40 MM x 53 AIR BURST MUNITION 
FOR AUTOMATIC GRENADE LAUNCHERS

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Air Burst Munition (ABM)

System Integration (35mm SkyShield)

- Detection/Tracking
- Ejection of 152 Subprojectiles
- Data Transmission
- Muzzle Velocity Measuring
- Fuze Programming
- Gun
- Computer

35mm Ahead Projectile
152 W-Subproj. (3.3 g each)

Programmable Electronic Fuze
Ejection Charge
Heavy Metal Payload

Muzzle Velocity Measurement
Programming Coil
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Fuze Challenge!
Programmable Payload Delivery (Demo 1992)

Precise Time Space Payload Delivery up to 5000 rd/min!

10 Rds between 1200 m & 300 m every 100 m!

10th Rd: 300 m
1st Rd: 1200 m

„String of Pearls“ at 550 Rd/min of 35mm Ahead-HETF Ammuno
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Fuze Programming without & with Compensation of Muzzle Veloc. Variation

DEMO 1992

7 Rd Burst 35mm Ahead-HETF Ammunition at 1600 m Range
ABM Family of Oerlikon Contraves

35mm x 228
Ahead
NATO Qual.

30mm x 173

40mm x 53
selected by Sweden for evaluation

Other studies on following calibers:
25mm x 137
27mm x 145
up to 140 mm

Scale:
ABM Fuze Components

Fuze Components:
1. Receiving Coil
2. Setback Generator
3. Electronic Timer Module
4. Squib
5. Safe & Arm
6. Booster, Ejection Charge
7. Base-Fuze Housing

Contactless Programming at Gun Muzzle
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Air Bursting System Upgrade
For All 40mm Automatic Grenade Launchers

ONE ABM-SYSTEM for all 40mm x 53 Weapon with minimal modifications!

CIS 40AGL
Vektor AGL
Saco Defense MK19
H&K GMG 40 x 53

ST Kinetics
Light Weight AGL
Air Burst Munition (ABM)

40mm x 53 AGL Air Burst Munition: One Fuze for All Types

ONE Fuze for all types of 40mm x 53 Air Burst Munition
40mm x 53 Automatic Grenade Launchers: Air Bursting Munition HTE309
Air Burst Munition (ABM)

Air Bursting Munition Concept
Electronic Timer Module ETM

Parameters & Features

• Operating range: 40 m to 1600 m
• Self-Destruction (SD): 1600 m
• Programming of impact function: On / Off
• Impact function & SD: On if not programmed
• Sensitivity of impact sensor: 2 mm Alum. Alloy
• Data transmission check: if negative -> SD is On
• Absolutely ECM safe
• Without external energy the fuze still works on impact even at graze angles
Air Burst Munition (ABM)

Air Bursting Munition Concept
Safe and Arm System

SAFETIES

- Setback pin
- Centrifugal pin
- Setback generator
- Detonator Safety
- Mechanical muzzle safety $\geq 18m$
- Mechanical arming $\leq 40m$
- Electronic muzzle safety $\sim 40m$
ABM HETF 40 mm x 53
Muzzle Programming Device

Ammunition Programming Phase in
Muzzle Programming Device
(X-Ray Picture)

Ammunition Programmer & Projectile

Trigger Coil
Programming Coil
Receiving Coil
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40mm x 53 ABM HTE309: Pre-Fragmented High Explosive Warhead

- Fragments: Tungsten Balls
- Number of Balls: min 330
- Ball Mass: 0.25 g each

Warhead designed to be effective against the „NATO Protected Man“

X-Ray Flash Picture of Detonating Warhead
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40mm x 53 ABM HTE309: Warhead Function
Air Burst Munition (ABM)

40mm x 53 Air Burst Munition for AGL
Two Blast Fragmentation Warhead Concepts

Nose Fuze Concept (Others)

Base Fuze Concept (Oerlikon)
Air Burst Munition (ABM)

Air Bursting Munition Analysis
Energy Pattern: Nose vs Base Fuze

Nose Fuze:
\[ V_{\text{frags}} = V_{\text{grenade}} - V_{\text{explosive}} \]

\[ V_{\text{frags}} \sim 750\text{m/s} \]

Base Fuze:
\[ V_{\text{frags}} = V_{\text{grenade}} + V_{\text{explosive}} \]

\[ V_{\text{frags}} \sim 1050\text{m/s} \]

Range: ca. 850 m
Frags: W-Balls 0.25 g
Air Burst Munition (ABM)

Air Bursting Munition Analysis
Max. Allowable Error Against Openings - N.F.
Air Burst Munition (ABM)

Air Bursting Munition Analysis
Max. Allowable Error Against Openings - B.F.

\[
\Delta h \quad \Delta v
\]

Firing Direction

BASE FUZE

Singapore Technologies Kinetics
Air Bursting Munition Analysis
“Behind Wall” Lethal Area

NOSE FUZE

BASE FUZE

Lethal Area

FIRING DIRECTION
Air Burst Munition (ABM)

Operation Versatility of the 40mm x 53 ABM
Air Burst Munition (ABM)

40mm x 53 Air Bursting Munition for AGL

Summary of Main Advantages

1. Smart technology simple and safe in use
2. No rate of fire limitation due to fuze programming
3. Inductive fuze programming at muzzle (not in the gun)
4. On-line compensation for muzzle velocity variation (optional)
5. Easy system upgrade: minimal weapon modification
6. Absolute gun unload safety
7. Insensitive to mud, humidity & other environmental factors
8. Firing through bushes (impact sensor switched off)
9. If no fuze programming required, self-destruct automatically on
10. Lethality level of each round adjustable
40mm x 53 Air Bursting Munition for AGL

Summary of Main Features

- **Electronic Base Fuze:** Ahead technology
- **Programmable at Muzzle:** Fuze time / impact sensor
- **Arming Time:** Mechanically & electronically driven
- **Safe and Arm:** Mechanically driven (Stanag)
- **Propulsion System:** Accurate / low muzzle velocity variation
- **Exterior Ballistics:** Compatible with standard ballistics
- **Point Detonating:** Piezo impact sensor / graze angle capability
  - Automatically On w/o fuze programming
  - Switched Off function programmable
- **Impact Sensor:**
- **Warhead:** HE pre-fragmentation / large footprint / high lethality
  (forward and lateral fragment release)
- **Self-Destruct Function:** Automatically On when no fuze programming
40mm x 53 Air Burst Munition System for AGL: Programme Mile Stones

• Start R&D (ABMS) Early 1998
• Start Partnership OCP - ST Kinetics May 1999
• Contract Signed with FMV-Sweden Dec. 2000
• Prototype Delivery FMV-Sweden May 2002
• Product Qualification Completed End 2003
• Start Serial Production 2004
Air Burst Munition (ABM)

40mm x 53 ABM HTE309: Firing Tests

Slow Motion Videos of single shot and burst firings up to 570 Rd/min

Video: M1 16117BA