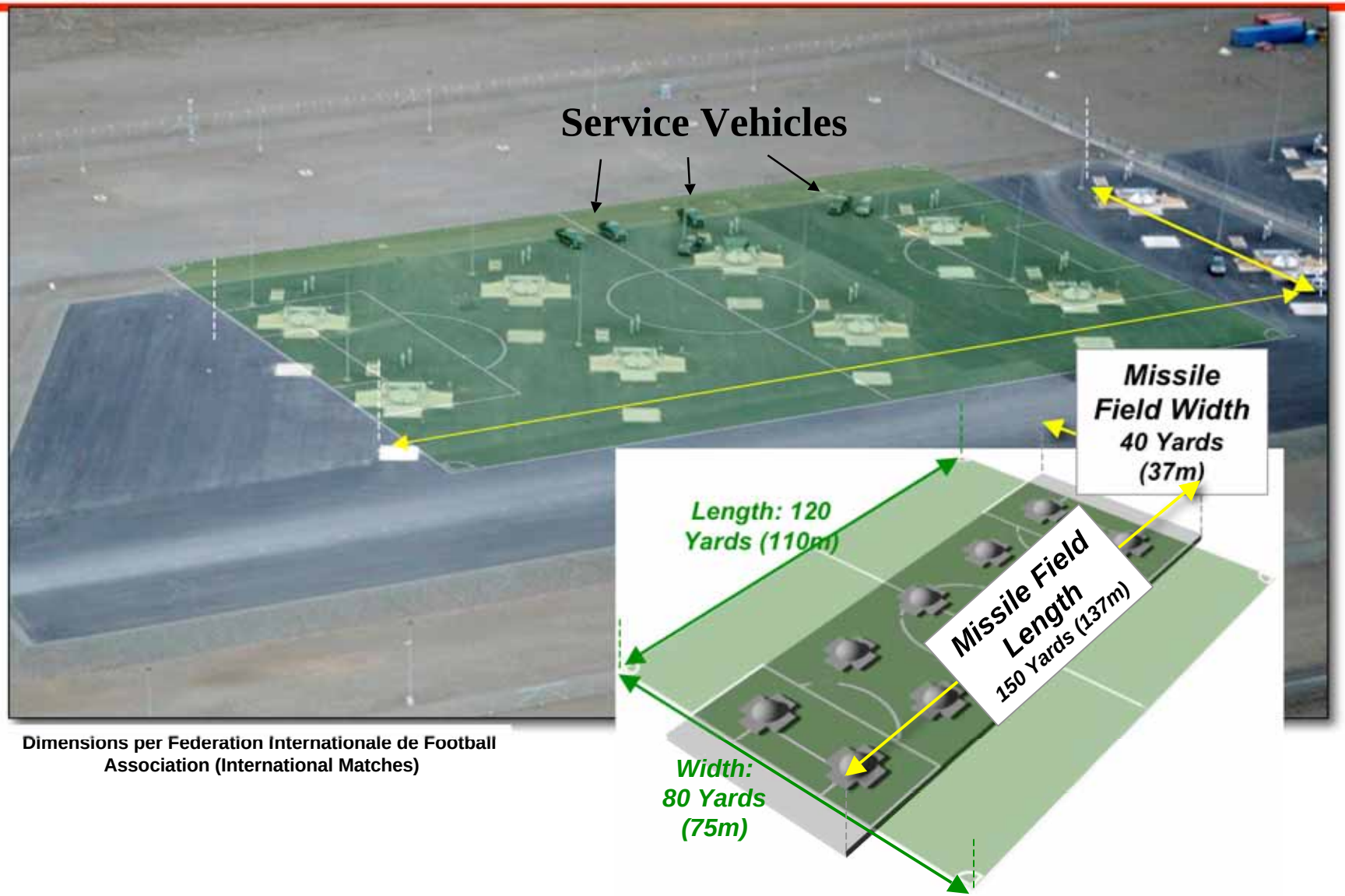
- **Silo-based long range interceptors located in Eastern Europe ≈ up to 10 (2011-2013)**
  - **$2,409M**

- **Re-location of a narrow-beam, midcourse tracking radar currently used in our Pacific test range to central Europe (2011)**
  - **$551M**

- **Field an acquisition radar focused on the Iranian threat placed in a forward position to provide detection, cueing, and tracking information (2010-2011)**
  - **$483.5M**

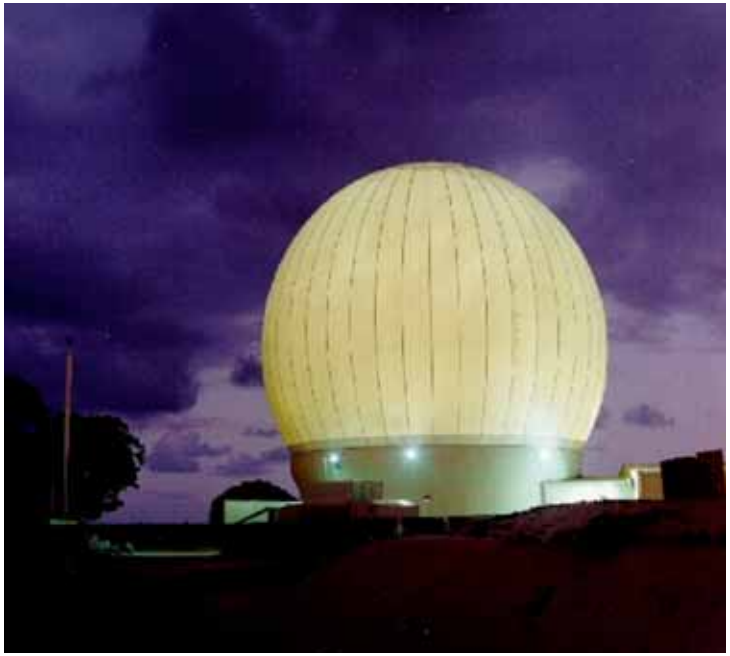
Future European Missile Site

Size Comparison

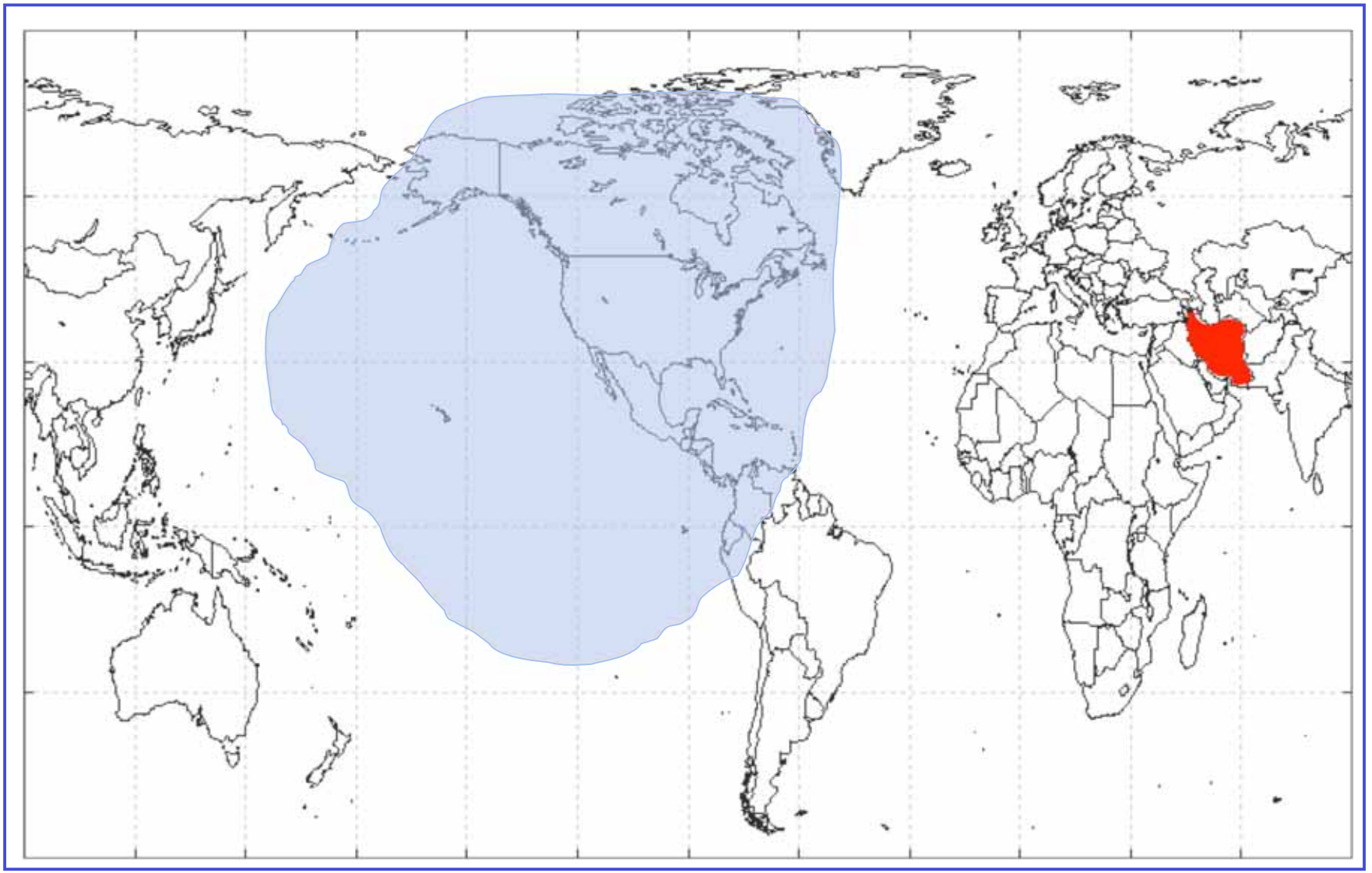


Dimensions per Federation Internationale de Football Association (International Matches)

European Midcourse Radar

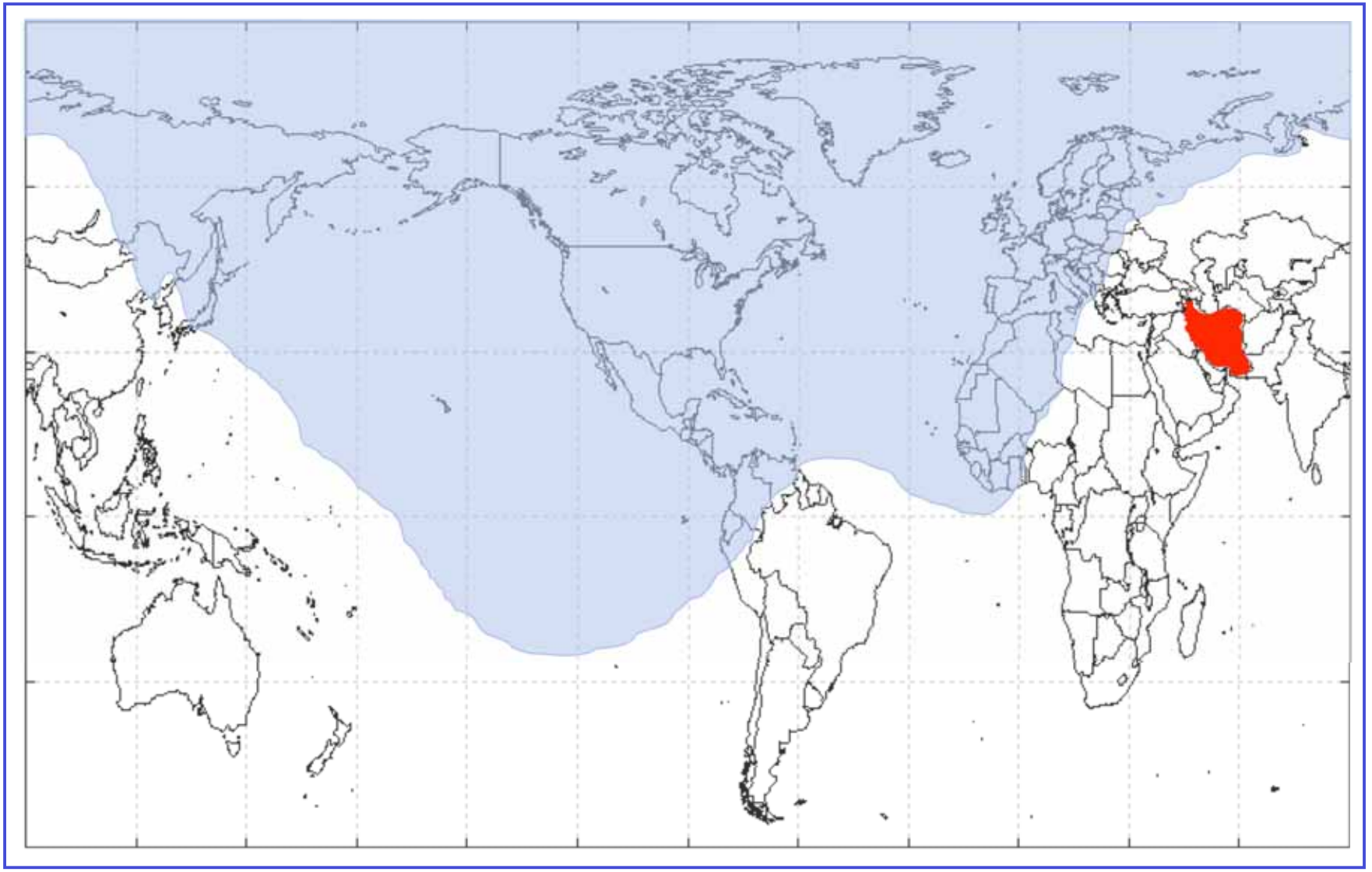


Capability Provided Versus Iranian Ballistic Missile
Block 2010 Without European Elements



Capability Provided Versus Iranian Ballistic Missile

Baseline Block 2008 + Interceptor Field (Poland) + Midcourse Radar (Czech Republic) + Forward-Based Radar



International Activity Highlights

Framework Partners

Japan: Forward-based X-Band radar siting, 21" Missile Development

UK: Fylingdales UEWR, lethality studies system-level analyses, advanced technology programs, target development

Australia: Science and technology cooperation

Denmark: Upgrade Thule Early Warning Radar, Technology Discussions

Italy: Framework MOU near completion, MEADS partner, architecture analysis study

Continuing Activity

Israel: Arrow Deployed, Arrow System Improvement Program

Germany: MEADS Partner, Laser Cross-Link Technology

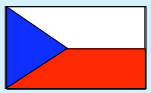
Netherlands: PAC-3, Trilateral Frigate Program Maritime Cooperation

NATO: Active Layered Theater BMD – System Engineering and Integration

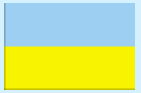
New Relations / Emphasis

Spain: U.S. -Spain Missile Defense Technical Group established

Poland: Missile Defense Consultations and Workshops; expressed interest in hosting missile site



Czech Republic: Missile Defense Consultations; expressed interest in hosting midcourse radar



Ukraine: Exploring possible cooperative projects

India: Missile Defense Discussions and Workshops ongoing

Russia: Theater Missile Defense Exercise Program

France: Exploring interest

Summary

- **Major progress towards meeting Presidential Direction**
- **Capabilities are in the warfighters' arsenal while concurrently supporting further development efforts**
- **We will build on the current system to close performance gaps and improve its capabilities over time**
- **European missile defense deployments will help defend the United States, allies and friends against the growing threat from Iran**


MISSILE DEFENSE AGENCY
DEPARTMENT OF DEFENSE