U. S. ARMY

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Aviation Rockets and Missiles Update

For

3rd Annual NDIA Missiles & Rockets Symposium and Exhibition

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Agenda

PM Overview

Hellfire Missiles

Additional Hellfire Applications

Hydra-70 Rocket

Advanced Precision Kill Weapon System

Aviation Rockets and Missile Project Office

Laser

HELLFIRE

Longbow

HELLFIRE

Hydra 70 Family of 2.75” Rockets

Missile Container

Laser/Longbow HELLFIRE Modular Launcher

M260/M261 2.75” Rocket Launchers

Basic AWM-101

Test Set AN/TSM-205

Aviation Rockets and Missiles

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CURRENT STRENGTH

	Military	Civilian	Temp
Missiles	3	82	1
Rockets	2	36	3
TOTAL	5	118	4

REDSTONE ARSENAL
ROCK ISLAND ARSENAL

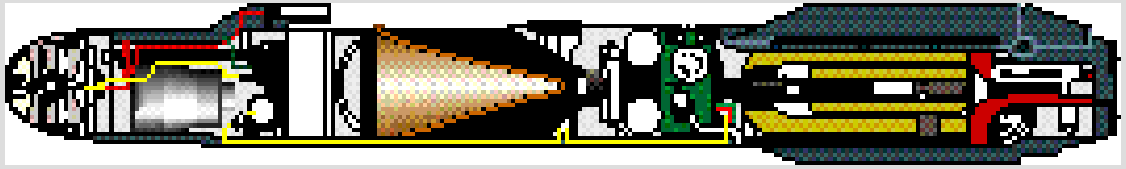
Hellfire Missile System

Hellfire Evolution

Production Awards	Characteristics	Performance	System Description
1982-1989	• Single Shaped Charge Warhead • SAL Seeker • Analog Autopilot	• Non-Reactive Armor • Non-EOCM Hardened • Not programmable for Improved Performance	***Basic*** (AGM-114A, B, C) Weight = 100 lbs Length = 64”
1990-1992	• Dual Warhead • SAL Seeker • Analog Autopilot	• Reactive Armor • Non-EOCM Hardened • Not Programmable for Improved Performance	***Interim*** (IHW) (AGM-114F) Weight = 107 lbs Length = 71”
1993-1997	• Robust Warheads • EOCM Hardened • SAL Seeker • Reprogrammable • IM Warheads - Apr 97	• Capable Against Predicted Early 21st Century Armor	***HELLFIRE II*** (AGM-114K) Weight = 100 lbs Length = 64”
1996-	• Robust Warheads • RF Seeker • Reprogrammable	• Capable Against Predicted Early 21st Century Armor • Adverse Weather • Fire and Forget	***LONGBOW*** (AGM-114L) Weight = 108 lbs Length = 69”
1999-	• IM Warhead • SAL Seeker • Reprogrammable	• Steel / Masonry • 4 Modes of Operation • Adverse Weather	***Blast Frag*** (AGM-114M) Weight = 106 lbs Length = 64”

Hellfire II / Longbow Hellfire

Hellfire II
(AGM-114K)

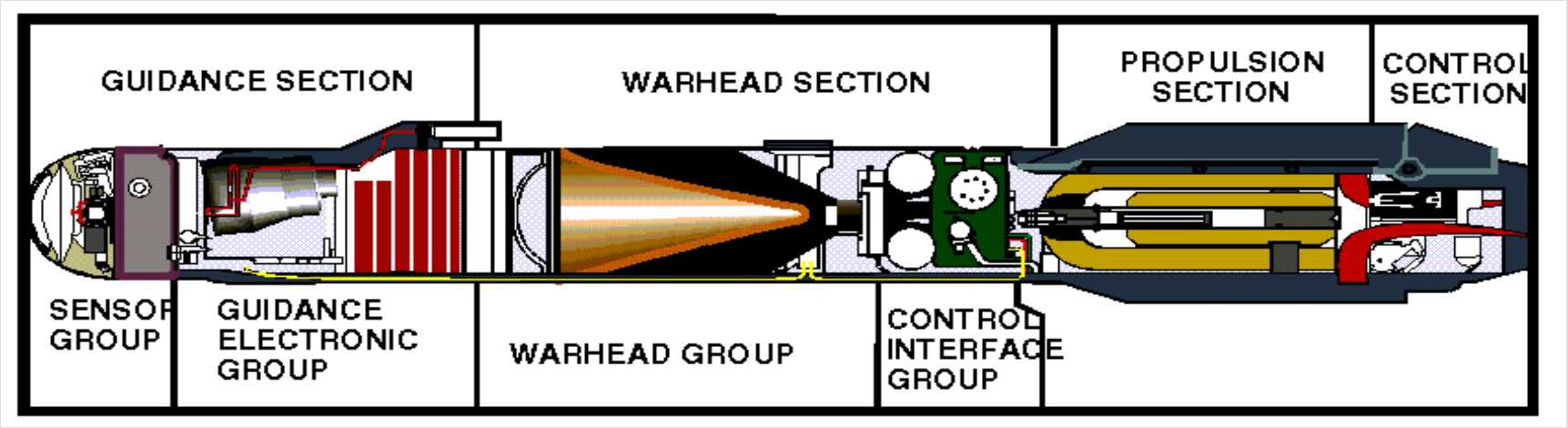


Weight = 100 lbs Length = 64”

Hellfire II (AGM-114K)

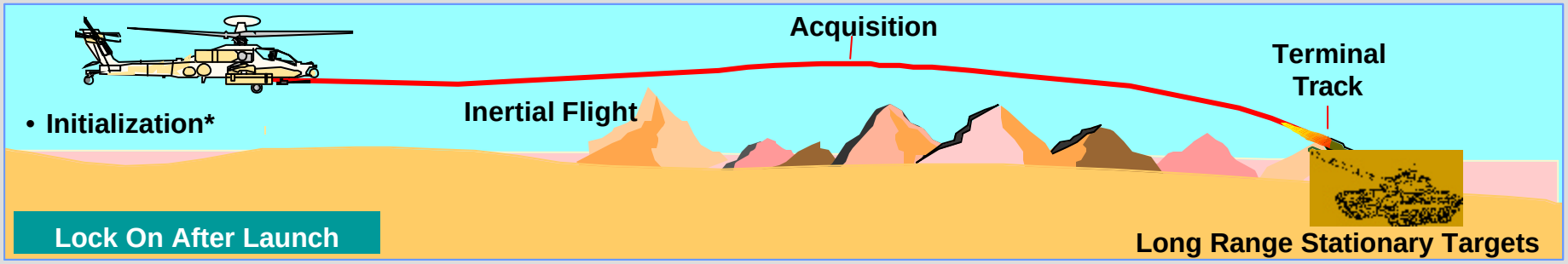
- Provides EO Countermeasures hardened seeker and guidance electronics
- Provides IM Compliant Tandem Warhead/
- Improved Electronic Fusing
- HERO Compliant
- Improved Performance- Lower trajectory/lower minimum ceiling requirements (Digital Autopilot)
- Ability to reacquire LASER spot
- Less susceptible to backscatter, and overspill

LONGBOW HELLFIRE MISSILE CHARACTERISTICS



- RADAR-AIDED INERTIAL GUIDANCE (FIRE&FORGET) FOR ENHANCED CREW SURVIVABILITY
- KA-BAND SENSOR FOR FULL PERFORMANCE IN ADVERSE WEATHER
- ROBUST CM CAPABILITY (TACTICS, DECOYS, SUPPRESSION, OBSCURANTS, ECM, ETC.)
- LETHAL WARHEAD PERFORMANCE AGAINST TANKS, AD, HELO, & APC TARGETS
- RANGE & AZ OFFSET: .5-8KM AT 0 TO $\pm$ 20^0 AZ OFFSET
- VELOCITY / TOF: 1.2 MACH PEAK / 20 SEC NOMINAL TOF (LOBL AT 5KM)
- WEIGHT / LENGTH / POWER: 108 LBS / 69.2 IN / 375 WATTS
- RELIABILITY: $\geq$ .94 FOR 4.3 HOUR MISSION

LONGBOW HELLFIRE OPPERATIONAL CONCEPTS

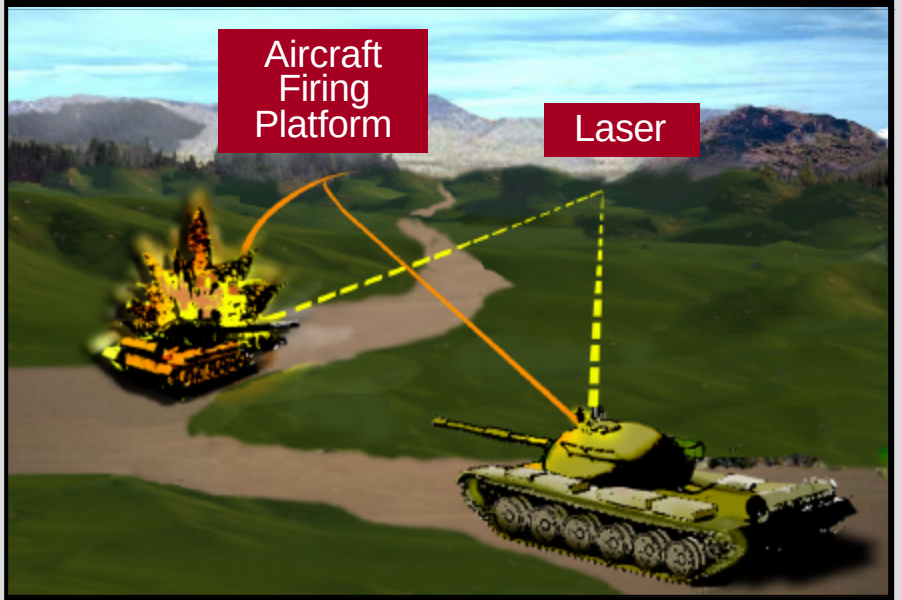


* Built-In Test; Transfer Alignment; Calibration; System Control

MULTIPLE TARGET ENGAGEMENTS

Rapid Fire

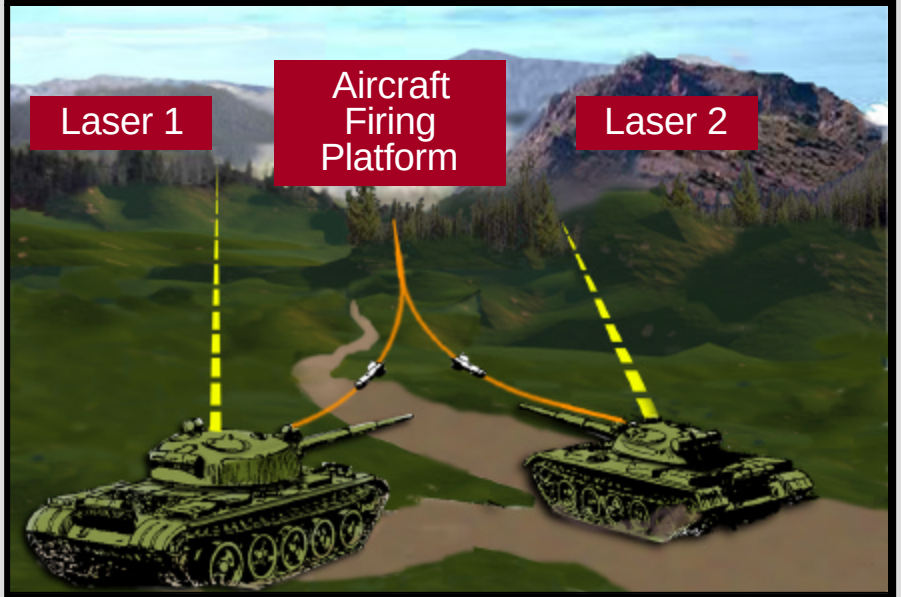
One Laser Designating



1 missile every 8 seconds

Ripple Fire

Two Lasers Designating*



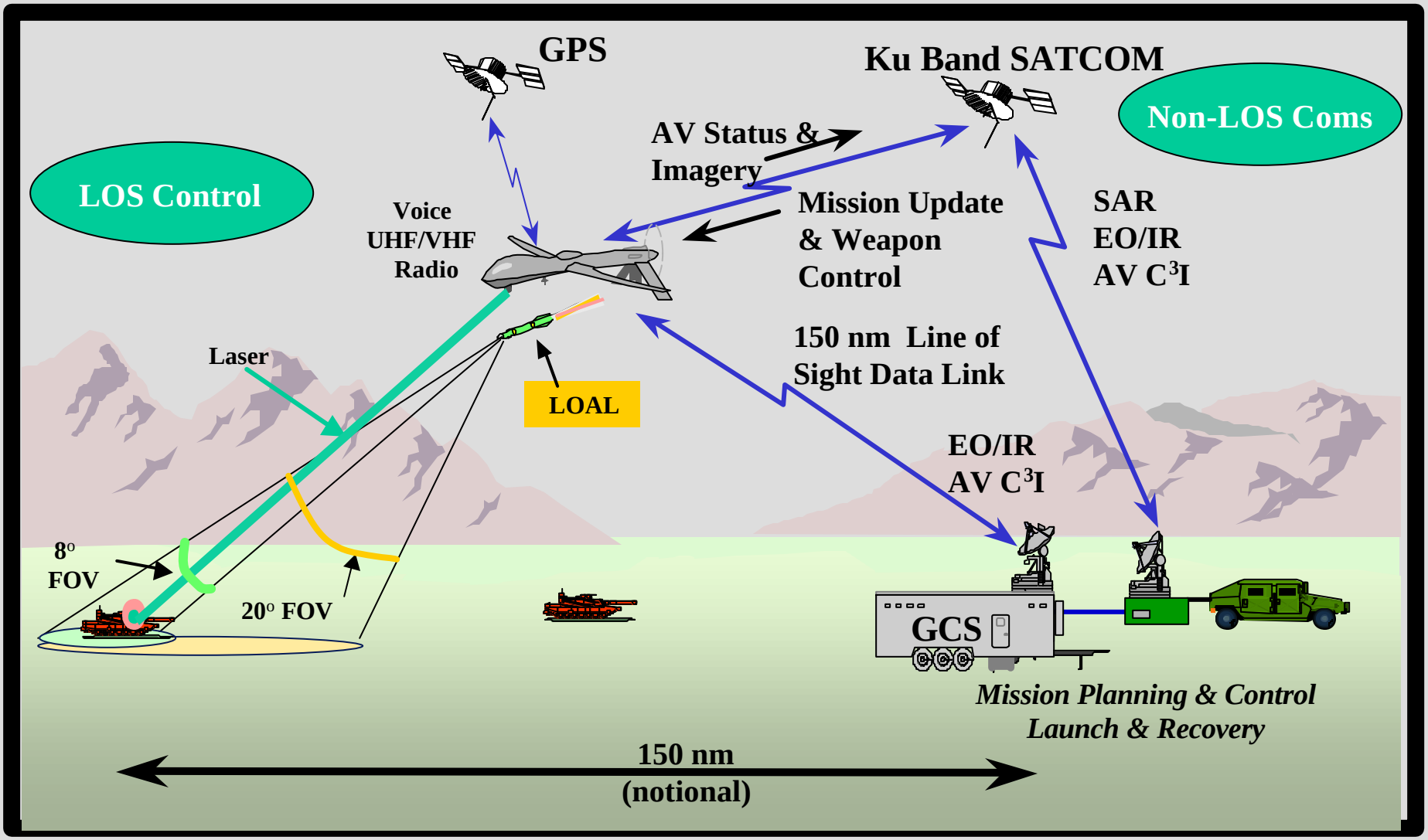
1 missile every 2 seconds

* Must be on different codes

Additional Hellfire Applications

Other Hellfire Applications

CONCEPT OF OPERATIONS



HELLFIRE / PREDATOR TEST OVERVIEW

PHASE I – COMPLETED FEB 01

- AGM-114A/C MISSILE
- 2,000 FOOT ALTITUDES
- STATIONARY TARGETS
- 3 FIRINGS: 3 DIRECT KILLS

PHASE II, PART I – COMPLETED JUN'01

- AGM-114 (HF II) MISSILES
- 10,000 Ft + ALTITUDES
- STATIONARY TARGETS
- 13 FIRINGS: 7 DIRECT, 2 NEAR TGT KILLS

PHASE II, PART II COMPLETED SEP'01

- 9 FIRINGS: 9 DIRECT KILLS

Hydra-70 Rockets

HYDRA 70 GENESIS

- **Developed by the Navy for fixed wing applications (1948)**
- **MK40 engagements in Korea and Vietnam**
- **Army assumed Tri Service management**
- **HYDRA 70 released in the mid 1980s**

- **Limited engagements (Grenada, Panama, Desert Storm, Somalia)**
- **Extensive Close Air Support use in Afghanistan (2002)**
- ***"Apaches save the day in Operation Anaconda With 2.75" Rockets and Guns!"***

HYDRA-70 DESCRIPTION

RANGE (MK 66 MOTOR)……8.8 km

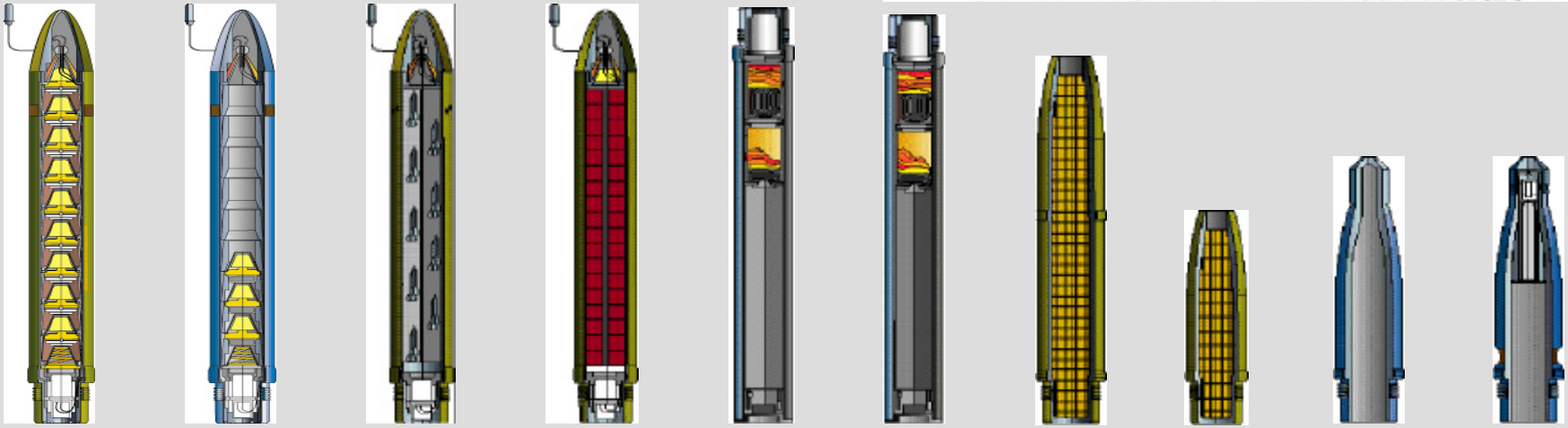
WEIGHT……23-30 lb

LENGTH……55-70 in

VELOCITY……600 m/s

VARIANTS……10

HYDRA-70 2.75" Qualified Aircraft



M261 M267 M255A1 M264 M257 M278 M229 M151 WTU 1/B M274

Advanced Precision Kill Weapon System (APKWS)

Advanced Precision Kill Weapon System (APKWS)

- **APKWS is a “Family Of Precision Rockets”**

- **All upgrades, improvements to 2.75” Rockets fall under the umbrella of APKWS**

- **All warheads required for future operations are part of the APKWS program**

- **APKWS program designed to replace warfighting inventory and provide for training resources**

- **Transition of Hydra & LCPK ATD to APKWS is PM ARM responsibility**

AVIATION OPERATIONAL NEED

Current Weapon Options For Soft Targets Don't Meet Mission Requirements

Employment Concepts

- **Precision Strikes on Soft/Light Armor Point Targets**
- **Close Aerial Fire Support**
- **Urban Terrain Employment**
- **Remote Designation of Targets**
- **Complement to HELLFIRE and Unguided Rockets**
- **Mission Description:**
  - **SASO – Enhanced Aircraft Performance and Duration**
  - **LIC – Enhanced Effectiveness for Scout/Reconnaissance**
  - **MIC – Provided Significant Capability vs Multiple Point Targets**
  - **HIC – Complement Deep Strike and Anti-Armor**

Does not meet Accuracy

Hydra-70 Rocket (1 - 6 Km)

- Short effective range
- Poor accuracy(Area Weapon)
  - High cost/soft kill at 6 Km
  - High collateral damage
  - Fratricide potential
  - Low stowed kills at 6 Km
- High transportation cost

HELLFIRE (1 - 8 Km)

- High cost/soft kill at 6 Km
- Weapon Over-match

Does not meet low Cost

~ Weapons Gap ~

Guided 2.75" Rocket
(Soft & Lightly Armored Point Targets)

Unguided 2.75" Rocket (Area Suppression)

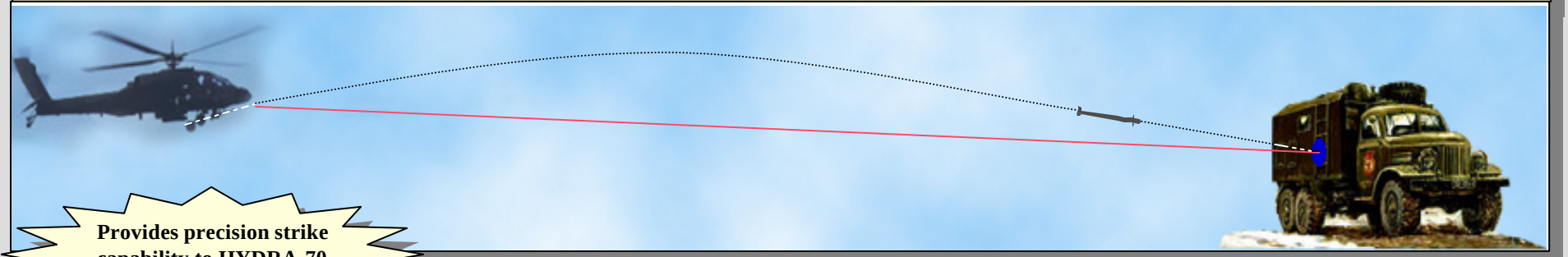
AGM-114 Hellfire (Anti-Armor)

- ***More Accurate Than Unguided 2.75" Rocket***
- ***Less Costly Than HELLFIRE***

TECHNICAL APPROACH

Semi-**A**ctive **L**aser (SAL) **L**ock **O**n **A**fter **L**aunch (LOAL)

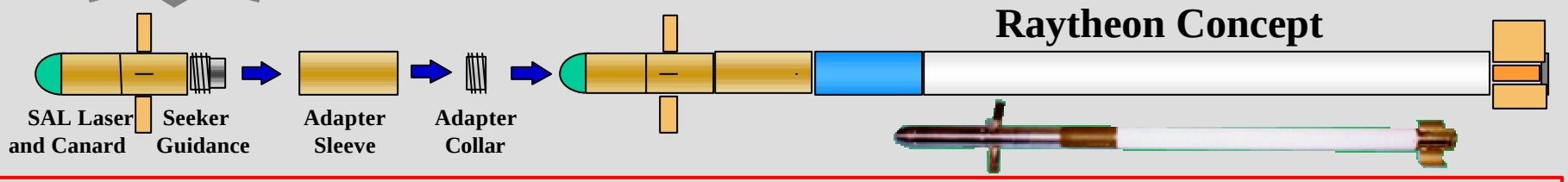
Engagement of individual targets with high probability of single shot hit requires terminal or command to line-of-sight guidance.
Low signature targets embedded in complex, cluttered environments can only be reliably engaged through visual acquisition & operator designation.



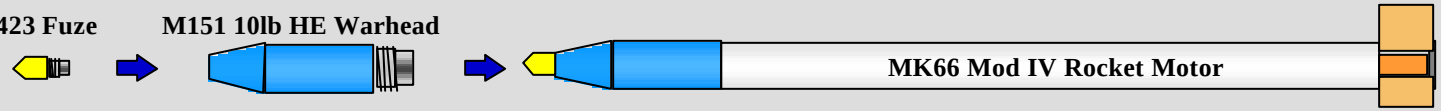
Provides precision strike capability to HYDRA-70 rockets

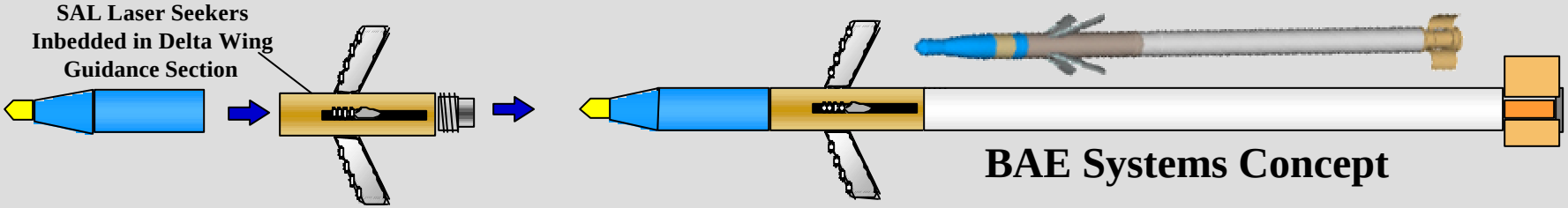
LCPK CANDIDATES

Raytheon Concept



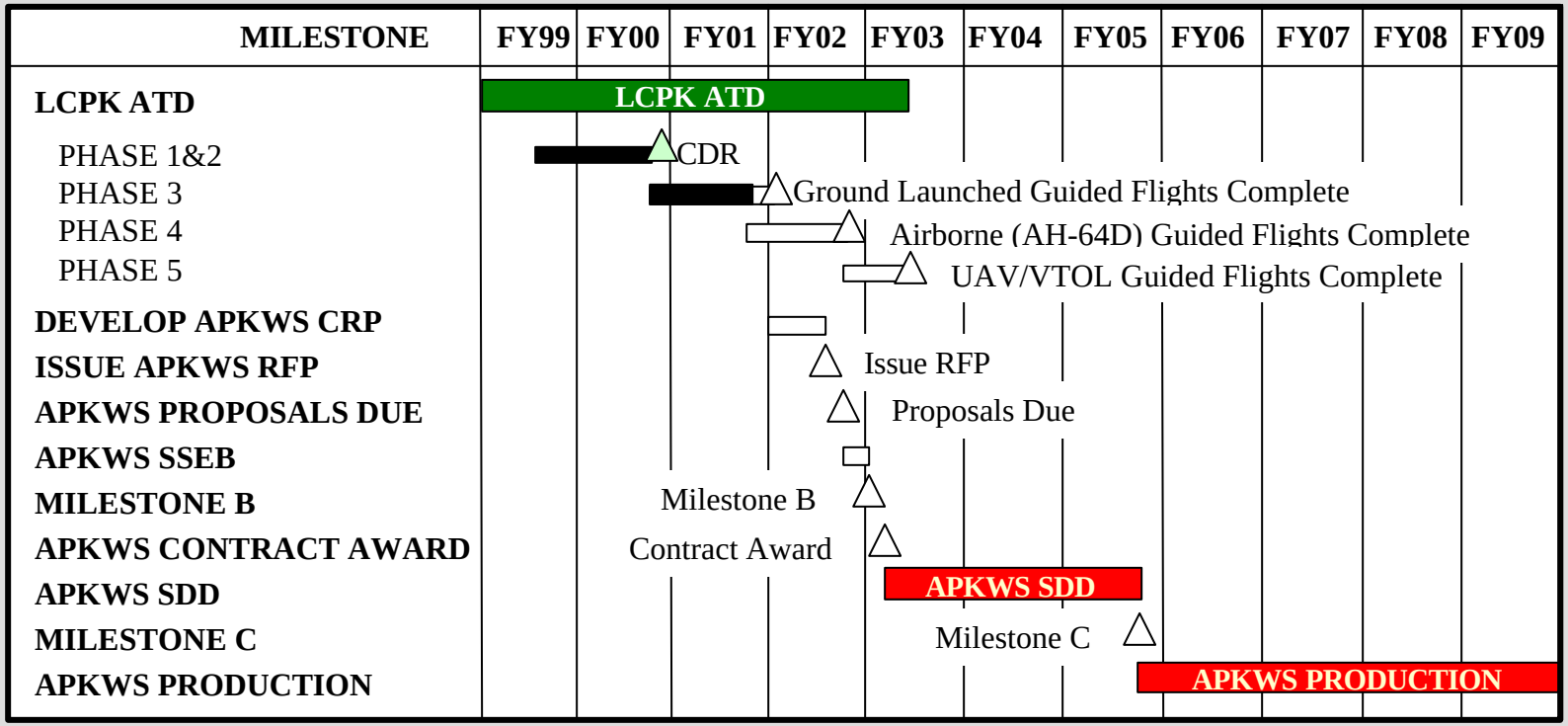
BASELINE HYDRA-70 ROCKET





BAE Systems Concept

APKWS Schedule



Questions