

Australian submarines in the Cold War: a force multiplier for the West

By Dr Tom Lewis

For around 30 years, from initial launch in 1965 to final retirement in 2000, Oberon-class submarines served the Royal Australian Navy with excellence. This paper discusses their role in Cold War operations.¹

Australia has a history of using submarines from its formation in 1911. It deployed two British boats in World War I. One, the *AE2*, attacked Turkish forces, and then – cornered – was scuttled by its commander rather than be captured. The second, *AE1*, was lost in water around New Guinea before being discovered in 2017.

A second acquisition of RN submarines was undertaken after the war but it was not successful. The obsolete six J-class boats were scuttled. Given this paper is first being presented in Melbourne, it is of note that one of these boats may be still seen today nearby. In the Sandringham Yacht Club one can walk through the marina past the wreck of *J7*, an enormous rusting length looking rather incongruous amongst the smart cabin cruisers. The wreck of the monitor *Cerberus* is also to be seen outside the marine.

Faced with Great Depression constraints a third class of two O-class boats were returned to the Royal Navy and consequently the RAN did not operate submarines in World War II.

The submarining legacy of World War II

As WWII drew to a close the numbers of submarines in world navies were an indication of how far the new weapon had come from its early beginnings. The USN lost 52 submarines out of 288 vessels, with 374 officers and 3,131 enlisted men. These personnel losses represented 16% of the officers and 13% of the enlisted operational submarine personnel – a higher fatality rate than the average for WWII.² American submariners, who comprised only 1.6% of the Navy, suffered the highest loss rate in the US Armed Forces, with 22% killed.³

The Japanese lost 128 submarines out of 186.⁴ This does not include their midget two-man boats, of which they still had around 900 by the end of the war, and their modified torpedo suicide *kaiten* boats; again of which they had hundreds. The Germans, the naval power focused around submarines, lost 785 boats of 1,158 constructed.⁵ The British, who concentrated far more on surface vessels than did the Germans, operated 260 submarines and lost 79. These were conventional vessels and do not include their specialised “midget” boats, of which they lost seven X-Craft, 18 Chariots and five Welman vessels.⁶ Presented in a comparative form is informative:

| | Japan | Germany | USA | Britain |
|--------------|--------------|----------------|------------|----------------|
| Lost | 128 | 785 | 52 | 79 |
| Survived | 58 | 373 | 236 | 181 |
| Total | 186 | 1,158 | 288 | 260 |
| Percentage | 69% | 68% | 18% | 30% |

It is not the intention of this paper to chart the somewhat staggering rise in capabilities of submarines around the world in World War II. But in six years they increased their roles manyfold to arrive at a comprehensive list:

- **Anti-surface attack**
- **Submarine versus submarine attack**

¹ A word on sourcing...the paper is necessarily only drawn from Open Source publications, and in places the author has sought and found and inserted definitions and descriptions from public works such as Wikipedia of technical submarine warfare practises rather than describe them in his own words, to therefore point them as being from public descriptions rather than his own acquired knowledge.

² <http://www.valoratsea.com/losses1.htm> “U.S. Submarine Losses in World War II”. February 2008.

³ <http://www.navy.mil/navydata/cno/n87/history/pac-campaign.html> Results of the American Pacific Submarine Campaign of World War II. Commander Michel Thomas Poirier USN. February 2008.

⁴ <http://www.valoratsea.com/losses1.htm> “U.S. Submarine Losses in World War II”. February 2008.

⁵ United States Navy. <http://www.navy.mil/navydata/cno/n87/history/wwii-campaigns.html> Results of the German and American Submarine Campaigns of World War II.

⁶ Naval Encyclopedia.com. <https://naval-encyclopedia.com/ww2/uk/british-submarines.php> and <https://www.navyhistory.org.au/british-and-german-submarine-statistics-of-world-war-ii>

- **Anti-air self-defence.** Although by the end of the war no submarine commander would fight aircraft, or even stay on the surface given their presence, submarines developed a considerable amount of firepower to counter hostile aircraft attacks and reconnaissance.
- **Covert midget submarine deployment.** Several navies developed this, although the Imperial Japanese Navy was the largest operator of both the suicide *kaiten* boats, and the two-man midgets
- **Covert swimmer and small boat operations.** Many navies developed to an art their ability to surface in a darkened state near land, and send off folding boats or swimmers, or to recover them
- **Intelligence gathering** against harbours and enemy shipping: learning about the placement of defences; weapons fits, etc
- **Minelaying.** Some specialised submarines were developed to do this through specialised tubes; others used conventionally deployable mines
- **Covert supply operations.** The Japanese, but also notably the British developed the ability to use submarines to transport supplies to besieged islands; in the former case in the Pacific, and in the latter Malta.

Given all of the above it is perhaps surprising the RAN did not look favourably upon the redevelopment of a submarine branch post-war. Then again, the arrival of the aircraft carrier was presenting new possibilities which they embraced, and with what is known in modern terms as a “peace dividend” perhaps it is understandable.

Post-war the lack of submarines meant a major shortfall in vessels to train against in anti-submarine warfare – partly met by RN assets on-station – but the abilities of the platforms as a major naval asset was also recognised, albeit slowly:

...in 1949 the RAN and the RNZN needed to concentrate their training on their anti-submarine role. On 14 July 1949 the Minister for the Navy, WJF Riordan, wrote to the Minister for Defence, JJ Dedman, to say that the Admiralty had offered to base three submarines in Sydney for an indefinite period to facilitate the anti-submarine training...⁷

The rebirth of the Australian Submarine Service followed the decision of the Naval Board, in 1963, to order four of the highly successful British “Oberon” class vessels for the RAN. ⁸ This quickly became eight, then six. On 22 January 1963, with the Royal Navy (RN) intending to withdraw the Fourth Submarine Squadron from its base in Sydney, the Minister for the Navy, Senator John Gorton, announced Cabinet approval for the purchase of eight Oberon, or O, Class submarines for the RAN, though the order was later reduced to six. ⁹

The Royal Navy's 4th Submarine Squadron, which included “T” class submarines, was disbanded on 10 January 1969 when the 1st Australian Submarine Squadron comprising *Otway* and *Oxley* was founded.¹⁰

The orders were placed with Scotts Yard at Greenock and each vessel took just under three years to build. In the tradition of their predecessors of some 40 years before, they were named in honour of men who figured in early Australian exploration. ¹¹

The RAN was fortunate to have one of its best-ever engineers, later-Rear Admiral Frederick William Purves, CBE, RAN, in Britain at the time. A man who liked nothing better than tackling a problem “spanner in hand”, he had been through a tough and different World War II.

From 28 February 1963 Purves served as the Deputy Chief of Technical Services and Assistant Naval Attache in Britain.¹² Although this was a diplomatic position, his engineering role prevailed, with frequent visits to Germany to check on machinery being manufactured at Friedrichshafen by the Zahnradfabrik factory for the

⁷ Hyslop, Robert. *Aye Aye Minister*. Canberra: Australian Government Publishing Service, 1990. (p. 195)

⁸ Submarine Institute of Australia. “The RAN Oberon Class.” <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

⁹ <https://www.navy.gov.au/HMAS-oxley-ii>

¹⁰ Submarine Institute of Australia. “The RAN Oberon Class.” <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹¹ Submarine Institute of Australia. “The RAN Oberon Class.” <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹² Purves, Robert. Letter. February 2002.

Oberon submarines. This was certainly appreciated by his superiors. 'His great practical ability and long experience have been of immeasurable value to the RAN...he has achieved the admiration and respect of all at Navy Office' was a comment on his report of November 1964. He was later to be Third Naval Member of the Naval Board with promotion to Rear Admiral from 14 March 1967. The position also carried the title of 'Chief of the Naval Technical Services'.¹³

Soon after the keel of the first of the four was laid down, the RAN began sending volunteers for submarine training with the Royal Navy. This flow of personnel was maintained as the building programme progressed, and so as each vessel was commissioned she was manned almost entirely by RAN officers and sailors.¹⁴

HMAS Oxley, the first submarine built for the RAN for almost 40 years, was launched on 24 September 1965 by Lady Downer, wife of Sir Alex Downer, Australian High Commissioner in the United Kingdom. She was commissioned on 27 March 1967 by Lieutenant Commander DH Lorrimer RAN. After leaving the United Kingdom on 12 June, she reached Sydney on 18 August 1967, where she was moored at *HMAS Platypus*, the new RAN submarine base commissioned on the day of *Oxley's* arrival. She was the first RAN submarine to pass through the Panama Canal. *Oxley's* original pennant number was S57 although in 1969 it was reduced to 57.¹⁵

| Oberon-class specifications¹⁶ | |
|---|---|
| Displacement | 2,070 tons |
| Length | 89.9 metres |
| Speed | 15 knots (submerged) |
| Crew | 63 |
| Machinery | 2 English Electric main propulsion motors with 2 Admiralty standard range diesel generators |
| Armament | |
| Torpedoes | <ul style="list-style-type: none"> • 6 x Mk8 & Mk23 Torpedo tubes (forward) • 2 x Mk20 Torpedo tubes (aft) – removed on last four boats |
| Mines | <ul style="list-style-type: none"> • Ability to lay up to 50 mines through torpedo tubes |
| Missiles (later) | encapsulated Harpoon anti-ship missiles |

It is worth while taking a brief look at what was happening world-wide in terms of the developing Cold War. The 1940s through to the 1960s had seen a developing rift between those under the Soviet influence, and related Communist idealism in the form of countries like Cuba and China. Winston Churchill had proclaimed on 5 March 5, 1946, at Westminster College, "From Stettin in the Baltic, to Trieste in the Adriatic, an iron curtain has descended across the continent." Things got steadily worse. The USSR had stolen atomic secrets through the efforts of the spy Klaus Fuchs, a German theoretical physicist who supplied information from the American, British and Canadian Manhattan Project to the Soviet Union. The USSR had exploded its first atomic weapon in 1949. The Berlin airlift saw the Soviets block access to the French, British and American sectors of Berlin. The Korean War saw Soviet aircraft flying against the countries supporting South Korea.

More and more hostile acts followed. followed: the Bay of Pigs invasion, Castro and exploding cigars, the Cuban missile crisis, JFK's assassination at the hands of Lee Harvey Oswald, a communist traitor, and a world where MAD – Mutually Assured Destruction was a reality. The Berlin Wall went up. It was against this background that Australia's submarines were being steadily launched.

HMAS Otway was the second Oberon-class submarine to be completed for the RAN. She was launched by Princess Marina, Duchess of Kent on 29 November 1966 and commissioned at Greenock on 23 April 1968 by

¹³ Department of the Navy. Letter to Captain FW Purves, 28 June 1966. Robert Purves Collection.

¹⁴ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹⁵ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹⁶ *Royal Australian Navy*. <https://www.navy.gov.au/HMAS-ovens>

Lieutenant Commander GR Dalrymple RAN. On 23 July *Otway* departed Portsmouth for Australia; arriving at Sydney on 7 October 1968. Her pennant number was 59.¹⁷

Despite a swing to acquiring some American vessels, the RAN remained committed to several British designs, amongst them the *Oberon* class. On 17 June 1966, Rear Admiral Purves officiated for the Navy in a ceremony to place the first hull section for *HMAS Ovens*. On 29 November 1966 he attended the launch of *HMAS Otway*.¹⁸

On 10 January 1969 *Otway* escorted *HMS Trump*, last of the Royal Navy's 4th Submarine Squadron based in Australia, out of Sydney Harbour as she departed for the United Kingdom.¹⁹

| | |
|--|--|
| <p>The third submarine completed for the RAN was <i>HMAS Ovens</i>. She was launched on 4 December 1967 by Lady Slim, wife of Viscount Slim, a former Governor-General of Australia. She was commissioned on 15 April 1969 under the command of Lieutenant Commander B Nobes RAN. <i>Ovens</i> departed the United Kingdom on 1 August and arrived at Sydney on 17 October 1969. <i>Ovens</i> was the first RAN submarine to serve with ANZUK forces under the Five Power Defence Agreement in the Far East in 1972. Her pennant number was 70.²⁰</p> | <p>Mottoes: <i>Oxley</i> Patience and Strength <i>Otway</i> Love of Country Conquers <i>Ovens</i> Silence is Golden <i>Onslow</i> Hasten Slowly <i>Orion</i> All around the world <i>Otama</i> Unseen We Seek</p> |
|--|--|

HMAS Onslow was the fourth "Oberon" class submarine completed. She was launched by Princess Alexandra on 3 December 1968 and commissioned on 22 December 1969 under Lieutenant Commander C Nixon-Eckersall RN. She departed for Australia in April 1970 and arrived at her Sydney base, *HMAS Platypus*, on 4 July that year. Her pennant number was 60.²¹

Two further Oberon-class boats were completed for the RAN some eight years later. They were similar in most respects to the earlier four Oberons but incorporated important design improvements including the provision of a long range passive ranging sonar, which was retro-fitted to the four earlier submarines.²² With significance to this paper's theme, *Orion* and *Otama*, the last two vessels, were nicknamed within the Submarine Service, according to one report, as "Mystery Boats", as they were "fitted with additional surveillance and intelligence-gathering equipment."²³

HMAS Orion was the fifth submarine to be completed. She was launched on 16 September 1974 and commissioned on 15 June 1977 under the command of Lieutenant Commander RJH Woolrych RAN. Her pennant number was 61. The name *Orion* is linked to the constellation of Orion, which is visible in the Southern Hemisphere.²⁴

The sixth and final Oberon-class submarine completed for the RAN was *HMAS Otama*. She was launched on 3 December 1975 by HRH Princess Anne and commissioned on 27 April 1978 under the command of Lieutenant Commander FVR Wolfe RAN. *Otama's* pennant number was 62. The name *Otama* is a northern Aboriginal word meaning 'dolphin'.²⁵

¹⁷ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹⁸ Official program. Robert Purves Collection.

¹⁹ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

²⁰ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

²¹ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

²² Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

²³ Wikipedia. "HMAS Otama." https://en.wikipedia.org/wiki/HMAS_Otama Accessed January 2024.

²⁴ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

²⁵ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

Dr John Nash notes that as an embryo submarine service the main support for successful growth was the Royal Navy:

...through the first decade of RAN Oberon operations that RN officers and sailors were regularly posted to Australian submarines under command and control structure of the RAN 1st Submarine Squadron. For example, the commissioning CO of *Onslow* was a Royal Navy officer. *Onslow* would again be under the command of an RN officer in 1976.

In 1970, *HMAS Oxley* had one RN LEUT posted to the ship in February, though illness delayed his posting aboard. In August 1970 an RAN officer replaced an RN officer as Navigator, ASL Smith, RN, the same who would later become CO of *Onslow*.

May 1976 records the changeover of the Sonar Officer, an RN LEUT replaced by an RAN one. As for sailors, in 1974 *HMAS Platypus* reported that an agreement had been reached for nine RN submariners for service to the RAN for a period of two and a half years.²⁶

Dr Michael White, who completed the authoritative two edition history of the RAN submarine service, advises that the submarine commanders “had transferred from the RN” for their positions.²⁷

One commentator notes however that the RAN boats were not fitted entirely with British equipment:

Australian Oberons had different electronic equipment, using primarily American radar and sonar systems. They had Sperry BQG-4 Micropuffs passive ranging sonar and Krupp CSU3-41 attack sonar. Instead of the British Tigerfish torpedoes, the Australians used American Mark 48 torpedoes. They had a slightly larger payload, carrying 22 torpedoes for the forward tubes, six of which were preloaded. Shortly after entering service, the aft torpedo tubes in all six submarines were sealed.

The Australian submarines were later updated to be equipped with the subsonic antiship Harpoon missile. In 1985, off the island of Kauai in Hawaii, *HMAS Ovens* became only the second conventional submarine in the world – and the first Oberon – to fire a subsurface-launched Harpoon missile, successfully hitting the target over the horizon. Consequently, the designation for the Australian Oberons changed from SS to SSG.²⁸

The initial roles of the Oberon-class were more related to the training of the surface fleet than anything else initially. In naval jargon, they were “a clockwork mouse.” Their job was to go to sea, and act as an enemy submarine. They should submerge, do their best to evade detection, and carry out dummy attacks – on their own Navy’s warships. That was really it at first. But this was to change, and some of that was due to the overarching presence of the Cold War.²⁹

The history of the RAN post-WWII makes little mention otherwise of submarines. For example, Eric Grove notes in “The British Admiralty and the future of the RAN 1958-60” that there were four outlines for the fleet composition in the Cold War:

- Four carriers and 50 escorts
- A smaller force based on the above but within the Naval Vote of £40 million
- A small ship navy
- A simplified but balanced force without the most modern and sophisticated weapons³⁰

Notably the word “submarine” did not feature. Then again ensuing discussions had at least British boats in the picture, and some RAN senior officers had them in their sights. One of these was Vice Admiral Henry Burrell,

²⁶ Nash, Dr John. “The 4th RN Submarine Squadron and the Introduction of Oberons into the RAN.”

<https://www.navy.gov.au/sites/default/files/documents/4th%20Royal%20Navy%20Squadron.pdf> (Dr Nash’s footnotes not carried across in this quotation.)

²⁷ Email from Dr White, 27 February 2024.

²⁸ Sea Forces online. <https://www.seaforces.org/marint/Australian-Navy/Submarine/Oberon-class.htm> Accessed January 2024.

²⁹ Authorial comment.

³⁰ Grove, Eric J. “Advice and assistance to a very independent people at a most crucial point: the British Admiralty and the future of the RAN 1958-60.” (p. 139) Stevens, David. (Ed.) *Maritime Power in the Twentieth Century*. NSW: Allen and Unwin, 1998.

Second Naval Member, who on a visit to the USA had made a visit to the world's first nuclear submarine, *USS Nautilus*. He later travelled to the UK and was instrumental in the decision to acquire the *Oberon* class.³¹ Michael White notes that the then-Minister for the Navy John Gorton "pressed for an offensive capability as well."³² He later said: "'the modern submarine, whether nuclear powered or diesel-electric, is the most versatile vessel afloat', and, 'the submarine is now a most effective anti-submarine unit'."³³

The RN felt that an Australian submarine force to hasten their acquisition of "this key weapon of the future."³⁴ One commentator, James Goldrick, said later of the acquisition that it would provide "a submarine arm to provide for Australian ASW and anti-surface warfare capability in 'limited war' in Asia."³⁵ He continued:

In addition to training, the peacetime use of the submarines for intelligence, surveillance and reconnaissance became increasingly important. The Oberons, which were commissioned from 1967 onwards, rapidly proved themselves capable, reliable and quiet, but they had significant sensor and weapon limitations, which became increasingly apparent in exercise encounters with surface and air ASW forces.

And so it came about that in the usual mish-mash of political decision making, with a range of needs, wants, pressures and influences, a policy was arrived at: the Oberons would be used for the full range of submarine warfare possibilities, from the covert to the open hostilities, from providing training for a surface force acquiring air assets, and beyond. The transition however did not come without difficulty. This was hardly unexpected: the submarine branch of the RAN could hardly proclaim its intentions to gather intelligence to the world at large. Therefore for years there persisted some confusion about the role of the submarines in the fleet, as Peter Scott noted:

...successful epochs of Navy senior leadership perpetuated the paradigm of Australian submarines as a discretionary training asset. To be fair, the vast majority of the officers and sailors in the RAN had no knowledge of the secret operations our Oberons conducted over this time period. Many were oblivious to the full capabilities of the submarines or did not comprehend the deterrent effect they have on the calculus of regional navies and governments.

Before turning to the Cold War in summary and intelligence activities it is worth reiterating Peter Scott's last point. Submarines, like guard dogs, do not actually have to bite anyone to be useful. One of their most useful attributes is that they are a deterrent. So submarines like guard dogs can be seen, and therefore feared, but they possess that extra force multiplier: once they leave port and dive they are unseen, and the circle of their possible proximity becomes bigger by the day.³⁶

The Cold War in summary

The Union of Soviet Socialist Republics spanned Europe from 1917.

It consisted of 15 Soviet Socialist Republics: Armenia, Azerbaijan, Belorussia (now Belarus), Estonia, Georgia, Kazakhstan, Kirgiziya (now Kyrgyzstan), Latvia, Lithuania, Moldavia (now Moldova), Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.³⁷

³¹ Lewis, Tom. *Australia's Naval Leaders*. RAN College, 2004. This was an "in-house" publication used for New Entry Officer Course trainees, containing potted biographies of 14 RAN naval leaders. Five of them were used as source material for the same author's *The Submarine Six* (Avonmore, 2010).

³² White, Dr Michael. "Australian Submarines Past and Present." *100 Years of the Royal Australian Navy*.

³³ Owen, Bill. "Submarines in Australia, 1949-1979". Mitchell, Rhett (ed.). *Australian Maritime Issues 2010*. Papers in Australian Maritime Affairs. Vol. 35. Sea Power Centre – Australia, 2011. pp. 25-33.

³⁴ Grove, Eric J. "Advice and assistance to a very independent people at a most crucial point: the British Admiralty and the future of the RAN 1958-60." (p. 146) Stevens, David. (Ed.) *Maritime Power in the Twentieth Century*. NSW: Allen and Unwin, 1998.

³⁵ Goldrick, James. *The Strategist*. "Persistence eventually pays: the Australian submarine force before the Collins Class."

<https://www.aspistrategist.org.au/persistence-eventually-pays-the-australian-submarine-force-before-the-collins-class/> Australian Strategic Policy Institute. 13 April 2016.

³⁶ Author's comment.

³⁷ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

The USSR was by area the world's largest country, covered some 8,650,000 square miles (22,400,000 square kilometres), seven times the area of India and two and one-half times that of the United States. The country occupied nearly one-sixth of the Earth's land surface, including the eastern half of Europe and roughly the northern third of Asia.³⁸

It was totalitarian by nature. In theory, all legislation required the approval of both chambers of the Supreme Soviet. In practice, all decisions were made by the small group known as the Presidium of the Supreme Soviet, itself strongly influenced by the Politburo of the CPSU, and were unanimously approved by the deputies. The role of the soviets in the individual republics and other territories was primarily to put into effect the decisions made by the Supreme Soviet of the U.S.S.R.³⁹

Communism entailed four sets of measures:

- (1) the nationalization of all the means of production and transportation,
- (2) the abolition of money and its replacement by barter tokens as well as free goods and services,
- (3) the imposition on the national economy of a single plan, and
- (4) the introduction of compulsory labour.⁴⁰

All but the smallest industrial enterprises were nationalized. Agricultural land, the main source of national wealth, was collectivized. Private ownership of urban real estate was abolished, as was inheritance.⁴¹

In World War II an uneasy alliance was created within the Allied forces, with the "Big Three" – US President Roosevelt; British leader Winston Churchill, and USSR leader Josef Stalin – putting aside any ideological differences to fight Germany and – eventually, on the Soviet part – Japan. A fundamental distrust of communism, which hadn't been diffused by the Spanish Civil War, began to surface almost immediately the fighting had stopped in May 1945.

By 1948 the Soviets had installed left-wing governments in the countries of eastern Europe that had been liberated by the Red Army. The Americans and the British feared the permanent Soviet domination of eastern Europe and the threat of Soviet-influenced communist parties coming to power in the democracies of western Europe. The Soviets, on the other hand, were determined to maintain control of eastern Europe in order to safeguard against any possible renewed threat from Germany, and they were intent on spreading communism worldwide, largely for ideological reasons.⁴²

The Cold War reached its peak in 1948–53. In this period the Soviets unsuccessfully blockaded the Western-held sectors of West Berlin (1948–49); the United States and its European allies formed the North Atlantic Treaty Organization (NATO), a unified military command to resist the Soviet presence in Europe (1949); the Soviets exploded their first atomic warhead (1949), thus ending the American monopoly on the atomic bomb; the Chinese communists came to power in mainland China (1949); and the Soviet-supported communist government of North Korea invaded U.S.-supported South Korea in 1950, setting off an indecisive Korean War that lasted until 1953.⁴³

From 1953 to 1957 Cold War tensions relaxed somewhat, largely owing to the death of the longtime Soviet dictator Joseph Stalin in 1953; nevertheless, the standoff remained. A unified military organization among the Soviet-bloc countries, the Warsaw Pact, was formed in 1955; and West Germany was admitted into NATO that same year. Another intense stage of the Cold War was in 1958–62. The United States and the Soviet Union began developing intercontinental ballistic missiles, and in 1962 the Soviets began secretly installing missiles in Cuba that could be used to launch nuclear attacks on U.S. cities. This sparked the Cuban missile crisis (1962), a confrontation that brought the two superpowers to the brink of war before an agreement was reached to withdraw the missiles.⁴⁴

³⁸ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

³⁹ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴⁰ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴¹ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴² *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴³ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴⁴ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

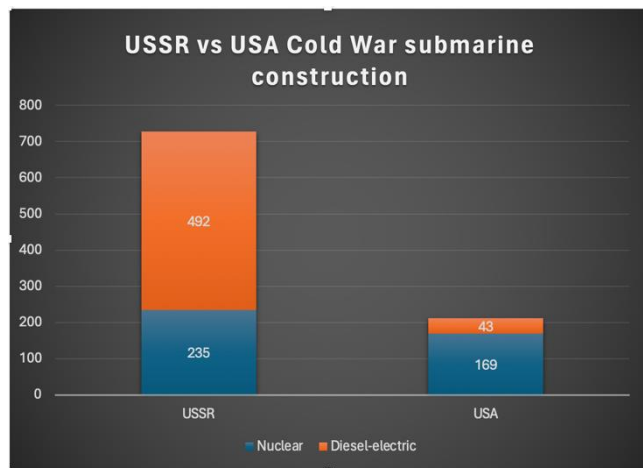
The Cuban missile crisis showed that neither the United States nor the Soviet Union were ready to use nuclear weapons for fear of the other's retaliation (and thus of mutual atomic annihilation). The two superpowers soon signed the Nuclear Test-Ban Treaty of 1963, which banned aboveground nuclear weapons testing. But the crisis also hardened the Soviets' determination never again to be humiliated by their military inferiority, and they began a buildup of both conventional and strategic forces that the United States was forced to match for the next 25 years.⁴⁵

Throughout the Cold War the United States and the Soviet Union avoided direct military confrontation in Europe and engaged in actual combat operations only to keep allies from defecting to the other side or to overthrow them after they had done so. Thus, the Soviet Union sent troops to preserve communist rule in East Germany (1953), Hungary (1956), Czechoslovakia (1968), and Afghanistan (1979). For its part, the United States helped overthrow a left-wing government in Guatemala (1954), supported an unsuccessful invasion of Cuba (1961), invaded the Dominican Republic (1965) and Grenada (1983), and undertook a long (1964–75) and unsuccessful effort to prevent communist North Vietnam from bringing South Vietnam under its rule (see Vietnam War).⁴⁶

The capability increase of the submarine post-WWII

Meanwhile the submarine numbers for the two leading super-powers, the USA and the USSR, were considerable. The US Naval Institute noted:

From 1945 through 1991, the Soviet Union produced 727 submarines – 492 with diesel-electric or closed-cycle propulsion and 235 with nuclear propulsion. This compares with the U.S. total of 212 submarines – 43 with diesel propulsion (22 from World War II programs) and 169 nuclear submarines...⁴⁷



One interesting aspect of post-war submarining was the growth of the vessel type both in literal and capabilities. The nuclear *Nautilus* devised by the US Navy in the late 1950s was a determiner in ways not yet seen. In the 1930s the capital ship had been the battleship, the giant all-gun armoured monster which had grown out of the pre-Great War dreadnought. In the war the aircraft carrier had supplanted it. At the end of the war there were 36 carrier battle groups operating in the Pacific.⁴⁸ The British Pacific Fleet included "all six of the *Illustrious* class armoured carriers in 1945,"⁴⁹ but the majority of the fleet would have been from the United States. In May 1945 there were 26 fleet carriers available, an enormous organisation of massive firepower.⁵⁰

The battleship, its gun range of scores of miles diminished by the range of hundreds which could be achieved off the decks of the carriers was to be relegated to the museum, although their guns made an appearance now and again, for naval gunfire support never dies.⁵¹

⁴⁵ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴⁶ *Encyclopedia Britannica*. <https://www.britannica.com/place/Soviet-Union>

⁴⁷ US Naval Institute. Polmar, Norman. "The Soviet Navy: How Many Submarines?" *Proceedings*. February 1998. Volume 124/2/1,140. <https://www.usni.org/magazines/proceedings/1998/february/soviet-navy-how-many-submarines> Accessed January 2024.

⁴⁸ See the author's *Atomic Salvation* from where the following two sources were first quoted.

⁴⁹ Hobbs, David. *The British Pacific Fleet in 1945*.

http://www.navy.gov.au/sites/default/files/documents/Hobbs_THE_BRITISH_PACIFIC_FLEET_IN_1945.pdf Accessed July 2014.

⁵⁰ "United States Pacific Fleet Organization. 1 May 1945." <http://ibiblio.org/hyperwar/USN/OOB/PacFleet/Org-450501/index.html> Accessed July 2014.

⁵¹ Authorial comment

Post-war it was thought too that the nuclear payload to be delivered against a future enemy may well have been delivered by jet aircraft, even lifting off the decks of carriers. For a while the carrier role was enhanced by their sole ability to get close to the Korean War theatre, but even the growth of bombers into the giant eight-engined B-52 was supplanted in the 1960s and 70s by the Inter-Continental Ballistic Missile-carrying nuclear submarine. First Polaris missiles, then Poseidon, then Trident were to be conceivably launched from the submerged silos of the “boomer” boats. They had the advantage of being not seen in a way in which the ICBM underground silos of mainland America could be. At the same time the nuclear submarine navies of the USA, Britain, and then France grew until today none of them operate diesel-electric boats – they are all driven by the nuclear reactor.⁵²

Submarines and intelligence gathering

One commander of both Oberon and Collins sums up what submarines do in terms of intelligence gathering:

“Submarines are all about stealth, [he] says. They cruise silently beneath the water far away from the Australian coastline to observe “what nations in our region are doing and form an understanding about what are the threats that Australia faces”.

“A submarine is sometimes analogised to a vacuum cleaner – it hovers up any signals, noise around it, and is able to record that, both noises under water and any electronic, magnetic signature above the water.”⁵³

It will be recalled that a long range passive ranging sonar was fitted to *Orion* and *Otama*, and then retro-fitted to the four earlier submarines.⁵⁴

The fundamental principles of sonar are to send out pulses and listen for echoes – active – or passive, which basically means listening for the sounds made by ships. In the movies you quite often see submarines sending out “pings” but in reality they rely on listening, rather than sending out signals that could give your position away. Sending out even one “ping” – think Vasily in *The Hunt for the Red October* – is basically the equivalent of hoisting a flag and saying “Submarine here!” Then again, in very uncertain waters, active sonar can be a valuable navigation tool. And if necessary it can be used to give combat information:

...while using an active sonar does alert a potential enemy to your presence, it does have some significant advantages. The latest nuclear boats produced by the former Soviet Union/Commonwealth of independent states are almost as good acoustically as a Flight 1 Los Angeles. This means that finding them passively is going to be extremely difficult.

And the current generation of diesel boats, when running on their batteries, are just a little worse, being *very* quiet targets to any passive sonar system in existence. Using an active sonar can overcome some of these problems at relatively short ranges, and has tactical benefits in some situations, especially in verifying ranges before shooting.⁵⁵

For detection submarines rely on passive sonar sensors. This has the advantage of being silent, but the disadvantage that ranging is cumbersome. To determine the range of a target with a passive sonar is an intriguing problem. Most solutions rely on target’s motion analysis, which often provides reliable results, but is time-consuming. For instantaneous ranging on many submarines distributed arrays are mounted. This so-called passive ranging sonar is able to determine ranges for targets in the near field of the sensor.⁵⁶

⁵² Authorial comment

⁵³ Willis, Belinda. *InDaily*. “Sub commander’s secret missions under the seas.” 24 Apr, 2023
<https://www.indaily.com.au/news/2023/04/24/sub-commanders-secret-missions-under-the-seas>

⁵⁴ Submarine Institute of Australia. “The RAN Oberon Class.” <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

⁵⁵ Clancy, Tom. *Submarine*. London: HarperCollins, 1993. (p. 91)

⁵⁶ Beerens SP, and SP van IJsselmuide, and AC van Koersel “Passive Ranging with Flank and Towed Array Sensors.” Netherlands Organisation for Applied Scientific Research. Conference Paper, June 2003.

- Here is a modern “Acoustic analyst submariner” telling us what his modern role entails. Although he is on a Collins-class boat, the principles are the same: <https://www.youtube.com/watch?v=WU4AebOKVPE>
- Here is a range of underwater sounds, from whale to dolphins, through a range of fish to what a tugboat sounds like to a submarine underwater: <https://www.youtube.com/watch?v=VUbNPO9gLvg>

Australia operates the Australian Joint Acoustic Analysis Centre (AJACC) at *HMAS Albatross*, south of Nowra.⁵⁷ Understandably reticent about its duties, the Centre was in the news ten years ago however in the hunt for the missing airliner MH 370:

The Chief Coordinator of the Joint Agency Coordination Centre, Air Chief Marshal Angus Houston (Ret'd), said an initial assessment of the possible signal detected by a RAAF AP-3C Orion aircraft yesterday afternoon has been determined as not related to an aircraft underwater locator beacon.

"The Australian Joint Acoustic Analysis Centre has analysed the acoustic data and confirmed that the signal reported in the vicinity of the Australian Defence Vessel Ocean Shield is unlikely to be related to the aircraft black boxes," Air Chief Marshal Angus Houston (Ret'd), said.⁵⁸

Why do submarines collect surface vessel sound signatures?

The term acoustic signature is:

used to describe a combination of acoustic emissions of sound emitters, such as those of ships and submarines. In addition, aircraft, machinery, and living animals can be described as having their own characteristic acoustic signatures or sound attributes, which can be used to study their condition, behaviour, and physical location.⁵⁹

A ship produces noises...

when under way, especially the vibration produced by its main and auxiliary engines and the sound produced by the propeller revolving. The combination of these noises constitutes the ship's acoustic signature. Each ship theoretically has its own unique acoustic signature, a sort of sonic fingerprint similar to those discussed earlier for aircraft and vehicles. These sonic signatures can be used for identification purposes. The identification is made by comparing the signal, recorded by means of hydrophones, with a pre-recorded specimen signature.

Once a library of such signatures has been developed, subsequent collection and analysis of a signature can provide valuable information regarding vessel classification, identification, activities, and capability.

Ships of identical design, built by the same shipyard, may have almost identical characteristics and thus very similar acoustic signatures, but by using fine-grain measurements of the signatures, an intelligence analyst can differentiate the two ships. The problem is that a ship's acoustic signature changes over time and under different conditions. When a ship's load changes, so does its draft; this alters the acoustic signature. The ship's signature changes as a result of age, damage, and modifications made to it. Some experts believe that the acoustic signature should be measured and recorded every six months to make reliable identification possible.'

The spectrogram in Figure 10-5 shows the acoustic signature of the large National Oceanic and Atmospheric Administration (NOAA) ship *Ronald H. Brown*, as it approached a hydrophone site in the equatorial Pacific Ocean. The horizontal, continuous, yellow "lines, bands of noise, are created by the rotation of the propeller blades. In the figure, strong lines occur at 21, 35, and 42 Hz. The military

⁵⁷ [https://en.wikipedia.org/wiki/HMAS_Albatross_\(air_station\)](https://en.wikipedia.org/wiki/HMAS_Albatross_(air_station))

⁵⁸ <https://www.buzzfeednews.com/article/mbvd/australian-prime-minister-confident-signals-are-from-mh370> 11 April 2014.

⁵⁹ Wikipedia. https://en.wikipedia.org/wiki/Acoustic_signature

routinely uses the characteristics of these "blade lines" to identify ship characteristics, class, and often individual vessels.⁶⁰

The US Navy reportedly uses specially configured attack submarines to obtain the acoustic signatures of foreign submarines. The program reportedly began in 1959, targeted on obtaining a signature library of Soviet submarines. Recent reports indicate that the program has expanded to include obtaining the acoustic signatures of and tracking Russian, Chinese, and Iranian submarines.⁶¹

The acoustic signature is made up of a number of individual elements. These include:

- Machinery noise: noise generated by a ship's engines, propeller shafts, fuel pumps, air conditioning systems, etc.
- Cavitation noise: noise generated by the creation of gas bubbles by the turning of a ship's propellers.
- Hydrodynamic noise: noise generated by the movement of water displaced by the hull of a moving vessel.
 - These emissions depend on a hull's dimensions, the installed machinery and ship's displacement. Therefore, different ship classes will have different combinations of acoustic signals that together form a unique signature.⁶²

How can acoustic signatures be used?

A submarine needs to detect what noises it hears to distinguish between friend or foe. Although, uneasily for most of us, a much quoted maxim of the submarine world is that every "surface skimmer" is a target, meaning they certainly practise on friendly warships.

A good sound-gathering session can be most productive. Here is one from the 1980, where a "gatekeeper boat" was off the Kola Inlet, near Murmansk, when it detected a Soviet submarine, where:

...the noise signature of the power plant and the other machinery on board did not match any known class of Russian boat, the captain of the U.S. boat decided to trail it and learn all about this new machine. Perhaps it was the first of the Sierra or Oscar-class boats, or even the one-of-a-kind Mike-class boat with its titanium hull and liquid sodium reactor. Whatever it was, though, the U.S. commander was intent on getting to know everything possible about the new Soviet sub. The US. skipper carefully and quietly started stalking the Russian boat, probably from the rear, at a short distance.

In the chase that followed, the American sub listened and watched every move of the new boat. The sounds of the propellers and the all-important blade rate, which is used to calculate the speed of a ship or submarine. All of the machinery noise from the reactor (or reactors-many Russian boats have two), turbines, and pumps. They may even have heard some of the day-to-day living noises aboard the Soviet boat. The bilge tanks being pumped out, the TDU dumping garbage, and maybe even the sounds of hatches closing and pots and pans clanging in the galley. And through it all, the American boat and her crew remained undetected by the Russian boat and any supporting vessels that might have accompanied her.⁶³

The acoustic signatures can also be passed on to other technology. Modern naval mines and torpedoes such as the CAPTOR mine can be programmed to distinguish the acoustic signatures of different vessels, leaving friendly vessels unmolested and attacking high-value targets when faced with multiple possible targets, e.g. distinguishing an aircraft carrier from its escorts.⁶⁴ In that way a modern minefield can be programmed to listen to passing ships, and only detonate when it hears a high-value target passing nearby, maybe remaining covert for weeks or even months.

⁶⁰ Clark, Robert M. *The Technical Collection of Intelligence*. 2010.

⁶¹ Clark, Robert M. *The Technical Collection of Intelligence*. 2010.

⁶² Wikipedia. https://en.wikipedia.org/wiki/Acoustic_signature

⁶³ Clancy, Tom. *Submarine*. London: HarperCollins, 1993. (p. 190)

⁶⁴ Wikipedia. https://en.wikipedia.org/wiki/Acoustic_signature

The Mark 60 CAPTOR (Encapsulated Torpedo) is the United States' only deep-water anti-submarine naval mine. It uses a Mark 46 torpedo contained in an aluminum shell that is anchored to the ocean floor. The mine can be placed by either aircraft, submarine or surface vessel.⁶⁵

The CAPTOR is actually an encased intelligent torpedo. When it acquires a target, it frees itself from its casing and goes off to detonate near its victim:

The mine uses Reliable Acoustic Path sound propagation to passively identify and track the difference between hostile submarine signatures, surface vessels and friendly submarines. Once identified, the torpedo leaves its casing to destroy its target.⁶⁶

How far can submarines hear?

Sound travels underwater much further than it does through the air, and four times faster too. Temperature also affects the speed of sound; sound travels faster in warm water than in cold water.⁶⁷ The speed of sound differs in air and water, with sound waves traveling faster in water. "For example, in air at a temperature of 18°C (64°F), the speed of sound is approximately 341 meters (1,120 feet) per second. In contrast, in salt water at approximately the same temperature, the speed of sound is approximately 1,524 meters (5,000 feet) per second." Depending on the depth, "... sound waves lose little energy, allowing the waves to propagate over distances in excess of 25,000 kilometers (15,500 miles)."⁶⁸

Some records from WWII are instructive. The action between the Japanese submarine *I-124* and the corvette *HMAS Deloraine* in January 1942 was heard by its three squadron fellow boats around 40 kilometres away. They survived to log their reports, citing the depth charging they heard which saw the end of the Imperial Navy boat.⁶⁹

Periscope photos – surface

The submarine still seeks even in modern times to carry out a periscope attack on its enemy. As WWII became more and more submarine unfriendly, the opportunities for boats to make a kill became less and less. However they have persisted into modern times – a photograph, well known in the submarining world, was taken of the aircraft carrier *USS Enterprise*, taken from the periscope camera of *HMAS Ovens* in an exercise in 1976. Similarly, the submarine *HMS Conqueror* commander took a final photo of the stricken cruiser *General Belgrano* in the 1982 Falklands War, although that was in much rougher seas.

But why take such photos? Photographs taken from a distance allow a submarine to identify the correct victim – it would not do to sink one's own side's ships. Submarines have always worked on silhouettes of their intended victims, which vary according to radar mast fittings; superstructures, and so on. Having a library of these to use to carry out an attack is essential, and they must be constantly updated.

Electronic listening

Photographs are not all you might want. There is the whole range of potential enemy electronic systems that one day you might find yourself fighting, so forewarned is forearmed. Not only do you want visual recognition but electronic signature recognition as well. One description of a submarine doing electronic listening at close range near an potential enemy harbor put it like this:

It helps to be invisible. That means you can get in close, and when you do that, you can learn things. The prime intelligence-gathering mission for a submarine is electronic surveillance. A simple-looking reedlike

⁶⁵ Wikipedia. https://en.wikipedia.org/wiki/Mark_60_CAPTOR

⁶⁶ Wikipedia. https://en.wikipedia.org/wiki/Mark_60_CAPTOR

⁶⁷ National Oceanic and Atmospheric Administration. US Department of Commerce. "Understanding Ocean Acoustics." <https://oceanexplorer.noaa.gov/explorations/sound01/background/acoustics/acoustics.html#:~:text=Sound%20moves%20at%20a%20fast%20rate,some%20parts%20of%20the%20ocean.>

⁶⁸ *Water Encyclopedia*. "Sound Transmission in the Ocean." <http://www.waterencyclopedia.com/Re-St/Sound-Transmission-in-the-Ocean.htm>

⁶⁹ See the same author's *Darwin's Submarine I-124* (Avonmore Books).

mast can gather all manner of electronic signals. You might want to learn about the other guy's radar systems, and he'll be careful with these so as not to let you know exactly what your aircraft will be up against. Therefore he won't use them much when unknown aircraft are about-but he has to use them some of the time in order that his own people can practice using them. ⁷⁰

And a submarine by its very nature is covert. An aircraft is seen; the foe closes down his systems well before it's close, and then it flies away again. But a submarine can be there anytime and even all the time – for days:

And so what you do is sneak a boat into his coastal operations zone, run up your ESM mast, and wait. You can also listen in to short-range radio traffic, the FM stuff that stops at the horizon. Such radios are normally not encrypted, and it's amazing what people will say when they don't think anyone is listening. In short order, you can monitor the other fellow's whole electronic spectrum, and over a period of time, to boot. This allows operating patterns and procedures to be explored. And you can learn a lot from that. You can do combined operations, with submarines and aircraft working together to see what is really on the other fellow's mind... ⁷¹

Periscope photos – underwater

Why take such such dangerously-acquired photos such as “hull shots” from your submarine while underwater? Think back to the glorious days of *Australia II*, the yacht contesting the America's Cup in the early 1980s. It had a secret weapon, a winged keel. This amazing advance, devised by Ben Lexcen, gave *Australia II* a big advantage in the races, as it allowed the yacht to point up with its mast more vertically, and therefore to allow less wind to spill off the top of the mainsail, which led to more speed.

Warships too are in a constant state of change. They develop sonar domes, propellers, rudders, and more – and the placement of these things varies too. Photographs tell one navy about what another navy is doing. If you can improve your own technology in this way, you get a combat advance. This is one of the reasons photographs of warships on slips often show parts hidden in shrouding, in the same way as the *Australia II* keel was.

Here is a 1980s US boat getting a break against a Soviet hull, when its captain decided to try for the:

...grand slam of submarine intelligence-gathering coups, getting some hull shots of the new Russian boat (video pictures of the hull, propellers, and control devices beneath the surface. Such an operation is done by running underneath the target boat, raising the periscope equipped with a low-light video camera and running a pattern around the hull to collect...

The coverage apparently included the control surfaces, propellers, and several sonar arrays. The quality of the video pictures was excellent, adding much to NATO's understanding of the new Russian boat. ⁷²

Covert swimmers

The US Navy and the Royal Navy use a (Sea-Air Land) SEAL Delivery Vehicle, a crewed submersible and a type of swimmer delivery vehicle used to deliver divers and their equipment for special operations missions. ⁷³

Australian *Oberon*-class submarines were reported to have regularly conducted operations with special forces, although due to their limited capability these were restricted to circumstances where the boat could surface, and were usually conducted at night. This included placing divers under the casing for further covert movement, or disembarking special forces teams using kayaks or inflatable boats. ⁷⁴

⁷⁰ Clancy, Tom. *Submarine*. London: HarperCollins, 1993. (pp: 231-232)

⁷¹ Clancy, Tom. *Submarine*. London: HarperCollins, 1993. (pp: 231-232)

⁷² Clancy, Tom. *Submarine*. London: HarperCollins, 1993. (pp: 190-191)

⁷³ https://en.wikipedia.org/wiki/SEAL_Delivery_Vehicle

⁷⁴ Patrick, Rex. "Submarines and Special Forces". *Asia Pacific Defence Reporter*. Venura Media Asia-Pacific. September 2014. (pp: 36-40)

Such actions can be extremely dangerous. In an example of naval espionage, Commander Buster Crabb GM RNVR disappeared in such a mission in April 1956, Portsmouth UK. He had been through a sterling career in diving and “frogman” warfare in WWII, and may have been on a clandestine dive under the Soviet cruiser *Ordzhonikidze*. A body was found 14 months later minus head and hands – the matter has never been fully resolved, but it may well be that the ship’s security team killed him.

The submarine’s enemies

Cold War operations overall could be most hazardous. Commander John Murphy USN writes: “over 500 Soviet submariners died during Cold War incidents from 1961 to 1991.”⁷⁵

However the very nature of the beast meant sometimes the enemy would be blamed for an accident:

The US Navy had tracked *K129* during its transit from the USSR to Hawaii and its subsequent sinking on 7 March, 1968. Most bets were that the sub and its crew of 98 perished when they either collided with an uncharted sea mount or from an internal explosion (battery or torpedo) which was detected by the Navy’s SOSUS (Sound Surveillance System). We knew exactly where *K129* had gone down, but the Soviets didn’t have a clue...

This may have led to the Soviets believing in a hostilities-incident where there wasn’t one:

All available evidence now points to a carefully planned trap and attack by the Soviets – in retaliation for the perceived sinking of *K129* by *USS Swordfish*. KGB port watchers reported *Swordfish* entering the port of Yokosuka, Japan 10 days after the *K129* went missing. She was badly damaged and the KGB concluded that the American nuke had sunk their nuke.

The truth was that *Swordfish* departed Hawaii on 3 February under urgent orders to check out the *USS Pueblo* which had been seized by North Korea on 23 January and taken to the port of Wonsan, North Korea. *Swordfish* made a beeline across the Pacific in early February and was attempting to look at the *Pueblo* on the night of 24 February when it ran into a glacier ice pack.

Swordfish had lost their eyes and ears – an attack scope, an ECM mast and a special operations mast were all severely damaged. They were forced to leave Wonsan and make a slow transit to Yokosuka for repairs. KGB port watchers saw the *Swordfish* limping into Yokosuka on 17 March and reported to Moscow that they had sunk the *K129* off Hawaii ten days earlier.

Opponents – the enemy submarine

If you watch the movies you would have many times seen the meme of a submarine hunting another submarine and one sinking the other while submerged. In actuality, only one submarine in history has sunk another while they were both submerged, thus confounding the cinema. *HMS Venturer* attacked and sank *U-864* on 9 February 1945, with four torpedoes, one of which hit. Such warshots were extremely difficult in WWI because of the absence of targeting information – captains normally made their assault with a bearing taken through a periscope sighting.

Then again, plenty of submarines have been sunk by other boats when their victim was on the surface. *HMS E3* was sunk in the first ever successful attack on one submarine by another, when she was torpedoed by the German *U-27* north of the Netherlands 18 October 1914.

HMS Saracen also carried out a surface boat versus boat attack when she torpedoed and sank the German submarine *U-335* southeast of the Faroe Islands on 3 August.⁷⁶ To make matters worse for the Axis, *Saracen* torpedoed and sank the Acciaio-class submarine *Granito* approximately 40 nautical miles, northwest of

⁷⁵ Emmitsburg News Journal. Murphy, Commander John, USN, “Cold War Warriors. Incidents at Sea – Part 2.

Submarines – the Secret War Within the Cold War.” https://www.emmitsburg.net/archive_list/articles/misc/cww/2011/submarines.htm

⁷⁶ Young, Edward. *One of our Submarines*. Great Britain: Richard Clay and Company, 1952.

Partinico, Sicily, on 9 November 1942. Edward Young was the First Lieutenant in both actions and was awarded a Mention in Despatches for the first action, and a Distinguished Service Cross for the second.

Opponents – enemy surface ships

Warships specifically equipped to hunt submarines are a deadly enemy. Strangely the Imperial Japanese Navy didn't steer away from this in WWII, something that was a major undoing of their strategy. *HMS Deloraine*, for example, a submarine-hunting corvette, was the victor over the Japanese *I-124* through a combination of teamwork and leadership on 20 January 1942 outside Darwin.

One it has been acquired, a modern submarine may find it difficult to shake off its pursuer. Peter Scott relates how *Otway* in an exercise was chased relentlessly by a US warship:

The Spruance-class destroyer *USS Oldendorf* made a particular nuisance of herself. It became genuinely nerve-wracking and demoralising being tracked day after day, night after night; the haunting whistle of her mainframe AN/SQS53 sonar creeping incessantly through the hull. Sometimes faint, sometimes powerfully loud, it was there when on watch in the control room, while eating a meal in the wardroom or waking from a short, broken sleep in my undersized bunk.⁷⁷

Once the surface vessel is in weapons range, it attacks. The depth charge, invented in World War I, and much improved in World War II, is still in business, with even a nuclear version developed. It has been joined by mortars, missiles, and in modern times drones. Guns were useful in the world wars against submarines and can still be potentially so, but the chances of a modern submarine surfacing anywhere near a warship is remote, for their commanders know full well what can happen.

Opponents – the enemy's aircraft

The aircraft emerged as the greatest threat to submarines through World War II. A submarine could easily be spotted from the air while at periscope depth although the extent of that depended on the condition of the sea.⁷⁸ Given its speed, the aircraft could be on top of a submarine extremely quickly. And its bombs or depth charges could damage a submarine. But the early results were not impressive. Attacks on U-boats by the RAF killed a solitary one percent of those boats attacked. "Probably sunk" was 2%, and "damaged" thought to be 15%. Some of the problems seemed to be in the height of attack – too high and it missed; too low and the aircraft risked getting smashed by its own depth charge explosions. But even when an explosion hit it was not powerful enough.

In the end the problem was solved by a combination of changes and new ideas. They were:

- Change the explosive to a new combination of TNT, aluminum powder, and RDX, or cyclotrimethylene trinitramine, an organic compound obtained by treating hexamine with white fuming nitric acid. This all brought together became known as Torpex.
- Change the depth settings to 50 feet, and then after experiments, to 25 feet.
- Drop the charges in groups, set by the aircraft's release system, of what eventually became 36 feet apart, in sets of three or four – depending on the aircraft's load and bomb-bay.

Torpex depth charges – more potent than previous models – emerged as a major factor in improving the situation. The new depth-charge was rolled out by the thousand, not only in Britain but across the world. The Canadians flew with it, as did the Australians. Given the changes, and a lot of practice, in Coastal Command by the end of the war, an attack from the air on a U-boat resulted in a kill 45% of the time.

As time went on the abilities of aircraft increased radically. Helicopters flying dipping sonar – deployed on a cable under a hovering machine – improved their abilities to detect submarines, as did dropped deployed buoy sonars. The system could determine the range and bearing of the target relative to the sonobuoy's position and can deploy to various depths within the water column.

⁷⁷ Scott, Peter. *Running Deep*. Western Australia: Fremantle Press, 2023. (p. 60)

⁷⁸ Cook, Graeme. *Silent Marauders*. London: Granada, 1976. (p. 107)

Opponents – The enemy’s hunter-killer group

During World War II, the US Navy formed specialized task groups to combat the German U-boat threat to Allied shipping. Composed of destroyers, destroyer escorts, and escort or auxiliary aircraft carriers to provide command and control and organic antisubmarine aircraft, they were known as hunter-killer groups.⁷⁹

The term seems to have been loosely expanded in the Cold War to include any combination of a surface vessel and aircraft working together against submarines, or even a submarine and a surface ship working together.

Intelligence-gathering patrols

Patrols [by Australian submarines] against Soviet assets were begun in 1978 against Soviet assets in the Pacific Ocean and South China Sea.⁸⁰ They continued until 1992.⁸¹ Peter Scott in his 2023 autobiography of *Running Deep* relates – without detail though – his presence on board *HMAS Oxley* when “we intentionally disappeared into the murk and mire of the South China Sea.” He later reflected that a boat’s “...total independence allows our submarines to conduct surveillance and intelligence collection in times of tension or offensive operations against an enemy at war without any reliance on direct support from other units.”⁸²

The Oberons were also smaller and lighter than the boats of the all-nuclear US Navy, and were therefore “better at littoral surveillance”.⁸³ [The definition being a region lying along a shore]

The Cam Ranh Bay base in Vietnam was developed by the USSR with up to 30 vessels including submarines deployed there. It was intended to challenge the US Navy in the South China Sea, and the northern approaches to the Singapore Strait. It was also wished to train and equip a Vietnamese force capable of presenting a deterring presence to China.⁸⁴

“It was the second biggest fleet after the Northern Fleet based at Murmansk,” a former intelligence officer recalls. “By the late 1980s, Cam Ranh Bay on Vietnam’s east coast had become a highly significant Soviet base. There were at least 15 surface ships, some submarines, 30 bomber aircraft, a SIGINT [signal intelligence] station, missile-handling facilities and 10,000 Soviet troops,” he says.⁸⁵

Australian submarines began conducting yearly patrols in 1981 against Soviet forces and continued these annually, except for 1985 when a defect in *Orion* caused her withdrawal – there was not sufficient capability for a replacement to be provided.⁸⁶

Manpower, or the lack of it, was another critical factor for the RAN. They had to compete against pushback for familial reasons against months-long deployment, and the mining hook [attraction of the industry] provided a substantial alternative for personnel looking elsewhere for financial reasons.⁸⁷

One particular success was the “underwater hull surveillance of Soviet warships”.⁸⁸ An article written on such missions was from Geoffrey Barker in 2003.

Deep below the choppy surface of the South China Sea, they waited in silence. Inside a black, barnacled metal cigar, 90 metres long and 8.7 metres wide, the stench of diesel fuel and the sour sweat of the crowded 75 men pervaded the humid heat, but nobody noticed. On the surface above, a new Soviet frigate was heading into Vietnam's Cam Ranh Bay at a gentle five to six knots.

⁷⁹ US Naval Institute. Captain Stephen J. Ilteris and Commander Michael E. Ilteris, U.S. Navy. “Resurrect the Hunter-Killer Group.” *Proceedings* Vol. 147. <https://www.usni.org/magazines/proceedings/2021/april/resurrect-hunter-killer-group> April 2021.

⁸⁰ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 537)

⁸¹ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 532)

⁸² Scott, Peter. *Running Deep*. Western Australia: Fremantle Press, 2023. (pp: 52-54)

⁸³ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 537)

⁸⁴ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 535-536)

⁸⁵ Barker, Geoffrey. *Financial Review*. “The mystery boats.” 28 November 2003. <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd>

⁸⁶ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 535-536)

⁸⁷ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 536-537)

⁸⁸ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 534)

Seeing an opportunity for what submariners call an 'underwater look', the O-boat commanding officer (CO) positioned himself about 1,000 yards (914 metres) behind the frigate to check its speed and course. Then he dived deep and closed quickly to about 200 yards behind the frigate to calculate the depth at which he could photograph its hull shape, propellers, weapons systems and sonar. How close he came would depend on the sea, the keel depth of the frigate and the height of the submarine.⁸⁹

The article continues:

When the submarine was just 50 yards behind the frigate, the CO raised his periscope. Now, finally, he could see the wake of the frigate. It was his first close visual sighting.

He brought the submarine to within six feet (1.8 metres) of the frigate's hull and passed silently along one side. The O-boat's cameras and hydrophones recorded the images and sounds of the Soviet vessel. Once past the frigate, the CO altered course slightly, slowed down, and allowed the unsuspecting surface vessel to overtake the submarine on the opposite side. Again, the cameras and hydrophones were recording. "If you got it right the first time, it generally took about 30 minutes to complete the manoeuvre," retired Rear-Admiral Peter Clarke tells *The AFR Magazine*, 20 years later. "But it was a very full-on thing. You were driving several thousand tons of submarine to within feet of a vessel that you could not see."

The primary role of such missions was not intelligence collection, but to remain undetected. Intelligence was secondary. Michael White, the primary historian of RAN submarines, has written that a different mindset was necessary: rather than to be "aggressive and to pursue a target opportunity relentlessly to destruction", now the commander had to focus on patience, focus, an ability to calculate risk and of course to avoid political embarrassment.⁹⁰

The operations continued in other waters:

Two of the six O-boats – *Orion* and *Otama* – were the RAN's designated 'mystery boats' and were specially fitted for intelligence collection. They made most of the patrols, but *Otway* and *Oxley* also made secret patrols. *Onslow* and *Ovens* were not involved, but were deployed to track Soviet submarines moving into the Arabian Gulf from Vladivostok via the Coral Sea, south of Tasmania, across the Great Australian Bight and past Cape Leeuwin in WA. The Soviet subs took this route in an effort to avoid detection, but *Onslow* and *Ovens* kept an eye on them.⁹¹

The O-Boats were particularly well suited to such missions:

"Conventional submarines are much better than nuclear submarines at littoral surveillance," a political figure familiar with the secret patrols says. "They can get into harbours for a decent look. They can get close to boats and have a useful capacity to listen to their emissions and look at their sonar and propulsion systems."

"If they get close to the coast they also have a capacity to hear what else is around. By getting close to a facility or to a city you can identify a considerable amount of what is being emitted. And that is useful for targeting purposes," he says.⁹²

⁸⁹ Barker, Geoffrey. *Financial Review*. "The mystery boats." <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd> 28 November 2003.

⁹⁰ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 533) Useful other reading in the area includes *Blind Man's Bluff*, by Sherry Sontag and Christopher Drew and *The Silent Deep*, by Peter Hennessey and James Jinks.

⁹¹ Barker, Geoffrey. *Financial Review*. "The mystery boats." <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd> 28 November 2003.

⁹² Barker, Geoffrey. *Financial Review*. "The mystery boats." <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd> 28 November 2003.

Geoffrey Barker suggests that an additional eight personnel were carried on board for such missions. They included civilians operating specialised intelligence-collection equipment, and specialist linguists, fluent in Russian and regional languages.

One depiction of a patrol has then-Defence Minister Beazley using covert footage to sell his concept of a further class of submarines to then-Prime Minister Hawke:

Beazley wanted to lock in Hawke's support for the costly and contentious plan to build six Collins-class subs in Australia.

The large and genial defence minister understood the strategic value of submarines as offensive and defensive weapons. When Hawke arrived, he looked like thunder and his crabbed body language signalled he wanted to be anywhere but hearing a presentation from the navy.

That was soon to change. Commander Kim Pitt began explaining he had been on patrol in *HMAS Orion* in the South China Sea from September 17 until November 9 the previous year; the focus of that patrol was Cam Ranh Bay on the east coast of Vietnam, then the largest Soviet naval base outside the USSR. Pitt began a video that grabbed Hawke's attention and immediately transformed his mood. The PM appeared transfixed as he watched dramatic and brilliantly clear footage taken by *HMAS Orion* as it slipped in behind and beneath a surfaced Soviet Charlie-class nuclear submarine heading into the Vietnamese port.

The video began with distant pictures of the Soviet submarine motoring towards the harbour, well outside the 12-nautical mile (22.2km) Vietnamese territorial limit. The video was shot through a camera in *Orion's* periscope as the submarine loitered, barely submerged in the choppy sea.

Then Pitt took the *Orion* deep, ran in close behind the Soviet boat, and came up to periscope depth again. Now the video showed the Soviet submarine's wake boiling and bubbling on the surface. Hawke watched, startled, as a clear image of the turning propeller appeared on the screen just above and ahead of *Orion*.

Pitt ran beneath the Soviet submarine, filming sonar and other fittings mounted along its hull. The remarkably clear pictures exposed the underwater secrets of Charlie-class technology. The only other way to get them would be for a western spy to penetrate dry-docks in the Soviet Union.

Pitt positioned *Orion* ahead of and beneath the Soviet submarine, slowed almost to a stop, and then allowed the Soviet boat to pass him while he filmed the other side of its hull.

Hawke grasped intuitively that this video intelligence would add immensely to Australia's prestige in the US. It could be used to Australia's advantage in negotiations with Washington and gave Australia a seat at the top table in the global Cold War intelligence collection game. For 45 minutes, Hawke asked questions about how the patrols were organised; their duration, their frequency, their success. He was told how the submarines recorded radio transmissions to deliver vital intelligence to the Western effort to track and identify the Soviet fleet.⁹³

Other opportunities taken up by a patrol of *HMAS Orion* are illustrative:

On another occasion, *Orion* recorded the procedures and protocol of the arrival of a Soviet Kirov-class nuclear powered cruiser as it entered Cam Ranh Bay. The information was invaluable in deepening Western understanding of Soviet Naval communications, command and control systems.⁹⁴

⁹³ *Naval Matters*. Website. <https://navalmatters.wordpress.com/2013/10/19/the-sneaky-beaky-cold-war-adventures-of-australias-oberon-class-submarines/> 19 October, 2013.

⁹⁴ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 542)

On another occasion *Orion* was also able to video-tape a conventional Soviet submarine as she entered Cam Ranh Bay.⁹⁵

Twenty-two patrols were conducted between 1977 and 1992.⁹⁶

Australians in Intelligence-gathering in other navy's boats

Australian naval people are posted overseas to other navies routinely, as are their members to the RAN. This gives a number of benefits, but chiefly to be able to learn from other forces, and to become personally known to people who one day you may be fighting alongside.

Michael White recalls being deployed in *HMS Oberon*:

Some time about the middle of 1966 we were ordered to do an intelligence patrol off Hainan, offshore from the large naval base in the southern part of China. The object was to gather intelligence for the Allied cause, even though the British were not in the war in Vietnam. We quietly took up our patrol position and did the usual things for a covert operation. The boat was worked up and the officers and crew worked well. At periscope depth we collected signal traffic and took periscopic photos of any surface traffic and snorted in order to charge the batteries. When deep, we used the sonars to record all the sound signatures of passing Chinese war ships. We were all on full alert as we were not sure what the Chinese would do if they detected us but, like the Russians, it was possible that they would try to sink us if they could.⁹⁷

Operations against Soviet submarines

US and British submarines in the 1980s routinely intercepted and trailed Soviet ballistic missile submarines in the Atlantic. Allied patrols remained undetected.⁹⁸ Here might be a good opportunity to point out that RAN submariners served on RN submarine patrols "in the Russian northern waters or Russian dominated parts of the Mediterranean, or patrols off China during the Vietnam War in the 1960s and 1970s."⁹⁹

One writer has them going even further afield: "Oberons also shadowed soviet [sic] submarines out of Vladivostok using a route through Australian waters that took them – undetected, they believed – to the Arabian Gulf."¹⁰⁰ This confirms with the earlier report: "...deployed to track Soviet submarines moving into the Arabian Gulf from Vladivostok via the Coral Sea, south of Tasmania, across the Great Australian Bight and past Cape Leeuwin in WA. The Soviet subs took this route in an effort to avoid detection..."¹⁰¹

Returning to the demonstrated capabilities given to the Prime Minister:

The officers put up a photograph of a Soviet Kirov-class nuclear-powered cruiser, much admired by Western navies. US spy satellites had picked up the cruiser leaving its base in Murmansk and tracked it around the Cape of Good Hope and into the Indian Ocean.

The RAN sent the guided missile frigate *HMAS Canberra* to intercept the cruiser off Sri Lanka and follow it through the Strait of Malacca and up towards Cam Ranh Bay. The frigate took vital photographs and monitored the cruiser's communications until it approached Vietnam.

Pitt, in *HMAS Orion*, was waiting, submerged outside Cam Ranh Bay with the submarine's communications masts deployed to record the cruiser's arrival. He recorded its procedures and

⁹⁵ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 542)

⁹⁶ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 538)

⁹⁷ White, Michael. *Another Fortunate Life: Memoirs by Michael White*. Chapter 10, Singapore. HMS *Oberon* 1966.

⁹⁸ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 535)

⁹⁹ White, Michael. *Australian Submarines – a History*. (2nd edition). St Kilda, Victoria: Australian Teachers of Media, 2015. (p. 542)

¹⁰⁰ Seal, Graham. *A Century of Silent Service*. Brisbane: Boolarong, 2013. (p. 85)

¹⁰¹ Barker, Geoffrey. *Financial Review*. "The mystery boats." 28 November 2003. <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd>

protocols, which deepened Western understanding of Soviet naval communications and command and control systems, meaning the West might be able to jam them in the event of hostilities.¹⁰²

However, the same writer castigates Admiral Mike Hudson for saying the patrols faced increasing danger:

The cautious admiral Mike Hudson, chief of the naval staff, dismayed the submariners by telling Hawke that while the operation was professional and produced good intelligence, it was very hazardous. A submarine might be detected and possibly captured, with serious international consequences. "As we do more and more patrols, the likelihood of this happening will increase," Hudson said.

Hawke rounded on him. "No, you are wrong," he replied. "I've got a degree in statistics and I can tell you that the probability of detection does not increase as the number of patrols increase. They are discrete, one-off events and the probability of detection is constant." Beazley was delighted with the meeting.¹⁰³

The last patrol of the Oberon-class did not go so well however. It was from 22 October, 1992, from Sydney to Shanghai to gather intelligence on the Chinese navy, especially its new submarines. The submarine *Orion* became entangled in fishing nets and had to cut themselves adrift and cancel the operation.¹⁰⁴

The Update Programme

By the early 1970s, it became apparent that the original Royal Navy sensors, weapons and fire control system of the Oberon submarines were becoming obsolete and would not meet the RAN's requirement until the end of the submarines' life. A number of projects were initiated to update this capability – the overall programme being known as the Submarine Weapons Update Programme (SWUP). Due to the lack of RN and USN development in conventional submarines, the selection, integration and design was carried out by the RAN.¹⁰⁵

The heart of the SWUP was the digital Submarine Fire Control System (SFCS) which was built by Singer Librascope to RAN philosophy. Other equipment included in the SWUP were CSU3-41 Attack Sonar, AN/BQG Passive Ranging Sonar, WSN-2 Gyro Compass, MK48 Torpedo and later modifications for the UGM-84 Encapsulated Harpoon Missile. *HMAS Oxley* completed her SWUP update on 18 December 1979, *Otway* on 30 April 1981, *Ovens* on 12 August 1982, *Orion* on 12 August 1983, *Onslow* on 21 September 1984 and *Otama* on 12 September 1985.¹⁰⁶

A quest for a medal

The national president of the Australian Submarine Association, Captain Barry Nobes (Rtd) wrote in 2003 to the Defence Force Chief General Peter Cosgrove as part of a plea for the Australian Active Service Medal (special operations) to be awarded to submariners who served on the secret spy patrols:

"The work was known to very few in government, defence and navy. The missions were conducted as 'war patrols' and the tasks undertaken by these submarines [were] considered ... to be among the most hazardous undertaken by RAN seagoing units for many decades."¹⁰⁷

¹⁰² *Naval Matters*. Website. <https://navalmatters.wordpress.com/2013/10/19/the-sneaky-beaky-cold-war-adventures-of-australias-oberon-class-submarines/> 19 October, 2013.

¹⁰³ *Naval Matters*. Website. <https://navalmatters.wordpress.com/2013/10/19/the-sneaky-beaky-cold-war-adventures-of-australias-oberon-class-submarines/> 19 October, 2013.

¹⁰⁴ *Naval Matters*. Website. <https://navalmatters.wordpress.com/2013/10/19/the-sneaky-beaky-cold-war-adventures-of-australias-oberon-class-submarines/> 19 October, 2013.

¹⁰⁵ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹⁰⁶ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

¹⁰⁷ Barker, Geoffrey. *Financial Review*. "The mystery boats." 28 November 2003. <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd>

Reflecting the submariners' view that they had not been adequately recognised with the award of the Australian Service Medal (with special ops clasp), Nobes reminded Cosgrove that the O-boat patrols "were of great importance to the nation in the era of the Cold War."¹⁰⁸

Here it would be appropriate to explain that there is a difference between the AASM and the ASM. The first has a blood-red line running down it; the second does not. Otherwise the medals are identical. While that might seem a small distinction, it is one that ADF members recognise and respect.

But Cosgrove was unmoved. Whether the AASM or the ASM was the appropriate medal, he replied in August this year, hinged on the definition of 'warlike' and 'non-warlike' operations 'under current regulations'. And the reviewing officers had determined the O-boat service warranted the ASM with special ops clasp because the operations were non-warlike.

Why? "... the nature of these patrols was not warlike," Cosgrove wrote, "because the application of force was not authorised, there was no expectations of casualties, there was no state of declared war, there were no conventional combat operations against an armed adversary [and] they were not peace-enforcement operations."¹⁰⁹

Transition to next class

Subsequent to placing the Collins-class order a plan was then devised to progressively decommission the ageing "Oberons". *HMAS Oxley* was decommissioned on 13 February 1992, *Otway* on 17 February 1994, *Ovens* on 1 December 1995, *Orion* on 4 October 1996, *Onslow* on 29 March 1999 and *Otama* in December 2000. The Oberon class submarine base in Sydney for almost 32 years, *HMAS Platypus* was decommissioned on 14 May 1999.¹¹⁰

The Oberons found some unusual homes. *Onslow* is on permanent display in the water in Sydney's Australian National Maritime Museum. *Ovens*, recently refurbished, is on dry land, at the West Australian Maritime Museum. *Otway* startles many a highway driver when they see her as a museum ship near the road at Holbrook, NSW. *Orion* was scrapped in 2006, but the fin was given to the City of Rockingham and is now mounted as a permanent memorial at Rockingham Naval Memorial Park. The port propeller was donated to the Western Australia Maritime Museum. *Oxley* paid off in 1992 and was scrapped. Her fin is on display outside the Submarine Training and Systems Centre at HMAS Stirling, and her bow preserved at the Western Australian Maritime Museum. An anchor forms part of a Submariners' Memorial at *HMAS Platypus*, dedicated on 18 August 2017, on the 50th anniversary of the boat's arrival in Sydney Harbour.

Otama had the saddest fate of all though. It was hoped she would be a maritime museum in Victoria but years of problems meant she was towed to Western Australia last year and probably even now there are some recognisable bits left but she is being scrapped as well. But perhaps with three out of six preserved the Aussie Oberons will be well remembered.

In conclusion, I will take this opportunity to urge Australia to keep its hard-won submarine capabilities, and to build and enhance them. They were a force-multiplier in the Cold War, and now are even more so as we enter the enhanced abilities of nuclear propulsion. It is worth reflecting on Peter Scott's musing on his first disappearance into "the murk and mire of the South China Sea" on board *HMAS Oxley* in the final stages of the Cold War. He reflected that:

In time I came to not only belong, but truly comprehend this strange world. I understood that, while technologies evolved, the fundamental characteristics of our submarines throughout the decades remained consistent. Stealth has always underpinned their safety, survivability and tactical effectiveness. Preservation of stealth is what allows operations in otherwise non-permissive or hostile

¹⁰⁸ Barker, Geoffrey. *Financial Review*. "The mystery boats." 28 November 2003. <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd>

¹⁰⁹ Barker, Geoffrey. *Financial Review*. "The mystery boats." 28 November 2003. <https://www.afr.com/companies/manufacturing/the-mystery-boats-20031128-j77yd>

¹¹⁰ Submarine Institute of Australia. "The RAN Oberon Class." <https://www.submarineinstitute.com/submarines-in-australia/The-RAN-Oberon-Class.html>

environments. Their long range enables them to sail into areas where the many advantages of a submarine are optimised, and endurance ensures poise and presence on station thousands of miles from our shores over weeks and months.

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The author would especially like to thank Dr Michael White for his assistance and guidance in the drafting of this paper.