SURFACE SHIP OPERATIONS pdf

1: Surface warfare - Wikipedia

NAVAL WAR COLLEGE Newport, R.1 SURFACE SHIP OPERATIONS IN THE LITTORAL: ENSURING ACCESS Eric F. Weilenman LCDR USN A paper submitted to the Faculty of the Naval War College in partial satisfaction of the.

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Surface ship operations by United States. Naval Education and Training Command, , Dept. of Defense, Navy Dept., Office of the Chief of Naval Operations], Naval Education and Training Command edition, in English - ed.

This article does not cite any sources. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. December A rare occurrence of a 5-country multinational fleet, during Operation Enduring Freedom in the Oman Sea. In four descending columns, from left to right: Modern naval warfare is divided into four operational areas: Each area comprises specialized platforms and strategies used to exploit tactical advantages unique and inherent to that area. Surface warfare involves surface ships. Description[edit] Modern surface warfare dates from the midth century, when surface, air, and submarine warfare components were blended together as a tactical unit to achieve strategic objectives. In US Navy doctrine, the two most important strategic objectives are interdiction and sea control. Interdiction is the process of intercepting an enemy transiting through a location. Sea control is the dominance of force over a given area that prevents other naval forces from operating successfully. For example, the mission of the Allied navies in the Atlantic during World War II was to maintain sea control and prevent Axis naval forces from operating. In the second half of the 20th century, the importance of naval surface power was reduced as air and submarine warfare platforms demonstrated their capabilities. This lesson was brought home through the surprising results of the Battle of Taranto , the Battle of Pearl Harbor , and the sinking of Prince of Wales and Repulse. Following World War II, guided anti-ship missiles required new[clarification needed] tactics and doctrines. Small, fast, relatively cheap missile boats became a threat for large ships, much more serious than previous torpedo boats. Proof of concept arrived on 20 October with the loss of an Israeli destroyer Eilat to Egyptian missile boats. In the 21st century, it has been clearly demonstrated that a modern navy must be composed of all three platforms surface, submarine, and air to be effective in projecting naval power and maintaining blue water sea control. Ships[edit] When people think of naval vessels, they usually think of heavily armed ships, such as battleships , aircraft carriers , cruisers , destroyers , frigates , and others. Surface combatants also include mine warfare ships , amphibious command ships , coastal defense ships , amphibious assault ships , and many others. An important facet of naval warfare are however the support ships that is, non-combat ships: Navy model, now widespread in the world, all kinds of ships would be primarily organized into the carrier battle group.

3: Anti-surface warfare - Wikipedia

Surface Combat Systems Center is a unique shore installation that provides the best maritime and littoral environment, operational team, high-fidelity combat systems and platform sensors, along with the ability to connect with ships, aircraft, and other land-based sites for Surface Navy testing.

Its purpose is to confound adversary locating and targeting while introducing a threat to their sea control ambitions. It is an offensive concept for the U. After decades of investment in defensive technology, systems, and training to counter cruise missiles, ballistic missiles, and submarines, distributed lethality represents a course change for surface warfare, or at least a return to accepting a major role in sea strike that had been ceded to the carrier air wings. With several world powers developing challenging sea denial capabilities, establishing sea control in contested areas is again a concern of naval planners. A return to the offensive capability of surface action groups SAG is necessary to add resilience to a naval force structure operating in these contested areas. It also leverages the tactical offense, which in naval warfare is advantageous to overemphasizing defensive capabilities. This paper describes a tactical doctrine to mature the concept of distributed lethality. By tactical doctrine we mean fundamental principles by which surface forces operate in the function-specific case of naval surface-to-surface engagements in a challenging electronic emission condition where adversaries may have an advantage in long-range detection of contacts. Distributed Lethality empowers the surface navy to reclaim a role in sea strike. It is not meant to preclude use of additional capabilities provided by cross-domain contributions, but it does focus first on the ship as the basic unit to build a distributed lethality system. This is a key philosophy for surface ship survival in a modern missile surface duel and somewhat of a sea change: To do otherwise invites creating our own vulnerability for the enemy to exploit. This tactical doctrine is based on three principal objectives: Out think the enemy Out shoot the enemy Out Think the Enemy: This concept mimics submarine independent operations to establish undersea dominance with each submarine having its own water space. Delegated command authority is not a new concept to the U. It empowers American initiative at the lowest level of command. We, however, must be careful that our desire for efficiencies in technological investments does not inhibit an individual Captain from exercising all his weapon systems and thereby restrict command initiative. For example, a communal surveillance resource like a maritime Global Hawk controlled from ashore provides cost-efficient sensor coverage usable by all in an operating area. But, if we rely on it, and it is lost due to enemy fire or intrusion, we blind all our SAGs. Empowering American initiative at the lowest level of command is the most effective counter to a tactical surprise by an enemy. As ships are added to a surface action group, and other platforms added to the adaptive force package, the group must also be capable of fighting as a team, in any emission control condition. Specific techniques will be addressed in the scouting section. Out Scout the Enemy: Passive electro-optic communications will need to be developed again between ships operating under the most restrictive emissions control US Navy photo. In Fleet Tactics, Wayne Hughes addresses both scouting and anti-scouting as methods to achieve a faster targeting cycle than the enemy. Alone and Unafraid Although adaptive force packages are envisioned as teams of several ship types with other support elements, the ability for each ship to operate independently in the most challenging emission control environment is a desired quality for force flexibility and resilience. In a truly contested environment friendly attrition may demand it. Technologies such as Low Probability of Intercept LPI radar operations, burst communications and bi-statistic active-passive operations using remote active sensors may allow for active emissions while limiting counter-detection. Nevertheless, we first address single ship operations in a completely passive condition with no organic air support or external targeting support. This is the most demanding scouting environment and is an effective anti-scouting technique particularly when combined with active decoys. Completely passive scouting techniques for a single ship include visual, electronic surveillance, and acoustic surveillance. Technologies such laser target designators, long range guided gun munitions, wire-guided heavyweight torpedoes for surface ships, and visually fired missile systems may need to be developed to enhance U. Passive and active search tactics with organic assets will need to be developed for each ship and helicopter

pair US Navy Photo. Beyond visual range, passive electronic and acoustic surveillance may be conducted with onboard electronic surveillance receivers and passive hull mounted and towed array hydrophones. Their information can be converted to a targeting technique through the use of Ekelund ranging and target motion analysis as used by the U. These assets can either enable passive cross fixing for cooperative targets [xi] , visual targeting, or in the case of an intelligent passive sonobouy trip wire design, range information. For air assets, use of off-axis, passive low flying and pop up techniques are anti-scouting tactics to mitigate the risk of enemy counter-detection. Use of air asset active radar sensors will extend search areas, but expose manned helicopters to the risk of being engaged. Specific active-passive tactics combined with pop maneuvers should be a priority for each ship-helicopter pair to develop. Care to use off-axis operations and random active search with these remote assets to avoid counter detection must be a given. One advantage to remote active operations is the possibility of seducing an adversary operating in passive mode to risk active emissions for a better defense condition, thereby increasing the U. This is different than the anti-scouting use of active decoys to entice the enemy to misuse their own targeting and striking assets, which is another appropriate tactic in this contested environment. In addition to tactical deception using decoys, other anti-scouting techniques for single surface ship operations include concealment and evasion. Concealment may involve operations close to land to mask radar returns or confound missile seekers and electro-optic sensors; the use of commercial shipping or fishers to mask movement; or a combination of both. As information is received from non-organic methods national intelligence, higher command, or orbiting maritime aircraft it may be silently fused with these other information to provide or enhance strike operations. The most challenging command decision for a Captain in this environment is when to switch from a passive offensive mode to an active defense condition in the face of a potential threat. If too late, we mitigate our advantage in defensive hard kill systems. Activation of short range hard kill systems should follow and long range radar and hard kill systems employed last, all to give as little information to enemy scouts as possible. Of course, an active missile homing signal with a rapid increasing frequency shift is a red flag for all active defense systems. After an actual attack and successful defense when any electronic emissions are employed, passive high speed evasion should immediately follow. Additional ships require formation configuration to best capitalize on passive cross bearing fixes allowing for environmental and acoustic conditions. For example, a two ship SAG may steam in a staggered line of bearing perpendicular to a threat axis with a distance between ships that gives a good cross fix area of uncertainty [xii] while allowing for mutual defense and electro-optic communications. Another example is a three-ship SAG steaming in roughly a triangular formation when no threat axis is available to cover a degree passive surveillance area. Frequent individual course changes should be made along base course to put passive towed array beams in the best position to acquire acoustic information. Exchanging information across a surface hunter-killer group in a strict emission control environment requires local C4I networks relaying on electro-optic communications such as laser, visual, or IR transmitters and receivers. Use of atmospheric layers by bending and reflecting signals may be explored to extend beyond line of sight, but intra-SAG communication that has no or little electromagnetic emissions will enhance SAG anti-scouting efforts. UAVs may be used as communication relays with low power emission or electro optic transmitters and receivers. Options for dispersed SAG operations exist where one or two ships are sent miles ahead along a known threat axis in completely silent emission control. The ships in the rear are active on radar and control forward unmanned sensors, transmitting their information to ships in the van to create an opportunity for covert and surprise attack. This increases the intermittent risk to the active ships, but use of anti-scouting techniques of remote active decoys, LPI radar, and random active operations may be used mitigate the danger. Multiple levels of active defense become an option with multi-ship SAG operations. Depending on indications and warnings of an attack, a SAG commander may decide the most capable air defense ship go active with hard kill systems while others employ soft kill only, or all go active, or some passively evade while others go active with hard kill. Again, these decisions are weighed against inadvertently providing targeting information to an enemy SAG too early in a defense cycle. The advantage of combat tactical doctrine is to permit training and rapid advances in tactical readiness through practice. Out Shoot the Enemy: Ship to ship missile systems should be designed for as much range as possible limited only by weight and size considerations for ship

employment and possibly the ability to reload at sea. It is dangerous, and a bit arrogant for weapons systems designers to limit a missile range based on assumed future tactical situations. Payload constraints of organic air assets limit the aggregate firepower needed to attack a capable enemy effectively, although they may be used to augment a shipborne attack, or attack independently with the purpose of making an uncooperative enemy go into active defense to provide better targeting data. Traditionally, the key to effective surface missile attack is to penetrate enemy defenses by having missiles arrive while they are in a passive search mode surprise , or to overwhelm his defenses with sufficient missiles arriving simultaneously. This includes specific passive target acquisition techniques informed by electronic and acoustic capabilities and environmental conditions, targeting methods informed by missile seeker capabilities, and passive defense measures informed by enemy missile seeker capabilities. By nature these tactics will be in the classified realm and modified as new technologies are introduced for the SAG or emerge as a threat from our adversaries. A retired naval officer with 26 years of service, Jeff is currently a Professor of Practice in the Operations Research department and holds the Chair of Systems Engineering Analysis. He teaches Joint Campaign Analysis, executive risk assessment and coordinates maritime security education programs offered at NPS. Jeff supports applied analytical research in maritime operations and security, theater ballistic missile defense, and future force composition studies. He has served on several Naval Study Board Committees. National Defense University Press, A Strategy for U. C, [vii] Hughes, Wayne.

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Scream over the runways of super-hardened Iraqi airbases as your squadron sprinkles bomblets on the pavement or blows up aircraft shelters using laser-guided bombs. Turn back the Russian tide in the Ukraine. Ride the Mediterranean waves in fast Israeli attack craft, trading barrages of anti-ship missiles with Syrian ships. Stand toe-to-toe against Iran in the Persian Gulf. Wrestle the Falklands under your control. Hunt down rogue nukes in Pakistan before they fall into terrorist hands. Face off with your carrier group against India or China â€" from either side. Square off against the Soviet Union in the cold war confrontation, and against resurgent Russia in the new multipolar world order. Lead nuclear-powered sharks of steel against the masters of antisubmarine ops. Exchange volleys of fire in close-quarters gun duels, or obliterate the enemy with sophisticated, heavy-hitting hypersonic missiles from hundreds or thousands of miles away. Survive massive, vicious air battles. Escort vital convoys to their destination, or make a last stand against all odds. When things escalate out of control, step up to unconventional or even nuclear weapons. Play the most dangerous game of hide and seek â€" at sea, on land and in the air - even in near-space. Every sensor and weapon system is modeled in meticulous detail. You are given the hardware; but you have to use it well. Rotate and zoom in and out of the action, from satellite view down to the trenches and wavetops. Play scenarios or build your own on any place on earth â€" from classics like the Middle East, South Atlantic, North Cape and Europe to new and rising hotspots like the Arctic, the Pacific and the Indian Ocean. Use a powerful yet intuitive point-and-click mouse interface for controlling your forces and go advanced with a wide collection of hotkeys for quickly jumping around the action and issuing complex orders in the heat of the battle. Customize your map and info windows to perfection to suit your play style, even on multiple monitors. Units move, detect, fight and win or die based on what their systems can and cannot do. Electronic warfare and technological levels can tilt the balance of battle. The weather can be your best ally and your worst enemy. The terrain, both overland and undersea, can hide you from the enemy but also can block your weapons from firing. Your aircraft can choose different mission profiles and loadouts, each with its advantages and limitations, and can dash high speed, range or scream low protection. Thermal layers, convergence zones, surface ducting, the deep sound channel and factors such as water temperature and terrain slope may decide the sub vs ship duel. Thick clouds or rain can render your fancy laser-guided bombs useless. Stealth may help you avoid detection, or a jamming barrage may tip the scales when you are out of options. People trained with varied proficiency from novice to ace , operating under custom doctrine and rules of engagement when to do what, how to decide, how to react etc. These people often matter far more than the hardware. The very same surface-to-air missile battery that is a worthless toy when staffed by Iraqi or Libyan crews turns to a deadly weapon even against ultra-modern aircraft under the expert hand of Egyptian, Serbian or Russian operators. The deadliest combat units are only as sharp as their crews. Past and future conflicts in the Pacific, Norwegian Sea, Russian periphery and more. Test your mettle against lethal land-based missile batteries, air regiments, naval fleets or pirate groups. Face off against threats of the past, present and future. How do you measure up against the challenges of modern warfare? Airbase crews shuffle aircraft around on land facilities to prepare them for the next mission. Aircraft position themselves to deliver their payloads optimally, and refuel on their own if they have to; Ships and subs maneuver on their own to reach out and touch the enemy including winding their way around islands, landmasses and even known mines â€" and everyone tries very hard to save his skin when bullets are flying. Manage the big decisions and let your virtual crews get to the details â€" and still intervene whenever you want. Create and share with other players detailed, exact-down-to-the-meter land installations from all over the world â€" from airbases to port complexes to ICBM fields. Customize unit icons, sound effects, even platform weapons and sensors Aegis on the USS Iowa â€" click and done. Create multiple sides with variable, complex alliances and postures and different proficiency ratings. Assign forces to detailed missions with

custom behaviors and inheritable doctrines. Script complex interactive events with the advanced event editor. Assign variable success thresholds â€" from triumph to utter defeat. From a gunboat duel all the way to global thermonuclear warfare â€" the possibilities are endless.

Surface ship operations / Naval Education and Training Program Management Support Activity.

Anti-surface warfare can be divided into four categories based on the platform from which weapons are launched: Anti-surface warfare conducted by aircraft. Historically, this was conducted primarily through level- or dive-bombing , strafing runs or air-launching torpedoes and in some cases by suicide Kamikaze attacks. Anti-surface warfare conducted by warships. These vessels can use torpedoes , guns , surface-to-surface missiles , or mines. UAVs represent an emerging technology. Asymmetric methods include the suicide boat. Anti-surface warfare conducted by submarines. Historically, this was conducted using torpedoes and deck guns. More recently, the submarine-launched cruise missile SLCM has become a preferred anti-ship weapon, offering a significantly longer range. Historically, this refers to shore bombardment from coastal artillery , including cannons. Today, shore-based cruise or ballistic missiles are considerably more common. Further, ground-controlled satellites may provide data on fleet movements. History[edit] Following the results of the Battle of Taranto and the Battle of Midway , the primary combatant ship type was the CV or fleet carrier. After WW2, the ASuW concept primarily involved the multiple carrier battle-groups fielded by the US Navy, against which the Soviet Union designed specialized strategies that did not equate to a 1: Against this necessity of logistical and combat support, the Soviet Union expanded its submarine fleet, which in the event of hostilities may have been sufficient to deny the supply of material to the theatre. As military strategists often design counter-strategies to meet the capabilities of the rival force, the Western then responded with the construction of SOSUS lines to track Soviet submarines. From the air, Soviet naval aviation had ASuW capabilities. Even the prop-driven Tu , primarily designed for ASW, could and was armed with antiship missiles. Today, following the end of the Cold War, ASuW still involves asymmetries, which may for now be more pronounced. Air ASuW[edit] After the development of reliable, long-range, guided missiles, Air ASuW was imagined to consist of a mass attack by high-speed jet aircraft launching a sufficient number of missiles to overwhelm the air defences of a fleet. Some commentators believed that this capability was consistently underestimated. The same advantages that made planes so successful against surface ships in World War II are largely still existent today. Aircraft can attack in large numbers with little warning and can carry multiple weapons that are each capable of disabling a ship. While warships are able to carry powerful defensive technologies the need to destroy every incoming missile leaves them at a disadvantage. Missiles and supersonic aircraft are very difficult targets to hit and even the most advanced systems cannot provide certainty of interception. During the Cold War the gulf was at its most pronounced, with saturation missile attacks a major concern but the gulf has closed a little in recent time. The advent of phased array radar on ships allow them to track and target a far larger number of targets at one time, increasing the number of missiles needed to saturate defences. The arrival of vertical launching systems allow for dozens of SAMs to be launched almost simultaneously from each ship, a substantial advance over older missile launchers that could only fire one or two missiles before reloading. Finally the arrival of networked fleet level defence direction using many radars and many launch platforms together to intercept a cloud of missiles allows for better use of defence resources. Previously each ship would have to act individually against a coordinated attack which leads to defensive fire being wasted on the same targets. Networking also brings information from airborne radar, giving vastly longer range than any ship board radar could achieve due to the radar horizon. Additionally modern communication and intelligence tools make carrier fleets harder to attack than in previous decades. The challenge for a carrier in the s was in effectively using its air arm against incoming bombers. Fighters could cause huge casualties in a bomber force, but their comparatively low range and loiter time made it impossible to keep a constant combat air patrol over hundreds of miles of ocean. The range of anti-ship missiles also typically put bombers out of range of fighters launching once a raid was detected, nullifying a major part of the fleets anti-air defences. The ability to bring real time intelligence from long range radars and satellite imaging to the fleet better allows fighters to be used against attackers in the air. Attackers retain the advantage because a fleet is still relatively static and needs to be successful against every

incoming missile to avoid significant losses while attackers only need to achieve a few hits to make an attack successful. The major change is that attackers now need to invest more resources into each attack. Larger formations of aircraft are needed to successfully saturate defences, but if this can be achieved then the aircraft will cause very significant damage. Even a single missile may be able to penetrate defences and sink a ship and even the most successful defence systems cannot guarantee an interception, simply a higher likelihood of one. Surface ASuW[edit] Most naval vessels today are equipped with long range anti-surface missiles such as Harpoon and Exocet which are capable of crippling or destroying enemy ships with a single hit. These can be fired from vertical launch systems or from stand alone launch tubes and are designed to attack other warships. A surface ship has several key disadvantages as ship to ship missile platform compared to other combatants. Being close to the surface substantially reduces radar range due to the radar horizon which makes it harder to find targets and decreases the maximum range that a missile could be usefully launched at. However ships can carry far more missiles than any other platform and are thus able to attack more targets or continue an engagement for longer than other platforms. While ships do retain a robust anti-ship missile armament the ubiquity of such missiles makes an engagement with anti-ship missiles between surface ships fairly unlikely because for one ship to launch its missiles it would have to bring itself within range of the enemies missiles. Even with surprise the flight time of such missiles is long enough for an enemy to return fire before being hit making such an engagement extremely dangerous without some additional advantage. The Battle of Latakia during the Yom Kippur War saw Israeli missile boats sink an equal number of Syrian boats by using electronic counter measures and chaff to successfully avoid missile fire but modern missiles typically have additional guidance systems that make such defences much less effective. In a modern conflict anti-surface missiles would more likely be used against merchant shipping or auxiliary ships and only against similarly armed vessels when no other weapons are available. The arrival of networked weapon systems do potentially offer surface to surface missiles way to launch, using radar data from an aircraft or UAV to target missiles over the horizon and engage ships without exposing the launcher to retaliation although such systems are yet to be deployed. One recent advance in surface to surface weaponry is the modification of RIM Standard anti-air missiles to attack surface targets. Although not as powerful as a dedicated anti-ship missile they are extremely fast and agile and better able to penetrate anti-missile defences. Additionally as many more surface to air missiles are typically carried on every vessel this increases a ships potential firepower many times over. While an Arleigh Burke Class destroyer typically carries eight Harpoons ready to fire, it carries forty or more Standard missiles in its vertical launch cells. This also presents a Standard armed ship with the potential to attack a long range target without necessarily trying to sink it, something very valuable against non-military targets. While naval guns have largely been supplanted by missiles, guns remain a part of many ships weaponry. Weapons such as the 5-inch Mark 45 gun remain in service to provide artillery support against land targets but also with a function against surface ships. Missiles are typically a better weapon in terms of their destructive potential but cannon shells are much harder if not impossible to intercept with anti-missile defence systems and likely will not be seen on the defenders radar, providing a potential advantage for a surprise attacker. Equally guns do not require a radar lock to fire, giving them utility against stealth vessels or those too small to be detected. Submarine ASuW[edit] Undersea versus fleet action is commonly described as a "cat-and-mouse" game, where submarines seek to escape detection long enough to engage in a punishing strike against the much more valuable CV fleet groups. Early Soviet submarine designs could be heard "across the Atlantic," but by the late 80s, many advanced designs were approaching sound-output equivalent to a body of water the size of the sub. Submarines seeking to engage in ASuW can also be targeted by other submarines, resulting in wholly undersea combat. Furthermore, satellites controlled from ground stations could provide information on enemy fleet movements.

6: A Tactical Doctrine for Distributed Lethality

The Surface Warfare Enhancement Act of was created in response to ship collisions that involved the USS Fitzgerald and USS John S. McCain guided-missile destroyers in

7: Library Resource Finder: Location & Availability for: Surface ship operations

A successful Surface Warfare Commander must achieve more than passive protection of the task force or avoidance of hostile contact; he is also required to _____. gain and maintain access to the operating area, maintain a safe buffer around the task force during transit to operating areas, and be prepared to conduct offensive operations.

8: Surface ship operations (edition) | Open Library

associated with surface ship maintenance and operations. At the same time, there has been widespread concern that surface ship materiel readiness is declining due to a high pace of oper -.

9: Surface Combat Systems Center

Surface combatants also include mine warfare ships, amphibious command ships, coastal defense ships, amphibious assault ships, and many others. An important facet of naval warfare are however the support ships (that is, non-combat ships): freighters, oilers, hospital ships, tugs, troop transports, and others.

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