

UNCLASSIFIED

EXTAC 1005 (Rev. A)

EXTAC 1005 (Rev. A) EXERCISE MANUAL

MULTI-NATIONAL MARITIME MANUAL

ORIGINATOR: NAVY WARFARE DEVELOPMENT COMMAND

SEPTEMBER 1996



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EXTAC 1005 (Rev. A)



DEPARTMENT OF THE NAVY
NAVAL DOCTRINE COMMAND
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September 1996

U.S. LETTER OF PROMULGATION

1. EXTAC 1005 (REV. A), EXERCISE MANUAL, is one of a series of publications designed for use in operations between NATO and non-NATO navies. It is a stand-alone document and shall be maintained separately from AXP-5.
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A handwritten signature in black ink, appearing to read "M. L. Bowman".

M. L. BOWMAN
Rear Admiral, U.S. Navy
Commander, Naval Doctrine Command

Exercise Manual

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FOREWORD

EXTAC 1005 is designed for use by NATO nations when conducting exercises or operations with non-NATO navies. Areas covered include communications, antisubmarine warfare, anti-air warfare, anti-surface warfare, maneuverability, replenishment at sea, and search and rescue.

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Comments and recommended changes to this document should be sent directly to the address listed below:

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NEWPORT, RI 02841-1207

References:

1. EXTAC 1000 (Formerly EXTAC 768), Maritime Maneuvering and Tactical Procedures.
2. EXTAC 1001, International HOSTAC.
3. EXTAC 1002, International HOSTAC - Technical Supplement.
4. MTP 2, Replenishment at Sea.
5. EXTAC 1004, Voice Procedures and Brevity Codewords.
6. EXTAC 1006, Structured Messages.
7. EXTAC 1007, Mine Countermeasures.
8. EXTAC 1009, Diving Safety.
9. EXTAC 1010, Non-Combatant Evacuation Operations.
10. EXTAC 1011, Naval Humanitarian Assistance Missions.
11. EXTAC 1012, Maritime Interdiction Force Procedures.
12. EXTAC 1013, International Regional Naval Control of Shipping.
13. EXTAC 1014, Meteorological Support.

CHAPTER 1

Conduct of Exercises**0101 Content and Use**

This chapter provides introductory and explanatory material such as general instructions and guidance for the conduct of exercises and, where appropriate, special safety precautions. Each exercise chapter is introduced by specific pertinent instructions, including standard safety precautions. Surface force exercises normally can be conducted external to the battle group environment; but integrated exercises should be conducted within the framework of the battle group to exercise all aspects of command, control, communications, and weapons employment, from the level of the warfare commander down to individual operators and aircrews.

0102 Command

1. Officer Scheduling the Exercise (OSE). The OSE is the officer who originates the exercise and orders it to take place. He will issue basic instructions that will include the objectives of the exercise, the designation of the exercise areas, the allocation of forces, and the necessary coordinating instructions. He will also designate the officer conducting the exercise (OCE). In ASW exercises, the OSE will ensure that the existence of submarine danger areas are highlighted in the exercise order.

2. Officer in Tactical Command (OTC). The OTC is the senior officer present eligible to assume command, or the officer to whom he has delegated tactical command. He shall ensure that all elements of an exercise requiring pre-exercise briefing are covered in the face-to-face briefing prior to conduct of the exercise.

3. Officer Conducting the Exercise (OCE). The OCE is responsible to the OSE for the conduct of the exercise from both the Orange and Blue aspects. He will issue such necessary supplementary instructions as detailed orders to all participating units, safety precautions, reports required from participants, and conduct of the exercise as it develops. The OCE shall ensure that

participants in the exercise attend a face-to-face briefing prior to conduct of the exercise.

4. Officer Conducting the Serial (OCS). The OCS is the officer designated to exercise tactical control over assigned forces for a specific exercise serial.

5. Submarine Operating Authority (SUBOPAETH). The SUBOPAETH is the command exercising operational control over submarines, and is normally a submarine force commander. In certain cases, however, another naval commander may be specifically designated as a SUBOPAETH.

0103 Safety

1. Safety of participating units, including safety of personnel and the safeguard of equipment, is paramount in the conduct of any exercise. Departure from established safety rules and precautions for the sake of completing an exercise is never warranted. All safeguards must be taken to ensure that the training environment does not create an actual hazard or bypass existing safety precautions or devices.

2. Violations of established safety procedures during an exercise shall be the subject of specific comment in a post-exercise critique. A safety observer shall immediately inform the OCE during the conduct of an exercise of impending violations to safety precautions, or their infraction, and the OCE, if in his judgment personnel or equipment will be endangered, shall terminate either the exercise or the exercise phase, until the reported condition is remedied.

3. For gunnery and missile exercises, accepted basic rules will apply. For example, all exposed personnel will take cover whenever there is danger of fragments falling on a firing ship. The OTC shall ensure that general safety rules and precautions are covered in the face-to-face briefing prior to conduct of the exercise.

4. Aircraft Distress Signals. When aircraft are participating in an exercise, the signals used by an aircraft in distress and the actions to be taken are to be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

5. Submarine Operating Authority (SUBOPAETH) Responsibilities.

a. Exercise operational control of units assigned.

b. Promulgate accountability reports and such area restrictions and safety regulations as may be required by local conditions for submarine safety.

c. Promulgate necessary instructions and guidance concerning the use of exercise weapons.

d. Ensure familiarization with all safety precautions by all units involved in submarine operations.

6. Safety Observers (Umpires). Safety observers should be assigned at appropriate locations, but assignment should be limited to minimize interference with the conduct of the exercise. Safety observers have one responsibility — take immediate action to notify the OCE and responsible ship's personnel of the incipient stages of a dangerous situation. By ensuring that safe procedures are used, safety observers aid in preventing serious casualties. Notwithstanding this, in all exercises, the primary responsibility for safety shall lie with the operating personnel.

0104 Pre-Exercise Considerations

1. Pre-Exercise Message. Annex 1A provides a format that may be used for issuing the pre-exercise message for missile and gunnery exercises. When using the format, omit designators that are not required. Reference EXTAC 1005, Annex 1A, in the message.

2. Pre-Exercise Briefing. To ensure that an exercise is completed safely and with a minimum of misunderstanding, it is mandatory that all participants in an exercise attend a face-to-face briefing prior to the conduct of the exercise.

a. The OCE should describe tactical maneuvers to be carried out, initial stationing for the exercise, and methods to be employed for maneuvering. The communication plan should be described in detail. Reports required and the methods of preparing and submitting them should be specified. Every item indicated in the exercise as requiring briefing shall be covered.

b. The pre-exercise briefing for an antisubmarine warfare (ASW) exercise shall include, as a minimum, the following items:

(1) Safety procedures for ships and submarines.

(2) Submarine disaster procedures, including search and rescue procedures to be followed.

(3) Torpedo recovery and search procedures, if the weapon is not immediately located (when exercise weapons are involved).

(4) Safety observers designated for the exercise and their duties.

(5) Submarine communication methods, including flares and disaster signals.

(6) Submarine and/or exercise target characteristics and limitations, including submarine safe depth requirements, depth tables to be used if required for the exercise, and the surfacing method to be employed.

(7) Exercise structure, including type of exercise to be completed, start and stop times, search plans and support methods, and any other parameters.

3. Servicing Aircraft and Ship Considerations. Communications between servicing aircraft and serviced units will be conducted by voice radio. Provide servicing aircraft with the exact position, course, and speed of a ship, since aircraft may have difficulty identifying the ship with which they are to exercise. When aircraft are detected and identified, they may be vectored into position. It should be appreciated that a ship has a limited amount of time to devote to a scheduled

exercise. It is therefore necessary for servicing aircraft to be ready on time.

4. Missile and Gunnery Exercise Considerations.

a. Safety in conduct of the exercise and realism in training are twin goals. The OCE shall brief all participants prior to the conduct of the exercise on the safety rules and precautions, including safety zones, safe fire areas, drones and drone control, aircraft overflights and aircraft towing targets, characteristics of weapons to be used, radar and/or visual surveillance of the firing area, posting and duties of safety observers, and so forth.

b. In preparing for a missile or gunnery exercise, the OCE should give attention to the selection of an appropriate tactical situation; however, simulation of an actual situation is limited by the need to maintain adequate safety measures and the restrictions on ammunition expenditure. Satisfactory completion of elementary exercises should be followed by more advanced exercises which simulate realistic battle problems and test command and control coordination. Realistic simulated casualties to fire control, command and control, and ordnance installations should also be included in advanced exercises.

c. If it is desired to exercise techniques requiring use of a search plan, such plan must be fully described in the exercise order and covered by the OTC in a face-to-face briefing prior to conduct of the exercise.

5. Exercise Preparations. These include the special attention given to presenting realistic situations to which participating personnel are expected to respond. Team leaders should prepare and discuss the exercise problem with the personnel involved.

a. An exercise may commence with the announcement of a general problem situation, simulated or actual. It is then necessary for the team leader to be prepared to brief participants on the exercise. He also ensures that personnel initiate all appropriate procedures before terminating the exercise.

b. Exercises included in this publication may be modified as required to meet operational requirements or weather restrictions. It is the OCE's responsibility to ascertain the specific parameters of a modified exercise prior to actual conduct of the exercise.

c. The imposition of a casualty or other situation may necessitate closing valves, opening switches, or stopping machinery. In every instance, umpires must inform the responsible personnel of the situation desired. The latter will operate the designated equipment. A casualty which cannot be imposed without danger of personnel injury or material damage shall be simulated.

d. The training of weapon control personnel requires that simulated attacks be as realistic as possible. A training weapon should be used when appropriate for realism, but even it may be simulated if an unsafe condition would otherwise arise.

e. Recognition training and its application to safety is of utmost importance and may be added as an integral part of an exercise when appropriate. Procedures to be used shall be in accordance with current directives and shall be covered in the face-to-face briefing prior to conduct of the exercise. It is highly desirable to practice the use of identification systems whenever possible; accordingly, instructions for their use may be added to an exercise where appropriate.

0105 Communications

1. The satisfactory conduct of an exercise depends on good communications. Therefore, the OTC shall ensure that all communications preparations have been made prior to conduct of the exercise, that the exercise includes an adequate communication plan, and that the communication procedures and the details of the circuits required by the exercise are covered in the face-to-face briefing prior to the conduct of the exercise.

2. Voice radio is the primary means of communication between units participating in an exercise. Radio teletype will be used for planning and coordinating exercises. Unless otherwise agreed, English will be used in all voice and radioteletype communications. Communications

with submarines may use underwater telephone (UWT) or sonar sound transmission (SST). Control ships shall provide a time check prior to commencement of any live firing exercise.

3. EXTAC 1000 provides instructions for using signals and sequences of signals that may be useful during any exercise in this publication. The signals supplement the International Code of Signals adopted by the Fourth Assembly of the Inter-Government Maritime Consultative Organization.

4. Visual communication methods that may be employed on occasion include signal flag and flashing light. Visual communications are to be in accordance with the International Code of Signals.

5. For antisubmarine warfare (ASW) exercises in Chapter 2, signaling may include the use of colored flares or smokes and grenades.

6. In exercises in Chapter 5, signaling includes the use of standard hand signals provided in the annexes to Chapter 5.

0106 Communication (COM) Exercises

1. The Order Table in Annex 1B provides the format for planning messages used to advise all forces by signal of the scheduling of communication exercises and to issue detailed instructions for the conduct of these exercises. In using the Order Table, omit paragraphs that are not

required. Reference EXTAC 1005, Annex 1B, in the message.

2. When ordering a radio communication exercise, the senior officer is responsible for obtaining clearance with appropriate authorities for the frequencies to be used. Units participating in such exercises are responsible for operating transmitters at the lowest practicable power and adhering strictly to the assigned frequency.

NOTE: The use of distress or emergency frequencies in any manner for operator training is prohibited.

3. Messages transmitted for the exercise of communication personnel will be identified by including the word "DRILL" at the beginning and ending of all plain language text messages and messages that consist of random groups and shall be included in the message group count. The word "EXERCISE" will be used for all other exercise traffic intended to be acted upon when the exercise nickname or code word is not provided. If it becomes necessary to transmit an operational message during a communication exercise or on an exercise circuit, the words "DRILL" and "EXERCISE" will be omitted.

4. Exercise COM-7 also provides training in maneuvering through the use of a plotting board. The procedures to be used in this exercise should be covered in a face-to-face briefing prior to conduct of the exercise.

COM-1 FLASHING LIGHT

Purpose

To exercise communication personnel in the use of flashing light.

Procedure

SENIOR OFFICER

Prescribe type of flashing light to be used.

CONDUCTING SHIP

Prepare and transmit two exercise messages at a rate not to exceed 10 words per minute.

One message to consist of 48 letters, 22 figures, and 10 prosigns/punctuation mixed in units of 5 characters each.

Second message to consist of 30 words of plain language text.

COM-2 FLASHING LIGHT (DIRECTIONAL AND NONDIRECTIONAL)

Purpose

To provide training for signal personnel in the application of directional and nondirectional light procedures.

Procedure

CONDUCTING SHIP

Transmit drill signals by directional or nondirectional flashing light.

EXERCISE SHIPS

Relay and answer conducting ship's signals in accordance with established procedure.

COM-3 FLASHING LIGHT (WORD READING SKILLS)**Purpose**

To exercise and develop flashing light word reading skills.

Procedure**SENIOR OFFICER**

Prescribe type of flashing light to be employed.

CONDUCTING SHIP

Prepare and transmit three exercise messages, one with 4-letter words, one with 5-letter words, and one with 6-letter words.

Note: The conducting ship may change the number of letters per word.

COM-4 FLASHING LIGHT PROCEDURES**Purpose**

To train signal bridge personnel in the use of directional/nondirectional flashing light.

Procedure**OCE**

Designate or assign:

1. Exercise ship.
2. Assist ship or station.
3. Starting time and duration of the exercise.
4. Directional/nondirectional procedures.

Require each transmitting ship to send at least three messages to include one codress message.

ASSIST SHIP(S) OR ASSIST STATION

As directed by the OCE:

Transmit a minimum of 3 messages with a minimum of 25 groups in either plain or coded format.

Maintain a complete log of transmissions.

Provide OCE with copy of log and exercise traffic.

Preface and end each message with the word "Drill."

Insert appropriate operating signal meaning "Drill" in the message instruction of each exercise message.

EXERCISE SHIP

Maintain a complete log of exercise traffic.

Maintain a record of all errors and/or corrections.

Submit log to OCE for evaluation. Preface and end each message with the word "Drill."

Insert appropriate operating signal meaning "Drill" in the message instruction of each exercise message.

Transmit messages as directed by the OCE.

COM-5 FLAGHOIST SIGNALING PROCEDURES

Purpose

To train the tactical communications team in flaghoist signaling procedures and proficiency in the use of EXTAC 1000.

Procedure

OCE

Designate or assign:

1. Exercise ship.
2. Assist ship or station
3. Starting time and duration of the exercise.
4. Number of signals to be transmitted and received.

Require the tactical communicator to encode five plain language messages which are then to be delivered to signal supervisor for hoisting.

ASSIST SHIP OR ASSIST STATION

As directed by the OCE, provide the following services:

Transmit a minimum of 15 flaghoist signals, including one incorrect signal.

Test speed and reliability of spotter and personnel manning the flagbag.

Encode visual call signs to test personnel in the use of visual call signs.

EXERCISE SHIP

Signalmen and tactical communications man normal underway stations.

Maintain a complete log of all exercise traffic for submission to the OCE.

Furnish OCE with a written decode of all signals.

COM-6 SEMAPHORE**Purpose**

To train communication personnel in the use of semaphore for exchange of administrative traffic and tactical information between ships at sea at close range.

Procedure

OCE

Designate and assign:

1. Exercise ship
2. Assist ship(s) or station.
3. Starting time and duration of exercise.

ASSIST SHIP(S) OR STATION

Transmit a minimum of three messages (two plain language and one codress) with a minimum of 25 groups per message.

Require each participating ship to transmit a minimum of three messages.

Transmit messages to all exercise ships simultaneously.

EXERCISE SHIP(S)

Maintain a complete log of exercise traffic.

Submit a copy of log and all drill traffic to OCE.

Preface and end each message with the word "Drill."

COM-7 RADIO-VISUAL COMMUNICATION DRILL (SIMULATED)**Purpose**

To exercise communication personnel in radiotelegraph and/or radiotelephone procedures and in maneuvering signals.

Provisions

The drill is to be simulated with respect to the ship's movement that will be carried out by plotting on maneuvering boards. The drill may be conducted either (1) in port when visibility is favorable or (2) underway when traffic and weather conditions permit.

Procedure**CONDUCTING SHIP**

Promulgate the organization for the exercise using paragraph QQ in the Order Table.

Prepare a series of maneuvers and transmit via radiotelegraph or radiotelephone.

EXERCISE SHIPS

Repeat all messages of the conducting ship by radiotelegraph or radiotelephone.

Work maneuvering boards in accordance with prescribed procedure.

Signal information as requested by conducting ship.

CONDUCTING SHIP

At end of exercise, require all ships to signal simultaneously the following:

1. If in organization 1 — Final course, speed, and station.
2. If in organization 2 — Final formation, speed, and other pertinent data as required.

**COM-8 RECEPTION OVER A RADIO
CIRCUIT****Purpose**

To provide training for communication personnel in Morse reception over a radio circuit.

Procedure**CONDUCTING SHIP**

Prepare and transmit an exercise message consisting of the following parts at 12 words per minute:

1. Message heading.
2. 90 words of English plain language.
3. 40 groups of 5 letters each.
4. 20 groups of 4 numerals each.
5. Message ending.

When standards of operations allow, speed may be increased to 15 words per minute.

**COM-9 RADIOTELEGRAPH
PROCEDURE****Purpose**

To provide training in all forms of radiotelegraph procedure for communication personnel. The use of authentication and operating signals may be included.

Provisions

Transmitters and receivers of all ships should be set on specified frequency at least 15 minutes before exercise begins.

Participating ships may set up as many operators as desired. If more than one operator on same station is being set up, every operator is given a number (starting with ONE) and the call sign extended by a slant and that number.

Ships taking part answer in alphabetical/numerical sequence. If a station fails to reply within 10 seconds, the following station will continue. Failing stations reply at the end of sequence.

Procedure**SENIOR OFFICER**

Obtain clearance for one or two secondary circuits (as practicable) in addition to the primary exercise circuit.

CONDUCTING SHIP

Order exercise ships to transmit messages.

Ask questions which will require application of all points of procedure.

Enforce rigid circuit discipline at all times.

Whenever practicable, upon completion of the exercise, furnish each exercise ship with copy of the exercise log showing errors noticed.

Note: Units participating in this exercise are responsible for operating transmitters at the lowest practical power.

**COM-10 RECEIVING ENGLISH
LANGUAGE RADIOTELEPHONE
COMMUNICATIONS**

Purpose

To exercise communication personnel in typing or writing out messages dictated by radiotelephone.

Procedure

OCE

Select 200 English words taken from any English language book.

CONDUCTING SHIP

Have operators transmit the 200 words in plain language at a dictation speed of 20 words a minute.

Note: Specify power output.

EXERCISE SHIP

Have communication personnel type or write out the 200 words dictated by the conducting ship's operators.

The following suffixes may be added to the short title of the exercise to indicate the speed of the dictation and standard of advancement:

None: 200 words at 20 words per minute

- A 250 words at 25 words per minute.
- B 300 words at 30 words per minute.
- C 350 words at 35 words per minute.

ANNEX 1A

Pre-Exercise Message Format

Designator	Meaning	Designator	Meaning
* A	Exercise to be conducted, designated by number of descriptive title	J	Date and time exercise is to start (COMEX)
B	Officer scheduling the exercise (OSE)	JJ	Date and time exercise is to end (if the opposing forces have not by then left the area) (FINEX)
* C	Officer conducting the exercise (OCE)	K	Duration of firing time
D	Officer in tactical command (OTC)	* L	Orders for gunfire 1. Ammunition 2. Number of runs 3. Number of rounds per run 4. Number of runs per salvo 5. Special ammunition to be used
E	Chief umpire	* M	Base course and speed
F	Analyzing authority	* N	Area of exercise 1. Firing area 2. Waiting area 3. Rendezvous point and date time group (when rendezvous is at different time and/or place than firing ships) a. Firing surface units b. Target ship c. Tow ship d. Aircraft
* G	Friendly forces (ships and aircraft assigned) 1. Senior officer 2. Composition 3. Initial formation 4. Initial course and speed 5. Aircraft (type, configuration, number, call sign, and home field)	O	Maneuvering instructions to surface units
* H	Opposing forces (ships and aircraft assigned) 1. Senior officer 2. Composition 3. Initial position 4. Initial course and speed a. Target ship (call sign) (1) Initial position (2) Initial course and speed b. Tow ship (call sign) (1) Initial position (2) Initial course and speed c. Aircraft (type, configuration, number, call sign, and home airfield) d. Target type	* P	Anticipated runs to be made by target 1. To be assigned 2. Runs to be used 3. Runs to be briefed 4. Modifications to runs (specify)
I	Time zone to be used throughout exercise	* Signifies mandatory items to be included in pre-exercise message.	

Designator	Meaning
Q	Firing general procedures 1. Type of shot (day or night) (visual or blind) 2. Type of armament 3. Type of observation 4. Method of observation 5. Time of opening fire 6. Cease fire
R	Nonfiring zone (safe zone)
S	Special instructions for friendly forces
T	Special instructions for opposing forces
* U	Communications 1. Voice frequency a. Primary b. Secondary 2. CRATT 3. Tacan/homer a. Channel/ID (if none, so state) b. Homer frequency (if none, so state) 4. Other (must be covered in a face-to-face briefing prior to conduct of the exercise)

Designator	Meaning
V	Particular assignments 1. Aircraft control ship a. Primary b. Secondary 2. Miscellaneous assignments
W	Orders for action in emergency (downed aircraft) and lost communications procedures
X	Special safety instructions
XX	Aircraft altitude assignments
Y	Ships detailed for drone recovery
Z	Movements on completion of exercise
ZZ	Special instructions for transfer of observers, keeping of records, and forwarding data
* Signifies mandatory items to be included in pre-exercise message.	

ANNEX 1B

Order Table for Communication Exercises

Designator	Meaning
A	Exercise to be conducted, designated by number of descriptive title. Add one of the following suffixes to indicate personnel who are to carry out exercises or work maneuvering boards: None Commanding officer assisted by CIC/AIO staff and signal staff 1 Officers of the deck/watch 2 CIC/AIO officers 3 Communication officers 4 Senior signal personnel 5 Junior signal personnel 6 Senior wireless personnel 7 Junior wireless personnel 8 CIC/AIO personnel
B	Officer scheduling the exercise (OSE)
C	Officer conducting the exercise (OCE)
D	Officer in tactical command (OTC)
E	Chief umpire
F	Analyzing authority
G	Composition of exercising ships
H	Composition of target (assist) ships
HH	Aircraft taking part in exercise

Designator	Meaning
I	Time zone to be used throughout exercise
J	Date and time exercise is to start (COMEX)
JJ	Date and time exercise is to end (FINEX)
K	Initial position of exercising ships
L	Initial position of target (assist) ships
N	Base course for exercise ships
NN	Base course for target (assist) ships
P	Area of exercise or rendezvous point before commencement of exercise
Q	Special instructions for exercise ships
QQ	Special instructions for simulated maneuvers. Use one of the following suffixes: 1. Ships taking part, organized as ordered at the beginning of the exercise 2. Ships in formation, course and speed, and location of OTC (must be briefed prior to start of exercise)
R	Special instructions for assist ships
S	Special instructions for aircraft taking part in the exercise

Designator	Meaning
T	Indication of commencement of exercise. Use one of the following suffixes:
	1 At time indicated
	2 Upon the order "Commence the scheduled exercise"
U	Communications means available. Use one of the following suffixes:
	1 Voice radio with frequencies and call signs
	2 Flashing light
	3 Radio teletype
	4 Other (must be briefed prior to start of exercise)

Designator	Meaning
X	Special safety instructions for aircraft taking part in the exercise
Z	Movements on completion of exercise
ZZ	Special instructions for keeping of records and forwarding of data

CHAPTER 2

Surface Antisubmarine Warfare (ASW) Exercises**0201 Standard ASW Exercises**

1. Standard ASW exercises are provided to facilitate the progressive training of the different types of ASW units, both independently and in coordination, in the various aspects of ASW. Exercise standards progress from the elementary stage through the more advanced coordinated stage, and culminate in the standards required for participation in major exercises.

2. The individual exercise provides a framework to progress fundamental training aims. It is the responsibility of exercise planning authorities to ensure that this framework is broadened as required to encompass the particular training requirements of individual units. This can be achieved by the use of the appropriate relaxations, exercise instructions, and special instructions listed.

3. The information in this publication is, of itself, unclassified. Once a particular scenario has been chosen, however, all concerned must ensure that operation orders, message traffic, and exercise reports are properly safeguarded. The same criteria for safeguarding will apply to compilations or summaries of the results of these exercises. Attention should be given to appropriate instructions for safeguarding material.

0202 Exercise Briefings

1. Pre-exercise briefings between the various participating units are beneficial in saving exercise time, avoiding mistakes, and enhancing safety.

2. Post-exercise briefings are most valuable if they take place immediately after an exercise. Many exercises can be analyzed on the spot, and the lessons learned from them can be passed on immediately to the units concerned. Exercise analysis may take longer if it requires the examination of records, but it is important that the results be extracted and passed on as quickly as possible. Details of particular exercises are soon forgotten, and valuable training lessons can be lost when

post-exercise briefings are held an undue time after an exercise has taken place.

0203 Definitions

ASW action. An exercise ASW action is an operation by one or more ASW units against a particular submarine. In order to permit the necessary maneuvers for ASW action to be safely executed, safety precautions to be taken by the submarine(s) and ASW units may be in addition to the safety precautions required in the exercise as a whole. In exercises, ASW action begins with COMEX and ends with FINEX or Stop Time, whichever is earlier. The duration of ASW action must be given in minutes in the exercise orders. If it is desired to continue the ASW action after FINEX, then a new COMEX must be ordered, providing that this is allowed by the exercise orders (see paragraph 0213.6). When Relaxation 2*M is in force, duration is not required.

COMEX. COMEX is the time of starting an ASW action. It is normally a warning to the submarine of attacks by ASW units.

FINEX. In exercises and when a duration has been established, FINEX is the time of ending of ASW action. It is equal to COMEX plus the duration of the ASW action ordered.

Go Time. The start of an ASW exercise period. After this time, dived submarines may be encountered and full safety precautions must be observed until Stop Time.

Stop Time. The end of an ASW exercise period.

surfacing procedure. The method used by a ship or helicopter to bring a submarine from Safe Depth to periscope depth.

submarine depth. All submarine depths referred to in this chapter are to be taken as keel depth.

night. Night is defined as extending from sunset to sunrise, the times of sunset and sunrise being obtained from the Nautical Almanac. These times are to be calculated from the position of the ASW action.

daylight. Daylight is defined as extending from sunrise to sunset.

Safe Depth. A submarine is said to be at Safe Depth when its keel depth is such as to provide the required separation between the top of the fixed structure of the submarine and the lowest point of any ship, other submarine assigned to a higher layer, towed ASW device, and helicopter sonars allowed in the exercise orders. When more than one towed device is being used in the exercise, safe depth applies to the deepest device being employed.

safety course. A pre-arranged course included in the exercise order. It must be one of the cardinal points of the compass, and it is always signaled "NORTH," "SOUTH," "EAST," or "WEST." It is the course to be steered when a submarine is coming to periscope depth using surfacing procedures or in an emergency.

time. Whenever possible, all times should be in GMT to avoid confusion.

0204 Submarine Operating Conditions

1. General. The submarine is a seaworthy and maneuverable vessel, which when fully surfaced complies with the International Regulations for Preventing Collisions at Sea. However, their construction differs from that of surface ships making them vulnerable, and this must be considered, particularly when in close proximity to ASW units during exercises.

2. External Appearance. Submarines have a relatively low freeboard, smooth contours, and little superstructure; consequently, they are more difficult to detect either visually or by radar than other ships. Furthermore, it is not easy to estimate the course of submarines visually as their inclination is difficult to determine even under the most favorable conditions.

3. Navigation Lights. Most submarines do not carry conventional navigation lighting but are permitted to be at sea at night under the International Rules of the Road. Their navigation lights are low and may be concentrated in the vicinity of the conning tower. This arrangement, when combined with the complete lack of other upper deck lights, may be misleading and gives a submarine at night the appearance of a much smaller ship. In accordance with the International Rules of the Road, some countries have authorized special submarine identification lights. Many submarines are unable to display navigation lights until they have surfaced.

4. Damage Control. A submarine's reserve of buoyancy is low. Thus any collision or other event that causes the pressure hull or ballast tank to be pierced immediately places the submarine in danger of sinking.

5. Handling Characteristics. Diving is a safe and routine operation for a submarine. Once submerged, a submarine is maneuverable and can avoid danger simply and quickly by increasing depth if there is sufficient water beneath its keel. Therefore, it is capable of taking part in all types of exercises without risk if certain rules for safety are observed by all ASW units participating in the exercise. Exercises will not be carried out in waters less than 77 meters (255 feet) unless Relaxations of the 12 Series are authorized.

0205 Responsibilities When Exercising With Submarines

1. Responsibility for Avoiding Collision Between Surface Ships and Submarines.

a. The Commanding Officer of a submerged submarine must assume that his presence is unknown to all participating units even when it may be assessed that such units hold positive sonar contact. The burden of avoiding collision, therefore, when at periscope depth, submerged, coming to periscope depth or surfacing, rests primarily on the submarine.

b. A submarine deeper than periscope depth cannot be fully acquainted with the situation on the surface, since it must

depend totally on sonar to locate ships. Surface ships, therefore, must take all possible action to ensure the safety of the submarine. Such action should include, for example:

- (1) Maneuvering to avoid a submarine sighted at close range. This may include taking way off the ship;
- (2) Informing the submarine of approaching deep draft vessels, or fishing vessels;
- (3) Advising the submarine when it is safe to return to periscope depth;
- (4) Informing the submarine of a significant change in the weather with particular emphasis on the visibility; and
- (5) Informing the submarine of towed sonar systems, decoys or obstructions that, through system malfunction or other overriding factors, are deeper than permitted in the exercise rules.

c. Submarines coming to less than Safe Depth are to take all possible steps to avoid collision. If the submarine is in any doubt of surface ship positions or movements, it should remain at Safe Depth and reinitiate surfacing procedures appropriate to the relaxations in force.

d. Splash/spar targets are likely to be towed by surface ships up to 600 yards astern of the ship. Submarines at periscope depth are not to approach these targets within 1,000 yards. Submarines that are deep are not to come to periscope depth within 1,600 yards astern of the ships.

2. Responsibility for the Safe Navigation of the Submarine.

a. The submarine Commanding Officer has the fundamental responsibility for the safe navigation of his submarine.

b. In scheduled exercises, however, the OCE or the officer to whom he has delegated responsibility (OTC/OCS) is responsible for taking all reasonable precautions to ensure the navigational safety of the

submerged submarine. In certain exercises this may require frequent communication between ships and submarine.

c. The OCE may require that the submerged submarine be informed by keyed sonar (SST) or underwater telephone (UWT) of its hourly position, or more often if circumstances warrant. Changes in sea conditions or visibility should be communicated if appropriate. If it should appear that the submarine is standing into danger, it may be desirable to bring the submarine to periscope depth.

d. Restricting Course and Speed of Submarine. In certain exercises it is necessary to order the submarine to steer a given course and/or maintain a specified speed. These are to be taken as through the water, without allowing for tide. Ships giving such instructions (or any alterations thereto) are to ensure that the submarine will not be endangered by obeying such instructions. This in no way relieves the submarine Commanding Officer of his basic responsibility for the safe navigation of his submarine.

0206 Emergencies During ASW Exercises.

1. During ASW exercises involving ships, submarines, and aircraft, prescribed safety precautions are to be observed to the fullest extent possible. The OTC/OCE is responsible for ensuring that such precautions are observed and, in the event of an aircraft casualty, for determining whether an exercise is to be continued.

2. It is the responsibility of the OSE to ensure that full details of the procedures to be carried out in the event of an aircraft or submarine accident are known to all forces taking part in an exercise.

3. The OTC shall brief search and rescue procedures to be carried out in the event of an aircraft or submarine casualty.

4. Aircraft Emergencies.

a. Aircraft Incident. The following conditions indicate an imminent or actual distress incident:

- (1) The position of an aircraft raises doubt as to its safety.

(2) Reports indicate that the operating efficiency of an aircraft is so impaired that a forced landing may be necessary.

(3) An aircraft is overdue or unreported.

(4) An aircraft is reported to have made a forced landing or is about to do so.

(5) The crew is reported to have abandoned an aircraft or is about to do so.

(6) Emergency IFF is received at any station.

(7) Distress transmissions are heard.

b. Action by Aircraft. In the event of an aircraft casualty that requires breaking off the exercise and raises the possibility of a forced landing, the decision as to the action to be taken rests entirely with the aircraft commander. Normally, one of the following procedures will be carried out:

(1) Crew and passengers may immediately parachute from the aircraft.

(2) An immediate forced landing in the sea may be made near a ship or surfaced submarine.

(3) A deferred or forced landing may be made on or near the land.

(4) A deferred landing may be made at a shore or carrier base.

c. Action by the On-Scene Commander.

(1) When an aircraft casualty occurs in the exercise area, the on-scene commander is normally responsible for initiating search and rescue action and for informing the authority exercising operational control of the aircraft.

(2) If a casualty makes it necessary for an aircraft to break off the exercise and carry out one of the procedures listed in paragraph 0206.4b, the on-scene commander may at his discretion cause the exercise to be terminated or interrupted

and may surface any submerged submarine in the vicinity.

d. Action by Submarines. In single aircraft/submarine exercises the air commander is responsible for the safety of the aircraft and for initiating search and rescue action.

e. Use of Distress Signals.

(1) The OTC shall brief aircraft distress signals, the nature of the aircraft emergency, the distress signals the aircraft is to make to the ASW ship or submarine, and the action to be taken by the ASW ship or submarine to effect rescue as quickly as possible.

(2) Helicopters may ditch suddenly without having time to make distress signals. Ships should, therefore, keep cooperating helicopters under constant observation when possible.

5. Submarine Emergency.

a. Detailed instructions for search and rescue operations, which are conducted as a result of the loss or apparent loss of a submarine, will be addressed by the OTC prior to the exercise.

b. The Aim of Rescue Forces. In the event of a submarine accident, the aim of ASW ships will be to fix the position of the submarine accurately and, if possible, to buoy this position preparatory to rescue operations. This ensures that an explosive charge signal can be made at a distance of 500 yards from the submarine to indicate the ships are standing by to pick up survivors. ASW aircraft should be employed to assist the rescue ships in such operations.

6. Submarine Surfacing in an Emergency. All ASW units must be prepared for the possibility that a submarine may have to surface in an emergency, possibly without the appropriate signal. A red pyrotechnic signal released by a submarine indicates that it is surfacing or is about to surface in an emergency.

a. The sighting of this signal is a sign that the submarine is about to surface and may, in fact, already be coming to the surface. Figure 2-1 provides action to be taken by ASW units.

b. If red signals are repeated or if the submarine fails to surface within a reasonable time, it must be assumed to be disabled. The surface ship is then to buoy the location, attempt communication by sonar, by UWT, or by tapping the hull, and look for a submarine marker buoy. Naval authorities are to be advised of the emergency.

c. Additional action:

(1) In addition to launching the red emergency identification signal, the submarine will, if possible, repeatedly transmit the International Distress Signal, "SOS" on UWT or SST.

(2) *A submarine that fires a red pyrotechnic signal must surface even if the red pyrotechnic signal was fired by accident or if the reason for firing no longer applies.*

d. If an unexpected signal, other than a green signal, is sighted by ASW units, they are to anticipate emergency surfacing and are to act accordingly by clearing the area and steering the safety course until the submarine surfaces or other direction is received.

0207 Basic Safety Rules, Procedures, and Requirements

1. Safety Separation of ASW Forces.

To avoid mutual interference; submarines, ships, and dipping helicopters will be separated by horizontal and/or vertical safety separation.

2. Horizontal Safety Separation.

a. Unless Relaxation 12*G has been authorized, submarines should not approach within 2 miles of the limits of their areas. This will achieve a 4-mile horizontal safety separation between submarines operating in adjacent areas. This separation distance may be modified by Relaxation 12*G

for certain exercises to accommodate variances in the size and/or environmental conditions in the exercise area.

b. Submarines are to remain **2 miles** clear or at a distance considered safe by the submarine Commanding Officer, from underwater hazards such as wrecks, pinnacles, or pipelines, where water depth is insufficient to allow minimum safe-depth operations above the hazard.

c. Submerged submarines observed to be approaching the limits of their areas or towards an obstruction are to be ordered by the OTC/OCS to return to their areas. Submarines unable to remain within their assigned areas are to surface. During more advanced ASW exercises, when exercise unit movements are unrestricted, the OTC/OCS will not always be able to establish the submarine's position. Therefore, the responsibility for the submarine to remain within assigned exercise areas rests with the submarine's Commanding Officer.

3. Vertical Safety Separation/Safe Depth Operation.

a. Safe Submarine and Water Depths. The vertical safety separations are not adequate for major casualties, but can be used for planning when inadvertent loss of depth control is the only consideration. For submarines operating in shallow water areas, the use of the 12 Series Relaxations is mandatory. It may be necessary to augment these Relaxations with exercise instructions and special instructions. The ordering of an exercise in shallow water areas requires special care and knowledge of all relevant paragraphs of this chapter by the OCE/OCS and the SUBOPAETH.

b. Upper Vertical Safety Separation (UVSS). This is the vertical distance that must be maintained between the top of the fixed structure of the submarine and the lowest point of any ship, other submarine assigned to a higher layer, towed ASW device and helicopter sonar systems allowed in the orders for the exercise. This UVSS is the same for submarine versus submarine, submarine versus ship, submarine versus

SIGNAL FROM SUBMARINE		ACTION BY ASW UNITS AS APPROPRIATE	ACTION BY SUBMARINE	REMARKS
Signal	Meaning			
<p>One red pyrotechnic repeated as often as possible.</p> <p>(SOS by SST or UWT)</p>	<p>Keep clear. I am carrying out emergency surfacing procedures.</p>	<ol style="list-style-type: none"> 1. Break off attacks. 2. Bearing in mind that the submarine may already be surfacing, clear immediately the area of the submarine and act in accordance with Method ALFA. See paragraph 0211.2a. 3. Cavitate. 4. Switch on navigation lights at night. 5. Broadcast to all units "Emergency Surfacing." 6. Set UWT watch; consider stopping transmissions on long- and medium-range sonar. 7. Switch off/recover/cut decoys. 8. Consider recovering VDS. 9. Stand by to render assistance. 10. Inform OCE. Mark plot and chart. 11. Prepare to lay offset danbuoy. 	<ol style="list-style-type: none"> 1. Act as necessary. 2. Make every endeavor to turn to safety course and release smoke/flare. 3. At night, switch on navigation lights. 	<p>This signal may also be used by a submarine on the bottom that is unable to surface, in order to indicate that it is in difficulty, and as a means of marking its position.</p> <p>If a red pyrotechnic is released by mistake, the submarine must surface as soon as possible to assure other forces that no emergency exists.</p>

Figure 2-1. Submarine Emergency Red Pyrotechnic Signal

VDS or towed decoy. When this safety separation in depth exists, the submarine is said to be at submarine Safe Depth.

c. Bottom Vertical Safety Separation (BVSS). This is the vertical distance that must be maintained between the lowest fixed part of the submarine and the sea bed. This safety separation is speed dependent.

d. Lower Vertical Safety Separation (LVSS). This is the depth of water required between the keel of the submarine and the maximum permissible operating depth. The maximum permissible operating depth is defined as an absolute depth for an individual submarine, below which that submarine must not deliberately proceed. The LVSS is speed dependent.

e. Operating at Safe Depth. During all exercises in which a submarine is participating, ASW units assume that a submarine is at Safe Depth at all times between COMEX and FINEX (or Stop Time), except:

(1) When there is positive evidence to the contrary; such as a signal from the submarine that it is not at Safe Depth, failure of the submarine to signal as required when it has reached Safe Depth, or sighting the periscope or another part of the submarine.

(2) When the Relaxation(s) for the exercise permit the submarine to be at less than Safe Depth. (Relaxations 2*J, 3*E, 3*K, 21A, 21B, and/or 21*C).

4. Visibility Requirements.

a. Visibility in Which Submarines May Dive. Submarines are not to dive if the visibility through the periscope is less than 3,000 yards. This means that surfaced submarines must be visible at a distance of not less than 6,000 yards from a ship's bridge. This rule may be relaxed at the discretion of the OSE in concurrence with the SUBOPAETH by using Relaxation 13*A, 13*B, or 13*C to enable exercises to be carried out. In shallow water, limitations on the maneuverability of the submarine should also be considered. The decision as

to whether the visibility is sufficient for the submarine to dive rests entirely with the Commanding Officer of the submarine. The fact that participating surface ships and submarines are equipped with radar in no way relaxes the visibility rules in force. The OSE will consider the efficiency of all participating forces in deciding on any relaxation of safety rules. If a submarine's radar becomes inoperative during darkness or reduced visibility and, as a result, information on which its safety depends cannot be obtained, the submarine's Commanding Officer should break off the exercise and retire from the vicinity until repairs are made. Navigation lights should be switched on during this period. The submarine should keep the OTC or OCS (whichever is appropriate) fully informed of its retirement and of its intention to re-enter the exercise. These instructions may only be relaxed if Relaxation 13*C is in force. If the visibility from the bridge of a ship participating in the exercise falls unexpectedly below that allowed for the exercise while the submarine is submerged and no Relaxation has been ordered for the exercise, the exercise is to be ended and the submarine surfaced when safe to do so.

5. Minimum Submarine Acoustic Equipment Requirements. Submarines are not to dive unless at least one of their sonar sets is capable of listening for Hydrophone Effect (HE) and of transmitting on SST or communicating by UWT. Submarines shall maintain a continuous guard on UWT and a continuous watch on the listening sonar at all times when submerged. In the event of failure of the UWT or passive sonar, the submarine must surface and assume an out-of-action status until the defect is repaired.

6. Surface Ship Noise.

a. Types of Surface Ship Noise. Submarines detect surface ships on sonar predominantly using one of the following noise sources:

- (1) Sonar transmissions.
- (2) Cavitation.
- (3) Radiated noise.

b. Noise reduction programs on board many surface ships have now significantly reduced radiated noise. It is important, therefore, particularly within the confines of the exercise, that the ship provides a reliable acoustic warning of its presence, i.e. sonar and/or cavitation. Ships must be aware, however, of conflict between sonar transmissions and UWT communications and also the speed at which cavitation occurs.

c. Surface Ship Radiated Noise Requirements. Surface ships operating with submerged submarines must cavitate unless Relaxation 7*A, 7*B, 7*C, 7*D, 7*E, or 7*F is specifically approved by the SUB-OPAETH. These relaxations do not apply when in the vicinity of a submarine that is known to be coming to periscope depth or surfacing.

7. Lookouts. Ships are to ensure that lookouts are trained in the recognition of submarine pyrotechnic signals and profiles. Where the ship's complement allows, at least two lookouts should be posted. It should be impressed on lookouts that the safety of the submarine may at any time depend on them and that they are responsible for immediately reporting any signals such as smoke, flares, and any emergency identification signals (such as red flares, bubbles, oil slicks), or periscope, mast, or any other portion of the submarine that is sighted.

8. Underwater Telephone Watch.

a. Participating units fitted with UWT are to maintain a continuous listening watch with optimum receiver gain. Whenever practicable, the UWT should be monitored by competent authority to ensure prompt reaction to emergency signals. ASW ships may enhance UWT clarity by positioning so that neither ship nor submarine is communicating through its baffles/stern arcs and by minimizing other active sonar transmissions in the vicinity consistent with the relaxations in force.

b. In exercises when Relaxation 7*F is in force, some submarines are unable to detect echo sounders and, to ensure safety, will transmit safety signals on UWT when returning to periscope depth. Any ship

hearing these signals is to reply without delay and is to transmit a long count every 30 seconds on UWT for 3 minutes to allow the submarine to establish a bearing.

9. Communications and Signals.

a. The OCE is to issue instructions in the exercise order regarding submarine diving and surfacing signals and check reports. The SUBOPAETH must be prepared to accept and coordinate such reports from participating submarines when required by national authorities.

b. All surface ships engaged in exercises with a submarine that is at periscope depth and restricted in course and speed, or with one that is about to surface or come to periscope depth, are to be prepared to warn all other shipping to proceed with caution and keep clear by means of the International Signal, CODE NE pennant 2.

10. Dumping of Trash, Garbage, and Waste (GASH). It is essential that gash not be dumped during an exercise except in areas that will not hazard operations. Positive steps must be taken to ensure that material disposed over the side will sink in the minimum time possible. Floating gash from participating ships may cause confusion in the event of a submarine emergency.

0208 Specific Safety Precautions

1. Safety Precautions When Operating With Aircraft.

a. Aircraft and Ships.

(1) Because of poor lookout positions in helicopters, ships are responsible for avoiding collision with helicopters in the dip.

(2) Ships firing weapons are to ensure that they do not endanger any aircraft in the vicinity.

(3) To prevent turbulence from affecting the helicopter, surface ships should not pass within 500 yards of a hovering helicopter. Preferably, ships should pass downwind of a hovering helicopter.

b. Aircraft and Submarines.

(1) Submarines are not to fire grenades (flares), other than red grenades (flares) in an emergency, unless Relaxation 2L is in force.

(2) For the precautions to be observed when using helicopter sonar, see paragraph 0208.4.

2. Safety Precautions When Surface Ships Approach. The SUBOPAETH may specify the range at which the submarine must go to Safe Depth when surface ships, without any towed devices, approach. In this case, that range (which may be as little as 1,200 yards) must be included in the briefed special instructions. This safety range will increase progressively with the depth of towed decoys and sonar, unless relaxations permit.

3. Safety Precautions When Employing Towed Decoys. The following precautions are to be observed when towed decoys are streamed by surface ships in exercises with submarines:

a. The type of decoy to be used must have the prior approval of the SUBOPAETH. When employment is authorized, the decoys may be towed either silent or emitting.

b. The fact that decoys are to be streamed is to be included in the exercise order, together with the type of decoy and the length of stay. Relaxations 9B, 9*C, 9D, and 9*E apply to the use of decoys.

c. When decoys are streamed at long stay, the submarine (if not already at Safe Depth) is to proceed to Safe Depth when the nearest ship approaches within 2,000 yards. This range may be reduced at the discretion of the SUBOPAETH using Relaxation 9*A.

d. Ship's speed is not to be reduced if this involves the decoy or tow dropping below the appropriate maximum depth briefed prior to the exercise.

e. Before starting the procedure to bring the submarine up to periscope depth, decoys are to be switched off and raised in

accordance with procedures briefed by the OTC prior to conduct of the exercise.

4. Safety Precautions When Employing Helicopter Sonar. To minimize the risk of collision between submarines and helicopter sonar, the following precautions are to be observed:

a. The submarine is to proceed at Safe Depth, based on the maximum depth at which the sonar will be employed, unless Relaxation 8C is in force.

b. When it is desired to operate the helicopter sonar transducer at the best search depth, and this determines a Safe Depth that the submarine is unable to reach, Relaxation 8F should be ordered. The submarine Safe Depth is then based on the initial search depth promulgated with Relaxation 8F.

c. In exercises where the use of evasive tactics is desirable, the submarine is not required to proceed to Safe Depth provided Relaxation 8C is in force. However, submarines are not to deliberately close within 500 yards of a dipping helicopter and helicopters are not to deliberately enter or remain at the dip if within 500 yards of the submarine.

5. Safety Precautions When Employing VDS/Towed Array Systems. All precautions regarding use of VDS/TAS will be briefed by OTC prior to the start of the exercise.

6. The Use of Explosive Charges. Two important factors influence the use of explosive charges: the type of charge, and the range/depth from the submarine. These factors will be covered by the OTC in a face-to-face briefing prior to conducting the exercise. *The national SUBOPAETH has the authority to prohibit the use of designated or all explosive charges.*

a. Under no circumstances is a charge to be aimed to hit a submarine or aimed at the estimated position of a submarine.

b. No charge is to be dropped on a submarine in the act of diving or surfacing.

c. Charges are only to be used where there is sufficient depth of water to ensure that they detonate.

d. The OSE/OCE/OTC is responsible for obtaining approval for Relaxation 10*A and Relaxation 10*B from the SUBOPAETH.

e. Where there are variations in range for different charges, the SUBOPAETH is to use a single range, which reflects the most restrictive condition, when approving Relaxation 10*B.

7. Electronic Sound Underwater Signals. ESUS are non-explosive electronic devices that are used for signaling submerged submarines. ESUS transmits a coded acoustic signal. The meanings of the various codes will be covered by the OTC in the face-to-face briefing prior to the conduct of the exercise. The following general instructions apply:

- a. ESUS can be used any time against any submarine without prior approval of the SUBOPAETH.
- b. ESUS that cannot be positively identified are not to be used.
- c. ESUS are not to be aimed to hit a submarine.

0209 ASW Exercise Restrictions

1. ASW Investigation Restrictions.

a. Investigation of Contact by ASW Ships. No ship is to deliberately approach a contact closer than 1,200 yards, and no ship with VDS streamed is to approach closer than 4,000 yards unless Relaxation 4*E is in force.

2. ASW Exercise Attack Restrictions.

Unless otherwise stated in the exercise order, ASW ships and aircraft may simulate attack on submarines subject to the restrictions contained in the paragraphs that follow.

a. Restrictions — Surface Ship Attacks.

- (1) No attempt or threat to ram a submarine or a submarine periscope is to be made.

(2) ASW ships are to avoid passing directly over a submarine believed to be at less than Safe Depth.

(3) When simulated attacks are carried out with medium- or long-range shipborne ASW weapons, COMEX need not be executed until surface ships close to within 5,000 yards.

(4) When initiating COMEX by sound signal, and to ensure that the submarine is aware of COMEX, the signal should not normally be made at a range greater than 5,000 yards from the submarine.

(5) No ship is to deliberately approach a contact closer than 1,200 yards, and no ship with VDS streamed is to approach closer than 4,000 yards, until 5 minutes after COMEX, unless relaxations in force otherwise permit. (Relaxation 2*B, 2*C, or 2*M.) In this case, it must be noted that it may be dangerous for the submarine, when Relaxation 2*J is granted, if relaxations such as 2*C and 2*M are in effect (see paragraph 0207.3e (2)).

(6) All ship weapons and projectiles are to be placed in such a condition that both accidental discharge or release, and exploder activation, are impossible.

(7) A distinction is to be made between practice projectiles requiring the submarine to be at Safe Depth (hereinafter referred to as heavy projectiles), and those for which no special precautions are necessary when fired at dived submarines (hereinafter referred to as light projectiles). Projectiles reaching a depth in excess of the surface ship draft in force for the exercise (Relaxation 12*B) are to be considered heavy projectiles. If Relaxation 2D or 2*E is in force, the appropriate type of projectile may be loaded.

(8) Practice ASW torpedoes may not be fired except under the provisions of paragraph 0209.4. (Relaxation 2*F.)

(9) Relaxation 2*B, 2*C, or 2*M cannot be authorized unless Relaxation 4*E is also authorized.

b. Restrictions — Aircraft Attacks.

(1) Aircraft are not to carry live bombs, depth charges, homing torpedoes, or rockets.

(2) Extraordinary precautions are to be taken by aircraft to ensure that no machinegun is loaded with ammunition prior to or during practice strafing runs.

(3) Under no circumstances whatever are any sonobuoys, depth charge markers, practice bombs, flares, or other missiles to be dropped on a submarine when any portion of the submarine other than its periscope, snorkel, or radar mast is exposed above the surface of the water. The weight of any such missile, except sonobuoys, must never exceed 4.5 kilograms (10 pounds). Sonobuoys may be used as above with prudence, although their weight exceeds 4.5 kilograms (10 pounds).

(4) No missile shall be dropped on a target if for any reason the aircraft commander is not certain that the target is a submarine, or if any portion of the submarine other than its periscope, snorkel, or radar mast is exposed above the surface of the water. Explosive weapon charges dropped by aircraft must comply with the prescriptions of paragraph 0208.6.

(5) Aircraft carrying out an attack on a submerged submarine and requiring a reply from the submarine are to drop two explosive charges to indicate the attack. The charges should be dropped 5 seconds apart. One properly coded Mk 84 ESUS may be used to indicate an attack in lieu of explosive charges.

(6) Aircraft carrying out an attack on a submerged submarine may drop one or more smoke bombs to indicate the attack, subject to the provisions of paragraph (3) above.

(7) Practice ASW torpedoes may not be dropped except under the provisions of paragraph 0209.4. (Relaxation 2*H.)

c. Restrictions — Submarine Attacks.

(1) When attacks by submarines are to be simulated, all torpedoes will be placed in such a condition that neither their accidental discharge nor activation is possible.

(2) Whenever exercise torpedo firings have been authorized, the submarine's Commanding Officer will ascertain that those torpedo tubes from which torpedoes will be fired contain only exercise torpedoes; all other weapons must be placed in the condition described in paragraph (1) above. If torpedoes are to be fired by submarines, the responsibility for firing on a safe torpedo course and at a safe torpedo depth rests entirely with the submarine's Commanding Officer; the target ships are responsible for assuming a suitable damage control condition prior to the firing of the torpedo.

d. Restrictions on the Marking of Attacks.

(1) It is desirable that every ASW attack on a submarine by a surface ship or aircraft be assessed or analyzed. However, the marking of attacks in tactical exercises should not be used as an aid to classification; for this reason, the dropping of two charges to mark attacks should be limited to certain basic exercises, the latter periods of ASW action in tactical exercises, and those cases in which it is required to analyze the result of vectored attacks.

(2) Unit is should not drop hand grenades and charges over the estimated position of submarines since there is a risk of causing serious damage to submarine if the charges explode in contact with the hull.

e. Abandonment of Attacks. All attacks are to be broken off and the period of attack is considered to be over as follows:

(1) At 5 minutes before the scheduled time of ending each ASW action (FINEX), or 5 minutes before Stop Time if this is earlier.

(2) At the desire of the submarine; in which case the indication to surface ships and aircraft may be:

(a) The sighting of a red pyrotechnic signal.

(b) An unexpected pyrotechnic signal for which there is no satisfactory explanation.

(c) The reception of unexpected transmissions of SST or UWT not in answer to explosive signals. In this event, all surface ships and aircraft taking part in the exercise are to be informed by the unit receiving the transmissions.

(3) At the desire of any surface ship or aircraft.

3. Restrictions Governing the Use of Submarines as Impact Targets. All restrictions governing the use of submarines as impact targets will be briefed by the OTC prior to conduct of the exercise.

4. Night ASW Exercise Restrictions. Unless otherwise stated in the exercise order, the following special restrictions apply during ASW exercises by night:

a. Only sonobuoys, Mk 84 ESUS, and smoke/light markers are to be dropped by aircraft unless Relaxation 2G is in force.

b. Ships are to show navigation lights at full brilliance unless Relaxations 6C, 6*D, 6E, or 6*F are in force.

c. The exercise area is to be reasonably clear of other shipping.

d. In night encounter exercises, the target ship is to be limited in speed and evasive steering. Such limits are to be agreed to by operating authorities of ships and submarines and are dependent on the experience of the submarine's Commanding Officer.

e. Only pyrotechnic signals that give visible flames are to be used by the submarine.

f. Submarines are to show navigation lights at full brilliance when on the surface unless Relaxation 6A or 6B is in force.

0210 Positioning of Surface Ships and Helicopters While Submarines Dive

1. When the submarine dives in the vicinity of ships and/or helicopters, they should station themselves at least 1,500 yards off the submarine's signaled diving course unless otherwise specified. VDS/DTAS ships may stream VDS/DTAS before the rendezvous for ASW-1, ASW-2, and ASW-11 provided that they remain at least 1,500 yards off the submarine's signaled diving course. The submarine is to be informed that the VDS/DTAS is streamed and its streamed depth.

2. The submarine is required to signal her proposed diving course. This will most likely be a course beam to sea. The submarine will signal when it is ready to dive. When the submarine reports "Ready," the OCS or delegated unit orders "Dive for serial...."

3. Submarines require time to adjust their submerged trim after diving and before going to Safe Depth. This usually is done at periscope depth to ensure that it is safe to return to the surface should this be necessary. The submarine should show as much periscope as possible during the trimming operation, which may take up to 10 minutes.

4. After the initial trim has been caught, subsequent dives can be made directly to Safe Depth. ASW units must not start ASW action until the submarine reports, "I am at correct depth, course, and speed and am ready to commence the exercise."

5. The following procedure is to be used:

a. Establish radio communications with the submarine prior to go time.

- b. Conduct time check with all units.
- c. Confirm submarine's position.
- d. Submarine reports intended diving course to OCS or delegated controlling unit.
- e. When the diving course is established the OCS or controlling unit will order units to take station laterally at least 1,500 yards from the submarine's diving course unless otherwise specified.
- f. If ships have VDS/DTAS streamed, then the OCS or controlling unit must report this to the submarine. This report must include at what depth VDS/DTAS is streamed.
- g. Submarine signals "Ready" when ready to dive.
- h. On receiving "Ready," the OCS or controlling unit orders the submarine to dive by "Dive for serial...."
- i. When at Safe Depth the submarine will report, "I am at correct depth, course, and speed and am ready to commence the exercise."

0211 Procedures for Units to Bring a Submarine from Safe to Periscope Depth

1. Responsibilities for Submarine Safety When Returning to Periscope Depth.

- a. The Commanding Officer of the submarine is responsible for submarine safety. The decision to leave Safe Depth and proceed to periscope depth should only be made when the submarine Commanding Officer is satisfied that it is safe to do so.
- b. If it is desired that the submarine not return to periscope depth at FINEX or Stop Time, arrangements should be made with the OCE prior to the start of the exercise (see Relaxations 3A, 3B, and 3*H).

2. Surfacing Methods and Procedures.

The following procedures are to be used when required to bring a submarine from Safe Depth to

periscope depth. These will be covered by the OTC in a face-to-face briefing prior to conduct of the exercise.

a. Method ALFA. Surfacing method ALFA is the standard method for a submarine to change depth from Safe Depth to periscope depth. Method ALFA is a controlled procedure that is normally used to bring submarines to periscope depth at FINEX or Stop Time. Method ALFA requires communications between the ship tasked with the procedure and the submarine in order to establish the submarine's position.

b. Method BRAVO. Surfacing method BRAVO is an alternative method for a submarine to change from Safe Depth to periscope depth at FINEX or Stop Time. It is only to be used when Relaxation 3*J is authorized for use and when ordered in the exercise message. Method BRAVO allows the submarine Commanding Officer to bring his submarine to periscope depth expeditiously and safely upon completion of an exercise. This is accomplished by surface units clearing the immediate area in which the submarine was operating on the safety course or its reciprocal while cavitating and transmitting on SRS/MRS regardless of the submarine's position at FINEX or Stop Time. Even if some ships are on the safety course and others are on the reciprocal, the main concern of the submarine Commanding Officer is that ships are well clear of his track before he brings his submarine to periscope depth.

3. Conduct of ASW Ships at Stop Time.

a. The procedures for returning to periscope depth outlined in paragraph 0211.2 (Methods ALFA and BRAVO) apply at Stop Time in the following cases, unless relaxations in force otherwise permit:

- (1) The ASW ships are in contact with the submarine.
- (2) The ASW ships are not in contact with the submarine but are remaining in the exercise area.

b. If no contact has been established with the submarine at Stop Time plus 1 hour, return to the last known position of the submarine, initiate a search, attempt to establish communication by all means possible, and follow instructions provided by the OTC in the face-to-face briefing prior to conduct of the exercise.

*NOTE: When the procedure for returning to periscope depth is applied, Relaxations 3*G, 8*G, and 12*B, if authorized, remain in effect until the submarine returns to periscope depth.*

0212 Standard Exercises and Method of Ordering

1. Summary of Standard Exercises.

a. Standard ASW exercises provided in this chapter include exercises involving ships and/or helicopters, exercises involving ASW aircraft, exercises involving multiple forces, and exercises of a miscellaneous nature.

b. By use of the Relaxation Table (Annex 2A), the Exercise Instructions Table (Annex 2B), and special instructions, the exercises may be varied to achieve virtually any desired complexity and also provide opportunities for submarine training.

c. When the term "unit" is used, it signifies a ship or aircraft or a small group of ships and/or aircraft acting as an entity.

d. When the term "aircraft" is used, it includes both fixed-wing aircraft and helicopters.

e. Exercises may be carried out by day or night unless otherwise specified.

2. Substitution for a Submarine. In certain exercises, a ship may take the place of a submarine when it is desired to exercise air/surface cooperation procedures. A mobile ASW target may take the place of a submarine in any exercise.

3. Method of Ordering Exercises.

a. This section contains information on the method of ordering the various ASW exercises listed in this chapter.

b. Security of the Order Table.

(1) The major part of the message ordering the exercise does not contain material requiring security and may be passed by unclassified message.

(2) Certain sections, however, may contain information of a classified nature.

4. Order Table.

a. When scheduling an ASW exercise, the authority ordering the exercise should first decide which of the exercises most nearly meets his requirements. Individual exercises list the procedure to be followed for starting, conducting, and stopping the exercise.

b. An Order Table should then be used by the authority ordering the exercise in compiling both the exercise order and exercise message. The authority ordering the exercise should always consider the whole Order Table when compiling his orders, but omit those headings that are not required. The Order Table used will be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

5. Relaxation Table. The table in Annex 2A should be used to modify the safety precautions, operating restrictions, and procedures to make the training more realistic. The use of relaxations will depend on the equipment, capabilities, and state of training of the participating units. Certain relaxations are marked with an asterisk (*) and may only be used subject to the prior approval of the SUBOPAETH. Exercise planners must obtain this approval before including starred relaxations in exercise orders.

6. Exercise Instructions Table. The table in Annex 2B is to be used in conjunction with the Relaxation Table. These two tables enable the

authority ordering the exercise to adapt any of the standard exercises to meet his specific requirements. Series 200, 300, and 600 Exercise Instructions must be covered by the OTC in the face-to-face briefing prior to conduct of the exercise in which they will be used.

7. Submarine Depth Tables.

a. These tables may be ordered by the use of Exercise Instruction Number 166. The tables must be covered by the OTC in the face-to-face briefing prior to conduct of the exercise. The use of the tables is subject to the Safety Rules in paragraph 0207.3. When the tables would require the submarine to exceed the limits imposed by the Safety Rules, the submarine is to proceed as near the depth specified in the Depth Table as the Safety Rules allow.

b. The following instructions apply to the Submarine Depth tables:

(1) Zero Time (minute 0) is the exact hour immediately preceding the time of execution. If the time of execution is exactly on an hour, that time will be Zero Time. The submarine is to go to the depth shown in the table for that time relative to Zero Time.

(2) If the table is completed before FINEX, the submarine is to restart the table at Zero Time.

(3) The times shown in the table are the times at which the submarine is to start altering to the ordered depth.

(4) The Depth Tables may be ordered in an exercise in which the submarine is unrestricted in course and speed.

8. Submarine Course and Speed Diagrams. The diagrams in Annex 2C may be ordered by the use of Exercise Instruction Number 121. The authorities ordering these diagrams are to ensure that the submarine can comply with the diagram while still remaining within the exercise area and within sufficient depth of water. Additional information on the use of the diagrams is provided in Annex 2C.

9. Long-Range Tracking Diagrams.

a. These diagrams present various options for maneuvering of units during basic tracking exercises. Each diagram provides a generalized scheme for the practice of specific techniques; course, speed, etc., must be ordered in the exercise message. The diagrams must be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

b. The diagrams are specifically oriented to passive operations but may also be applied to active tracking.

c. As proficiency improves, the target/sensor presentations can be made more complex by the superposition of parameters on a basic track.

10. Special Instructions. Some exercises require instructions that cannot be ordered by using the tables provided. These instructions should be written clearly and concisely and, if possible, should be discussed with all participants before the exercise.

0213 Communications and Signals

1. Introduction.

a. Some positive means of communication between all exercise participants is essential to provide for safety and control. This is normally accomplished by a combination of radio, UWT, keyed sonar (SST), explosive charges, and visual signals.

b. Selection of the best communication system to employ will largely depend on equipment fitted. For example, modern submarines and aircraft are not well suited for flashing light signaling. Environmental conditions are also a major factor to be considered when using SST or UWT.

2. Communication Methods. When appropriate, submarines are to acknowledge all explosive charge signals, and ships are to acknowledge smoke flares. Explosive charge signals and submarine pyrotechnics need not be used when in good communication by other means.

3. Explosive Charge Signals.

a. The safety of submarines is involved in the proper use of explosive charges and explosive charge signals. Explosive charges are not to be dropped in the immediate vicinity of submarines because of the danger of damage should the charge explode in contact with the hull. (See paragraph 0208.6.)

b. Explosive charges dropped by aircraft must comply with the prescriptions of paragraph 0208.6.

c. In multiple charge signals, charges should be dropped in a regular manner and without undue delay between charges. Commanding officers of surface ships originating explosive charge signals are responsible for ensuring that a proper number of actual explosions takes place for the signal intended.

d. Submarines must have a supply of explosive charge signals on board for use when on the surface.

e. As it is never certain that a submarine will hear an explosive charge signal, ships initiating COMEX at long range may repeat the COMEX signal when they have closed the contact.

f. Explosive charge signals, their meanings, and action to be taken will be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

g. Since the MK 84 Mod 0 and 1 ESUS are nonexplosive devices, they are also acceptable for use in communications with submarines.

4. Submarine Pyrotechnic Signals.

Submarine pyrotechnic signals may be in the form of floats (both smoke and flame), stars, flares, rockets, or grenades (see Relaxation 2L). They may emit colored smoke and/or flame. Submarines taking part in exercises with aircraft by day should, where possible, fire yellow smokes in order to avoid confusion with aircraft smoke markers, which normally give off white smoke. If a red pyrotechnic is released by mistake, the submarine must surface as soon as possible to assure

other forces that no emergency exists. (See Figure 2-1.) Pyrotechnic signals will be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

5. Sonar Signal Code Table. This signal code is primarily designed for use between ASW ships/helicopters and submarines. In order to ensure that the submarine understands the signal transmitted, dots should be 0.5 seconds, dashes should be 2 seconds with 5 seconds between dots and dashes and 10 seconds between letters. Thus, transmission time for the letter A is 7.5 seconds and the sequence AAA requires 42.5 seconds. This should be followed by at least 11 seconds before any other character is transmitted. The Sonar Signal Code Table shall be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

6. Submarine Safety and Control Signals.

a. Communication between the submarine and the OCE/OTC/OCS must be established in accordance with the requirements laid down for the particular exercise. If possible, this should be carried out at least 30 minutes prior to Go Time.

b. The OCS is to ensure that the submarine has received the exercise order and must confirm that torpedoes may be fired where this has been planned.

c. The procedure for the particular exercise is to be followed for diving the submarine.

d. COMEX is generally initiated by the first unit obtaining contact. Where this is at long range, the OCS may delay the execution of COMEX.

e. Where the exercise order allows, the ASW action may be repeated. To repeat an ASW action, a new COMEX is to be initiated at least 5 minutes before the present ASW action ends. Then, FINEX is delayed until the end of the new ASW action (from the new COMEX). The OCS must decide if the ASW action is to be repeated, keeping the submarine informed.

7. Ship/Submarine Torpedo Attack Signals.

a. The signals to be displayed by ships to show whether or not they are open to submarine torpedo attack will be covered by the OTC in the face-to-face briefing prior to conduct of the exercise. In exercises where torpedoes may be fired, the OTC/OCS must confirm this fact at Start Time by message to the submarine. If, at some later time, during the exercise, weather conditions or any other factor prevents torpedo firing, every effort should be made to inform the submarine. In addition to the briefed signals, ships should be ordered to:

- (1) Switch on navigation lights to full brilliancy.
- (2) Switch off long- and medium-range sonar.
- (3) Transmit on SST, UWT, and the briefed communication net the briefed signal.

b. Where the type of exercise requires communications to a greater range or sonar equipment does not allow CS transmissions, the exercise order may allow long- and medium-range sonar to transmit in a mode easily recognized by a submarine to indicate that torpedoes are not to be fired. (Frequency modulation of a sonar is an example of such a mode.)

8. Signals by Aircraft Maneuver. Signals by aircraft maneuver may be used to start or stop exercises or to acknowledge messages.

9. Aircraft or Surface Emergency/Contingency Distress Signals. Aircraft distress signals and signals indicating that assistance by the submarine is required are discussed in paragraph 0206.4e.

10. Special Signals. Submarines may use an air bubble to indicate their position.

11. Submarine Attack Signals. Submarines can mark their attacks using different modes to communicate to a unit that it is being attacked.

a. Marking of Short-Range Torpedo Attacks by UWT Communication. The submarine is always free to transmit the briefed code to mark an attack. In fact this method is recommended if all participating units are equipped with UWT.

b. Marking of Short-Range Torpedo Firing by Release of a Green Flare/Smoke. The release of a green pyrotechnic signal is a clear and unmistakable way to indicate an attack. However, when helicopters are operating in the vicinity, the submarine is restricted in the use of green flares. (Relaxation 2L and paragraph 0208.1 pertain.)

c. Marking by Signal of a Simulated Long-Range Torpedo Firing. When the submarine is attacking from such a long range that the unit being attacked is not likely to notice the green flare, nor to clearly interpret the transmissions of UWT attack signals, the submarine is to transmit a signal to inform the target that a simulated attack by long-range torpedoes has taken place.

- (1) An unclassified, FLASH precedence signal is to be transmitted on the circuit designated in the exercise order and UWT in the following format:

NAWS DE (call sign)
 DEEP FIELD, DEEP FIELD, DEEP FIELD
 TRUE BEARING FROM TARGET
 GEOGRAPHIC POSITION OF TARGET
 TARGET BY TYPE AND NAME (call sign
 if known)
 NUMBER OF TORPEDOES FIRED
 DTG OF FIRING

- (2) The signal is to be repeated twice, or more if necessary, to ensure that the minimum transmission time is at least 60 seconds.

d. Marking by Signal of a Simulated Missile Attack.

(1) An unclassified, FLASH precedence signal is to be made by the submarine using the following format:

NAWS DE (call sign)
 SNIPE CHARLIE, SNIPE CHARLIE, SNIPE
 CHARLIE
 TRUE BEARING FROM TARGET
 GEOGRAPHIC POSITION OF TARGET
 TARGET BY TYPE AND NAME (call sign
 if known)
 NUMBER OF MISSILES FIRED
 DTG OF FIRING

(2) This signal is to be repeated twice or more if necessary, to ensure that the minimum transmission time is at least 60 seconds.

(3) Frequency is to be designated in the exercise order.

(4) In addition to transmitting the signal as above, the submarine has to shine his radar down the firing bearing during the simulated missile flight.

0214 Records and Analysis**1. General Considerations.**

a. ASW exercises should be analyzed in order to establish any errors in procedure or drill and to allow the formulation of new and improved techniques. Such analysis will also enable a senior officer to assess the efficiency of his forces.

b. In order to permit satisfactory analysis, track charts and records should be neatly and accurately produced. Track charts should include the direction of true North, the scale of chart, the appropriate latitude and longitude scale (where possible), a geographic reference point, COMEX/FI-NEX times, and the name and hull number of the submitting command.

c. The analysis of ASW exercises falls into two broad categories: analysis or assessment of weapon attacks and tactical analysis.

2. Analysis or Assessment of Weapon Attacks.

a. **ASW Ships.** Two methods are available to assist in evaluating the effectiveness of surface ship attacks:

(1) Method A — Recording of Attack and Submarine Data. This method may be the most suitable for long-range attack systems or when it is not desired to compromise the submarine's position by requiring it to fire a smoke flare.

(a) The surface ship sends the appropriate signal by explosive charge signal, SST, or UWT, at the time of firing its weapon(s) and records the target data used (that is, submarine's estimated course, speed, and depth).

(b) The submarine, on receipt of the signal, records its course, speed, and depth, together with any changes during the anticipated time of flight of the weapon.

(2) Method B — Marking the Position of Submarine and Weapon. This method is best suited for evaluation of short-range weapon attacks, where there is no objection to compromising the submarine's position.

(a) The surface ship fires (or drops a marker on the surface that is related to the position at which the weapon or projectiles would enter the water) and makes the appropriate signal by explosive charge, SST, or UWT to alert the submarine to fire smoke/flare or bubble.

(b) The submarine marks its position by smoke/flare or bubble, subject to any time delay in use, and records time, course, speed, and depth.

NOTE: This system is subject to errors caused by the smoke/flare being washed aft, which increases with submarine speed or depth up to a maximum of 40 yards.

b. ASW Aircraft. During ASW attacks by aircraft, attack positions should be marked, when practicable, to permit the results to be assessed. The procedure for marking attacks aims to provide a visual representation of the result and is conducted as follows:

(1) The aircraft marks the position of the attack using underwater charges, smoke bombs, markers, and so forth. It should be noted, however, that since attacks using a single charge are not answered by the submarine, a visual aiming point is necessary to allow the assessment or analysis of such attacks.

(2) In reply to an attack in which two charges have been used, the submarine releases an answering smoke/flare, other than red, to indicate its position.

3. Claims for Attacks by Submarines.

a. The following message format is available to enable attacking units to claim their attacks. Claim message (ME — YOU) may be made by the appropriate communication method, as described in the paragraphs that follow:

(1) The attacking unit is to send the message as follows:

(a) The target attacked, and its estimated course and speed.

(b) The number of weapons that have or would have been fired, followed by the word "Fired" or "Dummy."

(c) The mean course or bearing on which weapons would have been set to run.

(d) Estimated range on firing, and running range/time where appropriate (in hundreds of yards or seconds).

(e) Time interval between consecutive firings of a salvo.

(f) Date-time group of firing.

(2) This information is to be made by the attacking unit in accordance with the following example.

-EXAMPLE-

"YOU 180-12-2 FIRED ME 090-12-30-13-250925Z." This would mean: "I estimated your course to be 180° at 12 knots when I fired, their mean course was 090°, my estimated range on firing was 1,200 yards, their running range is 3,000 yards. The interval between consecutive firings in the salvo was 13 seconds. I fired at 250925Z."

4. Submarine Track Message.

a. The submarine track message is designed to provide a method by which accurate and concise records of an exercise submarine's movement and operating events can be exchanged with participating units following a short-term action period. These records are required to provide for a rapid post-exercise analysis.

b. The submarine track message is a numerical method of recording the submarine's movement during each exercise serial. It employs a grid system based on initial position coded as 500 500, and measures displacement in hundreds of yards East-West and North-South from the initial position. The first group indicates displacement East-West; the second group displacement North-South. Displacements East and North of the initial position will be added to, and displacements West and South of the initial position will be subtracted from 500 500. To indicate the time of each position reported, a third group is included. The first figure denotes the last figure of the hour and the last two figures denote the time in minutes of the hour.

-EXAMPLE-

Time 1435, position 4,100 yards East and 3,600 yards South of the initial position, would encode as 541 464 435.

c. On reaching 50,000 yards from the initial position in either an East-West or North-South direction, the numbering

sequence for the particular direction will revert to 500. The sequence should never be allowed to progress to a four-figure group.

d. At COMEX, the submarine will note the latitude and longitude and include this information at the beginning of the track report. The submarine is to record its position whenever an alteration of course is made, and on the hour, or is to record its position every 10 minutes, whichever is more convenient.

e. To assist in analysis, the submarine is to report pertinent operating events using the briefed brevity code. The letter designator is to be included after the three group position report. More than one designator may be used.

f. The last group of the track message is to be the position in which the submarine surfaces; the group is to be preceded by the words "Surfacing position."

**0215 Antisubmarine Warfare (ASW)
Exercises**

ASW-1 BASIC TRACKING EXERCISE

Purpose

To exercise one ASW ship and/or helicopter in basic submarine tracking and attacking.

Forces Required

1. One ship and/or helicopter.
2. One submarine.

Situation

1. Submarine is on the surface or at periscope depth with the ship and/or helicopter within 4,000 yards and is required to dive to a safe depth, or
2. Helicopter and submarine are in visual contact.
3. Initially, submarine course, speed, and depth are to be restricted.

Procedure

1. Establish communications prior to Go Time.

2. Units station themselves in accordance with paragraph 0210.10.

3. Submarine reports "Ready."

4. Unit orders submarine to dive.

5. Submarine reports when at Safe Depth by UWT or SST.

6. Unit initiates COMEX.

7. Carry out ASW action.

8. Unit breaks off attacks 5 minutes before FINEX.

9. At FINEX, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force otherwise permit.

Special Provisions

None.

Records

As required by OCE.

ASW-2 BASIC COORDINATED TRACKING EXERCISE

Purpose

To exercise two or more ASW units in:

1. Tracking and attacking a submarine.
2. Inter-unit plotting and reporting procedures.

To exercise a submarine in counterattacking and evading.

Forces Required

1. Two or more ASW ships and/or helicopters.
2. One submarine.

Situation

1. Submarine is on the surface or at periscope depth with the ships and/or helicopters within 4,000 yards, and is required to dive to a safe depth; and/or
2. Helicopters and submarine are in visual and voice contact. Submarine may be on the surface or at periscope depth.
3. Initially, submarine course, speed, and depth are restricted.

Procedure

1. Establish communications prior to Go Time.
2. Units station themselves in accordance with paragraph 0210.1.
3. Submarine reports "Ready."
4. OTC/OCS orders submarine to dive or go to Safe Depth.
5. Submarine reports when at Safe Depth by UWT or SST.
6. OTC/OCS initiates COMEX.
7. Carry out ASW action.
8. Units break off attacks 5 minutes before FINEX.
9. At FINEX, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force otherwise permit.

Special Provisions

None.

Records

As required by OCE.

**ASW-3 BASIC SEARCH ATTACK UNIT
EXERCISE****Purpose**

To exercise two or more ASW units in:

1. Detecting, classifying, tracking, and attacking a submarine.
2. Simple search attack unit procedure.
3. Inter-unit reporting, plotting, and control procedures.

To exercise a submarine in counterattacking and evading after detection.

Forces Required

1. Two or more ASW units.
2. One submarine.

Situation

1. Submarine is to remain within 2,000 yards of start position until COMEX, unless otherwise directed.
2. Submarine is required to go to Safe Depth when threatened by ASW ships or helicopters.
3. After COMEX the submarine may be restricted or unrestricted.
4. Start position for ASW units is 10 to 15 miles (or as desired) from submarine's start position.

Procedure

1. Units close estimated position of submarine.
2. Submarine goes to Safe Depth in accordance with the Safety Rules (paragraph 0208) and/or Relaxations in force.
3. If the submarine is prematurely forced deep it may return to periscope depth, when safe to do so, provided COMEX has not been initiated.
4. First unit gaining contact initiates COMEX.
5. Carry out ASW action (see paragraph 0209.2).
6. Submarine remains at Safe Depth until FINEX or Stop Time, depending on Relaxations in force.
7. Units break off attacks 5 minutes before FINEX.
8. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA, unless Relaxations in force otherwise permit.

Special Provisions

None.

Records

As required by OCE.

ASW-4 DEFENSE OF AN OPEN ANCHORAGE OR ASSAULT AREA**Purpose**

To exercise ASW units in protecting an exposed anchorage or assault area.

To exercise submarines in penetrating a patrol of ASW units and attacking a concentration of shipping.

To exercise participants in conducting inshore operations.

Forces Required

1. Two or more target ships, or a reference ship.
2. Two or more ASW ships and/or helicopters.
3. One or more submarines.

Situation

1. ASW units defend the designated area while submarines try to penetrate the ASW patrol and attack the shipping or the reference ship.
2. Target ships or reference ship may be at anchor or underway.

Procedure

1. The OSE/OCE designates the area and establishes patrols.
2. At Go Time, or as ordered, the submarine is to dive, remaining in assigned approach sector, and is to try to penetrate the ASW defense.
3. ASW units defend the area as ordered.
4. Submarines which penetrate the patrol are to indicate simulated torpedo attacks by the appropriate signals, and avoid detection.
5. First unit gaining contact initiates COMEX.
6. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA, unless Relaxations in force otherwise permit.

Special Provisions

Submarines are to be informed of the limits of the approach sector and may be given information on the type of patrol used by the ASW units.

If more than one submarine takes part, the senior submarine commanding officer is to coordinate attacks.

Records

As required by OCE.

ASW-5 SONAR PASSIVE TRACKING**Purpose**

To exercise an ASW team in procedures for passively tracking a quiet submarine through use of passive bearings only.

To exercise sonar operators in operation of passive sonar equipment and classification of targets.

To develop proficiency in internal communications.

Forces Required

1. One or more ASW ships with passive sonar capability.
2. One submarine.

Situation

1. Submarine is on the surface or at periscope depth not less than 1,500 yards from exercise ship(s).
2. When surface units have gained passive contact and are ready, the OCE orders the submarine to submerge to Safe Depth.
3. When the submarine reports at Safe Depth and the surface units are ready, the OCE orders COMEX.
4. Surface units maneuver as necessary to maintain passive contact out to the maximum possible range.

Procedure**OCE**

1. Assigns stations to ASW ship(s) normally on the quarter of the submarine at a distance that would ensure good passive contact.
2. Establishes initial base course and speed of participating ships.
3. Promulgates course and speed maneuvers, if any, to the submarine. Maneuvers should be

kept simple, dependent upon training level of surface ships/operators, and should vary from no maneuvers for basic training to speed changes of 3 knots per hour for advanced training.

4. Orders COMEX when the submarine reports at Safe Depth and all units are ready.

ASW SHIP(S)

1. Take station(s) as directed by OCE.
2. Notify OCE when ready to commence passive tracking.
3. Track submarine as it submerges. When the submarine is at Safe Depth and OCE orders COMEX, maneuver as necessary to track the submarine. Maintain position that presents good passive contact.
4. Determine submarine course and speed by plotting passive bearings and through use of assist ship(s) bearings if available. Check accuracy of course and speed plotted when the submarine transmits courses and speeds.

SUBMARINE

1. When ordered by the OCE, take any depth which meets the briefed separation requirements, remaining above the thermal layer if possible. Report when at Safe Depth.
2. At COMEX, maneuver in accordance with exercise instructions.

Special Provisions

None.

Records

1. Submarine transmit courses and speeds to ASW ship(s) after FINEX.
2. As required by OCE.

ASW-6 MULTISHIP SONAR PASSIVE TRACKING**Purpose**

To exercise ASW teams of two or more surface ships in procedure for passively tracking and plotting a quiet, maneuvering submarine through use of passive bearings only with assistance from another passive surface ship.

To exercise sonar operators in operation of passive sonar equipment and classification of targets.

Forces Required

1. Two or more ASW ships with passive sonar capability. Ships must have satisfactorily completed ASW-5.
2. One submarine.

Situation

1. Submarine is on the surface or at periscope depth not less than 1,500 yards from exercise ships.
2. When surface units have gained contact and are ready, the OCE orders the submarine to go to Safe Depth.
3. When the submarine reports at Safe Depth and the surface units are ready, the OCE orders COMEX.
4. Surface units maneuver as necessary to maintain contact out to the maximum range possible while tracking the submarine.

Procedures**OCE**

1. Assigns stations to ASW ships, normally on the quarters of the submarine at a distance that would ensure good passive contact.

2. Establishes initial base course and speed of participating ships.

3. Orders COMEX when the submarine reports at Safe Depth and all units are ready.

ASW SHIP(S)

1. Take station(s) as directed by OCE.
2. Notify OCE when ready to commence passive tracking.
3. Track submarine as it submerges. When the submarine is at Safe Depth and the OCE orders COMEX, maneuvers as necessary to maintain contact and favorable firing position.
4. Determine submarine course and speed by plotting passive bearings and through use of assist ship(s) bearings. Check accuracy of course and speed plotted when the submarine transmits courses and speeds.

SUBMARINE

1. When ordered by OCE, proceed to any depth which meets briefed minimum separation requirements and report.
2. After COMEX and at intervals of 12 to 15 minutes, change course 30° to 60°, change speed by at least 3 knots, and change depth by at least 60 meters (200 feet). Operate on three different courses, speeds, and depths during a 45-minute exercise.

Special Provisions

None.

Record

1. Submarine transmit course, speed, depth changes, and time to ASW ships after FINEX.
2. As required by OCE.

ASW-7 BASIC PASSIVE TRACKING EXERCISE

Purpose

To exercise the towed array sonar (TAS) unit command and analysis team in basic classification, tracking, target motion analysis (TMA), and cross-fixing procedures.

Forces Required

1. One or more TAS units.
2. One noise-enhanced submarine.

Situation

1. Submarine is at start position, at periscope depth at Go Time.
2. TAS unit, with array streamed, is on specified side of safety lane within UHF communication range of the submarine.

Procedure

1. Establish communications prior to COMEX.

2. TAS unit and submarine lock plots. Safety lane must be drawn on both TAS unit and submarine plots.

3. Establish proper working order of noise augments.

4. When ready, TAS unit initiates COMEX and orders the submarine to proceed to best tracking depth.

5. Submarine proceeds on track ordered in exercise signal.

6. TAS unit maneuvers to maintain contact, opening and closing range as required for TMA.

Special Provisions

The risk of submarine and TAS unit collision is reduced by the establishment of the safety lane specified in the exercise signal (see paragraph 0207.1 and Series 14 Relaxations).

Primary communications are by secure voice or UWT.

Records

As required by OCE.

ASW-8 ACTIVE TRACKING

Purpose

To train an ASW team in procedures for tracking and plotting a target ship.

To train sonar operators in operation of equipment and classification of targets.

To develop proficiency in internal communications.

Forces Required

1. One or more ASW ships.
2. One target ship.
3. Target of opportunity may be used if sonar ranges allow safe execution.

Procedure

OCE

1. Assign station to ASW ship(s), normally on the quarter of the target ship at a distance that ensures good sonar contact.
2. Prescribe instructions for target.
3. Establish base course and speed of participating ships.

4. Order COMEX when all ships have reported ready.

ASW SHIP(S)

1. Take station as directed.
2. Notify OCE when ready to commence exercise.
3. At COMEX, track ship with sonar.
4. Determine course and speed using available techniques.
5. Check accuracy of techniques used above when ship transmits courses and speeds.
6. Make attacks from different angles.

TARGET SHIP

1. Keep in the van of the ASW ship(s).
2. Change course at intervals set by OCE.
3. Vary speed as directed by OCE.
4. Transmit course and speed changes as directed by OCE.
5. Conduct evasion as directed by OCE.

ASW-9 ACTIVE MULTIMODE TRACKING (LONG RANGE)

Purpose

To train the ASW team of ships with convergence zone (CZ)/bottom bounce (BB) sonar capability in detection, classification, and tracking.

Forces Required

1. One or more ASW ships with CZ or BB capability.
2. One surface ship, or target of opportunity.

Procedure

OCE

1. Select an area suitable for CZ or BB operations.
2. Order courses and speeds for target.
3. Set course to keep target in the limited area, and vary aspect.

ASW SHIP

1. Establish position of contact to be tracked as determined by OCE.
2. After closing and gaining contact, maneuver to maintain contact as directed by OCE.
3. Maneuver to lose and regain contact at speeds set by OCE.
4. Parallel to allow operators to optimize equipment setting.
5. Close contact to direct path (DP) range.

TARGET

Maneuver as instructed by OCE.

ASW-10 INTERMEDIATE ASW AREA SEARCH

Purpose

To exercise one or more ships and/or helicopters in the conduct of intermediate ASW area search operations.

To exercise submarines in detection avoidance and subsequent simulated attack on escorts without being counterdetected.

To exercise sonar operators in initial detection and contact classification.

Forces Required

1. One or more ships assisted by ASW helicopters, if available.
2. One submarine.

Situation

Submarine is on patrol in allocated areas and has freedom to maneuver limited only as briefed prior to the exercise.

Procedure

1. Units conduct ASW area search until contact is gained.
2. To avoid submarine smokes influencing the classification process, attacks are to be marked with a briefed signal until completion of the first period of ASW action. In any subsequent period of ASW action, attacks may be marked by any appropriate signal.
3. Duration is to be 30 minutes or until Stop Time.
4. Relaxations 2*J, 3A, 3D, 3*E, 3*H, and 3*K are to be considered.
5. If sufficient serial time remains at FINEX, ship(s) may break off and attempt to regain contact, reestablishing COMEX as required.
6. Unit(s) break off attacks 5 minutes before FINEX.

7. Submarine need not return to periscope depth at Stop Time.

Special Provisions

Although this exercise is predominantly designed for surface ships, it also allows submarine training as individual submarine commanding officers see fit. Submarine is to provoke attacks by surface forces in the final hour of the serial if no contact has been gained.

Records

As required by OCE.

ASW-11 BASIC AIR/SUBMARINE OPERATION EXERCISE

Purpose

To train submarines and aircraft in air/submarine operations against a snorkeling submarine target or surface contacts of opportunity.

Forces Required

1. One or more nuclear-powered or snorkel-equipped submarines equipped with medium- or long-range passive sonar.
2. One or more ASW aircraft.
3. One snorkel-equipped transiting submarine.

Situation

1. Patrolling submarines are in assigned submarine patrol areas and transiting submarine is in assigned start position at communication depth prior to Go Time.
2. Cooperating aircraft are in assigned aircraft patrol areas prior to Go Time.
3. The transiting submarine will operate to provide a maximum number of incidents between Go Time and Stop Time.

Procedure

1. Submarines and cooperating aircraft start establishing communication 45 minutes prior to Go Time. Aircraft will designate type of rendezvous desired as briefed prior to the exercise.
2. All participants report "Ready to Go" to the OTC/OCS at Go Time.
3. At Go Time:
 - a. Aircraft report "Ready" to cooperating submarines and commence operations in assigned aircraft patrol areas.
 - b. Submarines in submarine patrol areas dive and commence patrols.

c. Transiting submarine dives and commences transit as directed.

4. On gaining contact, submarines cooperate with assigned aircraft, employing the procedures briefed prior to the exercise.

5. On being attacked, by any means, the transiting submarine is to secure snorkeling and evade for the duration of the specified ASW action period, giving due regard to the Safety Rules.

6. On completion of the cooperating phase:

a. The OTC/OCS orders cooperating units to return to their assigned patrol areas in preparation for the next phase, and target data are exchanged.

b. On completion of the exchange of information, the patrolling submarine goes to best depth.

c. The transiting submarine resumes snorkel transit.

7. At Stop Time:

a. The patrolling submarines surface and report results to OTC/OCS.

b. The cooperating aircraft proceed as previously directed (when released).

c. The transiting submarine surfaces and reports to the OTC/OCS giving an evaluation of attacks received.

Special Provisions

OSE

The OSE designates:

1. Transiting submarine's speed of advance.
2. Operating instructions for transiting submarines, designed to generate a maximum number of incidents.
3. Simulated weapon assignments and loadings.
4. The OCE.

OTC/OCS

The OTC/OCS will:

1. Prepare and send the exercise message and obtain acknowledgment from all participants.
2. Establish submarine and aircraft patrol areas and order the degree of cooperation to be exercised as briefed prior to the exercise.
3. Designate the duration of each cooperative phase or ASW action.
4. Specify depth strata assignments and safety orders for patrolling and transiting submarines. These provisions must be briefed prior to the exercise.

Simulated attacks may be made using appropriate attack signals and safety precautions contained in paragraphs 0208.6, 0209.2b and c, and 0209.4.

When surface targets of opportunity are used for this exercise, only "Call for Assistance," "Aircraft Approach Methods," and "Contact Handover" procedures are to be conducted.

Records

As required by OCE.

ASW-12 ADVANCED AIR/SUBMARINE OPERATION EXERCISE

Purpose

To train submarines and aircraft in advanced air/submarine operations. Such training includes detection, classification, localization and attack, and evasion and attack by transiting submarines allowed.

Forces Required

1. Two or more nuclear-powered or snorkel-equipped submarines equipped with medium- or long-range passive sonar.
2. One or more ASW aircraft.
3. One or more nuclear-powered or snorkel-equipped transiting submarines.

Situation

1. Patrolling submarines are in assigned submarine patrol areas and transiting submarines are in assigned start positions at communication depth prior to Go Time.
2. Cooperating aircraft are in assigned aircraft patrol areas prior to Go Time.
3. Transiting submarines conduct their transits to avoid detection and are to attack patrolling submarines as opportunity occurs.

Procedure

1. All participants establish communications with the OTC 45 minutes prior to Go Time in accordance with the briefed communication plan.
2. All participants report "Ready to Go" to the OTC/OCS at Go Time.
3. At Go Time
 - a. Aircraft report "Ready" to cooperating submarines and commence operations in assigned aircraft patrol areas.
 - b. Submarines in submarine patrol areas dive and commence patrols.

c. Transiting submarines dive and commence transits as directed.

4. On gaining contact, submarines and assigned aircraft conduct operations briefed prior to the exercise.

5. Patrolling submarines are to conduct attacks on transistors as opportunity occurs.

6. On completion of each incident, cooperating units exchange target information.

7. At Stop Time

a. Patrolling submarines surface and report results to the OTC/OCS.

b. Aircraft proceed as directed by the OTC/OCS.

c. Transiting submarines surface and report to the OTC/OCS, giving an evaluation of attacks received.

Special Provisions

OSE

The OSE designates:

1. Transiting submarine's speed of advance.
2. Points through which transiting submarines are to pass.
3. Evasion and attack restrictions for transiting submarines.
4. Simulated weapon assignments and loadings for all participants.
5. The OCE.

OTC/OCS

1. Prepare and send the exercise message and obtain acknowledgment from all participants.
2. Establish submarine and aircraft patrol areas and order the degree of cooperation to be exercised as briefed prior to the exercise.
3. Designate the duration of each ASW action.

4. Specify depth strata assignments and safety orders for patrolling and transiting submarines. These provisions must be briefed prior to the exercise.

precautions contained in paragraphs 0208.6, 0209.2c and d, and 0209.4.

Records

Simulated attacks by all participants may be made using the appropriate attack signals and the safety

As required by OCE.

**ASW-13 MAD VERIFICATION AND
VECTORED ATTACK EXERCISE**

Purpose

To exercise ASW units in carrying out MAD verification and vectored attack procedures as briefed by the OTC prior to the exercise.

Forces Required

1. One or more ASW ships and/or helicopters.
2. One or more fixed-wing aircraft.
3. One submarine.

Situation

Submarine is on the surface or at periscope depth with ships and/or helicopters within 4,000 yards and is required to go to Safe Depth.

Procedure

1. Establish communications prior to Go Time.
2. ASW units station themselves in accordance with paragraph 0210.1.

3. Submarine reports "Ready."
4. OTC/OCS orders submarine to dive.
5. Submarine reports when at Safe Depth by UWT or SST.
6. OTC/OCS initiates COMEX.
7. Carry out ASW action.
8. Units break off attacks 5 minutes before FINEX.
9. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force otherwise permit.

Special Provisions

None.

Records

As required by OCE.

ASW-14 BASIC COORDINATED ASW EXERCISE**Purpose**

To exercise ASW units in localizing, attacking, and reporting a submarine whose initial position is known.

To exercise ASW units in scene-of-action commander (SAC) duties.

Forces Required

1. One or more ships and helicopters.
2. One or more fixed-wing aircraft.
3. One submarine.

Situation

1. Submarine is on the surface or snorkeling, at 10 to 20 miles from the ships and helicopters, and remains in the vicinity of its initial position until attacked by fixed-wing aircraft. If aircraft fail to locate the submarine, the latter should assist the aircraft by any means available.
2. Initial contact is made by fixed-wing aircraft. After first attack, submarine goes to most favorable depth to facilitate tracking.
3. Search attack unit (SAU) is formed.

Procedure

1. Units establish communications prior to Go Time.
2. Prior to Go Time, aircraft completes joining procedure.
3. Aircraft locates, attacks, and tracks submarine, making contact reports to OTC/OCS.
4. Helicopters and ships close scene of action as ordered by OTC/OCS.
5. Submarine goes to Safe Depth in accordance with the Safety Rules (see paragraph 0208) and/or the Relaxations in force.

6. If the submarine is prematurely forced deep, it may return to periscope depth, when safe to do so, provided COMEX has not been initiated.

7. SAC tracks, attacks, and reports the submarine.

8. SAU commander initiates SWAP.

9. First ship or helicopter in the SAU gaining contact initiates COMEX.

10. Carry out ASW action.

11. Submarine acts in accordance with Exercise Instructions.

12. Submarine remains at Safe Depth until FINEX or Stop Time depending on Relaxations in force.

13. ASW units break off attacks 5 minutes before FINEX.

14. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force otherwise permit.

Special Provisions

To provide balanced training, the exercise should progress through the following three phases:

1. Phase I — Search by aircraft, resulting in a contact and attack, with subsequent tracking and reporting. Recommended duration 30 minutes.
2. Phase II — SAU approaches datum; helicopters are homed by aircraft to contact or datum to assist prosecution of the contact. Recommended duration 30 minutes.
3. Phase III — SAU arrives at scene of action, executes SWAP, and prosecutes contact in a coordinated ASW action until FINEX or Stop Time. Recommended duration 30 minutes.

NOTE: The duration of phases may be varied by the OTC/OCS to accomplish specific objectives.

Aircraft tracking methods, with times, should be specified.

Records

As required by OCE.

ASW-15 ADVANCED COORDINATED ASW EXERCISE

Purpose

To exercise ASW ships, helicopters, and fixed-wing aircraft in coordinated ASW search attack tactics including advanced search attack unit procedures.

Forces Required

1. Two or more ASW ships and helicopters.
2. One or more fixed-wing aircraft.
3. One submarine.

Situation

1. Submarine is on surface or snorkeling in a delineated area, its position unknown to participating units. Aircraft should be outside the area at least 30 miles from the submarine, ships should be at least 10 miles from the submarine, or at least 5 miles further than the longest convergence zone (CZ) or bottom bounce (BB) range, depending on briefed objectives. The submarine is to remain on the surface or continue snorkeling until attacked by ASW aircraft.
2. Initial contact is made by aircraft. After first attack, submarine dives to most favorable depth to facilitate tracking.
3. Search attack unit (SAU) is formed.

Procedure

1. Units establish communications prior to Go Time.
2. Prior to Go Time, aircraft complete joining procedures.

3. At Go Time, aircraft commences ASW search as directed by SAU commander, locates, attacks, and tracks submarine, making contact reports to the OTC/OCS.

4. Submarine goes to Safe Depth in accordance with the Safety Rules (see paragraph 0208) and/or the Relaxations in force.

5. SAU closes scene of action, conducting direct path, convergence zone (CZ) or bottom bounce (BB), active or passive sonar operations in accordance with briefed objectives. If aircraft weapons are available, CZ/BB environmental conditions exist, and ships are CZ/BB sonar mode capable, the SAU need not enter the torpedo danger area.

6. First unit gaining contact initiates COMEX.

7. SAU conducts ASW prosecution, including directing aircraft ASW operations, SWAP with aircraft, and simulated attacks (if tactically advisable, or if ships cannot conduct CZ/BB sonar operations).

8. Submarine acts in accordance with Exercise Instructions.

9. Submarine remains at Safe Depth until FINEX or Stop Time, depending upon Relaxations in force.

10. ASW units continue prosecution and attacks, breaking off action 5 minutes prior to FINEX.

11. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force permit otherwise.

Records

As required by OCE.

ASW-16 ADVANCED COORDINATED ASW EXERCISE — PROTECTION OF A FORCE

Purpose

To exercise ASW units in protecting a force in a submarine probability area.

To exercise submarines in tracking, reporting, attacking, and avoiding detection.

Forces Required

1. One or more ships representing the main body.
2. Assigned ASW units.
3. An aircraft carrier if available, or aircraft control unit.
4. Carrier-based and/or land-based aircraft.
5. One or more submarines.

Situation

1. Submarines are positioned to detect and track the main body transiting a prescribed exercise area.
2. When detecting the main body, submarines may be required to report to authority designated by OSE and carry out attacks, avoiding detection.
3. ASW forces will oppose submarines to prevent attacks on the main body.
4. The track of the main body is planned to meet the briefed objectives of the participating forces.

Procedure

1. When detecting ASW units, submarines take appropriate action.

2. Submarines go to Safe Depth in accordance with the Safety Rules (see paragraph 0208) and/or the Relaxations in force.

3. If submarines are prematurely forced deep, they may return to periscope depth, when safe to do so, provided COMEX has not been initiated.

4. Fixed-wing aircraft carry out attacks at every opportunity, marking attacks and subsequent attacks by briefed signals. Prosecution of contact continues until relieved or as ordered by the authority controlling the aircraft.

5. The first ASW unit gaining contact may initiate COMEX in accordance with OCE/OCS instructions and prosecute the contact.

6. Submarine remains at Safe Depth until FINEX or Stop Time unless Relaxations in force otherwise permit.

7. Units break off attacks 5 minutes before FINEX and depart the scene of action to facilitate continuation of the exercise. (Relaxations 3D and 3*H.)

8. At FINEX, a submarine which has been engaged is to act in accordance with Relaxations and Exercise Instructions in force.

Special Provisions

Participating submarines must be positioned to avoid mutual interference.

Submarines may be aided by cooperating aircraft or ships.

Out-of-action periods may be declared to reposition participants.

Records

As required by OCE.

**ASW-17 ADVANCED COORDINATED
ASW EXERCISE AGAINST
TRANSITING OR PATROLLING
SUBMARINES****Purpose**

To exercise ASW forces in carrying out coordinated operations against transiting or patrolling submarines.

To exercise transiting or patrolling in evading ASW forces.

Forces Required

1. Ships, helicopters, and fixed-wing aircraft as assigned.
2. One or more submarines.

Situation

1. At Go Time, submarines are positioned within a defined area, and given a transit or patrol mission, acting to avoid detection by ASW forces.
2. ASW forces commence search at Go Time in positions which provide exercise realism.

Procedure

1. On detecting ASW units, the submarine is to take appropriate action.
2. Submarines go to Safe Depth in accordance with the Safety Rules (see paragraph 0208) and/or Relaxations in force.
3. If submarines are prematurely forced deep, they may return to periscope depth, when safe

to do so, provided COMEX has not been initiated.

4. Fixed-wing aircraft carry out attacks at every opportunity, marking attacks and subsequent attacks by briefed signals. Prosecution of the contact continues until relieved or as ordered by the authority controlling the aircraft.

5. The first ASW unit gaining contact may initiate COMEX in accordance with OCE/OCS instructions and prosecute the contact.

6. Submarines remain at Safe Depth until FINEX or Stop Time unless Relaxations in force otherwise permit.

7. Units break off attacks 5 minutes before FINEX and depart the scene of action to facilitate continuation of the exercise. (Relaxations 3D and 3*H.)

8. At FINEX, the submarine which has been engaged is to act in accordance with Relaxations and Exercise Instructions in force.

Special Provisions

Out-of-action periods may be declared to reposition forces.

Counterattacks by submarines must be positioned to avoid mutual interference.

Submarines may be aided by cooperating aircraft or ships.

Records

As required by OCE.

**ASW-18 ADVANCED COORDINATED
ASW BARRIER EXERCISE
AGAINST TRANSITING
SUBMARINES**

Purpose

To exercise ASW forces in coordinated ASW barrier operations against submarines.

To exercise submarines in transiting an ASW barrier.

Forces Required

1. One or more towed array sonar (TAS) surface ships and/or one or more submarines (if applicable) to form an ASW barrier. Submarines may be nuclear- or diesel-powered. Other surface, helicopter, and fixed-wing air ASW assets as assigned.

2. One or more nuclear- or diesel-powered submarines to act as the target submarine(s).

Situation

1. ASW barrier submarines (if applicable) are assigned submarine patrol areas. TAS surface units (if applicable) are assigned towed array patrol areas. Fixed-wing ASW aircraft are assigned aircraft patrol areas. Surface ships (not towed-array equipped) and ASW helicopters are assigned patrol areas as appropriate. All units are in their assigned patrol areas prior to Go Time.

2. The target submarine(s) are in assigned start positions prior to Go Time.

3. The target submarine(s) conduct a transit as ordered, acting to avoid detection by ASW forces.

Procedures

1. All participants establish communications with the OTC prior to Go Time in accordance with the briefed communications plan and report "Ready" as ordered.

NOTE

The scale of the exercise and distances involved may preclude such communications, in which case the OCE should specify in the exercise instructions an alternative procedure for starting the exercise.

2. At Go Time, all submarines proceed to assigned depth zones.

3. If it is desired to limit the duration of ASW action(s), COMEX will be initiated by the first unit attacking a target submarine or as ordered by the OSE.

4. Barrier submarines are to report contact in accordance with OTC/OCS instructions and are free to conduct attacks on enemy submarines as the opportunity occurs.

5. Air and surface units are to report and attack target submarines in accordance with procedures briefed by the OTC prior to the exercise.

6. If the target submarine considers himself to be detected, he is to take appropriate evasive action.

7. On gaining contact, if the target submarine considers himself to be undetected, the target submarine attacks or evades, if authorized by the Exercise Instructions.

Special Provisions

OSE/OCE

Designate as appropriate:

1. Target submarines' speed of advance.

2. Point(s) through which target submarines are to pass and/or transit lanes as briefed prior to the exercise.

3. Evasive and attack restrictions placed on target submarines.

4. Simulated weapon assignments and loadings for all participants.

5. Submarine patrol areas and towed array patrol areas.

at least 72 hours prior to the commencement of the exercise.

6. Depth separations and safety precautions for submarines (paragraph 0208.4 applies).

2. Prepare and send exercise messages.

3. Establish out-of-action periods and distances if repositioning of units is desired.

OTC/OCS

The OTC/OCS will:

1. Submit details of procedures and tactics to be exercised to the SUBOPAETH for approval

Simulated attacks may be conducted by all participants. Appropriate attack signals and safety precautions shall be in accordance with paragraphs 0208.6, 0209.2, 0209.4 and other elements to be briefed by the OTC prior to the exercise.

**ASW-19 INTERMEDIATE COORDINATED
ASW AREA SEARCH**

Purpose

To exercise one or more ships assisted by ASW helicopters or fixed-wing aircraft in the conduct of intermediate ASW area search operations.

To exercise submarines in detection avoidance and subsequent simulated attack on escorts without being counterdetected.

To exercise sonar operators in initial detection and contact classification.

Forces Required

1. One or more ships assisted by ASW helicopters or fixed-wing aircraft.
2. One submarine.

Situation

Submarine is on patrol in allocated areas and has freedom to maneuver limited only as briefed prior to the exercise.

Procedure

1. Units conduct ASW area search until contact is gained.
2. To avoid submarine smokes influencing the classification process, attacks are to be

marked with a briefed signal until completion of the first period of ASW action. In any subsequent period of ASW action, attacks may be marked by any appropriate signal.

3. Duration is to be 30 minutes or until Stop Time.

4. Relaxations 2*J, 3A, 3D, 3*E, 3*H, and 3*K are to be considered.

5. If sufficient serial time remains at FINEX, ship(s) may break off and attempt to regain contact reestablishing COMEX as required.

6. Units break off attacks 5 minutes before FINEX.

7. Submarine need not return to periscope depth at Stop Time.

Special Provisions

Although this exercise is predominantly designed for surface ships, it also allows submarine training as individual submarine commanding officers see fit. Submarine is to provoke attacks by surface forces in the final hour of the serial if no contact has been gained.

Records

As required by OCE.

ASW-20 ASW ACTION AGAINST BOTTOMED SUBMARINE OR TARGET

Purpose

To train sonar operators in locating, holding, and classifying a bottomed or hovering submarine or target.

To train ASW teams in attacking a bottomed submarine or target.

NOTE: A known wreck may be used as a target.

Forces Required

1. One or more ASW ships or helicopters.
2. One submarine or target.

Situation

1. Initially, submarine is on the surface or at periscope depth in visual contact with ASW units.
2. ASW units are stationed outside sonar range from the submarine or bottomed target.

Procedure (when a submarine is participating)

1. Establish communications prior to Go Time.

2. Submarine reports "Ready."
3. OTC/OCS orders submarine to dive.
4. Submarine dives and bottoms, or hovers at Safe Depth.
5. When bottomed or hovering at Safe Depth, the submarine reports by UWT, SST, or briefed pyrotechnics.
6. ASW units carry out exercise.
7. When contact has been gained, ASW units initiate COMEX.
8. ASW units break off attacks 5 minutes before FINEX or Stop Time.
9. At FINEX or Stop Time, submarine is to be surfaced in accordance with Method ALFA unless Relaxations in force otherwise permit.

Special Provisions

Submarines are to bottom only in a designated safe bottoming area.

Records

Not required; but after surfacing, the submarine is to report its heading, while bottomed (or hovering).

ANNEX 2A

Relaxation Table

2A01 Purpose

The Relaxation Table should be used to modify the safety precautions, operating restrictions, and procedures to make the training more realistic. The use of relaxations will depend on the equipment, capabilities, and state of training of the participating units.

NOTE: Certain Relaxations are marked with an asterisk () and may only be used subject to the prior approval of the SUBOPAETH. Exercise planners must obtain this approval before including starred relaxations in exercise orders.*

Topic	Relaxation Number	Degree of Relaxation Permitted
General	1	A All <i>nonstarred</i> Relaxations are authorized.
Attacks	2	A Spare.
		*B ASW ships may close and carry out simulated attacks at any range without restriction immediately after COMEX. (See paragraph 0210.2a(5).)
		*C ASW ships may close and carry out one simulated attack without delay, at any range without restriction, before signaling COMEX. (See paragraph 0210.2a(5).)
		D ASW ships may fire light projectiles at dived submarines. (See paragraph 0210.2a(8).)
		*E ASW ships may fire heavy projectiles, if the submarine is known to be at Safe Depth. (See paragraph 0210.2a(8).)
		*F ASW ships may fire practice ASW torpedoes or missiles carrying practice ASW torpedoes. (See paragraph 0210.2a(9).)
		G Aircraft may carry out night attacks against submarines, subject to paragraphs 0210.2 and 0210.3.
		*H Aircraft and drones may drop practice ASW torpedoes. (See paragraph 0210.2a(7).)
		*J Submarine is not obliged to go to, or to remain at, Safe Depth after COMEX or Go Time. (See paragraphs 0206.4 and 0208.4b(1)(b) and (c).)
		K Submarines may fire exercise torpedoes provided the requisite attack signals are displayed by the target ships. (See paragraph 0207.10.)
		L Submarines may fire grenades (flares), in addition to red grenades (flares) in emergency, provided it is assessed that helicopters or fixed-wing aircraft will not be endangered.
*M ASW ships may close and carry out any number of simulated attacks at any range without restriction, without delay, and without signaling COMEX. (See paragraph 0210.2(5).)		

Topic	Relaxation Number	Degree of Relaxation Permitted
Conduct of Forces at FINEX or Stop Time	3	A Submarines need not return to periscope depth after FINEX. (<i>Surfacing Method BRAVO shall be briefed by the OTC prior to the exercise.</i>)
		B Submarines are not to come to periscope depth after FINEX and will remain at Safe Depth until Stop Time.
		C Spare.
		D ASW ships may break off attacks before FINEX and continue operations without waiting for the submarine to come to periscope depth.
		*E Submarines may proceed from Safe Depth to periscope depth when in company with surface forces prior to receipt of the briefed signal. (See paragraphs 0206.4 and 0208.4.) (<i>Surfacing Method ALFA shall be briefed by the OTC prior to the exercise.</i>)
		*F Submarines are allowed to remain submerged at Stop Time, provided that UWT communication is established between the submarine and surface units before the latter departs from the scene of action.
		*G During the time that the submarine is coming to periscope depth or surfacing, ships may proceed at less than 12 knots but must cavitate.
		*H Submarines are allowed to remain submerged at Stop Time.
		*J Surfacing Method BRAVO is to be used as standard surfacing method. (Surfacing Method BRAVO shall be briefed by the OTC prior to the exercise.)
		*K Submarines may proceed from Safe Depth to periscope depth when in company with surface forces at the discretion of the submarine's commanding officer.
Contact Investigation	4	A Once contact has been made, shadowing submarines may leave their assigned areas and shadow the target, but are not to dive in other submarine areas.
		B Spare.
		C Spare.
		D Spare.
		*E ASW ships may investigate contacts by day or night without restriction. (See paragraph 0210.1.)
Evasive Steering	5	A The main body may carry out evasive steering as detailed in exercise instructions ordered.
		B Individual ships of main body may weave.
		C Ships of main body are free to avoid torpedoes.
		D Emergency turns are permitted by day.
		E Emergency turns are permitted by night.
		F ASW ships may use evasive steering as desired by day, independently of the force screened.
		G ASW ships may use evasive steering as desired by night, independently of the force screened.
		H ASW ships are entirely free to avoid torpedoes.
		J Evasive steering by surface forces is unrestricted.

Topic	Relaxation Number	Degree of Relaxation Permitted
Navigation Lights	6	A Submarines are not to show any navigation lights by night except for reasons of safety and when surfacing.
		B Submarines need not show navigation lights when surfacing at night.
		C Ships of main body are to dim their navigation lights except in situations where their safety is impaired.
		*D Ships of main body are <i>not</i> to show navigation lights except in situations where their safety is impaired.
		E ASW ships are to show only dimmed navigation lights except in situations where their safety is impaired.
		*F ASW ships are not to show navigation lights except in situations where their safety is impaired.
Surface Ship Propeller Cavitations (see paragraph 0205.4)	7	*A ASW ships may slow below cavitation speed and operate radiated noise masking systems or stop their screws by day. (<i>Surfacing Methods ALFA and BRAVO shall be briefed by the OTC prior to the exercise.</i>)
		*B ASW ships may slow below cavitation speed and operate radiated noise masking systems or stop their screws by night. (<i>Surfacing Methods ALFA and BRAVO shall be briefed by the OTC prior to the exercise.</i>)
		*C ASW ships may slow below cavitation speed or operate radiated noise masking systems, provided they transmit on sonar. (<i>Surfacing Methods ALFA and BRAVO shall be briefed by the OTC prior to the exercise.</i>)
		*D All ships may slow below cavitation speed and may operate radiated noise masking systems or stop their screws by day.
		*E All ships may slow below cavitation speed and operate radiated noise masking systems or stop their screws by night.
		*F All ships may slow below cavitation speed or operate radiated noise masking systems by day without transmitting on sonar, provided they transmit on echo sounder.
Variable Depth Sonar/ Towed Array Systems <i>Note: Units of measurement shall be specified in the exercise message.</i>	8	*A Submarines are to proceed to Safe Depth when nearest ship streaming VDS/DTAS approaches to within ___ yards as indicated. (<i>Operating procedures shall be briefed by the OTC prior to the exercise.</i>)
		*B Ships may employ VDS/DTAS ___ (briefed signal designator) to cable length ___ measured in meters (feet) from the waterline. (<i>Operating procedures shall be briefed by the OTC prior to the exercise.</i>)
		C Submarines need not proceed to Safe Depth when operating with <i>helicopters</i> using active sonar. They must not, however, deliberately approach to within 500 yards of any helicopter in the dip. (See paragraph 0208.7.)
		D Helicopters operating dipping sonar may lower transducers to maximum depth of ___ meters (feet) as indicated.
		*E In advanced exercises when VDS/TAS is employed, submarines need not initiate standard surfacing procedures before proceeding from Safe Depth to periscope depth.
		F Helicopters operating dipping sonar may lower transducers to best search depth if accurate sonar search, conducted at the start of each dip with the transducer at a depth no greater than ___ meters (feet), has negative results. Transducers should be raised to the above depth if a contact approaches within 1,000 yards.
		*G At FINEX or Stop Time, VDS/DTAS cable length must not exceed ___ meters (feet).

Topic	Relaxation Number	Degree of Relaxation Permitted
Variable Depth Sonar/ Towed Array Systems (Continued) <i>Note: Units of measurement shall be specified in the exercise message.</i>	8	*H Ships may employ VDS/DTAS ___ (briefed signal designator) to cable length ___ measured in meters (feet) from the waterline without transmitting on any active sonar, provided they transmit the warning signal "VDS" on underwater telephone every 5 minutes. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*J Ships may employ CATAS ___ (briefed signal designator) without restriction. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*K Ships may employ CATAS ___ (briefed signal designator) without transmitting on any active sonar, provided they transmit the warning signal "TAS" on underwater telephone every 5 minutes. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		L Ships may employ CATAS ___ (briefed signal designator) without restriction, provided the required authorization is promulgated. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*M Ships may employ VDS/DTAS ___ (briefed signal designator) in a zone ___ meters (feet) to ___ meters (feet) and zone ___ meters (feet) to ___ meters (feet). When a VDS/DTAS zone is authorized below the submarine, the system employed must be capable of maintaining the towed body accurately within the specified zone. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*N Ships may employ VDS/DTAS ___ (briefed signal designator) to cable length ___ measured in meters (feet) from the waterline without transmitting on any sonar, provided the fathometer is operated at maximum power, maximum scale. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*P Ships may employ CATAS ___ (briefed signal designator) without transmitting on sonar, provided the fathometer is operated at maximum power, maximum scale. (Operating procedures shall be briefed by the OTC prior to the exercise.)
Towed Decoys	9	*A Submarines are to proceed to Safe Depth when nearest ship towing decoy at long stay approaches to ___ yards as indicated.
		B Ships of main body may tow decoys at short stay. <i>Type of decoy is as briefed.</i>
		*C Ships of main body may tow decoys at short stay. <i>Type of decoy is as briefed.</i>
		D ASW ships may tow decoys at short stay. <i>Type of decoy is as briefed.</i>
		*E ASW ships may tow decoys at long stay. <i>Type of decoy is as briefed.</i>
		*F In advanced exercises when decoys are employed, submarines need not initiate standard surfacing procedures before proceeding from Safe Depth to periscope depth. (Surfacing Methods ALFA and BRAVO shall be briefed by the OTC prior to the exercise.)
Signal Charges (see paragraph 0208.8)	10	*A Ships and aircraft may drop briefed explosive charges within 1,000 yards of the estimated position of a submarine. (Operating procedures shall be briefed by the OTC prior to the exercise.)
		*B Ships and aircraft may drop briefed explosive charges ___ outside ___ yards of the estimated position of a submarine. (Operating procedures shall be briefed by the OTC prior to the exercise.)

Topic	Relaxation Number	Degree of Relaxation Permitted
Aircraft Height Separations	11	A Subject to the approval of the scene-of-action commander and the appropriate air commander, fixed-wing aircraft cooperating with helicopters are allowed to descend to any altitude to carry out ASW action. (<i>Operating procedures shall be briefed by the OTC prior to the exercise.</i>)
Submarine Safety Separations (see paragraph 0208.4)	12	*A Submarine height (base of keel to top of fin) is ___ meters (feet).
		*B Draft of surface ships may be assumed to be ___ meters (feet). (<i>Information related to the use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		*C Upper vertical safety separation is ___ meters (feet) for a speed of ___ knots as indicated.
		*D Bottom vertical safety separation is reduced to ___ meters (feet) for a speed of ___ knots as indicated.
		*E Lower vertical safety separation is reduced to ___ meters (yards) for a speed of ___ knots as indicated.
		*F Submarines may bottom. (See paragraph 02084c.)
		*G Horizontal safety separation modified to (. . .) miles.
Environmental Restrictions (see paragraph 0206.2)	13	*A If the visibility through the periscope by day or night is reduced to 2,000 yards, submarines equipped with surface warning radar, which is working efficiently, may dive.
		*B Submarines equipped with surface warning radar, which is working efficiently, may dive under all conditions of periscope visibility, day or night.
		*C Submarines not equipped with surface warning radar, or submarines which have defective surface warning radar, may dive under all conditions of periscope visibility, day or night.
Variable Depth Sonar/ Towed Array System	14	*A The exercise may be extended beyond 2 hours. It will include ___ runs of 2 hours. The neutral corridor must be re-established after each run. (<i>Information related to use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		*B The duration of the exercise will be 4 hours. The width of the neutral corridor will be extended to 8,000 yards at Go Time plus 2 hours. (<i>Information related to use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		*C The neutral corridor consists of two right-angle corridors. The zone reserved for the submarine is quadrant ____. (<i>Information related to use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		*D The neutral corridor at Go Time is defined in relation to a line bearing ___ (from visible landmark). (<i>Information related to use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		*E The neutral corridor at Go Time is reduced to 2,000 yards. (<i>Information related to use of this Relaxation shall be briefed by the OTC prior to the exercise.</i>)
		Note: Do not order this Relaxation at the same time as Relaxation 14*B.
Counterattacks	20	A ORANGE submarines may counterattack.

Topic	Relaxation Number		Degree of Relaxation Permitted
Depth (see paragraph 0208.4)	21	A	BLUE submarines may be at periscope depth at night from ___ to ____ . ORANGE submarines must be in their deep depth zone between these times.
		B	ORANGE submarines may be at periscope depth at night from ___ to ____ . BLUE submarines must be in their deep depth zone between these times.
		C	BLUE submarines may come to persicope depth while in the Safety Zone to identify hydrophone effect (HE), provided they return to Safe Depth within 5 minutes after arrival at periscope depth.
		D	BLUE submarines have freedom in depth until hydrophone effect (HE) has been firmly established, whereafter they are to go to Safe Depth or to ___ meters (feet).
Snorkeling	22	A	BLUE submarines may snorkel from ___ to ____ .
		B	ORANGE submarines may snorkel from ___ to ____ .
		*C	Submarines may snorkel at all times.
Safety Line	23	A	Reserved
Safety Circles	24	*A	Reserved
		*B	Reserved
Too Close	25	*A	Reserved

ANNEX 2B

Exercise Instructions Table

2B01 Purpose

The Exercise Instructions Table is to be used in conjunction with the Relaxation Table. These two tables enable the authority ordering the exercise to adapt any of the standard ASW exercises to meet his specific requirements.

NOTE: Series 200, 300, and 600 Exercise Instructions must be briefed prior to conduct of any exercise in which they will be used.

To Submarines	
EI No.	Meaning
100	Are to be marked throughout the exercise as follows: by day, by towing marker floats; by night, by burning navigation and/or specialty marker lights.
101	Dive ___ minutes after detecting aircraft radar transmission, and start snorkeling.
102	Are not to dive until aircraft are sighted visually.
103	Are not to dive until attacked by aircraft.
104	Remain within ___ yards of the diving position for ___ minutes after COMEX.
105	Remain within ___ degree sector, center bearing ___ from diving position.
106	Subject to any safety requirements, are to operate at the depth most favorable to ASW units.
106A	Remain at ___ meters (feet).
107	Is not to go below ___ meters (feet) unless safety requires.
108	Hover at ___ meters (feet).
109	Are to stay deep for a maximum of ___ minutes each ___ hour(s).

To Submarines	
EI No.	Meaning
110	Are to surface ___ minutes after diving.
111	Are to surface at specified times to expose themselves to the aircraft.
112	Remain within ___ thousand yards of start position until COMEX.
113	Maintain a course ___ for ___ minutes after COMEX.
114	Is to snorkel or remain at periscope depth in initial position.
115	At Go Time, is to be within ___ miles from start position.
116	Are to station themselves ___ miles apart.
117	Are to station themselves at ___ mile intervals along the Blue force route.
118	Is to steer safety course except during ASW action.
119	Limit speed to ___ knots for ___ minutes after COMEX.
120	Speeds are not to exceed ___ knots.
121	Comply with course and speed diagrams ___.
122	Remain within range of the aircraft sonobuoy pattern for ___ minutes.
123	Do not react to aircraft detections.
124	Reserved.
125	Snorkel until sighting aircraft.
126	Snorkel until attacked by aircraft.
127	Attempt to snorkel for ___ percent of exercise. However, they should avoid detection by aircraft.

To Submarines	
EI No.	Meaning
128	Is to have ___ percent battery endurance remaining on completion of transit.
129	Snorkel from ___ until ___ .
130	Make frequent changes in engine revolutions.
131	When ordered, stop diesel engines and start them again a few minutes afterwards.
132	While snorkeling, proceed at the quietest speed.
133	Is to ensure periods of high-speed snorkel.
134	Are to snorkel at various courses and speeds, or on ___ course and ___ speed.
135	Provide visual and acoustic detection opportunities for ___ percent of time.
136	Cavitate for ___ percent of time.
137	Cavitate for ___ minutes after COMEX.
138	Are to press home attack on force screened and, if undetected, may surface when force is out of sight, if safe to do so.
139	Priority of the target for attack is: <ul style="list-style-type: none"> a. Screening units b. Screened units c. Surface unit designated.
140	Is to indicate attack by releasing a green flare. (<i>Relaxation 2L must be in force.</i>)
141	Submarines are to simulate attacks and counterattacks as opportunity occurs.
142	Is to mark simulated attacks by UWT or SST without firing green grenades.
143	Is to obtain attack data by means of: <ul style="list-style-type: none"> a. Periscope b. Radar c. Active sonar.
144	While conducting attacks, obtain fire control data by making frequent transmissions on radar.
145	Reserved.

To Submarines	
EI No.	Meaning
146	Make frequent periscope radar transmissions on each ship and/or aircraft in turn, from ___ until ___ .
147	Transmit continuously on search radar from ___ until ___ .
148	May use UWT or SST for their own communications.
149	Evasion: <ul style="list-style-type: none"> a. No evasion. b. 30° from base course, 2 knots ordered speed, no change in depth. c. 60° from base course, 4 knots ordered speed, no change in depth. d. 90° from base course, unlimited speed, 15-meter (50-foot) change in depth. e. Evasion depth between Safe Depth and maximum permissible operating depth. f. Unlimited evasion in course and speed.
150	May use decoys or evasive devices.
151	Are to use decoys or evasive devices.
152	Are to station themselves to ensure that forces gain contact.
153	If not detected within ___ hours, provoke contact.
154	Provoke attacks by ASW forces.
155	Steer towards ASW units if it is considered that contact has been lost for more than ___ minutes.
156	Are to assist relocation after ___ minutes following last attack signal, when it is considered that contact has been lost, by: <ul style="list-style-type: none"> a. Smoke b. Pyrotechnic c. Underwater telephone or sonar sound transmission d. Bubbles e. Underwater vertical light.
157	Simulate guided missile fire by: <ul style="list-style-type: none"> a. Surfacing for 5 minutes, and b. Transmitting continuously on X-band radar on firing bearing for 5 minutes, and c. Firing two yellow submarine pyrotechnics.

To Submarines	
EI No.	Meaning
158	Are not deliberately to close within 1,000 yards of medium-range sonar-fitted helicopters.
159	Carry out EXTAC 1005 exercise ____.
160	Reserved.
161	Reserved.
162	Maximum speed for submarines at periscope depth is 10 knots.
163	Target submarine is to steer a straight course.
164	Target submarine is allowed to zig.
165	Release one (color) pyrotechnic signal when at Safe Depth and ready to COMEX. <i>(This instruction may only be ordered with the prior approval of the SUBOPAETH.)</i>
166	Comply with depth table no. ____ . Reference depth is ____ .
167	Submarines use underwater vertical safety light for 1 minute after ASW attack.
168	Submarine is to commence evasive maneuvers when active sonobuoys or attack signals are heard.
169	Before diving, are to transmit a short drill message on ____ kiloHertz.
170	Are to conduct ____ allround sweeps with radar at random intervals (or at intervals of ____ minutes.)
171	After the exercise, are to report to the OCE details of electronic transmissions; i.e.: a. Radar transmission times and durations; b. Times at which surface ships or helicopters were detected, giving bearings and ranges in yards; and c. Times of radio transmissions.
172 to 199	Spares

To Main Body/Force Screened/Targets	
EI No.	Meaning
200 to 299	Exercise instructions from this section must be covered by the OTC in a face-to-face briefing prior to the exercise.

To Escorts/Screening Ships	
EI No.	Meaning
300 to 399	Exercise instructions from this section must be covered by the OTC in a face-to-face briefing prior to the exercise.

To Fixed-Wing Aircraft	
EI. No.	Meaning
400	Dive submarine when at ____ miles.
401	May carry out simulated attacks subject to provisions in Article 0210.
402	Maximum duration of unsuccessful investigations ____ minutes.
405	Reserved.
403	Withdraw outside visual range of submarine.
404	Reserved.
406	Open and close submarine's position. (Pro Sub.)
407	Distance from cooperating ships to be ____ miles at Go Time or at ____ .
408	Distance from submarine to be ____ miles at Go Time or at ____ .
409	Make initial contact reports to ____ and amplifying reports, including contact classification, to ____ .
410	Carry out EXTAC 1005 exercise ____ .
411	Conduct only passive localization and tracking (until ____).
412	First attack is to be based on passive sensor information.

To Fixed-Wing Aircraft	
EI No.	Meaning
413 to 499	Spares

To Helicopters	
EI No.	Meaning
500	Maintain sonar contact on the submarine at Go Time.
501	At Go Time, one helicopter is to orbit the submarine and the others are to orbit between 5 and 10 miles away.
502	At Go Time, helicopters remain outside 5 miles from the submarine.
503	At Go Time, all helicopters are to be at least 3 X TSR distance from submarine.
504	Start exercise using <i>Method One</i> . At Go Time, helicopters are at immediate readiness and are scrambled so as to join fixed-wing aircraft at datum at Go Time plus ___ minutes.
505	Start exercise using <i>Method Two</i> . Helicopters join ASW ships at Go Time plus 20 minutes and search with them, being detached so as to join fixed-wing aircraft at datum at Go Time plus ___ minutes.
506	Start exercise using <i>Method Three</i> . Helicopters join ASW ships at Go Time plus 20 minutes and are sent to investigate a false datum. Subsequently, they are ordered to proceed direct from the false datum so as to join fixed-wing aircraft at the actual datum at Go Time plus ___ minutes.
507	Dive submarine when at ___ miles.

To Helicopters	
EI No.	Meaning
508	May simulate attack subject to provisions of Article 0210.
509	Track the submarine and home ASW ships to the datum in conjunction with fixed-wing aircraft, which will act as a radio link and carry out On Top procedures.
510	Assist surface ships in close ASW action in accordance with current doctrine.
511	Make initial contact reports to ___ and amplifying reports, including classification, to ___.
512	Maximum duration of unsuccessful investigations ___ minutes.
513	Medium-range sonar-fitted helicopters are not deliberately to dip or remain in the dip within 1,000 yards of a submarine.
514	Carry out EXTAC 105 exercise ___.
515	Helicopters may lower transducers to the maximum depth allowed in the exercise orders only when accurate sonar search, with the transducer at a depth of 15 meters (50 feet), has been completed with negative results. (See Relaxation 8C.)
516 to 599	Spares

To All Participants	
EI No.	Meaning
600 to 699	Exercise instructions from this section must be covered by the OTC in a face-to-face briefing prior to the exercise.

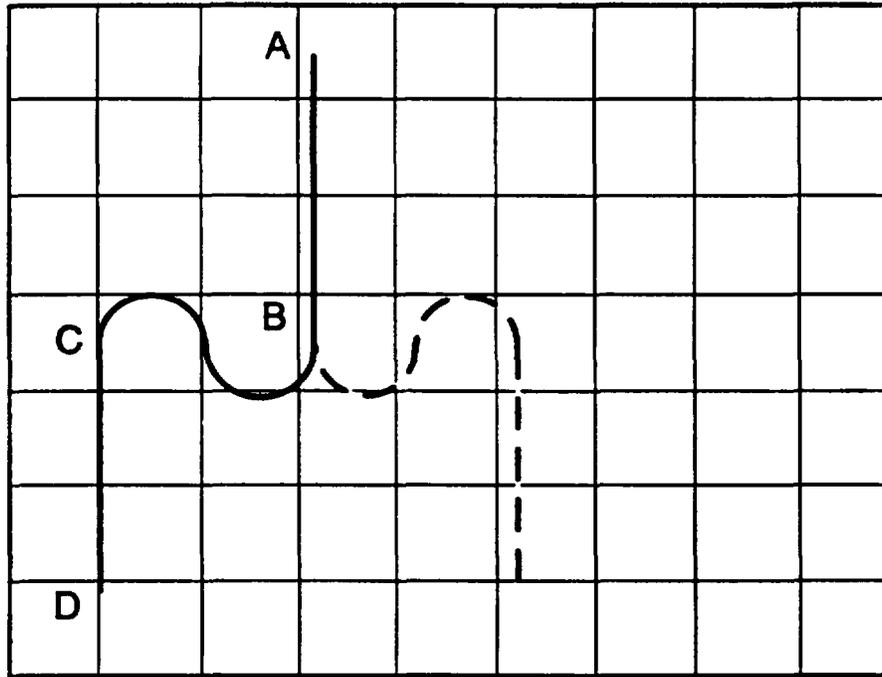
ANNEX 2C

Submarine Course and Speed Diagrams

2C01 Purpose

1. The submarine course and speed diagrams may be ordered by the use of Exercise Instruction Number 121. The authority ordering these diagrams is to ensure that the submarine can comply with the diagram while still remaining within the exercise area and within sufficient depth of water.
2. The diagrams are divided as follows: numbers 11 to 13 are for high-speed runs; number 21 is for a medium-speed run; and number 31 is for a slow-speed run.
3. Number 21 is designed for use in a restricted area. The finishing position corresponds to the starting position.
4. Number 31 allows for a small advance along the base course between the beginning and end of the run. It will be of advantage in a tideway or when starting the exercise in one corner of the exercise area.
5. The following instructions apply to the course and speed diagrams:
 - a. Courses and speeds are to be taken as through the water, without allowing for tide.
 - b. The base course (AB) should be arranged before the start of the exercise.
 - c. Zero time (minute 0) is the exact hour immediately preceding the time of execution. If the time of execution is exactly on an hour, that time will be zero time. The submarine is to go to the course and speed shown in the diagram for that time relative to zero time.
 - d. If the run is completed before FINEX, the submarine is to restart the run at zero time.
 - e. The times shown in the diagrams are the times at which the submarine is to start altering to the new course.

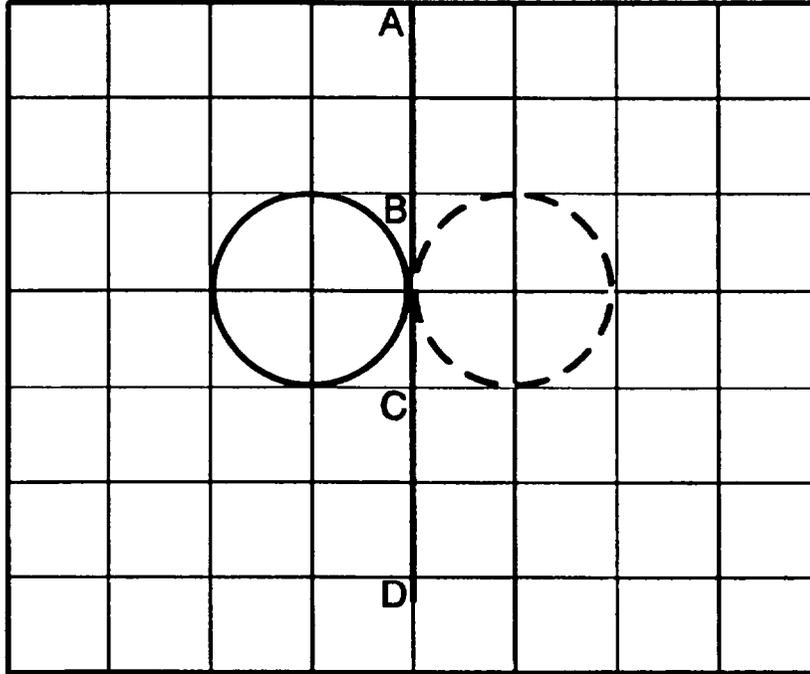
DIAGRAM No. 11



LEG	TIME (min)	SPEED (kt)
A B	30	10 to 15
B C	20	5 to 7
C D	30	10 to 15

Figure 2C-1. Diagram Number 11

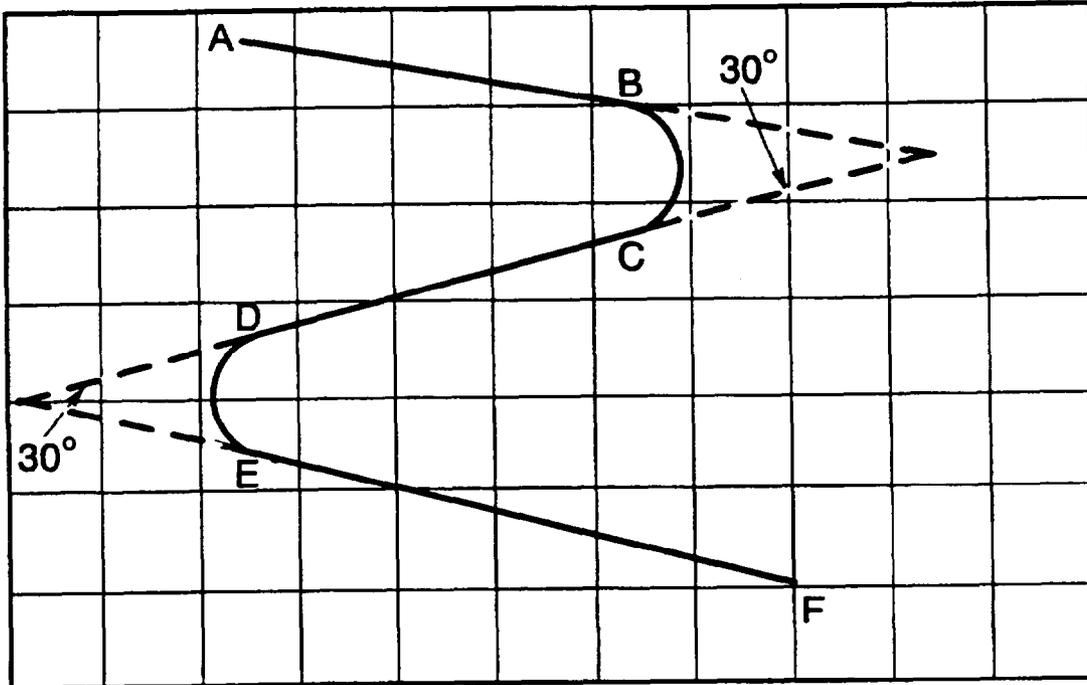
DIAGRAM No. 12



LEG	TIME (min)	SPEED (kt)
A B	30	10 to 15
B C	20	5 to 7
C D	30	10 to 15

Figure 2C-2. Diagram Number 12

DIAGRAM No. 13



LEG	TIME (min)	SPEED (kt)
AB	30	8 to 10
BC	15	5 to 7
CD	30	8 to 10
DE	15	5 to 7
EF	30	8 to 10

Figure 2C-3. Diagram Number 13

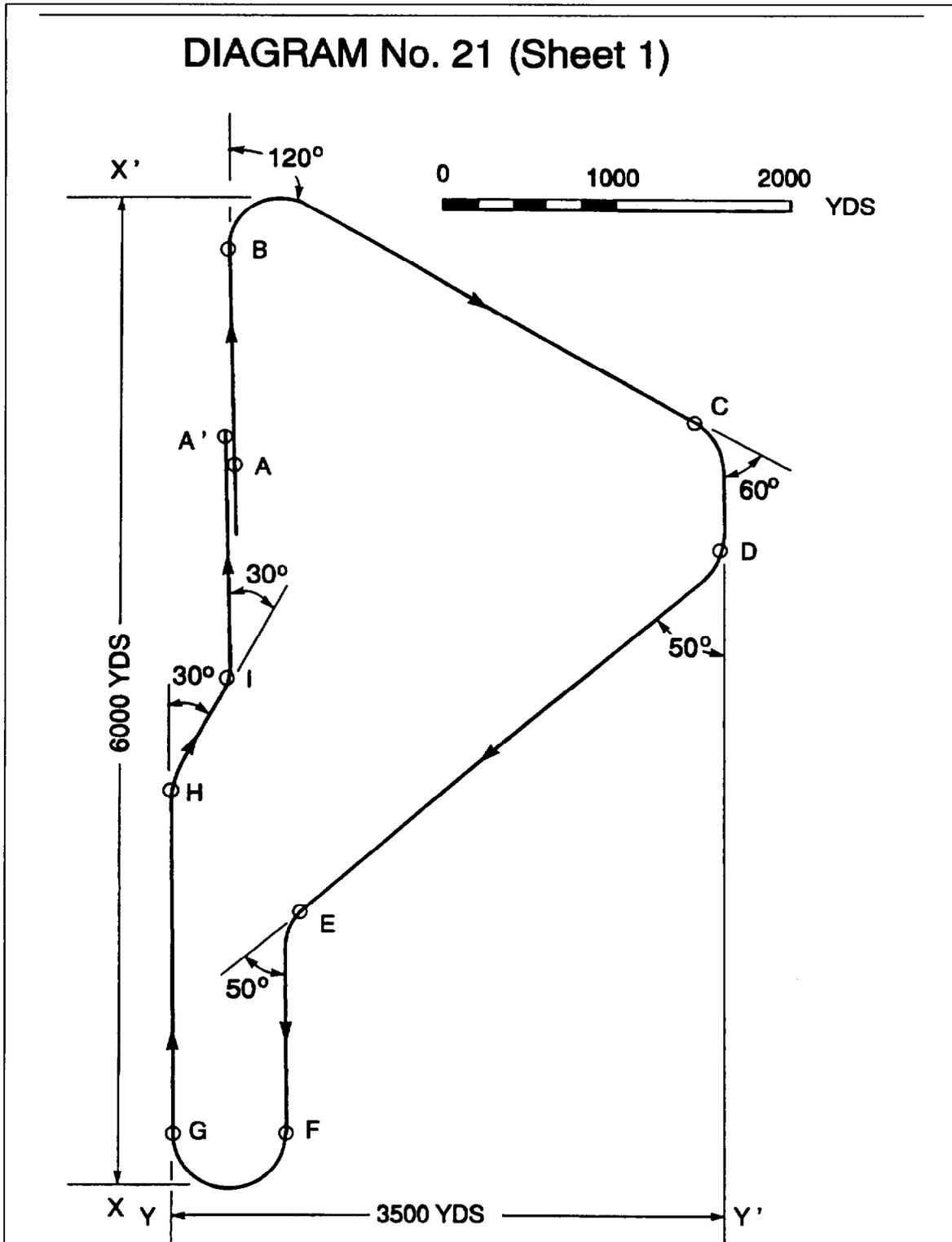


Figure 2C-4. Diagram Number 21 (Sheet 1 of 2)

DIAGRAM No. 21 (Sheet 2)

LEG	TIME (min)	SPEED (kt)	DISTANCE (yd)	TIME AT EACH POINT	
AB	13	3	1,358	A	ZERO
BC	24	4	3,243	B	+13
CD	11	2	743	C	+37
DE	20	5	3,378	D	+48
EF	10	4	1,351	E	+68
FG	7	4	946	F	+78
GH	10	6	2,027	G	+85
HI	10	2	675	H	+95
IA	15	3	522	I	+105
				A	+120

Figure 2C-4. Diagram Number 21 (Sheet 2 of 2)

DIAGRAM No. 31 (Sheet 1)

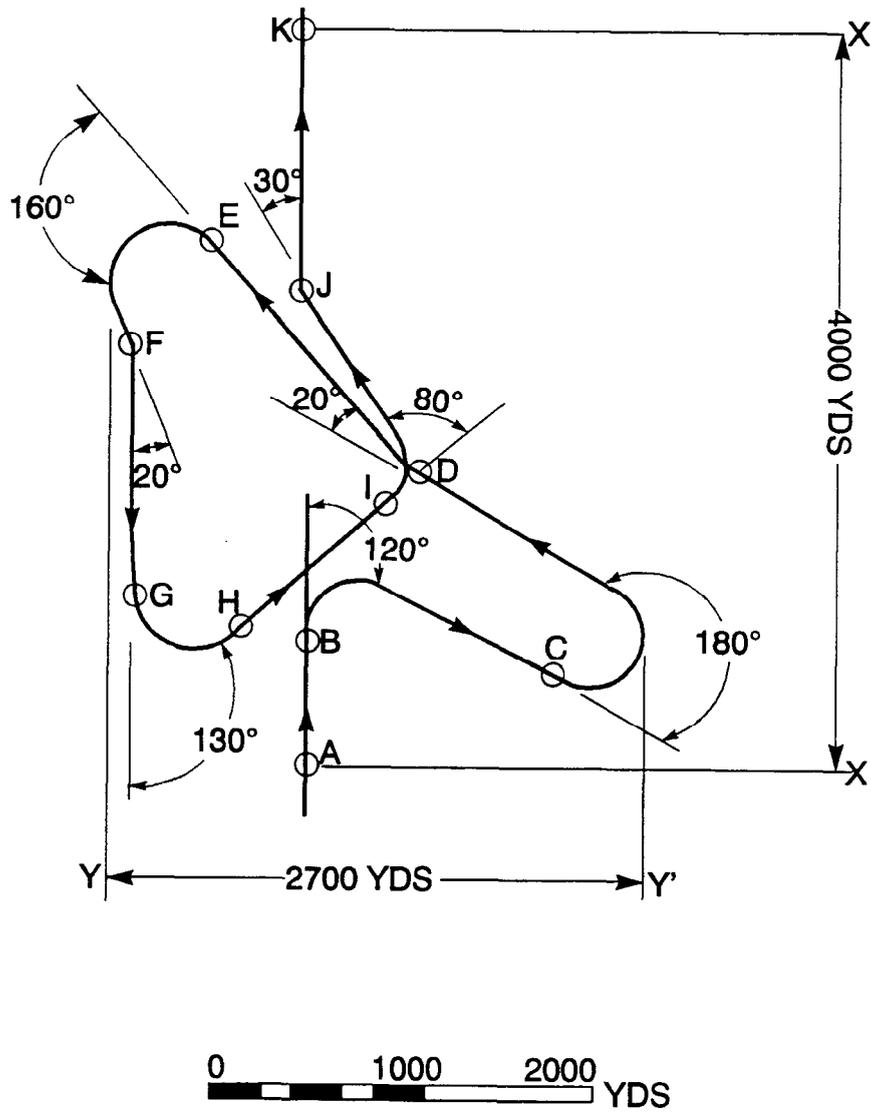


Figure 2C-5. Diagram Number 31 (Sheet 1 of 2)

DIAGRAM No. 31 (Sheet 2)

LEG	TIME (min)	SPEED (kt)	DISTANCE (yd)	TIME AT EACH POINT	
AB	8	2.5	676	A	ZERO
BC	15	3	1,520	B	+8
CD	15	4	2,027	C	+23
DE	10	5	1,689	D	+38
EF	15	2	1,013	E	+48
FG	10	4	1,352	F	+63
GH	10	2	676	G	+73
HI	10	3	1,013	H	+83
IJ	15	2.5	1,267	I	+93
JK	12	3.5	1,419	J	+108
				K	+120

Figure 2C-5. Diagram Number 31 (Sheet 2 of 2)

CHAPTER 3

Surface Antiair Warfare (AAW) Exercises**0301 Weapon Exercise Considerations**

1. Safety Zone. A safety zone must be selected along the range before a weapon firing exercise is conducted and the safety zone portion of the range must be cleared before firing. Weapon firings may be a hazard to transient ships and aircraft and a potential hazard to supporting ships and aircraft because of booster impact, fragmentation fallout, and guidance or homing errors. Naval commanders must establish adequate procedures to ensure that the range is clear before expending ordnance or missiles through an overcast in an approved warning area.

a. The operational commander who is to conduct the exercise is responsible for ensuring that he has a clear range, based on established visual and radar surveillance procedures, before beginning the exercise. In making his final decision, the operational commander is to consider all applicable factors, such as:

- (1) Missile hazard patterns.
- (2) Target hazard pattern.
- (3) Density of air and surface traffic.
- (4) Local visibility.
- (5) Distance off shore the exercise will be conducted.
- (6) Type and expected reliability of the ordnance.
- (7) Availability, accuracy, reliability, and completeness of radar coverage.

b. The safety zone should be surveyed during the exercise by all available facilities, including ship's radars and lookouts, and aircraft (when available).

c. The officer conducting the exercise (OCE) must accept a degree of risk

commensurate with the ordnance type, intercept range, and local operating area conditions. Since a 100 percent assurance of safety is not possible in every case, several curves are presented in Annex 3A to provide information from which the OCE can select appropriate boundaries for the safety zone. Exercise specific details will be covered by the OTC in a face-to-face briefing prior to conduct of the exercise.

2. Missile Destruction. A command or self-destruct reliability of 95 percent is expected; however, a higher percentage shall not be assumed. Destruct signals shall be sent to missiles 10 seconds after the predicted intercept time for a single missile or for the trailing missile of a two-missile salvo. If missile beacons fail, destruct signals shall be sent to missiles at a time after predicted intercept that is equal to one-tenth of the predicted flight time.

3. Drones. The OTC and OCE shall be familiar with the safety precautions regarding drones and drone control that are discussed in other documents. Nothing in the safety precautions shall prevent or preclude the OTC or OCE from exercising his own best judgement to enhance safety.

a. Procedures for out-of-sight drone control should be decided upon in complete detail prior to firing, particularly in the case of long-range missile firings. Advantages and disadvantages of shore-based and ship-based control should be weighed carefully. Drone-control aircraft should be located in an unengaged sector at the moment of firing. When physical considerations preclude such a location, adequate safety measures may still be provided by deploying the control aircraft so as to generate a high bearing rate while the drone generates a high range rate, making maximum use of altitude separation, IFF, and other characteristics that will identify drone and control aircraft. Whatever circumstances prevail, the final firing plan must receive the joint approval of:

- (1) OCE.
- (2) Firing ship's commanding officer.
- (3) Range safety officer.
- (4) Aircraft service squadron commanding officer.

b. When a drone is in the vicinity of the ship during a firing run, all hands topside shall be ready to take cover in the ship's interior should drone control be lost. Throughout an exercise, the anti-aircraft (AA) gun battery must be manned and armed in accordance with paragraph 0301.6 to destroy the drone if control is lost and damage to the ship is imminent.

4. Reports. The firing ship is responsible for the preparation and submission of reports as required by the appropriate instructions.

5. Observing Team. Each surface-to-air missile ship must select and train a permanent team to plan, conduct, and critique each exercise. The team leader must be familiar with the weapons system. Data recorders can be selected from a wide variety of ratings and readily trained, but safety observers and data takers must be chosen more selectively and should have some technical knowledge of the equipment they are monitoring. The number of data takers may vary slightly; in general, the following are required:

- a. Data recorder on air attack control frequency to record altitude data and tacan data of ranges and bearings received from attacking aircraft.
- b. Data observer on remote IFF transponder (or radar) scope to read ranges and bearings of attacking aircraft.
- c. Data recorder for IFF transponder (or radar) observer.
- d. Data observer in combat information center (CIC) to:
 - (1) Note time, range, and bearing of air contact's initial detection.
 - (2) Note air contact's entry into a tracking channel.

(3) Note open fire orders to weapons control system.

(4) Correlate air contact designations with tracking channel used and the director assigned.

e. Data recorder for CIC data observer.

6. Conduct of Exercises. AAW exercises will be conducted as follows:

a. The firing ship may designate the firing director and the launcher to be utilized.

b. The drone shall be flown so as not to close a surface ship closer than 2,000 yards horizontal range or as specified by the on-station range safety officer.

c. During drone operations when the drone is in the vicinity of the ship, all hands topside will be ready to take cover should control of the drone be lost.

d. Throughout the exercise the AA battery must be manned to destroy the drone should safety factors so dictate.

e. If guns are to be used in the exercise as well as in a safety role, ammunition should be positioned to best satisfy both exercise and safety requirements.

f. To realize acceptable success rates, reduce undetermined flight results to a minimum, and achieve optimum unit readiness, it is imperative that each missile ship pay scrupulous attention to training, maintenance, system testing, and the development of proper shipboard procedures. To that end, the following precautions shall be taken:

(1) Prior to firing, ensure a successful check out of shipboard equipment using prescribed prefire checklists.

(2) All target drones will be equipped with miss distance indicator (MDI) transponders where available.

(3) Consider an unsuccessful telemetry ground station check as a no-go item unless a telemetry station on a

e firing range has received the telemetry and will provide back-up services.

(4) Utilize countdown procedures as briefed in accordance with paragraph 0301.7.

(5) Initiate missile self-destruct when:

(a) Missile is observed to pass through range gate of tracking radar.

(b) Missile flight has exceeded computed intercept time by 10 seconds.

(c) Visual observation or safety reasons dictate that the flight must be terminated.

7. Surface Missile Systems (SMS) Ship Firing Procedures. SMS ship firing procedures will be covered by the OTC in a face-to-face briefing prior to conduct of the exercise. Exercise LOI shall not modify firing procedures and voice reporting requirements.

8. Message List for Ordering Exercises. This list may be used to inform all participants of pertinent details of scheduled AAW exercises. When using the list, omit designators that are not required. Reference EXTAC 1005, Annex 1A, in the message.

9. Tactical AAW Exercises. The highly coordinated attacks used in tactical AAW exercises provide weapons control system personnel with a realistic challenge and a complex target situation for training in the orderly processing of target data from initial detection to simulated kill. The exercises provide a weapons system check that supplements routine component checks. Weapons systems must be operated strictly in accordance with the individual ship's doctrine if any deficiencies are to be uncovered. In the case of combat systems with automatic detection and tracking and/or computer controlled engagement scheduling, the exercise tests both the equipment capability to function automatically (as designed) and those elements that are ship's force dependent to evaluate the level of training while operating in a casualty mode.

10. Conduct of Tactical Exercises.

a. A low TAU attack is the key to effective ship training and performance measurement. TAU is the time interval between the arrivals of successive aircraft at the maximum missile range, regardless of bearing. In delay-time scoring, TAU must be sufficiently low to ensure that a new target can be engaged whenever a director becomes available. The desired TAU value is 20 seconds, but a 10- to 30-second TAU is acceptable. Pilots can be expected to approximate the TAU value specified by the OCE within 5 to 10 seconds with minimum practice.

b. Tacan is the simplest method of attack control for individual ship exercises or when a number of ships are in close company. Aircraft should be separated by a nominal angle of 10° to exercise properly the acquisition phase of system operation. With tacan information and radio coordination, pilots are able to position themselves and conduct a low TAU attack without assistance. When there is a lack of tacan information from the missile ship or sufficient briefing on attack objectives for the pilots, a ship can station aircraft and conduct the run using standard air controller techniques. Aircraft can fly on a circumferential path at a specified range and then, depending upon the TAU desired, turn inward in a predetermined order and commence the run on the ship(s).

c. Excellent tracks can be plotted by having pilots mark via radio every 10-mile range of the tacan. Attack aircraft can readily determine their own TAU values by noting time differences at various range marks for successive aircraft. In recording data aboard ship, it is better to sacrifice an occasional report than recording accuracy whenever data flow is too fast for complete coverage. It is also advisable to record data from an IFF display to cover the contingency of tacan failure. IFF information should be corrected for the displacement of IFF indication from the actual target blip. The target controller and exercise aircraft shall have full use of all aids, such as ship and airborne radar, IFF, radio direction finding and homing equipment, regardless

of whether such aids are denied the exercise ship.

11. Instructions for Target Aircraft Pilots.

a. The basic requirement for an effective attack on a missile ship is coordination of the attacking aircraft so that they arrive simultaneously at the engageable range. By this means, the fire control system will be saturated. The time interval between the arrivals of successive aircraft at the maximum missile range, regardless of bearing, is designated TAU. An attack with simultaneous arrival has a zero TAU. The following conditions are desired in order that missile ships may be properly exercised.

(1) Low TAU — The OTC will cover low TAU in the face-to-face briefing.

(2) Bearing separation — The OTC will cover appropriate bearing separation in the face-to-face briefing.

(3) Radial raids (unless otherwise specified) — Aircraft coming directly over the missile ship will result in maximum utilization of services.

(4) Accurate reconstruction of positions of aircraft during the run. Provision of proper data to the missile ship to provide this reconstruction will allow verification of actual conditions that existed at any instant. This is particularly important for checking threat evaluation.

b. When several aircraft are used, it is probably easier for each pilot to take and maintain his desired position during the run using information from the missile ship's tacan and interplane radio coordination. During inbound runs, if each pilot gives a mark by radio as he passes each 10-mile range on his tacan, other pilots can determine their relative position by the time elapsing between marks of successive planes (this is actually TAU). At the same time, a recorder monitoring the circuit on-board ship can note the time and have an actual record of each aircraft's position every 10 miles. For radial attacks, a round of tacan bearings from the aircraft some

time during the run will complete the information required.

c. When separation in range between successive aircraft is small, precise timing is required and times will be recorded to the nearest second. It then becomes mandatory for a pilot to give each mark as accurately as possible. If interference precludes giving a mark on an even 10-mile range, it should be given at an appropriate mileage marker as soon thereafter as possible.

d. When there is a lack of tacan information from the missile ship, standard air control procedures may be used by shipboard air controllers to position aircraft.

e. The TAU of an attack must be closely controlled within a range approximately one and one-half times the maximum missile range for the exercise or 40 miles, whichever is greater.

12. Missile Ship in the Fleet Environment.

a. Fleet exercises enable a fleet commander to observe and obtain operational analysis data on many facets of naval warfare. Fleet exercises are designed specifically to provide individual missile ships with challenging attacks that will provide realistic training, including the requirement for coordination with other ships of a formation. The OCE should incorporate these exercises as a part of the overall exercise in a fleet environment.

b. The low TAU value of the main attack confronting missile ships should be preserved during fleet AAW exercises. The value of surface-to-air missile training is enhanced whenever additional aircraft move about in the operating area, since extra aircraft serve as diversionary targets, and when coupled with the intentionally diversionary tactics of the principal attackers, produce a superior challenge. Whenever possible, attacks should be planned so that each participating missile ship is confronted with at least one attack that can be scored during each exercise. In exercises that leave the attack plan to opposing forces, little raid control can be exercised by the missile ship. Any attack that is to be

effective against a formation of properly positioned missile ships must have low TAU attacks to saturate the missile system; otherwise, the targets can be picked off one by one with minimum effort.

13. Missile Firing Preparations. The lists of preparations following are considered the necessary minimum in order to demonstrate the readiness and status of equipment, alignment, and personnel.

a. A firing plan shall contain the following:

- (1) Objective and type of exercise.
- (2) Number of runs (tracking and firing). Specify launcher/rail to be used.
- (3) Specify gun mount(s) to fire (if applicable).
- (4) Standby launcher/rail (if applicable).
- (5) Specify safety mount (if applicable).
- (6) Target type, target profile, and open-fire range.
- (7) Missile to be fired: Naval Ammunition Logistic Code (NALC), serial number, booster number if applicable, and telemetry frequency.
- (8) Safety observers for each firing launcher, by name.
- (9) Checksight observer for firing gun mounts, by name (if applicable).
- (10) Detailed duties of observing team and recording forms.
- (11) Firing circuit control, manual or automatic.
- (12) Operational area.
- (13) Initial position, course, and speed.
- (14) Communication for the exercise.
- (15) Scenario (optional; may be added to enhance realism).

(16) Integrated Refractive Effects Prediction System (IREPS) used.

b. A comprehensive listing of safety procedures applicable to the exercise including:

- (1) Fire hoses and special tools/devices.
- (2) Misfire procedures (refer to appropriate sections of equipment operational manuals).
- (3) Procedures upon loss of communication.
- (4) Down-range hazard area defined.
- (5) Safe fire bearings and no fire bearings.
- (6) Reports required for "Batteries released":
 - (a) "Green range" from range operations controller.
 - (b) Surface and air hazard patterns clear.
 - (c) Target within safe firing bearings.
 - (d) Launcher safety observer report.
- (7) Hold fire procedures.
- (8) Cease fire procedures.
- (9) Check fire procedures.
- (10) Missile destruct procedures.
- (11) Misfire/dud procedures.

c. Diagram of exercise showing (as applicable):

- (1) Target.
- (2) Firing ship and any participating units.

(3) Safe fire bearings.

d. Identify the following personnel (or equivalents) and delineate their responsibilities in the firing plan and during the pre-firing brief:

- (1) Commanding officer.
- (2) Tactical action officer.
- (3) Combat systems/weapons officer.
- (4) Operations officer.
- (5) Officer of the deck.
- (6) Navigator (optional).
- (7) Surface evaluator (range safety).
- (8) Combat information center (CIC) officer (or CDCO).
- (9) Damage control assistant.
- (10) Fire control officer.
- (11) Gunnery officer (if applicable).
- (12) Fire control systems operators.
- (13) Launcher captain.
- (14) External launcher safety observers.
- (15) Gun mount captain (if applicable).
- (16) Data takers.

e. Conduct pre-firing brief. Personnel identified above and those below shall be present:

- (1) All launcher personnel.
- (2) All gun mount personnel (if applicable).
- (3) All fire control personnel.
- (4) All safety observers.
- (5) Air controller.

f. Conduct pre-firing checks.

g. Man appropriate stations and check communications prior to commencement of exercise.

h. Ensure initial velocity (IV) has been entered into GFCS computer (if applicable).

i. Ensure blast area is clear of personnel.

NOTE

- Strict and exact compliance with the precautions and procedures of applicable launcher operation manuals is mandatory.
- Prefiring checks, pre-firing conference, and pre-firing brief must be accomplished within 24 hours prior to commencing the exercise.
- When conducting multiship missile exercises, telemetry frequencies should be reviewed to preclude mutual interference.

j. Upon completion of exercise, review data obtained by observing party with team leader.

k. Request team leader hold critique of the exercise for all personnel to point out noteworthy performance or constructive criticism in order to gain the maximum training from the exercise.

14. Missile Firing Exercises.

a. The conduct of live missile firing exercises is not altogether compatible with advanced training of the missile ship. Certain requirements do not allow the best opportunity to test the system under high density or high pressure conditions. These include:

- (1) Observance of strict safety measures.
- (2) Need to gather telemetry and missile performance data.
- (3) Target control problems.

(4) Cost and limited training allowance of missiles.

b. Despite any drawback that may exist, it is necessary to exercise the total team in actual missile firing for testing the following:

(1) Missile reliability under live conditions.

(2) Total system performance under live conditions.

(3) Compatibility of doctrinal procedures and system performance.

(4) Personnel performance in:

(a) Maintaining and operating the system.

(b) Acquiring and processing the target from initial detection through firing and intercept.

(c) Loading and firing the missile.

(5) Effectiveness of past training efforts.

(6) Ability to ensure system electromagnetic compatibility.

c. Another important purpose of the live firing exercise is to motivate personnel by demonstrating the results of their past training and maintenance efforts.

0302 Antiaircraft Gunnery

1. Although it is essential to use towed targets for basic training, the emphasis in AA gunnery training must shift to firing at drones and other advanced targets as early as is practicable. Annex 3C provides the various types of AA gunnery targets. Tracking drills which use aircraft to simulate typical attacks are an important and continuous requirement of fire control training. Simulated, coordinated air attacks are needed periodically for tactical and overall gunnery

practice. Because continuity in AA gunnery is essential, whenever service aircraft are unavailable and local regulations permit, tracking drills at anchor, moored, or underway on targets of opportunity should be part of the training schedule of all combatant ships. Tracking of radar reflective balloons should also be conducted whenever aircraft are unavailable.

2. Adequate observation should be obtained for each firing. The following factors should be considered in scheduling AA gunnery firings.

a. Commanding officers may delegate to subordinates the authority to open fire when the participating batteries have attained an appropriate level of training.

b. Normal mode of control for the situations simulated are emphasized and, as far as practicable, each type of control available to the firing weapon should be used at least once each year.

c. Alternate tracking capabilities, where existing (e.g., optics/infrared), should be used when fire control radar is secured or not available.

d. The hazard area for gun ordnance in Annex 3A.

0303 Gunnery Reports

1. Surface gunnery reports reflect the analysis of the exercise by the observing party. The OCE designates the exercises for which he requires a written report. Responsibility for making the analysis and preparing the report lies with the firing ship.

2. Definitions used in preparing gunnery reports are:

a. Gun time for gun(s) scheduled to fire begins with the order to commence fire from the control station that directly initiates the firing of that gun and ends when its last allowed shot is fired, or when the full ammunition allowance for a gun is not expended at the time the order to cease fire is executed.

b. HPGPM for each run equals:

$$\frac{\text{Hits}}{\text{Sum of gun times of guns firing}}$$

(Use minutes in decimals computed to the nearest hundredth.)

c. For antiaircraft firing with semiautomatic guns, the SPM of each gun equals:

$$\frac{\text{Shots fired less first shot}}{\text{Time from first to last shot}}$$

0304 Firing Run Diagrams

Firing run diagrams are provided in Annex 3C.

0305 High-Speed Air Target Exercises

These exercises provide advanced training based on the successful completion by the firing battery of basic exercises. Objectives, prerequisites, and safety precautions of high-speed air target exercises will be covered by the OTC in a face-to-face briefing prior to conduct of the exercise. The sequence of voice procedures shown in Figure 3-1 will be mandatory.

0306 Safety Violations

1. In the pursuit of safe and efficient firing of any gun or mount, all personnel must be guided by the rule that, "The decision to cease fire rather than to continue fire under doubtful conditions is always above censure."

2. The commanding officer, executive officer or weapons officer, as appropriate, shall order "Cease fire" if any doubtful conditions become evident.

3. Definitions.

a. Serious safety violation — A violation that could cause immediate consequential hazard to life or limb, or gross material damage.

b. Major safety violation — A violation that, if not immediately corrected, could

cause damage or harm to personnel or equipment.

c. Minor safety violation — A violation that would not cause any immediate damage or harm to personnel or equipment but if not corrected promptly could cause an accident in the future.

4. Serious Safety Violations.

a. Ammunition was handled in a grossly negligent manner.

b. The gun mount commenced fire prior to being ordered to.

c. Smoking was noted in ammunition spaces and/or while handling ammunition.

d. The gun mount crossed the ship's centerline towards the nonengaged side when ammunition was available to the gun mount.

e. Personnel were noted working in a gun pit or on mount machinery with the power turned on and/or pressure in the accumulator.

f. Personnel used improper hot gun or misfire procedures.

g. The director tracked the service unit or other unit while the gun was assigned to it and ammunition was available to the gun mount.

h. Adjacent mounts were controlled by different directors.

i. Fire was commenced or continued outside safe fire bearings.

5. Major Safety Violations.

a. The mount captain/OMC operator failed to observe the lay of the gun barrel.

b. Excessive skylarking or inattention to duty was noted during the exercise.

c. Nonknowledgable checksight and safety observers were assigned.

CALL	SOURCE	MEANING	REMARKS
Green Range	Range Control Officer when on range OCE when off range	Range is clear of non-participants	This does not constitute a cleared to fire call.
Hot (Cold) Run	Range Control Officer when on range OCE when off range	Firing (nonfiring) run	Made at commencement of each run.
Contact (bearing and range)	Firing ship	Radar contact on tow aircraft and target with any shipboard radar	Bearing and range to each must be called.
Concur Your Contact	Range Control Officer when on range Tow aircraft pilot when off range	Firing ship's contact agrees with range tracking radar	
Locked On and Tracking (bearing and range)	Firing ship	Lock on target with fire control system radar	Fire control system radar bearing and range must be called.
Concur Your Lock-on	Range Control Officer when on range Tow aircraft pilot when off range	Firing ship's lock-on agrees with range tracking radar	
On Top	Tow aircraft pilot	Tow aircraft is overhead the firing ship	
Cleared to Fire	Range Control Officer when on range Tow aircraft pilot when off range	Firing ship is cleared to fire guns	Must have verified tow aircraft on top and green range.
Roger Cleared to Fire	Firing ship	Acknowledgement of cleared to fire	
Commenced Firing	Firing ship	Ship is firing	
Ceased Firing	Firing ship	Ship has cleared firing	
Bores Clear	Firing ship	Bores are clear	
Bores Foul	Firing ship	Bores are not clear	Guns must be aimed down range and tow aircraft must remain on opposite side of firing ship.
Hold Fire	Any	Abort — Do not fire	When required.

Figure 3-1. Sequence of Voice Procedures

d. Neither the "Cease fire" command or alarm was used.

e. Personnel used inaccurate bore report.

f. Personnel were inattentive to abnormal conditions and negligent to cause "Cease fire" or "Check fire" to be given.

g. All personnel exposed to gunfire did not wear ear protection.

h. A loaded gun was trained outside safe fire bearings.

6. Minor Safety Violations

a. There were fire and/or missile hazards in the gun mounts/magazines.

b. The Bravo flag was improperly used.

c. Battle dress was incorrect.

d. The checksight report was incorrectly given. (Terminology)

e. The bore report was incorrectly given. (Terminology)

0307 Gun Firing Preparations

1. Gun firing is 90 percent preparation and 10 percent execution. The lists of preparations following are considered the necessary minimum in order to demonstrate the readiness and status of equipment, alignment, and personnel.

2. A firing plan shall contain the following:

a. Objective and type of exercise.

b. Number of runs (tracking and firing).

c. Specify gun mount(s) to fire.

d. Specify safety mount.

e. Target type, target profile, and open-fire range.

f. Ammunition to be fired.

g. Checksight observer for firing gun mounts, by name.

h. Detailed duties of observing party and recording forms.

i. Firing circuit control, local or remote.

j. Operational area.

k. Initial position, course, and speed.

l. Communication plan for the exercise.

m. Scenario (optional; may be added to enhance realism).

3. A comprehensive listing of safety procedures applicable to the exercise including:

a. Fire hoses and special tools/devices.

b. Misfire procedures (refer to appropriate equipment operational manuals).

c. Procedures upon loss of communication.

d. Two-way communication procedures with service craft.

e. Surface and air hazard area defined.

f. Safe fire bearings and no fire bearings.

g. Reports required for "Batteries released":

(1) "Cleared for fire" from service craft.

(2) Surface and air clear, and limits of same.

(3) Target within safe fire bearings.

(4) Checksight observer report.

h. Cease fire procedures.

i. Check fire procedures including comment about anyone observing an unsafe condition should call "Check fire."

j. Bore report procedures.

4. Diagram of exercise showing (as applicable):
 - a. Target.
 - b. Firing ship and any participating units.
 - c. Safe fire bearings.
5. Identify the following personnel (or equivalents) and delineate their responsibilities in the firing plan and during the prefiring brief:
 - a. Commanding officer.
 - b. Tactical actions officer.
 - c. Combat systems/weapons officer.
 - d. Operations officer.
 - e. Officer of the deck.
 - f. Navigator (optional).
 - g. Surface evaluator (range safety).
 - h. Combat information center (CIC) officer.
 - i. Damage control assistant.
 - j. Plotting officer.
 - k. Gunnery officer.
 - l. Fire control systems operators.
 - m. Gun mount captain.
 - n. Data takers (if applicable).
6. Conduct prefiring brief. Personnel identified above and those below shall be present:
 - a. All gun mount personnel.
 - b. All fire control personnel.
 - c. All safety observers.
 - d. Air controller.
7. Conduct prefiring checks.
8. Train personnel and conduct rehearsals in all areas, including hot gun procedures.
9. Man appropriate stations and check communications prior to commencement of exercise.
10. Ensure initial velocity (IV) has been entered into gunfire control system (GFCS) computer.

NOTE

- Strict and exact compliance with the precautions and procedures of applicable launcher operation manuals is mandatory.
- Prefiring checks, prefiring conference, and prefiring brief must be accomplished within 24 hours prior to commencing the exercise.

11. Upon completion of exercise, review data obtained by observing party with team leader.
12. Request team leader hold critique of the exercise for all personnel to point out noteworthy performance or constructive criticism in order to gain the maximum training from the exercise.
13. Flag B shall be displayed by firing and target ships. When close up on the firing ship, it means "Firing has commenced." When hauled down by the firing ship, it means "Firing completed." When close up on the target ship, it means "Target ready: range is clear." When hauled down by the target ship, it means "Firing completed" or "Range is foul."

0308 Antiair Warfare (AAW) Exercises

AAW-1 RADAR AND IFF TRANSPONDER TRACKING

maximum specified distance for each run, whichever is least.

Purpose

To train personnel in the functions of aircraft detection and tracking, taking into consideration the predicted enhancement/detraction of environmental conditions on radar performance. Check the performance of air search and height-finding radars and IFF transponders.

Requirements

1. One or more jet aircraft.
2. Appropriate control area.
3. Two-way communications with aircraft.
4. Tacan channel for control of aircraft.

Procedures**OCE**

1. Designate aircraft distances and altitude for each run.
2. Designate tacan channel.
3. Designate aircraft station at least 50 miles at low altitude from the exercise ship(s). This normally will be the first run of the exercise.

CONTROLLING SHIP

1. Test communications on aircraft control channel.
2. Conduct IFF and tacan check with aircraft.
3. Control aircraft using fighter-director vocabulary.
4. Report beginning and end of each run.
5. Upon completion of run conducted at high altitude, continue runs, decreasing altitudes by an appropriate interval on each successive run during remainder of aircraft time on station.
6. Maximum distance of each run is to be limited by reliable communications, tacan, and

NOTE

Ships with automatic tracking systems will disable interfaces to force manual detection and tracking by watchstanders.

AIRCRAFT (LOW-FLYER RUN)

1. Proceed to position designated by OCE.
2. When directed, proceed inbound toward exercise ships(s) at low altitude in order to pass overhead.

AIRCRAFT (OUTBOUND)

1. Proceed on assigned heading.
2. Climb aircraft on established heading to reach prebriefed altitude at prebriefed distance.
3. Turn IFF transponder on with appropriate code.
4. Transmit range and bearing from exercise ships(s) at prebriefed distance and altitude increments.

AIRCRAFT (INBOUND)

1. Place IFF transponder in standby as directed by controlling ship.
2. When directed, proceed inbound at high altitude until over exercise ship(s) or directed to new outbound heading.
3. Continue outbound/inbound runs on headings and at altitudes as directed by controlling ship.

SHIP

1. Determine predicted radar ranges for the day, utilizing environmental information/data.
2. Track aircraft and record maximum range of IFF only on outbound runs and maximum observed range on inbound runs. Disable detection/tracking scope of IFF during inbound runs.

3. Record observed altitude and distance marks when reported by aircraft.

5. Record maximum observed range on inbound leg of low flyer run.

4. If desired, designate targets to fire control systems for designation and detection/tracking training.

6. Compare recorded detection range/altitudes with predicted range/altitudes.

AAW-2 ANTI-AIRCRAFT TARGET DESIGNATION AND ACQUISITION (NON-FIRING)

Purpose

1. Train ship's weapons control system personnel in the designation of air targets to fire control systems.
2. Train ship's fire control director personnel in acquisition of designated targets.
3. Train personnel and evaluate coordinated actions among combat information center (CIC), bridge, and anti-air (AA) weapons control.

Requirements

Two or more aircraft to make a minimum of five runs as prescribed by the OCE in accordance with Figures 3C-1 and ~~3C-2~~ in Annex 3C.

In the face-to-face pre-exercise briefing, include for each system that will be employed the range in yards at which the target will be initially designated.

This exercise is comprised of four complete phases, the phases to be as specified by the OCE. At least two of the phases shall simulate night conditions.

While in formation, multiple director ships attempt to acquire both targets (as though ships were operating singly), rather than selecting only one target on the basis of the briefed formation fire distribution doctrine. Single director ships are required to track only one aircraft per phase, either in formation or while operating independently.

Use interdirector and visual designation/acquisition when necessary. Visual assistance shall not be permitted on runs in which night conditions are simulated.

Control runs or ship's movement so that each director of a multiple director ship bears for at least two evaluated runs; single director ships shall complete at least four evaluated runs. For two director ships, make each evaluation on each run separate for each director.

All fire control and designation equipment will be in normal ready condition at the beginning of each run.

Exercise ships will maneuver to bring maximum number of directors to bear and to simulate evasive action.

Ships that are not controlling targets will monitor control of targets and keep necessary stations informed.

Procedures

OCE

1. Designate initial station, base course, and speed of exercise ships.
2. Designate ship(s) to control target aircraft.
3. Prescribe radio channels for target aircraft control coordination.
4. Prescribe runs to be made by target aircraft and specify initial range.
5. Specify night conditions to be simulated, if desired.

TARGET CONTROL SHIPS

Control target aircraft as directed by OCE.

TARGET AIRCRAFT

Make attack runs as directed by controller in accordance with Figures 3C-1 and ~~3C-2~~ in Annex 3C.

EXERCISE SHIPS

1. Take station on base course at speed designated by OCE.
2. Detect and acquire target aircraft at maximum range of installed fire control systems.
3. Prepare sketch showing plan view of ship, indicating location of directors and arc of clear bearing.
4. Prepare sketch of each run of the exercise and include amplifying data such as number of

targets, etc. Fully identify all equipment used (Mk and Mod, etc.).

procedures. Include the actual training of missile and gun mounts.

5. Conduct detection, tracking, and engagement in accordance with the ship's operating

6. Conduct a pre-exercise briefing with all personnel who will participate present.

AAW-3 DETECTION-TO-ENGAGEMENT SEQUENCE (NONFIRING)

Purpose

To train combat systems personnel to successfully complete a detection, assignment, and engagement sequence. Live air services will be used to demonstrate the following:

1. The maximum detection range of each radar system.
2. All operational modes of each radar.
3. The performance of IFF transponder.
4. The maximum acquisition and track ranges of all fire control radar at high and low attitude.
5. Operability of weapons direction equipment and command and control/weapons interface in a detect-to-engage scenario.
6. Tacan operation.
7. UHF communications.

Requirements

Mandatory observation/evaluation by combat systems assessment team. Aircraft cross-section is to be as close as possible to 1 m^2 . Operational area assignments and areas in which contacts are held must be carefully coordinated so that the required flight profiles can be flown. Additionally, time-distance requirements must be considered.

Include in the face-to-face pre-exercise briefing for each system to be employed the maximum range in yards at which initial target designation will occur.

Procedures

The ship is required to detect, track, and perform simulated engagements with all appropriate layers of defense. All requisite prefiring checks will be accomplished for appropriate systems. Ballistic data, initial velocity (IV), etc., will be calculated and entered. Missile launchers, gun mounts, etc., will be trained/elevated as in an actual engagement. Maneuvers to unmask batteries and reduce radar cross-section will be evaluated. Combat

system modes of operation and weapons employment in accordance with tactical doctrine as modified by commanding officer's standing battle orders will be assessed. The aircraft is simulating a faker aircraft, weapons capability unknown (actual air speed will be used as threat air speed to determine engageability). CIWS will be required to use PASS if available.

OUTBOUND PHASE

During the demonstration, positive control of the aircraft must be attained as soon as possible. The air controller should initially vector the aircraft outbound to a range of 225 nm at an altitude of 30,000 to 35,000 feet to demonstrate the long-range tracking capability of the air search radar(s). During this outbound run, blip scan data will be recorded for the air search radar(s) and associated IFF. When the aircraft is at 225 nm, it will be placed in an orbit until completion of UHF communication checks.

INBOUND PHASE

Upon completion of UHF communications checks, the aircraft will close the ship at an altitude of 30,000 to 35,000 feet and a speed of 300 to 350 knots to demonstrate the maximum detection, acquisition, and track ranges of air search radar(s) and the gun/missile fire control system(s). Use of IFF during the inbound run (except by the air controller for safety of flight purposes) is prohibited. At a range of 80 to 65 nm from the ship, the aircraft will commence a 4° descent so as to be level at an altitude of 200 feet approximately 9 nm from the ship. The aircraft will continue at this altitude for the remainder of the inbound run. During this run, the ship will conduct simulated engagements designating to the fire control systems at the ranges appropriate to the fire control system. After constructive engagement, the aircraft will be vectored to return to base.

TEAM EVALUATION

The combat systems assessment team will evaluate the ship's ability to detect and engage at appropriate ranges with successive levels of defense a 1 m^2 radar cross-section target flying a predictable profile at subsonic speed with a pre-alerted crew with no jamming. Appropriate ranges will be determined by IREPS/RPA predictions. Additionally,

long-range UHF communications, tacan, and IFF will be evaluated.

NOTE: Successful completion of this exercise is recommended prior to conduct of AAW-5 (ASMD live missile firing).

1. The exercise is designed to evaluate both the materiel condition of the ship's installed AAW systems and associated tactical employment. The range at which initial designation occurs will be restricted to the pre-briefed maximum range. The fact that initial target designation during the exercise is limited to specific ranges in no way precludes the ship from acquiring and tracking the target at ranges in excess of those listed below; however, as part of the simulation process, the ship is required to cease tracking the target and redesignate the fire control system at the pre-briefed range. This will allow for a timed evaluation of the watch team's ability to successfully employ the weapons systems.

2. All installed directors will be used and evaluated on each run of the exercise.

3. SM-2 capable ships will demonstrate a simulated SM-2 engagement at maximum range and will then demonstrate simulated SM-1 or SM-2 (Home-All-The-Way-mode) for the remainder of the exercise.

4. Redundancy of systems will be considered in determining success/failure of the exercise. The ship must effectively employ at least 50 percent of redundant systems during the exercise. For example, ships with two missile launchers and four associated fire control systems must have at least one launcher and two fire control systems fully operational to successfully complete the missile engagement portion of the exercise. The inability to successfully engage with any single level of defense (i.e., failure of one of CIWS, one of one missile launchers, one of one fire control systems, one of one gun systems, etc.) constitutes failure of the exercise.

**AAW-4 ANTISHIP MISSILE DEFENSE
(ASMD) (NONFIRING)****Purpose**

Train ship's personnel in rapid response to an antiship missile threat.

Requirements

1. One target drone capable of operating at low altitude or a small manned jet aircraft. (Towed targets are not authorized.)
2. Surface drone unit (SDU) capable of command control; may be substituted by cooperative surface unit under control of target control officer (TCO) or OCE, or may be simulated when SDU/cooperative unit is not available.
3. Suitable operating area, including land mass for coastal environment if desired.
4. Adequate radio communications, including the establishment of the appropriate coordination and reporting net for use in a multiship environment.
5. Electronic signal device to simulate electronic signature of threat missile (optional).

Safety

This is a nonfiring exercise. Commanding officers shall ensure that no live ammunition is loaded other than that which may be utilized solely to destroy a target in the unlikely event of drone malfunction.

Procedures**OSE/OCE**

1. Issue appropriate operation order or exercise order describing the simulated tactical environment, exercise communications, operational guidelines, electronic order of battle, and defensive posture.
2. Conduct pre-exercise briefing as required.
3. Promulgate vulnerability period.
4. Designate:

a. Readiness condition to be set by firing ship(s).

b. Initial position of firing platform/target based on recommendation of the TCO.

5. Establish communications with TCO or aircraft and exercise ship(s) on all exercise nets.
6. Conduct time check with TCO and exercise ship(s).
7. Order COMEX when TCO and exercise ship report ready.

TCO

1. Report to OCE when ready.
2. Upon receipt of COMEX, place SDU in position for simulated missile launch against unit (optional).
3. Radiate threat radar in accordance with exercise requirements. Record time radiation commences (optional).
4. Launch target pilotless aircraft (TPA). If SDU is used, vector TPA at low level to pass over SDU, then vector TPA directly at exercise unit at required speed. If SDU is not used, vector TPA at low level directly at exercise unit.
5. Repeat as time permits.

EXERCISE SHIP(S)

1. Set defensive posture.
2. Set condition of readiness as directed by OCE.
3. Take station in exercise area as directed by OCE.
4. Report to OCE when ready.
5. Upon receipt of COMEX, commence search. Make required reports to OCE on exercise nets.
6. Maneuver and employ countermeasures as required in accordance with current doctrine.

7. Acquire target and simulate missile and/or gun employment against simulated missile and missile launch platform.

8. Conduct a pre-exercise briefing with all personnel who will participate present.

AAW-5 ANTISHIP MISSILE DEFENSE (ASMD) (FIRING)

Purpose

1. Train ship's personnel to fire surface-to-air missiles accurately in an ASMD environment against low-flying targets (simulating air- or surface-launched cruise missiles) at subsonic speeds and with a small radar cross-section.
2. Provide team training and coordination against ASMs.
3. Train ship's personnel in simultaneous gun and missile employment.
4. Train gunnery personnel in engaging air targets.
5. Acquaint fleet personnel with capabilities of installed AAW systems under live conditions.
6. Develop and evaluate tactics for use of AAW missile ships.

Requirements

1. One ship-launched intercept guided missile.
2. One towed target. Target to make a low-level attack on designated surface target.
3. Target drone requirements are not waivable.
4. Surface drone unit (SDU) capable of command control is highly desirable but not required.
5. Standard gunnery ammunition.
6. Qualified observing team in exercise ship(s). See paragraph 0301.5.

Safety

See paragraphs 0301.1 through 0301.3.

TOWED TARGETS

The following precautions are applicable to all firings involving jet-towed targets and will be observed scrupulously.

Ships configured with the Mk 23 TAS RIM-7 weapons system, when firing against a towed target, shall use manual mode to ensure proper designation and acquisition of the tow target and to avoid inadvertent lock-up of tow tractor aircraft.

For modified Bravo runs (Figure 3B-6), the jet aircraft shall be visible to safety observers on the bridge and be at a position on the nonfiring side of the ship before the battery is released by the ship's commanding officer. This position angle is sufficient for safety considerations.

For modified BRAVO runs (Figure 3B-6), towed targets shall not be permitted to pass directly over the exercise ship. Tow aircraft shall attempt to fly into/out of true wind and pass directly overhead or very nearly across the stern of an exercise ship with way on. The aircraft shall fly at a briefed altitude that is optimum for both the exercise and safety.

For modified Bravo runs (Figure 3B-6), a minimum of 22,000 feet of tow cable is recommended for safety considerations.

Firing ship personnel must be conscious of excessive generated rates in train and elevation. Loading procedures need to be given special attention where high elevation rates are employed. Maintaining footage where high bearing rates are present is equally important. Mount personnel can sustain serious injury if not prepared for this movement.

Positive and accurate air control is mandatory for this exercise. This is necessary for achieving optimum gun positioning and for safety.

The tow aircraft, firing ship, OCE, and range control officer (RCO) shall maintain positive communications on a common UHF frequency.

The tow aircraft must be able to positively determine when passing overhead the firing ship. The commanding officer of the firing ship must verify this position with visual lookouts.

At least one satisfactory nonfiring run must be completed by each firing ship prior to a firing run.

The sequence of voice procedures listed in Figure 3-1 will be mandatory. Additional calls will be made only when absolutely required.

The exercise ship's firing plan must be in accordance with the above procedures, and a copy must be provided to the following personnel prior to commencement of the exercise: OCE, range safety officer, and aircraft service squadron commanding officer.

For missile firings, the firing ship should be prepared to hold fire if the predicted intercept point is outside safe fire bearings.

Procedures

OCE

1. Arrange for target drone range services.
2. Issue LOI describing the simulated tactical environment, exercise communications, operational guidelines, electronic order of battle, and defensive posture.
3. Ensure prefiring checks and pre-exercise briefing have been conducted.
4. Designate:
 - a. Initial position of firing ship(s).
 - b. Ship(s) base course and speed.
 - c. Readiness condition to be set by firing ship(s).
5. Confirm safe fire bearings with designated range safety officer.

FIRING SHIP

1. Conduct prefiring checks and pre-exercise briefing.
2. Take station in firing area as directed by OCE.
3. Set defensive posture.
4. Before actual firing, load launcher to determine loading time required (where applicable).
5. Firing director to be selected by fire control system (FCS) when engagement order issued.
6. Station safety personnel and umpires.
7. Report when ready to OCE.
8. Confirm safe fire bearings with designated range safety officer or OTC.
9. Upon receipt of target disclosure from OCE, detect and identify target and fire missile to achieve intercept as soon as possible after identification.
10. Ensure data extraction is initiated prior to target turn-in.
11. Set ordered condition of readiness.

AAW-6 ANTI-AIRCRAFT GUNNERY (FIRING)

Purpose

Train personnel in the delivery of AA gunnery fire.

Requirements

1. Jet aircraft to tow aerial target at speed between 225 to 350 knots.
2. Brief the number and type of rounds for each firing mount.

Safety

TOWED TARGETS

The following precautions are applicable to all firings involving jet-towed targets and will be observed scrupulously.

For modified Bravo runs (Figure 3B-6), the jet aircraft shall be visible to safety observers on the bridge and be at a position on the nonfiring side of the ship before the battery is released by the ship's commanding officer. This position angle is sufficient for safety considerations.

For modified BRAVO runs (Figure 3B-6), towed targets shall not be permitted to pass directly over the exercise ship. Tow aircraft shall attempt to fly into/out of true wind and pass directly overhead or very nearly across the stern of an exercise ship with way on. The aircraft shall fly at a briefed altitude that is optimum for both the exercise and safety.

For modified Bravo runs (Figure 3B-6), a minimum of 22,000 feet of tow cable is recommended for safety considerations.

The firing ship must be conscious of excessive generated rates in train and elevation. Loading procedures need to be given special attention where high elevation rates are employed. Maintaining footage where high bearing rates are present is equally important. Mount personnel can sustain serious injury if not prepared for this movement.

Positive and accurate air control is mandatory for this exercise. This is necessary for achieving optimum gun positioning and for safety.

The tow aircraft, firing ship, OCE, and range control officer (RCO) shall maintain positive communications on a common UHF frequency.

The tow aircraft must be able to positively determine when passing overhead the firing ship. The commanding officer of the firing ship must verify this position with visual lookouts.

At least one satisfactory nonfiring run must be completed by each firing ship prior to a firing run.

The sequence of voice procedures listed in Figure 3-1 will be mandatory. Additional calls will be made only when absolutely required.

"Fire" should never be transmitted except to call "Cleared to fire."

The exercise ship's firing plan should be in accordance with the above procedures, and a copy must be provided to the following personnel prior to commencement of the exercise: OCE, range safety officer, and aircraft service squadron commanding officer.

Procedures

OCE

1. Direct tow aircraft to take station at a briefed altitude that is optimum for both the exercise and safety.
2. Designate firing ship's base course and speed.
3. Commence exercise when all participants are ready.
4. Observe and record position of bursts relative to the target. Report observations to firing ship at the completion of each run.

TOW AIRCRAFT

1. Take station as directed by OCE.
2. Report to OCE when the target is streamed with a minimum of 22,000 feet of towline and is at the briefed altitude.
3. Upon receipt of "Commence the scheduled exercise," make approach in accordance with

the Modified Bravo Run Diagram (Figure 3B-6) at the briefed distance, speed, and bearing off the ship's beam.

4. Inform firing ship when commencing run and state type of run (i.e., hot run/cold run).
5. Upon completion of each run, inform firing ship of course, speed, and altitude of target.

FIRING SHIP

WARNING

“Hold fire” shall be mandatory until tow aircraft pilot calls “On top — Cleared to fire.”

1. Conduct one tracking run prior to commencement of exercise.
2. Rounds will not be placed at ram position until tow aircraft marks “On top.”
3. Maintain positive air control of aircraft.
4. A mandatory “Bores clear” call shall be made to the tow aircraft upon completion of and prior to commencement of a firing run.
5. Conduct four firing runs.
6. If practical, a topside observer will verify that the gun is not at or leading the target tow aircraft.

ANNEX 3A

Hazard Areas

**3A01 RIM-7H/M Seasparrow Missiles —
Range Safety Criteria****1. Missile Hazard Space (MHS) and
Launch Conditions.**

- a. The MHS for Seasparrow missiles is depicted in Figure 3A-1.
- b. At the time of missile launch, the computed target intercept point must lie within the tactical envelope.
- c. At the time of missile launch, the MHS must lie within the assigned operating area.
- d. The MHS must be evaluated to be clear of all nonparticipating surface and air contacts (to 25,000 feet MSL) at launch and throughout the missile time-of-flight.

2. Manned Aircraft Tow Target. The following requirements must be fulfilled prior to launching a missile:

- a. The tow cable length must equal or exceed 24,000 feet for firing presentations.
- b. The manned tow aircraft must be overhead the firing ship and passing to the non-firing side at the time of missile launch.
- c. The target must be inbound to the firing ship at the time of missile launch.

3A02 Hazard Area for Gun Ordnance

See Figure 3A-2.

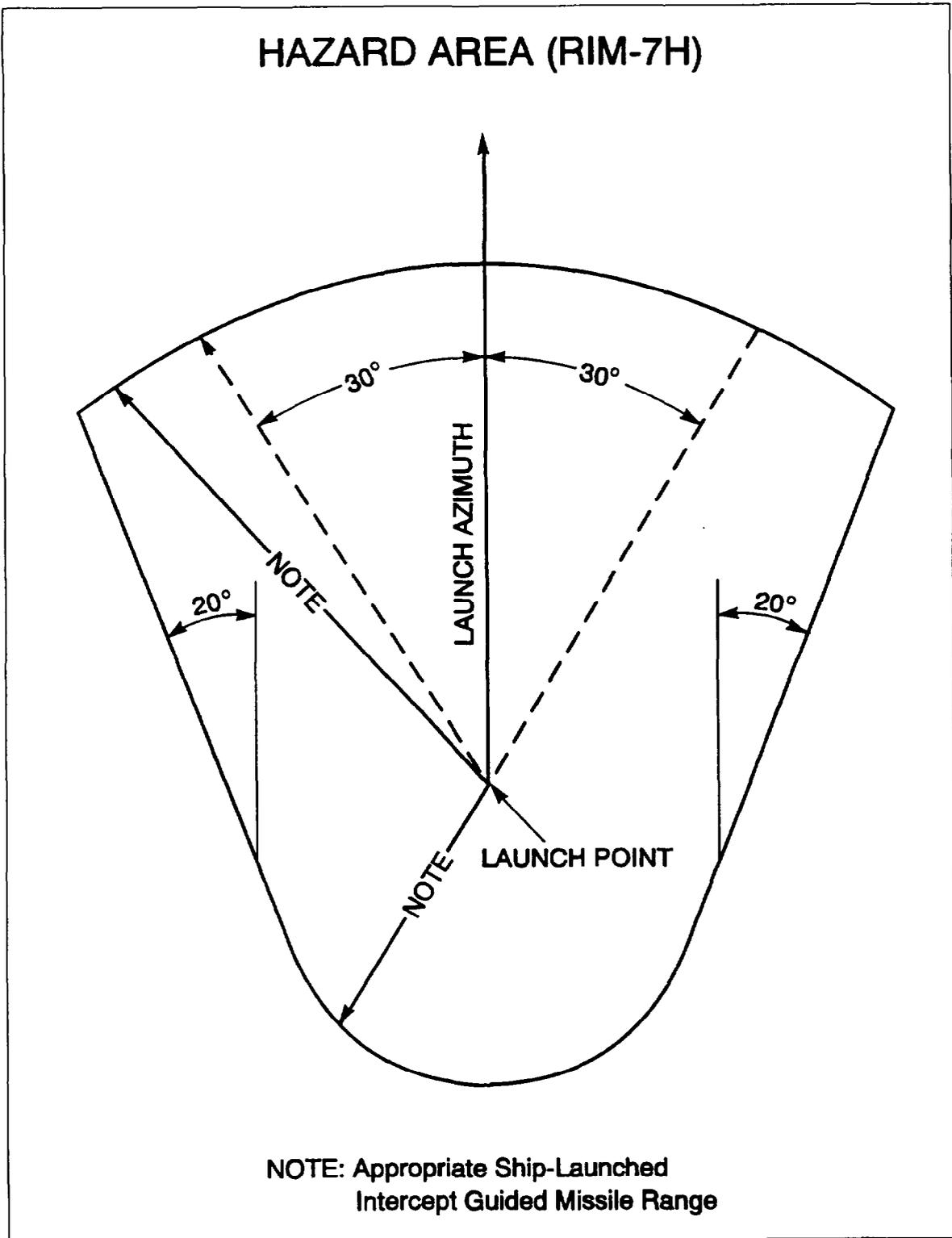


Figure 3A-1. RIM-7H Seasparrow Missiles (Sheet 1 of 2)

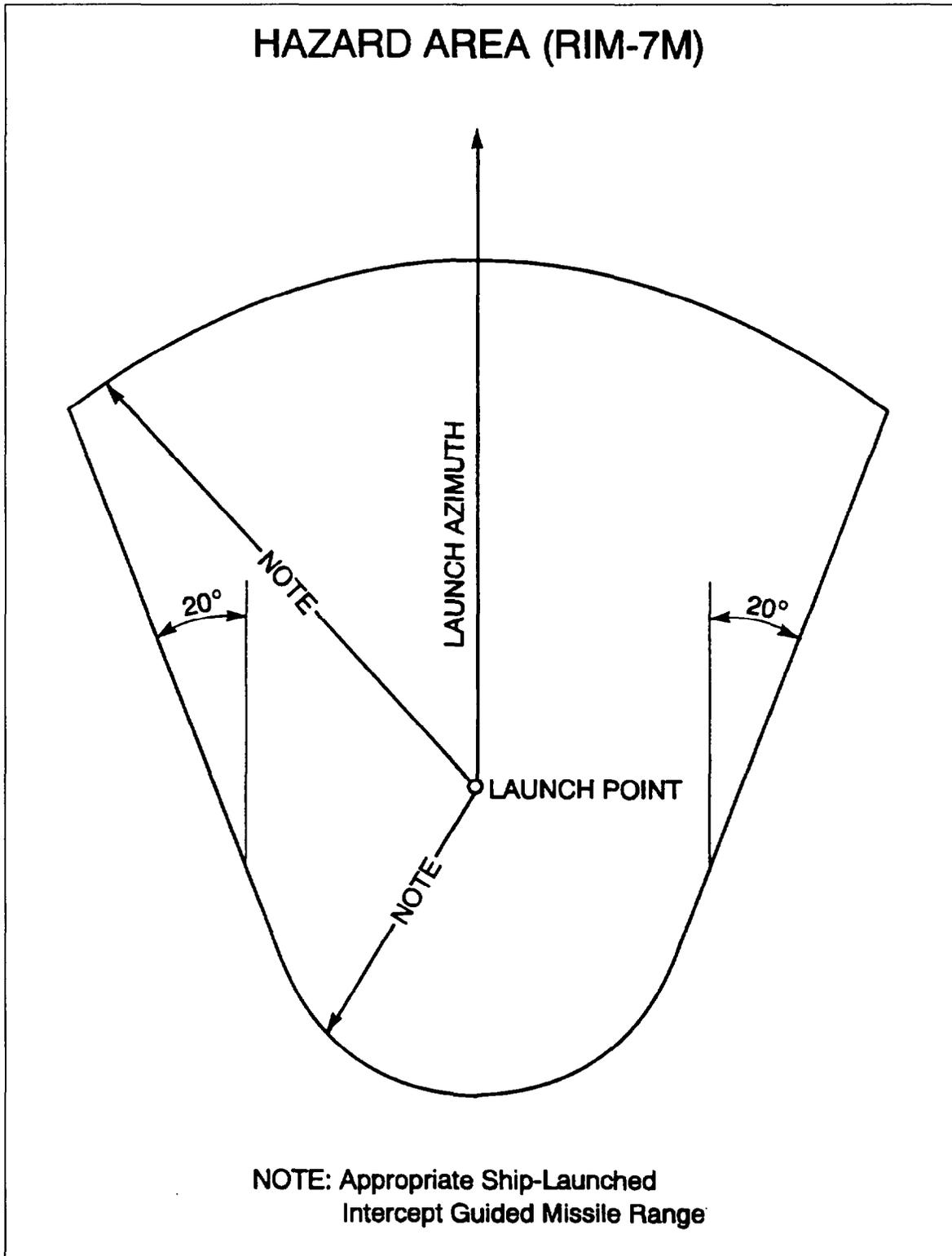


Figure 3A-1. RIM-7M Seasparrow Missiles (Sheet 2 of 2)

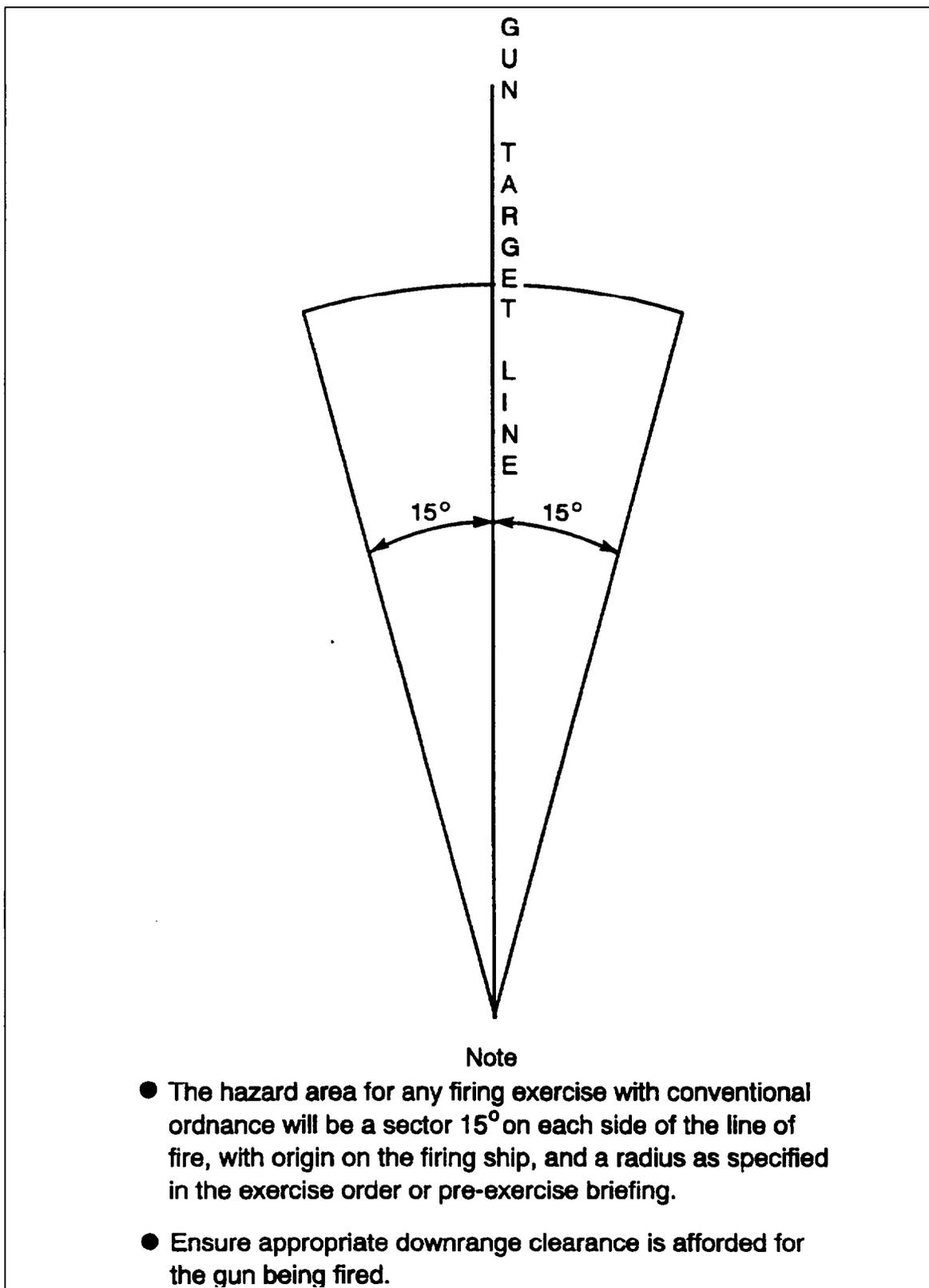


Figure 3A-2. Hazard Area for Gun Ordnance

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EXTAC 1005 (Rev. A)

ANNEX 3B

ASM and SSM Profiles and Firing Run Diagrams

**1005-3B-1
UNCLASSIFIED**

ORIGINAL

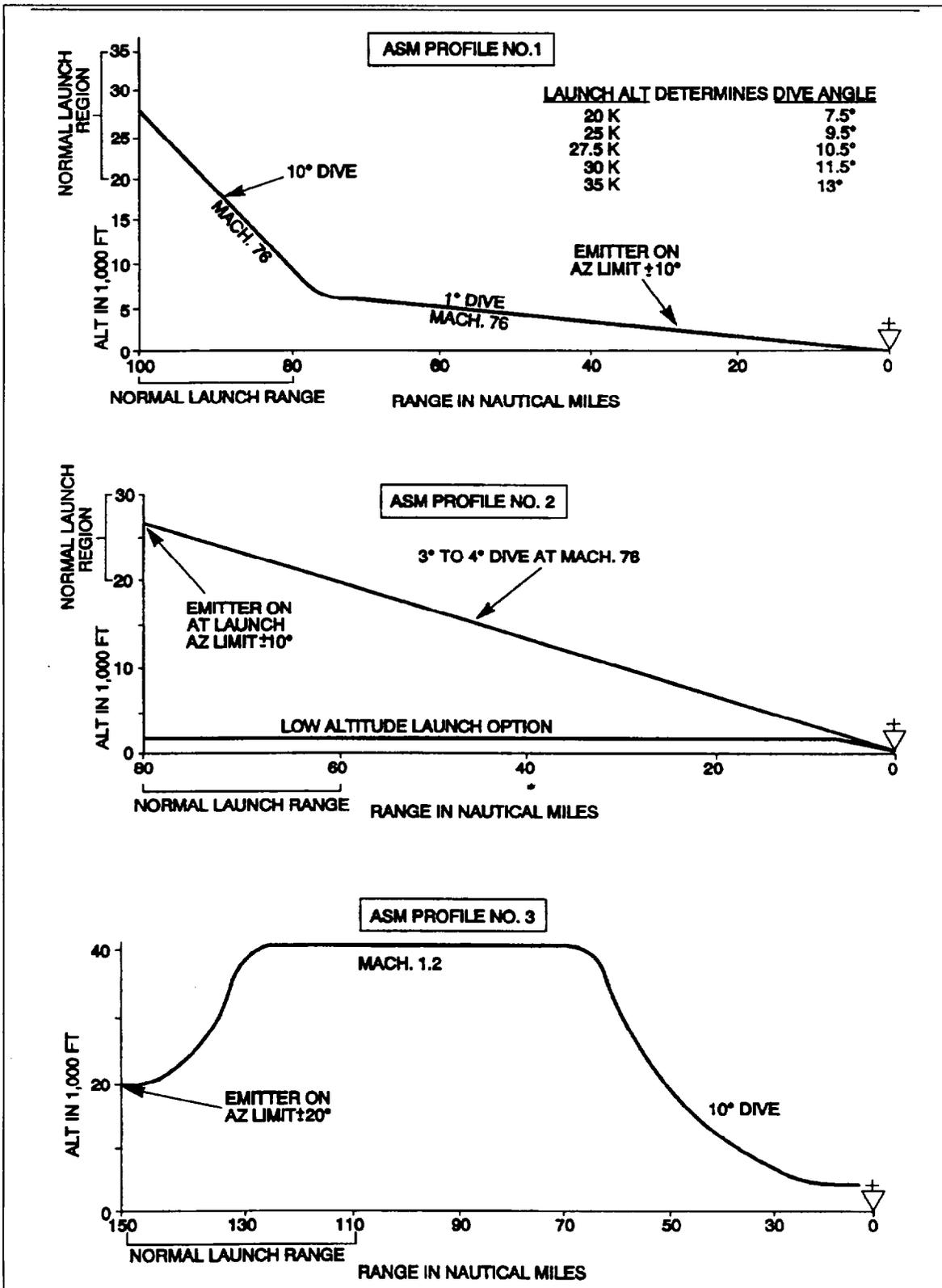


Figure 3B-1. ASM Profiles

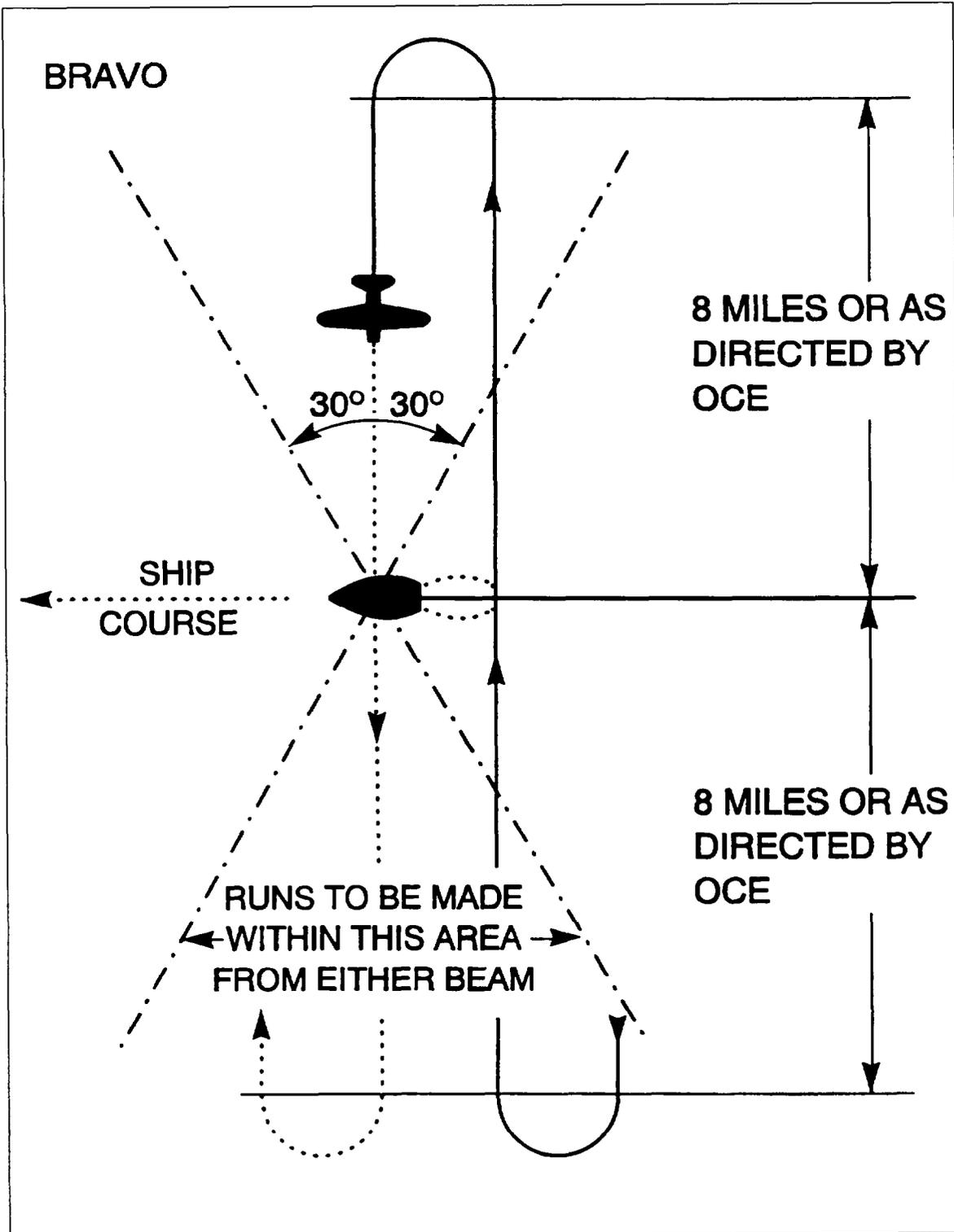


Figure 3B-3. Bravo Run Diagram

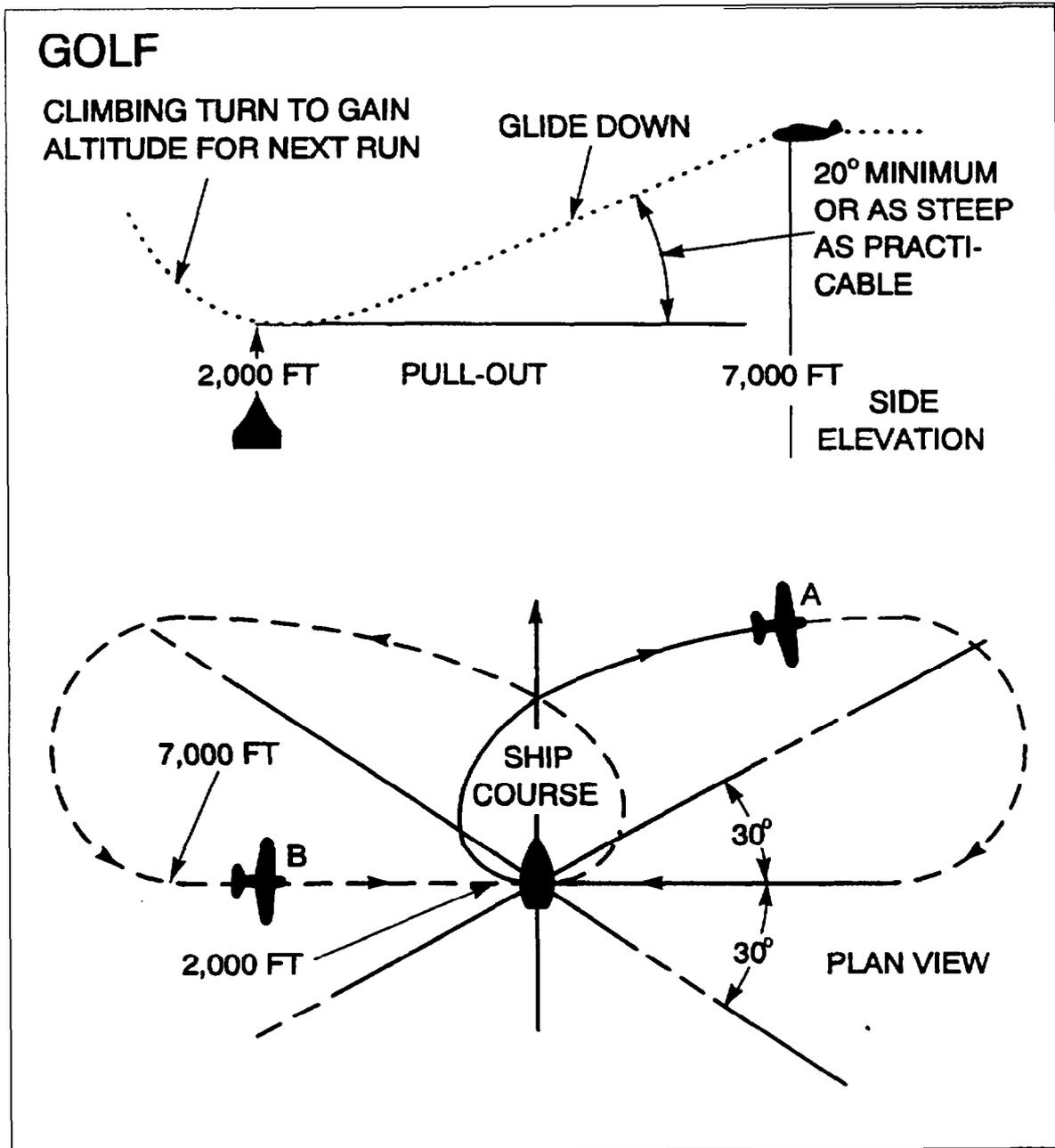


Figure 3B-4. Golf Run Diagram

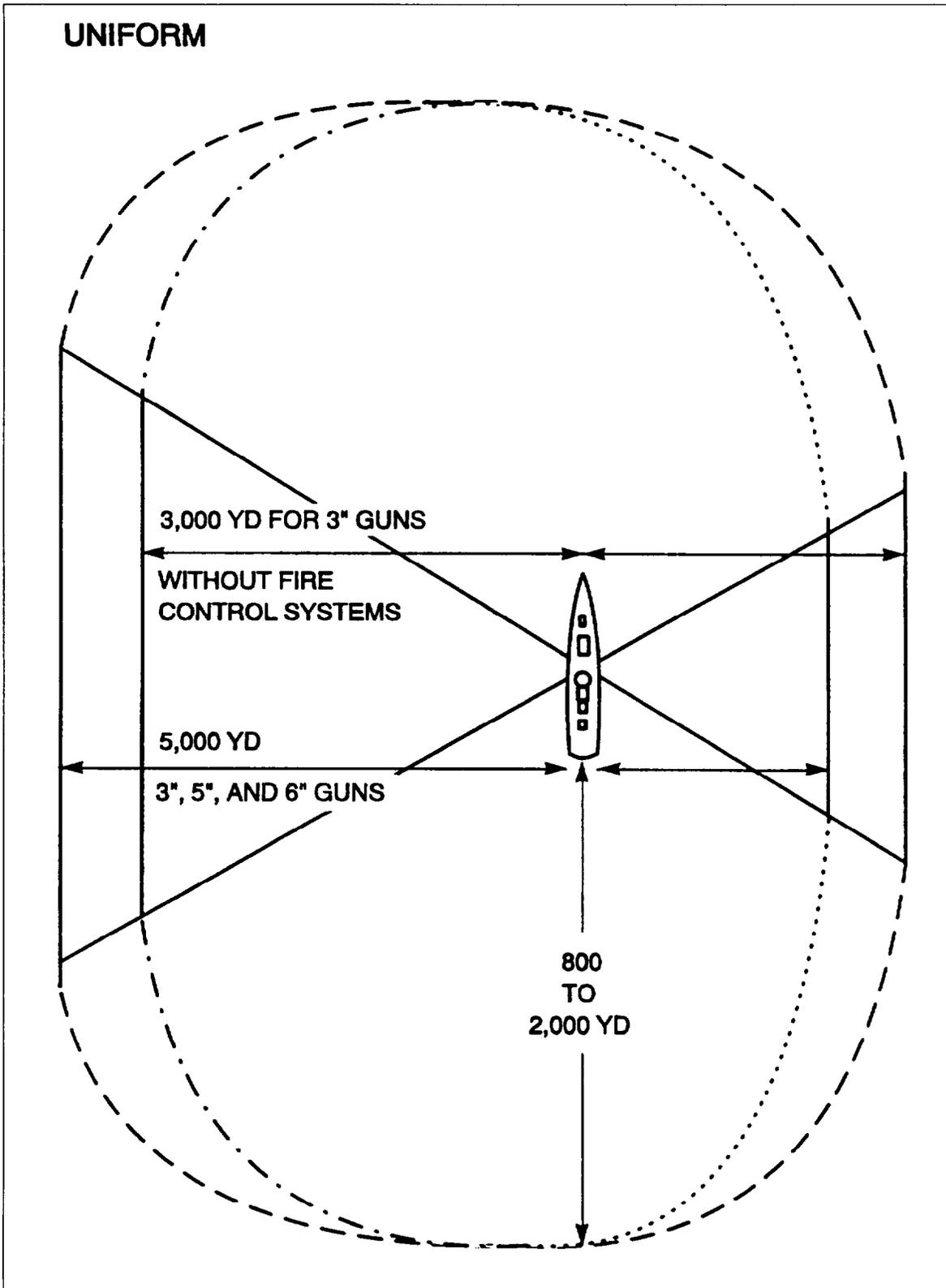


Figure 3B-5. Uniform Run Diagram

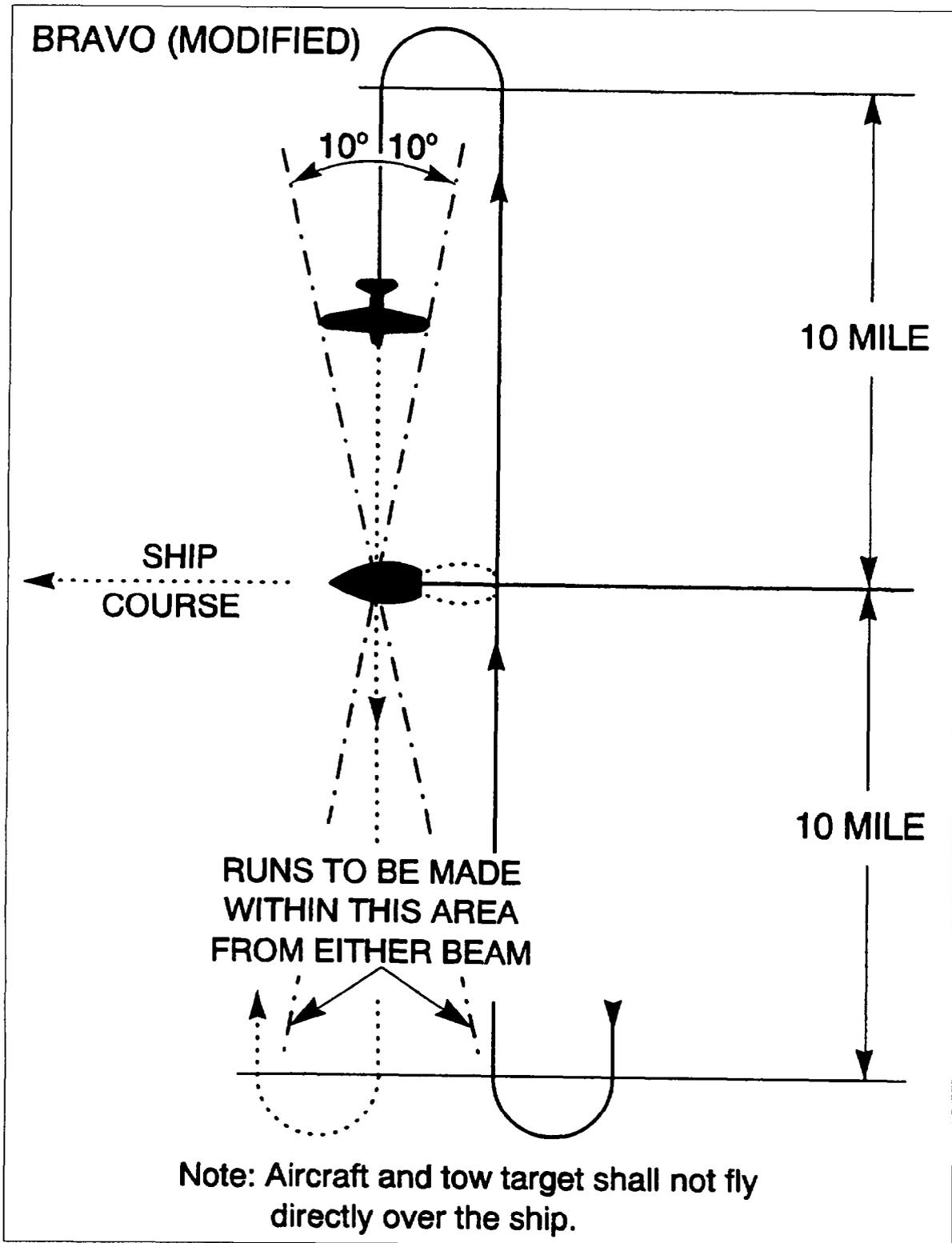


Figure 3B-6. Modified Bravo Run Diagram

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EXTAC 1005 (Rev. A)

ANNEX 3C

National Aerial Targets

**1005-3C-1
UNCLASSIFIED**

ORIGINAL

AIRCRAFT TOWED TARGETS						
Type	Dimensions	Maximum Tow Speed		Remarks		
TDU-32A/B	40 ft x 7.5 ft	250 knots (A-4, T-2, A-6, A-7, F-4, F-14, F/A-18)		Aerial banner, 90 percent radar reflective fabric.		
TDU-32B/B	40 ft x 7.5 ft	250 knots (A-4, T-2, A-6, A-7, F-4, F-14, F/A-18)		Aerial banner, 90 percent radar reflective fabric, laser reflective paint.		
TDU-34A/A	12 in x 25.5 in	0.9 Mach (A-4, A-6, F-4)		Radar augmentation with IR augmentation, real-time scoring, and visual augmentation available as kits.		
TARGET AIRCRAFT AND DRONES						
Type	Dimensions	Maximum Speed (Mach)	Service Ceiling (ft)	Flight Duration	Weight (lb)	Remarks
BQM-34S	155 in x 276 in	.3 to .97	10 to 50,000	40 min Mach 0.9 at 50,000 ft; 115 min Mach 0.6 at 38,000 ft; 15 min at Mach 0.4 at 10,000 ft	2,175	Launch from air, ground, ship Recoverable jet powered
BQM-74C	68 in x 151 in	.3 to .8	30 to 35,000	80 min Mach 0.6 at 30,000 ft; 30 min at Mach 0.6 at 20,000 ft	508	Launch from air, ground, ship Recoverable jet powered
QF-86F*	37.1 ft x 37.5 ft	.3 to .9	300 to 40,000	25 to 90 min	18,000	Remote control version of Navy F-86 Saber jet
QF-4		.4 to 1.9	300 to 50,000			
AQM-37A	168 in x 40 in	0.7 at 1,000 ft to 2.0 at 70,000 ft	1,000 to 70,000	2 to 15 min	570	Range of 25 nm at 1,000 ft to 155 nm at 70,000 ft. Expendable
AQM-37C	168 in x 40 in	1.2 to 3.0	55,000 to 80,000	2 to 15 min	570	Air launched
AQM-37C (ER)		1.2 to 4.0	55,000 to 100,000			
MQM-8X	28 in x 21.2 ft	2.2 M to 2.7	5,000 to 70,000	60 to 155 nm	7,855	Fleet VANDAL
MQM-8G	28 in x 21.2 ft	1.65 to 2.2	30 to 70,000	28 to 155 nm	7,855	Low- and high-speed versions
MQM-8G (ER)	25 in x 25 ft	2.15 to 2.7	30 to 70,000	Range 40 nm	7,855	Low-altitude version
AQN-127A	21 in x 216 in	.4 to 1.9	Less than 30	Range 55 nm	—	Under development
* Allocated for special exercises.						

Figure 3C-1. U.S. Navy Aerial Target

CHAPTER 4

Antisurface Warfare (ASU) Exercises**0401 Surface Gunnery Exercises**

1. Surface gunnery exercises are designed to train combatant ship personnel in the delivery of accurate fire on surface targets and to allow an evaluation of the performance of those personnel.

2. It is required that all spotters, optical and radar, spot each salvo. During night firings, there shall be no lights shown on the target.

3. A minimum 5-mil offset in deflection away from the towing ship is required for all surface gunnery exercises involving the use of a sled or a catamaran type of target, regardless of the type of ammunition used. A minimum 10-mil offset is required when using some equipment. Consult national doctrine for particular weapons systems being used. An exception to this is where offset is removed when the target is a surface balloon.

4. For all surface gunnery exercises, the towing ship must run a range-relative bearing plot of the firing ship from the most dangerous position and signal "Cease fire" whenever the plot passes outside the curve for the towline in use. A reduced-scale plot showing the limited safety bearing for surface firings is provided in Figure 4-1. Ranges should be corrected for known errors and the transmission interval.

5. When the orders for an exercise permit and such action will not result in foul range, the commander of the target group may change course to prevent the firing ship from reaching a limiting bearing. The towing ship must warn the firing group when the limit is approached. It is the responsibility of the firing ship to ensure that no firing is conducted when the parallax angle between the towing ship and the target is less than the values indicated. Ships of the target group, other than the towing ship, are required to maintain, throughout all maneuvers, stations that will ensure that their safety equals or exceeds that provided for the towing ship.

6. Officers formulating orders for gunnery exercises should plot possible tracks and

incorporate provisions for firing portions of normal runs to lie wholly within the safe fire areas. In formulating orders for gunnery exercises, when fixed true limiting safety bearings are considered necessary, the curves give limiting safety bearings relative to the base course without reference to ships and target maneuvers. When either is used, true limits should be so curtailed that safe relative bearings will at no time be exceeded by any ship of the target group.

7. While these curves outlining the safe fire areas are faired on the side of safety, the safety afforded by the use is dependent entirely upon control of fire with normal accuracy. It is imperative, therefore, that safety checksight officers remain alert. When checksights are obscured, additional safety observers should be designated to use multiple-mount indicators or whatever similar instruments have been installed. The ship should suspend firing when matching errors exceed safe values. Towing ships are obligated to advise firing ships of the length of towline before commencing the exercise.

8. The pre-action calibration (PAC) system will be used for all surface gunnery exercises. This system is used to obtain multiple early hits on a surface target at maximum effective range as follows:

a. Match the fire control radar with the present range on the computer.

b. Fire a salvo on a bearing close to the anticipated bearing of the target at the maximum effective range, and spot a second salvo to the range notch of the radar.

c. Fire third and fourth salvos. Both should land in the range notch at maximum effective range.

d. Without further adjustment, fire rapid salvo or continuous fire onto the target when it reaches maximum effective range.

9. Safety observers furnished by the firing ship:

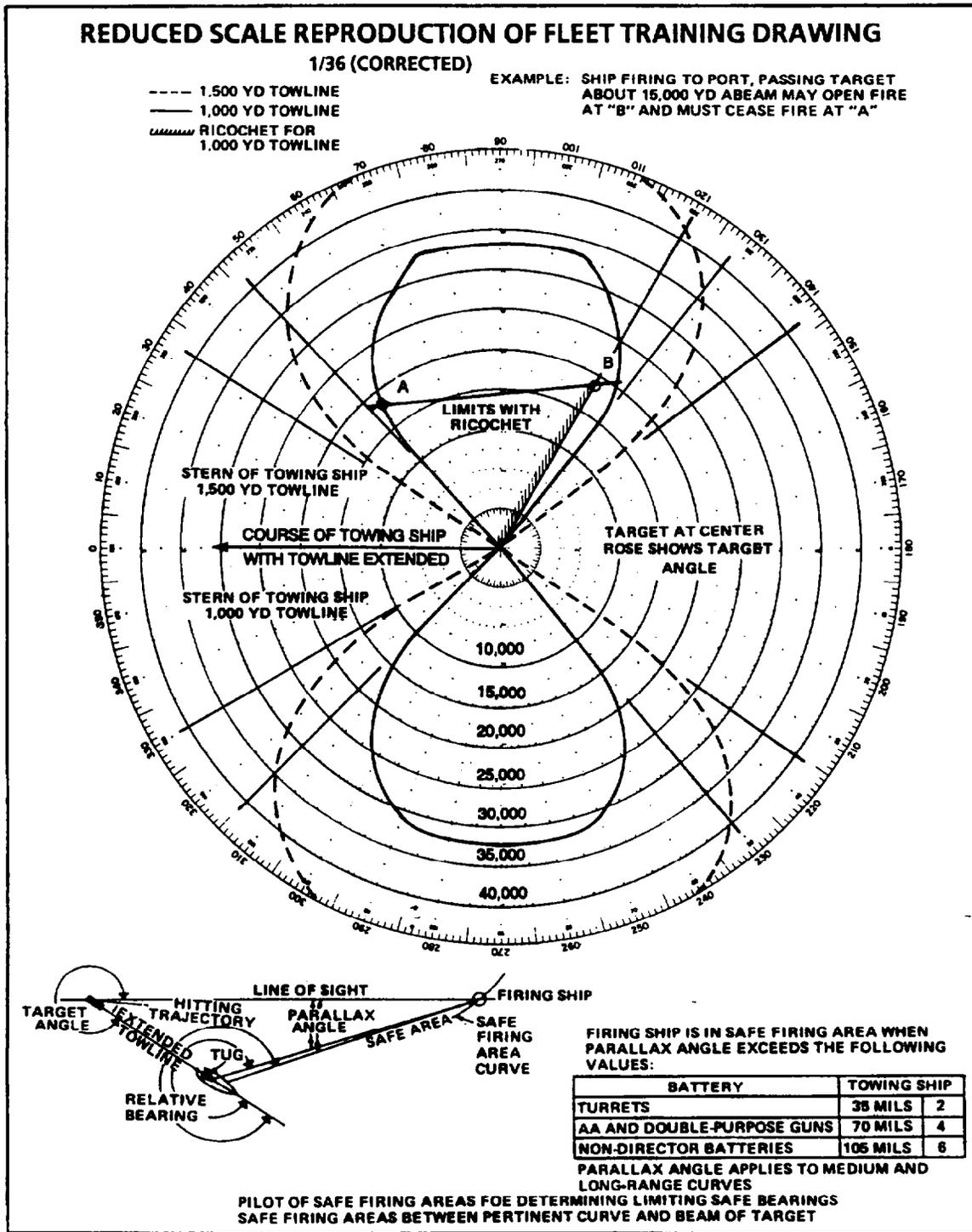


Figure 4-1. Limiting Safe Bearing

- a. Ascertain accuracy of shots. Proximity triggered bursts or material hits on a target must be visually observed.
- b. Ensure that safe procedures are used. For all firings, the area down range must be clear to the extreme range of the gun.
- c. Conduct post-exercise critique.

10. Each shot is raked by the target towing ship unless the OCE requires that the rake indicate only the median point of impact (MPI) of the salvo. Normally transmitted to the firing ship by voice radio, rakes for each salvo are sent separately.

11. Flag B shall be displayed by firing and target ships. When close up on the firing ship, it means "Firing has commenced." When hauled down by the firing ship, it means "Firing completed." When close up on the target ship, it means "Target ready; range is clear." When hauled down by the target ship, it means "Firing completed" or "Range is foul."

0402 Gunnery Safety

1. In the pursuit of safe and efficient firing of any gun or mount, all personnel must be guided by the rule that, "The decision to cease fire rather than to continue fire under doubtful conditions is always above censure."

2. The weapons officer shall order "Cease fire" if any doubtful conditions become evident.

3. Definitions.

- a. Serious safety violation — A violation that could cause immediate consequential hazard to life or limb, or gross material damage.
- b. Major safety violation — A violation that, if not immediately corrected, could cause damage or harm to personnel or equipment.
- c. Minor safety violation — A violation that would not cause any immediate damage or harm to personnel or equipment but if not corrected promptly could cause an accident in the future.

4. Serious Safety Violations.

- a. Ammunition was handled in a grossly negligent manner.
- b. The gun mount commenced fire prior to being ordered to.
- c. Smoking was noted in ammunition spaces and/or while handling ammunition.
- d. The gun mount crossed the tug with a loaded gun.
- e. Personnel were noted working in a gun pit or on mount machinery with power turned on and/or pressure in the accumulator.
- f. Personnel used improper hot gun or misfire procedures.
- g. The director tracked the service unit or other unit while the gun was assigned to it and ammunition was available to the gun mount.
- h. Adjacent mounts were controlled by different directors.
- i. Fire was commenced or continued outside safe fire bearings.

5. Major Safety Violations.

- a. The mount captain/OMC operator failed to observe the lay of the gun barrel.
- b. Excessive skylarking or inattention to duty was noted during the exercise.
- c. Nonknowledgeable checksight and safety observers were assigned.
- d. Neither the "Cease fire" command or alarm was used.
- e. Personnel used inaccurate bore report.
- f. Personnel were inattentive to abnormal conditions and negligent to cause "Cease fire" or "Check fire" to be given.
- g. All personnel exposed to gunfire did not wear ear protection.

h. A loaded gun was trained outside safe fire bearings.

6. Minor Safety Violations.

a. There were fire and/or missile hazards in the gun mounts/magazines.

b. The Bravo flag was improperly used.

c. Battle dress was incorrect.

d. The checksight report was incorrectly given. (Terminology)

e. The bore report was incorrectly given. (Terminology)

0403 Checksight Observer

1. A checksight observer shall be assigned to each firing mount (or in the case of an unmanned mount, to a designated position where he can properly perform checksight duties) for all gunnery exercises. He shall have no duties other than to ensure that the requirements of the safety precautions are fulfilled. Basically, the following shall apply: ship shall cease the firing of any gun whose line of fire is endangering any object other than the designated target. Those objects include friendly ships and aircraft, and own ship's structure together with the mounts and launchers, fixed or moving. This stipulation applies to objects in the vicinity of the firing, points throughout the trajectory, and in the vicinity of the target.

2. **Duties on Gun Mounts With Installed Checksight Telescope (When Sight Angle and Sight Deflection are Being Transmitted).** The checksight observer shall:

a. Maintain constant visual contact with the target by the use of the installed checksight telescope and report checksight conditions to the controlling station.

b. Cause the firing gun to cease fire immediately if any object other than the target becomes visible in the installed checksight telescope, including excessive gun smoke. If the target becomes obscured by gun smoke, "Check fire" is satisfactory until the target again becomes visible, at which time "Commence fire" may be ordered again.

c. Report to the controlling station the reason for causing the gun to cease firing.

d. Prevent the gun from firing until the dangerous condition has been remedied.

3. **Duties on Mounts Not Having Installed Checksight Telescopes.** The checksight observer shall:

a. Station himself behind the firing gun in order to sight along the barrel to ensure that the line of fire will not endanger any friendly ships, aircraft, or own ship's structure or equipment.

b. Cause the firing gun to cease firing immediately if the line of fire is not clear to the maximum range of the run.

c. Report to the controlling director the reasons for causing the gun to cease firing.

d. Prevent the gun from firing until the dangerous condition has been remedied.

0404 Checksight Conditions

For all antiaircraft firing exercises, the checksight observer shall report "Checksight foul" when the line of fire endangers any object other than the designated target. However, the target is seldom visible and the nonsighting of the target by the checksight observer should not be the basis for a "Checksight foul" report. For all surface firing exercises, the checksight observer shall ensure that the guns bear on the target sled and report "Checksight on target"; otherwise, report "Checksight foul."

0405 Safety Precautions in Surface Firings

1. **General Safety Rules.** These rules apply to all surface firings:

a. **Safety Sector.** Firing ship is to cease firing if any object is in dangerous proximity to the line of fire up to the maximum range of the gun as determined by the commanding officer. Due allowance is to be made for ricochets, errors in deflection, conditions of firing, and the nature of the practice. A reasonable safety figure for medium caliber guns (76 mm to 130 mm)

is 6° either side of the line of fire (excluding the tug) outside the maximum range at which ricochets will occur. A reasonable range for the safety sector is the maximum gun range plus 2,000 yards.

b. Aircraft. Firing ship is to cease fire if aircraft are detected flying below possible height of shell in dangerous proximity to the line of fire.

c. Ammunition. Fire is to be ceased if it is apparent that projectiles may fall within the following distances of any object other than the target:

- (1) Practice shell — 1,000 yards.
- (2) High explosive — 2,000 yards.

d. Ricochets. Shells which are fired to fall at ranges which are produced by gun elevations of less than 9° may be expected to deflect on the surface to the right of the line of fire. When ricochet occurs, the maximum angular deflection cannot be stated, because it depends on sea conditions and other factors. A deflection of up to 45° of line of fire is not abnormal. It must be assumed that high explosive shells may ricochet because of fuse failure. The maximum range to which ricochets will go is the range to the first impact plus one-third of that range. These factors must be considered when calculating the safety sector.

2. Day Visual Firings at Towed Targets. In addition to the general safety rules, the following rules are applicable:

- (1) When using full caliber practice ammunition, the minimum length of tow is to be as follows:
 - (a) 1,000 yards — All conditions except for item 2.
 - (b) 650 yards — 57 mm and below by day.
- (2) Except when specially authorized, only practice ammunition may be used against towed targets. When high explosive service ammunition is

authorized for surface practice, the minimum length of tow is to be 1,500 yards.

(3) Firings at towed surface targets are to take place only within the boundaries of 45° forward and aft of the target beam. If firing at ranges shorter than the maximum range that ricochets will occur, the towing ship is to be to the left of the line of fire.

3. Day Blind Firings at Towed Targets. In addition to the general safety rules, the following rules are applicable:

a. Blind firing is not to take place until both towing vessel and target have been identified positively. Range may subsequently be opened beyond visibility range provided the OCE has authorized the use of radar clear range procedures.

b. The length of tow is to be not less than 1,000 yards.

c. At ranges above 9,000 yards, firings are to take place only within the boundaries of 20° to 45° forward and aft of the target beam if pencilbeam fire control radars are to be used. If using track-while-scan radars, firings are to take place only within the boundaries of 45° forward and aft of the target beam. If firing at ranges shorter than the maximum range that ricochets will occur, the towing ship is to be to the left of the line of fire.

d. Blind surface firing is not to be carried out until a responsible officer has identified the towed ship and target echoes on the gunnery radar set display, has satisfied himself that the discrimination of the set is adequate, and has reported that it is safe to proceed with the practice. He must also ensure that radar does not jump from target to towing ship during the exercise.

e. Firing is to cease if difficulty is experienced in distinguishing between the target and the towing ship echoes.

f. Blind firing is not to take place until the visibility allows the towing vessel to

survey visually the following areas centered on the target:

- (1) Radius 1,000 yards — Practice shell firings.
- (2) Radius 2,000 yards — High explosive shell firings.

4. Throw-Off Day Firing. In addition to the general safety rules, the following rules are applicable:

- a. A safety observer is to ensure that when throw-off is applied, it is applied in the correct direction and by the correct amount.
- b. A reasonable minimum amount of throw-off to be applied is:
 - (1) 6° for practice shell firings.
 - (2) 12° for high explosive shell firings.
 - (3) The line of fire must be to the right of the target, if the firing range is under the maximum range that ricochet will occur; this applies to all types of shells.

5. Day Firings on Remote Controlled Targets. In addition to the general safety rules, the following rule is applicable:

Except when specially authorized, only practice ammunition may be used. When high explosive ammunition is authorized, the minimum firing range is 4,000 yards.

6. Night Firings. In addition to the general safety rules, and the applicable day firing rules, the following rules are applicable during night firings:

- a. The towing/target ship is to burn an all-around red masthead light in addition to navigation lights.
- b. If so prescribed by the OSE, the target may be fitted with an all-around white light in order to help the observing parties.
- c. Firing ship should be darkened and burn navigation lights only.

7. Starshell Firings. Starshells are not to be fired if the range is foul within 16° each side of the line of fire up to maximum starshell range plus 2,000 yards.

0406 Towing Ships

1. The following rules apply to all towing ships:

- a. If it becomes necessary for any reason to stop the exercise or practice, towing ships will haul down flag Bravo and inform the firing ship on the assigned frequency or send "Cease fire" by signal searchlight and sound several blasts on the whistle. Since flag and whistle signals may not be visible or audible at great distances, especially in bad weather, the towing ship should also fire one Very light.

- b. Immediately after completion of the practice, towing ships will report on their observations if so required. Such information must not be passed in plain language over radio circuits.

2. Towing ships must advise firing ships on length of towline before the practice is commenced and the number of radar reflectors on the target.

0407 General Precautions

1. No firing exercise shall commence until there is two-way voice communication between the firing ship and the service unit (tug or aircraft).

2. The service unit must never be tracked, nor shall any other ship or aircraft be tracked when ammunition is available to the mounts. Ammunition shall be considered available whenever it is broken out and the hoists or rotary magazines are filled.

3. During all firing runs, adjacent mounts must be controlled by the safe director/fire control radar or stowed in order to eliminate the possibility of one mount firing across or into another mount.

4. During all firing exercises, the safe director/fire control radar must be tracking the target before the mounts are ordered to automatic with an "air/surface action" command.

METHOD	FACILITIES REQUIRED (Other than observers on firing ship)	REMARKS
Counting material hits	Canvas target on sled	
Visual rake	Mechanical rake and rake party on target or tow ship	Can be used day or night. Should be used as an assist for other methods.
Camera rake	Camera mounted on tow ship	
Radarscope photography	Radarscope camera on firing ship	
Phototriangulation (2-cut)	Camera party and reference ship	Requires special preparation.
Phototriangulation (3-cut)	Camera party and reference ship	Provides additional set of photos to air analysis.

Figure 4-2. Methods for Determining Miss Distance for Surface Gunnery Exercises

5. Firing mounts shall not shift control to local control in the middle of a firing run before "Cease fire" because of the possibility of (1) endangering the tug and other surface craft and (2) the barrels of a mount being fired into by an adjacent mount. Gunnery officers should ensure that mount captains are familiar with this dangerous situation.

6. Guns and directors shall assume a position at the command "Cease fire" that provides a safe line of fire until it is determined that the bore is clear and the controlling station gives a ready command. For anti-aircraft firing, this should be 5° elevation on the firing beam; for surface firing, it is on the target in the same mode of control used for firing.

7. When using full charge service ammunition, the minimum length of tow cable is to be 1,000 yards for all conditions except:

- a. 650 yards for 57 mm and below by day.

0408 Determining Miss Distance in Evaluating Gunnery Exercises

1. The OCE is responsible for coordinating the means used to measure the miss distance and/or hit in evaluating gunnery exercises. (See Figure 4-2.)

2. Shell splashes, to be located with respect to the line of fire and target, reach maximum height in about 1 second and last 2-1/2 to 3 seconds. These times will vary with range, sea condition, and type of ammunition fired. Shell splash spray discernible on radar will linger for about 6 seconds.

3. Deflection or elevation miss distance in mils of a shell splash or burst usually can be determined by the firing ship. Conversion of deflection or evaluation in mils (d' or e') to deflection or evaluation in yards (d or e) at a known range (R) is accomplished by the formula $d = .001 Rd'$ or $e = .001 Re'$.

0409 Radarscope Photography and Mechanical or Camera Rake

1. Radarscope photography used in conjunction with mechanical (visual) rake or the camera rake will result in an adequate evaluation for most surface gunnery exercises.

2. **Radarscope Photography.** By using a radarscope camera on the target towing ship or other ship at a comparable range, it is possible to determine the fall of shot with an accuracy of 50 yards in range. Some splashes will be lost because of the inability of radar to resolve near misses and

splashes within 15 yards of each other. Also, if sea conditions are State 3 or above, it may not be possible to identify splashes. By plotting the line of flight through the target blip on the picture obtained, it is possible to estimate range error.

3. Camera Rake. Photographs taken from the target towing ship are interpreted. Assuming zero deflection, the fall of shot is located at the intersection of the target splash (TS) line and the line of fire (LOF). See Figure 4-3, wherein the firing ship has supplied the deflection miss distance thus allowing an accurate determination of the range miss distance. In this instance, without the ship's observed deflection, location of the splash(es) along the target splash line would be difficult.

4. Standard Mechanical Rake. The mechanical (visual) rake, situated on the target towing ship, measures miss distance in range, long or short of the target, along the line of fire. Based on the geometric relationships of similar triangles, the mechanical rake is designed to provide the distance directly in yards.

a. In Figure 4-4, the TS line is the apparent miss distance in range. Points S_1 and S_2 indicate where the splash actually may have occurred since the rake does not take into account deflection or firing ship bearing changes.

b. Comparing the similar triangles TSR and tsr of Figures 4-4 and 4-5, the formula for the miss distance in range (TS) along the line of fire (TF) is derived as follows:

$$TS:ts::RT:rt$$

$$TS \times rt = TS \times rt$$

$$TS = \frac{ts \times RT}{rt}$$

c. TS equals the miss distance in range along the line of fire (TF), and RT equals the target towline length. The rake arm ts scale is normally constructed so that 1 inch equals 25 yards; thus, the miss distance (TS) is read directly from the ts scale.

d. The rake is properly aligned by keeping the sighting arm rt pointed at the target and

lining up the sliding sight b with end peg f and the firing ship.

5. Design.

a. Figure 4-6 shows a mechanical rake that can be mounted on a stand with a cylindrical orifice. The numbered parts are:

- (1) Rake arm.
- (2) Sighting arm.
- (3) Parallax arm.
- (4) Parallel motion link.
- (5) Stationary sight.
- (6) Stationary sight block.
- (7) Sliding sight.
- (8) Parallel motion link connections.
- (9) Sighting arm clamp.
- (10) Sighting arm carrier bar.

b. The sights and arms have been arranged to permit compactness of design and to prevent mutual interference between operators. The sighting arm is graduated for effective towline lengths from 300 to 1,300 yards (can be varied if necessary) and is made adjustable by means of the sighting arm clamp. The graduation for towline length is set at the arrowhead on the sighting arm carrier bar. The reading edge of the rake arm is beveled so that colored distinguishing marks can run to the base of the pins. This facilitates the rapid observation necessary with the several shots of a large salvo. The parallax arm is graduated in inches from its pivot with the rake arm. By solution of similar triangles, the following is determined for setting parallax:

Parallax (in) =

$$\frac{\text{Towline length (yd)} \times \text{length of rake arm (in)}}{\text{Mean firing range (yd)}}$$

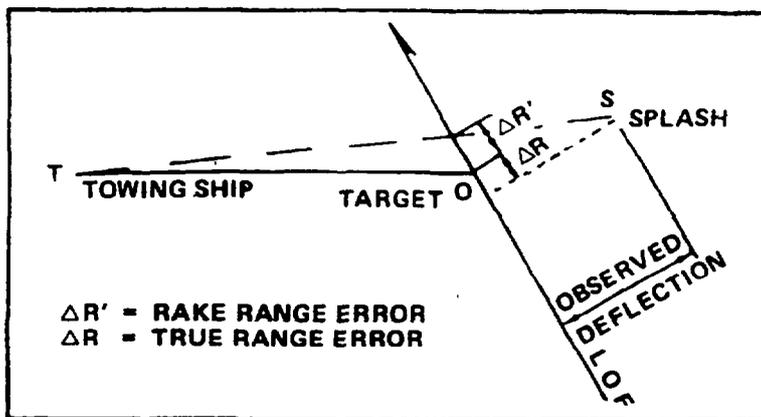


Figure 4-3. Camera Rake Diagram

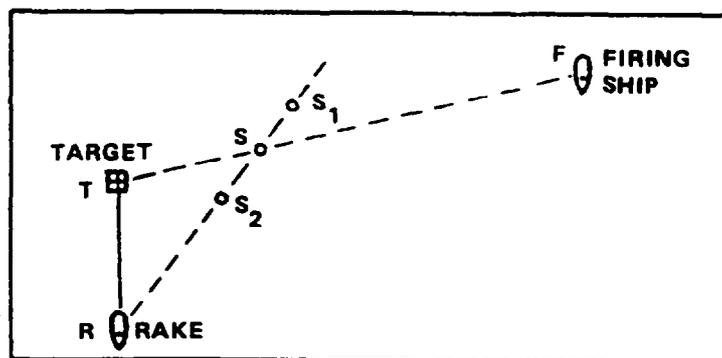


Figure 4-4. Rake Situation

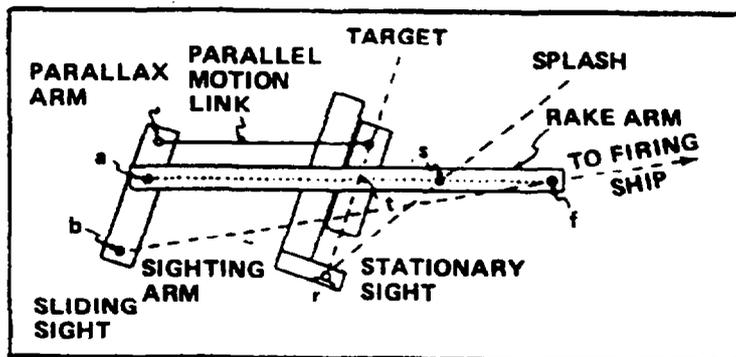


Figure 4-5. Rake Relationships

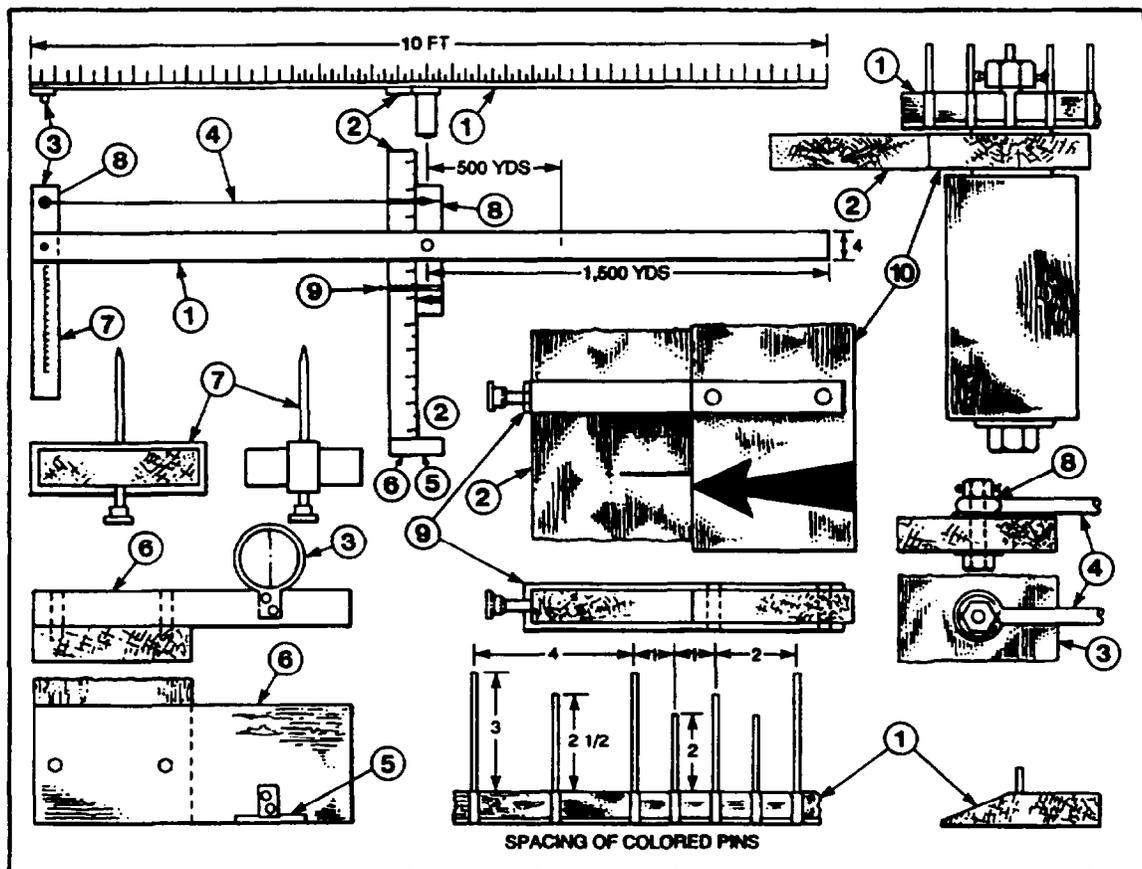


Figure 4-6. Rake Design

c. The parallax arm can be mounted on either end of the rake arm. For operation it is mounted on the end away from the firing ship. The rake should be finished with a coat of clear shellac.

0410 Missile Exercise Considerations

1. Safety Zone.

a. A safety zone must be selected along the range before a weapon firing exercise is conducted and the safety zone portion of the range must be cleared before firing. Weapon firings may be a hazard to transient ships and aircraft and a potential hazard to supporting ships and aircraft because of booster impact, fragmentation fallout, and guidance or homing errors. Naval commanders must establish adequate

procedures to ensure that the range is clear before expending ordnance or missiles through an overcast in an approved warning area. The operational commander who is to conduct the exercise is responsible for ensuring that he has a clear range, based on established visual and radar surveillance procedures, before beginning the exercise. In making his final decision, the operational commander is to consider all applicable factors, such as:

- (1) Urgency of the mission.
- (2) Density of air and surface traffic.
- (3) Local visibility.
- (4) Distance off shore the exercise will be conducted.

(5) Type and expected reliability of the ordnance.

(6) Availability, accuracy, reliability, and completeness of radar coverage.

b. The safety zone should be surveyed during the exercise by all available facilities, including ship's radars and lookouts, and aircraft (when available).

c. The OCE must accept a degree of risk commensurate with the ordnance type, intercept range, and local operating area conditions. A 100 percent assurance of safety is not possible in every case. The OCE can select appropriate boundaries

for the safety zone and ensure that they are covered in the face-to-face briefing prior to the exercise.

2. Missile Destruction. A command or self-destruct reliability of 95 percent is expected; however, a higher percentage shall not be assumed. Destruct signals shall be sent to missiles 10 seconds after the predicted intercept time for a single missile or for the trailing missile of a two-missile salvo. If missile beacons fail, destruct signals shall be sent to missiles at a time after predicted intercept which is equal to one-tenth of the predicted flight time.

0411 Antisurface Warfare (ASU) Exercises

ASU-1 COMBINED AIR AND SURFACE TRACKING

TARGET AIRCRAFT CONTROLLER

Purpose

As ordered by OCE.

To train personnel in the simultaneous tracking of air and surface contacts to determine contact data.

EXERCISE SHIPS

Requirements

1. One or more aircraft to act as target(s).
2. Two or more ships to act as surface targets.

1. Track surface and air contacts to determine contact data.

2. Report and evaluate contact to OCE, as directed in pre-exercise briefing.

3. At COMEX, ships shall delete all existing contact data.

Note: This exercise may be conducted using synthetic target simulators.

3. The exercise ship will maintain standard plotting procedures.

Procedures

OCE

1. Designate the following:
 - a. Base course, speed, and initial station for exercise and target ships.
 - b. Ship to control target aircraft.
 - c. Type attacks for surface and air targets.
2. Conducted time check with all units.
3. When all units report ready, order COMEX.

SURFACE TARGETS

1. Take station and make approach on exercise ship as directed by OCE.
2. Execute course and speed changes at appropriate intervals delineated in pre-exercise briefing.
3. Record and report to OCE data as delineated in pre-exercise briefing.

ASU-2 LONG-RANGE PASSIVE TRACKING AND TARGETING**Purpose**

To train ships in procedures for searching, detecting, tracking, multi-sensor correlating, and determining contact data.

Discussion

This exercise is designed to train ships in the mechanical aspects of tracking and determining contact data. The target ship's course is changed once to increase substantially the difficulty of the problem. Additionally, radar emissions have been varied to increase complexity of the detection portion of the problem.

Requirements

1. Blue tracking ship as briefed by OCE.
2. Orange tracking ship as briefed by OCE.

Scenario

An Orange target has been separated from the main threat force and is making a sweep toward Blue to locate potentially hostile surface units. The Blue tracking ship is ordered to covertly detect, classify, and localize the target ship and be prepared to launch an ASUW attack once a targeting solution has been obtained.

Procedures**OCE**

Designated exercise participants, communications plan, exercise area, COMEX and FINEX times. Exercise should be limited to 1 to 2 hours.

Direct Orange unit to maneuver as directed by OCE.

Provide special procedures for Orange ship, including radiation plan.

ORANGE TARGET SHIP

1. Set emissions control as directed by OCE. Upon COMEX, implement radiation plan. Transit toward Blue as directed by OCE.
2. Attempt to detect and classify Blue ship. Simulate engaging Blue when targeting solution has been obtained.
3. Collect data and maintain records as directed below.

BLUE TRACKING SHIP

1. Set emissions control as directed by OCE.
2. Detect and track ship using passive sensors and passive plotting techniques.
3. Track and localize target at maximum feasible range but close if necessary for passive sonar tracking.
4. Use shipboard weapons systems to estimate target location.
5. At FINEX, establish target ship position as directed by OCE.
6. Collect data and maintain records as directed by OCE.

ASU-3 SPOTTING**Purpose**

Train personnel in day spotting of surface fire and in optical spotting at night.

Requirements

1. Tow ship to tow sled target.
2. If day, camera party, reference ship, and spotting aircraft, if available.
3. OCE shall ensure that proper ammunition requirements are met.
4. OCE shall brief limiting safety bearing of target prior to the exercise.

Safety

If for any reason it becomes necessary to stop firing, the towing ship signals "Cease fire" to the firing ship visually and by voice radio, dips Bravo flag, and sounds repeated short blasts on the whistle.

A minimum 5-mil offset in deflection away (astern) from the target is required for all surface gunnery exercises involving the use of a sled or a catamaran type of target, regardless of the type of ammunition used.

In the event of loss of positive voice radio communication between the tow ship and the firing ship, the firing ship shall automatically cease fire until communication is re-established.

Assign safety observer to each firing mount.

Procedures**OCE**

1. Designate type of spotting (optical, radar, or aircraft) and firing range band for each run (if day), and base course, speed, and initial position of tow ship.

2. When tow ship, firing ship, and spotting aircraft (if day) report ready, order "Commence the scheduled exercise."

3. Direct firing ship and tow ship to burn all-around white truck light (if night).

TOW SHIP

1. Tow sled target with at least 1,500 yards of towline.
2. Take station designated by OCE and report ready.
3. Upon receipt of "Commence the scheduled exercise," change course and increase speed as briefed prior to the exercise.

SPOTTING AIRCRAFT (IF DAY)

NOTE: Aviators providing this service must know and understand the procedure of the exercise and must be thoroughly familiar with spotting procedures.

1. Report to OCE when on station and ready.
2. Spot and record each salvo as directed by OCE.
3. Terminate exercise as scheduled or as directed by OCE.

FIRING SHIP

1. Take station as directed by OCE on bow or quarter of tow ship and report ready to OCE.
2. OCE shall brief appropriate maneuvers to be performed upon receipt of "Commence the scheduled exercise" for both day and night exercises.
3. Fire exercise with optical ranging and spotting using appropriate illumination at night.
4. Use standard control and spotting doctrine.
5. Coordinate spotter roles for each run.

**ASU-4 SURFACE DRONE UNIT (SDU)
TARGET****Purpose**

Train rangefinder and radar operators in spotting gunfire against mobile targets.

Requirements

1. High-speed surface drone unit (SDU).
2. Drone control unit and reference ship.
3. Simulate night conditions. Use appropriate control and spotting.
4. OCE shall ensure that proper ammunition requirements are met. Phase I of SDU firing will require most of the rounds. Phase II of SDU firing will require the remaining rounds.

Safety

1. Firing trajectories shall not pass within 4,000 yards of the control ship if it is other than the firing ship.
2. OCE shall brief the appropriate range bands for firing prior to the exercise.

Procedures**OCE**

1. Designate base course and speed.
2. Prescribe initial setup with control ship as reference ship.
3. Order "Commence the scheduled exercise" when the firing ship, control ship, and SDU are ready.

CONTROL SHIP

1. Act as reference ship and steam on base course at base speed.
2. Prior to COMEX:
 - a. Disseminate intelligence report of tactical scenario.

b. Launch SDU, test operation and reliability of its control, and maneuver it into the appropriate position.

3. At COMEX:

a. OCE shall brief maneuvers to be conducted by control and reference ships at COMEX.

b. Maneuver the SDU to the appropriate closing course and speed.

4. Announce "Target" when the SDU is at the appropriate briefed ranges from the firing ship. OCE will cover these ranges in the face-to-face briefing.

5. When SDU reaches appropriate range from firing ship, as covered by the OCE in the face-to-face briefing, from SDU to a retiring course, reverse the control ship course, and announce "Torpedoes away."

6. At FINEX, close and recover SDU and provide firing ship with hit data.

FIRING SHIP

1. Take initial station as briefed by the OCE prior to the exercise.

2. At COMEX, increase speed to appropriate speed and commence two-phase exercise as briefed by the OCE prior to the exercise.

3. Open fire with control solution obtained when "Target" is announced by control ship. Appropriate range bands will be briefed by the OCE prior to the exercise.

4. Upon announcement of "Torpedoes away," conduct appropriate maneuvers while maintaining after battery unmasked to fire Phase II.

5. Upon completion of Phase II, turn and close SDU to simulate final destruction and recovery of evidence.

6. Terminate exercise and report FINEX when:

- a. SDU is incapacitated by gunfire, as observed by control ship or firing ship.

b. Loss of control is reported by control activity.

c. SDU sinks, burns, or is otherwise dead in the water.

d. Ammunition allowance is expended.

e. Range becomes foul.

ASU-5 ALTERNATE/LOCAL CONTROL, LONG-RANGE FIRING, HIGH-SPEED SURFACE TARGET

Purpose

Train personnel to deliver fire at long range under simulated night conditions without illumination.

Train personnel in procedures to counter high-speed surface targets.

Train personnel to deliver fire at short range using the alternate/local control mode.

Discussion

The OCE will brief specific requirements for various configured ships prior to the exercise.

Execution of the exercise has certain constraints. When firing with an offset, range spotting only will be performed.

General Requirements

AMMUNITION

The OCE will brief the type and number of rounds to be used for each phase of the exercise. The type of fire, FCS or GFCS, and firing ranges for each phase will also be covered in the face-to-face briefing prior to the exercise.

TARGET SUPPORT

1. Surface balloon (mandatory for Phase III).
2. Towed target sled (mandatory for Phases I and II.)

ACTIVITY SUPPORT

Exercise ASU-3 requires the following functional support:

1. Tug and target sled services.
2. Reference ships/aircraft.

Safety

GENERAL

If for any reason it becomes necessary to stop firing, the towing ship shall signal "Cease fire" to the firing ship visually and by voice radio, dip the Bravo flag, and sound repeated short blasts on the whistle.

The OCE will brief the minimum offset in deflection behind the target sled. Ensure that the service ammunition fuze is set on safe. No offset in deflection is required if a surface balloon is used.

In the event of loss of positive voice radio communication between tow ship, firing ship, and/or reference ship, the firing ship shall automatically cease fire until communication is re-established.

Safety observers shall be assigned to each firing gun mount.

The OCE will brief the limiting safety bearing of the gun-target line prior to the exercise.

Scenario

The OCE will brief the tactical scenario with respect to the threat and phases I, II, and III of the exercise. This will occur in the face-to-face briefing conducted prior to the exercise.

General Procedures

OCE

1. Designate base course and speed and initial positions of firing ship and tow ship.
2. Conduct time check (both intership and intraship).
3. If there is more than one ship firing during this exercise, designate order of firing for ships in company and when to commence run. Each ship is to fire singly.

NOTE: Ship equipped with more than one gun mount shall designate one firing mount for each exercise phase.

4. Designate day or night exercise conditions. When night conditions are specified, use standard night action.

5. When firing ship and tow ship report "Ready," order "Commence the scheduled exercise."

TOW SHIP ALL PHASES

1. Steam on base course as directed by OCE and report when ready.
2. Rake fall of shot and transmit rake data to firing ship on completion of exercise.

Firing Procedures

FIRING SHIP PHASE I (LONG-RANGE FIRE)

1. Upon receipt of "Commence the scheduled exercise," firing ship takes station as directed by OCE.
2. Upon receipt of "Prepare for surface action," firing ship maneuvers to pass target abeam at the range briefed by the OCE and at the appropriate speed.
3. Firing ship's course shall be approximately parallel to target course.
 - a. Data collection personnel take station to record fall-of-shot data.
 - b. Observers use optics and gun and director telescopes (if so configured) as necessary to ensure safety requirements.
4. When target is within the briefed limiting safety bearing, give command to "Open fire." Fire in accordance with the procedures outlined by the OCE.
5. Controlling spotters record spots for post-exercise critique.

FIRING SHIP PHASE II (COUNTER HIGH-SPEED SURFACE TARGET)

1. Upon completion of Phase I, take station briefed by the OCE on a reciprocal course in order to pass the target abeam within the designated range bands.
2. Upon receipt of "Prepare for surface action," firing ship increases to the appropriate speed.

3. Upon reaching the open fire bearing to the target, firing ship maneuvers to induce a closing range rate at the appropriate bearing at the range bands designated by the OCE.

4. Upon command "Open fire," fire in accordance with the procedures outlined by the OCE in the face-to-face briefing.

5. Controlling spotters record spots for post-exercise critique.

FIRING SHIP PHASE III (ALTERNATE LOCAL FIRE)

NOTE: Phase III will only be fired against a balloon. Upon completion of Phase II, slow to speed briefed by the OCE and maneuver to pass target on an approximately parallel course at a range briefed by the OCE.

1. Upon receipt of "Prepare for surface action," maintain course and speed to keep the target on the beam within the specified range.
 - a. Data collection personnel take stations to record fall-of-shot data.
 - b. Observers ensure safety requirements are met. No outside assistance for the Phase III firing will be available to the gun crew except that communications will be maintained for safety.
 - c. CIC, gun plot, fire control director, and radar crew will maintain track and record data.
2. When within the briefed limiting safety bearing, give command to "Open fire." Fire in accordance with the procedures outlined by the OCE in the face-to-face briefing.
 - a. Fire three rounds to bracket target.
 - b. Fire remaining rounds in slow salvo fire.

NOTE: If fired via target designation transmitter (TDT) control, operator must hold "On Target" button while firing.

ASU-6 SURFACE TRACKING**Purpose**

To train personnel in the tracking of surface contacts to determine course and speed.

Procedures

Note: This exercise may be conducted using synthetic target simulators.

OCE

1. Designate target ship(s).
2. Designate base course and speed.
3. Conduct time check.
4. Designate initial station of target ship(s) and exercise ship(s) (initial range should be maximum of surface radar if practicable).
5. When ships report ready, order "Commence scheduled exercise."

TARGET SHIP(S)

1. Take station as designated by OCE.
2. Transmit gyro error to OCE prior to COMEX.
3. At "Commence scheduled exercise," close exercise ship(s).
4. Change course/speed as directed by OCE.
5. At one end of the exercise, record and report the following to OCE:
 - a. Courses and speeds
 - b. Time of commencement of the course and speed changes.
 - c. Time when steady on course and speed.
6. End exercise when target ship(s) has/have maneuvered for 1 hour or when terminated by OCE.

ASU-7 OVER-THE-HORIZON TARGETING (OTHT)**Purpose**

Train ship's personnel in over-the-horizon targeting.

Requirements

1. Threat-oriented scenarios with two or more surface combatants (Blue SAG) and a suitable surface unit serving as threat ship (Orange).
2. OCE given control of the following functions:
 - a. Target mobility
 - b. Defensive posture
 - c. Target course/speed validation procedures.
3. Team contact management effort required for determination of target ship.
4. Demonstration of available passive plotting procedures.
5. Tracking ships will adjust defensive posture in accordance with proper tactics.

Procedures**OCE**

Designate exercise participants, communications plan, exercise area, and COMEX and FINEX times.

Designate SAG commander.

Designate threat axis. Direct Orange unit to station. Direct Orange unit to adopt measures to prevent disclosing course to Blue SAG prior to COMEX. At COMEX, direct Orange unit to select course(s) that will permit passage within 10 nm of Blue SAG's starting position. Direct appropriate speed.

Provide special procedures for Orange unit, including defensive posture. Designate and brief

appropriate usage plan for sonar, search radar, and HF radiation.

ORANGE TARGET SHIP

Set defensive posture and open Blue in direction to disguise ultimate course of attack. At COMEX, implement defensive posture provided by OCE. The OCE will brief safety requirements for the defensive posture.

Simulate firing SSMs when convinced targeting solution has been obtained.

Collect data and maintain records as directed below.

Discontinue reporting own ship's position on the appropriate circuit 1 hour prior to COMEX.

BLUE SAG

Compute environmental predictions for acoustic and electromagnetic propagation.

Establish baseline while maintaining communications capability and adequate baseline measurements.

Prior to COMEX, perform a time check with all SAG units.

Set defensive posture with consideration given to maintaining an accurate measurement of the baseline.

Within OCE guidelines, utilize a communication procedure that reduces communications to a minimum, maintains required level of security, and guarantees continuous communications capability.

Search for target ship using passive sensors and dual ship passive plotting techniques, including use of faired bearings.

Employ force over-the-horizon track coordinator (FOTC) procedures to provide target disposition to Blue SAG.

Upon initial detection, notify all SAG units of signal's presence. Maneuver formation to optimize chances that all SAG units will detect target.

Localize target using passive triangulation procedures. Correlate all intercepts and fixes.

Provide firing parameters to weapons console including compensation for wind, temperature, and target motion. Simulate the coordinated firing of weapons by all SAG units once every 15 minutes after initial targeting solution has been obtained.

At FINEX, radiate surface search radar and establish Orange target ship's position. Mark on all maneuvering plots.

Collect data and maintain records as directed below.

Data Requirements

Maneuvering plots on a scale of 1 inch = 5,000 yards with own ship's position marked at least every 5 minutes (all units).

Radar, sonar, and HF emission log (Orange target unit only).

Passive time bearing plots plus any intermediate worksheets (Blue SAG units only).

Weapon firing solution including data used in calculation (Blue SAG units only). Record seeker mode.

SSM firing solution (Orange target unit only).

Copy of all reports made on Orange target unit.

Commanding officer/tactical action officer narrative (all units).

Reconstruction

Blue SAG commander will obtain all Blue and Orange data. Using radar tiepoints plus supporting data, Blue will superimpose Orange track onto Blue's maneuvering plot and will assess number of times weapon firings would have hit Orange. Record range of each firing, miss distance, whether coordinated firings were achieved, and time of arrival of weapons in a multiple firing.

ASU-8 SHORT-RANGE, HIGH-SPEED, SURFACE ENGAGEMENT WITH MACHINEGUNS

Purpose

Train key personnel to react to small, high-speed surface craft attack.

Discussion

This is a quick reaction exercise designed to train personnel in the rapid assessment of and response to a small, high-speed surface craft attack. Since high-speed surface targets are not available, the ship must use relative speed to simulate target speed.

Exercise will be conducted utilizing appropriate available mounts.

General Requirements

SCHEDULING

This exercise should be scheduled upon completion of ASU-3.

AMMUNITION

The OCE will brief the number of rounds to be used for each mount prior to the exercise.

TARGET SUPPORT

1. One 55 gallon drum.
2. One ballon (weather, Mylar) or the target balloon if still afloat/inflated after completion of phase III of ASU-3.
3. One FAST (floating at sea target). (Ship's allowance permitting, a smoke float may be used to facilitate visual tracking of the target).

Safety Precautions

1. If for any reason it becomes necessary to discontinue firing, the firing ship shall signal "Cease fire" by sound-powered phones, 1MC, bullhorn, or repeated short blasts on the ship's whistle.

2. Mounts must have target in sight prior to commencing fire.

3. Safety observers shall be assigned to each mount.

4. Safety bearings are limited only to positive stops of mounts.

OCE

1. Designate base course and maximum speed up to 20 knots.
2. When firing ship reports ready, order "Commence the scheduled exercise."
3. Care should be taken to ensure any topside observers other than participants in this exercise remain clear and are provided adequate hearing protection.

FIRING SHIP

1. Take station as directed by OCE, set threatened level, and report when ready.
2. Upon receipt of "Commence the scheduled exercise," come to base course, slow to 3 to 5 knots, launch target, and increase to designated speed.
3. Maneuver as necessary (see Figure ASU-5-1) to approach drum at designated speed.
4. Open fire range will be briefed by the OCE for each mount prior to the exercise.
5. Cease fire range in all cases shall be 500 yards.

UMPIRE TEAM

Observers will correlate the pattern of the fall of shot with the constructive target size and attack profile of a small surface craft to determine the effectiveness of the firing. (To this end, the mounts should concentrate their fire at and slightly behind the drum.)

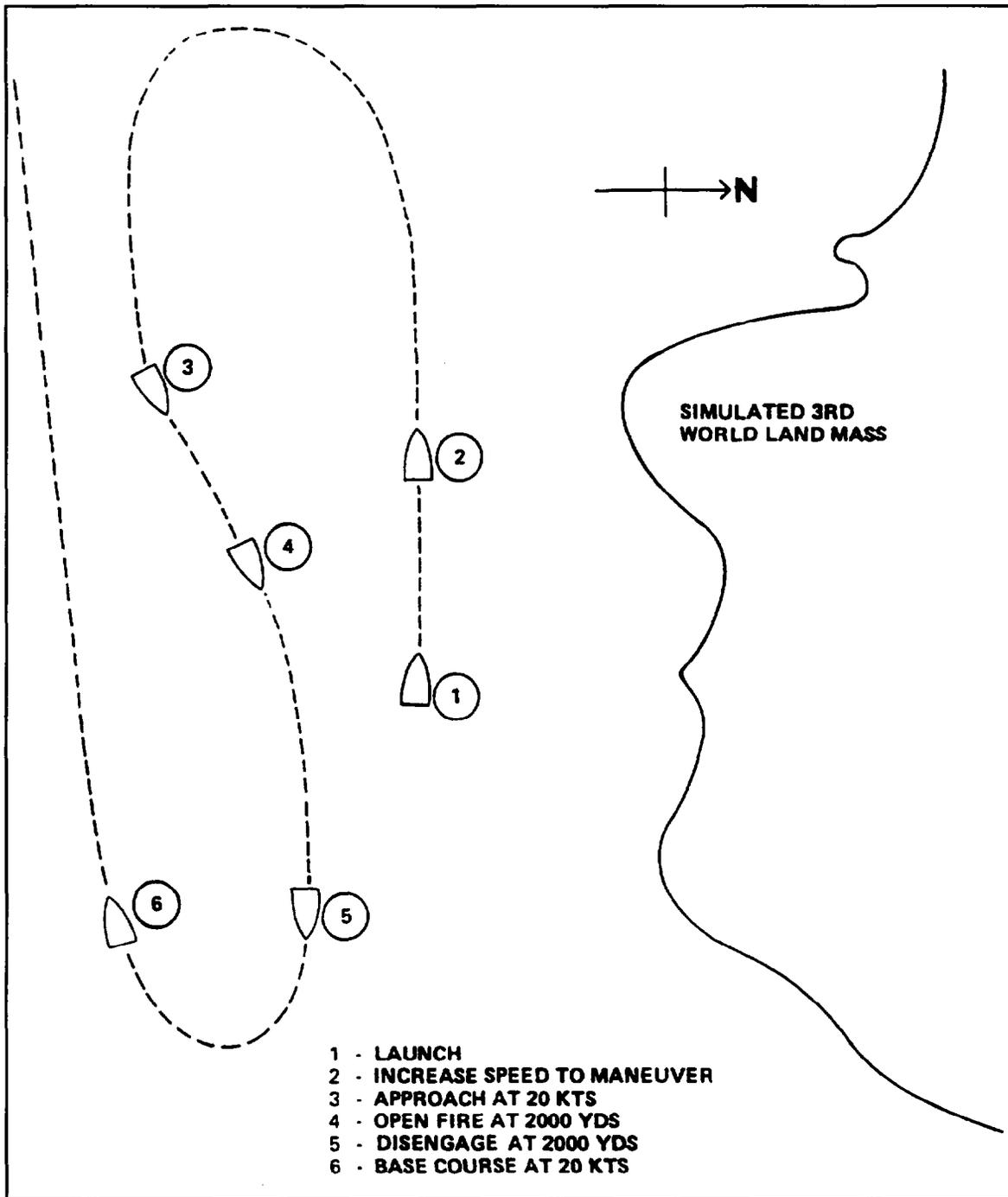


Figure ASU-5-1. Situation Maneuvering

Scenario

The OCE will cover the tactical scenario with respect to the threat and phases I, II, and III of the exercise. This will occur in the face-to-face briefing conducted prior to the exercise.

FIRING PROCEDURES

Phase I is a nonfiring evolution.

To commence Phase II, firing ship will conduct an operational check of weapon by firing a 3- to 5-round burst at target disclosure.

When at range briefed by OCE from target, order "Batteries released" and designated mounts(s) (if they have positive visual contact) will commence fire.

Firing procedures will be briefed by the OCE for each mount.

OCE will brief the conditions for cease fire.

Upon completion of this phase, if the target remains afloat, maneuver ship to repeat exercise.

Upon completion of exercise, ship should recover or sink target if still afloat.

ASU-9 CONVENTIONAL SURFACE TRACKING**Purpose**

To train combat information center (CIC) personnel in tracking surface contacts to determine course, speed, and closest point of approach.

Requirements

One or more surface vessels to act as targets.

This exercise may be conducted using synthetic target simulators.

Procedures**OCE**

Designate base course and speed, assign initial station for target ship(s), conduct time check and, when all ships report ready, order exercise commencement.

TARGET SHIP(S)

1. Take station assigned by the OCE. Transmit gyro error to OCE and report when ready to commence exercise. When ordered to

commence exercise, close the exercise ship while maneuvering within the following constraints:

- a. Course/speed changes: A minimum of six course changes and five speed changes must be made. Course changes must be at least 30° and speed changes shall be at least 5 knots. Target ship(s) shall remain steady on course not less than 4 minutes nor longer than 10 minutes. Speed shall be maintained for 6 to 10 minutes.
 - b. Ships without a dead reckoning tracer (DRT): Should the exercise ship not be equipped with a DRT, the target ship(s) shall maintain course and/or speed for 7 to 12 minutes.
2. Upon FINEX, or when within 4,000 yards of exercise ship, the target ship shall immediately report the following information to OCE:
 - a. Time of commencement of course and speed changes.
 - b. Time steady on course and speed.
 3. In the event reliable, secure voice communications cannot be established/maintained, the above information shall be passed in a timely manner over an appropriate circuit.

**ASU-10 APPROACH AND ATTACK
(SURFACE TARGET)**

Purpose

To train approach officers and ship control parties to make approaches on surface ships.

Requirements

1. Target as designated by OCE.
2. Air observer if available.

Procedures

OCE

1. Station exercise units as appropriate.
2. Prescribe target speed and maneuvering plan as appropriate.
3. Prescribe screening instructions.
4. Initiate run by executive method.
5. Inform air observer when firing signal is received.

6. Instruct submarine to proceed as directed upon termination of exercise.

TARGET

1. Upon receipt of "Execute," commence run as prescribed by OCE.
2. Maneuver only in accordance with prescribed plan or for safety reasons.
3. Do not attempt to evade attack. Inform OCE of receipt of firing signal.

SUBMARINE

1. Patrol as directed by OCE in initial position prior to zero time.
2. Upon receipt of "Execute," commence approach and attack.
3. Signal attack as directed by OCE.
4. Simulate additional torpedoes as directed by OCE.
5. Proceed as directed by OCE.

CHAPTER 5

Surface Maneuvering (MAN) Exercises

0501 General

1. The maneuvering exercises are designed to cover ship handling, standard and emergency procedures, replenishment at sea, and ship towing. They are designed to train shipboard personnel in:

- a. Proper application of the rules of the road and appropriate doctrine and instructions.
- b. Proper handling of ships in maneuvers.
- c. Safe operating procedures for deck equipment.
- d. Preparations and ship handling for the rescue of survivors and assistance to ships in distress.

2. In the interests of emphasizing safety, some replenishment procedures are reviewed below. The entire procedure to be exercised shall be covered by the OTC in a face-to-face briefing prior to conduct of the exercise. This briefing is in addition to the briefings required to meet the contingency of an emergency breakaway and to advise all personnel involved of the safety precautions and safety equipment used, which are part of each replenishment exercise. The equipment and procedures to be used for the transfer rig(s) employed shall also be covered in the face-to-face briefing.

0502 Replenishment at Sea

1. The close coordination required to effect transfers of material and personnel between ships underway can be achieved only by a clear understanding of the responsibilities of each ship. Standard procedures and good point-to-point communications are essential, especially at night.

2. The responsibilities related to ship handling are described in terms of the *control ship* and the *approach ship* — the control ship maintains the replenishment course and speed and is the unit guide, the approach ship keeps station abeam. The responsibilities relating to the rigs which are passed between the ships are set forth in terms of

the *delivering ship* and the *receiving ship* — the delivering ship furnishes and handles the rigs, the receiving ship receives the rigs. These terms are independent; either the approach ship or the control ship may be the *delivering ship*, the other being the *receiving ship*. Normally the *control ship* is the *delivering ship*.

3. Control Ship. The control ship is responsible for:

- a. Maintaining steady course and speed.
- b. Controlling, in close coordination with the approach ship(s), changes in course and speed necessitated by:

(1) Station keeping on the formation guide. (Formation course changes are executed in steps of not more than 5° (10° in emergencies), with time between steps to steady up.)

(2) Avoiding navigational hazards or collision.

c. During course changes:

(1) Advising the approach ship(s) when the rudder is put over for a course change and when the rudder is shifted to steady up.

(2) Altering the planned course change to steady on an intermediate course.

(3) Advising the approach ship(s) if it appears that a hazardous situation is developing during the turn.

d. Effecting required speed changes, which are not to be made simultaneously with course changes:

(1) Changing speed in increments not exceeding 1 knot, in coordination with the approach ship(s).

(2) Advising the approach ship(s) if it appears that a hazardous situation is developing during the speed change.

e. Making the required readiness (RO-MEO) signals for approach and transfer by signal flag hoist or by flashing light at night.

f. Displaying the appropriate international signal shapes (or task lights at night) from the time the approach ship commences the approach until the time the approach ship is clear.

4. Approach Ship. The approach ship makes the approach and keeps station on the control ship. The approach ship is responsible for:

a. Attaining and maintaining a position relative to the control ship that is optimum for safe tending and handling of the rigs passed between the ships.

b. Responding to required course or speed changes in close coordination with the control ship to maintain proper station for replenishment.

c. Making the required readiness (RO-MEO) signals for approach and transfer by signal flag hoist or by flashing light at night.

d. Displaying the appropriate international signal shapes (or task lights at night) from the time of commencing the approach until clear of the control ship and able to maneuver in an unrestricted manner.

e. Making the required disengagement (PREP) signals for departure by signal flag hoist.

5. Delivering Ship. The delivering ship is normally the control ship and will assume — unless otherwise directed by the OTC — the responsibilities of the control ship. The delivering ship normally furnishes the rigs, including the bolos or gun lines, station-to-station phone lines, and rig messengers.

6. Receiving Ship. The receiving ship is normally the approach ship and will assume — unless otherwise directed by the OTC — the responsibilities of the approach ship. The receiving ship furnishes and hand-tends the bridge-to-bridge phone/distance line and hand-tends the station-to-station phone lines.

0503 Maneuvering for Abeam Methods

1. The necessity for working at close quarters makes maneuvering during an UNREP a critical operation. Course and speed must be carefully selected to permit the precise maneuvering required of all ships for the approach, station keeping, and departure.

2. There must be adequate lateral separation during the approach, and the proper distance between ships must be maintained during transfers. Precise maneuvering is required to maintain station, because of the forces which act upon both ships. Particular emphasis must be placed on steering control and coordination between ships. Both ships must be prepared to execute an emergency breakaway and to avoid a collision.

3. For these reasons, a safety observer who is a naval officer qualified for and experienced in underway replenishment operations shall be assigned during an exercise on the bridge of each control and approach ship. If required for reasons of safety, he shall advise the OCE of a developing problem or direct the ship to initiate an emergency breakaway, as appropriate.

4. Designating the Control Ship. The ship supplying the product will usually be the delivering ship, the control ship, and the UNREP unit guide, unless the OTC directs otherwise.

5. Selecting Course and Speed.

a. The OTC or OCE selects and promulgates the replenishment course and speed. The replenishment course and speed should permit ships to maintain station with a minimum of strain on the rigs. Course selection should take into account the effects of sea state, wind conditions, and sheer currents (if present).

b. A replenishment speed between 10 and 16 knots is usually advisable. A ship must make sufficient speed to maintain steering control. A speed less than 8 knots is not advisable because of reduced rudder effect.

6. Approaching and Maintaining Station.

a. Distance Between Ships. Sufficient distance between ships must be maintained to ensure that replenishment can be accomplished with safety and efficiency. The proper distance depends on wind and sea conditions, sizes and types of ship, ability of ships to maneuver while abeam, transfer rig(s) employed, depth of water, and replenishment speed. Figures 5-1 and 5-2 provide distances between ships for the transfer rigs in use. On ships which have protrusions that extend outward from the hull, the distance is measured from the outermost protrusion, perpendicular to the centerline. Other considerations include:

(1) When replenishing in water of less than 35 fathoms (64 m), increase the distance between ships as the water becomes more shallow.

(2) Increase the distance between ships as replenishment speed increases. At a speed of 15 knots or more, distance between ships should be near the maximum limit.

(3) When ships yaw excessively, distance between ships should be near the maximum allowable distance.

(4) When all transfer stations are located on the quarter of a large ship, distance between ships should be maintained near the upper recommended limit.

b. Lateral Separation. Adequate lateral separation must be ensured during the approach, particularly when the bow of the receiving ship passes the stern of the delivering ship, because of the risk of collision. The differential in water pressure can cause the receiving ship's bow to veer in toward the delivering ship. Adequate lateral separation is vital at night and during periods of poor visibility when depth perception is impaired.

7. Approach Procedures.

a. The delivering ship, when steady on the replenishment course and speed, flies ROMEO at the dip on the rigged side. When ready to receive a ship abeam, the delivering ship hoists ROMEO close up. At night, ROMEO at the dip and close up must be signaled by flashing light.

b. The approach ship, when ready for UNREP at the designated stations, flies ROMEO at the dip. When the approach ship commences the approach, it hoists ROMEO close up. At night, ROMEO at the dip and close up must be signaled by flashing light.

TYPE OF RIG	INTERVAL (Notes 1, 2, and 3)	SHIP TYPE		
		FF and Smaller	Larger Ships	Carriers
STREAM for Transfer of Solid Cargo and Missiles (Note 4)	Normal	80 to 200 feet 24.3 to 60.9 meters	80 to 200 feet 24.3 to 60.9 meters	100 to 200 feet 30.4 to 60.9 meters
	Maximum	300 feet 91.4 meters	300 feet 91.4 meters	300 feet 91.4 meters
Burton Housefall Modified Housefall Synthetic highline	Normal	80 to 100 feet 24.3 to 30.4 meters	80 to 120 feet 24.3 to 36.5 meters	100 to 140 feet 30.4 to 42.6 meters
	Maximum	180 feet 54.8 meters	200 feet 60.9 meters	200 feet 60.9 meters
STREAM for Transfer of Fuel (Notes 4 and 5)	Normal	80 to 180 feet 24.3 to 54.8 meters	80 to 180 feet 24.3 to 54.8 meters	80 to 180 feet 24.3 to 54.8 meters
	Maximum	200 feet 60.9 meters	200 feet 60.9 meters	200 feet 60.9 meters
Nontensioned Spanwire Fuel Rig	Normal	80 to 100 feet 24.3 to 30.4 meters	80 to 120 feet 24.3 to 36.5 meters	100 to 140 feet 30.4 to 42.6 meters
	Maximum	180 feet 54.8 meters	200 feet 60.9 meters	200 feet 60.9 meters
Close-In Fuel Rig	Normal	60 to 80 feet 18.2 to 24.3 meters	60 to 100 feet 18.2 to 30.4 meters	
	Maximum	100 feet 30.4 meters	100 feet 30.4 meters	
Spanline Fuel Rig	Normal	60 to 80 feet 18.2 to 24.3 meters		
	Maximum	100 feet 30.4 meters		
<p>Notes: 1. Optimum distance between ships normally lies between upper and lower limits of the normal interval.</p> <p>2. Minimum safe distance between ships is the lower limit of the normal interval.</p> <p>3. When tensioned and nontensioned rigs are used together, the distance between ships should not exceed that specified for the nontensioned rig.</p> <p>4. Minimum separation of 140 feet (42.7 meters) is required during initial tensioning.</p> <p>5. 300 feet (91.4 meters) for heavy weather rig.</p>				

Figure 5-1. Distance Between Ships for Various Replenishment Rigs (US Specification)

Rig	Normal Working Distance		Working Distance Limits	
	Feet	Meters	Feet	Meters
Jackstay Fueling	140 to 180	43 to 54	120 to 220	37 to 67
Jackstay Storing (Heavy Rig)	About 120/140	37/43	100 to 220	30 to 67
Jackstay Storing (Light Rig)	About 110	34	80 to 200	24 to 61
Large Derrick	120 to 140	37 to 43	100 to 180	30 to 54
Small Derrick and Fueling Boom	About 95	29	70 to 120	21 to 37
Crane Rig	About 100	30	70 to 120	21 to 37

Figure 5-2. Distance Between Ships for Various Replenishment Rigs (UK Specification)

c. The approach ship slows so as to be moving at replenishment speed when in position abeam.

d. The conning officer on the bridge of the approach ship attains proper fore-and-aft position abeam by observing the appropriate ship structure.

e. When both ships are in the proper relative position, the first line is passed. Both ships haul down ROMEO when the first messenger is in hand.

8. Maintaining Station. Maintaining station abeam of the delivering ship requires precise maneuvering by the receiving ship. Steaming too far apart puts an undue strain on the transfer rigs. Steaming too close restricts maneuverability and increases turbulence between the ships. Communications and liaison must be maintained between conning officers. Bridge-to-bridge phones are essential for this purpose. If the delivering ship changes course or speed or encounters difficulty in steering, the receiving ship must be notified immediately.

9. Pressure Effects.

a. For a ship underway there are areas of increased water pressure at the bow and

stern and areas of decreased water pressure (suction) amidships as the result of the differences in velocity of the flow of water around the hull. When ships are underway abeam, this venturi effect is increased. It is complicated further by the intermingling of the pressure areas. These effects vary with distance between ships, size and configuration of ships, replenishment speed, and depth of water.

b. When ships of the same size are abeam, the best position is exactly at 90°. If the approach ship is considerably smaller than the delivering ship, the best position is in between the bow and stern pressure areas.

c. Ships are in dangerous positions when they are being acted on by radically different pressures. A change in relative positions will impose rapid changes in the pressure effects on their hulls and necessitate quick rudder action by the smaller ship. The hazard is increased when speed is reduced. A radical speed change will further aggravate the situation.

d. Replenishment operations usually are conducted in relatively deep water. In shallow water, where pressure effects are more pronounced, use extra care in maneuvering.

10. Steering Control.

a. Prior to conducting the approach, check steering control in all modes of operation from the pilot house and after steering, if applicable. Determine gyrocompass error and the operability of the standby gyrocompass and associated alarms.

b. Assign a qualified officer as ship control safety officer on the bridge. The ship control safety officer shall ensure that steering control station personnel acknowledge and comply with all orders of the conning officer. He shall assist as necessary in the event of a steering casualty and will have no other duties while assigned.

c. Assign an after steering safety officer, if applicable. The after steering safety officer shall ensure all orders received from the bridge are properly executed by all watchstanders in after steering. Keep after steering continually informed of the progress of the evolution, with particular attention to course and speed changes.

d. The conning officer of the approach ship must conn from a position where he can observe his own ship's heading, the rudder-angle indicator if installed, and the relative motion of both ships. Only experienced helmsmen and throttlemen should be used. Orders should be given to the helmsmen by actual course, in degrees or in half degrees. This should enable the conning officer to maintain proper distance between ships and adjust his relative fore-and-aft position without resorting to radical changes in course or speed.

e. A small amount of rudder is usually necessary for maintaining station abeam. The rudder angle to carry varies with the sizes and loads of ships, wind and sea conditions, replenishment speed, distance between ships, location(s) of transfer station(s), and transfer rig(s) employed. A delivering ship with ships maintaining station abeam on both sides will probably carry a different amount of rudder angle than when only one ship is abeam.

f. A greater amount of rudder usually is required when ships ride closer together than 80 feet (24 m). As a result of such increased rudder, speed is reduced. This complicates the problem of maintaining station. Should a steering casualty occur at such a time, the possibility of being "drawn in" by the combination of screw suction, the pull of tensioned lines, and excessive use of rudder will increase the probability of collision.

g. When loss of steering control is reported or sounded, the commanding officer and conning officer should determine as quickly as possible the position of the rudder and direction the ship is heading in relation to the replenishment course, before automatically giving a rudder command.

11. Departure Procedures.

a. On completion of replenishment:

(1) The receiving ship hoists PREP at the dip, 15 minutes before disengaging.

(2) The receiving ship hoists PREP close up, when disengaging at the last transfer station.

(3) The receiving ship directs a course outboard in 2° or 3° increments.

(4) The receiving ship increases her speed moderately (3 to 5 knots) and clears ahead and away.

(5) The receiving ship hauls down PREP, when all lines are clear.

b. To preclude fouling of the screws, ships shall ensure that all wires are clear of the water before altering course.

c. Radical changes in speed and course must be avoided. Propeller wash from the receiving ship's departure can adversely affect the delivering ship's steering and may cause a dangerous situation to develop, if another ship is abeam the delivering ship on her other side.

0504 Emergency Breakaway

1. Situations may arise that require an emergency breakaway. An emergency breakaway is basically an accelerated standard breakaway using an orderly and prearranged procedure. The objective is to disengage quickly without damaging rigs or endangering personnel. Personnel involved in replenishment shall be thoroughly briefed on the entire procedure prior to each UNREP. Ships should simulate an emergency breakaway to train their crews in the procedures to be followed on completion of each UNREP and/or exercise.

2. **Winch Watchers.** Winch watchers should be stationed at winches in use. Each winch watcher shall remain alert to detect malfunctions in the winch and report immediately any malfunction by blowing on a whistle loudly until acknowledged by the rig captain. *Winch watchers must not stand in the direct line of a winch wire under tension.*

3. **Securing Wires to Winch Drums.** On ships using wire rope rigs, the wire rope end shall be secured to the winch drum by only one wire rope clip or specially designed clamp or by a hemp tail line that itself is secured to the barrel. Seizing wire shall be removed from the bitter end of a wire rope, prior to securing the wire rope to a winch drum using a wire rope clip, to prevent the fouling of the wire rope in an emergency breakaway.

4. **Emergency Tools.** Emergency tools shall be stowed in a tool box readily accessible to each transfer station. In addition, wire rope cutters must be available to cut nontensioned wires and lines during an emergency breakaway if there is danger to ship's personnel or the ship's structure. The cutters shall not be used for any other purpose. *Never use wire rope cutters to cut a tensioned wire rope.*

5. **Exchange of Information Between Ships.** Once station-to-station communications are established, the safety officer at each transfer station on the delivering ship contacts the corresponding safety officer on the receiving ship and reviews *in detail* the procedures for emergency breakaway. The delivering ship shall send over with the first lines at each station written instructions for breakaway applicable to the rig being used. As soon as bridge-to-bridge communication is established, commanding officers shall review

in detail all actions to be taken in an emergency breakaway.

6. **Preparation of Lines.** Because an emergency may occur at any time, preparations must be made upon receipt of the first line. All lines, as they are brought onboard, shall be faked clear for running in the direction of tend and maintained faked down (if possible). Messengers are to be returned in accordance with the rig procedures. Housefall messenger lines, riding lines, and easing-out lines/slip ropes shall be belayed to cleats that are clear of interference and made ready for instant slacking/release. As soon as the spanwire or highline is secured to the highpoint on the receiving ship, an easing-out line shall be rigged through the spanwire end fitting, shackle, or the long link of the pelican hook. One end shall be belayed to a cleat so that the line is ready for easing out. The easing-out line shall be of appropriate length to ease the wire clear of the ship's side.

7. Conditions Warranting Emergency Breakaway.

- a. When an engineering casualty affects either ship's ability to maintain replenishment course or speed.
- b. When ship separation causes wires to approach the last layer on the winch drums.
- c. When a casualty or equipment failure may result in a tightline condition.
- d. When there is a general ship's power loss or a local power loss at a transfer station.
- e. When a rig parts and there is a possibility of the screw becoming fouled.
- f. When a man is lost overboard and a life-guard ship or helicopter is not on station.

8. Ordering Emergency Breakaway.

- a. The commanding officer of either ship may give the order for an emergency breakaway. Once initiated, the delivering ship will assume control and initiate hand signals and parallel information on the sound-powered phones to the receiving ship. Sufficient time should be allowed

for ships to disconnect rigs in an orderly manner.

b. Sound-powered phones and hand signals are the primary means of communication for ordering an emergency breakaway; however, other means may be used, if necessary, to ensure rapid ship-to-ship communication. The danger signal (six short blasts) shall be sounded on the ship's whistle or siren to alert all ships in the vicinity. The OTC and other ships in the formation shall be informed immediately of the emergency via voice radio. Amplifying details must be relayed as soon as possible thereafter.

9. Emergency Breakaway Procedure.

Take the following actions when a condition warranting an emergency breakaway is recognized:

a. Notify the following intraship stations that a condition warranting an emergency breakaway exists:

- (1) Bridge.
- (2) Cargo/fuel control center.
- (3) Cargo/fuel stations.

b. Initiate the danger signal by sounding six short blasts on the ship's whistle.

c. Pass the word between ships:

- (1) Bridge to bridge for all ships abeam.
- (2) Station to station.
- (3) Bridge to OTC and other ships in formation.

d. Stop all pumping/transfers.

e. Retrieve rigs using standard procedures.

f. Keep sound-powered phones connected until rigs are disconnected and clear of the receiving ship's side.

g. When the receiving ship has released all lines, both ships maneuver to get clear.

10. Releasing Hydraulic Brakes. If a power loss causes an emergency breakaway, control winches and slack off (pay out) wires using the hydraulic brake on the winch. Use great care, since releasing an hydraulic brake under tension may damage the hydraulic transmission. The wire can be readily controlled with the hydraulic brake until power is restored or the wire is payed out over the side. Use extreme care when trailing wires in the water. A turn away from the wire may draw it under the hull of the ship and into the screw. On ships with winches equipped with slip or air clutches, allow the wire to pay out on its own. Releasing the hydraulic brake should only be used as a last resort.

11. Recommended Emergency Maneuvering. When a steering casualty or loss of propulsion occurs, communicate own ship's intentions or limitations to the ship abeam. The flow of information must be continuous until the danger has passed. If the gyrocompass fails, obtain positive control by using rudder orders. Recommended emergency maneuvering procedures are listed below.

a. If the receiving ship has a casualty affecting her speed, the delivering ship should attempt to match her speed until breakaway is complete, then allow the receiving ship to drift aft and clear. This procedure will keep the replenishment gear near the surface of the water and reduce the possibility of fouling own ship's propellers.

b. If the delivering ship has a casualty affecting her speed, she should request the receiving ship to slow down to allow more time for disconnecting the rigs.

c. If either ship has a casualty affecting her steering, both ships should take action to minimize relative speed in order to reduce the damage that may be caused by raking.

d. If the delivering ship has a ship abeam to port and starboard and either one veers out, the delivering ship should maintain course and speed. Rigs will thus tend to remain near the surface as they are retrieved.

e. If two receiving ships are abeam the delivering ship when an actual emergency breakaway is sounded, both receiving

ships shall execute the emergency breakaway.

0505 Common Lines and Transfer Rigs

1. Common lines and equipment to be used in an exercise (i.e., shot line, messenger, bridge-to-bridge phone line, sound-powered phones, and station-to-station phone lines) are included in Annex 5C for reference. The transfer rigs to be used in an exercise, including the equipment and safe procedures for using them, shall be in conformance with appropriate publications and shall be covered thoroughly by the OTC in a face-to-face briefing prior to the conduct of the exercise.

2. A safety observer should be assigned to each transfer station. If an unsafe condition develops, he shall communicate the nature of the problem to the safety observer on the ship's bridge.

3. No highline or spanwire shall be delivered to, nor transfer rig connected to, a highpoint that has not been actually tested to determine if it meets the prescribed test load requirements, unless a waiver has been granted by the appropriate national authority. This restriction shall also apply to the safe load capacities of the winches to be used.

0506 Communications

1. Sound-powered phone transmissions between delivering and receiving ships are the primary means of communication during product transfer. A minimum of two independent transmission lines including monophones/headsets must be provided and manned between conning positions and transfer stations on the two ships. The delivering ship provides the transmission system. If a combined telephone/distance line is used, the receiving ship provides this line for station keeping and bridge-to-bridge communication.

2. Electric megaphones may be used during the approach and during the period sound-powered phone lines are being passed. They may also be used as a standby means of communication. Megaphones should be tested prior to each replenishment.

3. Radios may be used prior to the approach to exchange messages concerning replenishment capabilities. They should also be available during

replenishment to pass vital information in case of an emergency.

4. Hand signals should be used in conjunction with sound-powered phones. If the sound-powered circuit fails, hand signaling is a reliable alternate system of controlling rig operations. Hand signaling requires a trained man to be stationed adjacent to the transfer/reception station where he can observe replenishment operations affecting his particular rig. Hand signals will be given by colored wands on flashlights at night. Hand signals and procedures for their use are covered in Annex 5A.

5. Transfer station markers (bunting, metal, or painted area markers for day, and red lights for night) may be displayed by some supplying ships at each transfer station to indicate the type of commodity that is to be transferred. Markers are provided in Annex 5C.

6. Ships engaged in abeam replenishment shall display the required international shapes during daylight hours from a vantage point that can be seen for a distance of at least 2 miles or the required task lights at night. Day shapes shall be displayed from 30 minutes prior to sunrise until 30 minutes after sunset.

0507 Safety Precautions

Primary considerations in every replenishment are the safety precautions and safety equipment used. These shall be briefed to all personnel involved in an UNREP prior to the evolution. Detailed safety precautions and personnel safety equipment are provided in Annex 5B.

0508 Replenishment At Night

Darkened-ship condition (no white lights showing) is the normal lighting condition for night replenishment. Ships should be darkened prior to commencing the approach. Under darkened-ship condition, certain lighting is needed for coming abeam, maintaining station, and handling the gear and stores in the hold and on deck. If possible, avoid the blinding effect of bright white lights. Night lighting requirements are included in Annex 5C for reference.

0509 Personnel Transfer

Personnel are more readily transferred by helicopter than by synthetic highline. Transfer personnel internally in a helicopter in accordance with national publications. Annex 5B provides safety precautions for transfer of personnel by synthetic highline or by helicopter hoist should operational necessity so dictate.

0510 Vertical Replenishment

1. During VERTREP, the helicopter must hover over both the supplying and customer ships. Relative wind should be between 330° and 030° on the bow; a relative wind of 15 to 30 knots is considered ideal. The helicopter should take off, make approaches, and hover into the relative wind. The receiving ship may be stationed 400 to 1,000 yards up relative wind from the supplying ship, but not abaft 45° on the bow. This station allows the helicopter to fly into the wind with a heavy load and fly a safe return circuit with a light retrograde load.

2. In the interest of safety, the pilot shall make the final determination regarding flight visibility for a VERTREP operation. Since the hoisting of material or the amount of material to be hoisted can affect the stability of a helicopter, all transfers are at the discretion of the pilot. The exact weight of the load must be displayed to the pilot on a placard or blackboard, and the cargo is hooked up only after his approval has been obtained. Although VERTREP can be done while the ship is maneuvering, pilots conducting VERTREP operations shall be notified prior to any course change. VERTREP may continue at the discretion of the pilot while the ship is in a turn. Relative wind direction does not inhibit an H-46 helicopter. Customer ships can maneuver during VERTREP with an H-46, provided the helicopter pilot concurs.

3. Personnel taking part in a VERTREP operation must know their jobs thoroughly. The prereplenishment meeting ensures that key personnel of all ships know the details of the operation. Every ship has to brief its personnel and, if necessary, train their separate teams.

4. During a VERTREP exercise, a safety observer who is experienced in VERTREP operations shall be assigned on each ship. He shall stop

the transfer or order a wave-off, as appropriate, if an unsafe condition develops. A safety observer who is a naval aviator should be assigned to an appropriate station on any ship that does not have a naval aviation detachment.

5. VERTREP exercises shall not be conducted to an uncertified platform unless a waiver has been granted by national authorities. The transfer shall be limited to a high hover (15 feet or 4.6 meters) above the deck in day visual meteorological conditions (VMC). The locations of all obstructions to safe flight shall be covered by the OTC in a face-to-face briefing prior to conduct of the exercise. VERTREP exercises shall not be conducted at night unless ships have a current certification for night operations.

6. VERTREP Communications. Good ship-to-ship and ship-to-helicopter communications are essential in maintaining coordination in a VERTREP operation.

a. Ships scheduled to receive material by VERTREP should maintain a continuous guard on the designated helicopter control circuit. The circuit shall be activated and tested prior to VERTREP. Circuit discipline must be maintained at all times. The helicopter control circuit shall not be used for routine traffic between ships guarding this circuit.

b. Because the helicopter pilot depends primarily on internal phone directions from the aircrewman on all cargo pickups and drops, routine transmissions to the pilot shall not be made during this maneuver. Transmissions are normally made while the helicopter is traveling between ships.

c. Hand signals to be made by the helicopter director from the deck of a ship to the pilot of a hovering aircraft are provided in Annex 5D. All signals are advisory, except for the wave-off signal, which is mandatory.

7. Safety Precautions.

a. Safety is the primary consideration in all VERTREP operations. Commanding officers should obtain the advice of the officer in charge of the helicopter detachment on board in all matters relating to the

safety of the transfer. If helicopters are airborne, he should ask advice from the senior naval aviator when operating conditions appear marginal.

b. The safety precautions and safety equipment used shall be briefed to all personnel involved in a VERTREP prior to the evolution. Detailed safety precautions for VERTREP are provided in Annex 5B.

8. Load Transfer Procedures.

a. Staging Loads.

(1) Stage cargo on the supplying ship within the VERTREP hover area in an orderly sequence for pickup by the hovering helicopter for delivery to the customer ship. Procedures for cargo load makeup and staging in the VERT-REP area shall be covered by the OTC in the face-to-face briefing prior to conduct of the exercise. *All foreign object damage (FOD) material shall be removed from the VERTREP area prior to flight operations.*

(2) Before flight operations, provide pilots and crewmen with the name, type of ship, hull number, location, radio frequencies, and tactical voice call of the customer ship. As each load is picked up, display information — the destination and weight of each load — on a chalkboard from a position that is clearly visible to the pilot.

b. Load Pickup.

(1) As the helicopter approaches the supplying ship, its approach is announced over the deck edge speakers. All personnel shall clear the area, except the hookup man, who takes position forward or inboard of the load and holds the pendant up to signal the location of the load to the pilot. Guided by signals from the helicopter director, the pilot maneuvers the helicopter to hover over the load.

(2) A helicopter crewman, viewing the ship's deck through the open cargo hook access hatch, advises the pilot via

the helicopter's internal phone system as to the helicopter's exact position over the load. As the helicopter hovers over the load, the hookup man hands the pendant to the aircrewman positioned in the open cargo access hatch. *The hookup man shall stand forward or inboard of the load during hookup and shall never stand on the load or between the load being picked up and another load.* The hookup man clears the area, moving toward the helicopter director. The aircrewman slips the pendant over the helicopter hook and checks that the load is secure and ready for lifting.

(3) This method ensures positive hookup of the pendant. In alternate methods, the hookup man holds the pendant up until the aircrewman in the open cargo access hatch guides the pendant onto the helicopter's hook, or the hookup man raises the pendant and slips the eye over the helicopter's hook. The hookup man then clears the area, moving toward the helicopter director.

(4) The aircrewman aboard the helicopter gives pickup and lift-off directions to the pilot to clear the load from the pickup area. The aircrewman aboard the helicopter is the primary director of the helicopter while it is in a hover over the pickup or drop area. The helicopter director shall continue to give directions in case of an internal communications failure or an emergency of which the pilot or aircrewman is unaware.

c. Visual Circuit Procedures.

(1) When a helicopter operates between ships, both ships shall maintain visual contact with the helicopter until it has landed. Radar contact should also be maintained.

(2) The helicopter control ship will maintain radio control until the customer ship is ready to receive the load and the final approach is being made. Once the load has been dropped and the helicopter is clear of the customer ship's deck, control reverts to the supplying ship.

(3) When the helicopter is dispatched to more than one ship, responsibility for maintaining visual contact rests with the ship from which the helicopter last departed and the next succeeding ship.

(4) Under conditions of low visibility, positive air control is mandatory. A parent ship must be aware of the location of its helicopter at all times.

d. Load Delivery.

(1) As the helicopter approaches the receiving ship, the helicopter director on the customer ship and the helicopter crewman guide the pilot to the drop area. This enables the pilot to fly so that he can see and avoid any obstructions.

(2) A load spotter, if used, is positioned on the cargo landing spot for the incoming load. Once acknowledged by the aircrewman, he shall clear the drop area. *Personnel shall not enter the drop area nor attempt to steady the load while the helicopter is over the ship.* The load spotter shall be clear of the drop area before the load passes over the deck edge.

(3) Once over the drop area, the pilot follows the helicopter director's signals and the aircrewman's directions for positioning the load over the cargo landing spot. He relies on the aircrewman's directions for precisely spotting and lowering the load. The aircrewman informs the pilot as soon as the load is on deck. The helicopter director signals the pilot when the pendant slackens. The aircrewman releases the cargo hook and informs the pilot.

e. Clearing Loads.

(1) As soon as the helicopter departs, assigned men release pendant hooks, open the net, and cut any banding or strapping on the load. *Never cut a net.* Cargo handlers who have been standing by, clear of the drop area, move in, pick up a portion of the cargo, and leave the drop area. The last ones remove the pendant, cargo net, and

empty pallet from the drop area to a staging area. There they stack pallets and fold nets for later return to the delivering ship.

(2) *Personnel clearing stores must remove all loose debris from the drop area to the staging area and retain it there until dumping of trash is authorized.* They must take extra precautions to remove banding, paper, and other debris from the drop zone — prior to the next helicopter's approach — to preclude injury to personnel or damage to helicopter engines and rotor blades.

(3) A loaded helicopter shall not be waved off solely because the drop area is not completely cleared of the previous load. If space is available for another drop, pull the net up over the load and temporarily secure it by threading a hoisting sling leg or a safety hook through the net's rings or corners. All personnel shall clear the drop area while the next load is being deposited.

f. Returning VERTREP Equipment and Retrograde.

(1) As pallets, nets, pendants, triwalls, cargotainers, and hoisting slings accumulate on the customer ship, cargo handlers assemble them into a load within the hover area for return to the supplying ship. The makeup of any load of retrograde and VERTREP equipment by the customer ship is as important as proper makeup of a load of cargo by the supplying ship. Danger to the helicopter or loss of part or all of the load can result if retrograde is not properly secured or if prescribed methods are not followed. Procedures for retrograde load makeup and staging in the VERTREP area shall be covered by the OTC in the face-to-face briefing prior to conduct of the exercise.

(2) If the VERTREP hover area is of sufficient size to accommodate several loads, assemble the return load within the VERTREP hover area on the side away from the helicopter's approach. This will leave sufficient room for the

helicopter to deposit the incoming load on the approach side and then move forward over the return load.

(3) If the helicopter starts an approach before a retrograde load is completely assembled in the drop area, pull the net up over the load and temporarily secure it by threading a hoisting sling leg or a safety hook through the net's rings or corners. All personnel shall clear the area to await the helicopter's departure.

(4) The hookup man shall stay clear of the VERTREP hover area until the incoming load is on deck and the pendant released. As the helicopter moves over the return load, the helicopter director signals the hookup man to pick up the hoisting sling, hand the pendant to the aircrewman positioned in the open cargo access hatch or place it over the helicopter's hook. The hookup man clears the area, heading toward the helicopter director.

(5) *Never hook an empty net to the helicopter without at least 4 wooden or 6 metal pallets or an equivalent weight in the net.* To do so would endanger the helicopter by allowing the net to blow into the helicopter's rotors. In any questionable case, always consult the pilot.

0511 Search and Rescue

1. The helicopter is normally the primary means for rescuing a survivor in all-weather day and night missions, except when weather is below 300 feet and 1 mile visibility. The surface ship and/or its motor whaleboat/rescue boat shall be prepared to assume the primary rescue role day or night. Whichever is primary, the other should stay clear so as not to hamper the rescue mission but remain ready to assist if needed.

2. Rescue swimmers are an essential part of the rescue team. The best swimmer of those rates normally assigned to motor whaleboat/rescue boat duties shall be assigned to the boat rescue team. Rescue swimmers shall be designated first class swimmers, graduates of an approved rescue swimmer or equivalent course, and be CPR qualified. In any surface vessel search and rescue

(SAR) exercise, only fully qualified swimmers shall be used.

3. A SAR exercise is planned and conducted in accordance with the procedures in ATP-10. The planned exercise, except for the portion to be effected by a swimmer, shall be covered by the OTC in a face-to-face briefing prior to conduct of the exercise. If the simulated SAR incident involves personnel with parachutes attached, rescue litter procedures, or night operations, include details of a rescue for these situations in the briefing.

4. A safety observer shall be assigned to the surface ship and to the motor whaleboat or rescue boat. A safety observer who is a naval aviator should also be assigned during a coordinated SAR exercise.

5. Air/Surface Coordination. Familiarize surface ship personnel with what to expect during a helicopter rescue:

a. A parachute, whether deployed or not, represents a potential hazard to a helicopter. Helicopter rescue swimmers are taught to "Get the man out of his parachute." A surface ship or motor whaleboat/rescue boat assisting a helicopter or taking over a rescue must also be aware of this hazard.

b. The rotating anticollision lights on the helicopter are ON while it attempts the rescue. When the helicopter must yield to an alternate means of rescue, the helicopter turns these lights OFF. The forward anticollision light may be turned OFF to prevent pilot disorientation in fog.

c. The surface ship shall be prepared to give a magnetic bearing and range from the helicopter to the rescue site if requested.

d. While the helicopter effects the rescue, a surface ship should stay clear so as not to blanket the wind or otherwise cause interference to the helicopter.

e. If the parachute cannot be removed from the pilot and a motor whaleboat/rescue boat is available, the helicopter shall abandon its rescue attempt, turn OFF its anticollision lights, and move away from the rescue area if possible.

6. Motor Whaleboat/Rescue Boat Operations.

a. The motor whaleboat/rescue boat shall remain close but stay clear of the rescue until the helicopter's rotating anticollision light is turned OFF. At this signal, the boat assumes responsibility for the rescue.

b. Unless the boat coxswain can see the rescue site, the boat should be maneuvered using radio communications or flag/pyrotechnic signals from the ship.

c. On arrival at the rescue site, the boat crew must determine if the helicopter is successfully effecting the rescue.

d. To avoid the possibility of becoming fouled in the helicopter's hoisting cable, the motor whaleboat/rescue boat shall never pass between the helicopter and the survivor.

e. The boat's approach should be directly to the survivor, keeping the survivor on the port bow, so that the cast of the boat's screw in reverse will set the boat alongside the survivor. Personnel in the water with a parachute attached shall be approached with extreme caution.

f. The rescue swimmer shall deploy when commanded by the motor whaleboat/rescue boat officer in charge.

g. Recovery of personnel in the water shall be attempted with the survivor facing the gunwale of the boat. A rescue swimmer shall assist a survivor in the water when necessary.

h. Once on board the boat, the survivors' injuries should be investigated and first aid applied as necessary. Treat all survivors for shock.

7. Ship-Alongside Rescue.

a. The conning officer will conn the ship so as to place the survivor on the leeward side. Because of its sail area, the ship will

drift faster than a survivor in the water, and thus will drift toward the survivor.

b. When directed by the bridge, the deck recovery detail makes every attempt to deploy life rings, lines attached to monkey fists, etc., to gain contact with or positive control of the survivor. If the distance is too great, lower a swimmer into the water from the forecastle using a tending line attached to the swimmer's harness and the rescue strop.

c. In this rescue method, the survivor is brought alongside at the forecastle. Each surface ship should have some means of readily hoisting a man on board. Hoist personnel from the water to the forecastle using the rescue strop with line attached or the rescue litter. Lower the embarkation ladder to provide a handhold for the swimmer.

8. Rescue Hand Signals. Standard hand signals are the primary means of communication in a maritime environment whenever radio communication is not possible. The hand signals illustrated in Annex 5E are the standard signals for use by swimmers and survivors. All personnel involved in a rescue mission must be familiar with these hand signals.

9. Surface Vessel SAR Communications. Communications shall be available for on-scene coordination between all units involved in a rescue mission (except for the rescue swimmer). Helicopter crewmen shall maintain a running commentary of progress for pilots. This is especially important at night or in low visibility when pilots are on instrument, or when pilots are unable to see a survivor's location. Small boats that are not equipped with a UHF radio shall be equipped with a portable UHF radio. Vessels shall monitor the UHF frequencies normally associated with emergency rescue and SAR operations: 243.0 MHz and 282.8 MHz. Standard communication procedures and the circuits to be used for on-scene coordination shall be covered by the OTC in the face-to-face briefing prior to conduct of the exercise. Figure 5-3 provides nonradio signals for use between boat and ship.

From Ship to Boat		
Flag or Blinker	Pyrotechnics	Meaning
TWO	Two white stars	Steady on present course.
THREE	One white star	Steer straight away from ship.
THREE PORT	One red star	Steer left (or to port). When hauled down, cease turn and steady on present course.
THREE STBD	One green star	Steer right (or to starboard). When hauled down, cease turn and steady on present course.
EIGHT	Two green stars	Steer straight toward ship.
QUEBEC	Two red stars	Return to ship immediately.
From Boat to Ship		
Visual Signals	Pyrotechnics	Meaning
BLINKER OR SEMAPHORE	One green star	Cannot find man.
	One white star	Have recovered man.
	One red star	Need assistance.

Figure 5-3. Signals for Use Between Boat and Ship

0512 Maneuvering (MAN) Exercises

MAN-1 REPLENISHMENT AT SEA**Purpose**

Train personnel to replenish at sea from a servicing ship.

Train personnel in preparation and operation of gear.

Train officers in ship handling.

Provide actual experience in this operation in advanced areas and in task force exercises.

Evaluate the performance of personnel in replenishing at sea from a servicing ship and servicing ship personnel in delivering material.

Situation

Ships are steaming in formation.

Requirement

One or more large auxiliary or combatant ships.

One safety observer on the bridge of each ship and one at each transfer station.

Procedure

OCE

Arrange for services of auxiliaries.

Designate the following:

1. Auxiliary to which each ship is assigned, including side and station(s) from which to replenish.
2. Order in which ships replenish from each auxiliary.
3. Time allowed or quantity for each type of material allotted each ship alongside.
4. Base course and speed.
5. Replenishing position (if desirable).

6. Time for commencing exercise.

Order replenishing disposition formed on base course and speed.

Order "Commence the scheduled exercise."

OCE may change base course or speed or both during the exercise. During replenishment, the OCE should order a course change of at least 30° in 5° increments, to allow ships to demonstrate ability to maneuver while alongside.

If, in an emergency, it is necessary to alter course more than 30° in one step, the OTC may order an emergency breakaway. This directs receiving ships to disengage as rapidly as possible while the delivering ship maintains course and speed.

STANDBY STATION

Ships waiting to go alongside should take a standby station 300 to 500 yards astern of their alongside station.

An alternate waiting position, if so directed by the OTC, is a position abreast of their alongside station about 400 yards from the servicing ship.

LIFEGUARD STATION

Next ship alongside, or ship so designated by the OCE, take lifeguard station as assigned.

OTHER SHIPS

Take assigned station in disposition.

Conduct replenishment in accordance with the OCE's replenishment plan.

SUCCEEDING SHIPS

Repeat procedure for first relay.

Each ship clearing auxiliary ease out gradually and wait until well clear ahead before turning appreciably either way. This eliminates effect of cross wake on auxiliary and ship still alongside.

**MAN-2 REPLENISHMENT AT SEA:
APPROACHES****Purpose**

To train ships to execute RAS approaches.

To train officers in ship handling by conducting approaches on an AO/AOR or destroyer/frigate operating in a task unit/group.

Type of RAS Approaches

1. RAS Approach ALFA: RAS approaches on an AO/AOR for officers of the watch. The approaching ship makes its approach on one of the AO/AORs RAS stations. No lines are to be passed.
2. RAS Approach BRAVO: RAS approaches on ships of the force for officers of the watch. No lines are to be passed.
3. RAS Approach CHARLIE: RAS approaches on ships of the force for officers of the watch. Distance line is to be passed to practice station keeping alongside for a maximum of 5 minutes.

Procedure

Signal formation, RAS approach type, base course and speed, and communications method (tactical UHF voice or flaghoist).

RAS APPROACH ALFA

1. Prior to commencement of the exercise, the AO/AOR and ships are in formation. The AO/AOR is in Station One and is the Guide. The OCS designates the side of the AO/AOR on which the ships will make their approaches.
2. At commencement of the exercise, the first two ships making the approach are to be in standby stations on the ordered side. Other ships are to be formed at 1000 yards distance astern of the initial approach ships, on their designated sides.
3. Flag ROMEO procedure is to be followed with the exception that flag ROMEO is hauled

down when the approaching ship has settled alongside the AO/AOR, at its normal fueling position. Each ship is to remain alongside until satisfied with its station keeping (not to exceed 5 minutes).

4. On completion of the approach, alongside ships proceed to the rear of the line on the appropriate side, waiting for their next approach.

5. When the ship designated to make the approach hoists flag ROMEO close up, the next ship astern proceeds to the appropriate standby station without further orders, and remaining ships move up the line to the next vacant position.

RAS APPROACH BRAVO

Prior to commencement of the exercise, ships are to be in column formation at standard distance. If more than three ships are to be exercised, ships are to be divided into two or more divisions. Divisions are to be 1 nm apart.

1. TWO-SHIP COLUMN:

- a. At commencement of the exercise, the lead ship of the column is to become the Guide, hoist flag GOLF close up and flag ROMEO at the dip. Side to be determined by the Guide.
- b. When ready, the Guide hoists flag ROMEO close up, followed by the approaching ship at the moment the approach commences.
- c. Once the approaching ship is settled alongside and satisfied with its station keeping (not to exceed 5 minutes), the approach ship will haul down flag ROMEO and the Guide shall follow suit.
- d. The approaching ship shall then take station ahead at standard distance and when in station hoist flag GOLF and become the Guide.
- e. The approach sequence is then repeated.

2. THREE-SHIP COLUMN:

a. At commencement of the exercise, the second ship in the column is to become the Guide and hoists flag GOLF close up and flag ROMEO at the dip. Side to be determined by the Guide.

b. When ready, the Guide hoists flag ROMEO close up, followed by the approaching ship at the moment the approach commences.

c. Once the approaching ship is settled alongside and satisfied with its station keeping (not to exceed 5 minutes), the approach ship will haul down flag ROMEO and the Guide will haul down flag ROMEO and GOLF simultaneously.

d. On this signal the next ship ahead will become Guide, hoist flag GOLF close up and hoist flag ROMEO at the dip on the same side as the original Guide.

e. The approach sequence will then be repeated. On completion of this approach, the approach ship will take station ahead at standard distance and the entire sequence is repeated.

RAS APPROACH CHARLIE

Depending upon the number and types of ships participating (i.e., 2 or more ships with/without AO/AOR present), this method will be conducted in accordance with instructions for RAS Approach ALFA or BRAVO, with the exception that a distance line is passed.

Unless otherwise directed, the Guide will fire the gunline and provide the distance line. Once the distance line is passed, station keeping for approximately 5 minutes may be carried out before the gear is returned and the next approach commences in accordance with method ALFA or BRAVO.

MAN-3 VERTICAL REPLENISHMENT

Purpose

Train personnel in underway reprovisioning of ships by helicopter.

Requirements

One H-46 helicopter configured for VERTREP.

One replenishment ship with helicopter facilities certified or waived for VERTREP operations for H-46 helicopter.

One receiving ship (if unavailable, use another replenishment ship with helicopter facilities certified or waived for VERTREP operations for H-46 helicopter.)

One safety observer on each VERTREP platform.

Rigid enforcement of safe procedures outlined in Annex 5C.

Procedures

OCE

Recommend exercise course and speed for the best relative wind condition.

Ensure that communications are established between the ships and helicopter on all circuits prior to COMEX.

REPLENISHMENT SHIP

Transfer five loads of cargo to the helicopter deck. Load weights shall be as specified by the helicopter pilot. The first load will be on the helicopter deck at COMEX.

Provide for adequate communication between the helicopter deck, flight control, and the bridge (conn) to handle any emergency.

Have flight quarters stations manned in accordance with the Helicopter Operations Bill.

HELICOPTER

Transfer five loads of cargo to the receiving ship.

RECEIVING SHIP

Have flight quarters stations manned in accordance with the Helicopter Operations Bill.

Receive five loads of cargo, clearing each load from the receiving point when it arrives.

After five loads are received, return the nets (or exercise loads) to the replenishment ship.

MAN-4 UNDERWAY TRANSFER OF STORES

Purpose

Train personnel in underway reprovisioning of stores using connected replenishment methods.

Requirements

Assisting ship.

One safety observer at each station.

Dummy loads or actual stores.

Dummy retrograde material as applicable.

Make actual transfers using sufficient weight to test procedures and equipment.

Procedures

OCE

Arrange for services of assisting ship.

Designate initiating ship

Order "Commence the scheduled exercise."

MAN-5 UNDERWAY TRANSFER BY SYNTHETIC HIGHLINE

Purpose

Train personnel in transferring and receiving light freight, personnel, or guard mail while underway using the synthetic highline method.

Requirements

Assisting ship.

One safety observer at each station.

Dummies are to be used to simulate personnel transfer unless operational necessity dictates otherwise.

Procedures

OCE

Arrange for services of assisting ship.

Designate initiating ship.

Order "Commence the scheduled exercise."

MAN-6 EMERGENCY BREAKAWAY

Purpose

Train personnel in emergency breakaway procedures during underway replenishment, stressing safe and orderly disengagement.

Requirements

Ship is underway with a consort with ample sea room, hooked up in process of carrying out an underway replenishment.

Receiving ship is to maintain station until all rigs are clear.

One safety observer on the bridge of each ship and one at each transfer station.

This exercise is normally conducted with MAN-3 and MAN-4.

Procedures

OCE

Arrange for services of assisting ship.

Designate initiating ship.

Order "Commence the scheduled exercise."

INITIATING SHIP

Sound five short blasts on the whistle.

BOTH SHIPS

Pass word over the IMC, "Execute emergency breakaway."

Hoist "Emergency 6."

Pass word to all stations by sound-powered phones, "Execute emergency breakaway."

MAN-7 MAN OVERBOARD

Purpose

Train personnel in man overboard procedures.

Requirements

Man overboard occurs while the ship is underway under conditions selected from the following:

1. While ship operates singly.
2. While ship is in formation.
3. When the use of boat is desired.
4. When the use of boat is not desired.
5. From ship ahead.
6. From large ship or a formation.
7. At night.
8. At night, with ship darkened.
9. In confined waters (may be simulated).

Dummy to represent man overboard.

Nonparticipating member of ship's company to replace dummy as soon as it is recovered from water.

Ship's helicopter (if applicable).

Procedures

OCE

Order "Commence the scheduled exercise."

MAN-8 SEARCH AND RESCUE EXERCISE

Procedures

Purpose

OCE

Train personnel in search and rescue (SAR) procedures.

Designate type of simulated SAR incident and position by latitude and longitude or by bearing and range from the exercise ship.

Train personnel and helicopter crew in coordinated SAR procedures.

EXERCISE SHIP

Requirements

If coordinated SAR rescue, the ship shall ensure the following information is passed to the rescue helicopter:

Ship's davit crew, lifeboat with boat crew and two SAR qualified swimmers, and boat recovery crew detailed.

1. Type of mishap.
2. Magnetic bearing and distance to SAR incident.
3. Number of persons requiring rescue.
4. Radio frequency and call signs for radar vectors and other information.
5. Additional amplifying information as appropriate.

Helicopter, if coordinated SAR procedures are to be exercised.

Safety Precautions

When practicable and commensurate with safety, conduct exercise by placing a man in the water to be rescued. The man must be a qualified rescue swimmer and be wearing an approved flotation device and a wet suit when water temperature and conditions warrant.

MAN-9 RESCUE AND ASSISTANCE

Purpose

To train rescue and assistance party in handling of emergencies away from ship.

Requirements

Simulated emergency ashore or on another ship requires the assistance of the rescue and assistance party.

MAN-10 TOWING AND BEING TOWED

Purpose

Train personnel on board two ships in towing and being towed.

Procedures

OCE

Designate ship to be towed, the towing ship, and the operating area.

SHIPS

Towed ship lies dead in the water with engines available for immediate use.

Towing ship passes the tow line.

Use signals in Annex 5A for exchanging information where practical.

Towing ship takes other ship in tow for about 15 minutes, then changes course gradually 90°.

Exchange as towing ship and ship being towed and repeat the exercise.

**MAN-11 MOORING ALONGSIDE A
PIER OR ALONGSIDE A SHIP
AT ANCHOR**

Purpose

To train personnel in the proper procedure and methods of ship handling in approaching and mooring to a pier or ship at anchor.

Requirements

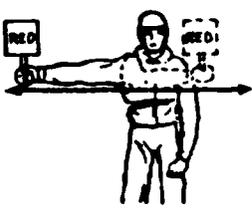
1. Assigned berth at pier (if required, tug and pilot services) or ship at anchor.
2. Conning officers should not be selected without concurrence of commanding officer.
3. Use personnel assumed to be absent as safety observers.
4. Simulation of designated senior officers and key personnel being absent.
5. Ship is underway after an emergency and is returning to prescribed berth at a pier or alongside another ship.

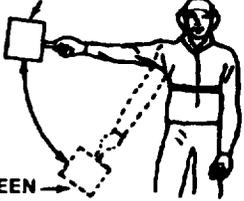
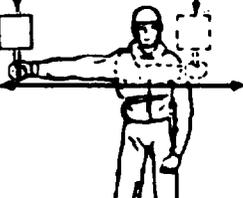
ANNEX 5A

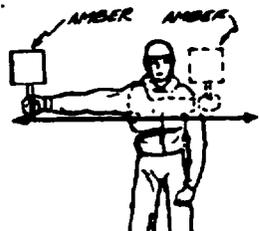
Replenishment Hand Signals

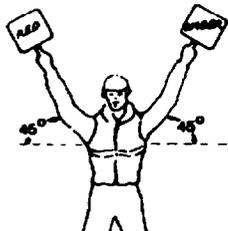
Hand signals should be used to parallel all orders passed over sound-powered (S/P) phones. Hand signals will be given with 12-inch by 12-inch (30.4 cm by 30.4 cm) paddles or 12-inch (30.4 cm) diameter paddles during the day or with chemical light wand holders or colored wands on flashlights at night. The standard hand signals used during replenishment operations are provided on the following pages. The following considerations apply to the use of these signals:

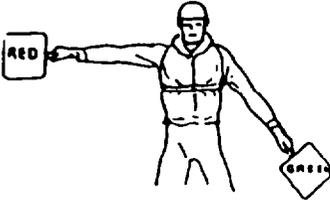
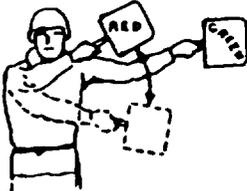
1. Red and amber paddles will be of solid colors. Green paddles will contain a 1 inch (25.4 mm) wide, white, diagonal stripe, running from the upper left corner to the bottom right corner. Print the signals shown in this annex on the backs of the signal paddles.
2. Assign the transfer station's signalman specifically to these duties. The requirement for a signalman to respond instantaneously to changing situations precludes his collateral assignment to any other duties (such as phone talker). Position the signalman in an area where he can readily see and be seen by the signalman with whom he is communicating and by the person in charge at the station. Signalmen will wear green safety helmets.
3. Use red and amber signals during rigging and unrigging operations and as operational signals during the actual transfer. Use green signals only during the beginning and end of pumping and transfer operations. Normally each ship signals the action it desires to be taken on the other ship.
4. If the signaled ship is unable to comply with the signaled action, that ship will initiate the avast signal. The originating ship will match any avast signal, halting the operation. The ship initiating an avast signal must originate the next signal when it is ready to proceed.
5. When two ships are replenishing from opposite sides of a service ship at night, care must be taken on each alongside ship not to confuse the signals of the other alongside ship for those of the replenishment ship.

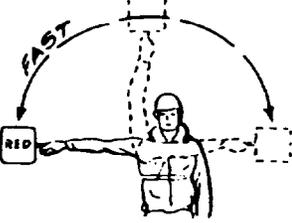
ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
STANDARD PROCEDURES	
SIGNAL	REMARKS
<p>1.</p>  <p>HEAVE AROUND</p>	<p>Signalman moves <u>red</u> signal device in a continuous complete circle in front of body, and keeps the proper color visible to the other ship at all times. When/where appropriate, the other ship answers with the "Slack off" signal.</p>
<p>2.</p>  <p>AVAST</p>	<p>Signalman moves <u>red</u> signal device horizontally in front of body, and keeps the proper color visible to the other ship at all times, meaning for the other ship to <u>stop</u>, <u>cease</u> heaving or slacking as appropriate.</p>
<p>3.</p>  <p>SLACK OFF</p>	<p>Signalman moves <u>red</u> signal device vertically in front of body and keeps the proper color visible to the other ship at all times, meaning for the other ship to slack off the appropriate line, wire, or hose until another signal is given.</p>
<p>4.</p>  <p>HOOKED-UP or CONNECTED</p>	<p>Signalman, with <u>red</u> signal device in right hand and <u>green</u> signal device in left hand, touches devices horizontally in front of body at shoulder height, meaning "Hooked-up or connected." Initiated by receiving ship and acknowledged by delivering ship with same signal.</p>

ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
STANDARD PROCEDURES	
SIGNAL	REMARKS
<p>5.</p>  <p>START PUMPING or COMMENCE TRANSFER</p>	<p>Signalman moves <u>green</u> signal device in a continuous complete circle in front of body, and keeps the proper color visible to the other ship at all times. This signal, executed by either station, indicates "I am ready to start pumping" or "I am ready to commence transfer." It is used only for the beginning of the pumping/transfer operation. When repeated by the other ship, begin transfer and commence signaling with red paddle. If not ready to commence operation, the red "Avast" signal is used.</p>
<p>6.</p>  <p>DESIRE INCREASE IN PUMPING PRESSURE</p>	<p>Signalman on the receiving ship moves a <u>green</u> signal device in a continuous circle over his head to indicate to the delivering ship that an increase in pumping pressure is desired.</p>
<p>7. GREEN</p>  <p>DESIRE DECREASE IN PUMPING PRESSURE</p>	<p>Signalman on the receiving ship moves <u>green</u> signal in an arc on his right side from shoulder to knee level to indicate to the delivering ship that a decrease in pumping pressure is desired.</p>
<p>8. GREEN GREEN</p>  <p>STOP PUMPING or CEASE TRANSFER</p>	<p>Signalman moves <u>green</u> signal device horizontally in front of body. This signal, executed by either station, indicates "Stop pumping" or "Cease transfer" and is used only to signal the completion of the pumping/transfer operation. When repeated by the other ship, immediately shift to amber or red signal devices as appropriate.</p>

ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
STANDARD PROCEDURES	
SIGNAL	REMARKS
<p>9.</p>  <p>START BLOW THROUGH</p>	<p>Signalman moves <u>amber</u> signal device in a continuous complete circle in front of body, and keeps the proper color visible to the other ship at all times. The signal, meaning "Start blow through now," is repeated until the delivering ship acknowledges with a "Blow through" signal, indicating that it has commenced blow through (fueling-at-sea use only).</p>
<p>10.</p>  <p>STOP BLOW THROUGH</p>	<p>Signalman moves <u>amber</u> signal device horizontally in front of body, and keeps the proper color visible to the other ship at all times. The signal, given by the receiving ship to indicate "Stop blow through," is acknowledged by the "Stop blow through" signal from the delivering ship, indicating that it has stopped the blow through (fueling-at-sea use only).</p>
<p>11.</p>  <p>TEST S/P PHONE LINE</p>	<p>Signalman raises <u>two green</u> signal devices overhead to form a "steeple," meaning "Test your phones/phone line."</p>
<p>12.</p>  <p>REPLACE S/P PHONE LINE</p>	<p>Signalman moves <u>two green</u> signal devices vertically in front of body, meaning "Replace your phone line."</p>

ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
STANDARD PROCEDURES	
SIGNAL	REMARKS
<p>13.</p>  <p>DETENSION</p>	<p>Signalman, with <u>red</u> signal device in right hand and <u>amber</u> signal device in left hand, arms extended vertically overhead, waves both signal devices vertically in front of body until acknowledged by other ship. Initiated by receiving ship means "Detension." Answered by delivering ship or initiated by delivering ship, signal means "I am detensioning."</p>
<p>14.</p>  <p>TENSION</p>	<p>Signalman holds <u>red</u> signal device in right hand and <u>amber</u> signal device in left hand with arms extended overhead to form a "V." This signal, initiated by receiving ship, means "I am ready to be tensioned." When initiated by the delivering ship, signal means "I am tensioning." and the delivery station will tension the appropriate wire.</p>

ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
COMPLETION OF OPERATION	
SIGNAL	REMARKS
<p>1.</p>  <p>PREPARING TO TRIP PELICAN HOOK</p>	<p>Signalman holds <u>red</u> signal device in right hand, in the horizontal. In left hand he holds <u>green</u> signal device, steady, at 45-degree angle from body. Signal given by delivering ship indicates "Prepare to trip pelican hook." Signal answered by receiving ship indicates "I am preparing to trip pelican hook."</p>
<p>2.</p>  <p>READY TO TRIP PELICAN HOOK</p>	<p>Signalman holds <u>red</u> signal device in right hand, at the vertical. In the left hand he holds <u>green</u> signal device, steady, at 45-degree angle from body. Signal from both receiving and delivering ships indicates "I am ready to trip pelican hook."</p>
<p>3.</p>  <p>TRIP PELICAN HOOK</p>	<p>Signalman holds <u>red</u> signal device in right hand and <u>green</u> one in left hand. He makes chopping motion with right arm on left elbow which is raised about shoulder height. Signal given by delivering ship indicates "Trip pelican hook." Signal answered by receiving ship indicates "I am tripping pelican hook." When pelican hook is tripped, receiving ship signals "Heave around."</p>

ABEAM — HAND SIGNALS (Paralleled by S/P phone)	
EMERGENCY BREAKAWAY	
SIGNAL	REMARKS
<p>1.</p>  <p>PREPARE FOR EMERGENCY BREAKAWAY</p>	<p>The delivering ship or receiving ship may initiate an emergency breakaway. Signalman of initiating ship <i>rapidly</i> waves <u>red</u> signal device in a semicircular arc overhead, meaning "Prepare for an emergency breakaway." Other ship acknowledges by repeating the signal with a <u>red</u> signal device, meaning "Understood. I am preparing for an emergency breakaway." Once initiated, the delivering ship assumes control.</p>
<p>2.</p>  <p>READY FOR EMERGENCY BREAKAWAY</p>	<p>Each ship continues making the prepare signal until ready to execute the emergency breakaway. When ready, each signalman holds the <u>red</u> signal device overhead, to indicate "Ready for emergency breakaway."</p>
<p>3.</p>  <p>EXECUTE EMERGENCY BREAKAWAY</p>	<p>The signalman of the delivering ship drops the <u>red</u> signal device straight downwards, meaning "Execute emergency breakaway now." The receiving ship acknowledges by repeating the signal.</p>

ANNEX 5B

Safety Requirements**5B01 Safety Precautions at Transfer Stations**

1. Personnel assigned to transfer stations must be thoroughly instructed in safety precautions. Safety precautions shall be reviewed immediately prior to each replenishment and must be observed.
 - a. Only essential personnel shall be allowed at a transfer station during replenishment.
 - b. Life lines should not be lowered unless absolutely necessary; if lowered, temporary life lines must be rigged.
 - c. When passing the shot line with a line-throwing gun, all personnel (except those who are designated by the rig captain at the receiving station to leave cover to retrieve the shot line) shall remain under cover until all shot lines are on board and the word is passed that the shot lines are secure.
 - d. Personnel assigned to each transfer station, including line and cargo handlers, should remove rings, watches, key chains, and other jewelry that could inadvertently be caught in the rigs, blocks, lines, and cargo.
 - e. Personnel shall be instructed to keep clear of bights, to handle lines from the inboard side, and if practical, to remain at least 6 feet (1.8 m) from the blocks, cleats, gypsy heads, capstans, etc., through which the lines pass.
 - f. All personnel on rig teams, station-to-station phone lines, and bridge-to-bridge phone/distance lines should be forward and inboard of all lines and wire ropes. If required to work aft, personnel must keep well inboard of all lines and wire ropes, exercising extreme caution and alertness to potential danger.
 - g. Personnel shall not stand in the direct line of a winch wire under tension, shall never use wire rope cutters to cut a tensioned wire rope, and shall never trip a spanwire or highline under tension.
 - h. Personnel shall be cautioned to keep clear of a suspended load and to stay clear of the rig's attachment points until the load has been landed on deck. Personnel must remain alert and never turn their backs on an incoming load.
 - i. Each transfer station shall be equipped with a life ring with a distress marker light attached.
 - j. Care must be taken to prevent the shifting of cargo that might endanger personnel or material. Personnel should not get between a load and the rail.
 - k. Spanwires, whips, and wire highlines shall be secured to winch drums by one wire rope clip or specially designed clamp — to minimize the possibility of damage should an emergency breakaway be necessary.
 - l. Use fairled lizard lines when retrieving highlines to prevent the transfer head from swinging sharply into the stops and causing the wire to pinch inside the trolley.
 - m. Deck spaces in the vicinity of transfer stations must be covered with nonskid paint to provide secure footing.
 - n. Both the delivering and receiving ships shall station a lifebuoy watch well aft on each engaged side. The watch shall have sound-powered phone communications with the bridge and shall be equipped with two smoke floats and a 24 inch (60.9 cm) ring buoy fitted with a float light.
 - o. All hands shall be instructed on the hazards of emergency breakaway.

p. Phone talkers on intership phone lines shall not fasten their neck straps. Phone lines shall be hand tended.

q. Cargo handlers should not step on or in a cargo net attached to a cargo hook.

r. Personnel involved in a replenishment operation shall wear the required safety equipment.

s. Personnel rigging aloft or working out-board of bulwarks or safety chains shall use safety harnesses and safety and working lines.

t. Easing-out lines must be rigged immediately upon rig hook-up to be prepared for an emergency breakaway.

u. Line handlers and riggers must button sleeves and remove loose objects to ensure against wrapping around or fouling in lines.

5B02 Personnel Safety Equipment

1. Personnel safety equipment shall be worn as prescribed below.

a. Personnel in the immediate area of the transfer station, with the exception of phone talkers, shall wear construction-type safety helmets, equipped with quick-acting breakaway devices. Chin straps shall be fastened and worn under the chin. Phone talkers shall wear a helmet designed for use with sound-powered phones with the chin strap unfastened. Safety helmets shall be coded as follows:

WHITE	OFFICER/CHIEF PETTY OFFICER
WHITE with GREEN CROSS	SAFETY OFFICER
WHITE with RED CROSS	CORPSMAN
YELLOW	RIG CAPTAIN
GREEN	SIGNALMAN
RED	LINE-THROWING GUNNER/BOLO HEAVER
BROWN	WINCH OPERATOR

PURPLE	WINCH WATCHER/ REPAIRMAN
BLUE	LINE HANDLER/ DECK RIGGER
ORANGE	CHECKERS/SUPPLY PERSONNEL
GREY	ALL OTHERS

NOTE: Battle helmets shall not be worn at transfer stations.

b. Topside personnel who are engaged in handling stores or lines or who are in the transfer area (except forklift truck operators, winch operators, and winch repair personnel) shall wear properly secured, orange-colored, inherently buoyant, vest-type life jackets with collars. Forklift truck operators, winch operators, and winch repair personnel shall wear inflatable life jackets fully ready for use: life jacket in front, opened, with yoke over the head (except for actual inflation). Colored jerseys or vests over life jackets are not required.

c. Personnel rigging aloft or working out-board of bulwarks or safety chains shall wear a properly secured, orange-colored, inherently buoyant, vest-type life jacket with a button hole in the back cover to permit concurrent use of the safety harness and safety and working lines.

d. Personnel at transfer stations shall wear a one-cell flashlight or a green chemical light, whistle, and dye marker on the outside of their life jackets. Flashlights need not be lighted; chemical lights must be lighted. Chemical lights are not to be discarded over the side during hours of darkness or until completely extinguished. The ship on lifeguard station may mistake a discarded chemical light for a man overboard.

e. Personnel involved in cargo handling operations shall wear safety shoes and shall carry an appropriate knife for use in routine work and in an emergency.

f. Personnel handling messenger, distance, and inhaul lines should use the "hand-over-hand" grip and may wear gloves.

Personnel handling wire-bound or banded cases must wear work gloves.

g. Personnel assigned to VERTREP transfer stations shall wear ear and eye protection.

5B03 Safety Precautions for Personnel Transfer by Synthetic Highline

1. Safety of personnel is the primary consideration during transfer of personnel. The following precautions apply to transfers of personnel by synthetic highline.

a. The maximum safe load for transfer by synthetic highline is 600 lb (272 kg).

b. All lines shall be hand tended; power shall not be used for transfer of personnel.

c. The station transferring personnel shall be the only station rigged while personnel are being transferred.

d. Personnel who are being transferred must wear an orange-colored, inherently buoyant, life jacket; a one-cell, pin-on type, white, watertight flashlight or a green chemical light; a whistle; a dye marker; and a safety helmet with chin strap.

e. Personnel who are being transferred should wear immersion suits when the temperature of the water is 45 °F (7 °C) or below.

f. Instruct personnel on how to unhook the quick-release belt and get out of the chair, if the rig fails and the chair falls into the water.

g. Station a lifeguard ship astern of ships making personnel transfers. When no lifeguard ship or helicopter is available, each ship shall have a lifeboat and crew ready in all respects for rescue operations.

h. Conduct personnel transfers at night or during heavy weather only in an emergency.

5B04 Safety Precautions for Personnel Transfer by Helicopter

1. Safety of personnel is the primary consideration during transfer of personnel. The following precautions apply to transfers of personnel by helicopter.

a. The maximum safe capacity of the helicopter's utility hoist is 600 lb (272 kg).

b. Never attach the cable from the helicopter's utility hoist to the ship.

c. Night helicopter passenger flights to or from air capable ships shall be limited to situations of operational necessity and only to properly certified ships.

d. Passenger transfer by hoist at night is prohibited, except in an extreme emergency situation, and then only with the aircraft commander's concurrence.

e. Brief passengers on the use of rescue slings or seat; hazards, including avoidance of reaching for any support that might be a helicopter or hoist control lever; and assistance the flight crew will provide him when he enters and departs the helicopter.

5B05 Safety Precautions During VERTREP Operations

1. Personnel assigned to VERTREP transfer stations must be thoroughly instructed in safety precautions. Safety precautions shall be reviewed immediately prior to each replenishment and must be meticulously observed by ships' personnel.

a. All personnel except the helicopter director (and the hookup man only when required) shall be clear of the VERTREP transfer area and remain clear during load pickup or load delivery.

b. Personnel participating in a VERTREP operation or working near an operating helicopter shall wear the required safety equipment: a life jacket, helmet with chin strap, eye and ear protection, and safety shoes. Loose articles of clothing should not be worn. Ball caps, rags, or other loose articles shall be removed from pockets.

- c. All foreign object damage (FOD) material shall be removed from the VERTREP transfer area and adjacent areas prior to a VERTREP operation.
- d. A staging area adjacent to the drop area shall be cleared for receiving cargo and storing retrograde. Hatches and covers near the drop area shall be closed.
- e. Removable objects which could be damaged by a swinging load and all movable obstructions shall be removed from the drop area.
- f. Spectators must be kept clear of pickup and drop areas while VERTREP is in progress.
- g. Personnel near a helicopter shall remove their hats while the rotors are turning.
- h. Personnel at pickup and drop areas shall be trained to take cover immediately on command of the officer or petty officer in charge.
- i. Personnel working near a helicopter shall observe the aircraft carefully for any sign of malfunction, such as smoke, oil leak, hydraulic leak, etc., and immediately report the condition to the helicopter pilot or VERTREP officer, or to the helicopter control officer in the tower if the helicopter is airborne.
- j. A ship participating in a VERTREP operation shall station a firefighting detail at the VERTREP transfer area. Personnel assigned to the crash/firefighting crew shall be properly clothed and shall not be assigned any other duty, such as cargo handling.
- k. A ship participating in a VERTREP operation shall have the rescue boat fully prepared and the boat crew detailed and available at short notice.
- l. Personnel shall be instructed concerning the shrapnel effect caused when a rotor blade strikes a solid object.
- m. The hookup man shall never stand on the load or between the load being picked up and another load and should always be inboard or forward of the load.
- n. The drop area shall be cleared and kept clear of objects, such as trash, that can be blown around by rotor wash or ingested into jet intakes.
- o. Large relatively light objects in the drop area, such as empty boxes, sheet metal, and plywood, shall be tied down or removed.
- p. Personnel clearing cargo from the drop area must take extra precautions to remove banding, paper, and other debris prior to the helicopter's next approach to preclude injury to personnel or damage to helicopter engines and rotor blades.
- q. Ships shall not dump trash and garbage during a VERTREP operation.
- r. Cargo handlers shall not enter the drop area, nor attempt to steady a load, nor rush to the load, while the helicopter is over the ship. Personnel shall never be under a load that is being lowered. The load spotter shall be clear of the drop area before the load passes over the deck edge. The hookup man (if required) shall stay clear of the drop area until the incoming load is on deck and the pendant is clear of the load.
- s. To minimize FOD hazard to the helicopter, cardboard boxes (excluding triwall containers) or other lightweight material shall not be returned.
- t. During VERTREP transfers and cargo handling, the officer of the deck (OOD) shall notify the deck crews of any anticipated ship movement.
- u. Do not hook an empty net to a helicopter without at least 4 wood or 6 metal pallets or an equivalent weight in the net. To do so will endanger the helicopter by allowing the net to blow into the rotors.

ANNEX 5C

Lines, Phones, and Lighting

5C01 Gun Line

1. A bolo or line-throwing gun is used to pass a nylon shot line between ships. Gun lines are sent across by the delivering ship to all receiving ships, except ships with aircraft on deck. The bolo is hand heaved. It can be used for passing the gun line in daylight and should be used when practicable. An adapter used on a rifle propels a rubber projectile with the gun line attached. An orange chemical light shall be used to illuminate the projectile at night.

2. Signals associated with the passing of the first line between the delivering and receiving ships are given in Figure 5C-1. The safety officers in charge of the transfer stations on the delivering and receiving ships give these signals. Either a red paddle (day) or a red wand (night) will be used to indicate where the gun line should be passed.

3. On receipt of the ready signal, the safety officer in charge on the firing ship shall give the order to fire. The gun will not be fired except by his order. Only personnel designated by the rig captain on the receiving ship shall leave cover to retrieve the gun line. Other personnel shall remain under cover until all gun lines are on board and the word is passed that the gun lines are secure. The gun line shall not be cut by the receiving ship, except in an emergency, and shall be returned intact at the earliest possible time.

5C02 Sound-Powered Phones

1. Monophones/headsets/telephone jack-boxes must be kept dry by sealing them in plastic bags or similar material for passing and recovery. They should be manned during replenishment operations. *All phone lines must be hand tended and, to avoid injury, phone talkers on intership phone lines shall not fasten the neck straps.*

2. When sound-powered phone communication cannot be established, even though both stations are apparently manned, the person at the station sending the phone line shall initiate a "test

signal" by positioning his arms over his head to form a "steeple." Both stations will then connect hand-test sets to their station's terminals. If communication still cannot be established, the phone line should be replaced. Personnel at the station returning the equipment to the originator will tend it by messenger line to prevent immersion between ships. The signals are included in Annex 5B.

5C03 Transfer Station Markers

Figure 5C-2 provides transfer station markers to be used during abeam replenishment operations by the delivering and receiving ships. Some supplying ships use a night transfer station marker box that is portable and fitted with arrangements for securing to guardrails or special brackets in a position clearly visible to the receiving station.

5C04 Distance Line

1. The distance line is to be used during all abeam replenishment operations. It is to be supplied by the delivering ship and manned by the receiving ship. The distance line is one of the first lines to be passed between ships. By watching a selected marker, the conning officer of the ship can readily ascertain whether his ship is maintaining the desired lateral separation.

2. **Distance Line Markings.** The distance line is a 1/2 inch (12 mm) diameter manila or polypropylene line 300 feet (91 m) in length. Distance markers attached to the distance line are colored-cloth, nylon-coated, fabric or painted canvas, each 8 inches (20.3 cm) by 10 inches (25.4 cm), and spaced at 20 foot (6.0 m) intervals from 0 to 300 feet (0 to 91 m). The distance is shown in numerals 5 inches (12.7 cm) high — white numerals on green, red, and blue markers and black numerals on white and yellow markers. Markers are sewn, lashed, or otherwise stopped off in such manner that they will not slide along the line. Pouches are provided on each side of the markers for lashing chemical lights at night to provide an unobstructed view during flapping and twisting of the distance line. The zero end of the distance line is secured to the guardrail of the delivering ship. Inglefield

WHISTLE SIGNAL (At Station by Petty Officer in Charge)	BY MEGAPHONE (Voice)	MEANING
ONE BLAST	"Stand By"	Prepare to receive my gunline, bolo line, or heaving line.
TWO BLASTS	"Ready"	We are ready to receive your gunline, bolo line, or heaving line. All personnel have taken cover.
THREE BLASTS	"Lines Passed"	When originated by delivering ship — All lines have been passed.
	"Lines Lost"	When originated by receiving ship — Line lost. Pass another line. (Commence cycle with one blast.)

Figure 5C-1. Signals for Passing the First Line Between Ships

clips (fixed or swivel) or snap hooks are to be fitted to the ends of the distance line.

3. Self-Tautening Day Distance Line (UK). The distance line is made up as in paragraph 2 above, except that each marker is to be a 9 inch (23 cm) equilateral triangle of painted canvas. The line is finished with a non-swivel Inglefield clip at each end. Once the line is passed, the ship keeping station is to supply and attach a four-parted monkey's fist, which is then led through the forward fairlead on the engaged side, across the forecastle, and out the fairlead on the engaged side. The end is allowed to trail freely in the sea, where the drag on the monkey's fist tautens the line between the delivering and receiving ships.

4. Tending the Distance Line. The distance line is kept taut, at right angles to the ship's centerline, in view of the conning officer. The distance line shall be supervised by a petty officer who is experienced in line handling procedures. During night replenishment, the distance line petty officer shall keep the conning officer informed of the distance between the delivering and receiving ships. When the line is tended some distance from the bridge, there must be a sound-powered phone link between the line-tending station and the conning officer. The distance line shall be maintained free for running (coiled or faked) and shall never be secured to the approach ship's structure. *Personnel must keep inboard of all lines and exercise extreme caution and alertness to potential danger.*

5C05 Station-to-Station Phone Line

A station-to-station phone line goes across at each transfer station. It provides sound-powered phone communication between each delivering and receiving station. The line is required for each rig in use and is normally provided by the delivering station. Where possible, the phone line should be passed and hand tended forward of the rig.

5C06 STAR Messenger (US)

The STAR messenger is the main line used to assist in hauling any basic rig across between ships. The preferred location for handling the STAR messenger and other lines is forward and inboard of the rig. If space is limited forward, aft and inboard of the rig is acceptable on a station-to-station basis. Other lines, such as the station-to-station phone line and the lead line messenger for the bridge-to-bridge phone/distance line, are attached to the messenger at a minimum distance of 200 feet (60.9 m) from the smaller end. The spanwire or highline is stopped to the messenger at a minimum distance of 350 feet (106.5 m) from the larger end. A 5 inch (12.7 cm) soft eye splice forms the bitter end of the messenger.

5C07 Preparations for Night Operations

1. Preparations for night operations on both delivering and receiving ships include:

Commodity Transferred	Code		
	Day Bunting or Painted Area (1 m (3 ft) square)		Night Light Box
Fuel, Residual (F77, F82)	Red		
Diesel Oil (US)	Blue		
Fuel, Naval Distillate (F75, F76)	Red & Blue Triangles		
Turbine Fuel, Aviation (F44)	Yellow & Blue Triangles		
Lube Oil	Black & Yellow Quarters		
F77 and F44 (US Double Hose Rig)	Red/Yellow & Blue Triangles		
F76 and F44 (US Double Hose Rig)	Red/Blue & Yellow/Blue Triangles		
Feed Water	White		
Potable Water (US)	White With Blue Letter "P" Centered		
Stores	Green With White Vertical Stripes		
Personnel and/or Light Freight	Green with White Letter "P" Centered		
Bridge-to-Bridge Phone/Distance Line (US)	Green With White Letter "B" Centered		

Fig 5C-2. Transfer Station Markers

a. Ensuring that station marker light boxes are ready for operation and properly coded.

b. Providing necessary signaling equipment; rig, obstruction, and highpoint lights; and illuminated line-throwing projectiles for each transfer station.

c. Checking dimming controls for normal navigation lights and servicability of Not Under Command, RAS, obstruction, contour, wake, and kinpost lights.

d. Checking darken ship arrangements and fog sound signaling equipment.

e. Giving special attention to personnel safety factors; issuing whistles, dye markers, and chemical lights or single-cell flashlights to all personnel requiring life jackets; and checking operation of the life-buoy float light.

e. Seeing that all attachment points and major rig fittings are painted white to aid visibility under night lighting conditions.

2. Working areas on deck, in the holds, cargo landing areas, and highpoints shall be illuminated if necessary. Lights shall be equipped with shields or shades of sufficient dimension and positioned so as to avoid illuminating the other ship's station.

5C08 Night Lighting Requirements

1. **Navigation Lights.** Navigation lights may be dimmed by both ships from the time the approach ship starts its approach until it is well clear. Dimmed navigation lights do not comply with the Rules of the Road.

2. Approach and Station-Keeping Lights.

a. **ROMEO Close Up.** Control and approach ships indicate ROMEO close up by using shielded directional signal lamps or Nancy.

b. **Hull Contour Lights (US).** Two blue lights are exhibited by the delivering ship just before the approach commences and during the period the receiving ship is abeam. They are located at the fore and aft

extremes of that portion of the ship's side that parallels the ship's keel. They are horizontally shaded to illuminate 135° of visibility measured from directly astern to 45° forward of the beam. The lights are shaded in a manner that restricts the beam of light to a vertical arc of 80° (i.e., 40° above and 40° below the horizontal axis of the ship in the upright position). A third contour light should be exhibited by delivering ships over 600 feet (185 m) in length. The three contour lights should be uniformly spaced.

b. **Wake Light.** The blue wake light is exhibited during the approach phase only. It shall be shaded so as to illuminate only the wake. The light is extinguished when the delivering and receiving ships are passing gear. When the wake light is in use, the white stern light of the International Regulations is to be darkened.

c. **Masthead Obstruction/Truck Light.** The red masthead light is shown during the approach phase only. The light is extinguished when the delivering and receiving ships are passing gear.

d. **Kingpost Lighting (UK).** Royal Fleet Auxiliaries exhibit a hooded red light from the top of the aftermost kingpost. The light (one-cell flashlight) is aimed downward and outward at a 45° angle and serves as a range light to assist in station keeping.

e. **Distance Line Lights.** During hours of darkness, a single green light or a cluster of three green lights shall be placed at the 18, 30, and 42 meter positions. If a single green light is used at these three positions, single red lights shall be placed at the zero and all other distance markers. If a cluster of three green lights is used at these positions, single green lights are to be placed at the zero and all other distance markers. All lights are to be stopped to the line just outboard of the markers.

e. **Distance Line Lights (US).** Chemical lights are lashed in pouches in the distance line markers. Use two blue chemical lights, one on each side of the marker, at the 60, 100, 140, and 180 foot (18.2, 30.4, 42.6, and 54.8 m) markers. Use one red chemical

light on the approach ship's side of the other markers. (One-cell, pin-on-type, red flashlights (torches) may be used in lieu of red chemical lights.)

5C09 Lights for Obstructions, Rig Fittings, Work Areas, and Attachment Points

1. Lighting measures are provided below to assist personnel in handling cargo and working rigs. *White lights must never be used because of their blinding effect.*

2. **Obstruction Lights.** Mark the deck edge and all obstructions at the receiving station with red-lens, one-cell, pin-on-type flashlights (torches) or red chemical light wands, as follows:

a. Mark with at least one red light: Deck-edge elevator corners, stanchion base sockets, davit sockets, torpedo and gun mounts, and similar obstructions.

b. Mark with three red lights, 6 inches (15.2 cm) apart in a vertical line: Vertical stanchions, boom guys, preventer wires, elevator cables, and other vertical obstructions which form the limits of open area available for working at the station.

c. Mark with six red lights the deck edge or highest obstruction outboard at the station. Prepare a 6 inch (15.2 cm) wide by 12 foot (3.6 m) long strip of white canvas, with grommets and securing lines for securing the canvas in a straight line, or a 12 foot length (3.6 m) of 21-thread manila or 1-1/2 inch (38.1 mm) nylon line. Affix six red-lens flashlights (mounted with the lens up) or six red chemical light wands to the canvas strip (or line) spaced at 24 inch (60.9 cm) intervals, with the first and last lights attached 12 inches (30.4 cm) from the ends of the canvas strip (or line). Secure the canvas strip (or line) in a straight horizontal line at the deck edge, centered at the center of the clearest space of the landing area or at the height of the highest obstruction outboard of the receiving station's landing area.

3. **Lights for Rig Fittings.** Red-lens, one-cell, pin-on-type flashlights (torches) or blue chemical light wands shall be installed or rigged at

these points, in the number and manner prescribed below. When chemical lights are used, one per side is sufficient.

a. **Messengers and Lines.** One adjacent to the identification tag.

b. **RAS Rig Fittings.**

1. Trolleys for personnel/cargo transfer and modified housefall: Four each side in a horizontal line, positioned with lens ends alternately up and down. When transferring a litter, install green chemical lights on the trolley's flotation cover.

2. Highline end: One on each side of the end fitting, the thimble, and so forth.

3. Housefall block: Three on each side.

4. Burton whip end: One, attached to the messenger, near the whip wire end.

5. Burton or housefall tie-plate: Three on each side, secured to the side of the plate.

6. Cargo hook tag line: One at the lower end.

7. Personnel transfer chair: One at each corner, top and bottom.

c. **Highpoint.**

(1) Receiving stations shall rig three lights at each forward and aft side of, and on a horizontal line with, the highpoint for the highline pelican hook, housefall block pelican hook, and outhaul/messenger block padeye or link.

(2) The lights shall be tied together and secured with the lens ends facing the attachment point — to serve as a reference point for delivering station deck rigging crews and winch operators.

4. **Floodlights for Work Areas, Highpoints, and Winches.**

a. Illuminate with low-level floodlights the working areas on deck and in the holds, cargo landing areas, areas at attachment

points, and areas around winches. Floodlights shall be a minimum of 150 watts, controlled by individual switches and variable transformer dimmers, and equipped with shields of sufficient dimensions to avoid illuminating the other ship.

b. Illuminate cargo landing, cargo handling, and working areas with:

(1) At least two floodlights for illuminating each cargo landing area, one light located forward of the area and directed aft and the other light located aft of the area and directed forward .

(2) Floodlights, spaced horizontally at appropriate intervals, for lighting deck working areas. A deck working area is any area where personnel are handling lines, stores, ammunition, and so forth.

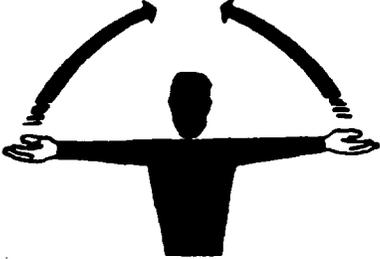
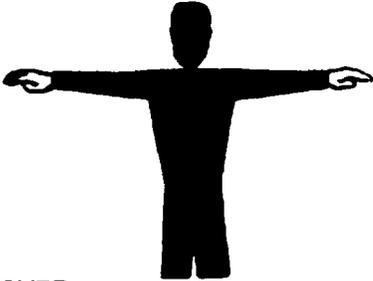
(3) At least one floodlight to illuminate the highpoint area, directed inboard and down to illuminate the highpoint, if practicable.

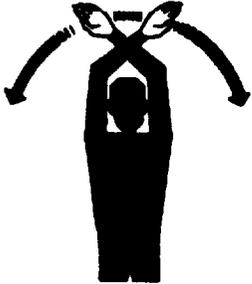
(4) Floodlights to illuminate winches used for RAS rigs.

ANNEX 5D

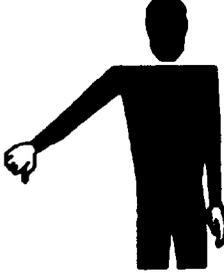
Hand Signals for Hovering Aircraft

The signals are designed for use by the helicopter director facing the aircraft in a position where the helicopter director can best be seen by the pilot. The helicopter director should wear a distinctive garment, preferably of fluorescent international orange or yellow. The pilot may use these signals, as appropriate, in a similar way to that indicated for the helicopter director.

STANDARD SIGNALS FOR HOVERING AIRCRAFT	
SIGNAL	REMARKS
<p>1.</p>  <p>MOVE UPWARD</p>	<p>Arms extended horizontally sideways beckoning upwards, with palms turned up. Speed of movement indicates rate of ascent.</p>
<p>2.</p>  <p>HOVER</p>	<p>Arms extended horizontally sideways, palms downward.</p>
<p>3.</p>  <p>MOVE DOWNWARD</p>	<p>Arms extended horizontally sideways beckoning downwards, with palms turned down. Speed of movement indicates rate of descent.</p>
<p>4.</p>  <p>MOVE TO LEFT</p>	<p>Right arm extended horizontally sideways in direction of movement and other arm swung over the head in the same direction, in a repeating motion.</p>

STANDARD SIGNALS FOR HOVERING AIRCRAFT	
SIGNAL	REMARKS
<p>5.</p>  <p>MOVE TO RIGHT</p>	<p>Left arm extended horizontally sideways in direction of movement and other arm swung over the head in the same direction, in a repeating motion.</p>
<p>6.</p>  <p>WAVE-OFF</p>	<p>Waving of arms over the head. <i>This signal is mandatory.</i></p>
<p>7.</p>  <p>HOOK UP LOAD</p>	<p>Rope climbing motion with hands.</p>
<p>8.</p>  <p>RELEASE LOAD</p>	<p>Left arm extended forward horizontally with fist clenched; right hand making vertical pendulus movement with fist clenched.</p>

STANDARD SIGNALS FOR HOVERING AIRCRAFT	
SIGNAL	REMARKS
<p>9.</p>  <p>LOAD HAS NOT BEEN RELEASED</p>	<p>Bend left arm horizontally across chest with fist clenched, palm downward; open right hand pointed up vertically to center of left fist.</p>
<p>10.</p>  <p>WINCH UP</p>	<p>Left arm horizontal in front of body with fist clenched; right hand with palm turned upwards making upward motion.</p>
<p>11.</p>  <p>WINCH DOWN</p>	<p>Left arm horizontal in front of body with fist clenched; right hand with palm turned downwards making downward motion.</p>
<p>12.</p>  <p>CUT CABLE</p>	<p>Right arm extended forward horizontally with fist clenched; left arm making horizontal slicing movements below the right fist with palm downward.</p>

STANDARD SIGNALS FOR HOVERING AIRCRAFT	
SIGNAL	REMARKS
13.  AFFIRMATIVE (ALL CLEAR)	Hand raised, thumb up.
14.  NEGATIVE (NOT CLEAR)	Arm held out, hand below waist level, thumb turned down.

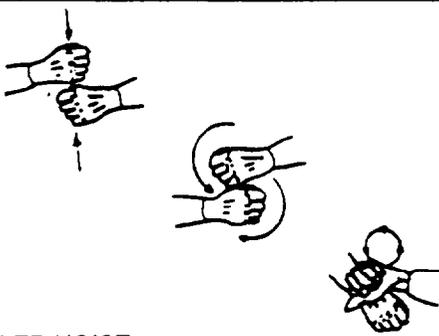
ANNEX 5E

Hand Signals for Swimmers and Survivors

These hand signals are the standard hand signals for use by rescue personnel and survivors in daylight and are to be used whenever radio communication is not possible.

STANDARD RESCUE SIGNALS	
SIGNAL	MEANING
<p>1.</p>  <p>I AM ALL RIGHT</p>	<p>Raised arm, open hand, fingers extended.</p>
<p>2.</p>  <p>MOVE IN FOR PICKUP</p>	<p>Raised arm, thumb up.</p>
<p>3.</p>  <p>IN TROUBLE, NEED ASSISTANCE</p>	<p>Vigorous waving of one arm.</p>
<p>4.</p>  <p>DEPLOY RAFT</p>	<p>Clenched fists, arms crossed overhead.</p>

STANDARD RESCUE SIGNALS	
SIGNAL	MEANING
<p>5.</p>  <p>DEPLOY RADIO</p>	<p>Hand held to ear.</p>
<p>6.</p>  <p>DEPLOY PNEUMATIC WEBBING CUTTER</p>	<p>Clenched fist, arm pumping motion.</p>
<p>7.</p>  <p>DEPLOY RESCUE LITTER</p>	<p>One arm raised with open palm, fingers extended; other arm raised over swimmer's head and touching the first arm at the elbow.</p>
<p>8.</p>  <p>DEPLOY RESCUE NET</p>	<p>Both arms raised, palms open, fingers extended at a 45-degree angle to the side of the swimmer's head.</p>

STANDARD RESCUE SIGNALS	
SIGNAL	MEANING
<p>9.</p>  <p>READY TO BE HOISTED</p>	<p>Raised arm, thumb up.</p>
<p>10.</p>  <p>STOP HOISTING</p>	<p>Raised arm, clenched fist.</p>
<p>11.</p>  <p>LOWER CABLE</p>	<p>Raised arm, thumb down.</p>
<p>12.</p>  <p>FAILED HOIST</p>	<p>Clenched fist over clenched fist followed by a thumbs down by hoist operator.</p>

LIST OF EFFECTIVE PAGES

Effective Pages	Page Numbers
Original	1005-I (Reverse Blank)
Original	1005-III (Reverse Blank)
Original	1005-V thru 1005-XIII (Reverse Blank)
Original	1005-XV (Reverse Blank)
Original	1005-1-1 thru 1005-1-10
Original	1005-1A-1, 1005-1A-2
Original	1005-1B-1, 1005-1B-2
Original	1005-2-1 thru 1005-2-43 (Reverse Blank)
Original	1005-2A-1 thru 1005-2A-6 1005-2B-1 thru 1005-2B-4
Original	1005-2C-1 (Reverse Blank)
Original	1005-2C-3 thru 1005-2C-9 (Reverse Blank)
Original	1005-3-1 thru 1005-3-23 (Reverse Blank)
Original	1005-3A-1 thru 1005-3A-4
Original	1005-3B-1 thru 1005-3B-7 (Reverse Blank)
Original	1005-3C-1, 1005-3C-2
Original	1005-4-1 thru 1005-4-25 (Reverse Blank)
Original	1005-5-1 thru 1005-5-24
Original	1005-5A-1 thru 1005-5A-7 (Reverse Blank)
Original	1005-5B-1 thru 1005-5B-4
Original	1005-5C-1 thru 1005-5C-6
Original	1005-5D-1 thru 1005-5D-5 (Reverse Blank)
Original	1005-5E-1 thru 1005-5E-4
Original	1005-LEP-1 (Reverse Blank)

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EXTAC 1005 (REV. A)

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