U.S. NAVY	NTTP 3-04M	U.S. MARINE CORPS	MCTP 13-10L
U.S. COAST GUARD	CGTTP 3-90.5	U.S. ARMY	ATP 3-04.19
U.S. AIR FORCE	AFTTP 3-2.4	U.S. SPECIAL OPERATIONS COMMAND	Pub 3-04

MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR SHIPBOARD HELICOPTER AND TILTROTOR AIRCRAFT OPERATIONS

EDITION MARCH 2019

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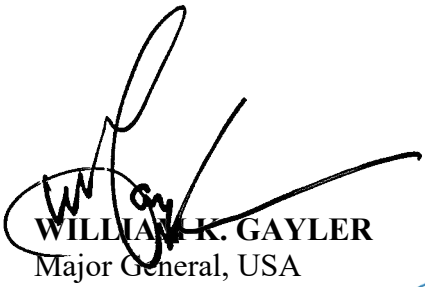

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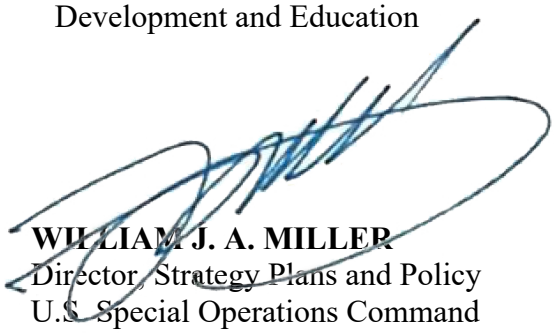

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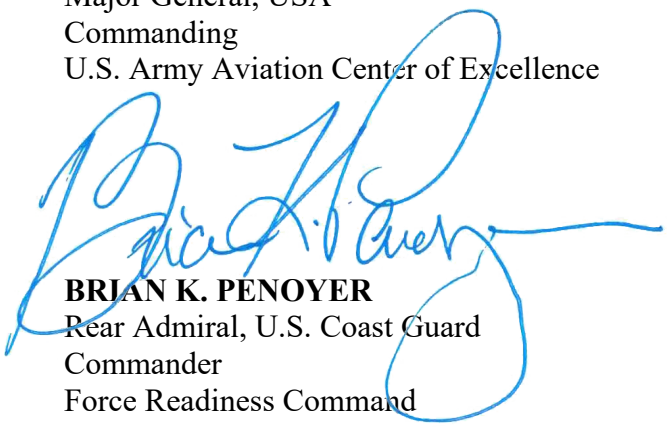

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April 2025

ERRATUM NOTIFICATION

1. PURPOSE. Erratum 1 to NTTP 3-04M/MCTP 13-10L/CGTTP 3-90.5/ATP 3-04.19/AFTTP 3-2.4/Pub 304 (MAR 2019), Multi-Service Tactics, Techniques, and Procedures for Shipboard Helicopter and Tiltrotor Aircraft Operations, is developed in accordance with NTRP 1-01 (MAR 2024), The Navy Warfare Library User Manual.

2. SUPERSEDURE. Erratum 1 supersedes NTTP 3-04M/MCTP 13-10L/CGTTP 3-90.5/ATP 3-04.19/ AFTTP 3-2.4/Pub 3-04 (MAR 2019), Multi-Service Tactics, Techniques, and Procedures for Shipboard Helicopter and Tiltrotor Aircraft Operations.

3. CONTENTS OF CHANGE. This change updates terminology to align with ALNAV 017/25.

   a. Changes ‘gender’ to ‘sex’ on page E-1.

   b. Updates the front cover and List of Effective Pages (LEP).

4. ENTRY OF CHANGE. This change is developed with the intent that the entire publication is to be reprinted and distributed in its entirety. Affected pages are identified in the LEP. Changes throughout are identified by change bars and/or updated footers.

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March 2019

PUBLICATION NOTICE ROUTING

1. Navy Tactics, Techniques, and Procedures (NTTP) 3-04M/Marine Corps Tactical Publication (MCTP) 13-10L/Coast Guard Tactics, Techniques, and Procedures (CGTTP) 3-90.5/Army Techniques Publication (ATP) 3-04.19/Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.4/United States Special Operations Command (USSOCOM) Pub 3-04 (MAR 2019), MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR SHIPBOARD HELICOPTER AND TILTROTOR AIRCRAFT OPERATIONS, is available in the Navy Warfare Library. It is effective upon receipt.

2. NTTP 3-04M/MCTP 13-10L/CGTTP 3-90.5/ATP 3-04.19/AFTTP 3-2.4/USSOCOM Pub 3-04 provides doctrine to plan, coordinate, and conduct multi-Service shipboard helicopter and tiltrotor aircraft operations from United States aircraft carriers, amphibious assault ships, and air-capable ships.

3. Summary of Changes from Joint Publication 3-04 Joint Shipboard Helicopter and Tiltrotor Aircraft Operations dated 06 December 2012:

   a. Removes information on rotor weight classifications.

   b. Updates the risk management discussion.

   c. Updates discussion on passenger overwater flights at night.

   d. Updates discussion for hazards of electromagnetic radiation to ordnance.

   e. Updates discussion on flight deck status light.

   f. Revises the Embarked Unit Predeployment Planning Checklist.

   g. Updates the current references.

   h. Revises glossary by deleting outdated terms and modifying definitions.

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Note to Navy Warfare Library Custodian

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CONTENTS

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LIST OF ILLUSTRATIONS

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CHAPTER 2—PLANNING

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PREFACE

This publication provides multi-Service tactics, techniques, and procedures for planning, coordinating, and conducting multi-Service shipboard helicopter and tiltrotor aircraft operations from United States aircraft carriers, amphibious assault ships, and air-capable ships.

Unless otherwise stated, masculine nouns and pronouns do not refer exclusively to men.

Report administrative discrepancies by letter, message, or e-mail to:

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When items for changes are considered urgent, send this information by message to the primary review authority, info NWDC. Clearly identify and justify both the proposed change and its urgency. Information addressees should comment as appropriate. See the sample for urgent change recommendation message format on page 13.

ROUTINE CHANGE RECOMMENDATIONS

Submit routine recommended changes to this publication at any time by using the routine change recommendation letter format on page 14. Mail it to the address below or post the recommendation on the Navy Doctrine Library site.

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CHANGE BARS

Revised text is indicated by a black vertical line in the outside margin of the page, like the one printed next to this paragraph. The change bar indicates added or restated information. A change bar in the margin adjacent to the chapter number and title indicates a new or completely revised chapter.

WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to warnings, cautions, and notes used in this manual:

WARNING

An operating procedure, practice, or condition that may result in injury or death if not carefully observed or followed.

CAUTION

An operating procedure, practice, or condition that may result in damage to equipment if not carefully observed or followed.

Note

An operating procedure, practice, or condition that requires emphasis.

WORDING

Word usage and intended meaning throughout this publication are as follows:

“Shall” indicates the application of a procedure is mandatory.

“Should” indicates the application of a procedure is recommended.

“May” and “need not” indicate the application of a procedure is optional.

“Will” indicates future time. It never indicates any degree of requirement for application of a procedure.

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Urgent Change Recommendation Message Format

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SUBJECT: ROUTINE CHANGE RECOMMENDATION TO *(Publication Short Title, Revision/Edition, Change Number, Publication Long Title)*

ENCL: *(List Attached Tables, Figures, etc.)*

1. The following changes are recommended for NTTP X-XX, Rev. X, Change X:

a. CHANGE: (Page 1-1, 1.1.1, line 1)
Replace "…the ~~National Command Authority~~ President and Secretary of Defense establish~~es~~ procedures for the…"
REASON: SECNAVINST ####, dated ####, instructing the term "National Command Authority" be replaced with "President and Secretary of Defense."

b. ADD: (Page 2-1, 2.2, line 4)
Add sentence at end of "See figure 2-1."
REASON: Sentence will refer reader to enclosed illustration.
Add figure 2-1 (see enclosure) where appropriate.
REASON: Enclosed figure helps clarify text in 2.2.

c. DELETE: (Page 4-2, 4.2.2, line 3)
Remove "Navy Tactical Support Activity."
"…~~Navy Tactical Support Activity, and~~ the Navy Warfare Development Command ~~are~~ is responsible for…"
REASON: Activity has been deactivated.

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Routine Change Recommendation Letter Format

CHAPTER 1

Introduction to Multi-Service Shipboard Helicopter and Tiltrotor Aircraft Operations

"The helicopter is probably the most versatile instrument ever invented by man. It approaches closer than any other to fulfillment of mankind's ancient dreams of the flying horse and the magic carpet."

Igor Sikorsky, 13 September 1959

1.1 PURPOSE

1. This publication provides general guidance for integrating any Service helicopter or tiltrotor aircraft on board air-capable ships (ACSs), amphibious assault ships (AASs), and multi-purpose aircraft carriers, (nuclear-powered) (CVNs) for operations from the sea.

2. Authoritative multi-Service and Service publications containing technical data, safety of flight information, and other guidance subject to periodic reviews are appropriately referenced throughout this publication. A comprehensive listing of relevant references is included in the References section.

1.2 GENERAL

1. Each ship class is different; however, all aspects of the ship must be shared, such as command and control (C2) facilities, office spaces, maintenance spaces, flight deck, hangar deck, medical and dental facilities, storage areas, logistics, messing, and berthing. Unlike some multi-Service operations where the Services are assigned operational areas and interact with each other on the margins (via communications channels or across boundary lines), multi-Service shipboard helicopter and tiltrotor operations require continuous interaction, coordination, and teamwork to accomplish the simplest of tasks. Many embarking units are generally unfamiliar with the complexities and hazards of the shipboard environment. Reduced interaction and coordination between Services can result in personnel injury and equipment damage. Differences in Services' terminology, training, equipment, and standing operating procedures should be identified and mitigated, so they are not magnified and develop into significant challenges. To mitigate these challenges, commanders, leaders, and personnel use the risk management process as an integral part of planning, embarking, operations, and debarkation in addressing risks.

For more information on risk management, refer to Joint Publication (JP) 3-0, Joint Operations.

2. A ship provides the combined benefits of a landing zone, maintenance and work areas, refueling platform, air operations planning facilities, and C2 for embarked units. The ship also provides for sustainment, living, dining, and recreation, as well as other daily necessities such as the ship's laundry, store, and barber shop. A ship also provides a temporary landing area for other units that are not embarked to reposition assets prior to an assault, refuel, to make repairs, or for other reasons as required.

3. The shipboard environment demands the ultimate in teamwork. At any time, there can be an event, combat-related or otherwise (e.g., heavy weather), that may affect all personnel aboard the ship. Even during peacetime, the ever-present dangers of flooding or fire can require sounding general quarters (GQ) which stations the crew, including helicopter/tiltrotor aircraft detachments, to an assigned battle station. During flight operations, the flight deck environment is particularly lethal. If an aircraft mishap occurs, there is the

real possibility of a major conflagration because of the explosive characteristics of fuel and ordnance that, if not properly responded to, may cause the loss of the ship and lives. It is incumbent on everyone embarked on a ship to know their responsibilities during the many evolutions that transpire during normal ship's routine. The ship's company (crew) has the responsibility to impart that knowledge to personnel not familiar with ship surroundings.

4. Daily shipboard routine is promulgated in the ship's plan of the day (POD). The POD is the primary means of announcing each day's schedule of important events and will normally include a general flight schedule. A detailed flight schedule will be promulgated as a daily air plan. The ship's executive officer (XO) is responsible for the POD. Commanders and officers in charge (OICs) of embarked units should be included in POD development to better coordinate the use of common spaces, accommodate training activities, synchronize operations, and ensure that unit personnel fully understand shipboard responsibilities. For information that needs to be passed to the crew immediately, there is a general announcing system (1MC).

5. General shipboard helicopter/tiltrotor aircraft operations and procedures, as well as specific mission tactics, are not covered in this publication. Consult the source documents listed in appendix A for specific procedures. Specific and general wind envelopes (the wind limits for individual helicopter/tiltrotor aircraft and ship combinations) and pitch and roll limits are contained in the following Naval Air Training and Operating Procedures Standardization (NATOPS) program publications and United States Coast Guard (USCG) Commandant instruction (COMDTINST):

a. Naval Air Systems Command (NAVAIR) 00-80T-105, CV NATOPS Manual

b. NAVAIR 00-80T-106, LHA/LHD NATOPS Manual

c. NAVAIR 00-80T-120, CVN Flight/Hangar Deck NATOPS Manual

d. NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual

e. NAVAIR A1-V22AB-NFM-000, NATOPS Flight Manual Navy Model MV-22B Tiltrotor

f. NAVAIR A1-V22AC-AFM-000, NATOPS Flight Manual USAF Series CV-22 Tiltrotor

g. NAVAIR A1-H60CA-NFM-000 NATOPS Flight Manual Navy Model H-60 Aircraft

h. COMDTINST M3710.2 (Series), Shipboard-Helicopter Operational Procedures Manual

i. NAVAIR A1-H53BE-NFM-000_NATOPS Flight Manual Navy Model CH-53E Helicopter

j. NAVAIR 01-H1AAD-1_NATOPS Flight Manual Navy Model AH-1Z Helicopter

k. NAVAIR 01-110HCG-1_NATOPS Flight Manual Navy Model UH-1Y Helicopter.

6. If there is a conflict between authoritative technical manuals and the information in this publication, the applicable Service-specific technical manual will take precedence.

CHAPTER 2

Planning

"Plan and train carefully. Execute rapidly. Simple plans are the best plans."

War Instructions
United States Navy, 1944

2.1 COMMANDER CONSIDERATIONS

1. Mission Trade-offs. When embarking other Service helicopters/tiltrotor aircraft on United States Navy (USN) and USCG ships, there are three major ship mission trade-offs to consider:

a. Displacement of naval aircraft

b. Removal of the ship from its mission in the amphibious ready group (ARG) or carrier strike group to support the embarked unit

c. Degradation of ship and/or embarked unit mission capabilities resulting from emission control (EMCON)/hazards of electromagnetic radiation to ordnance (HERO) requirements, wind limitations, and/or geographic location requirements.

2. The impact of embarking other Service helicopters/tiltrotor aircraft is difficult to assess because ships are complex, multimission platforms.

a. If the footprint of embarking unit's helicopters/tiltrotor aircraft, when added to the organic aircraft footprint, is larger than the maximum allowable ship deck density, some organic aircraft will have to be debarked.

b. The number of other Service helicopters/tiltrotor aircraft embarked, including associated equipment and personnel and the anticipated duration of the embarkation, drive mission area trade-offs.

(1) The number and type of helicopters/tiltrotor aircraft and numbers and ranks/rates of personnel will determine the number of naval aircraft and personnel that must be debarked to make room for the embarking units.

(2) Lost maritime mission capabilities may result from disruptions in normal flight operations and maintenance or having to debark a significant number of ship aircraft and personnel.

3. Large-scale Helicopter/Tiltrotor Aircraft Operations. For large-scale operations involving battalion or brigade size aviation units, CVNs, AASs and/or multispot ships are required. Flight decks can accommodate a limited number of helicopters/tiltrotor aircraft. Folding rotor blades will increase the number of helicopters/tiltrotor aircraft that may be embarked on a particular ship. On large deck ships, it is possible to develop alternate spotting schemes that will accommodate large numbers of helicopters/tiltrotor aircraft and that do not require blades to be folded. The choreography required for high deck density operations necessitates meticulous planning and must be in accordance with (IAW) Naval Air Engineering Center-Engineering (NAEC-ENG)-7604, Maximum Density Aircraft Spotting CV and CVN Aircraft Carriers, amphibious assault ship (general purpose) (LHA), and amphibious assault ship (multipurpose) (LHD) Class

Ships. Cyclic flight operations can be planned and coordinated for operations from several ships simultaneously. Among the issues to consider are:

a. Wave/serial composition

b. Distance to the landing zone/target area

c. Time required to respot the deck for the next wave/serial

d. Arrangements for a helicopter/tiltrotor aircraft requiring an emergency landing.

4. Ship/Unit Capabilities and Limitations. To effectively plan helicopter or tiltrotor operations, the embarking unit's planner should be familiar with the various classifications of ship aviation capabilities.

a. Air-capable Flight Deck Information. U.S. air-capable flight deck information is contained in NAEC-ENG-7576, Shipboard Aviation Facilities Resume, produced by Naval Air Warfare Center, Aircraft Division (NAWCAD), Lakehurst, New Jersey. This document is compiled from aviation facility certification inspections and describes and depicts aircraft landing, vertical replenishment (VERTREP)/hover, and helicopter in-flight refueling facilities aboard ACSs. Helicopter in-flight refueling, not to be confused with helicopter aerial refueling, is the practice of refueling a hovering helicopter from a fuel hose attached to the flight deck.

b. ACSs. Most ships are classified as ACSs, which are characterized by small flight decks on the stern, bow, or both. Due to the size of some smaller flight decks, certain helicopters/tiltrotor aircraft are limited to hover operations only. The number of helicopter/tiltrotor aircraft landing spots available to support operations should be verified prior to embarkation. ACSs are divided into three levels which describe the environmental conditions in which each ship is capable of operating.

(1) Level I ships are capable of day or night operations in visual meteorological conditions (VMC) or instrument meteorological conditions (IMC), and are equipped with tactical air navigation (TACAN) and ultrahigh frequency homing.

(2) Level II ships are capable of day or night VMC operations only.

(3) Level III ships are capable of day VMC operations only.

Each level is further divided into eight classes which describes the specific type helicopter/tiltrotor aircraft support capability of each ship:

(a) Class 1—Landing area with support (service and maintenance) facilities for the types of aircraft certified

(b) Class 2—Landing area with service facilities for the types of aircraft certified

(c) Class 2A—Landing area with limited service facilities for the types of facilities

(d) Class 3—Landing area for the types of aircraft certified; no service

(e) Class 4—VERTREP/hover area (maximum obstruction height of 5 feet) for types of aircraft certified

(f) Class 5—VERTREP/hover area (maximum obstruction height of 15 feet) for types of aircraft certified

(g) Class 6—Helicopter in-flight refueling facility capable of delivering a minimum of 50 gallons of fuel per minute, at a pressure of 20 pounds per square inch (psi), to a height of 40 feet above the water

(h) Class 6R—Helicopter in-flight refueling facility capable of delivering only 25 to 49 gallons of fuel per minute, at a pressure of 20 psi, to a height of 40 feet above the water.

Refer to NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual, and NAEC-ENG-7576, Shipboard Aviation Facilities Resume, for naval aircraft operations, or to COMDTINST M3710.2 (Series), Shipboard-Helicopter Operational Procedures Manual, for detailed procedures for USCG aircraft operations.

c. AASs. The USN has two ship classes which fall into this category: LHA and LHD. These ships are characterized by large flight decks with multiple landing spots, a large hangar below the flight deck, and full maintenance and service capabilities. These ships are day and night all-helicopter, tiltrotor aircraft (short takeoff and vertical landing aircraft), and vertical/short takeoff and landing operations capable, aided by TACAN and full radar services from the amphibious air traffic control center. Refer to NAVAIR 00-80T-106, LHA/LHD NATOPS Manual, for detailed procedures when operating with AASs.

d. CVNs are the only ships in this category. Helicopters/tiltrotor aircraft can expect full services and maintenance support when operating from CVNs. The CVN air traffic control (ATC) center provides complete radar service in all weather, day and night. Refer to NAVAIR 00-80T-105, CV NATOPS Manual, and NAVAIR 00-80T-120, CVN Flight/Hangar Deck NATOPS Manual, for detailed procedures when operating with CVNs.

2.2 GENERAL COMPATIBILITY CONSIDERATIONS

After determining the desired mission capabilities, it is necessary to determine whether the required mix of ships, helicopters, and tiltrotor aircraft to achieve that mission are compatible or to develop mitigation plans.

1. The physical characteristics of helicopters/tiltrotor aircraft embarked aboard ships with flight decks can create challenges for the operational capabilities of both the ship and the embarking unit. It is incumbent upon the personnel of the embarking unit and the ship to analyze potential incompatibilities and take actions to minimize them in advance of operations. Failure to do so can lead to significant operational problems, damage to equipment, and/or injury to personnel. Factors to consider include:

a. Severely limited space for flight operations, maintenance, and storage.

b. High power electromagnetic (EM) emitters operating in close proximity to aircraft and personnel, and HERO ordnance types.

c. Limited options for alternate landing sites.

d. Heightened fire risks due to crowded conditions and proximity of ordnance.

e. Varying and sometimes severe ship motion.

f. Frequent high, turbulent winds.

g. Frequently obscured or indistinct horizon IMC.

h. Exposure of equipment to the corrosive effects of salt spray.

i. Sudden loss of ground effect.

j. Helicopter/tiltrotor aircraft limits (rotor engage/disengage, launch/recovery/pitch/roll).

k. Lack of overwater navigation aids, such as automatic direction finder, nondirectional beacon, and high frequency homing.

l. Tiltrotor high exhaust temperatures can cause long-term fatigue damage to flight decks without proper mitigation.

m. Shipboard radars (e.g., AN/SPS-49) and communications emitters may cause electromagnetic interference (EMI) with aircraft electronic systems, including weapons/avionics systems and automatic blade fold systems.

2. Once the personnel of the embarking unit and the ship have researched potential incompatibilities, a formal visit to the ship by the embarking unit's maintenance, logistics, and operations personnel should be scheduled to discuss mitigation strategies.

a. It is imperative that the personnel of the embarking unit inspect the operating, maintenance, storage areas and supporting equipment they will use aboard ship. Quite often, additional issues will arise after the embarking unit has examined available/assigned ship facilities.

b. The sources listed in appendix A may be useful for identifying known issues.

3. Geometric Fit/Deck Load Limits. Both ship and unit personnel should consider geometric fit issues during the planning process. Among the issues to consider are:

a. Deck and elevator load limits

b. Flight deck, elevator, hangar deck fit (blades spread, folded, and/or removed)

c. Takeoff and landing spots

d. Maintenance areas.

4. A detailed safety analysis involving aircraft fit and deck and elevator strength shall be completed before embarking any helicopter/tiltrotor aircraft aboard a ship. The results of these analyses are used to determine ship certification levels and associated restrictions, which are published in NAEC-ENG-7576, Shipboard Aviation Facilities Resume. Requests to deviate from the certification and restrictions published in NAEC-ENG-7576 shall be addressed to fleet commanders in the form of a waiver request. When operational necessity requires that an uncertified ship operate with aircraft, or that a currently certified ship operate with aircraft for which it is not normally certified (but whose operation can safely be conducted), the fleet commanders shall submit such waivers to Commander, United States Fleet Forces Command, or Commander, United States Pacific Fleet, who are authorized to issue a waiver IAW Chief of Naval Operations Instruction (OPNAVINST) 3120.28, Certification of the Aviation Capability of Ships Operating Aircraft. If granted, the waiver enables the ship to conduct operations within known limitations and/or deficiencies. The waiver is issued by message containing specific levels, classes, and types of aircraft; specific operating procedures, and specific mission, geographic location, and time.

5. Contingency and crisis response operations may generate questions regarding nonstandard aircraft spotting to achieve a greater deck density or more rapid launch sequence than would otherwise be permitted. Should this situation arise, ships should contact NAWCAD for assistance in analyzing nonstandard spotting. NAWCAD may have knowledge of previous operations with the proposed helicopter/tiltrotor aircraft and ship combination. NAWCAD engineers can help in resolving fit issues and determining best spotting arrangements for the proposed aircraft mix and operating concept.

6. Helicopter/Tiltrotor Aircraft Characteristics/Limitations. All aircraft have handling and operating limitations that affect how they can be moved and operated. The shipboard environment may require modifications to unit standard operating procedures (SOPs). The following capabilities and limitations should be addressed and considered by both ship's company and embarking units prior to conducting shipboard operations. Most are addressed in the aircraft operator's manuals or unit SOPs. Where limitations have not been established, units should refer to the manufacturer or to units with prior experience operating the same or similar helicopter aboard ship. Wind envelopes for tiltrotor aircraft are contained in V-22 NATOPS publications, NAVAIR 00-80T-105, CV NATOPS Manual, NAVAIR 00-80T-106, LHA/LHD NATOPS Manual, and NAVAIR 00-08T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual, which also contains the V-22B general launch and recovery envelope aboard an ACS when no other envelope is specified. Launch and recovery wind envelopes for Navy/Marine helicopters are contained in their applicable type/model/series NATOPS manuals. United States Army (USA) and United States Air Force (USAF) units (helicopters and tiltrotor aircraft) should consult their applicable operator's manual before conducting shipboard operations.

a. Heavy weather capability such as tie down (TD) points and blade harness/TD

b. Danger areas

c. Blade arcs (vertical and horizontal clearances)

d. Engine/auxiliary power unit exhaust (velocity and temperature profile)

e. Rotor downwash (velocity and pattern)

f. Overwater safety provisions (egress system design/survival equipment)

g. Water landing capabilities (expected float time)

h. Door/window jettison points

i. Rafts/flotation devices

j. Signal devices (day, night, visual, aural)

k. Beacon

l. Rescue harness

m. Self-contained search and rescue (SAR) capabilities (winch, spotlight)

n. Loiter capability

o. Range capability

p. Overwater navigation capability

q. Wind limits (azimuth and velocity)

r. Startup/shutdown (e.g., wind constraints, transient revolutions per minute [rpm])

s. Launch/recovery wind envelopes

t. Blades static (tied down and not tied down)

u. Folding operations/blades folded

v. Pitch/roll limits

w. Rotor coast down method (rotor brake equipped versus nonrotor brake equipped)

x. Pilot and crew field of view/blind spots

y. Landing signalman enlisted (LSE) placement

z. Lighting (night vision device [NVD])

aa. External lights (masthead, rotor tip, tail, navigation)

bb. Sling load/capability operations

cc. Communications capability/radio configuration

dd. Rotor blade antiflap restraint and droop-stop considerations

ee. Weapons systems and shipboard certification requirements

ff. Ground handling/turning radius (tail wheel location)

gg. Corrosion control requirements

hh. Refueling procedures and limitations

ii. Explosive cartridge and ammunition handling requirements and limitations.

7. Electromagnetic Environmental Effects (E3). E3 is the impact of the electromagnetic environment (EME) upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all EM disciplines including EM compatibility and EMI, electromagnetic vulnerability (EMV), EM pulse, electronic protection, hazards of electromagnetic radiation to personnel (HERP), HERO, and hazards of electromagnetic radiation to fuels (HERF), and natural phenomena effects of lightning and precipitation static.

For specific guidance on E3 planning, refer to paragraph 9 and JP 6-01, Joint Electromagnetic Spectrum Management Operations.

8. Planners should thoroughly research E3 emitter profiles and individual system susceptibilities for both helicopter/tiltrotor aircraft and ship and develop mitigation strategies to accommodate integration. Information on ships' emitter profiles may be obtained from the electronic warfare officer aboard each ship. Information on helicopter/tiltrotor aircraft emitters may be found in the applicable helicopter/tiltrotor aircraft operating manual or by contacting the embarking unit directly. Individual system susceptibilities may be available from classified sources. Using EMCON procedures and implementing HERO (ship's HERO EMCON bill) procedures when ships and helicopter/tiltrotor aircraft operate together can mitigate these issues.

9. Ordnance. Embarking units are required to inform the ship's ordnance handlers and weapons officers of specific ordnance they plan to embark, including cartridge actuated devices. Navy ammunition logistics code (NALC) or Department of Defense identification code (DODIC) and the national stock number (NSN) should be used to identify ordnance. Shipboard magazines are certified to store many types of ordnance; however, some ordnance may not be compatible with a specific magazine. Ordnance compatibility issues include:

a. Weapon System Explosive Safety Review Board (WSESRB) approval of the ordnance and containers for shipboard employment

b. WSESRB approval of the type, model, and/or series aircraft and installed weapons systems

c. Magazine storage space to include ordnance storage compatibility

d. Loading equipment

e. HERO test data on ordnance designed with electrically initiated devices (EIDs) to determine safe shipboard radio frequency (RF) environments and/or required EMCON.

10. Although the ship's magazines may be certified to hold specific ordnance in the joint inventory, ordnance for the ship's weapons systems may not be compatible with embarked unit ordnance. Ship's ordnance handlers may need to reconfigure their magazine loads to accommodate other Service ordnance. Compatibility information for particular ordnance may be found in Naval Sea Systems Command (NAVSEA) Ordnance Publication (OP) 4, Ammunition and Explosives Safety Afloat.

For more details concerning ordnance planning, refer to paragraph 8 in this chapter.

11. Ship and Helicopter/Tiltrotor Aircraft Major Equipment/Servicing Interoperability. Operations and maintenance planners should determine ship's service compatibility with the embarking helicopter's/tiltrotor aircraft's fuel, defuel, electrical, hydraulic, and pneumatic systems, as well as any special ground support equipment (GSE) requirements. Information on the helicopter/tiltrotor aircraft systems requirements, such as electrical power voltage, phase, and amperage, or pneumatic pressures, servicing limits, and pressure fueling/defueling systems, is available in the service's aircraft operating manual. Ship's service information can be located in the NAEC-ENG-7576, Shipboard Aviation Facilities Resume.

2.3 GENERAL PLANNING CONSIDERATIONS

The quality of predeployment planning relates directly to the success of the overall helicopter and tiltrotor operations. Historically, planning time has been limited by the emergent nature of contingency operations. Unit and staff personnel can enhance mission success by considering the issues discussed in the following paragraphs.

1. General

a. Considerations for Planning. Regardless of the time available for planning, the following areas must be considered: required training and certification, embarkation, communications system support, intelligence operations, health services, ordnance, aircraft maintenance, and logistics/supply.

b. Liaison Officers. Exchanging liaison officers is the most commonly employed technique for establishing close, continuous, physical communications among organizations.

Liaison personnel enhance information sharing and contribute significantly to mission success. Liaison officers should be prepared to discuss aircraft footprint, embarkation, C2, maintenance requirements, logistics, ordnance, communications system support, personnel, and habitability issues.

c. Predeployment Planning. Detailed predeployment planning is one of the most important factors for the successful and safe conduct of helicopter and tiltrotor operations and includes items that should be addressed prior to embarking. The timelines and checklists provided in this and other publications are recommendations that may be adjusted depending on the situation. Though it may be impossible to complete all the items listed in the various checklists prior to embarkation, the checklists should be used as a starting point for planning. Those items that cannot be completed prior should be accomplished shortly after embarking.

(1) The following essential elements of predeployment planning are addressed in this chapter and throughout this publication: presail conference, embarking unit predeployment planning checklist, embarkation conference(s), pre-embarkation ship visit(s), and training and qualification requirements (safety, firefighting, ordnance handling, ship indoctrination, maintenance, aircrew, and deck landing qualification [DLQ]).

(2) Personnel from the units involved should meet with/talk to their counterparts as early as possible and continue a dialogue until the at-sea period is completed. It is essential to discuss integration of embarked personnel in afloat operations prior to helicopter and tiltrotor operations.

2. Presail Conference. The naval surface community schedules a presail conference during the early stages of deployment planning. The presail conference is an essential part of the planning process. It provides key personnel of the participating units with a formal forum to address the concept of upcoming operations at sea as well as procedural and safety issues. A presail conference should be scheduled to solidify all planning and coordination conducted to date, resolve outstanding issues or operational challenges, and confirm embarkation planning. Most integration issues are listed in the embarked unit predeployment planning checklist (appendix G). The presail conference is a formal visit to the ship by key personnel representing the embarking unit's maintenance, logistics, and operations departments. The presail conference is necessary to discuss embarkation, maintenance, operations, C2 to include command relationships, ordnance, communications system support, habitability, and safety in regards to the upcoming deployment. Typically, unlike the United States Marine Corps (USMC) which regularly embarks on board ship, when United States Army (USA) or United States Air Force (USAF) units embark aboard ship, the personnel of both the embarking unit and the ship have limited knowledge of each other's capabilities and operational concepts. Nothing should be assumed by either party when planning for helicopter and tiltrotor aircraft operations. It is essential, starting with the presail conference and continuing throughout the planning process, that unit and ship personnel conduct detailed and meticulous planning, utilizing the checklists and other references listed in this publication and Service publications. Additionally, USN predeployment planning issues are discussed in:

a. NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual

b. Commander, Naval Surface Forces Instruction 3500.4/Commander, Naval Air Atlantic Instruction 3500.51/Commander, Marine Forces Atlantic Order 3500.2, Readiness Milestones for Amphibious Ships and Embarked Aviation Units

c. NAVAIR 00-80T-106, LHA/LHD NATOPS Manual

d. NAVAIR 00-80T-105, CV NATOPS Manual

e. NAVAIR 00-80T-120, CVN Flight/Hangar Deck NATOPS Manual.

3. Pre-embarkation Ship Visit. Prior to and/or following the presail conference, it is imperative the embarking unit tour and become familiar with work spaces, living spaces, maintenance and storage areas, and support equipment available. Quite often, additional compatibility issues will arise once the spaces are actually visited by the embarking unit during this tour. This is when the space constraints inherent with shipboard operations become apparent to the embarking unit.

4. Points of Contact (POCs). A key element to successful presail visits for those Services that do not typically embark is the development of a POCs list. Figures 2-1, 2-2, and 2-3 show general POCs aboard different ship types, their functions, responsibilities, and their embarking unit counterparts for USA and USAF counterparts. USMC embarkation and planning follows established amphibious doctrine as outlined in JP 3-02, Amphibious Operations.

5. Mission Integration. The degree to which the operations of the embarked unit are merged or deconflicted from those of the ship is dependent on several factors, listed below.

a. The unit with the priority mission will determine mission requirements; therefore, mission priorities may shift among several units as operations transition between phases. The most likely mission integration scenarios occur in support of contingency operations. Probable scenarios include:

(1) Helicopter/tiltrotor aircraft units fly out to the ship. The ship sails to the operational area where the unit executes the mission and returns to the ship. The ship sails to the fly-off point and the embarked units fly off.

Planning Points of Contact on Aircraft Carriers

Navy	Responsibility	Army/Air Force Counterpart
Commanding Officer (CO)	Responsible for mission execution/ accomplishment and safe rotocraft operations.	Commander
Executive Officer	Responsible to CO for mission execution and coordination between shipboard departments. Oversees administration and embarkation details.	Executive Officer
Strike Operations Officer	Schedules mission and training evolutions; flight planning and scheduling.	Operations Officer
Air Officer	Flight deck and flight operations.	Operations Officer
Flight Deck Control	Aircraft movement to accommodate maintenance, ordnance upload, and prelaunch positioning on the flight deck.	Aviation Maintenance Officer
Hangar Deck Control	Aircraft movement to accommodate maintenance on the hangar deck.	Aviation Maintenance Officer
Supply Officer	Hotel services, parts/material replenishment.	Logistics Officer
First Lieutenant	Loading and unloading cargo.	Logistics Officer
Weapons Officer	Controls ordnance on/off load, buildup, strikedown, issue, and accounting.	Operations Officer
Communications Officer	Communications capabilities and requirements, and coordination.	Communications Officer
Electronic Warfare Officer	Electronic missions, detection and counter-detection.	Operations Officer
Aircraft Intermediate Maintenance Department	Intermediate level maintenance assistance for engine, hydraulic, and electronic component repairs.	Aviation Maintenance Officer
Chief Engineer	Responsible for electrical power, fuel, water production, and firefighting systems.	Logistics Officer
Combat Information Center Officer	Coordinates intelligence resources, requirements, briefings, debriefings; conducts mission briefs and mission debriefs.	Intelligence Officer

NOTE:
When the carrier air wing (CVW) is embarked the air wing commander (CAG) may be designated to coordinate embarkation efforts for both Navy squadrons and embarking Army and Air Force units. The point of contact will be the CAG embark officer. When CVW is not embarked, the air boss or the ship's 1st Lieutenant may be tasked with coordination. Either way the embarking unit(s) will need to coordinate closely with both.

Figure 2-1. Planning Points of Contact on Aircraft Carriers

Planning Points of Contact on Amphibious Assault Ships

Navy	Responsibility	Army/Air Force Counterpart
Commanding Officer (CO)	Responsible for mission execution/ accomplishment and safe rotocraft operations.	Commander
Executive Officer	Responsible to CO for mission execution and coordination between shipboard departments. Oversees administration and embarkation details.	Executive Officer
Combat Cargo Officer	Embark coordination.	Unit Embark Officer
Operations Officer	Schedules missions and training evolutions. Flight planning and scheduling.	Operations Officer
Air Officer	Flight deck and flight operations.	Operations Officer
Aircraft Intermediate Maintenance Department	Intermediate level maintenance assistance for engine, hydraulic, and electronic component repairs.	Aviation Maintenance Officer
Flight Deck Control	Aircraft movement to accommodate maintenance, ordnance upload, and prelaunch positioning on the flight deck.	Aviation Maintenance Officer
Hangar Deck Control	Aircraft movement to accommodate maintenance on the hangar deck.	Aviation Maintenance Officer
Supply Officer	Hotel services, parts/material replenishment.	Logistics Officer
Combat Cargo Officer	Loading and unloading cargo.	Logistics Officer
Weapons Officer	Controls ordnance on/off load, buildup, strikedown, issue, and accounting.	Operations Officer
Communications Officer	Communications capabilities and requirements, and coordination.	Communications Officer
Electronic Warfare Officer	Electronic missions, detection and counter-detection.	Operations Officer
Chief Engineer	Responsible for main propulsion, electrical power, fuel, water production, and maintenance of fire fighting systems.	Logistics Officer
Combat Information Center Officer	Coordinates intelligence resources, requirements, briefings, debriefings; conducts mission briefs and mission debriefs.	Intelligence Officer

Figure 2-2. Planning Points of Contact on Amphibious Assault Ships

Planning Points of Contact on Air-Capable Ships

Navy	Responsibility	Army/Air Force Counterpart
Commanding Officer (CO)	Responsible for mission execution/ accomplishment and safe rotocraft operations.	Commander
Executive Officer	Responsible to CO for mission execution and coordination between shipboard departments. Oversees administration and embarkation details.	Executive Officer
Operations Officer	Schedules missions and training evolutions. Flight planning and scheduling.	Operations Officer
Supply Officer	Hotel services, parts/material replenishment.	Logistics Officer
First Lieutenant	Responsible for the maintenance of the flight deck and training of flight deck personnel.	Logistics Officer
Helicopter Control Officer	Coordinates flight deck and flight operations.	Operations Officer
Weapons or Combat Systems Officer	Controls ordnance on/off load, buildup, strikedown, issue, and accounting.	Operations Officer
Communications Officer	Communications capabilities and requirements, and coordination.	Communications Officer
Electronic Warfare Officer	Electronic missions, detection and counter-detection.	Operations Officer
Chief Engineer	Responsible for main propulsion, electrical power, fuel, water production, and maintenance of fire fighting systems.	Logistics Officer
Combat Information Center Officer	Coordinates intelligence resources, requirements, briefings, debriefings; conducts mission briefs and mission debriefs.	Intelligence Officer

Figure 2-3. Planning Points of Contact on Air-Capable Ships

(2) The ship provides a safe haven for helicopter/tiltrotor aircraft units based and operating ashore.

(3) The helicopter/tiltrotor aircraft units fly out to the ship after support personnel and troops embark in port. The ship provides transportation to the operational area and conducts operations, then transports the helicopter/tiltrotor aircraft and aircrew personnel back to home base.

b. When planning a long-term embarkation, the embarking unit's planner must determine if organic ship aircraft will also be embarked. If no organic aircraft are embarked, the issues associated with integrated flight operations should be minimal.

c. With organic air assets embarked, operational scenarios for different helicopter/tiltrotor aircraft compositions can be compared for fully integrated, semi-integrated, or coordinated flight operations. Flight operations are considered fully integrated when non-naval helicopter/tiltrotor aircraft launches and recoveries are accomplished during regular cyclic fixed-wing flight operations for CVNs, or during regular flight operations for other class ships. Semi-integrated operations describe conditions where naval aircraft and helicopters/tiltrotor aircraft operate in sequential periods. Coordinated flight operations refer to the

case where helicopter/tiltrotor aircraft operations take place in a single period outside scheduled naval flight operations for the carrier air wing, United States Marine Corps (USMC) aviation combat element (ACE), or ACS.

(1) Fully Integrated Flight Operations. These operations are the most difficult to coordinate, conduct, and sustain but allow helicopters/tiltrotor aircraft to take advantage of carrier strike group direct-support capabilities. Fully integrated flight operations from ARG ships can take advantage of integral ARG/Marine expeditionary unit capabilities. Fully integrated flight operations have few advantages for cruiser and destroyer class ships because of the limited deck and hangar space.

(a) CVN Operations. Fully integrated flight operations aboard CVNs are difficult under optimal conditions and become more so under adverse conditions. If fully integrated flight operations are contemplated, then a reduction in air wing composition should also be considered.

(b) AAS Operations. Integrating helicopter/tiltrotor aircraft units into the ARG mission may be achieved in several ways. Depending on the unit size and composition, it may be possible for the embarked unit to operate from the smaller decks in the ARG. If unit size, composition, or offload requirements makes this difficult, some organic helicopter/tiltrotor aircraft assets may be detached to other ships in the ARG to make room aboard the AAS.

(c) ACS Operations. ACSs typically carry a detachment of one or two organic manned or unmanned helicopters/tiltrotor aircraft. Not all of these ships provide hangar facilities or mechanical handling equipment. Helicopters have operated safely and successfully from ACSs, but at some cost to traditional maritime missions. Embarkation of helicopters/tiltrotor aircraft for short periods may require a ship's organic helicopters to temporarily operate from other locations, potentially impacting that ship's mission. If integrated fueling/arming operations can be accomplished while organic assets are airborne or hangared, the mission impact can be minimized.

(2) Semi-integrated Flight Operations. Inserting a flight period (cycle) dedicated to helicopter/tiltrotor aircraft operations between scheduled naval flight operation periods (cycles) combines some of the advantages of coordinated operations while removing some of the operational difficulty and risk of fully integrated flight operations.

(3) Coordinated Flight Operations. Although easier to schedule and coordinate, coordinated (nonsimultaneous) fixed-wing, tiltrotor aircraft, and rotary wing operations have certain disadvantages. Non-naval flight operations take place during what would normally be nonflying hours. This can overwork the ship's air department personnel, significantly impact aircraft respotting, and hinder flight deck maintenance required to enable the next day's flight operations.

6. Ordnance Planning. Detailed presail/pre-embarkation planning for ordnance is even more important in the multi-Service environment when individual Service processes/procedures may differ. If all or a portion of the ship's ammunition must be offloaded to accommodate required helicopter, tiltrotor aircraft, or infantry ammunition, significant planning will be required. Ordnance planning for helicopter and tiltrotor operations involves significant, in-depth research on the type of ordnance and aircraft armament systems to be embarked aboard ship, including assuring WSESRB/Naval Ordnance Safety and Security Activity (NOSSA) approval of the ordnance identified for shipboard loadout and employment, WSESRB-approved ordnance containers for shipboard operations, and the test data for ordnance designed with EIDs to determine shipboard HERO susceptibility.

a. Non-USN ordnance aboard ships is one of the most critical helicopter and tiltrotor operations issues and must be addressed early in predeployment planning. Direct liaison between the embarking unit's ordnance officer and the ship's weapons department representatives will identify and/or solve many of the associated compatibility, procedural, and training issues. Initial planning for the onload of non-USN ordnance may require close coordination with NOSSA (http://www.navsea.navy.mil/home/nossa.aspx). The Web site provides information on ordnance physical security, insensitive munitions, and ordnance safety aboard

USN ships. This ordnance information will assist the embarking unit when preparing for shipboard helicopter operations involving non-USN ordnance. NAVSEA OP 4, Ammunition and Explosives Safety Afloat, is a comprehensive USN directive delineating ordnance handling and storage procedures aboard USN ships (http://navsea.navy.mil). Infantry ordnance is not common to most ship's magazines. Planners should research all available data thoroughly before the presail conference. NOSSA will be the POC for joint ordnance compatibility waivers.

b. If the assigned ship and embarked helicopter detachment are not forward deployed, a pre-embarkation ordnance planning conference will be scheduled by the appropriate geographic combatant commander (GCC) to identify the type of support and timelines for the required support. The type, model, and/or series of aircraft, including the installed aircraft weapons control systems and the ordnance weapon systems planned for shipboard employment, require NOSSA commanding officer (CO) approval prior to ammunition/explosives (A/E) onload. NOSSA-approved USA ordnance is identified in NAVSEA SW020-AC-SAF-010, Transportation and Storage Data for Ammunition, Explosives and Related Hazardous Materials, where required packaging and explosive stowage data are included for each ordnance by NSN. Requests for A/E that are not included in NAVSEA SW020-AC-SAF-010 shall be referred by the ship to the type commander (TYCOM) and NOSSA for resolution. Deviation from the explosive safety standards set forth in NAVSEA OP 4, Ammunition and Explosives Safety Afloat, requires a waiver to be submitted by the host ship with supporting rationale from the affected GCC.

c. Organizational Messaging Service. The ordnance onload requires extensive preplanning and coordination by ship's force. Chief of Naval Operations (CNO)-approved waivers may be required for pierside loading, depending on the area and location. To ensure the onload is conducted smoothly and efficiently, it is imperative the ordnance depot or ammunition stock point keep the ship and the helicopter/tiltrotor aircraft detachment constantly up to date on the types and quantities of ordnance to be loaded via Organizational Messaging Service in the following format:

(1) NALC or DODIC.

(2) NSN. An NSN will be used for locating detailed information on each item.

(3) Quantity. Total quantity of each NALC/DODIC.

(4) Lot Number. The ammunition lot number (ALN) or serial number (SN) when available. Refer to Naval Supply Systems Command (NAVSUP) Publication (P)-724, Conventional Ordnance Stockpile Management; NAVSUP P-801, Notice of Ammunition Reclassification (NAR) Manual; and NAVSUP P-802, Navy Ammunition Logistics Codes, for details on mandatory identification and control requirements.

(5) Hazard Classification. Used to determine the stowage compatibility/segregation for A/E. Verification through NAVSEA SW020-AC-SAF-010 is mandatory.

(6) Container Identification and Dimensions. If at all possible, information on the dimensions of the A/E containers separately and as palletized unit loads should be provided to ensure adequate stowage space is available aboard the ship. Verification through NAVSEA SW020-AC-SAF-010 is mandatory.

(7) Number of Palletized Lifts. Required for pierside crane services and for onload evolution timing.

(8) Applicable Notice of Ammunition Reclassification (NAR). All USN ammunition and most USA A/E are catalogued in the Ordnance Information System. When an item of A/E by ALN or SN requires a change in the material condition code of a DODIC/NALC lot or SN, a NAR is promulgated by Naval Supply Systems Command Ammunition Logistics Center. A similar control system is in place for USA A/E. To ensure that ships' supporting special operations forces (SOF) are continually aware of any change in the materiel condition of embarked SOF A/E, Naval Supply Systems Command Ammunition Logistics Center includes USA ammunition reclassification in USN NARs. To ensure

there is no oversight or omission in the USN NAR, the appropriate GCC shall ensure the supporting Army ammunition supply point (ASP) is provided plain language address directory of the host ship. The ASP shall provide the host ship with all related USA A/E material condition reclassification action on a continuing basis until the SOF and USA A/E is completely expended or offloaded.

(9) Small Arms Weapons. A list of all small arms weapons, by type and quantity, being deployed aboard the ship is required to ensure secure stowage facilities are available.

(10) An inventory of all aircraft armament systems by nomenclature, part number, serial number, and quantity, being deployed aboard the ship is required to ensure appropriate secure stowage and storage capacity requirements are met. Additional aircraft armament systems guidance can be found in Commander, Naval Air Forces (COMNAVAIRFOR) Instruction 8380.2, Aircraft Armament Systems Program.

d. Determine Availability of USN-approved USA and USAF Aircraft Loading Checklists. Aircraft loading checklists for shipboard operations are available for numerous USA weapons platforms. The checklists are to be on the person during a loading evolution and utilized as a quick reference. These checklists were developed by the Weapons Loading Standardization Team at the Naval Air Warfare Center, Weapons Division (NAWCWD), and are listed in appendix A. They are available on the Naval Air Technical Data and Engineering Service Command Web site at https://airworthiness.navair.navy.mil.

7. Administration

a. The ship's XO is responsible for all administrative matters aboard ship. The XO coordinates activities of the ship's crew and holds daily department head meetings to discuss the POD and important evolutions in the day's schedule. A senior officer from the embarked unit should attend these department head meetings to coordinate the unit's operations, training, and other needs with the ship's schedule.

b. The ship's administrative department handles routine administrative issues supporting USN personnel. The ship's CO has authority to exercise nonjudicial punishment IAW the Uniform Code of Military Justice over all personnel assigned or attached to the ship regardless of Service branch. This authority does not apply where members of an organized unit, particularly of another Service branch, are embarked for transportation only. Potential good order and discipline procedures should be discussed prior to embarkation.

c. USN ships are almost entirely cashless. Embarked units must coordinate with the ship's supply department to obtain cash cards for each Soldier, Marine, or Airman, and to pay for messing (food) while aboard.

8. C2 Planning

a. Available space and types and availability of equipment aboard the ship govern C2 planning considerations. Space constraints may require the embarked unit(s) to be divided and placed on more than one ship, further exacerbating the challenges. Command and staff action and control of non-naval embarked units may require modifications to unit SOPs (both ship and embarked unit). Basic communications, detailed planning, rehearsals, and mission execution are all more difficult when forces are located on several ships.

b. Ships are generally multimission capable. Accordingly, under most circumstances, a ship's CO will be required to complete assigned missions in addition to providing support to an embarked unit. Most ships are not designed to facilitate the normal operations and mission accomplishment of embarked units, especially in terms of communications systems and intelligence support. It is critical that leaders fully understand the capabilities, limitations, and needs of all forces (ships and embarked units) and develop a plan that will satisfy overall mission accomplishment. The following are typical planning tasks:

(1) Establish clear command relationship and authorities for all organizations aboard each ship.

(2) Determine who is responsible for specific functions/coordination.

(3) Determine working space and communications requirements for embarked units.

(4) Determine areas where it is advantageous for ship's company and embarked units to work in the same spaces.

(5) Establish air control tower manning requirements.

(6) Establish intelligence center manning requirements.

(7) Establish communications center manning requirements.

(8) Establish strike operations/combat information center/amphibious ATC manning requirements.

(9) Determine onload and/or offload locations for ordnance and HERO procedures.

(10) Determine EMCON procedures and personal electronic device policy.

(11) Determine required/available/assigned frequencies.

(12) Determine communications systems material security requirements.

(13) Determine potential RF interference.

(14) Determine embarked unit's communications requirements and employment procedures.

(15) Determine EMV to aircraft.

9. Operations. The operations section supports mission planning which is conducted backwards from the time on target at the objective. It should include the following considerations at a minimum:

a. C2, to include control measures.

b. Controlling agencies.

c. Number of helicopters/tiltrotors per wave/serial.

d. Number of waves/serial.

e. Cyclic operations and time sequence(s) (e.g., briefs, preflights, spotting, takeoff, rendezvous, en route, return, recover).

f. Helicopter/tiltrotor spotting for launch.

g. Air tasking order or air plan/load plan.

h. Debarkation planning (moving helicopter/tiltrotor aircraft, troops, and equipment ashore) to support the mission. Coordination should be conducted if sling-load operations are envisioned.

10. Medical. Medical health services vary widely depending on the class of the ship. Single-spot ACSs may have only an independent duty corpsman and no dental services, while multispot ACSs may have a physician and/or a dentist assigned. AASs and CVNs usually have forward resuscitative care capability. Embarked unit planning should address medical and dental personnel to augment the ship's medical teams.

11. Logistics/Supply

a. USN ships' supply inventory does not normally include other Service-unique items. In addition to the standard aircraft maintenance packup kits containing small parts, tools, and consumables, a helicopter/tiltrotors maintenance unit assigned shipboard missions should prestage essential parts, such as rotor blades and engines, aboard ship prior to deployment. Ship's supply officers (SUPPOs) should ask the embarking unit which items they may need and make arrangements to bring them on board the ship. Embarking units should contact the ship and discuss unique requirements with the SUPPO early in the planning cycle.

b. The Navy supply system generally operates in several stages. Ships are supported via airheads and beach detachments. The airhead is a central location for all parts going to a particular ship. Expediters at the airhead forward supplies to an appropriate beach detachment located within flying range of the ship. The beach detachment collects the supplies and loads them aboard aircraft or logistics ships scheduled to operate in the vicinity of the requesting unit. Helicopter/tiltrotors units that are embarked aboard ship for an extended period should tie into the Navy supply pipeline to get replacement parts and supplies from their parent organizations. Embarked units should coordinate with the ship's SUPPO to establish POCs at each of the logistics stops in the ship's supply chain.

For specific guidance concerning logistic support, refer to chapter 4.

12. Unmanned Aircraft System (UAS). Shipboard UAS and manned aircraft operations requires careful planning. UAS will be required to operate under positive control and comply with published approach or departure procedures. In addition, significant effort and lead time may be required to support the installation of UAS antennas, mission control station(s), and autonomous landing capability (such as UAS common automatic recovery system) aboard a ship. Additional considerations include:

a. Reliable access to the EM spectrum

b. Frequency management

c. Fuel supply storage

d. Required networks/bandwidths for data.

13. Shipboard Protection. Planning for flight operations must consider chemical, biological, radiological, and nuclear (CBRN) environments. Operations in a CBRN environment may involve Service-specific procedures and equipment based on the type and model of aircraft used. Such procedures and equipment may not be compatible with USN shipboard CBRN SOPs. Planners should consider Service-specific CBRN flight operations and equipment compatibility with shipboard operations. Planners should coordinate appropriate training for embarked personnel. Compatible CBRN flight and flight deck equipment and clothing should be obtained. Additionally, prior experience has illustrated that operations in a CBRN environment need not be caused by hostile actions. Nevertheless, such operations can severely degrade the mission capability of a ship or embarked aircraft. See Naval Ships' Technical Manual chapter 470, Shipboard Biological Warfare/Chemical Warfare Defense and Countermeasures, and JP 3-11, Operations in Chemical, Biological, Radiological, and Nuclear Environments.

2.4 PREDEPLOYMENT TRAINING AND CERTIFICATION

1. General Training Requirements. The training requirements in this chapter should be met except for immediate operational requirements where the success of the mission would be clearly jeopardized by delaying operations. These requirements include qualification training as well as unit certification that fall into two general categories:

a. Pre-embarkation Training

(1) Shipboard and aircraft firefighting training

(2) Aviation ordnance training and follow-on qualifications/certifications.

(3) Aircrew qualification and currency

(4) Flight deck familiarization IAW Naval Education and Training (NAVEDTRA) 43426-0B, Personnel Qualification Standard for Flight Deck Familiarization.

b. Afloat Training. This training is conducted by the ship's company indoctrination organization. It should include shipboard electrical safety, storage, handling, and disposal of hazardous or flammable material, hearing conservation, emergency escape breathing device and oxygen breathing apparatus use, HERO and EMCON plans, material conditions of readiness, basic damage control organization and embarked aviation detachment responsibilities, abandon ship bill/life raft stations, emergency egress blindfold drill (berthing compartment and workspace), ship's battle bill and man overboard bill, and GQ (with and without flight quarters).

2. Detachment Ground Personnel Training. Maintenance personnel and aircrew assigned to helicopter/tiltrotor aircraft detachments that maintain a capability to operate from ships will receive academic and ground school training IAW the Army/Air Force Deck Landing Qualification, Memorandum of Understanding between the Department of the Navy and the Departments of the Army and the Air Force to ensure their safety and effectiveness at sea. These requirements apply to embarked operations and are not intended to restrict personnel whose exposure to the shipboard environment is limited to DLQ training periods.

3. Aircrew Training, Qualification, and Currency Requirements. Pilots obtain initial, recurrent, and requalification training for type aircraft IAW parent Service directives as appropriate. The DLQ requirements identified in figure 2-4 are derived directly from the Army/Air Force Deck Landing Qualification, Memorandum of Understanding between the Department of the Navy and the Departments of the Army and the Air Force. Approved Air Force CV-22 simulators are able to model ships and practice ship approaches and landings.

4. Certification. Before embarkation, helicopter/tiltrotor aircraft detachments will be certified for shipboard operations by their unit commander or other authority. This certification will ensure training requirements set forth in this publication have been met and the detachment has met parent-Service training requirements for the intended mission. Any specific training shortfalls or additional training intended after embarkation should be briefed during the presail conference when applicable and appropriate. Certification is not required for all training operations that do not require embarkation (e.g., DLQ). The unit commander shall provide the ship with documentation that aviation ordnance device-handling personnel have been thoroughly trained, qualified, and certified on the safe and efficient handling of aviation ordnance.

5. Helicopter/Tiltrotor Aircraft Specifications. Prior to operations, and when requested, unit commanders should provide diagrams of embarked aircraft to the helicopter control officer (HCO) or air officer (air boss) and crash and salvage parties.

2.5 EMBARKATION PLANNING

1. General. Embarkation planning involves reverse planning from the objective, to the landing zone, to the ship, and to the port of embarkation (POE) such that the equipment that will be needed first is the last equipment loaded on board ship. Successful embarkation plan development requires early coordination between the embarking unit and the ship's crew. Both should work concurrently to develop embarkation milestones, schedule an embarkation conference, staff advance parties (to include ship guides), assign embarkation coordinators, and generate the load plan. Most of the issues concerning embarkation should be discussed during the embarkation and presail conferences. See appendix E.

United States Army/United States Air Force Deck Landing Requirements for One-Spot Ships and Multispot Ships

Requirements			Day (D)	Night Unaided (N)	Night Aided (NVD)
Initial Qualification	Instructor		DLQ current IP or USN/USMC HAC	N DLQ current IP or USN/USMC HAC	NVD DLQ current IP or USN/USMC HAC
	Prerequisite		Qualified in the aircraft, DLQ academics	Day DLQ current, 2 ship or simulator DLQs (D/N/NVD) within 7 days	Day DLQ current, 2 ship or simulator DLQs (D/N/NVD) within 14 days
	FDLPs	Within 14 days	5 FDLPs in aircraft or qualified simulator	5 Night unaided FDLPs in aircraft or qualified simulator	5 NVD FDLPs in aircraft or qualified simulator
	DLQs		5	5	5
	Period		6 Months (1SS), 1 Year (MSS)		
Currency	DLQs		5 DLQs (D/N/NVD) within: 6 months (1SS), 1 year (MSS)	5 N DLQs (D/N/NVD) within: 6 months (1SS), 1 year (MSS)	5 NVD DLQs within: 6 months (1SS), 1 year (MSS)
	Night DLQ Prerequisite		N/A	2 ship or simulator DLQs (D/N/NVD) within 7 days	2 ship or simulator DLQs (D/N/NVD) within 14 days or 2 ship or simulator NVD DLQs within 45 days
Simulator DLQ Currency	Instructor		DLQ Current IP/simulator IP or USN/USMC HAC	N DLQ Current IP/simulator IP or USN/USMC HAC	NVD DLQ Current IP/simulator IP or USN/USMC HAC
	Simulator DLQs		5 DLQs (D/N/NVD)	5 N DLQs	5 NVD DLQs
	Prerequisite		Day DLQ current	Night DLQ current	NVD DLQ current
	Period		(1SS) 6 months from simulator flight, not to exceed 1 year from last 1SS landing. (MSS) 1 year from simulator flight, not to exceed 2 years from last MSS landing.		
DLQ Academics			Required for all initial DLQ training, or if currency has elapsed for both 1SSs and MSSs.		

Legend

1SS	one-spot ship	MSS	multispot ship
DLQ	deck landing qualification	N/A	not applicable
FDLP	flight deck landing practice	NVD	night vision device
HAC	helicopter aircraft commander	USMC	United States Marines Corps
IP	instructor pilot	USN	United States Navy

Figure 2-4. United States Army/United States Air Force Deck Landing Requirements for One-Spot Ships and Multispot Ships

2. Embarkation Procedures/Coordination. The embarkation process will be enhanced by assigning single POCs for both the ship and the embarking unit. It is imperative the unit and ship embarkation coordinators work together to develop embarkation milestones. Once the milestones are published, changes must be coordinated through both the unit and the ship.

a. Embarkation planning issues to be discussed include:

(1) Embarkation team organization for each Service unit.

(2) Personnel requirements.

(3) Communications (means of communication during the evolution and identification of those personnel who should be communicating to include viability/compatibility of cryptologic equipment).

(4) Materials handling equipment (MHE).

(5) Safety.

(6) Cargo handling systems.

(7) Securing of cargo and vehicles.

(8) Traffic routes for cargo and personnel moving on and off the ship.

(9) Onload and/or offload points.

(10) Types and amounts of cargo, ordnance, aircraft armament systems, and vehicles.

(11) Operational checks of MHE prior to onload and offload. Drivers must be qualified IAW SW023-AH-WHM-010, Handling Ammunition and Explosives with Industrial Materials Handling Equipment.

(12) Coordinating communications security storage requirements and agreements.

b. Guidance for embarkation is provided in Marine Corps Tactical Publication (MCTP) 13-10M/Navy Tactics, Techniques, and Procedures (NTTP) 3-02.6/Army Techniques Publication (ATP) 4-15.5/Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.1, Amphibious Embarkation. The USN and USMC follow embarkation guidelines outlined in MCTP 13-10C, Unit Embarkation Handbook. General guidelines for embarkation can be found in OPNAVINST 5720.2M, Embarkation in United States Naval Ships.

3. Naval personnel load cargo based on cube and weight. Any cargo that is not hand carried must be palletized and banded or loaded in standard International Organization for Standardization (ISO) configured equipment and containers (military van, container express, quadruple container, six-compartment container) and other naval logistics integration-approved containers, such as the various versions of the joint modular intermodal containers. When palletizing cargo, embarking units should plan on using one of the more commonly used sizes in North America (48 inches × 48 inches, 48 inches × 40 inches or 42 inches × 42 inches). 463L pallets cannot be used unless arrangements can be made to provide USA low-profile forklifts on CVNs or AASs (USN forklifts cannot handle 463L pallets). Failure to follow these simple palletizing requirements may delay embarkation. It is important to let the load officer know the volume and weight of crates and equipment containers so they can arrange the appropriate storage space on ship. In addition, they will need to know which items are necessary for ready access and which will be infrequent access/use items. A critical part of embarkation planning is the embarkation conference. This conference should be scheduled six months or more in advance or as early as possible in the planning process and shall address:

a. Ordnance and aircraft armament system embarkation and ammunition reporting requirements

b. Load plan preparation and submission requirements

c. ISO container loading policy, constraints, and criteria

d. Naval support element lift footprint and assignment to ships

e. POE inspection requirements

f. Motor gasoline storage capacities, retrograde capabilities, and safety considerations

g. Aviation GSE embarkation requirements

h. Embarking unit accommodations, inspection timeline, reporting requirements, and methodology

i. U.S. Customs and Department of Agriculture requirements

j. Embarkation schedule of events development, submission, and modifications

k. Inport loading of embarking unit personnel, supplies, and equipment

l. Compilation and distribution of command POCs

m. Munitions crossdecking and retrograde policy development

n. Hazmat (lithium batteries, sulfuric acid, calcium hypochlorite).

4. Administrative/Training Coordination. Shipboard operations are a complex orchestration of activities. Ship activities are planned during the ship's department head meeting and planning board for training. The embarked unit should send a representative to each of these meetings.

5. Future events are discussed and scheduled during the planning board for training. This is the forum where the embarked unit will address unit-training requirements and coordinate and schedule these requirements with the various ships' departments whose services or spaces may be needed. Ship departments have periodic training requirements such as engineering casualty drills, and EMCON or deceptive lighting evolutions that may significantly impact the embarked unit's maintenance or flight operations. The planning board for training is the venue where these competing requirements are negotiated.

6. Habitability Coordination. Habitability issues should be coordinated with the designated ship's representative. Among the issues to coordinate are cleaning and preservation of embarked unit spaces and billeting and messing of embarked personnel.

7. Embarked Unit Ship Support Requirements. Addressing augmentation requirements during the embarkation and presail conferences will allow the embarking unit to plan/arrange for personnel augmentation accommodation. Issues to consider include laundry service, food preparation, and cleaning details.

8. Safety. Embarking units will find the shipboard environment is like an industrial area. Ships are a collection of electrical, electronic, and mechanical equipment. Awareness of ship hazards and their locations is the first step toward safety aboard ship. Much of this information will be presented during shipboard indoctrination after unit embarkation. Hazmat storage/issue spaces are found in various locations dependent on ship class or type. Temporary hazmat storage lockers are located throughout the ship in spaces requiring frequent access to hazmat in performing daily routine tasks.

9. General Onload. There are several avenues for onload of personnel and equipment. For small units, embarking for short duration, flying everything aboard may be the preferred method. For larger units or for longer durations, a combination of pierside loading and fly-on may be the optimal method. Embarking units should have an advance party embark 48 to 96 hours prior to loading. This provides sufficient time to become familiar with the ship and establish coordination before cargo, vehicles, and personnel arrive. The advance party should be composed of personnel to coordinate all general onload preparation.

10. Ordnance Onload. Ordnance onload requires extensive planning and coordination by ship's company. CNO-approved waivers may be required. To ensure the onload is conducted smoothly and efficiently, it is imperative the embarking helicopter/tiltrotor aircraft detachment keeps the ship's weapons department and safety personnel up to date on a continual basis regarding the types and quantities of ordnance to be loaded/employed. Message format will be used initially and when any change occurs. Per OPNAVINST 8023.24, Navy Personnel Conventional Ammunition and Explosive Handling Qualification and Certification Program, all personnel handling aviation ordnance on board USN ships, will be fully trained, qualified, and certified for all assigned tasks. The ship's explosive handling qualification and certification board qualifies ship's personnel IAW this directive. Ordnance can be loaded pierside IAW the net explosive weight allowance identified on the explosive site approval or flown aboard the ship while underway as cargo. Underway replenishment (connected/vertical) is prohibited for non-USN packaged munitions due to safety considerations. After the supporting ordnance is identified IAW NAVSEA OP 4, Ammunition and Explosives Safety Afloat, and the operational commander identifies an onload target date to both the Service depot/ASP and the ship's weapons officer, the ship can arrange for onload through the applicable TYCOM. Similar arrangements will be made for the ordnance offload following completion of the operational tasking. Full justification for any related waivers that must be submitted by the host ship will be provided by the embarking unit commander. Aircraft armament systems onload should be coordinated with the ship's weapons officer IAW COMNAVAIRFOR Instruction 8380.2, Aircraft Armament Systems Program.

11. Helicopter/Tiltrotor Aircraft Onload/Fly-on. Coordination of fly-on from a shore site to a ship at sea will depend on distance between the ship and shore, available navigation aids, and communications between shore ATC and the ship's controllers. Several items should be coordinated and agreed upon before flying out to the ship (e.g., arrival sequence, ship's position, navigational aids [NAVAIDS]). Preferably, these items will be addressed and resolved not later than the presail conference.

2.6 DEBARKATION PLANNING

This section will cover debarkation considerations. It is not an all-encompassing source document. This data forms the baseline from which ship and embarked unit personnel can begin to develop a debarkation plan. There are two debarkation processes to discuss. Mission debarkation is leaving the ship to conduct the mission (return to the ship is anticipated and expected) and is focused on operational concerns and support requirements. Post-mission debarkation is leaving the ship (return not anticipated). Post-mission debarkation is a mirror image of the embarkation process. Coordination for debarkation should begin well before the anticipated debarkation date. Discuss timelines and support requirements both on the ship and on shore. All areas covered in the embarkation conference should be addressed in debarkation planning.

1. Mission Debarkation Procedures and Coordination. Mission debarkation involves much of the ship and the embarked unit. Debarkation will proceed more smoothly with planning and close coordination among embarked units and the ship. Essential elements of mission debarkation are milestones, load planning, shipboard coordination, and staging.

2. Post-mission Debarkation Procedures and Coordination. Like embarkation, assigning single POCs for both the ship and debarking unit will enhance the debarkation process. As soon as the anticipated debarkation date is estimated, debarkation coordinators should begin debarkation planning. The unit and ship debarkation coordinators should work together to develop debarkation milestones to provide a baseline for the debarkation evolution. The debarking unit and the ship should make every attempt to adhere to the published milestones. Once the milestones are published, changes must be coordinated through both the unit and the ship. Planning issues to consider include timeline, support requirements (shore, ship), ordnance, aircraft armament systems, and hazmat offload. Offload will be most efficient if those responsible for moving the material off the ship are thoroughly familiar with the offload plan. Prior to arriving pierside, the offload coordinators should conduct a briefing for all involved personnel to cover the plan in detail.

3. Helicopter/Tiltrotor Aircraft Offload/Fly-off. Embarked helicopter/tiltrotor aircraft may fly off the ship as it approaches port or in some cases may fly off the ship once it is pierside. When arranging to fly off, helicopter/tiltrotor aircraft units should ensure coordination among ATC (both ship and shore), the ship's

operations and air departments, and unit shore personnel. Issues to consider prior to fly-off include departure sequence, ship's position, and NAVAIDS.

For further information on debarkation planning, refer to MCTP 13-10M/NTTP 3-02.6/ATP 4-15.5/AFTTP 3-2.1.

2.7 SAFETY

1. Responsibility for Safety. The CO of the ship has supervisory responsibility for the safety of embarked helicopters/tiltrotor aircraft at all times. The helicopter/tiltrotor aircraft unit CO or detachment OIC is directly responsible for the overall safety of assigned aircraft and personnel. The embarked unit CO or detachment OIC will make the final determination concerning overall flight safety and unit flight activities. However, decisions concerning the safety of a particular aircraft, crew, and passengers are the responsibility of the respective aircraft commander or pilot in command.

2. Risk Management. Planning is key to successful risk mitigation and mission success for all units involved. Clear risk management guidance and frequent interaction between senior leaders and planners will promote an early, shared understanding of the risks involved for complex helicopters/tiltrotor operations. Implementing proper procedures and providing appropriate resources for personnel to perform assigned tasks will enable mission success. Parent commands should provide embarking units with appropriate water survival aviation life support equipment and train them on the proper care and use during normal unit train-up. Awareness of ship hazards and their locations is the first step toward safety aboard ship. Much of this information will be presented during shipboard indoctrination conducted by the ship's safety department after unit embarkation. Items to discuss include:

a. Machinery noises and other routine shipboard activity, including night flight/amphibious operations, may affect crew rest.

b. The ship is an industrial environment. Shipboard electrical systems are different. Fire hazards present a greater risk aboard ship than in the field. Risk management depends heavily on awareness and avoidance of the hazards.

c. Hazmat, concentration of machinery, electronic emitters, and shipboard weapons stations compound the hazards.

d. Limited space and tight quarters present injury hazards from equipment and/or boxes hanging on the walls (bulkheads) and ceilings (overheads).

e. Shipboard drills require participation by all personnel aboard ship.

f. All embarked personnel should be aware of water survival techniques.

g. Personnel should be trained in the use of flight deck safety equipment.

h. Wind, sea state, and ship motion may adversely impact what would otherwise be routine evolutions. Unsecured gear may move unexpectedly in even mild sea states, damaging equipment and presenting a hazard to personnel.

i. Shipboard activities must be coordinated to ensure incompatible evolutions do not occur in close proximity.

j. Salt air exposure and its corrosive effects on airframe and electronic components/systems.

k. Mitigation programs; tool control, foreign object damage (FOD) control, and shipwide drills.

l. Shipboard standard terminology/compartment numbering.

3. General Safety Measures. The squadron CO or detachment OIC and ship personnel will evaluate the hazards involved in all phases of shipboard helicopter/tiltrotor aircraft operations and develop appropriate

safety measures. Shipboard personnel will be trained in safe operating procedures before commencement of helicopter/tiltrotor aircraft operations.

a. During flight operations, only those personnel whose presence is required will be allowed in the flight deck area. All other personnel will remain clear or below the flight deck.

b. Personnel engaged in flight operations (other than aircrew member on participating aircraft) will wear approved head and hearing protection, sound suppressors, safety goggles, steel-toe safety shoes, flotation devices, long-sleeved shirts or flight deck jerseys, and long trousers. Transient crews will wear appropriate clothing/equipment IAW parent Service directives. Reflective tape will be applied to headgear and/or the upper body area of flight deck personnel clothing or equipment. All personnel on exposed decks will remove their hats (except for approved fastened safety helmets) while helicopter/tiltrotor aircraft operations are being conducted. All personnel on the flight deck must be trained to take cover immediately on command of the flight deck officer, air officer, LSE, or landing signals officer (LSO).

c. Personnel are allowed to transit the area under the rotor arc of an operating helicopter/tiltrotor aircraft only with the permission of the pilot (who will signal the LSE or LSO before permitting such passage). Personnel shall enter the rotor arc from the 3 or 9 o'clock position only. For operating helicopters configured with a tail rotor, persons transiting from one side to the other under the rotor arc will do so via the nose of the aircraft. The use of a guide to move personnel around turning aircraft rotor blades should be considered. Personnel shall not enter the rotor arc while aircraft are starting up or shutting down.

4. Safety Concerns for Aircraft Passengers and Troop Movement. All shipboard passenger transfers shall be conducted IAW COMNAVAIRFOR M-3710.7, NATOPS General Flight and Operating Instructions Manual. Ensure passengers to be transferred are manifested and briefed IAW Service guidelines, have proper cranial protection and emergency flotation devices, and have received a flight emergency briefing with a copy of the pertinent helicopter/tiltrotor aircraft emergency diagram.

5. Safety Concerns for Transfer of Personnel by Hoist

a. If landing is not practicable, a transfer may be made by hoist. Passengers in the helicopter/tiltrotor aircraft will remain seated with safety belts secured at all times except when otherwise directed by a crewman during the actual hoist transfer. Personnel will be briefed on helicopter/tiltrotor aircraft ditching procedures and the proper position of the hoisting device. Personal baggage will not be carried during the hoisting operation.

b. Flight deck personnel will electrically ground the helicopter/tiltrotor aircraft hoist cable prior to the passenger reaching the ship's deck.

c. Transfer of passengers by hoist at night is prohibited except in emergency situations.

6. Night Over-water Helicopter/Tiltrotor Aircraft Passenger Flights. Helicopter and tiltrotor passenger overwater flights at night are authorized and subject to the following restrictions:

a. Ship launches and recoveries shall be made during daylight hours. This constraint may be waived by the strike group commander, amphibious squadron commander, Marine air-ground task force commander, or officer in tactical command (OTC) in cases of operational necessity.

b. In cases of medical evacuations (MEDEVACs), a qualified medical attendant who is current in approved water survival training (non-aircrew underwater emergency egress as a minimum training requirement), and has been properly briefed on emergency egress procedures for that aircraft, may be transferred at night with approval from the ship's CO.

c. This does not preclude troop movement in support of amphibious exercises, visit board search and seizure operations, or SOF training and operational missions.

7. General Flight Deck Hazards

a. FOD. All-weather deck areas, and particularly the flight deck, will be inspected before and monitored throughout all helicopter/tiltrotor aircraft operations to ensure they are clear of FOD. FOD-producing material includes rags, paper, line, ball caps, hardware, and other matter that can be caught by air currents and damage aircraft or injure personnel.

b. Helicopter/Tiltrotor Aircraft Equipment Hazards. Equipment aboard helicopters/tiltrotor aircraft can present unfamiliar dangers to ship personnel. Equipment restrictions and limitations should be discussed during the presail conference and reinforced during orientation.

c. Weapons Hazards

(1) Helicopters/tiltrotor aircraft parked or operating in the vicinity of ship's weapons are subject to damage from rocket blast, gunfire concussion, and FOD from materials scattered when ship's weapons are fired. All appropriate measures should be taken to preclude the firing of any weapon in the vicinity of the helicopter/tiltrotor aircraft operating area when an aircraft is parked on deck or when flight operations are in progress. When weapons firing is anticipated, aircraft will be positioned outside the weapons blast or concussion range. If this is not possible, aircraft should be secured as far as is practical from the firing mounts, with doors and hatches open.

(2) Procedures for the custody and security of personal small arms (e.g., 9 millimeter and M4/M16 rifles) will be IAW the ship's current small arms (weapons) instruction and OPNAVINST 5530.13C, Department of the Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives (AA&E).

d. Wave Hazards on Low Freeboard Ships. Many variables can decrease the rotor to sea clearance. These variables include ship speed (squat), pitch, roll, weight, rudder angle, the helicopter's position on deck, tip path plane orientation, strut servicing, slack in tie down chains, wind, sea state, variability in wave height as well as ship and wave interactions. Even with the aircraft chocked and chained and a red deck set, on low freeboard ship flight decks the combination of ship motion, sea state and wave action can lead to contact between the airframe or rotor system and the sea or waves over the deck. Contact between the sea and an engaged rotor system bears the potential for catastrophic results. Refer to NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual, for detailed considerations.

e. Tiltrotor High Exhaust Temperatures Hazards. Tiltrotor engine exhaust comes out of the bottom of the engine and is pointed straight down on the deck from a height of only 4 feet.

8. Emergency Procedures. While aboard ship, there are generally two categories of emergencies: shipboard emergencies (especially shipwide emergencies) or aircraft emergencies. Each emergency situation is unique. Therefore, pre-established procedures may not hold in every instance, but the following general guidelines are appropriate:

a. Shipboard Emergencies. These emergencies include GQ and man overboard.

(1) GQ is a condition of readiness when naval action is imminent or there is an incident on board the ship placing the crew or ship in danger (e.g., engine room fire, flooding). All battle stations are fully manned and alert, ammunition is ready for instant loading, and guns and guided missile launchers may be loaded. Normally, embarked personnel are directed to their working area or berthing area during GQ to allow ship's personnel to conduct battle or handle the emergency situation.

(2) Man overboard indicates there may be someone in the water who needs to be rescued. When man overboard is announced over the 1MC, it is imperative visual muster be conducted of all personnel. An accurate muster is necessary to determine whether someone from the ship is, in fact, in the water and who that person is. The muster report should be forwarded to damage control central or the bridge as required. The method for forwarding this information will depend on the ship's established procedures. The ship may launch helicopters to aid in the search and recovery effort.

b. Aircraft Emergencies. These emergencies fall into three basic categories: aircraft ditch or crash, an

immediate landing, and a precautionary shipboard landing.

(1) Helicopter/tiltrotor aircraft emergency information will be passed to the flight deck crew and fire party either over the 1MC or the flight deck crew announcing system, whichever is most expedient.

(2) When the flight deck has an emergency and a crash alarm is sounded, unnecessary personnel will be cleared from the flight deck and surrounding area.

(3) During any emergency, the first consideration of the ship should be to close the distance to the helicopter/tiltrotor aircraft and prepare for immediate recovery. For single-spot ship emergencies, the senior member of the air detachment on board the ship should report to the bridge. If the emergency involves a tail rotor malfunction, single engine condition, engine fire, or power loss, optimum relative wind for recovery is required. If a flight control malfunction is indicated, a stable flight deck with acceptable winds is warranted. Specific actions are outlined in aircraft flight manuals.

9. Cold Weather Operations. The operation of helicopters/tiltrotor aircraft in cold weather requires special procedures for maintenance, servicing, and operations. Extreme cold weather operations require advance preparations and special equipment and procedures. Allied Tactical Publication-17, Naval Arctic Manual, is an excellent resource. It includes information on crew exposure, helicopter icing, and general cold weather operational guidance.

a. Environmental Considerations. Adverse climatic and other environmental conditions at sea will affect ships and their equipment during cold weather operations.

b. Maintenance and Servicing. While routine tasks take longer because of difficulties posed by low temperatures, aircraft and equipment can be maintained and serviced when exposed to temperatures as low as -40° Celsius. The time required to perform a maintenance task on an aircraft in cold weather is best determined by considering it to be a function of wind chill rather than temperature. Cold weather operation of helicopters/tiltrotor aircraft shall be IAW the applicable aircraft manual.

c. When refueling at low temperatures, care should be taken because objects can become charged with static electricity more readily than at normal temperatures. Refueling should be carried out as soon as possible after shutdown to prevent water condensation inside fuel tanks.

d. Flight Operations. All flight operations should be planned and scheduled with consideration for aircrew/passenger survival time and SAR capability in the area of operations. Personnel transfers to or from ships during cold weather operations should be kept to a minimum as required by operational necessity. Cold weather passenger transfers should be performed over the shortest distance possible, preferably within visual range. Transferring and receiving units should establish and maintain communications/radar contact for the duration of the transfer. Arctic wind chill factors near a hovering helicopter can freeze exposed flesh in a matter of seconds. Protective measures and frequent rotation of personnel should be considered.

e. Cold-water Estimated Survival Time. Figure 2-5 displays predicted cold-water survival time (i.e., the time required to cool the core body temperature to 30° Celsius/86° Fahrenheit) of lightly clothed, nonexercising humans in cold water. The graph depicts a broad zone indicating the individual variability associated with body composition, physical fitness, state of health, and water survival techniques and equipment. The zone would include approximately 95 percent of the variation expected for adult and teenage humans under the conditions specified. The zone would be shifted downward into the fast coolers section by physical activity (e.g., swimming) and upward into the slow coolers section for heavy clothing and/or protective behaviors (e.g., huddling with other survivors or adopting a fetal position in the water). Specialized insulated protective clothing (e.g., survival suits, wet suits) are capable of increasing survival time from 2 to 10 times (or more) the basic duration shown here. In the zone where death from hypothermia is highly improbable, cold water greatly facilitates death from drowning, often in the first 10 to 15 minutes, particularly for those not wearing flotation devices.

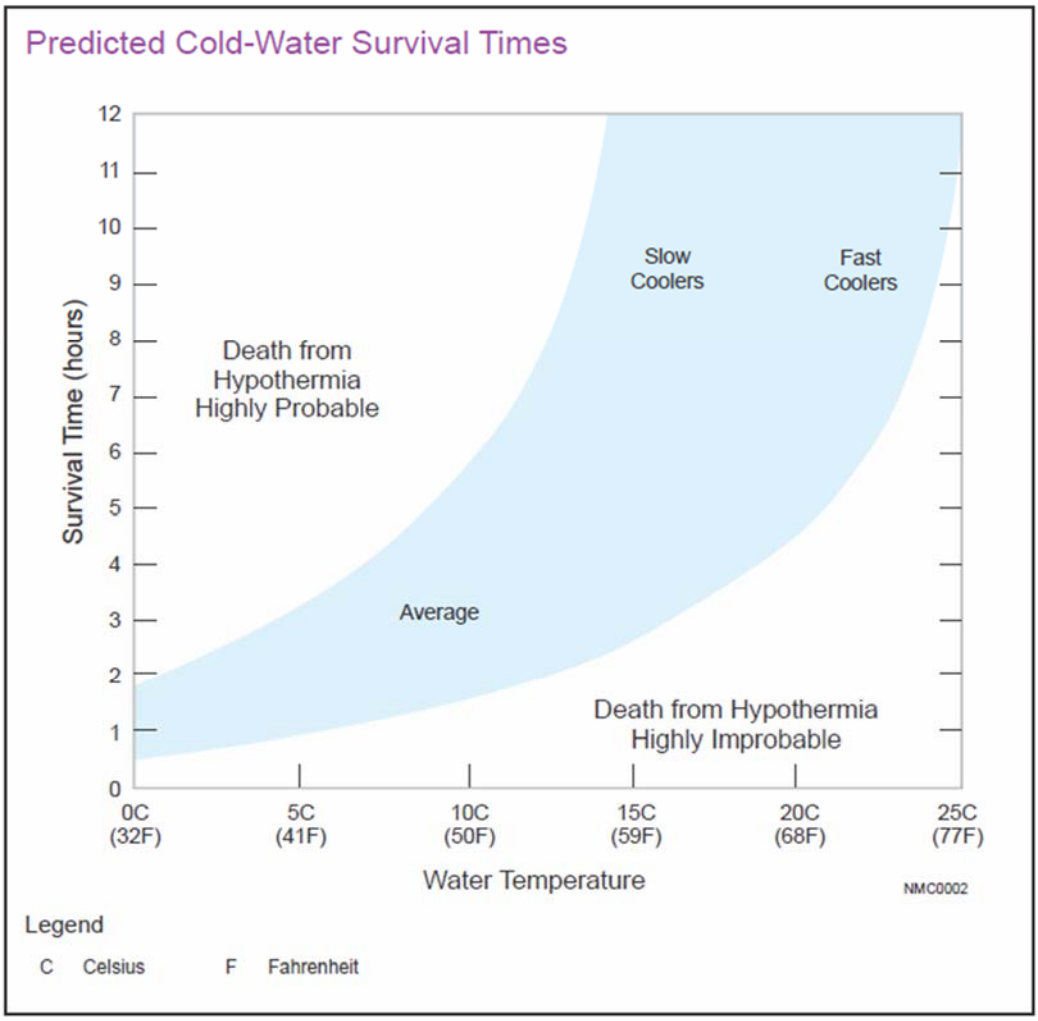

Figure 2-5. Predicted Cold-Water Survival Times

2.8 ORDNANCE AND AIRCRAFT ARMAMENT SYSTEMS

2.8.1 Ordnance Movement, Handling, and Stowage

1. The movement, handling, and stowage of explosive ordnance carried aboard ships and aircraft is inherently dangerous. Shipboard handling/stowage of A/E is therefore governed by the most definitive and restrictive Department of Defense (DOD) regulations and precautions. What might be considered a relatively minor explosive incident ashore could be catastrophic aboard ship due to the confined environment. Safety is the responsibility of all hands, and understanding the risk is paramount. Sound knowledge and a healthy respect for ordnance operations will help ensure safety requirements are met. Safety must not be jeopardized by either the introduction of weapons not approved for shipboard employment by WSESRB or use of inadequately trained personnel to accomplish ordnance tasks. The destructive capacity of explosives has the potential to severely cripple or destroy the ship and crew in a matter of minutes. It is therefore imperative that mandatory safety procedures are complied with at all times by qualified and certified personnel with the appropriate supervision.

2. Aircraft armament systems encompasses all TYCOM-managed aircraft armament equipment, aircraft gun systems, aircraft crew served weapons, and laser aiming devices. The embark, stowage, and inventory accountability of these assets shall be accomplished IAW COMNAVAIRFOR Instruction 8380.2, Aircraft Armament Systems Program.

2.9 ELECTROMAGNETIC ENVIRONMENTAL EFFECTS

1. Introduction. Operations in and around ships subject both the helicopter/tiltrotor aircraft and the ship to E3 emissions neither may have been designed to encounter. When planning shipboard helicopter/tiltrotor operations, potential radiation hazards, EMI, and electronic vulnerability effects must be considered so applicable transmitter conditions can be set prior to arrival of helicopters/tiltrotor aircraft aboard the ship. Planners should contact NOSSA to receive proper HERO and EMV guidance prior to issuing authorization to conduct helicopter/tiltrotor aircraft operations.

2. Conducting flight operations on and around ships places a helicopter/tiltrotor aircraft in close proximity to dozens of high-powered transmitters and can make them susceptible to E3. Among the primary areas of concern for the planner are the susceptibility of unshielded helicopter/tiltrotor aircraft electronic systems and nonmaritime ordnance carried by helicopters/tiltrotor aircraft or personnel to shipboard emitters and the susceptibility of shipboard sensors and communications to helicopter/tiltrotor aircraft emitters. In a worst-case scenario, these transmitters can detonate or dud ordnance, impact flight control systems, and permanently damage helicopter/tiltrotor aircraft avionics and electronics. Unlike their USN/USMC counterparts, most helicopters/tiltrotor aircraft were not designed to operate in the shipboard EME. Since many of these high-powered transmitters are utilized by the ship's air/missile defense, navigation, and communications systems, they cannot be simply turned off when helicopters/tiltrotor aircraft are embarked. Therefore, many precautions must be taken to protect these aircraft from the E3 impact of the shipboard transmitters.

a. The integrated joint force operational EME is continuously changing as existing systems are modified and new systems are installed. Multi-Service operations increase the potential for safety, interoperability, and reliability problems if the platforms and their associated systems and equipment, including avionics, ordnance, and other embarked systems, are exposed to an operational EME different from those for which they were designed and tested. Integrated joint operations aboard ACSs require a careful balance of weapons, EMCON, delivery platforms, and ordnance handling procedures in the most extreme EMEs.

b. HERO

(1) Introduction. Ordnance items containing electro-explosive devices (EEDs) are sensitive to EM energy from a variety of sources such as radar and communication transmitters, including handheld walkie-talkie devices. Extreme caution must be exercised to ensure EEDs are not exposed to an EME that would cause inadvertent activation of the ordnance, thus causing injury to personnel and/or damage to property. This potential hazard exists in all life cycle phases of an ordnance item, including storage, transportation, assembly, disassembly, handling, loading, staging, when platform loaded, and immediately post launch. There are numerous at-sea and in-the-air situations where an ordnance item may become exposed to an unacceptable level of EM energy. Ordnance items that contain EEDs can be inadvertently activated or dudded by the EM fields typically present in the exposed topside areas of operational ships. The restriction of transmitter emissions through the use of standard EMCON procedures may reduce vital sensor data needed for successful battle management in a hostile environment. Unnecessary restrictions placed upon radar, communication, electronic warfare, and other shipboard systems to avoid ordnance mishaps can severely limit the host platform's warfighting capability and jeopardize overall mission accomplishment. Comprehensive and accurate HERO information is essential for the operational commander to establish a risk-based mitigation plan, balancing ordnance operations and the use of communication, radar, and electronic warfare transmitters.

(2) DOD and the Joint Spectrum Center work with NOSSA and Naval Surface Warfare Center, Dahlgren Division (NSWC DD) to determine the safety measures required to mitigate the risks associated with non-USN ordnance aboard USN ships. This analysis must be accomplished prior to embarking any non-USN ordnance on board ships. To ensure this is accomplished quickly and efficiently, the embarked units must be prepared to provide a DODIC or NALC and a complete NSN list of all ordnance items that will be brought to the ship. This includes aircraft cartridge-actuated devices, fuel tank, fire suppression, aircraft ordnance, and personnel munitions.

(3) Responsibilities

(a) The Department of the Navy (DON) HERO Program. The ship's CO has ultimate authority over embarked units in all areas involving safety of the ship and its crew. With respect to HERO safety, the USN has well-established policies and procedures to ensure safety of operations involving ordnance exposure to the EME. The DON HERO program objectives are to develop, coordinate, and direct HERO efforts to ensure the conflict between ordnance safety and use of the EM spectrum can be effectively managed in the conduct of DON and multi-Service operations. These objectives are met primarily by the design and certification of electrically initiated ordnance to the requirements of Military Standard (MIL-STD) 464C, Electromagnetic Environmental Effects Requirements for Systems, and the measurement of the EME ashore and afloat as required by NAVSEA OP 3565/NAVAIR 16-1-529 Volume 2, Electromagnetic Radiation Hazards (U) (Hazards to Ordnance) (U). NAVSEA OP 3565/NAVAIR 16-1-529 Volume 2 classifies ordnance types as safe, susceptible, unsafe, or unreliable. It establishes separation distances between ordnance and various types of RF emitters, describes how to develop the HERO EMCON bill and provides procedures for calculating field strengths and requesting a HERO survey. Naval Sea Systems Command Instruction 8020.7, Hazards of Electromagnetic Radiation to Ordnance Safety Program, assigns NOSSA the responsibility to administer the HERO program within the DON. The NSWC DD is assigned the technical agent for the DON HERO program and provides engineering and technical support including maintaining HERO test facilities, certifying ordnance and weapon systems for use aboard ship, and providing operational HERO EMCON bills for managing ordnance operations aboard ship and at shore facilities.

(b) CO and Helicopter/Tiltrotor Aircraft Squadron Commander/Detachment OIC. DOD Manual 6055.09-M, DOD Ammunition and Explosives Safety Standards, requires DOD components to take measures to ensure HERO issues are resolved during the planning of multi-Service or combined operations. Measures that can minimize HERO include identifying ordnance susceptibilities, quantifying EMEs, evaluating risks associated with ordnance procedures, and establishing tailored EMCON instructions. However, when the USN HERO EMCON bill does not address the operational concerns on non-USN ordnance aboard ship, contact NOSSA for HERO guidance.

(c) Ship's CO. The ship's CO has overall responsibility for the welfare and safety of all personnel on the ship. Although not all-inclusive, the CO's responsibilities for safe ordnance handling are:

(i) Provide safe ordnance operations and verification of helicopter/tiltrotor aircraft detachment and personnel ordnance certifications.

(ii) Maintain a technical publications library of aviation ordnance handling, safety, and security publications, checklists, and associated USN TYCOM instructions. These publications will normally be made available as a predeployment package by the TYCOM.

(iii) Stow all ammunition IAW NAVSEA OP 4, Ammunition and Explosives Safety Afloat, and if required, submit waivers for stowage of ammunition and obtaining approval prior to loading on board.

(iv) Upon receipt of list of anticipated weapons and explosives, verify all ordnance for use by the helicopter/tiltrotor aircraft unit has been approved by the WSESRB. A report is made to the TYCOM on initial receipt of all ammunition brought aboard for the aviation detachment. Monthly reports reflecting air detachment inventory will be submitted until the detachment departs. A final report will then be submitted.

(v) Ensure a HERO or EMCON bill is promulgated before arrival of a helicopter/tiltrotor aircraft detachment. COs shall ensure EM radiation hazards that have the potential to affect electro-explosive ordnance devices, fuel, and assigned personnel are controlled during

shipboard helicopter/tiltrotor aircraft operations. The ship's HERO or EMCON bill should depict individual HERO or EMCON conditions to be set before each specific operational condition, specifically arming or de-arming, aviation ordnance movements, and fueling operations.

(vi) Establish an aviation ordnance qualification or certification board to certify the combined ship and other Service aviation ordnance team.

(d) Helicopter/Tiltrotor Aircraft Squadron Commander/Detachment OIC Responsibilities. The squadron commander/detachment OIC is responsible to the ship's CO for safe aviation ordnance operations as they relate to the helicopter/tiltrotor aircraft unit. Although this list is not all-inclusive, the squadron commander/OIC will:

(i) Ensure squadron/detachment personnel use Service- and NAVAIR-approved aircraft system checklists and ordnance loading and downloading procedures

(ii) Verify the qualification of assigned squadron/detachment personnel to conduct aviation ordnance operations aboard ship and present qualification or certification documentation to the ship's CO when requested

(iii) Assist the ship's ordnance personnel in the handling and movement of aviation ordnance and related materials from the ship's magazines to designated assembly, staging or ready service, or flight deck areas as appropriate

(iv) Provide the ship's CO with an ammunition embarkation plan that identifies the types, quantities, number of pallets, weight, and cube of ammunition

(v) Provide an inventory of all personal and individual weapons

(vi) Provide list of anticipated weapons and explosives to the ship's CO for review against WSESRB requirements for shipboard operations

(vii) Ensure compliance with OPNAVINST 8023.24C, Navy Personnel Conventional Ammunition and Explosives Handling Qualification and Certification Program. Provide proof of compliance to the ship

(viii) Ensure compliance with the ship's qualification or certification board to certify the combined ship and squadron/detachment aviation ordnance team

(ix) If available, acquire aircraft loading checklists for shipboard operations for the type, model, and/or series aircraft and ordnance types that will deploy aboard ship, as described above.

(4) HERO EMCON Bill. A HERO EMCON bill is a set of directions for implementing HERO restrictions on ships and shore stations. Aboard ship, an EMCON bill's implementation is typically the responsibility of the combat system officer or the electronic warfare officer. Its purpose is to prescribe operating restrictions, through planning, the known conflicts between the EME created by high-power transmitting equipment and HERO classified ordnance. The degree of relief from HERO EMCON restrictions that can be obtained by following a HERO EMCON bill is dependent upon two factors:

(a) The amount and type of ordnance that is involved

(b) Knowledge of the ambient RF environment at locations where exposure occurs during presence, handling, loading, storage, assembly, and transportation operations.

(5) Once the EMCON bill is established, appropriate separation distances must be maintained between fixed emitter systems and inbound and outbound aircraft carrying HERO susceptible and HERO unsafe/unreliable ordnance. This process may also result in the silencing of communications and high-power search and fire control radars.

(6) The ship requires information concerning the exact ordnance the embarking unit will be loading aboard. This information is important both for the ship's ordnance personnel to plan where and how to store it and also for ship operators to determine other safety factors. As noted in the listing of responsibilities of the squadron commander/detachment OIC, the embarking squadron/detachment must declare all ordnance and emitter items to the ship's CO. This information will allow any required changes to be made to the ship's EMCON bill due to the introduction of the embarking squadron's/detachment's ordnance loadout.

(7) NAVSEA OP 3565 Volume 2, Electromagnetic Radiation Hazards (U) (Hazards to Ordnance), addresses HERO EMCON requirements and procedures in detail. A HERO survey is usually required to develop the HERO EMCON bill. This survey provides measured data on the shipboard EME along with detailed information on the configuration, status, and operational procedures of RF transmitters and ordnance items.

c. HERF and HERP

(1) HERF. HERF is the potential hazard that is created when volatile combustibles, such as fuel, are exposed to EM fields of sufficient energy to cause ignition. To reduce the possibility of fuel vapor ignition by high-powered transmitters or other spark sources, the USN uses jet propulsion fuel, type 5 (JP5) exclusively aboard ship. Typically, most USA and USAF units use jet propulsion fuel, type 8 (JP8), or jet propulsion fuel, type 4 (JP4), which have a lower flash point than JP5 and are therefore considered more susceptible to shipboard E3. Aircraft containing JP8 fuel may operate aboard USN ships, including launch/recovery, startup/shutdown, and refueling. Aircraft with fuels other than JP5 are requested to notify the ship's air officer (air boss) prior to landing, so appropriate precautions may be taken by flight deck personnel. Aircraft containing fuel other than JP5 will not be allowed in the ship's hangar. If shipboard hangaring of nonorganic aircraft is anticipated, embarking helicopters/tiltrotor aircraft should make every effort to fill all aircraft tanks with JP5 fuel prior to arrival on the ship (available at most USN airfields). If this is not possible, the aircraft will be refueled on the flight deck with JP5, and fuel samples will be drawn and flash point tested. The aircraft will not be hangared until all samples test at 120° Fahrenheit or higher. In the absence of flash point testing, aircraft arriving with fuel other than JP5 will not be permitted in the hangar until they have been refueled at least three times with JP5. For more specific information, consult NAVAIR 00-80T-109, Aircraft Refueling NATOPS Manual.

(2) HERP. HERP is the potential hazard that exists when personnel are exposed to an EM field of sufficient intensity to heat the human body. If the body's heat gain exceeds its ability to rid itself of excess heat, an increase in body temperature can occur that could have an effect on metabolic processes, with potentially deleterious effects. Radiation from high-powered transmitters can cause injury to personnel in the vicinity of transmitting antennas located on the ship's deck and masts. Stand-off areas around high-powered RF antennas are clearly marked on the ship's decks and bulkheads with a bright red circle. Since it is not possible to visibly determine if an antenna is transmitting, personnel should avoid entering these stand-off areas at all times. Exposure to excessive levels of RF radiation may not produce a noticeable feeling of pain or heat to warn that injury is occurring. Avoid entry into marked stand-off areas.

For more information, consult JP 6-01, Joint Electromagnetic Spectrum Management Operations.

d. EMCON and EMV

(1) This section covers the EMCON and EMV information that is necessary to prepare for compatible and interference-free shipboard helicopter/tiltrotor operations. Some nonmaritime helicopters/tiltrotor aircraft have not been tested in the EME of various ship classes.

(2) Multi-Service operations increase the potential for undesired E3, particularly if the platforms and their associated systems and equipment are exposed to operational EMEs different from those for which they were designed and tested. When helicopters/tiltrotor aircraft are operating in the vicinity of ships,

there must be established guidelines and procedures to avoid or minimize the potential for harmful EMI to shipboard, avionics, engine, and flight control systems. This guidance provides platform distance separation restrictions, along with radar main-beam illumination restrictions to preclude burnout and/or performance degradation of sensitive electronic components aboard the aircraft. The preparation and implementation of an effective HERO EMCON bill will also assist in the control of EMI during operational deployments.

(3) In an effort to mitigate E3 on multi-Service Service helicopters/tiltrotor aircraft, numerous EMV tests have been conducted on USA and USAF aircraft. Many USA helicopters can obtain shipboard transmitter guidance from the aircraft's high-intensity radio transmission area (HIRTA) messages. These messages are retained and can be provided by the NSWC DD or NOSSA.

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CHAPTER 3

Operations

"If you are in trouble anywhere in the world, an airplane can fly over and drop flowers, but a helicopter can land and save your life."

Igor Sikorsky, 1947

3.1 PRE-OPERATIONS

1. Helicopter/tiltrotor aircraft operations from ships place both ship and flight personnel in a unique and demanding environment. Close coordination and proper actions are required by all personnel at all times. Operational effectiveness and flight safety require extensive training in the areas of C2, aircraft coordination, and flight deck procedures. To provide the required amount of teamwork and enhance flight safety, the air officer, aviation officer, squadron commander, detachment OIC, or a designated officer shall conduct the following briefings:

a. Ship's CO and XO. The Ship's CO and XO will receive a thorough brief from the air or aviation department head and the commander/OIC of the Service helicopter/tiltrotor aircraft squadron/detachment. This briefing will cover, but should not be limited to, aircraft capabilities, planned training, and operational evolutions, with impact on ship's schedule and waiver requirements emphasized. Particular emphasis will be placed on the relation of each evolution to normal operations and any waiver requirements.

b. HCO. An HCO is a designated helicopter pilot or a graduate of the HCO's course. On ships other than a CVN or AAS, the HCO will be responsible for the supervision and direction of launching and landing operations and for servicing and handling of all embarked helicopters/tiltrotor aircraft. The HCO or air officer will thoroughly brief the commander/OIC of the helicopter/tiltrotor aircraft unit before commencing flight operations with newly embarked units. This brief will cover, but is not limited to the following:

(1) Normal shipboard instrument flight rules (IFR)/visual flight rules (VFR) aircraft launch and recovery procedures.

(2) Radio communications and terminology unique to shipboard operations. See recommended brevity codes in ATP 1-02.1/Marine Corps Reference Publication (MCRP) 3-30B.1/NTTP 6-02.1/AFTTP 3-2.5, Multi-Service Tactics, Techniques, and Procedures for Multi-Service Brevity Codes.

(3) Light and hand signals.

(4) Flight deck procedures to include: deck cycles, aircraft towing/movement, fueling, arming/de-arming, TD, and rescue specifics.

(5) NVD procedures and operating techniques.

(6) Emergency procedures.

c. Ship's Air or Aviation Officer, Flight Deck Officer or Director, and Flight Deck Cargo Supervisor. Key air operations personnel will be briefed on planned operations by the ship's operations officer.

Coordination of flight deck evolutions and operation-specific procedures will be covered in detail.

d. Officer of the Deck (OOD). All OODs will be briefed by the air or aviation department head and operations officer regarding specific limitations on deck movement, wind envelopes, and ship maneuvering limitations during flight operations.

e. Engineer Officer or Aviation Fuels Officer. These officers will be briefed by the embarked unit with regard to the type of fuel to be brought aboard by the Service units, fuel requirements, and fueling or defueling procedures once aboard. Particular attention will be paid to the hazards of JP8 and its effect on storage risks, volatility of mixtures, and firefighting considerations. The engineering or aviation fuels officer is responsible for routine fuel sample inspections and will provide a fuel sample for the helicopter/tiltrotor aircraft commander during hot refueling operations (refueling with engines, auxiliary power units, and/or rotors in operation).

f. Crash Crew or Fire Party On-scene Leader. Firefighting and rescue personnel will be briefed by the embarked detachment regarding aircraft particulars as they pertain to rescue and salvage operations. Once embarked for operations, the helicopter/tiltrotor aircraft units will provide the weapons/ordnance officer and crash crew personnel with orientation lectures on rescue access, armament de-arming, ordnance, firefighting hazards, and aircraft emergency shutdown procedures.

g. LSO or LSE. The LSO or LSE will be briefed by the embarked unit on special requirements with regard to lighting, signals, NVDs, aircraft securing, and fueling operations.

h. Air Controllers and Combat Information Center Personnel. Air control personnel will be briefed by the operations officer with regard to communications and identification equipment, SAR capabilities, weather criteria, and instrument approach procedures.

i. Weapons/Ordnance Department Personnel. Weapons/ordnance department personnel will be briefed by the embarked unit on the characteristics of all aviation ordnance planned for employment, loading/arming/de-arming procedures and inherent design safety features of the ordnance and aircraft systems of each aircraft planned for embarkation. Non-USN embarking units will provide training to ship's weapons personnel on ordnance when requested by the ship following the presail conference.

j. Flight Deck Personnel. Flight deck personnel, including the ordnance officer or the designated ordnance subject matter expert, will be briefed by the embarked unit on platform-specific procedures for fueling and deck handling evolutions, including procedures for the use of NVDs if their use is planned.

k. Ship's Company Briefs. When applicable, the ship's company will be briefed by the operations department regarding operations security aspects and restrictive lighting measures, including the lighting hazards during NVD operations.

2. C2 Spaces. Most USN ships are not configured with C2 spaces for embarked USA or USAF units. The embarked unit command element will be required to share already occupied shipboard C2 spaces. Units such as SOF that desire a sensitive compartmented information facility for planning should make this requirement known early in the predeployment planning process as these facilities are limited in number and size, particularly on ACS.

3. Communications Equipment. Some embarked units will bring their own portable communications equipment. While having their own communications pathways can ease competition for scarce shipboard resources, antenna location must be coordinated. Additionally, possible interference with shipboard electronics, EMCON, and HERO policies must be considered and carefully coordinated.

3.2 SHIPBOARD COMMAND AUTHORITIES

1. Ship's CO. USN and USCG regulations set forth the authority of the ship's CO with respect to aircraft embarked in or operating from the ship. When operating with a helicopter/tiltrotor aircraft unit embarked, the joint force commander's (JFC's) operation order will define command relationships for the assigned mission. These command relationships will normally apply from initial embarkation until final debarkation. In all cases, the ship's CO retains authority over embarked units in all areas involving safety of the ship or its crew.

2. Embarked Unit's Commander/OIC. An embarked unit commander/detachment OIC reports directly to the ship's CO, air wing commander, or authority specified by the JFC for the mission assigned. Administratively, the commander/OIC normally reports to the ship's XO for matters of day-to-day routine with respect to the embarked unit while embarked on the ship. When embarked on an ACS or AAS, the commander/OIC reports to the officer specified in the appropriate tasking order regarding the assigned mission and administrative routine. Normal procedure will be for one of the organic helicopter squadrons on the CVN to act as host and provide liaison between the ship and the embarked unit. The commander/OIC has the authority and responsibility for the following:

a. Initiate coordination for a presail conference (sample checklist in appendix E)

b. Coordinate embarked unit embarkation requirements with the XO of the ship

c. Provide certification documents to the ship's CO on the embarked unit's completion of presail

d. Coordinate all requirements for communications to higher authority with the ship's CO

e. Apprise the ship's CO and operations officer of operational and support requirements that directly affect the ship's operations

f. Apprise the ship's CO of embarked unit's readiness when required for operational reporting requirements to higher authority

g. Ensure embarked unit compliance with ship's routine operating and administrative instructions.

3.3 FLIGHT AND HANGAR DECK OPERATIONS

The ship's CO has overall responsibility for all actions that take place on a ship, to include the flight and hangar decks. Limited space and the potential for conducting numerous varied and hazardous tasks simultaneously require close control and coordination to ensure operations are conducted safely. Flight and hangar decks are hazardous work areas. Constant vigilance is required to prevent personal injury or helicopter/tiltrotor aircraft or other equipment damage during flight and hangar deck operations. The embarked unit should plan on providing a noncommissioned officer as flight deck liaison to facilitate close coordination with the ship's personnel.

1. Immediately after embarkation, the unit should expect to attend a general shipboard safety brief. This brief should also include the conduct expected of personnel while on the flight and hangar decks. Aircrews and maintenance personnel can expect a more specific flight and hangar deck orientation brief prior to beginning their operations in these areas. The risks associated with conducting daily flight and hangar deck operations can be minimized through effective communication and coordination between ship's personnel and embarked personnel.

2. Deck Handling/Maneuvering/Spotting. Space is very limited aboard ship, with aircraft required to share takeoff, landing, and maintenance spots. Therefore, helicopters/tiltrotor aircraft may need to be repositioned frequently and expeditiously, often on a windy, wet, and moving deck in close proximity to other aircraft and ship's structure. When not being repositioned, aircraft must be chained to the flight deck to prevent unintended movement due to wind and ship motion. Helicopter/tiltrotor aircraft space requirements and ease of handling largely determine the number of aircraft that a ship can accommodate and, in turn, have a major impact upon the tempo and effectiveness of operations.

3. Helicopters designed for land operations typically require more space than helicopters designed for maritime operations. Most do not have automatic blade folding systems but do have limited manual blade fold capability to enable transportation aboard ship or aircraft. These manual fold systems are typically not designed for quick and easy folds, nor are they robust enough to withstand high winds. Damage to folded rotor systems can occur in less than 25 knots of relative wind. The landing gear geometry and towing systems of helicopters designed for land operations are not optimized for maneuvering in tight spaces. The aircraft TD points may not be designed to deal with the stresses associated with high winds and deck movement. Therefore, these helicopters may require special handling when maneuvering, spotting, and parking.

4. Personnel are trained to maneuver maritime helicopters/tiltrotor aircraft using shipboard support equipment. It may be necessary to alter established practices with helicopter/tiltrotor aircraft designed for land operations because of their limitations and compatibility with shipboard support equipment. Embarked unit maintenance personnel should brief shipboard handlers on the appropriate procedures and established practices for handling their particular type, model, and/or series of helicopter/tiltrotor aircraft. Information on the following issues can be obtained from specific aircraft maintenance manuals and should be addressed with the unit at the presail conference:

a. Towing systems: Which tow tractors and tow bars are compatible with, or acceptable for use with, the embarking helicopter/tiltrotor aircraft?

b. Aircraft mooring/chaining system (aircraft physical security): location of the helicopter/tiltrotor aircraft TD points and how the helicopter/tiltrotor aircraft is to be secured.

c. Blades folded mooring system limitations: USA and USAF blade TD systems are designed to hold the blades for an air transport, not for heavy weather security.

d. Blade or tail fold provisions and requirements.

e. Blade removal requirements.

f. Special handling equipment.

5. Forward firing weapons pose a serious hazard to the ship when pointed at the ship's superstructure. Helicopters/tiltrotor aircrews shall be thoroughly briefed regarding specific offset procedures with forward firing ordnance as defined within the appropriate NATOPS manual.

6. The combination of relative winds and rotor downwash when launching or landing a helicopter/tiltrotor aircraft immediately adjacent to a spot occupied by a shutdown helicopter/tiltrotor aircraft may cause rotor system damage to the shutdown helicopter/tiltrotor aircraft. Blade fold systems of helicopters designed for land operations are designed for aircraft transport or storage only. Extreme care should be taken when launching or recovering helicopters/tiltrotor aircraft immediately adjacent to a spot occupied by these helicopters. Rotor downwash created by the CH-47, CH-53E, and the V-22 is greater than that produced by any other embarked helicopter. This downwash is sufficient to damage unsecured rotor blades and to blow aircraft chocks, tiedown chains, and towbars about the deck or overboard, and cause personnel injury or death. Because of the susceptibility of the AH/MH-6 helicopter to wind-related damage, launches and recoveries to a spot immediately upwind or crosswind from a static AH/MH-6 (blades unsecured, tied down, or folded) should not be conducted except in case of an emergency.

7. Post Landing, Shutdown, and Blade Fold

a. Post Landing. All post landing events will be controlled by/coordinated with appropriate ship's personnel. After landing, expect the following sequence of events in preparation for shutdown:

(1) The helicopter/tiltrotor aircraft will be chocked and chained.

(2) De-arm aircraft IAW applicable NATOPS.

(3) Cargo and personnel will be unloaded.

(4) The helicopter/tiltrotor aircraft will be shut down, unless it will be launching again.

(5) The helicopter/tiltrotor aircraft will be refueled as required (time permitting).

(6) Any required immediate action maintenance will be performed (time permitting).

b. Shutdown. Engine shutdown and rotor disengagement aboard ship can be more difficult and more hazardous than ashore, especially for helicopters that do not have a rotor brake. High winds and a rolling/pitching flight deck, coupled with the geometric design of ships and their superstructures, can cause unusual wind patterns (accelerated updrafts and downdrafts) in the helicopter shutdown area. Helicopters not equipped with a rotor brake may experience rotor coast-down times in excess of five minutes, as well as rotor blade flex and flap as the rotor rpm slows. It is not unusual for the main rotor blades to flap downward to within two feet of the flight deck or to flap up in excess of 45 degrees during a no rotor brake shut down. This excess flapping can cause damage to rotor head components and is a potential safety hazard to personnel. Prior to no-rotor brake shutdowns, the ship should strive to obtain the minimum winds across the deck and should also keep other helicopters from landing on or departing from adjacent spots to reduce the possibility of helicopter component damage and/or personnel injury. If helicopters are to remain spread after shutdown, the embarked unit(s) needs to be aware that the ship may have to frequently change course, causing shifts in the relative winds. Therefore, the embarked unit(s) needs to quickly secure the rotor blades or fold them to avoid excessive blade flexing and/or flapping.

c. Blade Fold. Folding main rotor blades may be required to conserve flight deck space, use the ship's elevator, or to hangar the aircraft. Tiltrotor aircraft are equipped with an automatic blade fold and wing stow system. Typically, automatic blade fold systems are designed to fold helicopter main rotor blades in less than two minutes. USA helicopters do not have automatic blade fold systems; however, most USA helicopters have the capability to fold their blades manually. Manual blade fold times vary depending on the type of helicopter and the proficiency of the fold crew. In general, the smaller the helicopter, the quicker and easier it is to fold. The MH-6 can fold rotor blades in less than 10 minutes while the MH-47 typically takes 40 minutes or longer to fold rotor blades. Manual blade fold procedures may require repositioning of the helicopter on the flight deck to ensure blade walkers will be able to remain safely on the flight deck while walking blades to the folded position. Close coordination and understanding between the ship's personnel and helicopter unit is required to determine blade fold capabilities and develop launch/recovery timelines. The effects of wind speed and direction, combined with ship motion, can adversely affect the ability to control the blades. Crews must exercise extreme caution when folding or spreading blades in high wind/deck motion conditions. It is highly recommended that maintenance crews practice manual blade fold/spread procedures prior to embarkation. It is also recommended that the specific helicopter that will be embarked on the ship conduct at least one blade fold/spread evolution prior to embarkation to ensure rotor head pins, nuts, and bolts are serviceable and move freely and easily. USA and USAF blade fold support systems are not designed for the high winds and turbulence routinely encountered on the flight deck of a ship underway. Personnel should reference aircraft operations manuals to ensure blade fold support systems, rotor blades, and/or rotor heads are not damaged by winds or when in close proximity to launching/recovering aircraft. The V-22 maximum safe relative wind conditions for folding or unfolding the proprotor blades and wing stow/unstow is 45 knots from any quadrant. EMI from AN/SPS-49 radars may cause the blade fold planetary tube shear pins to break during blade fold and wing stow.

8. Shipboard Refuel/Defuel. JP5 is required by the USN for shipboard operations because of its higher flash point compared to other types of jet fuel. If possible, aircrew should plan to arrive aboard ship with only JP5 in their fuel tanks.

9. Shipboard Helicopter/Tiltrotor Aircraft Deck Handling/Movement. Safe, efficient helicopter/tiltrotor aircraft movement aboard ship is a joint effort between ship's personnel and the helicopter/tiltrotor aircraft unit's personnel. After coordination has been accomplished, the ship will provide a qualified move director and move crew. The helicopter/tiltrotor aircraft unit will provide a plane captain or crew chief to act as a brake rider and/or unit safety observer. The embarked unit should provide ship's personnel with a helicopter/tiltrotor aircraft orientation brief prior to handling/movement operations because ship's personnel may not be familiar with other Service helicopters/tiltrotor aircraft. At a minimum, the orientation brief should cover TD points, grounding points, movement procedures, refuel/defuel procedures, unique features, and aircrew emergency access/rescue procedures. Care should be taken when spotting or stacking V-22s to avoid damage from engine exhaust to antennas and radomes. Deck heating from aircraft nacelles should be minimized through the use of established procedures specified in the aviation certification and aircraft operating procedures. The inboard engine should be shut down if delay time is to exceed 30 minutes.

10. On ACSs without air departments, helicopter/tiltrotor aircraft movement and handling will be conducted manually (personnel will push the helicopter/tiltrotor aircraft to the desired location). On ships with air departments (CVNs, AASs, and amphibious transport docks), helicopter/tiltrotor aircraft movement/handling is usually performed with tow bars, tow tractors, or other USN GSE provided by the ship. Any special equipment requirements for helicopter/tiltrotor aircraft movement must be arranged with the ship. The embarking unit should be prepared to provide required specialized handling equipment. Severe weather, high winds (normally in excess of 45 knots relative) and/or high sea state may preclude all helicopter/tiltrotor aircraft movement/handling.

11. Pre-takeoff Procedures. Based upon the air plan and flight schedule, the ship will man its flight quarters stations in time to meet the first scheduled launch. The ship and the helicopter/tiltrotor aircraft unit will be conducting independent and coordinated actions in preparation for helicopter/tiltrotor aircraft launch. Each ship and embarked unit should establish the pre-takeoff sequence that best supports their operations and the assigned mission. A notional sequence of events in support of the initial launch of helicopter/tiltrotor aircraft is listed below; these recommended times may be reduced as ship and unit personnel gain experience working together:

a. Pilot/aircrew brief (approximately 120 minutes prior to launch time).

b. Ship personnel man flight quarter stations (approximately 30 to 90 minutes prior to launch time). All ATC, fueling, firefighting, and helicopter/tiltrotor aircraft movement/handling stations are manned. This time may need to be adjusted depending on the requirement to manually spread rotors and/or conduct ordnance evolutions.

c. Ship calls for FOD walk-down (approximately 60 minutes prior to launch time).

d. Pilots/aircrews conduct preflight inspections (approximately 45 minutes prior to launch time).

e. Pilots/aircrew man helicopter/tiltrotor aircraft (30 minutes prior to launch time pilots in their seats).

f. Ship obtains necessary winds for start. Helicopter/tiltrotor aircraft engines started and rotors engaged (15 minutes prior to launch time). Radio checks complete.

g. Ship obtains winds for launch. Helicopter/tiltrotor aircraft loaded (10 minutes prior to launch time). Arm aircraft IAW applicable NATOPS.

h. All helicopters/tiltrotor aircraft: chocks and chains removed (one to three minutes prior to launch time).

i. Helicopter/tiltrotor aircraft launched on time IAW the air plan/flight schedule.

j. When the launched aircraft reports all conditions normal and is proceeding on mission, secure flight quarter stations as required.

12. Spread Rotors/Proprotors and Start-up

a. Spreading Rotors. Most helicopters/tiltrotor aircraft have the capability to fold and spread rotor blades or proprotors. The spread procedures are much the same as the fold procedures, but they are conducted in reverse order. Embarked units will need to coordinate and schedule the rotor spread evolution to ensure completion in time to support the air plan and flight schedule. Manual blade spread will require the helicopter to be positioned so each blade can be walked into position by maintenance personnel.

b. Helicopter/Tiltrotor Aircraft Start-up and Rotor Engagement. Helicopter/tiltrotor aircraft engines/auxiliary power units shall not be started without the ship's permission. Ship personnel coordinate with the embarked unit to ensure aircrews have the winds required for a safe engine start and rotor engagement for their specific helicopter/tiltrotor aircraft. During initial engine start and rotor engagement, the low inertia/speed of the main helicopter rotor blades will permit rotor blades to flex and flap as they rotate. As the velocity of the relative wind increases, the likelihood of the blades flexing and flapping will also increase. During this stage of rotor engagement, keep personnel outside and well clear of the rotor arc. Prior to rotor start-ups, the ship should strive to obtain minimum winds across the deck and should also preclude other helicopters from landing on and/or departing from adjacent spots to reduce the possibility of helicopter component damage and/or personnel injury. H-1 and V-22 aircraft engage rotors simultaneously with engine start. V-22 aircraft may engage or disengage rotors with the ship in a turn and wind conditions within the engage/disengage wind envelope established in the applicable NATOPS manual.

c. The flight deck status light provides information to the air crew and flight deck personnel. The HCO receives permission from the OOD prior to any changes in the flight deck status light.

(1) The HCO will turn the flight deck status light to red when the ship has attained the proper launch envelopes which indicates to the flight deck permission to start engines. Engines are started on signal from the LSE after flight deck safety checks.

(2) The HCO will turn the flight deck status light to amber when the flight deck has permission to engage rotors. Rotors are engaged on signal from the LSE after flight deck safety checks.

(3) The HCO will turn the flight deck status light to green when the flight deck has permission to launch the helicopter. The pilot has permission to launch on signal from the LSE.

For additional information on the flight deck status light, see NAVAIR 00-80T-105, CV NATOPS Manual, NAVAIR 00-80T-106, LHA/LHD NATOPS Manual or NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual.

d. The aircrew must inform the ship once the pre-takeoff checks are complete and the helicopter/tiltrotor aircraft is ready for takeoff. Following this notification, the ship will provide the relative winds for takeoff and will remove the chocks and chains from the helicopter/tiltrotor aircraft. On AASs, launch/recovery of V-22s shall be conducted from/to H-53 mainmount wheel boxes.

13. General Fueling Procedures. Helicopter/tiltrotor aircraft fueling operations on ships are classified as either cold refueling (engines off) or hot refueling (rotors/proprotors turning or engines operating). Cold refueling may be accomplished by pressure or gravity. Hot refueling is limited to pressure fueling only. Shipboard fueling and defueling procedures may be found in NAVAIR 00-80T-109, Aircraft Refueling NATOPS Manual, and NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual.

a. Fuel Compatibility. To reduce the potential of shipboard fires, only fuel with a flash point above 140° Fahrenheit is permitted to be stored aboard ships. USA and USAF aircraft use JP8 (or their North Atlantic Treaty Organization [NATO]/civilian equivalents which may include JP4) as their first choice for fuel, although all can operate with JP5. Since USA and USAF installations typically do not provide JP5 fuel—and USN aviation refueling installations are not always available—it may not be

possible for helicopters/tiltrotor aircraft to transition to JP5 prior to arriving at the ship. In addition, USN safety instructions prohibits the hangaring of helicopters/tiltrotor aircraft with significant quantities of JP4 or JP8 in their tanks because of the low flash points of those fuels. Furthermore, JP4 and JP8 cannot be introduced into ship JP5 fuel tanks because of concerns about lowering the flash point of the fuel stock and introduction of additives (such as Plus 100) that adversely affect the ability of USN shipboard filtration systems to remove water from the fuel. Because JP5 is not universally available on shore, helicopters/tiltrotor aircraft are likely to arrive at the ship with significant quantities of JP4 or JP8 in their systems, especially in short notice operations. This presents a problem if it is necessary to immediately hangar the helicopter/tiltrotor aircraft (high winds, maintenance). Unless the ship is equipped with a holding tank to contain the discarded fuel, the only alternative will be to defuel the aircraft to the environment, which may not be a viable option, depending upon local environmental protection regulations. Therefore, if a ship is expected to operate with helicopters/tiltrotor aircraft designed for land operations, it should be equipped with the capability to defuel JP4 or JP8 to a holding tank, or otherwise dispose of it. For exceptional circumstances, procedures for hangaring helicopters/tiltrotor aircraft with other than JP5 may be found in NAVAIR-00-80T-109, Aircraft Refueling NATOPS Manual. The following procedures should be used to raise the flash point to the desired level:

(1) Preferred Procedure. Defuel helicopter/tiltrotor aircraft completely and refuel with JP5. Ships have limited ability to handle hazardous waste; therefore, this procedure should be done ashore prior to embarking on the ship.

(2) Alternate Method. Helicopter/tiltrotor aircraft should burn down to minimum fuel and refuel with JP5 after landing (an alternate method for AASs and CVNs is to use the plane-to-plane transfer cart available on AASs and CVNs).

Neither procedure is guaranteed to raise the flash point. The ship will take fuel samples and determine flash point prior to hangaring the helicopter/tiltrotor aircraft. It may be necessary to repeat the procedures several times.

b. Refueling Equipment. Not all helicopters are equipped with single point pressure refueling systems as in the USN. Some of them require closed circuit refueling (CCR) (gravity fueling with nozzle/tank fitting adapter to capture fumes) and/or open-port fueling to fill some or all of their fuel tanks. In addition, some non-USN aircraft cannot utilize CCR at pressures greater than 15 psi, whereas current USN helicopters are capable of CCR at a minimum of 45 psi. CCR nozzles, such as the Wiggins and NATO high capacity nozzles, cannot be used to refuel closed circuit USA helicopters. The 45 psi output of these nozzles could damage the aircraft's fuel systems, rupture tanks, and cause a fuel spill or fire. If shipboard CCR operations of USA aircraft are anticipated, the aircrew must provide refuel personnel with a USA fuel nozzle, unless already included as part of the deployment packup equipment.

c. Hot Refueling

(1) Pressurized Refueling. Hot refueling shall be performed using only single point refueling or CCR nozzles and aircraft receptacles.

(2) Gravity Refueling. Under normal operating conditions, aircraft shall not be gravity refueled with the engines operating, IAW NAVAIR 00-80T-109, because of the increased probability of a fuel spill and fire.

(3) Hot Refueling Aircraft with Ordnance. Aircraft with ordnance are not normally hot refueled on board ships. When all required HERO precautions have been met, the ship's CO may authorize ordnance-equipped helicopters to be hot refueled when required by operational necessity.

CHAPTER 4

Sustainment

"Is the proposed operation likely to succeed? What might the consequences of failure? Is it in the realm of practicability in terms of material and supplies?"

Admiral Chester W. Nimitz (1885–1965)

4.1 MAINTENANCE CONSIDERATIONS

Conducting aircraft maintenance aboard ship requires detailed planning and coordination. Issues to consider include ship movement and environmental conditions; space, time, weather, and lighting constraints; safety requirements; availability of repairable items and consumable parts and supplies; calibration requirements; and the inherent maintenance capability of the ship.

1. General. Most shipboard helicopter/tiltrotor aircraft maintenance must be conducted on the flight deck of the ship. Flight decks are exposed to the elements and are in constant motion due to changing sea states. As a result, helicopter/tiltrotor aircraft maintenance can be extremely hazardous at all times, but especially at night, in inclement weather, or when flight operations are in progress. On multispot ships, helicopter/tiltrotor aircraft maintenance can be extremely difficult and/or hazardous during flight operations. Each class/type ship has different helicopter/tiltrotor aircraft maintenance support capabilities and procedures.

2. Maintenance Facilities. Available aviation maintenance facilities vary widely with ship class. NAEC-ENG-7576, Shipboard Aviation Facilities Resume, provides guidance regarding ACSs. CVNs and AASs have extensive maintenance facilities, including an aircraft intermediate maintenance department (AIMD). However, support for particular systems is not assured and should be determined in advance. JFCs are responsible for coordinating required maintenance infrastructure.

3. CVN Maintenance Capabilities. The large deck edge elevators, large hangar door openings, and large hangars make it relatively easy to move most helicopters/tiltrotor aircraft to/from the hangar deck for maintenance on CVNs. All USA and USAF helicopters may be moved from the flight deck to the hangar deck with blades spread (it should be noted that this is not the preferred method for ship's personnel). Presail planning and/or coordination with the ship should determine specific helicopter/tiltrotor aircraft certifications for elevator and hangar deck operations. The hangar deck is well lighted, protected from the elements, contains overhead hoists, and has support equipment available.

a. CVNs have a robust AIMD that is capable of providing third- and fourth-echelon maintenance. The AIMD is capable of providing repairs for airframe structures, hydraulic systems, fuel cells, avionics/weapons systems, and corrosion control, engine buildup and testing, electronics repair, tire and wheel buildup, composite material repair, oxygen and nitrogen servicing, and inspection and repair of aircrew survival equipment.

b. Although the AIMD is designed to support USN aircraft, its expertise may be of great benefit to an embarked unit, especially in terms of corrosion control, airframes, hydraulics, and special tool fabrication. Additionally, CVNs have spaces designed as maintenance workspaces. In the event a helicopter/tiltrotor aircraft unit will be embarked for an extended period of time, the embarked unit may want to augment the ship's AIMD with personnel expertise and/or test/calibration equipment.

4. AAS Maintenance Capabilities. AASs have the same type of maintenance capabilities as CVNs, although in a somewhat smaller package. AASs have a smaller flight deck, smaller elevators, smaller hangar door openings, and smaller hangars than CVNs. Much like the CVN, the hangar deck of the AAS is well lighted, protected from the elements, contains overhead hoists, and has support equipment available. All heavy helicopter/tiltrotor maintenance should be conducted on the hangar deck if possible. AASs also have a robust AIMD with similar capabilities and expertise as CVNs.

5. ACS Maintenance Capabilities. An embarking unit will find limited helicopter/tiltrotor aircraft maintenance support available on these types of ships. Normally, the smaller classes of ships do not have maintenance spaces available and most maintenance is performed on the exposed flight deck. Hangars, if available, have been designed for specific organic helicopters and are extremely limited in size and capability. There is no AIMD on board these ships.

6. Maintenance Procedures. Normal land-based helicopter/tiltrotor aircraft maintenance procedures must be examined and, where required, modified for shipboard operations. As an example, extreme caution should be used when jacking a helicopter/tiltrotor aircraft aboard ship. Even in calm seas, a rapid turn by the ship could dislodge a jack and cause the helicopter/tiltrotor aircraft to fall. Additionally, work around procedures for helicopters/tiltrotor aircraft that possess avionics equipment that cannot be tested/calibrated on a moving platform should be addressed. Finally, as previously mentioned, most helicopter/tiltrotor aircraft maintenance will be conducted on the exposed flight deck. Procedures for working on a wet helicopter/tiltrotor aircraft in high winds and rough seas will need to be addressed. It is important to remember that all flight and hangar deck evolutions (movement, using deck edge power, using GSE, and starting an auxiliary power unit) must be coordinated with and approved by the ship. The ship and the embarked unit should identify the personnel responsible for conducting maintenance coordination as soon as possible after embarkation. General POCs are listed in figures 2-1, 2-2, and 2-3.

7. Post Maintenance Check Flight (PMCF). PMCFs must be either scheduled on the daily air plan and unit flight schedule or coordinated between the embarked unit and the ship on an emergent basis. PMCFs are normally accomplished prior to the first launch, after the last launch, or between normal launch and recovery cycles. Due to the requirement to adhere to the air plan/flight schedule, aircrews conducting PMCF should be prepared to meet their requirements in the minimum time necessary while maintaining safe flight operations.

8. Corrosion Prevention and Control. The shipboard environment is inherently corrosive. Embarked aircraft will require cleaning and treatment for corrosion more frequently than shore-based aircraft. When at sea, embarked units must place special emphasis on the importance of a dynamic corrosion prevention and control program and ensure it receives priority for timely accomplishment along with other required maintenance. The frequency and content of a program for inspecting, cleaning, corrosion control, and preservation of aircraft and support equipment should be established prior to commencing embarked operations.

9. Support Equipment. Each ACS will have an allotted individual material readiness list (IMRL) that lists the special tools, test equipment, and GSE available on that specific ship. Additionally, each ACS will have an aviation consolidated allowance list (AVCAL) that lists the aviation supply items carried on that specific ship. Additionally, each ACS will have an allotted amount of armament weapons support equipment (AWSE) designed to handle weapons and A/E on that specific ship. The IMRL, AWSE, and AVCAL are excellent resources to compare the ship's special tools, equipment, and supplies to the embarking unit's requirements to reduce the overall footprint of the embarking unit.

10. Aircraft Security. Responsibility for the helicopter/tiltrotor aircraft physical security rests with the embarked unit. Embarking units should coordinate with the ship to ensure sufficient, compatible TD chains are available to secure the unit's aircraft. USA MB-1 mooring hardware is not compatible for shipboard use. Due to the harsh, at-sea environment, constant monitoring of the security of the helicopter's rotor blades/tiltrotor aircraft proprotor and the security of helicopter/tiltrotor aircraft TD chains is required. To reduce the potential for a shipboard fire, all helicopters/tiltrotor aircraft should be constantly monitored for fuel and other fluid leaks while aboard ship. The ship may require the embarked unit to provide an aircraft integrity watch when the ship is not at flight quarters to monitor helicopter/tiltrotor aircraft security. It is

important that personnel assigned to this watch are thoroughly instructed by the ship on the procedures and responsibilities associated with their position. The aircraft integrity watch is responsible for the security of all aircraft and equipment on the flight deck and hangar bays. The watch stander should routinely check each aircraft to ensure it is not leaking petroleum, oils, and lubricants on the deck and is properly secured (aircraft chained to the deck and rotor blades tied down).

4.2 OTHER LOGISTICS AND PERSONNEL SERVICE CONSIDERATIONS

1. Background. The purpose of this section is to outline general procedures for providing material support for helicopter/tiltrotor aircraft units assigned to multi-Service operations. The scope and details of the implementation of these procedures are highly dependent on the duration and circumstances of a particular exercise or mission. A short-duration detachment will usually draw the bulk of its supply material from a packup kit provided by the parent Service. Resupply of drawn material will occur as needed. Material support for detachments of longer duration will be better served by establishing an independent unit identity, especially when shipboard operations will be conducted outside the umbrella of the parent Service support infrastructure. Establishment of independent unit identity will provide the most flexible support if a helicopter/tiltrotor aircraft unit is to relocate from ship-to-ship or ship-to-shore. Units should bring as many consumable items as possible.

2. Funding. The parent organization of a helicopter/tiltrotor aircraft unit/detachment funds the expenses associated with aircraft maintenance and operation. A ship's CO funds shipboard operating and maintenance costs from the operating target allowance. Unless specified, funding will be provided by the parent organization or groups performing travel under joint travel regulations. Units required to purchase supplies or fuel from ships' stores will be required to provide appropriate accounting data.

3. Meals. Shipboard meals for officers are normally handled by an independent fund, to which individual officers contribute. Officers can expect to pay directly or be billed for meals consumed. Enlisted members eat in a dining facility operated by the ship's SUPPO and funded from the ration allowances of the members. Orders for enlisted members should reflect rations in kind for the duration of shipboard embarkation. USCG cutters will treat meals provided to embarked personnel as reimbursable issues and submit Department of Defense (DD) Form-1149, Requisition and Invoice/Shipping Document, IAW COMDTINST M4061.5, Coast Guard Food Service Manual.

4. Supply Requisitions. The ship's SUPPO can help prepare and transmit properly formatted supply requisitions into the system; however, the embarked helicopter/tiltrotor aircraft unit provides the technical, identification, and funding data for the required material.

5. Cargo Routing. Procedures for shipping material to units deployed worldwide exist within the Defense Transportation System and are contained in Defense Transportation Regulation. The shipper's service control office (SSCO) for all USN units is the Navy Material Transportation Office (NAVMTO) in Norfolk, Virginia. NAVMTO maintains a cargo routing information file that contains up to date information on how to route material to covered mobile units. Embarked units possessing individual unit identifies and desiring to avail themselves of this service should make arrangements with NAVMTO and their parent SSCO to be included in the cargo routing information file. The appropriate ships' personnel will keep NAVMTO and other responsible SSCOs apprised of consignment instructions for embarked detachments. Alternatively, material for an embarked detachment may be consigned to the host ship. Detachments operating from USCG cutters should contact the cutter's SUPPO before deployment to coordinate cargo routing.

6. Aviation Fuel. If reimbursement is required, embarked helicopter/tiltrotor aircraft units will reimburse ships for aviation fuel at the established DOD price. Selected ships may be capable of processing a DOD fuel identification plate; however, use of a DD Form-1348, DOD Single Line Item Requisition System Document (Manual), is more common. For continuing operations, fuel may be billed on the 10th, 20th, and last day of the month, to coincide with ship's fuel usage reports. Because many ships are not equipped with meters, aircrew should be prepared to determine the quantity delivered, in pounds, using aircraft fuel gauges.

7. Hazardous and Flammable Material. The embarked unit should coordinate all hazmat requirements with the ship's SUPPO prior to deployment. The embarked unit is responsible for ensuring their required hazmat and corresponding material safety data sheets are requisitioned and loaded. The ability to procure required hazmat on deployment is very limited. All hazmat must be approved for shipboard use.

8. Ammunition

a. Parent Service Issuing Activities. Parent Service ammunition issuing activities will ensure only authorized and fully serviceable ammunition is issued. Ammunition items issued will be complete as identified by a NSN, DODIC, or NALC, as well as applicable lot or SNs. Refer to NAVSEA OP 4, Ammunition and Explosives Safety Afloat, for further guidance. Ammunition or components that do not have DODICs or NALCs will not be issued to, or embarked on, USN/USCG ships.

b. Shipment of Explosives. Ammunition or other hazmat to be shipped to ships by a DOD component or a common (commercial) carrier will be packed, marked, and labeled IAW NAVSEA SW020-AC-SAF-010, Transportation and Storage Data for Ammunition, Explosives and Related Hazardous Materials, and NAVSEA SW020-AG-SAF-010, Navy Transportation Safety Handbook for Ammunition, Explosives and Related Hazardous Materials, or appropriate DOD hazmat regulations for rail, motor vehicle, water, or air shipment.

c. Allowance Lists. Ammunition requirements for units afloat are established to provide a basic authorization by quantity and type to suit the applicable mission and armament of the unit. Normally, these authorizations are in the form of allowance lists.

d. Mission Load/Shipfill Ammunition Allowances. The mission load ammunition allowance is a CNO-approved allowance of ammunition carried by CVNs or AASs in support of embarked units such as a carrier air wing or ACE. The shipfill ammunition allowance supports the ship's armament, embarked helicopter/tiltrotor aircraft, and embarked helicopter/tiltrotor aircraft detachments.

e. Replenishment. Embarked helicopter/tiltrotor aircraft ammunition must be replenished by aerial on board delivery or by pierside onload. USN ammunition will not be issued to the embarked helicopter/tiltrotor aircraft detachment without the approval of the CNO.

f. USA Ordnance Replenishment. USA A/E packaging has not been tested and approved by the Naval Packaging, Handling, Shipping, and Transportation Division for underway replenishment. Due to this safety risk, all USA A/E will be loaded pierside IAW the net explosive weight allowance identified on the explosive site approval or transferred aboard as internal aircraft cargo. USA A/E will arrive on board USN ships in their standard packaging configurations. When aircraft are used to deliver USA A/E to USN ships, the aircrew will download the internally loaded A/E, and the host ship will transport the A/E to below deck magazines using ship's armament weapons system equipment.

9. Mail. The military postal service is a method for delivery of moderate-sized parts and supplies, as well as personal and official mail. Embarked helicopter/tiltrotor aircraft units may obtain a mobile unit Army post office or fleet post office address from the U.S. Military Postal Service Agency, Washington, DC, IAW DOD 4525.6-M, Department of Defense Postal Manual. Establishment of an address and ZIP Code is required approximately 60 days in advance. Ships will update mail routing instructions for embarked detachments.

10. NAVAIR Warfighter Response Center Help Desk. The NAVAIR Warfighter Response Center Help Desk is focused on connecting fleet users with NAVAIR technical experts for authoritative, aviation-related answers. For assistance related to naval aircraft, weapons, launch and recovery equipment, support equipment, and information technology systems, contact the Warfighter Response Center via the NAVAIR National Help Desk: continental United States toll-free: 1-888-292-5919 (Option 3), e-mail requests: nav_helpdesk.fct@navy.mil, NAVAIR unclassified Web site: https://nhd.navair.navy.mil.

APPENDIX A

Shipboard Helicopter and Tiltrotor Operations Publications

The following sources of information, procedures, and guidance support shipboard helicopter/tiltrotor operations:

1. NAEC-ENG-7576, Shipboard Aviation Facilities Resume. This publication is updated in near real time and lists every ship with a flight deck and in each case lists aircraft certified to operate on its deck, describes the services available, provides ship's certification levels, and provides a diagram of the flight deck including obstacles. The resume does not provide particulars on the incompatibilities that determine a particular certification level.

Aviation Facilities Team Lead
Naval Air Warfare Center, Aircraft Division
Code 4.8.2.5
Highway 547
Lakehurst, NJ 08733-5052

For assistance in answering questions relating to shipboard aviation facilities, call the Shipboard Aviation Facility Hotline Action Desk at Defense Switched Network (DSN): 624-2592/Commercial: (732) 323-2592.

2. NAEC-ENG-7604, Maximum Density Aircraft Spotting CV and CVN Aircraft Carriers, LHA, and LHD Class Ships. This publication is updated and revised periodically and provides an analytical tool for operational planning of air wing mixes aboard CVN, LHA, and LHD class ships. Operational planning is made possible through the establishment of spot factors and the evaluation of deck multiples.

SE & ALRE Department
Naval Air Warfare Center, Aircraft Division Lakehurst
Aviation/Ship Integration Branch
Lakehurst, New Jersey 08733-5033

For assistance in answering questions relating to this reference contact the Carrier Analysis Lab at NAWCAD Lakehurst, Aviation/Ship Integration Branch, Code 4.8.1.5, at (732) 323-7173 or DSN 624-7173.

3. NATOPS Manuals. Distribution of these publications including the USMC MV-22 and USAF CV-22 tiltrotors produced by NAVAIR are established by the automatic distribution requirements list maintained by Naval Air Technical Data and Engineering Service Command, in San Diego, California. For assistance, contact:

Commanding Officer, Naval Air Technical Data and Engineering Service Command
Naval Aviation Depot North Island
Building 90, Code 3.3A
P.O. Box 357031
San Diego, CA 92135-7031

These publications can be obtained online at https://airworthiness.navair.navy.mil.

a. NAVAIR 00-80T-105, CV NATOPS Manual. This manual issues policy, guidance and information for CVN COs, air officers, air operations officers, air wing commanders, squadron COs, aircraft detachment OICs, and aircrews aboard CVN class ships. The information presented includes relationships, responsibilities, training requirements, and selected normal and emergency procedures for conducting flight operations on and in the vicinity of the CVN.

b. NAVAIR 00-80T-106, LHA/LHD NATOPS Manual. The responsibilities, requirements, and procedures contained in this manual apply to all persons involved with flight operations on all LHA/LHD-class ships. The information addressed in this manual encompasses a wide range of subjects that include planning and preparing for flight operations, control of and communications with aircraft, aircraft launch and recovery procedures, and aircraft and aviation weapons handling procedures.

c. NAVAIR 00-80T-109, Aircraft Refueling NATOPS Manual. This manual provides technical requirements and operating procedures for ready-issue (retail) aviation fuel operations aboard ship, at shore activities, and in tactical units.

d. NAVAIR-00-80T-113, Aircraft Signals NATOPS Manual. The signals in this manual are for use by aircrews, aircraft handling personnel, aircraft maintenance and support personnel, aircraft controllers, and ground-based personnel working with aircraft in SAR situations. Visual signals include hand and body signals, various light and lamp signals, wand, smoke, and mirror signals, aircraft motion signals, and panel signals. The signals are suitable for use during daylight and/or darkness and can be used during normal operations as well as in degraded mode, EMCON and emergency situations. This manual also contains aircraft identification friend or foe/selective identification feature transponder signals for use during radio failures. These visual signals have been standardized with those used by the other U.S. Armed Forces.

e. NAVAIR 00-80T-120, CVN Flight/Hangar Deck NATOPS Manual. This manual provides organizational relationships, responsibilities, requirements and procedures for aircraft and related support operations aboard CVN ships. Areas of operations addressed include: control and monitoring of aircraft aboard and in the ship's visual flight rules (VFR) launch, recovery, and starboard holding patterns; movement and placement of aircraft on the flight deck, on aircraft elevators, and on the hangar deck; launch and recovery of aircraft; aircraft crash and salvage, firefighting, and rescue; fueling, loading, and maintenance of aircraft; and aircraft security, both during and after flight quarters.

f. NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual. This manual covers the responsibilities, requirements, and procedures that apply to all persons who work on or transit the flight decks of ACSs, including ACSs of the amphibious forces (e.g., amphibious transport dock, dock landing ship). These include operation, control, and monitoring of aircraft aboard and in the ship's instrument flight rules (IFR) and VFR rules launch, recovery, and holding patterns; movement and placement of aircraft on the flight deck and in the hangar; launch and recovery of aircraft; fueling, loading, maintenance, and security of aircraft; and aircraft crash and salvage, firefighting, and rescue.

4. COMDTINST M3710.2 (Series), Shipboard-Helicopter Operational Procedures Manual. This manual provides the primary source of information for the utilization of the shipboard-helicopter team on all Coast Guard missions. The manual contains specific direction and guidance, and serves as a reference to other pertinent directives and publications. Questions pertaining to this manual should be referred to:

Commandant (CG-711)
United States Coast Guard STOP 7324
2703 Martin Luther King Jr AVE SE
Washington, DC 20593-7324
Commercial: (202) 372-2233

5. Ordnance Manuals and Checklists. Ordnance compatibility information from Commander, NAVSEA:

Commanding Officer, Naval Ordnance Safety and Security Activity
3817 Strauss Avenue
Indian Head, MD 20640-5151
Commercial: (301) 744-6095

Toll-Free "One-Touch" Support for the Fleet: 1-877-4-1-TOUCH or 1-877-418-6824 Distance Support Anchor Desk. This number is exclusively provided for Service members to receive support via a single toll-free number.

a. NAVSEA OP 4, Ammunition and Explosives Safety Afloat. This publication is applicable to all ships owned or operated by the USN. It is also applicable to other vessels, such as Military Sealift Command chartered or controlled, which carry naval A/E. It is intended to provide guidance to all personnel engaged in the handling, stowage, use and transfer of A/E and to provide a source for a continuing, aggressive mishap prevention program.

b. NAVSEA OP 3565 Volume 2, Electromagnetic Radiation Hazards (U) (Hazards to Ordnance). This publication is a safety manual which defines HERO and provides approved methods or procedures for minimizing accidents that could result from these hazards. Failure to observe operating procedures and precautions specified in this manual may lead to accidental initiation of EIDs contained in ordnance systems, injury or death to personnel, or unreliable ordnance operation.

c. NAVSEA SW020-AC-SAF-010, Transportation and Storage Data for Ammunition, Explosives and Related Hazardous Materials. This manual provides the most current data necessary for the safe storage and transportation of USN and USMC conventional ammunition, explosives and related hazardous materials. Data is given on each explosive round or component, including its description, packaging details, requirements for international and domestic transportation, storage requirements, and any loading documentation available on the item. This publication contains all ammunition, explosive, and related hazmat transportation and storage classifications, including package marking, explosive weights, and metric conversions in one comprehensive document, precluding the need to refer to separate source documents for other applications. The hazardous classifications in this manual have been assigned by DOD in conjunction with the DOD Explosives Safety Board.

d. Weapons Loading Standardization Team, NAWCWD Ordnance Loading Checklists. The following checklists need to be obtained and trained with before embarkation:

(1) UH-60 AECM LOADING CHECKLIST

(2) UH-60 ARMING AND DEARMING CHECKLIST

(3) CH-47 AECM LOADING CHECKLIST

(4) CH-47 ARMING AND DE-ARMING CHECKLIST

(5) AH-64 HELLFIRE LOADING CHECKLIST

(6) AH-64 2.75 INCH ROCKET LOADING CHECKLIST

(7) AH-64 30MM GUN LOADING CHECKLIST

(8) AH-64 AECM LOADING CHECKLIST

(9) AH-64 ARMING AND DE-ARMING CHECKLIST

(10) MH-47 AECM LOADING CHECKLIST

(11) HH-60 G AECM LOADING CHECKLIST

(12) OH-6 HELLFIRE LOADING CHECKLIST

(13) OH-6 2.75 INCH ROCKET LOADING CHECKLIST

(14) OH-6 .50 CAL. GUN LOADING CHECKLIST

(15) OH-6 ARMING AND DE-ARMING CHECKLIST

(16) MH-60L/K HELLFIRE LOADING CHECKLIST

(17) MH-60L/K 2.75 INCH ROCKET LOADING CHECKLIST

(18) MH-60L/K.50 CAL. GUN LOADING CHECKLIST

(19) MH-60L/K ARMING AND DE-ARMING CHECKLIST

(20) MH-60L/K 7.62MM MINI GUN LOADING CHECKLIST

(21) MH-60L/K AECM LOADING CHECKLIST

(22) MH-60L/K 30MM LOADING CHECKLIST.

United States Navy checklists are currently available on the Naval Air Technical Data and Engineering Service Command Web site, or from: Weapons Loading Standardization Team, Naval Air Warfare Center, Weapons Division, China Lake, CA 93555. US Army checklists are available from aircraft-specific technical manuals located at https://armypubs.army.mil/.

6. Army/Air Force Deck Landing Qualification Memorandum of Understanding between the Department of the Navy and the Departments of the Army and the Air Force. Provides DON, Department of the Army, and Department of the Air Force policy and procedures for Army and Air Force rotorcraft deck landing training and qualification, as well as currency requirements and approved simulators. Available from Chief of Naval Operations Air Warfare Directorate OPNAV N98, Department of the Army Directorate of Training DAMO-TRI, or Department of the Air Force A30-AS.

7. Multinational Publications. Multinational publications are used when supporting NATO and coalition helicopter crossdeck operations. Publications are available by contacting the Navy Warfare Development Command:

Commander
Navy Warfare Development Command
1528 Piersey Street, Building O-27
Norfolk, VA 23511
e-mail: fleetpubs@nwdc.navy.mil

a. Multinational Procedural Publication (MPP)-02, Volume I Helicopter Operations from Ships Other Than Aircraft Carriers (HOSTAC). This manual provides procedures to cross operate safely and efficiently with NATO and coalition partner nations. This publication also contains regional specific guidance as well as a multinational embarkation planning aid.

b. MPP-02.1, Crossdeck Operations Technical Supplement: National Procedures and Ship Data. This manual provides flight deck and national procedures used during multinational cross operations to foreign ACS, AAS and aircraft carriers.

c. MPP-02.2, Crossdeck Operations Technical Supplement: National Aircraft Data. This manual includes releasable US aircraft information (including tiltrotor), used during multinational cross operations. This includes approved US aircraft wind envelopes to be employed during these multinational operations.

d. MPP-02.1.1, Ship/Aircraft Interoperability Matrix and Advance National Information. This manual includes the interoperability ship/aircraft matrix and national points of contact.

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APPENDIX B

Sample Letter of Instruction

(May be published via message)

3120

Ser

From: Commander, U.S. (Numbered) Fleet

To: Commanding Officer, USS _____ (ship)

Commander, _____ (USA/USAF Aviation unit)

Subj: LETTER OF INSTRUCTION (LOI)

Ref: (a) [EMPLOYMENT SCHEDULE]/Fleet Approval

(b) NTTP 3-04, Multi-Service Shipboard Helicopter and Tiltrotor Aircraft Operations

(c) Memorandum of Understanding between the DON and DA/DAF, Army/Air Force Deck Landing Qualification, January 2002

(d) NAVAIR 00-80T-109, Aircraft Refueling NATOPS Manual

(e) Memorandum of Understanding among Army/Air Force/Navy/Marine Corps/Coast Guard Safety Centers "Safety Investigation and Reporting of Joint Service Mishaps"

1. Summary. This LOI describes the concept of operations and assigns responsibility for Commanding Officer, USS _____ and assigned detachment from [U.S. Army Command/U.S. Air Force MAJCOM] for DLQ training exercises. This LOI is effective for planning for day/night VFR operations.

2. Mission. USS _____ will provide underway platform services in the conduct of DLQ training exercises (reference (a)). Individual ship routine and exercises may be conducted consistent with attainment of DLQ training goals, safety, and operational security.

3. Concept of Operations. A detachment of helicopters/tiltrotor aircraft from the USA/USAF will conduct a series of DLQ training exercises consisting of day/night VFR landings on the flight deck, IAW references (b) through (e).

4. Command Relationships and Responsibilities

a. Approval to conduct USA/USAF aircraft operations on USN and Military Sealift Command ships must be granted by [fleet commander]. [numbered fleet commander] will initiate the request and inform all units concerned.

b. Commander, (numbered fleet) is the officer scheduling the exercise (OSE).

c. Commanding Officer, USS _____ is assigned OTC for scheduled DLQ training exercises and will coordinate with area/shore commands for appropriate operating area (OPAREA) clearances. The host ship can provide limited administrative, logistics, material, maintenance, and repair support. The OTC will ensure a flight deck safety/indoctrination brief is provided to USA/USAF aircrews prior to the scheduled operations. The OTC will ensure the wind envelopes for the participating aircraft are available to the HCO and the USA/USAF unit conducting the DLQs.

d. The officer-in-charge of the [helicopter/tiltrotor aircraft detachment] is assigned as the officer conducting the exercise (OCE) and is directed to conduct vigorous training exercises, pre-exercise training and planning, and to convene a presail conference briefing for major participants. The OCE will ensure prerequisites for shipboard helicopter/tiltrotor aircraft operations are satisfied, will coordinate and supervise training exercises as they pertain to the helicopter/tiltrotor aircraft unit, and will conduct appropriate preflight briefs.

5. Embarked Unit's Shipboard Helicopter/Tiltrotor Operations Prerequisites

a. Training requirements and personnel qualifications to conduct deck landing operations (references (b) and (c)) will be attained prior to actual helicopter/tiltrotor aircraft DLQ training exercises.

b. The helicopter/tiltrotor aircraft detachment will initiate coordination for a DLQ presail conference scheduled approximately four weeks prior to the actual operation. A sample DLQ presail conference checklist is provided in reference (c).

c. The helicopter/tiltrotor aircraft detachment should provide a qualified aviation officer on board ship for liaison between the ship and helicopter aircrews during DLQ.

d. The liaison officer will provide diagrams of pertinent aircraft depicting aircraft egress, fuel cell locations, and TD points for the HCO and crash/fire crew during the DLQ presail conference.

e. Aircrew personnel will brief flight deck/fire party personnel on helicopter/tiltrotor aircraft orientation/safety requirements, which may include a walk-through of the aircraft.

f. The aircraft scheduled for DLQ training should meet the shipboard aviation fuel safety requirements set forth by the USN (reference (d)). Aircraft shutting down aboard the ship with other than JP5 shall notify the first available ship's controlling authority prior to recovery.

g. Supported units shall be familiar with pertinent shipboard aviation manuals:

(1) NAEC-ENG-7576, Shipboard Aviation Facilities Resume.

(2) Sections of NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships, pertaining to launch/recovery procedures, ATC, aviation fueling and general helicopter operations.

(3) Sections of NAVAIR 00-80T-106, LHA/LHD NATOPS Manual, pertaining to launch/recovery procedures, ATC, aviation fueling and general helicopter operations.

(4) Sections of NAVAIR 00-80T-105, CV NATOPS Manual, pertaining to launch/recovery procedures, ATC, aviation fueling and general flight operations.

h. Field deck landing patterns (FDLPs) can be accomplished at any facility that suitably replicates shipboard deck markings. FDLP may also be conducted in approved flight simulators.

6. Administrative/Logistics. The USA/USAF OCE is responsible for coordinating and arranging shore based administrative and logistics support.

7. Safety Reports. Actions to be taken in the event of aircraft mishap/incident will be IAW OPNAVINST 3750.6, The Naval Aviation Safety Program, and the memorandum of understanding among the Services' safety centers (reference (e)). Initial message notification of aircraft mishap/incident will include as an information addressee, the U.S. Army Headquarters: CSA WASHINGTON DC//DAMOTRI// or U.S. Air Force Headquarters: MAJCOM/CC (Use corresponding MAJCOM's address), as appropriate.

//signed//
Operations Officer
Numbered Fleet Staff

Copy to:
GROUP SQUADRON
Participating USA/USAF Unit(s)

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APPENDIX C

Sample Currency Waiver Request Format

FROM (Air Force/Army originator)

TO For Air Force originator (not deployed):
Respective MAJCOM//A3//
HQ USAF WASHINGTON DC//XOOS// (Thru appropriate channels)
For Air Force originator (deployed):
Respective COMAFFOR or COMASOF (Thru appropriate channels)

INFO NFO U.S. Numbered Fleet (Joint Force Commander)
HQ USAF Washington DC//A30-AS//
(Joint Force Maritime Component Commander)
(other appropriate agencies)

(Classification)//N03000//
MSGID/GENADMIN/(ORIGINATING COMMAND)/(OFFICE SYMBOL)//
SUBJ/DECK LANDING QUALIFICATION CURRENCY WAIVER REQUEST// REF/A/PUB/NTTP 3-04//
AMPN/MULTI-SERVICE SHIPBOARD HELICOPTER AND TILTROTOR AIRCRAFT OPERATIONS//
1. ( ) IAW REF A, REQUIRE DLQ CURRENCY WAIVER FOR (specify—day/night/NVG) QUALIFICATIONS
2. ( ) QUALIFICATION EXPIRED ON (date) DUE TO (reasons)
3. ( ) NO OTHER OPTIONS TO REQUALIFY EXIST WITHIN CURRENT TIME CONSTRAINTS. (i.e., using USN, USMC, or other Service unit IPs)
4. ( ) FOL INFO PROV:
   A. (name/rank)
   B. TOT HRS (insert #)
   C. TOT NVD HRS (insert #) (if applicable)
   D. TOT SHIP LDNGS (insert #)
   E. TOT NVD SHIP LDNGS (insert #)

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APPENDIX D

Sample Waiver Request Format

(For Other than Currency Requirements)

FROM (Air Force/Army originator)

TO For Air Force originator (not deployed):
Respective MAJCOM//A3// (Thru appropriate channels)
For Air Force originator (deployed):
Respective COMAFFOR or COMAFSOF (Thru appropriate channels)
HQ USAF WASHINGTON DC//XOOS// (Thru appropriate channels)
For Army originator: CSA WASHINGTON DC//DAMO-TRS// (Thru appropriate channels)

INFO U.S. Numbered Fleet or CTF-80 (as appropriate)
HQ USAF Washington DC//A30-AS//
(Joint Force Commander)
(Joint Force Maritime Component Commander)
(other appropriate agencies)

(Classification)//N03000//
MSGID/GENADMIN/(ORIGINATING COMMAND)/(OFFICE SYMBOL)//
SUBJ/(specify) WAIVER REQUEST//
REF/A/PUB/NTTP 3-04//
AMPN/MULTI-SERVICE SHIPBOARD HELICOPTER AND TILTROTOR AIRCRAFT OPERATIONS//

RMKS/
1. ( ) (specify waiver requested)
2. ( ) (specify reason for waiver request)
3. ( ) (provide data to support request)

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APPENDIX E

Predeployment Planning Checklists

E.1 GENERAL

Cooperation is a key element to all multi-Service operations. It is essential to discuss integration issues prior to conducting multi-Service shipboard helicopter operations. When ship and helicopter/tiltrotor aircraft units are notified about an upcoming shipboard mission, participants should begin coordinating the specifics of their requirements.

E.2 PRESAIL CONFERENCE

1. General. The naval surface community schedules a presail conference during the early stages of deployment planning involving an embarked unit. The presail conference is an essential part of the compatibility analysis, as it provides key personnel of the participating units with a formal forum to address the concept of upcoming operations at sea as well as procedural and safety issues.

a. The presail conference normally requires an entire day and should be scheduled no less than four weeks prior to embarkation/deployment. The number and expertise of both embarking unit and ship's company attendees should be sufficient to fully address specific C2, operational, aircraft maintenance, supply/logistics, ordnance, and administrative requirements needed to plan the multi-Service operation. Temporary additional duty/temporary duty funding spent here will significantly enhance preparation, planning, and ultimate success of the multi-Service deployment aboard ship.

b. Ensure all units involved in the upcoming multi-Service ship helicopter/tiltrotor aircraft operations are invited, paying particular attention to divisional/departmental responsibilities so that representatives can meet their respective counterparts at the conference.

c. Determine/arrange for a central conference room/area (normally the ship's wardroom aboard the host ship).

d. Publish a POC/counterpart listing (phone number/e-mail) as early as possible.

e. Develop agenda and promulgate to all commands/units prior to the conference.

f. Determine the casualty care response.

(1) Prestaged medical supplies (blowout kits)

(2) Casualty care training

(3) Casualty movement to higher capability of care.

g. The issues in paragraph 2b through 2i should be addressed during the presail conference and/or follow-on discussions/visits between the embarking unit and ship personnel.

2. Host Ship's Administrative Considerations

a. Number, rank, and sex of embarking unit/staffs' officer/enlisted for billeting requirements ER-1

b. Identify possible administrative, operations/planning, aircraft maintenance workspaces, and ready room locations (Do a walk-through of these spaces with embarking unit before their representatives depart the ship.)

c. Identify officer and enlisted mess bill arrangements

d. Determine secure space requirements for classified equipment/material stowage

e. Determine stowage requirements/security for personal mission equipment (backpacks, special equipment, personal weapons, and computers)

f. Determine transportation/logistical arrangements of personnel/equipment coming to ship, the cube/weight of equipment to be loaded aboard, the pierside loading required, and the estimated time of arrival of advance equipment

g. Develop preliminary embarkation/debarkation load plans with embarking unit to include administrative support items, classified material, and security for same

h. Develop computer, local area network, and telephone support requirements for assigned ship's spaces

i. Employ information assurance measures to protect and defend the availability, integrity, authentication, confidentiality, and repudiation of the ship's information and information systems

j. Arrange for and schedule ship orientation briefing and safety briefing for all embarking personnel immediately upon arrival at ship to include general ship compartment layout/location, general safety aboard ship; and shipboard drills such as GQ, man overboard, fire, and flooding

k. Discuss possible augmentation requirements aboard ship (mess duties, laundry)

l. Discuss ship's EMCON/SIGCON policy and procedures including the use of wireless networks and personal electronic devices.

3. Determine health service requirements.

4. Host Ship Flight Operations

a. Determine concept of multi-Service helicopter/tiltrotor flight operations and mission requirements.

b. Determine structure of the embarking helicopter/tiltrotor aircraft organization and establish POCs.

c. Determine number, type, capabilities and operating restrictions (wind launch/recovery limits, blade fold, no rotor brakes) of helicopter/tiltrotor aircraft to be embarked.

d. Determine ordnance and fuel requirements for embarking helicopter/tiltrotor aircraft.

e. Brief ship's communications and navigation equipment. Are embarking unit's communications capabilities compatible with the ship's capabilities?

f. Brief the air plan development process (with examples of typical day's flight schedule). How is the air plan developed with input from embarking unit/staff?

g. Discuss ship's overhead message. What does it contain? How does the embarking unit get this message when ashore prior to the fly-aboard?

h. Establish the requirement for a check-in report—generally required with ships when 50 miles out (to inform ship of cargo or personnel to be offloaded during the fly-aboard).

i. Determine fly-aboard sequence and download evolution of equipment/personnel/ordnance.

j. Discuss the following items:

(1) Radio communications interoperability of ultrahigh frequency, very high frequency, secure voice, identification, and friend or foe squawks, to include cryptological requirements.

(2) Navigation capabilities (non-TACAN equipped, Global Positioning System [GPS] equipped) of embarking helicopter/tiltrotor aircraft.

(3) Helicopter/tiltrotor aircraft fuel endurance/standard fuel loads/type fuel (JP4/JP8 status/flash point when flying aboard).

(4) Load-carrying capability (troops/cargo/VERTREP).

(5) Standard ordnance loads/special mission ordnance loads.

(6) Embarking unit pilot shipboard experience and DLQ (day/night) and NVD training requirements.

(7) Briefing requirements needed from host ship (weather, intelligence, radio frequencies, call signs, IFR recovery operations) for daily operational aircrew briefings.

(8) SAR support requirements needed and assets available (surface and helicopter) to support shipboard helicopter/tiltrotor operations.

(9) Concept of helicopter/tiltrotor aircraft launch cycles, types of ordnance to be carried/employed, and ordnance and troop load plan for air plan development. Ensure the ship's ordnance handling officer/combat cargo officer/combat systems officer attend.

(10) Pierside service requirements for both embarkation and debarkation. Predeployment troop or equipment loading requirements (both on flight deck fly-aboard and at pierside) before ship departs. What pierside services will be needed to accomplish onload/offload (cranes/forklifts)? How should equipment be packaged (containers, pallets)?

(11) Mission support equipment requirements (communications and intelligence) and compatibility/interoperability of same.

(12) Ready room assignments (visit/inspect spaces).

(13) Flight manuals (operators manual for embarking type helicopter/tiltrotor aircraft) provided to host ship (primary flight control [PRIFLY] and operations).

5. Ship's Air Department. The ship's air department should address the following items:

a. Air department organizational structure and personnel responsibilities.

b. Work stations/color codes of flight deck jerseys, general flight deck layout of type/class host ship (dimensions, flight deck lighting [NVD compatibility]), landing spot locations and markings, elevators, ordnance arming spots, location of bomb farm, and location of ordnance elevators.

c. General flight deck positioning of helicopter/tiltrotor aircraft and support equipment during flight operations (e.g., large helicopter/tiltrotor aircraft aft, medium and light helicopters forward).

d. General flight deck procedures and safety awareness (FOD, rotorwash).

e. PMCFs and general maintenance arrangements POCs.

f. General time sequence for launch/recovery (aircrew man-up, start engines).

g. Sounding of flight quarters (what happens?). Discuss flight quarters for aircraft movement only. Emphasis on plane captains/crew chiefs manning cockpits/brakes for moves and safety when moving aircraft.

h. FOD walkdown (stress all hands involvement).

i. Manning cockpits and LSE on launch spot (expected minutes) prior to launch?

j. Signal to start (LSE or pilot initiated).

k. Start engines/rotors signal (wind limits for rotor engagement for type helicopter/tiltrotor embarked).

l. Troop loading. Where will troops be staged? Who escorts the lines of troops (sticks) to helicopter/tiltrotor aircraft? (Combat cargo coordination required.)

m. Weapons arming (aviation ordnance loading [including hot/cold tube loading of rockets], arming, de-arming, downloading, and related aircraft maintenance/refueling limitations).

n. Break down (unchaining of helicopter/tiltrotor aircraft; pilot ready signal: thumbs up to LSE or calls "ready" to boss).

o. Launching (desired launch sequence, wind-over deck [WOD] requirements for launch).

p. Departure radio call expected ("fuel to splash and souls on board?").

q. In-flight emergencies/IFR recovery procedures.

r. General landing procedures.

s. Landing patterns (day/night/NVD).

t. WOD limits for recovery (general wind envelope).

u. Aircraft position on spot expected (nose on the crow's foot?).

v. WOD limits for helicopter/tiltrotor aircraft rotor shutdown and blade fold?

w. Embarked helicopters with rotor brakes. Which do not have rotor brakes?

x. Special aircraft handling equipment requirements. Is the embarking unit bringing these items aboard?

y. Helicopter/tiltrotor aircraft TD procedures (TD points). Who has TD chains? Embarked unit brings?

z. Ordnance de-arm/hung ordnance procedures and hung ordnance flight pattern.

aa. Crash/salvage Procedures and required lift slings for non-USN helicopter/tiltrotor aircraft.

bb. Integrity watch/aircraft security requirements and responsibilities.

6. Discussion Points for Embarking Unit

a. What is embarking unit's organizational structure and who are ship's POCs?

b. Who is embarked unit's designated flight deck maintenance representative/liaison contact for air department?

c. Are there unique aircraft handling characteristics and handling equipment required for specific types of helicopter/tiltrotor aircraft to be embarked (tiller/guide bar for H-47, handling wheels for skid type) to be addressed to air department?

d. Who supplies what support equipment (GSE, TD chains)?

e. Fueling ports and TD points known to host ship air department?

f. Type of fuel available on host ship? JP5?

g. Are alternative fueling procedures (gravity refueling) and equipment (Wiggins fitting) available for refueling?

h. What type of shipboard defueling capability exists? Is it compatible with your helicopter/tiltrotor aircraft?

i. What helicopter/tiltrotor aircraft heavy weather TD equipment (blade TDs, blade supports) are needed for heavy weather/high winds for flight deck (45 knots plus)?

j. Does air department know type helicopter/tiltrotor aircraft pilot/crew positions, type helicopter/tiltrotor aircraft rescue procedures, engine shutdown levers, battery location, ordnance locations/type ordnance? (Termed "crash and smash brief;" normally done immediately after fly-aboard.)

k. Does embarking helicopter/tiltrotor aircraft have a maximum (never exceed) fuel pressure limitation (ship fueling station normally fuels at 55 psi)? Is ship's fueling system compatible (fuel nozzle, fuel pressure, defueling system)?

l. Has all ordnance that requires loading onto the host ship to meet the mission assignment been identified and preapproved by the WSESRB prior to ammunition onload? When and where will the ammunition be onloaded? Where should the ammunition be shipped to for follow-on load on the host ship?

m. Does ship's flight deck have NVD-compatible lighting and qualified LSEs to accomplish NVD operations?

n. How will the weapons department be advised of air plan aviation ordnance requirements? Where will aviation ordnance be staged on the flight deck? How much staging lead time can be provided to facilitate aircraft loading? Where will expendable countermeasures be preloaded? What procedures must be followed for rocket cold/hot tube loading? What ammunition accountability procedures will be utilized?

7. Shipboard Aircraft Maintenance

a. What are the aircraft maintenance capabilities of the host ship?

b. Does it have an AIMD (to accomplish higher than squadron-/company-level maintenance)?

c. Does this type/class ship normally operate similar type helicopter/tiltrotor aircraft?

d. Does host ship's supply department stock aviation supplies (AVCAL)? These supplies (also listed by NSN) can be compared to your deployment needs. An embarking supply representative must verify this at the planning conference and before deployment. (Note: This AVCAL may change prior to deployment due to air wing and type aircraft fleet needs.)

e. What special technical test equipment is needed to support your helicopter/tiltrotor aircraft (electronic test equipment, ordnance equipment particular to type helicopter/tiltrotor aircraft) that will not be found aboard ship?

f. Where will the embarking unit safely stow the myriad equipment to be either self-lifted to the ship or loaded aboard at the pier?

g. Where are the embarking unit's assigned maintenance spaces aboard ship? (Take the time to look at these spaces before leaving the ship while on your visit.)

h. What department/individual needs to know if heavy/critical maintenance is to be performed? (Example: The raising of aircraft up on jack stands to facilitate maintenance should be relayed to the ship's OOD so that precautions are in place to prevent any sharp maneuvering of the ship while the helicopter/tiltrotor aircraft is on jack stands.)

i. Who does the embarking unit coordinate with to perform an aircraft wash evolution aboard ship? Aircraft deployed at sea need protection from the salt-laden environment. This requires frequent fresh water washes.

j. Does the embarking unit have the correct TD chains in sufficient number for deployment? If not, where does the unit get them?

k. Were the embarked unit personnel working on the flight deck thoroughly briefed on the use of flight deck/hangar deck firefighting equipment?

l. How do the embarking unit's lines of supply/logistics integrate with the USN supply/logistics system?

m. Is host ship's electrical power and GSE support compatible with embarking unit aircraft (voltage/phase/hydraulic fittings)?

n. What TD supplies (cargo straps) does the embarking unit have to ensure safe TD of all embarked equipment/boxes at sea?

8. Ship's Weapons Department

a. Ordnance.

b. Required ordnance safety briefings.

c. Ordnance crew certification requirements (embarked unit and host ship).

d. A comprehensive listing of all types/classes of ordnance (aircraft and personal weapons) by NSN and DODIC proposed for embarkation aboard ship.

e. Required ordnance packaging and marking for shipment and onload aboard ship.

f. Schedule and method of ordnance onload (pierside or fly-aboard).

g. Designated ordnance stowage areas aboard ship for multi-Service ordnance.

h. Temporary stowage areas for ordnance/ammunition on the flight deck and prevention of FOD.

i. Stowage, point of issue, responsibility for the issue, and accountability of personal weapons and ammunition aboard ship.

j. Ship's HERO restrictions for specified ordnance. Who (in ship's company) is responsible for setting HERO?

k. Ordnance load plan input for ship's notional air plan.

l. Aviation ordnance storage, buildup, loading and unloading procedures aboard ship (see NAVAIR 00-80T-106, LHA/LHD NATOPS Manual; NAVAIR-00-08T-105, CV NATOPS Manual; and NAVAIR 00-80T-122, Aircraft Operating Procedures for Air-Capable Ships NATOPS Manual).

m. Aviation crew-served weapons on the flight deck (type and safety).

n. Positioning of aircraft with forward-firing ordnance (rockets) on flight deck.

o. Hung ordnance procedures (flight patterns and download).

p. Post mission/debarkation ordnance offload requirements.

9. Safety

a. Schedule general shipboard safety brief for embarking unit/staff.

b. Schedule flight deck safety orientation and flight crew rescue brief for air department.

c. Review aircraft mishap reporting responsibilities. Ensure availability of ships preaccident and embarking unit preaccident plans.

d. Review proper equipment for flight deck.

e. Explain flight deck FOD program.

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APPENDIX F

Deck Landing Qualification Presail Checklist

The following DLQ checklist has been extracted from Army/Air Force Deck Landing Qualification Memorandum of Understanding Between the Department of the Navy and the Departments of the Army and the Air Force.

1. Create key personnel list:

	Duty Position	POC	Phone/e-mail
Aviation	_____	_____	_____
Ship	_____	_____	_____

2. Establish:

   a. DLQ date _____

   b. Schedule _____

   c. Ship location_____

3. Field DLQ requirements (as required) _____

4. Type and number of aircraft involved _____

5. DLQ requirements _____

   a. Number of pilots _____

   b. Number of landings (D/N/NVD) _____

6. Surface/air clearances (ship responsibility) _____

7. Aviation facility waiver (if required) _____

8. Communications/NAVAIDS/transmitters _____

   a. Ship call sign and frequencies (primary and alternate) _____

   b. Aircraft call sign _____

   c. Ship emitter restrictions (EMV/HIRTA) _____

9. Ship overhead message (include PLAD message address) _____

10. Safety/operations brief (ship responsibility) _____

11. Crash rescue procedures _____
12. SAR/lost plane procedures _____
13. Ship certification (level/class/type) and support _____
    a. Landings/spotting restrictions _____
    b. Maintenance capability (fresh water rinse) _____
14. Launch/recovery envelopes _____
    a. Wind _____
    b. Pitch/roll _____
15. Rotor engage/disengage and limits _____
16. Rotor brake equipped? _____
17. Weather procedures _____
    a. Minimums (D/N/NVD) _____
    b. Inadvertent IMC _____
18. Fuel requirements on board ship _____
    a. JP5 considerations _____
    b. NATO D1 or Wiggins fitting _____
19. Fuel cost reimbursement _____
20. Flight liaison officer _____
    a. Embarkation/debarkation _____
    b. Berthing/messing _____
    c. Passenger/maintenance transfer (prohibited at night) _____
21. Shore-based administrative logistics _____
    a. Coordinator _____
    b. Transient aircraft local operations brief (base operations) _____
    c. Helicopter ramp parking _____
    d. Fresh water wash _____
    e. Billeting _____
    f. Messing _____
    g. Local transportation _____

Numbered Fleet Air Operations POCs:

CTF-80 Air Operations (Atlantic)
DSN: (757) 836-2514
Commercial: (757) 836-2514

COMTHIRDFLT (Eastern Pacific)
DSN: (312) 553-3028
Commercial: (619) 553-3028

COMFOURTHFLT (USSOUTHCOM AOR)
DSN: (312) 960-6914
Commercial: (904) 270-6914

COMFIFTHFLT (USCENTCOM AOR)
DSN: (318) 439-4132
Commercial: 011-973-1785-4132

COMSIXTHFLT (USEUCOM, USAFRICOM AOR)
DSN: (314) 626-4551
Commercial: 011-39-081-568-4551

COMSEVENTHFLT (Western Pacific/Indian Ocean)
DSN: (315) 243-7719
Commercial: 011-81-46-816-7719

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APPENDIX G

Embarked Unit Predeployment Planning Checklist

1. Key Personnel List:

   a. Aviation Unit:

      (1) OIC: _____Phone/Email: _____

      (2) LNO: _____Phone/Email: _____

      (3) ASO: _____Phone/Email: _____

      (4) FLD: _____Phone/Email: _____

   b. SHIP:

      (1) OSE: _____Phone/Email: _____

      (2) OIC: _____Phone/Email: _____

      (3) NSO: _____Phone/Email: _____

      (4) HCO: _____Phone/Email: _____

2. Establish/Confirm:

   a. Concept of Operation: _____

   b. DLQ Date: _____

   c. Types/Numbers/Names of Ships Involved: _____

   d. Flight Schedule and Deck Times: _____

   e. Types and Number of Aircraft Involved: _____

   f. Initial Ship Location and Method Receive Updates: _____

   g. Aviation Facility Waiver Required (COMNAVSURFLANT N84 will coordinate): _____

3. DLQ Qualification and Currency Requirements: (IAW Current Army/Air Force DLQ Memorandum of Understanding):

   a. Number of Pilots: _____

b. Number of Landings (D/N/NVG): _____

c. SS or MS Currency and FDLP Requirements Complete (IAW Current Memorandum of Understanding): _____

4. Surface/Air Clearances: (Ship Responsibility): _____

5. Ship Certification:

a. Level, Class and Type: _____

b. Maintenance Capability (fresh water rinse): _____

c. Hangar Space: _____

6. Aircraft Considerations:

a. Navigation Equipment: _____

b. Fuel Nozzle Requirements/refueling locations/fuel flashpoint _____

c. Rotor Brake Equipped and Engage/Disengage Limits: _____

d. Tow Bars or Wheels: _____

e. Tie Down and Grounding Points: _____

f. Wind envelopes/pitch/roll limitations _____

7. Communications: (Positive Communications Required Prior to Conducting Operations):

a. Ship Call sign and Hull Number:

b. PRIFLY Frequencies: (Pri) _____ (Alt): _____

c. Initial Check-in and Departure Procedures: _____

d. Aircraft Callsigns: _____

e. Ship Emitter Restrictions (EMV/HIRTA): _____

f. Ship Overhead Message Receipt (Containing OPS/COMM Info): _____

g. Radar Capability: _____

h. Aids to Navigation and Frequencies (TACAN/NDB/Radar):
TACAN: _____ NDB: _____

i. Ship to Shore Capability for Coordination of any Update or Change:
_____

j. PACE PLAN:
(P): _____ (A): _____ (C): _____ (E): _____

k. EMCON procedures _____

8. Lighting Requirements and Coordination:

   a. Ship:

      (1) Minimal Lighting (Perimeter and Line-Up Lights): _____

      (2) Stern Lights Extinguished (NVG): _____

      (3) Deck Status Lights Extinguished (NVG) with positive radio communications: _____

      (4) Navigation Lights as Required by Captain: _____

   b. Aircraft:

      (1) Position Lights: _____

      (2) Blacked Out (Covert) Lighting (If required): _____

      (3) Anticollision Lights (Y/N): _____

      (4) Landing/Searchlights (as required): _____

9. Weather Requirements and Launch/Recovery Envelopes: (30 Minute Reserve)

   a. Launch and Recover WX Minimums (D): _____ (N): _____ (NVG): _____

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d. Recovery Hospital and Coordination: _____

e. Name and Location: _____

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g. Pad Lighting and Set-up: _____

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c. Crash Rescue and Post Crash Fire Procedures: _____

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e. Provide Aircraft Specific Egress, Danger Area, Fuel Cell and Weapons Locations:

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f. Provide Aircraft Desired Wind Envelopes: _____

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14. Passenger ON/OFF Load Procedures:

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c. Elevator Coordination for Launch and Recover Times: _____

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e. Coordinate for SAR and Confirm Procedures: _____

f. Berthing/Mess (Payment): _____

g. Passenger Transfers and Manifests: _____

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i. Security clearance sent to ship _____

17. Shore-Based Admin and Logistics:

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_____

c. Aircraft Parking: _____

d. Fresh Water Rinse Facility: _____

e. Billeting/Mess: _____

f. Local Transportation: _____

g. Payment Method: _____

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GLOSSARY

air-capable ship (ACS). A ship other than an aircraft carrier, nuclear; amphibious assault ship (general purpose); or amphibious assault ship (multipurpose) from which aircraft can take off, be recovered, or routinely receive and transfer logistic support. (NTRP 1-02)

ammunition lot. A quantity of homogeneous ammunition, identified by a unique lot number, which is manufactured, assembled, or renovated by one producer under uniform conditions and which is expected to function in a uniform manner. (NTRP 1-02)

bill. A ship's publication listing operational or administrative procedures. (NTRP 1-02)

cartridge-actuated device (CAD). Small explosive devices used to eject stores from launched devices, actuate other explosive systems, or provide initiation for aircrew escape devices. (NTRP 1-02)

combat information center (CIC). The agency in a ship or aircraft manned and equipped to collect, display, evaluate, and disseminate tactical information for the use of the embarked flag officer, commanding officer, and certain control agencies. (NTRP 1-02)

de-arming. An operation in which a weapon is changed from a state of readiness for initiation to a safe condition. Also called **safing**. (NTRP 1-02)

deck status light. A three-colored light (red, amber, green) controlled from the primary flight control. Navy—The light displays the status of the ship to support flight operations. United States Coast Guard—The light displays clearance for a helicopter to conduct a given evolution. (NTRP 1-02)

delaying operation. An operation in which a force under pressure trades space for time by slowing down the enemy's momentum and inflicting maximum damage on the enemy without, in principle, becoming decisively engaged. (NTRP 1-02)

downloading. An operation that removes airborne weapons or stores from an aircraft. (NTRP 1-02)

electro-explosive device (EED). An explosive or pyrotechnic component that initiates an explosive, burning, electrical, or mechanical train and is activated by the application of electrical energy. (NTRP 1-02)

flight deck. 1. In certain airplanes, an elevated compartment occupied by the crew for operating the airplane in flight. 2. The upper deck of an aircraft carrier that serves as a runway. The deck of an air-capable ship, amphibious assault ship, or aircraft carrier used to launch and recover aircraft. (NTRP 1-02)

flight deck officer (FDO). Officer responsible for the safe movement of aircraft on or about the flight deck of an aviation-capable ship. (NTRP 1-02)

flight quarters. A ship configuration that assigns and stations personnel at critical positions to conduct safe flight operations. (NTRP 1-02)

foreign object damage (FOD). Rags, pieces of paper, line, articles of clothing, nuts, bolts, or tools that, when misplaced or caught by air currents normally found around aircraft operations (jet blast, rotor or prop wash, engine intake), cause damage to aircraft systems or weapons or injury to personnel. (NTRP 1-02)

hazards of electromagnetic radiation to fuels (HERF). The potential hazard that is created when volatile combustibles, such as fuel, are exposed to electromagnetic fields of sufficient energy to cause ignition. (NTRP 1-02)

hazards of electromagnetic radiation to ordnance (HERO). The danger of accidental actuation of electro-explosive devices or otherwise electrically activating ordnance because of radio frequency electromagnetic fields. (NTRP 1-02)

hazards of electromagnetic radiation to personnel (HERP). The potential hazard that exists when personnel are exposed to an electromagnetic field of sufficient intensity to heat the human body. (NTRP 1-02)

hung ordnance. Those weapons or stores on an aircraft that the pilot has attempted to drop or fire but could not because of a malfunction of the weapon, rack or launcher, or aircraft release and control system. (NTRP 1-02)

instrument approach procedure. A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually or the missed approach procedure is initiated. (NTRP 1-02)

instrument meteorological conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling; less than minimums specified for visual meteorological conditions. (NTRP 1-02)

landing aid. None. (Upon approval of this revised publication, this term and its definition will be removed from NTRP 1-02)

landing signalman enlisted (LSE). Enlisted man responsible for ensuring that helicopters/tiltrotor aircraft, on signal, are safely started, engaged, launched, recovered, and shut down. (NTRP 1-02)

landing signals officer (LSO). Officer responsible for the visual control of aircraft in the terminal phase of the approach immediately prior to landing. (NTRP 1-02)

multispot ship. Those ships certified to have two or more adjacent landing areas. (NTRP 1-02)

Naval Air Training and Operating Procedures Standardization manual (NATOPS manual). Series of general and specific aircraft procedural manuals that govern the operations of naval aircraft. (NTRP 1-02)

officer of the deck (OOD). 1. When underway, the officer designated by the commanding officer to be in charge of the ship, including its safe and proper operation. 2. When in port or at anchor, the officer of the deck is designated by the command duty officer, has similar responsibilities, and may be enlisted. (NTRP 1-02)

operational necessity. A mission associated with war or peacetime operations in which the consequences of an action justify the risk of loss of aircraft and crew. (NTRP 1-02)

ordnance handling. Applies to those individuals who engage in the breakout, lifting, or repositioning of ordnance or explosive devices to facilitate storage or stowage, assembly or disassembly, loading or downloading, or transporting. (NTRP 1-02)

packup kit (PUK). Service-provided maintenance gear sufficient for a short-term deployment, including spare parts and consumables most commonly needed by the deployed helicopter detachment. Supplies are sufficient for a short-term deployment but do not include all material needed for every maintenance task. (NTRP 1-02)

presail. The time prior to a ship getting under way used to prepare for at-sea events. (NTRP 1-02)

primary flight control (PRIFLY). The controlling agency on air-capable ships responsible for air traffic control of aircraft within five nautical miles of the ship. (NTRP 1-02)

spot. 1. To determine by observation, deviations of ordnance from the target for the purpose of supplying necessary information for the adjustment of fire. 2. To place in a proper location. 3. An approved shipboard helicopter landing site. (NTRP 1-02)

vertical replenishment (VERTREP). The use of a helicopter for the transfer of material to or from a ship. (NTRP 1-02)

visual meteorological conditions (VMC). Weather conditions in which visual flight rules apply; expressed in terms of visibility, ceiling height, and aircraft clearance from clouds along the path of flight. (NTRP 1-02)

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LIST OF ACRONYMS AND ABBREVIATIONS

AAS	amphibious assault ship
ACE	aviation combat element (USMC)
ACS	air-capable ship
A/E	ammunition/explosives
AFTTP	Air Force tactics, techniques, and procedures
AIMD	aircraft intermediate maintenance department
ALN	ammunition lot number
ARG	amphibious ready group
ASP	ammunition supply point
ATC	air traffic control
ATP	Army techniques publication
AVCAL	aviation consolidated allowance list
AWSE	armament weapons support equipment
C2	command and control
CBRN	chemical, biological, radiological, and nuclear
CCR	closed circuit refueling
CGTTP	Coast Guard tactics, techniques, and procedures
CNO	Chief of Naval Operations
CO	commanding officer
COMDTINST	Commandant instruction (USCG)
COMNAVAIRFOR	Commander, Naval Air Forces
CVN	multi-purpose aircraft carrier (nuclear-powered)
DD	Department of Defense (form)

DLQ	deck landing qualification
DOD	Department of Defense
DODIC	Department of Defense identification code
DON	Department of the Navy
DSN	Defense Switched Network
E3	electromagnetic environmental effects
EED	electro-explosive device
EID	electrically initiated device
EM	electromagnetic
EMCON	emission control
EME	electromagnetic environment
EMI	electromagnetic interference
EMV	electromagnetic vulnerability
FDLP	field deck landing pattern
FOD	foreign object damage
GCC	geographic combatant commander
GQ	general quarters
GSE	ground support equipment
HCO	helicopter control officer
HERF	hazards of electromagnetic radiation to fuels
HERO	hazards of electromagnetic radiation to ordnance
HERP	hazards of electromagnetic radiation to personnel
HIRTA	high-intensity radio transmission area
IAW	in accordance with
IFR	instrument flight rules
IMC	instrument meteorological conditions
IMRL	individual material readiness list

ISO	International Organization for Standardization
JFC	joint force commander
JP	joint publication
JP4	jet propulsion fuel, type 4 (Army standard fuel for turbine engines)
JP5	jet propulsion fuel, type 5 (standard high-flash-point Navy fuel, MIL-T-5624)
JP8	jet propulsion fuel, type 8 (standard Air Force kerosene jet fuel, MIL-T-83133)
LHA	amphibious assault ship (general purpose)
LHD	amphibious assault ship (multipurpose)
LSE	landing signalman enlisted
LSO	landing signals officer
MCRP	Marine Corps reference publication
MCTP	Marine Corps tactical publication
MEDEVAC	medical evacuation
MHE	materials handling equipment
MPP	Multinational Procedural Publication
NAEC-ENG	Naval Air Engineering Center-Engineering
NALC	Navy ammunition logistics code
NAR	notice of ammunition reclassification
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training and Operating Procedures Standardization
NAVAIDS	navigational aids
NAVAIR	Naval Air Systems Command
NAVMTO	Navy Material Transportation Office
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NAWCAD	Naval Air Warfare Center, Aircraft Division
NAWCWD	Naval Air Warfare Center, Weapons Division

NOSSA	Naval Ordnance Safety and Security Activity
NSN	national stock number
NSWC DD	Naval Surface Warfare Center, Dahlgren Division
NTTP	Navy tactics, techniques, and procedures
NVD	night vision device
1MC	general announcing system
OCE	officer conducting the exercise
OIC	officer in charge
OOD	officer of the deck
OP	ordnance publication
OPNAVINST	Chief of Naval Operations instruction
OTC	officer in tactical command
P	Publication
PMCF	post maintenance check flight
POC	point of contact
POD	plan of the day
POE	port of embarkation
PRIFLY	primary flight control
psi	pounds per square inch
RF	radio frequency
rpm	revolutions per minute
SAR	search and rescue
SN	serial number
SOF	special operations forces
SOP	standard operating procedure
SSCO	shipper’s service control office
SUPPO	supply officer

TACAN	tactical air navigation
TD	tie down
TYCOM	type commander
UAS	unmanned aircraft system
USA	United States Army
USAF	United States Air Force
USCG	United States Coast Guard
USMC	United States Marine Corps
USN	United States Navy
USSOCOM	United States Special Operations Command
VERTREP	vertical replenishment
VFR	visual flight rules
VMC	visual meteorological conditions
WOD	wind-over deck
WSESRB	Weapon System Explosive Safety Review Board
XO	executive officer

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