40mm Low Velocity
Air-Burst Munition System

Date: 25th May 2011

LV ABMS

Aw Cheng Hok
contact no: +65 96374533
e-mail: awch@stengg.com

Patented
Advancing Towards New Frontiers

This document remains the property of the company and may not be copied or given to third parties without our permission.
Current & Future Situation

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

This document remains the property of the company and may not be copied or given to third parties without our permission
Technology

- **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
LV ABMS Concept of Operation

1. Obtain the target distance

2. PU computes time of burst & transmits

3. Programme ABM

Alternative solution

FCS + Interface Card

LV ABM TP (F&B)  LV ABM HE

Programmer Unit (PU)

ABM HE
Munition Concept

Fragment: Spherical Ball
No. of ball: 330

Range: 300m
Vt: 55m/s

Power Supply
(Setback Generator)

Programming Unit
Safe & Arm

Programming Fuze
Warhead

Flash X-ray

ST Kinetics
A company of ST Engineering

Target Vulnerability
Personnel Incapacitating Probability Diagram

60m²
HEDP

100m²
ABM

Advancing Towards New Frontiers
Lethality

Terminal Ballistic of LV ABM HE

- **With Base Fuze:**
  - Lethal area much larger - Better hit probability
  - $\text{Velocity}_{\text{rd}} + \text{Velocity}_{\text{frags}}$ - 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.

Base Fuze
**Programmer Unit**

**Adaptation**

1. Weapon without FCS (adapt PU)
   - Programmer Unit (PU)

2. Weapon mounted with FCS (adapt PK)
   - FCS
   - Programmer Kit (PK)

3. Weapon mounted with FCS (embedded with PIC)
   - FCS
   - Programmer Interface Card (PIC)

**ST Kinetics**

A company of ST Engineering
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

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

NATO Test Range at Pendine
22/10/10

Fixed Stand Firing
SA80/UGL

Advancing Towards New Frontiers
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

Advancing Towards New Frontiers
# 40mm Air Bursting Munitions

## Specifications

<table>
<thead>
<tr>
<th>Performance</th>
<th>LV ABM TP (S402)</th>
<th>LV ABM HE (S403)</th>
<th>Programmer Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muzzle Safety</td>
<td>14 m</td>
<td>14 m</td>
<td>Dimension</td>
</tr>
<tr>
<td>Arming Distance</td>
<td>28 m</td>
<td>28 m</td>
<td>Weight</td>
</tr>
<tr>
<td>Muzzle Velocity</td>
<td>76 m/s</td>
<td>76 m/s</td>
<td>Day sight</td>
</tr>
<tr>
<td>Penetration</td>
<td>-</td>
<td>12 mm</td>
<td>Laser Range</td>
</tr>
<tr>
<td>Lethal Radius</td>
<td>-</td>
<td>8 m</td>
<td>Battery</td>
</tr>
<tr>
<td>Warhead Filling</td>
<td>Report Charge</td>
<td>Comp. A5</td>
<td>Temperature</td>
</tr>
<tr>
<td>Fuze</td>
<td>Programmable Base Fuze</td>
<td>Programmable Base Fuze</td>
<td></td>
</tr>
<tr>
<td>Self-Destruct</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Max. Range</td>
<td>400 m</td>
<td>400 m</td>
<td>Max. Range</td>
</tr>
<tr>
<td>Status</td>
<td>Production (TRL 8)</td>
<td>Production (TRL 8)</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**EFFECT**

### Advancing Towards New Frontiers

This document remains the property of the company and may not be copied or given to third parties without our permission.
Summary

- 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
Thank You