



Qualification Testing of the PGU-47 Armor Piercing High Explosive Incendiary-Traced 25mm Cartridge

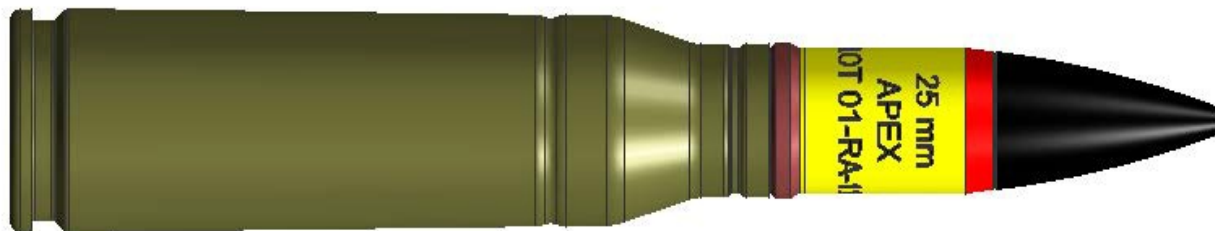
NDIA Armament Systems Forum

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**Presented By:
Jim McConkie
Code E33,
Naval Surface Warfare Center
Dahlgren Division**

Background

- Cartridge developed by Nordic Ammunition Group (NAMMO) Raufoss, Norway
- Fuze developed by Dezamet, S.A.
- Fired from GAU-22/A, developed by General Dynamics Ordnance and Tactical Systems (GD-OTS)
 - Internally mounted on F-35A
 - Externally mounted pod (Missionized Gun System) for F-35B and C
- Candidate to meet F-35 ORD
- OSD approved DoN FCT to conduct comparative testing





USN Qualification Program Activities and Lead POCs

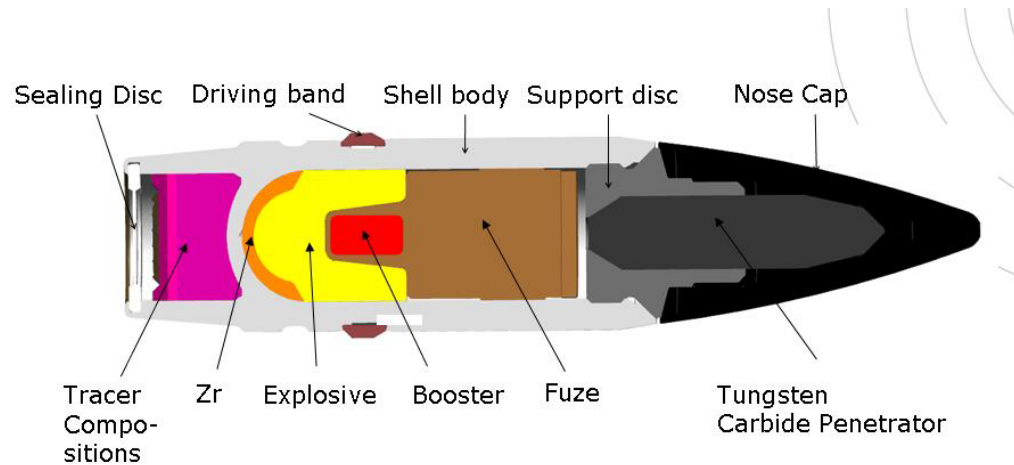


- **NAVAIR, Code PMA-242 – Pete Sweazy**
 - Management, Procurement & Configuration Management
 - FCT Program Lead – John Preble
- **NSWC – China Lake (CA)**
 - Principal for Safety (PFS) – Dr. Charles Ezeike
 - Logistics Manager – Ron Swanson
- **NSWC – Dahlgren**
 - Qualification Program Lead – Jim McConkie
 - Qualification Technical Lead – Scott Smith
- **NSWC – Crane**
 - Quality Evaluation (Surveillance) Plans – Greg Deckard
- **NSWC – Indian Head**
 - Energetics Qual – Mike McDonnell
 - Naval Munitions Data (NMD) – Brian Cole
- **EOD Tech Division**
 - EOD Procedures – Mike Bonaguro

Contractor Qualification Program Activities and Lead POCs

- **NAMMO (Norway)– Eva Friis**
 - Design, Procurement, Configuration Management, & Program Management
 - Select Qualification Testing of All-Up 25mm PGU-47/U Cartridge
- **DEZAMET (Poland) – Pawel Chlebowski**
 - Design, Procurement, Configuration Management of FMU-171 Fuze
 - Design & Qualification Testing of FMU-171 Fuze
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- **GD-OTS (Burlington, VT) – Gary Miller**
 - Select Qualification Testing of All-Up 25mm PGU-47/U Cartridge
 - Design & Function and Casualty Testing in GAU-22 Gatling Gun
- **GD-OTS (St Marks, FL) –**
 - Design & Manufacture of Propellant
- **KRATOS (Dahlgren, VA) – Dave Powers & Susan Koban**
 - Documentation (Program Planning Documents & Qualification Report)

PGU-47 Description



Component	Material, Nomenclature	Net Explosive Weight
Propellant	SMP 795	83.0 grams (g)
Main Charge	PBXN-11	6.0 g
Booster	PBXN-5 Type I, Class 4	0.28 g
Tracer	NAMMO compositions	4.8 g
Fuze Detonator	M55 Stab	82 milligrams (mg)
Fuze Booster Lead	PETN, Class 4 (D)	18 mg

Basic Safety Tests

Test	Requirement	Conduct	Status
28 Day T&H	MIL-STD-2105	NAMMO	Complete
Vibration	MIL-STD-2105	NAMMO	Complete
4 Day T&H	MIL-STD-2105	NAMMO	Complete
40 ft. Drop	MIL-STD-2105	NAMMO	Complete



In insensitive Munitions and Hazard Class Tests

Test	Requirement	Conduct	Status
Fast Cook Off	MIL-STD-2105, NAVSEAINST 8020.8C	NAMMO	Complete
Slow Cook Off	MIL-STD-2105	NAMMO	Complete
Bullet Impact	MIL-STD-2105	NAMMO	Complete
Fragment Impact	MIL-STD-2105	NAMMO	Complete
Sympathetic Reaction	MIL-STD-2105, NAVSEAINST 8020.8C	NAMMO	Complete
Shaped Charge Jet Impact	MIL-STD-2105		Not Planned
Energetics Qualification	NAVSEAINST 8020.8	USN	Complete

Reaction types for each test were typical for minor caliber high explosive gun cartridges.

Insensitive Munitions and Hazard Class Tests



Test	Requirement	Conduct	Status
PVAT	GD-OTS A11710 CIDS	USN, NAMMO	Complete
Function and Casualty	GD-OTS A11710 CIDS	USN, GD-OTS	Complete
Salt Fog	MIL-STD-810	GD-OTS	Complete
Sand and Dust	MIL-STD-810	USN	Complete
Arena	JTCG/JMEM	USN	Complete
Shipboard Shock	MIL-S-901	USN	Complete
Waterproof	MIL-STD-810	GD-OTS	Complete



Test	Requirement	Conduct	Status
HERO	MIL-STD-464		N/A
ESD	MIL-STD-331 MIL-STD-464	USA, Redstone	Complete
EMV	MIL-STD-464		N/A
Lightning Strike	MIL-STD-464	USA, Redstone	Complete
THVA	MIL-STD-810	GD-OTS	In Progress
Terminal Effects	GD-OTS A11726 CID	NAMMO	Complete



Fuze Tests

Test	Requirement	Conduct	Status
Fuze Function	GD-OTS A11726 CID	NAMMO/GD-OTS	Complete
Fuze Arming Distance	MIL-STD-331	NAMMO	Complete
Primary Explosive Component Safety	MIL-STD-331	NAMMO	Complete
Interrupter Effectiveness	MIL-STD-331	Dezamet	Complete
Jolt	MIL-STD-331	NAMMO	Complete
Jumble	MIL-STD-331	NAMMO	Complete
Lead Azide	NAVSEAINST 8020.3A	USN	Complete
5 ft. Drop	MIL-STD-331	NAMMO	Complete
Brush Impact	MIL-STD-331	NAMMO	Complete

Qualification Status

- Completed the Following for the 25mm PGU-47/U APHEI-T Cartridge:
 - All Cartridge Level Testing Completed and Final Report Completed
 - Final Type Qualification (FTQ) – Submitted and granted
 - Final Hazard Classification (FHC) Submitted and granted
 - FISTRIP Finding - Closed
 - Final Operational Capability – Submitted to WSESRB
- Future Qualification Events for the 25mm PGU-47/U APHEI-T Cartridge:
 - Cartridges Procured from Manufacturer (NAMMO) for 25mm GAU-22 Missionized Gun System (MGS) Qualification Testing
 - Document and Report the Finding of the MGS Testing

Summary

- All 25mm PGU-47/U Evaluation, Analysis, and Qualification Testing Complete
- Awaiting Final Operational Capability (FOC) from WSESRB (Cartridge Only)
- Qualification of 25mm PGU-47/U APAHEI-T cartridges in F35 Missionized Gun System (Gun Pod) - TBD
- Awaiting Decision by USN/USMC of Operation Use



Questions?



Clif Samuels – A Warfighter’s Friend A Tribute

- Mr. Clif Samuel, a lifelong resident of Fredericksburg passed away on Friday, 15 Jan 2016.
- He was a U.S. Army WWII veteran, who served in France and was a member of the VFW Post 3130 and the American Legion Post 55.
- He was a NSWCCD Sr. Project Manager for Minor caliber Guns Systems that Supported the USMC, NAVSEA and NAVAIR for over 40 years.
- He Supported NDIA Guns and Ammo Symposiums thru-out his career.
- A Gentleman, A Mentor, and a Fired to All He met.

