

ARCHIVED REPORT

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EMD

Outlook

- L3Harris with U.S. Navy deploys and recovers first AUV from fast-attack submarine
- No orders received for the Expendable Mine Destructor
- L3 and Harris Corp merged to create L3Harris Technologies
- L3Harris Technologies continues development of AUV capabilities

Contractors

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Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length	125.82 cm	49.535 in
Diameter	200 mm	8.77 in
Weight (without warhead)	31.75 kg	70 lb
Performance		
Speed	12-15 kt	12-15 kt
Duration	30 min at 8 kt 9 hr at 2 kt	30 min at 8 kt 9 hr at 2 kt
Max depth	300 m	984 ft
Min depth	2 m	6.56 ft
Acquisition range	30 m	98 ft

Propulsion. The EMD uses a battery-powered propulsion system.

Control & Guidance. Prior to launching, the EMD is programmed with the target's coordinates. The vehicle then proceeds to these coordinates automatically and destroys the intended target.

Launcher Mode. The EMD can be launched from small or large vessels.

Recovery. The EMD is expendable and therefore has no recovery system. However, there is a recoverable version available for reconnaissance and training.

Warhead. The EMD can be equipped with a variety of warheads. The system could be outfitted with the semi-armor-piercing projectile gun developed by the U.K.'s Defence Evaluation and Research Agency (DERA).

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Source: L3

Variants/Upgrades

There are two variants of the EMD: one is designed to destroy sea mines and the other is a special reusable version with a TV camera instead of warheads. This version is an inexpensive substitute for ROVs and can be used for training and inspection.

For more information on the system, please see the **Program Review**.

Program Review

Background. L3Harris Technologies' Mk 8x Expendable Mine Destructor program has its roots in an effort started in the 1970s when L3Harris's Ocean System division was part of Bendix. This Bendix program provides a mine-destruction system that can be used from U.S. Navy helicopters. The system is designed as an autonomous mine disposal vehicle for use by mine countermeasures forces.

Countering Moored and Bottom Mines

Description. The EMD is designed for the identification and clearing of bottom, moored, and floating sea mines. The vehicle can easily be launched from large or small vessels.

The Expendable Mine Destructor is available with a variety of warheads ranging from bulk to shaped charges, as well as an armor-piercing projectile that can destroy all types of mine targets (including those armed with insensitive munitions). The EMD is usually equipped

with four shaped-charge warheads. These warheads are symmetrically angled and designed to detonate the mine's explosive charge.

L3Harris Technologies believes the greatest advantage of the EMD over its competitors is that it is fully autonomous once launched. This autonomous capability is also said to greatly reduce the amount of time required to train its operators.

A recoverable and reusable EMD version is available for reconnaissance and training missions.

Operation. Once a target is located and identified by a minehunter, the EMD is programmed to find and destroy the mine.

The EMD is monitored by a control ship's onboard sonar, with course corrections made via its fiber-optic link (overriding the vehicle's programming). Acoustic control can also be used. A television camera is optional.

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Source: L3

The EMD approaches a target at speeds up to 12 knots, and, once within range, uses its onboard charges (four in all) to destroy it. Multiple shaped charges are used to ensure maximum kill effectiveness. Should the mine's charge not detonate, the explosion of the EMD is designed to be sufficient to disable the target's triggering mechanism.

The system is capable of working well in water currents up to 5 knots (by some estimates) and in areas populated by undersea growth and other obstacles.

Some 20 to 50 EMDs could be carried per ship, depending on the vessel's size.

New AUVs. L3Harris Technologies has developed the Iver Precision Workhorse (Iver PW) autonomous undersea vehicle. The company displayed this AUV at the 2018 Sea-Air-Space Exposition.

The Iver PW is the first in a family of advanced military AUVs. These systems will address a wide variety of customer missions, including multi-domain intelligence, surveillance and reconnaissance (ISR); anti-submarine warfare (ASW); seabed warfare; and mine warfare.

L3 OceanServer said in April 2018 that it had built more than 300 UUVs since 2003. The company did sell commercial off-the-shelf UUVs to the U.S. Navy, including the Iver3. These UUVs are in service with several agencies and naval services around the world.

The U.S. Marine Corps ordered one Iver3 UUV for test and evaluation as a potential reconnaissance system for amphibious intelligence units.

L3Harris unveiled the Iver4 580 UUV in June 2020, the second member of this family. This UUV has a diameter of 14.73 centimeters (5.8 in) and is 2.08 meters (82 in) long. The Iver4 580 UUV can operate at a depth of 200 meters and travels at a speed of 4 knots.

Northrop Grumman is providing its micro-synthetic aperture sonar system for use on the Iver4 series.

The U.S. Navy said in January 2020 that it had selected the Iver4 900 PW UUV for testing under its Next Generation Small-Class Maritime Expeditionary Mine Countermeasures Unmanned Undersea Vehicle (MEMUUV) program.

The Iver4 900 AUV weighs 90 kilograms, is 2.5 meters long, and has a diameter of 0.23 meters. The UUV can run for 20 hours on NiMH batteries and 40 hours using Liion batteries. This version can reach a depth of 300 meters and can cruise at 3+ knots. The Iver4 900 is designed for intelligence, surveillance, and reconnaissance (ISR), mine warfare, and anti-submarine warfare operations.

L3Harris unveiled its Hunterwater UUV in 2022. This system is for the detection, classification and neutralization of naval mines.

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In July 2023, L3Harris announced it became the first company to launch and recover an AUV from a submarine in coordination with the U.S. Navy. The press release noted the event utilized Iver4 technology, but the

vehicle type is unknown. The company plans to continue work on the Torpedo Tube Launch and Recovery (TTL&R) which allows SSN submarines to act as AUV motherships.

Funding

No specific information is available concerning the internal funding for UUV research at L3Harris Technologies. The company remains involved in the unmanned and autonomous underwater vehicles market. Demand for UUVs, as well as mine disposal vehicles (MDVs), remains steady.

Worldwide Distribution/Inventories

The EMD has been offered to the navies of the U.S., the U.K. and other countries, but no orders have been placed. There are rumors that ST Dynamics, part of Singapore Technologies, may be developing a system similar to the Mk 8x EMD or could be marketing this system in Asia for L3Harris Technologies.

User Countries. None.

Forecast Rationale

The chances of L-3 Communications winning an order for its Mk 8x Expendable Mine Destructor (EMD) system are rapidly disappearing. The EMD is a member of a new family of expendable mine disposal vehicles (MDVs).

The Expendable Mine Destructor can clear naval bottom and moored mines. This expendable vehicle's design allows deployment from surface ships, helicopters, fixed-wing aircraft, and rigid hull inflatable boats (RHIBs). The EMD remains in the company's naval product line, but the level of effort in finding EMD production contracts is probably not considerable.

The lack of a significant naval mine threat when the U.S. entered Iraq provided only a passing chance for systems like the EMD to shine. The world's attention quickly shifted to the exploits of unmanned air and ground vehicles in Afghanistan and Iraq. As production and funding surged for unmanned air and ground vehicles, their undersea counterparts did not see a corresponding increase.

Mine disposal vehicles are intended to speed up the clearing of naval mines, a tedious mission that can involve numerous ships, hundreds of sailors, and thousands of hours of work. Although the chances that Europe will see a major war involving the extensive use of sophisticated naval mines has receded considerably since 1991, the threat in other parts of the world has not.

The ability to manufacture naval mines is not restricted to the major powers. Saddam Hussein had a rudimentary but dangerous naval mine capability. Iran is manufacturing similar naval mines and routinely threatens to close the Strait of Hormuz to all oil transports. In addition, North Korea builds naval mines and is more than willing to sell to any potential customer.

L-3 Communications is unlikely to win any orders for its Expendable Mine Destructor. The prospects for an EMD production award diminish with each passing year. Potential customers appear to favor systems other than the EMD.