

# 40mm Low Velocity Air-Burst Muniton System

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**LV ABMS**

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**Patented**

Advancing Towards New Frontiers

# Current & Future Situation



Demand for **more 40mm capable rounds** to combat a **wider range of threats**



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# 40mm LV Air Burst Munition System

## ■ What is LV ABMS?

- An upgrade of the current LV grenade launchers with **Precision Technology**
- LV ABMS air-burst capability greatly improves the accuracy & lethality
- It is effective against defilade targets e.g. hidden behind window, low walls, rooftop
- Enhanced troops & civilian safety (self-destruct mode)
- Ease of adaptation to all in-service grenade launchers.

**Transforms existing grenade launchers  
into  
Low Cost precision weapons**



## ■ Key Innovations

### – Air-Burst Munitions (ABM)

- Gun hardened COTS electronic board
- No battery (Setback generator)
- Reliable Safe & Arm
- Round initiates bi-directional communication

### – Programmer Unit (PU)

- Gun hardened COTS laser range finder
- Gun hardened COTS programmer card
- Rugged for rough environment



**Programmer Unit**

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# LV ABMS Concept of Operation



# Munition Concept

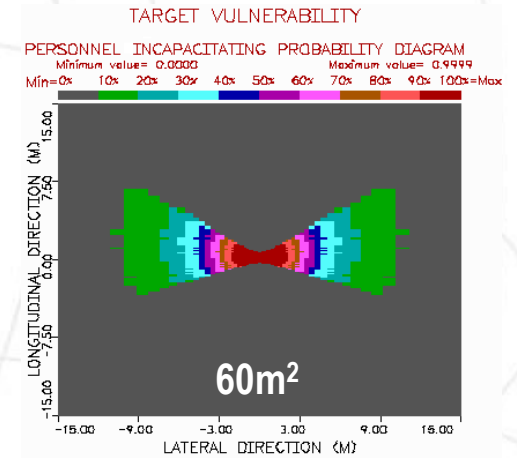
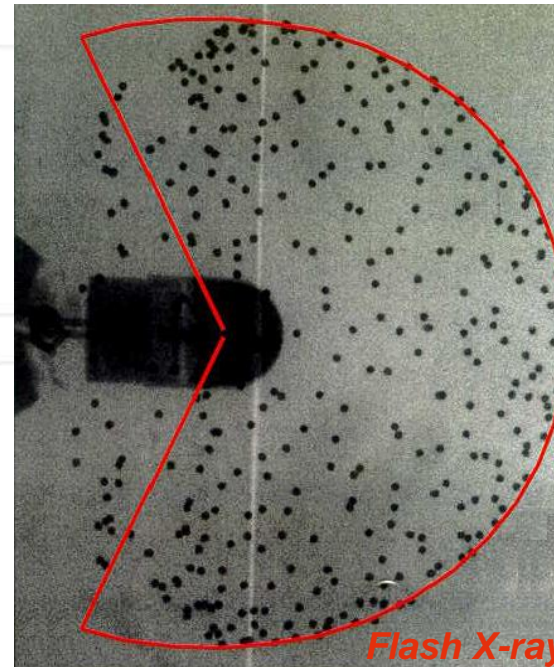
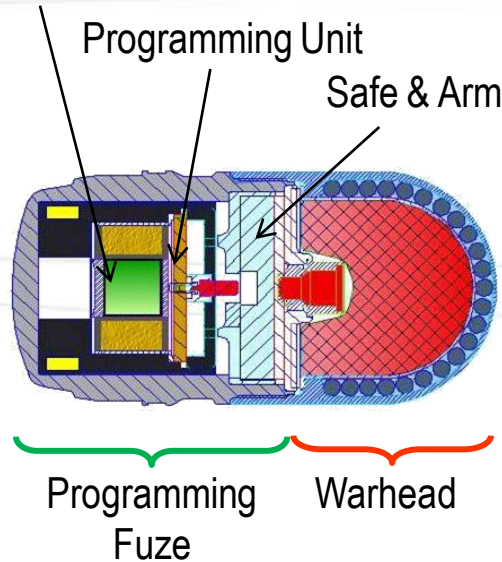
Fragment : Spherical Ball

No. of ball : 330

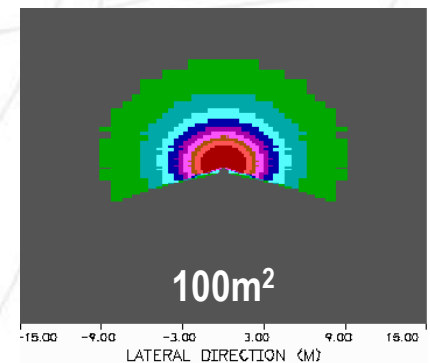
**Range: 300m**

**Vt: 55m/s**

Power Supply  
(Setback Generator)



**HEDP**

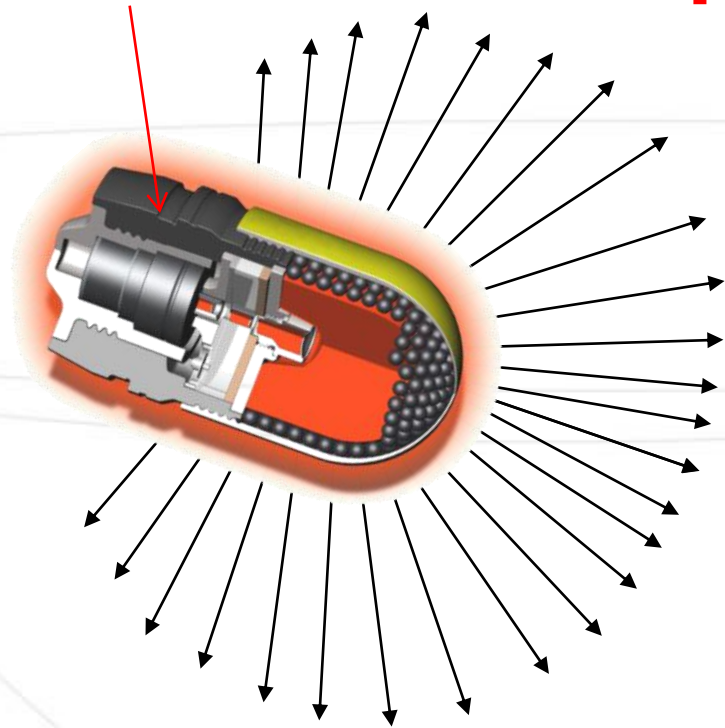


**ABM**

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## Terminal Ballistic of LV ABM HE

Base Fuze



### ■ With Base Fuze:

- Lethal area much larger - Better hit probability
- $Velocity_{rd} + Velocity_{frags}$  - Higher fragment velocity, (i.e. more lethal)
- Direct detonation wave - Better performance on impact
- “Behind Wall” effects - larger lethal area.
- Forward fragments - Higher safety at shorter range.



# Programmer Unit

## Adaptation

**1**

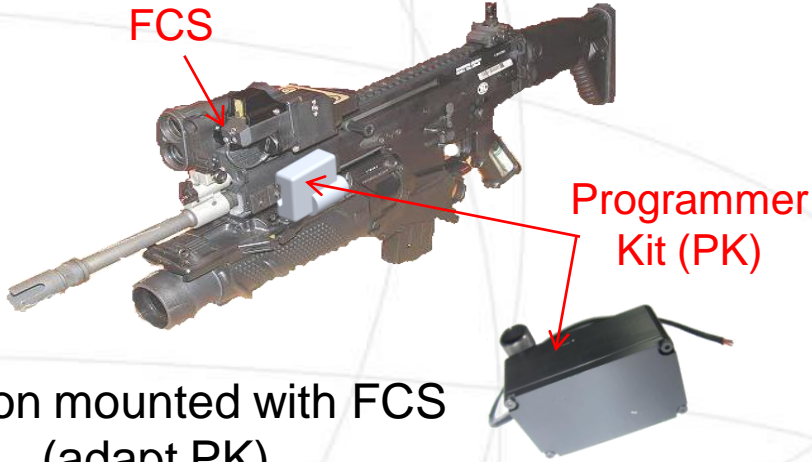


Programmer Unit (PU)

Weapon without FCS (adapt PU)

This diagram shows a black assault rifle without a front sight assembly. A separate black rectangular device with two blue lenses, labeled 'Programmer Unit (PU)', is shown below it. A red arrow points from the PU to the rifle's front sight area.

**2**




FCS

Programmer Kit (PK)

Weapon mounted with FCS (adapt PK)

This diagram shows the rifle with a front sight assembly (FCS) mounted. A white rectangular box, labeled 'Programmer Kit (PK)', is mounted on the side of the rifle. A separate black rectangular device is shown below it. Red arrows point from the labels to the FCS and the PK on the rifle.

**3**



Programmer Interface Card (PIC)

FCS

Weapon mounted with FCS (embedded with PIC)

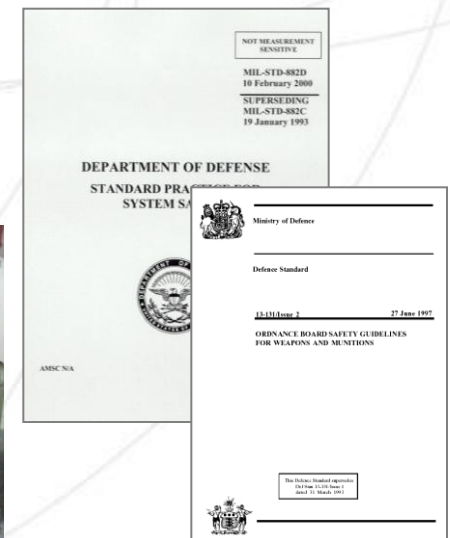
This diagram shows a green printed circuit board (PIC) with various components. A red arrow points from the PIC to the FCS on the rifle. The rifle is shown in a hand, with the FCS clearly visible.

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# Compliant Ammunition Standards

- LV ABM ammunition was developed and qualified to international standards
  - Mil-Std-331B
  - Mil-Std-810D
  - Mil-Std-1316E
  - STANAG 4157
  - OB P116
- LV ABMS is also subjected to System Safety assessment
  - Mil-Std-882D



# LV ABMS Technical Firing



1  
HE in flight set to detonate 1m from door



2  
Moment of detonation



3  
Emerging fireball



4  
Fireball & fragmentation effect on door & Pendine blocks

LV ABM HE Air-Burst 1m in front of the Door

NATO Test Range  
at  
Pendine  
22/10/10

Fixed Stand Firing  
SA80/UGL

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# LV ABMS Demonstration Firing

LV ABM HE Air-Burst in front of  
the Window

Test Range  
at  
Bukit Timah  
10/8/10

Hand Held Firing  
CIS 40GL



**Air-Burst  
SA80/UGL**



**Impact  
SA80/UGL**

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# 40mm Air Bursting Munitions



**LV ABM TP  
(F&B)**



**LV ABM HE**

Performance	Low Velocity		Programmer Unit	
	LV ABM TP (S402)	LV ABM HE (S403)	Performance	Unit
Muzzle Safety	14 m	14 m	Dimension	114 X 78 X 50
Arming Distance	28 m	28 m	Weight	300 gm
Muzzle Velocity	76 m/s	76 m/s	Day sight	1 X
Penetration	-	12 mm	Laser Range	600m±1m
Lethal Radius	-	8 m	Battery	3VDC > 3hrs Continuous
Warhead Filling	Report Charge	Comp. A5	Temperature	-40°- +50°C
Fuze	Programmable Base Fuze	Programmable Base Fuze		
Self-Destruct	Yes	Yes		
Max. Range	400 m	400 m		
<b>Status</b>	<b>Production (TRL 8)</b>		<b>Production (TRL 8)</b>	



**Programmer Unit**



- TP (F&B) - For target practice with powder to indicate Flash and Sound
- HE - Effective against personnel and light armour targets

- **Operational Benefits**
  - Improves accuracy & lethality
  - Reduce logistic footprint
  - Lethal to Less Than Lethal munitions
  - Effective against defilade targets
  - Flexibility in engagement (i.e. Air-burst or Impact)
  - Enhance troops survivability
  - Ease of adaptation to all grenade launchers
- **Transforms the existing grenade launchers into a **Low Cost precision weapon with Air-Burst Capability** that Enhances Warfighters Effectiveness**

# ENHANCING WARFIGHTER'S EFFECTIVENESS

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**ON DEMAND SURVEILLANCE**  
 Soldier Parachute  
 Aerial Reconnaissance  
 Camera System  
 (SPARCS)

**PRECISION**  
 Air Bursting  
 Munitions

**LETHALITY**  
 Enhanced Blast  
 Munitions

# Thank You



**SINGAPORE QUALITY AWARD**  
 SAFETY Self-Defeating Cartridges and Insensitive Munitions



**INNOVATION EXCELLENCE AWARD**  
 2016 AWARDS



**DNV**  
 ANS100 REGISTERED FIRM



**ISO 9000**  
 PSB



**ISO 14000**  
 PSB



**OHSMS**  
 PSB



**SINGAPORE SERVICE CLASS**



**BETTER ACCEPTEDE ELOPER**  
 LONGER RANGE  
 SINGAPORE  
 Low Velocity Extended Range Munitions