US Navy MK 38 Mod 2 MGS Coaxial Gun ORDALT Qualification Status

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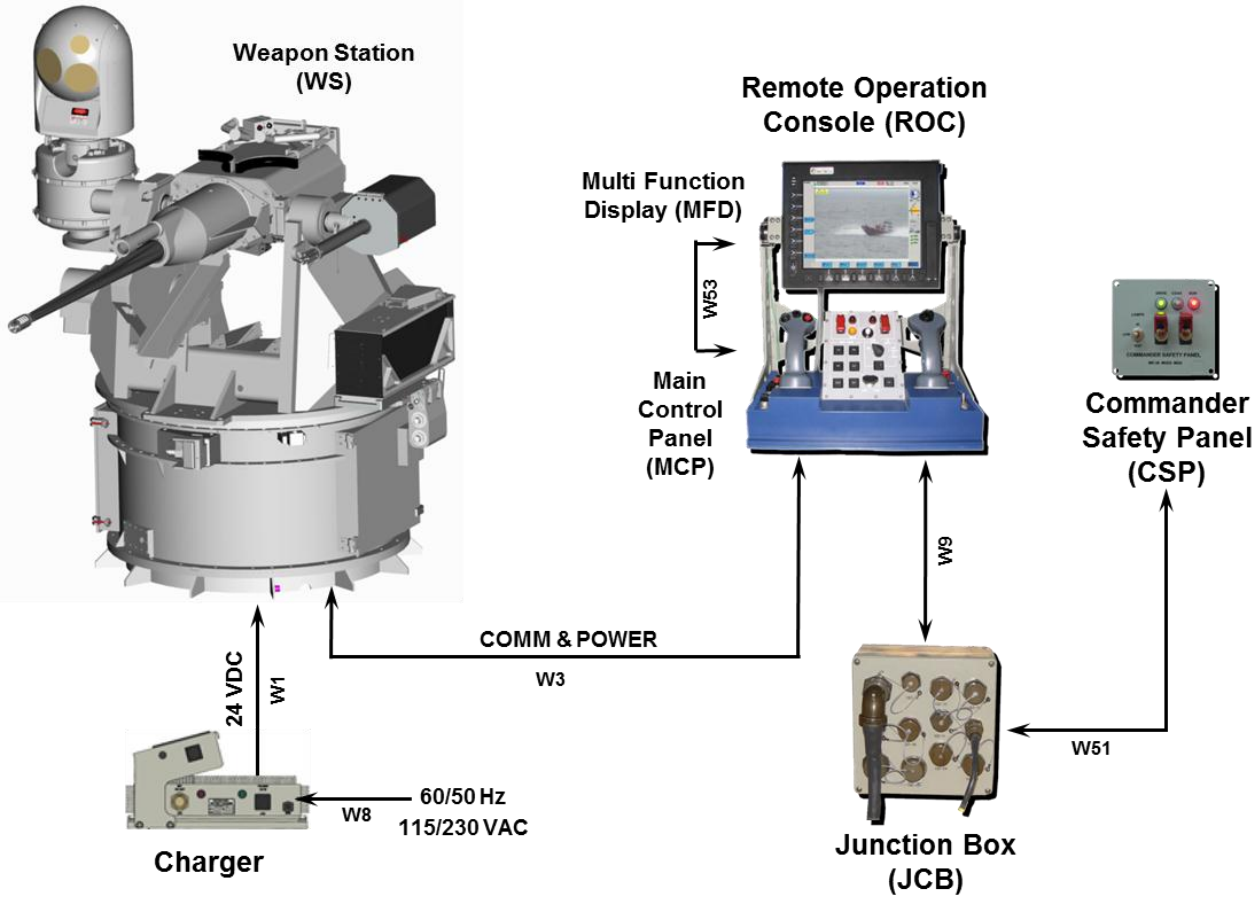
MK 38 Mod 2 MGS Mission & Description

- Mission: Defense Operations, Law Enforcement & Homeland Security
- Description: MK 38 Mod 2: 25mm remote control, automatic and stabilized MGS with day and night sensors and eye-safe laser rangefinder
  - MK 38 Mod 2 was developed in FY04 under CNO direction (N764 Letter ser N764/3U623240 of 7 July 2003) in pursuit of simple, stabilized, low-cost solutions to outfit near-term deployers to counter small boat threat.

MK 38 Mod 2 MGS

MK 38 Mod 2 MGS Coaxial ORDALT



MK 38 Mod 2 MGS Coaxial Gun ORDALT: ATK 7.62mm Chain Gun

Technical Data: Short Barrel

• Caliber	7.62mm x 51mm NATO
• Method of Operation	Electrically powered
• Feed System	Single-belt feed (M13 Links)
• Overall Length	660.4 mm
• Barrel Length	580 mm
• Width	152 mm
• Height	155 mm
• Weight	
Receiver	10.88 kg
Barrel	2.23 kg
Total	13.73 kg
• Rate of Fire	520 rds/min
• Power Requirements	18 - 30 volts DC
• Recoil Force (max)	455 kgf
• Ejection of Cases	Fwd
• Cook-off Safety	Open bolt design
• Firing Safety	Mechanical & electrical

MK 38 Mod 2 MGS Coaxial Gun ORDALT Project & Plans

- In 2011, The US Navy in support of Project Task Force Defense requested that improved surface warfare capability be added to the 25mm MK 38 Mod 2 MGS.

- Naval Surface Warfare Center, Dahlgren Division was tasked by PEO IWS-3C to prepare and conduct qualification testing on a 25mm MK 38 Mod 2 MGS Coaxial 7.62mm Gun ORDALT kit.

- NSWC Crane is supporting the qualification testing and evaluation by providing Chain Gun and small arms support as well as "mid-weight" MIL-S-901 Shipboard Shock Testing.

- NSWC, Indian Head, Picatinny Detachment is the In-Service Engineering Agent (ISEA) for the 25mm MK 38 Mod 2 MGS and will provide ISEA support for the MK 38 Mod 2 MGS Coaxial Gun ORDALT.
  - This includes supporting the qualification testing and the At-Sea operational suitability testing and evaluation.

MK 38 Mod 2 MGS Coaxial Gun ORDALT Project & Plans

- The US Navy contracted to develop a coaxial gun kit ORDALT that is integrated to the 25mm MK 38 Mod 2 MGS for US Navy qualification (performance, reliability, and safety) testing in FY14.
  - The coaxial gun chosen was the accurate and reliable 7.62mm Chain Gun.

- The 7.62mm Chain Gun is designated as the MK 52 Mod 0 by the US Navy. It will be qualified as part of the MK 38 Mod 2 Coaxial Gun ORDALT.
  - The 7.62mm Chain Gun has seen extensive service in the UK land forces as a Coaxial Gun in the Challenger main battle tank and the Warrior Infantry Fighting Vehicle (IFV) since the early 1990s.
  - NSWCDD evaluated the 7.62mm Chain Gun in the 1980s in a 100,000-round service suitability test. The gun proved to be very durable, reliable, and accurate.

MK 38 Mod 2 MGS Coaxial Gun ORDALT Project & Plans

- NSWCDD will conduct
  - Land-based testing beginning in early September 2014;
  - At-Sea testing aboard X-PB-777 at the Naval Air Warfare Center, Chesapeake Bay Test Range beginning in early September 2014;
  - Each test site will have a 25mm MK 38 Mod 2 MGS with the coaxial 7.62mm MG ORDALT kit for parallel testing operations.

- During testing, NSWCDD plans to fire over 60,000 rounds of 7.62mm ball ammunition and several hundred rounds of 25mm TP-T ammunition to verify performance, safety, and reliability of the coaxial 7.62mm Gun ORDALT kit.

- The US Navy ISEA for the MK 38 Mod 2 (NSWC, Indian Head, Picatinny Detachment) will oversee a service suitability test that will be conducted aboard a US Navy combatant in the 2nd Qtr of FY15 for a 6-month evaluation period.

- Upon completion of all Land Based and At-Sea testing, the US Navy will prepare and submit a Safety Assessment Report to the US Navy Weapon System Explosives Safety Review Board (WSESRB).

Coaxial Gun ORDALT Qualification Evaluation Matrix (1/5)

Test No.	Test	Description
GT-1	Train Power Drive	Check train power drive control accuracy. Determine maximum velocities and acceleration in train. Check consequences of a power failure. Check functionality of stops and lock pin.
GT-2	Elevation Power Drive	Check elevation power drive control accuracy. Determine maximum velocities and acceleration in elevation. Check consequences of a power failure. Check functionality of stops and lock pin.
GT-3	Ammo Loading	Evaluate the performance and safety of the ammunition-handling system.
GT-4	Electrical Compatibility	Determine the power requirements of the mount in various modes of operation. Verify that the system meets shipboard power compatibility requirements.

Red text indicates a safety-critical test.

Coaxial Gun ORDALT Qualification Evaluation Matrix (2/5)

Test No.	Test	Description
GT-5	Remote Safe and Arm	Verify that all safe and arm switches function properly.
GT-6	System Safety Analysis	Verify proper operation of all system safety features. Evaluate and assess the safety of operational procedures and system design.
GT-7	Wave Loading Analysis	Verify that equipment can withstand stresses caused by wave loading.
GT-8	Maintenance and Manning	Evaluate the adequacy of draft MRC procedures. Evaluate manning requirements.
GT-9	Stabilization	Demonstrate that the system maintains a stable LOS and LOB under simulated operational sea-state conditions. Demonstrate that the system survives simulated high sea-state conditions.

Red text indicates a safety-critical test.

Coaxial ORDALT Qualification Evaluation Matrix (3/5)

Test No.	Test	Description
GT-10	Electromagnetic Vulnerability	Evaluate the performance of the system in an electromagnetic environment. Measure the electromagnetic emissions of the system.
GT-11	Dispersion and Accuracy Firings	Measure the accuracy of the system. Evaluate the performance of the laser rangefinder
GT-12	Shipboard Vibration	Verify that shipboard vibration does not degrade the performance of the system.
GT-13	Shipboard Shock	Verify that the system can meet Grade B shock requirements.
GT-14	Storage Temperature	Verify that the system functions properly following exposure to expected life-cycle storage temperatures.
GT-15	Operating Temperature	Verify that the system functions properly during exposure to expected life-cycle operating temperatures.

Red text indicates a safety-critical test.

Coaxial ORDALT Qualification Evaluation Matrix (4/5)

Test No.	Test	Description
GT-16	Humidity	Verify that the system functions properly after exposure to humidity.
GT-17	Water Intrusion	Verify that the system functions properly after exposure to simulated rain and blowing rain.
GT-18	Salt Fog	Verify that the system functions properly after exposure to a salt fog environment.
GT-19	Sand and Dust	Verify that the system functions properly after exposure to blowing sand and dust.
GT-20	Solar Radiation	Verify that the system functions properly after exposure to solar radiation.
GT-21	Reliability and Tactical Life	Evaluate the number of rounds fired between system component failures. Evaluate the useful life of system components.

Coaxial ORDALT Qualification Evaluation Matrix (5/5)

Test No.	Test	Description
GT-22	At-Sea Test Aboard X-PB-777	Testing will check performance, safety, and operational suitability of the Coaxial Gun ORDALT Kit aboard an x-US Navy 65-foot patrol boat. Specific tests are to include the following: Check the functionality of cut outs. Evaluate the offset tracking feature, fire correction procedure, manual track mode, and warning shot capability. Evaluate the performance of the system in auto track mode using auto lasing to engage targets.

- Upon completion of the land-based and at-sea testing, the US Navy will request concurrence from WSESRB to deploy two MK 38 Mod 2 MGSs with the 7.62mm Coaxial Gun ORDALT Kits aboard a US Navy combatant for a 6-month in-service operational evaluation to be conducted by NSWC, Indian Head, Picatinny Detachment.
- Upon completion of all testing and evaluations, the US Navy will compile all performance, safety, reliability, and operational suitability data, analysis, and reports into official technical publications and a Safety Assessment Report for presentation to the WSESRB for Final Operational Capability (FOC) concurrence in October 2015.

MK 38 Mod 2 MGS Coaxial Gun ORDALT Summary

- The 25mm MK 38 Mod 2 with 7.62mm Coaxial Gun ORDALT will provide close-in surface warfare capability for USN combatants using the MK 38 Mod 2 MGS.
  - The 7.62mm Coaxial Gun ORDALT will eventually be fitted to all MK 38 Mod 2 MGSs in the USN upon successful completion of all analysis and performance, safety, and reliability testing.

- The USN qualification testing will validate that the 7.62mm Coaxial Gun ORDALT provides improved surface warfare performance in a safe and reliable manner that is operationally suitable for use in the US Navy.

- The 25mm MK 38 Mod 2 Coaxial Gun ORDALT will complete testing and evaluation in FY15 and be reviewed by the US Navy WSESRB for FOC concurrence in October 2015.

Si Vis Pacem, Para Bellum