Oerlikon Ammunition for New Defense Environment

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### Lessons Learned & Implemented

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**FAP:** Frangible Armor Piercing (Frap Technology)

**FAPDS:** Frangible Armor Piercing Discarding Sabot (Frap Technology)

**APFSDS:** Long Rod

**ABM:** Air Burst Munition (Ahead Technology)
Threat Spectrum
Evolution of Medium Caliber Ammo Types
Paradigm-Shift (Quantum Leap)

70’s 80’s 90’s 2000’s

- Long Rod (APFSDS)
- Frap (incl. FAPDS, FAP)
- Air Burst Munition (incl. Ahead)

PAST

- AP
- APDS
- HEI (PD-Fuze)
- SAPHEI, APHEI
- HEI (Base Fuze)
- HE (with Prox. Fuze)

NEW
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).
Safety Issue with High Explosive Aircraft Ammunition

Swiss F/A-18 “Early Burst”

USAF F-16 In-Bore Explosion

USNavy F/A-18 Gun Barrel Rupture

Ref.: www.google.com:
Search: PGU-28/B
Solution: FAP Ammunition
Lethality of 20mm x 102 FAP & HEI

Attrition Kill

Mission Abort

Vulnerable Areas in Red

HEI

FAP

Range: 900 (m), Side & Head-on attack
Urban Targets
Solution: FAPDS Ammunition (e.g. 25mm x 137)

Target: 20 cm (2 x 10 cm) Concrete Wall with double steel-structure reinforcement at a range of 1500 m
"Soft" Targets
Solution: FAPDS Ammunition

FAPDS Main Characteristics:
• Higher Hit Probability (shorter ToF)
• Higher Lethality
• Lower Vulnerability (no HE-Filling)
• Lower Life Cycle Costs
'Hard' Targets
Solution: FAPDS Ammunition (e.g. 25mm x 137)

Results:

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<th>HEI-T:</th>
<th>no penetration of main armour</th>
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<tr>
<td>FAPDS-T:</td>
<td>full penetration of main armour</td>
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Target: BMP-2
Range 1.2 km
Armoured Targets
Solution: APFSDS-T (Long Rod) Ammunition (e.g. 30mm x 173)

• 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
Vehicle & Naval Craft
Solution: ABM Ahead System - Principle

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

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

Fire CS → ABM Electronics → Fuze Programming

Payload Ejection

Vo Measuring

ABM Projectile KETF

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

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)

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

Air Threat: incl. ASM, AGM
Infantry Solution: ABM 40mm x 53 Calibre (AGL)

AGL: Automatic Grenade Launcher

Any AGL System incl. LWAGL, MK19

Light Weight AGL of ST Kinetics with ABM System Upgrade

Air Burst Munition (Ahead-HETF)
Trends in Air Threat

Difficult to

- Detect, Track, Engage, Hit, Kill

Trend
Solution: GB Air Defense Skyshield 35mm Ahead

Detection/Tracking

Subprojectiles

Ejection

Data Transmission

Muzzle Velocity Measuring

Gun Computer

Fuze Programming

Muzzle Base with Programmer
UAV’s & Missiles
Solution: Skyshield 35mm Ahead

UAV-Target Destroyed

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

IR-Camera Picture
New Threat: Rockets, Artillery, Mortars (RAM)
Solution: Counter RAM (Rocket Artillery & Mortar) for Military Camp Protection

Skyshield 35mm Ahead: Tests in Todendorf (Germany, Dec. 04)
35 mm ABM Ahead Technology:
C-RAM Defense Potential demonstrated

Target: 120mm Mortar destroyed

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

Skyshield Tests in Todendorf (Germany, Dec. 04)
ABM-Ahead Technology: Versatile Solution to Defense Problems

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

- Air-Burst ABM: $V_o = 1100 \text{ m/s}$
- Long-Rod APFSDS-T: $V_o = 1405 \text{ m/s}$
- Frangible FAPDS-T: $V_o = 1405 \text{ m/s}$
- Training TPFDS-T: $V_o = 1465 \text{ m/s}$