

GD-OTS/Nammo 30mm Combat and Training Ammunition

46th Annual Armament Systems: Gun & Missile
Conference & Exhibition

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Miami, FL

Nammo

PRECISION, PEOPLE AND TECHNOLOGY

Approved for Public Release

GENERAL DYNAMICS

Ordnance and Tactical Systems



Agenda

- Nammo/GD-OTS Team Information
- 30mm MK317 TPDS-T
- 30mm MK266 HEI-T
- 30mm MPAB-T
- 30mm Link
- 30mm MK264 MP-T/SD
- 30mm MK258 APFSDS-T
- 30mm MK320 APDS-T
- 30mm P-SRTA-T Trainer
- 30mm Blank
- Questions/Comments



GD-OTS/Nammo Partnership

- Since 1981, GD-OTS and Nammo have been working together on the development of advanced Medium Caliber Ammunition (MCA). In 2000, the relationship was further strengthened with the signing of a new Strategic Alliance Agreement (SAA) extending to 2020.
- Numerous cooperative efforts have been conducted on both domestic and international production sales as well as joint development efforts including:
 - Kinetic Energy (KE) Cartridges
 - Airburst (HEAB-T) Technology
 - Multipurpose (MPC) Cartridges

General Dynamics-Ordnance and Tactical Systems (GD-OTS)



•3,927 Employees

•17 Operating Facilities

- 6 Strategic Business Units
 - Large Caliber Ammunition
 - Medium Caliber Ammunition
 - Small Caliber Ammunition
 - Precision Systems
 - St. Marks Powder
 - GD-OTS Canada

GD-OTS Marion Operations Facility

631 acres leased for Manufacturing



Propelling charge, solid propellant products, Advanced Development

290 acres owned



Ammunition Manufacturing

Roadway:	10 miles
Buildings:	224
	76 Magazines
Operating Buildings:	
(Area, Square Feet)	159,290



Test Range

GD-OTS Medium Caliber Ammunition Product Portfolio

20mm Ammunition



20mm C-RAM



30mm Lightweight



25mm Ammunition



30mm x 173



25mm - 57mm Airburst



40mm Grenades



30mm x 173 GD-OTS/Nammo Family

Original 30mm
GAU/8, MK44
Family



Improved 30mm
MK44
Family

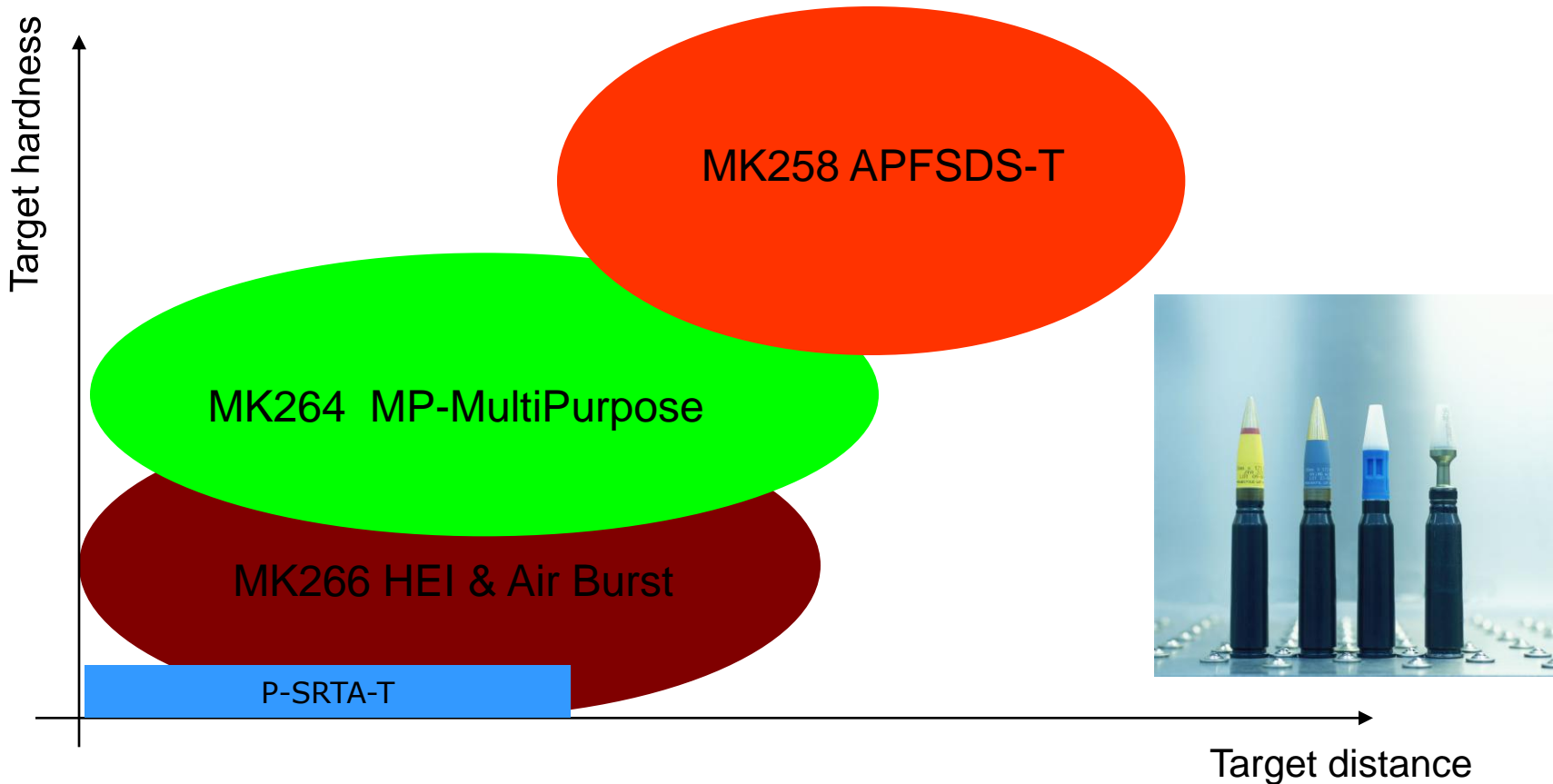
MK317/320
developed as a
practice round for
MK258



HEAB fills capability
gap against troops in
trenches, barricades
and buildings



30mm Team Solutions



The GD/Nammo team can provide a 30mmx173mm family of ammunition capable of satisfying all military requirements!

30mm X 173 MK317 TPDS-T



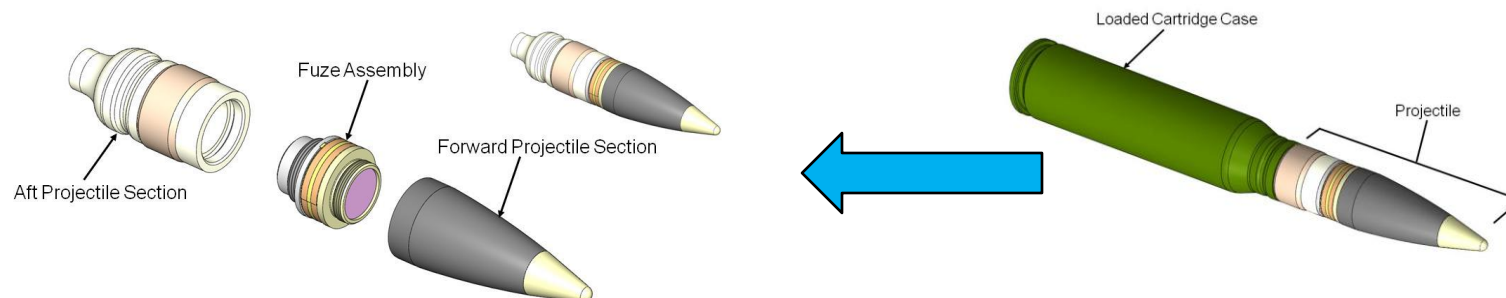
- GD-OTS has developed a low cost 30mm Target Practice Discarding Sabot-Trace (TPDS-T) round that is ballistically matched to the qualified MK258 and MK268.
- Time of flight to 2000m <0.5 second delta to 30mm MK258 and MK268.
- Max range <8,000m using “Fort Bliss Hot Day” conditions.
- Trace visible for >3000 meters (5 sec.).
- TRL-7 design included in recent US Navy qualification testing.

30mm x 173 MK266 Mod 3 HEI-T



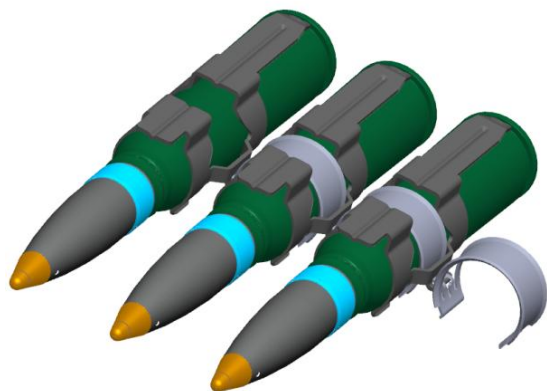
- GD has been working with the USN to qualify the MK266 Mod 3, High Explosive Incendiary-Trace (HEI-T) cartridge.
- Cartridge pairs current GD-OTS qualified MK266 projectile and cartridge design with proven M505 fuze.
- All testing successfully completed in 2010.
- USN currently putting into place a Final Operation Classification (FOC) for the MK-266 Mod 3.
- FOC approval expected in 2011 with US Navy/USMC.

30x173mm MPAB-T



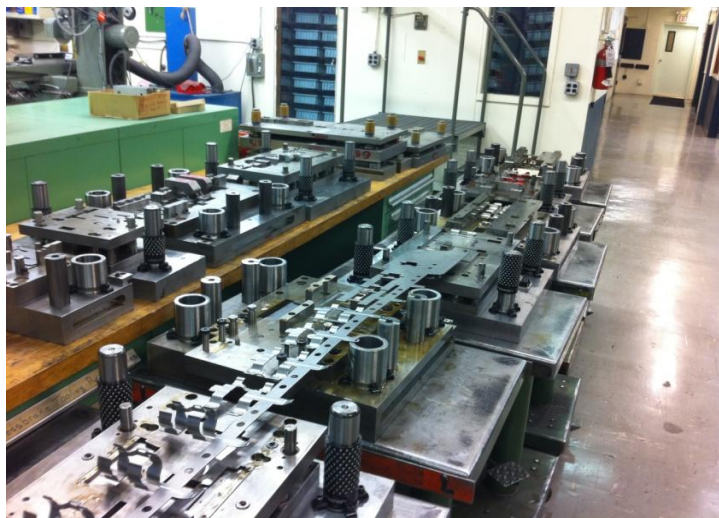
- GD-OTS/Nammo team has a 30mm Multi Purpose Air Burst-Trace (MPAB-T) solution.
- Time based fuze operates with both contact and inductive fuze setting methods.
 - Nammo will be demonstrating Radio Frequency (RF) communication in June 2011.
- Fuze has been subjected to US Army fuze safety board reviews and is scalable across 25-57mm.
- The munition has demonstrated effectiveness against hard armor targets, troops in the open and defilade, and light skin targets at multiple ranges.
- GD-OTS under contract for further fuze development.

30mm Link Development



- Compatible with 30mm Bushmaster Weapons.
- Baseline link design complete.
- 30mm/40mm compatible.
- Production ready link tooling is ready.
- Feed system cycle testing with prototype links is complete.

30mm Link Development



30mm Link Die Set



Linked 30mm Ammunition



Link on 40mm Case

Nammo's Business Units

Small Caliber

Medium &
Large Caliber

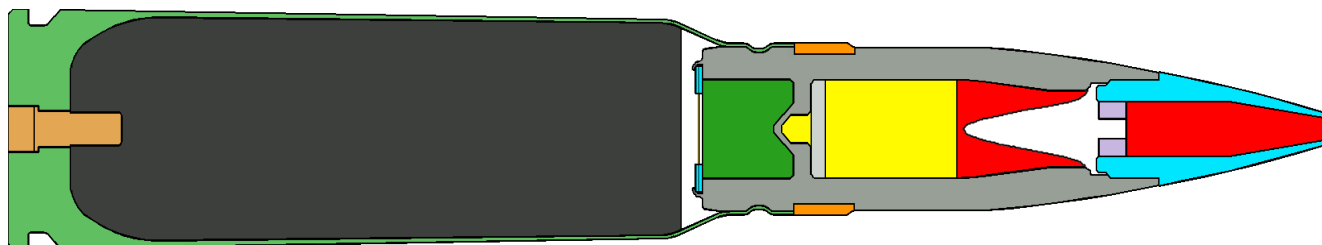
Missile Products

Demil

Talley Defense Systems

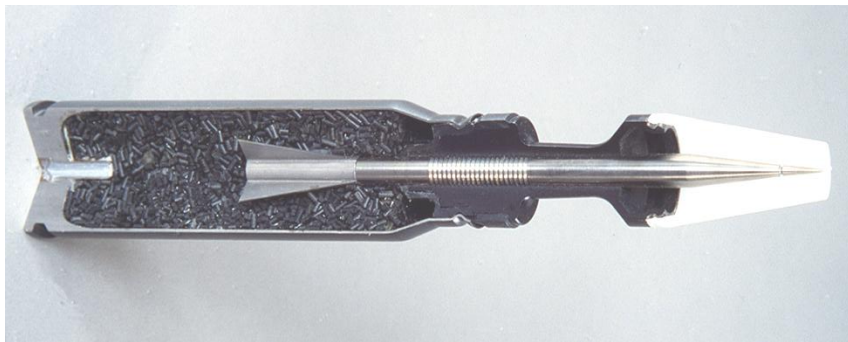


30mm X 173 MK264 MP-T/SD



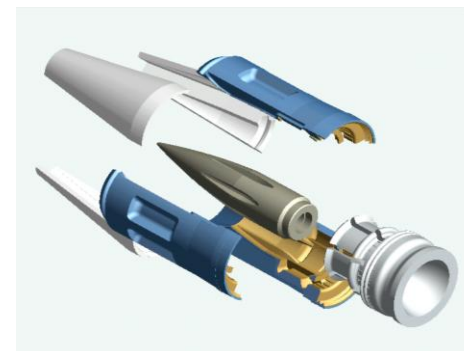
- The USG qualified MK264 Multi Purpose-Traced round with Self Destruct (MP-T/SD), is combat proven and is the choice for multispectral target defeat ammunition for 30mm users.
- Based on the well proven Nammo MP concept.
- Characteristics:
 - Muzzle Velocity-1070m/s
 - Dispersion- <0,4 mils
 - Self Destruct-4,7s, approx 3500m
 - Impact delay-0,4ms
 - Low velocity drop due to the low drag shape.
 - Penetration with high volume of fragmentation (50-60 ea) with blast and incendiary effects.

30x173mm MK258 APFSDS-T



- Armor Piercing Fin Stabilized Discarding Sabot-Trace (APFSDS-T) round for hard armor defeat at extended ranges.
- Design features super cavitating nose tip for below water line missions.
- Nammo currently in production with the qualified MK258 Mod 0 and Mod 1.
- GD-OTS Americanized version (Mod 2) meets all US requirements and leverages high rate APFSDS-T manufacturing experience.

30mm X 173 MK320 APDS-T



- Nammo has developed a 30mm Armor Piercing Discarding Sabot-Trace (APDS-T) round, ballistically matched to the qualified MK258, that can be used in both tactical and training environments.
- Tactical tungsten penetrator with no cobalt defeats urban targets. (walls, hard armor)
- Training window 100-1500m; Max range less than 8000m.
- Tracer identical to APFSDS-T.
- Serial production-June 2008.

30mmX173 P-SRTA-T

- Plastic Short Range Trainer Ammunition-Trace (P-SRTA-T)
- Trainer has a max range <1200m.
- Effective training range=300m
- Trainer round includes:
 - Day/Night Tracer
 - Plastic Link
 - Non Toxic Plastic
 - Used by Food Industry
 - UV-Degradable Materials
- Qualified by FLO in Nov-08



30mm Plastic Blank Ammunition

- Items used for:
 - Force-on-force exercises.
 - Implemented in Battle Training Systems.
- Round Safety Distance:
 - 15m / 50 ft in front of muzzle.
- Cartridge color is either red or black.
- Cartridge utilizes plastic link.
- Status:
 - Delivered 10,000 rds in 2005 to Norway.
 - Delivered 20,520 rds in 2006 to SE Asia.
 - Delivered 25,000 rds in 2009 to SE Asia.



Summary

- GD-OTS/Nammo has ready for USG use an extensive suite of 30mm tactical and training ammunition.
- With a new/strengthened relationship, the Team is now focused on strategies that best reduce manufacturing cost while continuing to develop new higher effectiveness products.

The GD/Nammo team stands ready to support the USG with state-of-the-art 30mm products!