ARMY, MARINE CORPS, NAVY, AIR FORCE


# AOMSW

## MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR AIR OPERATIONS IN MARITIME SURFACE WARFARE

***NTTP 3-20.8***
***AFTTP(I) 3-2.74***

**November 2008**

**AIR LAND SEA APPLICATION CENTER**



MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES

## FOREWORD

This publication has been prepared under our direction for use by our respective commands and other commands as appropriate.

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**This publication is available through the ALSA Web site (www.alsa.mil) and through the Air Force at the Air Force Publishing Web site (www.e-publishing.af.mil).**

# PREFACE

## 1. Purpose

This multi-Service tactics, techniques, and procedures (MTTP) publication consolidates the Services' best tactics, techniques, and procedures (TTP) for missions involving air assets conducting maritime surface warfare (SUW). The objective is to enable seamless integration of air assets in the conduct of maritime SUW. This MTTP publication lays the foundation for integrating forces in either preplanned or dynamic scenarios and strives to simplify "plug and play" interoperability.

## 2. Scope

The overarching objective of this publication is to describe TTP that facilitate the integration of joint forces supporting current operation plans (OPLANs) and concept plans (CONPLANs). Emphasis is placed on checklists, check-in formats, aircraft capabilities, and weaponeering guidance to engage maritime surface vessels. When applied, the MTTP in this publication will improve the joint force maritime component commander's (JFMCC's) ability to rapidly establish superiority within the maritime operational environment. This publication also addresses smaller scale operations including protecting surface vessels in transit or conducting operations.

## 3. Applicability

This mission specific publication is applicable to United States Navy (USN) and United States Air Force (USAF) assets. Even though the target users are theater air maritime planners and squadron level aircrew, the manual applies to personnel at all echelons. Planners should use the MTTP publication to support comprehensive CONOPS development and crisis-action plans; support the development of small and large-scale exercises; and serve as a quick reference guide to assist decision making in time-sensitive scenarios. Shipboard watchstanders and tactical aircrews will find this MTTP publication to be a straight forward guide to training and execution.

## 4. Implementation Plan

Participating Service command offices of primary responsibility will review this publication, validate the information, and, where appropriate, reference and incorporate it in Service manuals, regulations, and curricula as follows:

**Navy.** The Navy will incorporate these procedures in US Navy training and doctrine publications as directed by the Commander, Navy Warfare Development Command (NWDC)[N5]. Distribution is in accordance with Military Standard Requisition and Issue Procedure Desk Guide (MILSTRIP Desk Guide) Navy Supplement Publication-409 (NAVSUP P-409).

**Air Force.** The Air Force will incorporate the procedures in this publication in accordance with applicable governing directives. Distribution is in accordance with Air Force Instruction (AFI) 33-360.

## 5. User Information

a. NWDC, the Curtis E. LeMay Center for Doctrine Development and Education (LeMay Center), and the Air Land Sea Application (ALSA) Center developed this publication with the joint participation of the approving Service commands. ALSA will review and update this publication as necessary.

b. This publication reflects current joint and Service doctrine, command and control (C2) organizations, facilities, personnel, responsibilities, and procedures. Changes in Service protocol, appropriately reflected in joint and Service publications, will likewise be incorporated in revisions to this document.

c. We encourage recommended changes for improving this publication. Key your comments to the specific page and paragraph and provide a rationale for each recommendation. Send comments and recommendations directly to—

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**AFTTP(I) 3-2.74** — **Curtis E. LeMay Center for Doctrine Development and Education, Maxwell Air Force Base, Alabama**

**17 November 2008**

# AOMSW
# MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR AIR OPERATIONS IN MARITIME SURFACE WARFARE

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# EXECUTIVE SUMMARY

# AOMSW

# Multi-Service Tactics, Techniques, and Procedures for Air Operations in Maritime Surface Warfare

This publication consolidates the Services' best TTP in air operations against maritime targets into a single MTTP publication. The manual is written under the assumption that the joint force maritime component commander (JFMCC) is the supported commander providing the majority of AOMSW mission support. The objective is to describe effective response options specific to the maritime domain with the appropriate aircraft and sensors/weapons available. These TTP are the foundation for integrating forces in either preplanned or dynamic scenarios with an emphasis on multi-Service interoperability. The mission specific TTP in this publication are applicable to United States Navy (USN) and United States Air Force (USAF) assets. The target users for this document are theater air maritime planners and tactical level aircrew. Planners should use the MTTP publication to support comprehensive CONOPS development/crisis-action plans; support the development of small and large-scale exercises; and serve as a quick reference guide to assist decision makers in time-sensitive scenarios. Tactical aircrews will find this MTTP publication to be a straight forward guide for training and execution.

## Chapter I Overview

Chapter I describes basic maritime C2 and provides an overview of AOMSW missions to include surface warfare considerations.

## Chapter II Maritime Control Responsibilities

Chapter II discusses strategic and operational C2 in a maritime environment. Consideration is given to differences between air and sea C2 responsibilities/ capabilities.

## Chapter III Planning

Chapter III outlines mission planning and weaponeering considerations for both planners and aircrew in the maritime environment.

## Chapter IV Execution

Chapter IV defines SSC, MAS, and AIMT missions in support of AOMSW. The chapter also describes TTP for tactical execution of AOMSW missions.

## PROGRAM PARTICIPANTS

The following commands and agencies participated in the revision of this publication:

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# Chapter I
# OVERVIEW

## 1. Introduction

This publication provides multi-Service TTP for the seamless integration of air assets during the conduct of maritime surface warfare. The maritime domain is defined as the oceans, seas, bays, estuaries, islands, coastal areas, and the airspace above these, including the littorals. AOMSW is intended to support the joint force commander's (JFC's) objectives by providing capabilities/forces in support of joint maritime operations. The end state of this publication is a streamlined support process for maritime surface warfare within the joint force maritime component commander's (JFMCC's) area of operations (AO).

## 2. Missions

The JFC normally designates a JFMCC to command and control joint maritime operations. As a functional component commander, the JFMCC has authority over assigned and attached forces as well as forces/assets made available for tasking to perform operational missions. When the JFC designates a JFMCC AO, the JFMCC is the supported commander within the AO. As the supported commander, the JFMCC has the authority to designate target priority, effects, and timing of fires within his AO. This MTTP publication provides a foundation to enable effective joint and coalition air participation in planning and executing three specific missions: surface surveillance coordination (SSC), air interdiction of maritime targets (AIMT), and maritime air support (MAS). See table 1. MAS operations, unlike close air support (CAS), may cover large areas of open water. As the JFC's maritime warfighter, the JFMCC integrates coalition and Service assets into these missions.

**Table 1. Mission Descriptions**

| | |
|---|---|
| **Surface Surveillance Coordination** | SSC in maritime SUW provides reconnaissance and surveillance in support of the maritime commander's objectives. The SSC mission plays a critical role in establishing/maintaining the common operational picture (COP). |
| **Maritime Air Support** | MAS is air action against hostile surface targets at sea that require detailed integration of each air mission with the fire and movement of maritime forces. |
| **Air Interdiction of Maritime Targets** | AIMT in maritime SUW differs from MAS in that detailed tactical integration with surface forces is not required. This mission shares many common similarities with traditional air interdiction and strike coordination and reconnaissance (SCAR) missions. |

## 3. Surface Warfare Considerations

a. When the find, fix, track, target, engage, and assess (F2T2EA) steps of the joint targeting process are applied to the maritime domain operations are complicated by factors such as adverse weather; mobility; threats; intelligence, surveillance, and

reconnaissance (ISR) capability; and weapons' capability. To overcome limitations involved in completing the targeting process on maritime surface targets, this MTTP publication identifies tactical C2 factors, planning considerations, and execution processes in order to augment traditional naval roles such as:

(1) Protecting sea lines of communication

(2) Denying the enemy commercial and military use of the seas

(3) Establishing maritime power projection

(4) Protecting naval logistic support to forward deployed battle forces

b. While there are many similarities between air operations over land and sea, important differences exist:

(1) Lack of visual/terrain references at sea. The lack of visual references adversely affects not only the ability to navigate but also the ability to quickly orient an aircrew to the tactical picture for safety and targeting. The lack of terrain eliminates the capability of low altitude aviation assets to employ terrain masking for threat avoidance. Therefore, these assets will often be within range of a surface ship's weapon systems when attack criteria are achieved.

(2) Target identification (ID). Similarities in ship design, appearance, and density of surface traffic require aircrew threat training tailored to the maritime environment.

(3) Naval vessel mobility. Surface vessel mobility negates the effectiveness of coordinate seeking weapons. A vessel's mobility coupled with poor weather conditions can increase difficulties in performing visual identification and complicate targeting.

(4) Friendlies/Neutrals/Noncombatants. The vast majority of maritime vessels are commercial shipping representing every major nation in the world. Their presence in the midst of an emerging tactical picture has fratricide and collateral damage implications.

(5) Maritime rules of engagement (ROE). The maritime environment encompasses historical laws of the sea which impact ROE (e.g., territorial waters versus high seas).

(6) Maritime airspace control. Nearly every combatant has a powerful radar sensor/weapons system; as a result, maritime airspace control tends to be more positive vice procedural. This emphasis on positive control involves more controlling agencies within the maritime domain. (e.g., REDCROWN [RC], GREENCROWN [GC], STRIKE control)

(7) Tactical C2. While the maritime environment contains common tactical C2 such as a forward air controller (airborne) (FAC[A]) and a strike coordination and reconnaissance coordinator (SCARC), it also employs tactical C2 unique to the maritime environment such as a maritime air controller (MAC) and an aircraft control unit (ACU).

(8) Composite warfare commander (CWC) nomenclature. Maritime forces are scalable in size and capabilities; therefore, a unique naming convention has evolved to accommodate this scalability within the CWC command structure. See chapter II for additional details.

(9) Naval flight operations. The very nature of naval flight operations is that they are mobile; the large deck aircraft carriers and smaller combatant vessels possess aviation detachments. The location of high-density flight operations is ever changing, requiring constant coordination for safe deconfliction.

(10) Sub-surface operations. Deconfliction of surface warfare and subsurface operations will be coordinated at the CWC level. Aircrew should immediately report the location of all submarines, when spotted, to the CWC.

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# Chapter II
# MARITIME CONTROL RESPONSIBILITIES

## 1. Overview

This chapter discusses the tactical C2 structure and airspace deconfliction considerations for naval surface forces. The information is useful to guide joint air assets conducting SUW because control responsibilities differ from SSC and MAS. In addition, AIMT operations are not executed in close tactical coordination with naval surface forces.

## 2. Tactical Airspace Control

a. Command and Control. Maritime tactical air C2 is normally conducted by air and surface units under the broad category of aircraft control units (ACUs). ACUs must efficiently utilize assets to maximize search volume and maintain deconfliction for controlled assets. In most cases, SSC assets will be controlled by a designated ACU. Typical ACUs include airborne platforms and surface vessels.

b. REDCROWN/GREENCROWN

(1) Air assets approaching carrier strike groups (CSGs) or expeditionary strike groups (ESG) must establish contact with the initial controlling agency responsible for detection and identification as soon as they are within radio range. REDCROWN (RC) supports the maritime air defense commander (ADC) and is responsible for detection and identification of aircraft approaching a CSG's airspace and delousing friendly aircraft from enemy aircraft. GREENCROWN (GC) is responsible for detection and identification for ESGs. Contact with RC/GC must be established as soon as practicable and in accordance with the applicable theater operating procedures.

(2) When checking in with RC/GC, the following information is required at a minimum if not already coordinated by C2 aircraft for individual fighter/bomber flights:

(a) Aircraft call sign (number and type of aircraft).

(b) Mission number.

(c) Position/altitude using BULLSEYE, tactical air navigation (TACAN) cuts, established geographic references (GEOREFs), or latitude/longitude in accordance with special instructions (SPINS).

(3) RC/GC will verify SUW aircraft for operable identification, friend or foe (IFF) Mode 2/4. Assuming IFF Mode 2/4 is valid, SUW aircraft should expect to receive "SWEET SWEET" from RC/GC which allows them to proceed on their missions. If Mode 2/4 is not coming up as valid with RC/GC they will report "SOUR" for either Mode 2, 4, or both. Unless specifically addressed in the SPINS, SUW aircraft without valid IFF Mode 2/4 will not normally be allowed to continue the mission.

c. Airborne Command and Control (E-2, E-3, P-3C littoral surveillance radar system [LSRS]).

(1) Whenever possible, C2 aircraft (E-2, E-3, or in some cases E-8) should be used to streamline communication for aircraft joining and exiting the area.

(2) Airborne C2 can be designated as the regional ADC or sector air defense commander and may fulfill the roles of RC/GC.

d. Airspace Deconfliction

(1) Surface Action Group (SAG). A SAG can consist of one or more naval surface vessels with rotary wing aircraft or unmanned aircraft systems (UASs) that usually operate at low altitude. Airspace control and deconfliction will occur using the ship's call sign on a prebriefed frequency. In the absence of a prebriefed frequency, the ship should expect to be queried on the international emergency frequency (Guard). Aircraft should maintain a 5 nautical mile (nm) standoff from Navy SAGs unless cleared otherwise.

(2) Carrier Strike Group

(a) A CSG consists of one aircraft carrier (CVN) supported by other naval surface vessels with significant fixed wing and limited rotary wing aircraft. Because of the large volume of traffic within close proximity to the CVN, caution must be exercised when approaching CSG airspace. CSG airspace control is provided by strike control, marshal control, and tower control which extends out to 50 nm. See figure 1.

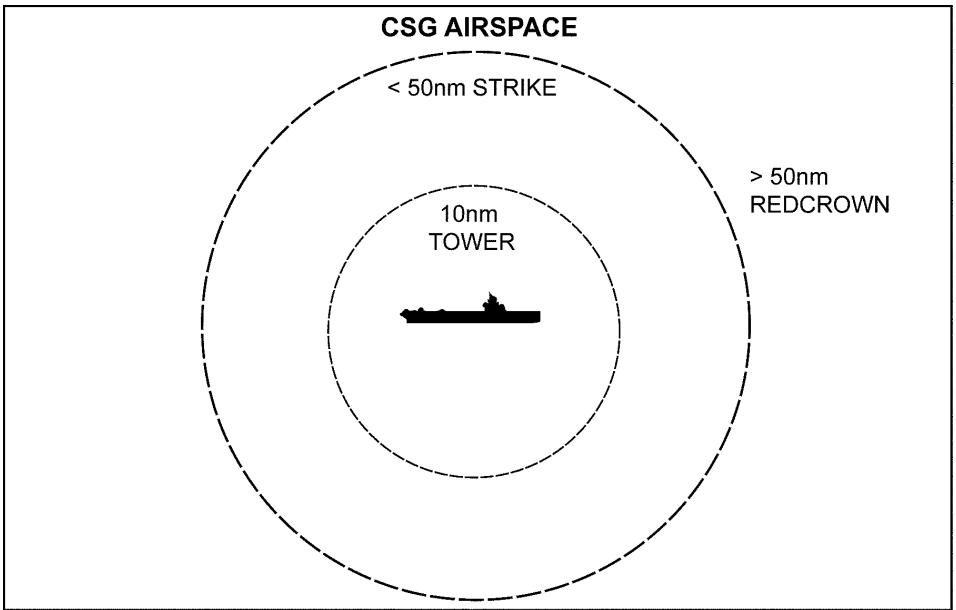


**Figure 1. CSG Airspace**

(b) Strike Control. "STRIKE" controls aircraft within 50 nm of a CSG or ESG. If transiting within 50 nm of a CSG or ESG, aircraft will check in with STRIKE using the same format as with REDCROWN. The STRIKE controller has the ability to provide radar control but primary duties are for administrative accounting and IFF verification of aircraft in CSG or ESG airspace.

(c) Marshal Control. "MARSHAL" provides services for the CVN similar to an approach control. MARSHAL establishes holding and airspace deconfliction during recovery at night and in poor weather conditions. AOMSW aircraft may have to contact MARSHAL control for deconfliction within an approach area.

(d) Tower Control. "TOWER" controls airspace within a 10 nm radius of the CVN from the surface to unlimited. TOWER can be contacted on the land/launch frequency. No aircraft should approach closer than 10 nm without positive control from TOWER.

(3) Expeditionary Strike Group

(a) An ESG consists of air-capable amphibious ships supported by other naval surface combatants. Like a CSG, an ESG conducts both rotary wing and fixed wing aircraft operations. ESG airspace control extends out to 50 nm and is provided by the tactical air command center (TACC), amphibious air traffic control center, and tower control. See figure 2.

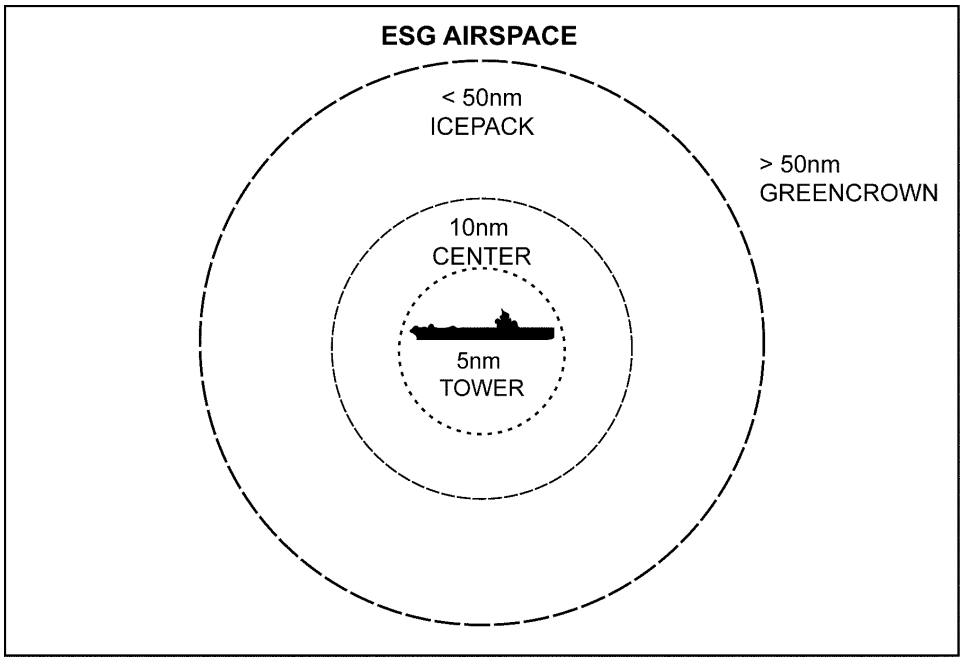


**Figure 2. ESG Airspace**

(b) TACC. “ICEPACK” controls aircraft within 50 nm of the amphibious assault ships (LHD/LHA). If transiting less than 50 nm from the ESG, aircraft check in with ICEPACK using the same format as GREENCROWN.

(c) Amphibious Air Traffic Control Center. “CENTER” controls aircraft within 10 nm from the LHD/LHA and is responsible for providing instrument meteorological conditions (IMC) approach and departure services. No aircraft should approach closer than 10 nm without positive control from CENTER while the LHD/LHA is conducting flight operations.

(d) Tower Control. “TOWER” controls airspace within 5 nm of the LHD/LHA. TOWER can be contacted on the land/launch frequency. No aircraft should approach closer than 5 nm without positive control from TOWER.

### 3. Composite Warfare Commander

a. The CSG and ESG utilize the composite warfare commander (CWC) construct. The officer in tactical command (OTC) is normally the CWC. However, the CWC construct allows an OTC to delegate tactical command to the CWC. The CWC wages combat operations to counter threats to the force and to maintain tactical sea control with assets assigned, while the OTC retains close control of power projection and strategic sea control operations. Subordinate to the OTC and CWC are principal warfare commanders responsible for specific warfare areas as depicted in figure 3. These warfare commanders are responsible for collecting and disseminating information and, in certain situations, are delegated authority to respond to threats with assigned assets.

b. Six principal warfare commanders (PWCs), subordinate to the CWC, are designated by their warfare area. Aircraft may be assigned to more than one PWC based on priorities. Delineation of PWC supported/supporting relationships and assignment of responsibilities will be outlined by operation task (OPTASK) message.

c. The CWC and the PWCs are assigned an individual two letter callsign. The first letter of the callsign identifies the particular strike group while the second letter identifies the corresponding mission area. For example, the callsign of the Air Defense Commander (ADC) for the Enterprise strike group could be EW (Echo Whiskey). Figure 3 lists the various PWCs. Depending on the situation, one PWC can serve as both the Sea Combat Commander (SCC) and the Surface Warfare Commander (SUWC). NWP 3-56, *Composite Warfare Commander’s Manual,* provides further information concerning the CWC concept.

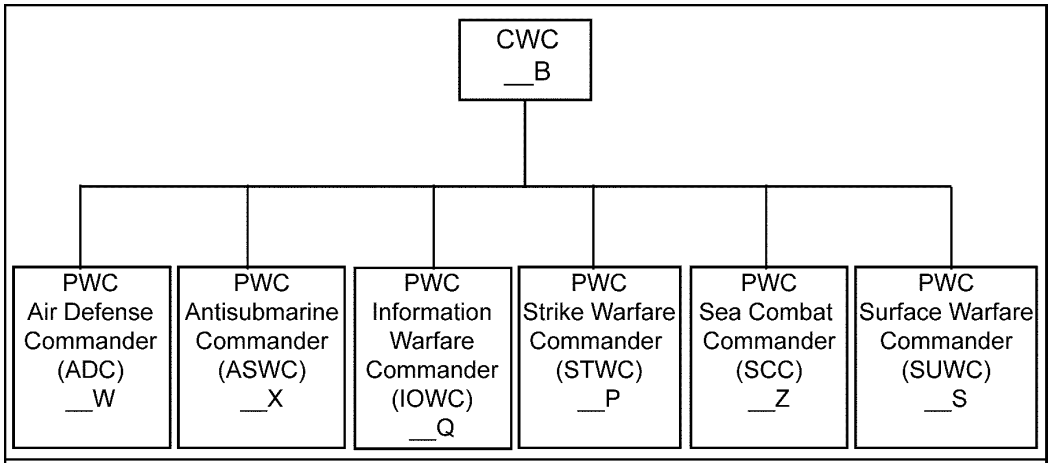


**Figure 3. Composite Warfare Commander Call Signs**

# Chapter III
# PLANNING

## 1. Overview

This chapter provides resources for mission planning and maritime weaponeering. The general planning and employment considerations previously developed for air-to-ground missions serve as the baseline for maritime mission planning. NWP 3-20 series (Surface Warfare), NTTP 3-03.4, *Naval Strike and Air Warfare*, and AFTTP 3-1.1, *General Planning and Employment Considerations*, also provide checklists for mission planning.

## 2. Planning Resources

a. Air Tasking Order (ATO)

b. Airspace Control Order (ACO)

c. Special Instructions (SPINS)

d. Collaboration-at-Sea website. The majority of resources needed to operate with Naval assets can be found on the collaboration-at-sea website. If tasked to contact a Navy asset (e.g., CSG, ESG, SAG), access the general collaboration-at-sea portal on SECRET Internet Protocol Router Network (SIPRNet): http://205.0.132.75/ The following information is displayed on the unit specific collaboration-at-sea website:

(1) Operational Tasking Messages.

(a) Operation Task (OPTASK) Communications. This document defines the satellite communications channels and radio (secure and clear) frequencies the CSG utilizes.

(b) OPTASK Link. This document provides all the parameters for link utilization including net assignments, track limitations, and crypto.

(c) OPTASK Link ID. This document delineates the appropriate link symbology for track assignments.

(d) OPTASK Air Defense and/or ADC Daily Intentions Message (DIM). This message outlines naval vessels designated as firing units, ACUs, and additional fleet air defense responsibilities.

(e) OPTASK SUW/Sea Combat Commander (SCC) and/or the SCC DIM. This message will contain the priority contact set:

- Contacts of Interest (COI). COI have tactical significance but may not be a threat to the force. As an example, a COI may be defined as a naval combatant operating in a particular area or it may be an unknown surface contact operating in a designated area. Their presence has no real impact on mission completion.
- Critical Contacts of Interest (CCOI). CCOI present a threat to the force and their locations must be identified for successful completion

of the mission. A CCOI could be a potential adversary suspected of either terrorist or smuggling activity.

- Vessel of Interest (VOI). The term VOI is usually assigned to specific vessels whose interest is derived from intelligence sources.

(f) Area of operations with defined vital areas and criteria needed for classification and identification.

- Vital Area (VA). VA is defined by the expected weapons release range of the threat and is centered on the high value unit. It is possible to have more than one VA.
- Classification, Identification, and Engagement Area (CIEA). CIEA is the area outside the VA but inside the surveillance area (SA) in which all contacts detected must be classified, identified, and monitored. The ability to escort, cover, or engage must be maintained. Any potential threat must be monitored prior to entering the VA.
- Surveillance Area. The area determined by the CSG commander where organic and inorganic sensors keep track of activity to prevent surprise contacts from entering the CIEA.

(g) Commander's guidance and intentions for prosecuting contacts (e.g., engagement authority, positive identification [PID] requirements). See figure 4 for a typical CSG/ESG operational area.

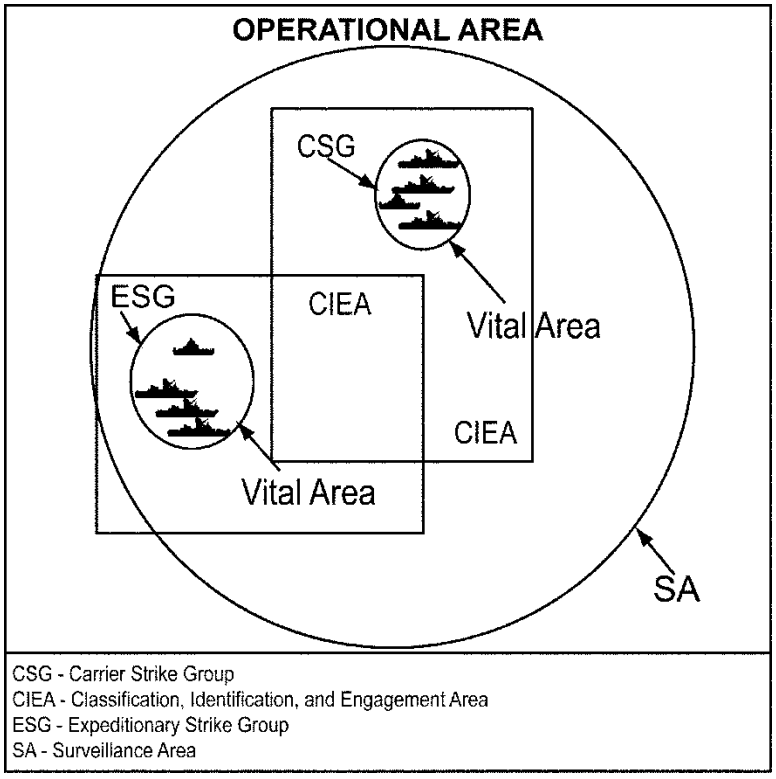


**Figure 4. CSG/ESG Operational Area**

(h) Pre-Planned Response (PPR) documents. PPRs are the guiding documents for strike groups to follow for response to a myriad of situations. Often the PPR will drive the DIMs and it can provide guidance for assets working with strike groups.

(2) Carrier Air Wing (CVW) Air Plan/Expeditionary Strike Group (ESG) Air Plan. An air plan is a graphical representation of flight operations which lists call signs, tactical frequencies, launch/recovery times, flight composition, and fuel/ordnance loads. Air Plans contain Navy direct support sorties which are not normally listed on the ATO as well as ATO-derived common use sorties.

(3) Card of the Day (frequency/call signs). The card of the day or the card of the week will have SPINS and maritime-specific daily code words, base numbers, as well as the call signs and TACAN channels of friendly Navy units.

(4) Point of Contact (POC) Email and Phone Numbers.

(5) Carrier Intelligence Center. This is the intelligence hub of the CSG. Points of contact can be found on the specific ships' collaboration-at-sea site.

## 3. Mission Planning Considerations

a. National Airspace and Maritime Domain

(1) National Airspace. National airspace extends to 12 nm off the coast of the respective country, including any island or group of islands. Consent to fly into national airspace requires a diplomatic clearance. Diplomatic clearances can require full disclosure of aircraft contents and the purpose of the proposed overflight. While ships enjoy rights of innocent passage, there are no automatic rights of entry for aircraft.

(2) International Airspace. Aircraft normally have freedom to conduct all types of military operations subject to the requirements of "due regard" as defined by Department of Defense Instruction 4540.01. There are no legal requirements for a nation's airspace controlling agency to provide safety of flight. The US does not recognize a specific altitude at which airspace ends and outer space begins. Every country has complete and exclusive sovereignty over the airspace above its territory and their domestic laws apply to activities in its territorial airspace. Any activities conducted in the airspace of another country require the approval of that country. For example, conducting ISR in the national airspace above another country without permission would likely be viewed as an infringement on that country's sovereign rights and a violation of its territorial integrity. Although several coastal nations have asserted claims intended to prohibit warships and military aircraft from operating in security zones extending beyond their territorial sea (12 nm from their coast), these claims have no basis in international law and are not recognized by the United States. International law does not recognize the right of any nation to restrict the navigation of foreign warships or flight of military aircraft beyond its territorial sea.

(3) International Straits. Military aircraft are afforded the right of transit passage through international straits. While in the strait exercising this right, aircraft must proceed without delay and refrain from any threat or use of force against nations bordering the strait. Military aircraft will operate with "due regard" for safety of

navigation and will monitor the appropriate international distress radio frequency (i.e., Guard). Consult NWP 1-14M, *The Commander's Handbook on the Law of Naval Operations,* July 2007, for further information.

(4) Law of the Sea Convention. Figure 5 depicts the divisions of the oceans and airspace per the 1982 United Nations Convention on the Law of the Sea.

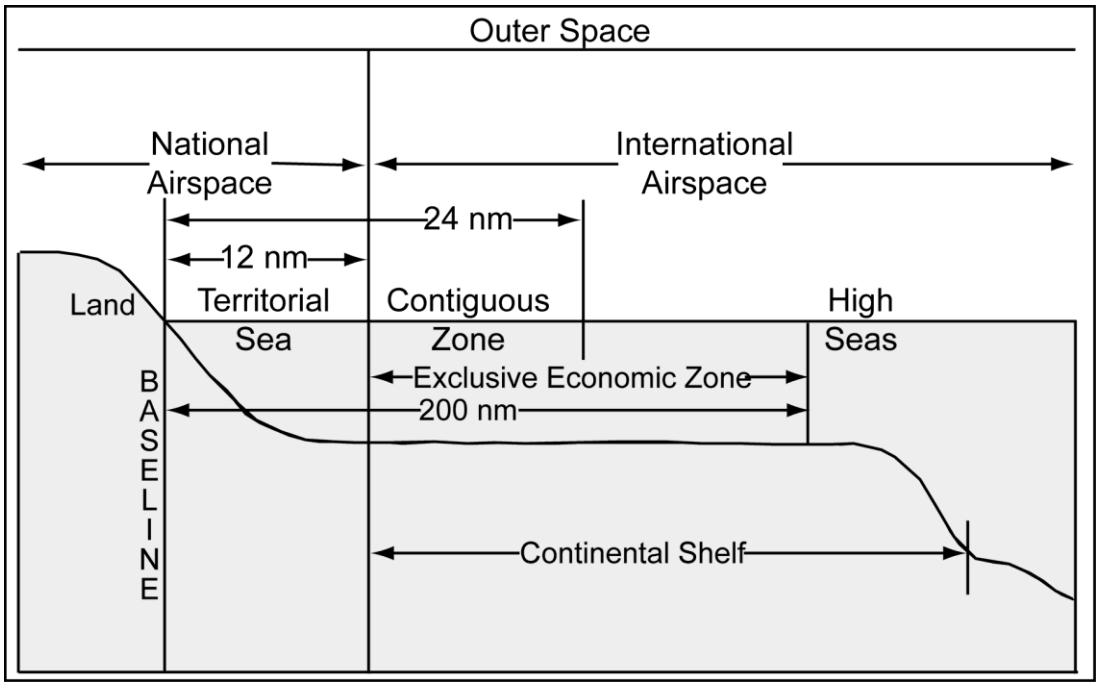


**Figure 5. 1982 United Nations Convention on the Law of the Sea**

(5) NWP 1-14M, *The Commander's Handbook on the Law of Naval Operations*, July 2007. This publication sets out those fundamental principles of international and domestic law that govern US naval operations at sea. This includes the leg divisions of oceans and airspace (national and international waters, straits, etc.), navigation and national over flight of military aircraft, the general Law of Armed Conflict, and Principles of Lawful Targeting (to include lawful and unlawful combatants). A copy of this publication can be found on the NWDC Doctrine Discussion Group website at:
https://dom.nwdc.navy.mil/DDG/DDG.nsf?OpenDatabase

(6) Maritime Claims Reference Manual. This manual contains a framework for understanding international/territorial claims as well as US recognized limits of sovereignty. A copy of the Maritime Claims Reference Manual is posted at:
http://www.dtic.mil/whs/directives/corres/html/20051m.htm

b. Maritime Airspace and Procedures. When operating in the maritime environment, it is important to understand the different types of airspace control measures and procedures.

c. Timely and Accurate Intelligence.

(1) Obtain threat information. Threat information on adversary air-to-air and surface-to-air capabilities is essential for employing appropriate tactics and planning support assets for SUW force protection.

(2) Obtain target description, locating data, and self-defense weapon systems information.

(3) Obtain the common operational picture (COP) or PICTURE/LOWDOWN to include friendly and enemy surface contacts and CSG/ESG operational areas.

d. Local Air Superiority. Theater-wide air superiority or supremacy is not required to conduct AOMSW operations; however, local air superiority is a key enabler. Air superiority may range from local or temporary control to control over the entire theater. Multi-role aircraft with the capability to conduct self-escort into the target area by carrying both air-to-air and air-to-surface weapons may be necessary in the absence of local air superiority. Range limitations, aircraft loading, or tactics may degrade the effectiveness of aircraft in completing their mission.

e. Suppression of Enemy Air Defenses (SEAD). The SEAD level of effort is determined by the threat level and the acceptable level of risk (ALR). It may be necessary to destroy or disrupt all or parts of an enemy's integrated air defense system prior to or during AOMSW execution.

f. Effective Communications. Communication nets between C2 and AOMSW assets must be clearly established with dedicated AOMSW frequencies considered in the development of the communications plan. Ideally, a frequency will be associated with each mission to enable asset coordination.

g. Weather. Weather conditions may complicate the AOMSW mission. Poor weather conditions affect target search/ID, targeting, and post mission assessment. See table 2.

**Table 2. Weather Planning Rules of Thumb**

| | |
|---|---|
| Good Weather | >8000ft ceiling – 3 statute mile (sm) visibility (vis) in most cases provides adequate target acquisition for EO-IR weapons |
| Poor Weather | <8000ft ceiling – 3sm vis<br>but > 300ft ceiling – 1sm vis may limit search and targeting capabilities |
| Adverse Weather | <300ft ceiling – 1sm vis limited to nonvisual or stand-off attacks (fixed wing) |

(1) Winds. Strong surface winds can generate rough seas that complicate low-altitude acquisition of surface targets. Sea spray can reduce/negate the capabilities of the electro-optical-infrared (EO-IR) systems for low-altitude operation.

(2) Sea State. Ships in heavy seas can pitch vertically as much as 30' or more in addition to having a roll component. Large vessel pitch and roll during heavy sea states can have a significant impact on a weapon's effectiveness against ships.

Decreased impact angle and moving laser spot are potential factors that must be considered.

(3) Ceiling and Visibility Criteria. For general planning considerations in this MTTP, the rules of thumb (ROT) for weather categories are listed in table 1.

(4) Water Temperature. Radical changes in water temperature (shallow versus deep water, gulf stream, etc.) will affect thermal imaging systems.

h. Aircraft Capabilities. SUW missions must be able to effectively locate, positively identify, and engage target vessels in all environmental conditions. In almost all cases, target engagement will be against moving targets and standoff capability (detection, identification, and targeting) is essential against a defended target. Often, aircraft must be able to conduct AOMSW missions at significant distances where fuel limits time on station. Typically, one type aircraft cannot conduct all of these mission requirements simultaneously. Clear, concise communication capability - both voice and tactical data link - is essential to mission success. Current Air Force and Naval aircraft mission capabilities can be found in AFTTP 3-1.2, *Tactical Threat Reference Guide and Countertactics*, or NTTP 3-03.4, *Naval Strike and Air Warfare.*

- P-3C LSRS is a new intelligence, surveillance, reconnaissance, and targeting system not currently listed in NTTP 3-03.4. P-3C LSRS has the capability to search and locate maritime contacts at extended stand-off ranges using maritime moving target indicator radar. It has the ability to classify designated tracks at extended stand-off ranges using inverse synthetic aperture radar.

i. Aircrew Skill Set Requirements. Aircrew proficiency will have a major impact on mission success. The unit tasked with the SUW mission should consider the following skill sets when selecting aircrew:

(1) Ability to create and execute complex plans integrating airborne and surface assets.

(2) Knowledge of other platforms, weapons, sensors, and capabilities.

(3) Knowledge of surface forces, including likely dispositions and formations.

(4) Surface vessel recognition.

(5) Knowledge of potential threats.

j. Commander’s Intent. Commander’s intent shall be detailed in a separate SUW section of special instructions (SPINS) or conveyed in the daily intentions message (DIM). This section should include:

(1) Objective (mobility kill, functional kill, command directed).

(2) Acceptable level of risk (ALR).

(3) Rules of engagement (ROE) and SPINS.

(4) Target priorities and restricted targets.

(5) Positive identification (PID) requirements (and method to disseminate target identification).

k. Additional Considerations:

(1) Altitude requirement for effective threat reaction and mission performance.

(2) Airspace requirement based on number of aircraft in the area of operations.

(3) Weapons type and load.

(a) Targeting pods—laser target designator, laser spot tracker, infrared (IR) pointers.

(b) Target marks; e.g., rockets, gun, flares.

(c) Suitable munitions and fuses.

(4) Lack of terrain, ground references, navigational aids, and refueling/divert points.

(5) C2 line of sight limitations and/or long range missions.

(6) Surface traffic density.

(7) Air-to-air refueling.

(8) Coordinated tactics.

(9) Threat contingencies.

(10) Airborne battlespace command and control contingencies.

(11) Communications:

(a) Secure communication capabilities.

(b) Marine band capable very high frequency (VHF) – 156 MHz to 174 MHz.

(c) Channel 16 (156.8 MHz) International Distress, Safety, and Calling. All ships are required to monitor this frequency.

(d) Maritime channels can be found on the US Coast Guard (USCG) website: http://www.navcen.uscg.gov/marcomms/vhf.htm

(e) Data link.

## 4. Maritime Weaponeering Considerations

a. For optimal planning, use the Joint Munitions Effectiveness Manuals (JMEMs) or the Ship Targeting Analysis Tool in JMEM Weaponeering System (JWS) or Ship Weaponeering Effectiveness Tool in JWS to achieve the desired weapons effect against the target. When timelines do not allow for pre-planned weaponeering, the following rules of thumb are listed in order of preference:

(1) Plan weapon impact at the water line near the engine room.

(a) For combatant ships, aim for the center of mass (beneath the stack) located at center of the ship.

(b) For cargo ships, engine room is generally located at the stern.

(2) If unable to hit the water line at the center of the ship, deliver the weapon with a steep impact angle down the stack (70º to 90º).

(3) Use 15-30 millisecond delay fusing. Longer than 30 millisecond fusing may result in the weapon functioning outside the intended target.

(4) For air-cushioned vessels:

(a) Aim for center of mass.

(b) Use instantaneous-5 millisecond delay fusing.

b. Based on the commander's intent, aircrews may receive instructions to achieve the following:

(1) "Mobility kill" refers to disabling a ship's ability to maneuver, e.g., propulsion, steering mechanism, personnel.

(2) "Firepower kill" refers to damage inflicted on a ship that destroys the ships weapon systems or substantially reduces its ability to deliver weapons effectively.

(3) "Catastrophic kill" (K-KILL) refers to damage inflicted on a ship that renders it both unusable and irreparable.

c. During maritime combat operations, US Naval surface combatants will operate in a three layered zone defense: a short-range ship engagement zone (SEZ); a medium-range dual engagement zone (DEZ); and a long-range air engagement zone (AEZ). Each zone will employ weapon systems tailored for optimal performance based upon range. Additionally, shipboard weapon systems exist that possess dual anti-surface and anti-air capabilities. In order to eliminate fratricide, aircrew operating in the vicinity of surface combatants must understand that surface ships may operate in a self-defense mode during maritime operations. Refer to figure 6 for a basic illustration of the three defensive zones. Further information is posted at the following SIPRNet link: http://www.fleetforces.navy.smil.mil/swdg

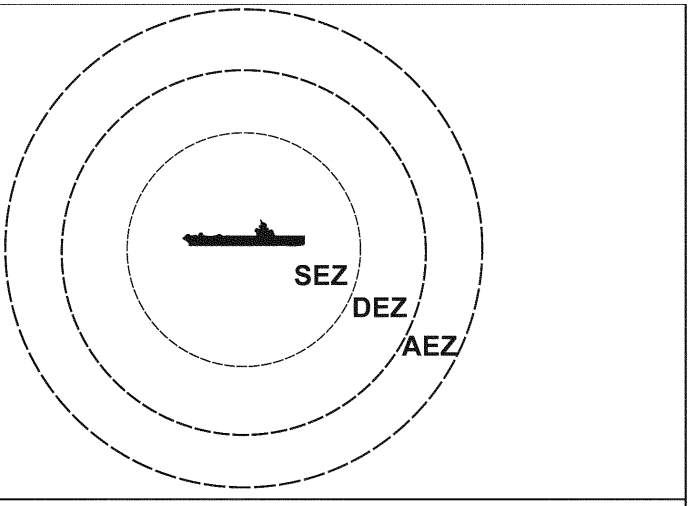


**Figure 6. US Naval Surface Combatant Defensive Zones**

# Chapter IV
# EXECUTION

## 1. Overview

a. This chapter provides specific guidance and checklists/procedures for engaging maritime targets in support of SUW. Considerations for C2 platforms/agencies and for aircraft tactics/weapons employment are presented. The generic execution/ employment checklists and tools in this publication should be effective across the spectrum of missions, time constraints, and available assets. To the maximum extent practicable, the goal is to enable simple and executable "plug and play" employment by joint, interagency, and coalition forces to meet commander objectives.

b. The three basic missions specific to SUW are: SSC, MAS, and AIMT. Within each mission area the assumptions, considerations, and tactics are discussed relative to F2T2EA. It is important to note the respective steps of the targeting process are situation dependent for each mission area.

## 2. Surface Surveillance Coordination

a. SSC in maritime SUW provides reconnaissance and surveillance in support of the maritime commander's objectives. The SSC mission plays a critical role in establishing/maintaining the common operational picture (COP) or PICTURE/ LOWDOWN. Although SSC may encompass all steps of the targeting process, SSC focuses on find, fix, and track. Assets may be tasked via the ATO, CVN air plan, ESG air plan, or re-rolled from another mission area. Typical SSC assets include E-2, E-3, P-3, MH-60R, and tactical air wing aircraft.

b. SSC Considerations. For preplanned SSC missions, detailed unit-to-unit coordination is critical and specific remarks should be included in the air support request and listed on the ATO as needed. For dynamically re-tasked SSC assets, in-flight briefings should be conducted by the controlling unit. The following information should be briefed as a minimum:

(1) Search area.

(2) Position, course, speed, and description of contact (type, class, name, flag) if known.

(3) Amplifying remarks (known hazards, friendly/neutral forces, and threats).

c. Command and Control. Aircraft control units (ACUs) must efficiently utilize assets to maximize search volume and maintain deconfliction for controlled assets. In most cases, SSC assets will be controlled by a designated ACU. Typical ACUs include airborne platforms (E-2, E-3) and surface ships.

(1) SSC flight leads will check in to the ACU using the check-in format shown in appendix A, "Briefing Formats."

(2) Assigned search areas may be provided in any of the following formats:

(a) Sector search (bearing/range from a GEOREF/BULLSEYE).

(b) Directed (ACU will give specific coordinates or bearings to contact).

(c) Autonomous (pilot controlled search).

(d) Grid/common geographic reference system (CGRS) / global area reference system (GARS) box.

(3) SSC assets must be prepared to transition to a MAS mission or maintain SHADOW (follow indicated target). SSC assets will report contacts via a surface contact report contained in appendix A, “Briefing Formats.”

(4) AO Deconfliction

(a) SSC assets should consult current ROE/SPINS/intelligence reports for published standoff distances. Additionally, SSC assets should assume that all surface contacts have a man-portable air defense system with small arms and should honor the threat by providing a sufficient standoff distance to the maximum extent possible.

(b) Aircraft should pay particular attention to other possible manned and unmanned aircraft in the area which may be on Link-16 but not on the same frequency.

(c) Confirm deconfliction methods with the airspace controller.

(d) Maintain a 10 nm minimum standoff from a CVN unless explicitly authorized. CVNs are generally referred to as “MOTHER”. The onboard TACAN (referred to as “FATHER”) is the primary method of locating the ship; however, the airspace controller will provide CVN location information upon request.

(e) Method of friendly ID is thru IFF Mode 4 or Link 16 precise participant location and identification.

(f) SSC assets will not approach closer than 500 feet or as directed in SPINS/ROE from any surface contact. SSC assets will avoid crossing the bow of any surface vessel, a threatening posture, to the maximum extent possible.

(g) Friendly aircraft operating in the vicinity of Blue naval forces equipped with the Phalanx Close-in Weapon System (CIWS) should know that certain aircraft flight profiles may cause the CIWS to engage. Also, allied/coalition ships’ self-defense systems may differ from those of the USN. More information on CIWS is contained in the classified SWDG Tactical Memorandum (TM) TM SWDG 3-20.305 and available at SIPRNet link: http://www.fleetforces.navy.smil.mil/swdg

(5) Assets. SSC assets should consider flying with digital cameras and binoculars to maximize search volume, accuracy, and documentation of surface contacts. This consideration does not supersede command or Service guidance which may restrict the use of digital cameras and binoculars in aircraft.

d. SSC Aircraft Tactics.

(1) SSC Search Techniques. Air-to-surface visual search techniques are similar to air-to-air search techniques. Both require a continuous scan while avoiding fixation. Based upon assigned search areas, SSC assets should optimize their

search techniques based on platform capabilities and limitations. Figures IV-1 through IV-3 depict three different techniques that aircraft can employ to search for surface contacts.

(a) Bar Scan Search Technique. The visual detection range, given the prevailing weather conditions at the time of the search operation, forms the basis for calculating search pattern spacing requirements in a bar scan search. The visual detection range must also be adjusted to account for the physical size of the search object. For example, if the prevailing visibility is estimated at 6 nautical miles (nm), and this distance is deemed an acceptable range for identifying the search object, then search aircraft should establish 12 nm spacing (or twice the visual detection range) between search pattern legs. See figure 7.

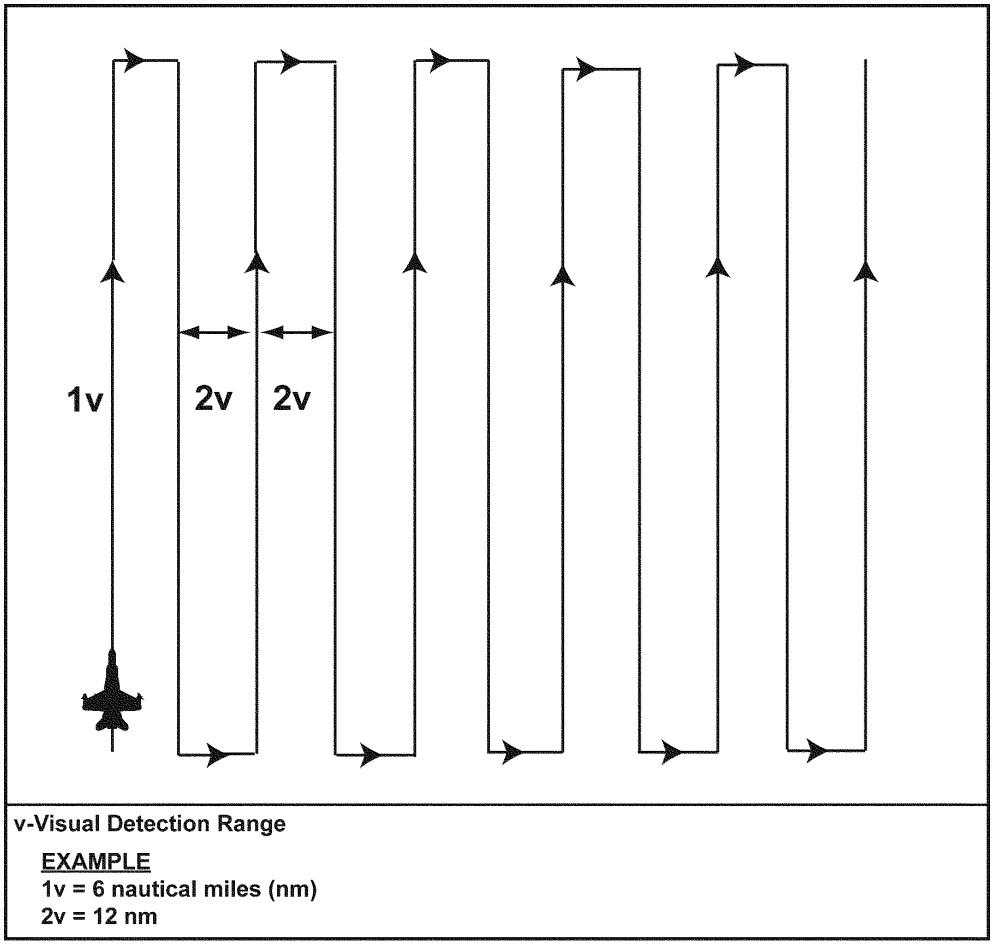


**Figure 7. Bar Scan Search Technique**

(b) Expanding Square Search Technique. The expanding square search technique employs the visual detection range calculation noted previously in the bar scan search technique description. However, the expanding square search pattern typically originates directly over the last known position (LKP) of the search object. The first two legs are flown at twice the calculated visual detection range, the next two legs are at four times the visual detection range, and so on. Each turn to a subsequent leg in the search pattern will be flown in the same direction (i.e., left) and the new heading will be 90 degrees from previous. See figure 8.

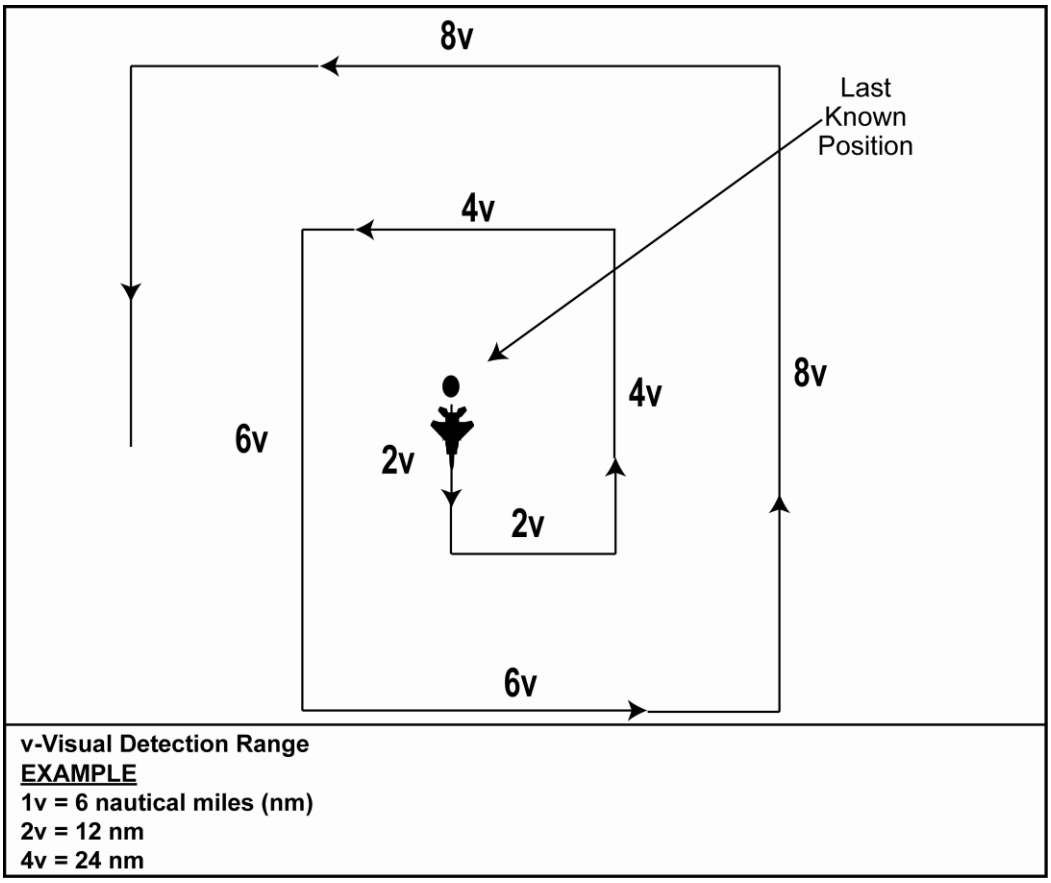


**Figure 8. Expanding Square Search Technique**

(c) Sector Search Technique. The sector search technique is performed so that the LKP of the search object is overflown during each leg of the pattern. Each turn to a subsequent leg in the search pattern will be flown in the same direction (i.e., right) and the new heading will be 120 degrees from previous. Following three passes over the LKP, the pattern is shifted 30 degrees and flown in the same manner as the first. See figure 9. A designation on the Link-16 situation display can be used to assist in station keeping.

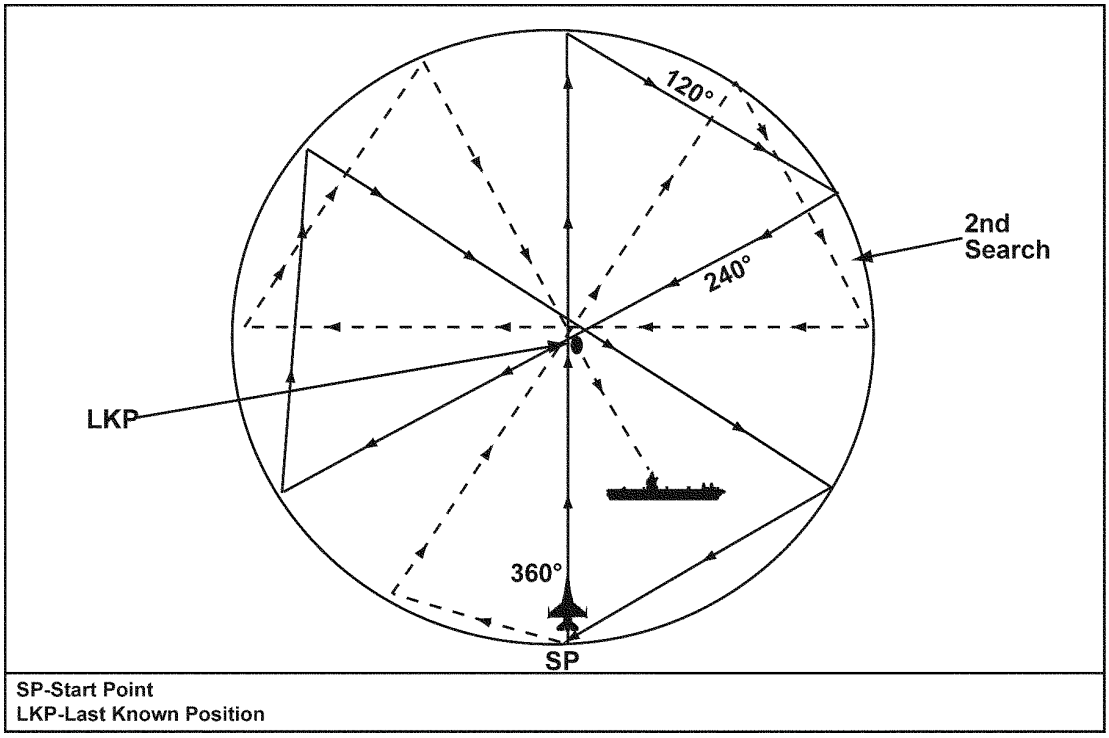


**Figure 9. Sector Search Technique**

(2) Classification and Identification of Surface Contacts.

(a) Classification of a surface contact includes the two categories (merchant or combatant), type (e.g., patrol craft, destroyer), and class (e.g., Houdong, Houbei) as provided in the theater ship recognition guide.

(b) Identification of a surface contact includes hull number, name, and flag. The identification is typically derived from electro-optical systems or rigging. In order to assist visual identification/reporting appendix B contains US surface ship types and classes while appendix C contains a merchant surface vessel classification guide.

(3) Rigging of Surface Contacts. Rigging is a close approach overt procedure dependant on: time available, threat conditions, and commander's intent (CCOI, COI, or VOI requirements). Rigging procedures allow SSC aircraft to obtain critical ID of contacts in a non-threatening manner (i.e., not crossing the contact's bow).

(a) Full Rig: This is the preferred procedure for CCOI, COI, or VOI in a low threat, time permissive environment. Ideally, the aircraft will take multiple pictures from various angles, concentrating on quartering, beam, and stern to provide maximum detail of the surface contact. Figure 10 depicts two possible approaches for obtaining details about a surface contact.

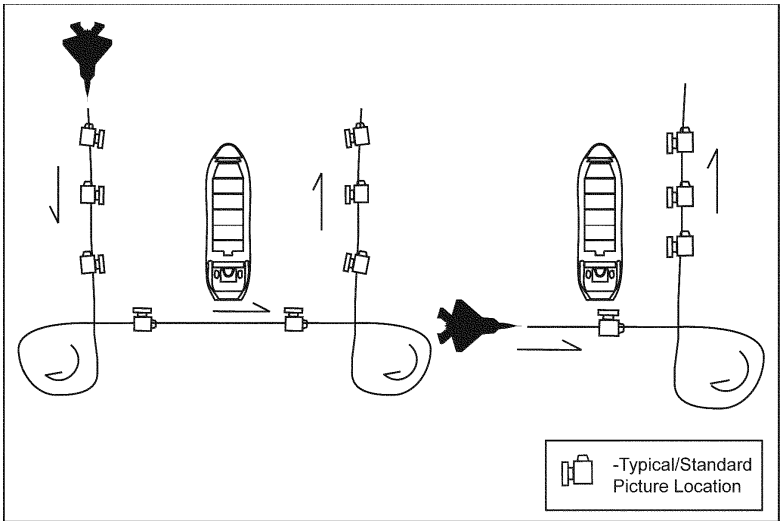


**Figure 10. Full Rig Technique**

(b) Quick Rig: This is the preferred procedure in a time restrictive environment. As a minimum, the aircraft should take at least two pictures that capture the stern and beam of the surface contact and if able, a third picture should be taken from a quartering aspect. Figure 11 depicts a possible quick rig approach to a surface contact.

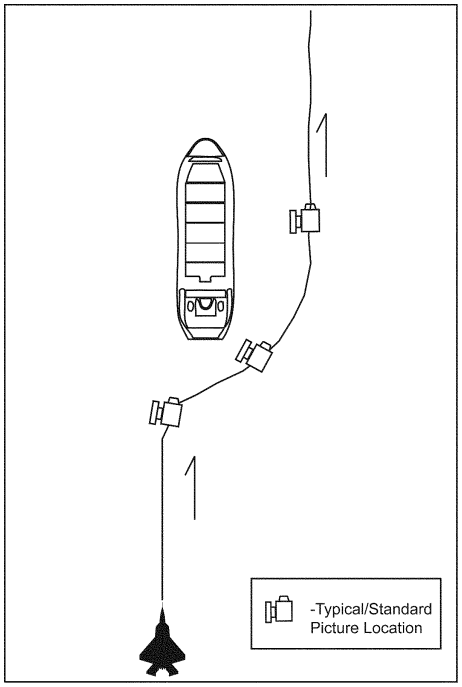


**Figure 11. Quick Rig Technique**

(4) Maritime Interception Operations Support. During boarding operations, SSC assets may be requested to provide support. Two primary support roles for boarding parties include reconnaissance and show of force. In the reconnaissance role, aircraft can provide awareness and force disposition to the boarding party. In the show of force role, aircraft may orbit in the vicinity of the vessel to be boarded.

(5) SLEDGEHAMMER Tactic. The SLEDGEHAMMER tactic is designed as a rapid response in defense of friendly/neutral forces under attack or as a method to identify the intention of an unknown contact. Any aircraft regardless of pre-assigned mission may be instructed to conduct a SLEDGEHAMMER. The term "SLEDGEHAMMER" is only used in an actual scenario. The term "GANGPLANK" is used for training only.

(a) Rapid Response in Defense of Forces. When SLEDGEHAMMER is called in response to an attack, the concept is very similar to a troops in contact (TIC) scenario. The defended unit , C2, or on-scene commander may call a SLEDGEHAMMER. Available assets (including non-SSC assets) can be re-rolled to provide defense for units under attack. It is imperative that the C2 or on-scene commander deconflict the airspace and provide a complete situation report (SITREP) to all assets.

(b) Identify Intention of an Unknown Contact. When a contact approaches friendly forces, the intent of the approaching vessel may not be known. In order to ascertain the vessel's intent, SLEDGEHAMMER will consist of an escalation of aggressive acts conducted by an aircraft as listed in table 3. The entire series of events do not have to be conducted during a single encounter with an unknown contact; the situation will dictate required actions.

**Table 3. SLEDGEHAMMER Threat Intentions**

| | |
|---|---|
| ORBIT | Aircraft will hold at medium altitude above contact. |
| FLY-BY | Aircraft will conduct a low altitude pass abeam or over the vessel. Do not cross the bow.[1,2] |
| THUMP | Aircraft will conduct a low altitude, high speed pass over or abeam the vessel. Do not cross the bow. Supersonic airspeed is authorized as long as damage to the vessel does not occur.[1,2] |
| PEPPER | Aircraft will strafe 1,000 ft ahead of the bow of the vessel. |
| TARGET | ROE, PID, coordination of forces, and commander's guidance requirements on the referenced target/track have been satisfied. Target/track correlation and collateral damage estimation (CDE) must be accomplished prior to employing ordnance/fires. |

**Notes:**
1. As a naval custom while performing the FLY-BY or THUMP, aircraft should not cross the bow of a vessel inside of 4 nautical miles unless more stringent restrictions are published in theater.
2. The only difference between FLY-BY and THUMP is airspeed.

(c) SLEDGEHAMMER will be considered complete when the intention of the vessel is no longer hostile to the force or the vessel location/status is not a factor to the force.

(6) Lethal, Nonlethal, and Nonkinetic Target Considerations. In certain scenarios (i.e., Homeland Defense) the commander's intent may be to deter/stop merchant/civilian vessels using gradual force escalation as needed. Specific actions in these scenarios will be dictated locally (e.g., DIMS) but may include any or all of the steps shown in table 4.

| Table 4. Escalation of Force | |
|---|---|
| Step 1 | Radio queries to contact crew on maritime ship-to-ship VHF or other frequencies. |
| Step 2 | Radio instructions for target vessel to alter course or stop engines. |
| Step 3 | Dispense flares. |
| Step 4 | Be clearly visible to the vessel's bridge. |
| Step 5 | Disabling fire to create a mobility kill but not sink the vessel (aiming at stern or bridge). |

(7) Responding to Queries from Surface Contacts. Refer to theater SPINS for specific responses to queries from a surface contact when operating in international airspace.

### 3. Maritime Air Support

a. MAS is air action against hostile surface targets at sea that require detailed integration of each air mission with the fire and movement of maritime forces.

b. MAS Considerations.

(1) To conduct effective MAS, the following conditions are desired:

- Local air superiority (implies effective SEAD).
- Weather conditions acceptable for target acquisition and weapons employment.
- Appropriate ordnance.

(2) Mission Requests. The requesting commander identifies situations where combat force may be employed to accomplish the mission and submits either a preplanned or immediate request. The method employed should be based on the tactical situation and priority of threat. Much like SSC, all requests should be as detailed as possible.

(a) Preplanned Requests. If sufficient time allows, preplanned requests should be dedicated missions and annotated as "MAS" on air plans or ATOs when appropriate. Depending on the scenario, the mission may become an on-call MAS or dedicated strike sortie.

(b) Immediate Requests (mission retaskings). If assets are needed for same-day operations, naval, joint, or coalition assets may be retasked prior to

launch or while airborne to support the requesting commander. In an emergency situation with a vessel under attack, the order “SLEDGEHAMMER” will be issued for immediate support to the vessel.

c. Command and Control. Authority for control of MAS assets is derived from the JFMCC. In most cases, the sea combat commander (SCC) or the SUWC will be authorized to designate surface contacts as hostile within the link. **Link combat ID characterization does not automatically authorize engagement.** The SUWC will also typically exercise engagement authority consistent with OTC/CWC guidance and ROE. **Note that once the decision is made to engage a target, the MAC and MAS aircrew will then use the brevity code HOSTILE which does represent clearance to engage.** The meaning of the link combat ID symbology “hostile” differs from that of the brevity code “HOSTILE” as spoken over tactical voice circuits between trained controllers and strike aircrew.

(1) Maritime Air Controller (MAC). A MAC performs the role of channeling strike assets to targets and is responsible for the tactical command and control of MAS missions. The MAC shall coordinate and optimize all arrivals, engagements, departures, and post-engagement assessments. MAC primary duties include:

(a) Know the location of enemy threats.

(b) Locate, identify, and track targets.

(c) Request and control maritime air support assets.

(d) Relay bomb hit assessment (BHA) or battle damage assessment (BDA) with recommendations for follow-on strikes.

(2) MAC Assignment. The SUWC or SCC will assign a single MAC (or multiple MACs) based on the surface or airborne platform(s) with the highest level of tactical awareness. The SCC will clearly communicate the MAC assignment to the appropriate ship or aircraft commander and provide all available target information, threat indications, and friendly order of battle. If multiple MACs are assigned, specific sectors/lanes/geographic zones will be designated for each MAC. Considerations for MAC selection include:

(a) Airborne C2 MAC. An E-2, E-3, and in some cases an E-8 and a P-3 LSRS may act as a MAC. Airborne C2 aircraft have the ability to deconflict aircraft, generate target coordinates, and provide the tactical air (TACAIR) picture to SUW aircraft.

(b) Marine Patrol and Reconnaissance Aircraft (MPRA) MAC. MPRA sensor suites (such as the P-3’s) are typically well suited and optimized to the maritime mission and are capable of maintaining and accurately tracking a substantial surface plot. However, MPRA MAC’s will rely on procedural control and deconfliction as they lack airborne radars and/or tactical data links.

(c) Tactical Aircraft MAC. In addition to mission support the tactical aircraft may be able to provide lasing capability or add FAC(A) qualified aircrew.

(d) Rotary-wing MAC. Forward-looking infrared (FLIR)-equipped helicopters may be able to laze for target marking or laser-weapon guidance. Helicopter crews may also be FAC(A) qualified.

(e) Shipboard MAC. A watchstander representing the SUWC or SCC aboard the CVN or other naval vessel will be designated as a shipboard MAC. Unless supplemented with a common data link picture, the shipboard MAC's sensors are limited to the horizon. However, a shipboard MAC may have better access to the air picture and UAS data than a tactical aircraft or helicopter MAC.

(f) MAC Assistance. In cases where P-3, MH-60R, or other MAC asset does not have a good air picture, an ACU (E-2 or E-3) can help to coordinate deconfliction of MAS assets and hand them off to the MAC as needed in order to deconflict the air picture.

d. MAS Execution.

(1) Check In. On initial check in MAS assets will pass call sign, mission number, and position with the appropriate air defense C2 (REDCROWN, GREENCROWN) before proceeding on the mission. Table 5 provides an example of a check in brief between an aircraft and the ADC.

**Table 5. MAS Asset Check-in Example**

| | |
|---|---|
| MAS Asset | *"REDCROWN, Blade 21, mission number 1151, MARKING* MOTHER's 150/20, Angels 20."* |
| REDCROWN | *"Blade 21, REDCROWN radar contact, SWEET SWEET. Proceed to XXX, contact YYY."* |

**"MARKING"* as used in this context is a naval term to describe an aircraft's position relative to a vessel's location/navigational aide.

(2) Flight leads will check in with the MAC using the check-in format shown in appendix A. If not under positive control and transiting within 50 nm of any CVN, contact STRIKE for deconfliction. Additionally, STRIKE is a good source of information for location and frequencies of other assets (MAC, tanker, CSG, or ESG).

(3) Airspace Considerations. There are numerous techniques to deconflict arriving aircraft using vertical, lateral, timing, or a combination of the three. The MAC should establish a deconfliction method that efficiently utilizes the available MAS asset's sensor/weapon capabilities and PLAYTIME while in transit, holding, and during execution. Specific platform ROT are:

(a) Fighters: MAC should plan a minimum of a 1,000' (2,000' night/ degraded visibility) vertical separation and deconfliction block for a section (two aircraft) of fighters. 2,000' (3,000' night/degraded visibility) vertical separation is desired for a division (4 aircraft). A typical altitude block is 15-25K MSL with a 15 nm x 8 nm holding area.

(b) Bombers: B-52s, B-2s and B-1s have a large turn radius. Plan a holding area of 20 nm x 10 nm. Bombers will typically hold at a higher altitude than fighter aircraft.

(c) Helicopters: Helicopters usually operate below 500' AGL. A consideration when performing MAS with helicopter assets is their repositioning time. Additionally, since helicopters often operate at low altitude, the MAC must consider the fragmentation envelope in relation to the helicopter position. As a rule of thumb use land based risk estimate distances found in FM 3-09.32; MCRP 3-16.6A; NTTP 3-09.2; AFTTP(I) 3-2.6 *Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower.*

(d) AC-130s: AC-130s will typically hold between 8,000'-12,000' AGL, and require a 5 nm x 5 nm area or larger.

(e) MPRA: MPRA, such as the P-3, typically hold below FL 200 and can hold below 10,000' AGL Due to their larger size, MPRA may require holding areas 10 nm x 10 nm or larger. When MPRAs act as a MAS asset, consideration should be given to weapon and sensor performance before assigning holding altitudes. Many MPRA lack Link-16 and rely heavily on procedural control. When feasible the MAC should provide at least 2000' vertical and several miles horizontal separation from MPRA.

(f) UAS: UAS capability to execute MAS missions varies greatly among UAS types and assigned UAS missions. UAS typically lack the ability to see and avoid manned aircraft, but they may contain other onboard systems (radio, tactical data links, IFF) which allow the MAC to use standard deconfliction (altitude, lateral, timing) measures during MAS. Due to the limited performance of UAS, it may take minutes to have a UAS laterally deconflict to a specific sector or change altitude. MACs should consider deconflicting UAS early during MAS missions to prevent slowing MAC execution later. Another major consideration when working with UAS is the lost link plan. The lost link plan is a pre-programmed route the UAS will fly if it loses contact with its control station. The MAC and UA operator must develop the lost link plan to ensure proper deconfliction.

(4) Target Area Tactics. The MAC holding and deconfliction plan should take into consideration enemy capabilities, target orientation, weather, threats, aircraft sensors, and MAS asset capabilities. Aircraft will report "established" upon arrival at the assigned position and hold as required. Hold points may be established as fixed points (i.e., lat/long), points referenced from Bullseye locations, or moving points (i.e., CVN TACAN or range/bearing from a surface contact of interest); regardless, aircrew should adjust the holding pattern to maintain station and keep their sensors in a position to search. Two deconfliction techniques are: keyhole and sectored.

(a) Keyhole Technique. The keyhole technique is an efficient and flexible method for designating a holding pattern or an initial point (IP). When MAS assets are handed off to a MAC, the MAC should immediately pass target coordinates to the MAS assets and then anchor their hold point off the target with direction and distance. Figure IV-6 depicts cardinal directions with letters of the alphabet: A – North, B – East, C – South, D – West, and E – Overhead Target. See figure 12.

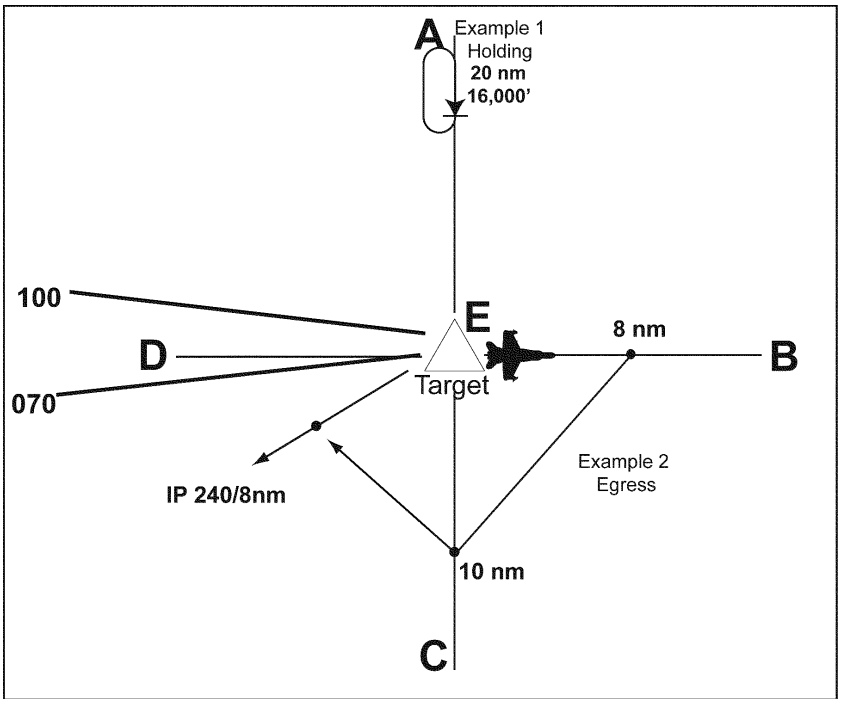


**Figure 12. Keyhole Technique**

- Example 1. If an IP is designated North of the target, example holding instructions provided to MAS assets could be: MAC—*"Stang 11, Dome 601, proceed Alpha 20, Angels 16. Report established."*
- Example 2. The MAC may also use the keyhole technique for deconfliction post target attack. For example, *"Blade 11, Dome 601. Egress east to B8, then south to C10, back to the 240 at 8."*

(b) Sectored Technique. A grid/CGRS/GARS box is another option for holding and deconfliction. A GARS description is provided in the AIMT section. MAC—*"Stang 11, Dome 601. Hold at 006AB, Angels 16. Report established."*

(5) Find/Fix/Track. Typically, units who request a MAS asset or mission must accomplish the Find/Fix/Track phases of the joint targeting process. Once the MAC has updated the target location/information they will provide this data to the attacking aircraft via the MAS 9-Line format as depicted in appendix A, "Briefing Formats."

(6) Target. Once the MAC has updated the target location information they will provide this data to the flight leads using the MAS 9-line brief as shown in appendix A. Mandatory read back items are lines 5, 6, 8, and remarks. Although similar to a CAS 9-Line, for aircrew familiarity, the MAS 9-Line is intended to focus aircrew onto mobile targets. An abbreviated MAS 9-Line may also be used, in which the MAC will only relay target and friendly/neutral vessel location with remarks, allowing the aircrew freedom of action relative to those omitted items (i.e., IP, target bearing). In the case of an abbreviated 9-Line, the MAS asset will be "targeted" with read back of lines 6 and 8 plus any remarks. The MAS asset will also be responsible for creating the desired IP and ingress headings. While the 9-line (and perhaps data link tracks) will provide initial target cueing for attacking aircraft, the dynamic nature of surface

vessels will require additional refinement for weapons employment. All contacts (friendly, neutral, or threat) located within 20 nm of the target will be reported using the target as the reference point, regardless of the full brief or abbreviated 9-Line format. Table 6 is an example of a modified MAS 9-Line.

| Table 6. Abbreviated MAS 9-Line | |
|---|---|
| Dome 11 | *"Blade 11,TARGET"* |
| 5. | *"Group 3 Oil Tanker, Liberian Registry named Cape Antwerp, Blue with white stripe. Track 270/15 Knots"* |
| 6. | *"N 31 22.400, W128 63.333"* |
| 8. | *"White shipping North 10 nm track 010/10 Knots"* |
| 9. | *"Egress to Charlie 20, Angels 19"* |
| Reply | |
| Blade 11 | *"Dome 11, Blade 11, N 31 22.400, W128 63.333, White shipping North 10 nm track 010/10 Knots, Egress Charlie 20, Angels 19"* |

(a) IP Selection. The MAC should consider the aircraft type and weapons loadout when assigning an IP for the target. If the MAC does not designate an IP, the MAS asset can employ the weapon as appropriate for platform/weapon TTP.

(b) Asset Deconfliction. The MAC should use lateral, vertical, and/or time separation to ensure the safe flow of assets and deconfliction from surface fires.

(7) Engage. Release authority will be transmitted to the weapons platform via the MAC. MAS operations can cover large areas of open water and the environment (nighttime, weather, sea state) or standoff distances may preclude the MAC from maintaining visual contact on the target and/or strikers. Therefore, a MAC shall never clear a MAS asset "hot" or verify that they are attacking the correct target. A directive call (as defined in the special instructions [SPINS]/daily intentions message [DIM]) from the MAC in conjunction with a MAS 9-line briefing authorizes the strikers to attack (e.g., ENGAGE, TARGET). Target correlation remains the responsibility of the strikers to ensure they are attacking the same target specified in the MAS 9-line. Ingress and egress flow must be carefully planned and executed to minimize risk of fratricide. Depending upon various factors the MAC may direct a single attack or multiple sequential attacks to accomplish the commander's intent.

(8) Assess. MAS assets will provide the MAC with timely mission reports (see INFLTREP format in appendix A) to include any re-strike recommendations.

### 4. Air Interdiction of Maritime Targets

a. AIMT in maritime SUW differs from MAS in that detailed tactical integration with surface forces is not required. This mission shares many common similarities with traditional air interdiction and strike coordination and reconnaissance (SCAR) missions.

b. AIMT Considerations. Maritime surface targets are considered dynamic targets due to their inherent mobility. Since AIMT missions do not require detailed tactical integration with maritime surface forces, strike coordination and reconnaissance

(SCAR) missions can be tasked in the maritime domain. SCAR in the maritime environment could be directed by a strike coordination and reconnaissance coordinator (SCARC) or as specified by the SUWC in the SPINS/DIM. The SCARC is responsible for directing all aircraft in the specified area for the associated SCAR mission. A SCARC does not have to be a forward air controller (airborne) (FAC[A]). Detailed SCAR procedures are outlined in FM 3-60.2, MCRP 3-23C, NTTP 3-03.4.3, AFTTP(I) 3-2.72 *Multi-Service Tactics, Techniques, and Procedures for Strike Coordination and Reconnaissance*.

c. Command and Control.

(1) Airborne C2 Responsibilities. Airborne C2 will build the SCARC/mission commander's situational awareness by providing the air/surface picture, AIMT surface targeting information, and coordinating flow of forces. In the AIMT role, airborne C2 will be provided by an E-2, E-3, E-8, or P-3 LSRS. In some scenarios, airborne C2 will take charge of the overall AIMT effort and assign AIMT aircraft to the area. Airborne C2 is also responsible for assigning target sets and collecting/evaluating mission reports (MISREPs). Airborne C2 should pass the surface picture via Link, BULLSEYE format, or lat/long.

(2) Tactical Aircraft C2. In permissive scenarios, a SCARC may be established to facilitate the execution of the AIMT mission. The SCARC role can be performed by any aircraft (including UAS) that has the ability to find/fix targets and communicate the coordinates and description to other strike assets or C2. In a nonpermissive scenario, a package/mission commander may be designated.

(3) Check In. AIMT assets will check in using the format in appendix A. Airborne C2 will pass PICTURE/LOWDOWN following initial check-in and will also check aircraft squawks and accomplish BULLSEYE checks.

(4) Airspace Coordination/Deconfliction. Following check-in, aircraft will be directed to a holding point, initial point, control point, or a kill box/lane. If another asset is already in the area, the asset's frequency and call sign will passed by C2 for situational awareness. This step may be combined with the picture/lowdown transmission

d. Mission Type. AIMT missions are classified as permissive or nonpermissive and can be executed using pre-planned or dynamic taskings. The degree of aircrew familiarity and Service interoperability should be considered when flexing to more dynamic taskings.

**(1) Permissive AIMT.**

(a) Assumptions.

1. Local air superiority established.

2. Standoff not required.

3. ID can be provided by own ship or off-board sensors.

(b) AIMT missions utilize the dynamic targeting process of F2T2EA. Permissive AIMT targeting considerations include:

1. Find. Because AIMT may follow a traditional SCAR at sea role, it is imperative that AIMT assets understand the commander's intent and are familiar with the joint integrated priority target list due to potential limited playtime and ordnance.

2. Fix. Identification in the AIMT mission will generally take longer to solve than in MAS or SSC due to an increased area and potentially greater standoff requirements. Refinement of target location is a key factor in the use of stand-off weapons. Refer to platform specific TTP for discussion on search and weapon pairing.

3. Track. The AIMT asset or C2 asset will use all available sensors to continuously track the target. The AIMT asset maintains situational awareness by recording the target location, assigning another AIMT asset to monitor, or handing the track off to a C2 agency. Throughout the tracking process, the target's window of vulnerability must constantly be evaluated. Destruction of all targets may not be necessary or required. However, accurate and timely reporting of all targets will help build a more accurate COP.

4. Target. Due to the range from friendly surface forces, engagement authority should be delegated to the lowest level practical.

5. Engage. To facilitate rapid engagement of targets, the SCARC will direct AIMT assets using INVESTIGATE, TARGET, and SMACK or as delegated by the supported commander and stipulated in the SPINS/ROE or in real time via C2. Smack authority is not implicit in the SCAR mission.

INVESTIGATE: Verify specified element(s) of ROE, PID, CDE, and/or coordination of forces on the referenced target/track. This implies that neither PID nor CDE has been accomplished by the SCARC. The AIMT asset should investigate the target in order to satisfy these requirements. The AIMT asset reports results of the investigation back to the SCARC.

TARGET: ROE, PID, coordination of forces, and commander's guidance requirements on the referenced target/track have been satisfied. Target/track correlation and CDE must be accomplished prior to employing ordnance/fires. Authorization to drop ordnance is granted once these conditions have been met.

SMACK: Clearance to employ ordnance/fires on surface target coordinates. ROE, PID, CDE, coordination of forces, and commander's guidance requirements on the referenced target/track have been satisfied.

6. Assess. There are no significant variations in the assess phase for permissive AIMT.

**(2) Nonpermissive AIMT.**

(a) Assumptions.

1. Acceptable level of risk is appropriate to support mission objectives.

2. Appropriate ordnance is available.

3. ID can be provided by own ship or off-board sensors.

(b) In a nonpermissive scenario an overall strike lead or mission commander should be designated who will coordinate a detailed strike package for prosecuting targets. However, if a strike lead/mission commander is not assigned, standoff AIMT will be coordinated by airborne C2. Typical standoff weapons employed against enemy surface vessels include AGM-84 (HARPOON and SLAM-ER), joint stand-off weapon (JSOW), AGM-130, and the Laser Joint Direct Attack Munition (LJDAM). In the event the threat is degraded, the strike lead or other capable aircraft should assume the role of a SCARC and conduct permissive AIMT. Nonpermissive AIMT targeting considerations are:

1. Find/Fix. When executing stand-off AIMT missions, the surface picture will generally be built by off-board sensors since AIMT aircraft may not have on-board detection of the target prior to weapons release. The picture is generally fused in the command and control agency by an E-2, E-3, E-8, or R-3 LSRS. Integrating platform data link capabilities will be critical to building a usable picture.

2. Track. Continuous tracking must be maintained to ensure consistent ID. Once the contact is lost, the find/fix phases must be reinitiated to re-establish ID.

3. Target. Free fire zones, kill boxes, or exclusion zones may be used but kill boxes are the preferred fire support coordination measure for SCAR missions. Prior to weapons employment, operators will ensure ROE is met and their sensors do not detect ID conflicts.

4. Engage. Prior to weapon release when employing long-range weapons, airspace deconfliction and waterspace management tasks must be accomplished. To the maximum extent possible, weapon and aircraft overflight of neutral shipping and friendly forces will be avoided. If over flight is unavoidable, the AIMT asset should request approval authority via C2 prior to weapon release or as stipulated in the SPINS/DIM. Reference theater specific guidance/ROE for more detail.

5. Assess. Due to employment and standoff considerations BDA/BHA may be more difficult to collect.

e. AIMT Target Area Tactics. Examples of a lane structure and a kill box are outlined in the following paragraphs.

(1) Lane Structure. In a lane structure scenario, the theater SPINS or ACO will define the lane coordinates structure, control points, lane entry and exit points, and any other applicable airspace coordination measures. Figure 13 depicts an example lane structure positioned between the threat country/axis and a carrier strike group with one refueling aircraft assigned to serve the strike aircraft located in each lane. All lanes and tanker tracks are active except lane 3N and tanker track 4. The points numbered one through five in the lanes are control points which have multiple uses including aircraft holding pattern waypoints and lane entry/exit points.

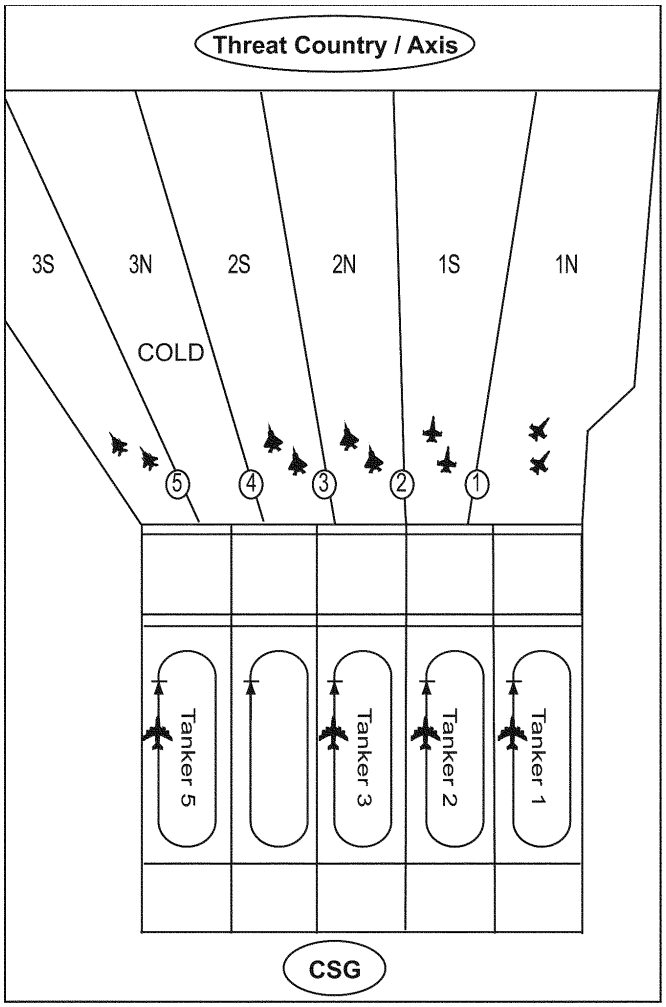


**Figure 13. Lane Structure Example**

(b) Kill Box. Figure 14 depicts a sample kill box format employing GARS. When using GARS, each 30 x 30 minute area defines one kill box. The kill box is further divided into 4 quadrants (labeled 1-4), with 5 min x 5 min keypads within each quadrant. If attacking a target in quadrant 1, then quadrants 2, 3, and 4 may be assigned to specific flights for geographic deconfliction. Using the kill box example, a sample deconfliction plan employing a SCARC (Viper 1) could sound like, *"Python 35, Viper 1, hold block 16-19, 006AB, quadrant 3. Hornet 21, working targets quadrant 1 keypad 8."* This provides an area of 15 nm by 15 nm for deconfliction but may not be optimum for sensor coverage. For bomber aircraft, the SCARC should assign two quadrants. SCAR assets should avoid the borders of their assigned quadrant by enough distance to ensure deconfliction from assets working in adjacent quadrants.

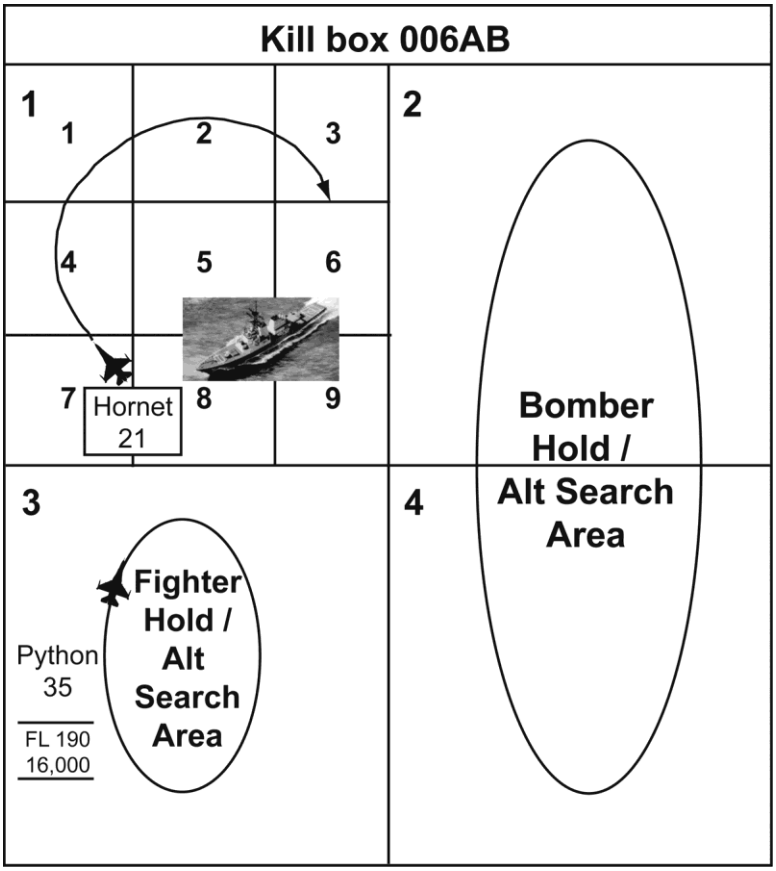


**Figure 14. GARS Enabled Kill Box**

(c) Timing. If the SCARC wants multiple elements to attack the same target array/area, the SCARC should assign time on targets (TOTs) for each element to ensure the attacks are safely deconflicted. The SCARC should attempt to assign a 2-minute TOT window to each element and separate those elements by 1 minute minimum. Consider using 2 minutes for deconfliction if SCAR assets have dramatically different groundspeeds. This approach serves to prevent timing mistakes and target obscuration from impacting SCAR asset effectiveness. If slower tempos are acceptable the SCAR may decide to employ SCAR assets one at a time with each element working until they are WINCHESTER. If an element of the SCAR flight is taking too long the SCARC should direct them to egress if this will allow more capable assets to engage the target array.

(3) Target Assignment. Targets will be passed by airborne C2 or by tactical aircraft C2.

(a) Airborne C2 only (no SCARC): Targets will be passed by airborne C2 directly to AIMT assets.

(b) Airborne C2 with Tactical Aircraft C2 (SCARC): Targets should be passed by airborne C2 to the SCARC. The SCARC will coordinate prosecution with AIMT assets.

(4) Engagement authority from the JFMCC may be provided by the SUWC via the MAC, even in cases where the aircrew is beyond visual range of the target.

Engagement instructions will be passed using the MAS 9-line or modified 9-line. Table 5 depicts engagement instructions using a modified 9-line for permissive AIMT. Do not transmit line numbers.

(5) Employment: Aircrew will reply to the 9-line with mandatory read back items [lines 5, 6, 8, and remarks] and communicate the appropriate brevity code (e.g. RIFLE, LONGRIFLE, BRUISER, etc.) post weapon release.

(6) MISREPs: Table 7 lists an example MISREP. It is critical to pass BDA/BHA in order to optimize re-attacks if required. Do not transmit line numbers.

**Table 7. Mission Report Example**

| | |
|---|---|
| Blade 11 | *"Dome 11, Blade 11, MISREP to follow"* |
| 1. | *"Blade 11"* |
| 2. | *"Mission Number 1151"* |
| 3. | *"Request number 1152 Oil Tanker"* |
| 4. | *"N 31 22.400 W128 63.3331"* |
| 5. | *"TOT: 1315Z"* |
| 6. | *"K-KILL"* |
| Remarks | *"1 GBU-12 and 400 rounds 20mm expended, no re-strike required, 1 GBU-12 remaining"* |
| Reply | |
| Dome 11 | *"Copy, switch to REDCROWN"* |

(7) Checkout: Check out when directed by C2 or when munitions/fuel/ vulnerability time expires.

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## Appendix A:
## BRIEFING FORMATS

### 1. Check-in Brief

The check-in brief is used to identify AOMSW assets and capabilities to airspace controlling authorities. Do not transmit line numbers.

| Table 8. Check-in Brief (aircraft transmits to controller) |
|---|
| Aircraft: "_____, _____"<br>(Airspace Controller Call Sign) (AOMSW Asset Call Sign)<br>1. Identification / Authentication "_____"<br>2. Number and Type of Aircraft "_____"<br>3. Position and Altitude "_____"<br>4. Ordnance "_____"<br>5. On-station Time "_____"<br>6. Abort Code "_____"<br>Remarks (as appropriate): "_____" |
| ***Note:*** Abort code may be N/A. The AOMSW asset should expect to receive holding and deconfliction instructions from the airspace controller. |

## 2. Surface Contact Report

The Surface Contact Report is used when reporting standardized information on vessel or tracks of interest. Do not transmit line numbers.

**Table 9. Surface Contact Report**

1. Contact/Track #: "_____"
2. Position: "_____" (Lat/Long)
3. Course/Speed: "_____"
4: Ship Type: "_____"
*5. Ship Name/Hull#: "_____"
6. Ship Flag: "_____"
7. Time: "_____" (Zulu)

Remarks: "_____"

(Ship or Deck Activity/Cargo/Homeport)

*In the absence of ship name/hull #, provide a description, example hull, waterline, superstructure, color, distinctive features, etc.

### 3. MAS 9-Line

The MAS 9-line is modeled after the CAS 9-line format and has been modified for the AOMSW mission to streamline passing target information to an AOMSW asset. The MAS 9-Line format should be read in groups of three without transmitting line numbers. **Bold** denotes read back items when requested.

**Table 10. MAS Briefing Form (9 Line)**

Airspace Controller: "_____", "_____"
(aircraft call sign) (airspace controller call sign)

1. IP: "_____" (Lat/Long, GEOREF)

2. Heading (bearing): "_____" (magnetic)

   Offset: "_____" (left/right)

3. Distance (range): "_____" (IP to target in nm)

4. Target Elevation: "_____" (feet MSL)
   (usually zero in MAS scenario)

**5. Target Description:** "_____" (include course and speed)

**6. Target Location:** "_____"
(latitude/longitude or grid coordinates or offsets or visual)

7. Type Mark: "_____", Code: "_____" (laser, IR)

**8. Location of friendlies or neutrals:** "_____"
Position marked by: "_____"

9. Egress: "_____"

**Remarks (as appropriate):** "_____"

Line 6: If attacking multiple ships in close proximity to each other, describe each ship in line 6. (Multiple targets not in close proximity will require multiple 9-lines). Close proximity is defined as 1 nm spacing or less.

Line 7: Laser and code, or other means of marking (IR pointer, fires, etc.)

Line 8. Magnetic bearing and range in nautical miles to any friendlies and neutrals in close proximity to target. Referenced from target location given in line 6.

Line 9: Egress direction in magnetic heading.

## 4. Checkout Briefing Format

The inflight report (INFLTREP) is used to report actions taken during AOMSW missions. Do not transmit line numbers.

| Table 11. Checkout Briefing (INFLTREP) |
|---|
| 1. Call Sign: "_____"<br>2. Mission Number: "_____"<br>3. Request Number/Target: "_____"<br>4. Target Location: "_____"<br>5. TOT: "_____"<br>*6. Results: "_____" |
| *Results: May include but not limited to ordnance expended, ordnance remaining, re-strike, BDA/BHA, etc. |

## 5. Surface Picture Report

The surface picture report (SURPIC) is a two-page guide used to record standardized information about surface contacts. AOMSW assets fill out the first page utilizing information from page two that best matches the details of the surface contact.

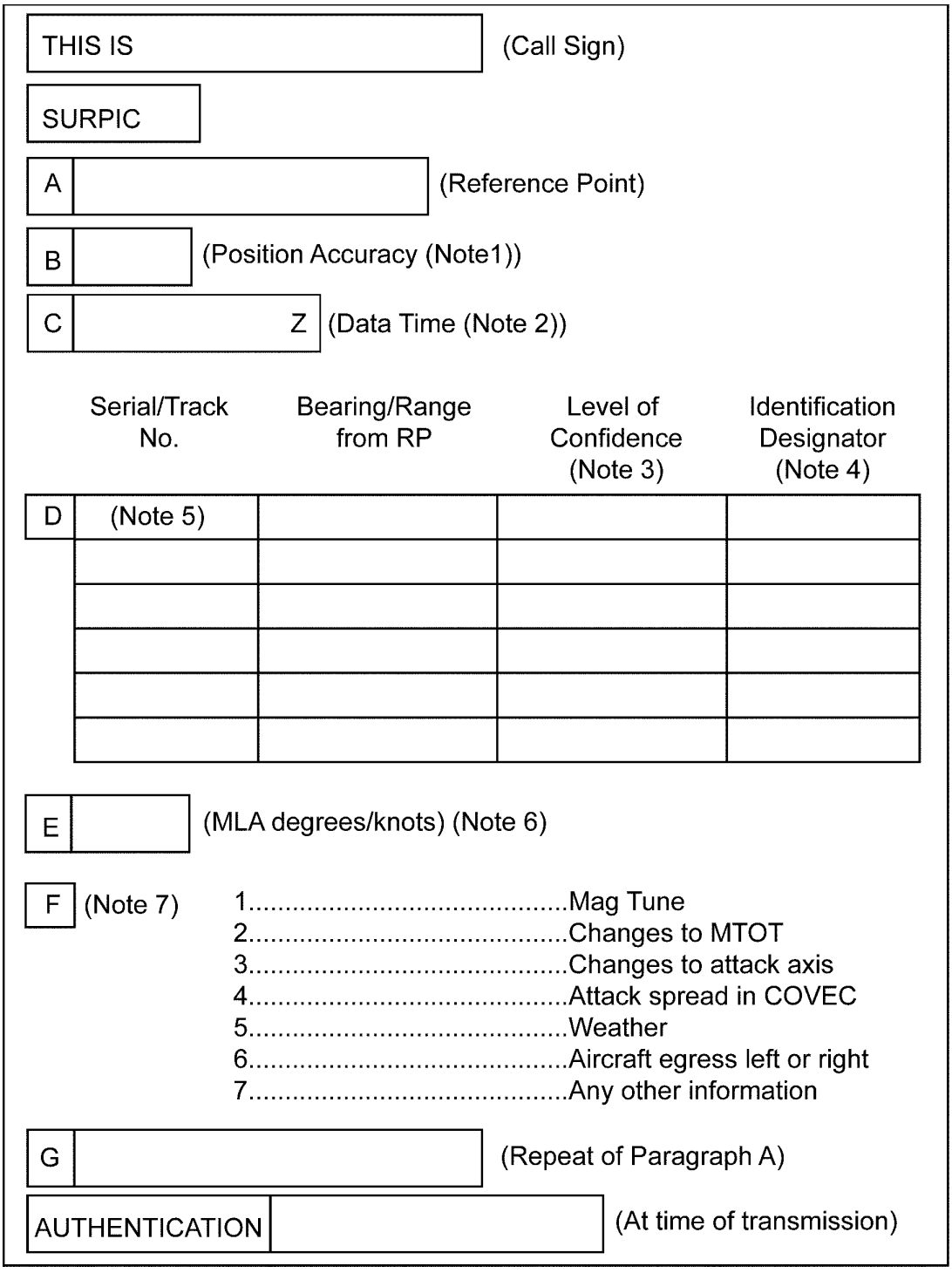



**Figure 15. Surface Picture Report (front side)**

Notes:

1. The estimated accuracy of the RP is to be denoted by an accuracy suffix selected by the reporting unit from the following:

| | |
|---|---|
| X-RAY ALFA | - within 1 nm |
| X-RAY BRAVO | - within 2 nm |
| YANKEE ALFA | - within 3 nm |
| YANKEE BRAVO | - within 4 nm |
| YANKEE CHARLIE | - within 6 nm |
| YANKEE DELTA | - within 8 nm |
| YANKEE ECHO | - within 10 nm |
| ZULU | - worse than 10 nm |

2. Data time is the time (ZULU) of the contact's last known position.

3.

| | |
|---|---|
| CERT | - Contact has been sighted and positively identified by a competent observer. |
| PROB | - Contact classified using an imaging sensor to naval class supported by evidence from another sensor or good intelligence |
| POSS HIGH | - Contact classified using imaging sensor to naval class, or nonimaging radar with corroborating unique ES. |
| POSS LOW | - Contact classified using an imaging sensor to naval class (combatant, merchant/auxiliary, landing platform, small craft) or, nonimaging radar but with intelligence or corroborating nonunique ES. |
| UNK | - Contact about which the operator is unsure. |

4.

| General Type | Specific Type (from STANAG 1166) | |
|---|---|---|
| AA – Auxiliary | AGI | - Intelligence Collector |
| | AO | - Oil Tanker, General |
| | AS | - Submarine Tender |
| | AK | - Cargo Ship, Naval |
| TM – Merchant Ship | TMB | - Bulk Carrier |
| | TMP | - Passenger Ship |
| | TMO | - Tanker |
| | TMZ | - Oil Rig |
| TU – Fishing Vessel | TUF | - Fish Factory Ship |
| CC – Cruiser | CG | - Guided Missile Cruiser |
| CV – Aircraft Carrier | CVH | - Helicopter Carrier |
| | CVS | - ASW Support Center |
| DD – Destroyer | DG | - Guided Missile Destroyer |
| FF – Frigate | FG | - Guided Missile Frigate |
| JJ – Skunk | JJ | - Unidentified or enemy surface contact detected by radar |
| | JU | - Unidentified or enemy large surface contact detected by radar |
| | JM | - Unidentified or enemy medium surface contact detected by radar |
| | JS | - Unidentified or enemy small surface contact detected by radar |
| | JV | - Unidentified large warship > 500 feet |
| | JW | - Unidentified medium warship > 300 feet |
| | JX | - Unidentified small warship < 300 feet |
| LL – Amphibious Craft | LHA | - Amphibious General Assault Ship |
| | LPH | - Amphibious Assault Ship, Helicopter |
| MM – Mine Warfare Vessel | | |
| PP – Motor/Patrol Craft, Fast | PBF | - Patrol Boat, Fast |

5. DELTA should contain one track unless several tracks in the same general vicinity can be reported as one of the same data time (field C) and with the same MLA (field E).

6. The MLA of the target/target group is to be reported (degrees true/speed in knots). Significant variations, by individual units, may be included in paragraph F.

7. F1. Magnetic/True. All bearings passed are true or magnetic.
F2. Any alteration to mean time on target (MTOT). (Passed as a plus or minus figure on the MTOT ordered in the tasking message.)
F3. Any change in attack axis (plus or minus degrees)
F4. Axis spread [covert vector (COVEC) values will be added].
F5. Weather (to include wind, temperature, and any known areas or turbulent clouds that may affect the attack run).
F6. Egress left/right (this is a B-52 unique field not applicable to SSC).
F7. Any other information.
Normally only F1 and F7 are contained in SSC SURPIC reports.

**Figure 16. Surface Picture Report (back side)**

## Appendix B:
## US SURFACE VESSEL IDENTIFICATION

### 1. US Surface Vessel Identification

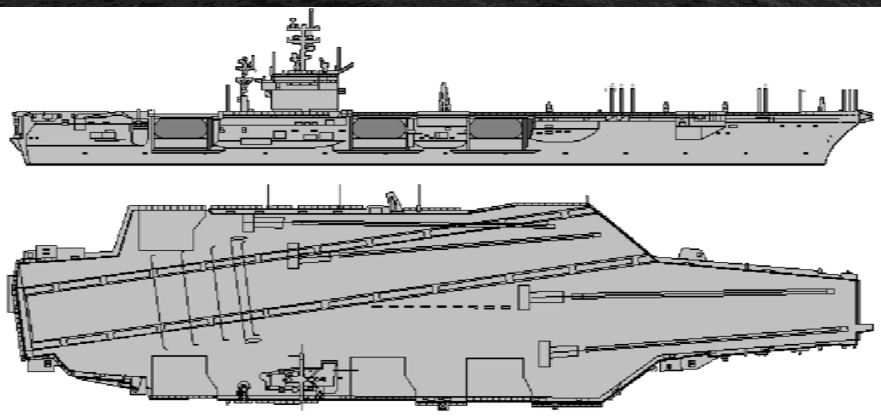
The following pictures and descriptions are intended to provide the user a visual reference to commonly encountered US surface vessels. Proper recognition of friendly assets is useful in preventing fratricide during surface vessel engagements.

### 2. Aircraft Carriers

Nimitz Class Aircraft carriers are deployed worldwide in support of US interests and commitments. They can respond to global crises in ways ranging from peacetime presence to full-scale war. Together with their on-board air wings, the aircraft carriers play vital roles across the full spectrum of conflict.

General Characteristics:

- 10 of 10 remaining in active service
- 1,040 feet in length, 134 feet wide
- Missile and gun air defense systems

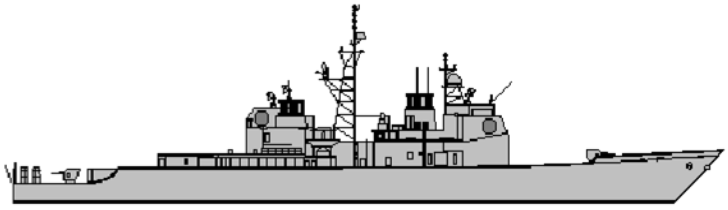


## 3. Cruisers

Ticonderoga Class Guided-Missile Cruisers. Modern US Navy guided missile cruisers perform primarily in a battle force role. These ships are multi-mission surface combatants capable of supporting carrier battle groups, amphibious forces, or operating independently and as flagships of surface action groups. Cruisers are equipped with Tomahawk land attack cruise missiles.

General Characteristics:

- 22 of 27 ships still active
- 567 feet long, 55 feet wide
- Armament:
- SM-2 Standard SAM
- 2 x 5 inch
- Mk-45 (lightweight gun)
- 2 x 20 mm Phalanx CIWS
- 2 x SH-60 Seahawk LAMPS III helicopters

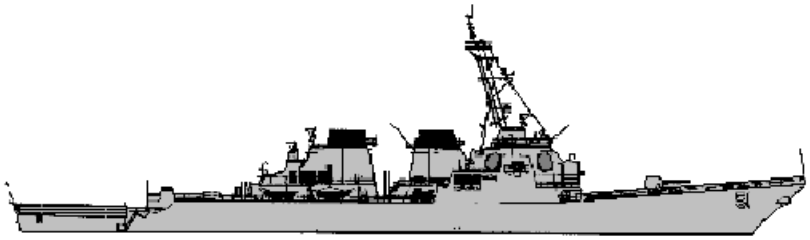
## 4. Destroyers

Arleigh Burke Class Guided-Missile Destroyers. The Arleigh Burke class destroyer employs the same Aegis weapons system developed for the CG-47 class and employs an array of weapons and sensors into a multi-mission warship. The Aegis combat system integrates air, surface, anti-submarine warfare sensors and engagement systems. It is capable of firing Standard SM-2 Block III/IV surface-to-air missiles.

General Characteristics:

- All 52 Arleigh Burke Destroyers are active
- 505 feet long, 59 feet wide
- Armament
- 1 x 5 inch (127 mm/54 or 62) Mk-45 lightweight gun
- 2 x 20mm Phalanx CIWS
- 2 x SH-60 Seahawk LAMPS III helicopters

Note: Flight IIA (DDG-79 Oscar Austin and higher) Arleigh burke class DDGs have one or two helicopters onboard. Flight I and II Arleigh Burke DDGs do not have helicopters on board.

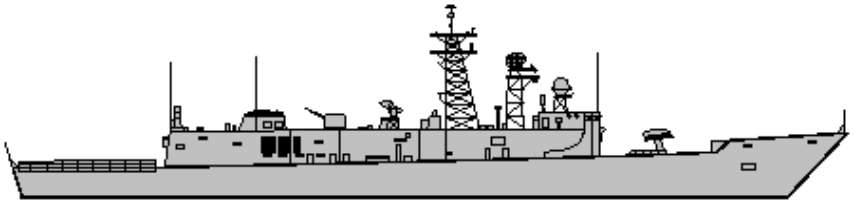


## 5. Frigates

Oliver Hazard Perry Class Guided-Missile Frigates. The guided-missile frigates bring a short range anti-air warfare capability provided by their Phalanx CIWS to the frigate mission. This class is a robust platform, capable of withstanding considerable damage.

General Characteristics:

- 30 of 50 ships still active
- 445 feet long, 45 feet wide
- Armament:
- 1 x 76 mm (3-inch)/62 caliber MK 75 rapid fire gun
- 1 x Phalanx CIWS



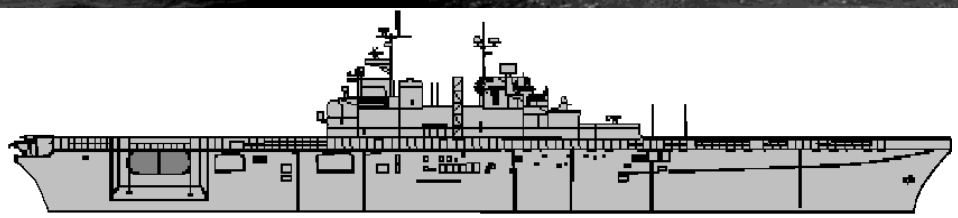
## 6. Amphibious Assault Ships

Amphibious assault ships are designed to land forces on hostile shores. While they may resemble an aircraft carrier, their primary role may not be to operate fixed wing aircraft. This class usually has a large air wing of helicopters which are dedicated to ferrying troops and equipment ashore from the ships.

a. The Wasp class vessels are the largest amphibious ships in the world. WASP class ships are the first to be specifically designed to accommodate the AV-8B Harrier jump jet and the LCAC hovercraft, along with the full range of Navy and Marine helicopters, conventional landing craft, and amphibious assault vehicles to support a Marine Expeditionary Unit of 2,000 Marines.

General Characteristics:

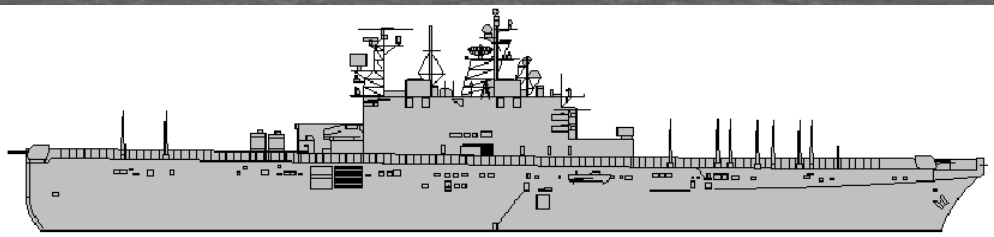
- All 7 Wasp class ships are active
- 844 feet long, 106 feet wide
- Armament:
- Rolling Airframe Missile
- Sea Sparrow Missiles
- 2 x Phalanx CIWS



b. Tarawa Class Amphibious Assault Ship. These ships have the general profile of an aircraft carrier, with superstructure to starboard. They can support a 35-aircraft complement including AV-8B jet and AH-1, CH-53E, and CH-46D/E helicopters.

General Characteristics:

- 4 of 5 Tarawa class ships are active
- 820 feet long, 106 feet wide
- Armament:
- Rolling Airframe Missile
- 2 x Phalanx CIWS
- Mk 38 Cannons



## 7. Amphibious Transport Docks

The amphibious transport dock is a warship that embarks, transports, and lands elements of a landing force for expeditionary warfare missions. The ships primary use is as a landing craft, although they have a limited airborne capability.

a. San Antonio Class. The San Antonio class is a multi-mission ship designed to accommodate all elements of the Marine Corps landing capability. It is designed to support embarking, transporting, and landing elements of a Marine landing force in an assault by helicopters, landing craft, and amphibious vehicles.

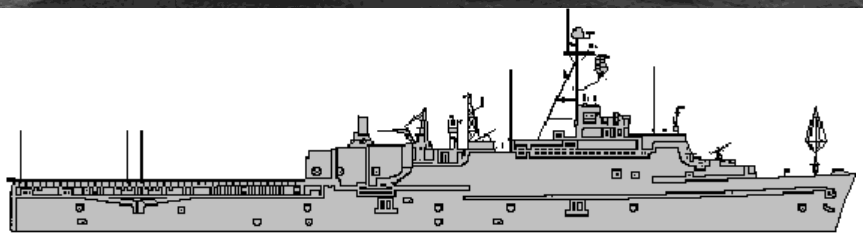
General Characteristics:

- 3 of 9 San Antonio class LPD ships are active (6 have yet to be commissioned)
- 684 feet long, 105 feet wide
- Armament:
- Bushmaster II 30mm guns
- Rolling Airframe Missiles

b. Austin Class Amphibious Transport Dock. The Austin class is used to transport and land Marines, equipment, and supplies by embarked landing craft or amphibious vehicles augmented by helicopters during amphibious assault.

General Characteristics:

- 6 of 12 Austin class LPD ships are active
- 570 feet long, 84 feet wide
- Armament:
- Mk 38 guns
- 2 x Phalanx CIWS

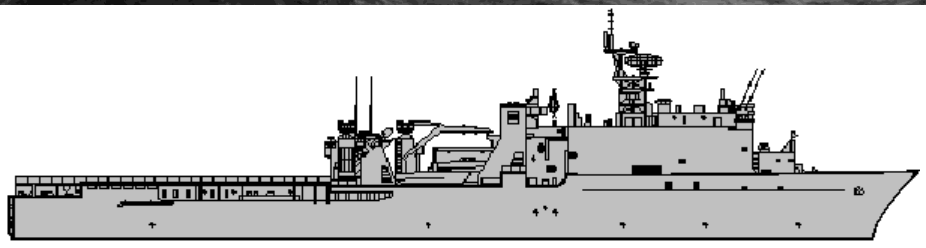


## 8. Dock Landing Ship

Whidbey Island Class Dock Landing Ship. The Whidbey Island class dock landing ship is designed to support amphibious operations. These amphibious assault ships transport and launch amphibious craft and vehicles with their crews and embarked personnel. They are mainly used to carry Landing Craft Air Cushions, and also Marines.

General Characteristics:

- All 7 Whidbey Island ships are active
- 609 feet long, 84 feet wide
- Armament:
- Rolling Airframe Missiles
- Mk 15 Vulcan Phalanx
- Mk 38 25mm guns

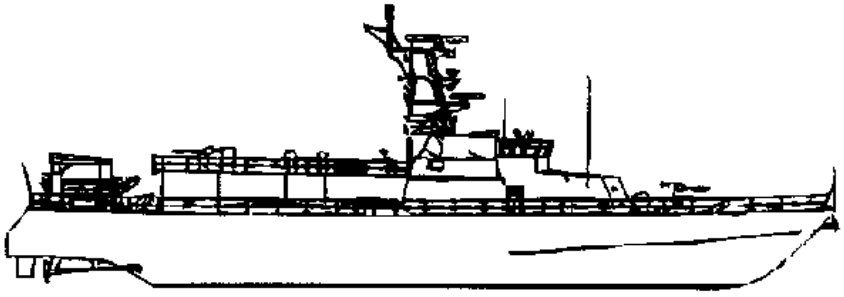


## 9. Coastal Patrol Ships

Cyclone Class Coastal Patrol Ships. The primary mission of these ships is coastal patrol and interdiction surveillance in support of littoral operations. Outlined in the Navy's strategy, "Forward...From the Sea." This class of ship is particularly suited for the maritime homeland security mission and has been employed jointly with the US Coast Guard to help protect our nation's coastline. This class has also been forward deployed in support of the war on terrorism.

General Characteristics:

- 8 of 14 coastal patrol ships remain active with the US Navy
- 170 feet long, 25 feet wide
- Armament:
- Mk 96 machine guns
- Mk 38 25mm machine guns
- Various small arms

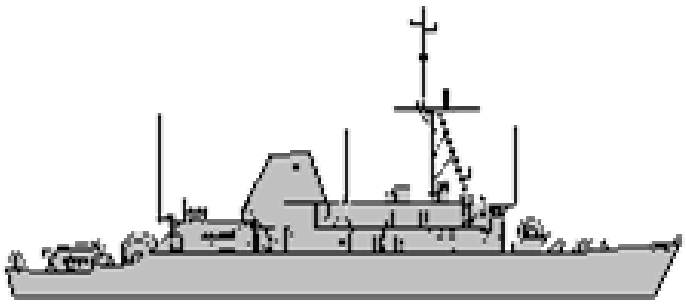


## 10. Mine Countermeasures Ships

Avenger class mine countermeasures ships. These ships were designed as mine hunter-killers capable of finding, classifying, and destroying moored and bottom mines. Their mission is to detect, classify, and neutralize all known and projected types of influence and contact mines. They perform precise navigation and clear minefields by sweeping moored, magnetic, and acoustic influence mines.

General Characteristics:

- All 14 Avenger class ships are active
- 224 feet long, 39 feet wide
- Armament:
- Small arms only

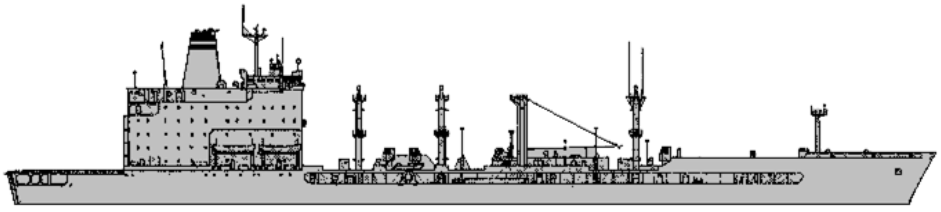



## 11. Auxiliary Ships

The Henry J. Kaiser class of ships is composed of fleet replenishment oilers which began construction in August of 1984. The class is comprised of eighteen underway replenishment oilers which are operated by Military Sealift Command to provide underway replenishment of fuel to US Navy combat ships and jet fuel for aircraft aboard aircraft carriers at sea.

General Characteristics:

- 13 of 18 are still active
- 677 feet long, 98 feet wide
- Armament:
- Small arms only

## Appendix C:
## MERCHANT SURFACE VESSEL CLASSIFICATION GUIDE

Aircrews need to be familiar with the basic visual recognition guide for groups one, two, and three merchant ships. The recognition process is broken down into three phases: appearance group, hull profile, and upright sequence. Additionally, general comments about the contact of interest are provided. The three group classifications are as follows:

Group 1: Large superstructure—superstructure exceeds one-third of the overall length of the ship.

Group 2: Composite (block) superstructure, funnel amidships—superstructure amidships less than one-third of the overall length of the ship. These ships generally have a small block-like superstructure with deck space devoted to cargo-handling equipment and hatches.

Group 3: Funnel aft—funnel is located on the aft third of the ship; however, if the superstructure exceeds one-third of the overall length, the ship remains in group one.

Auxiliary: Those that do not fall into the categories listed above.

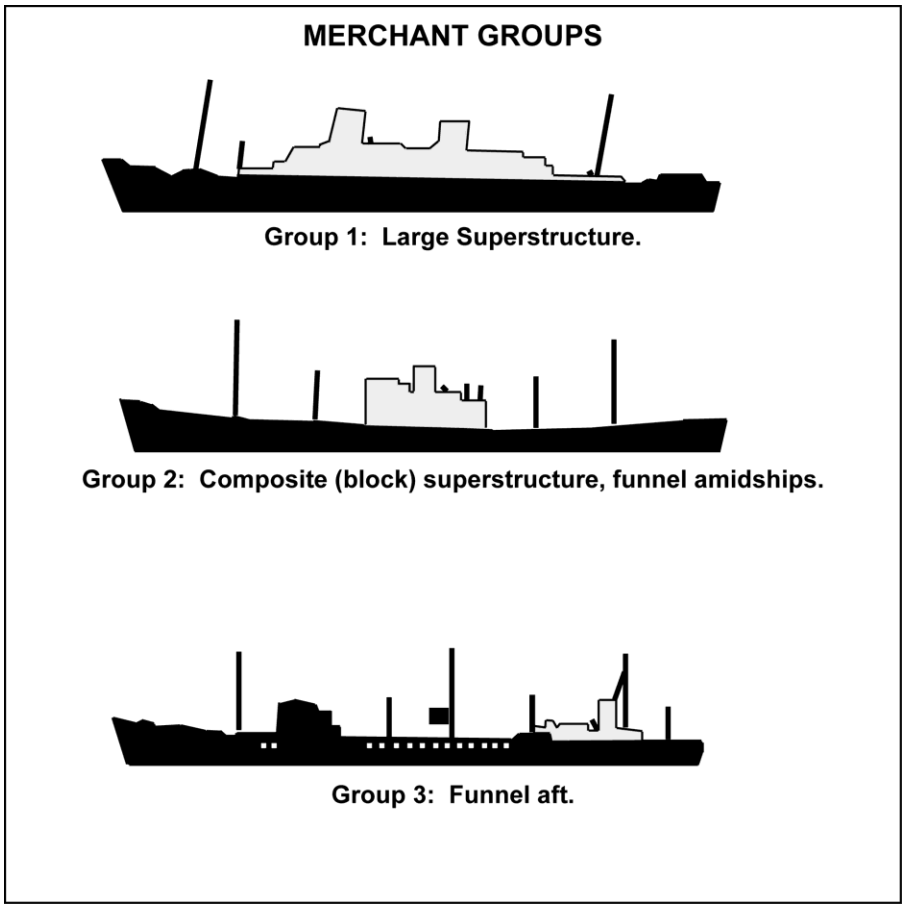



**Figure 17. Merchant Vessel Groups**

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# GLOSSARY

## PART I – ABBREVIATIONS AND ACRONYMS

**A**

| | |
|---|---|
| ACO | airspace control order |
| ACU | aircraft control unit |
| ADC | air defense commander |
| AFDD | Air Force Doctrine Document |
| AFI | Air Force Instruction |
| AFTTP | Air Force tactics, techniques, and procedures |
| AIMT | air interdiction of maritime target |
| ALR | acceptable level of risk |
| ALSA | Air Land Sea Application Center |
| AO | area of operations |
| AOMSW | air operations in maritime surface warfare |
| ATO | air tasking order |

**B**

| | |
|---|---|
| BHA | bomb hit assessment |

**C**

| | |
|---|---|
| C2 | command and control |
| CAS | close air support |
| CDE | collateral damage estimation |
| CGRS | common geographic reference system |
| CIEA | classification, identification, and engagement area |
| CIWS | Close-in Weapon System |
| COI | contacts of interest |
| CCOI | critical contacts of interest |
| CONOPS | concept of operations |
| CONPLAN | concept plan |
| COP | common operational picture |
| CSG | carrier strike group |
| CVN | aircraft carrier, nuclear |
| CVW | carrier air wing |
| CWC | composite warfare commander |

**D**

| | |
|---|---|
| DEZ | Dual Engagement Zone |
| DIM | daily intentions message |
| DOD | Department of Defense |

**E**

| | |
|---|---|
| EO-IR | electro-optical-infrared |
| ESG | expeditionary strike group |

**F**

| | |
|---|---|
| F2T2EA | find, fix, track, target, engage, and assess |
| FAC(A) | forward air controller (airborne) |
| FLIR | forward-looking infrared |

**G**

| | |
|---|---|
| GARS | Global Area Reference System |
| GEOREF | geographic reference |

**I**

| | |
|---|---|
| ID | identification |
| IFF | identification friend or foe |
| INFLTREP | inflight report |
| IMC | instrument meteorological conditions |
| IP | initial point |
| IR | infrared |
| ISR | intelligence, surveillance, and reconnaissance |

**J-K**

| | |
|---|---|
| JDAM | Joint Direct Attack Munition |
| JFC | joint force commander |
| JFMCC | joint force maritime component commander |
| JMEM | Joint Munitions Effectiveness Manual |
| JP | joint publication |
| JSOW | joint stand-off weapon |
| JWS | JMEM weaponeering system |
| K-KILL | catastrophic kill |

**L**

| | |
|---|---|
| LAT | latitude |
| LHA | amphibious assault ship (general purpose) (multi-purpose) |
| LHD | amphibious assault ship (dock) |
| LKP | last known position |
| LONG | longitude |
| LSRS | littoral surveillance radar system |

**M**

| | |
|---|---|
| MAC | maritime air controller |
| MAS | maritime air support |

| | |
|---|---|
| MILSTRIP | military standard requisitioning and issue procedure |
| MISREP | mission report |
| MPRA | maritime patrol and reconnaissance aircraft |
| MSL | mean sea level |
| MTTP | multi-Service tactics, techniques, and procedures |

**N**

| | |
|---|---|
| NDP | Naval Doctrine Publication |
| NM | nautical mile |
| NTRP | Navy tactical reference publication |
| NTTP | Navy tactics, techniques, and procedures |
| NWDC | Navy Warfare Development Center |
| NWP | Naval Warfare Publication |

**O-P-Q**

| | |
|---|---|
| OPLAN | operation plan |
| OPTASK | operation task |
| OTC | officer in tactical command |
| PID | positive identification |
| POC | point of contact |
| PWC | principle warfare commander |

**R**

| | |
|---|---|
| ROE | rules of engagement |
| ROT | rules of thumb |

**S**

| | |
|---|---|
| SA | surveillance area |
| SAG | surface action group |
| SCAR | strike coordination and reconnaissance |
| SCARC | strike coordination and reconnaissance coordinator |
| SCC | sea combat commander |
| SEAD | suppression of enemy air defenses |
| SIPRNet | SECRET Internet Protocol Router Network |
| SITREP | situation report |
| SM | statute mile |
| SPINS | special instructions |
| SSC | surface surveillance coordination |
| SUW | Surface Warfare |
| SWDG | Surface Warfare Development Group |

**T**

| | |
|---|---|
| TACAIR | tactical air |
| TACAN | tactical air navigation |

| | |
|---|---|
| TACC | tactical air command center |
| TIC | troops in contact |
| TOT | time on target |
| TTP | tactics, techniques, and procedures |

**U-Z**

| | |
|---|---|
| UAS | unmanned aircraft system |
| US | United States |
| USAF | United States Air Force |
| USCG | United States Coast Guard |
| USN | United States Navy |
| VA | vital area |
| VHF | very high frequency |
| VOI | vessel of interest |

## PART II – TERMS AND DEFINITIONS

**aircraft carrier—**A warship designed to support and operate aircraft, engage in attacks on targets afloat or ashore, and engage in sustained operations in support of other forces. Designated as CV or CVN. CVN is nuclear powered. (JP 1-02)

**airspace control order—**An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document. Also called ACO. (JP 3-52)

**air superiority—**That degree of dominance in the air battle of one force over another that permits the conduct of operations by the former and its related land, sea, and air forces at a given time and place without prohibitive interference by the opposing force. (JP 3-30)

**air tasking order—**A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called ATO. (JP 3-30)

**area of operations—**An operational area defined by the joint force commander for land and maritime forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. Also called AO. (JP 1-02)

**BULLSEYE—**An established reference point from which the position of an object can be referenced by bearing (Magnetic) and range (NM) from this point. (Multi-Service Brevity Codes)

**carrier airwing air plan—**A graphical representation of flight operations which lists call signs, tactical frequencies, launch/recovery times, flight composition, and fuel/ordnance loads.

**close air support—**Air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. Also called CAS. (JP 3-0)

**command and control—**The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2. (JP 3-0)

**common operational picture—**A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness. Also called COP. (JP 3-0)

**composite warfare commander—**The officer in tactical command is normally the composite warfare commander. However the composite warfare commander concept allows an officer in tactical command to delegate tactical command to the composite warfare commander. The composite warfare commander wages combat operations to counter threats to the force and to maintain tactical sea control with assets assigned; while the officer in tactical command retains close control of power projection and strategic sea control operations. Also called CWC. (JP 3-02)

**due regard—**Military operational situations may not lend themselves to ICAO flight procedures; e.g., military contingencies, classified missions, politically sensitive missions, routine aircraft carrier operations, and some training activities. Operations not conducted under ICAO flight procedures are conducted under the **"due regard"** or "operational" prerogative of military aircraft are subject to one or more of the following conditions:

1. Aircraft shall be operated in visual meteorological conditions.
2. Aircraft shall be operated within surveillance and radio/satellite communications of a surface and/or airborne facility.
3. Aircraft shall be equipped with airborne radar that is sufficient to provide separation between themselves, aircraft they may be controlling, and other aircraft.
4. Aircraft shall be operated outside controlled airspace.

(Department of Defense Instruction 4540.01)

**dynamic targeting—**Targeting that prosecutes targets identified too late, or not selected for action in time to be included in deliberate targeting. (JP 3-0)

**expeditionary strike group air plan—**A graphical representation of flight operations which lists call signs, tactical frequencies, launch/recovery times, flight composition, and fuel/ordnance loads.

**forward air controller (airborne)—**A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an

airborne extension of the tactical air control party. Also called FAC(A). (JP 3-09.3)

**forward-looking infrared—**An airborne, electro-optical thermal imaging device that detects far-infrared energy, converts the energy into an electronic signal, and provides a visible image for day or night viewing. Also called FLIR. (JP 3-09.3)

**HOSTILE—**A contact identified as enemy upon which clearance to fire is authorized in accordance with theater rules of engagement. (Multi-Service Brevity Codes)

**identification—**1. The process of determining the friendly or hostile character of an unknown detected contact. 2. In arms control, the process of determining which nation is responsible for the detected violations of any arms control measure. 3. In ground combat operations, discrimination between recognizable objects as being friendly or enemy, or the name that belongs to the object as a member of a class. Also called ID. (JP 1-02)

**identification, friend or foe—**A device that emits a signal positively identifying it as a friendly. Also called IFF. (JP 1-02)

**initial point (IP)—**1. The first point at which a moving target is located on a plotting board. 2. A well-defined point, easily distinguishable visually and/or electronically, used as a starting point for the bomb run to the target. 3. airborne--A point close to the landing area where serials (troop carrier air formations) make final alterations in course to pass over individual drop or landing zones. 4. helicopter--An air control point in the vicinity of the landing zone from which individual flights of helicopters are directed to their prescribed landing sites. 5. Any designated place at which a column or element thereof is formed by the successive arrival of its various subdivisions, and comes under the control of the commander ordering the move. Also called IP. (JP 3-09.1)

**intelligence, surveillance, and reconnaissance—**An activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence and operations function. Also called ISR. (JP 2-01)

**joint force maritime component commander—**The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking maritime forces and assets; planning and coordinating maritime operations; or accomplishing such operational missions as may be assigned. The joint force maritime component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. Also called JFMCC. (JP 3-0)

**kill box—**A three-dimensional area used to facilitate the integration of joint fires. (JP 3-09)

**LOWDOWN—**A request to provide tactical ground information pertinent to the mission in a digital bullseye format. (Multi-Service Brevity Codes)

**PICTURE—**A request to provide air information pertinent to the mission in a digital bullseye format unless briefed otherwise. (Multi-Service Brevity Codes)

**positive identification—**Identification criteria established in the rules of engagement that requires a potential target to be identified as a valid target prior to engagement. Positive identification criteria may vary from operation to operation because the joint force commander and subordinate commanders will establish requirements for positive identification prior to combat operations, in order to achieve the required confidence of target identification for engagement. Also called PID.

**principle warfare commander—**Under the composite warfare commander (CWC) concept and subordinate to the officer in tactical command and CWC are six principal warfare commanders: Air Defense Commander (ADC), Antisubmarine Commander (ASWC), Information Warfare Commander (IWC), Strike Warfare Commander (STWC), Sea Combat Commander (SCC), and Surface Warfare Commander (SUWC). The SUWC and SCC are sometimes combined under one warfare commander. Also called PWC. (NTRP 1-02)

**rules of engagement—**Directives issued by competent military authority that delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered. Also called ROE. (JP 1-02)

**SHADOW—**Follow indicated target. (Multi-Service Brevity Codes)

**SOUR—**Invalid/no response to an administrative IFF/SIF check. (Multi-Service Brevity Codes)

**strike coordination and reconnaissance—**A mission flown for the purpose of detecting targets and coordinating or performing attack or reconnaissance on those targets. Strike coordination and reconnaissance missions are flown in a specific geographic area and are an element of the command and control interface to coordinate multiple flights, detect and attack targets, neutralize enemy air defenses, and provide battle damage assessment. Also called SCAR. (JP3-03)

**strike coordination and reconnaissance coordinator—**The individual that is responsible for directing all aircraft in the specified area for that associated SCAR mission. The SCARC does not have to be a FAC(A). Also called SCARC.

**SWEET—**Valid response to an administrative IFF/SIF check request. (Multi-Service Brevity Codes)

**suppression of enemy air defenses—**Activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. Also called SEAD. (JP 3-01)

**time on target—**1. Time at which aircraft are scheduled to attack/photograph the target. 2. The actual time at which aircraft attack/photograph the target. 3. The time at which a nuclear detonation as planned at a specified desired ground zero. Also called TOT. (JP 3-09.3)

**unmanned aircraft system—**That system, whose components include the necessary equipment, network, and personnel to control an unmanned aircraft. Also called UAS. (JP 3-03)

**waterspace management—**The allocation of surface and underwater spaces into areas and the implementation of agreed procedures to permit the coordination of assets. The intention is to prevent mutual interference between submarines or between submarines and other assets, while enabling optimum use to be made of all undersea warfare assets involved. Also called WSM. (NTRP 1-02)

**WINCHESTER—**No ordnance remaining. (Multi-Service Brevity Codes)

**17 November 2008**

By Order of the Secretary of the Air Force

STEPHEN J. MILLER
Major General, USAF
Commander
Curtis E. LeMay Center for Doctrine Development and Education

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