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Following the departure of the UK from the European Union, the British Government's ambition is to be a Global Britain. This requires protected trade routes, many of which are linked to maritime trade routes that pass through several chokepoints. To deter aggressive actions that could impact British trade, a persistent RN presence near the chokepoints is required. To achieve this, diplomatic, informational, military, and economic investment by all UK Government departments is essential. To ensure the initiative against a near-peer adversary is not lost, the RN must become more comfortable holding additional risk and have an adept amphibious assault capability. However, in a near-peer battle, against an A2AD threat, the RN would face a greater challenge.

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SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Executive Summary

Title: The Royal Navy's (RN) ability to conduct amphibious assaults in the absence of sea control.

Author: Major Luke Davies, Royal Marines

Thesis: To achieve a Global Britain, the UK and its allies must be more collaborative in every aspect of diplomatic, informational, military, and economic strategic means.

Discussion: Following the UK's departure from the European Union, the British Government's ambition is to be a Global Britain that is financially stable on the open market. Britain requires protected trade routes, of which the majority are maritime trade routes that pass through several chokepoints. Violent extremist groups in these areas make Britain's trade vulnerable to attack. Additionally, chokepoints are areas that control access, preventing freedom of maneuver that is necessary for trade. As Britain regains a maritime trading role, these chokepoints are becoming vital ground. A persistent RN presence near the chokepoints is necessary to deter aggressive actions from violent extremist groups to near-peer adversaries that could impact British trade. The UK needs an uncompromising amphibious capability to conduct aggressive activities at sea or on the surrounding terrain to deter potential aggression.

The current RN force structure has survivability issues aligned to task group force protection, logistics, and missile defense. These capability shortfalls correlate with the RN's present mass, which is significantly smaller than close competitors. Although the RN is a highly technical and advanced force that successfully develops new lethality concepts such as the Future Commando Force and deception through information warfare, ultimately, the RN has limited resilience. Therefore, the RN must seek out capability that is disruptive, innovative, and advances RN survivability to win in an A2AD environment. Investment in disruptive innovation must occur to generate a surprise effect on the competitor. This surprise will create opportunities that the RN can then utilize to break the will and cohesion of the competitor's A2AD. A paradigm shift in future doctrine, requiring innovative joint force technological advances, is urgently needed across the UK MOD to compete in a contested sea.

History has shown us that deception techniques are effective, and these should be reviewed and upgraded for 21st-century warfare. With solid financial investment and support from the government, combining deception with advancements in lethality systems, the RN can provide a more forward persistent presence in chokepoints worldwide. These are the first steps along a combined approach that breaks a competitor's A2AD network and allows the coalition into a contested littoral sea environment. Once there, the force then has to try and remain.

Conclusion: The RN is a highly technical and skilled force developing tomorrow's capabilities. However, substantial multibillion-dollar new technologies will not be a catch-all solution. Technology is only one part of a problem. The UK government must also invest in these new technologies, and there must be a common vision of what Global Britain means. Without either investment or a combined approach within MOD, the ability to disrupt a competitor's A2AD network within a contested sea environment will be very limited.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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Preface

As a Landing Craft Officer in the Royal Marines (RM), I have specialized in amphibious warfare and the tactics, techniques, and procedures in deploying and conducting this type of warfare. Therefore, I have a natural affinity for whether the Royal Navy will evolve this warfare style as the threats and economic viability of amphibious warfare have changed considerably. Amphibious warfare is a wicked problem. Amphibious assaults are combined operations, requiring a trained force, purpose-built ships, and aircraft and is the last bastion of combined maneuver operations; however, it is cumbersome and slow. In today's world, this may be the nail in the coffin as the speed of relevance of modern weapon systems combined with their lethality and range is far superior to the current doctrinal littoral distances of over the horizon or 12Nm from the shoreline.

I would like to acknowledge the support of several people who have made this project possible. Firstly, my amazing and loving wife Melody spurred me on when I wanted to be elsewhere and has considerable patience in reading numerous drafts and correcting my grammar. Secondly, for the advanced research group led by Dr. Anna-Louise Antonoff and the Marine Corps University's supporting academics for the discussions and support while undertaking this project. It has been a truly remarkable experience, and I have enjoyed all the conversations and breadth of knowledge I have received over this short period. Lastly, the Royal Marines (RM) granting me this opportunity to study abroad. It has undoubtedly made me a broader individual, and I will return to the UK with a wealth of ideas that I hope will support the RM development as they transition into the Future Commando Force.

Introduction

On 23 June 2016, the United Kingdom (UK) held a referendum on its membership of the European Union (EU), and following the 'Leave' result, the UK then began the long process to depart the EU by the end of 2020. The referendum result divided the country, forcing the UK along a path that the Conservative government had neither planned nor expected. The divisive nature that Brexit caused also spread into many industries and government departments. A critical component in the UK's endeavor to emerge from Brexit was a stable economic framework. A stable framework is aided by a shared vision that the UK government could not provide; four years of negotiations, three different prime ministers, and two changes to the opposition leader assisted a torn and divisive nation with an unclear path. As the Brexit end date got closer individual departments became more insular, protecting their own rather than the greater good. The Royal Navy (RN) impact saw individual arms considering how best to maintain their current capability to the disadvantage of others.

What was clear was that reliance on maritime trade would again become a central component to maintaining Britain's economy. The UK has been reliant on good maritime trade links throughout its entire existence. As an island nation, the ability to deliver trade securely via maritime sea lanes is not a new problem. However, it may be one that Britain has neglected as globalization has become more prolific, and previous relationships with the European Union (EU) annulled cross-border trade tariffs. As Britain has now left the EU, trade is once again a critical factor in how Britain's economy moves forward and develops post-Brexit. In the glory years of the British Empire, Britain maintained trade routes from India, around the Horns, into the Mediterranean, and back to the English Channel. Supported by the RN's mass, the UK could develop itself as a great sea power and nurture international maritime trade links that led it to flourish as a nation in the early 18th Century. The RN's seamanship, naval gunnery, and naval leadership were a significant

advantage over other sea-faring countries, allowing the British to rule the sea. James Thompson's poem Rule Britannia in 1740 came to reflect British belief in its Navy.[1]

The world is now in constant competition, sometimes referred to as the "information age." Aggressive state actions towards others are occurring below the threshold of war that does not warrant an all-out military response. To compete in this so-called gray zone, previous strategies utilizing diplomatic, informational, and economic sanctions are still viable to actively counter aggressive competition from non-peer states and violent extremist organizations. Nevertheless, these need to develop and adapt to the evolving threats. Soft power diplomacy supporting maritime trade must be backed by hard power to deter unwarranted acts of aggression. For the UK, hard power comes in the form of the RN amphibious forces. The RN must develop a new amphibious assault doctrine, using disruptive technology and focussed on Cyber, Land, Air, Space, Sea, and Subsurface (CLASS[2]) domains to break down the competitor's advantage to achieve victory. The character of amphibious warfare has reached a paradigm shift and must change to defeat the emerging threats.

Terminology

NATO defines amphibious operations as "A military operation launched from the sea by a naval and landing force embarked in ships or craft, with the principal purpose of projecting the landing force ashore tactically into an environment ranging from permissive to hostile."[2]

The RN has the means and capability to conduct three types of amphibious operations; the definitions below are from the NATO Glossary of terms:

Operational type	AAP-06 Definition	Remarks
Amphibious Assault	The principal type of amphibious operation involves establishing a force on a hostile or potentially hostile shore.	**Subdivision of Amphibious assaults is Raid, Demonstration, Withdrawal, and Feint.**
Air Assault	An air assault defined as the movement of friendly assault forces by rotary-wing aircraft to engage and destroy enemy forces or to seize and hold key terrain.1	This definition is from NATO ATP 3.2.1 p3-17.[3]

Non-combatant Evacuation Operation	An operation conducted to relocate designated non-combatants threatened in a foreign country to a place of safety.	

Table 1 – Amphibious definitions.[4]

As defined above, amphibious assaults within RN doctrine refer to all types of amphibious operations that require a force transition from sea to an objective. The USMC classifies this style of operation within the context of Joint Force Entry Operations (JFEO), "Seizing and holding of a military lodgment in the face of armed opposition or forcing access into a denied area to allow movement and maneuver to accomplish the mission."[5] For clarity, within this document, RN terminology will be used as the primary reference.

Literature Review

In May 2017, the 1st Sea Lord RN hosted a Sea Power conference in which BP Chief Financial Officer Brian Gilvary was a keynote speaker. [6] In the speech, Gilvary emphasized that global trade had risen from £55 billion in 1950 to £16 trillion in 2017. Mr. Gilvary stated that Britain could not simply choose to be a global economy; it had to back up this claim through power projection, and perceived history and soft power alone were not enough to secure trade routes. Gilvary proffered the idea that Seapower was, therefore, a critical requirement and in Britain's national interest to advance and remain a prosperous trading nation once it left the EU. The British threat of hard power and an experienced military supports Britain's goals to be a strong economy with good trading routes. BP's maritime defense relies heavily on RN security at choke points along the naval trade routes located East of Suez, namely the Bab al-Mandab (BAM) and Strait of Hormuz (SOH). Britain's amphibious history East of Suez supports the narrative that RN can protect these trade routes and Britain's global interests.

In May 2018, the British government launched their post-Brexit plan for the UK, entitled Global Britain, and many government departments were unsure how to implement such a diverse

plan. In Sep 2020, the Ministry of Defence released its assessment of Global Britain through the *Integrated Operating Concept (IOPC) 2025*. [7] The IOPC outlined the MOD's necessary transformation to support a Global Britain engaged in continuous competition from resurgent and developing powers and violent extremism. This transformation requires a whole of government approach to gain traction and influence against these threats. In the IOPC, General Nick Carter, UK Chief of Defence, states, "We need a new model for deterrence that takes account of the need to compete." A significant portion of this competition occurs in the Grey Zone, which the IOPC defines as achieving objectives without the need to escalate above the threshold of war. As a response, the UK MOD's vision is to "drive the conditions and tempo of strategic activity, rather than responding to the action of others." [8] This vision moves away from Alfred T. Mahan's philosophy and more into the Corbett style of thinking, having local sea control and maneuvering the competitor into a more favorable decisive engagement, rather than having sea power dominance. "It seems demonstrable, therefore, that as commerce is the engrossing and predominant interest of the world today, so, in consequence of its acquired expansion, oversea commerce, over-sea political acquisition, and maritime commercial routes are now the primary objects of external policy among the nations." [9] Mahan's quote from the early 20th Century indeed associates control of trading routes with sea dominance. Therefore the UK MOD's vision would mean the RN is projecting local sea power to protect trade, as trade is paramount for a Global Britain to survive and remain a strong power.

Chokepoints are vital ground for trade route security. They refer to an area of risk for maritime shipping where the ship closes with land and passes through a narrow navigable channel. Chokepoints are often a 3-dimensional problem as the channel's width, length, and depth can be restricted. A chokepoint is usually an excellent offensive opportunity for a land-based force to get within range of shipping. Therefore, an adversary can bring land-based weapon systems with minimal range to bear on a maritime asset. Maritime traders will frequently navigate chokepoints to

save transit times and expedite the delivery of goods. For the RN, this means that chokepoints need to be protected in times of war, especially if they provide essential trade and logistical functions. Figure 1 depicts the volume of oil, one type of economic trading commodity, that annually passes through seven maritime chokepoints.

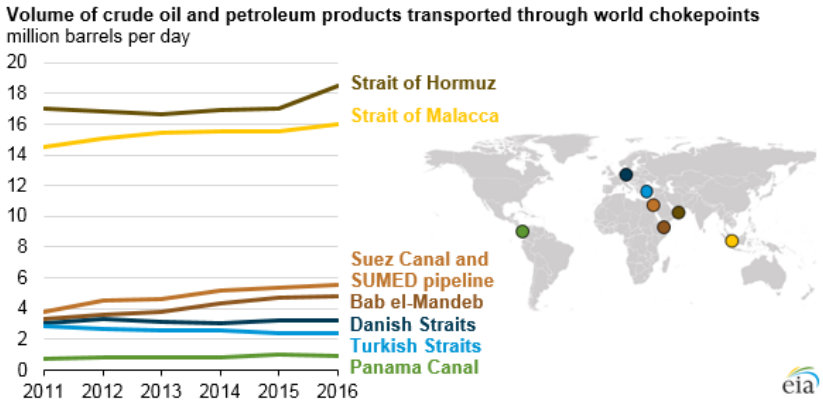

Figure 1 –Volume of Oil Transported Through World Chokepoints.[10]

Contested seas also apply to the littoral regions where the UK's competitors have extensive Anti Access Area Denial (A2AD) capabilities. Among the abundance of literature outlining the A2AD threat, Bradley Martin's RAND testimonial publication, in which he breaks down A2AD, stands out.[11] First, he states that Anti Access prevents or degrades the ability to enter an operational area, whether geographic, military, or diplomatic. Secondly, he defines Area Denial as active threats that impede the movement freedom within the operational area. For the RN, this generates two problems:

1. How does the RN counter the competitor's lethality to access the littoral region of our choosing; and
2. How does the RN improve their survivability to remain there?

The above problem statements are extremely daunting tasks, and many have proffered that amphibious operations are dead within an A2AD construct.

Admiral Scott Swift US Navy (Rtd) has extensive Naval operations experience, retiring as Comd US Pacific Fleet in May 2018. At the USMC Command and Staff Course November 2020, he presented "How the Navy fights," where he outlined his thoughts on why amphibious operations

are no longer viable. In summary, he questioned why any commander, while deploying sea connectors to get a force ashore, would risk their ship within 12Nm of land in an A2AD environment. In his opinion, the threat of a counter strike and mission failure was a significant risk that political consensus would be unwilling to take. However, he also stated that aviation assaults were still an acceptable mode of amphibious assaults within an A2AD environment. The aviation range is far greater than current sea connectors. It, therefore, reduces the risk to shipping as the aviation can be launched and retrieved outside of the current A2AD threat ranges.

Two RUSI research fellows support Adm Swift's opinion that amphibious assaults are no longer viable. Jack Watling, and Sidharth Kausal, in their RUSI paper, *Amphibious assault is over*.[12] In this, Watling and Kausal outline the daunting challenge that the A2AD environment has created for a naval planner. The weapon ranges for anti-ship cruise missiles are 250 Nm, and RN amphibious doctrine requires an amphibious operational area within 12-20 miles of land. The adversary only needs a moderate mass of missiles to deal a decisive blow to an amphibious assault, which can occur far out to sea in deep-water, far away from the littoral zone. Add innovative tanks, kamikaze UAVs, and mines, and the advantage lies with the defender. Any real success with amphibious assaults comes at significant risk. Watling and Kausal indicate that the RN has to rethink amphibious operations. The RN has to reconceptualize the amphibious approach to move away from raiding and into securing sea lanes.

The US Marine Corps has applied a similar approach. The *Tentative Manual for Expeditionary Advanced Base Operations (EABO)*, published in February 2021, outlines the USMC's concept for conducting JFEO operations in an A2AD environment. EABO is "a form of expeditionary warfare that involves deployment of mobile, low signature, persistent, and relatively easy to maintain and sustain naval expeditionary forces from a series of austere, temporary locations ashore or inshore within a contested or potentially contested maritime area to conduct sea denial, support sea control, or enable fleet sustainment."[13] The EABO concept employs small

USMC teams that utilize modern technology; man-portable ASBM's, mine warfare to block navigable channels, attack drone swarms, and disruptive cyber and space warfare to control key areas of the littoral. By utilizing the littoral topography, the USMC can deny access, conduct maritime force protection, or supporting naval activity within the littoral region. EABs will use the topography to establish on land rather than sea basing if it is an archipelagic region. EABO applies lethal disruptive technologies to reverse the A2AD effect back on to the adversary. This concept limits the adversary's ability to operate freely in the maritime littoral area and subsequently generates safe corridors for the US Navy to attack gaps and seams, as the enemy, within a contested A2AD zone, cannot be strong everywhere.

To counter this argument, a paper from Feb 2014, *A2AD The New Death Knell For Amphibious Forces,* by Lt Col Jernigan USMC and Lt Col Cooper USAF summarised a need to look at history, stating that amphibious operations have faced similar technological disadvantages in the past. [14] For example, at the outset of Gallipoli (WWI), amphibious operations were at a disadvantage with the advent of machine guns, armor, and artillery. However, with the Normandy landings (WWII), the military adapted and overcame the challenges, thus ensuring a successful mission outcome. The two Lieutenant Colonel's go further and state that amphibious operations will always be required and, in particular, refer to the four types of amphibious assaults: raid, demonstration, feint, and withdrawal. They use the example that currently, assault operations are unfavorable within an A2AD environment, with the high-risk factor limiting its appeal to military planners. However, it does not mean the remaining amphibious operations are untenable. The Colonel's argue that naval planners should look at everything in context and that with one new technology, new innovative counter technologies emerge. They go on to say that we are currently in a period where A2AD is a new threat, "to ensure lethality and survivability in the A2/AD environment of the future….. Success in the A2/AD domain will not be achieved by executing traditional models of Navy-Marine Corps amphibious operations but rather will succeed by

matching service capabilities to achieve effective and lethal joint effects."[15] The lethal effects capture the essence of complex amphibious operations requiring a joint entry approach, which needs investment by the government to gain a foothold and advantage for subsequent operations.

Gregory Copley, the Defence and Foreign Affairs Strategy policy editor, argues that amphibious assault is an important capability.[16] Copley's article *Amphibious Operations in a New Era of Offensive Total War* outlines a compelling viewpoint that the world is seeking a new equilibrium. The constant competition for innovation and opportunism leads to the by-product of offensive warfare. A new era of amphibious warfare has begun, with expeditionary warfare now favored as the new form of power projection. Copley believes that victory in an offensive war is assumed when an exchange of territory has occurred. Success, therefore, requires hard power and an ability to hold terrain with land forces, which is a highly aggressive stance for present-day politics. However, even the UK MOD *IOPC* mentioned at the start of this review confirms this viewpoint, that the world powers are now in a period of constant competition. [17] Copley concludes his article curiously with a review of amphibious doctrine, pondering why the rejuvenation behind such an important future concept has not occurred since WWII. The race for expeditionary capabilities has seen navies the world over discard old ships to replace them with new ones, but no navy has a cohesive 21st-century architecture for power projection. Copley argues that there is a lack of clear doctrine and strategic level capabilities to support this mindset.

An organization that seems to counter the Copley statement above is NATO. Dr. Lee Willet, the editor of Janes Weapons, Strategic, in *A Sharper Edge Offshore,* describes what NATO has been doing about the new offensive war concept that Copley proposes. [18] Willet counters Copley's argument about navies not investing wisely with the correct doctrine and strategy. Willet suggests that the US, UK, and the Netherlands' future littoral operating ideas are essential requirements contributing to amphibious rejuvenation within NATO. The maritime domain borders 80% of NATO's operational area. A joint operational amphibious capability is vital to counter the Russian

A2AD threat. The future littoral operating plans contribute to NATO's goal of releasing an amphibious concept by mid- 2021 and then linking this to a NATO analysis paper on amphibious requirements out to 2030. Once published, the expectation is that all NATO states will support the amphibious concept when required.

Recent NATO exercises such as BALTOPS 2019 tested the current amphibious capability. NATO has worked hard to learn the lessons from these exercises, and the NATO Amphibious Leaders Expeditionary Symposium (NALES) is the framework to express these lessons. NALES originally began in 2016, and it has steadily developed to encompass all things amphibious for the defense and deterrence of NATO. [19] Current areas for improvement are Command and Control (C2) and the ability to integrate all NATO countries, therefore developing a mesh network allows any NATO state to link in and operate with a fellow NATO state at any time. The network supports both the C2 infrastructure and the different force capabilities. In 2020, Lt Col Oscar Van der Veen an amphibious planner at MARCOM in Northwood, London, defined the NATO end state for NALES as "effectively employing national amphibious forces at scale for deterrence and collective defense. [20] This would include a scalable ATF that can deliver effects in modern and future operating environments." The NALES framework is a considerable advancement in countering the Russian A2AD threat, a combined force with significant mass operating over a vast area with good C2 to effectively and efficiently conduct their missions.

This significant investment by NATO has recently seen financial commitment and support from the UK government. The announcement on 18 Nov 20 by the UK Prime Minister, Boris Johnson, defined "a once in a generation modernization of the UK Armed forces to extend British influence and protect the public" investing £16.4 billion over the next four years into the Naval service to support shipbuilding and the future amphibious capability. [21] This additional bounty has been received very well by the UK Armed Forces. There are already several projects such as the Type 26 and Type 31 Frigates, Logistical Supply Ship, and the Future Commando Force designed

to make Britain's Navy, particularly the Carrier Strike Group, better at sea projection support to the Global Britain strategy.

However, is Britain investing in the right areas to provide the sea control to support a Global Britain? Alternatively, are we still advancing on the Falklands campaign lessons Sir Lawrence Freedman and Julian Thompson suggested, to acquire sea control, a Carrier Strike Group is needed.[22] If the latter is true, it stands to reason that as this was the last time the RN competed in an amphibious beach assault, at range, with no combined support. Without a carrier strike group, the recapture of the Falklands may not have been possible. The MOD publication *Defence in a competitive age*, released in March 2021, clarifies that the MOD and the RN presence will be more persistent in the Indo-Pacific within the next decade. A region identified as critical to the future British economy, security, and British global ambition. [23] The associated A2AD threat deployed by China is the most dangerous within the Indo-Pacific. The first official tour for the HMS Queen Elizabeth will be to the Indo-Pacific for defense engagement and trade investment options. The RN must prepare to operate within an A2AD threat bubble. Are the technologies currently in development going to be the game-changer, thereby allowing the RN to break the adversary's A2AD kill chain and gain the advantage within a contested sea? I will try to answer this question, develop it, look at the sea control aspect within an A2AD environment, and determine whether the RN's current innovation will be supporting or counterintuitive to success.

Contested Sea Competitors – The Need For A Common Vision

The RN must work towards a common vision. A vision pulls all the different arms of service together and forces them to look at the threat and combine their experience to find the solution. The current dislocations within the RN are surrounding what type of navy do we want to be. A Carrier Strike, Anti-submarine, or Amphibious Assault. Adding to the woe is the government's inability to resource any of the three options financially. The aptly named *Securing Britain in an Age of*

Uncertainty: The Strategic Defence and Security Review, published in October 2010, highlights the UK's overstretched force with an evident lack of direction.[24] The RN has had the same fate, struggling with their identity. Subsequent Strategic reviews published in 2015 and 2020 have begun to steer the RN towards the Carrier Strike role to take on emerging great powers, such as China and Russia, defined as competitors. Nevertheless, airpower alone will not provide the security that Britain seeks at maritime chokepoints. Therefore some form of amphibious assault force must also remain a vital component of the RN. The future competition will be at chokepoints, the Strait of Gibraltar, Suez canal, and Strait of Istanbul (Bosporus Strait). These chokepoints will form the power struggle with Russia to control the Mediterranean Sea.

Over the next decade, the UK will pivot to the Indo-Pacific with China as the emerging threat.[25] The conflicted chokepoints will be the Bab-el-Mandeb, to deter military force from entering the Indian Ocean, and the Malacca Strait to deter military force from gaining access to the South China Seas and the disputed Spratly archipelagic islands chain. China's A2AD threat changes the lethality advantage and gives the initiative to the defender. Both Russia and China have developed strategic plans to deter and counter current Western insertion strategies. The fundamental assumptions that developed NATO doctrine for sea control have changed, and our competitors know our critical vulnerabilities and have established a kill chain to neutralize them. Although NATO, through its NALES working group, is working on a strategy to counter this threat style, it is too great a task for the RN alone.

Our competitors' deliberate innovation in low profile, low cost, uncrewed, and mass-produced lethal weapon systems has also given our near-peer adversaries the strategic initiative in defense of large swathes of littoral regions. Weaponized area denial increases the lethality ratio within an already constrained area (depth, civilian traffic, navigable channels). It works to deter the RN presence or drive them into an area where the RN survivability ratios are poor. China or Russian can mass lethality systems simply through the use of intermediate-range ballistic missiles.

These missiles can potentially destroy a UK Carrier Strike Group (CSG) and Amphibious Task Group (ATG) before closing with the amphibious operational area. [26] Near-peer competitors will use A2AD tactics against an ATG as it attempts to conduct an amphibious assault in the littoral regions by countering RN aggression in the Deep, Near, Close, and confined battlespace.

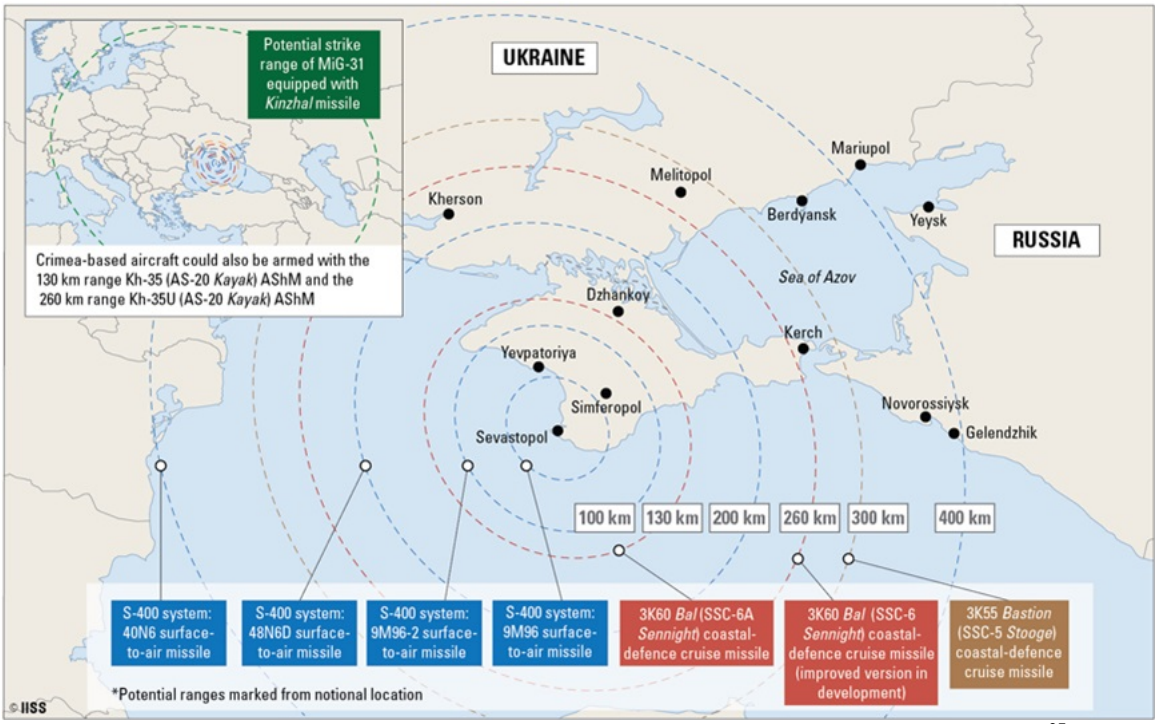

Figure 2 - Russian Anti Access and Area Denial – the Close, Near, and Deep battlespace.[27]

Figure 2 above uses the 2014 Crimea conflict as an example to highlight the A2AD deep, near, and close battlespace within a littoral region. The Russian forces had the ability in 2014 to deny the Black Sea and deter access from the Mediterranean with their S400 missile systems, thereby effectively countering any planned combined operation counterattack in support of Ukraine. The A2AD bubble means that a combined force would have to fight from approximately 2000km through the Strait of Istanbul and into the Black Sea before establishing any sea-based force ashore in Crimea. The Black Sea marks the near and close battlespace with a range of plus 400km.

In a 'fight tonight' readiness profile, the competitor would aim to defeat RN amphibious operations at increased range by deploying lethality systems on mass; Anti-Ship Ballistic Missiles (ASBM) with increased ranges, mines denying approach lanes, disruptive satellite communication

through cyber and electronic warfare operations. The abundance of lethal force applied against the RN would also affect intelligence and surveillance operations and inhibit a common operating picture from supporting littoral command and control. The RN does not have the force mass to compete against a competitor such as China or Russia by themselves and relies on alliance support, either through NATO as the primary means or through a coalition. The response to deter an aggressive Russia must be swift and severe. A powerful multinational Joint Expeditionary Force (Maritime) (JEF(M)) composed of all the Mediterranean and Black sea countries opposed to Russian aggression could deliver a powerful diplomatic message that the stick is far more prominent than the carrot. Therefore the risk to Russia would outweigh the reward. To defeat A2AD competitors in this style of warfare requires developing a hybrid strategy, powerful diplomatic ties changing the competition's nature, and regaining the initiative to compete on terms better suited to a strong alliance.

This increased range contest demands more logistical support dispersed over a wider area and overloads RN defensive systems through threat overmatch. The competition becomes a contest of risk. The lethality volume from a competitor is in direct competition with the defender's ability to use their defensive systems (the speed of relevance conundrum).[28] The competitor has the advantage of working within the action cycle of the RN and its partners. Failure to defeat the threat within the speed of relevance results in the loss of systems, personnel, aircraft, and ships. Success results in an active defense and the ability to move into an area and gain control or launch subsequent operations. Currently, the anti-air defense systems in Type 45's are world-leading, and the Sea Viper missile system supported by the SAMPSON multi-function array radar provides exceptional warning ranges.[29] Nonetheless, a peer competitor's missile mass could launch against the task force would overmatch a Type 45 destroyer and her associated systems. A peer competitor would only need to destroy the logistical support ships to restrict the force to 28 days of offensive

actions at a maximum. If this were to occur, RN offensive actions would be severely limited. Table 1 is a typical RN JEF(M).

Task Force Ships	UK Air Elements	UK Land Elements	Foreign Units
HMS *Bulwark* (Flagship)	814 Naval Air Squadron (Merlin HM.1)	3 Commando Brigade HQ	*Somme*
HMS *Illustrious*	(*Royal Air Force*)	42 Commando	—
HMS *Montrose*	815 Naval Air Squadron (Lynx HMA.8)	Royal Marines Armoured Support Group	—
HMS *Westminster*	845 Naval Air Squadron (Sea King HC4)	30 Commando Information Exploitation Group	—
RFA *Lyme Bay*	—	Commando Logistics Regiment	—
RFA *Mounts Bay*	—	29th Commando Regiment Royal Artillery	—
RFA *Diligence*	—	24 Commando Regiment Royal Engineers	—
RFA *Fort Austin*	—	17 Port and Maritime Regiment RLC	—
RFA *Fort Victoria*	—	—	—
MV *Hurst Point*	—	—	—

Table 2 – JEF(M) Cougar 13 Deployment. 2013[30]

From the table, key roles are:

1. Fleet flagship, HMS Bulwark, is the command platform that also supports Landing Platform Docks (LPD) supporting amphibious surface maneuver;
2. two Landing Ship Docks Auxiliary (LSDA) that facilitate the logistical support for 28 days ashore and carries the UK land element;
3. three Auxiliary Oiler and Solids Ship (AO);
4. a Roll On Roll Off (RoRo) civilian ferry that supports NATO class I-V for the task force; [i]
5. a Frigate (Type 23) that will provide the anti-surface and anti-submarine warfare;
6. a Destroyer (Type 42) that will provide the anti-surface and anti-air warfare component; and

[i] NATO Logistics classes of supply, CLASS I – Subsistence Food and Water, II – Supplies of material and equipment, III-Petroleum and oils, IV-Engineer stores and additional storage for CLASS II, V-Ammunition and explosives.

7. a Landing Platform Helicopter (LPH), HMS Ocean, was sold to Brazil in 2018 for £84 million.

The RN's ability for integral aviation support was lost when the RN disbanded HMS Illustrious. An additional Royal Fleet Auxiliary is now required to fill the gap in aviation lift. HMS Argus can support a Commando Merlin helicopter detachment. All future aviation support will be sea-based on a Queen Elizabeth class carrier.

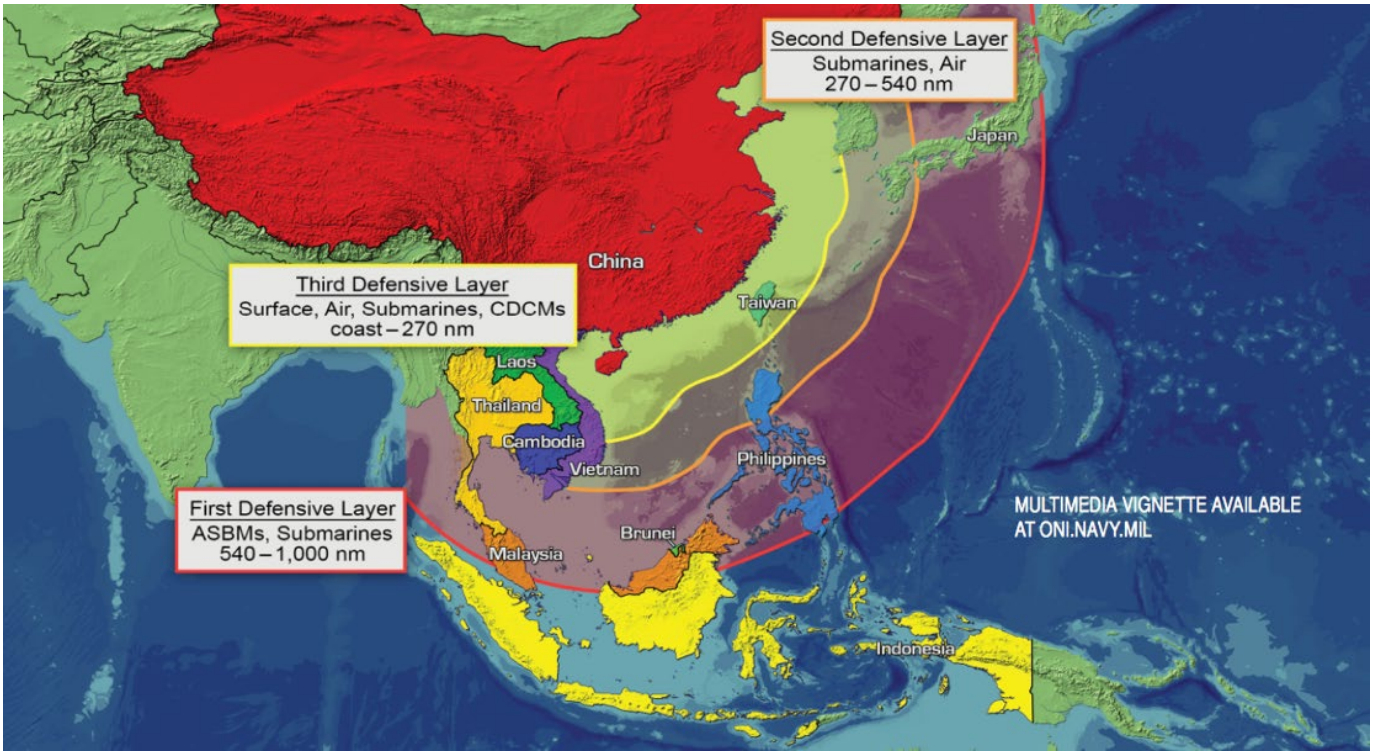

Figure 3. China's A2AD bubble in the South China Sea and Pacific.[31]

The RN must consider the protection required to support HMS Queen Elizabeth (QE) as she prepares to depart the UK and heads to the Indo-Pacific for her first operational tour. The importance of an alliance and the provision of associated capabilities have been realized by the US's support, providing an F-35 squadron and an additional destroyer to enhance the defensive posture of the UKCSG. [32] The US support assists the CSG's survivability as it will be transiting through an A2AD threat area. The lethality overmatch represented in Figure 3 outlines the scale of the threat that the RN must prepare for to conduct routine freedom of navigation passages within the

Indo-Pacific region. This combined force demonstrates an operational approach to the Indo-Pacific A2AD problem.

There must be a reliance on allies and partners for the RN to conduct amphibious assaults in a contested sea. A combined force is needed to fulfill the capability gaps in the event of a large-scale amphibious assault. This approach requires diplomatic allies within the region of interest, a strong western economic market that supports technological advances, and a renewed and transformed military that is thoroughly joint but capable of operating in a disruptive and dispersed strategy. This strategy requires investment in capabilities such as:

1. optimization of low-profile surface connectors;
2. a rebalance of amphibious assault loadouts that support fires and logistic dispersion;
3. increased sea-based or land logistic nodes;
4. increased armament and lethality on amphibious ships to not present a soft target for opportunistic attacks. Including all current logistic vessels within the RN;
5. a more mobile air defense missile systems that are man-portable; and
6. frequent readiness training with allies and partners in preparation for operations.

To support a more favorable JEF(M) mission risk profile, the RN will also require Pre-Landing Forces (PLF) composed of joint agency and specialized military personnel operating in numerous small, highly mobile destructive teams. These teams could deploy a month or two ahead of the main task force and link up with the Secret Intelligent Service, who may have been in the area for several years conducting intelligence and espionage missions. The PLF must be adaptable to living within the local economy or foraging but have a low-profile signature. Specialized in various maritime guerrilla warfare tactics, techniques, and procedures, the PLF must also be a dispensable item to the force. Dispensable ensures that PLF beat the lethality system's economic value to counter PLF actions, which is economic attrition warfare. Currently, a Royal Marine's training requirement is 36 weeks in Commando Training Centre, Lympstone, which equates to

£54,000 per recruit.[33] A minimal amount compared with the estimated cost of a Chinese intermediate-range ballistic missile, the DF-26 averaging $21 million or $1.1 billion to develop. Assisted by Cyber, AI, and uncrewed systems, PLF could create an overmatch in multidomain lethal technology without being decisively engaged. PLF with small signature profiles using multiple theatre access points removes the competitor's ability to counterattack. Access to the littoral could be regained through the swarming of PLF adopting maritime guerrilla warfare for decisive disruptive attacks on A2AD systems to deliver a surprise effect. In a Krulak Centres Brutecast, Col Art Corbett USMC (Retd) referred to this concept as forcing the competitor into a condition of unpreparedness that generates surprise. [34] By developing such an effect, the competitor's threat ratio reduces as he has to combat the surprise effect first. Concurrently it increases the odds of survivability for the follow-on entry force.

Regional Diplomacy in Contested Seas

MOD IOpC25 outlines that the UK is now in a persistent competition, a phase of hybrid warfare on a constant stream, and, like a dimmer switch, the intensity can be turned up or down but never off. Therefore, the UK and the RN have to move beyond the conventional thought that hard and soft power will dictate a state of peace or war. This concept no longer exists in the information age, where the competitor's scalability of hybrid warfare can be turned up or down within hours or days rather than months. The UK has to detect these infringements better to move faster to counter the posed hybrid threat. This change also needs to be mirrored in the international organization that closely work with Britain. More globally, Britain will need to develop better diplomatic relations in all areas in which the RN operates. Better relations should support a more open dialogue that would increase the relevance cycle's speed in identifying the threat, generating a faster reaction to counter the hybrid threat.

Within European waters, RN support to NATO in pursuit of countering a hybrid threat is ongoing. Within a JEF(M), NATO can manage capability gaps to deter the competitor. The support through NALES, with French, German, US forces, and soldiers from other NATO states filling the capability holes, would significantly affect the hybrid attacks relevance cycle. As threats are identified and passed efficiently over communication systems, this support could change the advantage and swing it towards the alliance. However, NATO may not be able to support in the Indo-Pacific as it resides outside of NATO Article 6 limits - "Parties in Europe or North America, on the Algerian Departments of France, on the territory of Turkey or on the Islands under the jurisdiction of any of the Parties in the North Atlantic area north of the Tropic of Cancer."[35] To invoke Article 3 and 5 of the North Atlantic Treaty requires a NATO member state to be attacked by an overwhelming aggressor that an internal state military or homeland defense cannot resist. For Article 5, endorsement requires a 100% positive member vote, and this has only occurred once in NATO's 70-year history, following the attacks on 9/11 on the World Trade Centre. Competition in China would never warrant an Article 5 NATO response unless China launched an attack on a NATO member state's home territory.

The Falklands campaign is an example where Britain could not request NATO support due to the South Atlantic geography. However, the RN still managed to gain the support of NATO members even without enacting Article 5. During the Falklands campaign, NATO members supported the UK through covert means. France's action in establishing an arms embargo on Argentina once they had invaded and using DGSE operatives to gain intelligence on Argentinian forces and the US intelligence and logistical support out of Ascension Island all supported the UK's efforts in retaking the Falklands. [36] Additionally, other NATO members declared diplomatic support for the UK over this period, although many believed that the UK would not mount a successful recapture campaign. These alliances and partnerships built through NATO displayed resilience when Article 5 was not an appropriate diplomatic action.

For the UK to protect its maritime economic trade, a persistent deterrence such as the JEF(M) positioned near either the Suez Canal, Bab el Mandih or Strait of Hormuz could deter unwanted aggression. At the same time, the JEF(M) could engage in diplomatic relations adopting a defense engagement posture by supporting training or an Advise, Assist, (Accompany) and Enable (A3E) operational structure to surrounding allies within the gulf region. A permanent high readiness joint force in striking distance of global trade chokepoints, ready to conduct operations or defensive engagement, ensures UK international trade is not affected by acts of violent extremism, either state-sponsored or terrorist organized. To have strong alliances in the operational theatre must be the essential first step in any campaign for future success. The world is now too connected, and the challenge to any hegemony state will be by an alliance of states competing in diplomatic, informational, military, and economic statecraft.

Innovation for A Contested Littoral Battlespace

To compete against a competitor in an A2AD environment, the RN must put the competitor into a condition of unpreparedness, which generates surprise.[37] A whole-of-government approach is required, and disruptive innovation to counter the competitor's character of war is essential. Mr. Art Corbett summed this approach up in his BruteCast "A disruptive approach creates surprise which is a condition that can be inflicted on an enemy, who remains afflicted until he resolves the threat that incited the surprise. Disruptive innovation can greatly extend the duration of the condition of surprise." [38] The job description for the RN Chief Technology Officer should be precisely this sentiment. By reaching out to the industry at events such as the Defence and Security Equipment International (DSEI), the RN can remain at the forefront of the information age and look to the industry to help develop this disruptive approach. [39] The RN should lead amphibious assault planning in the maritime sphere at the combined operational level, supported by all three services and Strategic Command. One lead would cohere capability across the service and other Government

departments and support fast development when innovative technology flagged for quick investment. The RN's Future Commando Force (FCF) represents the RM's development in disruptive innovation capability.

The FCF moves beyond just an amphibious force and restructures the RM into a specialized maritime initial entry force. FCF can deter and desist aggression in a war zone's subthreshold, referred to as grey zone operations. The aim, insertion of small technical and highly mobile teams into topography areas previously thought too austere to destroy and remove adversary threat systems. Thus, they aim to increase the survivability ratio for an Amphibious Task Force.

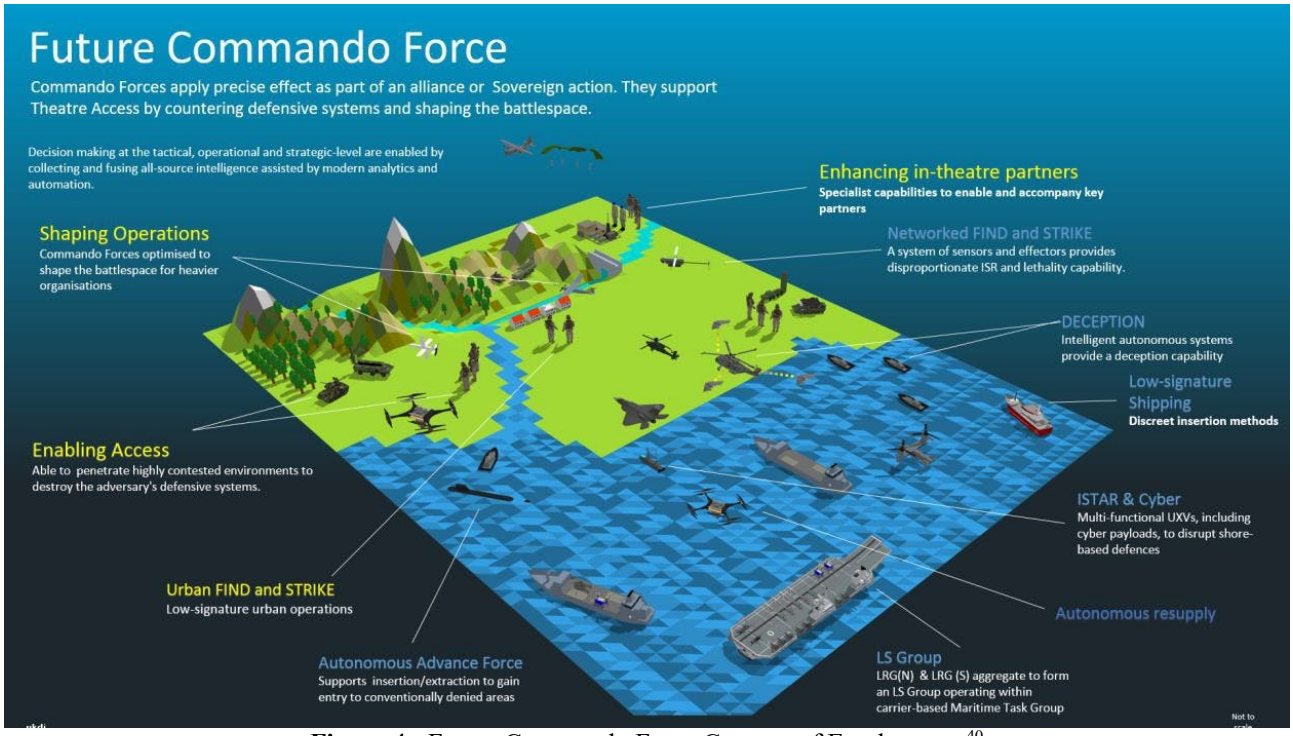

Figure 4 - Future Commando Force Concept of Employment[40]

FCF is not focused exclusively on combating an A2AD competitor. However, there are definite capabilities that work to deter or destroy advanced AI technologies. Lt Col Mark Totten, the program director of FCF, states, "It is important for political decision-makers to have a broad range of military options to complement actions by the intelligence agencies and special forces. The Future Commando Force is billed as a possible high-end conventional contribution to this demand."[41] A trained FCF Marine will bypass and overcome problems by adapting quickly on the ground. The skillset developed in training by the Marine allows mission command at the lowest

denominator. The FCF concept was demonstrated in March 2021 at a US $400 million war game in California. A hundred Royal Marines with disruptive innovative technologies were let loose and quickly destroyed 1500 US Marine Corps personnel.[42] With insertion distances of 2000km as alluded to in Figure 2. Nick Childs, from the IISS, observed, "It's not going to be the classic assault across the beach anymore, it's going to be from more stand-off ranges around 150 nautical miles, delivered onto land. In order to be able to be really effective [they] will have to invest in more capabilities."[43] Therefore a different means of insertion to the old conventional amphibious assault is now required.

One concept that could support the insertion of FCF teams from RN assets is jet systems. A maneuver capability would provide small teams to move through a contested littoral battlespace to multiple targets quickly. The jet system flown below radar systems as a form of swarming land tactic, that once the team has landed, the equipment could be quickly cached, ready for subsequent

use, or later extraction. This insertion method has potential for deployment from submarines or any small ship or dhow. The procurement of standard commercial or fishing vessels to close the could be concealed either below the radar range, at night, or during inclement conditions to defeat sensors. Supporting the logistical burden of this could be through the large Class C drone that the RN is already developing. [45] Successful trials of this drone have occurred from QE class carriers. [46] These drones could have the capacity to carry heavier additional personal or specialist equipment. This insertion technique would allow the FCF fire team to remain in a light configuration, working

similarly to an SOE operative in World War II with caches and aerial drops of specialist equipment. As the FCF teams are not reliant on heavier equipment, the teams are harder to track and target through indirect fire, although in a direct fire contest, they lack the support that a more conventional force could bring to bear. The FCF defense concept requires a reliance on the team's ability not to be detected and decisively engaged with the enemy. With many groups operating independently, the competitor's common operating picture can become confused and cluttered as the FCF teams' disruptive effects begin. Raids or more prolonged assaults could all be launched in this way to negate the need for heavier transport vehicles ashore. As technology advances, Hypersonic missiles deployed from Naval gunfire or a space system could support an FCF team to counter a more mechanized force. However, the FCF concept is not designed around striking a competitor's mechanized brigade directly in a conventional strike. It is more focused on the disruptive effects needed to deter that force. How do we prevent the mechanized brigade from affecting an amphibious landing? The best form of defense for FCF would be to set the conditions for the arrival of a heavier force and not become decisively engaged during the shaping phase.

Programming drones could achieve the FCF teams' sustainment. The drones could return to the logistical hubs and collect pre-packed logistical bundles rather than sending in an entire logistical convoy or ship. Removing the surface connectors completely from amphibious operations would remove the effect of sea state, reducing the launch risk of supporting connectors. A poor sea state has a significant impact on surface connectors, which can cause havoc to a planned assault.

Aerial insertion from a submarine is also a possibility, and the US military has tested this concept. [47] Drones are controlled by the submarine at periscope depth once they have launched. The connection allows the drones to be flown ashore or packed with explosives and used as a flying IED against any large ship. Future UAVs' potential development by carrying torpedo payloads sink their target with the command submarine far enough away not to be compromised. Submarines are more likely to maintain surprise than warships in a contested sea as they are harder to detect.

Underwater warfare is an area in which disruptive innovation could have a significant effect. The surprise is more likely to occur from the submarine's silent insertion than from the surface ship insertion. The aggressor holds the surprise, augment this attack with swarming jet pack marines, and very quickly, the competitor's situational awareness would become cluttered. Swarming attacks to numerous landing points would generate a vast capability that would be difficult to defend. This disruptive innovation could help support the style of hybrid warfare required to counter a contested A2AD littoral battlespace that the RN will be operating in within the next decade.

Training and Education in Deception

Instead of bypassing problems that a competitor has created, maybe the solution should be that the RN barge right through it. Field innovation has developed intuitive solutions to wicked problems. Training and education in deception is one strategy that could assist the RN in regaining the initiative and bringing more favorable odds. Deception operations were employed in World War II by the British to fool the Germans into believing an amphibious landing would occur closer to Holland than Normandy. The use of inflatable tanks positioned along the Norfolk coast to display mass sufficiently deterred the Germans from moving further south and allowed the Normandy landings to gain a foothold. This knowledge of these tactics should be reinvigorated, and the use of high-tech cyber warfare to modernize a new form of deception supports the realism that paint had in the 1940s.

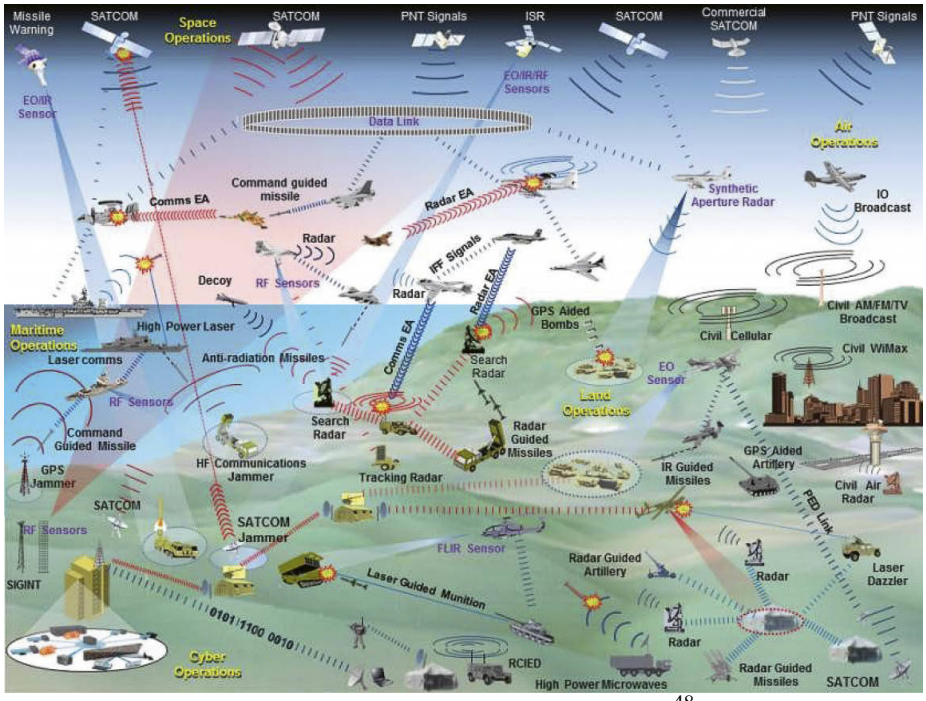

Figure 6. A contested littoral battlespace[48]

Raytheon Missile & Defence has a concept that could deceive a competitor by generating a deceptive surveillance picture, forcing the competitor to react and give away their positions. [49] The Miniature Air Launch Decoy (MALD) generates a simulated strike aircraft force, which flies ahead of the main body and triggers the competitor's defensive response. The MALD acts as the advanced force that is engaged first; this develops the situational awareness picture and feeds the ISTAR collection assets that fly at the threat envelope's edge. The main strike force flying a tactical bound behind communicates with the MALD to detect missiles or any other threat launched at the decoy. Thus the competitor attacks the decoy giving away their positions, and the electromagnetic signatures provide the coordinates for a counterattack. The MALD's are much cheaper to manufacture than a conventional strike fighter. Their programming allows several different ways to depict aircraft characteristics for both the host nation and its allies. This type of deception enables the attacker to stay far behind the initial wave, increasing their survivability and avoiding getting targeted while also gaining a better situational picture. The generated picture provides the target locations for offensive strikes on the competitor. The benefit to the RN would be that they would not require such a significant strike air component. The MALD could deceive the air force's size

flying into a combat zone, thereby significantly supporting the current QE capability. Likewise, if MALDS can be programmed to support many different flight patterns, they may provide a deterrence capability, as deceptive fighter jets on patrol around a CSG. Deception like this would deter possible competitor aircraft from getting within a strike range but allow coalition pilots to conduct mission planning and rehearsals ready for the next advance.

This deception concept could be the technology used on a sea connector, develops a deceptive picture of swarming fast attack craft. These uncrewed vessels could act as a deception to the main landing, increasing the force's survivability. As the competitor's systems unmask to engage the MALD, they can be targeted and neutralized. The USMC has researched the GuardBots, which are uncrewed amphibious droids capable of seaborne insertion, ranging in size from 3 inches to 7 feet. [50] They can move on land at 90 mph but are limited to 3 mph through the water. Therefore, although not quite as advanced as the MALD, further development could see an adaption and a similar GuardBot to deceive the competitor by generating a swarm of fast attack craft.

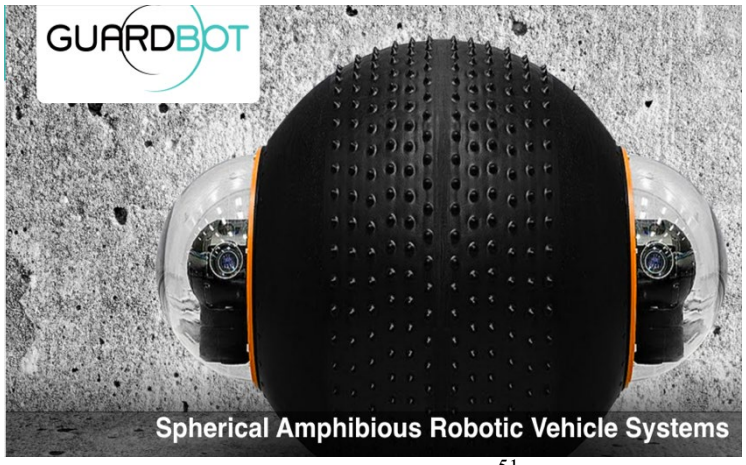

Figure 7. GuardBots[51]

A deceptive swarm of small vessels could disperse the competitor's defenses over a greater distance, forcing the competitor to prepare defenses in areas of battlespace away from the planned objective and main attack. By extending the competitor's defensive line and logistics reach, they become

stretched, and his overall defensive position weakens, thus generating opportunities for the aggressor.

A problem the RN faces is that of Fleet mass. Every ship built in the current RN Fleet supports either a CSG or an amphibious assault JEF(M). The RN is a small, highly technical Navy, with little capability redundancy and spare capacity within the fleet. As the RN looks to operate more in the Indo-Pacific, more mass is required to counter the A2AD lethality of the next decade. When Britain was a great sea power in the 18th Centuries, it was not due to possessing the most sophisticated ships; it was due to vessel quantity with the associated mariner's skills. The RN captured vessels from the French and Spanish. Often these were faster vessels that were then reflagged and crewed by RN ships companies, creating a mixed Fleet with many capabilities. This style of warfare should be upcycled and developed to support disruptive innovation in the 21st Century. Whether this is an increase in air defense missiles, ships to deliver swarm attacks, submarines to transport FCF teams with jet suits, greater mass is required to provide a better

Figure 8. The future fighter[52]

force risk ratio. In the 21st Century, mass need not be tonnage but uncrewed autonomous systems. Cyberwarfare would be a key component in this battle, and the RN's competitors have the

advantage in this area. Other forms of coercion must counter the competitors' advantage, but this must occur before the competition boundaries are defined. Coercion is a whole government approach requiring enduring interagency support to shape the battlespace. Through persistent force presence or diplomacy, urgent consideration is needed for this art of deception to generate the most significant disruption within the RN's competitors.

These technologies do not need to generate a substantial deceptive counter mission. A small change in the competitor's approach may gain the initiative and break a layer off the A2AD defense. By peeling back the competitor's defensive layer, opportunities will present themselves to allow the follow-on forces, via an amphibious assault or aviation assault, to break through and exploit the land-based defenses further. In a contested sea environment, where the competitor tries to break the command decision matrix by making it more contested and cluttered, the problem becomes the competitors again. Their inability to determine friend or foe will force mistakes and sway the advantage towards the RN.

Disruptive Logistics Innovation

A genuine concern to the RN is the logistical requirements of supporting deterrence at range for prolonged periods. Particularly concerning the QE as she prepares for her Indo-Pacific deployment, summer 2021, and the supporting strike group required for the contested operational theatre. The current logistical fleet operated by the Royal Fleet Auxiliary (RFA) service is dated and needs upgrading. The National Audit Office commented in Jun 2020, "Britain has only one solid support vessel, RFA Fort Victoria, that can replenish a carrier at sea. It entered service in 1994 and is due to retire in 2028, having had its life expectancy extended."[53] The National Audit offices findings are a damming reflection on a significant logistic capability not resourced for the future. The four replacement Tideclass tankers achieved a successful oil and water transfer with QE in Mar

2020, but the Fleet Solid Support (FSS) tankers expected to support Class I-III and V are not due into service until 2026. [54]

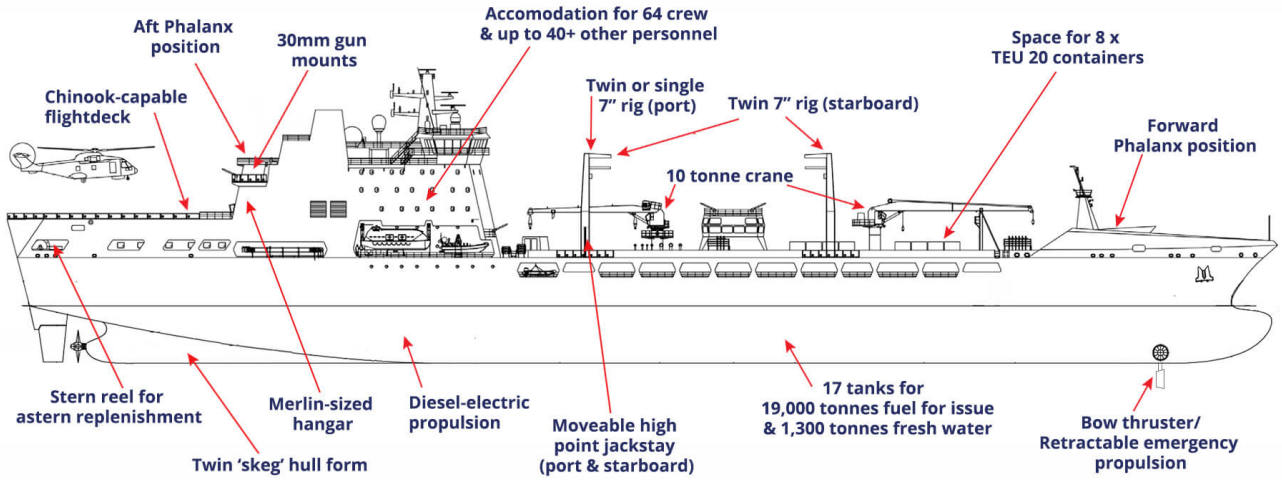

Figure 9. Tideclass FSS tanker.

The Tideclass FSS self-protection systems have twin Phalanx positions, forward and aft, and a 30mm gun for close protection. This defensive package provides enough protection for the vessel in an amphibious assault with a non-peer competitor. However, within an A2AD environment, this ship would be a high-value target, requiring additional RN shipping to support its protection. Therefore, the defensive suites do not really support a peer A2AD competition. Consequently, these ships would have to remain outside the missile threat range. If they closed within the littoral, the FSS would require additional frigates and destroyers to generate the air and the surface defense requirement. The center of gravity for the RN within an A2AD environment becomes the layered defense heavily reliant on the T45 destroyer and T23 frigates. Removal of these few protection assets would attrite the RN's task group's defensive capability.

With only five fleet support tankers, removing these protection assets leaves the RN with little spare capacity. A deployed CSG requires two supporting logistics ships. If both carriers are needed to compete with the competitor's A2AD threat, it will leave an FSS as the RN's only resilience. One FSS is insufficient to support a JEF(M). Therefore, partner nations would be required to support a CSG. This logistic support would allow the UK to release an FSS to move

closer inshore and support the amphibious fleet in a direct logistical role. Conducting logistics via only aviation is a highly time-consuming process that requires numerous aircraft, making it a maintenance-heavy burden and relatively untenable. Therefore logistic ships are a necessity to support sustainment and resupply within contested seas.

Submersible logistics platforms able to cruise under the task group and emerge at set times for replenishment at sea could alleviate additional protection requirements. The logistics submarine could have all the Class I-III stored below the water, removing its signature from the surface, using the sea as a natural protector. Therefore allowing the T45 destroyers and T23 frigates could focus on the carrier protection rather than the FSS. Submersible logistic vessels could travel freely between different task groups without an escort, assuming no mine threat. It would require a new operating concept but would deliver a disruptive logistical edge to the RN that would be difficult to find and counter.

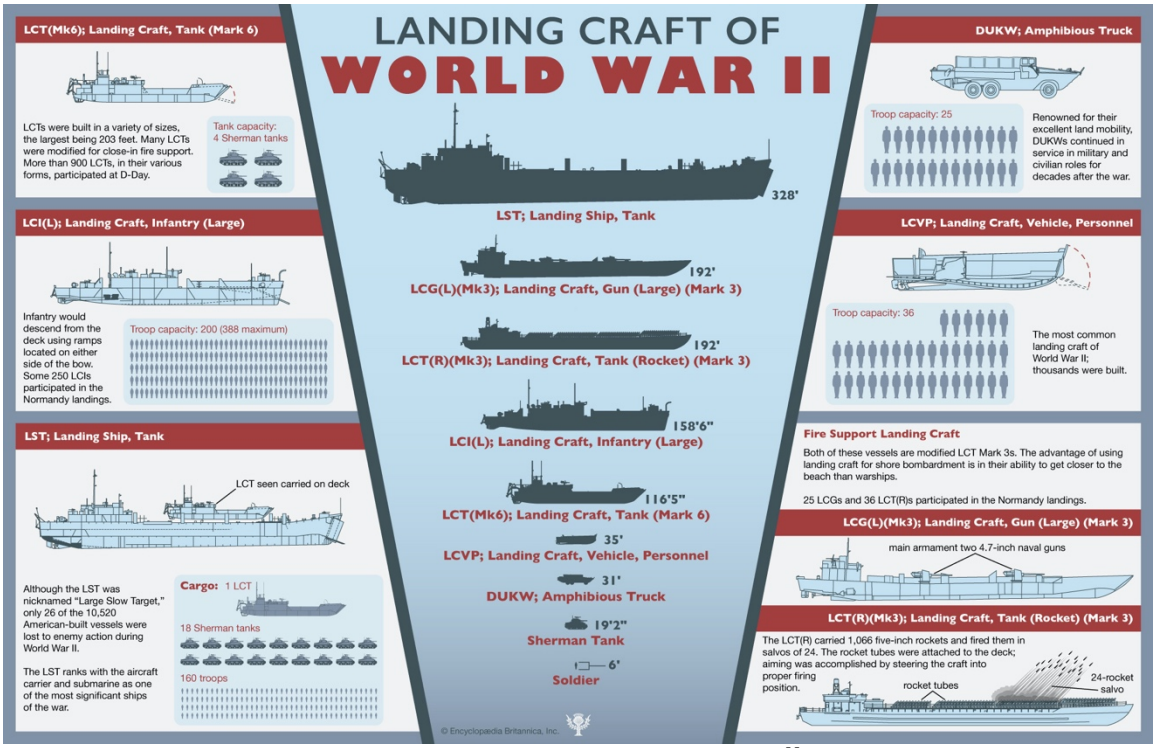

Figure 10. World War 2 Landing Craft[55]

During World War II, several landing craft sizes ranged from the Landing Craft Vehicle Personnel to the Landing Craft Tank. Although used to conduct amphibious landings, these vessels

were also convenient utilities and logistical support vessels, with a capacity from 150-2100 tons. After the war, these vessels have slowly filtered out of the RN ship holdings, and the Landing Craft Utility Mark 8 is the current heavy-lift surface connector. It is smaller than the LCT displayed in the picture, with a capacity of a Challenger 2 tank at 62 tons, which is a significant reduction in payload. To improve small logistic utility and not solely rely on drone resupply or larger FSS tankers, an option utilized in Australia and considered by other militaries, including the US, is developing a Light Amphibious Warship (LAW). This option supports the future EABO concept that the USMC is developing in partnership with the US Navy. It looks at dominating island chains to generate an alternate A2AD and thereby deter the peer competitor while allowing freedom of movement for amphibious forces within an island chain or archipelagic region.

The small but capable sea connector design under consideration is the Stern Landing Vessel (SLV) developed by Sea Transport Solutions of Australia.[56]

Figure 11. Stern Landing Vessel – Sea Transport Solutions, Gold coast Australia[57]

The SLV's features adapted from commercial craft working in remote areas of Australia. It can transport 78 personnel with 1,000 to 8,000 tons of cargo. It is designed to operate as a logistic lily pad servicing the islands and resupplied by a larger logistic vessel at sea in safer water outside the threat range. With a sea range of 3500 Nm, the SLV is a highly adaptable and versatile craft that in a hybrid war could be highly employable. Another benefit of the SLV is that it is comparatively cheap to manufacture in smaller shipyards dispersed worldwide. The RN would not solve their logistics problems by procuring a different vessel. Still, it would provide options to the RN and allow for a JEF(M) to conduct missions independently of the Tideclass FSS. Procurement of SLV's would allow the FSS to focus on the CSG and not directly resupply the JEF(M) component.

The CLASS^2 System

The future amphibious force must change the current amphibious assault doctrine and become a networked mesh system. Many specialist nodes all working to the commander's intent but in many different ways and over many domains. No one node is a high-value target, and any node is dispensable as another node can easily replace them. All nodes seek an opportunistic advantage against the competitor. The competitor has no option but to try and target every single node in all domains. The competitor must dilute the strength of their force over potentially vast terrain and multiple domains to counter the potential threat.

The CLASS^2 (Cyber, Land, Air, Space, Sea, and Subsurface) system looks at breaking down the competitor's layered defenses to achieve victory. The assault starts with cyber strikes and an information warfare attack, supported by interagency espionage and sabotage on critical land facilities. These initial attacks generate the first opportunistic advantage and create battlespace to allow the advance forces of air (jet suit) marines, launching from submarines and fishing vessels, supported by drones, to infiltrate in many dispersed locations. By swarming ashore, the advance force continues to degrade the situational awareness of the competitor. Thus breaking or

overloading their common operating picture. Our cyber warfare adapts and moves to counter the competitor's AI ability, forcing a human interaction in all computing aspects, slowing his command and control systems, and the competitor's ability to react quickly to the changing circumstances.

Further degradation of the competitor occurs, as they lose the ability to analyze the aggressor's strategy. When the nodes deem it necessary, they attack. H hour, a timing that conforms to force coherence on the objective, no longer exists. Attacks on the competitor are unremitting, occasionally simultaneous, or supporting but never massed. The adversary's strength is networked mesh nodes working over large ranges. The competitor is now in a state of unknown certainty.

The second opportunistic advantage is now occurring. Navigable channels have allowed an ATG to close with the littoral, and more jet marines can fly ashore and supported by a heavier air logistic offload. Uncrewed surface systems deploying radar deception and other electromagnetic innovation measures defend the amphibious task force from threats such as mines and short-range missiles. Air superiority occurs as MALD systems draw out the competitors' remaining defensive air missile systems, and the follow-on air strike force targets them. The competitor now has the fog of war; their common operating picture displays a potential envelopment of his force on all fronts. Their OODA loop cycle cannot get past orientate. All the competitor can observe is a constantly changing force picture as CLASS^2 continually cycles through different assaults over all the domains.

The third opportunistic advantage has occurred. A lodgement has been seized, signaling the death knell for the competitor as heavier forces are now in his battlespace. There is nothing left to do but withdraw, defeated by small nodes of highly skilled operators a CLASS above the competition.

To retain the initiative against a peer adversary, the RN does not have to lower mission risk profiles to compete but requires a culture change at all levels of command to become more comfortable holding additional risk. The mesh network CLASS^2 approach requires mission

command at all levels. Orders are stripped from the 200-page document to a page with annexes as they become more agile in adapting to the evolving environment. The commander's intent and main effort are the focus; the rest of the plan belongs to the individual node leader.

This CLASS^2 approach will require diplomatic, informational, military, and economic investment by all UK Government departments. Concurrently disruptive innovation advances in all capability domains are necessary to survive and win in an A2AD environment. Within this combined force, the RN is developing tomorrow's capabilities and can provide a viable advance force to set the conditions for subsequent actions.

Conclusion

The RN is preparing for a multidomain competition but must accept that this is no longer a single service lead and now requires a vast array of government support. The amphibious assault competence within the RN is a proficient capability against non-peer competitors. However, the RN must prepare for the most dangerous course of action, a near-peer battle against an A2AD threat. The multidomain competition that A2AD generates requires a holistic approach, and the RN must combine with the Army and Royal Air Force to deliver a coherent and credible deterrent capability. The RN must not be a soft target; a CSG or ATG must have a deterrent A2AD capability to support global operations during transits through competitors' backyards, such as the QE Indo-Pacific deployment. Only working within a larger coalition will the RN have the ability to defeat an A2AD competitor. The RN has neither the mass nor the economic backing to make this a successful venture without external support. Alternatively, CSGs and ATGs supporting broader coalition will be more aggressive in posture and conduct amphibious assaults such as those developed by NALES against future Russian aggression in the Crimea.

To compete in a contested littoral sea, the RN and broader UK MOD requires technological advances in disruptive innovation, creating a paradigm shift to regain the advantage from the

competitor. The current government investment of £16.4 billion has secured the commitment to ground-breaking capabilities for T26 and T31 frigates, FCF, and associated uncrewed systems. The investment by the government is a positive first step, but a lot more financial support will be required as technology is evolving quickly. The introduction of new roles such as the RN Chief Technical Officer (CTO) has accelerated the acquisition for some of these projects mentioned above, breaking down the often-clunky Project, Programme, Portfolio, and Management to a more agile SCRUM decision making process. A faster procurement cycle enables a force to develop and define tactics, techniques, and procedures. With the Headquarters holding the development risk, the initiative is with the subunits in employing and using the technology. The whole process becomes far more intuitive with the operators. They create a faster learning cycle that can then be refined and enhanced by hindsight, removing what failed or was nice to have. An open learning process will certainly assist in the development of Jet soldiers.

However, huge multibillion-dollar new technology will not be a catch-all solution. History has shown us that deception techniques are effective, and rejuvenating past success may support 21st-century littoral warfare. However, with deception also comes the longer wargame. Some deception techniques need time to generate the best effect, and again, this requires a whole Government approach to future littoral warfare. The message to the UK competitors must be clear - The RN is a highly technical and skilled force developing tomorrow's capabilities. With solid financial investment and support from the government, the RN can provide a more forward persistent presence in chokepoints worldwide. These are the first steps along a combined approach that breaks a competitor's A2AD network and allows the coalition into a contested littoral sea environment. Once there, the force then has to try and remain.

To achieve a Global Britain, the UK and its allies must be more collaborative in every aspect of Diplomatic, Informational, Military, and Economic statecraft.

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