

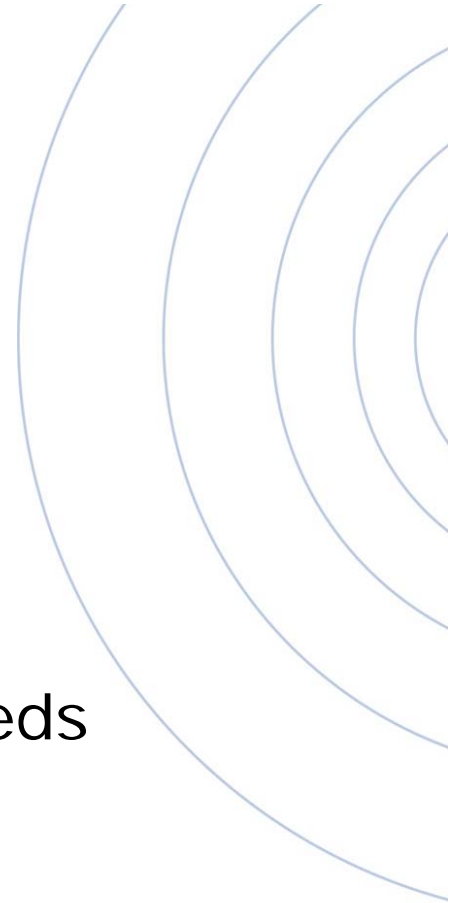
- "Urban Operation Solutions with Medium & Large Caliber Ammunition"

Presented at
42nd International Guns & Missiles Conference
Charlotte, NC, USA

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Medium & Large Caliber Ammunition
Nammo MLCD
Norway
2007-04-24

Contents

- Definitions
- Challenges
- Solutions to Support the Warfighter needs
- Recommendations



Nammo's Business Units

Small Caliber

Medium & Large Caliber

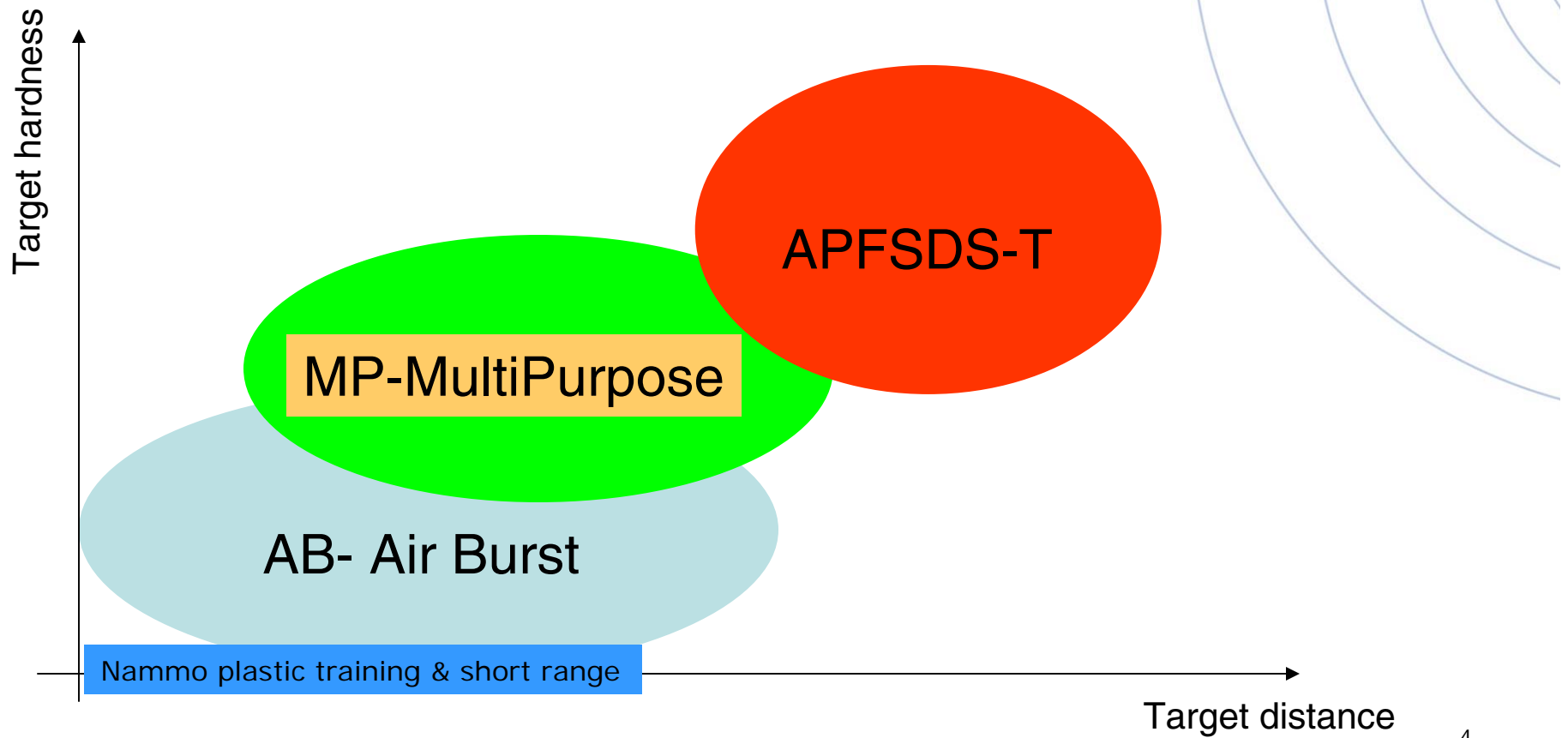
Missile Products

Demil

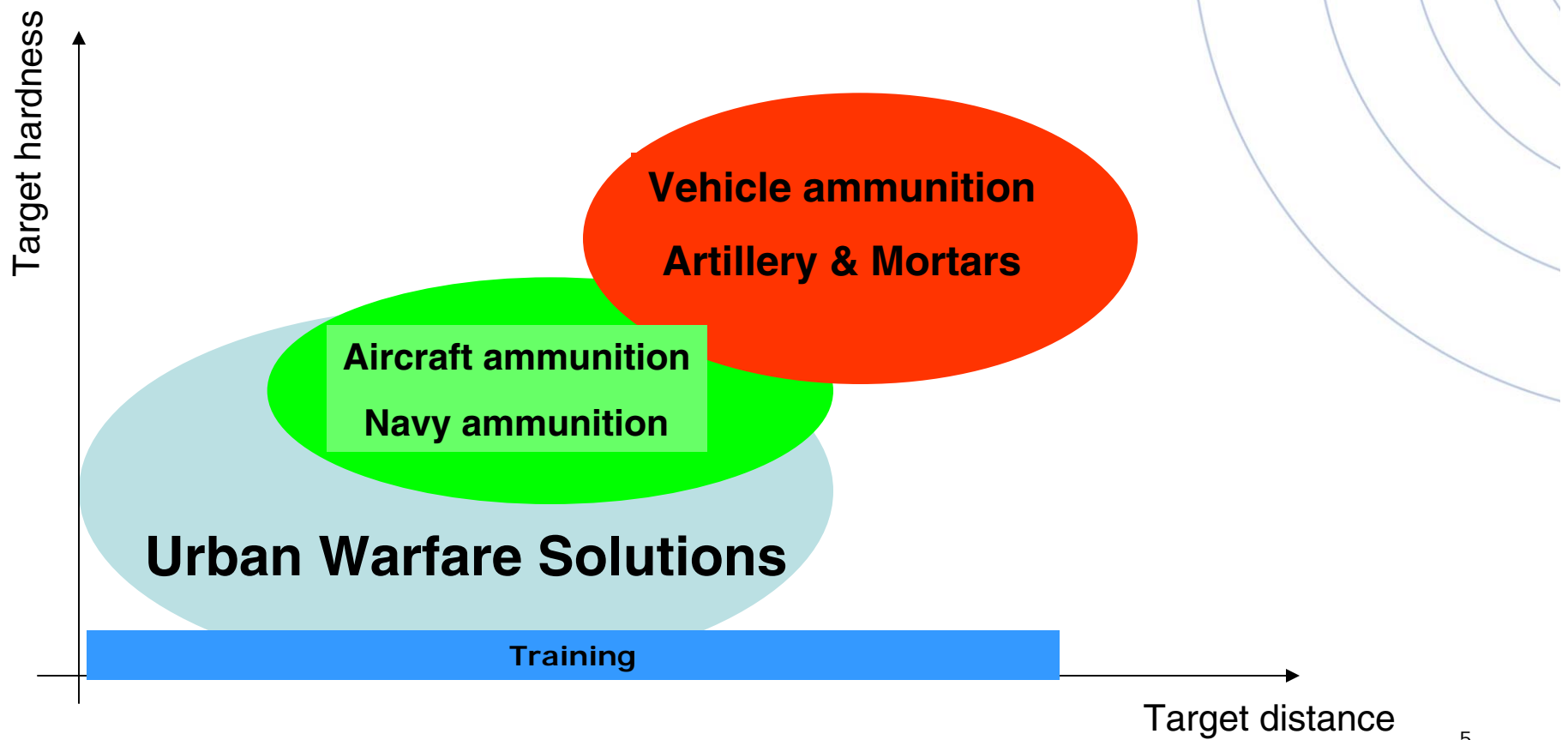
Talley Defense Systems



#1 Challenge for Nammo Technology & Products
-Customer want's more out of less types of
ammunition

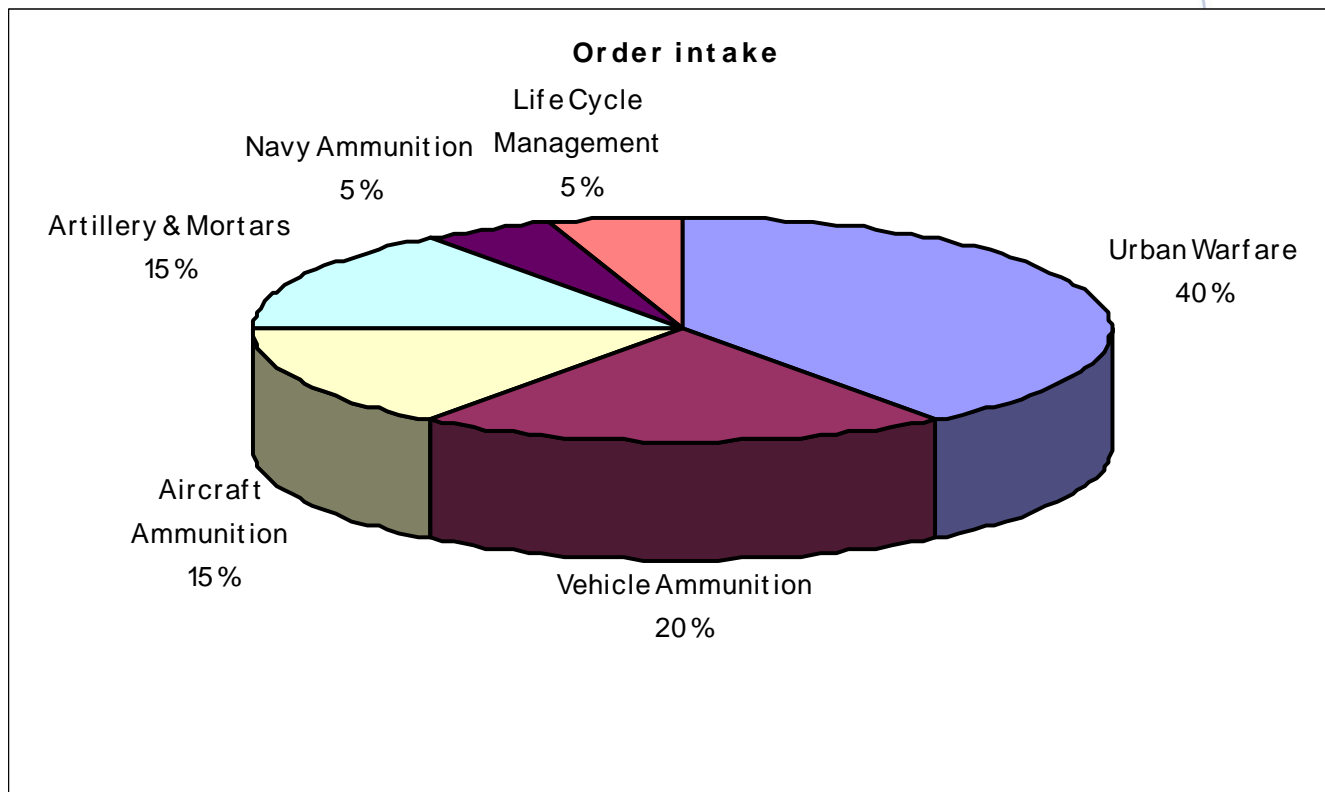


#2 Challenge for Nammo Special Products
-Customer want's a complete solution for the operational needs



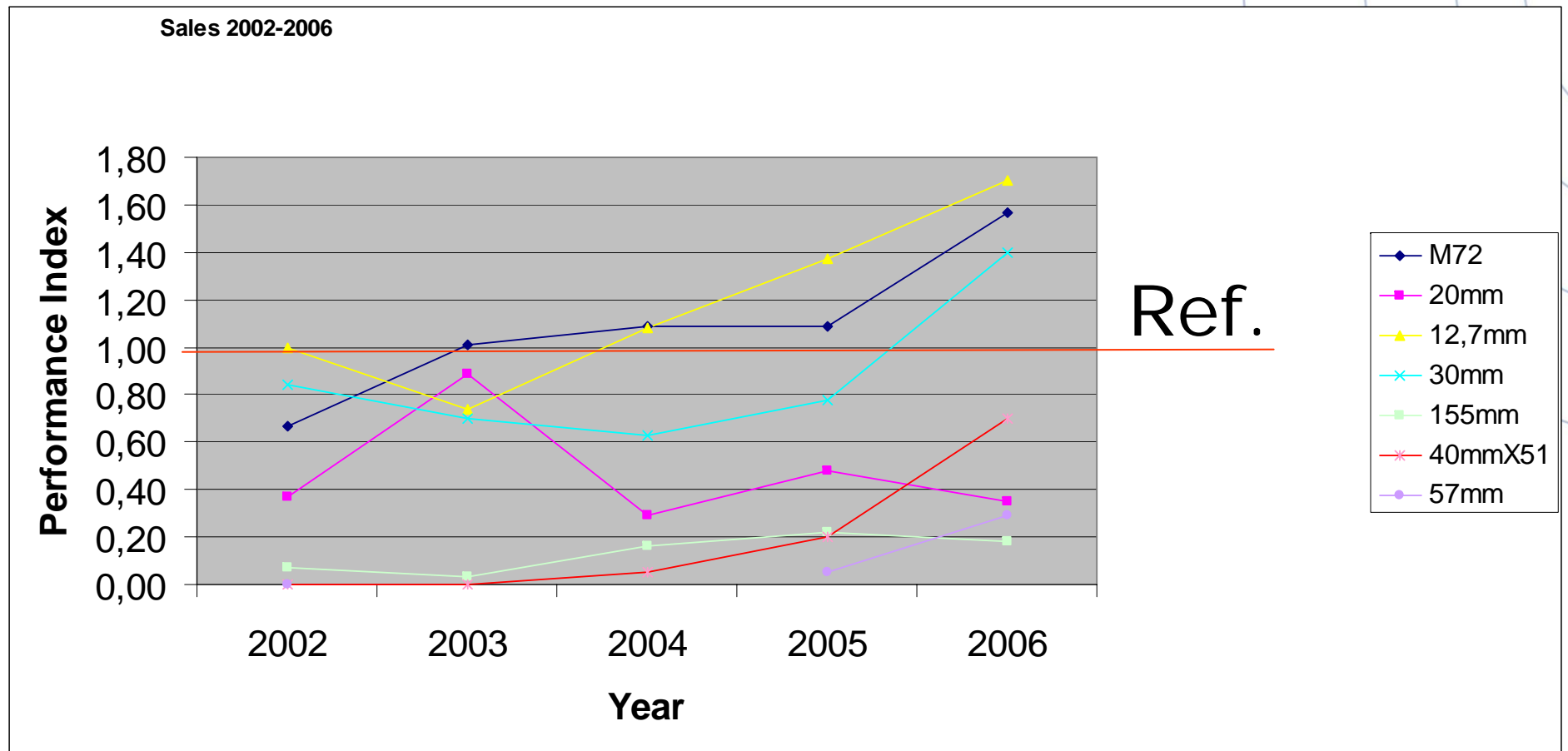
Definition of Business Development Areas

MLCD_[2007]



Warfighter Ammunition Solutions

-Trends with Asymmetric threat



URBAN WARFARE SOLUTIONS

-Meeting the Warfighters needs



Urban Warfare Solutions

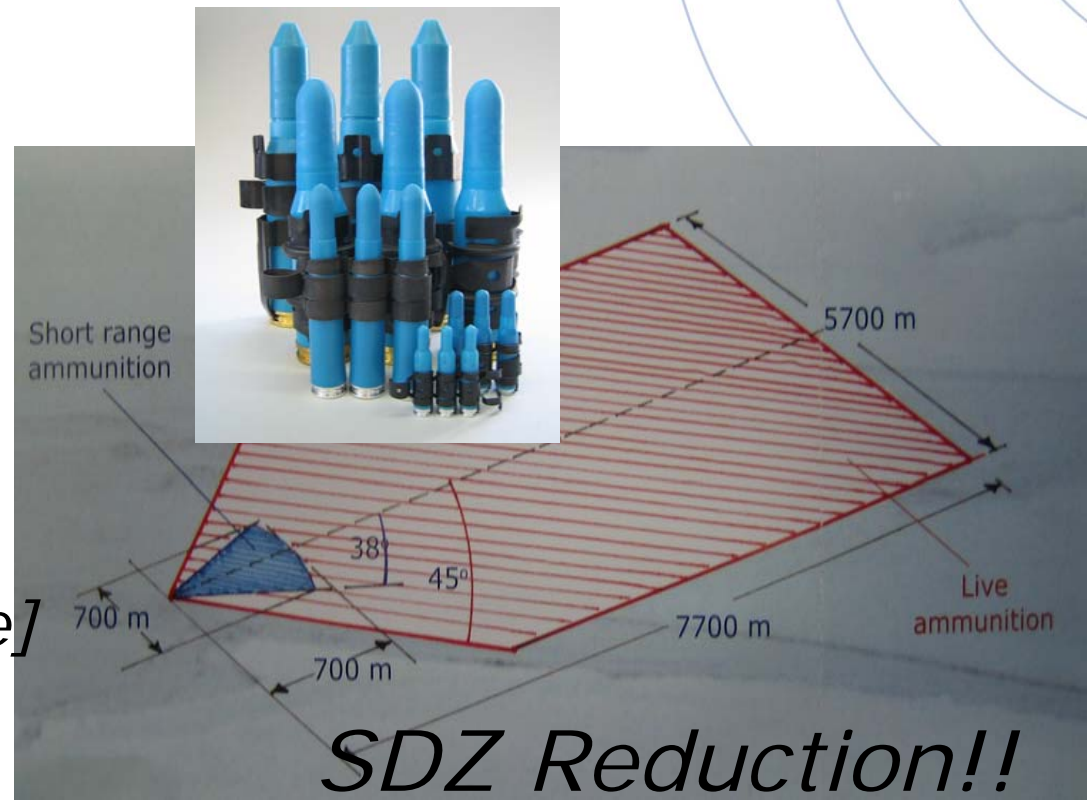
- 12,7mm as the true MultiPurpose Ammunition
- 40mmX51 AGL Programmable Ammunition
- M72 Shoulder Launched Missile
- Training & Short Range Ammunition



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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]

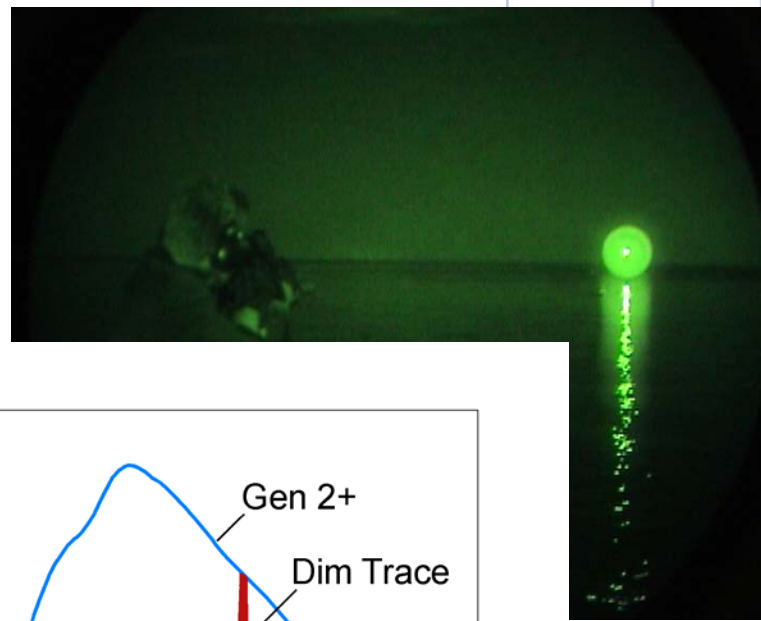


12,7 MP-DT for Night Operations

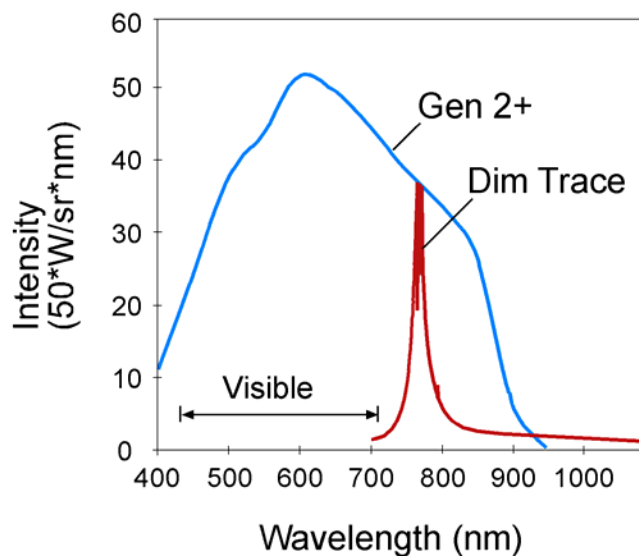
Dim Tracer at target



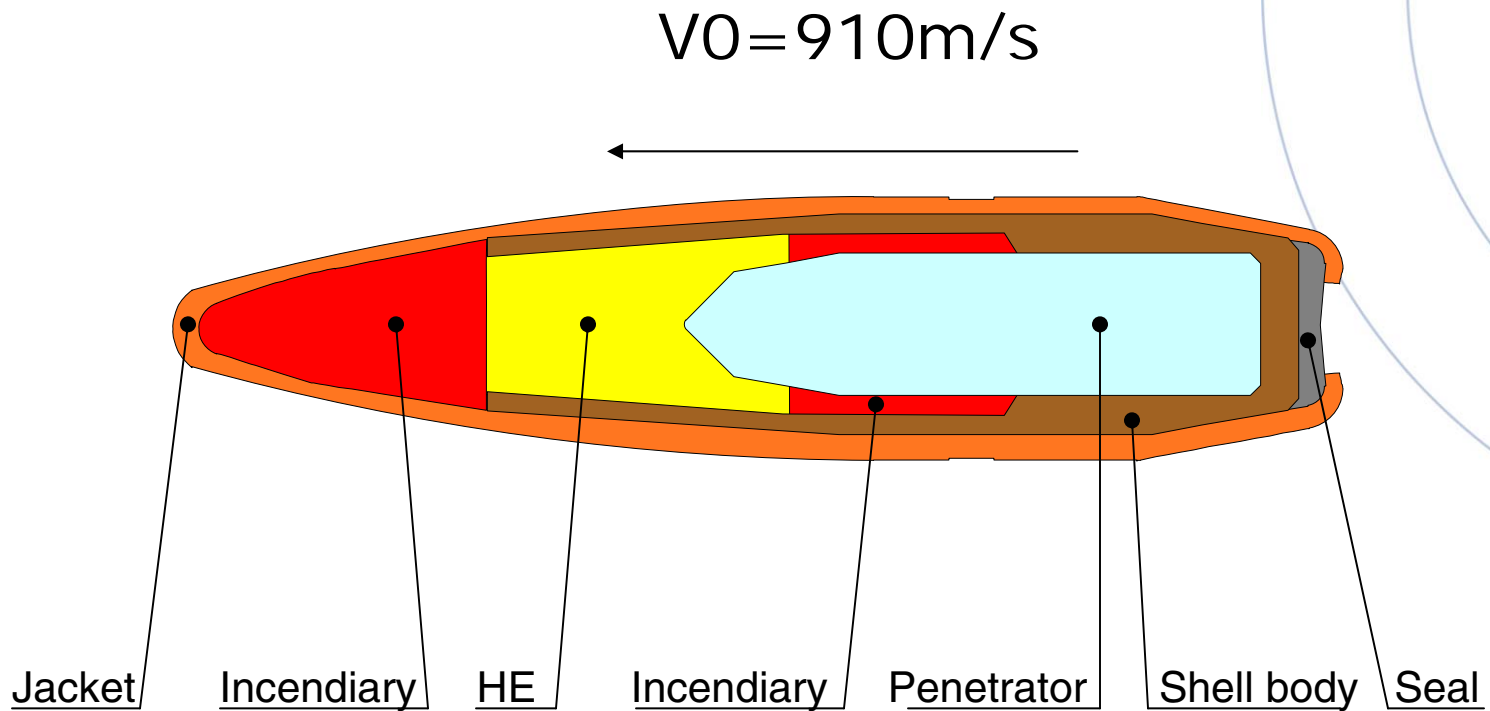
Standard Tracer at target



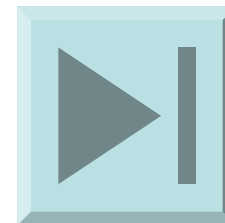
Qualified with:
-5,56mm
-7,62mm



12,7mm MULTIPURPOSE, MP



0.50 Cal. MK211 by ATK/Nammo



40mmX53 Ammunition Solutions for 40mm Automatic Grenade Launchers

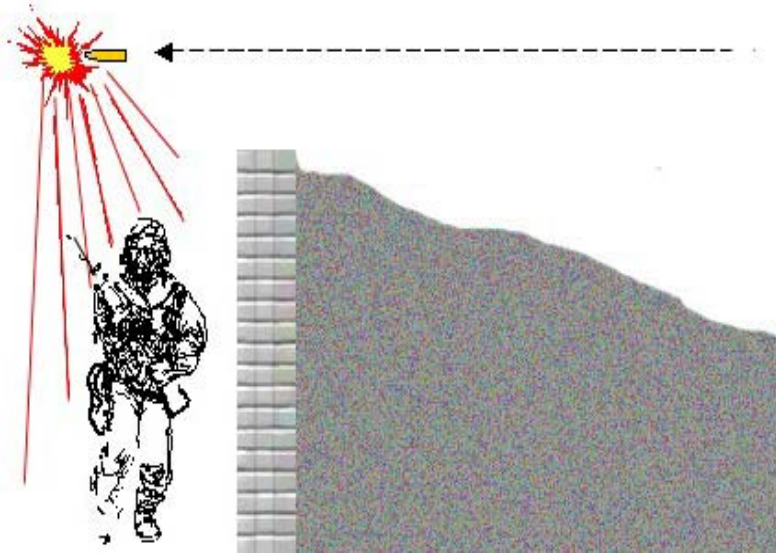
- New Ammunition – Programmable Air-Burst
 - 40mmX51 PPHE MK285
 - 40mmX51 IHV-HEDP M430PIP by N2 Defence(NICO&Nammo)
 - 40mmX51 PPHE-RF
- New AGL systems developed during the last 10 years
 - Mk47 Striker by GD-ATP
 - GMG by Heckler&Koch,H&K
- Mk 19 Legacy



40mm x 51 Nose Fuzed HE Round The Solution for Urban Operations

Fragments distributed:

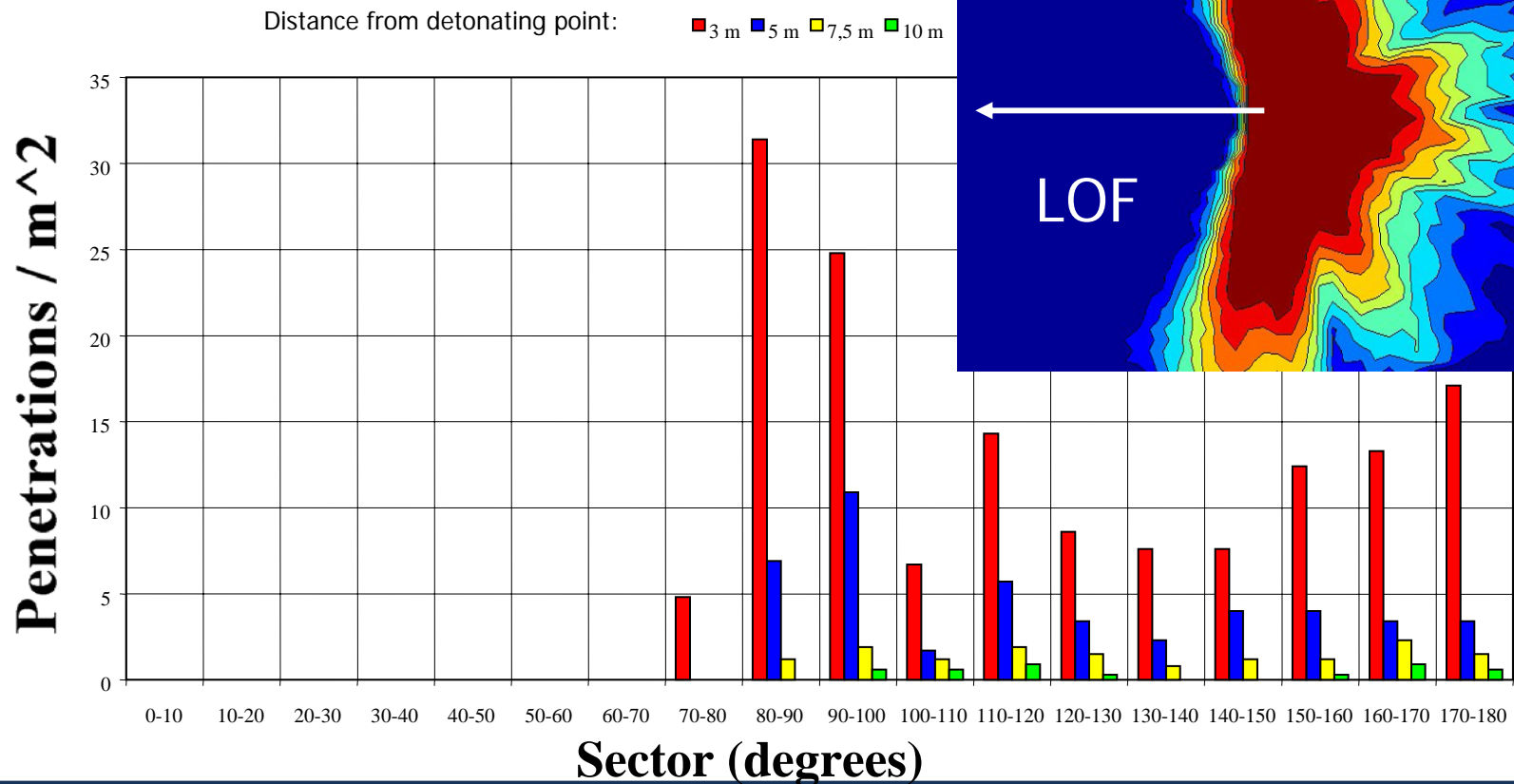
- Sideways
- Backwards



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

EAGLE kill
40mm MK285
warhead



40mmX51 PPHE Ammunition (US MK 285)

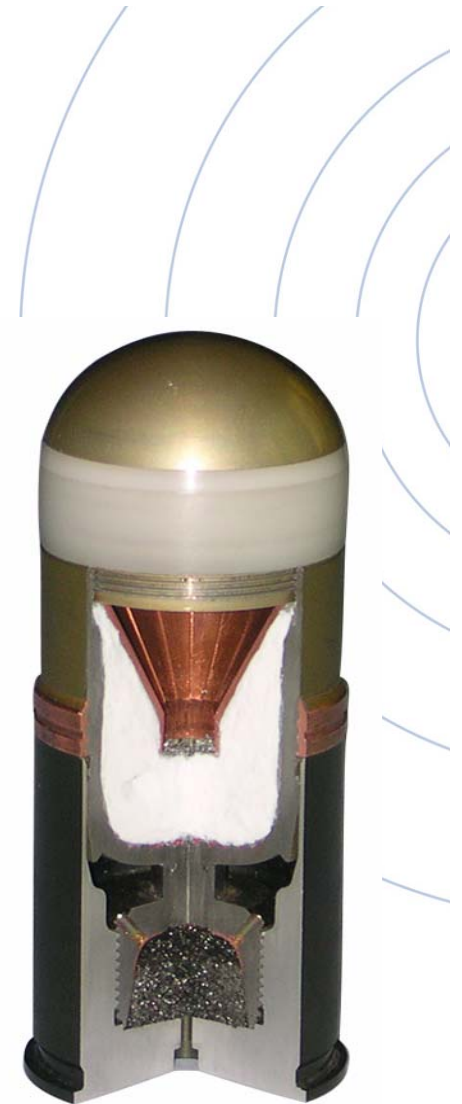
- Electronic programmable Time Fuze (US MK 438)
 - Point Detonating (mechanical)
 - Self-Destruct (electronic)
 - Mechanical Safe & Arm (US MK91)
- Prefragmented Shell
- IM Properties (use of PBXN 5 & 9)
- Improved Propulsion (NICO)
 - $V_0=240\text{m/s}$
 - Very small V_0 variation with temperature



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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



N2 Defence
by Nammo/RWM

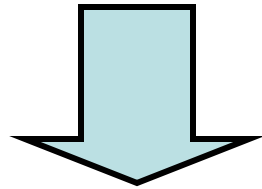
40mmX51 PPHE-RF (Radio Frequency) New Air-Burst technology

- 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 receiver built-in in the fuze



M72 LIGHT ANTI-ARMOUR WEAPON

M72 LAW



IMPROVEMENTS/NEW VERSIONS

Deep Penetration



M72 EC-LAW

Urban Terrain



M72 ASM-VERSIONS

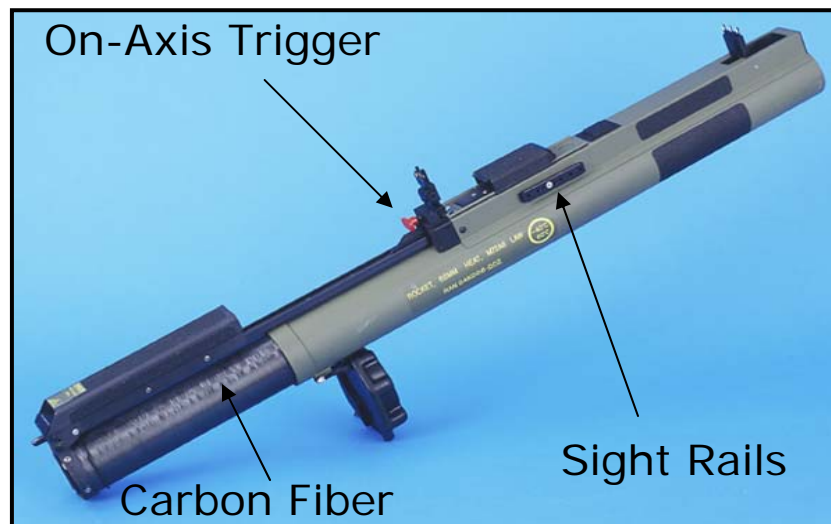
(EC = ENHANCED CAPACITY) (ASM = ANTI STRUCTURE MUNITION)

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



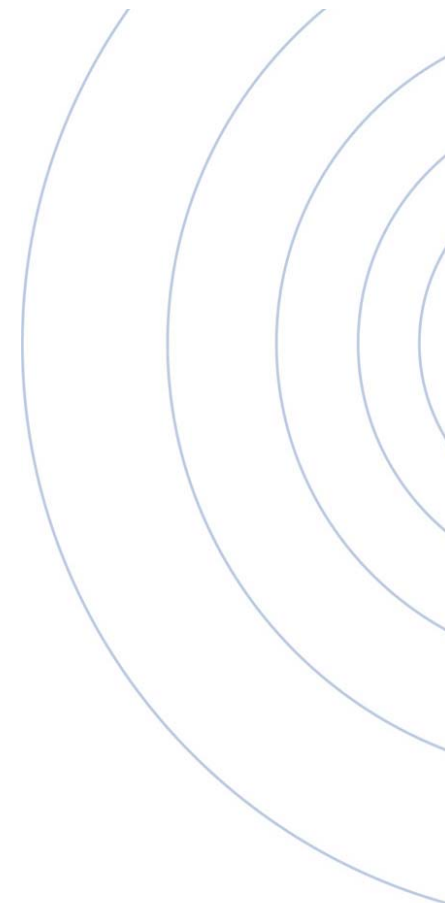
RC- Reduced Caliber WARHEAD :

- 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:

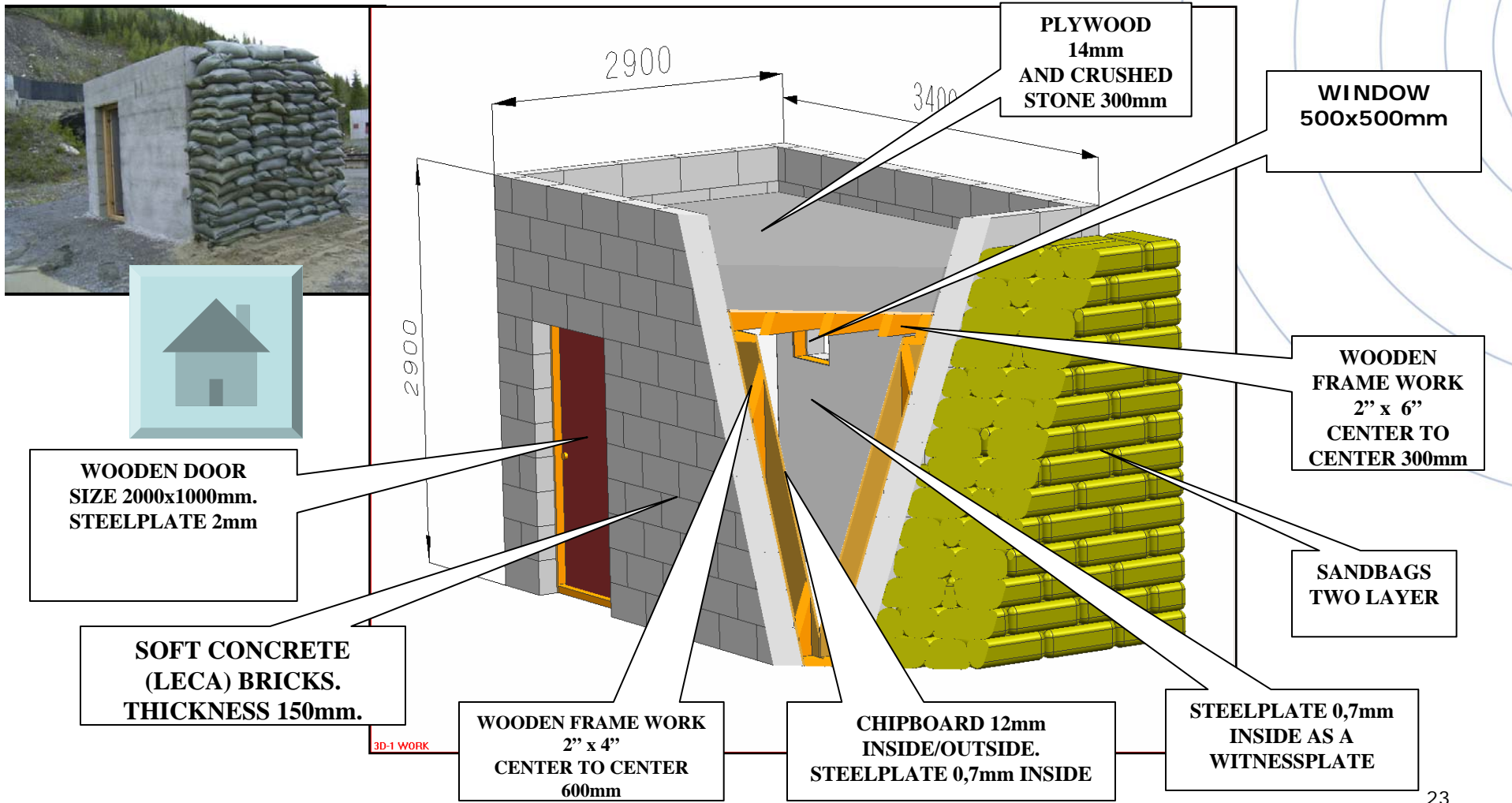
- Single mode – long delay (20 ms)
- Dual mode
 - Long (20ms) or short delay (2 ms)
- Graze function



M72 ASM-RC

FIRING DEMONSTRATION

FIRING AGAINST URBAN STRUCTURE. FUZE WITH **LONG DELAY**



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

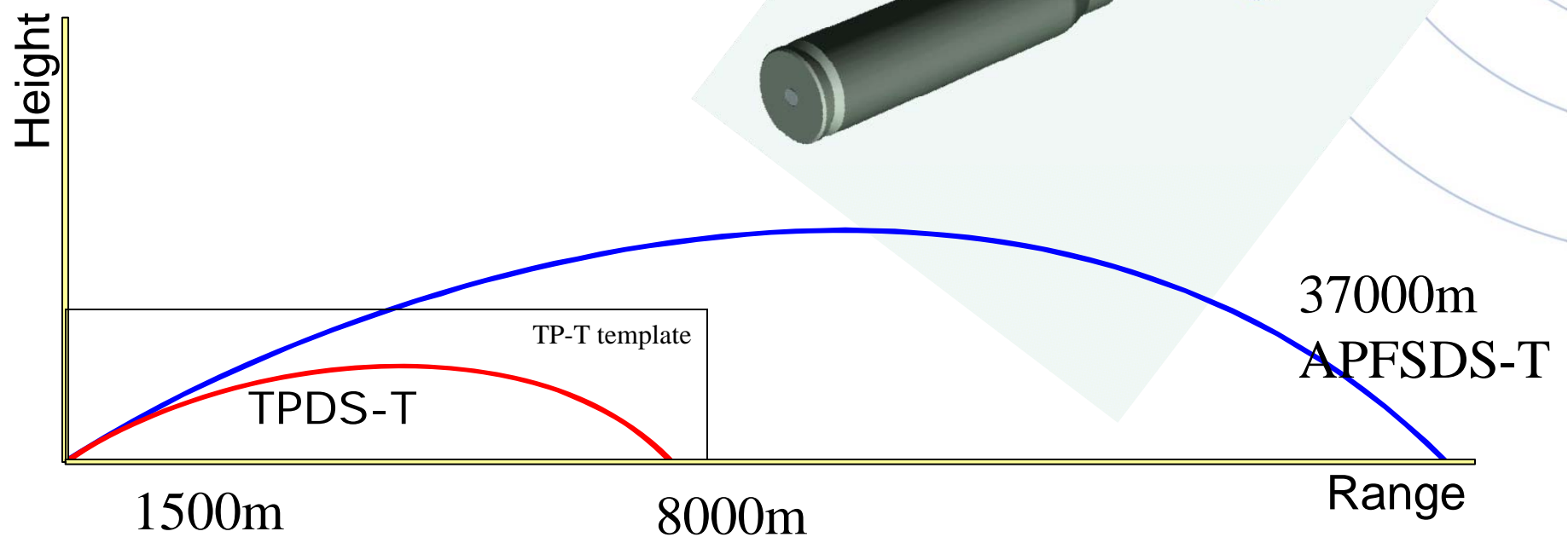


Rapid development and qualification of State-of-the-Art Ammunition! (example 30mmX173)

- 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”

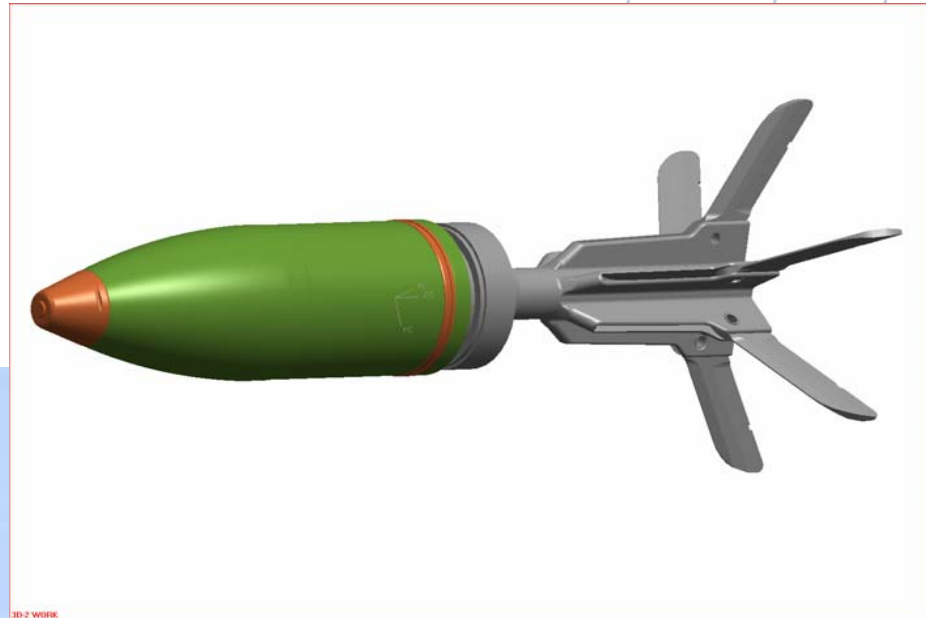
Range Reduction by 30mmX173 TPDS-T -Ballistic match with APFSDS-T



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

- $V_0=744\text{m/s} \rightarrow \underline{1030\text{m/s}}$
- 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 $[-54\text{---}+71\text{C}]$

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



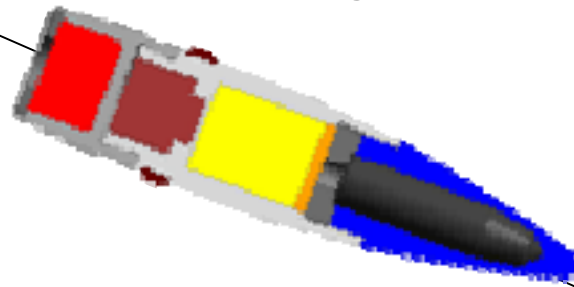
User Requirements Solved by APEX



Air to Air

"MP" functionality inside light skinned targets

- Fragmentation
- Blast
- Fire starting capability



Improved
capability

Close Air Support
Heavy ground targets

- Penetration of armor
- Penetrating Fragments



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?



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