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21st Century Naval Policy: Don't Be Foolish!

What is a navy for? Definitions abound, but without delving too deeply into doctrinal history, most if not all writers, past and present, will probably agree that a navy's ultimate purpose would be to achieve *Command of the Sea*: to build and maintain a fleet in such a way that no adversary could ever hope to fight that fleet and walk away.¹ The objective is strategic. However, with near-peer competitors catching up technologically it may not be achievable. So whatever wartime mission – projection of power ashore, anti-A2AD, protecting communications, denying an enemy fleet's mission – is assigned,² a fleet might have to fight for *Sea Control* first. The same holds true if an adversary miscalculates. Destroying the enemy fleet would of course dispense with the need to fight any future naval battle, but opportunities to do so should be expected to be rare or even non-existing: an enemy running the danger of being wiped off the board might simply decline decisive battle, which would be all the more likely the smaller the opposing navy is. Either way, while “[a navy's] seat of purpose is on the land”,³ there is an important difference between naval battles and land battles: an army can defend, a navy cannot. The difference becomes obvious by comparing respective force ratio recommendations. While for land combat a 3 to 1 advantage of the attacking force over the defending force has long been seen as a must-have,⁴ the navy's analogue is much more simple: “Attack Effectively First!” It is a cornerstone⁵ that holds true even if the overall situation is defensive. There is a reason why non-ballistic missile submarines are called attack submarines, or hunter-killer submarines: even when used for sea denial they cannot afford to give enemy vessels, whether surface or sub-surface, an opportunity to shoot first. To quote from Admiral Frank Schofield's *Fleet Problem XIII CINCUS Report*, “... we are stronger, quicker and more effective when acting on the offensive than on the defensive [no matter what the tactical or strategic situation].”⁶

In peacetime, a navy's mission is to deter. There are two kinds of deterrence, either to achieve political objectives and/or to deter an enemy from taking up arms, or nuclear deterrence. Examples for the former range from 19th century gunboat diplomacy over Theodore Roosevelt's enforcement of the Monroe Doctrine during the Venezuelan Crisis of 1902-03⁷ and the subsequent conception of the Great White Fleet to deploying the

I am grateful to two anonymous referees for their constructive critique of an earlier version of this text.

1 In a way, it would also hold true for a smaller independent navy whose purpose might be called *Command of the [albeit only littoral] Sea*.

2 Cf. Turner 1974.

3 Cf. Hughes 2000: 34.

4 Cf. Christian 2019.

5 Cf. Hughes 2000: 40.

6 Cf. Hone/Hone 2006: 83. See also Vego 2013. The one exception are sea mines. While mine warfare can be part of both offensive and defensive situations, sea denial exercised by conventional sea mines can, due to their very nature, only be defensive. Cf. Richer 2023.

7 Cf. Hendrix 2009a: 25 ff.

U.S. Navy's Sixth Fleet to the Eastern Mediterranean during the 1970 Jordanian crisis.⁸ Nuclear deterrence is not dissimilar from *Command of the Sea*: one of the reasons the Cold War was “won” was the ability of the U.S. Navy to track every single Soviet submarine 24/7.⁹

To summarize, naval doctrine and naval tactics are about fighting a war on or from the sea. The objective of any war should be to win that war.¹⁰ Once that has been achieved, i.e. peace has been restored, maritime operations should be secure, apart from attacks by non-state actors. It is only here that *Maritime Security*, a relatively new catchphrase, comes into play. In conjunction with *Maritime Safety*,¹¹ *Maritime Security* refers to commercial shipping. Any infringement of *Maritime Security* by non-state actors is first and foremost a police matter. Delegating the task to naval forces stands of course to reason, if only because the tactics to be used against state actors would at least be similar to those used against non-state actors. To thwart a Houthi-style attack on commercial shipping using anti-ship cruise missiles (ASCMs), ASCMs have to be intercepted by surface-to-air missiles (SAMs) the very same way they would if the target had been the escorting warship itself or, as a more lasting solution, the land-based missile-sites would have to be attacked pre-emptively. Providing *Maritime Security* can thus be seen as a close to perfect opportunity for training as it would permit live-fire exercises unthinkable anywhere else.

The first disvalue of thinking in terms of *Maritime Security* when it comes to building a fleet ready to fight a future war at sea¹² is that the very term is misleading. Merriam-Webster defines “security” as being “free from danger” or “free from fear”. As events in the Red Sea or off the coast of Somalia have shown, no commercial vessel is secure. Nor should one ever think in terms like *Maritime Security* in war. It would only give rise to fallacies by fueling two misperceptions, one, that military vessels can thwart any attack, i.e. will not be hit, and two, that a hit is survivable. Naval tactical models tell us, at least in the small print, that the probability of a SAM successfully intercepting an incoming ASCM is smaller than one.¹³ It does not even need catastrophic HMS *Sheffield*-style failings.¹⁴ The possibility of so-called *leakers* – ASCMs evading a defense

⁸ Cf. Cutler 2014.

⁹ Cf. Lehmann 2018: 202 ff.

¹⁰ Unfortunately, the dilly-dallying of Western politicians too often suggests otherwise. When asked by President Lyndon B. Johnson on how to proceed in the Vietnam War, (then) Colonel Robin Olds famously replied: “... the way to end this war is just to win the damned thing.” Cf. Olds 2010: 343 f.

¹¹ The first International Convention for the Safety of Life at Sea was passed in 1914 in response to the sinking of the Titanic, and it only talked about *Maritime Safety*. Cf. International Maritime Organisation (n.d.).

¹² Never forget Publius Flavius Vegetius Rhenanus: “Si vis pacem, para bellum!”

¹³ No technology is fool-proof. Economics has acknowledged this by the so-called *O-Ring Production Function*, named in reference to the 1986 Challenger disaster caused by the failure of a simple O-ring. The *O-Ring Production Function* envisions output, in contrast to classical production theory, not as a quantity but as the reliability of the system or mission. Once a subsystem fails, such as an O-ring on a space shuttle, so will the mission. Examples from defense include aircraft carrier flight deck operations or exponentially rising costs of defense projects due to an increase in the number of subsystems. The interpretation of an F-35 as an *O-Ring Production Function* has led to the *Mosaic Warfare* concept. Cf. Kremer 1993, Rochlin et al. 1987, Schimmelpfennig 2021, respectively.

¹⁴ The moment the incoming Argentine Exocets were detected, the *Sheffield*'s anti-air warfare officer had gone for a coffee and his assistant to the lavatory (Cobain 2017)..

layer's SAMs – is addressed explicitly in the literature.¹⁵ It is also acknowledged between the lines by Hughes. He discusses an example where Aegis-like cruisers have to defend themselves against a flotilla of small enemy ships and refers to a “doctrine [that] specifies that two SAMs will be fired at each enemy ASCM.”¹⁶ Such a doctrine would not make sense unless ASCMs may leak with a non-zero probability. To illustrate the numerical significance, assume the probability of a SAM intercepting an ASCM to be 0.9. Then the probability of that ASCM to leak if attacked by two SAMs according to doctrine would only be 0.01, looking like a very low-risk scenario. Now assume, e.g., the number of enemy ships to be three, each carrying six ASCMs, implying a salvo size of 18. Then the chance of every ASCM being intercepted goes down to $0.99^{18} = 0.834514$, i.e. the probability of a cruiser being hit by at least one leaker becomes $1 - 0.99^{18} = 0.165486$, or almost one in six: it would not be dissimilar from playing Russian roulette.

Further, the chances of a successful interception depend on the time left between detection and impact. As long as the ASCM is subsonic – the ones used by the Houthis, such as the C-802, designed by China and exported to Iran, are subsonic – reaction times are, in theory, looking rather comfortable:¹⁷ assuming a maximum radar detection range of 20 NM and an ASCM travelling at Mach 0.9, the time between detection and impact would be around 120 seconds. If the ASCM is supersonic or hypersonic, the respective numbers come down quickly though. Simple calculus shows that if attacked by a Russian SS-N-22 Sunburn at Mach 3, there would be under 40 seconds left between detection and impact, and just 15 seconds in case of a SS-N-33 Zirkon at Mach 8. Worse, chances are that all these numbers are extremely optimistic. First, the actual detection range may be considerably smaller than the theoretical maximum detection range due to extreme atmospheric conditions such as much higher temperatures or humidity – as could be expected in, e.g., the Red Sea. Second, not only has the inbound missile to be detected but the contact has to be clearly identified as a threat. The more cluttered the environment, the more time this will take. Unfortunately, the more littoral the sea, the more clutter there will be. Finally, as shown by the events of January 30, 2024, when for reasons unknown the USS *Gravelly* had to rely on its Close-In Weapons System (CIWS) to destroy an incoming Houthi missile less than six seconds from impact, even a single ASCM may slip a warship's outer defense layer.¹⁸

Another fallacy concerns the implications of a hit, or a warship's *Staying Power*, defined as the “number of standard sized or notional hits required to achieve a firepower kill, not to sink it.”¹⁹ An empirical study by Schulte would give an estimate of 2.06 for an Arleigh Burke-class destroyer and 1.89 for an F 125, a study by Hura and Miller would arrive at 3.09 and 2.90 respectively.²⁰ Learned fiction is even more optimistic: In his novels following the career of a fictional U.S. Navy officer through a future war with

¹⁵ Cf, e.g., Tiah 2007.

¹⁶ Hughes 2000: 288. The doctrine is known as “shoot, shoot, look, shoot” (SS-L-S), cf. Clark (2027), p. 17. Hughes disregards the final “shoot” which refers to launching a third interceptor once one realizes the first two have missed.

¹⁷ Reaction times are of course somewhat smaller than the time left before impact because an incoming missile that is intercepted with only a couple of hundred yards to go would still cause considerable damage.

¹⁸ Ziezulewicz 2024.

¹⁹ Hughes 1995: 271.

²⁰ Cf. Schulte 1994 and Hura/Miller 1985.

China, David Poyer, looking back at 30 years of service with the U.S. Navy himself, suggests a *Staying Power* as high as three for an Arleigh Burke-class destroyer and four for a Ticonderoga-class cruiser.²¹ In other words, frigates, destroyers and cruisers are believed to be able to continue fighting even after taking more than one ASCM hit.

Contemporary naval history paints a different picture. From the first instance of missile salvo warfare when the Israeli destroyer *Eilat* was attacked (and sunk) by Russian-made Styx launched from Egyptian missile patrol boats in 1967 to most recent events of the Ukraine War, no naval vessel ever recovered after being hit by just one ASCM: at best it had to withdraw from the fight, at worst it was sunk. Not a single case is known where a naval vessel that took a hit from an ASCM could carry on fighting. As the HMS *Sheffield* has shown, even if the ASCM's warhead fails to explode, the damage and casualties suffered from a subsonic ASCM's kinetic energy can prove to be too catastrophic for the ship to be able to continue fighting. If the warhead explodes and/or the ASCM is supersonic, the implications are unimaginable even when the command information center is located below the waterline.

The implication is obvious: the chances for destroyer-sized surface vessels to survive in a future naval war against a technologically advanced enemy look bleak. Those of aircraft carriers, despite having an umbrella of fighter aircraft and a screen of guided-missile cruisers and destroyers, are not much better. Tactically speaking, carriers are high-value targets that have to be protected like any other high-value target that cannot defend against ASCMs on its own. And just like their escorts, they have to rely on surprise. To quote Wayne Hughes and Robert Girrier, "American warships [including carriers] depend for survival on out-scouting the enemy and attacking him not only effectively, but decisively first. These are tactics suitable for a fleet in the open ocean. The tactics will lose their efficacy in littoral waters."²² The advent of hypersonic ASCMs does not help. Tactics have to be reviewed. So has strategy. The risks involved when fighting a war at sea, in particular in the littorals, are much higher than when providing *Maritime Security* in peacetime.

The Ukraine war provides a glimpse into the future. Russian naval vessels have proved to be susceptible to attacks by unmanned vessels. With no deployable Ukrainian navy at hand, all attacks have been launched from the shore and/or by special forces. The old adage "a ship's a fool to fight a fort" comes to mind, and as Wayne Hughes pointed out in an interview: "Nelson is supposed to have said it first, yet he lost an eye and an arm while fighting forts."²³ Further, when it comes to defining "littorals" from the perspective of naval tactics, ever more future naval battles will effectively be "coastal combat". ASCM capabilities no longer extend just hundreds of miles from the coast.²⁴ It was sufficient to cover the Baltic, the Taiwan Strait and the South China Sea. Today's ASCM ranges have become four-digit numbers,²⁵ giving China A2AD capabilities up to at least the second island chain,²⁶ while its inventory gives rise to the possibility that U.S. Navy defenses could be saturated by the salvo size.²⁷

²¹ Cf. Poyer 2016 and Poyer 2017.

²² Hughes/Girrier 2018: 157.

²³ Nelson 2018.

²⁴ Cf. Vego 2015.

²⁵ Cf. Gormley et al. 2014: 5, Office of the Secretary of Defense 2021: 62.

²⁶ Cf. Pollpeter 2023.

²⁷ Cf. Gormley et al. 2014: xviii.

The idea of “strength in numbers” in naval surface warfare is not new,²⁸ and it had been pioneered even much earlier. While the 1944 Battle of Surigao Strait is called “the last great naval battle”,²⁹ McGarty identifies it as the “first battle of a new way of warfare, namely that of swarming”.³⁰ It offered a preview of today’s swarming tactics. Surigao Strait should have resulted in an Allied victory anyway because Rear Admiral Jesse Oldendorf had managed to “cross the T”. But when the Japanese Southern Force, originally consisting of two old battleships, one heavy cruiser and four destroyers, reached the northern extent of the strait where Oldendorf was waiting, it had been thrown into disarray and reduced to just one battleship, one cruiser and one destroyer by relentless American PT boat and destroyer attacks.³¹ The battle of battleships facing battleships was over before it had even begun.

The idea to go for small and less expensive rather than large and state-of-the-art platforms was reiterated in an article in the United States Naval Institute Proceedings, calling to “buy Fords, not Ferraris!”³² At first, it might look contradictory: as staying power increases with size, smaller vessels would be even more vulnerable. However, on the other hand, hypersonic ASCMs are very expensive and their number would thus be limited, meaning that the more vessels you have the more are likely to get away. They would not just live another day but they might well inflict more damage than a conventional fleet as suggested by the Battle of Surigao Strait back in 1944, Drennan’s numerical examples, and the ongoing war in the Black Sea.³³ On the other hand, “strength in numbers” is also the very essence of the *Mosaic Warfare* idea with its emphasis on unmanned platforms and, due to the O-Ring Production-type disadvantage of complex weapon systems, might guarantee a substantially higher probability of mission success.³⁴ Paradoxically, “strength in numbers” and “Fords, not Ferraris” may even have a deterrent effect, just as much as the *Command of the Sea* idea is to deter in the sense that an enemy would think twice before going to war on the seas.

“Small is beautiful” does not need to be exclusive though. It could be superimposed – as Surigao Strait had demonstrated – on a force structure favoring large platforms, e.g. a carrier-centric navy, as every new target, provided it can sting, would have to be addressed by the enemy, making his coordination problem ever more difficult.³⁵ “Strength in numbers” is about avoiding overconcentration in order to deny the enemy the chance

²⁸ Cf. Drennan 2014.

²⁹ The Battle of Leyte Gulf, usually called the “greatest naval battle in history”, actually consisted of five battles, one of which was Surigao Strait.

³⁰ Cf. McGarty 2007. See also Arquila/Ronfeldt 2000.

³¹ Cf. Cutler 1994: 182 f.

³² Hendrix 2009b.

³³ One must not forget, though, that while deploying smaller vessels might increase the probability of mission success, the greater vulnerability of any such small platform could lead to more casualties. Irrespective of the effects on morale, additional costs for having to train new personnel would incur which might outweigh the cost advantage of smaller platforms.

³⁴ The idea of *Mosaic Warfare* is amazingly straightforward: if your adversary goes after your systems – “system destruction warfare” – just disaggregate your systems! Rather than putting all proverbial eggs (read subsystems or nodes) in one basket (read on board a single O-ring-production-function-type platform such as the F-35), use small platforms hosting disaggregated nodes instead. Cf. Deptula et al. 2019. For a quantitative analysis see Schimmelpfennig 2021. On top of that, as many of these small platforms may be unmanned, own casualties do not necessarily have to go up either.

³⁵ Hughes compared these small platforms to “pawns on a chessboard, individually their offensive capacity is limited, but collectively they are a powerful, threatening force.” Cf. Hughes 1981.

of incapacitating one's own force in one strike. It holds for small navies, too: if a navy only has a small number of small ships, having more but still smaller ships might be helpful. The keyword is "offensive sea control",³⁶ or "distributed lethality".³⁷ One proposal is to augment smaller surface combatants like patrol boats, minesweepers or Littoral Combat Ships with vertical launching systems that would increase both their offensive and defensive options, while larger surface combatants such as cruisers or destroyers should carry fewer SAMs, with a change in the corresponding doctrine, in order to make room for offensive weapons.³⁸ The enemy's calculus might be made even more complicated by adding merchant ships converted to missile ships to the mix, some of them covertly, as has been proposed as a means to win in an A2/AD situation, in particular for the South China Sea. From the enemy's perspective, all at once every merchant ship might look like a threat.³⁹

Many of these ideas have, in particular by emphasizing the need for unmanned systems and AI, found their way into the "KURS MARINE 2035+", which in all but name can be described as the strategic vision of the Chief of the German Navy.

Finally, the possibly gravest problem of thinking in terms of *Maritime Security* is that it may lead to poor procurement decisions. The German Frigate 125 provides a perfect example. A batch of four had been ordered in 2007 and the lead ship was commissioned in 2019. It had been designed for, inter alia, low- and medium-intensity peacekeeping missions – it is amicably called *Stabilisierungsfregatte*; how could anyone object to such a concept! –, to combat asymmetric threats such as piracy and to support special forces operations.⁴⁰ While being able to conduct high-resolution aerial and surface surveillance, its layered ASCM-defense capabilities are limited, to say the least, as it is only equipped for medium range missile defense and close-in defense. Acting on its own, an F 125 could not defend commercial vessels against Houthi-style attacks in peacetime *Maritime Security* missions. Worse, from a national security perspective, it could not provide missile defense for a naval battle group in war either. Back in the 1990s, a U.S. Navy captain went to bat for the frigate. Departing from the central criterion of affordability, he argued that "not all missions need a luxury four-door Lexus when a little two door Mazda Miata will do." He concluded "the frigate still fits" but demanded that the "frigate of the future" should "contribute in classic warfare regimes of anti-air, anti-surface and anti-submarine warfare" and have a "stout 'puncture proof' self-defense philosophy".⁴¹ With the exception of anti-submarine warfare, the F 125 ticks neither of these boxes. To call the class a forward-looking (*zukunftsweisend*) solution can only be excused if meant to refer to technologies tested here for the first time; however, lauding a member of the class for "showing the flag" in the Baltic following Russia's attack against Ukraine only exposes a startling lack of understanding of the

³⁶ Cf. Clark 2017: 14.

³⁷ Cf. Rowden et al. 2015.

³⁸ SS-L-S would be substituted by "shoot, look, shoot" (S-L-S) and missile defense would concentrate on medium-range Evolved Sea Sparrow Missiles (ESSM), effectively foregoing long-range defense. As long as enemy ASCMs are subsonic, it might work and would be cost-effective, too. If enemy ASCMs are supersonic or hypersonic, the already small chance of intercepting the ASCM would go down to zero. Cf. Clark 2017: 17 ff.

³⁹ Cf. Harris et al. 2019.

⁴⁰ Cf. Bundesministerium der Verteidigung 2022: 86.

⁴¹ Linder 1993.

concept of naval presence.⁴² Naval presence only works by deterrence – and deterring is what an F 125 cannot do. The class was conceived in peacetime, clearly having asymmetric *Maritime Security* in mind. But procuring for peace not only does not end wars, it breeds wars. “KURS MARINE 2035+” seems to have taken account of the F 125’s deficiencies and proposes to cut its number by 2035, albeit by just one, and substitute it by a frigate capable of layered missile defense.

In general, it is perfectly fine to use warships to improve *Maritime Security* in peacetime, just as it is perfectly fine to use warships to help with humanitarian missions, but warships they have to be. In times of increasing threats and scarce financial resources a navy should only spend its money on what a navy is for, i.e. improving its ability to fight a war. Every dollar spent differently reduces national security.

To summarize, both naval strategies and tactics and naval procurement must be reviewed. As does the language that is used. At best, poor wording may lull the nation into a false sense of security. At worst, wanting to sound amicable may endanger national security. Coming back to the original question of what a navy is for, its non-negotiable purpose is to be able to fight a future war at sea. If it is good at doing something else, fine.⁴³ If not, bad luck, but at least national security has not been compromised any further.

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⁴² Steffens et al. 2022.

⁴³ To give just two examples, protection of undersea communication cables is a sine qua non in wartime and peacetime alike, while securing critical harbor infrastructure, indispensable in wartime, would be a prerequisite for, e.g., providing peacetime humanitarian assistance, too. To put it in economic terms, military expenditure would give rise to positive peacetime externalities.

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