

## AUSTRALIAN NAVAL MINE WARFARE

*Low-technology mines are one of the most cost-effective weapons in existence.*

Vice Admiral Stanley Arthur, USN, 1991<sup>1</sup>

The sea mine is a sea denial weapon. The laying of even a limited minefield in port approaches, in focal areas, or in choke points can deny an adversary free access. A known or suspected minefield will compel an adversary to either accept the loss of access and associated costs or commit resources to lengthy and costly mine countermeasures (MCM) operations. Minefields can be used protectively in support of allied shipping or aggressively against an adversary. A mining threat will affect an adversary through disruption of plans, hindrance of maritime activity, lowering of morale, and disruption of national economy.

Australia is dependent on maritime trade, and mining an Australian port or its approaches would effectively close that port to shipping. Effective MCM assets provide the only practical means to reopen it. The defence of Australia requires an effective and balanced mine warfare force incorporating a combination of minehunting, minesweeping and clearance diving. The ideal should be to acquire a mine warfare force capable of deployment as required to support Australia's strategic interests and objectives.

### MCM SHIPS AND UNITS

The RAN currently employs the following ships and units in the conduct of defensive MCM.

**The deployable Commander Mine Warfare and Clearance Diving (MCD) task group, including the Mine Warfare Command Support System.** This is a deployable headquarters capable of planning and executing MCM operations from either a sea or shore based headquarters. Small components of the headquarters may be deployed as part of a multinational headquarters. The task group regularly conducts exercises with Five Power Defence Arrangement (FPDA) nations, the Royal Navy (RN), Canadian Navy and the United States Navy (USN), both in Australia and abroad.

**Huon class coastal minehunters (MHC).** The six *Huon* class vessels (two maintained in Extended Readiness) are capable of conducting minehunting to a maximum depth of 200m and performing both mechanical and influence minesweeping operations. The MHCs carry clearance divers to provide an identification and disposal capability.

**Minesweepers.** Three remotely-controlled minesweeping drone units (MSDU) capable of conducting precursor operations to sweep mines targeting minehunters and minesweepers using mini dyads and the Australian Acoustic Generator.

**Clearance Diving Teams (CDT).** The two permanent RAN CDTs have the ability to locate, identify, dispose of and exploit mines in the shallow and very shallow water regions. A third RAN CDT is formed and deployed for specific military operations. All CDTs may be employed in advance force operations, port and wharf clearances, and in support of MHC operations. They also possess unique specialist diving, salvage, demolition, explosive ordnance disposal (EOD) and improvised explosive device disposal (IEDD) skills that can be used in other operations such as:

- underwater and land-based EOD and improvised explosive device disposal
- support to amphibious operations by undertaking
  - landing site reconnaissance and survey
  - landing site sea mine and obstacle survey and clearance in very shallow water
  - other maritime tactical operations as required
- contributing to advanced force operations such as Rapid Environmental Assessment (REA)
- undertaking other specialist diving operations assigned (eg. placing and recovery of underwater sensors, offshore maritime counter-terrorist)
- limited underwater battle damage patching, repair and salvage capability to assist a damaged ship to return to a support facility for more comprehensive repairs.

**Naval Reserve Diving Teams.** The seven naval reserve dive teams have a limited diving and salvage capability that, assuming training and currency requirements are met, can be used to supplement the CDTs or to backfill CDT roles when the CDTs are deployed.

**Maritime Geospatial Deployable Support Team (MGDST).** The unit provides technical and performance analysis of MCM operations, evaluation of MCM effort, intelligence and forward-based logistics support to deployed MCM forces. MGDST operates MDSU and Autonomous Underwater Vehicles (AUV) for support of MCM operations.

**Naval Reserve Mine Warfare Groups.** Among other tasks, the two groups have the ability to supplement headquarters staff and provide additional personnel to the MGDST.



*The MHC, HMAS Gascoyne. Current proposals envision these units being replaced by offshore combatant vessels equipped with a rapidly deployable modular MCM system (RAN)*

### MILITARY TASKS

The advantages of employing the sea mine include engaging an adversary at minimal risk to own units; providing the possibility of delivering a pre-emptive defensive attack; engaging an adversary with a covert weapon that maintains a continuous threat; forcing an adversary to operate both military and commercial shipping in areas that make them more vulnerable to other weapons; forcing an adversary to maintain an MCM capability; and presenting an adversary with a significant psychological threat.

The sea mine threat may be described under two main categories. Moored mines are positively buoyant, attached to the seabed, floating at a pre-determined depth below the sea surface, and may be laid in depths down to 300m or greater. Ground mines are negatively buoyant, resting on the seabed, and are laid in water depths in excess of 200m. The diversity of sea mine types available to an adversary means that the planners of MCM operations need to consider a number of different approaches. MCM operations may be divided into offensive and defensive. Offensive MCM operations are carried out to prevent an adversary from successfully laying sea mines and may include:

- strategic strike against an adversary's mine warfare infrastructure
- maritime strike against an adversary's seaborne minelayers enroute to the mine laying areas
- air attack against an adversary's airborne minelayers enroute to the mine laying areas

The ADF does not possess an offensive mining capability, and for the majority of ADF military operations some form of defensive MCM will be required. For example, defensive MCM operations are needed to protect expeditionary forces used for maritime power projection, to defend sea control forces operating in the littorals, and to counter an enemy's efforts to deny Australia the use of the sea. Defensive MCM operations are carried out to remove or reduce the threat after sea mines have been laid and include:

- passive measures, such as the localisation, identification and avoidance of the threat through intelligence, mine and obstacle avoidance sonar, peacetime route survey operations, route selection and publication of mine danger areas
- active measures, such as the use of MCM assets to remove, destroy or neutralise the mines or delineate the probable limits of the minefield.

The two main measures are minesweeping and minehunting. Minesweeping techniques use either influence or mechanical sweeps towed behind the minesweeper. Influence sweeps are designed to emulate the magnetic and/or acoustic signatures of a surface or sub-surface target and explode the mine. Mechanical sweeps are designed to cut the mooring cables of buoyant mines, using explosive cutters attached to the sweep wire, allowing the mine to float to the surface for subsequent disposal. Influence minesweeping is conducted by towing a specially designed rig astern of a minesweeper. These can be used in any combination to precisely emulate the magnetic and acoustic signature of the target vessel to these types of mine.

Minehunting involves detecting and classifying sea mines using high definition sonar. Once classified as a 'possible' mine, remotely controlled underwater mine disposal vehicles or clearance divers can be deployed to identify and destroy or neutralise the mine. The principal advantage of minehunting over minesweeping is that minehunters use forward-looking sonar, which enables the vessel to avoid passing over a mine while searching. It is currently the only practical MCM technique to counter the pressure mine.

The effectiveness of the MCM effort is expressed in terms of risk to the transitor and/or levels of confidence. For example, the outcome of a clearance operation may result in a 90% confidence level that the first transitor would not interact with a mine. Therefore a mixture of the risk that is acceptable to supported commanders, the clearance required to reduce

that risk and the time taken to achieve that clearance, determines the end state of operations. In some cases the required level of clearance may not be achievable in the time required and the supported commander will have to make the decision to either accept the higher risk or extend the time allowed for the operation.

## CONSTABULARY AND DIPLOMATIC TASKS

In addition to their primary military functions, RAN MCM ships and units can contribute a wide range of constabulary tasks such as search and rescue, Defence Force aid to civilian authorities, environmental and resource protection and peace operations. The CDTs possess specialist underwater search and deep water diving support capabilities, which also makes them well suited to performing search and rescue operations or assisting police divers in this task. The RAN also provides clearance divers to the Australian Army Tactical Assault Group East for the conduct of maritime counter-terrorism operations, support to major fleet unit operations for an enhanced boarding capability and for EOD/IEDD support to operations in Afghanistan. MCM units also provide an underwater or land-based EOD and IEDD device disposal capability to assist police. MCM ships can contribute to fisheries protection and the prevention of illegal immigration, by supplementing patrol combatant and surface combatant patrol operations. In addition MCM ships have contributed in recent years to ADF and coalition peacekeeping and peace building operations in Bougainville, East Timor and the Solomon Islands, by providing a stabilising presence and contributing to patrols intended to monitor ceasefires.

The RAN's MCM ships and units also contribute to a range of diplomatic tasks including assistance to allied and friendly nations, evacuation operations and humanitarian assistance and disaster relief. MCM ships and units can conduct preliminary reconnaissance, survey and, if necessary, clearance of approaches to beach landing sites used in operations undertaken to protect or evacuate Australian nationals during regional crises. Since 1945 RAN MCM units have also cleared enormous quantities of mines and unexploded ordnance from South East Asia, Papua New Guinea, and the islands of the South West Pacific. Each year RAN CDTs respond to a variety of EOD taskings in Australia involving the discovery of mines laid during World War II (WWII). They also provide EOD assistance to other nations within the region to deal with discarded Allied and Japanese WWII ordnance. Additionally, they have contributed to regional disaster relief operations and the clearing of passages through reefs.

## AN EYE ON THE FUTURE

The future direction and concepts for MCM will be shaped by an understanding of the expeditionary capabilities currently being delivered to the ADF. Certainly, mine warfare will not be less important in future. The opposite is the case, since mine warfare will permeate across all activities that the ADF undertakes at sea. The RAN does not just rely upon a few specialist personnel operating a small number of MCM vessels but rather deploys mine warfare specialists across the fleet to undertake passive and active countermeasures at home and abroad. The current mine warfare force is evolving and navy people are currently working hard re-examining mine warfare concepts and doctrine in an effort to guide the future capability.

<sup>1</sup> Vice Admiral Stanley Arthur, US Naval Commander in the 1991 Gulf War, quoted in 'Desert Storm at Sea' in *US Naval Institute Proceedings*, Naval Review Issue 1991, p. 86.

