

# Development of a Hover Test Bed at the National Hover Test Facility



**Edwina Paisley**  
**Multiple Kill Vehicle**  
**Lockheed Martin Space Systems Company**

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# Agenda

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## *Multiple Kill Vehicle*

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# Program Description

## *Multiple Kill Vehicle*

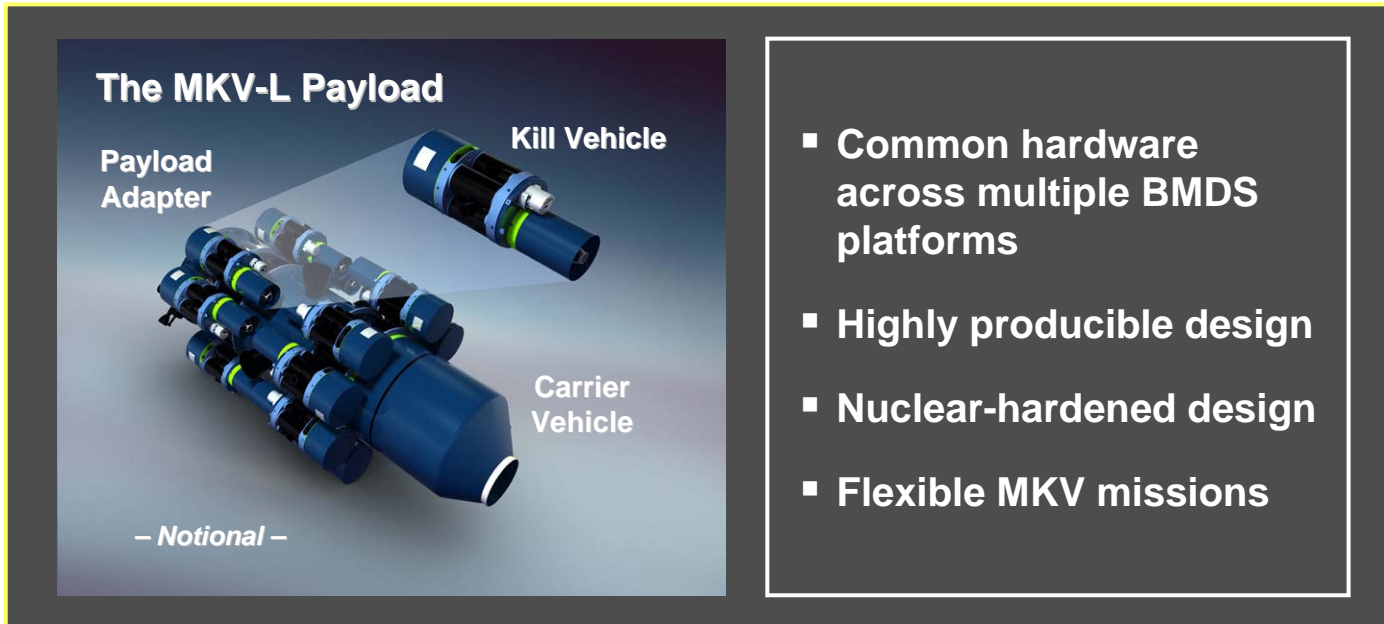
- **First payload designed to destroy multiple threat objects with a single interceptor**
  - **Lowest cost-per-kill solution for current and future threats**
  - **Destroys multiple credible objects – both lethal threats and countermeasures**
  - **Integrates into the BMDS architecture**
  - **Common to multiple basing platforms**
  - **Leverages extensive industrial base experience**

**The Multiple Kill Capability for Ballistic Missile Defense**



# Major segments: Carrier Vehicle, Kill Vehicle and Payload Adapter

*Multiple Kill Vehicle*



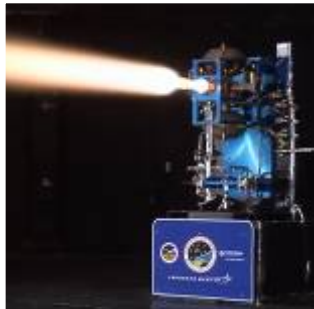
- **Carrier vehicle assesses the threat set, deploys and assigns kill vehicles, manages the engagement, and can act as a kill asset or observer**
- **Carrier vehicle and kill vehicles intercept lethal threat objects and credible countermeasures**
- **Payload adapter interfaces carrier vehicle with weapon systems**



# MKV-L Program Milestones

*Multiple Kill Vehicle*

- End-to-end simulation demonstration: December 2007
- Seeker captive carry key performance event #1: December 2007
  - Carrier vehicle hot fire test: August 2007
- Engagement management testbed demonstration: May 2008
- MKV-L divert thruster tests: July 2008



Carrier Vehicle Hot Fire Test



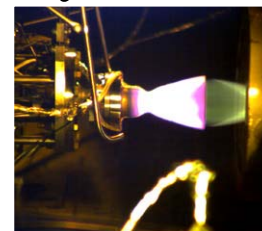
CV Divert Thrust Chambers



Kill Vehicle Hot Fire Test



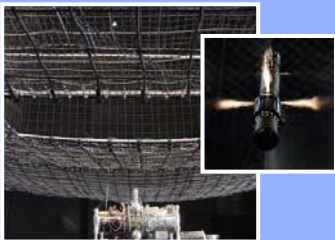
Kill Vehicle Divert Test



Divert Thruster Tests



Seeker Captive Carry Mirrors



National Hover Test Facility Hover Testbed

- Carrier vehicle telescope/focal plane integration: Summer 2008
- Hover test bed operational: Fall 2008
- Captive carry seeker test: Summer 2009



Captive Carry Test

***Multiple Kill Vehicle technologies maturing  
Successful hardware component testing and demonstrations***



# Hover Test Overview

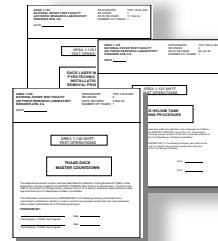
*Multiple Kill Vehicle*

- **Purpose:** The Hover Test Bed serves as a test asset for the Missile Defense Agency for static and hover tests of increasing size and complexity

## Hover Test Bed (HTB)



**National Hover Test Facility and Operational Safety Services**



**Plans, Procedures, & Repeatable Processes**



**Qualified and Trained Personnel**

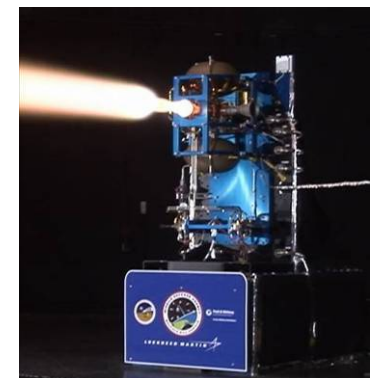


**Special Test Equipment (STE) and Ground Support Equipment (GSE)**

**MKV-L Hover Test Vehicle (HTV)  
October 2008**



**Carrier Vehicle DACS Static Hot Fire Test**



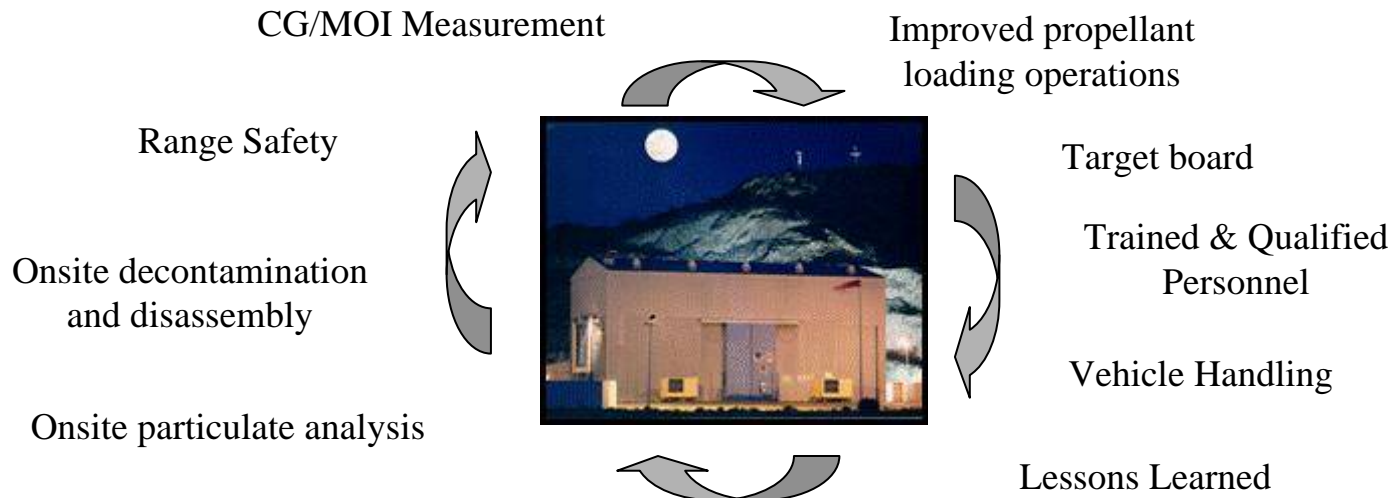
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# Reactivation of the National Hover Test Facility

*Multiple Kill Vehicle*

- **Developed as a test bed for missile defense kinetic energy weapons in 1988**
  - **Short-term deactivation between 2004 and 2006**
  - **Reactivated in January 2007 to support MKV-L Static DACS firing and other future MDA activities**
- **Existing capabilities enhanced and new capabilities added**
  - **Resources for end-to-end handling of test article**





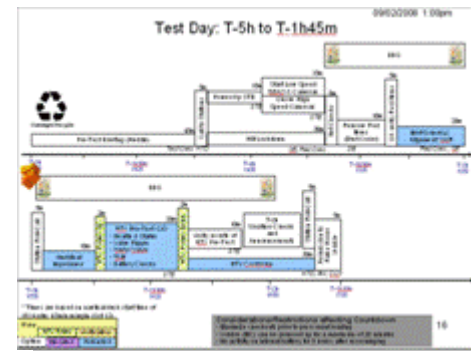


# Plans/Procedures/Processes

## Multiple Kill Vehicle

- Repeatable plans, processes, and procedures for future static and hover tests
- Standardized test bed interfaces facilitates contractor-supplied test or support equipment integration
  - Test articles accommodated in a “Plug-and-Play” environment

Test Item	Test Description	Test Method	Test Equipment	Test Location	Test Date	Test Status
1.1	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.2	Pre-flight/Post-flight	Static	Launcher	Wallops	10/10/07	Complete
1.3	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.4	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.5	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.6	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.7	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.8	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.9	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.10	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.11	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.12	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.13	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.14	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.15	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.16	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.17	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
1.18	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete
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1.20	Launch/Recovery	Static	Launcher	Wallops	10/10/07	Complete

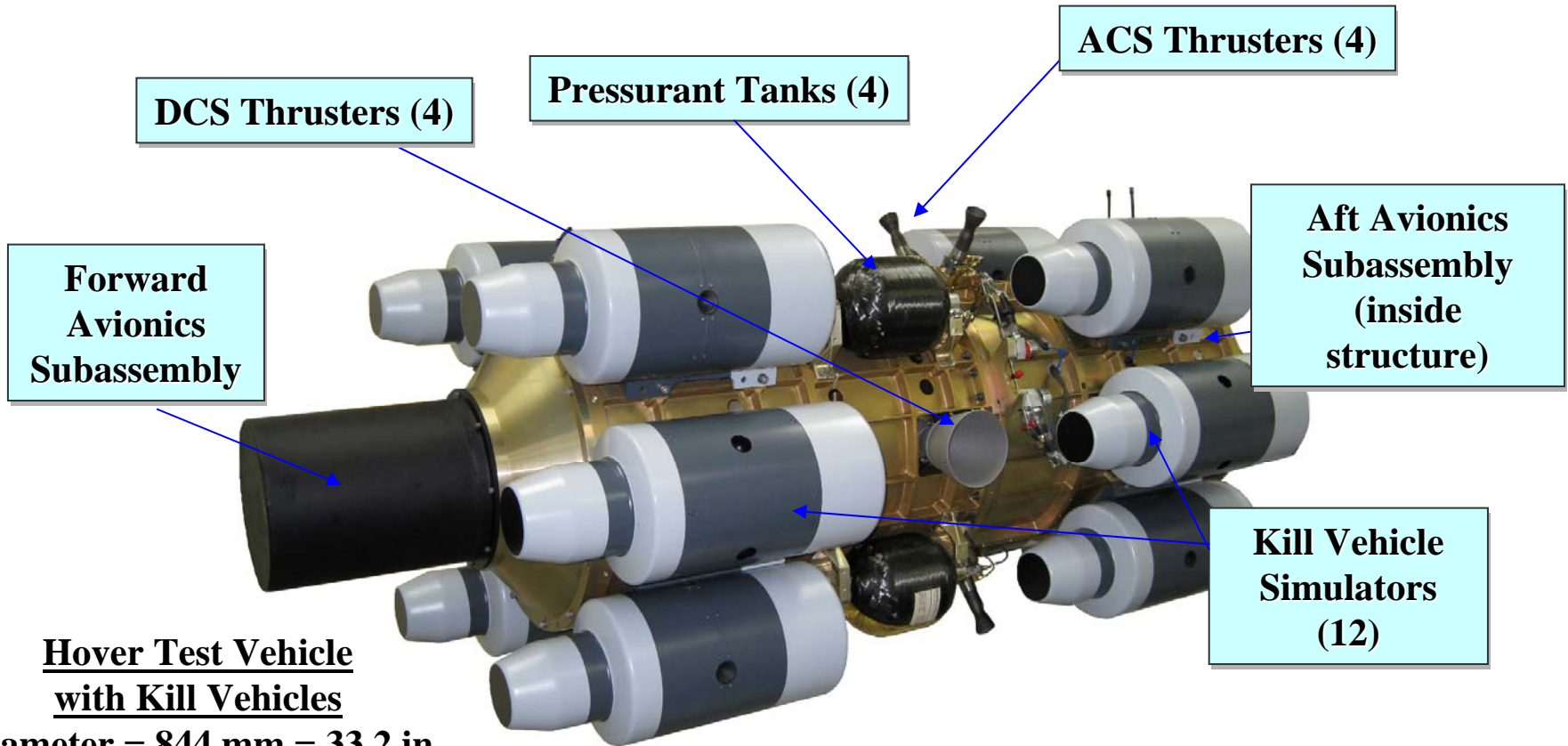


Repeatable processes help ensure Mission Success



# MKV-L Pathfinder-1 Overview

*Multiple Kill Vehicle*



Hover Test Vehicle  
with Kill Vehicles

Diameter = 844 mm = 33.2 in

Length = 1640 mm = 64.6 in

Mass = ~ 211.3Kg = 464.9 lb

**Validates the Capabilities of the Hover Test Bed**



# Demonstration and Validation of the HTB

*Multiple Kill Vehicle*

- Validation of the Hover Test Bed encompasses the lifecycle of a test article
  - Receipt and processing of test article through post-test decontamination and disassembly
- Define and implement standard facility interfaces
- Foster a continuous learning process incorporating all lessons learned to improve the testbed capability

Integration of Special Test Equipment and Ground Test Equipment

Propellant, Ordnance & Pressurant Operations

Test Telemetry Monitoring & Video Capture

Range Safety

Requirements/ Capabilities Definition

CG/MOI Measurement

Executive & VIP Viewing Capability

Target Operations

Decontamination & Disassembly



# Video

*Multiple Kill Vehicle*





# Summary

## *Multiple Kill Vehicle*

- **Validated a critical test bed resource for kinetic energy weapon testing for the Missile Defense Agency through the design, development and test of the Hover Test Vehicle**
- **Defined full-spectrum capabilities of the test bed to support end-to-end processing of static and hover vehicles of increasing complexity and size**
- **Collected lessons learned to aid in the enhancement of existing capabilities to provide better value for future test activities**

**The Hover Test Bed is ready to support the needs of  
Missile Defense**