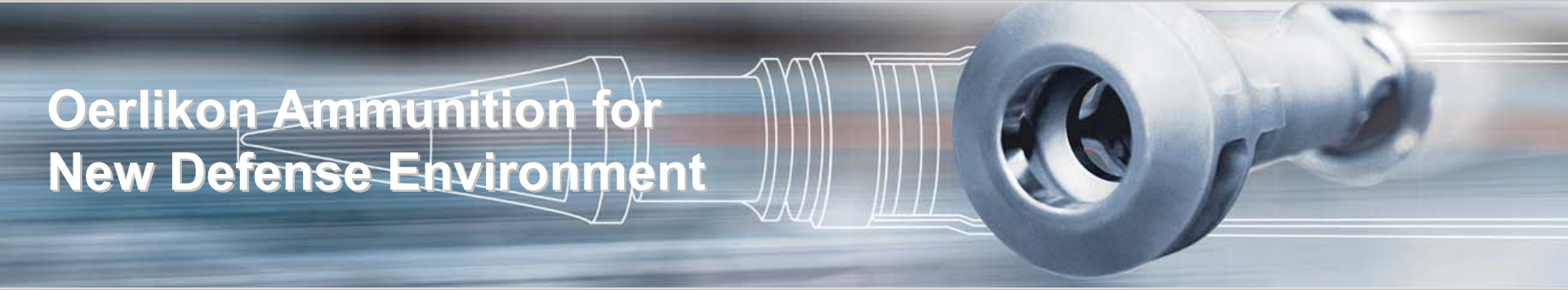
RHEINMETALL
WAFFE MUNITION



Oerlikon Ammunition for New Defense Environment

NDIA 40th Annual Armament Systems
New Orleans, LA - April 25-28, 2005

Presented by:
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Lessons Learned & Implemented

AMMUNITION		
System	**Issue**	**Solution**
Aircraft	Safety	FAP
Gun Ship	Diffused Ground Target	ABM
Vehicle	Multiple Threat	ABM, FAPDS; APFSDS
Naval	Asymmetric Threat	ABM, FAPDS
GB Air Defense	Missile-, RAM-Threat	ABM, FAPDS

FAP: Frangible Armor Piercing (Frap Technology)
FAPDS: Frangible Armor Piercing Discarding Sabot (Frap Technology)
APFSDS: Long Rod
ABM: Air Burst Munition (Ahead Technology)

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Threat Spectrum

Evolution of Medium Caliber Ammo Types
Paradigm-Shift (Quantum Leap)

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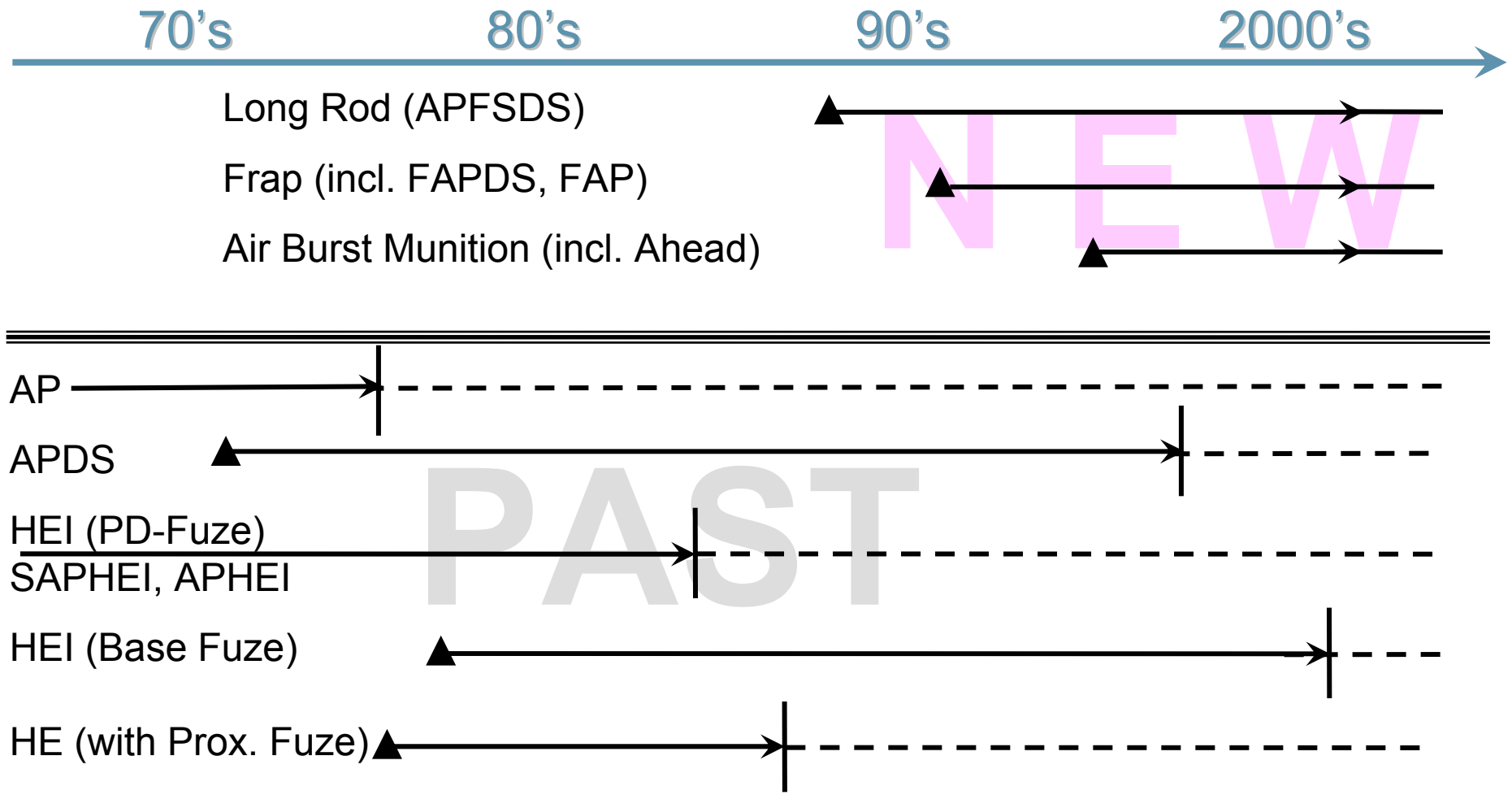

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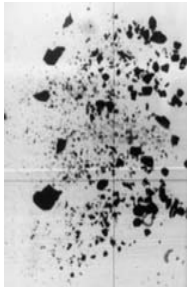
Frap (Fragmenting Payload) Definition

Frap is a generic term defining a KE ammunition with an inert payload designed to fragment and release its energy after target penetration, thereby creating devastating in-depth and lateral secondary effects (fragments, blast, incendiary).



Heavy Metal Fragment Cloud

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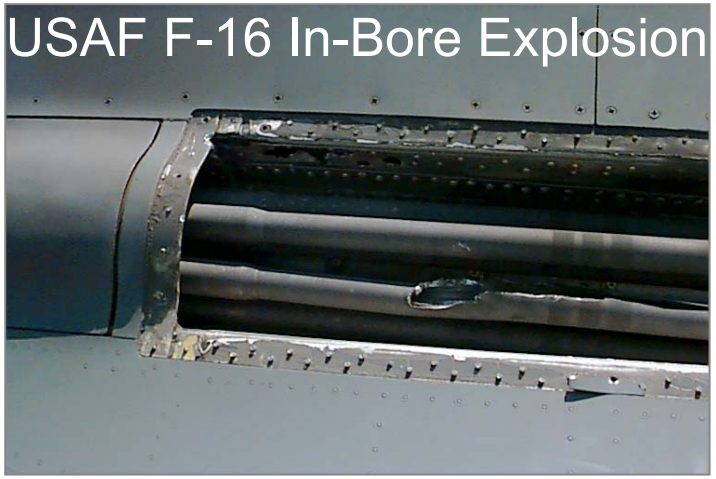
Safety Issue
with High Explosive Aircraft Ammunition



Ref.: www.google.com:

Search: PGU-28/B

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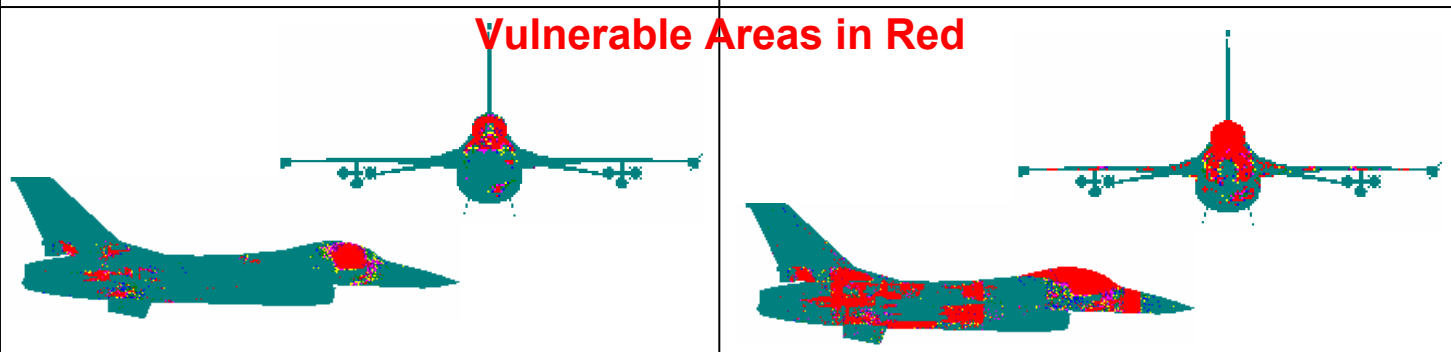
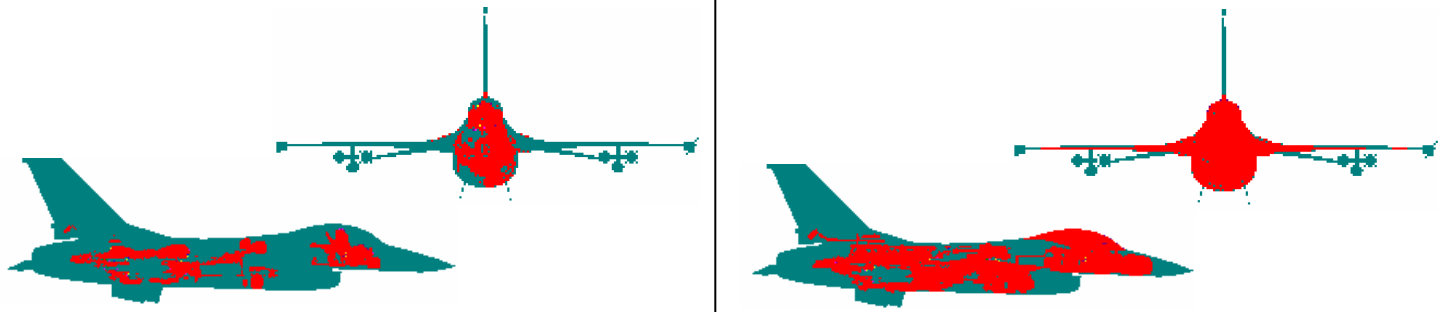
Solution: FAP Ammunition
Lethality of 20mm x 102 FAP & HEI

TARVAC Vulnerability Assessment
Code run by TNO/NL

	Attrition Kill	Mission Abort
HEI		
FAP		

Vulnerable Areas in Red

Range: 900 (m), Side & Head-on attack

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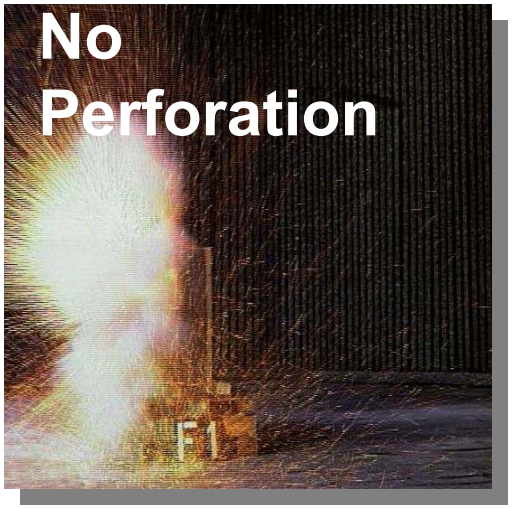
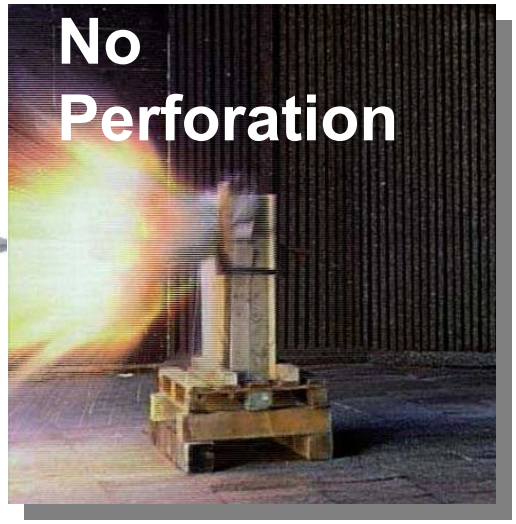
Urban Targets
Solution: FAPDS Ammunition (e.g. 25mm x 137)

HEI-T



SAPHEI-T



Target: 20 cm (2 x 10 cm) Concrete Wall with double steel-structure reinforcement at a range of 1500 m

FAPDS-T

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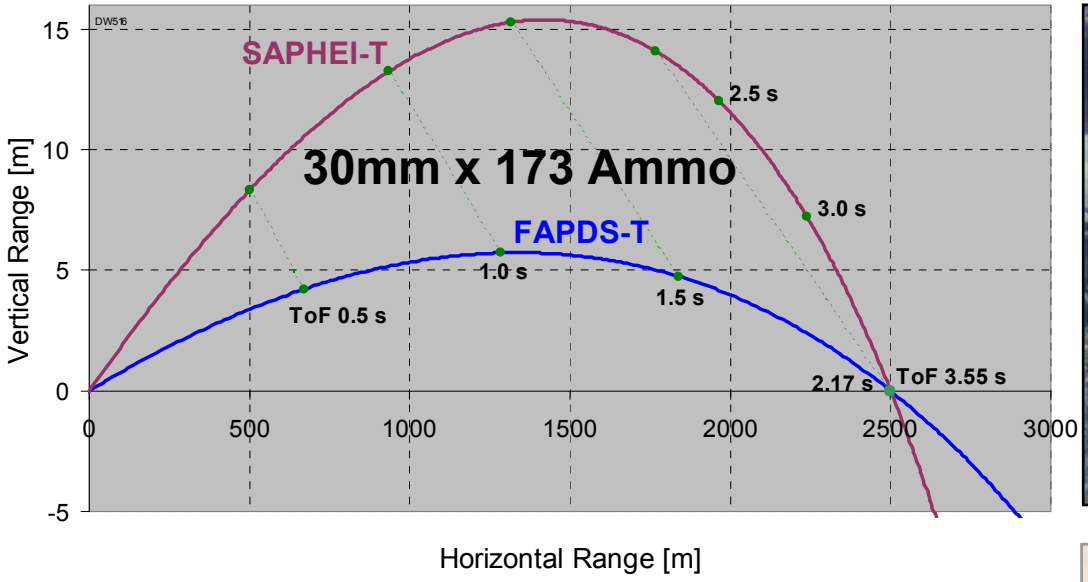
‚Soft' Targets
Solution: FAPDS Ammunition



FAPDS Main Characteristics:

- Higher Hit Probability (shorter ToF)
- Higher Lethality
- Lower Vulnerability (no HE-Filling)
- Lower Life Cycle Costs

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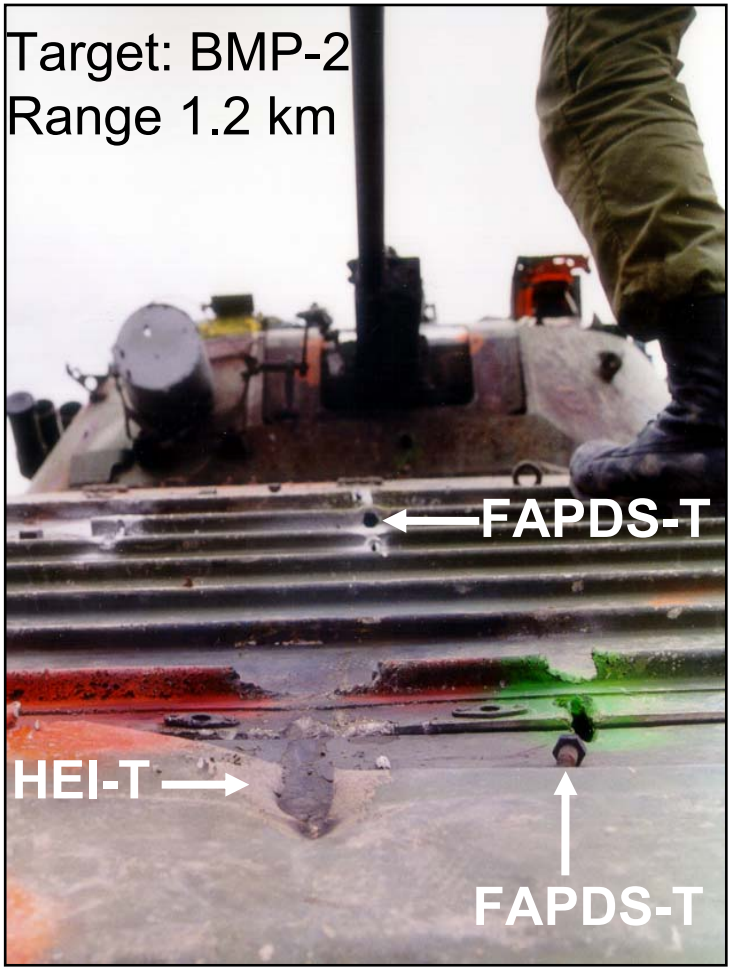
‚Hard' Targets
Solution: FAPDS Ammunition (e.g. 25mm x 137)

Results:

HEI-T:
no penetration
of main armour

FAPDS-T:
full penetration
of main armour



Armoured Targets
Solution: APFSDS-T (Long Rod) Ammunition (e.g. 30mm x 173)

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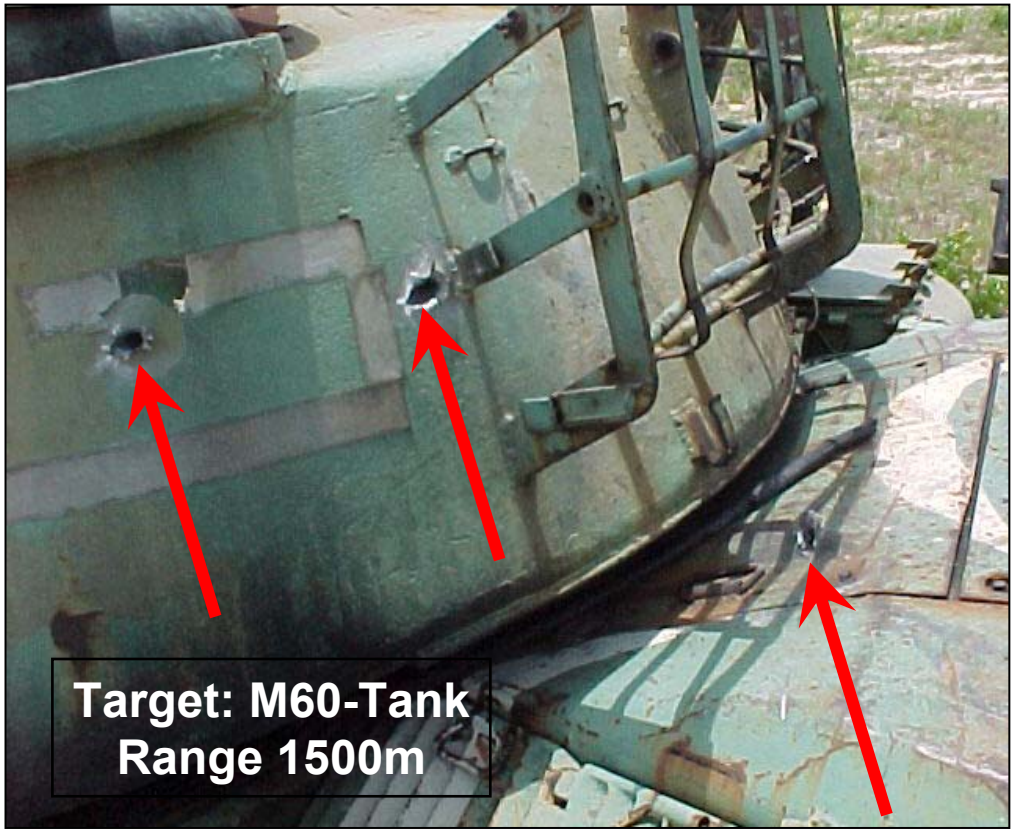

- 2 hits with full penetration through the turret side, in the area of the ammo storage, angle of impact 45° and 60°NATO
- 1 hit on engine cover with angle of impact >70°NATO

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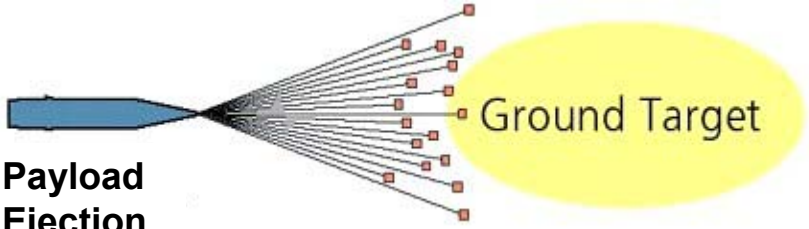
Vehicle & Naval Craft
Solution: ABM Ahead System - Principle

Examples:

Ground Vehicles
Puma / DE (30mm)
CV9035 / NL
Skyranger / OCAG

Programmer



Payload Ejection

Naval Crafts:
35mm: GDM-A07 & Millennium
30mm: MK44; DS30B

Vo Measuring

Fire CS

ABM Electronics

Fuze Programming

ABM Projectile KETF

ABM-Ahead Ammunition 30 & 35mm for Modern Vehicle Armament (Examples)

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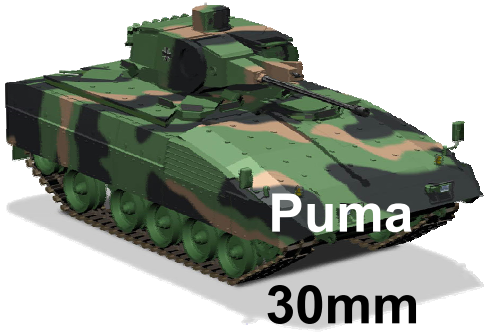
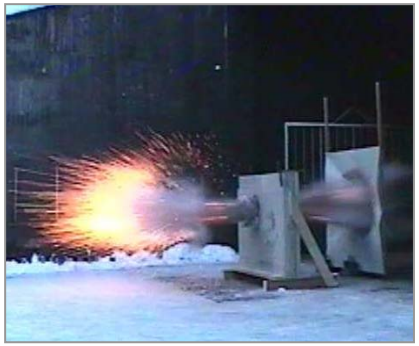
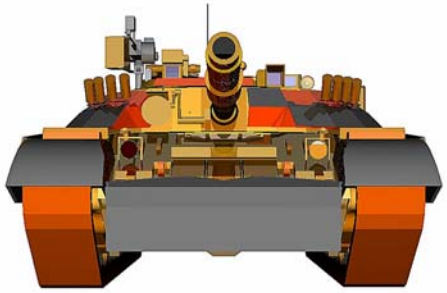


ABM Fire Power against incl. MBT (neutralise), Mi-24 Hind-D, Personnel (covered in Foxhole & dispersed Infantry Soldiers), Urban Targets.





ABM-Ahead Ammunition 35mm for Navy Applications (Examples)

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Surface Threat: incl. Fast Intruder Attack Craft (e.g. Boghammar, Jet Ski), Submarine-Periscope.

Air Threat: incl. ASM, AGM

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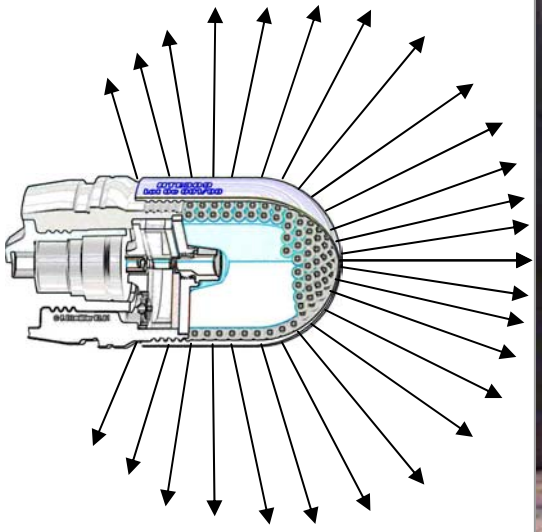
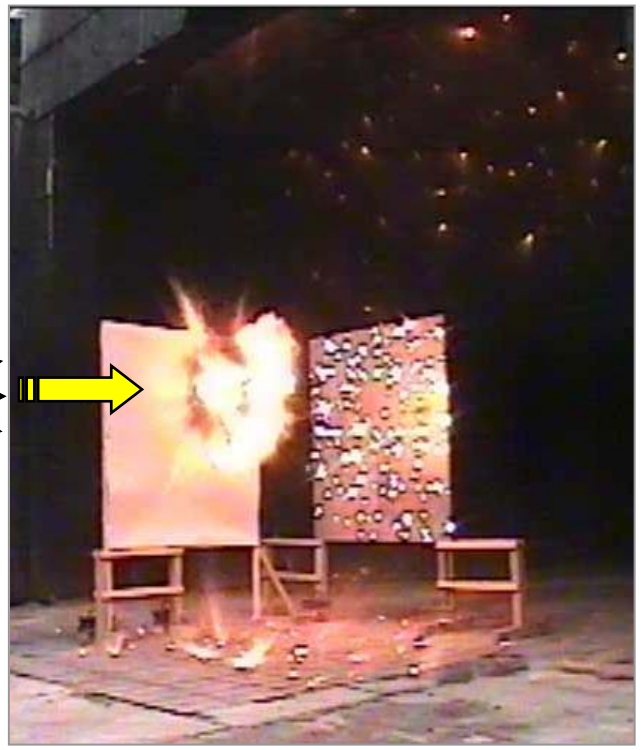
Infantry
Solution: ABM 40mm x 53 Calibre (AGL)

AGL: Automatic Grenade Launcher

Any AGL System
incl. LWAGL, MK19

Air Burst Munition (Ahead-HETF)





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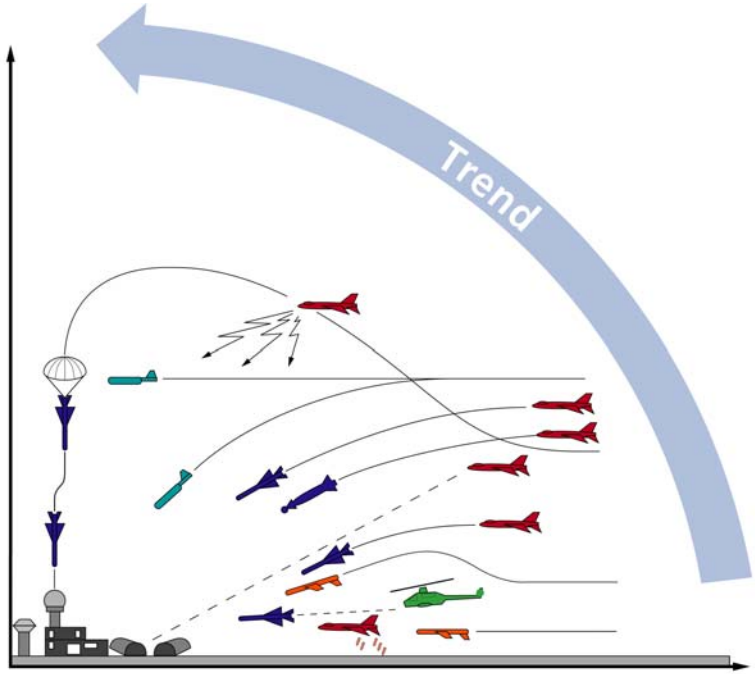
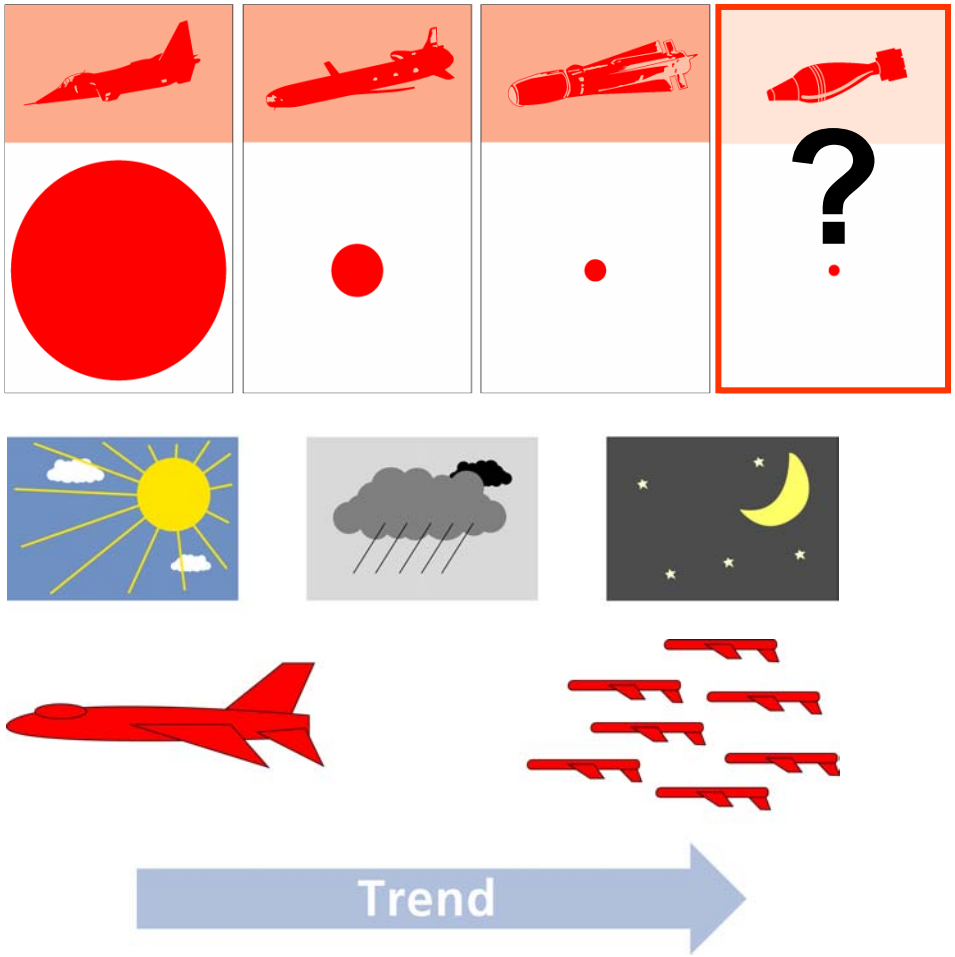
Trends in Air Threat

Difficult to

- Detect, Track, Engage, Hit, Kill





Solution: GB Air Defense Skyshield 35mm Ahead

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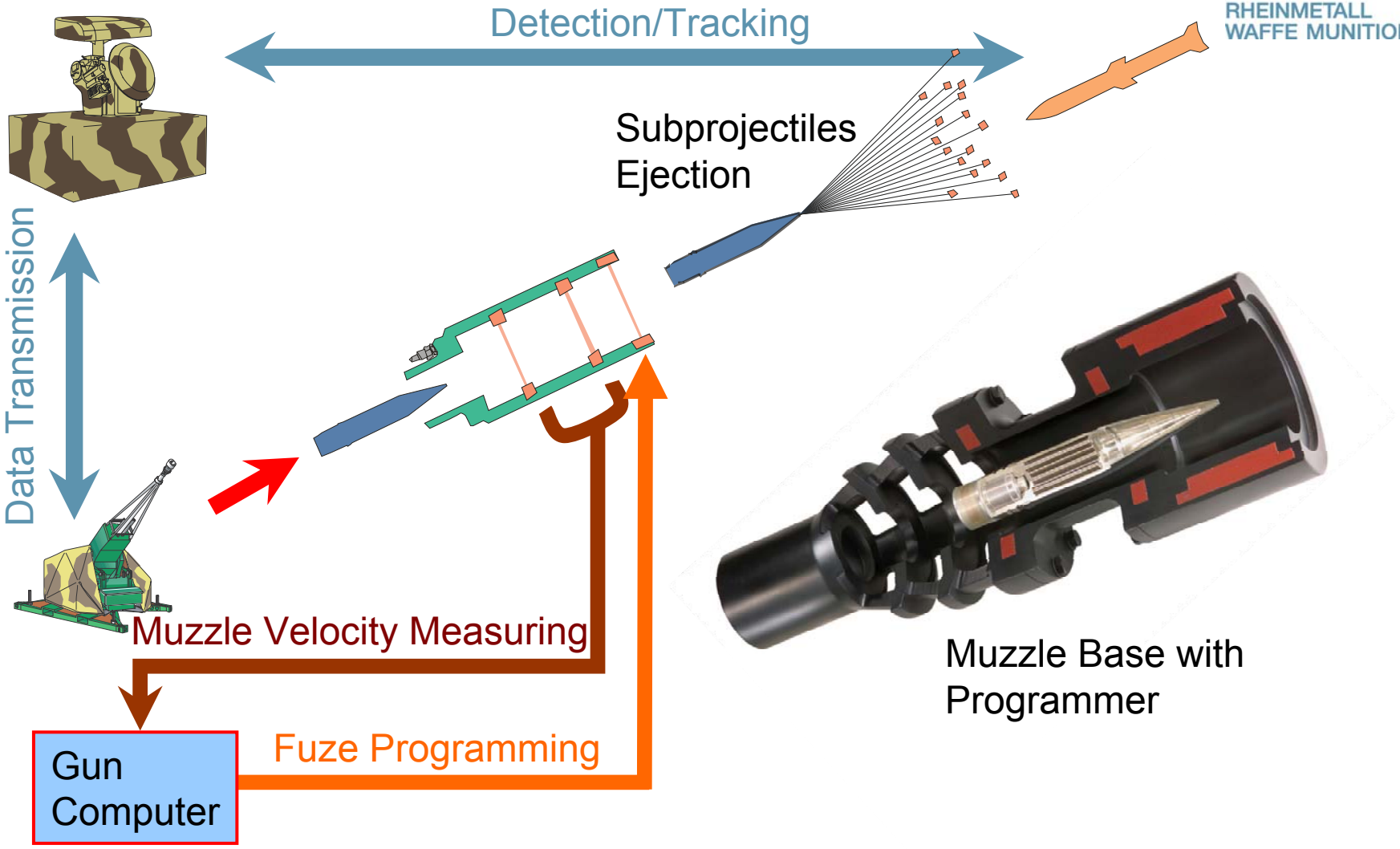

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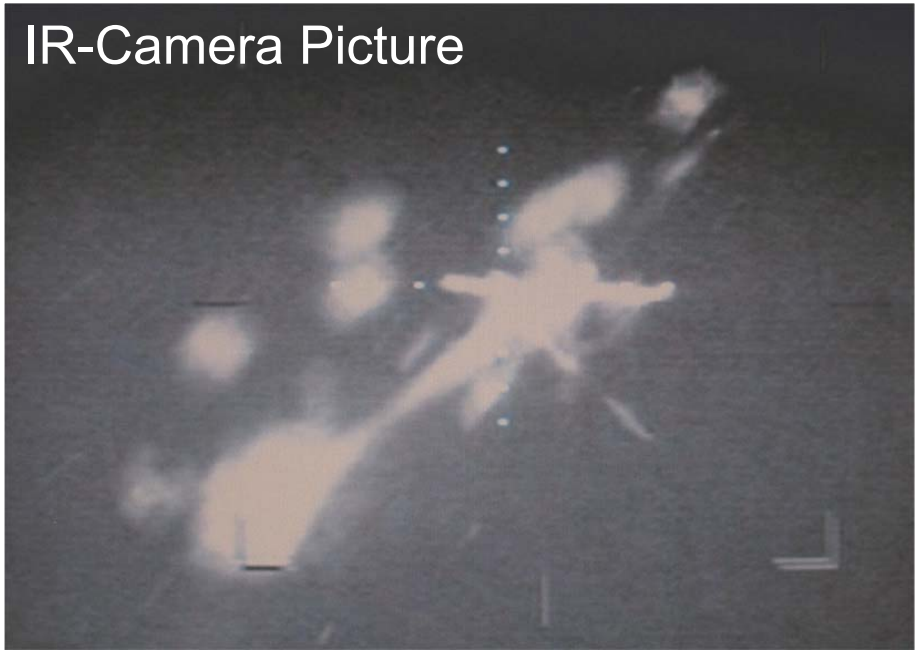
UAV's & Missiles
Solution: Skyshield 35mm Ahead



U.S. Army Test,
NAWS China Lake, July 2004

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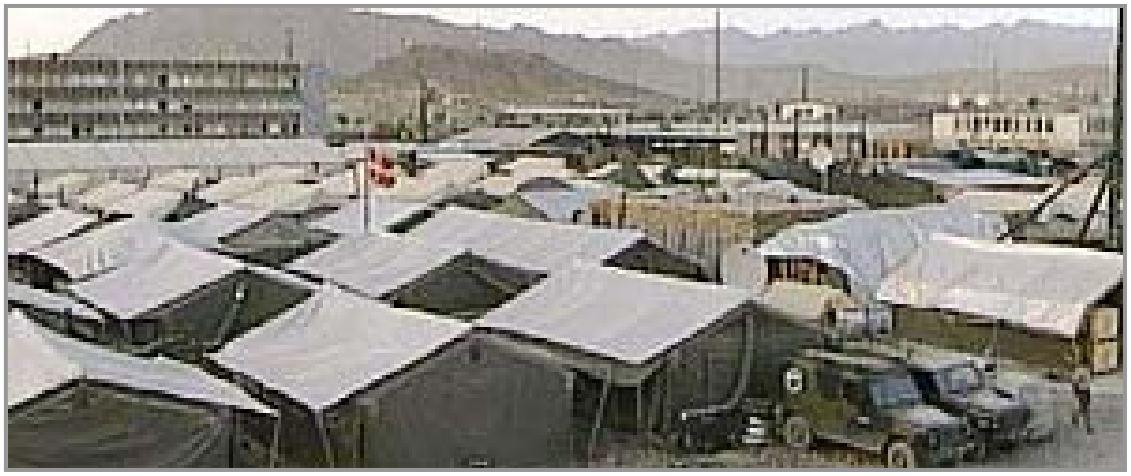
New Threat: Rockets, Artillery, Mortars (RAM)



Solution: Counter RAM (Rocket Artillary & Mortar) for Military Camp Protection

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35 mm ABM Ahead Technology: C-RAM Defense Potential demonstrated

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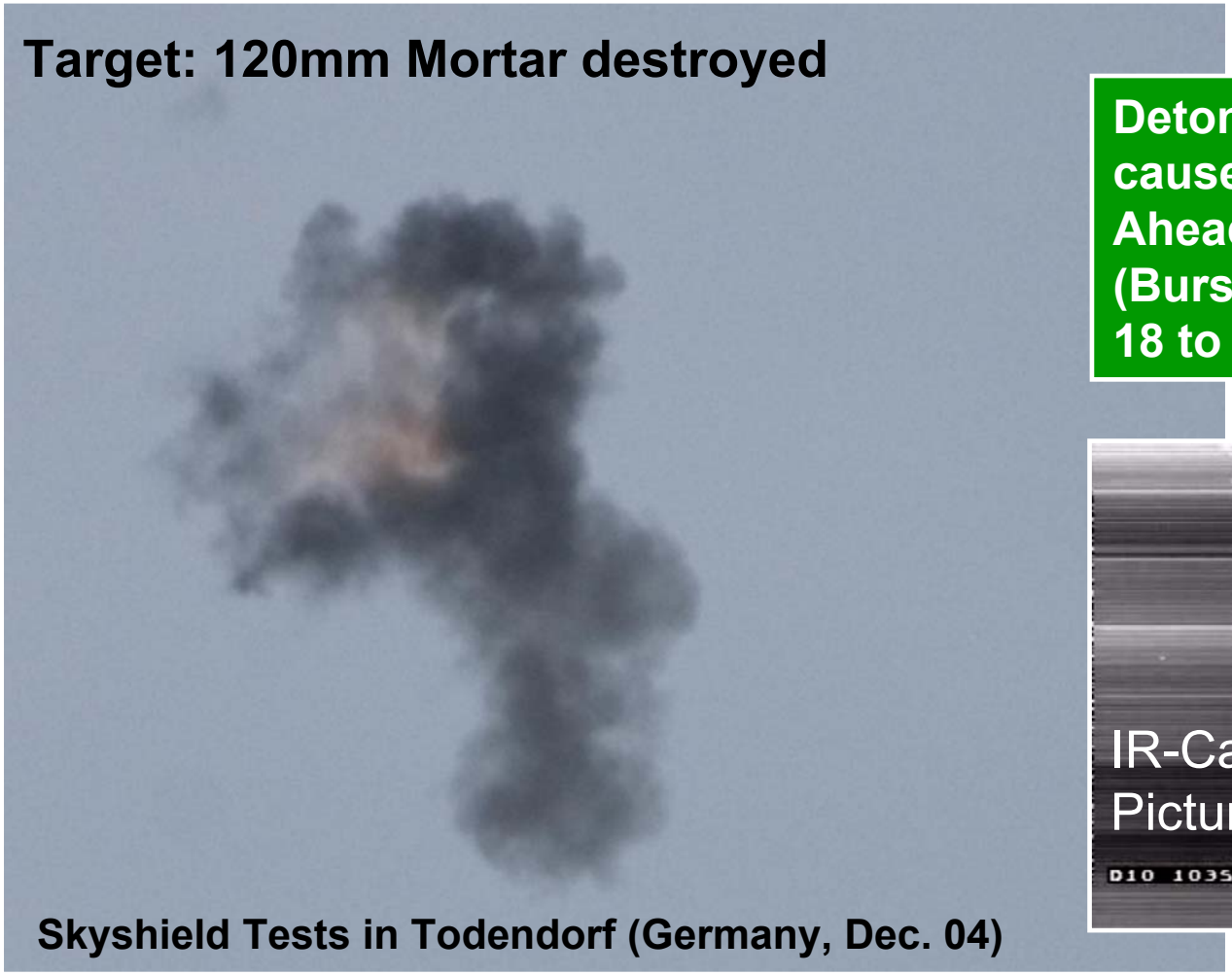
Target: 120mm Mortar destroyed



Skyshield Tests in Todendorf (Germany, Dec. 04)

Detonation caused by Ahead (Bursts of 18 to 36 Rds)

ABM-Ahead Technology: Versatile Solution to Defense Problems

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The Space-Time Programmable Ammunition:
For **ANY Defence Role** & **TARGET Engagement**

- **Armies**
- **Navies**
- **Air Forces**
- **Peace Keeping & Enforcement Forces**

TARGET Engagement

- **Hard to Soft**
- **Dispersed to Concentrated**
- **Open to Hidden**
- **Lethal to Less-Than-Lethal**

Example of a Modern Med. Cal. Ammo Family: 30mm x 173 New Oerlikon Ammunition

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		Vo
Air-Burst ABM		1100 m/s
Long-Rod APFSDS-T		1405 m/s
Frangible FAPDS-T		1405 m/s
Training TPFDS-T		1465 m/s