Was trawling the net and came across this 55 second one from Thales. I've talked of SONOFLASH before -a mash of TUSA's RASSPUTIN and Barra where you get both monostatic with bi- and multi-static options -if you are brave enough - but monostatic mainly because the starred operators could not wrap their brains nor bravery around Bi- and Multistatics (the ones with stripes, JOs and NCOs, could though). For all that - there is nothing to say that SONOFLASH would not beat the living daylights out of MAC, because simple Explosively Enacted(EE) DCL using Barra or a SSQ 53G would anyway - so the French have multiple options including EEDCL while the rest of the west have a big sugar hit but not much else MAC to munch on.

I liked the title: SonoFlash: a major step forward in sonobuoy multistatism - Thales 'Multistatism' - seems like the kiddies at Thales have invented a new word - so let's take that imagining one more step to market it to the admirals that that love the buzzwords 'Big Data' and 'AI' where 'big data' can stand for 'Bistatic Interceptions Giving Detections Across Theatre Areas' and 'AI' 'Active Interdiction'. The pattern can be made up of different buoys Sonoflash, DIFAR, Barra which can all be excited in different ways to produce DCL results thus passing the SLG's Diversity and Inclusion criteria. And the Active Interdiction, using normal EEDCL, operates without fear nor favour finding Foe, Neutral and friend, thus ticking the Equality box. Of course with a bit of charge shaping you can introduce positive discrimination to find only those targets that you wish to cancel. Beauty is, like most sonar terms like propagation & environment, you can toss the terms 'Big Data' and 'AI' around in the conference rooms with gay abandon; the SLG will nod sagely not having clue that, in-trade, it actually means something; and the elephants in the room will remain silent out of respect for your wishing to get on with it.

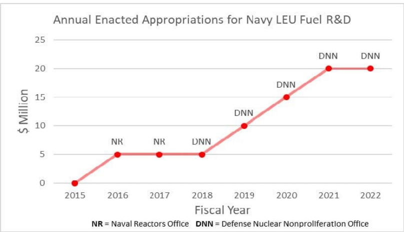
https://youtu.be/KQU8otbLfzo

# U.S. Congress funds Navy LEU fuel R&D for 7th consecutive year

Australia can avoid bomb-grade uranium fuel in AUKUS submarines

By APDR Staff 13/03/2022

Both houses of the U.S. Congress recently approved a comprehensive annual funding bill for FY2022 including $20 million for development of low-enriched uranium (LEU) fuel for the nuclear reactors that propel naval submarines and aircraft carriers – a proliferation-resistant alternative to the weapons-grade, highly enriched uranium (HEU) fuel currently used by the U.S. Navy. If developed successfully, the LEU fuel also would be suitable for Australia’s future submarines under the September 2021 AUKUS agreement. President Biden is expected to sign the bill into law, providing a seventh consecutive year of funding for development of the less risky naval LEU fuel.



uranium, sufficient for at least 160 nuclear weapons. Other countries, including Iran, would likely respond by demanding equivalent rights to import or produce HEU for their own prospective nuclear navies, creating grave proliferation concerns.

“It is no exaggeration to say that Australia’s choice of fuel for its nuclear submarines may help determine whether nuclear weapons spread rapidly or not in decades ahead,” said Alan Kuperman, coordinator for the Nuclear Proliferation Prevention Project (NPPP), who is visiting Australia for a week of lectures and meetings on reducing the proliferation risks of AUKUS.

The U.S. R&D program aims to develop LEU fuel providing identical power and lifetime as existing HEU fuel in naval reactors, thereby reducing proliferation risks while avoiding refuelling. France and China already fuel their naval reactors with LEU but choose to refuel rapidly during routine maintenance of their vessels.

# THE OFFICER STRUCTURE IN A ROYAL NAVY SSN

Commander James F. Perowne, OBE, RN

Old but still very informative as far as I am concerned.This was written for the USN 40 years ago, just after he had driven an S Boat (SUPERB) - he had also driven HMS OPPORTUNE. From a hunter's perspective, there is a huge difference between taking on a boat with a Rickover mentality and others.  The difference in cultures and how the boats are driven is quite stark to those of us that eyeball & sniff the scat and  the spoor.  In the absence of knowledge of such articles I had to learn it the hard way via the Daggers and those in with Pearl I was talking to pretty much daily to weekly in those days.  But those discussions gave me aim points to watch  Daggers like a hawk to catch traces of their backgrounds coming out in their styles that I could use against others. Tim Brown and Greg Sammut were fun to watch being of engineering backgrounds, especially as one had actually practiced as an engineer and the other hadn't. Same for Pusser and Birdie change overs.  With the AUKUS D and, I think Briggsy referred to it a while back, probably a good moment to air this one  may be of use to increase peoples' understanding of what a big difference may be in the offing.

Although Royal Navy submarines have many similarities in operational performance and achievement with U.S. Navy submarines, the composition and structure of their ships company, and in particular the Wardroom, are quite different having historically evolved along separate lines. As an SSN Commanding Officer, I will, in the main, restrain my remarks to the SSN Wardroom, but many parallels can be drawn to the SSBN world as well.

**The Officer Structure of the Royal Navy**

There are some fundamental differences in the officer structure of the Royal Navy to that of the U.S. Navy. The Royal Navy has no “Line Officer”. Instead, a man before he ever enters Britannias Royal Naval College, Dartmouth, must have been selected for one of four streams: Seaman, Marine Engineer, Weapons Engineer or Supply/Secretariat. After a communal period of basic naval training consisting of 3 months at Dartmouth, 3 months at sea in a training ship, and one year at sea in the Fleet, the training for each type of officer varies:

Seaman Officer Returns to Dartmouth or a University for further academic training, then completes eight months of professional Naval courses.

Marine Engineer Completes a three year degree-course at the Royal Naval Engineering College at Manadon, followed by a one-year Application course.

Weapons Engineer – Same as for Marine Engineer, but with weapon/electrical bias.

[View full article for table data]

Supply Officer – The same for the Seaman Officer but his professional courses train him in supply and secretariat. duties.

**The Composition of the SSN Wardroom**

The SSN Wardroom is also divided into the same four departments and the chain of command is as shown in illustration.

**The Operations Department**

This is the fighting/tactical department of the submarine and consists entirely of operators with no equipment maintenance responsibilities except for the traditional cleaning, painting and ship husbandry duties. The officers all have their watches in the control room and become tactical specialists. In order to fight the submarine effectively, they require a working knowledge of the whole submarine and therefore, although they are not qualified nuclear operators, they still require a firm grasp of the propulsion systems — and this aspect is not forgotten in their training.

**Seaman Officer's Training**

The training of the Operations Branch Officers continues throughout their career in submarines. A typical career structure with the completion of basic professional courses might look like this:

Officers Training Class (4 months) – A basic introduction to a submarine, submarine systems and an introduction to submarine tactics.

Nuclear Greenwich Course (7 weeks) – An introduction to reactor physics, reactor/propulsion systems and nuclear safety.

– Joins the First Submarine –

Part Ill Qualifications (4 months) – On the job training. Consolidates all that has been taught. He will watchkeep in all positions in the submarine both forward and aft. On successful completion he is awarded his "Dolphins."

– Completes first tour at sea – (Approx. One Year) –

Submarine Warfare Course (10 weeks) – Further tactical, weapons and sensor training enables officer to be competent Control Room Watchkeeper in a tactical environment.

– Second Tour at Sea (Approx. 18 months)-

Submarine Specialist Course (10 weeks) – Either Navigation or Sonar(ASW) Sub-marine

Advanced Warfare Course – Further tactical training. Enables officer to lead the Control Room Watch in advanced tactical situations.

– Third Tour at Sea (Approx. 2 Years) –

Attack Coordinator Course – To teach the function of the First Lieu- tenant (4 weeks) in the Command Team.

-Fourth Tour at Sea as First Lieutenant of SSK (the Executive Officer) –

Commanding Officer's Qualifying Course (5 months) – All aspects of submarine tactics, attacks, and safety . Preparation for command of an SSK . A very testing course conducted ashore and at the sea

Commanding Officer of an SSK (Approx. 2 Years) – Promotion to Commander rank by selection.

Nuclear Pre-Joining Training – (14 weeks) – A full tactical refresher on all aspects of submarine operations and tactics including an introduction to surface ship tactics and strategic plans. This course also includes a refresher on Nuclear Safety and operations.

Commanding Officer of a Nuclear Submarine

Note:

1. Any tour at sea may be in either an $SS8N_1$ SSN or SSK. The aim is to give most officers across-the-board training in all aspects of submarine operations during their careers.
2. It can be seen that the Seaman Officer receives extensive tactical $_1$ sensor and weapon training throughout his career, giving him great in-depth knowledge of all aspects of submarine operations by the time he aspires to command.
3. The Seaman Officer, who can aspire to command, is not a nuclear operator. Thus, the CO of a nuclear submarine will have received no more than 9 weeks of nuclear courses — where the emphasis is on nuclear safety.
4. Marine Engineers and Weapons Engineers will never assume command of a seagoing ship of any type in the Royal Navy — including submarines. Command at sea posts will always be filled by Seaman Officers.

**The Weapon Engineers (WE) Department**

This department is responsible for the maintenance and availability of all sonars, tactical data handling, fire control, weapons and navigation systems. The Royal Navy submarine service does not have an operator maintenance policy and the bulk of the ratings in the WE department will be artificers. The two officers in this department are fully qualified weapon engineers who on top of their detailed specialist knowledge obtain tactical experience by keeping watch in the Control Room. This mix of tactical and engineering knowledge is later in their careers used in the procurement and development of future sensors and weapons.

**The Marine Engineers (ME) Department**

This department under the MEO is responsible for all aspects of maintenance, operations and safety of primary and secondary propulsion systems and electrical power distribution throughout the submarine. All ME Officers have completed a post-graduate course in Nuclear Engineering and have had further training in applying that knowledge to submarines. They are all qualified Nuclear Plant Operators and regularly have to requalify to satisfy the stringent requirements of the Nuclear Safety Directorate. Throughout their careers they keep watches in the Maneuvering Room although they do spend periods in the Control Room to enhance their ship and tactical knowledge to help them become more proficient in their understanding of the Command problems. The MEU is responsible to the Commanding Officer for all aspects of Nuclear Safety and advice on plant operation. There must be a regular dialogue between these two to ensure that the tactical and engineer's requirements do not clash. The MEO will be a very experienced Engineer and Nuclear Operator, having completed two or three tours at sea as well as shore appointments on Ministry of Defense/Flag Officers' Staffs or in Dockyard repair/refit duties.

**Summary**

The Royal Navy, as there is no line officer concept, splits its officer corps into four main specializations. This has the advantages of being able to train the officers to a great depth within their own departments and allows for the Seaman Officers to have great tactical experience in all aspects of submarine warfare. This split in specializations can lead to a split between forward (operations) and aft (propulsion). To avoid this, requires the Commanding Officer and the three main Heads of Departments, the First Lieutenant, MEO and WEO. to work together to ensure that all persons onboard understand what the submarine is trying to achieve and to plan their respective department's work and training to achieve it .

# Succeeding in Periods of Change

The Imperial Japanese Navy was certain of victory at Midway, but it had not accounted for a foe better prepared to learn and adapt.
By Steven Spear and Trent Hone
March 2022
Proceedings
**They have come a long way since then** [https://www.military.com/daily-news/2022/03/11/space-force-guardians-grow-exasperated-waiting-branchs-policies-slowly-emerge.html](https://www.military.com/daily-news/2022/03/11/space-force-guardians-grow-exasperated-waiting-branchs-policies-slowly-emerge.html)

The challenges confronting today's Navy are substantial. Technology is changing rapidly, peer adversaries are developing new capabilities, and the best way forward is uncertain. Fortunately, history offers some valuable lessons for how to explore, experiment, and share knowledge to develop answers for some of today's most difficult questions. One example begins more than a century ago and culminates in the U.S. Navy victory over the Imperial Japanese Navy (IJN) at Midway in June 1942.

In the late 1800s and early 1900s, the U.S. and Imperial Japanese navies approached strategic and technological unknowns in markedly different ways. The U.S. Navy's choices better prepared it for the uncertainty of combat and the challenges of new technologies and enabled it to deliver devastating counterpunches in the first half of 1942, well before the U.S. industrial base had fully ramped up.[1]

Key factors that allowed the Navy to succeed were:

- Delegation of authority and responsibility to experiment at small scale and at low risk
- Mechanisms for knowledge capture and sharing
- Incremental decomposition of large problems into small, conceptually tractable steps
- A culture of forceful feedback so plans, designs, and ideas receive constructive critique before being finalized
- Regular cycles of planning, preparation, and performance so future plans are informed by past experience

These approaches are just as valuable today as they were a century ago.

## Same Problem, Two Approaches

By the summer of 1942, the IJN should have been celebrating. In December 1941, it had unleashed an offensive of unprecedented size and scope, rapidly capturing Guam, Singapore, and the Philippines. There were setbacks—most notably the Battle of the Coral Sea in May 1942—but a decisive victory was expected in June. As the IJN's Combined Fleet approached Midway, it outnumbered its U.S. opponents in every category that mattered.

But during the Battle of Midway, the Pacific Fleet surprised the IJN, sank four carriers of the *Kido Butai*, and turned the tide of the war in the Pacific.

How did the U.S. Navy triumph? There are many answers: Code-breaking was significant, as was the initiative of pilots such as Lieutenant Commander Wade McClusky, commander of the USS *Enterprise* (CV-6) air group. However, Jonathan Parshall and Anthony Tully, authors of *Shattered Sword: The Untold Story of the Battle of Midway*, contend the IJN's fate was sealed more than a decade prior. After examining the battle from the IJN's perspective, they conclude that crucial decisions during the fight were informed by beliefs and assumptions that had been ingrained long before.[2]

By 1929, the Japanese Navy had locked into a doctrine of massive and devastating first strike. It expected a hard first punch would wreck the opposing fleet and destroy the adversary's will to fight. This was an extrapolation from the Russo-Japanese War and the logic behind the Pearl Harbor raid. This emphasis on "decisive battle" anchored the IJN's plans. Confident in its conclusion, the IJN set to work designing tactics and force structure around the concept—building planes and ships that could secure an initial advantage by striking first at extreme range.[3]

Although the emphasis on decisive battle brought focus, it also created a dangerous certainty, which influenced the IJN's decision-making. Parshall and Tully describe how in war games conducted before Midway the threat of a potentially more assertive Pacific Fleet that might fight differently than expected was brushed aside. In part, this can be attributed to the personal prestige Admiral Isoroku Yamamoto, Commander-in-Chief of the Combined Fleet, had invested in the Midway plan, but the emphasis on decisive battle also played a role. As a result, the IJN missed an opportunity to learn from the initiative of younger officers who were playing the role of the U.S. Navy, assess flaws in their assumptions, and improve their plans.

## Generating a Learning Culture

The U.S. Navy's approach contrasted markedly with that of the IJN. Starting in the 1890s, senior Navy officers emphasized experimentation and distributed decision-making. One reason for this was technology was undergoing a step change, marked by the introduction of the destroyer, the submarine, the dreadnought battleship, steam-turbine propulsion, and radio. Modern ships were faster, more lethal, and could fight at longer ranges; naval combat was transforming.

In such an environment, it would have been reasonable for the Navy hierarchy to determine an effective approach and then impose it on the fleet. There were calls for new tactical forms and rigorous experimentation to determine the best ones. The Navy's "Battle Plan No. 1" was such a concept. This is a comfortable pattern: Assign the problem to a dedicated team of "experts," have them determine solutions, and then have the fleet execute those solutions and measure compliance. Other navies of the day followed patterns like this.

**TABLE 1: FLEET PROBLEMS**

| | | |
|---|---|---|
| I | 1923 | Defend the Panama Canal from surprise attack |
| II–IV | 1924 | Advance to the western Pacific, seize an advanced base, and conduct an offensive from it |
| V | 1925 | Explore how best to attack and defend advanced bases |
| VI | 1926 | Move across Pacific to relieve the Philippine garrison before it surrenders |
| VII | 1927 | Simulate an advance across the Pacific and seize an advanced base |
| VIII | 1928 | Practice evading the enemy while transiting the Pacific |
| IX | 1929 | Execute delaying operations against a superior coalition of Great Britain and Japan |
| X | 1930 | Test new tactical fleet dispositions and battle plans |
| XI | 1930 | Concentrate a widely dispersed fleet in the face of enemy opposition |
| XII | 1931 | Test an aircraft-heavy force against a more conventional fleet |
| XIII | 1932 | Recapture Hawaii from an aggressive Asian power |
| XIV | 1933 | Defend the West Coast from carrier raids |
| XV | 1934 | Make an opposed advance and explore advanced base operations (attack/defense) |
| XVI | 1935 | Simulate an offensive Pacific campaign |
| XVII | 1936 | Investigate operational problems associated with an extended Pacific campaign |
| XVIII | 1937 | Capture a series of advanced bases in sequence (island hopping) |
| XIX | 1938 | Simulate a protracted Pacific campaign, including advanced base capture |
| XX | 1939 | Defend the Western Hemisphere from a major European fascist power |
| XXI | 1940 | Defend against Japanese attacks while much of the fleet is in the Atlantic |

The U.S. Navy did not. At the dawn of the 20th century, senior officers admitted—some explicitly and others implicitly—they had no answer. Instead of imposing solutions, the Navy emphasized learning. Experimentation was used to determine the potential of new technologies and how best to use them. By allowing different ships to explore alternative approaches, multiple avenues could be investigated simultaneously, and situational nuance could emerge. Local experimentation coupled with mechanisms for harnessing and sharing newly acquired knowledge allowed the Navy to rapidly develop new tactics and techniques.

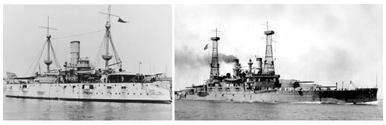
*Delegate for Iterative Experimentation*

One of the initial challenges involved fire control. How could the new, higher velocity guns hit targets at much greater ranges? During the Spanish-American War, at the Battles of Manila Bay and Santiago, the U.S. Navy's hit rates were around 1 percent. This poor performance stimulated efforts to improve. Initial gains were achieved when the new Inspector of Target Practice, Lieutenant Commander William S. Sims, introduced gunnery practices to train the fleet in continuous aim, a concept developed by the Royal Navy. This increased the speed with which gunners hit their targets by 100 percent and improved overall effectiveness by 500 percent.[4]

The real value of Sims' work, however, was the introduction of a *system* of target practice that could be used to continuously refine the Navy's methods. That system relied on standardized rules, competition, and—this is key—dissemination of lessons from failures and successes during practice to advance collective understanding. When it became apparent that individual gunners could not control the fire of their guns at anticipated battle ranges, the system of target practice spurred the development of centralized fire-control techniques, with spotters aloft adjusting the fire of coordinated salvos rather than individual guns.

Once experimentation solved one problem, new ones emerged. Getting the guns on target required new technologies, such as target bearing indicators, range projectors, and mechanical fire-control computers. The Navy used distributed experimentation and knowledge sharing recursively, addressing one problem after another and expanding beyond the challenge of fire control.[5]

During World War II, this same approach was used to integrate new technologies—such as radar and very high frequency radio—into tactical doctrine. Early in the war, ships regularly lost situational awareness as their officers were overwhelmed by the flood of information generated by these new technologies. The combat information center (CIC) addressed the issue by providing a way to collect, consolidate, and display relevant information. To rapidly develop CIC techniques, Admiral Chester W. Nimitz used experimentation. He told the ships of the Pacific Fleet the outcomes they should strive for but left them free to determine the best techniques, even to the extent of reconfiguring internal layouts to enhance their performance.



Commissioned just 15 years apart, the old battleship USS Texas (left) and dreadnought USS South Carolina (BB-26) illustrate the rapid advance of technology at the turn of the 20th century. The Texas displaced around 6,000 tons and mounted two low-velocity, short-range 12-inch guns, aimed and fired by gunners at the mounts. The South Carolina was built for a new era and was nearly three times the size, with high cage masts permitting spotters aloft to correct the aim of a centralized fire control system—developed through iterative experimentation—and bring the eight high-velocity 12-inch guns onto targets at long range. Credit: Naval History and Heritage Command

#### *Capture Lessons and Improve Existing Approaches*

Without the ability to harness lessons from distributed experimentation, the Navy would have had some great performers, many that were adequate, and a few poor ones. Instead, because lessons routinely were assessed and synthesized, the Navy improved as a whole. One mechanism for distributing lessons was the type commands. They were responsible for identifying, refining, and disseminating official doctrines and practices. Another was the fleet structure. Destroyer squadrons, cruiser divisions, and carrier air wings took the guidance from their type commands and balanced it against their own experiences and ingenuity to craft contextual approaches.

During the interwar period (1919–39), the Naval War College enhanced the Navy's ability to learn by helping to structure the Fleet Problems, informing the rules that governed them, and familiarizing officers with a variety of important processes, such as how to craft and frame orders. It also analyzed hypothetical problems, those that could not be worked through in the fleet because of various constraints. The Naval War College, for example, could simulate a large Pacific campaign over months; the fleet could not.

#### *Decompose Large Problems into Small Steps*

Both the IJN and the U.S. Navy faced the challenge of projecting power across the vast distances of the Pacific, but they approached it differently. The IJN decided early to focus on decisive battle, which provided a foundation for how to train and equip the Combined Fleet. The U.S. Navy preserved its options longer. Its senior officers recognized that they did not know exactly how to create a transoceanic force and triumph in a war against Japan. That is why, starting in 1923 and continuing for nearly two decades, they ran a series of Fleet Problems to explore the challenge.

The Fleet Problems explored key questions, such as:

• If the Panama Canal is key for moving ships and supplies, how should it be defended from attack?

• How can we integrate aircraft carriers and their air wings with the fleet?

• What is the best way to seize and establish an advanced base?

• How can we defend the battle fleet against attack from submarines and light forces as it moves across the Pacific?

The fleet regularly took to sea to explore these questions, test ideas, and determine what worked and what did not.[6] Lessons were integrated with an increasingly sophisticated understanding of the challenges of modern naval warfare, allowing the U.S. Navy to keep pace with advancing technology and reinforcing the need to test and validate assumptions. To contrast the different approaches of the two navies, consider that in 1929, when the IJN anchored to decisive battle, the U.S. Navy was focused on the operational challenges of a Pacific war, such as seizing advanced bases and conducting sustained offensive operations from them.

In 1929, naval aviation was a rapidly evolving technology, and Fleet Problem IX was the first to test the concept of an independent carrier task force. Here, battleships and other ships of the U.S. fleet at anchor in Panama at the completion of the exercise, photographed from the USS Lexington (CV-2). Credit: Naval History and Heritage Command

***Introduce a Culture of Fast and Frequent Feedback***

In effect, the Fleet Problems took the recursive incrementalism used to explore the problems of fire control and applied it at large scale.[7] That learning model relied on feedback, and during the Fleet Problems it took place at the most senior levels of command. After each one, there was a large debrief with the commanding officers who had participated in the problem. The open sharing of experiences and perspectives made it more apparent what had worked, what had not, and where the Navy's plans needed to be improved.

The performance of senior commanders was not immune to criticism. If they had mishandled their forces, made poor estimates, or issued unclear orders, those facts came out in the debrief. It was a feedback and learning opportunity for all. This honest assessment of existing limitations and capabilities was one reason Admiral Nimitz was driven to claim after the war, "Nothing that happened in the Pacific was strange or unexpected." The prewar exploration had thoroughly prepared him and his peers for the conflict they eventually would fight.[8]

***Cycle Among Planning, Preparation, and Performance***

It would be understandable to conclude that the Navy's learning system operated effectively during peacetime but was abandoned under the pressures of war because of the need to fight and win. But it would be wrong. The Navy continued to learn.

One of the reasons it was able to do so is that it built in the capacity to recuperate and reassess. One of the best examples is combat pilots. Navy pilots regularly cycled back to Hawaii and the United States so they could rest, share their experiences with others, and return to combat refreshed.

When they came back to the operating theater, their skills were used to improve the training and preparation of others, constantly advancing tactics and doctrine.

IJN pilots, in contrast, were sent out without recuperative breaks. This was a bleak fate for pilots, but it was devastating to the IJN's ability to learn and improve. By failing to systematically leverage the skill of combat pilots, doctrine and tactics failed to keep pace with actual experience. Accordingly, the ability of new IJN pilots degraded during the war, while the ability of U.S. Navy pilots increased.

The IJN's decision not to cycle its aviators mirrored the situation in the European theater in 1940, when the British and Germans were fighting the Battle of Britain. The British, even though they were on the defensive, deliberately cycled their aviators for periods of rest and recuperation, acknowledging the need to recover from the physical and psychological stress of air-to-air combat. This allowed them to share lessons and systematically capitalize on the most recent combat experience. The Germans, in contrast, perhaps hoping to maintain the offensive and secure a decisive victory, emphasized the needs of the present over those of the future. Their crews flew more missions and logged more flight hours. They had fewer opportunities to recuperate and were less effective at sharing their experience with others. Basically, they began to burn out and did not have a chance to regenerate their capabilities.[9]

## Application Today

In June 1942, Admiral Yamamoto was optimistic about the Combined Fleet's chances at Midway. What he did not appreciate was that his foe possessed a "secret weapon": the many lessons gathered from distributed experimentation across multiple scales and the behaviors and culture necessary to deploy those lessons at a much faster rate. That "secret weapon" would hand his fleet the greatest defeat in its history.

While today's strategic and technological challenges are far different, there is much to learn from the Navy's approach of a century ago. Now, as then, success depends on harnessing the creative potential of service members to achieve a common purpose. The Navy was effective at doing that in the years before World War II, and, if it embraces these five principles once more, it can do so again.

1. The late 19th and early 20th centuries were a period of "disruptive innovation" for naval warfare. New technologies, weapons, and platforms such as steam propulsion, radio, the torpedo, the submarine, and the airplane challenged established tactical and operational concepts. That meant that "sustaining innovation"—getting better at existing ways of doing things—was insufficient. New platforms created the opportunity to contest spaces that had not been contested before and fight in ways previously unanticipated. Navies had to determine how to employ new platforms and technologies to achieve their objectives.

Alternative concepts emerged, such as the French Navy's Jeune École, Admiral John Fisher's plans for the Royal Navy's battle cruisers, and the IJN's First Air Fleet or *Kido Butai*. As is typical with "disruptive innovations," the platforms involved supported new technologies and were less effective at "traditional" roles but offered the potential for paradigmatic operational shifts. Battle cruisers were poorly suited to the line of battle but could police vital shipping lanes and destroy raiders. The *Kido Butai* lacked the sustained fighting power of a battle fleet but could overwhelm one with a long-range pulse of airpower. These disruptive innovations were rooted in sociological and organizational changes that repurposed existing technologies to support new tactics and operational concepts. They reshaped the contested space. As technology and operational doctrine co-evolved, what had been a "disruptive approach" to contesting a new space could become the dominant paradigm. This happened with aircraft carriers but not the Jeune École or battle cruisers. Organizations with the adaptability to explore these alternatives can gain a decisive advantage, provided they honestly assess their new concepts and use regular feedback to validate them.

For more details, see Clayton Christensen, *The Innovator's Dilemma* (Boston: Harvard Business Review Press, 1997), Theodore Ropp, *The Development of a Modern Navy: French Naval Policy, 1871–1904*, ed. Stephen S. Roberts (Annapolis, MD: Naval Institute Press, 1987), Jon T. Sumida, *In Defence of Naval Supremacy: Finance, Technology, and British Naval Policy, 1889–1914* (New York: Routledge, 1993), and Mark Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909–1941* (Annapolis, MD: Naval Institute Press, 2002).

2. Jonathan Parshall and Anthony Tully, *Shattered Sword: The Untold Story of the Battle of Midway* (Sterling, VA: Potomac Books, 2005).

3. David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887–1941* (Annapolis, MD: Naval Institute Press, 1997).

4. LCDR Benjamin F. Armstrong, USN, "Continuous-Aim Fire: Learning How to Shoot," *Naval History* 29, no. 2 (April 2015).

5. There is a parallel with modern "'agile" approaches for developing software, rapid sprints to a succession of minimally viable products. Try to accomplish one thing, find out what needs modification, and quickly use the incremental feedback to find new problems and iterate through a succession of solutions.

6. Albert A. Nofi, *To Train the Fleet for War: The U.S. Navy Fleet Problems, 1923–1940* (Newport, RI: U.S. Naval War College, 2010).

7. Note that this approach of decomposing a very large problem into a series of smaller, more tractable ones was how the Apollo lunar program succeeded. The "small step" Neil Armstrong took as he set foot on the moon was the result of many cycles of testing, validating, and learning.

8. The exception was, of course, the Japanese decision to employ kamikaze tactics.

9. The U.S. Navy was not immune to this challenge. Consider Commander Dudley W. "Mush" Morton, who commanded the submarine *Wahoo* (SS-238), credited with sinking 19 Japanese ships during four Pacific patrols in 1943. Morton did not have much recuperation time between patrols—the *Wahoo* was underway 23 days in January, 42 in February and March, 26 in April. The strain was visible in the increasing illegibility of Morton's logs. He and the *Wahoo* were lost in October 1943.

## Urgent need for radical thinking on Australia's defence

14 Mar 2022|Peter Jennings

As a grad from the University of Russell, majoring in toxic swamp gas survival; I'd reckon one of the simple things one could do is have a rip back through the hundreds of Unapproved Minors that went out the window for no other reason than no cash or no promotion potential, the CTDs that were found ready to transition to reality but the associated capability Prime was under no obligation to use it and the CoA was simply too risk averse (there IS a single word for it) to shovel it into the program as GFM;  the DIN jobs that show promise but don't fit somebody's narrative,  you might find that the radical thinking largely needs to be in relation to who gets the cardboard box left on their desk.

Way too much of the kit and associated know-how is just waiting to be recognised as useful and available (ask somebody like  Brent Clark who has worked both sides of the fence bigtime for a list) without having to fit  into a bunch of buzzword based PR statements. There is simply way too much reliance on Primes. Was talking to another operator the other day and it said words along these lines:  In my mind the wondrous AI, machine learning networks, enterprise architectures (and every other highfalutin meaningless term on the bingo card )they talk about  that generates standard outcomes across disparate and sometimes contradicting information flows from a collection of sensors and systems across the  battle is the 'Command Team'.  It is not some electronic information highway that magically generates the right course of action to be blindly followed by unthinking, unimaginative operators.  If the RAN's collection of 'Command Teams' aren't up to the job then no number of billions of dollars will generate the outcome we as taxpayers demand from the ADF. I hope I got it right because it was an ear full. But the message for me is clear; the risk aversion everybody is happy to talk about is not about the complexity of the game nor the systems one needs to play - it lies in the domain of the fear of being found out as inadequate for the job by those who forever seem to be seeking new challenges on Linkedin.

I recall my DGSM of the time demanding that I air my SPO's biggest risk for the Branch Business Plan - after some bayonet poking in my neck area he got one - The risk that the CEO DMO would make a  decision that would have a positive outcome for alcon; we didn't have a process to handle that. We laughed, he kicked me out as a lost cause.

Opposition leader Anthony Albanese began his Lowy Institute speech last Thursday referring to Prime Minister John Curtin’s 1941 declaration that Australia ‘looked to America’ in our moment of deepest strategic danger.

In 2022 we have no choice but to do the same because our developing khaki election could well produce Australia’s next wartime prime minister.

Before World War II, Australian governments watched global security deteriorate as authoritarian governments rearmed and attacked their neighbours. Our responses were woefully inadequate, relying on diplomatic rhetoric about how countries should behave. Australia’s defence preparations were too little too late and utterly inadequate compared to the threat. Curtin’s statement was a cry of desperation, not an exercise of policy choice.

Does this ring true today? Consider the positives. For all the criticism flung at it, the Australian Defence Force is as militarily capable as it ever has been. Australia has a deeply connected defence relationship with the US. Our relationship with Japan in cooperation with the US is developing as a powerful military partnership.

Albanese says he wants to ‘deepen’, ‘elevate’ and ‘enhance’ relations with partners. The door is already open in South Korea, India, Singapore and other countries to do more.

It’s a pity that Albanese didn’t find space in his speech to mention Britain, other than in a passing reference to climate change. Some ideological shibboleths die hard. AUKUS creates an opportunity to design a modern security relationship with Britain.

We also have absolute clarity about the principal risk to our security. It’s the People’s Republic of China, a wealthier, more orderly, more powerful version of Russia, with an undisguised intent to dominate the region.

On defence planning and spending, the penny may finally be dropping with the government and the opposition that the need is to quickly find ways to strengthen the ADF.

The government's announcement to develop a new naval base for nuclear-powered submarines on the east coast is an essential step. Plans to grow the ADF by a further 18,500 are entirely sensible, as are the identified priority areas: submariners, long-range missileers, cyber warriors and the rest.

But this growth is spread out over two decades. The people we plan to run our 'composite space control program' (whatever that is) in 2040 are currently in nappies watching *Bananas in Pyjamas*.

In our national security community, it's thought that the mid-2020s will be the period of maximum risk. If Xi Jinping is going to attack Taiwan, that's the time when the People's Liberation Army may be best placed relative to its opponents for a move against Taipei.

Beyond the tragic consequences this would have for Taiwan, the greater risk is that a conflict could rapidly widen and escalate potentially to a nuclear exchange. Europe is living with this reality right now. It will be astonishing if the war remains inside Ukraine's borders.

Even if there is only a small chance that this assessment of China is right, the bipartisan defence policy plans of Albanese and Prime Minister Scott Morrison must be completely rethought.

One can have too much bipartisanship. On defence, it produces a type of timid complacency.

Defence is not fighting the last war; it's positioning to fight an imaginary war in 2045. The risk is that we have 24 to 36 months to get ready for a conflict, or to better position to prevent one.

What to do? First, if we don't want to be drawn into a conflict over Taiwan, we should be helping the Taiwanese to defend themselves. Out of a fear of provoking Russia, the West failed to arm Ukraine. Let's not repeat that mistake. We must rethink our one-China policy, seeking to make Taiwan a very prickly target.

Second, we need an independent review of the ADF's capabilities. Doing a new white paper would be pointless because, if Defence drives the process, we will get a revalidation of its efforts over the past 20 years.

The key aim for a review of military capabilities is to determine what can be done to build a stronger deterrence capability inside three or four years.

The only way to do that is to latch on to current production lines in the US, Britain and Europe. The current bipartisan emphasis on building sovereign defence industry capability is a dangerous myth. Far better to become part of an AUKUS and Quad shared industrial base.

Third, Defence is doing a lot of essential work, but it can't meet the strategic challenge alone and the organisation's worst instinct is to push aside external help.

Delivering on the AUKUS plans for nuclear submarines, hypersonic weapons and more will succeed or fail based on what industry can produce. My understanding is that Defence is resisting any discussion with industry on delivering AUKUS.

The prime minister should convene an industry–AUKUS partnership. We need to harness the private sector of the AUKUS and Quad countries towards delivering new high-technology defence capabilities.

For its size, Defence delivers significant military capability to government, but it is not designed to handle the scale and speed of current threats. We urgently need to tap more lateral and radical thinking about ways to strengthen our deterrence c