Homeland Defense

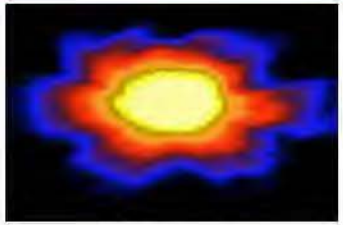
To: 2014 Space And Missile Defense Conference

By: VADM J. D. Syring, USN
Director
Missile Defense Agency
August 13, 2014

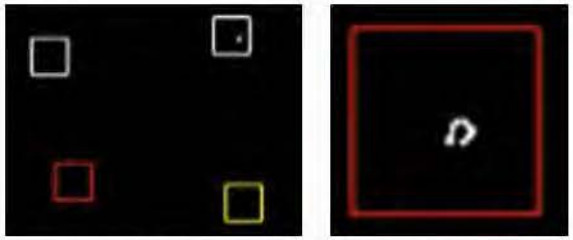
FTG-06b Video

FTG-06b Mission Overview

– Successful Intercept –

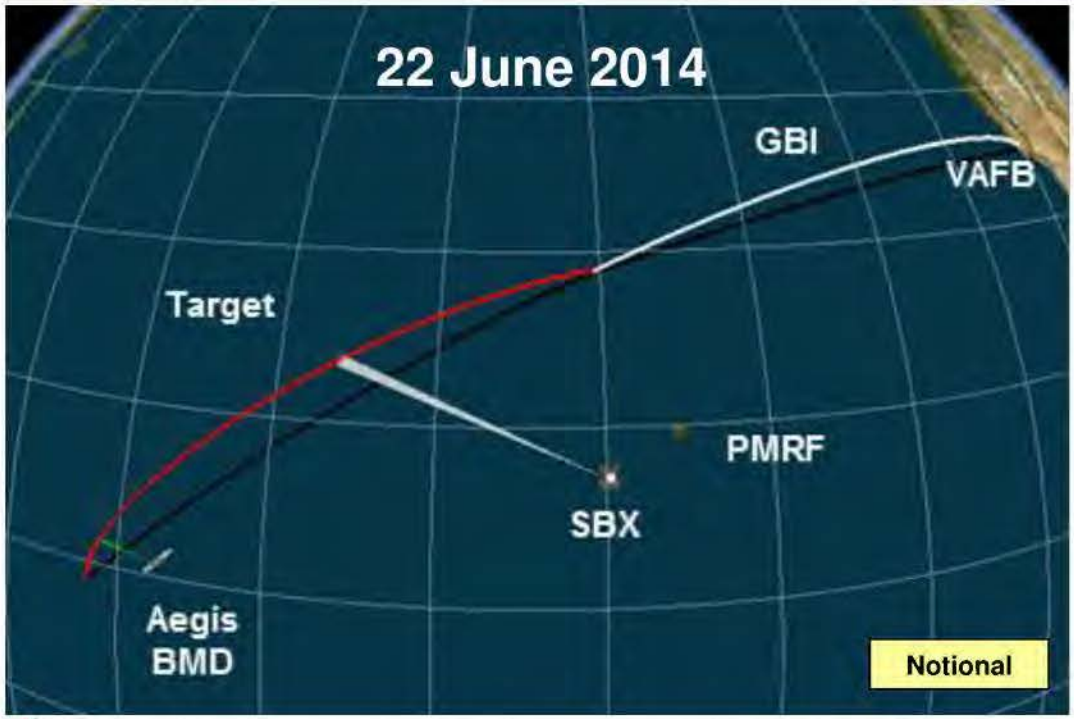


Intercept



Exo-atmospheric Kill Vehicle Target Scene

GBI Launch from Vandenberg AFB



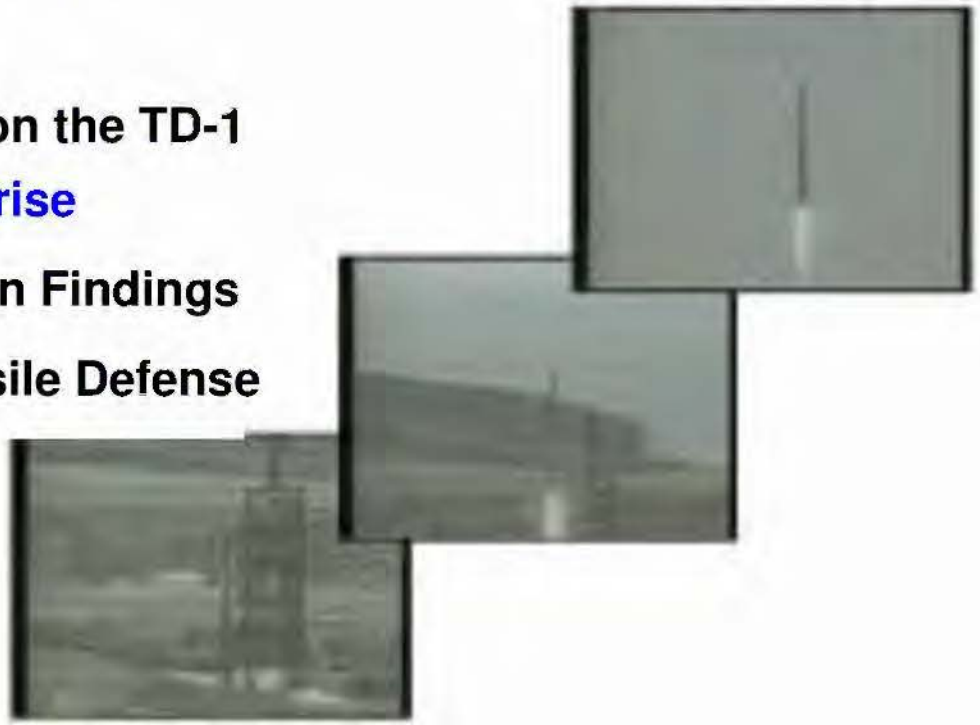
- ✓ Capability Enhancement-II , Exo-atmospheric Kill Vehicle Intercepted a long-range target
- ✓ USS Hopper (Aegis BMD ship) acquired the target and sent track data to the Command, Control, Battle Management, and Communications (C2BMC) system
- ✓ C2BMC forwarded Aegis BMD track data to GMD Fire Control
- ✓ Sea-Based X-band Radar provided track data on the target complex to the GFC

Agenda

- Program history
- Ground-based Midcourse Defense program achievements
- Testing
- Vision for the future
- Criticisms and responses

North Korea Taepo Dong-1 Launch
31 August 1998

- TD-1 SLV launch demonstrated key technologies needed to develop an ICBM
  - Stage separation
  - A 3-stage SLV could deliver light payload to the United States
  - 3rd stage failed to place a satellite in orbit
- 3rd stage was unanticipated
- US Intelligence had been reporting on the TD-1
  - Timing of the launch was a surprise
- Affirmed 1998 Rumsfeld Commission Findings
- Led to revitalization of National Missile Defense program



Taepo Dong 1 Launch
Source: North Korean television, 31 August 1998

Sources: OSD, Proliferation: Threat and Response, 1996, 2001
NASIC, Ballistic and Cruise Missile Threat, 2000

Recent Ballistic Missile Developments

"If the US imperialists threaten our sovereignty and survival… our troops will fire our nuclear-armed rockets at the White House and the Pentagon, the sources of all evil,"

--North Korean Vice Marshal Hwang Pyong-So, 28 July 2014

"Persistent spoilers. One of them is North Korea. North Korea fired off another missile, another ballistic missile today. North Korea is -- has been in the process of firing off these missiles, been in the media, and they are essentially desensitizing us because they want to know or they want us to know that they have this capability. But that is a -- that is clearly a spoiler."

-- LTG Michael Flynn, Director, DIA

Iran claimed … to have test fired two homemade missiles, including "a laser-guided surface-to-surface and air-to-surface missile and a new generation of long-range ballistic missiles carrying Multiple Reentry Vehicle payloads," according to Fars.

--http://missilethreat.com/iran-ballistic-missile-test-a-firm-response-to-u-s/

SUMMARY OF BALLISTIC MISSILE DEFENSE RDT&E PROGRAM

- Aggressive RDT&E Program
  - Without Commitment To A Single Architecture
  - With No Procurement Until Ready
  - Employs Parallel Risk Reduction Paths To Mitigate Potential Cost/Schedule/Performance Problems
  - Capabilities Based Vs. Requirements Based
  - Robust Testing
- Multilayer, Multi-faceted Development Program
  - Protect U.S., Allies, Friends And Deployed Forces
  - Managed As One System
  - Explores Air, Sea, Ground and Space Concepts
  - Designed To Intercept Any Range Of Threat
  - Designed To Intercept Threat In Boost, Midcourse, Terminal Phase
- Structured To Permit Test Asset For Operational Use On An Interim Basis, If Directed

DIRECTION TO THE MISSILE DEFENSE AGENCY

- Rapidly Capitalize On Promising Concepts And Promptly Adjust Program Priorities By Ensuring Rapid Decision Making Cycle Times
- Streamline Executive Oversight And Executive Reporting Requirements
- Management Of BMDS Elements in Three Phases (Development, Transition, Procurement and Operations)
- Single Development Program For All Work
- Improve BMDS System Through Incremental Improvements
- Ensure International Cooperation Remains Key Long-term Component
- Tailor DoD Planning, Programming And Budget System To Be Consistent With New SECDEF Direction

National Security Presidential Directive-23 – 16 DEC 2002

"... 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 capabilities later."

"... will not have a final, fixed missile defense architecture…Rather, we will deploy…initial capabilities that will evolve…2004 and 2005 will include ground-based interceptors, sea-based interceptors, additional Patriot (PAC-3) units, and sensors on land, at sea and in space."

"... Missile defense cooperation will be a feature of U.S. relations with close, long-standing allies… protecting not only the United States and our deployed forces, but also friends and allies;…"

"Recognizing the evolutionary nature of our missile defense program, the Secretary of Defense, as appropriate, shall update me and propose changes."

GMD Program History
1990-2002

Strategic Defense Initiative Organization | Ballistic Missile Defense Organization (BMDO) 1993 | MDA 2002

ABM Treaty Withdrawal — Dec 2001

Boeing Booster Vehicle

Boeing Booster Program (thru June 2002)

Alt Booster Program (2001)

Dual Booster Program

EKV Technology Development (LEAP)

EKV Down-select

LMMS BV+

Orbital Boost Vehicle

1990

2002

IFT-1a Jun 1997 CE-0	IFT-2 Jan 1998 CE-0	IFT-3 Oct 1999 CE-0	IFT-4 Jan 2000 CE-0	IFT-5 Jul 2000 CE-0	IFT-6 Jul 2001 CE-0	IFT-7 Dec 2001 CE-0
						
EKV Performance	EKV Performance	Intercept Test	Intercept Test	Intercept Test	Intercept Test	Intercept Test
			X	X		
Successful Fly-by	Successful Fly-by	Successful Intercept	Coolant Blockage in EKV	Booster Avionics Package Failure	Successful Intercept	Successful Intercept

GMD Program History 2002-2004

Eareckson, AS

Cobra Dane

DSCS

IFICS Data Terminal

Across the US

GMD Communication Network

President Bush announced intent to deploy initial system NSPD-23 December 2002

Ft. Greely, AK

LDC-1 thru LDC 5 Jul – Sep 2004

IFICS Data Terminal

DSCS

GFC Node

Colorado Springs

GFC Node (Schriever AFB)

Remote Workstations (Cheyenne Mtn)

Pacific Ocean

Regional Joint Range Extension

Aegis BMD AN/SPY-1 Radar

Buckley AFB

DSP

Vandenberg AFB

Launch Facilities LF-02, LF-03

Limited Defensive Capability Achieved 30 SEP 04

2002

2004

IFT-8
Mar 2002
CE-0

Intercept Test

Successful Intercept

IFT-9
Oct 2002
CE-0

Intercept Test

Successful Intercept

Five consecutive successful CE-0 Intercept Tests

IFT-10
Dec 2002
CE-0

Intercept Test

X

Failure in Laser Firing Unit

IFT-13B
Jan 2004
MMU+

Booster characterization Test

Successful Simulated Intercept

GMD Program History 2004-2007

LDC-6 FGA Nov 2004

LDC-7 & 8 VAFB Dec 2004

Beale UEWR

SBX Platform and Payload Integration April 2005

AN/TPY-2 ESG Integration

LM BV+ Program Terminated Nov 06

GCN Expansion to UK

FGA IDT-2 Dec 06

Fylingdales, UK

Sea-Based X-Band Radar

21 GBI's at FGA

3 GBI's at VAFB

October 2004 — **September 2007**

IFT-13C Dec 2004 CE-0+

Intercept Test

X

Software Error

IFT-14 Feb 2005 CE-0+

Intercept Test

X

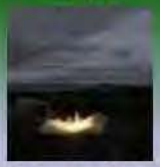
Silo Support Arm Failure

Independent Review Team Established To Review GMD Flight Test Failures

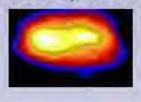
FT-1 Dec 2005 CE-I

Successful Demonstration Flight

FTG-02 Sep 2006 CE-I



Intercept Test



Successful Intercept

FTX-02 Mar 2007

Successful Simulated Engagement

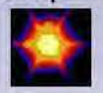
FTG-03 May2007

NO TEST

Target Failed to reach sufficient altitude

FTG-03a Sep 2007 CE-I

Intercept Test



Successful Intercept

GMD Program History 2007-2012

VAFB IDT-2
Jul 08

MF3
Sep 08

VAFB LF-24
Nov 08

BMDR /
PPD-10
2010-11

VAFB

FGA 2nd GFC
Node
Mar 12

Ft Greely
Power Plant
Sep 12

European Interceptor
Site Planned Start
1QFY08

European Midcourse
Radar Planned Start
4QFY08

GM European
Component canceled to
support MDA PAA
1Q10

26 GBIs
at FGA
Sep 10

Missile Field 2
Apr 12

October 2007 **September 2012**

FTG-05
Dec 08
CE-I

Intercept Test

Successful
Intercept

FTG-06
Jan 10
CE-II

Intercept Test

X

DACS Lockwire
missing and SBX
stopped radiating

FTG-06a
Dec10
CE-II

Intercept Test

X

High Frequency
Vibrations caused
Track Gate Anomaly

Return To
Intercept
Initiated

GMD Program History
2013-Today

Add 14 Ground-based Interceptors at Fort Greely

Refurbish Missile Field 1 Harden 6 Silos

Upgraded Inertial Measurement Unit (IMU)

New Servers and Improved Software Capability

Booster Avionics Upgrades

Ft. Drum IFICS Data Terminal (IDT) Construction

2nd AN/TPY-2 Radar, Japan (end 2014)

2013

SECDEF Announcement March 2013

2014

Present

CTV-01
Jan 2013
CE-II

EKV Characterization Test

Successful Flight Test

FTG-07
Jul 2013
CE-I

Intercept Test

X

EKV battery

FTG-06b
Jun 2014
CE-II

Intercept Test

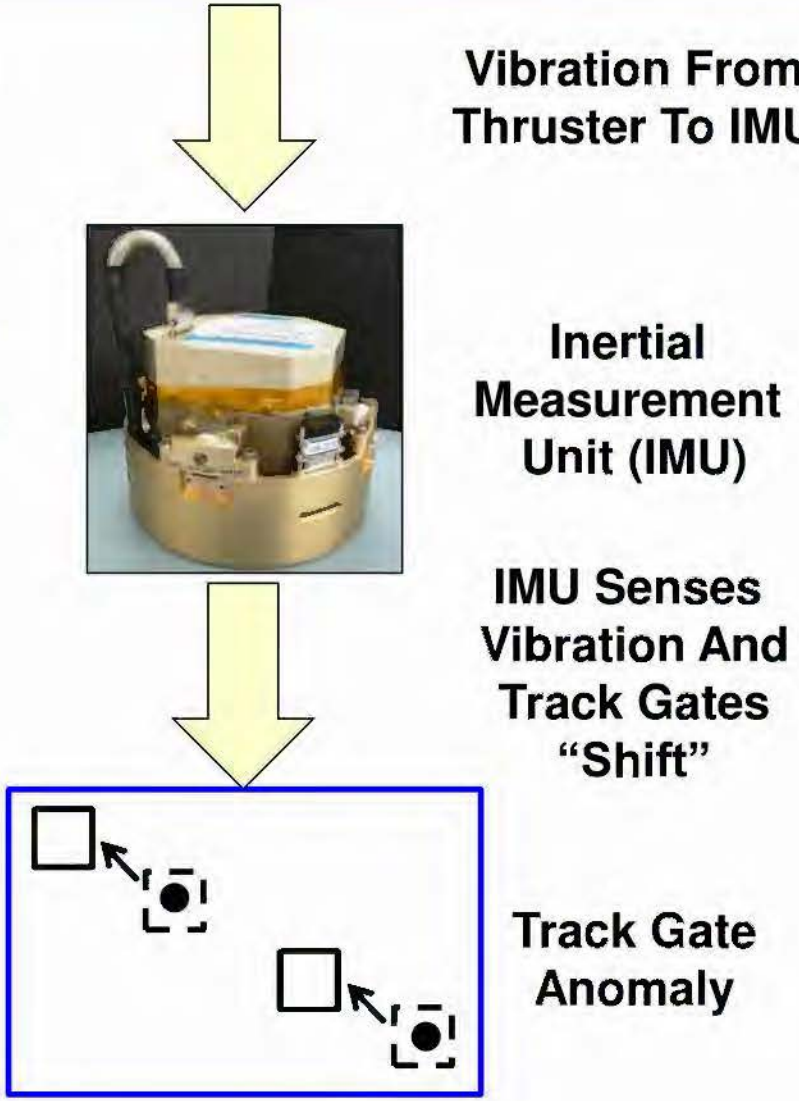
Successful Intercept

GMD Flight Test Failures

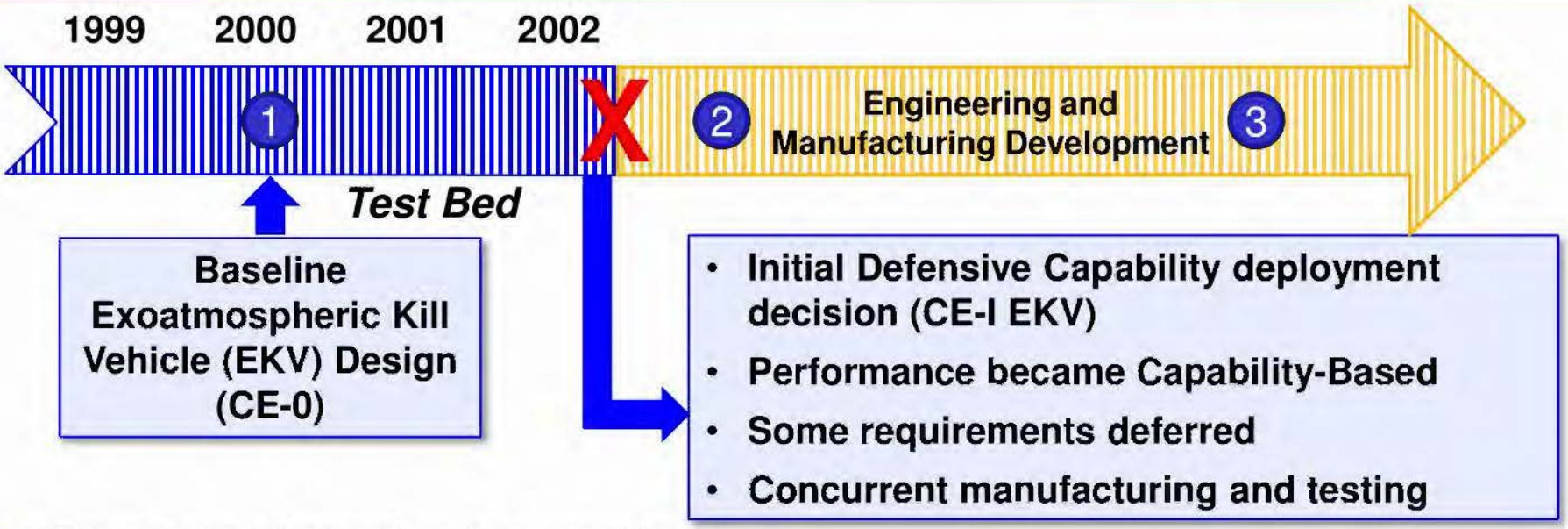
Flight Test	Date	EKV	Failure	Cause
IFT-4	JAN 2000	CE-0	Seeker Anomaly	Coolant blockage
IFT-5	JUL 2000	CE-0	No booster/EKV separation	Surrogate booster data bus failure
IFT-10	DEC 2002	CE-0	No booster/EKV separation	Failure in Laser Firing Unit
IFT-13c	DEC 2004	CE-0+	GBI Aborted Launch	OBV booster BIT failure (software error)
IFT-14	FEB 2005	CE-0+	GBI Aborted Launch	Rusted release arm
FTG-06	JAN 2010	CE-II	Guidance error	Missing DACS lockwire and SBX stopped providing data earlier than planned
FTG-06a	DEC 2010	CE-II	Guidance error	High frequency vibrations caused track gate anomaly
FTG-07	JUL 2013	CE-I	No booster/EKV separation	EKV battery

Track Gate Anomaly (TGA)

- Track Gate Anomaly (Pointing Error) Has Been A Long Historical Issue
  - First observed in 2001 during IFT-6
  - Observed in 8 flight tests over 9 years
- Complex Issue, Difficult to Diagnose and Correct
  - Initial Assessment from 2001 to 2005 - Caused by electromagnetic interference (EMI)
  - Updated Assessment from 2005 to 2014 – Caused by vibrations and IMU sensitivity
- Corrective Actions Implemented Over Time
  - Multiple iterations of software mitigations
  - IMU mounting modification
  - Additional instrumentation
  - Grounding cable changes
  - Divert live fire testing
  - IMU vibration testing
  - Updated IMU firmware
  - Added isolation cradle around IMU
- Resolution successfully demonstrated in FTG-06b



Ground-Based Interceptor Engineering Timeline



1 CE-0 to Test Bed (Manufacturing transition)

Test Bed – Significant change from laboratory build to manufacturing facility – welded lines, EU, IMU, and sensor producibility, improved discrimination algorithms, global shielding, new battery, new communications link frequency

2 Test Bed to CE-I (Connector Obsolescence)

CE-I – minor obsolescence modification when new lot of 15 interceptors placed on contract

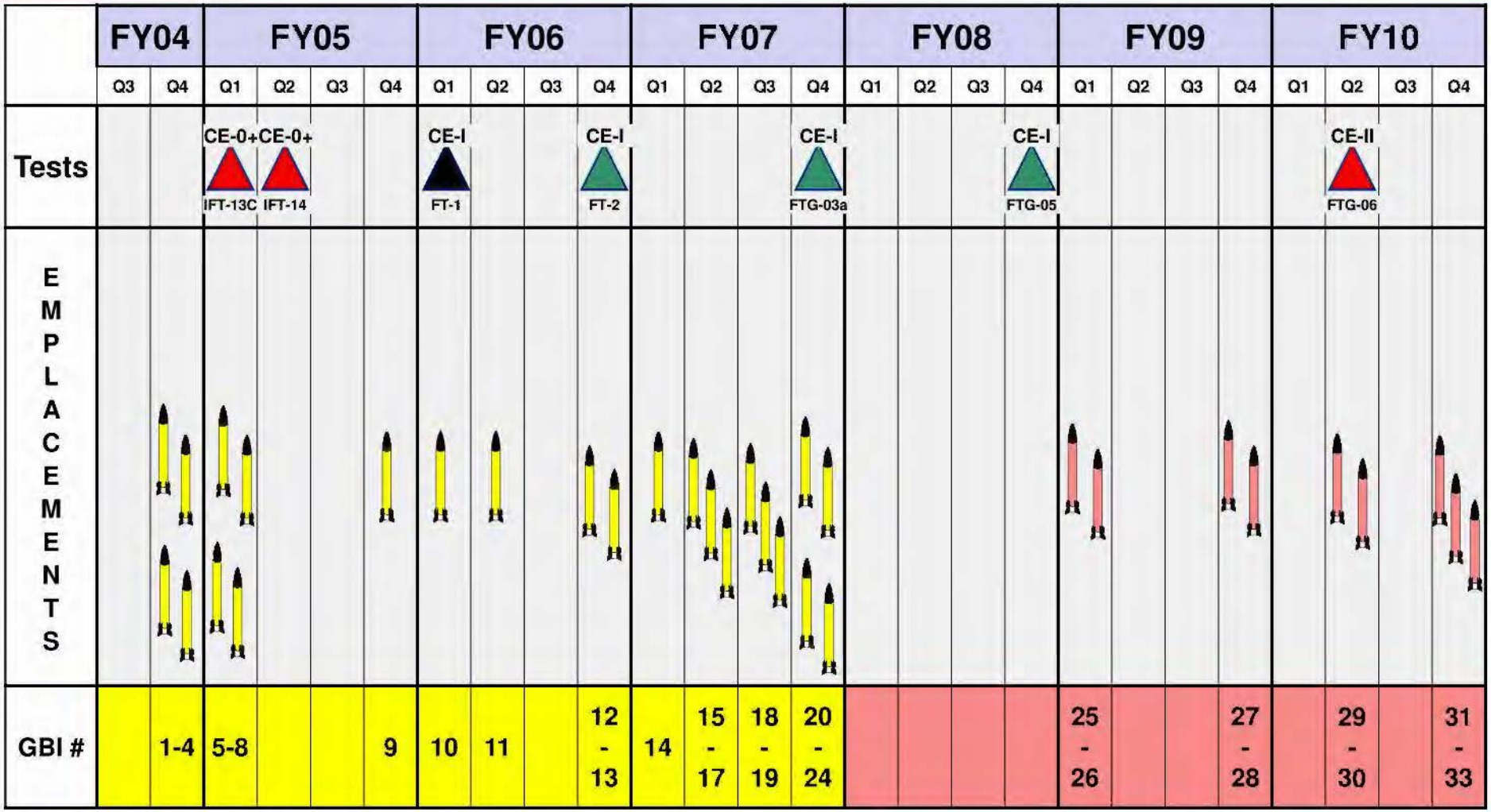
3 CE-I to CE-II (Processor Obsolescence)

CE-II – processor obsolescence addressed when new lot of 10 interceptors placed on contract; increases number of objects EKV can track; minor algorithm performance improvements

GMD Program Timeline

	NSPD 23	MRTF Charter	Affordability	Presidential Mandate	RTI	SECDEF Mandate
		Drivers for Change X IFT-13c Failure X IFT-14 Failure			*Drivers for Change* X FTG-06 Failure X FTG-06a Failure X FTG-07 Failure	
	Test Bed FY02-04	Mission Readiness Task Force (MRTF) FY05-06	Major Program Adjustments FY06-08	30 GBIs FY09	Return to Intercept (RTI) FY10-14	44 GBIs FY13-17
Priorities	• Test Bed Construction • Build, Test, And Verify Initial Defensive Capability • Place BMDS On Alert • Execute Concurrent Testing And Defensive Operations • Continue Development To Incrementally Improve Capability	• Demonstrate Increased Confidence in Capabilities and Increase Test Realism - Reduce Booster Risk - Conduct Flight Tests to Verify, Not to Discover - Conduct the Next Flight Mission As Soon As Practical Within Acceptable Risk Bounds	• Missile Defense Plan II Added To Block 2006 - 10 Additional Silos And GBIs At Ft. Greely - 10 GBIs At Third Missile Site - 2-Stage variant for 3rd Site - Midcourse Radar in Czech Republic - Upgrade Thule EWR	• Refocus program to prioritize verifying capability & improving confidence in the fielded System through operationally realistic testing - Field 30 operational GBIs • Expand the BMDS capability with the development of EPAA • PPD-10 (2011)	• FTG-06a Failure Resolutions with Successful CTV-01 and FTG-06b to Support Manufacturing Restart • GBI reliability improvement • Missile Field 2 completion • DSC award and transition	• Increase operational fleet of Ground Based Interceptors (GBIs) from 30 to 44 in 2017 • Missile Field 1 Refurbishment • Interceptor Reliability Enhancements • Plan for 14 additional GBIs

GBI Fleet Deployment History



CE-I CE-II

Non Intercept Test

Successful Intercept Test

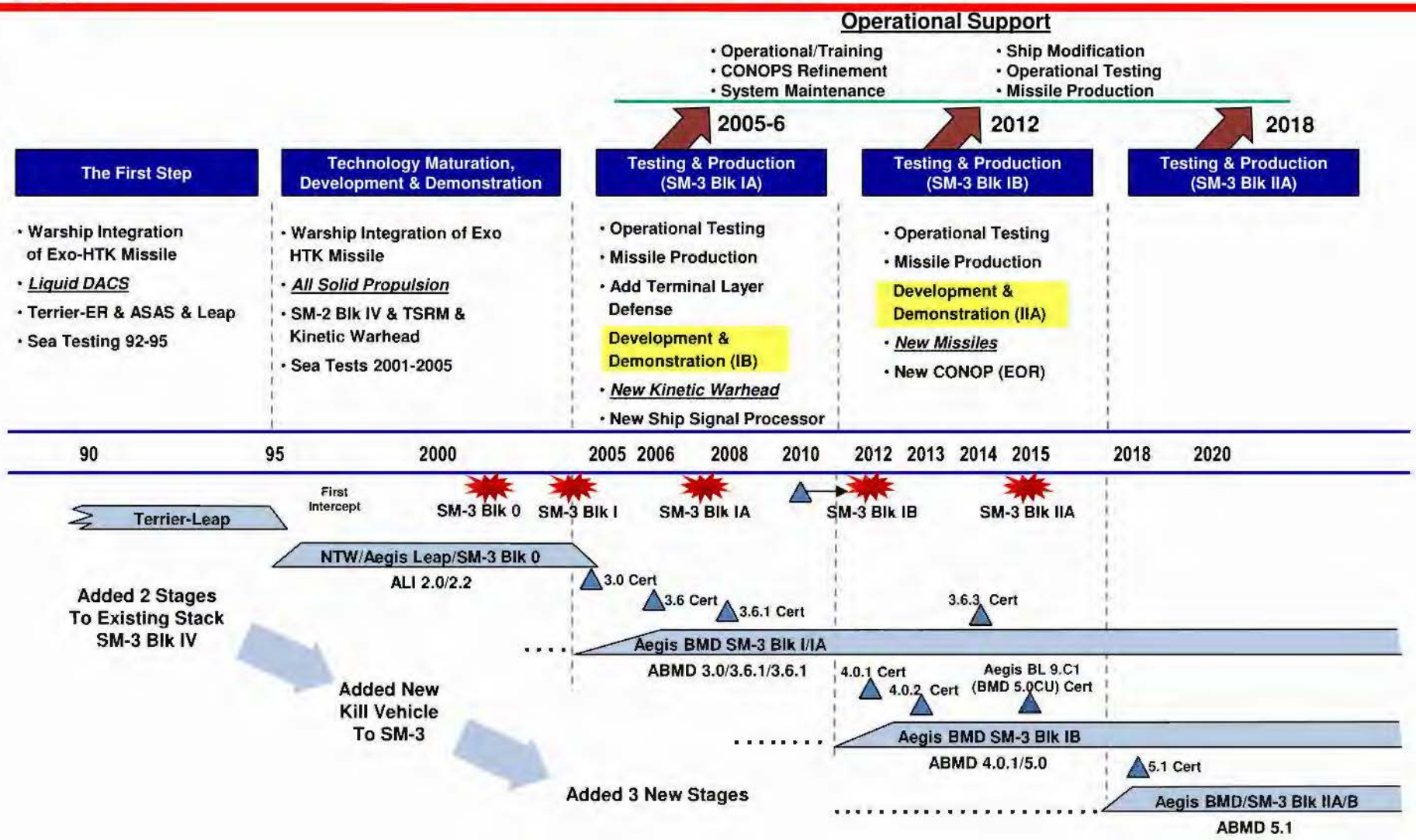
Failed Intercept Test

Ground-Based Midcourse Defense Fielding

GMD Subsystem	Initial Defensive Operations 2004	Today's Capability	Future Capability
Interceptor Fleet	• CE-I GBI	• 30 CE-I and CE-II GBIs	• 44 CE-I, CE-II & CE-II Block 1 GBIs (2017)
Missile Fields	• Ft Greely Alaska (FGA) Missile Field (MF) 1 – 6 silos • Vandenberg AFB (VAFB) – 2 silos	• FGA MF 2 – 14 silos • FGA MF 3 – 20 silos • VAFB – 4 silos	• FGA MF 1 Upgrade – 6 silos • FGA MF 2 – 14 silos • FGA MF 3 – 20 silos • VAFB – 4 silos
GMD Fire Control and Launch Support Systems	• GMD Fire Control (GFC) • Command Launch Equipment (CLE) • Launch Support Equipment (LSE)	• GFC nodes at Colorado Springs (COS) for planning • Fire Direction Centers (FDC) at FGA for execution • Training centers at COS and FGA • CLE at VAFB and FGA	• CLE / GFC Rearchitecture (2017) • LSE Upgrade (2020)
IFICS Data Terminals (IDTs)	• Test Bed IDTs at FGA and VAFB	• Operational and Test IDTs at FGA, VAFB, and Eareckson Air Station	• Fort Drum, NY IDT (2015) • Technical Refresh (2017)
Ground Systems Software	• Initial Capability	• Fielded 6B.1.5 in 2009 – Enabled two TPY-2 radars	• Discrimination Improvements for HD (2016)
Sensors	• Defense Support Program • Cobra Dane • UEWR Beale • Aegis SPY-1 Radar	• TPY-2 Radar Japan - 2006 • SBX – 2008 • Fylingdales UEWR – 2010 • Thule UEWR – 2011 • 2nd TPY-2 Japan – 2014 (Dec)	• Clear UEWR (2016) • Cape Cod UEWR (2017) • LRDR (2020)

Aegis BMD Development

– Historical Timeline –

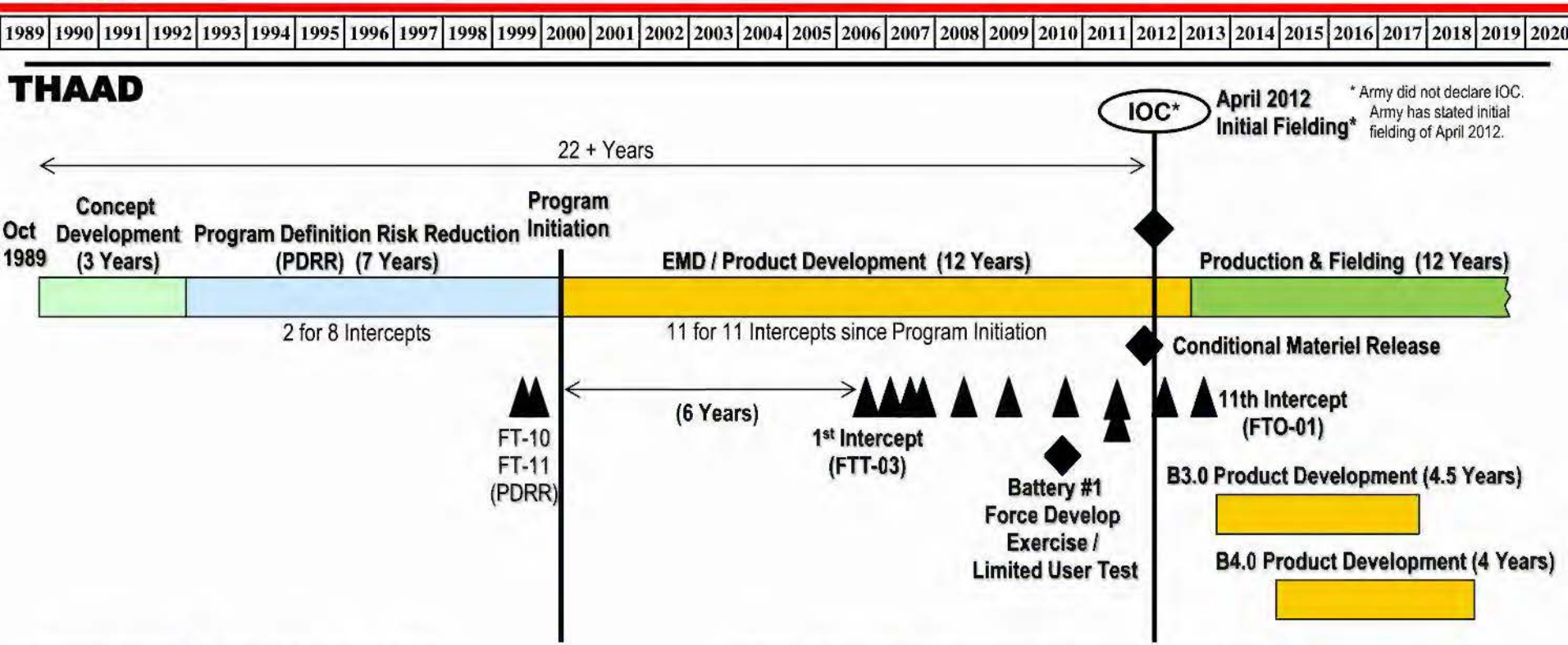


Build a Little, Test a Little, Learn a Lot

Aegis BMD Flight Test Failures

Flight Test	Date	Missile	Failure Description	Root Cause
Flight Mission 5 (FM 5)	JUN 2003	SM-3 Blk 0	SDACS Divert and Attitude Control Failure	Cracked ball in the Attitude Control Assembly causing loss of Kinetic Warhead control
Flight Test Standard Missile 11 (FTM-11)	DEC 2006	No SM-3 fired	Missile did not fire because of incorrect system setting aboard the Aegis cruiser	Threat engagability settings modified prior to target launch and the system did not achieve engagability requirements, therefore did not fire the SM-3
Pacific Blitz	NOV 2008	SM-3 Blk I	Infra-Red (IR) Seeker Failure	Initial Deployment Rounds (IDR) had been assembled by Engineering Staff with variable layouts and staking of the IR Cryogenic Cooling System. The cooling gas leaked out of the cryogenic gas bottle
Japanese FTM-2 (JFTM-2)	NOV 2008	SM-3 Blk IA	SDACS Divert and Attitude Control Assemblies (ACA) Failure	DACS Malfunction
FTM-16 Event 2	SEP 2011	SM-3 Blk IB	Third Stage Rocket Motor (TSRM) pulse Failure	TSRM had a burn through of the rocket motor case during pulse 2 burn and impinged on the high pressure TSRM Attitude Control System (ACS) causing a rupture of the gas bottle
Flight Test Intercept 01 (FTI-01)	OCT 2012	SM-3 Blk IA	Inertial Measurement Unit (IMU) Failure	IMU memory chip error

THAAD Development Program Summary



Program Definition Risk Reduction

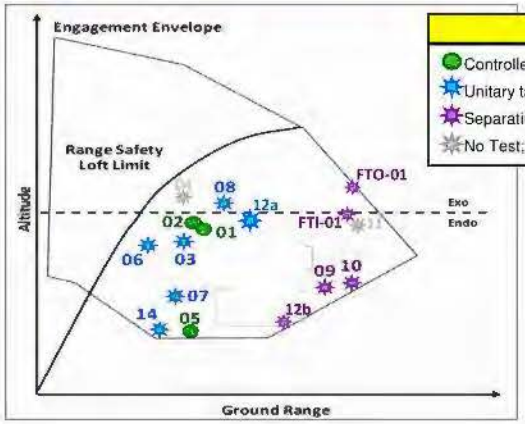
- Program Office Chartered 1992
- Critical Design Review 1993
- FT-1, FT-2, FT-3 Successful Non-Intercept missions (1995)
- FT-4 through FT-9 Failed to Intercept (1995-1999)
- FT-10 and FT-11 Successful Intercepts in June and August 1999 enabled a Milestone B decision in 2000

EMD / Product Development / Production Fielding

- Critical Design Review 2003
- First Manufacturing Contract 2006
- 1st/2nd Battery Activations 2008/2009
- Government Ground Testing (2yrs) 2008-2010
  - Safety, Mobility, Environments
- 1st Emergency Activation 2009
- Incremental Production Decisions 2010, 2012 & 2014
- Deployment to Guam 2013

THAAD Flight Test Incremental Growth

Capability Proven Through Flight Testing 11 for 11 Successful Intercepts



KEY
- Controlled Flight (No Target)
- Unitary target intercept
- Separating target intercept
- No Test; Target failure

FTT-01
22 Nov 05
WSMR

Interceptor Control Flight Test

FTT-02
11 May 06
WSMR

Integrated System Test Virtual Target

FTT-03
12 Jul 06
PMRF

Integrated Element Seeker Characterization Test

FTT-06
26 Jan 07
PMRF

High Endo Intercept of Unitary Target

FTT-07
5 Apr 07
PMRF

Mid Endo Intercept of Unitary Target

FTT-05
26 Jun 07
WSMR

Interceptor Low Endo Control Flight Test (No target)

FTT-08
26 Oct 07
PMRF

Exo Intercept of Unitary Target

FTT-09
25 Jun 08
PMRF

Mid Endo Intercept of Simple Separating Target

FTT-10A
17 Mar 09
PMRF

Intercept of Simple Separating Target

FTT-14
28 Jun 10
PMRF

Intercept of Unitary Liquid-Fueled Target

FTT-12 (IOT&E)
05 Oct 11
PMRF

Multiple Simultaneous Engagement (MSE) of MRT & FMA Target

FTI-01
25 Oct 12
RTS

BMDS Operational Regional / Theater Flight Test vs. MRBM & SRBMs

FTO-01
9 Sep13
RTS

BMDS Operational Regional / Theater Flight Test vs. MRBMs

On-going Capability Demonstration

FTT-18
4QFY15
Wake
Flight Test vs. IRBM

FTO-02 E2 (FTT-11a)
4QFY15
Wake
Flight Test vs. SRALT

FTT-15
2QFY17
RTS
Flight Test vs. ELRALT
- Endo engagement

Incremental Growth → Increased Complexity

PMRF – Pacific Missile Range Facility, HI
RTS – Reagan Test Site
WSMR – White Sands Missile Range, NM

Successful Intercept

GBI Evolution

EKV

CE-I

- Prototype Design
- "Hit-To-Kill" Demonstrated
- Fielded in Response to Imminent Threat

CE-II

- Obsolescence Upgrades
- Increased Processor Throughput
- Software Improvements
- Targeted Corrective Actions to Known Issues
- Minor Producibility Improvements

CE-II Block I

- Reliability Improvements:
  - Inertial Measurement Unit
  - Avionics
  - DACS Tanks
  - DACS Thrusters
  - Pulse Code Modulator Encoder
  - Communications Link Sub-system
  - Harness Reshaping

2004 → **2008** → **2016**

OBV

2004

C1 Heritage (3 Stg / 2 Stg)

- 3 Stage Booster (Fielded)
- Vehicle design and hardware components based on legacy Space Launch vehicles: Pegasus, Taurus, and Minotaur
- Proven design successfully verified in all Flight Tests
- 2 Stage Heritage design also developed and successfully flight tested in BVT-1

2016

C2 Design Upgrade (3 Stg)

- 3 Stage design upgrade based on original FAU/OP Program
- Improves reliability, addresses H/W obsolescence, and reduces risks
- Avionics upgrades to Flight Controller, Booster Controllers, IMU, TVCs, Batteries, and Flight S/W
- Compliant with MIL-STD-1901A Ignition Safety
- Enhanced Natural Environments
- Non-Tactical Equipment also upgraded for Flight Test vehicles

2020

C3 Evolution (2 Stg)

- 2 Stage Booster combines the 2 Stg C1 design and the 3 Stg C2 Upgrades
- Improves reliability, addresses H/W obsolescence, and reduces risks
- Provides flexibility for maximizing coverage with various basing options

Discrimination Improvements For Homeland Defense

- Discrimination Function
  - Determines which objects from a threat missile launch are ruled as lethal or not lethal
- Importance of Discrimination
  - Insufficient interceptor inventory to engage all lethal objects and non-lethal decoys
  - Cost-effectiveness requires the right balance between number of interceptors and discrimination capability
- Discrimination Plan
  - Near Term (2014-2015)
    - Update threat definitions in existing system components
    - Make better use of current sensors
  - Mid Term (2017-2020)
    - Use available technology to improve sensors, kill weapons, and battle management/fire control capabilities needed to better address countermeasures
  - Far Term (2021+)
    - Field new advanced sensors and upgrade discrimination capabilities made available by the technology development investments we are making now

Robust Homeland Defense (2020-2025 Timeframe)

Increased Inventory (44 by 2017)

C3 Ground Based Interceptor

- Redesigned EKV (REKV)
  - Focus on mature technology and component reuse
  - High priority on improved cost effectiveness, manufacturability, supportability, testability, and reliability

Notional

- Two Stage Booster
  - Producible, Reliable, Maintainable, Cost Effective
  - Integrates with REKV
  - Qualifies all hardware to Two Stage flight environments
  - New HW and SW design to address differences in 3 vs 2 stage flyout

Ground Systems Upgrades / Discrimination Improvements for Homeland Defense (DIHD) (2016 and 2019)

- Key DIHD Objectives
  - Updated threat databases
  - Use of data from all sources
  - KV use of on-board and off-board data
  - Improved discrimination
  - Salvo logic
- Ground Systems Upgrades
  - GFC CLE Re-architecture PH 2 (LSE)
  - On-Demand Comms
  - GCN Modernization
  - Technology Modernization
  - LRDR Infrastructure

[1]Long Range Discriminating Radar (LRDR) (2020)

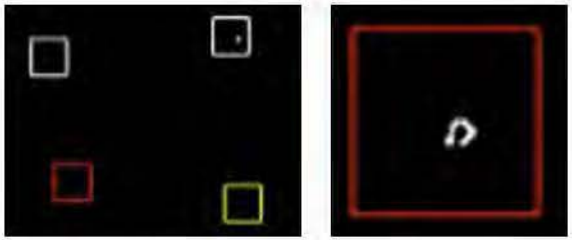
Homeland Defense Criticisms

MDA has not tested against an ICBM

- **FTG-06b involved a target missile that approached ICBM speeds and included countermeasures**
- **MDA test approach is to increase test complexity over time, using realistic scenarios**
- **Between now and 2024 there are 7 tests against ICBM targets with countermeasures – the first is planned for FY 2016**

Homeland Defense Criticisms

We have not demonstrated the capability to do target discrimination.



Exo-atmospheric Kill Vehicle Target Scene

- **FTG-06b demonstrated the ability to correctly discriminate and intercept the RV in the presence of operationally realistic countermeasures**
- **The failures to intercept in FTG-06a and FTG-07 were not associated with an inability to properly discriminate the most lethal object**
- **Early successful developmental intercept tests (1997 to 2002) included penetration aids (IFT-3, IFT-6, IFT-7, IFT-8, and IFT-9)**

Homeland Defense Criticisms

We can't do hit-to-kill

- **MDA has repeatedly proven hit-to-kill technology is technically possible**
- **Since 2001:**

System	Number of Test Attempts	Number of Hits
GMD	14	8
Aegis BMD	31	25
THAAD	11	11
PAC-3	25	21
TOTAL	81	65

≈ 80%

Homeland Defense Criticisms

The GMD tests are scripted for success

- **Our test philosophy is to add complexity and reduce the number of controls we place on our flight tests of an element as it matures**
- **We limit variables in our tests to**
  - **Derive lessons learned in areas of greatest interest**
  - **Ensure we follow safety and environmental regulations**

Summary

- The Nation has committed itself to the deployment and improvement of homeland defenses against a limited threat
  - We have come a long way since 2001 and Limited Defensive Operations in 2004
  - GMD element was a building block for the development of more robust capabilities in the future
  - Technical and fiscal challenges remain and are being addressed
- Increasing test complexity is central to the BMDS test approach
- Future homeland defenses will feature improved discrimination and hit assessment capabilities and greater warfighter capacity
- Despite progress, there are still many misconceptions about the BMDS