BAE SYSTEMS

PRECISION TARGETING

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Recent Developments in Affordable Laser Guided Precision Weapons Capabilities

Jim Franciscovich
Electronics and Integrated Solutions Inc.
Sensor Systems

Affordable Tactical Seekers

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PRECISION TARGETING

➢ Driven by Changes

- **The Precision War = Dynamic Missions/Threats**
  - Target Sets Requiring Better than GPS Accuracy
    - Tank (T-80), SA-6, SA-8, Guns, Self Propelled AAA, APC, Bunker doors, small revetments, pickup trucks, SUV's etc
  - Real Time Reactive Targeting – Dynamic Mobile Targets
  - Fighting in Close without Boundaries- Distributive Operations
  - Restricted Rules of Engagement
  - Minimize Collateral Damage - Preservation of the Infrastructure
  - Minimize Potential for Fratricide
- **Affordability**
  - Low Unit Cost – Shortened Development Timelines
  - Use of Qualified & In Inventory Assets
  - One Weapon One Kill
  - Minimize Platform Integration Costs
  - Minimize Training & Logistics Burdens









➢ Enabled by Technology

Focus on the Future = Low Cost Precision Effects

Advanced Precision Kill Weapon System (APKWS™)

Approved for Public Release

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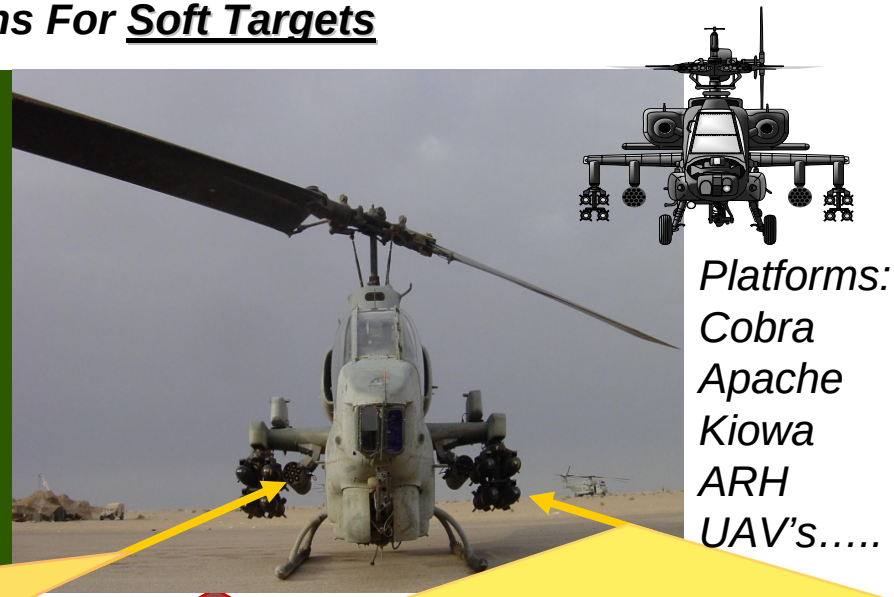
AVIATION OPERATIONAL NEED

Limited Weapon Options For Soft Targets

Employment Concepts

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



Platforms:
Cobra
Apache
Kiowa
ARH
UAV's…..

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)

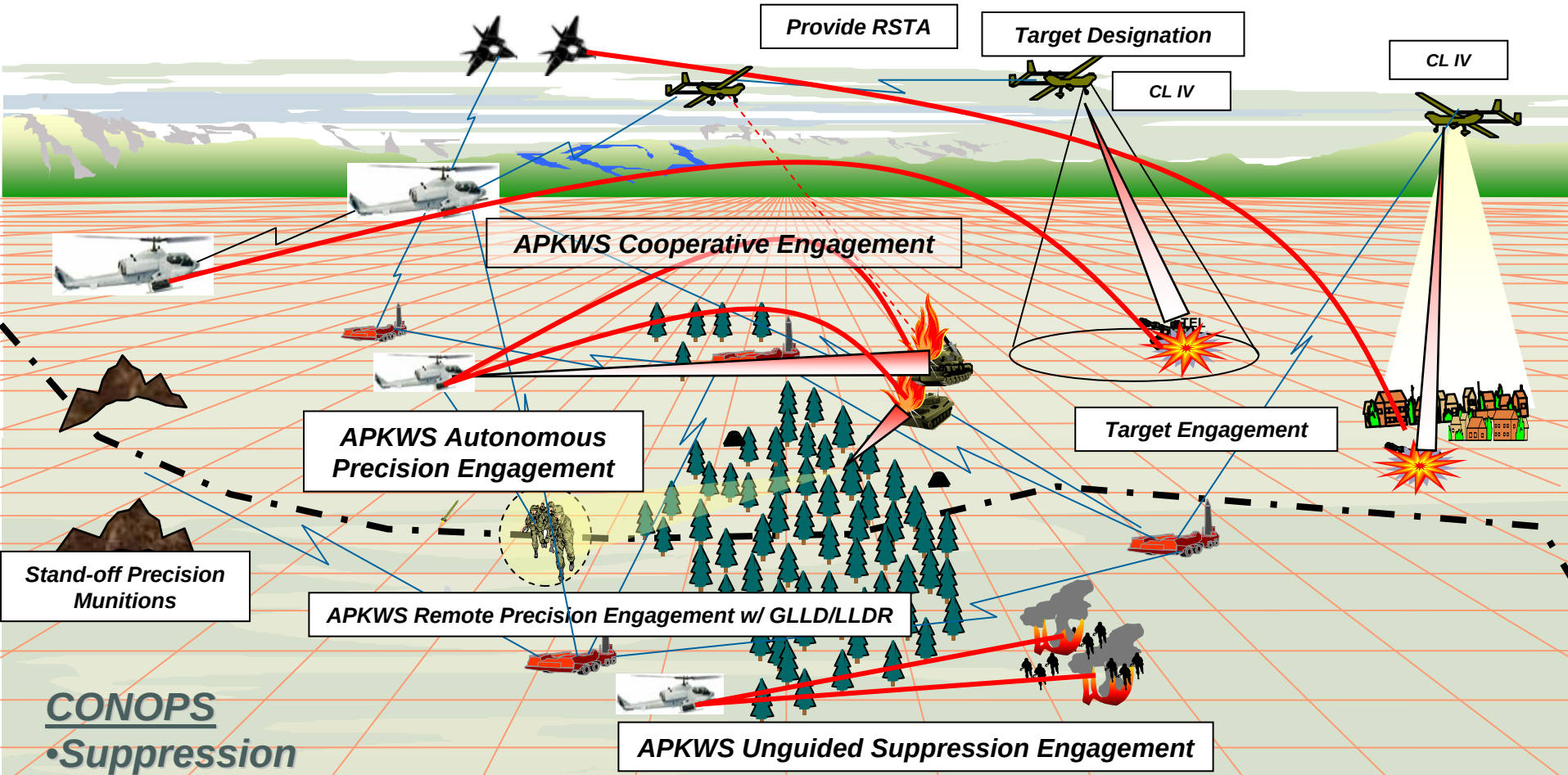
Unguided 2.75" Rocket (Area Suppression)

AGM-114 Hellfire (Anti-Armor)

- *More Accurate Than Unguided 2.75" Rocket – Essential Anti-Terror Weapon*
- *Less Costly Than HELLFIRE and allows for more Stowed Kills*
- *Reduced collateral damage*

APKWS™

CONCEPT OF OPERATIONS



CONOPS

- Suppression
- Self Designate
- Cooperative Engagement

APKWS™ Components

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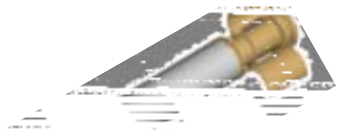
PRECISION TARGETING

Mid-body Design is *Supportable*

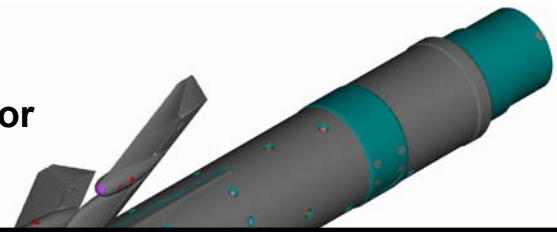
- No field modifications required
- No changes to weapons loading
- Limited training required for pilots

Mid-body Design is *Reliable*

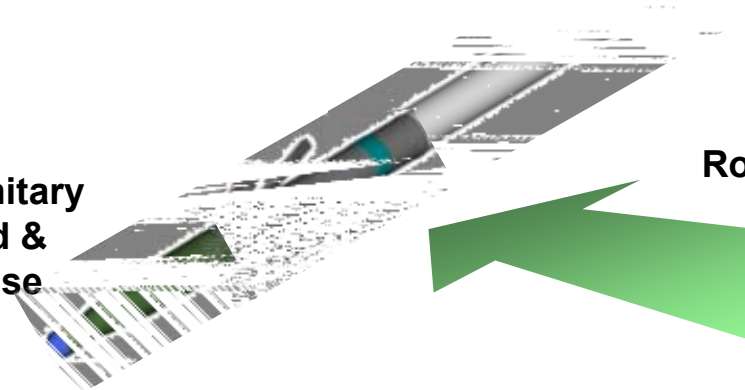
- Optics protected prior to launch from adjacent firings, sand, moisture, etc.
- Wide FOV for broader capture area



Mark 66
Mod 4
2.75”
Rocket Motor



M151 Unitary
Warhead &
M423 Fuse



Description	Current Wt per Unit (lbs)	Length (inches)
Guidance & Control	8.9	18.5
Motor	13.7	41.8
Payload & Fuse	9.2	13.5
All Up Round	31.8	73.8
Requirement	*35*	*75*

No Impact on Warhead Effectiveness

- Warhead does not “fire through” guidance unit

Mid-Body Seeker

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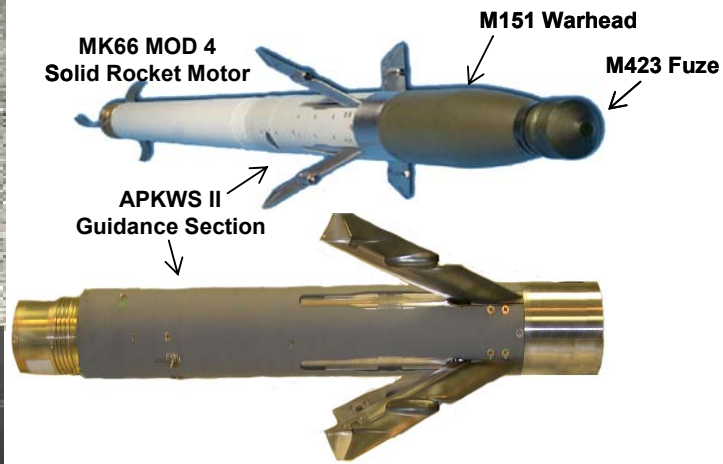
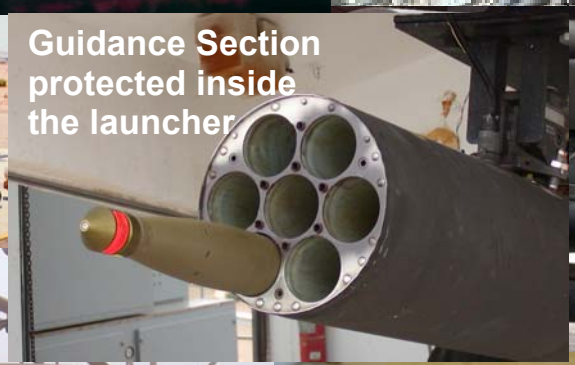
Simple Guidance Section Assembly Into an All Up Round





Proven Performance

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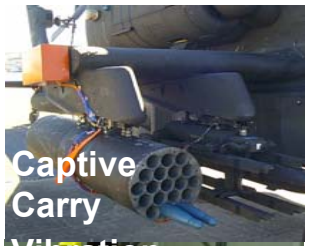
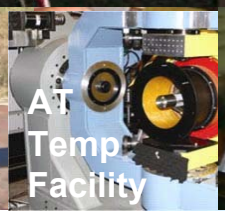
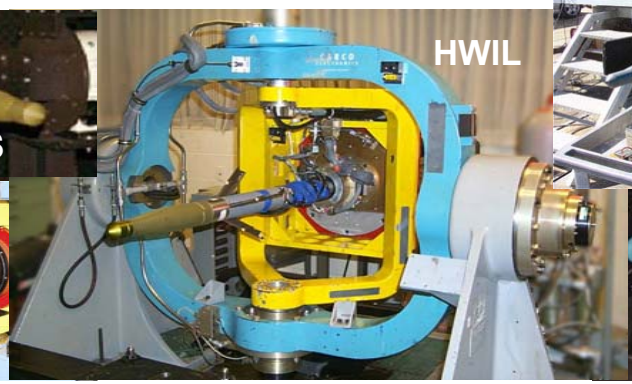
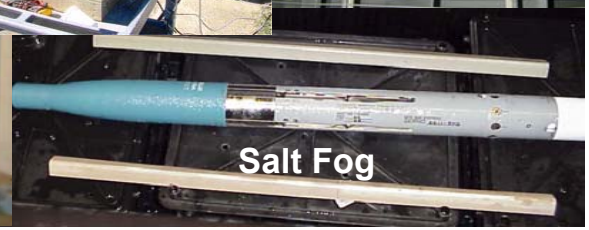
Tested throughout the full environmental spectrum

- Vibration
- Shock
- Environmental Testing
- HWIL, ALSPES, at Temp Facility, Outdoor Range Testing









Flight Test Success

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APKWS™ Advantages

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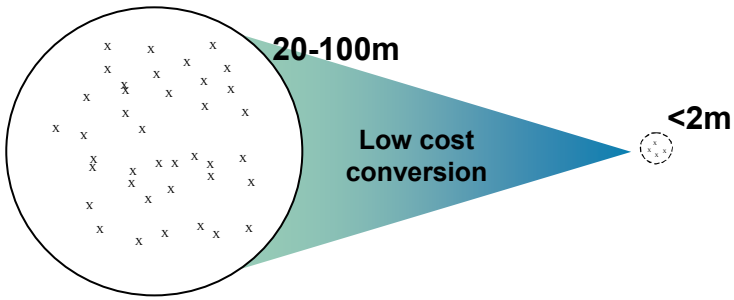
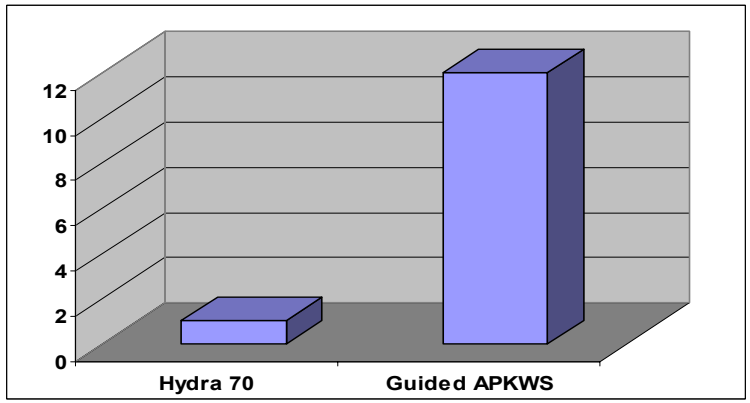
Increased Accuracy



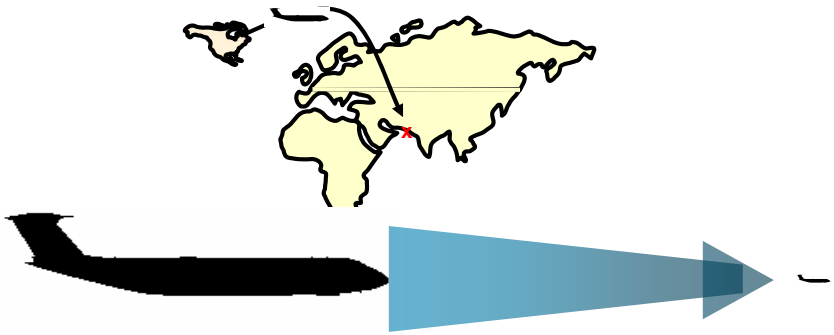
1.5km to 5km range

Area Suppression becomes Precision Strike

> Stowed Kills per Sortie

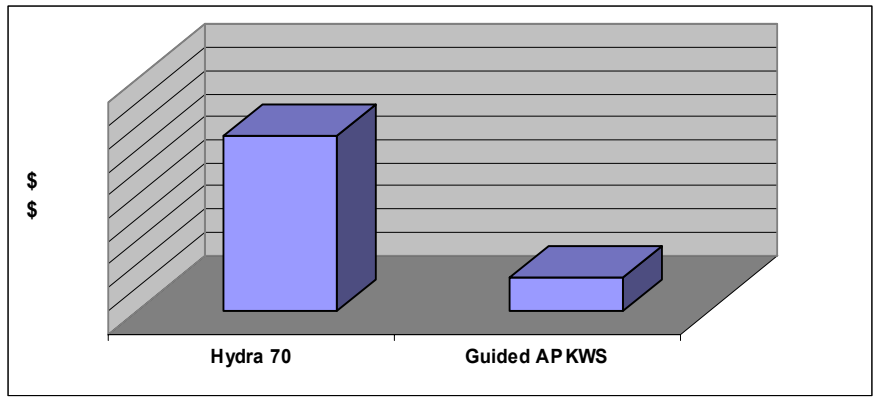


Reduced Logistics Burden



12 to 1 reduction in transport load outs for same combat effectiveness

< Cost for Stowed Kills per Sortie



• AMRDEC/DCD analysis in support of LCPK ATD

XM 395 PGMM
Precision Guided Mortar Munition

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ATK ALLIANT TECHSYSTEMS

PRECISION TARGETING

PGMM

XM 395 PGMM Satisfies the need for responsive, precision munition that reduces collateral damage

Target set includes enemy personnel protected by brick over block walls, lightly armored vehicles (LAV), and an earth & timber bunkers

- BAE Systems Wide FOV Distributed Aperture Semi-Active Laser Seeker "DASALS™"
  - Delivered > 50 Seekers
  - Demonstrated Mortar Launch Hardness
    - Rail Gun & Guided Flight
  - Demonstrated Hit
    - ATK scored a hit after firing PGMM from a standard 120mm mortar at Yuma Proving Grounds.
    - The round flew approximately 2.5 miles to target and maneuvered to a precision strike

Flight Test Success

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ATK
ALLIANT TECHSYSTEMS

PRECISION TARGETING

Optically Designated Attack Munitions (ODAM)

60 mm fuze / guidance

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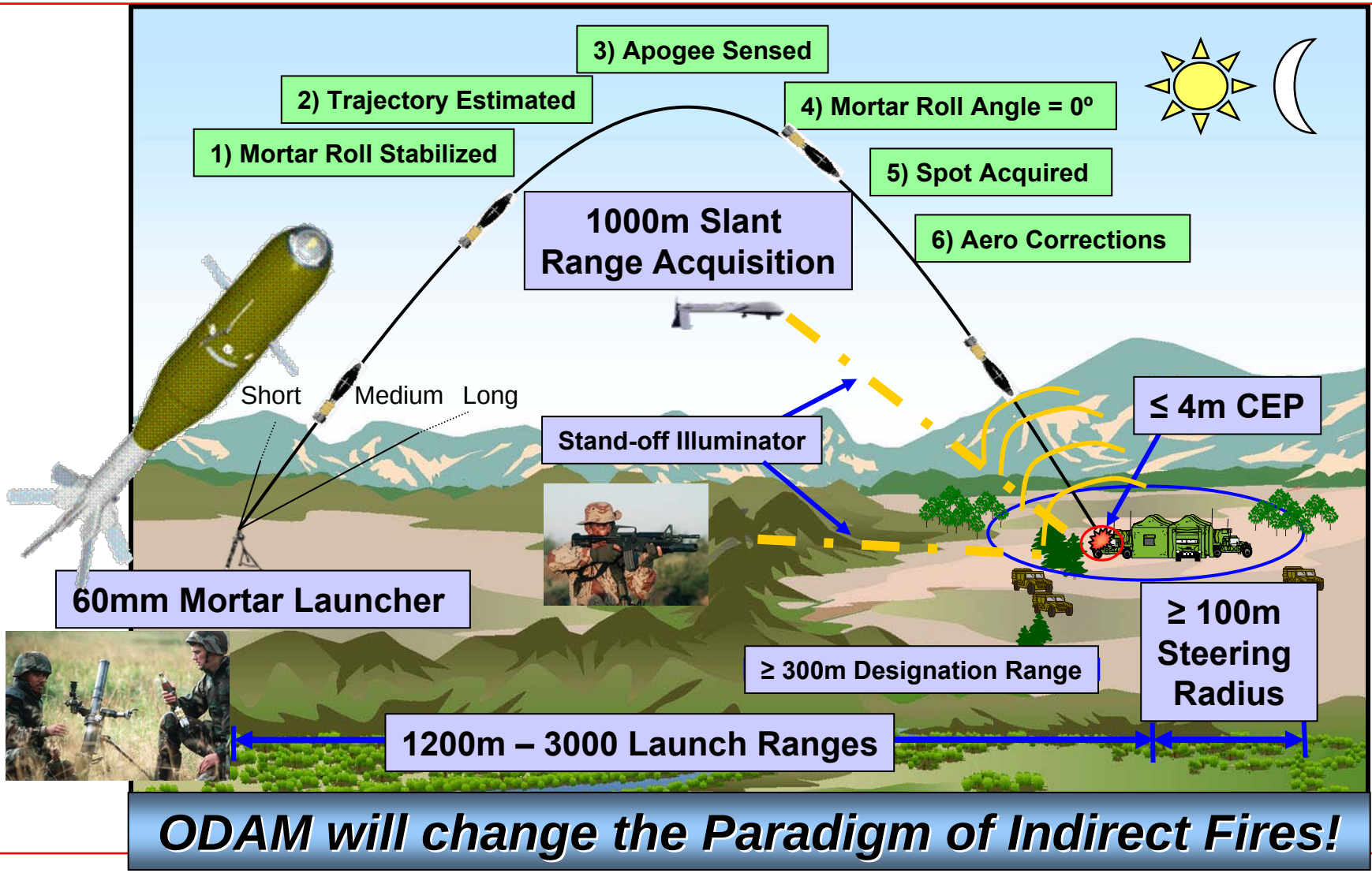

ODAM will change the Paradigm of Indirect Fires!

Why ODAM?

- Drives precision down to infantry company level
  - First-shot kills, avoid collateral damage
  - Enable reliable indirect / long-range fires
- Dramatically accelerates the infantry battle
  - ~5X more kills / mortar platoon, ~10X faster
- Low cost – not silver bullet – use as either guided or unguided round, as tactics dictate
  - Train as you would fight

- If proven successful – <u>disruptive technology</u>
  - ~1/20 recurring cost of other precision rounds
  - Adds only 1 lb / round, 4 in to length (3.7 to 4.7 lb, 15 to 19 in)

Flight Test Success

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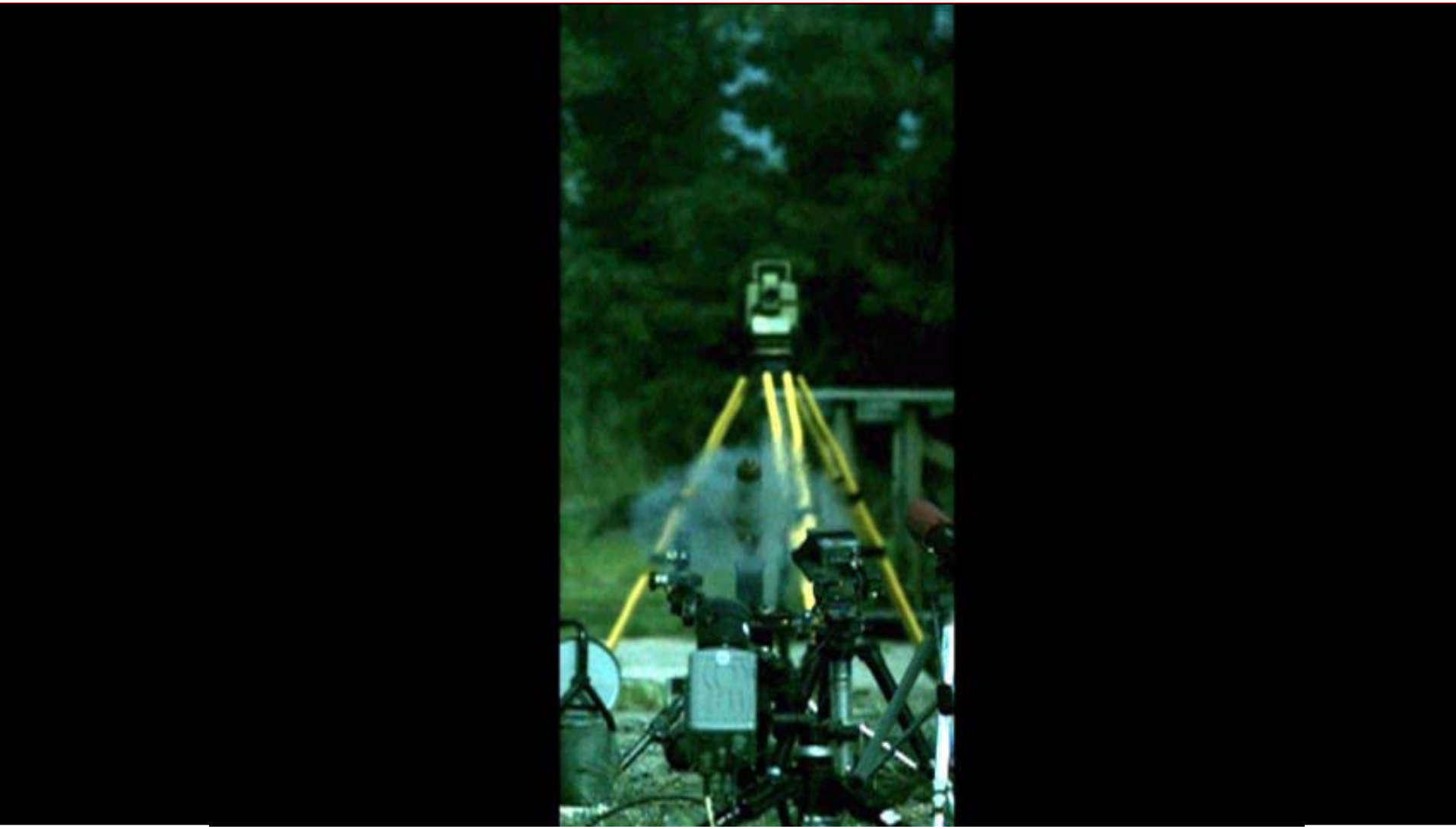
PRECISION TARGETING



Summary

- ***Affordable Precision Benefits the Warfighter***
  - *Fills the Requirements for Responsive, Precision Munitions that Reduce Collateral Damage*
  - *Demonstrated Progress & Increased Technology Readiness Levels*
  - *Improves the ability to Train as you would Fight*
- ***First-shot kills accelerates the battle in a distributed operational environment***
  - *Potential exist to drive precision down to Infantry Company level*
  - *Allows for Affordable Real Time Reactive Targeting addressing Dynamic Mobile Targets*

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