DOLPHINS
“Sentinels of the Sea”

Dolphins are playing a stellar role in locating deadly mines in the deep oceans and sea waters.

What is a Sea mine?
“Sea mines” or “Naval mines” are self-contained explosive devices placed in ocean and seawaters to destroy ships or submarines. Unlike depth charges, mines are deposited and left to wait until they are triggered by the approach of or contact with an enemy ship. They can be used offensively to obstruct enemy ships or lock them into a harbour, or defensively to protect friendly ships and create “safe” zones for them.

These mines are laid by various means such as purpose-built minelayers, refitted ships, submarines, aircraft or by dropping them into a harbour by hand. Just like land mines, it costs a lot to remove them. The cost of producing and laying a sea mine is usually anywhere from 0.5% to 10% of the cost of removing it. It generally takes up to 200 times as long a time to clear a minefield as to lay it. This is the reason why even today there exist in the deep seas minefields that were planted during World War II.

To get a clearer picture of the object, the Dolphin moves around and interprets it from multiple points of view, while varying the kinds of clicks.

SNIFFER dogs are trained to sniff out explosives. But how do you search for mines deep in the seas? The U.S. Navy started training bottlenose Dolphins and some sea lions since the 1960s to detect sea mines.

Sea mines deep in the ocean became a matter of concern for the U.S. Navy after they suffered extensive damage to their commercial and war ships, which sank after hitting sea mines during World War II. In fact, more ships have been damaged from mines than from all other causes like active enemy attacks. Fortunately, the Dolphins are doing a very good job of detecting mines.
Dolphins to the Aid

Just like Bats and Whales, Dolphins have a biological sonar detecting ability called “echolocation” that makes them better qualified than humans to find underwater mines from distances of even 100 meters. Dolphins belong to the order Cetacea. The members of this order have special ability of echolocation and communication. Whales and porpoises also belong to the same order. But the capability appears to be particularly well developed in the dolphin, suborder Odontoceti, and particularly in the genus Tursiops.

In sonar technology, sound is bounced off other objects or hills or icebergs and even submarines. The distance of the submarine can be easily ascertained. But why is sonar helpful for underwater operations? Because water bodies are often very dirty or murky for observation by sight, and the speed of sound is greater in comparison to that in air.

Dolphins have been using this skill for millennia. The dolphin’s characteristic clicks and squeaks that are heard by humans include many clicks that are of very high frequency to be heard by the human ear. Dolphins use these clicks as active sonar mechanisms by which they have the capability to tell the difference between a BB gun pellet and a seed of corn 50 feet away.

Dolphins do not need any special costumes or goggles. They can be trained to locate and attach hardware to underwater objects for retrieval. They can dive to depths much deeper than humans, with no need for time-consuming decompression. And this is why the Pentagon calls them the “Sentinels of the Sea”.

Though the Navy can equip Dolphins with cameras and sensors, it is really the Dolphins’ natural abilities that make them perfect for the job. These mammals are saving the lives of hundreds of people every day,

Dolphins are very gregarious, carnivorous and pack animals. They are also known as “sea canaries” and their repertoire of signals is very wide. They can identify an individual on the shore from a distance of over 100 meters. For echolocation, the Dolphins are equipped to use two distinct types of biosonar. One is an impulse-type (click-type) biosonar for high precision echolocation, the other being imaging of targets within 100 meters.

The sonar of Dolphins is considerably more sophisticated than any current man-made sonar in the world. It rivals the most advanced airborne radars available today. Some of the properties of the dolphin sonar are:

- It is primarily a multi-band
- Multimode in nature, includes Doppler detection
- Frequency-hopping capability
- Steerable beam is emitted
- Has Binaural receiver
- Penetrating single-pulse system

These features are similar to the latest man-made systems like the stealth fighter plane, the F-117, and the latest stealth bomber, the B-2. And this is the reason why after seeing this ability of Dolphins, the United States Navy has started training Dolphins and sea lions to locate sea mines, which are then removed by specially trained officers. In fact, the United States Navy has been studying the hydrodynamics of Dolphins since the 1950s in an attempt to engineer better submarine, torpedo and ship designs.

Training the Dolphins

The Navy trains the Dolphins to spot suspicious, man-made metallic objects from far away. Likewise, they are taught to search for a mine. When a Dolphin finds a mine, it swims back up to the boat to poke an appropriate figure, such as a ball that
result. In this way the Dolphins can determine the size and shape of the objects even in muddy and murky waters.

**Ethical Concerns**

According to many people this act of sending animals to find deadly mines is inherently unethical. Animal rights groups find fault with the process that is carried out during training of the Dolphins. They say that it is inhuman to use these innocent creatures, which are completely ignorant of the dangers involved, to perform such tasks. They argue that to train the Dolphins in the potentially mine-infested waters, the Navy has to transport them. This transportation process involves carrying Dolphins within slings in tanks for a long period and hence they face a rough ride through the way. This method may be devastating for these animals, which otherwise should be free to roam about in the water bodies.

Furthermore, the stress endured could weaken the Dolphins' immune systems. Not only this, when the Dolphins reach the training destination, they have to face a new environment that could bring them discomfort. In fact, when one of the groups heard that the Navy had planned to bring Dolphins to the cold waters off Washington State, they started knitting sweaters for the Dolphins!

The U.S. Navy, however, claims that they are not doing anything inhuman. The Navy claims that the mine-hunting process is much safer for the Dolphins than it may sound. They say that Dolphins aren’t trained to get close to a mine, but rather sense it from a safe distance (which their powerful sonar skill allows them to do).

The Navy also points out that these mines don’t explode when the Dolphins come near them. These mines aren’t built to detonate when disturbed by marine life, but are for large, heavy ships. If natural underwater creatures could detonate a mine, all the mines would have exploded soon after being planted, rendering it useless as a weapon against enemy ships. The Navy stands firm that the Dolphins are well cared for. It claims that staff veterinarians nurture the Dolphins diligently and are on call at all times.

Further investigations into the U.S. Navy's Marine Mammal Program have found that the Dolphins are not penned up in captivity for their entire lives, like those at amusement parks. The work these marine mammals perform for the military is done in the open sea. The Dolphins are actually trained to return to port after an evening spent in the open ocean. Sea mammals are no longer taken from the wild because the Navy has developed a marine mammal breeding program, which enables them to better train the animals.

However, the U.S. Navy has made it clear that its long-term goal is to discontinue this Marine Mammal Program once mechanisms are developed that match the unique abilities of the Dolphins and sea lions.

Though the Navy can equip Dolphins with cameras and sensors, it is really the Dolphins' natural abilities that make them perfect for the job. These mammals are saving the lives of hundreds of people every day, especially the navy. The losses suffered by the navy due to damage through these mines has considerably reduced.

Even though scientists are still not sure how a Dolphin's brain interprets sonar information, humans must realise that they owe a lot to these ‘sentinels of the sea’.

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