

## **H.M.A.S. Stuart: The ebb and flow of capability 1939-1941** by Greg Pierce

H.M.A.S. *Stuart* and the ‘Scrap Iron Flotilla’ were amongst the first units of the Australian Armed Forces deployed into the Second World War.<sup>i</sup> The significant contribution their ships’ companies made during the first two years of the war in the Mediterranean Sea were both enabled and inhibited by their capability.

**Capability:** “In a military context, Capability is the power to achieve a desired operational effect.”<sup>ii</sup>

This paper examines *Stuart’s* anti-surface warfare capability whilst referencing the Fundamental Inputs to Capability (FIC) with a particular focus on the FIC elements of Organisation, Personnel, Collective Training and Major Systems.<sup>iii</sup> The development of *Stuart’s* anti-surface warfare capability progressed from her pre-deployment exercises and culminated at the Battle of Cape Matapan. The development of capability is an organisational responsibility borne by each military service. An understanding of capability provides insights to the decisions and actions of those called to serve under extraordinary circumstances.

### **From acquisition to the Mediterranean**

H.M.A.S. *Stuart* was a Scott class flotilla leader, transferred from the Royal Navy in 1933 with the V & W class destroyers *Vampire*, *Vendetta*, *Voyager* and *Waterhen*. These were not new ships having entered service with the Royal Navy between 1917 and 1919.<sup>iv</sup> They were later dubbed the ‘Scrap Iron Flotilla’ by Axis propaganda<sup>v</sup> - a term of derision which their crews wore as a badge of pride.<sup>vi</sup> Of the five destroyers, only *Stuart* and *Vendetta* survived the war.<sup>vii</sup> *Stuart* was the largest of the five ships, accommodating the flotilla commander and his support staff. *Stuart’s* greater speed enabled her to place the flotilla commander in the best position to command and control the destroyer formation. *Stuart* also had 1,500 miles greater range than the V & W class and was more heavily armed.<sup>viii</sup>

From January 1934 the ships were rotated through periods of reserve status during the Great Depression.<sup>ix</sup> The Munich Crisis of September 1938 was the only time all five ships were returned to service prior to the start of the Second World War a year later.<sup>x xixiii</sup> *Stuart* was re-commissioned on the 1<sup>st</sup> of September 1939<sup>xiii</sup> and after undergoing work-ups and maintenance she departed Sydney for Malta via Singapore, Colombo, and an unfruitful search for the German pocket battleship *Graf Spee* in the Southern Indian Ocean.<sup>xiv xv</sup> When the Australian flotilla arrived in Malta in December 1939, they became a significant addition to the Royal Navy’s Mediterranean Fleet which at that time was comprised of only three ‘C’ class light cruisers.<sup>xvi xvii xviii</sup>

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<sup>1</sup> 690 officers and sailors were required to crew all five ships.

## **The Fundamental Inputs to Capability.**

The principles underpinning the contemporary management of the Fundamental Inputs to Capability (FIC) have been practiced by the Royal Navy for several hundred years. A military capability is a capacity to have an effect in the battlespace. This effect is usually an impact upon the enemy or a form of support to friendly forces. *Stuart* was therefore not a capability but a major system dependent upon other elements of FIC to contribute an effect in the battlespace. An effective fighting unit requires a trained crew, supplied with food, water, fuel, ammunition and commanded by well organised leadership. Maintenance activities supported by national industry ensure the ship is seaworthy and fully operational when required by the Admiralty. How well the elements of FIC are brought together will be a determining factor for what a military unit is capable of achieving. An examination of a unit's FIC elements will also provide insights into what inhibits performance and limits effectiveness in combat.<sup>xix</sup>

There are several models for the Fundamental Inputs to Capability. What follows has been tailored to the analysis of naval history from a Defence Science and Technology Organisation study in 2006.

**Organisation** is the underpinning structure of functional departments within each ship, across the fleet and the Navy. The ship's complement needs to be of an appropriate size. Each department needs to be comprised of positions at an appropriate rank and with the right professional qualifications. Some flexibility is needed to facilitate personnel rotations in response to contingencies and support continual force improvements across the wider Navy.<sup>xx</sup>

**Command and management** are decision-making processes, procedures and reporting lines. It is the ability to plan, apply, measure, monitor, and evaluate the functions being performed on the ship, within the fleet or across the Navy with due consideration to risk management. Command and management also include regulations, instructions, publications, directions, requirements, doctrine, tactical level procedures, and preparedness documents.<sup>xxi</sup>

**Personnel.** Positions within the organisation must be filled with individuals who satisfy the necessary individual readiness requirements, have the appropriate training and competency to perform the functions of their position. They also require the motivation to apply those competencies to the required standards. The personnel element of FIC also includes retention, the development of people and conditions of service.<sup>xxii</sup>

**Collective Training** applies to all levels of command from teams within ship's departments, to ships within a fleet, up to joint and combined forces. On-going collective training enhances performance and validates preparedness requirements derived from higher-command guidance.<sup>xxiii</sup>

**Major Systems** include platforms such as ships, armoured vehicles, and their significant sub-systems such as major weapons and electronic systems.<sup>xxiv</sup>

**Facilities** include buildings, structures, property, plant, equipment, training and exercise areas and firing ranges. Facilities also include utilities and civil engineering works necessary to support capabilities. <sup>xxv</sup>

**Supplies** are consumables and spare parts. These include tools and individual equipment, fuels and lubricants, construction materials, ammunition, personal items, minor systems such as small-arms, medical supplies, as well as spare parts and components for repairs underway. <sup>xxvi</sup>

**Support** encompasses the national strategic support base including some training functions, materiel and maintenance services, some communications functions, strategic intelligence, recruiting, research and development activities, some administrative support functions and transport support services. <sup>xxvii</sup>

Interoperability has been a consideration for Australian military capability since the inception of Australia's Armed Forces. At its establishment, the Henderson Report recommended that in time of war an Australian Navy should become "an integral part of the Royal Navy".<sup>xxviii</sup> The Royal Australian Navy has adopted many FIC elements from the Royal Navy including major systems such as ships and weapons. Royal Australian Navy command and management draws upon the Royal Navy's signals systems, influence over the Australian Naval College curriculum<sup>xxix</sup>, and naval doctrine. The Australian Naval Regulations mirror the King's Regulations and Admiralty Instructions. Integration has also been tested and enhanced through collective training during combined fleet exercises and personnel exchanges at every rank level.<sup>xxx</sup>

The 'V & W' class of the Australian flotilla served with the Mediterranean Fleet until replaced by the 'N' class destroyers from 1941. By the time Italy entered the war in June 1940, Australia's 'Scrap Iron Flotilla' were amongst twenty-five destroyers in the Mediterranean Fleet.<sup>xxxi</sup> Despite their age, the Australian flotilla's FIC elements of organisation, command and management, personnel, collective training, and requirements for facilities, supplies and support remained compatible with the Royal Navy's Mediterranean Fleet. This level of interoperability proved invaluable for the R.A.N.'s ability to sustain operations so far from Australia.

### **The development of H.M.A.S. *Stuart's* anti-surface warfare capability.**

**Major Systems.** When *Stuart* departed Sydney on the 14<sup>th</sup> of October 1939, <sup>xxxii</sup> her major systems for anti-surface warfare were five 4.7 inch 45 calibre guns which had a maximum range of approximately 7.8 nautical miles.<sup>xxxiii</sup> At the Battle of Calabria *Stuart's* crew may have scored a hit during her opening salvo at a range of 6.2 nautical miles.<sup>xxxiv</sup> Technical specifications indicate *Stuart* was capable of firing 30 shells a minute under ideal conditions when all five guns were operating.<sup>2</sup> However, as with all crew served artillery of that era, *Stuart's*

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<sup>2</sup> This rate of fire requires the gunners to hand-load and fire one round every ten seconds.

achievable rate of fire depended upon the proficiency of her gunners.<sup>xxxv</sup> *Stuart* also carried six 21-inch torpedos in two deck mounted triple launchers.<sup>xxxvi</sup> During the night action at the Battle of Cape Matapan, *Stuart's* torpedos struck the Italian destroyer *Alfieri* at a range of less than two nautical miles.<sup>xxxvii xxxviii</sup> The effectiveness of *Stuart's* major systems depended upon the FIC elements of Organisation, Personnel and the proficiency they developed during Collective Training.

**Personnel.** Initially, sixty seven percent of *Stuart's* crew were full-time Royal Australian Navy members, thirty percent were reservists, and the remaining three percent where Royal Navy personnel on exchange.<sup>xxxix</sup> Personnel need collective training to bond as a crew, as well as test and repair *Stuart's* various systems. These were objectives of the work-up exercises prior to the deployment.

CMDR Hector MacDonald Laws Waller was given command of *Stuart* and the Australian flotilla. He had undertaken seven postings with the Royal Navy, graduated top of his class from the Royal Navy signals course and served as the Australian Squadron Signals Officer aboard the cruisers *Australia* and *Canberra*. From 1934-1936 Waller served as the executive officer of the Royal Australian Naval College.<sup>xl</sup> By 1939, Waller had returned to Australia following a posting in command of the destroyer H.M.S. *Brazen* and had been recommended for promotion to Captain.<sup>xli</sup> Waller's command experience in the Royal Navy and service as Squadron Signals Officer made him highly suitable for the role of integrating a destroyer flotilla into a British Fleet. His instructional experience also prepared him to oversee the work-up training required to forge an efficient flotilla from a core of full-time personnel supplemented by reservists.

**Collective Training.** The 8<sup>th</sup> of September 1939<sup>xlii</sup> was *Stuart's* first day at sea for during the Second World War. Most outings involved gunnery practice with both full and sub-calibre firings by day and night. Practice torpedo attacks were also conducted with several torpedo live-fire shoots.<sup>xliii</sup> On the 11<sup>th</sup> of September *Stuart*, and *Waterhen* departed Sydney for fleet integration exercises with *Canberra*.<sup>xliv xlv</sup> Unfavourable weather caused sea-sickness amongst the crew and various drills were not conducted to Waller's satisfaction.<sup>xlvi</sup> In response, Waller anchored *Stuart* and *Waterhen* within the calm confines of Two Fold Bay on the 12<sup>th</sup> and 13<sup>th</sup> of September where the senior hands became instructors, and the short comings of the previous day were addressed. Weapons crews aboard both ships conducted gunnery and torpedo drills, and the Officers conducted sight director exercises to enhance their proficiencies in aiming the weapons.<sup>xlvii</sup>

**CMDR Waller** "This brief spell in harbour, doing things in 'slow time' was invaluable, as was shown by the much-improved drill at warlike evolutions the following day at sea."<sup>xlviii</sup>

During their return to Sydney on the 13<sup>th</sup> of September Waller had *Stuart* and *Waterhen* conduct the first of many night encounter exercises during which the crews were trained to quickly respond to unexpected sightings of other vessels in the dark.<sup>xlix</sup> The rapid and accurate passing of information, operation of weapons

and manoeuvre of the ship were critical. Exercising night encounters so early in the work-up training is indicative of its importance in Royal Navy doctrine and the need for frequent practice to develop proficiency.<sup>1</sup> These exercises also generated the expectation amongst the crew that they would have to fight at night and that war at sea was a twenty-four-hour endeavour – arguably for the first time in naval history. Although Waller worked *Stuart's* crew hard – it was balanced against other preparations. Of the 50 days between being re-commissioned and departing on deployment, *Stuart* spent 20 days at sea with the remaining 30 days invested in ship's maintenance including a dry-docking at Cockatoo Island, embarking stores, and crew leave.<sup>li</sup>

Throughout the passage to the Mediterranean, Waller continued to drill and exercise the crew to maintain and enhance their proficiency.<sup>lii liii</sup> However once in the Mediterranean, the need for exercises and training were balanced against a high operational tempo and resting the crew. The last night encounter exercise annotated in *Stuart's* summary of proceedings was held on the 3<sup>rd</sup> of June 1940,<sup>liv</sup> almost eleven months prior to the Battle of Cape Matapan. Although a lack of structured exercise activity risks the atrophy of proficiency, operations also built experience and confidence including; firing shots across the bow of merchantmen,<sup>lv</sup> <sup>lvi lvii</sup> providing naval gunfire support to troops ashore,<sup>lviii</sup> and engaging Italian destroyers at the Battle of Calabria. <sup>lix</sup> Other opportunities to exercise the crew were possibly undertaken without being annotated in the summary of proceedings.

**Organisation.** As proficiency and teamwork was being built, it was also being eroded by the posting cycle. Fifty four percent of *Stuart's* crew posted off the ship in the year leading up to the Battle of Cape Matapan. <sup>lx</sup> Nine crew members posted off *Stuart* the day she departed Alexandria for that Battle. Forty percent of the personnel who left *Stuart* in the lead-up to Matapan were sent to the U.K. to form an experienced core of crew for the new 'N' class destroyers. Of the remainder, the majority were posted to other ships or training establishments as instructors.<sup>lxi</sup> The organisational element of FIC flexibly facilitated personnel rotations to develop and sustain capability across the Navy.<sup>lxii</sup> At the same time 46 percent of *Stuart's* original crew remained aboard as an experienced core and source of mentorship for new crew members. All this took its toll with at least fifteen members of *Stuart's* initial ship's company discharged permanently unsuitable for naval service before the end of the war – a measure of the significant combat stress they experienced.<sup>lxiii</sup>

**Sustaining Collective Training.** *Stuart's* contribution to the Navy's continual force improvements needed to be balanced against her own capability and preparedness requirements. At times this was achieved by last-minute collective training. On the day she departed Alexandria for the Battle of Cape Matapan, sixty of *Stuart's* gunners had been aboard for less the five weeks and most had no night firing experience. Five members of *Stuart's* 'B' gun crew had come straight from initial training.<sup>lxiv lxv</sup> To address this, *Stuart's* main armament and close-range gun crews were drilled in port from mid-morning on the day of departure for the battle. <sup>lxvi</sup> This demonstrated the importance of retaining almost half of *Stuart's* original

crew. Just like the work-up exercises prior to departing Australia, it was these senior hands who instructed the new crew members. In a little over twenty-four hours they would be engaging enemy ships at night, at ranges as close as 150 yards. Military capability is not static and the need for collective training to sustain operational preparedness never stops.

### **H.M.A.S. *Stuart* at the Battle of Cape Matapan 27-30 March 1941.**

The day phase of the Battle of Cape Matapan was a series of running duels between the Italian Fleet and a British light cruiser force which included H.M.A.S. *Perth*. The Italian cruiser *Pola* was damaged by Allied air strikes and the cruisers *Zara*, *Fiume* with the destroyers *Alfieri*, *Gioberti*, *Carducci*, *Oriani* were sent to assist. That night this Italian force met Admiral Cunningham's Battle Fleet which consisted of the battleships *Warspite*, *Valiant*, *Barham*, and the aircraft carrier *Formidable* escorted by the destroyers *Stuart*, *Havock*, *Greyhound*, and *Griffin*.

As the night battle commenced the British Battle Fleet proceeded at 20 knots under conditions where visibility was only two and half nautical miles — they were therefore sailing to the extent of their vision every seven and a half minutes.<sup>lxvii</sup> As they proceeded toward an unidentified radar contact tracked by *Valiant*, the lookouts aboard *Stuart* were the first to sight the Italian cruiser force at 2223.<sup>lxviii</sup> All of Waller's night encounter exercises had paid off as this cruiser force was a separate and previously unknown enemy group not reported by *Valiant's* radar. The first three vessels were the Italian destroyer *Alfieri* followed by the heavy cruisers *Zara* and *Fiume*<sup>lxix</sup>. As *Stuart's* night alarm was received aboard the flagship *Warspite*, *Greyhound* illuminated the *Fiume* with her search light.<sup>lxx</sup> At 2228 *Warspite* and *Valiant* opened fire with their 15-inch main guns and 6-inch secondary armament at less than 4,000 yards, causing heavy damage to *Fiume*. *Barham's* first two salvos engaged *Alfieri* before shifting her fire to *Zara*.<sup>lxxi</sup> After setting *Fiume* ablaze, *Warspite* and *Valiant* also engaged *Zara* and *Alfieri* was observed passing behind the two burning cruisers.<sup>lxxii</sup>

At 2230 the Italian destroyers *Gioberti*, *Carducci* and *Oriani* were seen to turn away from the British battleships whilst laying smoke with at least one launching torpedos. The battleships executed an emergency 90° turn away to the north. This close-range Italian torpedo attack did not achieve any hits but caused Cunningham to withdraw his capital ships.<sup>lxxiii</sup> <sup>lxxiv</sup> *Stuart* and *Havock* were on the outside of the battle fleet's turn and had a clear line of fire toward the enemy cruisers. *Stuart* engaged the burning cruisers with her 4.7-inch main guns but ceased fire at 2238 as she crossed the stern of *Griffin*.<sup>lxxv</sup> <sup>lxxvi</sup> In the confusion *Havock* was mis-identified by *Warspite* and straddled by up to two 6-inch salvos but fortunately was not hit.<sup>lxxvii</sup> <sup>lxxviii</sup> *Stuart* was also briefly illuminated by a search light from *Warspite* but was not fired upon.<sup>lxxix</sup> <sup>lxxx</sup>

Cunningham ordered his four destroyers to finish off the enemy and Waller led *Stuart* and *Havock* on this task.<sup>lxxx</sup> At 2259 Waller could see a badly damaged heavy cruiser being circled by what he thought was a light cruiser. These ships were probably *Zara* and *Alfieri*. *Zara* was dead in the water and both Italian ships

were pointing away from *Stuart*. The enemy's stern quarter was a difficult attack angle for Commissioned Torpedo Gunner Mr Frank Ley.<sup>lxxxii</sup> At 2300 as the two ships appeared to separate a little, *Stuart* launched all six of her torpedos from approximately 3000 yards.<sup>3</sup> At least one, and possibly two of *Stuart's* torpedoes appeared to hit the 'non-burning cruiser'<sup>lxxxiii</sup> and this was probably *Alfieri*.<sup>lxxxiv</sup> <sup>lxxxv</sup> *Stuart's* successful engagement of an enemy warship at night from such a challenging angle demonstrated the proficiency of the entire torpedo crew who had benefited from their collective training.

LTCDR Robison as Gunnery Officer had *Zara's* range and bearing. At 2305 *Stuart* fired several rapid salvos of 4.7-inch shells from 2000 yards, striking the heavy cruiser which briefly returned fire without inflicting damage <sup>lxxxvi</sup> *Stuart* then fired upon *Alfieri*<sup>lxxxvii</sup> which was heavily listing 1,500 yards<sup>4</sup> to starboard. Hits from *Stuart's* main guns caused secondary explosions and set *Alfieri* on fire<sup>lxxxviii</sup>. *Alfieri* probably sank around 2315.<sup>lxxxix</sup> The accurate delivery of rapid fire at multiple targets demonstrated the benefit of all the gunnery drills they had conducted since their initial work-ups, including the drills in Alexandria the day of their departure.

*Stuart* and *Havock* continued on a south easterly heading when out of the darkness loomed the destroyer *Carducci*. Evasive manoeuvres were required to avoid a collision <sup>xc</sup> and *Stuart* opened fire whilst passing within 150 yards of the Italian destroyer.<sup>5</sup> This was a further demonstration of swift ship handling and weapons operation in response to a dynamic situation as exercised during night encounters. *Havock* detached to engage *Carducci* with gunfire for approximately twenty minutes before sinking her with torpedoes.<sup>xcii</sup>

By 2312 the fog of war had created the impression in Cunningham's mind that both his destroyer forces and his detached light cruisers were engaging the Italian Fleet. To minimise the risk of further friendly fire incidents in the dark Cunningham ordered all ships not engaged in sinking the enemy to withdraw to the north east.<sup>xciii</sup>

About this time *Stuart* narrowly avoided another collision with *Oriani* which was tracking south. <sup>xciii</sup> Neither vessel opened fire as Waller may have believed *Oriani* to be an undamaged light cruiser and did not want to draw her fire. It is possible *Oriani* did not fire upon *Stuart* after seeing the colour of the tracer from her captured Italian Breda 20mm cannons which had fired at *Carducci*. <sup>xciv</sup> <sup>xcv</sup> By 2317 *Stuart* was back on a south easterly heading firing upon *Zara* from approximately 2,500 yards.<sup>6</sup> Explosions were observed aboard the cruiser which did not return fire on this occasion. Waller did not receive Cunningham's order to withdraw until

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<sup>3</sup> 2000 yards is 0.99 of a nautical miles or 1.83 kms.

<sup>4</sup> 1500 yards is 0.74 of a nautical miles or 1.37 kms.

<sup>5</sup> Some accounts from *Stuart's* crew identify Italian ship involved in this near collision as the *Alfieri*. However, the Royal Navy's 'Naval Staff History Battle Summary No. 44: The Battle of Cape Matapan' published in 1950 assesses it was probably the *Carducci*. Both the *Alfieri* and *Carducci* were of the same ORIANI class, and so would be difficult to tell apart in battle at night.

<sup>6</sup> 2,500 yards is 1.23 nautical miles or 2.29km.

2318 after two near collisions and engaging *Zara* for a second time. At this point *Stuart* was alone, out of torpedos and was no longer engaged so Waller attempted to withdraw as ordered.<sup>xcvi</sup>

*Stuart* changed course to the north west and at 2330 passed approximately 500 yards from a heavy cruiser that was dead in the water and burning fiercely.<sup>xcvii</sup> In the confusion Waller did not realise they had relocated the *Zara* for a third time but from the opposite side. Robison's gunners opened fire again, scoring several more hits and *Zara's* return fire wild and ineffective. The damaged cruiser ceased fire and *Stuart's* last two salvos went unanswered.<sup>xcviii</sup> Finally, Waller ordered *Stuart* onto a more northerly heading before relocating the British Battle Fleet at dawn.<sup>xcix</sup>

## Conclusion.

The Battle of Cape Matapan was an intense, confusing, close quarter engagement fought under the glare of search lights, star-shell and at times in complete darkness. In Cunningham's own words;

*ADML Cunningham* "The movements and the results achieved by H.M.A.S. *STUART's* division during the night remain most obscure. H.M.S. *HAVOCK* certainly sank an enemy destroyer. They had an exciting night and did considerable execution, but the presence of undamaged enemy cruisers in the area at the time seems unlikely and it is not improbable that the ships so reported by H.M.A.S. *Stuart* were in fact some of the others of his own division."<sup>c ci</sup>

*Stuart* probably sank the Italian destroyer *Alfieri* with a combination of torpedos and gunfire after *Alfieri* had been damaged by *Barham*. *Stuart* probably damaged the heavy cruiser *Zara*, successfully suppressing the secondary armament on both sides of that ship which possibly assisted the 14<sup>th</sup> destroyer flotilla to sink her the following morning. *Stuart* also damaged the destroyer *Carducci* with gunfire, which sank during a duel with *Havock*. *Stuart* herself sustained no damage beyond the added strain placed on her old machinery. Most importantly, none of her crew were physically injured.

Several honours and awards were bestowed upon *Stuart's* crew. Waller received a Bar to his Distinguished Service Order (DSO). The ship's 1st Lieutenant and Gunnery Officer - Robison received the Distinguished Service Cross (DSC) for his bravery and enterprise. Commissioned Gunner (Torpedo) Mr Frank Ley was Mentioned in Dispatches. Waller also ensured that recognition was shared with the engineering department for their maintenance of the ship's systems with Petty Officer Marcus Goodwin receiving a Distinguished Service Medal (DSM).<sup>cii ciii</sup>

*CAPT Waller* "I cannot help making special mention of my Commissioned Torpedo Gunner, Mr F H R Ley RAN, also the Ordnance Artificer OA 3rd class Marcus L Goodwin and their staffs. The complete absence of either electrical or mechanical failures went a long way towards a successful



*action and was a clear indication of tireless and efficient maintenance in a 22-year-old ship, in which very little encouragement is normally needed to make things fall to pieces.*"<sup>civ</sup>

The achievements of *Stuart* at the Battle of Cape Matapan were the result of capability management over the preceding eighteen months. Despite half of *Stuart's* crew having served aboard her for less than a year, she demonstrated an effective anti-surface warfare capability. This is a credit to the effectiveness of collective training and instruction given to newer crew members by the core of experienced personnel. All personnel had worked hard under arduous conditions to operate and maintain the major systems. Waller's command and management ensured the required standards were attained and maintained. These elements of FIC were managed by Waller's organisation and leadership. Capability is more than a ship, weapons, a crew, and a gifted commander. *Stuart's* anti-surface warfare capability was the sum of all of these FIC elements applied to the creation of an operational effect in the battlespace.

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<sup>i</sup> Pages 73 – 77, "Royal Australian Navy 1939-1942" by G Hermon Gill, Australian War Memorial Canberra, Griffin Press Adelaide, 1957.

<sup>ii</sup> <https://www.airforce.gov.au/capability> accessed 27 Nov 2021.

<sup>iii</sup> Page 45 – 46, "A Review of Capability Options Development and Analysis System and the Role of Risk Management", by Svetoslav Gaidow, Seng Boey and Richard Egudo, Defence Science and Technology Organisation DSTO-GD-0473, Land Operations Division, Edinburgh South Australia, 2006.

<sup>iv</sup> Page 100-103, "Australian and New Zealand Warships 1914-1945" By Ross Gillett, Doublebay Australia, 1983.

<sup>v</sup> Page 27, "Captain Hec Waller: A Memorial Book", by Dr Tom Lewis, Richard Waller and John Waller, Drawquick Printing Sydney, 2008.

<sup>vi</sup> Page 1, "Scrap-Iron Flotilla" by John F Moyes, N.S.W. Bookstall Co PTY LTD, Sydney 1944.

<sup>vii</sup> Page 100-103, "Australian and New Zealand Warships 1914-1945" By Ross Gillett, Doublebay Australia, 1983

<sup>viii</sup> Page 100, "Australian and New Zealand Warships 1914-1945" By Ross Gillett, Doublebay Australia, 1983.

<sup>ix</sup> Page 14-20, "Scrap Iron Destroyers", By L.J. Linde and A.Payne, The Naval Historical Society of Australia, St Leder Press Mascot, 1976.

<sup>x</sup> Page 8, "The Sydney Morning Herald", Friday 22 December 1933 – Restoring The Navy.

<sup>xi</sup> Page 100-103, "Australian and New Zealand Warships 1914-1945" By Ross Gillett, Doublebay Australia, 1983.

<sup>xii</sup> Page 18-20, "Scrap Iron Destroyers", By L.J. Linde and A.Payne, The Naval Historical Society of Australia, St Leder Press Mascot, 1976.

<sup>xiii</sup> NAA, 01 Sep 1939, HMAS Stuart Ship Log Sep 1939, Series number: SP551/1, Control symbol: BUNDLE 515, Barcode number: 443277, Location of item: Sydney, Access status: Open

<sup>xiv</sup> Entries 01 Sep 39 – 27 Dec 39 - AWM78 Reports of Proceedings, HMA Ships and Establishments, HMAS *Stuart* I, Item Number 326/1, Title September 1939 – January 1946. Entry 01 Oct 1940.

<sup>xv</sup> Page 28, "Scrap Iron Destroyers", By L.J. Linde and A.Payne, The Naval Historical Society of Australia, St Leder Press Mascot, 1976.

<sup>xvi</sup> Pages 138, "Royal Australian Navy 1939-1942" by G Hermon Gill, Australian War Memorial Canberra, Griffin Press Adelaide, 1957.

<sup>xvii</sup> Page 47-48, "The Leader of the Crocks", by L.E. Clifford, F.W. Cheshire PTY. LTD. Melbourne, 1945.

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