Direct Fires & Precise Weapons for the modern battlefield

Danny Schirding
Program Manager & Marketing Director
Munition Systems Division, IMI
Tel: +972 3 5486122
E-mail: dschirding@imi-israel.com

2011
Lessons learned from the battle field
The Battlefield Scenarios

War

Non Limited Conflicts at High Friction (NLCHF) / Major Operations

Limited Conflict at Medium Friction (LCMF) / Routine security operations
# Challenges (Typical targets) Vs. scenarios

<table>
<thead>
<tr>
<th>Dismounted Infantry (Short / long range A.T Teams...)</th>
<th>Tanks</th>
<th>Assault Helicopter</th>
<th>IFV’s</th>
<th>Military infrastructures (Bunkers, field fortifications ...)</th>
<th>Mines / IED’s</th>
<th>Buildings</th>
<th>Snipers</th>
<th>Tracks / Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) WAR</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2) NLCHF</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3) LCMF</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

**NLCHF** = Major Operations including MOUT

**LCMF** = Routine security operations
Direct Fires & Precise Weapons for the modern battlefield
120mm Guided Mortar Munitions (GMM)

Indirect Fire

2011
System Requirements

120mm mortar bomb which provides combat teams with organic, rapid response, and all weather indirect fire capability

The Requirements:

- Precision
- First round on the target
- Increased lethality
- Minimized collateral damage
- Reduced logistical support
- Leveraged joint fire networking
Performance Goals

- Ballistic Range: 7.2 Km (K6-charge 5)
- Gliding range: ≈ 10 Km (K6-charge 5)
- GPS guidance, CEP (Circular Error Probable) < 10 m
- Laser guidance, CEP (Circular Error Probable) < 1.5 m
Operational Sequence

• The bomb could be fired from existing platforms
• The bomb operation procedures are like regular bombs except loading of mission data
Video Clip
“HORNET”
120-mm Light Mobile Mortar System

IMI
Israel Military Industries Ltd.
Munition Systems Division (MSD)

General Business Information

2011
**IMI's Hornet System**

An Organic, light, highly mobile and Helicopter carried Weapon System, that consists on off-the-shelf military components.

**The solution**

To generate accurate and effective fire to support the Operational forces (Activities of infantry) in an independent and fast fire networking for immediate response.
Two 4X4 All Terrain Vehicles (ATV)

Light Mortar

Munitions

Command Control Communication & Computer (C4) Systems
Passive Target Acquisition Goniometer System

- Interface Assembly
- Payload control buttons
- Azimuth brake lever
- Elevation brake lever
- Steering Handle
- LED Bubble Assembly
- Quick Release Latch
- Trigger button
- Keypad
- Power switch
- GIS Map Display window
- Trigger button
- Target Screen
- Tools
- Orthophoto Multilayer
- Target Position
- Zoom
**Light 120 mm mortar**

**Mortar’s Positioning & Orientation Sensor Box (POSB)**

- GPS Compass (x,y,z, AZ)
- Inclinometer (Pitch, Roll)
- Gyro (Yaw, Pitch, Roll)

**Main processor board**

**Digital Serial output**

**Mortar Fire Control System (MFCS)**
System Advantages

Optimal and most cost-effective solution for the user’s Elite Units or Special forces:

• High Mobility

• First Round on Target - capability with low collateral – damage when firing the 120mm GMM.

• Can be carried by helicopters.

• Capable of firing wide-rang of mortar ammo. (GMM, Smoke, Illumination etc.) for various operational-tasks.

• Increasing the lethality and survivability of the fighting-forces.
120 mm HE–MP–T, M339
Multi-Purpose Tank Cartridge

Direct Fire
2011
The Main Requirement of The Armor Corps - Analysis

1 – Mission Statement / Operational Attributes
2 – Technical and Performance
3 – Certification and Capabilities
General Business Information

- Urban Terrain
- Structures
- Field Fortification
- Armored Vehicle
- Anti-tank Squad
- Helicopter
- Tanks

Chemical Cartridge

Kinetic-Energy Cartridge
Destroy Multi Threats

Chemical Cartridges

APAM-MP-T
HE-MP-T
HEAT-MP-T
HE-MP-T 120, M339 - Introduction

- Multi-Purpose Tank Cartridge
- Can be fired with 120mm smooth bore guns L44/L55
- Developed and qualified according NATO STANAG 4385 and IDF requirements

Complies with:
- STANAG 4493
- STANAG 4369 & AOP 22
- STANAG 4157
- MIL-STD-810, ITOP and others

IM round includes –
- HE (CLX663) – Qualified by the IDF
- LOVA propellant (optionally) – Qualified by the IDF
HE-MP-T 120, M339

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartridge length</td>
<td>984 mm</td>
</tr>
<tr>
<td>Cartridge weight</td>
<td>27 Kg</td>
</tr>
<tr>
<td>Projectile weight</td>
<td>17 Kg</td>
</tr>
<tr>
<td>HE weight (TNT/IM-CLX663)</td>
<td>2.7/3 Kg</td>
</tr>
<tr>
<td>Muzzle velocity</td>
<td>900 m/sec</td>
</tr>
<tr>
<td>Chamber pressure</td>
<td>3,300 bar</td>
</tr>
<tr>
<td>Accuracy (SD)</td>
<td>0.3 mil</td>
</tr>
</tbody>
</table>

Electronic Device (*)

Warhead

Combustible Cartridge Case

Electric Primer

Propellant (M26)

Stub Case

(*) – Programmable Electronic Base Fuze

Data Link
Impact - with Delay (PDD)

Typical penetration
( Ø 40~60 cm )

Penetrate at least, 200mm double reinforced concrete wall
Impact - with Delay (PDD)

Before

After
Impact - with Delay (PDD)

Before

After
**Impact - Super Quick**

Range = 300 m,  \( T = 200\text{mm}, 30\text{MPa}, \)  Hole = 120x180 cm

Breach wall for infantry pass by using 2 rounds

Line of site
Air Burst

Air Burst operation – view from the tank
HE-MP-T 120 – Accuracy Test (2,000 m)

Target Size: 2.30x2.30 m

7 Rounds
0.12x0.19 mils

7 Rounds
0.18x0.19 mils

Side corr.

warmer

(II)

(I)
## IM Reaction Levels (with CLX663)

<table>
<thead>
<tr>
<th>IM Stimulus</th>
<th>Cond.</th>
<th>Reaction Level</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Fuel Fire (Fast Cook-Off)</td>
<td>N</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Slow Heating (Slow Cook-Off)</td>
<td>N</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Bullet Impact</td>
<td>N</td>
<td>4</td>
<td>X3 In Fuze</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>5</td>
<td>X3 In Primer</td>
</tr>
<tr>
<td>Fragment Impact</td>
<td>N</td>
<td>5</td>
<td>In Fuze</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>5</td>
<td>In Primer</td>
</tr>
<tr>
<td>Sympathetic Reaction</td>
<td>N</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Shaped Charge Jet Impact</td>
<td>N</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

1 – Detonation; 2 – Partial Detonation; 3 – Explosion; 4 – Deflagration; 5 – Burning
N – Without Package; P – In Package
Video Clip – Demonstration test
Every one could sling at a hairbreadth and not miss

Judges 20/16
MPRS - Multi Purpose Rifle System

- Unique multipurpose 40mm grenades
- Launcher breechblock inductive coil
- Bi directional data link
- Keypad (x2)
- Internal LRF, eye-safe invisible
- Ballistic computer - FCS
- Direct view optics
- Sensors (inclinometer etc.)

- Data I/O interface to C4I systems

AB
Air Burst

PDD
Point Detonation Delay

SD
Self Destruct

PD
Point Detonation

Orion
# IMI’s solution for the modern battlefield

<table>
<thead>
<tr>
<th>Dismounted Infantry (Short / long range A.T Teams...)</th>
<th>Tanks</th>
<th>Assault Helicopter</th>
<th>IFV’s</th>
<th>Military infrastructures (Bunkers, field fortifications ...)</th>
<th>Mines / IED’s</th>
<th>Buildings</th>
<th>Snipers</th>
<th>Tracks / Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NLCHF</strong></td>
<td><strong>√</strong></td>
<td></td>
<td><strong>√</strong></td>
<td><strong>√</strong></td>
<td><strong>√</strong></td>
<td><strong>√</strong></td>
<td><strong>√</strong></td>
<td><strong>√</strong></td>
</tr>
</tbody>
</table>
Thank you for your attention!

QUESTIONS?

The Technology is Proven and In the Market