U.S. Department of Transportation
**Federal Aviation Administration**

# Advisory Circular

**Subject:** APPROVAL OF OFFSHORE HELICOPTER APPROACHES | **Date:** 10/21/88 | **Initiated by:** AFS-210 | **AC No:** 90-80A | **Change:**

1. PURPOSE. This advisory circular (AC) describes acceptable methods for obtaining approval to use Airborne Radar Approaches (ARA) and Offshore Standard Approach Procedures (OSAP).

2. FOCUS. These criteria apply to FAR Parts 91 and 135 helicopter offshore support operations.

3. CANCELLATION. Advisory Circular 90-80, Approval of Airborne Radar Approach (ARA) Procedures for Helicopters to Offshore Platforms, dated May 18, 1981, is canceled.

4. PRINCIPAL CHANGES. This advisory circular retains the provisions of ARA procedures that were in AC 90-80 and adds criteria for OSAP's.

5. RELATED FAR.

a. FAR Part 27, Airworthiness Standards: Normal Category Rotorcraft.

b. FAR Part 29, Airworthiness Standards: Transport Category Rotorcraft.

c. FAR Part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration.

d. FAR Part 91, General Operating and Flight Rules.

e. FAR Part 135, Air Taxi Operators and Commercial Operators.

6. RELATED READING MATERIAL. Additional information may be found in the following publications:

a. Federal Aviation Administration (FAA) documents:

(1) FAA Order 8260.3, as amended, U.S. Standard for Terminal Instrument Procedures (TERPs), stock no. 050-007-00345-5. Copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(2) FAA Order 8260.19, as amended, Flight Procedures and Airspace. Copies may be purchased from the FAA Document Inspection Facility, Public Inquiry Center, 800 Independence Avenue, S.W., Washington, D.C. 20591.

(3) Advisory Circular AC 20-121, Airworthiness Approval of Airborne LORAN C Systems for use in the U.S. National Airspace System, dated August 23, 1984. Copies may be obtained from U.S. Department of Transportation, Distribution Requirements Section, M-443.2, Washington, D.C. 20590.

(4) Technical Standard Order (TSO) C63c, Airborne Weather and Ground Mapping Pulsed Radars. TSO's may be reviewed at any FAA regional office.

b. Other documents:

(1) Radio Technical Commission for Aeronautics (RTCA) Document No. RTCA DO-172, Minimum Operational Performance Standards for Airborne Radar Approach and Beacon Systems for Helicopters. Copies may be obtained from RTCA Secretariat, One McPherson Square, Suite 500, 1425 K Street, N.W., Washington, D.C. 20005.

(2) Radio Technical Commission for Aeronautics (RTCA) Document No. RTCA DO-173, Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars. Copies may be obtained from RTCA Secretariat, One McPherson Square, Suite 500, 1425 K Street, N.W., Washington, D.C. 20005.

Robert L. Goodrich
Acting Director, Flight Standards Service

CONTENTS

Page No.

# CHAPTER 1. DEFINITIONS

The following definitions apply to both ARA and OSAP procedures unless otherwise noted.

a. Aeronautical Radar Beacon. An active transponder which responds to radar interrogations.

b. Altitude Above Ground Level (AGL). Altitude expressed in feet measured above ground level. For ARA and OSAP approaches, it is also altitude expressed in feet above the level of the water surface surrounding an approach target.

c. Airborne Radar Approach (ARA). A nonprecision instrument approach procedure based upon use of an ARA system as the primary approach aid in the intermediate, final, and missed approach phases of the procedure.

d. Airborne Radar Approach Systems (ARA only). An airborne Weather/Mapping Radar which includes cockpit displays, controls, and instrumentation which provides approach guidance using primary radar imaging, beacon return, and/or reflectors.

e. Airborne Radar Operator (ARO). A pilot responsible for operating the Airborne Radar and providing vectors to the pilot at the controls of a helicopter during ARA or OSAP procedures. The ARO may be the pilot in command or second in command.

f. Airborne Radar/LORAN C Approach System (AR/LORAN C) (OSAP only). A system comprised of an Airborne Weather/Mapping Radar, a LORAN C (approved in accordance with AC 20-121) and the cockpit displays, controls, and instrumentation necessary to provide approach guidance for an OSAP procedure.

g. Approach Offset (OSAP only). A segment of the Offshore Standard Approach Procedure, where the final approach segment is offset .5 NM either left or right, depending upon the location of the MAP and missed approach Clear Area.

h. Approach Target. A stationary platform, rig, or ship to which an approach procedures is oriented. The approach target may or may not be the destination where the helicopter will land.

i. Area Calibration (OSAP only). Area calibration is a manual mode of operation requiring pilot input to the LORAN C unit, intended to reduce the effect of propagation anomalies. Application of correction values to the LORAN C system is a function of receiver design.

j. Clear Area (OSAP only). An area centered on the offset final/missed approach course which provides .5 NM lateral obstruction clearance starting at the decision point and continuing throughout the missed approach.

k. Clear Sector (ARA only). An area overlying and centered on the final approach course. It is 4 NM wide at the DWFAP and narrows linearly to a 2 NM width at 2 NM from the approach target. (See figure 1.)

l. Clear Zone (ARA only). A rectangular zone established for missed approach to the right or left of the final approach course and clear of any obstacle. (See figure 1.)

m. Cluster Approach (ARA only). An Airborne Radar Approach to an approach target located less than 4 NM from any other platform, rig, drill ship, or other obstacle.

n. Course Bearing Cursor (ARA only). An electronically generated aid shown on a radar display to assist pilots in flying a straight line surface track between the DWFAP and MAP.

o. Course Bearing Selector (ARA only). A pilot-selectable control which positions the cursor on the display.

p. Decision Point Altitude (DPA) (OSAP only). A point located on the offset final approach course at 500 ft. MSL and not less than 2 NM from the approach target. At DPA, if the radar presentation forward along the offset approach course is clear of all obstructions by at least .5 NM, the approach may continue to MDA. However, if at DPA minimum lateral separation from obstructions is not assured, a missed approach must be initiated.

q. Destination Platform. The platform of intended landing. The destination platform may or may not be the approach target.

r. Downwind Final Approach Position (DWFAP). The position, downwind from the approach target, from which the final approach is initiated.

s. Intermediate Approach Fix (IF). The IF may be a DME fix (based upon VORTAC) or a waypoint based upon an approved RNAV system. It connects the en route structure to the intermediate segment of an instrument approach procedure.

t. Lowest Radar Altitude (LRA). The lowest altitude to which descent may be made referenced only to an onboard radar altimeter.

u. Missed Approach (ARA only). An immediate climbing turn toward a clear zone to the intermediate approach altitude. It begins at the missed approach point (MAP).

v. Missed Approach (OSAP only). An immediate climb to intermediate approach altitude while tracking an offset final/missed approach course. After passing 900 ft. MSL, continue climbing and return to the en route fix at 2000 ft. MSL or as directed by ATC.

w. Missed Approach Point (MAP) (ARA only). The missed approach point is a point in space at the radar minimum altitude or lowest radar altitude, as appropriate, no closer to the approach target, as observed on the radar display, than the minimum authorized visibility for landing.

x. Missed Approach Point (MAP) (OSAP only). A point on the offset final approach course where a missed approach is initiated. It is located on the .5 NM offset course before reaching the offset abeam point. This will place the helicopter approximately .7 NM from the destination offshore platform on a diagonal line. A helicopter is at the MAP when the LORAN C distance indicates .7 NM or at any time the primary target is lost from the radar screen, whichever occurs first.

y. Observed Coordinates. Observed coordinates are LORAN C coordinates adjusted for area calibration determined by a LORAN C receiver installed in an aircraft.

z. New Observed Coordinates. LORAN C coordinates (determined by an aircraft installed LORAN C receiver for reuse by the same receiver) adjusted for area calibration for use during an OSAP procedure. Observed coordinates are ordinarily current for 28 days. However, other periods of time may be specified in a company manual (or letter of approval) for a particular operator if geographical considerations and experience show that the 28 days currency period is not appropriate.

aa. Offset Approach (ARA only). An operating technique whereby a radar operator, at one mile from the approach target, vectors a helicopter to position the approach target off the zero azimuth mark by no more than 25% of the scan angle being used.

bb. Offshore Standard Approach Procedure (OSAP). A procedure designed specifically for helicopters operating over water at least 5 NM from land. The procedure uses LORAN C for course guidance and Airborne Weather/Mapping Radar for detecting and avoiding obstructions.

cc. Radar Minimum Altitude (RMA) (ARA only). The lowest altitude to which descent is authorized when 1.0 NM lateral obstacle clearance is not maintained, offshore heliport facilities (paragraph 17) are not available, or at least one Radar Altimeter is not operative.

dd. Radar Altimeter. Aircraft equipment which makes use of reflected radio signals to determine aircraft height above the surface.

ee. Radar Altitude. Height above a surface measured by a radar altimeter.

ff. Reflector. A passive "primary radar," "skin-paint" source.

gg. Single Platform Approach (ARA only). An Airborne Radar Approach to an offshore platform located 4 NM or more from any other platform, rig, ship, or other obstacle.

# CHAPTER 2. OFFSHORE STANDARD APPROACH PROCEDURE (OSAP)

## 1. GENERAL.

### a. Background.

(1) The first letdown procedure approved for helicopters operating IFR over water was the Helicopter En Route Descent Area (HEDA). This procedure allowed helicopters to descend IFR into an area clear of obstructions. Upon reaching visual meteorological conditions (VMC), the helicopter could proceed VFR to its destination. HEDA's allowed properly equipped helicopters to descend to an altitude of 400 ft., although sometimes still many miles from their final destination. Airborne Radar Approaches (ARA) evolved from HEDA's. This was the first significant effort at establishment of IFR approach procedures to offshore platforms. Advisory Circular 90-80, dated May 18, 1981, contained an acceptable means for operators to obtain approval of Airborne Radar Approach procedures.

(2) ARA approaches are usually preferred over HEDA's because the procedure is to a specific location (platform), whereas HEDA's are en route IFR descent to VFR conditions. The ARA was intended to replace HEDA's. However, HEDA's were retained because they required less time for approval and served larger areas. By the time an ARA is approved, the platform could very well have been moved to a new location, making the procedure obsolete. It became apparent that a new "generic" or universal type approach was needed which incorporated the advantages of both HEDA's and ARA's while providing an acceptable level of safety.

(3) In January 1980, the FAA and the National Aeronautics and Space Administration (NASA) conducted a helicopter flight test program in the Gulf of Mexico to evaluate the feasibility of utilizing airborne weather and mapping radar as an approach system for offshore drilling platforms. In September 1984, the FAA conducted further testing in the Gulf of Mexico. In these later tests Airborne Weather/Mapping Radar was evaluated to determine if it was feasible to use radar as a primary device for detecting and avoiding obstructions. The radars which were tested were found acceptable for obstruction detection and avoidance only when the crosswind correction angle did not exceed 10° on final approach. Recommendations from reports of these tests were used to develop guidelines for "generic" Offshore Standard Approach Procedures (OSAP). Offshore Standard Approach Procedures (OSAP) are applicable only to helicopter operations to and from offshore platforms, rigs, or ships and are not to be used less than 5 nautical miles (NM) from land.

### b. Operations Specifications and Letters of Authorization.

Authority to use these Offshore Standard Approach Procedures will be conveyed in operations specifications for FAR Part 135 operators or by letter of authorization for FAR Part 91 operators.

2. OPERATIONAL CONCEPTS.

a. The System as a Unit. Incorporating the Airborne Radar and the LORAN C as one navigation/approach system provides the following:

(1) A positive fix for the Downwind Final Approach Position (DWFAP).

(2) A positive method of maintaining desired track over the surface on the final/missed approach course.

(3) A definite missed approach point.

b. System Integrity. While on final approach and before descending below 900 ft. AGL, the flightcrew must confirm that the LORAN C range and azimuth display agrees with the airborne radar display. The LORAN C and airborne radar displays will be compared to confirm system differences do not exceed ± 0.2 NM in range and correct azimuth. During an OSAP approach if either the Airborne Radar or LORAN C fails, the pilot must immediately execute a missed approach.

c. Intermediate. Operators must provide flightcrews with current observed coordinates for locations which are designated as approach targets. Arriving at the initial fix the crew will enter the observed approach target coordinates into the LORAN C. That action designates the approach target as a "waypoint." LORAN C is used for course guidance. Airborne radar is used for obstruction detection and avoidance. The flightcrew must select a final approach course which requires no more than a 10° alignment difference between the wind direction and the intended final approach track to the target platform. Limiting the final approach to within 10° of the windline reduces the probability of premature radar target loss. The crew must then determine if the selected approach target can accommodate the planned approach based upon evaluation of observed obstacles in the area. The helicopter then proceeds directly toward the approach target waypoint descending to no lower than 900 ft. AGL prior to reaching 5 NM distance to go. During descent, the crew must establish the location of a DWFAP not less than 5 NM (LORAN C range) from the approach target. As the helicopter nears the approach target, the ARO compares the radar screen location of the approach target with the LORAN C indications. When the ARO is assured the information is reliable and both the airborne radar and LORAN C systems are operationally correct, the flight may continue and (1) arc to the DWFAP, or (2) overfly the approach target to DWFAP using either a teardrop procedure turn or a standard course reversal to manuever to the selected inbound final approach course.

NOTE: Throughout this procedure the radar antenna sweep must not be less than 120°. Anything less than a 120° antenna sweep will limit the ARO's ability to accurately observe and locate obstructions. Smaller sweep angles increase the possibility of premature loss of peripheral radar targets.

d. Final Approach.

(1) LORAN integrity must be verified after turning on final approach but before descending to less than 900 ft. AGL or offsetting the LORAN C final approach course. The observed coordinates entered as the approach target waypoint must provide LORAN C navigation information which corresponds to the airborne radar return (within a tolerance of ±0.2 NM in range) and indicates a correct azimuth. Before arriving at the DWFAP the flightcrew must pick an obstacle-free area, either right or left of the approach target for a straight ahead approach and missed approach. The crew must then program the LORAN C to provide guidance on a selected offset final approach course. This action will assure an obstruction-free area from the DPA to the MAP and a corridor approximately 2.0 NM straight ahead of the MAP to permit a missed approach climb to 900 ft. AGL. This clear area extends 0.5 NM on either side of the offset LORAN C course. The crew then locates the MAP .70 NM from the approach target along the offset final approach course. This offset enables the aircraft to fly a straight course throughout the final approach segment and permits a straight ahead missed approach if visual reference is not established with the approach target at the MAP.

(2) Departing the DWFAP inbound, the flightcrew must stabilize approach airspeed and descend to 500 ft. AGL while flying a heading to intercept the 0.5 NM offset final approach course. To avoid adversely affecting LORAN C updating capabilities the pilot should maintain a stabilized airspeed and make small heading changes using well coordinated turns.

(3) Before arriving at the DPA, all radar returns must be avoided by at least 0.5 NM. This is accomplished by making minor heading changes as necessary; however, the aircraft must be established on the offset final approach course prior to the DPA. After departing the DPA, heading changes to avoid obstacles are not permitted. A missed approach is required if a minimum lateral separation distance of 0.5 NM from obstructions cannot be assured.

(i) Avoiding Obstructions on Final Approach. Before arriving at the DPA, and while flying at 500 ft. AGL or above, the ARO shall vector the pilot from the final approach track to avoid all obstructions by at least 0.5 NM. The ARO should use the minimum heading changes necessary while considering the following:

(A) Drift caused by windspeed and direction;

(B) The effects of heading changes on the ability of the LORAN C to update;

(C) Location of the helicopter in relation to obstructions in the event of radar failure; and

(D) Minimum obstruction clearance distances during the approach and subsequent missed approach.

(4) The ARO shall continue to vector the aircraft returning to and stabilizing on the LORAN C offset course prior to the DPA. (The decision point altitude shall be located not less than 2.0 NM from the MAP.) Before beginning descent at the DPA, the flightcrew shall accomplish the following:

(i) Select the lowest appropriate scale on the airborne radar display to assure maximum radar accuracy.

(ii) Cross check the radar and LORAN C to confirm agreement and accuracy;

(iii) Confirm a minimum lateral obstacle separation of 0.5 NM from the intended LORAN C course throughout the final and missed approach; and

(iv) Then, at the DPA, continue descent to the appropriate MDA. When visual reference with the approach target is established the helicopter may proceed to the desired destination. If visual contact with the approach target is not established at the MAP, a missed approach must be executed by climbing straight ahead using LORAN C for course guidance and airborne radar for obstacle avoidance.

e. System for Recording LORAN C Chain Designations and Updating Observed Coordinates. Accuracy of OSAP depends upon the crews ability to determine and select chain combinations and to use precise, up-to-date, observed coordinates. Therefore, each operator authorized OSAP operations must develop a system for providing precise chain determination capabilities and both current and accurate observed coordinates. Approval of this system will be a part of the operator's OSAP authorization.

f. Minimum Equipment List Considerations. Operators with FAA approved Minimum Equipment Lists (MEL's) must modify those MEL's to account for the effect of inoperative equipment on OSAP operations.

3. OPERATING PROCEDURES. Operators using OSAP's should develop detailed procedures to ensure clearly defined crew duties for two-pilot operations. The following operating procedures were found usable and safe during procedural development testing by the FAA.

a. En Route. Flight from the departure point to the Intermediate Fix (IF) along VORTAC or RNAV routing does not require modification to accommodate the OSAP. Procedures unique to OSAP begin at the intermediate fix.

NOTE: Descent below MEA is not authorized at any point in the OSAP unless the aircraft is offshore and within 20 NM of the approach target.

b. Missed Approach. A missed approach requires an immediate climb to 900 ft. AGL anytime any one of the following events occur: (1) failure of the LORAN C or Airborne Radar, (2) the approach target is lost from the Airborne Radar display, (3) when the ARO determines the helicopter's track will not avoid all obstacles by at least 0.5 NM, or (4) when 0.7 NM from the offset approach target if visual contact is not established. The crew should make only minor heading changes to avoid flight closer than 0.5 NM to any radar returns while following LORAN C course guidance during a missed approach. After climbing to 900 ft. AGL, the flight crew shall return to the en route fix at a minimum altitude of not less than 2000 ft. MSL or as directed by air traffic control.

4. MINIMUMS.

a. Landing Minimums.

| MDA | Visibility |
|---|---|
| 200 ft (see notes 1 and 2) | 3/4 statute miles |

NOTE 1: Increase MDA by 50 ft. without radar altimeter.

NOTE 2: MDA will be adjusted upward by a factor of 5 ft. for each mile over 5 miles that the approach target is distant from the altimeter setting source. The altimeter setting source must not be more than 10 NM from the approach target.

b. Alternate minimums. Standard alternate minimums of 800-2 for nonprecision approaches will apply for OSAP approaches. When an airport or approach target is listed as an alternate airport it must have:

(1) An approved source of weather observations and reports.

(2) Two-way radio communications with aircraft making an approach.

(3) A standard or special instrument approach.

5. TRAINING PROGRAM. Operators requesting authority to use OSAP's are required to satisfactorily train their flightcrew members under an FAA-approved training program before beginning OSAP operations. Operators should submit a proposed training program to the local FAA Flight Standards district office (FSDO) for approval. A sample training program outline is in appendix 3.

6. FLIGHTCREW MEMBER EXPERIENCE.

a. This paragraph describes the minimum experience for crewmemers used in OSAP operations. Partial credit for previous experience will be given crewmembers who have experience using ARA's. Experience must be a matter of record and have been gained at the crew station appropriate to the crew duty (pilot or ARO) performed. Before participating in OSAP operations each flightcrew member must have at least 10 hours of flightcrew experience operating IFR (at either crew station) in the offshore IFR route structure and have made 10 OSAP's (no more than 6 approaches in 1 crew station) or 5 OSAP's and 5 ARA's. After completing OSAP training, each flightcrew member who successfully completes both a line check and an OSAP proficiency flight check may be authorized to use minimums of MDA 300 ft., visibility 1 statute mile (SM). Each crewmember must fly and record 10 additional OSAP's before receiving authorization to use minimums lower than MDA 300 ft., visibility 1 SM.

b. Helicopter flight simulators specifically approved for OSAP training by the National Flight Simulator Evaluation Team and the POI assigned to the operator may be used for any amount of required training.

7. OSAP SYSTEM COMPONENTS. Before being authorized to conduct OSAP's, each operator who applies must have at least one helicopter equipped with (1) Airborne Weather/Mapping Radar approved for OSAP use, (2) IFR approved LORAN C capable of offsetting a course by .5 NM, and (3) a TSO'd radar altimeter.

a. Airborne Weather/Mapping Radar Equipment. The radar system must meet the following minimum requirements:

(1) Meet either TSO C63b; TSO C63c; or TSO C102 requirements.

(2) Have a stabilized 120°/60° sector scanning antenna, with scan rates no less than 12/minutes and 24/minutes respectively.

(3) Have an adjustable, bright display.

(4) Have an alphanumeric display for selected ranges and azimuth markers; however, alphanumeric displays of selected ranges are not required when a positive means of determining the range which has been selected is available and the radar operator is appropriately trained.

(5) Have an indicated range error not in excess of plus or minus 0.2 NM for display ranges of 5 NM or less.

(6) Have a lowest selectable range/range mark display which provide at least 2.5/.5 NM to meet currently authorized MDA's.

(7) Have tilt control of +/-15°.

(8) Display a test pattern.

(9) Be operable in primary mode.

(10) Be equipped with a fault monitor or self-test function.

(11) Indicate the antenna beam center to within +/-3° at any scan angle by means of the indicator update strobe line when zero pitch and roll signals are applied to the antenna scanner to represent level flight.

NOTE: An operational course bearing cursor that provides course guidance may be used to supplement navigation track accuracy.

b. Airborne LORAN C Navigation Equipment. The LORAN C must meet the following minimum requirements:

(1) Meet TSO C60a or AC 20-121 requirements.

(2) Have a suitable course deviation indicator that provides course guidance and is installed in compliance with the provisions of FAR Section 29.1321.

(3) Be able to solve simple ambiguity.

(4) Have a "navigation valid" indication that is visible to the pilot.

(5) Provide distance and bearing information to waypoints.

(6) Provide the capability of selecting both left and right parallel course offset.

(7) Provide visible annunciation to alert the pilot of navigation system abnormalities and/or course offset operations.

c. Radar Altimeter. The radar altimeter must meet the requirements of TSO C87.

8. AIRWORTHINESS. All equipment required for OSAP should be installed and maintained in a manner that meets all applicable airworthiness standards. The selected equipment components must, as a minimum, meet the referenced TSO requirement and be specifically approved for OSAP by the FSDO. Equipment not meeting these standards requires further evaluation and approval by FAA engineering before it may be used. Installation of Airborne Radar, Radar Altimeter, and LORAN C equipment may constitute a major change in type design making the provisions of FAR Section 21.97 applicable. Each person who approves an aircraft for return to service after modification for OSAP operations must comply with the provisions of FAR Sections 43.5 and 43.7.

a. System Installation.

(1) System controls and data displays must be visible and conveniently accessible to appropriate flight crewmembers at their duty stations. System controls should be adequately protected from inadvertent operation.

(2) Electrical power for the system should be obtained from a bus that provides maximum reliability without jeopardizing service to other essential or emergency loads.

(3) The OSAP system should not be a source of objectionable electromagnetic interference and not be adversely affected by electromagnetic interference from other equipment in the aircraft.

(4) Any probable malfunction of the OSAP system should not adversely affect the normal operation of other systems or equipment installed in the aircraft.

(5) System performance should not be adversely affected by changes in aircraft attitude normally encountered in flight operations.

9. MAINTENANCE.

a. Airborne Radar, Radar Altimeter, and LORAN C maintenance will be performed in accordance with FAR Part 43 and the manufacturer's instructions, or in accordance with a manual under an FAA-approved maintenance program. Records of maintenance should be entered in the helicopter maintenance records required by FAR Section 43.9, or in the records required by the operator's approved maintenance program. Following repair or alteration, the system should be checked by appropriate ground and/or flight evaluations before predicating any operation on its use. Compatibility of system replacement parts/components should be assured.

b. Each operator's maintenance program must be approved by the FSDO issuing the OSAP authorization before any IFR OSAP operations may be conducted.

10. INSPECTION AND TEST PROCEDURES. Operators using OSAP who do not have an approved maintenance program should establish procedures to inspect and test the OSAP equipment periodically to determine that it is operating as accurately as it was required to for its original approval. These procedures should include methods for analyzing malfunctions and defects to determine whether established inspections and tests reasonably assure the equipment is maintaining its accuracy. Test and inspection procedures and intervals should be adjusted in accordance with the results of the analysis. In addition to the equipment manufacturer's recommendations, the following test and inspections should be included:

a. A visual inspection to determine condition and security of equipment mounting, electrical wiring and connectors, Radome, antennas and cables, waveguide and couplings, indicator mounts, knobs, etc.

b. A functional test of Airborne Radar, Radar Altimeter, and LORAN C to determine operating condition. Tests should be performed in accordance with appropriate manufacturer's procedures.

c. Other appropriate tests and/or inspections to determine whether the complete system is operating properly.

NOTE: The inspection and test procedures must be approved by the FSDO issuing the OSAP authorization before the operator conducts any IFR OSAP operations.

11. WHERE TO APPLY FOR APPROVAL. To receive authorization for helicopter OSAP's, operators must submit a written request to the FAA. This request must include a list of helicopters, the type of OSAP equipment installed, and evidence of FAA approval of the airborne radar system for obstacle avoidance. A description of the equipment installation, aircraft flight manual changes, proposed Minimum Equipment List (MEL), training program, and maintenance program shall also be provided. The FAA will evaluate the request to ensure that a particular Radar/LORAN C combination meets minimum requirements, that aircrew training requirements are met, and that aircraft and avionics maintenance requirements are adequate. FAA engineering flight test and evaluation is required if a radar is installed that has not previously been approved for obstruction avoidance. Basic performance requirements for airborne radar are in TSO C102 and RTCA DO-172.

12. APPROVED WEATHER OBSERVATION AND REPORTING REQUIREMENTS. OSAP's require an approved weather reporting station within 10 NM of the approach target for which an OSAP is oriented. Flightcrews must be furnished a report of the current weather observation before beginning an OSAP.

# CHAPTER 3. AIRBORNE RADAR APPROACH

13. GENERAL.

a. Background. Energy exploration programs depend on the helicopter industry for full-time logistical support. Aircraft and avionics suitable only for VFR operations cannot satisfy the requirements of an around-the-clock, all-weather industry. Several new-generation IFR helicopters have been certificated, and flight control and avionics systems particularly suitable for IFR helicopter operations have developed rapidly. Airborne Radar appears especially applicable to helicopter instrument approach operations to offshore platforms where space available for ground facility siting is limited. Airborne Weather and Mapping Radar has been used by helicopter operators for some time as a navigational aid off shore during marginal VFR weather. Offshore IFR helicopter operations have been approved using Airborne Radar as a descent aid. This document presents an acceptable means for offshore helicopter Airborne Radar Approach procedures using Airborne Radar as the primary approach aid.

b. Operations Specifications and Letters of Authorization. Instrument approach procedures authorized for use only by air carriers or some specific segment of the aviation industry are not published in the Federal Register and are known as "special procedures." Special procedures require the use of landing aids, communications, or weather services not available for public use. Helicopter Airborne Radar Approach (ARA) procedures to offshore platforms are classified as special procedures. The procedures will be developed for individual operators and issued to the users through operations specifications or letters of authorization. The operations specifications or letters of authorization usually contain conditional authorizations that apply to individual operators. The Manager of the Flight Standards Division in the region having jurisdiction over the airport is the approving authority for these special instrument approach procedures. Flight Standards division managers may delegate this authority to other FAA personnel. Coordination and distribution of "special procedure" forms are accomplished by the regional Flight Procedures Branch. Applications for approval of ARA procedures should be submitted to the appropriate regional Flight Standards division. Applications should be accompanied by appropriate supporting information as described in paragraph 22.

14. OPERATIONAL CONCEPTS. Airborne Radar Approaches require two pilot flightcrews and differ significantly from other instrument approaches. Airspeed control is critical due to the dimensions of the missed approach clear zone.

a. Course Guidance. The Airborne Radar Operator interprets radar returns on the cockpit display and vectors the aircraft clear of observed targets to the MAP. This is a definite departure from the traditional concept of approach guidance in FAA Order 8260.3B, U.S. Standard for Terminal Instrument Procedures (TERPs).

b. Obstacles. TERPs defines an obstacle as an object for which vertical clearance is, or must be, provided during flight operations. The nature of offshore operations is such that numerous permanent or transient targets may be displayed on radar. For ARA procedures, obstructions 50 ft. or higher above the surface are considered obstacles. Where landing platforms are less than 100 ft. above the surface, all obstacles within 50 ft. of the platform's height shall be plotted. Those obstacles depicted within the final approach area on the ARA approach chart will include known height; however, those objects not shown on the chart must be considered dynamic obstacles of indeterminate height for which radar provides means of lateral rather than vertical clearance on final approach. Before final approach, vertical clearance over surface obstacles is assured by adherence to specified minimum altitudes. Missed approach obstacle avoidance is provided by an immediate climbing turn to a clear zone.

c. Planning. Operational experience has shown that an ARA procedure to a single platform is a relatively uncomplicated operation. However, operations to and from a platform cluster increase potential for operator error. This potential can be reduced by careful evaluation of the procedure during the approval process, adequate training by the operator, proper approach planning, and use of aids such as a course bearing cursor to supplement basic Airborne Radar.

(1) Target Identification. Prompt and positive identification of the approach target solely by the use of search (mapping) mode can be difficult when returns from dynamic targets confuse the pattern of the targets depicted in a cluster. Where identification of a cluster cannot be assured in the search mode and approved navaids are unavailable to resolve target ambiguity, the approving authority should, as an option, consider whether to require installation of a radar beacon.

(2) Approach Planning. To assure obstacle-free flightpaths on final and missed approach, it is necessary to thoroughly scan and evaluate these areas before the approach is initiated.

(3) Overshooting the MAP. Range errors caused by the time required for target update, possible equipment malfunctions, equipment accuracy, and crew reaction time may cause the achieved MAP to be closer to the approach target than the desired MAP. While turning during the missed approach, radar cannot be relied upon to

provide lateral obstacle avoidance. It is, therefore, imperative that crews be trained to execute an immediate climbing turn toward a clear zone at the missed approach point. To ensure obstacle clearance, it is necessary to initiate the missed approach at the designated MAP. Otherwise the flightpath could transgress an area which does not provide missed approach obstacle clearance.

(4) Use of Course Bearing Cursor. A final approach flown by maintaining the approach target on the course bearing cursor increases the probability that the aircraft will be on the final approach course upon arrival at the designated MAP.

d. Minimums. See paragraph 30, Takeoff and Landing Minimums.

e. Flexibility. An offshore ARA requires procedural flexibility to provide options for the crew in planning the approach. The procedure must provide a transition from an en route fix to a downwind position before beginning the final approach. This requires provision in the procedure for selection of a downwind final approach position which accounts for variations in wind conditions. On a cluster approach, where the close proximity of other targets does not permit sufficient lateral clearance for an ARA directly to the destination platform, the approach can be made to a more suitable approach target located on the perimeter of the cluster and include a visual transition to the destination platform. Selection of an approach target depends upon existing wind conditions which in turn determine the location of the downwind final approach position, approach target selection, and missed approach clear zone. An approved ARA procedure will provide an into-the-wind final descent to a cluster perimeter or to a single platform from any geographical direction.

15. OPERATING PROCEDURES. Operators using Airborne Radar for offshore instrument flight should develop detailed procedures to ensure clearly defined flight crewmember duties for two-pilot operation. Confusion or misunderstanding with respect to responsibility and authority during an Airborne Radar Approach can be detrimental to safety. The following operating procedures were found both safe and usable during procedural development testing by NASA and the FAA.

a. En Route. Offshore en route navigational guidance may be based upon any approved system appropriate to the route flown. The last en route fix is also the intermediate approach fix and is based on en route facilities. The Airborne Radar Operator obtains weather information and other relevant data for the landing area, identifies the destination area and target platform, determines DWFAP and missed approach clear zone, and discusses the approach with the other pilot before arrival at the intermediate approach fix.

b. Approach. The Airborne Radar Operator vectors the helicopter from the intermediate approach fix to a position downwind from the approach target and provides all further vectors to the missed approach point. The pilot makes no heading changes except to those vectors specified by the Airborne Radar Operator. The helicopter shall not be flown over an obstacle during final or missed approach. Descent on final approach may not begin until the Airborne Radar Operator confirms that all of the following conditions exist:

(1) All equipment required for the approach must operate properly.

(2) The final approach track does not overlay any obstacles other than the approach target, and, when descending to LRA, the clear sector is clear of all obstacles. (See paragraph 30a(2).)

(3) The missed approach clear zone is free of obstacles.

c. Minimum Altitudes. The altitude to which descent is authorized depends on the following conditions:

(1) All required equipment must be operational before descent to the lowest radar altitude (LRA). (See paragraph 30a(2)(i).)

(2) Descent below RMA is not authorized if:

(i) Lateral clearance of 1.0 NM cannot be maintained. (See paragraph 30a(2)(ii).)

(ii) Required offshore heliport facilities are not operational. (See paragraph 18.)

(iii) A required radar altimeter is inoperative.

d. Missed Approach. A missed approach must be initiated immediately if:

(1) A flight crewmember has not established visual contact with the approach target at the authorized minimum visibility distance as shown on the radar display; or

(2) During final approach there is any malfunction or failure of equipment required for the approach, unless the helicopter is in VFR conditions and can continue to the destination platform in VFR conditions; or

(3) The approach target is lost during any single radar scan when the helicopter is within 2-1/2 NM of the target.

(4) Visual contact with the approach target is lost during a visual transition.

e. Departures. For takeoff minimums on departure from platforms having approved ARA procedures see paragraph 30. For departures from platforms which have no approved ARA procedure, remain VFR until able to climb through an obstacle clear area to the appropriate intermediate approach altitude.

16. TRAINING PROGRAM. Operators are required to establish and maintain an approved training program appropriate to their operations. (See appendix 1.) The proposed training program should be acceptable if:

a. It includes all responsibilities, specific duties, and detailed procedures for flight crewmembers involved in use of Airborne Radar for navigation in IFR operations;

b. Initial training for flightcrew includes the following:

(1) Theory and operation of airborne radar equipment;

(2) Step-by-step instruction and practice in operation of ARA equipment;

(3) Limitations of ARA equipment;

(4) Crew coordination procedures;

(5) Detecting and reporting equipment malfunctions;

(6) Emergency procedures;

(7) Radar display interpretation;

c. All pilots assigned ARA duties must complete as many trips as necessary, under the supervision of an instructor or check airman, over routes terminating in offshore ARA procedures in order to:

(1) Ensure their competency in use of the equipment, and

(2) Enable certification of their proficiency in the system.

d. Recurrent training is provided to assure continued compliance with paragraph 29c.

e. Training programs are submitted to the FAA in writing and approved before authorization of ARA operations may be granted.

f. Appropriate training and testing records are maintained.

NOTE: An acceptable outline of a ground school/flight training curriculum segment is presented in appendix 1.

17. ARA SYSTEM COMPONENTS. (Accuracy numbers reflect a 95% probability.) Minimum system components for procedures based on Airborne Radar only (with or without beacon capability) are as follows:

a. Airborne Equipment.

(1) Radar system minimum requirements.

(i) Stabilized 120°/60° sector scanning antenna with scan rates of no less than 12/minutes and 24/minutes respectively.

(ii) Adjustable bright display.

(iii) Alphanumeric display for selected ranges and azimuth markers; however, alphanumeric display for selected ranges is not required when:

(A) A positive means for determining selected scale is available, and

(B) The radar operator is appropriately trained.

(iv) The indicated range error should not exceed plus or minus 0.2 NM for display ranges of 5 NM or less.

(v) Lowest selectable range/range mark display should provide at least 2.5/.5 NM to meet currently authorized MDA's. Equipment which provides a lowest range/range mark display of 5/1 NM may be used, but a 1/4 NM penalty is imposed on established visibility minimums.

(vi) Tilt control +/-15°.

(vii) Test pattern.

(viii) Primary mode (beacon mode may be necessary for cluster approaches. (See paragraph 14c(1).)

(ix) Fault monitor or self-test.

(x) An operational course bearing cursor that provides course guidance is required to fly cluster approaches below obstacles. (See paragraph 30a(2)(i).)

(xi) With zero pitch and roll signals applied to the antenna scanner representing level flight attitude, the indicator update strobe line should indicate the antenna beam center to within +/-3° at any scan angle.

NOTE: A radio altimeter must be installed and operational before descent to the Lowest Radar Altitude (LRA) is authorized.

b. Offshore Heliport Facilities.

(1) An approved source for weather observations and reports.

(2) When required, a radar transponder beacon. The location of the beacon should be evaluated during the approval process to ensure positive identification of targets. (See paragraph 14c(1)).

(3) Two-way communications, platform-to-aircraft and platform-to-shore.

18. SYSTEM LIMITATIONS AND PROCEDURAL CONSIDERATIONS.

a. Blind Flightpath Segments.

(1) If the DWFAP is not established directly downwind and the approach course is not directly upwind, a homing approach will result. A homing approach can result in blind flight path segments. This means that, with windspeeds as low as one-third of the airspeed, segments of the flightpath may not be visible to the ARO when using a 40° sweep angle. When using a 120° sweep angle, a windspeed of 0.9 of the airspeed may cause blind flightpath segments. Homing approaches can occur whenever the windspeed to airspeed ratio is greater than or equal to sine $\left|\frac{\text{sweep angle}}{2}\right|$.

(2) In a no wind condition, a target return 1.0 NM to the left or right of the 0° azimuth mark will disappear from the radar display at the following ranges as the distance to the target decreases:

| Sweep Angle | Range |
|---|---|
| 120° | 0.58 NM |
| 80° | 1.19 NM |
| 60° | 1.73 NM |
| 40° | 2.75 NM |

(3) When a wind causes a 10° crab, or in a 10° offset approach, a target 1.0 NM to the side of the 0° azimuth mark away from the crab or offset will disappear at the following ranges:

| Sweep Angle | Range |
|---|---|
| 120° | 0.84 NM |
| 80° | 1.73 NM |
| 60° | 2.75 NM |
| 40° | 5.67 NM |

(4) Considering that radar is used to avoid obstacles laterally, the importance of establishing an accurate DWFAP should be apparent.

b. Missed Approach Area. The clear zone in figure 3-1 is designed to protect the missed approach. Its dimensions assume that a helicopter on track at the MAP at an airspeed of 60 Knots Indicated Air Speed (KIAS) less than 304 ft./NM.

19. AIRWORTHINESS. As a minimum, ARA systems should meet the airworthiness requirements of TSO C63b or TSO C63c. Installation of an ARA system for IFR use is a major change in type design, and the provisions of FAR Sections 21.97, 43.5, and 43.7 apply.

a. System Installation.

(1) System controls and data displays must be conveniently accessible and visible to Airborne Radar Operators at their duty stations. The system controls should be protected against inadvertent operation.

(2) Electrical power for the system should be obtained from a bus that provides maximum reliability for electrical power without jeopardizing other essential or emergency loads.

(3) The ARA system should not be a source of objectionable electromagnetic interference and shall not be adversely affected by electromagnetic interference from other aircraft equipment.

(4) Any probable malfunction of the ARA system should not derogate the normal operation of other systems equipment connected to it.

(5) System performance should not be adversely affected by aircraft maneuvering or by changes in altitude or attitude normally encountered in flight operations.

20. MAINTENANCE. All Airborne Radar maintenance will be performed in accordance with FAR Part 43 and the manufacturer's instructions or in accordance with an FAA-approved maintenance program. Records of maintenance should be entered in the helicopter maintenance records required by FAR Section 43.9 or in the records required by the operator's approved maintenance program. Following repair or alteration, the system should be checked before predicating any operation on its use. Compatibility of replacement components should be assured. Ground-based radar beacon/reflector maintenance will be performed in accordance with the manufacturer's instructions and must be under an FAA-approved maintenance program.

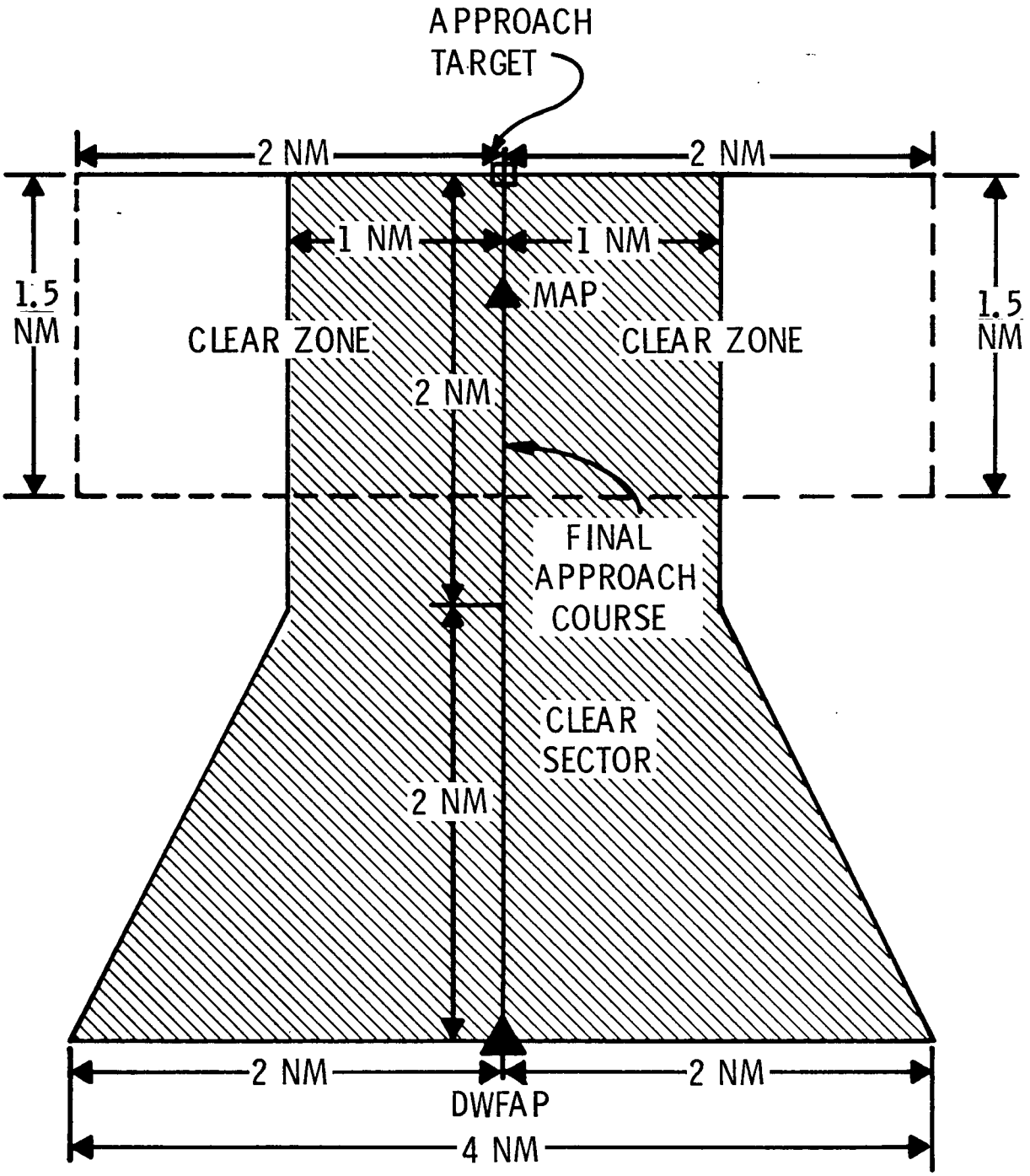



Figure 3-1. Clear Zone and Clear Sector

21. INSPECTION AND TEST PROCEDURES. IFR ARA systems which are not under an approved maintenance program should be maintained under inspection and test procedures which ensure the equipment continues to be capable of navigation with at least the degree of accuracy required for original approval. These procedures should include methods for analyzing malfunctions and defects to determine that established inspections and tests reasonably assure maintenance of equipment accuracy. Procedures and intervals for tests and inspections should be adjusted in accordance with results of the analysis.

22. WHERE TO APPLY FOR APPROVAL. Operators should submit requests for approval and/or establishment of ARA procedures to the appropriate regional Flight Standards division through the local Flight Standards district office (FSDO). The request should include specific information on onboard navigational guidance capability, altimeter type(s), and offshore platform location(s). The request should contain the following: evidence of FAA airworthiness approval of the Airborne Radar system and a description of the installation, evidence of an FAA approval of any required ground-based transponder beacon, a description of any ground-based transponder beacon installation, aircraft Flight Manual supplements, Minimum Equipment Lists (if appropriate), training programs, and maintenance programs (airborne and ground equipment). If the FSDO determines the applicant is qualified to use ARA procedures, the following information shall be forwarded to the regional Flight Standards division for processing as a special instrument approach procedure:

a. Platform locations (latitude and longitude to within the nearest tenth of a second).

b. Navigational systems to be used (shore to platform).

c. Elevation and location of all landing platforms, rigs, or drill ships and any other obstacles within the intermediate and final approach areas. (See paragraphs 27a and 28a.)

d. Platform lighting.

e. Recommendation as to night operations.

f. Communication frequencies.

g. Availability of and requirement for use of a platform-based radar transponder beacon.

h. Platform markings.

i. Location of nearest weather and altimeter setting source.

j. A letter from the applicant indicating willingness to enter an agreement to pay expenses associated with procedure development and Flight Inspection costs incurred. The letter should include the name, address, and phone number of a person authorized to execute agreements on behalf of the company requesting the procedure. Upon return of the approved, special instrument approach procedure to the FSDO, approval is accomplished by completing operations specifications or a letter of authority, as appropriate. Two copies of the charted procedure shall be furnished the regional Flight Procedures Branch.

## CHAPTER 4. PROCEDURES CRITERIA FOR AIRBORNE AND RADAR APPROACH

23. PURPOSE. This chapter applies to helicopter ARA procedures for offshore platform operations conducted under Instrument Flight Rules. The procedures criteria contained herein apply to airborne weather avoidance and mapping radar systems that have a demonstrated navigational capability acceptable to the Administrator for ARA procedure. The Airborne Radar systems which have proved suitable for use as primary instrument approach aids are short-range pulse radars, manufactured and approved for the purpose of weather avoidance rather than navigation. (See paragraph 17.)

24. TYPE OF PROCEDURE. ARA procedures to offshore platforms are helicopter-only procedures intended solely for logistic support to offshore platforms. Since these platforms are privately owned, ARA procedures are Special Instrument Approach Procedures approved under the provisions of FAA Order 8260.19, as amended. Procedures to offshore locations (single platform) are shown in figure 4-1.

25. PROCEDURE IDENTIFICATION. The procedure shall be identified as Copter Offshore ARA with the name of the cluster or rig. If the procedure requires beacon capability, the procedure will be annotated "Beacon Required."

26. PROCEDURE CONSTRUCTION. An ARA procedure to offshore platforms has two areas--the intermediate area and the final approach area. Missed approach airspace is contained within the two areas. (See figure 4-1). Determine whether the procedure is for a single platform or for a platform cluster. Identify the final approach area. Connect it to the en route structure by an overlying intermediate area which is used for transition. The procedure shall also contain the landside navigation facility, the route designation, and the location of the destination platform or platform cluster. Sample approach charts for single platform and cluster approaches are in appendix 2.

27. SINGLE PLATFORM PROCEDURE. The procedure provides for an into-the-wind final descent to the platform from any direction, depending on the surface wind reported in the platform area and the operating procedures selected by the flight crew.

a. The Intermediate Approach Fix (IF) is located on the en route course centerline not less than 10 NM and not more than 20 NM from the platform

b. The Intermediate Approach Area Obstacle Clearance is 500 ft. above the highest known obstacle in the intermediate approach until arrival at the DWFAP inbound.

c. The Intermediate Approach Area is centered on a straight course between the intermediate approach fix and the platform. The intermediate approach area is bounded by an arc having a 7 NM radius centered on the platform. Straight lines drawn tangent to the arc extend the area to the en route boundaries at the intermediate approach fix. The intermediate approach area overlies and includes the entire final approach area. (See figure 4-1.)

d. Final Approach Obstacle Clearance.

(1) Vertical Clearance over Obstacles is provided for under paragraph 30a., Altitudes.

(2) Lateral Obstacle Avoidance is provided by vectors to the pilot from the Airborne Radar Operator.

e. Downwind Final Approach Position (DWFAP). The downwind final approach position is a position on the circumference of the circle defining the limit of the final approach area.

f. Final Approach Area. The final approach area is the area contained within a circle with a 4 NM radius centered on the platform.

28. PLATFORM CLUSTER PROCEDURE. The procedure provides for an into-the-wind final descent to the cluster from any direction, depending on the surface wind reported in the cluster area, and the operating procedures selected by the flight crew. Procedures to a platform cluster are shown in figure 4-2.

a. The Intermediate Approach Fix (IF) is located on the en route course centerline not less than 10 NM and not more than 20 NM from the nearest platform in the cluster.

b. Intermediate Approach Area Obstacle Clearance. Same as paragraph 27b.

c. The Intermediate Approach Area is bounded by arcs whose radii are centered on each outlying platform in the cluster. Each radius is 7 NM. Straight lines drawn tangent to arcs at the lateral extremities of this area extend the area to the en route boundaries at the intermediate approach fix. The intermediate approach area overlays and includes the entire final approach area.

d. Final Approach Obstacle Clearance. Same as paragraphs 27d and 30a.

e. Downwind Final Approach Position (DWFAP). The downwind final approach position can be any position on the arcs defining the limits of the final approach area. The DWFAP is a position inbound to the approach target at 4 NM on the radar display.

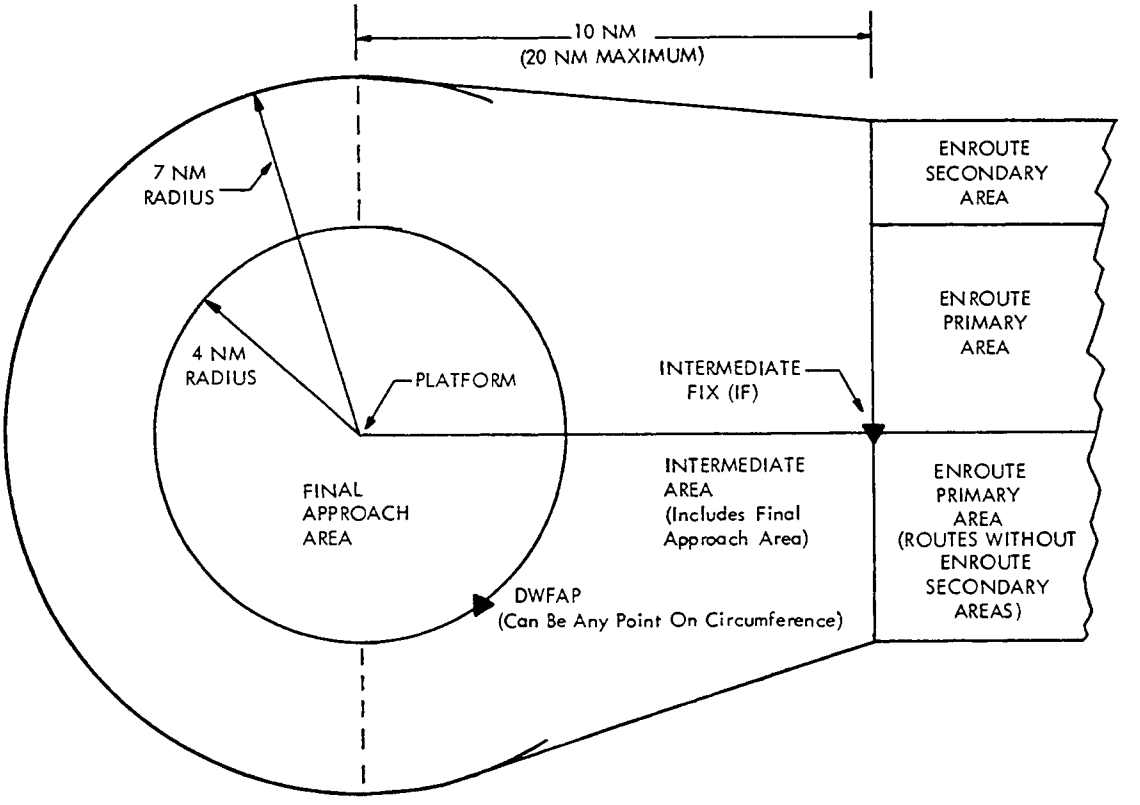



Figure 4-1. Single Platform Approach Procedure

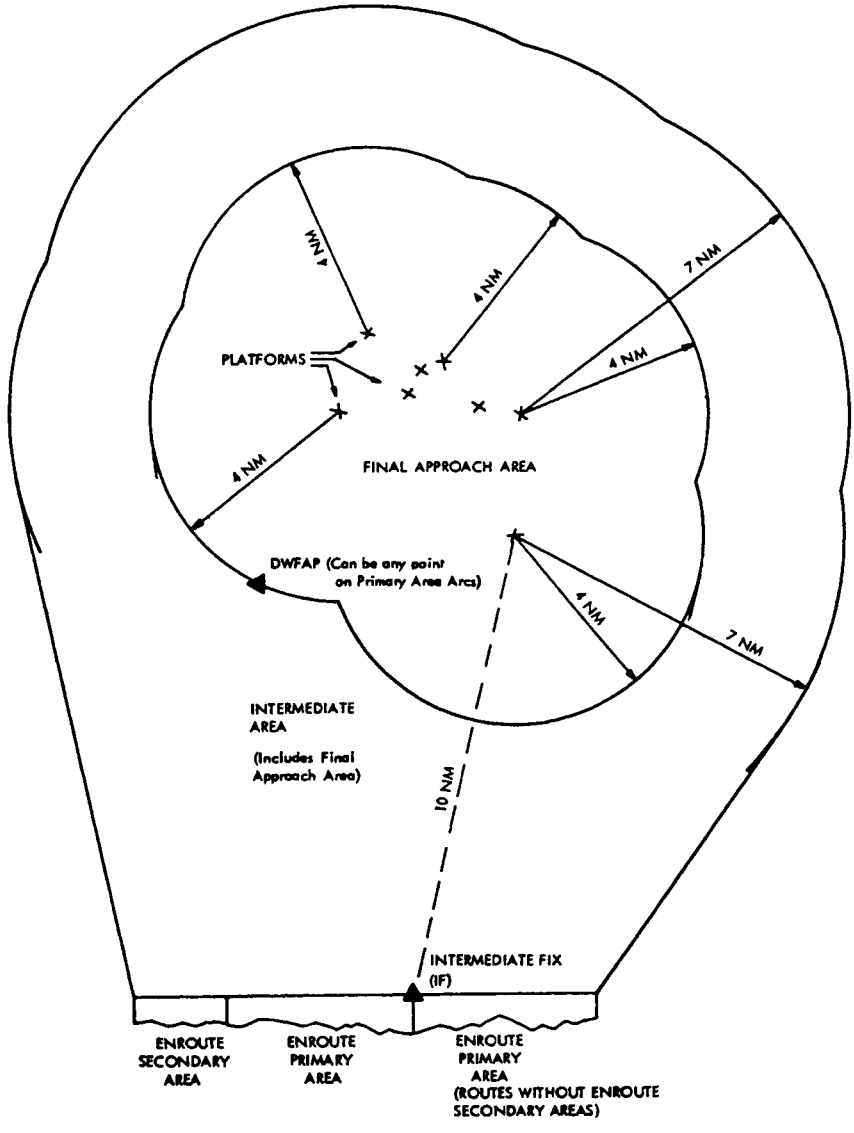



Figure 4-2. Platform Cluster Approach Procedure

f. The Final Approach Area is bounded by arcs whose radii are centered on each outlying platform in the cluster. Each radius is 4 NM.

29. MISSED APPROACH. The missed approach begins at the missed approach point and ends at an appropriate point or fix where intermediate approach or en route obstacle clearance is provided.

a. Missed Approach Point. The missed approach point is a point in space at the radar minimum altitude or lowest radar altitude, as appropriate, no closer to the approach target, as observed on the radar display, than the minimum authorized visibility for landing.

b. Missed Approach Area. The missed approach area is clear zone left or right of the final approach course, 1.5 NM long and 2.0 NM wide. (See figure 3-1.)

c. Missed Approach Obstacle Avoidance. Obstacle avoidance is provided by an immediate climbing turn away from the approach target into a clear zone.

30. TAKEOFF AND LANDING MINIMUMS. Minimums shall be specified for takeoff and landing. Landing minimums shall be specified as an RMA based on vertical obstacle clearance and offshore heliport facilities with an LRA also specified for use by operators with an operative radar altimeter and a course bearing cursor for approaches to a cluster.

NOTE: For departures from platforms for which no ARA procedure is approved, remain in VFR conditions until able to climb through an obstacle clear area to the intermediate approach altitude.

a. Altitudes.

(1) Takeoff ceiling shall be no lower than the LRA or RMA authorized for the departure platform.

(2) Landing.

(i) Lowest Radar Altitude (LRA). The LRA is the lowest altitude to which descent is authorized in procedures using Airborne Radar, an operational radar altimeter, and for cluster approaches, a course bearing cursor. It is the higher of the following:

(A) 200 ft. radar altitude,

(B) 50 ft. radar altitude above the landing platform on the approach target, or

(C) 100 ft. radar altitude above the highest obstruction located within a cluster if a course bearing cursor is not used.

(ii) Radar Minimum Altitude (RMA). The RMA is the lowest altitude to which descent is authorized when 1.0 NM lateral obstacle clearance is not maintained, the offshore heliport facilities are not available, or the airborne radar altimeter is not operative. (See paragraph 15.) RMA is computed by adding 250 ft. to the highest obstacle in the final approach area and is adjusted upward 5 ft. for each mile over 5 miles from the altimeter setting source to the approach target. RMA is then rounded to the next higher 10-foot increment, for example, 309 ft. shall become 310 ft.

b. Visibilities.

(1) Takeoff visibilities shall be no lower than the minimum landing visibilities authorized for the platform.

(2) Landing visibility is 3/4 SM for LRA approaches and 1/2 SM for RMA approaches. Simply stated, if the lowest descent altitude is above obstructions, the visibility authorized is 1/2 SM. If the lowest descent altitude is below obstructions, then the visibility authorized is 3/4 SM. LRA visibilities of less than 3/4 SM may be approved provided the applicant can demonstrate the equivalent level of safety by way of additional navigational equipment and/or radar equipment having better performance than the minimum performance standard.

c. Alternate Minimums. Add 200 ft. and 1/2 SM to landing minima for the ARA procedure to be used.

31. FLIGHT INSPECTION. All routes and approach segments based on course guidance other than Long Range Area Navigation (RNAV), LORAN C, and Airborne Radar shall pass normal flight inspection. (See paragraph 22j.)

## APPENDIX 1. AN ACCEPTABLE GROUND SCHOOL/FLIGHT TRAINING OUTLINE ARA PROCEDURES

An operator using this special approach should be thoroughly competent in the operation of the ARA system before using it for offshore instrument approaches. Flightcrews should complete as many trips over a route terminating in an offshore airborne radar approach procedure, under the supervision of an instructor, as may be necessary to ensure competency using ARA systems for instrument approaches. Operators will be expected to develop training programs (see Chapter 3, paragraph 16) acceptable to the FAA before final approval of the special approach procedure.

| | Hours (See Note 1 & 2) Ground | Flight |
|---|---|---|
| I. Basic radar principles | 5 | |
| A. Typical systems components | | |
| 1. Block diagrams (P-40/50, BDX 1300/1400) | | |
| 2. Terminology | | |
| B. Radar returns | | |
| 1. Primary | | |
| 2. Secondary | | |
| 3. False returns, clutter, anomalies | | |
| 4. Enhancement devices: beacons/reflectors | | |
| C. Equipment limitations | | |
| D. Equipment malfunctions | | |
| II. Operation of equipment | 1 | |
| III. Interpretation of display | 8 | |
| A. Correlation of ground photos/maps with radar scope pictures | | |
| B. Identification of clusters/targets | | |
| IV. ARA procedures | 2 | |
| A. Definitions | | |
| B. Procedure development | | |
| C. Minimums | | |

| | Hours | |
|---|---|---|
| | Ground | Flight |
| D. Format | | |
| E. Missed approach | | |
| F. General information | | |
| V. Flight training | | |
| A. Radar observer (visual, with instructor supervision) | 3 | |
| 1. Operation of radar equipment | | |
| 2. Identification of clusters | | |

NOTE 1: The hours shown in the example are for illustrative purposes only. POI's must determine, with their operators, an appropriate number of hours based on the operator's environment, experience, procedures, and equipment. POI's are directed by policy which prohibits approving any initial ARA training program with less than a specific number of ground and flight training hours.

NOTE 2: Flight training requirements may be expressed in numbers of ARA approaches rather than in numbers of flight hours.

# APPENDIX 2. SAMPLE OFFSHORE COPTER ARA APPROACH CHARTS SINGLE PLATFORM AND PLATFORM CLUSTER

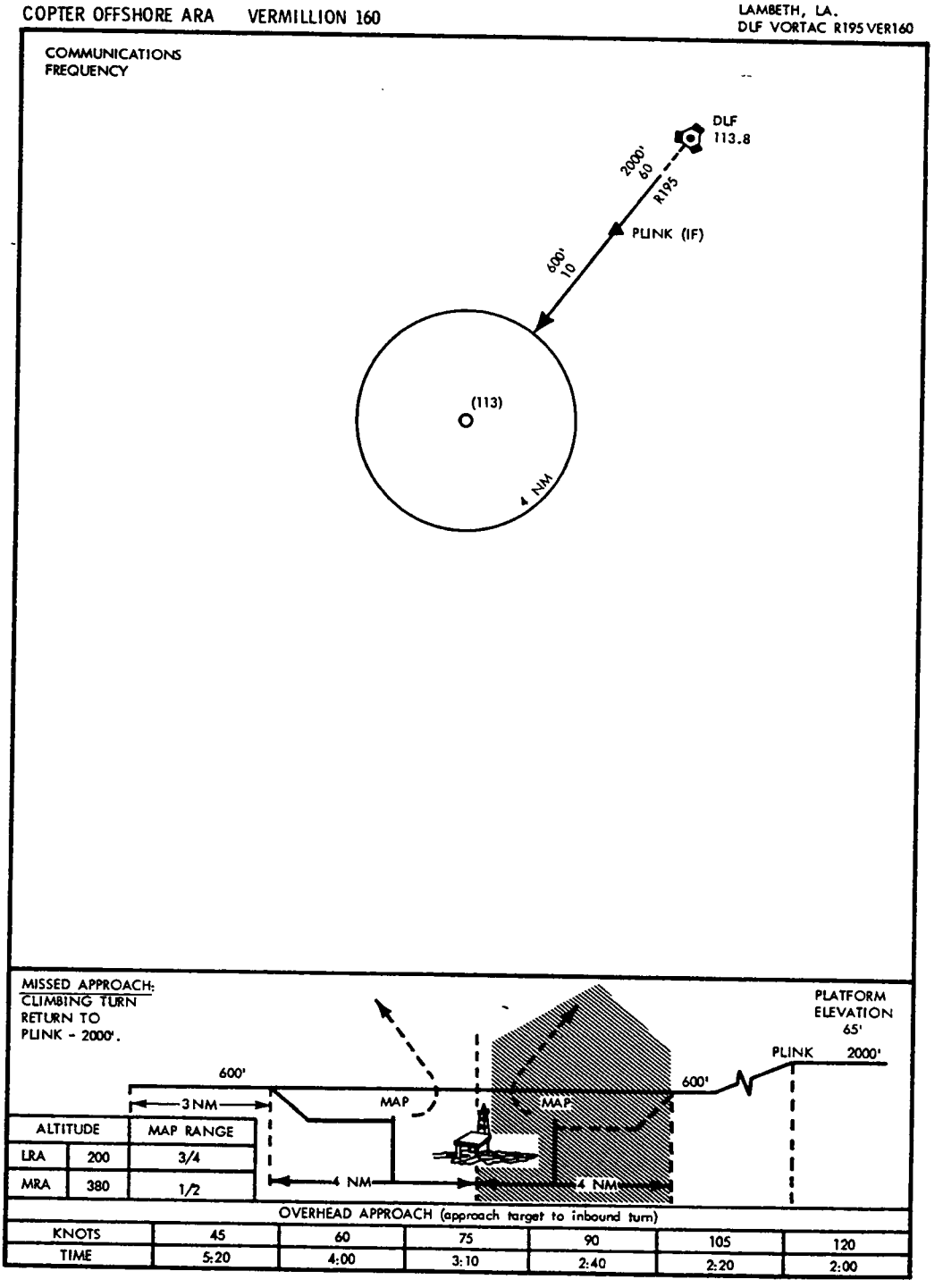



Figure 1. Single Platform Approach Chart

# APPENDIX 2. SAMPLE OFFSHORE COPTER ARA APPROACH CHARTS SINGLE PLATFORM AND PLATFORM CLUSTER

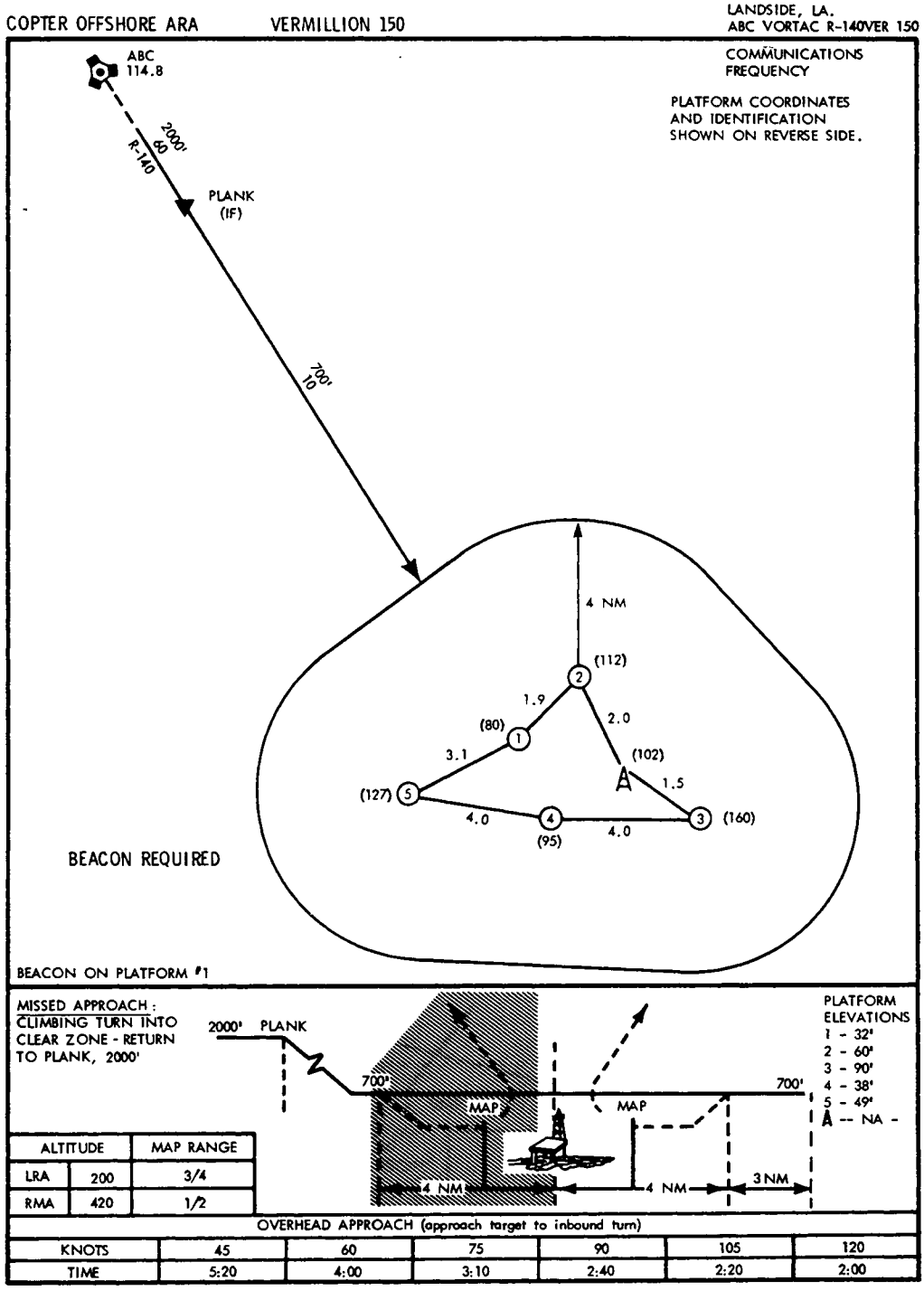



Figure 2. Platform Cluster Approach Chart

## APPENDIX 3. AN ACCEPTABLE OSAP TRAINING PROGRAM

a. General. Anyone requesting authorization to use Offshore Standard Approach Procedures (OSAP) in IFR flight operations must train each crewmember on the following subjects:

(1) Basic Airborne Radar Principles

(i) Theory of Operation

(A) Terminology

(B) Block diagrams (P-40/50, BDX 1300/1400, etc.)

(ii) Interpretation of Radar Returns

(A) Primary

(B) Secondary

(C) False return, clutter, anomalies

(D) Enhancement devices: beacons/reflectors

(iii) Equipment Limitations

(A) Effects of precipitation

(B) Effects of sea state and wave height

(iv) Detecting and Reporting Equipment Malfunctions

(v) Emergency Procedures

(2) LORAN C Principles and Operation

(i) Introduction and Basic Principles

(ii) Controls, Indicators, and Display Functions

(A) Display Unit and Functions

(B) Data Selector Switch, Controls and Indicators

(C) Course Deviation Indicator

(D) Receiver Computer Unit

(iii) Operating Procedures

(A) General

(B) Preflight and Operational Checks

(C) Self-Test

(D) Initial Present Position Entry

(E) Magnetic Variation Entry

(F) Area Navigation (RNAV) Using Waypoints

(G) Leg Change Entry

(H) Offset Track - Entry and Steering

(I) Area Calibration Procedures

(iv) Identifying and Correcting Operational Problems

(3) Offshore Standard Approach Procedures (OSAP)

(i) Limitations

(ii) Weather Requirements

(iii) Equipment Requirements

(iv) Approach Target Identification

(v) DWFAP Identification and Verification

(vi) Verification and Placement of the Missed Approach Point

(vii) Final Approach Course

(viii) Course Adjustment to .5 NM Offset

(ix) Decision Point Altitude

(A) Verification of Equipment Accuracy at DPA

(B) Verification of Minimum Horizontal Obstacle Clearance

(C) Using the lowest appropriate radar scale

(x) Missed Approach

(xi) Crew Coordination, Duties, and Responsibilities

(A) Before Final Approach Segment

(B) During Final Approach Segment

(C) After Visual Reference is Established with the Approach Target

(D) When Visual Reference is Lost While Maneuvering to the Landing Platform

(E) Upon Reaching the MAP Without Visual Reference with the Approach Target

(4) Flight Training

(i) All assigned pilots and ARO's must complete as many trips over a route terminating in an OSAP, under the supervision of an instructor or check airman, as may be necessary to:

(A) Ensure their competency in the use of the equipment,

(B) Enable certification of their proficiency in the system,

(ii) Recurrent training for pilots and ARO's is required annually.

(5) Records

(i) A method of maintaining crewmember training records must be approved by the FAA prior to authorizing OSAP operations.

(ii) Appropriate training and certification records will be maintained by each operator and shall be presented for inspection on request of the FAA.

NOTE 1: POI's must determine, with their operators, an appropriate number of hours based on the operator's environment, experience, procedures, and equipment. POI's are directed by policy which prohibits approving any initial ARA training program with less than a specific number of ground and flight training hours.

NOTE 2: Flight training requirements may be expressed in numbers of ARA approaches rather than in numbers of flight hours.

# APPENDIX 4. SAMPLE OPERATIONS SPECIFICATIONS (OSAP)

HXXX. Helicopter Offshore Standard Approach Procedures (MMDDYY). The certificate holder is authorized to conduct helicopter Offshore Standard Approach Procedures (OSAP) within the areas listed in this paragraph. The certificate holder shall conduct all OSAP operations in compliance with the conditions, limitations, and procedures in this paragraph and shall conduct no other OSAP operations.

a. OSAP Approach and Landing Minimums and Authorized Helicopters. The certificate holder is authorized to use the following OSAP approach and landing minimums for the helicopters listed in the following table providing the conditions and limitations in paragraphs HXXX.b and HXXX.e are met.

| HELICOPTER TYPE MAKE/MODEL | MDA NOT LESS THAN | LOWEST VISIBILITY AUTHORIZED |
|---|---|---|
| | | |

b. Required OSAP Airborne Equipment. The flight instruments, radio navigation, and other airborne systems required by the applicable FAR must be installed and must be operational for OSAP operations. The airborne radar, LORAN C, and radar altimeter equipment listed or referenced in the following table is also required and, except for the radar altimeter, must be operational for OSAP operations.

| HELICOPTER (MAKE/MODEL/SERIES) | ADDITIONAL EQUIPMENT |
|---|---|
| | |

c. Weather Reporting Capabilities. The certificate holder shall not conduct any OSAP operations unless an approved source of weather observations is located within 10 nautical miles (NM) of the approach target to which a particular OSAP is oriented, or extended operations are approved using enhanced weather information systems or a system devised by the operator and approved by the FSDO on the operations specifications.

d. Flight Crewmember Qualifications. No pilot or airborne radar operator (ARO) shall conduct any OSAP operations in any helicopter unless that person has successfully completed the certificate holder's approved OSAP training program and has been certified as qualified for OSAP operations by one of the certificate holder's check airmen who is properly qualified for OSAP operations or by an FAA inspector.

e. Operating Limitations. The certificate holder shall not begin or continue the final approach segment of an OSAP unless all of the following conditions and limitations are met:

(1) The maximum indicated airspeed does not exceed 90 knots.

(2) The maximum groundspeed does not exceed 70 knots (never slower than Vyse for multiengine helicopters) between the Decision Point Altitude (DPA) and the Missed Approach Point (MAP).

(3) There is no indication on the weather radar display of contouring due to the intensity of precipitation.

(4) All obstructions which are observed on radar are avoided by at least 0.5 NM when below 900 ft. MSL during a takeoff and departure procedure.

(5) Whenever a required radar altimeter is inoperative the MDA must be increased by 5 ft. for each nautical mile in excess of 5 NM that the approach target is distant from an approved altimeter setting source.

f. Missed Approach Requirements. A missed approach shall be executed when any of the following conditions exist:

(1) Any of the airborne equipment (other than a radar altimeter) required for OSAP operations becomes inoperative.

(2) At least 0.5 NM lateral separation from obstacles cannot be maintained after passing the DPA.

(3) The approach target disappears from the radar display.

(4) The reliability or accuracy of the LORAN signal cannot be ascertained.

(5) Whenever the approach target is not in visual contact at any distance less than 0.7 NM.

# APPENDIX 5. SAMPLE LETTER OF AUTHORIZATION (OSAP)

August 15, 1987

Energy Resources, Inc.
1234 Fifth Avenue
Wellhead, LA 98765

Gentlemen:

Energy Resources is authorized to conduct helicopter Offshore Standard Approach Procedures (OSAP) under Federal Aviation Regulations (FAR) Part 91 within the areas listed in this letter. Energy Resources shall conduct all OSAP operations in compliance with the conditions, limitations, and procedures in this paragraph and shall conduct no other OSAP operations.

a. OSAP Approach and Landing Minimums and Authorized Helicopters. Energy Resources is authorized to use the following OSAP approach and landing minimums for the helicopters listed in the following table providing the conditions and limitations in paragraphs b. and e. are met.

| HELICOPTER TYPE MAKE/MODEL | MDA NOT LESS THAN | LOWEST VISIBILITY AUTHORIZED |
|---|---|---|
| | | |

b. Required OSAP Airborne Equipment. The flight instruments, radio navigation, and other airborne systems required by the applicable FAR must be installed and must be operational for OSAP operations. The airborne radar, LORAN C, and radar altimeter equipment listed in the following table is also required and, except for the radar altimeter, must be operational for OSAP operations.

| HELICOPTER (MAKE/MODEL/SERIES) | ADDITIONAL EQUIPMENT |
|---|---|
| | |

c. Weather Reporting Capabilities. Energy Resources shall not conduct any OSAP operations unless an approved source of weather observations (including wave height) is located within 10 nautical miles (NM) of the approach target to which a particular OSAP is oriented or extended operations are approved using enhanced weather information systems.

d. Flight Crewmember Qualifications. No pilot or airborne radar operator (ARO) shall conduct any OSAP operations in any helicopter unless that person has successfully completed the Energy Resources' approved OSAP training program and has been certified as qualified for OSAP operations by an FAA inspector.

e. Operating Limitations. No pilot in command shall begin or continue the final approach segment of an OSAP unless all of the following conditions and limitations are met:

(1) The maximum indicated airspeed does not exceed 90 knots.

(2) The maximum groundspeed does not exceed 70 knots (never slower than Vyse for multiengine helicopters) between the Decision Point Altitude (DPA) and the Missed Approach Point (MAP).

(3) There is no indication on the weather radar display of contouring due to the intensity of precipitation.

(4) All obstructions which are observed on radar are avoided by at least 0.5 NM when below 900 ft. MSL during a takeoff and departure procedure.

(5) Whenever a required radar altimeter is inoperative, the MDA must be increased by 5 ft. for each nautical mile in excess of 5 NM that the approach target is distant from an approved altimeter setting source.

f. Missed Approach Requirements. A missed approach shall be executed when any of the following conditions exist:

(1) Any of the airborne equipment (other than a radar altimeter) required for OSAP operations becomes inoperative.

(2) At least 0.5 NM lateral separation from obstacles cannot be maintained after passing the DPA.

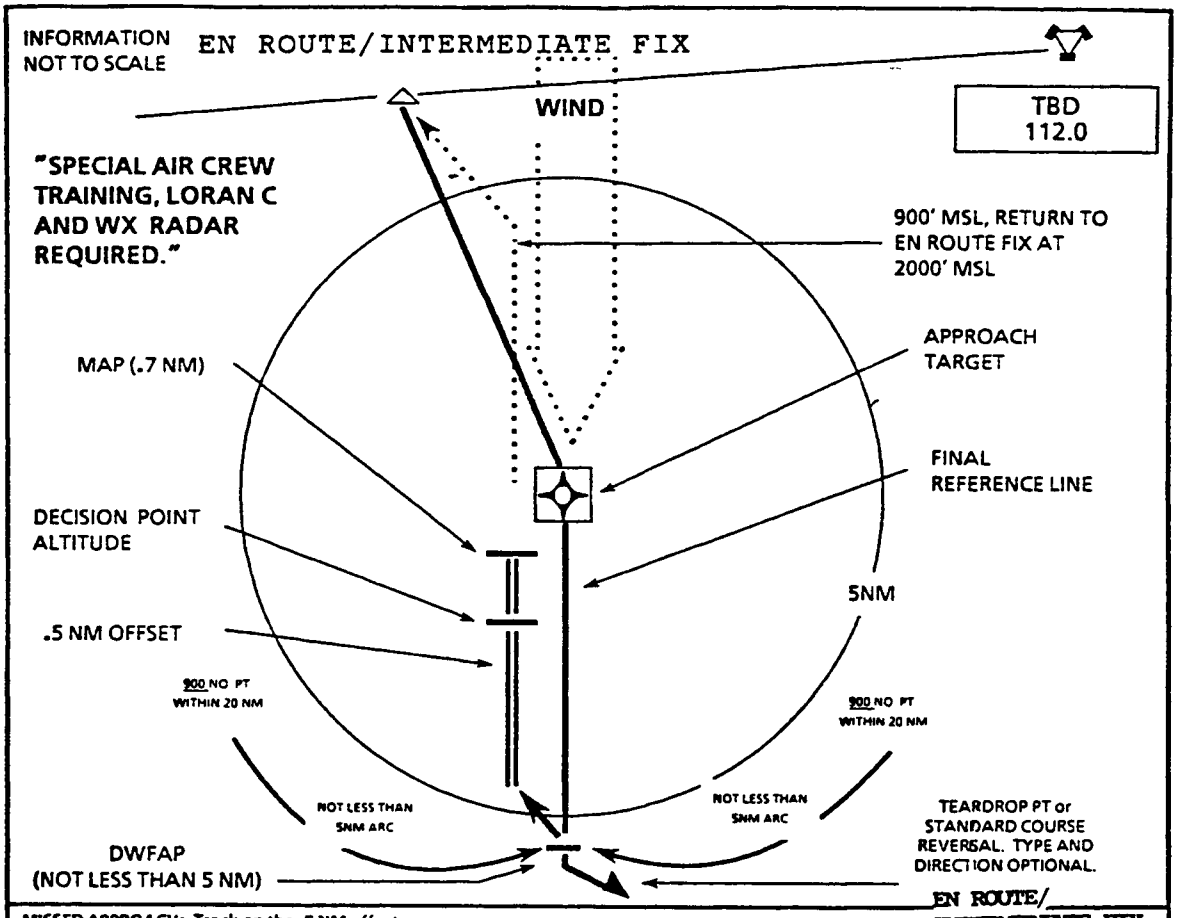
(3) The approach target disappears from the radar display.

(4) The reliability or accuracy of the LORAN signal cannot be ascertained.

(5) Whenever the approach target is not in visual contact at any distance less than 0.7 NM.

William X. Jones
Manager, Baton Rouge
Flight Standards District Office

# APPENDIX 6. SAMPLE OFFSHORE STANDARD APPROACH PROCEDURE (OSAP)




IMC DEPARTURES FROM OFFSHORE LOCATIONS WILL BE IN ACCORDANCE WITH CURRENT OPERATIONS SPECIFICATIONS/LETTER OF AGREEMENT AND WILL AVOID RADAR TARGETS BY .5 NM UNTIL REACHING 900' MSL

**APPROVED WEATHER REQUIRED WITHIN 10 NM OF APPROACH TARGET**

| MDA 200 : VIS 3/4 | MDA 250: VIS 3/4 | MDA ADJUSTED: VIS 3/4 | FOR FILING AS AN ALTERNATE |
|---|---|---|---|
| WITH RADAR ALTIMETER AND BAROMETRIC ALTIMETER | RADAR ALTIMETER INOP and ALTIMETER SOURCE WITHIN 5 NM | RADAR ALTIMETER INOP and ALTIMETER SOURCE MORE THAN 5 NM BUT LESS THAN 10 NM. INCREASE MDA 5' ABOVE 250' FOR EACH NM BEYOND 5 NM. | USE STANDARD NON-PRECISION ALTERNATE MINIMUMS |

* U.S. Government Printing Office : 1988 - 617-000/80499

U.S. Department
of Transportation

**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

**BULK MAIL**
POSTAGE & FEES PAID
FEDERAL AVIATION
ADMINISTRATION
PERMIT NO. G-44

**RETURN POSTAGE GUARANTEED**

Official Business
Penalty for Private Use $300