"Urban Operation Solutions with Medium & Large Caliber Ammunition"

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by
Jan G. Hasslid
Vice President/Marketing
Medium & Large Caliber Ammunition
Nammo MLCD
Norway
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Contents

• Definitions
• Challenges
• Solutions to Support the Warfighter needs
• Recommendations
#1 Challenge for Nammo Technology & Products
-Customer wants more out of less types of ammunition

- Target hardness
- Target distance

MP-MultiPurpose
AB- Air Burst
APFSDS-T

Nammo plastic training & short range
#2 Challenge for Nammo Special Products
-Customer want’s a complete solution for the operational needs

- Vehicle ammunition
- Artillery & Mortars
- Aircraft ammunition
- Navy ammunition

Urban Warfare Solutions

Target hardness

Target distance

Training
Definition of Business Development Areas
MLCD[2007]

Order intake

Urban Warfare 40%
Vehicle Ammunition 20%
Aircraft Ammunition 15%
Artillery & Mortars 15%
Navy Ammunition 5%
Life Cycle Management 5%
Warfighter Ammunition Solutions
-Trends with Asymmetric threat

Sales 2002-2006

Performance Index

Year

2002 2003 2004 2005 2006

M72
20mm
12.7mm
30mm
155mm
40mmX51
57mm

Ref.
URBAN WARFARE SOLUTIONS

- Meeting the Warfighters needs
Urban Warfare Solutions

- 12.7mm as the true MultiPurpose Ammunition
- 40mmX51 AGL Programmable Ammunition
- M72 Shoulder Launched Missile
- Training & Short Range Ammunition
12.7 mm MP Family (0.50cal)

- Multipurpose Warshots
  - MP [NM 140, MK211]
  - MP-T [NM160, MK300]
  - MP-DT [Dim Trace]
  - AP-S [NM 173]
  - Training ammunition
  - SG [Ballistic match]
  - SG-T [Ballistic match]
  - RR [Reduced range]
  - PSRTA-T [Short range]
  - Blanks [Plastic]
12,7 MP-DT for Night Operations

Dim Tracer at target

Standard Tracer at target

Qualified with:
- 5,56mm
- 7,62mm
12,7mm MULTIPURPOSE, MP

V0=910m/s

Jacket  Incendiary  HE  Incendiary  Penetrator  Shell body  Seal

0.50 Cal. MK211 by ATK/Nammo
40mmX53 Ammunition Solutions for 40mm Automatic Grenade Launchers

- New Ammunition – Programmable Air-Burst
  - 40mmX51 PPHE MK285
  - 40mmX51 IHV-HEDP M430PIP by N2 Defence(NICO&Nammo)
  - 40mmX51 PPHE-RF

- New AGL systems developed during the last 10 years
  - Mk47 Striker by GD-ATP
  - GMG by Heckler&Koch,H&K

- Mk 19 Legacy
40mm x 51 Nose Fuzed HE Round
The Solution for Urban Operations

Fragments distributed:
- Sideways
- Backwards

Highly effective against hidden targets e.g. on rooftops, behind corners, inside buildings, in trenches etc., targets you don’t normally take out with direct fire.
Fragmentation of HE Warhead

Distance from detonating point:
- 3 m
- 5 m
- 7.5 m
- 10 m

Penetrations / m²

Sector (degrees)

EAGLE kill
40mm MK285 warhead
40mmX51 PPHE Ammunition (US MK 285)

- Electronic programmable Time Fuze (US MK 438)
  - Point Detonating (mechanical)
  - Self-Destruct (electronic)
  - Mechanical Safe & Arm (US MK91)
- Prefragmented Shell
- IM Properties (use of PBXN 5 & 9)
- Improved Propulsion (NICO)
  - V0=240m/s
  - Very small V0 variation with temperature
40mmX53 IHV-HEDP M430 PIP

- M430 (HEDP) Improved High Velocity Program
  - Key improvements:
    - PD/SD function implemented
    - New Propulsion Unit (NICO)
    - IM properties with PBXN-11
    - After Armour Effect (Incendiary)
    - Penetration++
    - Reduced safety zone (Back-plug)
- P-Programmable version optional
40mmX51 PPHE-RF (Radio Frequency) New Air-Burst technology

- Developed as a co-operation between NAMMO and FFI (Norwegian Defence Research Establishment)
- The principle can be used on all systems which requires the advantage of Air-Burst capability
- External add-on solution
  - We only need Fire Control with Range Finder & Ballistic Computer
- Radio Signals sent from transmitter to reciever built-in in the fuze
M72 LIGHT ANTI-ARMOUR WEAPON

M72 LAW

IMPROVEMENTS/NEW VERSIONS

M72 EC-LAW  M72 ASM-VERSIONS

(EC = ENHANCED CAPACITY)  (ASM = ANTI STRUCTURE MUNITION)

M72 by Nammo Group(Talley Defence Systems/Nammo MLCD)
M72

Launcher Improvements for the User

- Increased hit probability – on-axis trigger operation
- Reduced weight – Carbon composite fiber inner tube
- Improved human factors – grip tape and self-folding sights
- Available for all M72 product improvements
M72 ASM-RC

RC- Reduced Caliber WARHEAD:

- Penetrates building structures such as
  - Double brick Walls
  - Clay Walls
  - Timber and Sand Bags Bunker
- 400 g explosives of type DPX-6
- Multiphase blast effect
- Composite warhead shell body
- Low Collateral Damage Warhead
M72 ASM-RC

FUZE:
- Single mode – long delay (20 ms)
- Dual mode
  - Long (20ms) or short delay (2 ms)
- Graze function
M72 ASM-RC
FIRING DEMONSTRATION
FIRING AGAINST URBAN STRUCTURE. FUZE WITH LONG DELAY

- Plywood: 14mm and crushed stone 300mm
- Window: 500x500mm
- Wooden frame work: 2" x 6" center to center 300mm
- Wooden door: size 2000x1000mm, steelplate 2mm
- Soft concrete (LECA) bricks, thickness 150mm
- Wooded frame work: 2" x 4" center to center 600mm
- Chipboard: 12mm inside/outside, steelplate 0.7mm inside
- Steelplate: 0.7mm inside as a witnessplate
- Sandbags: two layer
Vehicle Ammunition
-New products suitable for asymmetric warfare

- 25mm
- 30mm
- 120mm
- Key elements
  - Precision strike
  - Insensitive Munitions
  - Low Collateral damage
  - Short range training
  - Air Burst capability
Rapid development and qualification of State-of-the-Art Ammunition! (example 30mmX173)

- **Warshots**
- **MP-T/SD** MK 264 mod 0 NM 222
- **TP-T** MK 270 mod 0 NM 219
- **APFSDS-T** MK 258 mod 0 NM 225
- **APFSDS-S** MK 258 mod 1 “Swimmer”
- **Training**
- **TPDS-T** [Qualified May 2007]
- **TP-T RRR** Reduced Ricochet Risk
- **P-SRTA** Plastic Short Range
- **Blanks**

“-We have been supported by our Home Market CV90’s and US NAVY/USMC-EFV”
Range Reduction by 30mmX173 TPDS-T
-Ballistic match with APFSDS-T

<table>
<thead>
<tr>
<th>Height</th>
<th>Range</th>
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<tbody>
<tr>
<td>1500m</td>
<td>30mmX173 TPDS-T</td>
</tr>
<tr>
<td>8000m</td>
<td>APFSDS-T</td>
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120mm Ammunition
Product & Development Programs

• HE-T MK I
• IMHE-T
• TP-T (spotting)
• TP-I (Inert)
• KE-TP
• APFSDS-T

120mm cooperation GD-OTS/Nexter/Nammo
120 mm IMHE-T Tank Ammunition

- $V_0 = 744 \text{m/s} \rightarrow 1030 \text{m/s}$
- Improved accuracy to $<0.2 \text{mils @ 2000m}$
- Increased explosive charge weight ($2.7 \rightarrow 3.2 \text{kg}$)
- Increased penetration
- Dual mode Fuze
- Maintaining fuze function at low graze angles
- Qualify the round according to the new NATO STANAG for operational and storage temperatures $[-54--+71 \text{C}]$
120 MM IMHE-T AMMUNITION

Project plan:

• IM testing of the explosive and propellant will be completed in June 2007
• Firing demo is planned for July 2007 US/GD-OTS
• Development finalized by Dec. 2007
• Ammunition qualified in Sept. 2008
Aircraft Ammunition

- Expanding the MP capabilities by APEX ammunition in 25, 27 and 30mm applications
User Requirements Solved by APEX

Air to Air
“MP” functionality inside light skinned targets
  - Fragmentation
  - Blast
  - Fire starting capability

Close Air Support
Heavy ground targets
  - Penetration of armor
  - Penetrating Fragments

Improved capability
Recommendation…

(Examples)

• Urban Warfare Solutions
  – 12.7mm
  – 30mmX173
  – 40mmX51 MK 285 & IHV-HEDP
  – M72 Shoulder Launched Weapon
  – 120mm HE-T Mk I
• Rapid Developments (2007)
  – 12,7 Dim Trace (IR)
  – 30mm TPDS-T
  – M72 ASM-RC
  – 120mm IMHE-T
• Development Programs
  – APEX
  – Air Burst (30-120mm)
Questions?
Jan G. Hasslid

Vice President/Marketing
Medium & Large Caliber Division
Nammo Raufoss AS
P.O. Box 162
NO-2831 Raufoss
Norway
Tel: +47 61 15 25 33
Fax: +47 61 15 22 50
Mob: +47 46 42 03 88
jan.hasslid@nammo.com
www.nammo.com