

ocean floor have had to be supplemented by the Surveillance Towed Array Sonar System (SURTASS) which consists of a long array of small hydrophones towed behind special slow-speed vessels. Smaller versions of SURTASS or the Canadian version, CANTASS, are also towed behind frigates and other types of vessels, including submarines, to improve their ability to detect submarines operating in their vicinity. These arrays of hydrophones are towed some distance behind a vessel so that its own noise, its self-noise, will not drown out the noise produced by a nearby submarine. In fact, as submarines become quieter, many components of anti-submarine surface ships, including the propellers and the engine mounts, have to be carefully designed to reduce self-noise as much as possible.

The task of designing modern anti-submarine surface ships has been further complicated by the changing nature of the combat environment these ships are now expected to operate in. Ships built in the 1950s, such as most of the older ships in the Canadian Navy, were provided with only light armament to defend themselves against other ships and aircraft. However, the development of anti-ship missiles such as the Exocet and the lessons learned in recent limited naval conflicts in the South Atlantic and the Persian Gulf have forced ship designers to significantly increase the ability of surface ships to deal with attacking ships and aircraft. Thus, in addition to complex submarine detection equipment, modern surface ships must now have sophisticated air defence and anti-ship radars and weapons systems, such as anti-ship missiles as well as missiles and guns capable of destroying incoming anti-ship missiles. The number and the complexity of weapons added to the three Canadian ships deployed to the Persian Gulf area demonstrate the complexity of the new naval combat environment.

The complexity of the combat environment above the surface highlights the value of using submarines in anti-submarine warfare. Although by no means invulnerable, submerged submarines have a certain advantage over surface ships which are constantly exposed to air attacks. Besides, since they operate in the same environment as the enemy submarines they are chasing, submerged submarines with towed-arrays and hull-mounted sonar often have better chances of detecting the noise produced by their prey than surface ships. Furthermore, improvements in submarine technology, such as better underwater endurance and more reliable powerplants, have improved their capabilities as anti-submarine platforms. However, experience has shown that anti-submarine forces must rely on teamwork between submarines, surface ships and aircraft in order to have the best possible chance of finding submarines. Indeed, despite the ever-increasing sophistication of anti-submarine equipment, detecting submarines and pinpointing their exact location still require considerable effort and the value of supplementing surface ships with underwater and aerial surveillance capabilities has been recognized by anti-submarine forces throughout the world.