OERLIKON CONTRAVES

Fragmenting Payload Ammunition Frap

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rap (Fragmenting Payload) Definition

rap defines a KE ammunition with an inert payload designed to

agment and release its energy after target penetration, thereby

eating devastating in-depth secondary effects and significantly

ugmenting the lethality of the round against a wide range of targets.

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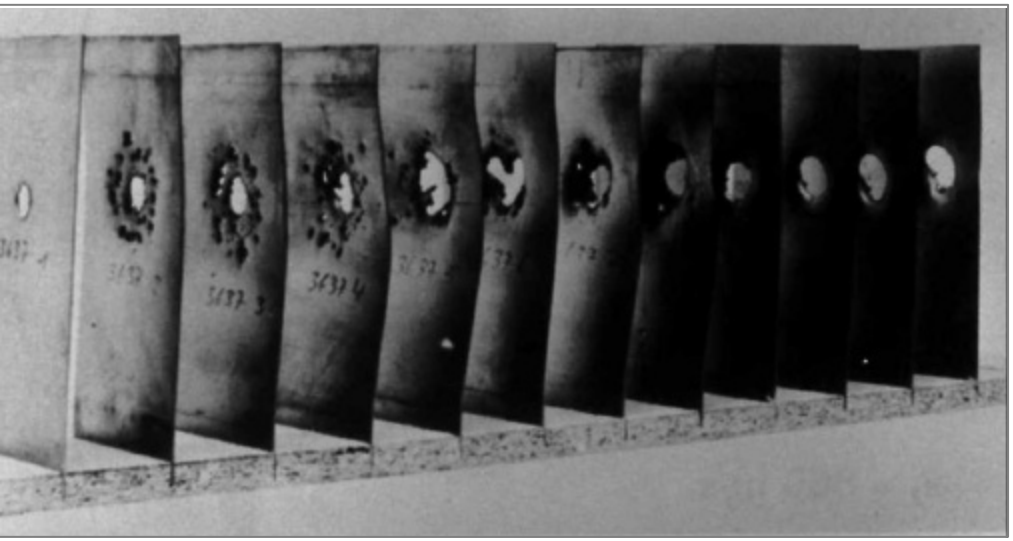
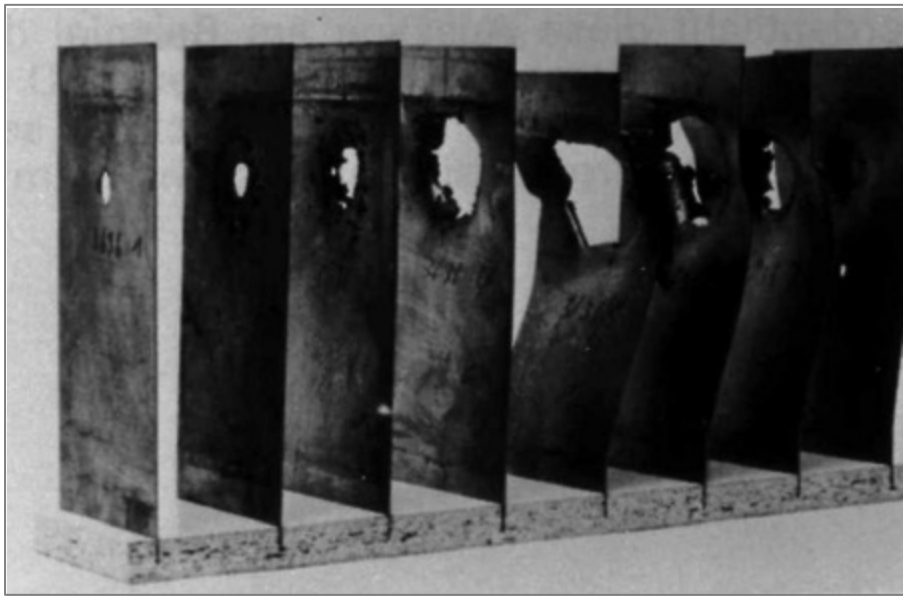
rap Phenomenon

teel Ball Projectile, a) soft annealed: b) hardened:





his discovery was made by the AFB (Abteilung Für Ballistik/Germany
arly 70's.

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rap Development at Oerlikon

n the late 70's Oerlikon discovered that heavy metal subcaliber penetrators with an axial front cavity (empty or filled with various materials) created the Frap-effect after target penetration.

n the 80's specially treated heavy metal technology was developed complete the full scale development of an FAPDS subcaliber ammo family: 23, 25, 30 & 35mm.

By the end of the 90's this technology was also adapted to meet the very stringent requirements of full caliber 20mmx102 aircraft ammo.

Currently 27mm x 145 aircraft ammunition with a Frap concept based on a pre-fragmented payload technology is in development.

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Current Frap Payload Designs

- **Frangible** - Specially treated heavy metal

- **Subprojectiles** - Prefragmented heavy metal

ethal Area of Various Ammunition Types in oft Target

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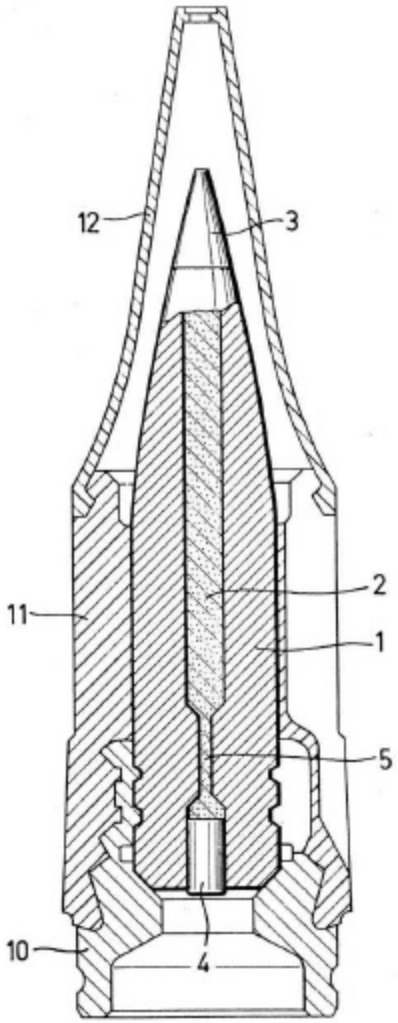
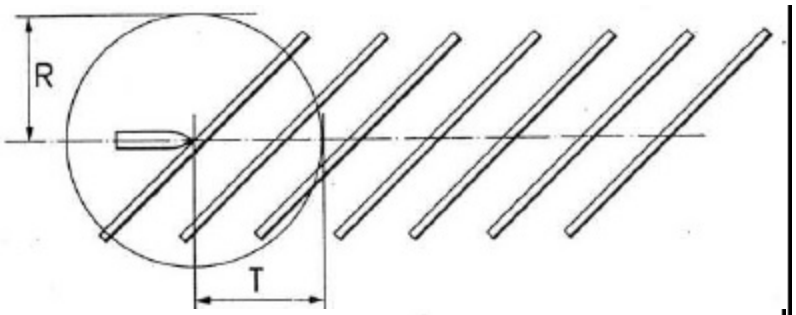
Early Oerlikon Patent



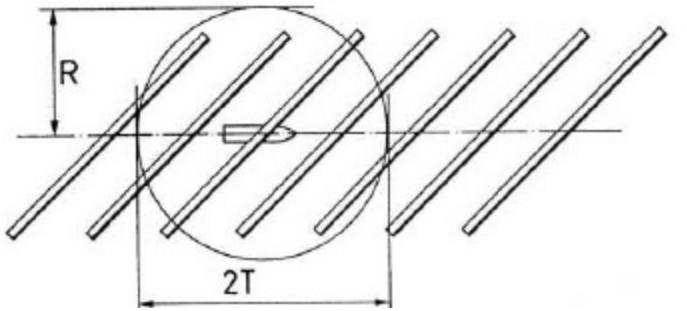
Ammo Type:

Lethality Area:

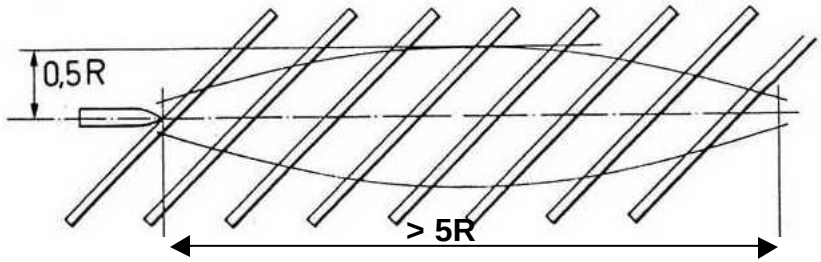
HEI w/PD Fuze



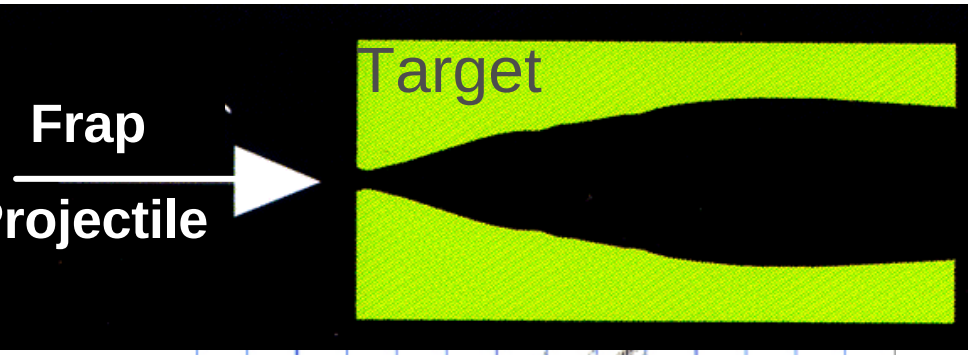
HEI / SAPHEI w/Base Fuze

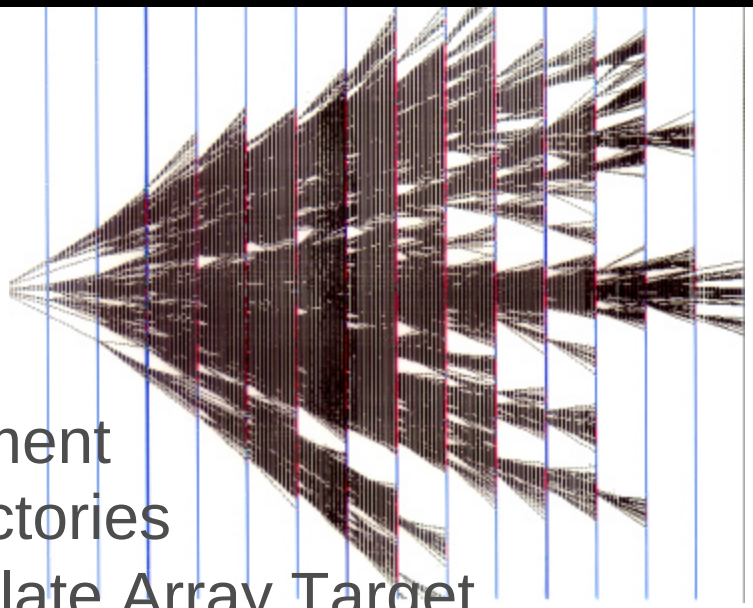


Frap

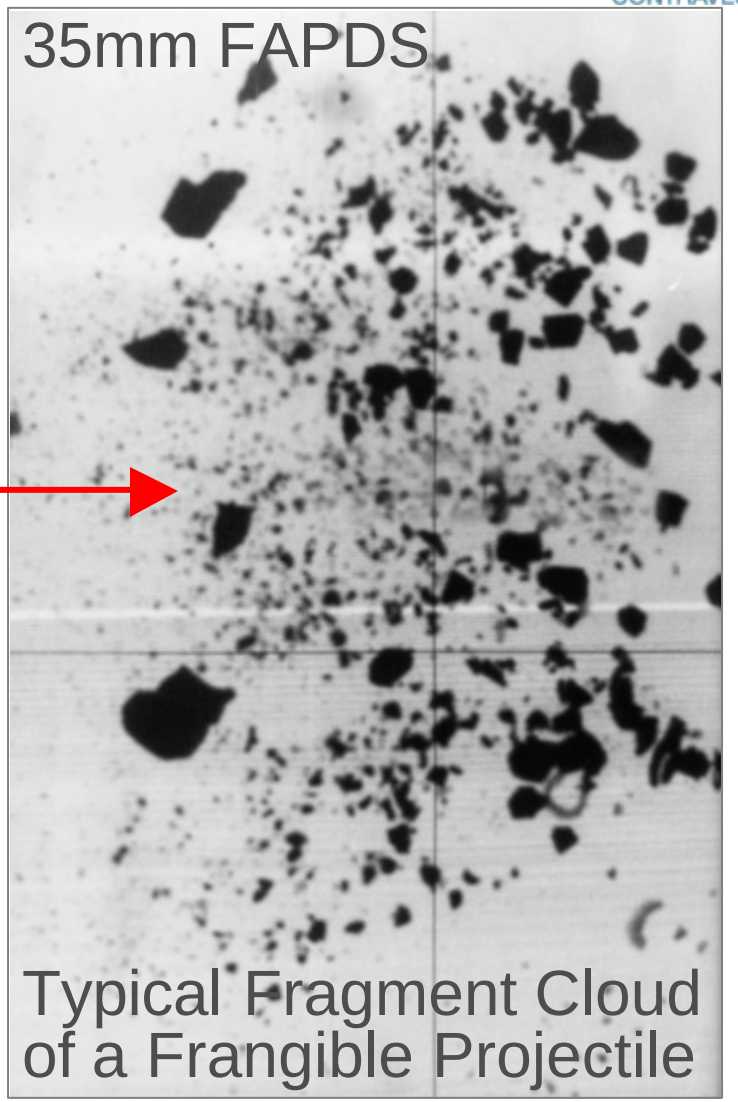


rangible Material Frap:
ull & Subcaliber





Fragment
Trajectories
n a Plate Array Target
(Cascade Model by TNO)



Typical Fragment Cloud
of a Frangible Projectile

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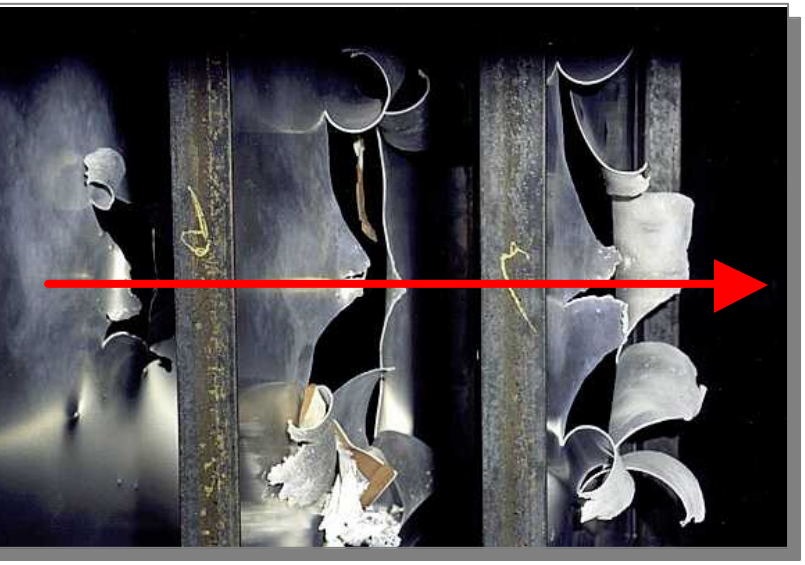
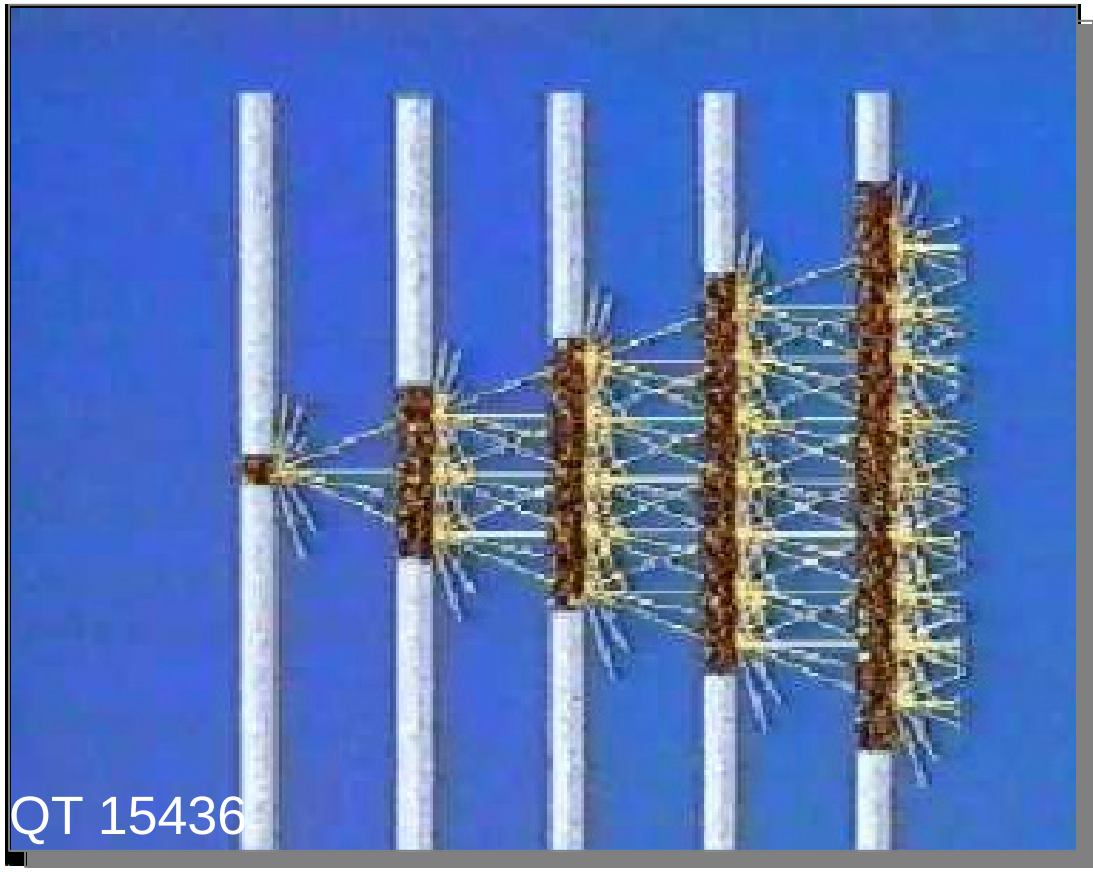
rangible Material Effect





Frangible Video Clip
TNO / OCP

5mm x 137 Frangible Ammunition FAPDS-T
ffectiveness against BMP 2 at 1200 m

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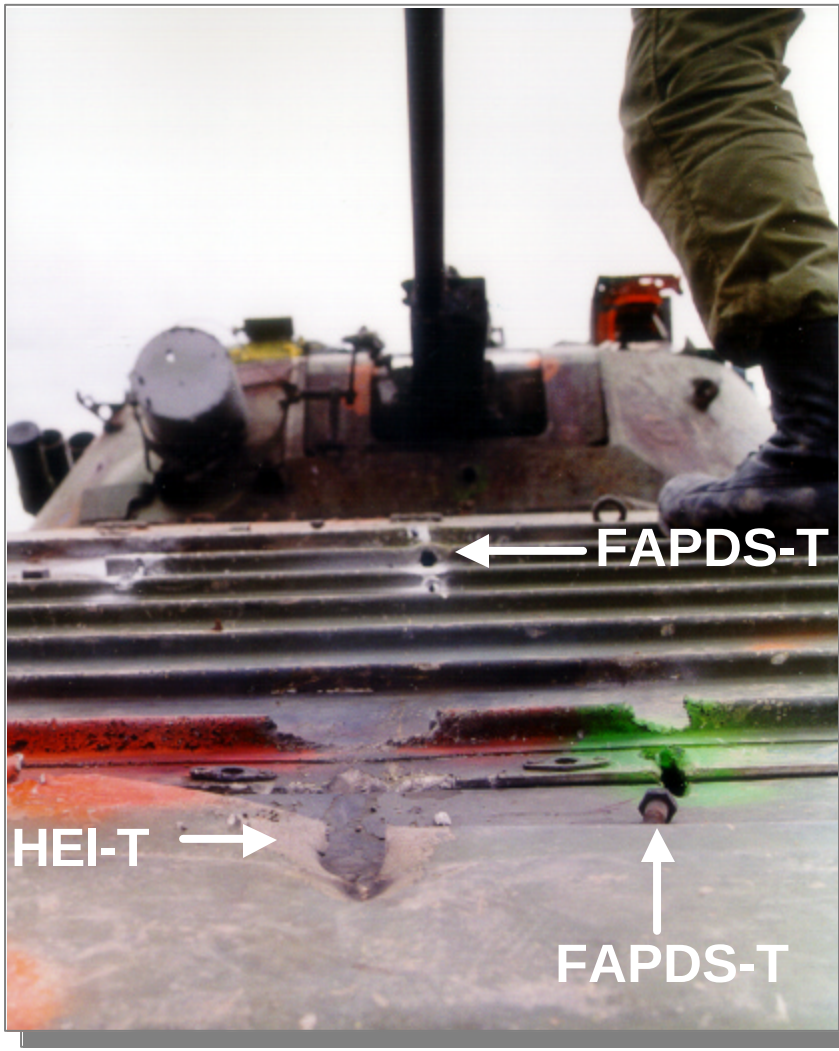

FAPDS-T: full penetration
HEI-T: no penetration

5mm x 137 Frangible Ammunition FAPDS-T
ffectiveness against Helicopter

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Firing Video

Target after Firing

3 Round Burst at 1200 m Range

ubprojectile Payload ABM:
jection in an Air Burst Munition Mode

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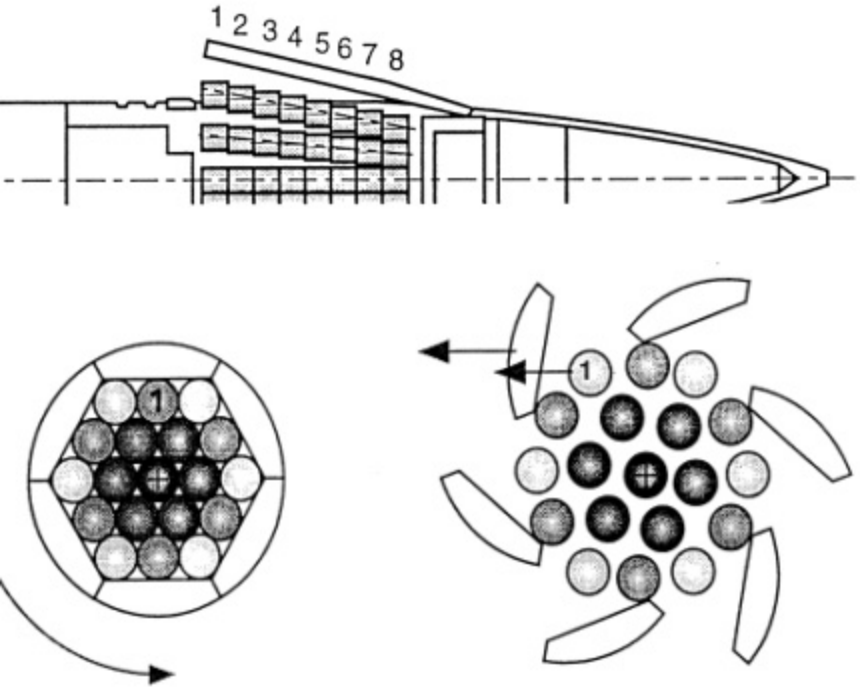
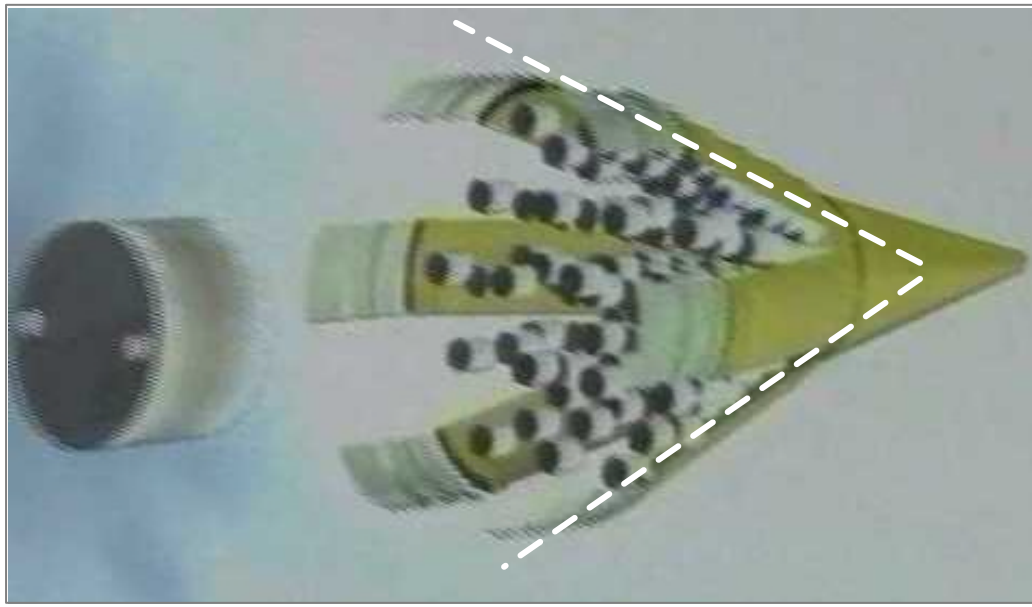
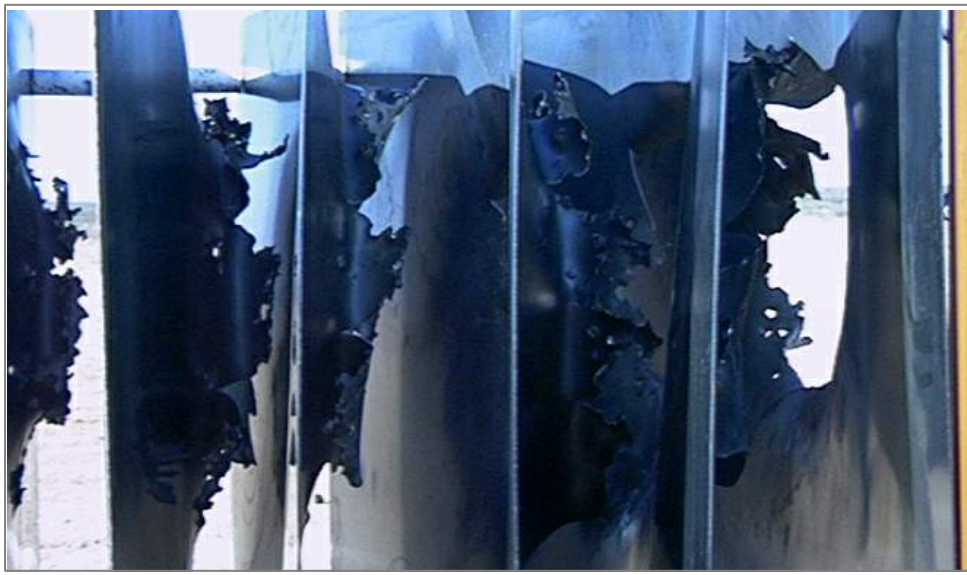
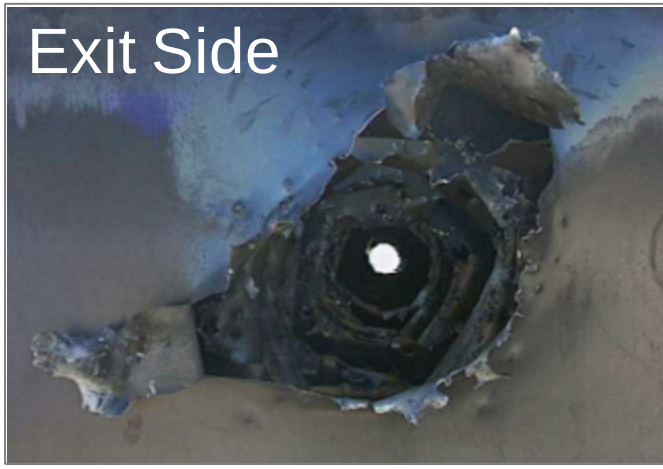




Pre-fragmented (Subprojectiles) payload
opens up from the back to the front!

5mm x 228 ABM (Ahead) Impact Mode ubprojectile Payload Effectiveness





late Array Target: 13 mm HHA (1st plate)
10 mild steel plate 1.6 mm, 10 cm apart.

0mm x 173 ABM Impact Mode
ubprojectile Payload Effectiveness I

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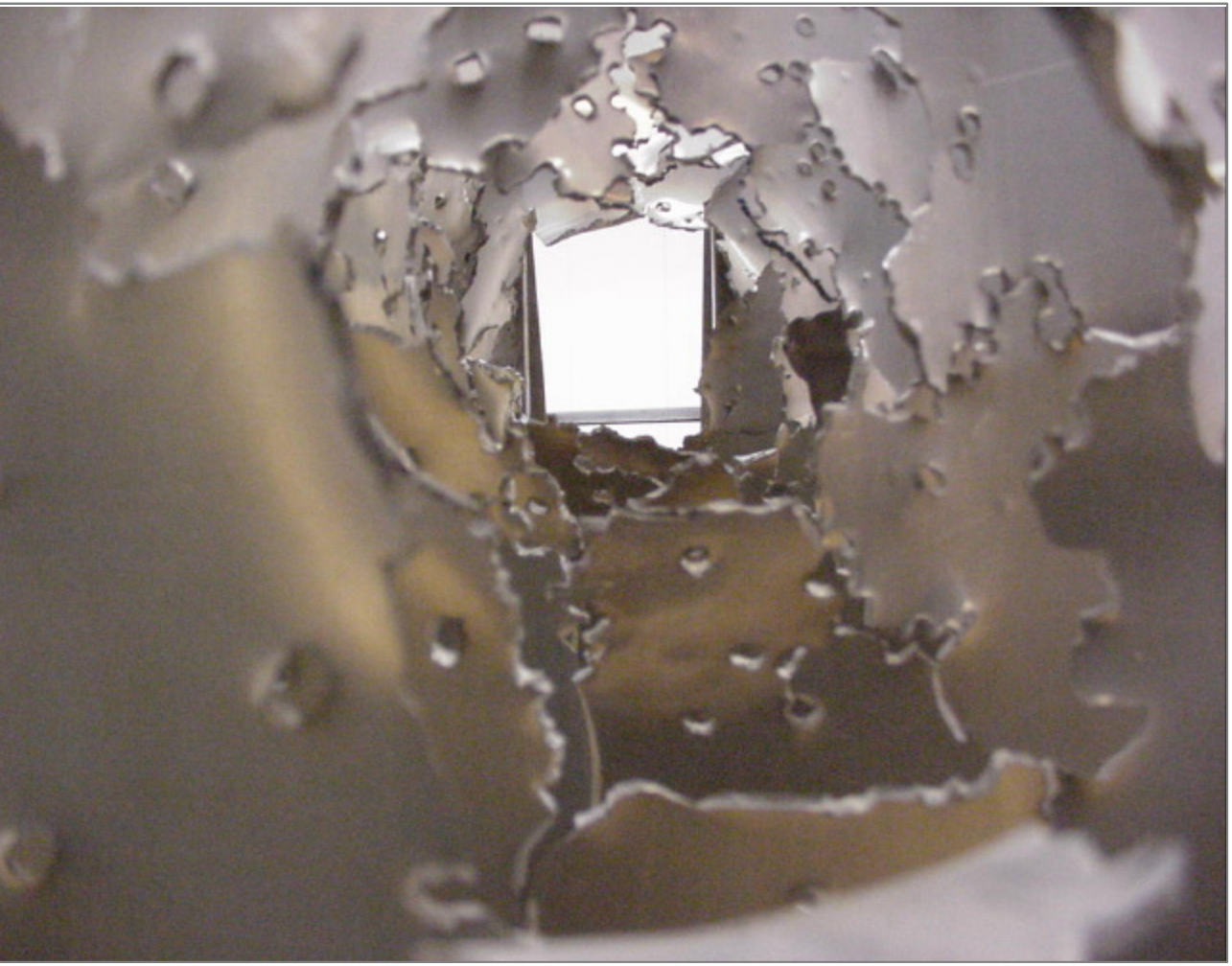

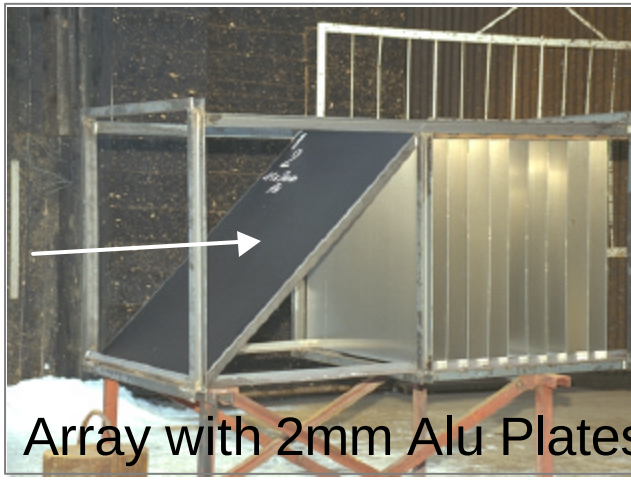

0mm x 173 ABM Impact Mode
ubprojectile Payload Effectiveness II

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ubprojectile Payload Frap (27mm x 145): jection After Impact

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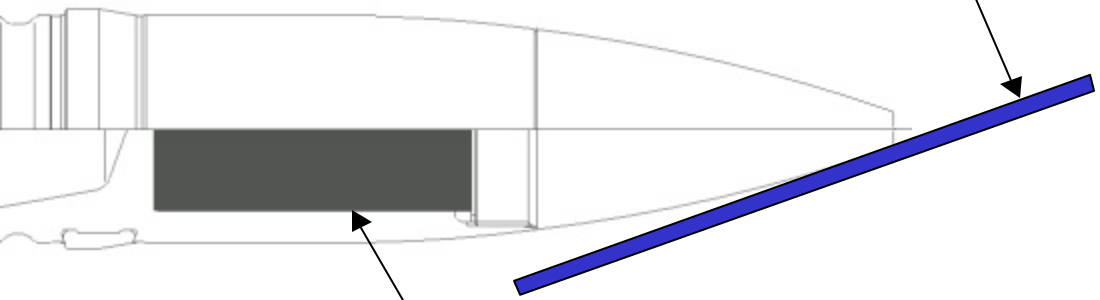
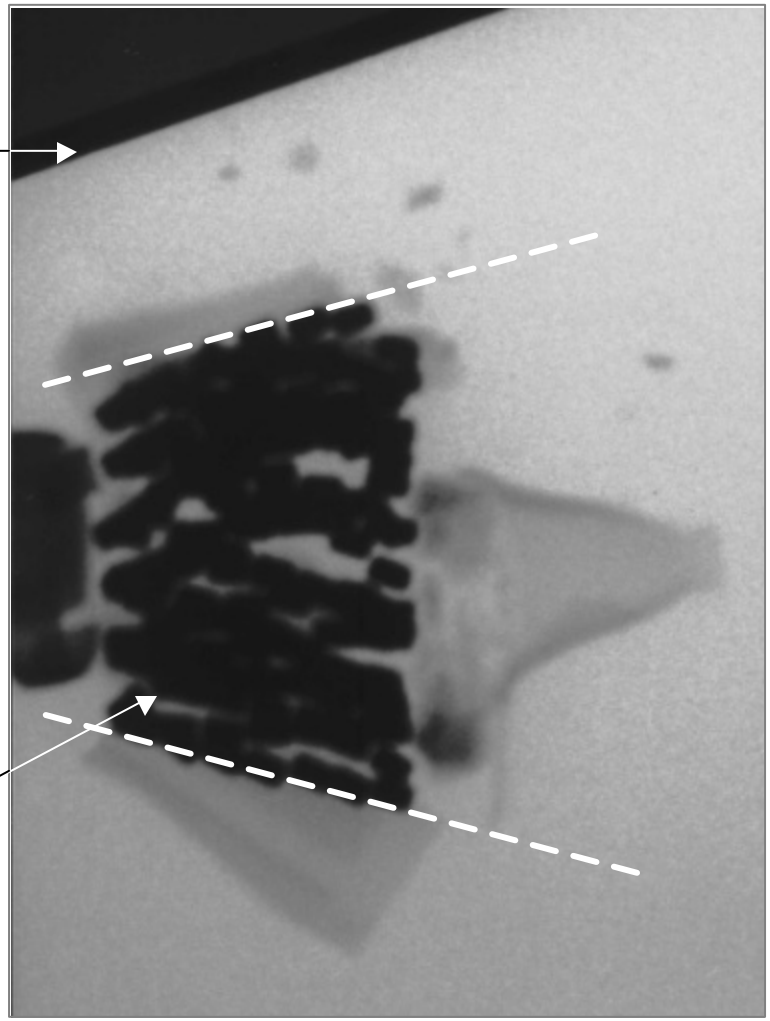
Impact Plate:

2 mm Av Plate / 70°NATO





Subprojectile payload

opens up from the front to the back!

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ootprint of Subprojectile Payloads

30mm ABM (Air Burst Mode)

b) 27mm Frap (BK27)

7mm x 145 Frap:
iring at Aircraft Target Simulation S1

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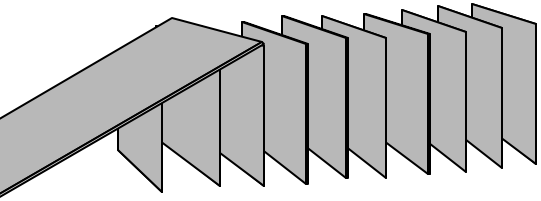

Target S1: 11 Alu Plates 2 mm
Spacing: 30 cm
1st Plate: 70° NATO

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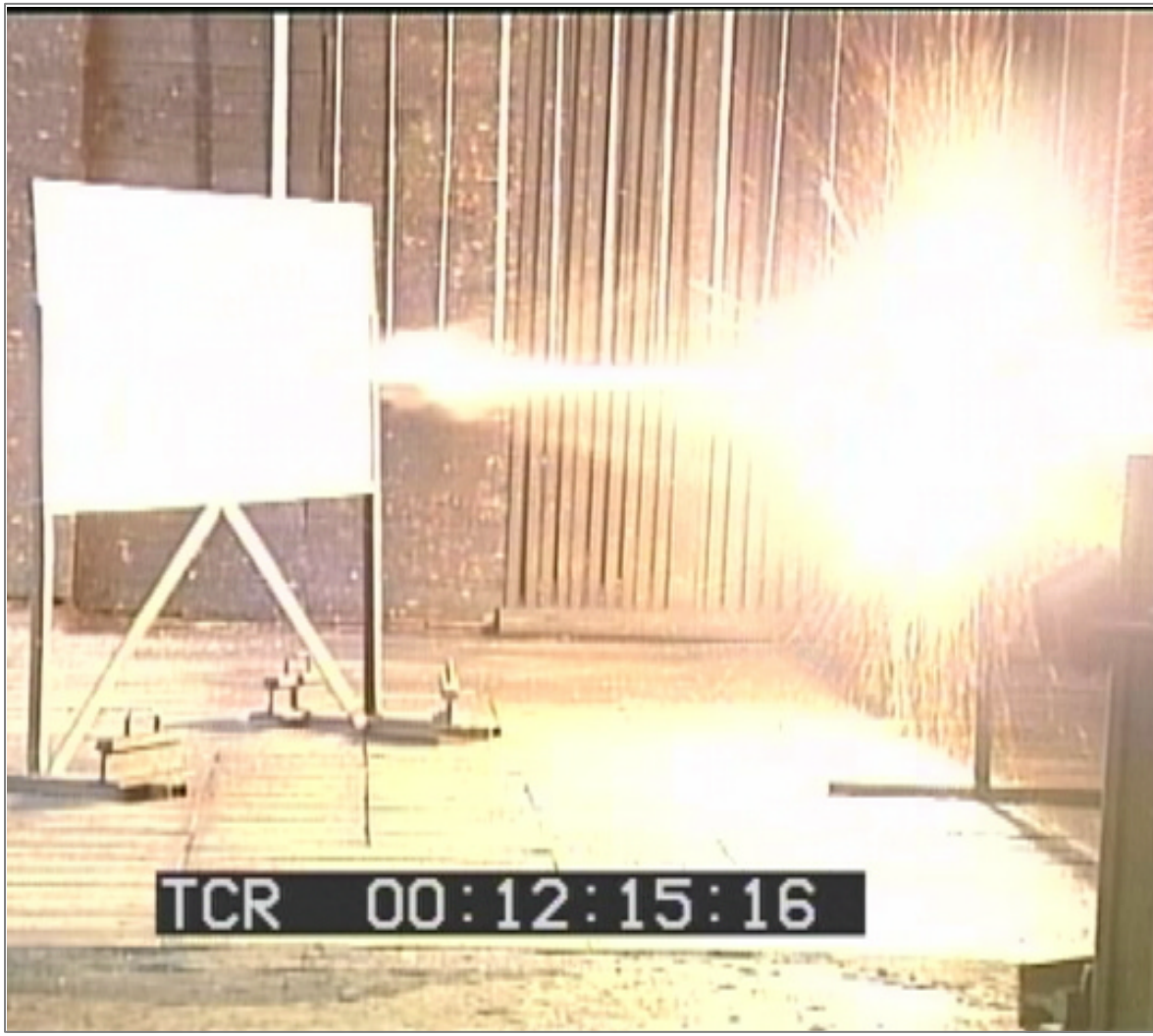
ire Start Capability / Marking Charge

The integration of an nert incendiary mix provides the Frap ammo (here 27mm x 145) with the capability of:

- Fire Start,

as well as:

- Marking of Hit Area



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rap: Main Features

erformance	Devastating in-depth secondary effects (fragments blast - incendiary) against soft and light armoured targets
afety	Safe for operation (no fuze, no HE-filling), no duds and reduced ricochet risk
nvironment	No toxic elements
ransport/Storage	UN-classification analogous TP

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rap Advantages

Enhanced Survivability:

Totally inert projectile (No fuze & no HE-filling)

Combat and training in one round

Greater stowed kills

Lower Life Cycle Costs:

No special transport, storage or handling requirement (analogous TP

Reduced logistics burden (only one ammunition)

Simplified demilitarisation / re-use of projectile