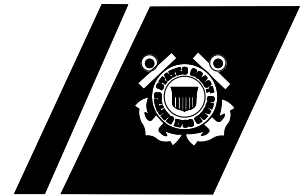


U.S. Department of  
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**United States  
Coast Guard**



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# **AERONAUTICAL ENGINEERING MAINTENANCE MANAGEMENT MANUAL**



**COMDTINST M13020.1F**



U.S. Department of  
Homeland Security

United States  
Coast Guard



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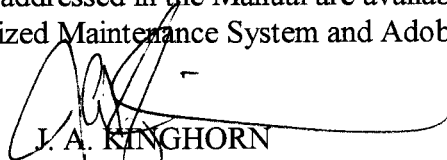
COMDTINST M13020.1F

APR 1 2003

# COMMANDANT INSTRUCTION M13020.1F

Subj: AERONAUTICAL ENGINEERING MAINTENANCE MANAGEMENT MANUAL

1. PURPOSE. This letter promulgates the new issue of the Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1F. Policies and procedures are outlined for the Aeronautical Engineering Community.
2. ACTION. Area and district commanders, maintenance and logistics commands, and commanding officers of headquarters units shall ensure compliance with the provisions of this Manual. Internet release authorized.
3. DIRECTIVES AFFECTED. COMDTINST M13020.1E is cancelled.
4. DISCUSSION. This Manual supersedes COMDTINST M13020.1E dated 30 April 1998 in its entirety and reflects changes in mission, processes, and responsibilities. A significant portion of the manual has been removed and transformed into Process Guides; accordingly, a thorough reading is required.
5. CHANGES. Recommendations for improvements/changes to the Manual shall be submitted via the chain of command using the CG-22 Form. This Manual will be reviewed on a regular basis.
6. ENVIRONMENTAL ASPECT AND IMPACT. Environmental considerations were examined in the development of this directive and have been determined to be not applicable.
7. FORMS AVAILABILITY. Forms addressed in the Manual are available in the jet form filler, G-SEA Forms Plus, the Aviation Computerized Maintenance System and Adobe Forms.

  
J. A. KINGHORN  
Assistant Commandant for Systems

## DISTRIBUTION – SDL No.140

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COMDTINST M13020.1F

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U.S. Department of  
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# **AERONAUTICAL ENGINEERING MAINTENANCE MANAGEMENT MANUAL**



**COMDTINST M13020.1F**







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## CHAPTER 1. MAINTENANCE MANAGEMENT POLICY

- A. GENERAL.** This Manual provides a summary of the objectives, policies, organizational structures, and responsibilities which form the foundation for the United States Coast Guard (USCG) aeronautical maintenance management system. This system is a composite of United States Air Force (USAF) and Navy (USN) systems, commercial procedures, and USCG developed procedures. The procedures required for uniform and effective management of aeronautical maintenance resources are contained in this Manual and referenced process guides.
- B. MAINTENANCE SYSTEM OBJECTIVE.** The system objective is to ensure, in the most cost-effective manner, that assigned materiel is serviceable (safe and operable) and properly configured to meet mission requirements. This is accomplished by performing maintenance, including but not limited to, inspection, repair, overhaul, modification, preservation, testing, and condition or performance analysis. Emphasis is placed on planning and scheduling these tasks, by supervisors, to allow timely accomplishment through the efficient use of personnel, facilities, and equipment. Proper planning reduces unscheduled maintenance events and allows for an orderly progression of maintenance actions toward returning materiel to a safe and operable condition.
- C. EQUIPMENT READINESS.** The key to a unit's mission success is its sustained ability to provide safe, reliable, and properly configured equipment at the time and place it is required. The degree of equipment readiness at an operating unit should be put in context with the assigned mission. Failure to recognize the extent of equipment readiness required may result in excessive acceptance of equipment deficiencies and a maintenance backlog. On the other hand, unrealistically high readiness requirements may cause essential maintenance to be deferred, with the same result. Either extreme serves to reduce a unit's mission capability. Commanding Officers should ensure equipment is made available for maintenance when the resources are available. It is the Commanding Officer's responsibility to ensure that maintenance is completed in an orderly and timely manner to meet the assigned mission requirements.
- D. MAINTENANCE SYSTEM ORGANIZATION.** Three basic elements comprise the aeronautical maintenance system: a management element, a technical element, and a production element. Additional information concerning the duties and responsibilities of these elements is addressed in succeeding chapters of this Manual and associated process guides.
1. Management Element. The Aeronautical Engineering Division, Commandant (G-SEA) at USCG Headquarters has primary responsibility for the management element and serves as a focal point for technical and engineering support for systems and equipment in the operational inventory.
  2. Technical Element. The Aircraft Repair and Supply Center and field units designated "Prime Units" perform the major share of the technical element of maintenance engineering under the direction of Commandant (G-SEA).
  3. Production Element. Operating activities are concerned primarily with maintenance production and provide the basic data inputs for maintenance engineering decisions. Maintenance production is the physical performance of equipment maintenance and related functions such as servicing, repairing, testing, overhaul, modification, calibration, conversion, and inspection. These tasks are performed at two levels: unit and depot.
    - a. Unit-Level Maintenance. USCG unit-level maintenance includes both the Department of Defense (DOD) levels described as organizational and intermediate. Individual units have the responsibility to perform unit level maintenance on their assigned equipment. This normally consists of inspecting, servicing, lubricating, adjusting, and replacing components, minor assemblies, and subassemblies. It also consists of calibrating, repairing or replacing damaged or unserviceable parts, components, and assemblies; modifying materiel, emergency manufacturing of unavailable parts; and developing/providing internal technical assistance.
    - b. Depot-Level Maintenance. Designated maintenance activities perform depot-level maintenance to augment stocks of serviceable materiel and support unit level maintenance activities. These depots have more extensive shop facilities and equipment, and personnel of higher technical skill than are normally available at the

lower levels of maintenance. Depot-level maintenance usually consists of repairing, modifying, overhauling, reclaiming, or rebuilding parts, assemblies, subassemblies, components and end items; emergency manufacturing of unavailable parts; and providing extensive, detailed technical assistance to using activities. Depot level maintenance is normally accomplished by Aircraft Repair and Supply Center (ARSC) and other overhaul activities designated by Commandant (G-SEA).

- E. **MAINTENANCE STANDARDIZATION.** Standardized maintenance improves overall maintenance quality, capability, and reliability. The required level of standardization will be achieved through application of the maintenance management procedures prescribed by this Manual and associated process guides.
- F. **MANAGEMENT ACTIONS ON INSPECTION REPORTS.** Inspection reports, whether from unit quality control or other inspections, are valuable management tools that must be given special attention. Positive action is required to identify and eliminate the causes of the specific defects noted. Supervisors should ensure that responsible individuals are made aware of deficiencies and become involved in correcting the problems. Review of corrective actions is incumbent on the Commanding Officer and Engineering Officer to ensure underlying causes for discrepancies are identified and rectified to preclude recurrence.
- G. **MAINTENANCE CAPABILITY.** Maintenance capability is the ability of a unit to maintain assigned equipment in serviceable condition and proper configuration. Development of this capability begins with systems requirements definition for acquisition. Systems requirements analysis is performed to determine the system capabilities, adequacy of the requirements definition, and whether the systems meet these requirements. While defining requirements and determining capabilities, the system requirements analysis also develops the overall system maintenance philosophy. The overall maintenance philosophy determines both the depot and unit level maintenance capabilities. This determination is based on the requirement for unit-level maintenance to support the mission, and the cost effectiveness of in-house depot-level capability. The unit capability is then translated into resources of unit facilities, billets, and the unit spares allowance list, which drives procurement and positioning of spare parts. Engineering Officers must gauge their maintenance capability when planning to meet mission requirements. If maintenance capability is exceeded for extended periods, maintenance quality will suffer, and ultimately, mission requirements will not be met and safety will be compromised.
  - 1. **Maintenance Work Hours.** Because the number of maintenance work hours available is limited, the Engineering Officer must take considerable care with this resource. Every effort should be made in maintenance plans and schedules to ensure personnel are productively employed throughout their workshift.
  - 2. **Sparing Levels.** Sparing levels of critical components and piece-parts are based on a predicted mean time between failure. Service-wide budgetary restrictions also impact levels of sparing through reduced funds for parts buys and contracted rework. To prevent shortages elsewhere in the fleet, Engineering Officers should ensure only the authorized level of sparing is maintained. They must be innovative, making use of supply practices such as parts pooling.
  - 3. **Maintenance Capability and Mission Accomplishment.** The relationship between maintenance capability and successful accomplishment of the mission must be clearly understood. When resource deficiencies exist, the Engineering Officer should request and justify additional resources to support a continuous workload or request temporary assistance to perform emergency workloads. Assistance may be requested to perform maintenance beyond the unit's capability. The Personnel Resources (Mil & Civ) & Civilian Employment Ceiling Manual, COMDTINST M5312.13 (series), provides guidance, policy, and procedures on the subject of Personnel Resources. Where resources (parts or personnel) are not available or cannot be made available, reductions in mission requirements may be necessary.
- H. **MAINTENANCE EFFECTIVENESS.** The Aeronautical Engineering system provides integrated logistical support for all aspects of Coast Guard Aviation. When fully effective, the Aeronautical Engineering system produces aircraft that satisfy operational requirements in a reliable, maintainable, and supportable fashion.

A system of measurements of effectiveness (MOEs) indicates the performance of Coast Guard Aeronautical Engineering as related to strategic plans and goals. This MOE system consists of multi-dimensional indices and individual data points. These are taken collectively and considered over time to adequately reflect overall system performance. These measures are available through the Aviation Logistics Management Information System (ALMIS) Decision Support System (DSS). Engineering Officers at Air Stations must also monitor and measure the effectiveness of their maintenance efforts.

- I. **AIRCRAFT AVAILABILITY.** Availability of aircraft to perform operational missions is dependent on a wide range of variables. These include availability of flight and maintenance crews, special tools, ground support and launching equipment, spare parts, fueling apparatus, and other factors too numerous to mention. An Availability Index (AI) indicates the percentage of time that aircraft assigned to Air Stations are available to perform Coast Guard missions. It is defined as follows:

$AI = [100 - NMCT]$  where

$NMCT = \text{Not Mission Capable Total} = NMCM + NMCS + NMCD \text{ (units) and}$

NMCM is Not Mission Capable due to Unit-Level Maintenance

NMCS is Not Mission Capable due to Supply

NMCD (units) reflects the portion of Not Mission Capable Time due to Depot-Level Maintenance which is performed at a unit

A more detailed definition of NMC categories can be found in CGTO PG-85-00-110, Chapter 3.

1. **NMCT Target.** The USCG target for aircraft availability is 71% (which equates to an NMCT of 29%). This is the goal for mature aircraft systems, but is only one of many indicators of maintenance effectiveness.
2. **NMCS Target.** A target of 5% is a planning goal for NMCS rates (this equates to a parts availability rate of 95%). This target also serves as a justification for resources required to meet an NMCT rate of 29%. However, the Coast Guard must strive to meet these targets at minimum total system costs. The greatest efficiencies can be realized through minimizing inventory investment at ARSC and in unit allowances consistent with this goal.

- J. **MAINTENANCE DOCUMENTATION.** Documentation is an essential part of maintenance management. The objective of maintenance documentation is to provide the Engineering Officer with timely, complete, and accurate maintenance production data for planning, control, and analysis, and to provide an accurate record of completed work. It also provides performance data to managers at all levels and is essential in the development of a maintenance management information system. Additionally, this information will aid in identifying problem parts or items and in the development of yearly budgets.

- K. **FINANCIAL MANAGEMENT.** Management of funds plays a key role in maintenance. The Engineering Officer is responsible for financial planning, preparation of budget requirements and controlling expenditures within budget allocations. Exact procedures will vary among operating units; however, the primary goal of financial management at the unit level is to receive the maximum benefit from the funds available.

1. **Responsibilities.** The Financial Resource Management Manual, COMDTINST M7100.3 (series), provides detailed information concerning the responsibilities of the various levels of the USCG organization regarding administration of appropriated funds. All personnel involved in the planning for, or expenditure of, appropriated funds should have a working knowledge of the system described therein.
2. **Allocation of Funds.** Operating aviation units receive funds under AFC 30. Each Maintenance Logistics Command (MLC), district, and operating activity has developed procedures for the allocation of these funds within their areas of responsibility. Commanding Officers have final authority regarding the sub-allocation of funds to various departments. The Engineering Officer should ensure that planning for and expenditure of assigned funds is consistent with the overall objective of the unit maintenance plan.

- L. CANNIBALIZATION.** Cannibalization is the removal of a specific assembly, subassembly, or component from one equipment end item for installation on another to meet mission requirements. Cannibalization is a costly practice in terms of time, labor-hours, documentation, and damaged equipment. Cannibalization shall be closely controlled and monitored. All cannibalization actions shall be authorized by the Engineering Officer or their designated representative.

**NOTE**

Certain components either cannot be cannibalized or require special procedures in the event of cannibalization. Refer to the aircraft type specific ACMS Maintenance Procedure Card (MPC) for guidance, if applicable.

**NOTE**

Cannibalization will be logged on the CG-5181, Carry Forward Discrepancies Form, unless the aircraft is in temporary storage (14 days or longer) or ACMS has been suspended, in which case entries will be permitted on the CG-4377B, NO FLY. These forms are available in jetform filler.

**M. MODIFICATION AND CHANGES TO AIRCRAFT.**

1. General. The Commandant encourages improvement of USCG aircraft while preserving standardization and providing guidance to accomplish aircraft modification or change projects. These instructions are intended to supplement any general instructions governing aircraft testing. The term aircraft, as used in this sense, includes related systems and support equipment. Refer to Chapter 8. for more specific guidance on avionics components.
2. Changes or Tests. No modifications or changes (including temporarily installed sound systems) will be made without authorization from the Commandant (G-SEA). No in-flight testing will be conducted without authorization from Commandant (G-OCA). Authorization to change an aircraft or make tests may be granted, provided that none of the following is adversely affected: structural loads, aerodynamic characteristics, weight and balance, or performance.
3. Procedures.
  - a. Operational Requirements. Recommendations for changes or modifications to fulfill operational requirements or improve mission performance shall be addressed to the facility manager, Commandant (G-OCA); copy to the system manager, Commandant (G-SEA).
  - b. Correction of Materiel Defects. Recommendations for changes or modifications to correct materiel defects or unsatisfactory conditions (including avionics) will normally be submitted by Unsatisfactory Report (UR). Urgent safety of flight materiel defects should be submitted in message format.
  - c. Aircraft Configuration Control Board (ACCB). The USCG ACCB will review and recommend changes to standard aircraft configuration. The ACCB recommendations will be subject to joint final action by Chief of Aviation Forces and Chief, Office of Aeronautical Engineering. See the ACCB Process Guide, CGTO PG-85-00-70, for specific information.
  - d. Prototype Installation. Prototype installations are authorized by the Commandant (G-SEA) after feasibility approval has been granted by the ACCB. The prototype facility is responsible for advising the appropriate Standardization Unit when the design has reached the stage where procedures may be developed for flight handbooks. With the proper prior operational consultation in Phases I and II of the ACCB proceedings, this will not become a redesign process for the change.

- e. Trial Installations. A trial installation is normally performed by the Prime Unit. The trial installation verifies all aspects of the modification, including installation procedures, parts, and changes to operating and maintenance procedures.
- f. Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) Testing. Electromagnetic Interference/Electromagnetic Compatibility testing shall be conducted prior to the installation or operation of electronic devices (including PDAs, laptops, cell phones, etc.) on board a Coast Guard aircraft. Contact the Electronics Engineer at the ARSC Engineering Support Cell to coordinate testing of any proposed electronic equipment. Installation of prototypes requires completion of EMI/EMC testing and feasibility approval from the ACCB.
- g. TEMPEST Testing. TEMPEST testing by a certified TEMPEST team is required for each prototype or initial fielding of a new Communications Security (COMSEC) system. TEMPEST testing for prototypes of modified COMSEC systems or equipment shall also be required except when specifically exempted by the USCG ARSC Field Technical Authority (FTA) or other qualified DOD authority. See the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 1 for TEMPEST Testing Program requirements.

#### **N. AIRCRAFT WEIGHT AND BALANCE.**

- 1. General. Weight and Balance, AFTO 1-1B-50 outlines the specific weight and balance requirements for USAF aircraft. These requirements, as modified below, will be used as a guideline to define weight and balance criteria for USCG aircraft.
- 2. Requirements. Reporting custodians shall ensure that USCG aircraft are weighed and the balance computed in accordance with the following criteria:
  - a. At initial delivery.
  - b. During programmed depot maintenance.
  - c. When major modifications or repairs are made that will affect the weight and balance of the aircraft.

#### **CAUTION**

THE REMOVAL OR ADDITION OF COMPONENTS WITHIN THE AIRCRAFT MAY SIGNIFICANTLY ALTER THE BASIC AIRCRAFT CENTER OF GRAVITY. THE UNIT WEIGHT AND BALANCE OFFICER WILL BE NOTIFIED OF ALL AIRCRAFT CONFIGURATION CHANGES SO THAT A REVISED WEIGHT AND BALANCE FORM F, DD FORM 365F, (JETFORM FILLER) MAY BE COMPLETED PRIOR TO FLIGHT.

- d. When the calculated weight and balance data is suspected of being in significant error.
- e. When unsatisfactory flight characteristics are reported which cannot definitely be determined as improper loading or error in weight and balance data.
- f. Whenever specified by ACMS.
- g. More detailed guidance is provided in the Aircraft Weight and Balance Process Guide, PG-85-00-180 (under development).

#### **O. FUNCTIONAL CHECKS OF AERONAUTICAL EQUIPMENT.**

- 1. General. A functional check is a check to determine if a system or component is correctly performing its intended function. The depth of maintenance performed on an aircraft prior to flight and its relevance towards flight safety determine the extent to which components are functionally checked prior to release for operations. Functional checks are divided into ground checks, flight verification checks, and test flights, and are defined as follows:

- a. Ground Checks. Visual inspection and functional checks performed on the ground utilizing auxiliary power units, ground power (electrical or hydraulic) units, ground test equipment, the aircraft engines, or rotor engagement to provide system power.
  - b. Flight Verification Checks. Airborne functional checks, conducted during a scheduled operational or training mission, for components or systems whose failure would neither adversely affect flight safety nor seriously affect mission accomplishment.
  - c. Test Flights. Airborne functional checks to establish if an airframe or equipment, when subjected to design environment, is operating properly. Generally, areas checked on test flights are equipment or systems whose failure would adversely affect flight safety.
2. Requirements. Specific functional check requirements are delineated herein and are minimum standards. The prerogative for more stringent minimums is reserved for Commanding Officers as local conditions or events dictate. The following requirements shall be adhered to:
- a. Ground Checks.
    - (1) General. The performance of all aeronautical equipment is normally ground checked after maintenance has been completed. Ground checks shall be performed in accordance with applicable maintenance procedure cards (MPCs), Technical Orders (T.O.s) or maintenance instructions, and as dictated by good judgment. Certain specific maintenance actions, such as the replacement of landing gear actuators, are clearly detailed in maintenance instructions. The required ground checks for system cycling and landing gear drop checking are included in those instructions. Other maintenance actions not specifically addressed by the applicable publications require application of sound engineering practice and enlightened supervision to ensure adequate ground checks.  
  
Example: Maintenance on landing gear hydraulic lines or fittings where replacing a line or tightening loose fittings may only require a system pressure check; whereas, replacement of a selector valve would require aircraft jacking and a complete landing gear drop check.  
  
Adequate ground checks are essential to safe execution of flight verification checks and test flights.  
  
Flight Controls. Disassembly or replacement of any portion of a flight control system:  
  
Example: Elevators, rudders, ailerons, blade unfolding, trim tabs, rotor head and blades, tail rotor gearbox and blades, control cables, fairleads, pulleys, rods, servo system, etc., all require a ground check to ensure synchronization of pilot's and copilot's controls and the proper movement of the control surfaces. This ground check shall be performed by all of the following:
      - (a) The mechanic performing maintenance.
      - (b) A quality assurance inspector.
      - (c) The pilot designated to conduct the required test flight or flight verification check.
  - b. Maintenance Release. Any aircraft having undergone maintenance requiring a functional check or test flight must be maintenance released. Additionally, any aircraft suffering damage on the ground or inflight must be maintenance released before further flight is attempted. A maintenance release signifies that a responsible individual has determined the correct maintenance or inspection has been completed for the discrepancy or other requirement. A signed release also signifies that adequate ground checks and maintenance documentation have been correctly performed.

**NOTE**

The Engineering Officer is authorized to maintenance release aircraft at their unit. Additional officers and petty officers qualified to sign a maintenance release shall be designated in writing. Enclosure (4) is a sample Aircraft Maintenance Release Authority letter. Variations may be utilized as appropriate.

- c. Flight Verification Checks. Any component or system not specifically requiring a test flight may receive a flight verification check at the discretion of the Engineering Officer. Certain exceptions are allowed; see paragraph 1.O.2.d.(3).
- d. Test Flights.
  - (1) Test Flight - Complete. Complete test flights shall be conducted in accordance with test flight procedures detailed in applicable maintenance procedure cards (MPCs) or technical manuals. A complete test flight is required:
    - (a) After extended aircraft storage.
    - (b) After completion of major structural rework, including PDM.
    - (c) As indicated by maintenance procedure cards or technical manuals.
    - (d) Prior to delivery of aircraft to a PDM facility (see the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 5).
  - (2) Test Flight - Partial. Upon completion of critical maintenance, a partial test flight is required to functionally check those components or systems which may have been affected by the maintenance action. Partial test flights are required:
    - (a) As indicated by MPCs, maintenance instructions, or applicable T.O.s.
    - (b) Flight control disassembly or replacement of any portion of a flight control system (for example: elevators, rudders, ailerons, trim tabs, rotor head and blades, tail rotor gearbox and blades, control cables, bearings, fairleads, pulleys, rods, servo system, etc.).
  - (3) Test Flight - Exceptions.
    - (a) HH-65 main rotor blade fold/unfold requires only a ground check with rotor engagement.
    - (b) If HC-130 aircraft maintenance requiring a test flight is limited to no more than one power plant package, a flight verification may be conducted in lieu of a test flight at the discretion of the Commanding Officer. Restrictions in the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series), apply.
    - (c) HU-25 aircraft ATF3 engine replacement (one or both), module replacement, and fuel or electrical systems maintenance do not require a test flight, provided appropriate ground checks have been completed and an acceleration time check is satisfactorily completed prior to, or in conjunction with, the first takeoff following maintenance.
    - (d) HC-130 aircraft requiring airborne functional checks conducted prior to delivery of an aircraft to PDM, or to fulfill annual ACMS requirements may be conducted as a flight verification at the discretion of the commanding officer providing no safety of flight maintenance has been performed.

**NOTE**

A test flight for flight control maintenance may be waived at the discretion of the Commanding Officer or their designated representative when all of the following conditions are met:

1. The flight control maintenance involves only the removal and reinstallation of common connecting hardware (nut, bolt, cotter key, etc.) without a resulting change in adjustment and/or alignment, and no other flight control maintenance has been performed.
  2. The applicable maintenance procedure card does not require a test flight.
  3. Ground checks are conducted IAW paragraph 1.O.1.a.
  4. Documentation initiated and completed IAW the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 3: Flight Safety Maintenance Document (CG-4377A), CG-4377 Part III, and/or CG-4377B entry. These forms are available in jetform filler.
- e. Preflight Briefing. Pilots in command of flight verification checks and test flights shall be briefed on procedures and systems to be checked by a Maintenance Officer or Quality Assurance Inspector prior to aircraft departure. Additionally, a Quality Assurance Inspector should be assigned as a part of the flight crew when practical. The pilot in command (PIC) signature on Form CG-4377A, Flight Safety Maintenance Document (jetform filler), certifies completion of this briefing.
- f. Records.
- (1) Maintenance Flight Safety Warning. A Maintenance Flight Safety Warning Tag shall be attached to the pilot's yoke or cyclic stick whenever safety of flight maintenance requiring a ground check or airborne functional check has been performed. This tag shall be locally manufactured for reuse and state "CAUTION PILOTS AND AIRCREW. SAFETY OF FLIGHT MAINTENANCE HAS BEEN PERFORMED ON THIS AIRCRAFT. CHECK THE AIRCRAFT MAINTENANCE RECORD PRIOR TO FLIGHT."
  - (2) Form CG-4377A, Flight Safety Maintenance Document. The Flight Safety Maintenance Document is retained with the CG-4377 Part III (jetform filler) in the Aircraft Maintenance Record. It is used for all maintenance performed that requires a functional check. It provides for the type of check required and appropriate sign off blocks for maintenance accomplishment, required ground checks, quality assurance inspection, maintenance release, pilot in command (PIC) acceptance, and final completion of functional check. An aircraft requiring a test flight as the final maintenance action shall remain in an NMCM status, except while airborne, for the test flight items. Once all test flight items have been satisfactorily completed, signed off, and the aircraft preflighted, the aircraft can then be returned to a Bravo status. Form CG-4377A can be accessed on SWIII jetform filler.
- P. **AIRCRAFT OWNERSHIP.** During pick-up or delivery of an aircraft scheduled for PDM, or modifications, the PIC's home unit (ARSC or the operational unit) assumes custody and ownership during the transfer flight to, or from, ARSC. Once the aircraft has landed at ARSC, ARSC assumes custody and ownership. ARSC's ownership extends to all maintenance flights where the intent is to depart and return to ARSC — regardless of the PIC's home unit. In approval messages for Drop-in-Maintenance (DIM) flights to ARSC, Commandant (G-OCA) will direct transfer of custody to ARSC, beginning at the point the aircraft departs the home unit for the flight to ARSC. This transfer will occur regardless of which unit provides the PIC for the flight. This will apply only to those situations in which the aircraft is not authorized to perform operational missions due to the nature of the discrepancy, and is only authorized to fly to ARSC.

- Q. COMMANDANT'S AERONAUTICAL ENGINEERING LOGISTICS COMPLIANCE INSPECTION (LCI).** Visits to aviation units by personnel assigned to Commandant (G-SEA) and Commanding Officer ARSC will be conducted on a scheduled basis. The LCI team will focus on unit's adherence to aviation supply process procedures. Every aspect from ordering to disposition of parts will be scrutinized by ARSC supply personnel. The primary purpose of these visits is to ensure a direct flow of communication between the unit and the aeronautical engineering support structure. COMMUNICATION is the key word. Both the aeronautical engineering support personnel and the unit aviation engineering staff must receive and transmit meaningful information. During the course of the visit, the representatives from Commandant (G-SEA) and ARSC will closely scrutinize the quality of our joint product, i.e., the condition and configuration of assigned aircraft. Additionally, maintenance support systems will also be reviewed to ensure that required standards are adhered to and, perhaps more importantly, to take unit ideas and management successes for fleetwide improvement. In order to properly prepare for this visit, a LCI Worksheet has been provided as enclosure 1 to the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110. An internal review of this checklist at the unit level upon relief of Engineering Officers and on a semiannual basis is encouraged.
- R. RELIABILITY CENTERED MAINTENANCE (RCM) PROGRAM.** Reliability Centered Maintenance (RCM) is a logical discipline for the management and analysis of scheduled maintenance programs. The goal of the program is to realize the inherent reliability capabilities of the equipment being maintained. The Engineering & Industrial Support Division (EISD) at ARSC manages the RCM program. Refer to the RCM Process Guide, CGTO PG-85-00-30, for further information.
- S. FLIGHT SAFETY CRITICAL AIRCRAFT PARTS (FSCAP) PROGRAM.** This program establishes Coast Guard policy and procedures that shall be used for Flight Safety Critical Aircraft Parts (FSCAP). The FSCAP program provides for identification and control of FSCAP throughout the materiel life cycle. Proper identification and control of FSCAP is critical to ensure that both the Coast Guard and the public at large are protected from the use of unapproved parts. Unapproved parts are those for which there is insufficient documentation to determine the parts status, parts that have been deliberately misrepresented (counterfeit) and those parts that have reached a design life limit (or been damaged beyond repair) and altered, then deliberately misrepresented as acceptable. The FSCAP program is managed by G-SEA in coordination with G-SL, G-CFM-3, and ARSC. Refer to the Property Management Manual, COMDTINST M4500.5 (series), for additional information regarding FSCAP disposal policy and procedures. Refer to the Supply Policy and Procedure Manual (SPPM), COMDTINST M4400.19 (series), for additional information regarding FSCAP general logistics policy and procedures. Questions or comments on specific aircraft parts should be directed to the appropriate ARSC aircraft Product Line Engineering Cell. For further information on FSCAP procedures refer to the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 1.



## CHAPTER 2. ORGANIZATION

- A. GENERAL.** The Organization Manual (Coast Guard), COMDTINST M5400.7 (series), provides detailed information regarding organizational characteristics and principles of various elements of the USCG. Engineering Officers should develop a working knowledge of these principles and ensure they are followed at the unit level. Organizational information provided in this chapter enables personnel to understand the interrelationships of the various elements of the organization pertaining to management of aeronautical maintenance.
- B. OFFICE OF AERONAUTICAL ENGINEERING, COMMANDANT (G-SEA).** Under the direction and general supervision of the Director of Engineering, Commandant (G-SE), the Chief, Office of Aeronautical Engineering shall:
1. Participate with Office of Contract Support, Commandant (G-ACS), in the negotiation of contracts for the installation, repair, maintenance, and alteration of aircraft, engines, and related equipment; make final determinations as to acceptance terms and conditions included in such contracts insofar as dates of delivery, plans, specifications, and characteristics of the items desired are concerned.
  2. Transmit requests for procurement to Commandant (G-ACS) accompanied, when appropriate, by detailed plans, specifications, etc.
  3. Monitor contract performance insofar as inspections, tests, and technical judgments are necessary or desirable to assure compliance; assist in expediting contracts as required.
  4. Ensure acquisition technical data packages meet Continuous Acquisition and Life-cycle Support (CALS) standards.
  5. Furnish progress, scheduling and materiel requirement information concerning the installation, repair, maintenance, and alteration of aircraft, engines, and related equipment.
  6. Review Boards of Survey for aeronautical materiel.
  7. Initiate requests for research and development (R&D) special studies, analyses, and projects which involve new aeronautical concepts, systems, and hardware for the Coast Guard inventory. Work closely with R&D staff in such development efforts.
  8. Prepare technical proposals in response to tentative operational requirements.
  9. Manage all Coast Guard aviation maintenance programs including, but not limited to: avionics, support equipment, rescue and survival equipment, computerized aircraft maintenance, and aviation maintenance information systems.
  10. Assist operational commanders in maintaining aviation unit facilities and support spares to adequately repair, maintain, outfit, and alter aircraft, engines, and related equipment.
  11. Schedule Logistics Compliance Inspection (LCI) visits to aviation units by members of Commandant (G-SEA) and ARSC to assess quality and adequacy of Coast Guard aviation support.
  12. Coordinate Commandant (G-SEA) tasks assigned to the Aircraft Repair and Supply Center (ARSC). Function as the central contact and approving authority for work desired by other elements and for all matters which affect ARSC's ability to perform its primary mission.
  13. Serve as Program Office for ARSC.
  14. Coordinate Commandant (G-SEA) tasks assigned to the Aircraft Program Offices (APOs). Function as the central contact and approving authority for work desired by other elements and for all matters which affect the APOs ability to perform their primary mission.
  15. Provide input to Planning Proposal Review Boards (PPRBs) involving aeronautical engineering matters.
  16. Identify outside resources (8a contractors, etc.) to provide management studies, personnel studies, logistic studies, and automated data processing (ADP) studies in support of Commandant (G-SEA) programs.

17. Review aviation mishap board reports. Serve as voting member on the Commandant's Aviation Safety Board.
  18. Act as advocate for logistics issues within the area of aeronautical engineering.
- C. PROGRAM MANAGER, COMMANDANT (G-SEA-A).** Under the direction and supervision of the Chief, Office of Aeronautical Engineering, the Program Manager shall:
1. Fulfill the duties of Office Chief in his absence.
  2. Assist the Chief, Office of Aeronautical Engineering in the administration and oversight of the Aeronautical Engineering program.
  3. Monitor and coordinate personnel actions concerning the training and assignment of officers to aeronautical engineering duty. Participate as a voting member of selection boards for aircraft maintenance officer and aeronautical engineering post graduate training programs. Coordinate activities of Duty Under Instruction Students (DUINS) at post graduate school for Commandant (G-SEA) sponsored programs.
  4. Supervise the civilian Administrative Assistant.
  5. Act as Senior Member of the Aviation Maintenance Office Selection Panel and the Aviation Maintenance Post Graduate Selection Panel.
  6. Manage the day to day office function within Commandant (G-SEA), including the review of all correspondence for the Office Chief's signature, AFC-30 and AFC-41 budget management, leave and liberty management, and development of Office policy and procedures.
  7. Serve as Senior Member of the joint Commandant (G-SEA) and ARSC Budget Control/Planned Obligation Project (POP) Board.
- D. AERONAUTICAL SYSTEMS DIVISION, COMMANDANT (G-SEA-1).** Under the direction and supervision of the Chief, Office of Aeronautical Engineering, the Chief, Aeronautical Systems Division shall:
1. Manage the aircraft, life support equipment, and avionics maintenance programs for assigned aircraft. Management of these programs includes, but is not limited to:
    - a. Programmed Depot Maintenance (PDM) programs.
    - b. Aircraft configuration control including the ACCB process.
    - c. Initiating and reviewing technical directives.
    - d. Developing policies to improve maintenance effectiveness and aircraft reliability.
    - e. Monitoring aircraft computerized maintenance programs.
  2. Monitor the logistical support of assigned aircraft and installed avionics systems.
    - a. Provide technical guidance in the procurement and maintenance of replacement items, spare parts, and special equipment.
    - b. Coordinate the policy and planning functions related to the installation, maintenance, and support of all airborne electrical and electronic systems, their attendant ground support, and special test equipment.
  3. Select and direct aviation maintenance officers, technical specialists, and ARSC personnel to participate as members of aviation Mishap Analysis Boards (MABs).
  4. Develop cost estimates, price determinations, and specifications for procurement, modification, programmed depot maintenance (PDM), and support of assigned aircraft and aircraft being considered for inclusion in the Coast Guard inventory.
  5. Provide, or coordinate, assistance to Coast Guard and DOD elements on matters relating to the development of technical studies, engineering analyses, maintenance, alterations, repair, and other special projects related to assigned aircraft.
  6. Monitor the activities of the Prime Units and ARSC regarding Headquarters assigned projects.
  7. Provide Coast Guard representation on various technical committees.

8. Monitor technical progress in the field of aeronautical engineering.
  - a. Remain abreast of new developments for possible application to Coast Guard aviation programs.
  - b. Plan for the development and procurement of equipment to meet future aeronautical systems requirements.
9. Serve as technical subject matter specialist for assigned aircraft and provide inputs to Commandant (G-OCA), Commandant (G-S) and Commandant (G-SEA) as required.
10. Oversee the Coast Guard aviation TEMPEST program. Ensure the program remains consistent with National, DOT, and Commandant G-S policy. Monitor aviation compliance.
11. Provide liaison with other military and non-DOD users of similar type aircraft, engines, avionics, and special equipment. Administer the Navy-Type-Navy-Owned (NTNO) avionics equipment program.
12. Assist the Office of Acquisition in major procurement programs for assigned aircraft, engines, avionics, and special equipment.
13. Provide assistance to aviation units on matters relating to aircraft salvage.
14. Develop specifications for new equipment to satisfy operational requirements.
15. Supervise the design, procurement, and installation phases of assigned acquisition projects including attendant ground support and special test equipment.
16. Manage the Reliability Centered Maintenance (RCM) Program.

**E. AERONAUTICAL RESOURCES DIVISION, COMMANDANT (G-SEA-2).** Under the direction and supervision of the Chief, Aeronautical Engineering Division, the Chief, Aeronautical Resources Division shall:

1. Prepare preliminary budget estimates, make allotment recommendations, administer AFC-30, AFC-41 and AC&I funds allocated to the office, and pass on obligations for items to be charged against field allotments in those instances where prior Headquarters authorization is required.
2. Coordinate and supervise military and civilian personnel management responsibilities to ensure that necessary actions required by personnel management procedures are accomplished.
3. Coordinate Commandant (G-SEA) responses to questions and answers from Congress, Office of Management and Budget (OMB), Office of the Secretary of Homeland Security (OHS), Commandant (G-CCS) elements, and outside news media.
4. Coordinate with Office of Force Management, Commandant (G-SRF), concerning technical knowledge and maintenance responsibilities for the Aviation Maintenance Technician (AMT), Aviation Survival Technician (AST), and Avionics Technician (AVT) ratings. Review the recommendations of the Aviation Technical Training Advisory Committee (ATTAC).
5. Provide technical input in the review of preliminary or detailed plans for construction or alteration of facilities for assigned aircraft.
6. Coordinate technical training programs at ARSC, Aviation Technical Training Center (ATTC), and other Coast Guard elements including, but not limited to:
  - a. Maintain liaison with ATTC concerning courses.
  - b. Act as subject matter specialist for all aircraft related matters including training, course curriculum content, and enlisted rating qualifications for the AMT and AVT rates. Coordinate with the Commandant (G-SRF), ATTC, and Prime Units.
7. Coordinate funding of the DOD Joint Oil Analysis Program (JOAP).
8. Review Commandant (G-SEA) project implementation plans to ensure adequate resources will be available to support all maintenance and logistics aspects before proceeding from the development/procurement phase to the production/operational phase.
9. Manage acquisition projects using assigned project managers.

- a. Ensure that projects are managed in compliance with USCG directives, guidance from higher authority, and sound business practices.
  - b. Manage all aspects of each project to meet approved cost, schedule, performance, and support goals.
  - c. Act as the central focal point for information within the Coast Guard for the project assigned. Answer inquiries from higher authority and provide project liaison with ARSC, DOD, and other Coast Guard segments.
10. Coordinate RP preparation with Commandant (G-SEA). Act as project fund manager and approval authority for execution of funds appropriated for the project as directed by Commandant (G-SEA). Coordinate solicitation or reprogramming action, as required to meet changes in requirements, with Commandant (G-SEA).
  11. Provide liaison with Commandant (G-SLS) and Commandant (G-SLI) in Information Technology areas of value to Aeronautical Engineering. Provide information conduit and requirements monitoring of ARSC Information Technology issues. Provide guidance in the development of the Coast Guard corporate information system.
  12. Provide liaison with other Coast Guard Headquarters' program entities responsible for developing systems whose requirements potentially impinge on Coast Guard Aviation Logistics Systems. Identify and support requirements to ensure Coast Guard Aviation Logistics Mission Essential Activities are maintained or enhanced.

**F. AIRCRAFT REPAIR AND SUPPLY CENTER (ARSC), ELIZABETH CITY, NC** ARSC's mission is to provide the Right Stuff, at the Right Place, at the Right Time, at the Right Cost...EVERYTIME. To do this, ARSC must (1) provide depot level maintenance, overhaul, major repair, and modification of aircraft and aeronautical equipment; (2) provide for procurement, storage, stocking of inventory, control, accounting, issue, and shipping of supply parts and aeronautical equipment; (3) preserve, store, and maintain replacement aircraft and parts; (4) provide technical engineering support in aeronautical and avionics fields, and (5) provide salvage advisory expertise when required.

1. Aviation Logistics Division (ALD). The Logistics Division performs the following functions: Principal fiscal and supply advisor for the command; budgets and accounts for all funds transferred to ARSC; Aviation Inventory Control Point (AICP) for USCG aviation materiel; stocks and distributes aviation materiel to users; develops and maintains aviation unit Allowance Lists; administers warranties and contractor maintenance programs for Coast Guard aeronautical materiel; administers the Aviation Maintenance Management Information System (AMMIS); provides routine dispersion services, and coordinates the civilian payroll at ARSC.
2. Engineering and Industrial Support Division (EISD). The EISD is responsible for ARSC facilities management and providing technical information and data to other ARSC divisions, Headquarters, and other operating units. Various proposed components and systems are refined, prototyped, tested, and installed. The division manages the following sections:

Aeronautical Engineering Technical Publications  
 Aviation Life Support Equipment (ALSE)  
 Avionics Projects and Policy  
 Reliability Centered Maintenance (RCM) Program  
 Joint Oil Analysis Program (JOAP)  
 Support Equipment (SE)  
 Flight Safety Critical Aircraft Parts (FSCAP) Program  
 Avionics Projects and Policy  
 Aircraft Component Repair  
 Corrosion Control Program  
 Spare Parts Breakout Program  
 Quality Assurance Program

The division also coordinates the administration of all aircraft maintenance industrial systems that are common to both fixed and rotary wing aircraft. These include:

Pollution Prevention

Hazardous Materials Management

Accident Prevention

Industrial Applications

3. Personnel Resources Division (PRD). The Personnel Resources Division responsibilities include administration of the military and civilian personnel program including performance evaluations, promotions, training, wage rate changes, hiring, and firing.
4. Information Systems Division (ISD). The ISD is tasked with the responsibility to provide information storage, retrieval, and other services normally associated with an automated data processing (ADP) system. This responsibility includes financial analyses, inventory control models, production scheduling models, man-hour accounting information, and ADP support for ALMIS and its subsystems (ACMS, AMMIS, DSS, and EAL) and ATIMS. Coordinating these programs to achieve maximum effective utilization from the available ADP equipment is a primary function.
5. Product Line Division (PLD). The PLDs were created at ARSC to optimize the technical, logistical, and depot level maintenance support of Coast Guard aircraft. There are four Product Line Divisions responsible for support issues pertaining to their respective aircraft type (HU-25, HC-130, HH-65, HH-60).
  - a. Product Line Manager (PLM). The PLM's responsibilities are to oversee and coordinate the efforts of the Engineering, Supply and Program Depot Maintenance Cells for their respective aircraft. To monitor product line support costs (both Operating Expenses (OE) and Acquisition, Construction and Improvement (AC&I)) to ensure best value to the Government and that sound business practices are balanced against operational requirements. The PLM actively participates in managing the annual budget process, contracting issues, and inventory management issues relating to their specific aircraft.
  - (1) Engineering Cell. The Engineering Cells are responsible for providing technical information, support and data to field units, EISD, PDM and Headquarters for their respective aircraft PLD. They are the point of contact for "Request for Technical Assistance" messages from the field units. They coordinate with the PLM for personnel, repair plans, parts, tooling, special equipment, transportation, funding, and expertise necessary to assist the field unit in correcting the pertinent aircraft discrepancies. They are responsible for the development, prototyping, testing and installation of TCTOs. They are the reviewing and approval source for RCPs as well as extensions beyond those listed in the Maintenance Due Lists (MDLs) for their respective aircraft.
  - (2) Program Depot Maintenance (PDM) Cell. The PDM cells have the primary responsibility of managing the PDM program for their respective aircraft as well as the major repair and depot-level modification of these aircraft. They provide direct support for requests by field units and their respective aircraft Engineering Cell for technical assistance, through the provision of labor, parts, tooling, special equipment, training, and expertise. Provide for aircraft drop-in maintenance when unique depot-level resources are required (crash damage repair, special airframe systems changes, etc.). Ensure all logs, records, and weight and balance information are correct for delivered aircraft, provide post induction and corrosion reports, and coordinate ferry, crew assignment, and movement for induction and delivery of aircraft.
  - (3) Supply Cell. The Supply Cell performs the following functions for their respective aircraft PLD: Principal fiscal and supply advisor; budget and account for all transferred funds; Aviation Control Point for stocked USCG materiel; stock

and distribute aviation materiel to users; develop and maintain unit Allowance Lists; administer warranties and contractor maintenance programs.

- G. TYPICAL AVIATION UNIT.** The Coast Guard Air Operations Manual, COMDTINST M3710.1 (series), provides detailed information regarding the standard organization for air units.
- H. PRIME UNIT.** The purpose of providing a designated "Prime Unit" is to ensure a centralized point for technical responsiveness to field level maintenance management of a specific aircraft type or aviation life support equipment. The scope of the Prime Unit responsibilities extends beyond the aircraft to all of its related systems, subsystems, SE, special tools, equipment, and shop practices. Prime Units receive their tasking from ARSC and function as the first point of contact on technical matters for all respective field activities as outlined in paragraph 2.H.1. and paragraph 2.H.2.

1. Designated Prime Units. The following units are designated Prime Units for the indicated aircraft and aviation life support equipment (ALSE):

<u>Aircraft</u>	<u>Aviation Unit</u>
ALSE	ATC Mobile
HU-25	ATC Mobile
HC-130	Elizabeth City
HH-60	Elizabeth City
HH-65	Atlantic City

2. Functions and Responsibilities. The Prime Unit is responsible for providing a constant review of field level maintenance management practices. Specific functions of the Prime Unit are:
- Maintenance Procedure Cards (MPCs) and Maintenance Text Cards (MTCs). The Prime Unit develops, reviews, and updates MPCs and MTCs as necessary to ensure that all field level maintenance is accomplished with optimum efficiency. ARSC will provide technical review and final approval on all proposed MPC and MTC changes. The initiating unit will maintain a file of proposed changes and recommendations for 1 year.
  - Manuals. Aircraft Prime Units continuously review their aircraft specific manuals listed in the Master Publications Index (MPI) and submit CG-22s, Aeronautical Publication Change Recommendation, to implement any proposed changes relating to field maintenance. The ALSE Prime Unit is responsible for the Aviation Life Support Systems Manual, COMDTINST M13520.1 (series). Prime Units are often requested to participate in pre-publication reviews of new or revised manuals.
  - Prototype and Verification of Changes and Technical Orders. When directed by ARSC, Prime Units make trial installation of changes prepared by ARSC or other activities to verify kit contents and installation instructions prior to distribution. Prime Units are often requested to prototype a change and prepare the TCTO. TCTOs are then forwarded to ARSC for review and final approval.
  - Aircraft Records. Prime Unit will review the standardization of aircraft records and inventories, and submit proposed changes to ARSC.
  - Unsatisfactory Reports (URs). Prime Units (for the affected aircraft/ALSE) shall be included as information addressees on all Urgent Interim URs. Prime Units will closely scrutinize all Urgent Interim URs and make comments or recommendations to ARSC. When requested, Prime Units will support ARSC with the evaluation of routine URs.
  - Conferences and Meetings. Prime Units may be invited to send representatives to attend selected technical meetings which involve ALSE or prime aircraft, its engine or avionics.
  - Technical Training Courses. Prime Units will assist in the development and review of technical courses of instruction at ATTC and commercially developed schools. They

will occasionally be directed to attend selected courses and provide written feedback on their relevance to Coast Guard maintenance requirements.

- h. Aircraft Configuration Control Board (ACCB). Prime Units may be tasked with reviewing a proposed aircraft configuration change and/or providing a recommendation for location and installation of new equipment.
- i. General Shop Practices. The Prime Unit will review all tools required to maintain the prime aircraft/ALSE, including tools that are not listed as 'special tools' but facilitate maintenance. They will examine the requirements for, and suitability of, all available maintenance stands, protective covers and devices, and commercially developed standard practices.



## CHAPTER 3. CLASSIFICATION OF AVIATION MAINTENANCE ACTIVITIES

- A. GENERAL.** Each aviation field unit has a prescribed minimum level of maintenance capability. Enclosure (1) provides a listing of the specific functions required to attain these levels or classification. The classifications permit a cost versus benefit comparison in determining allocation of personnel, materiel and funds. This standard provides units, districts, and Maintenance Logistic Commands (MLCs) with an effective tool for evaluating the following items:

1. Requests for changes in allowance list.
2. Requests for new/replacement equipment.
3. Requirements for additional aircraft maintenance funds.

### NOTE

The prescribed levels or classifications are minimum objectives for staff support as well as unit attainment. The levels prescribed are "minimum required" and as such are not intended to restrict initiative or expansion of capability when economical and practical. The abilities of personnel assigned, local operating conditions, efficiency of operations, and cost are unique to each unit; therefore, individual capabilities should be considered in that context.

- B. CLASSIFICATIONS.** Each aviation unit has two classifications:

1. The first classification describes the required level of maintenance utilizing local military and commercial facilities to the fullest extent practical. The distance/time elements of the word "local" are left to the Commanding Officer of each unit and dependent on the following:
  - a. Urgency of need.
  - b. Frequency of need.
  - c. Transportation availability.
  - d. Inherent delays in obtaining the services or use of the facility versus time available.

### NOTE

Major changes in the availability of these facilities and services to the unit may necessitate changes in the on-board equipment or funds needed to maintain the required level of capability.

2. The second classification is the minimum in-house or on-board capability required. This capability shall be maintained regardless of availability of local facilities and represents the minimum readiness posture of the unit from the aircraft maintenance standpoint. Note that these classifications are interdependent with type of aircraft and support equipment assigned. Consequently, major changes in aircraft or support equipment assigned may also necessitate changes in on-board equipment or funds to maintain the required capability.

- C. TYPES OF CLASSIFICATIONS.** The classifications assigned to the USCG aviation unit levels of maintenance are defined as follows:

1. Class D (Shop Maintenance). Class D-level maintenance is also a part of the DOD "Intermediate Maintenance." The work performed consists of the routine day-to-day upkeep required by shop facilities. This includes minor repair, check, test, and adjustment of aeronautical items that have been removed and which are normally to be reinstalled after completion of such work. Shop maintenance includes preservation, inspection, examination, specified bench test, correction of discrepancies, adjustment, minor repair and/or replacement, and emergency manufacture of parts, all of which require only portable hand or machine tools, semi-portable or bench mounted equipment.
2. Class C (Component Repairs). Class C-level maintenance is also categorized under the DOD "Intermediate Maintenance" and is devoted to the repair (not overhaul), test, and return to serviceable status of unserviceable aeronautical components and equipment. Items

repaired by C-level maintenance are removed from locally operating aircraft or equipment and, due to the nature of the discrepancies involved, are usually replaced by serviceable items drawn from stock. Component repair maintenance involves preservation, inspection, examination, specified bench test, correction of discrepancies, calibration, repair and/or replacement, and emergency manufacture of parts requiring light installed equipment. Class C-level maintenance also includes all the requirements of lower, Class D-level maintenance.

#### **D. UNIT REQUIREMENTS.**

1. Table 3-1. shows the minimum maintenance capability required of each aviation unit. All USCG aviation units are expected to perform their own periodic inspections and minor repair. Commanding Officers of aviation units shall ensure that at least the specified capability is maintained. The Commandant (G-SEA), MLCs and District Commanders should provide equipment and funds sufficient to support the assigned level of maintenance, and they will balance requests for additional equipment or funds against other parameters such as economics, local conditions, and district or area operational requirements.
2. All unit avionics shops are required to maintain an in-house capability for avionics repair at the Class C-level. Aircraft type avionics system Integrated Logistics Support Plans (ILSPs) or maintenance manuals will provide specific guidance on the level of repair authorized at the unit for a given avionics system.

**Table 3-1. Maintenance Level Classification**

Area, District, Unit	Utilizing Local Facilities	In-House Capability		
	Class Level	Exceptions	Class Level	Exceptions
<b>1st District</b>				
Cape Cod	C		D	Note 1
Atlantic Area				Note 2
Clearwater	C		D	Note 1
Elizabeth City	C		D	Note 1
<b>5th District</b>				
Atlantic City	D		D	Note 1
Elizabeth City	C		D	Note 1
<b>7th District</b>				
Borinquen	D		D	
Clearwater	C		D	Note 1
Miami	C		D	Note 1
Savannah	C		D	
<b>8th District</b>				
Corpus Christi	C		D	
Houston	C		D	
Mobile	C		D	Note 1
New Orleans	C		D	
<b>9th District</b>				

Area, District, Unit	Utilizing Local Facilities	In-House Capability		
	Class Level	Exceptions	Class Level	Exceptions
Detroit	C		D	
Traverse City	C		D	
11th District				
Humboldt Bay	C		D	
Los Angeles	C		D	
San Diego	C		D	
San Francisco	C		D	
Sacramento	C		D	Note 1
Pacific Area				Note 2
Barbers Point	C		D	Note 1
Kodiak	C		D	Note 1
13th District				
Astoria	D		D	
North Bend	D		D	
Port Angeles	D		D	
14th District				
Barbers Point	C		D	Note 1
17th District				
Kodiak	C		D	Note 1
Sitka	D		D	
Headquarters				
Washington	C		D	
Note 1: Exceptions				

Items of Exception	Minimum Level Required of Excepted Items
Cable, tube and rod work (Controls)	C
Soldering	C
Paint	C
Hydraulic/pneumatic component maintenance	C
Note 2: Area Commands control HC-130 operations, except CGAS Sacramento.	



## CHAPTER 4. DIRECTIVES AND PUBLICATIONS

- A. COMMANDANT INSTRUCTIONS.** These directives form the basis of the USCG directive system. Detailed information concerning the status of these directives and publications, as well as authorized allowances and the requirements for maintaining and filing, is contained in the Directives, Publications and Reports Index (DPRI), COMDTNOTE 5600. Instructions for the preparation of these directives is contained in the Coast Guard Directives System, COMDTINST M5215 (series). It should be noted that while the majority of the directives published concerning aeronautical materiel will be assigned subject classification numbers in the 13000 (series), there are many other directives of interest to maintenance managers. See Index under Commandant Instructions.
- B. TECHNICAL ORDERS.** Technical Orders (T.O.s) are used to disseminate technical aeronautical information required for the operation and maintenance of USCG aircraft. The following formats are used based on the T.O. urgency.
- C. PRECEDENCE OF DIRECTIVES.** USCG directives have precedence over all others. Use of DOD instructions shall be tempered with good judgment. The precedence of directives is as follows:
1. Aviation Computerized Maintenance System (ACMS)
  2. Coast Guard TOs
  3. Air Force TOs
  4. Navy TOs
  5. Commercial Publications

### NOTE

Air Force publications have precedence over Navy and commercial publications for general procedures that are non-aircraft specific. Coast Guard aircraft have maintenance manuals that are DOD or commercially sponsored (i.e., HC-130, Air Force; HH-60, Navy; HU-25 and HH-65, commercial).

## **D. REFERENCE PUBLICATIONS.**

1. AFIND 2, Numerical Index of Standard and Recurring Air Force Publications, contains a list of all Air Force Manuals (AFM) and pamphlets (AFP). See Enclosure (3).
  2. AFIND 9, Numerical Index of Departmental Forms, contains the prescribing directives for the USAF, Air Force Technical Orders (AFTO), and Department of Defense (DOD) forms listed herein.
  3. AFTO 0-1-CD-1 contains a numerical listing of all USAF technical order indexes. Each index lists all technical orders for a specific category, e.g., T.O. 0-1-1-5 is the index for aircraft category technical orders pertaining to helicopters. AFTO 0-1-CD-1 can be accessed at <http://toindex-S.Robins.af.mil/toindex//>.
  4. A1-H60CA-AML-000, Aircraft Documentation List (Navy).
  5. AFTO 0-4-6-2-CD-1 is a cross reference file of Equipment Numbers to Technical Order Numbers. AFTO 0-4-6-2-CD-1 can be accessed at <http://toindex-S.Robins.af.mil/toindex//>.
  6. AFTO 00-5-18, USAF Technical Order Numbering System.
  7. 00-25-100, Naval Air Systems Command Technical Manual Program.
  8. N0000-00-IDX-000, Navy Standard Technical Manual ID Numbering System.
  9. OPNAVINST 4790.2 (series), Naval Aviation Maintenance Program Instructions (NAMPI).
- E. COAST GUARD TECHNICAL ORDER SYSTEM.** The Coast Guard Technical Order System is the medium used to provide technical information and instructions to operate, install, maintain, inspect, or modify Coast Guard aviation systems and equipment. The T.O.s are published under authority of the Chief, Aeronautical Engineering Division, Office of Engineering Logistics and Development, U.S. Coast Guard, and distributed in accordance with the Standard Distribution List, COMDTNOTE 5605.

1. Coast Guard Technical Orders (CGTOs) are printed directives of long term nature (i.e., manuals referencing maintenance, repair, component, etc.).
2. Coast Guard electronic technical manuals are now available on the Coast Guard Aircraft Repair and Supply Center Technical Publications (EISD) Standard Workstation III (SWIII) web site. Electronic distribution of manuals dramatically reduces the time required to update and distribute changes and achieves affordable readiness through reduced production, distribution and handling costs. Use of electronic data (manuals) from the EISD web site is authorized as the primary source for Coast Guard aviation maintenance functions.
3. Maximum use will be made of other service technical publications to avoid duplication of information. Occasionally, Maintenance Advisories will be issued to allow urgent dissemination of information prior to issuance of a Time Compliance Technical Order (TCTO), change to a Maintenance Procedure Card (MPC), or to clarify any published guidelines.

**NOTE**

When conflict of information exists, ACMS MPCs shall take precedence over CGTOs, which take precedence over other DOD publications.

4. Compliance with the Coast Guard Technical Order System is mandatory. Technical order instructions play a critical role in achieving system and equipment readiness. Commanding Officers shall ensure that activities under their jurisdiction are aware of the need for full compliance and effective use of the technical order system.
5. Coast Guard units will not make changes/corrections to T.O.s except as directed by official T.O. changes (either interim or formal). The CG-22, Aeronautical Publication Change Recommendation, or AF Form 847, Aeronautical Change Recommendation, will be used to correct errors or voids in existing technical orders.

**NOTE**

Supply Item Change Records (SICRs), ARSC Form 3200-3 (jetform filler) submitted by manufacturers or ARSC, changing or adding part numbers to any Coast Guard Illustrated Parts Catalog, or Illustrated Parts Breakdown may be incorporated directly from the approved SICR and not sent through the CG-22, Aeronautical Publication Change Recommendation, Process.

**F. AIRCRAFT MAINTENANCE PUBLICATIONS.**

1. General. Coast Guard aviation is involved in many tasks requiring a mix of aircraft types. The basic aircraft requirements were initially developed by the USAF, USN, or through commercial contractors requiring dependence on other than USCG sources for maintenance publications. The diversity of maintenance sources and changing information often requires USCG interpretation and resolution; this Manual and the CGTO series will be utilized to resolve these ambiguities. Refer to Table 4-1. for detailed information.
2. Utilization.
  - a. Air Force. The HC-130 and C-20B are Air Force sponsored aircraft. The Technical Information Maintenance and Ordering System (TIMOS) and Process Guide, CGTO PG-85-00-50, will have precedence over Air Force Technical Orders detailing the distribution and management of technical publications.
  - b. Navy. The HH-60 is a Navy sponsored aircraft. The TIMOS System and Process Guide, CGTO PG-85-00-50, will have precedence over Navy publications detailing the distribution and management of technical publications.
  - c. Commercial.

**NOTE**

Screening and studying commercial sources of technical information is considered advantageous and is encouraged. Changes to equipment which affect performance, part number, configuration or interchangeability are not authorized unless covered by an applicable USCG directive or otherwise specifically authorized.

- (1) HU-25 and HH-65 maintenance publications are commercial publications written in Air Transport Association of America Specification 100 (ATA-100) format. The basic manuals have been assigned CGTO numbers and are indexed by the ATA-100 numbering system. See Enclosure (5) for an explanation of ATA-100 format. There are a few exceptions where specific equipment has received a DOD designation and is supported by military (T.O.) publications.

**NOTE**

The flight handbooks are written according to military specifications.

- (2) C-4A and C-20B maintenance publications are commercial and procedures for use are contained therein.

3. Procurement of Publications.

- a. Coast Guard. All Coast Guard publications (including those for HH-65 and HU-25), aircraft model changes, and aircraft model bulletins may be ordered from ARSC utilizing TIMOS. Continuing requirements are mailed automatically in accordance with unit requirements on file at ARSC.
- b. Air Force. USAF publications are currently obtained and distribution changed utilizing TIMOS.
- c. Navy. Navy publications are currently obtained utilizing TIMOS.
- d. Army. Army publications are ordered utilizing TIMOS.
- e. Commercial. For the C-4A/C-20B, procure publications in accordance with their maintenance manual instructions. Other commercial publications for USCG peculiar requirements will be requisitioned from ARSC Publications Distribution Center through TIMOS.

- G. PROCESS GUIDES.** Process guides have been established to provide explanation and guidance in the use or objective of various Coast Guard systems and processes. ARSC EISD is implementing the conversion of process guides from paper to electronic.

Publication Number	Title
CGTO PG-85-00-10	ACMS User's Process Guide
CGTO PG-85-00-20	CG-22 Process Guide/User Manual
CGTO PG-85-00-30	Reliability Centered Maintenance Process
CGTO PG-85-00-40	TCTO Guidelines
CGTO PG-85-00-50	TIMOS User's Process Guide
CGTO PG-85-00-60	Aeronautical Engineering Corrosion Control Program Process Guide
CGTO PG-85-00-70	ACCB Process Guide
CGTO PG-85-00-80	Reserved

CGTO PG-85-00-90	Project Officer Management Guide
CGTO PG-85-00-100	Power by the Hour Process Guide
CGTO PG-85-00-110	Aeronautical Engineering Maintenance Management Manual Process Guide
CGTO PG-85-00-120	U.S. Coast Guard Acceptable Terms, Acronyms and Abbreviations
CGTO PG-85-00-130	Unsatisfactory Report Process Guide
CGTO PG-85-00-140	Coast Guard Aviation Supply Process Guide
CGTO PG-85-00-150	Support Equipment Process Guide
CGTO PG-85-00-160	Aircraft Transfer Process Guide
CGTO PG-85-00-180	Weight and Balance Process Guide

**H. TCTOS.** The following formats are used based on the T.O. urgency.

1. Time Compliance Technical Orders (TCTOs) generally require a physical change to an aircraft or a special, urgent, or repeated inspection requiring compliance within specified time limits. Applicability is determined by ARSC and published in the ACMS Maintenance Due List (MDL) to track compliance. TCTO formats are contained in Enclosure (2).
  - a. Coast Guard Message Time Compliance Technical Orders (Message TCTOs) are maintenance actions, in message format, used for rapid dissemination of information, generally of an urgent or safety-of-flight nature.
  - b. Coast Guard Time Compliance Technical Orders (TCTOs) are printed directives in MPC format requiring accomplishment of a specific task (i.e., inspection of components or physical change to an aircraft or component).
2. Compliance with Air Force TCTOs and TCTOs that apply to HC-130 and C-20B.
  - a. HC-130 and C-20B units shall comply with Air Force TCTOs and ITCTOs only when directed by ARSC. Double heading of Air Force message ITCTOs will serve as direction for compliance. Notification of TCTO applicability will be via ACMS Maintenance Due Lists.
  - b. Reports and/or findings, when required, shall be forwarded to ARSC vice the Air Force.
3. TCTOs accomplish special inspections or modification of aircraft. Modification/prototype of aircraft is only authorized by Commandant (G-SEA). All ideas for TCTOs shall be forwarded to ARSC with a copy to the respective Prime Unit. Refer to the TCTO Process Guide, CGTO PG-85-00-40, for additional information.
  - a. Specific guidance for TCTO preparation is contained in Enclosure (2).
  - b. When a TCTO is amended, the revised TCTO is published in its entirety with all changes identified by revision bars. Amendments to existing TCTOs will be identified by the basic TCTO number followed by a sequential number depending on the number of times the directive has been amended. For example, the third amendment to TCTO 972020 would be CGTCTO 972023.
  - c. A TCTO master file will be maintained at each unit. It will be arranged utilizing ATA chapter numbers.

**I. MONITORING TCTOS.** The status of TCTO accomplishment must be a primary concern of all Engineering Officers. Quality control personnel should fulfill the TCTO program monitoring functions. Significant problems or potential delays in accomplishment that are detected by maintenance supervisors and quality control personnel must be brought to the immediate attention of the Engineering Officer for timely resolution. Final accomplishment of TCTOs is recorded in ACMS through MPC sign-off. If the interval and compliance date are not listed on the ACMS Status Report

for a specific aircraft, the unit must research that TCTO to determine its applicability and its last done date. Aviation materiel personnel must closely monitor the status of TCTO kits.

**Table 4-1. Maintenance Publications Information**

Aircraft Type	HC-130
Airframe Procurement Source	Lockheed
Publications and Status	AFTO manuals supplemented by CGTOs
List of Applicable Publications (LOAP)	TIMOS Master Publication Index
Maintenance Procedure Cards	ACMS Maintenance Requirements List
Component Replacement Interval	AFTO 1C-130A-6 and ACMS Maintenance Requirements List
Input Method for Correcting	CG-22, Aeronautical Publication Change Recommendation and AF Form 847, Recommendation for Change of Publication (jetform filler)
Publication Updating Responsibility	ARSC
Aircraft Type	C-4A/C-20B
Airframe Procurement Source	Gulfstream Aerospace
Publications and Status	Gulfstream I and III commercial manuals
List of Applicable Publications (LOAP)	Index in commercial manuals (LOAP) plus Enclosure (3) for list of additional avionics publications
Work Cards	Computerized Maintenance furnishes work control cards
Component Replacement Interval	Computerized Maintenance Requirements List
Input Method for Correcting	Letter report to Grumman
Publication Management Responsibility	ARSC
Aircraft Type	HU-25
Airframe Procurement Source	Falcon Jet Corporation
Publications and Status	Commercial Manuals, CGTO numbers assigned
List of Applicable Publications (LOAP)	TIMOS Master Publication Index
Maintenance Procedure Cards	ACMS Maintenance Requirements List
Component Replacement Interval	ACMS Maintenance Requirements List
Input Method for Correcting	CG-22, Aeronautical Publication Change Recommendation and AF Form 847, Recommendation for Change of Publication (jetform filler)
Publication Management Responsibility	ARSC
Aircraft Type	HH-65
Airframe Procurement Source	Eurocopter, France
Publications and Status	Commercial Manuals, CGTO numbers assigned
List of Applicable Publications (LOAP)	TIMOS Master Publication Index

Maintenance Procedure Cards	ACMS Maintenance Requirements List
Component Replacement Interval	ACMS Maintenance Requirements List
Input Method for Correcting	CG-22, Aeronautical Publication Change Recommendation and AF Form 847, Recommendation for Change of Publication (jetform filler)
Publication Management Responsibility	ARSC
Aircraft Type	HH-60
Airframe Procurement Source	Sikorsky
Publications and Status	USN manuals and OPNAVINST 4790.2 (series)
List of Applicable Publications (LOAP)	TIMOS Master Publication Index
Maintenance Procedure Cards	ACMS Maintenance Requirements List
Component Replacement Interval	ACMS Maintenance Requirements List
Input Method for Correcting	CG-22, Aeronautical Publication Change Recommendation and AF Form 847, Recommendation for Change of Publication (jetform filler)
Publication Management Responsibility	ARSC

## CHAPTER 5. AIRCRAFT INSPECTIONS

- A. GENERAL.** The Aviation Computerized Maintenance System (ACMS) for Coast Guard aircraft, support equipment (SE), and special equipment includes all applicable inspection requirements. Instead of accomplishing a large number of maintenance tasks during an extended periodic down time, tasks are completed and accounted for on an individual basis. This allows operational and maintenance flexibility and increased labor-hour savings. The savings and flexibility are made possible by utilizing a computer system to track the large volume of daily maintenance activities. ACMS utilizes a computer to maintain status records, schedule maintenance tasks, and report the results of maintenance operations. From updated computer data files, a series of reports and information covering all maintenance tasks is generated. Refer to ACMS Users Process Guide, CGTO PG-85-00-10, for a detailed description of the forms, reports, and procedures associated with ACMS.
- B. DEFINITION OF INSPECTIONS.** Maintenance inspections, varying in scope, purpose, and frequency, are performed on assigned aircraft to ensure that aircraft are maintained in a safe serviceable condition. USCG aircraft inspection types and applications are defined under two categories: Routine and Special.

### NOTE

The specific inspection cycle prescribed for each type/model aircraft in USCG inventory is listed in Table 5-1. through Table 5-5.

1. Routine Inspections. The following inspections are considered routine:
  - a. Preflight Inspection. The Maintenance Preflight Inspection is accomplished prior to the first flight of the day and remains effective for 24 hours provided no subsequent maintenance has been performed. The preflight inspection consists of checking the aircraft for flight preparedness by performing visual examinations and operational tests to discover defects and maladjustments which, if not corrected, could adversely affect safety or mission accomplishment.
  - b. Thruflight Inspection. The Thruflight Inspection requirements are accomplished as a turnaround inspection prior to takeoff on the second and each subsequent flight of the day on selected types of aircraft. Units will have satisfied the requirements for preflight certification on the CG-4377 Part I (jetform filler) upon completion of a thruflight.
  - c. Postflight Inspection. The Postflight Inspection will be accomplished after the last flight of the flying period. This inspection consists of checking the aircraft to determine if it is suitable for continued flight by performing a visual inspection of certain components, systems, or areas to assure that no defects exist which would be detrimental to further flight. Additionally, checking for leaks, chafing, maladjustments, etc., should disclose defects requiring correction before deterioration into major maintenance items. The postflight inspection frequency ranges from once a day to once per week depending on the type aircraft.
  - d. Hourly/Weekly Inspections. These inspections are designed to provide servicing and verification of satisfactory functioning of critical systems/components at frequent intervals. The frequency of these types of inspections prohibits use of the computer for scheduling.
  - e. ACMS Maintenance Due List (MDL). These inspections, Operations, Calendar, Hourly, Cycles, and Landings, ensure a thorough examination of all systems and components on a scheduled basis.
2. Special Inspections. Special inspections are certain additional inspections, distinct in frequency from routine inspections, which are conditional upon operational environment, specific incidents, or other circumstances requiring inspections. The number of special inspections required for all aircraft and circumstances are too numerous to list. A few types are given in the following items to illustrate their distinction from routine:

- a. Overtemperature, Overspeed, Overtorque, Metal Contamination, Hard Landing, Lightning Strike, (etc.). These types of special inspections define the specific maintenance actions taken based upon the circumstances of the event. Inspections of this nature have been documented into existing manuals and the Aviation Computerized Maintenance System as the result of actual experiences or a high probability of encountering the event.
  - b. Time Compliance Technical Order (TCTO)/Message Time Compliance Technical Order (Message TCTO). TCTOs may be issued to perform inspections of an aircraft component or system. Action is normally generated by a reported safety-of-flight incident or failure trend. TCTOs will appear on the MDL for action.
  - c. Aircraft Damage Sustained as a Result of a Mishap. Commanding Officers shall ensure that all damage sustained is properly inspected by competent maintenance personnel and that the complete extent of the damage has been reported. Inspection should not be limited solely to the damaged area. A complete evaluation by the Engineering Officer or other qualified Maintenance Officer should be done prior to release for flight.
  - d. Aircraft Damage Sustained as a Result of Flight Through Volcanic Ash. Inadvertent flight through volcanic ash clouds is an infrequent but very real and significant hazard. Numerous commercial and military aircraft have sustained tremendous damage at jet airway altitudes hundreds of miles from active volcanos. Volcanic ash is typically composed of extremely fine particles of glass shard and pumice. When this ash enters the intake of jet engines it rapidly erodes compressors, melts and glassifies in the combustion section, solidifies on turbine nozzles; resulting in vastly reduced efficiency while the electronic fuel control (EFC) calls for greatly increased fuel and coking all fuel nozzles. All of the above can happen in less than a minute. The very fine nature of the shards can contaminate pitot static, pneumatic, and electrical and avionics systems and equipment. Windscreens, lights, glass, and plexiglass become glazed and opaque. If flight through a volcanic ash cloud is known or suspected, contact Commandant (G-SEA) for decontamination procedures. Depot and Original Equipment Manufacturer (OEM) support will most likely be required.
- C. REQUIREMENTS.** Proper utilization of ACMS is critical to safe and efficient maintenance management. The importance of accurate data reporting and management review must be emphasized at all levels of the maintenance organization. Unit Engineering Officers will ensure that they and their maintenance supervisors have a thorough working knowledge of ACMS requirements, procedures, and capabilities.
1. Inspection Interval. The calendar and flight hour inspection times listed in Table 5-1. through Table 5-5. and the ACMS Maintenance Due Lists are the maximum intervals for inspections. The inspection schedules are limits based upon average operating experience and aircraft manufacturer's recommendations. Whenever an aircraft or engine inspection, that has both a calendar and an hour interval, accumulates the limiting number of hours before the calendar interval has expired, the inspection becomes due and must be performed (i.e., HC-130 weekly). Commanding Officers are responsible for the adequate maintenance and corrosion control of aircraft in their custody and are to impose such other inspection requirements as necessary to meet differing environmental and operational conditions as may exist.
  2. Extension of Interval. Maintenance items may be delayed at the discretion of the Commanding Officer, or their designated representative, as specified in the ACMS Maintenance Due List (MDL) and paragraph 5.B. Extensions beyond those listed in the MDL or paragraph 5.B. must be approved by the appropriate Product Line Engineering Cell Leader. Failure to accomplish actions within this time frame shall require grounding of the aircraft. Mandatory Special Requirements (MSR) shall not be extended. Overdue MSR items shall be removed from service until the required inspection is completed.

#### **NOTE**

No extensions are authorized for Low Cycle Fatigue (LCF) or other fatigue life limits on aircraft components.

3. Restrictions to Performing Maintenance Actions Early. The following restrictions apply to performing maintenance actions early:
  - a. Thirty days/10% maximum for scheduled component changes.
  - b. Operations - Operations may be accomplished as early as stated in the "Do Not Do Before" column of the Operations MDL.
4. Scheduled Maintenance. Scheduled maintenance is planned maintenance performed according to the intervals specified on the ACMS Maintenance Due List. Unscheduled maintenance is defined as maintenance performed as a direct result of the failure of a specific component, system, or subsystem.
5. Suspension of Interval. The accumulation of calendar time on an aircraft may be halted for the period that the aircraft is in storage, extended repair, lengthy modification status, or other specified reasons. The Commanding Officer, ARSC will determine and authorize on an individual basis, those situations which constitute causes for interval suspension. The aircraft shall not be flown while in suspension. A notation should be made on the CG-4377B (jetform filler) indicating that the aircraft is grounded for suspension of ACMS tracking. ACMS must be notified by message of any change in ACMS status. An airframe Significant Component History Report (SCHR) entry should also be made indicating that the aircraft has suspended or resumed ACMS tracking. Calendar time accrual will resume when the aircraft is returned to operational status. ARSC will suspend/resume ACMS tracking as part of the normal Programmed Depot Maintenance (PDM) process.
6. Inspection Facilities. Aircraft missions should be planned so that ACMS inspections are performed at the home station where adequate personnel, parts, tools, and equipment are available. This will ensure a high level of quality control and minimum NMC (Not Mission Capable) time.
7. Aircraft Transfer. The physical transfer of an aircraft will take place upon completion of the mandatory joint inventory by the transferring and receiving units. Shortages of equipment on the OPNAVINST 4790 are unacceptable. If shortages exist at the time of transfer, the transferring unit has 15 days to rectify the inventory shortage by forwarding the shorted equipment to the receiving unit. If the shortages are not rectified within this time frame, the receiving unit will send a message formally identifying all shorted equipment to: Commandant (G-SEA), inform the transferring unit, and the ARSC Item Manager.
  - a. Whenever an aircraft is transferred, except HC-130 aircraft to PDM, the following materiel shall accompany the aircraft:
    - (1) Aircraft Maintenance Logbook. (Refer to the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 3 for content.)
    - (2) Unincorporated TCTO change kits.
    - (3) Joint Oil Analysis Program (JOAP) records for engines and gearboxes.
    - (4) Spectrometric Oil Analysis Program (SOAP) (HU-25) records for engines and gearboxes.
    - (5) Aircraft status reports.
    - (6) Completed forms CG-4377 Part III, CG-4377A, and CG-4377B for the previous 12 months. All forms available in jetform filler.
    - (7) Maintenance Due List (except for aircraft being transferred into ARSC PDM).
    - (8) Completed Maintenance Discrepancy Reports and Forms CG-5181 (CF/PP/Cannibalization Actions) (jetform filler) for the previous 12 months.
    - (9) The Classified Materiel System (CMS) custodian shall change the safe combination to the "traveling combination" and verify that it can be opened.

- (10) The Data Encryption System (DES) keys will be placed in the safe.
- (11) Cryptographic equipment shall be removed and applicable bypass cables and blank face plates installed.
- (12) If no replacement aircraft is anticipated, two complete sets of unscheduled MPCs (including binders).
- b. When an HC-130 is transferred to PDM, the following shall accompany the aircraft:
  - (1) Aircraft Maintenance Logbook. (Refer to the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 3 for content.)
  - (2) Up-to-date Avionics Tracking System Configuration Report for installed avionics.
  - (3) Change kits.
  - (4) Completed forms CG-4377 Part III, CG-4377A, and CG-4377B for the previous 12 months. All forms available in jetform filler.
  - (5) Completed Maintenance Discrepancy Reports and Forms CG-5181, Carry Forward Discrepancies, for previous 12 months. All forms available in jetform filler.
  - (6) The CMS custodian shall change the safe combination to the "traveling combination" and verify that it can be opened.
  - (7) The DES keys will be placed in the safe.
  - (8) Cryptographic equipment shall be removed and applicable bypass cables and blank face plates installed.
- 8. Inspection/Discrepancy Records. Completed MPCs will be retained for 90 days; then may be discarded. Maintenance Discrepancy Reports and CG-5181, Carry Forward Discrepancies, (jetform filler) will be retained by unit for a period of 12 months; they may then be discarded.
- 9. Field Maintenance Adaptation and Feedback.
  - a. Changing missions, equipment, and operating conditions require review and adjustments of practices to support the USCG aircraft maintenance system. Units are encouraged to submit suggestions and proposed maintenance system improvements to the Commandant (G-SEA) via normal channels. Variations in maintenance scheduling techniques (i.e., night check crews, etc.) are within the purview of the Commanding Officer, provided the calendar/time limits are not exceeded. Results of these variations should be reported to the Commandant (G-SEA). Periodic Maintenance Management Reviews will be conducted by the Commandant (G-SEA) in an effort to provide an optimum aircraft system within available resources, and to assist in developing future requirements. Feedback from the field is an indispensable element to all portions of this program to ensure its success.
  - b. Suggestions for revisions/changes to the Maintenance Procedure Cards (MPCs) shall be submitted on a CG-22, Aeronautical Publication Change Recommendation. Refer to the CG-22 Process Guide, CGTO PG-85-00-20.

**Table 5-1. Inspection Criteria for HC-130 Aircraft**

1. Maintenance Planning Concept - Aviation Computerized Maintenance System (ACMS)
2. Routine Inspection Cycle

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Preflight	Prior to first flight of the day	ACMS	Valid for 24 hours. However, fuel sumps and filter drains shall be checked prior to the first flight each day.
Thruflight	Prior to second and subsequent flight each day	ACMS	Completion constitutes authorization for certification of preflight on CG-4377 (jetform filler).
Weekly/hourly	7 days or 45 flight hours	ACMS	To meet workload, scheduling, or operational requirements, non-deployed aircraft may be extended 1 day and/or 5 flight hours. Deployed aircraft may be extended 3 days and/or 5 flight hours.
As scheduled by Aircraft Maintenance Due Lists (MDL)	Various	ACMS	May be extended as listed in the MDL.

3. Special Inspections    On occurrence                      ACMS

See Aircraft Scheduled Inspection & Maintenance Instructions, AFTO 1C-130A-6, or as scheduled by ACMS.

**Table 5-2. Inspection Criteria for C-4A/C-20B Aircraft**

1. Maintenance Planning Concept - Gulfstream Computerized Maintenance System
2. Routine Inspection Cycle

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Preflight	Prior to first flight of the day	Pilot's Handbook	
Thruflight	Prior to second and subsequent flight each day	Promulgated Locally	
Postflight	After last flight of the day	Promulgated Locally	
Computerized Maintenance System	Various	Computerized Maintenance Program Workloads	Computerized cycle system using 12 increments per cycle.

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
As scheduled by CG-5181 (jetform filler)	Various	ACMS	Hourly items may be extended by 10 percent.

3. Special Inspections - Dictated by nature of incident, inspections prescribed by Grumman inspection manuals.

**Table 5-3. Inspection Criteria for HU-25 Aircraft**

1. Maintenance Planning Concept - Aviation Computerized Maintenance System (ACMS)
2. Routine Inspection Cycle

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Preflight	Prior to first flight of the day	ACMS	Valid for 24 hours. A completed postflight eliminates the requirement for next day's preflight unless maintenance is performed after that postflight. However, fuel sumps and filter drains shall be checked prior to the first flight each day.
Thruflight	Prior to second and subsequent flight each day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).
Postflight	After last flight of the day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).
Weekly	7 days	ACMS	May be extended 1 day to meet workload, scheduling, or operational requirements. Deployed aircraft may be extended up to 7 days, but inspection must be complied with upon return to home unit.
As scheduled by the Aircraft Maintenance Due List (MDL)	Various	ACMS	May be extended as listed in the MDL.
As scheduled by CG-5181 (jetform filler)	Various	ACMS	Hourly items may be extended by 10 percent.
3. Special Inspections	On occurrence	ACMS	Refer to Maintenance Procedure Cards (MPCs).

As scheduled by ACMS.

**Table 5-4. Inspection Criteria for HH-65 Aircraft**

1. Maintenance Planning Concept - Aviation Computerized Maintenance System (ACMS)
2. Routine Inspection Cycle

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Preflight	Prior to first flight of the day	ACMS	Valid for 24 hours. A completed postflight eliminates the requirement for next day's preflight unless maintenance is performed after that postflight. However, fuel sumps and filter drains shall be checked prior to the first flight each day.
Thruflight	Prior to second and subsequent flight each day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).
Postflight	After last flight of the day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).
Weekly	7 days	ACMS	May be extended 1 day to meet work load, scheduling, or operational requirements.
As scheduled by Aircraft Maintenance Due List (MDL)	Various	ACMS	May be extended as listed in the MDL.
As scheduled by CG-5181 (jetform filler)	Various	ACMS	Hourly items may be extended by 10 percent.
3. Special Inspections	On occurrence	ACMS	

**Table 5-5. Inspection Criteria for HH-60 Aircraft**

1. Maintenance Planning Concept - Aviation Computerized Maintenance System (ACMS)
2. Routine Inspection Cycle

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Preflight	Prior to first flight of the day	ACMS	Valid for 24 hours. A completed postflight eliminates the requirement for next day's preflight unless maintenance is performed after that postflight. However, fuel sumps and filter drains shall be checked prior to the first flight each day.
Thruflight	Prior to second and subsequent flight each day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).

<u>Inspection</u>	<u>Interval</u>	<u>Inspection Procedures</u>	<u>Remarks</u>
Postflight	After last flight of the day	ACMS	Completion constitutes authorization for certification of preflight on the CG-4377 (jetform filler).
14 day	14 days	ACMS	May be extended 1 day to meet work load, scheduling, or operational requirements.
As scheduled by Aircraft Maintenance Due List	Various	ACMS	May be extended as listed in the MDL.
3. Special Inspections	On occurrence	ACMS	

## CHAPTER 6. PERSONNEL AND TRAINING

### References:

1. Staffing Standards Manual, COMDTINST M5312.11 (series)
  2. Personnel Resources (Mil & Civ) & Civilian Employment Ceiling Manual, COMDTINST M5312.13 (series)
  3. Management and Administration of Aviation Incentive Pays, COMDTINST M7220.39 (series)
  4. Enlisted Performance Qualifications Manual, COMDTINST M1414.8 (series)
  5. Enlisted Qualifications Codes Manual, COMDTINST M1414.9 (series)
  6. Training and Education Manual, COMDTINST M1500.10 (series)
- A. **GENERAL.** Commandant (G-SEA) is Program Manager for the three enlisted ratings in Coast Guard aviation (Aviation Maintenance Technician (AMT), Aviation Survival Technician (AST), and Avionics Technician (AVT)); Commandant (G-SRF) is responsible for the structure and content of these rates. In addition, Commandant (G-SRF) manages the initial training for Aviation Maintenance Officers. In managing training requirements for aviation, Commandant (G-SRF) works closely with Commandant (G-SEA), Commandant (G-WTT), the CG Training Manager, and Commandant (G-OCA), the operational program manager for aviation. A healthy personnel system meets job performance requirements, provides for a dynamic promotion system, and accommodates professional development goals. The primary tools of the personnel system in which Commandant (G-SEA) participates directly are Staffing Standards development, Rating Review, Quals Review, and the Aviation Training Plan. These processes are discussed in greater detail below.
  - B. **PERSONNEL ALLOWANCES.** Allocation of personnel resources is controlled by the Staffing Standards Manual and is communicated to units in the Personnel Allowance List (PAL). Requests for change to unit PALs must reference the Staffing Standards Manual and the Personnel Resources Manual, which contain policy and procedures on personnel resources.
  - C. **FLIGHT ORDERS.** Detailed guidance on management and reporting of flight orders for enlisted personnel is contained in the Personnel Manual, COMDTINST M1000.6 (series) and in the Management and Administration of Aviation Incentive Pays, COMDTINST M7220.39 (series).
  - D. **PERFORMANCE QUALIFICATIONS.** The performance qualifications are the foundation on which all staffing, training, and evaluations are developed. They describe the task elements to be performed at each rank level of a specialty. The aviation performance qualifications are reviewed and revised by Commandant (G-SRF) on a regular cycle with the assistance of the Training Manager, Commandant (G-WTT) and Workforce Planning, Commandant (G-WR-2). The qualifications review process is conducted in accordance with the Enlisted Qualifications Manual and is normally held in conjunction with the Rating Review which verifies rating and workforce structure. Field personnel are encouraged to participate in this process through the solicitation of board members.
    1. **Qualification Codes.** Qual codes identify enlisted billets by specific skill and knowledge requirements and are assigned to eligible personnel following appropriate training and professional accomplishment. The most common aviation qual codes are those assigned at the completion of residential training and Aircrew qualification. They enable the Force Manager to project training requirements, improve personnel distribution, and optimize personnel utilization. Failure to accurately record qual codes severely impacts the ability of the Force Manager and CGPC-epm to manage the enlisted workforce. Descriptions of qual codes and the procedures for their assignment and revocation are found in the Enlisted Qualifications Codes Manual, COMDTINST M1414.9 (series). It should be noted that many qual codes are not assigned by the training centers at course completion because there is often a demonstration period attached to the specific skills. In these cases, the parent unit must assign the qual code after adequate performance is demonstrated over a specified time period, and for all Aircrew qualifications.
  - E. **TRAINING.** Aviation training takes the form of residential training, nonresidential training and in-service delivery on-the-job training (OJT) methods. The acquisition of specialized skills is critical to the success of the aircraft maintenance effort.

1. Residential Training. Residential training available to Coast Guard aviation maintenance personnel ranges from introductory level apprentice courses to specific components or system training. These schools are labeled Class "A," "B," and "C." Specific information on approved schools is contained in the Training and Education Manual, COMDTINST M1500.10 (series).
  - a. Class "A" School. Aviation Class "A" School instruction is two tiered.
    - (1) Tier One: A 4 month (non-resident) Airman Program will be completed at air stations prior to attending resident Class "A" School. Completion of the Airman Syllabus is a prerequisite for all of the aviation Class "A" Schools. The Airman Program is outlined below in the In-Service Training Programs.
    - (2) Tier Two: Resident Class "A" School. Formal "A" School curricula is developed from the rating's E-4 Enlisted Performance Qualifications. This instruction concentrates on the facts, concepts, and principles supporting aircraft systems and is provided by the Aviation Technical Training Center (ATTC) in Elizabeth City, North Carolina. ATTC provides instruction for the ratings; Aviation Maintenance Technician (AMT), Aviation Survival Technician (AST), and Avionics Technician (AVT).
  - b. Class "B" Schools. These schools provide advanced training, normally at DOD facilities, for specific career fields (e.g., AVT "B" School).
  - c. Class "C" Schools. This title refers to a body of schools and courses designed to address specific components, systems, or processes and are intended for the experienced technician. They are taught at a variety of CG, DOD, and contractor sites.
2. Nonresidential Training. Nonresidential courses are utilized when performance objectives can be met without disrupting the normal work requirements of the individual member. Current courses address a wide range of professional and technical development requirements and are provided by a variety of CG, DOD, and contractor sources. Some courses are self-paced and have no testing component; others are time tracked with testing required. Information on specific nonresident course offerings may be obtained from the unit Educational Services Officer.
3. In-Service Training. In-service training is a command responsibility that continues the education process begun in residential and nonresidential formal training. The importance of a systematic and measurable training program cannot be overstressed. The characteristics of a successful in-service training program require that it be needs driven, that is, it addresses actual job performance requirements; and it must be consistently applied. Training opportunities take many forms, including formal training lectures, actual maintenance, informal counselling, and others. The Engineering Officer must ensure their personnel are provided instruction of sufficient quality and quantity to meet job performance requirements and professional development goals. To do this, the Engineering Officer must be familiar with aviation enlisted qualifications, training system capabilities, and required training listed in the Training and Education Manual, COMDTINST M1500.10 (series). Commandant (G-SEA) will assist with the accomplishment of the in-service training effort through the publication of instructor criteria, standardized training plans, and periodic review of unit training requirements.
  - a. Airman Program. The Airman Program is a prerequisite to attending any Aviation Class "A" School and is covered by policy in the Training and Education Manual, COMDTINST M1500.10 (series) and the Personnel Manual, COMDTINST M1000.6 (series). The objective is to prepare service members bound for Aviation Class "A" Schools in the basic practices of aircraft maintenance.

- (1) Aviation "A" School eligible personnel will be transferred Permanent Change of Station (PCS) as Airmen to an assigned air station approximately 4 months prior to an anticipated Class "A" School convening date. The Coast Guard Personnel Center (CGPC) shall issue PCS orders to personnel on the AMT, AST and AVT Rating List in time for them to arrive at their air station 4 months prior to their "A" School convening date. Airmen will fill a Training Allowance Billet (TAB) at the unit while completing the Airman Syllabus. Assignment of Airmen by CGPC will be based on the projected needs of the service for third class Petty Officers.
  - (2) Airmen shall be assigned to the Aeronautical Engineering Department with an experienced Petty Officer assigned as a mentor. The Engineering Administrative Division will be responsible for monitoring all Airmen and will ensure progress is documented in the member's training record not later than the first week of every month. The Educational Services Officer shall enroll the member in the Coast Guard Institute's Airman Course and provide the Airman with a package of training materials. The Airman Course Training Package provides both unit and member with administrative guidance and sets the standards for successful completion of the program.
  - (3) All Airmen are to be evaluated after 3 months at the unit by senior enlisted members of the Aeronautical Engineering Department. This evaluation shall include a review of the member's progress in the Airman Syllabus for potential completion prior to attending "A" School. At this point, the Command must make a determination as to the individual's potential for aviation service. If applicable, the Commanding Officer must notify CGPC-epm by message of personnel disenrolled from the Airman Program. Upon completion of the Airman Program, units must notify CGPC-epm for placement of the Airman on the assignment list for a convening "A" School class.
- b. Apprentice Program. The objective of the Apprentice Program is to accelerate and formalize the processes by which aviation "A" School graduates acquire the skills necessary to effectively maintain the Coast Guard's aircraft systems. The Apprentice Program is a natural complement to aviation "A" School instruction and the Airman Program. While aviation "A" School instruction concentrates on the FACTS, CONCEPTS and PRINCIPLES surrounding aircraft systems, the Apprentice Program is designed to promote the practical application of that knowledge in completing the PROCESSES and PROCEDURES involved in aircraft systems maintenance. Essentially, the Apprentice Program is completing the E-5 Performance Qualifications for the rating as detailed in the Enlisted Qualifications Manual, COMDTINST M1414.8 (series).
- (1) All new Third Class Petty Officers will enter the Apprentice Program on their arrival at the air station. Members will remain in the Apprentice Program until completion of all E-5 Performance Qualifications.
  - (2) A MENTOR will be assigned to each member entering the Apprentice Program. Mentors will be E-6 or senior E-5s of the same rating. Mentors will be responsible for ensuring that all apprentice training is in accordance with Commandant Instructions. Mentors will provide a written monthly report to the Apprentice's supervisor. Reports will consist of the Apprentice's progress in the areas of performance accomplishments, aircraft knowledge, quality of work, using resources, safety, stamina, working with others, and loyalty. Figure 6-1. is a copy of the report which also aids in documenting performance for marking period evaluations. The Engineering Leading Chief will be responsible for monitoring the progress of personnel in the Apprentice Program.

- (3) Members who quickly adapt and show strong progress in the Apprentice Program should be marked as “recommended for SWE.” Otherwise, members should be evaluated “not recommended for SWE” on their semi-annual Evaluation Report. Since time in grade for E-4 is only 6 months, it is imperative that supervisors send a correct signal to the member with the first and subsequent Evaluation Reports.
    - (4) Members in the Apprentice Program may attend aircraft Class “C” Schools, i.e., HH-65A AMT, HU-25 AVT. Members in the Apprentice Program shall not normally be recommended for advanced Class “C” Schools, i.e., Rotor-Tuner, Composite Repair.
    - (5) Personnel who fail to complete the Apprentice Program by the end of their second enlistment (approximately 8 years time in service) should not be recommended for reenlistment. Commanding Officers will determine if the member has had sufficient time to finish the program.
  - c. Journeyman: The Journeyman designation is the next progression point for the Apprentice. The Journeyman possesses the skills and experience needed to perform most complex tasks with little or no supervision. Members who successfully complete the Apprentice Program and the E-6 Performance Qualifications for the rating will be designated as a Journeyman.
    - (1) Journeyman certificate will be awarded to personnel designated as a Journeyman. The Engineering Leading Chief must submit a completion letter to Commandant (G-SRF) requesting a Journeyman Technician designation for the member. Figure 6-2. is a copy of the Journeyman completion letter.
  - d. Master Technician: In addition to being a technical expert on the aircraft systems, the Master Technician manages personnel and resources to meet the unit’s operational commitments. Upon advancement to Chief Petty Officer, the member will be designated as a Master Technician.
4. Maintenance Resource Management (MRM) Training. Maintenance errors contribute to approximately 20% of DOD and commercial aviation mishaps. Review of Coast Guard mishaps reflects similar rates. Many factors such as experience levels, operational tempo, and cannibalization can impact mishap rates. The losses are unacceptable and place our crews at risk. MRM has proven highly effective in the private sector and applies contemporary human factors knowledge to the aviation maintenance arena.
    - a. Initial MRM training is taught at ATTC Elizabeth City “A” schools, Spartan training centers, and at individual units by Coast Guard MRM instructors experienced in aviation maintenance.
    - b. Refresher MRM training is required biannually. Certified unit MRM instructors will give refresher training at individual units.
    - c. Initial and refresher MRM training is required by all rated enlisted aviation maintenance personnel, engineering officers, student engineers, and maintenance officers. Contract and civilian aviation maintainers are strongly encouraged to receive this training.
  5. Joint Services A&P Certification Program. The Federal Aviation Administration (FAA) has approved the Coast Guard’s Aviation Maintenance Technician (AMT) Rating for this program. The Coast Guard has institutionalized a standard policy on the application process for Airframe and Powerplant (A&P) Certification. This program will ensure that qualified military members will receive their authorization to test for the FAA A&P Certification by the local FAA Flight Safety District Offices in the most efficient manner.
    - a. The Coast Guard A&P Syllabus standardizes the military airframe and powerplant certification program and constitutes an approved military program that the Armed Forces and the FAA use for the A&P Certification.
    - b. The Syllabus can be downloaded from the ATTC Internet web site at: <http://www.uscg.mil/systems/attc/index.htm>.

- c. The Coast Guard A&P Program Manager position resides at the Aviation Technical Training Center (ATTC) in Elizabeth City, NC. The A&P Program Manager or the USMAP representative will issue the required FAA Certificate of Eligibility upon completion of the CG-G-EAE-2 or (2B) form, A&P syllabus, and the syllabus final exam. The certificate will be the only FAA recognized documentation accepted that denotes military experience and formal training.
    - d. The governing body for the A&P Certification program for each branch of the military services is the Joint Services Aviation Maintenance Technician Council (JSAMTC). The Coast Guard A&P Program Manager is the Coast Guard's representative on the JSAMTC. Requested changes to the Coast Guard A&P Syllabus must be sent to the A&P Program Manager at ATTC. Final approval for all requested changes is the JSAMTC and the FAA at their annual meeting.
6. Aircraft Maintenance Officer Training. Each year, Commandant (G-SEA) selects Maintenance Officer candidates using a formal selection board sponsored by CGPC-opm. Candidates are transferred PCS to an air station to complete an Aircraft Maintenance Officer qualification syllabus. After approximately a 1 year training program, graduates can expect assignment to appropriate maintenance officer positions at field units. Commandant (G-SEA) maintains a formal Maintenance Officer training syllabus which provides for resident and in-service instruction on a variety of practical maintenance subjects; syllabus information may be obtained by contacting the Program Manager at Commandant (G-SEA). The format for application and schedule of board convenings are contained in the Training and Education Manual, COMDTINST M1500.10 (series).
7. Advanced Education. The Office of Aeronautical Engineering has requirements for highly specialized skills in key positions throughout the organization. To support these requirements, Commandant (G-SEA) sponsors several unique advanced education opportunities for qualified individuals seeking to enhance their contributions to the organization.
  - a. Maintenance Technician Advanced Education. Commandant (G-SEA) and Commandant (G-SRF) sponsor advanced (college level) education programs for the enlisted workforce (E-5 through E-7) in Aviation Maintenance Technology (AMT rating) and in Advanced Computer and Electronics Technology (AVT rating). Graduates of these programs can expect assignments to appropriate positions at either ARSC, ATTC, or a Prime Unit. Target applicants are highly competent senior E-5s and E-6s. These are 2 year programs leading to either an Associates or Bachelors Degree. Acceptance into the program obligates the member to an additional 6 years of service as 3 years of obligated service is incurred for each year of education. Application requirements and the selection process are further detailed in the Training and Education Manual, COMDTINST M1500.10 (series).
  - b. Engineering Officer Advanced Education. Commandant (G-SEA) sponsors Masters level educational programs in Aviation Engineering Administration, Aeronautical Engineering, Project Management, and Operations Research. Graduates of Commandant (G-SEA) sponsored programs can expect assignment to appropriate positions at ARSC or the Office of Aeronautical Engineering. Particulars of the advanced education selection process and timing of boards are contained in the Training and Education Manual, COMDTINST M1500.10 (series), and the appropriate advanced education application solicitation messages.
8. Unit Training Plan. Units may submit a request for annual training quotas to Commandant (G-SRF) on the Class "C" School Training Report using the Aviation Unit Training Plan (AUTP) format. Commandant (G-SRF) will coordinate the submission of a combined request to Commandant (G-WTT) for the Aviation Training Quota Manager. Commandant (G-SRF) will provide Commandant (G-WTT) training allowance information for the formulation of individual unit training allowances. Any nonrecurring requested quota in excess of the established training allowance must be fully justified in a request to Commandant (G-SRF). The unit AUTP must indicate training required to meet authorized unit training allowances.

9. Aviation Technical Training Advisory Committee (ATTAC). ATTAC is charged with providing customer and field level input to Commandant (G-SRF) in the oversight of the aviation workforce training issues. ATTAC is composed of experienced aircraft maintenance officers and subject matter experts of the three rates drawn from the field; permanent representatives from Commandant (G-SEA), Commandant (G-WTT), CGPC-epm, TQC, and ATTC are included. Meetings are scheduled twice a year by Commandant (G-SEA). ATTAC services are conducted in accordance with the ATTAC Process Guide. Specific information on ATTAC composition, meeting schedule, and agendas may be obtained from Commandant (G-SRF) and the Aviation Technical Training Advisory Committee, COMDTINST 13020.2 (series).

## Apprentice Monthly Progress Evaluation

Coast Guard Air Station \_\_\_\_\_ Date: \_\_\_\_\_

Mentor: \_\_\_\_\_ Apprentice: \_\_\_\_\_ Supervisor: \_\_\_\_\_

**Unsatisfactory:** Apprentice not performing to minimum standard for time in rate, unable to demonstrate basic proficiency of job requirements.

**Progressing:** Apprentice is making progress toward completion of requirement of Apprentice Program.

**Satisfactory:** Apprentice has background and skills to perform assigned duties and complete requirements for Apprentice Program.

**Accomplishments:** Examples – completion of E-5 Performance Qualifications, ACMS Cards, CG-4377 maintenance signoffs and Basic Aircrew.

### Aircraft Knowledge

\_\_\_ **Unsatisfactory:** Marginal or poor understanding of basic aircraft systems.

\_\_\_ **Progressing:** Demonstrates a knowledge of aircraft systems and routine rating concepts.

\_\_\_ **Satisfactory:** Good knowledge of aircraft systems, able to analyze and solve system difficulties.

Accomplishments: \_\_\_\_\_

### Quality of Work

\_\_\_ **Unsatisfactory:** Poor quality, components installed incorrectly, often requires redoing, constant supervision required.

\_\_\_ **Progressing:** Applies previous training and experience to produce quality work.

\_\_\_ **Satisfactory:** Quality work performed, takes time to excel, minimal guidance required.

Accomplishments: \_\_\_\_\_

### Using Resources

\_\_\_ **Unsatisfactory:** Wastes time, poor understanding of procedures, improper use of tools, publications, and ACMS cards.

\_\_\_ **Progressing:** Requests help from others, able to use publications and tools correctly.

\_\_\_ **Satisfactory:** Seeks out others to increase personal knowledge and skills, uses initiative to accomplish task.

Accomplishments: \_\_\_\_\_

### Safety

\_\_\_ **Unsatisfactory:** Disregard for hazard to self and others, fails to use safety equipment (PPE) or follow standard procedures.

\_\_\_ **Progressing:** Usually practices safety, follows instructions when visible.

\_\_\_ **Satisfactory:** Safety conscious, consistently follows correct safety procedures in performance of all tasks.

Accomplishments: \_\_\_\_\_

### Stamina

\_\_\_ **Unsatisfactory:** Performance and productivity decreases during periods of extended work, resists overtime.

\_\_\_ **Progressing:** Works overtime to complete assigned task.

\_\_\_ **Satisfactory:** Willingly works additional hours to complete tasks, volunteers to work overtime to acquire knowledge.

Accomplishments: \_\_\_\_\_

### Working with Others

\_\_\_ **Unsatisfactory:** Disorganized and disregards ideas and instructions of others.

\_\_\_ **Progressing:** Listens and learns from others, accepts share of work.

\_\_\_ **Satisfactory:** Can-do player, works effectively with others to achieve completion of assigned tasks, carries share of work.

Accomplishments: \_\_\_\_\_

**Figure 6-1. (Sheet 1 of 2)**  
**Apprentice Monthly Progress Evaluation**

**Loyalty**

- ☐ Unsatisfactory: Often complains, outwardly shows lack of commitment to CG aviation, aircraft maintenance, and shipmates.
- ☐ Progressing: Showing pride in work, helps shipmates and respectful of seniors.
- ☐ Satisfactory: Personal actions exhibit pride in work and CG, consistently supports Command, seniors, and shipmates.

Accomplishments: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Figure 6-1. (Sheet 2 of 2)**  
**Apprentice Monthly Progress Evaluation**

U.S. Department of  
Homeland Security

United States  
Coast Guard



Commanding Officer  
United States Coast Guard  
Air Station

Sacramento, CA.  
Staff Symbol:  
Phone: ((916) 643-2796 )  
Fax: ( )  
Email:

1520

## MEMORANDUM

From: E. A. WHITE  
CG AIRSTA Sacramento

To:  
Thru: COMDT (G-SEA)

Subj: COMPLETION OF AVIATION APPRENTICE PROGRAM

Ref: (a) Aeronautical Engineering Maintenance Management Manual, COMDTINST  
M13020.1  
(b) Enlisted Performance Qualification Manual, COMDTINST M1414.8

1. AMT3 John J. Doe 999 55 1234, USCG has successfully completed the Aviation Apprentice Program as outlined in reference (a) and described below:

a. Tier One: Airman Program completed at Air Station Sacramento on 15 August 2002.

b. Tier Two: AMT A-School successfully completed on 7 February 2003.

c. Tier Three: AMT2 Performance Qualifications as outlined in reference (b) successfully completed on 20 July 2003. AMT3 Doe holds the Basic Aircrew Certification in the HC-130.

2. Request that AMT3 Doe be designated an Aviation Journeyman Technician. AMT3 Doe has consistently demonstrated the technical skills and expertise to contribute to this unit's Aviation Engineering Maintenance Program.

#

Figure 6-2. Apprentice Letter of Completion



## CHAPTER 7. SUPPORT EQUIPMENT (SE)

A. **GENERAL** Support Equipment management, procurement, and Aviation Inventory Control Point (AICP) for aircraft ALSE, Avionics Support Equipment, and Common Support Equipment are the responsibility of the Commanding Officer, ARSC. Refer to the Support Equipment Process Guide, CGTO PG-85-00-150 for a detailed description of requirements and procedures associated with SE.

1. Responsibilities of the Commanding Officer, ARSC as SE Manager.
  - a. Monitor the condition of SE.
  - b. Manage the ALSE, Avionic Support, and Common Support Mandatory Special Requirements Program.
  - c. Maintain and amend as necessary the unit allowance lists of SE contained in AMMIS.
  - d. Prepare specifications and provide technical coordination for the procurement of new equipment and systems.
  - e. Plan for, budget, and procure major SE.
  - f. Monitor GSA and DOD Surplus Property Bulletins as possible sources of SE to fill unit requirements.
  - g. Advise Aviation Units of any changes/TCTOs applicable to Coast Guard SE and recommend action to be taken to comply with these changes.
  - h. Establish liaison with DOD support equipment logistics management specialists to ensure that Military Interdepartmental Purchase Requests (MIPRs) for required equipment are prepared and submitted in a timely manner.
2. Responsibilities of Aviation Units.
  - a. Commanding Officers shall establish and maintain preventive maintenance programs to ensure that SE will meet projected service life requirements.
  - b. Major premature failures beyond the repair capabilities of aviation units should be reported to Commanding Officer, ARSC for disposition instructions. Routine maintenance and replacement of component parts on a required basis is a unit responsibility funded by unit AFC 30 funds. Extensive overhaul shall be coordinated through ARSC.
  - c. Lead time for planning, budgeting, and procurement of major items of SE is 3 years. Requests should be submitted in writing giving specifics of equipment to be replaced and/or justification for any new/additional equipment desired. The Support Equipment Survey will be used for general planning purposes but will not be considered as a formal request for equipment replacement.



## CHAPTER 8. AVIONICS

- A. **SCOPE.** This chapter outlines general avionics systems maintenance philosophies and provides guidelines to a unit's maintenance responsibilities. Wherever this Manual and the Electronics Manual, COMDTINST M10550.25 (series) differ, this Manual shall have precedence for avionics equipment and avionics support equipment.
  - B. **GENERAL AVIONICS PUBLICATIONS.** Enclosure (6) contains a list of publications which should be screened by each unit and used as a basis for establishing and maintaining a general avionics technical publications library.
  - C. **GENERAL AVIONICS MAINTENANCE.** An effective avionics maintenance program is essential in keeping Coast Guard aircraft fully mission capable. The ACMS Avionics Tracking System (ATS) and other avionics maintenance programs ensure that aircraft and equipment are serviceable, safely operable, and properly configured to meet mission requirements. ATS is a centralized data base of avionics maintenance actions that enable tracking of avionics components through their entire life cycle. Specific objectives of ATS are to provide component maintainability and reliability statistics, component history, maintenance related information, and configuration control. Refer to ACMS User's Process Guide, CGTO PG-85-00-10, for a detailed description of the forms, reports, and procedures associated with ATS.
    1. **Corrective Maintenance.**
      - a. The level of corrective maintenance authorized at the unit level is defined in the applicable aircraft type avionics Integrated Logistics Support Plan (ILSP). If an aircraft type avionics ILSP has not been published, the level of repair authorized at the unit level shall be in accordance with the applicable maintenance manual series. If repair is beyond the field level capability, the equipment shall be classed as unserviceable. The Unsatisfactory Report (UR) is an important record for corrective maintenance. URs shall be submitted as discussed in the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 3.
      - b. **Maintenance on Avionics Systems Under Warranty.** No maintenance shall be performed on systems covered by warranty except as authorized by their ILSP.
    2. **Preventive Maintenance.**
      - a. Preventive maintenance for avionics systems shall be performed in accordance with ACMS and applicable maintenance directives.
    3. **Acceptance Testing, Minimum Performance Testing, and Fault Verification.**
      - a. Acceptance testing is required only for specific avionics equipment identified by ARSC or required by ACMS. Unit maintenance policy may determine the need for acceptance testing on unspecified equipment as required.
      - b. Minimum performance testing is required on all avionics equipment after corrective maintenance has been performed on the Line Replacement Unit (LRU), or when specified by ACMS. Minimum performance testing shall be accomplished by the repair facility performing the corrective maintenance.
      - c. Fault verification testing is required on all equipment. Initial on-aircraft fault verification may satisfy this requirement. It is important to note, No Fault Found (NFF) evolutions reduce equipment availability, increase maintenance costs and create longer pipelines. Unit's should make a concerted effort to reduce avionics LRU No Fault Finds.
- NOTE**
- All acceptance testing, minimum performance testing, and fault verification shall be entered into ACMS.
4. **Changes to Avionics Equipment.**

- a. Policy. The general guidelines, policy, and procedures contained in Chapter 1. shall be applicable to changes concerning avionics equipment.
- b. Review of Technical Directives. The Commanding Officer, ARSC has the responsibility for reviewing all Technical Directives, Service Bulletins (distributed by other Government agencies and commercial firms) and materiel changes with possible application to Coast Guard avionics equipment.
- c. Service Bulletins and Letters. Service Bulletins and letters that provide test procedures and maintenance hints may be utilized when such procedures do not affect the form, fit, function or operational characteristics of the equipment (as used by the Coast Guard). Should a Service Bulletin alter the form, fit, function or operational performance, Commandant (G-SEA) must approve its incorporation.
- d. Depot Level Changes. Commandant (G-SEA) and Commanding Officer, Aircraft Repair and Supply Center (as authorized by the Commandant) shall be the sole authority for approving changes to avionics systems and Avionics Support Equipment (ASE) at the depot level. Depot level changes may be accomplished by:
  - (1) CGTO
  - (2) ARSC Engineering Specifications
  - (3) Other Government agency technical directives
  - (4) Overhaul directives or other directives approved by the Commandant (G-SEA)

**NOTE**

The Commanding Officer, ARSC may approve depot level changes that do not affect the fit, form or function of the equipment when necessary during the depot repair cycle. The Commanding Officer, ARSC is responsible for ensuring that all changes incorporated are fully documented to the lowest level of repair. This authority is limited to equipment repaired by other Government agencies, ARSC and commercial vendors directed by ARSC. Incorporation of changes that affect the form, fit, function or operational characteristics shall not be accomplished by ARSC without approval of the Commandant (G-SEA). Changes to ASE by Government calibration and repair facilities may be accomplished without prior approval if the change does not affect form, fit, or function and the change is approved by the agency operating the facility.

- e. Unit Level Changes. Unit level materiel changes to avionics and ASE must be approved by Commandant (G-SEA). Normally, this approval shall be in the form of a CGTO published by the Commandant (G-SEA). Other forms include:
  - (1) Message changes, double headed and distributed by the Commandant (G-SEA).
  - (2) Authorization by letter from the Commandant (G-SEA) under special circumstances.

**NOTE**

The Commanding Officer, U.S. Coast Guard Aviation Unit, Washington, D.C. may approve incorporation of commercial service changes to equipment peculiar to C-20B aircraft. The Commanding Officer, U.S. Coast Guard Air Station Miami may approve incorporation of commercial service changes to equipment peculiar to the C-4 aircraft.

5. Maintenance Beyond the Capability of the Field.

- a. Printed and Integrated Circuit Boards. Printed and integrated circuit boards can easily be damaged beyond repair. Shop supervisors must ensure that the repair of integrated circuit boards is attempted only when allowed by the aircraft type avionics ILSP or maintenance manual, and only by experienced technicians qualified to effect the repair. If qualified technicians are not available, board repair at the unit level shall not be attempted.

**NOTE**

The terms A Condition, RFI, and serviceable are used interchangeably. The terms F Condition, NON-RFI, and unserviceable are used interchangeably. The preferred terms are serviceable and unserviceable.

- b. Sealed Assemblies. When they have become faulty or have reached their life limit, they will be placed in the F condition (unserviceable) system unless specifically stated otherwise in the associated ILSP or technical manual.
6. Unserviceable Materiel. Once an item is declared unserviceable materiel, the practice of using it as a source of spare parts is not authorized. The F condition (unserviceable) system and procedures are covered in the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 4. Expeditious return of F condition (unserviceable items) is essential for effective materiel management.
7. Reusable Shipping Containers. Reusable shipping containers are available for many avionics systems. All shipments of avionics equipment must utilize these reusable containers. Additional containers needed to meet unit allowance may be ordered from ARSC. Containers in excess of requirements shall be returned to ARSC for future use. Commanding Officers are to ensure all avionics equipment is correctly packed for protection during shipment.

**NOTE**

It is imperative that avionics equipment be properly prepared and packaged before shipment to prevent damage. Damage to equipment during shipment due to inadequate packing and preparation negates warranties, creates added depot maintenance expense, and decreases availability.

8. Special Handling Procedures for MOS (Metal-Oxide-Semiconductor) Devices.
  - a. Alert to Special Procedure. These precautions, though not all inclusive, are provided in the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Enclosure (9) in an effort to alert all concerned to the special procedures necessary for MOS devices.
9. Software Change Procedure.
  - a. Proposed changes to aircraft software shall be submitted to the appropriate Stan Unit using the Software Trouble Report (STR). The procedure for making a proposed change to aircraft software is provided in Enclosure (7).

**D. FORMS AND REPORTS.**

1. Unsatisfactory Report (UR) of Aeronautical Equipment. URs are a necessary supplement for avionics failures more extensive than random failures. The avionics UR should report unsatisfactory electronics system conditions such as: poor quality repair, inadequate equipment design, improper equipment location, human factor or display inadequacies, unsatisfactory interface to related systems, or abnormal number of failures of a given system. See the Aeronautical Engineering Maintenance Management Process Guide, CGTO PG-85-00-110, Chapter 3 for further guidance on URs.

## E. LOGISTICS.

1. Integrated Logistics Support Plan (ILSP). The ILSP contains all pertinent data relative to the logistics support of an avionics system, as per the Major Systems Acquisition Manual, COMDTINST M4150.2 (series). Prior to acquisition of any avionics system, the Avionics System Manager, Aeronautical Engineering Division, Commandant (G-SEA) in conjunction with the Office of Logistics Policy (G-SLP), develops an ILSP. Before the start of each subsequent acquisition phase, the ILSP is reviewed and updated as necessary to ensure that the most effective support program is implemented. The Commanding Officer, ARSC is responsible for ensuring that data contained in the ILSP is current. CG-22s will be submitted by units when errors are discovered.
  - a. The purpose of the ILSP Program is to ensure:
    - (1) All aspects of support, known as support elements, are considered prior to implementing operational use of the system.
    - (2) The support and maintenance policy formulated is that which provides the lowest Life Cycle Cost (LCC) while meeting the stated readiness requirements.
    - (3) The Aviation Inventory Control Point (AICP), the Program Manager, the prime contractor, and operating units are aware of and implement the policy formulated.
  - b. When developing the ILSP, some prime factors considered are operational effectiveness, life cycle costs, depot work-hour loading, and unit work-hour loading. It should be noted that the ILSP is not formulated with a single element as a controlling factor: i.e., 100% operational availability, zero unit maintenance required, or minimum paperwork. For example: A system such as a radar altimeter for a helicopter which is mission essential, requires that the ILSP be weighted in favor of high operational effectiveness. Conversely, the ILSP for a HC-130 PA system, would be weighted for minimum costs and would allow for a higher NMC rate than a mission essential system.
  - c. Individual avionics system ILSPs are being replaced with aircraft type avionics system ILSPs. The new avionics ILSP format is as follows:
    - (1) Section One is the introduction which includes the purpose and applicability of the ILSP along with general avionics maintenance and support concepts and ILS responsibilities.
    - (2) Section Two is an overview of the avionics systems in the type aircraft addressed by the ILSP.
    - (3) Additional sections provide specific maintenance concepts and associated support resources for each avionics system/subsystem aboard the type aircraft addressed by the ILSP.
    - (4) Training. Indicates the formal training schools available or programmed for the system.
    - (5) Configuration Control. Indicates what configuration control criteria has been established for the system.
    - (6) Supply Support. Explains how the item will be supported, i.e., what spares and where they will come from, allowance lists, etc. It includes the Aircraft Material Stocking allowance. In special cases, such as a one-of-a-kind system, the actual allowance may be established here in lieu of the Aircraft Material Stocking List. Initial outfitting of avionics spare equipment will normally be furnished to each air unit upon commissioning, when receiving new aircraft types, and when changing configurations.
    - (7) Avionics Support Equipment (ASE) and Special Tools. Lists the ASE and special tools required to maintain the system. If a unit fabricated Test Bench Harness (TBH) or other unit fabricated item is required, a drawing number or other suitable reference will be provided. Common ASE such as Digital

Voltmeters (DVMs), oscilloscopes, etc., will not be listed. See paragraph 8.E.2. below for further information on ASE.

- (8) Maintenance Practices. Details the basic maintenance policy for the system. It also includes data not covered in the listed applicable manuals. Instructions in this section take precedence over any conflicting instructions in the listed applicable manuals.
2. Avionics Support Equipment (ASE). Avionics Support Equipment consists of general and specialized test equipment required to support avionics systems and components. Certain test bench harnesses, alignment fixtures, and special tools may also be classified as Avionics Support Equipment.
    - a. Allowance. Allowances for Avionics Support Equipment are contained in AMMIS. All requests or suggestions for additional ASE shall be made by submitting an AMMIS Allowance Change Request (ACR) detailing the need, benefits, and other supporting data.
    - b. Initial Outfitting. An initial outfitting of ASE will be furnished to each aviation unit upon commissioning, when receiving new aircraft types, and when changing the system's configuration. All requests or suggestions for new or additional ASE shall be made by official correspondence to ARSC, detailing the need, benefits, and other supporting data.
    - c. Repair and Calibration. Routine repair and calibration of ASE shall be accomplished by using MLC, district, unit, DOD, the Government and Industry Data Exchange Program (GIDEP) metrology database, or commercial facilities. Each district is required to develop a suitable program for the repair and calibration of electronics test equipment. ASE shall be included in this program. In the interest of flight safety and commensurate with its use, the test equipment utilized to repair and calibrate avionics equipment shall be repaired and calibrated by one of the methods listed below. Broad guidance for electronic test equipment calibration is contained in chapter 27 of the Electronics Manual, COMDTINST M10550.25 (series). The calibration intervals specified in AF Metrology and Calibration Program, AFTO 00-20-14, apply to Coast Guard avionics test equipment.
      - (1) Coast Guard Calibration Facilities (CALFAC). Certain major electronic shops are designated by the district commander as CALFAC. A CALFAC may be utilized for the repair and calibration of avionics test equipment when that facility is traceable to the National Standard, and when calibration and repair will not exceed 3 weeks after receipt of equipment.
      - (2) Other Military Facilities. The Coast Guard utilizes the repair facilities of other military services by negotiating an Interservice Support Agreement (ISSA) with the service concerned. Naval Calibration Facilities and Air Force Precision Measurement Equipment Laboratories (PMEL) are the prime sources used. These facilities are adequate for avionics test equipment repair and calibration, except when the time to repair or calibrate exceeds 3 weeks after receipt of equipment.
      - (3) Factory Repair and Calibration. Warranty and non-warranty repairs and calibration of commercial electronic test equipment are authorized when the lead time to repair or calibrate avionics test equipment exceeds 3 weeks, or when the customized and specialized nature of the test equipment to be calibrated/repared dictates the use of the manufacturer or an authorized repair/calibration facility.
      - (4) Commercial Repair and Calibration. Avionics test equipment may be repaired and calibrated by a commercial facility when that facility is traceable to the National Standard.
    - d. If repair cannot be accomplished utilizing the district repair and calibration program, replacement, exchange, or repair may be requested via ARSC. Requests will be made by official correspondence and will specify the reason support is requested.

- e. General Use Test Equipment and Specialized Test Equipment for Non-Avionics Use. Multi-meters and similar hand held meters will not be procured by ARSC. Procurement of General Purpose Electronics Test Equipment used primarily for station maintenance and all specialized Electronics Test Equipment for other than avionics use is a MLC or district responsibility. All units should analyze their station maintenance requirements and request MLC or district procurement for replacement Electronics Test Equipment as necessary to meet these requirements.
- f. Publications. Spare publications for commercial off-the-shelf ASE will not normally be stocked for future issue. Units requiring additional or replacement publications and unable to locate a federal supply source through appropriate publication indexes will be required to procure these publications from the equipment manufacturer.

## CHAPTER 9. AVIATION LIFE SUPPORT EQUIPMENT

- A. SCOPE.** This chapter outlines general Aviation Life Support Equipment systems management and provides guidance regarding organization and responsibilities.
- B. GENERAL.** Aviation Life Support Equipment (ALSE) is a key element in the Coast Guard's aviation mission support structure. ALSE is funded by both AFC-30 and AFC-41 as outlined in the Financial Resource Management Manual, COMDTINST M7100.3 (series). Therefore, the Commandant (G-OCA) Aviation Life Support Requirements Manager and ARSC Aviation Life Support Systems Manager must closely coordinate their efforts to ensure that this mission critical requirement is properly funded, stocked, and issued to operational aviation units.
- C. EQUIPMENT TYPES.** There are two types of ALSE which align with AFC-30 and AFC-41 guidelines. Commandant (G-OCA) and Commandant (G-SEA) will determine the equipment type which will dictate the type of support funding. The examples given are not inclusive and are only intended to provide general guidance.
1. Personal/Deployable ALSE. Equipment that is individually issued to crewmembers or deployed from the aircraft for rescue. This does not include Rescue Swimmer physical training uniforms or deployment ensembles which, although supported with AFC-30, are managed solely by the Commandant (G-OCA) Rescue Swimmer Program Manager IAW the Coast Guard Helicopter Rescue Swimmer Manual, COMDTINST M3710.4 (series).
    - a. Air stations are responsible for procuring this equipment utilizing AFC-30 funds.
    - b. Responsibility: Commandant (G-OCA) is responsible for establishing the operational requirement and obtaining initial funding. ARSC will assist with the initial acquisition and implementation if requested.
    - c. Examples: Aircrew Dry Coveralls, Flight Suits, Flight Helmets, Flight Jackets, Rescue Swimmer Harnesses, Air Delivery Systems, Dewatering Pumps.
  2. Aircraft ALSE. Equipment that is part of the aircraft configuration or that is listed in the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series), as the minimum required rescue/survival equipment for the aircraft type.
    - a. AFC-41 provides funding support for this equipment. Material is ordered from ARSC and is provided to the units as free issue.
    - b. Responsibility: Commandant (G-OCA) is responsible for establishing the operational requirement and obtaining initial and out year funding. ARSC is responsible for acquisition, implementation, storage, issue, technical support, modification, and superseding equipment.
    - c. Examples: Rescue Litters, Rescue Baskets, Oxygen Masks, Aircrew Life Rafts, Survival Vests, Personnel Parachutes.
- D. ORGANIZATION.**
1. Commandant (G-OCA) is the Aviation Life Support Requirements Manager. As such, Commandant (G-OCA) sets the operational requirements for ALSE.
  2. Commandant (G-SEA) maintains liaison with Commandant (G-OCA) for operational requirements and funding issues, Commandant (G-WKS) for flight safety related ALSE deficiencies, and ARSC for project management and technical support. Commandant (G-SEA), Commandant (G-OCA), Commandant (G-WKS), and ARSC jointly review and prioritize ALSE issues.
  3. ARSC is the Aviation Life Support Systems Manager. As such, ARSC acts as the project manager for new ALSE acquisitions, and manages in-service ALSE as described above by equipment type. The Aviation Life Support Systems Manager receives tasking from Commandant (G-SEA).
  4. ATC Mobile is the ALSE Prime Unit. As such, ATC Mobile is responsible for technical responsiveness to field level ALSE maintenance managers. The ALSE Prime Unit receives tasking from ARSC, and functions as a Prime Unit as outlined in Chapter 2. of this Manual.



## CHAPTER 10. AIRCRAFT SALVAGE

- A. GENERAL.** Recovery and salvage of Coast Guard aircraft is the responsibility of the Commanding Officer of the unit to which the aircraft is permanently assigned. This responsibility includes the establishment and maintenance of a salvage plan, the assignment of a salvage officer, coordination of recovery/salvage resources, and execution of the recovery/salvage effort.
- B. SALVAGE PLANS.** All helicopter aviation units shall prepare and maintain a helicopter salvage plan. Provisions for fixed wing salvage, where appropriate, shall be addressed in the unit pre-mishap plan. The purpose of this plan is to assist unit personnel in initiating and coordinating recovery and salvage if an aircraft mishap necessitates such an effort. The helicopter salvage plan should be designed to interface with, and amplify, the unit pre-mishap plan. This plan shall include, but is not limited to, the following:
1. Checklist format of action items required for various key individuals (CO, OPS, EO, Salvage Officer, etc.).
  2. A complete list showing location of all equipment stocked in the unit's salvage kit. This list shall include, but not be limited to, all equipment specifically listed in the appropriate aircraft maintenance manual for recovery/salvage of that type aircraft.
  3. Specific recovery/salvage procedures - Specific procedures for recovery/salvage of each type helicopter are contained in detail in the appropriate aircraft maintenance manual. Additional procedures and techniques can be documented as desired.
  4. Each salvage plan shall be updated annually. It is desirable that this be performed by a prospective salvage officer. A list of potential resources available within the unit's normal geographic area of operation shall be maintained. Specific attention should be given to assuring that the list of resources is current and that phone numbers and other contact information are correct.
  5. Salvage plans shall be maintained in a current status in district operations centers. Plans will be reviewed during the unit's Logistics Compliance Inspection.
- C. ASSIGNMENT OF SALVAGE OFFICERS.** Assignment of the Salvage Officer is the responsibility of the Commanding Officer. This individual will be the Commanding Officer's direct representative and shall be responsible for coordination and implementation of the recovery/salvage effort. It is recommended that all prospective Salvage Officers maintain a working knowledge of all references listed herein.
- D. RESPONSIBILITIES FOR AIRCRAFT RECOVERY/SALVAGE.**
1. Unit Commanding Officer - The Commanding Officer of the unit to which an aircraft is permanently assigned has full responsibility for the recovery/salvage of their aircraft. Assistance in carrying out this responsibility is available as discussed below. A written report of all salvage/recovery scenarios will be submitted to Commandant (G-SEA) via the chain of command within 30 days of occurrence.
  2. District Commanders - District Commanders are responsible for coordination of district resources in support of a recovery/salvage effort. They are also responsible for coordination of commercial or other service resources from within the district.
  3. Area Commanders - Area Commanders are responsible for coordination of area resources in support of a recovery/salvage effort.
  4. Commandant (G-SEA) - Is responsible for providing:
    - a. Approval for unusual funding requirements in connection with a recovery/salvage operation.
    - b. Assistance in coordination of any extraordinary resources (i.e., commercial or other military service), which are beyond unit or district capability to coordinate.
    - c. Technical Assistance - Commandant (G-SEA) is generally the most current source of information relating to recovery/salvage. All members of the branch are available through Flag Plot, to advise or provide technical information to Salvage Officers. If

requested so by the unit, Commandant (G-SEA) will provide an experienced advisor for any salvage operation.

- E. COAST GUARD VESSEL RECOVERY CAPABILITIES.** Polar class icebreakers are the only Coast Guard vessels considered adequate for recovering an HH-60 helicopter. Other Coast Guard vessels should be used for such an operation only in extreme circumstances, with the knowledge that considerable salvage related damage is probable. One hundred seventy-five foot WLM or WLB buoy tenders are marginally adequate for recovering HH-65 helicopters. These vessels should normally be utilized only under ideal (near flat calm) conditions when no other resources are readily available. They may be utilized in less than ideal conditions as the situation dictates, with the realization that significant salvage related airframe damage is probable. Generally, commercial or other military service resources are desirable and should be used for water recovery of Coast Guard helicopters. The following basic minimum requirements are defined in the respective aircraft maintenance manuals.

<u>Type ACFT to be Recovered</u>	<u>Main Hoisting Capability</u>	<u>Ability to Hoist Outboard of Gunwale</u>
HH-65	30,000 lbs	25 ft
HH-60	50,000 lbs	50 ft

- F. SALVAGE REFERENCES.** The following is a list of references that pertain to aircraft recovery/salvage and a brief description of what information is in each publication.
1. Coast Guard Air Operations Manual, COMDTINST M3710.1 (series) - Assigns Commanding Officer's basic responsibilities with regard to assigned aircraft.
  2. Appropriate Aircraft Maintenance Manual - Lists specific recovery/salvage techniques and recommended salvage equipment list. While this technical information relates strictly to an aircraft in the water, it is assumed that the basic information will be modified to apply to other recovery/salvage situations as well.
  3. Aviation Unit Salvage Plans - Contains procedures and information pertinent to specific units/geographic locations.
  4. Shipboard Helicopter Operational Procedures Manual, COMDTINST M3710.2 (series) - Provides flight-deck-equipped cutters with basic guidelines for their responsibilities during the initial phase of a recovery/salvage operation.
  5. Multiservice Helicopter External Air Transport: Basic Operations and Equipment, COMDTINST M13482.2 (series) - Provides guidance on joint service salvage efforts.

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## MAINTENANCE LEVEL FUNCTIONS

**A. APPLICABLE NOTES.** These notes apply throughout this enclosure when a number is indicated as applying to a maintenance level:

1. When removal of components is required and disassembly of aircraft components is involved or light installed job-shop type equipment is required, the function is classified to the C level.
2. When removal of components is required, but disassembly of aircraft components is not involved, and semi-portable or bench-type equipment is required, the function is classified to the D level.
3. Participation in the Joint Oil Analysis Program or Spectrometric Oil Analysis Program (HU-25) is mandatory for certain components and optional for others. All units must maintain oil sampling equipment on board.

**B. AIRCRAFT GENERAL.** Maintenance functions applicable to the aircraft in general are classified as follows:

1. Upkeep Inspections

CLASS

C      D

a.	Preflight	-	X
b.	Thru-flight	-	X
c.	Postflight	-	X
d.	Computerized	-	X
e.	Special	-	X
f.	Acceptance and transfer	-	X
g.	Inventory	-	X

2. Preservation

a.	5 to 10 days	-	X
b.	11 to 30 days	-	X
c.	31 to 60 days	-	X

3. Machine Operations (Metal and Metal Machine Work Plate, Bar, Sheet, Tubing, Rod, Wire, and Cable)

CLASS

C      D

a.	Shaping operations	1	-
b.	Drilling operations	1	2
c.	Milling operations	1	-
d.	Turning operations	1	-
e.	Cutting operations	1	2
f.	Grinding operations	1	2

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
g.	Pressing operations	1	2
h.	Sawing operations	1	2
i.	Forming operations	1	2
j.	Bending operations	1	2
k.	Flaring operations	1	2
l.	Beading operations	1	2
m.	Punching operations	1	2
n.	Shrinking operations	1	2
o.	Stretching operations	1	2
p.	Dimpling operations	1	2
q.	Riveting operations	1	2
r.	Welding operations	1	2
s.	Spinning operations	1	-
t.	Shearing operations	1	2
u.	Swaging operations	1	2
v.	Rolling operations	1	2
w.	Filing operations	1	2
4.	<u>Cable, Tube, and Rod Work (Controls)</u>		

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspect installed	-	X
b.	Functional test	-	X
c.	Tensioning	-	X
d.	Remove and replace cables, tubes, and rods	-	X
e.	Manufacture, swage, and test cables	1	-

**Encl. (1) to COMDTINST M13020.1F****5. Welding and Soldering****CLASS****C      D**

a.	Oxyacetylene welding and cutting	1	2
b.	Electric arc	1	2
c.	Electric inert arc	1	2
d.	Soldering	-	X

**6. Painting**

a.	Strip and refinish subassemblies	X	-
b.	Strip and refinish parts	-	X
c.	Brush and spray touch-up on aircraft	-	X
d.	Paint identification markings on aircraft	-	X
e.	Paint identification markings on components	-	X
f.	Apply acid proof paint	-	X

**7. Cleaning**

a.	Wash aircraft	-	X
b.	VCU-Blast corrosion on airframe and components	X	-

**8. Examination and Testing**

a.	Magnetic particle process, installed or portable equipment	-	X
b.	Fluorescent process, installed or portable equipment	-	X
c.	Dye penetrant process	-	X
d.	Radiographic (X-ray) process	X	-
e.	Eddy current process	-	X
f.	Ultrasonic process	X	-
g.	Hardness test process		
(1)	Installed equipment	X	-
(2)	Semi-portable equipment	X	-
(3)	Portable equipment	-	X

**Encl. (1) to COMDTINST M13020.1F****9. Miscellaneous**

		CLASS	
		<u>C</u>	<u>D</u>
a.	Joint Oil Analysis Program (JOAP) sampling	-	3
b.	Spectrometric Oil Analysis Program (SOAP) (HU-25) sampling	-	3
c.	Maintaining spare aircraft assigned to specific stations by the Commandant	-	X

**C. AIRFRAMES SYSTEMS AND COMPONENTS.**

1. Airframes components include the fuselage, wings, fixed surfaces, movable surfaces, boost units, cockpits, seats, fairings, access doors, flight control attachment fittings, bearings, bell cranks, chains, cables, drums, fairleads, torque tubes, pulleys, quadrants, rigging rods, associated rollers and sprockets, control wheels, rudder pedals, surface control locks, all technical controls (see Instrument System), trim tab controls, cargo hoists, and related airframe items.
2. Maintenance functions applicable to airframes components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspection (routine and special)	-	X
b.	Inspection (removed components)	-	X
c.	Preflight line test of airframe systems, flight and mechanical controls	-	X
d.	Servicing and lubrication	-	X
e.	Adjust linkage, controls, cables, etc.	-	X
f.	Removal of strainers, filters, fasteners, safety wire, etc.	-	X
g.	Removal and installation of components	-	X
h.	Repair of components		
(1)	By replacement of parts easily accessible. Component removal not required	-	X
(2)	By replacement of parts which require component removal. Bench test may or may not be required	-	X
(3)	By replacement of parts which usually require extensive component disassembly or special tools or support equipment. Subsequent to repair, functional testing and quality assurance inspections are normally required	X	-
i.	Repair of structural damage	1	2
j.	Incorporation of aircraft changes	1	2

**Encl. (1) to COMDTINST M13020.1F**

3. Landing gear components include the main, nose and tail gear, skis, amphibious gear and flotation equipment, retracting mechanism controls, gearboxes, valves, struts, shimmy dampers, warning and position indicating transmitters, doors, door actuating struts, ground steering mechanisms, wheels, brakes, tires and tubes, and associated lines and fitting.

4. Maintenance functions applicable to landing gear components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspection (routine and special)	-	X
b.	Inspection (components removed)	-	X
c.	Servicing and lubrication	-	X
d.	Removal and replacement of components (strut actuators, shimmy dampers, brake assemblies, etc.)	-	X
e.	Functional test by cycling	-	X
f.	Repair of components		
(1)	By replacement of easily accessible parts. Component removal not required	X	-
(2)	By replacement of high usage parts which require component removal. Bench test may not be required	-	X
(3)	By replacement of high or low usage parts requiring extensive component disassembly, or support equipment. Subsequent to repair, functional testing or quality assurance inspection is normally required	X	-
g.	Bench test of components	X	-
h.	Incorporate aircraft changes	1	2
i.	Repair of damage	1	2

5. Hydraulic/pneumatic components include hydraulic pumps, air compressors, fluid reservoirs, pressure accumulators, booster pumps, relief valves, check valves, pressure warning transmitters, overflows, vents, and associated lines and fittings.

6. Maintenance functions applicable to hydraulic/pneumatic components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspection (routine and special)	-	X
b.	Servicing	-	X
c.	Removal and replacement of filters and strainers, etc.	-	X
d.	Removal and replacement of components (pumps, air compressors, accumulators, relief valves, etc.)	-	X
e.	Functional test of system or subsystem. Support equipment may or may not be required	-	X
f.	Repair of components		

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
(1)	By replacement of seals, gaskets, packing, standard fitting, etc. Component removal not required	-	X
(2)	By replacement of high usage standard hardware, seals, gaskets, packing, fittings, and parts which require component removal and minor disassembly. Bench test may or may not be required	-	X
(3)	By replacement of high or low usage repair parts requiring extensive component disassembly or special tools, quality assurance inspection normally required	X	-
g.	Flex lines and rigid tubing		
(1)	Fabrication and testing	-	X

**NOTE**

Low pressure and medium pressure (1500 PSI) hose assemblies (including teflon) may be manufactured at unit level in accordance with AFTO 42E1-1-1. Preformed and high pressure hoses (3000 PSI) will be procured in accordance with existing instructions.

- |    |                              |   |   |
|----|------------------------------|---|---|
| h. | Incorporate aircraft changes | 1 | 2 |
| i. | Repair of damage             | 1 | 2 |
7. Utility components include complete heating, ventilating, pressurization, anti-icing and deicing (except propeller and rotors), fire extinguishing system components; associated fuel filters, fuel pressure regulators, fuel pumps, fuel pressure transmitters, dampers, anemostats, thermistors, cabinstats, air distribution controls, ducts, packing, cabin air filters and filtering elements, cabin air pressure regulators, valves, quick disconnect blocks, windshield defrosters, warning system components, reservoirs, vacuum pumps, filters, controls, engine fire extinguisher cylinders, associated lines and fittings.
8. Maintenance functions applicable to utility components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspection (routine and special)	-	X
b.	Servicing and lubrication	-	X
c.	Removal, cleaning, and replacement of filters, strainers, packing, insulation, etc.	-	X
d.	Removal and replacement of components (heaters, motors, pressure regulators, transmitters, etc.)	-	X
e.	Functional test of systems or subsystems	-	X
f.	Repair of components		

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
(1)	By replacement of seals, gaskets, packing, standard fittings, etc. Component removal not required	-	X
(2)	By replacement of high usage standard hardware, seals, gaskets, packing, fittings, and parts which require component removal and minor disassembly. Bench test may or may not be required	-	X
(3)	By replacement of high or low usage repairs requiring extensive component disassembly, or special tools or shop equipment. Subsequent to repair, functional testing or quality assurance inspection normally required	X	-
g.	Incorporate aircraft changes	1	2
h.	Repair of damage	1	2
9.	Safety and survival components include seat belts, shoulder harnesses, inertia reels, oxygen cylinders, liquid oxygen converters, regulators (except miniature mask mounted), lines, connections and fittings, portable fire extinguisher, rescue slings, baskets, litters, water bottles, and mounting brackets.		
10.	Maintenance functions applicable to safety and survival components are classified as follows:		

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspection and servicing	-	X
b.	Ground test of equipment and systems	-	X
c.	Minor adjustments of equipment and systems	-	X
d.	Removal and replacement of components	-	X
e.	Functional test and adjustment of safety and survival equipment and systems using portable or mobile test equipment	-	X
f.	Routine inspections of removed aviator's equipment and systems	-	X
g.	Bench test of safety and survival components	-	X
h.	Repair of components		
(1)	By replacement of parts easily accessible. Component removal not required	-	X
(2)	By replacement of high usage standard parts which require component removal and minor disassembly. Bench test may or may not be required	-	X
i.	Complete repair of components	X	-
j.	Incorporate changes and modifications	1	2

**Encl. (1) to COMDTINST M13020.1F****D. AVIONICS SYSTEM AND COMPONENTS.** Avionics Systems Components include the following:**NOTE**

LRUs under warranty do not apply.

1. Transmitting, receiving; radar (navigation and search), recognition (IFF), Loran, radio range, radio compass, radio altimeter, marker beacon, runway localizer, glide path, antennas, cables, wires, control panels, headsets, microphones and switches, infra-red, data transmission, data analysis and recorders.
2. Electrical, aircraft power distribution; generators, inverters, motors, reverse current relays, voltage regulators, over-voltage relays, warning lights and test switches, junction boxes, batteries, battery vent system units, installed auxiliary power unit (generator only). Landing, recognition, navigation and approach lights; compartment, cockpit, and cabin lights, flood and trouble lights, electric actuators and electric portions of airframes and engine accessories.
3. Engine, flight, navigation; quantity, pressure, position, vacuum instruments; automatic pilot and stabilization units, pitot and static system units, lift computers, stall warning devices and fire detecting units (except elements installed in engine compartments); instrument panels and lights and associated regulators, pumps, lines, and connections.
4. Maintenance functions applicable to avionics components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspection and servicing	-	X
b.	Functional test and adjustment of installed systems components	-	X
c.	Removal and replacement of minor components	-	X
d.	Removal and replacement of system major components	-	X
e.	Routine inspection of systems	-	X
f.	Routine inspection of removed components	-	X
g.	Bench test of system components	-	X
h.	Repair of components		
(1)	By replacement of parts of subassemblies without removal of unit from the aircraft	-	X
(2)	By replacement of parts, subassemblies, and mechanical components. (Repair of subassemblies and mechanical components by replacement of parts is included in this function)	-	X
(3)	No repair functions are assigned to the C level; however, certain maintenance or repair functions for selected and identified avionics items may be appropriately assigned to the Class C level due to facility and tooling requirements	-	-
i.	Incorporate changes and comply with bulletins	-	X

**NOTE**

For repair functions for avionics support equipment (bench harnesses, simulators, and test equipment) refer to Enclosure (1)I.

**E. ORDNANCE SYSTEMS AND COMPONENTS.**

1. Ordnance components include loading equipment, pyrotechnic ejectors and launchers, and jato units.
2. Maintenance functions applicable to ordnance components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspection and servicing	-	X
b.	Ground test of ordnance systems	-	X
c.	Minor adjustments of ordnance system components	-	X
d.	Removal and replacement of strainers, filters, safety wire, fasteners, etc.	-	X
e.	Functional test and adjustment of ordnance system components	-	X
f.	Periodic inspection of ordnance systems	-	X
g.	Preservation		
	(1) 5 to 10 days	-	X
	(2) 11 to 30 days	-	X
	(3) 31 to 60 days	-	X
h.	Repair of ordnance accessories	-	X
	(1) Replacement of parts which do not require removal or bench test	-	X
i.	Incorporate armament changes and comply with armament bulletins	-	X

**F. PHOTOGRAPHIC SYSTEMS AND COMPONENTS.**

1. Photographic components include cameras, view finders, associated controls, solenoids, indicator lights, switches, vacuum pumps, heaters, window washer, and intervalometers.
2. Maintenance functions applicable to photographic components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Inspection (routine and special)	-	X
b.	Inspection (removed components)	-	X
c.	Preflight line test of photographic systems and components	-	X
d.	Servicing, lubrication, adjustment, and replacement of film and consumables	-	X
e.	Functional test and adjustment of photographic systems and components	-	X
f.	Removal and installation of components	-	X

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
g.	Bench test of photographic components	-	X
h.	Repair of components	-	X
(1)	By replacement of parts easily accessible. Component removal not required	-	X
(2)	By replacement of high usage standard parts which require component removal. Bench test may or may not be required	X	-
i.	Incorporate photographic service changes and comply with photographic bulletins	1	2

**G. POWER PLANT EQUIPMENT AND SYSTEMS.** Power plant and related system components include the following:

1. Engine, engine mounts, engine control quadrant, cables, rods, pulleys, and fair-leads; injection pumps, oil strainers, valves, baffles, anti-drag, cowl flaps, cowl flap actuating mechanisms and indicating transmitters, permanently installed auxiliary power units (engine only), engine driven pumps, lines, filters and filter body (from engine manifold only); fuel and oil pressure switches and transmitters, fire detecting elements, burner baskets, main bearing supports, tail pipes, compressors, diffusers, turbines, engine anti-icing systems, main fuel pumps, engine driven fuel boost pumps, inlet guide vane actuators, variable stator actuators, fuel distributors, fuel nozzles, fuel/oil heat exchangers, torch ignitors, air bleed governors, emergency fuel systems, and starters.
2. Tanks, coolers, cooler door actuating mechanisms and indicating transmitters, filters, regulators, transfer pumps, relief valves, heat exchangers, oil dilution solenoids and valves, temperature bulbs, tank sumps, lines, hoses, and fittings.
3. In-line engine cooling tanks, radiators, after-coolers, expansion tanks, pumps, thermometers, relief valves, heat exchangers, header tanks, lines, hose and fittings, engine cooling fans.
4. Fuel tanks (wing, fuselage, dropable), fuel quantity tank units, master fuel shut off valves, selector valves, booster pumps, fuel pumps, strainers, vents, primers, water injection tank, pumps, time delay relays, pressure switches, regulators; associated lines and fittings (to the engine manifold only).
5. Maintenance functions applicable to power plant and related system components are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, and postflight inspection	-	X
b.	Ground test of power plant system	-	X
c.	Minor adjustments of power plant system components	-	X
d.	Removal or replacement of strainers, filters, safety wire, etc., which are easily accessible	-	X
e.	Inspections of power plant systems (power plant installed or removed)	-	X
f.	Functional test and adjustment of power plant and systems (power plant installed)	-	X

## Encl. (1) to COMDTINST M13020.1F

		CLASS	
		<u>C</u>	<u>D</u>
g.	Removal and replacement of power plant system components (engine, accessories, propellers, rotors, etc., power plant removed)	-	X
h.	Removal and replacement of power plant system components (engines, accessories, propellers, rotors, etc., power plant installed)	-	X
i.	Assemble quick change assemblies (engine build-up)	-	X
j.	Preservation of uninstalled power plant		
	(1) 11 to 30 days short term	-	X
	(2) For shipment	-	X
k.	Repair and bench test power plant accessories (all type power plants)		
	(1) Replacement of external parts, linkages, etc., such that the accessory does not require disassembly or bench test	-	X
	(2) Replacement of any components or parts which require disassembly and bench test of the accessory or subassembly	X	-
l.	Repair gas turbine engines		
	(1) Minor repair of installed engines	-	X
	(2) Repair of removed engines by replacement of parts (disassembly as authorized for the specific engine model)	-	X
	(3) Major repair removed engines, not including disassembly of rotating assemblies which require balancing after reassembly, or major units authorized only for "complete repair"	X	-
m.	Incorporate engine changes	1	2
6.	Propellers and related system components include propellers, blades, hubs, governors, spinners, feathering control motors, brushes, deicing and anti-icing fixed components, slinger rings, nozzles, and shoes.		
7.	Maintenance functions applicable to propeller and related system components are classified as follows:		

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspection	-	X
b.	Ground test of propeller systems	-	X
c.	Minor adjustment of propeller system components	X	-
d.	Routine and special inspection of propeller system and components	-	X

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
e.	Removal and replacement of propellers and system components	-	X
f.	Preservation for shipment	-	X
g.	Propeller assembly and disassembly	-	X
h.	Repair and bench test of propeller and components		
(1)	Repair by replacement of parts easily accessible. Propeller or component removal not required	-	X
(2)	Functional test of propeller and components using propeller and governor test bench. No repair by replacement of internal parts authorized (electrical components will be repaired under provisions of Enclosure (1)D.)	-	X
(3)	Repair by replacement of components or parts which require component removal. Extensive disassembly or special tools or support equipment may be required. Subsequent to repair, functional testing and quality assurance inspections are normally required	X	-
(4)	Deicer boot replacement and propeller balancing changes	X	-
i.	Incorporate propeller changes	1	2
8.	Rotary wing dynamic drive systems and components include blades, heads, hubs, anti-flapping and anticoning devices, anti-icing and deicing attached fixed component, snubbers, dampers and related reservoirs and lines, controls and linkage; drive shafting, universals and flexible couplings, transmissions, gear boxes, free wheeling units, vibration absorbing couplings, clutch assemblies, and rotor brakes.		
9.	Maintenance functions applicable to rotary wing dynamic drive system and components are classified as follows:		

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspections	-	X
b.	Ground testing, blade tracking, minor rigging adjustment	-	X
c.	Removal or replacement of strainers, filters, safety wire, easily accessible	-	X
d.	Routine and special inspection of dynamic system components	-	X
e.	Servo timing, system rigging, adjustment of reinstalled system components	-	X
f.	Removal and replacement of components and accessories	-	X
g.	Build-up of quick change assemblies	-	X

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
h.	Repair of components		
(1)	By replacement of seals, gaskets, packing, standard fittings, etc., (component removal not required)	-	X
(2)	By replacement of high usage standard hardware, seals, gaskets, packing, fittings, and parts which require component removal and minor disassembly. Bench test may or may not be required	-	X
(3)	By replacement of high or low usage repair parts requiring extensive component disassembly, or special tools or shop equipment. Subsequent to repair, functional testing or quality assurance inspection normally required	1	2

**H. AVIATOR'S EQUIPMENT AND SYSTEMS.**

1. Aviator's equipment includes parachutes, harnesses, life rafts, life vests, oxygen masks, suspension straps, emergency equipment kits, flight clothing, oxygen regulators (miniature mask mounted), PRC Series transmitters, and helmets.
2. Maintenance functions applicable to aviator's equipment are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Preflight, thru-flight, postflight inspection	-	X
b.	Ground test of aviator's equipment and systems	-	X
c.	Minor adjustments of aviator's equipment and systems	-	X
d.	Removal and replacement of minor components	-	X
e.	Routine and special inspections of aviator's equipment and systems	-	X
f.	Functional test and adjustment of aviator's equipment and systems using portable or mobile test equipment	-	X
g.	Removal and replacement of aviator's equipment and systems major components	-	X
h.	Routine and special inspections of removed aviator's equipment systems	-	X
i.	Bench test of aviator's equipment	-	X
j.	Repair of components		
(1)	By replacement of parts easily accessible	-	X
(2)	By replacement of high usage standard parts which require equipment removal and minor disassembly. Bench test may or may not be required	-	X

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
(3)	By replacement of high or low usage parts requiring extensive component disassembly or special tools or support equipment. Subsequent to repair, functional testing or quality assurance inspection is normally required	-	X
k.	Incorporate changes	1	2

**I. AIRCRAFT MAINTENANCE SUPPORT EQUIPMENT.**

1. For the purpose of classifying maintenance functions for the maintenance and repair of aircraft maintenance support equipment, the following categories of equipment have been established:
  - a. Avionics support equipment
  - b. Gasoline, electric, and diesel powered servicing equipment
  - c. Gas turbine powered servicing equipment
  - d. Trailers, dollies, and carts (non-powered)
  - e. Mechanical support equipment
2. Maintenance of support equipment is based upon ownership. The owner is responsible for ensuring proper maintenance.
3. Avionics support equipment includes electronic test sets; simulators, voltage, current, power, waveform measuring equipment and electromechanical devices such as rate tables, vacuum-pressure testers, temperature and fuel quantity indicator test sets, blade trackers, etc.
4. Maintenance functions applicable to avionics support equipment are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Operational check and test	-	X
b.	Routine servicing	-	X
c.	Minor adjustment and removal and replacement of minor components and parts (knobs, safety wire, fuses, light bulbs, etc.)	-	X
d.	Removal and replacement of major components, parts, subassemblies, and modules	-	X
e.	Repair of components by replacement of parts (tubes, transistors, resistors, etc.)	-	X
f.	Bench test of components	-	X
g.	Repair of sealed or potted units, subassemblies or modules, high precision mechanical components and units requiring special chemical treatments, sealing, or finishes	-	-
h.	Calibration	-	X
i.	Incorporate authorized modifications or changes	1	2

**Encl. (1) to COMDTINST M13020.1F****NOTE**

Calibration will be in accordance with CGTO PG—85—00—110 and Chapter 8. of this Manual.

5. Gasoline, electric, and diesel powered servicing equipment includes equipment such as air compressors, hydraulic stands, mobile air conditioners, mobile electric power plants, flood light trailers, etc. (not including turbine powered equipment).
6. Maintenance functions applicable to gasoline, electric, and diesel powered servicing equipment are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Pre-operation, post-operation, and daily inspection	-	X
b.	Servicing and daily maintenance	-	X
c.	Removal and replacement of minor parts (light bulbs, fuses, batteries, filters, cables, tires, spark plugs, fan belts, etc.)	-	X
d.	Periodic inspection and maintenance	-	X
e.	Preventive maintenance lubrication, oil change, tune-up, adjust brakes, road test, etc.	-	X
f.	Remove, replace, repair, and test nonautomotive components (pumps, gages, generators, etc.)	-	X
g.	Remove and replace automotive components	-	X
h.	Minor repair to body fenders, frame, housing, etc., including straightening, welding, repainting, etc.	-	X
i.	Repair and test automotive components (on or off vehicle). Includes pumps, valves, gages, tubing, carburetor, ignition, brake relining or replacement, brake cylinder rebuilding, generators, etc.	-	X
j.	Incorporate authorized modifications or changes and comply with bulletins	1	2

7. Gas turbine powered servicing equipment includes equipment such as GTC-85, (including pad or enclosure) PP-105, MA-1A, etc.
8. Maintenance functions applicable to gas turbine powered servicing equipment are classified as follows:

		CLASS	
		<u>C</u>	<u>D</u>
a.	Pre-operation, post-operation, and daily inspection	-	X
b.	Servicing and daily maintenance as published on Maintenance Requirements Cards	-	X
c.	Adjustment, removal and replacement of components and parts	-	X
d.	Removal and replacement of gas turbine engine	-	X
e.	Periodic inspection and maintenance	-	X

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
f.	Functional test and adjustment of complete unit (as a complete assembly)	-	X
g.	Preservation of gas turbine engine	-	X
h.	Repair and bench test of components and accessories	-	X
i.	Repair and repaint enclosure	-	X
j.	Repair of removed gas turbine engines (not to include disassembly of rotating assemblies which require balancing or extensive testing of components after reassembly)	-	X
k.	Incorporate authorized modifications or changes	1	2
9.	Trailers, dollies, and carts (non-powered) include equipment such as engine removal and transportation trailers, cryogenic servicing trailers, crash dollies, wheel removal dollies, preservation carts, weighing scales, water-alcohol trailers, shipment stands, engine test stands, etc.		
10.	Maintenance functions applicable to trailers, dollies, and carts (non-powered) equipment are classified as follows:		
		CLASS	
		<u>C</u>	<u>D</u>
a.	Pre-operation, post-operation, and daily inspection	-	X
b.	Servicing and daily maintenance	-	X
c.	Minor adjustment, removal and replacement of minor parts	-	X
d.	Periodic inspection and maintenance	-	X
e.	Removal and replacement of components	-	X
f.	Test components (on or off vehicle)	-	X
g.	Repair components (on or off vehicle)	-	X
h.	Metal work straightening, welding, repainting, etc.	-	X
i.	Incorporate authorized modifications or changes and comply with bulletins	1	2
11.	Mechanical support equipment includes equipment such as jacks, work stands, hoists, tow bars, hoisting slings, adapters, ladders, fixtures, wheel chocks, portable tools, tie-downs, analyzers, line testers (other than avionics), etc.		
12.	Maintenance functions applicable to mechanical support equipment are classified as follows:		

**Encl. (1) to COMDTINST M13020.1F**

		CLASS	
		<u>C</u>	<u>D</u>
a.	Pre-operation, post-operation, and daily inspection	-	X
b.	Servicing and daily maintenance	-	X
c.	Minor adjustment, removal and replacement of minor parts	-	X
d.	Periodic inspection and maintenance	-	X
e.	Removal and replacement of components	-	X
f.	Test components (on or off vehicle)	-	X
g.	Repair components (on or off vehicle)	-	X
h.	Metal work straightening, welding, repainting, etc.	-	X
i.	Calibration of selected equipments	-	X
j.	Overhaul components or complete equipment	-	X
k.	Incorporate authorized modifications or changes and comply with bulletins	1	2



Encl. (2) to COMDTINST M13020.1F

## SAMPLE TCTO

*AR&SC AIRCRAFT TECHNICAL PUBLICATIONS CELL  
TCTO/SCTO NUMBER REQUEST AND TRACKING FORM*

TRACKING SHEET IS TO ACCOMPANY DRAFT TCTO/SCTO AT ALL TIMES.

SCTO: _____		TCTO/SCTO NUMBERS ARE ORIGINATED ONLY THROUGH THE AIRCRAFT TECHNICAL PUBLICATIONS CELL (SEE JIM BRONSON)	DATE OF TCTO/SCTO
TCTO: _____ - _____			_____/_____/_____ MONTH DAY YEAR
<input type="checkbox"/> MESSAGE TCTO	<input type="checkbox"/> SCTO		
TCTO/SCTO WORK ORDER NUMBER _____		NUMBER REQUESTED BY: _____	
AIRCRAFT TYPE: _____		PROJECT OFFICER _____	
TCTO/SCTO TITLE _____ _____			
TITLE WILL BE EDITED TO 25 DIGITS, COUNTING SPACES.			
ACCB 1 REQUIRED _____		AVIONICS COMPONENT MODS	
ACCB 2 NOT REQUIRED _____		REQUIRE OEM SUPPLIED REVISION	
REFER TO ACCB PROCESS GUIDE		NUMBER ASSIGNED AND RESERVED.	
ARSC SUPPLY <u>DOES NOT</u>		G-SEA _____	
ORDER BULK PARTS PRIOR		TCTO/SCTO SPONSORED BY:	
TO ACCB 2 NOTIFICATION.		CHIEF, ENGINEERING AND	
		INDUSTRIAL SUPPORT DIVISION _____	
PLM MUST BE MADE AWARE OF THIS TCTO/SCTO BY THE AIRCRAFT ENGINEERING CELL.			

**ROUGH DRAFT OF TCTO/SCTO**

TCTO/SCTO AUTHOR: _____	ENG. TECH. SERVICES	AIRCRAFT TECHNICAL PUBLICATIONS CELL
HAS SUPPORTING DOCUMENTATION BEEN COMPLETED ? <input type="checkbox"/> YES <input type="checkbox"/> NO		
INCLUDE ALL CG-22s AND SICRs TO UPDATE MANUALS AND ACMS.		
ARSC AIRCRAFT EXAMINER REVIEW: _____		
TCTO/SCTO AUTHOR REVIEW: _____		
TECHNICAL PUBLICATIONS CELL EDITOR REVIEW: _____		
POLLUTION PREVENTION COORDINATOR: _____		

**ALL TCTOs/SCTOs REQUIRING PARTS WILL BE ASSIGNED A KIT WHICH INCLUDES THOSE PARTS (THERE ARE SPECIAL EXCEPTIONS TO THIS RULE).**

SUPPLY CELL EQUIPMENT SPECIALIST REVIEW BY: \_\_\_\_\_

NSN 

NAME \_\_\_\_\_ DATE \_\_\_\_\_  
THE LOGISTICS MANAGEMENT SPECIALIST(S) (LMS) RESPONSIBLE FOR STOCK ITEMS THAT ARE MODIFIED BY THIS TCTO/SCTO WILL ORIGINATE THE REQUIRED DOCUMENTATION TO ENSURE ALL STOCK AND SUPPLY PIPELINE ITEMS ARE MODIFIED. COMPLIANCE WITH THIS MODIFICATION WILL BE MONITORED BY THE LMS.

NAME \_\_\_\_\_ DATE \_\_\_\_\_  
SUPPLY CELL LEADER \_\_\_\_\_  
NAME \_\_\_\_\_ DATE \_\_\_\_\_

**SEND COMPLETED ROUGH DRAFT OF TCTO/SCTO TO AIRCRAFT TECHNICAL PUBLICATIONS CELL FOR FINAL FORMATTING OF TEXT, GRAPHICS, AND WIRING DIAGRAMS.  
AIRCRAFT TECHNICAL PUBLICATIONS CELL WILL PRODUCE FINAL DRAFT. 08/11/00**

**Encl. (2) to COMDTINST M13020.1F**

TCTO H65-TXXXXX  
ARSC W.O. No. XXXX-XXX-XXXX

**1. APPLICATION.**

This technical order is applicable to all Coast Guard HH-65A aircraft.

**2. PURPOSE.**

- a. This technical order directs the visual inspection of the aft side of the left 14 degree frame (near the leather hand hold) for cracks or a previously installed doubler.
- b. This TCTO also provides for the installation of a doubler on aircraft that have not been previously modified.

**NOTE:**

Parts will only be ordered for aircraft in which doubler has not been previously installed.

**3. TCTO COORDINATOR.**

Technical questions or comments associated with this TCTO should be referred to HH-65A Product Line Engineering Cell, telephone number (252) 335-6210, fax number (252) 335-6463.

**4. WHEN TO BE ACCOMPLISHED.**

Within 180 days after receipt of this TCTO.

**5. BY WHOM TO BE ACCOMPLISHED.**

All HH-65A unit level and depot level maintenance activities.

**6. WHAT IS REQUIRED.****a. SUPPLY INFORMATION AND REQUIREMENTS.****(1) Kit/Parts/Materials Required.**

The following kit contains the parts required to comply with this TCTO and shall be requisitioned from Coast Guard Aircraft Repair and Supply Center, Elizabeth City, NC 27909-5001. Questions regarding the 14 degree frame repair kit should be referred to HH-65A Aircraft Section, telephone number (252) 335-6173, fax number (252) 335-6496.

<u>QTY</u>	<u>NSN</u>	<u>PART NUMBER</u>	<u>NOMENCLATURE</u>	<u>SOURCE</u>
01			Kit, 14 Degree Frame Repair	ARSC

The following parts are furnished in the 14 degree frame repair kit and do not need to be requisitioned separately.

<u>QTY</u>	<u>NSN</u>	<u>PART NUMBER</u>	<u>NOMENCLATURE</u>	<u>SOURCE</u>
01		H65-953140	TCTO	ACMS Contractor
01		950-162	Doubler	KD
12	5320-01-138-4239	CR3213-4-3	Rivet, Cherry Max	KD
02	5305-00-206-3701	NAS517-3-3	Screw, Machine	KD
02	5310-00-167-0753	AN960PD10L	Washer	KD
02	5310-00-807-1474	MS21042L3	Nut	KD

**Encl. (2) to COMDTINST M13020.1F**

The following parts required to comply with this TCTO are not furnished in a kit and will be obtained through the appropriate supply source.

<u>QTY</u>	<u>NSN</u>	<u>PART NUMBER</u>	<u>NOMENCLATURE</u>	<u>SOURCE</u>
AR	8030-01-330-2404	MIL-C-81706	Alodine 1200	GSA
AR	8010-01-935-7080	MIL-P-23377	Primer, Epoxy	GSA
AR		A-A-3164	Lacquer, Flat Dark Gray	Local
AR		MIL-S-81733	Sealing Compound	Local

(2) Action Required on Items in Stock.

Not applicable

(3) Kits/Parts/Materials Required to Modify Items in Stock.

Not applicable.

(4) Disposition of Removed and Replaced Parts/Materials.

Not applicable.

(5) Drawings Required.

Not applicable.

(6) Size, Weight, and Cost of Kits/Parts/Materials.

Not applicable.

(7) Disposition of Kits/Parts/Materials.

Not applicable.

**b. PERSONNEL INFORMATION AND REQUIREMENTS.**

<u>WORK PHASE</u>	<u>SKILLS</u>	<u>LABOR-HOURS</u>
Installation	AMT	8.0
Inspection	QA	<u>0.5</u>
TOTAL		8.5

**c. SPECIAL TOOLS, FIXTURES, AND SOFTWARE REQUIRED.**

Not applicable.

**7. HOW WORK IS ACCOMPLISHED (Refer to Figure 1.).**

- a. Locate aft side of the left 14 degree frame at the cabin door upper forward corner.
- b. If a doubler has been previously installed, inspect area for crack propagation from under doubler. If crack propagation is found, contact ARSC HH-65A Product Line Engineering Cell for further assistance (252) 335-6210. If no cracks are found, TCTO can be signed off and no further action is required.
- c. If no doubler is installed, perform a visual inspection of the 14 degree frame weld area for cracks.
- d. Remove cover along forward side of 14 degree frame.
- e. If a crack is found, proceed to step 7.f. for repair procedures. If no cracks are found, proceed to step 7.g. for doubler installation.

**Encl. (2) to COMDTINST M13020.1F**

- f. If a crack is found, remove paint and primer from localized area. If in doubt as to length of crack, perform NDI of the area. Stop drill approximately 1/16" past ends of crack utilizing a no. 40 drill bit. This will allow crack to extend into stop drilled hole assuring removal of undetected stress cracks.
- g. Remove leather hand hold, two hex head bolts, two large diameter countersunk rivets, and LC nut (anchor nut). Retain reusable parts. Remove and discard small doubler from around anchor nut hole.
- h. Place 14 degree frame doubler in place. Carefully inspect to ensure that the repair fits against airframe structure as tight as possible. Grinding of the base of the weld on doubler or airframe may be necessary for this repair doubler to fit correctly. There is some variance from airframe to airframe which may prevent a tight fit. If a reasonably tight fit cannot be obtained, contact ARSC HH-65A Product Line Engineering Cell for shimming instructions.
- i. With doubler in place, mark location and drill holes for two hex head bolts (Item 2) and two countersunk machine screws (Item 1) utilizing a no. 10 drill bit. Countersink two holes (Item 1) with a 100° countersink.
- j. Utilizing standard layout procedures, mark location and drill 12 holes along leg of doubler with a no. 30 drill bit.
- k. Mark location and drill hole for LC nut (anchor nut) (Item 3) with a "J" drill bit. File notches required for LC nut installation.

**WARNING**

**AVOID EYE OR SKIN CONTACT WITH ALODINE 1200 P/N MIL-C-81706. AVOID INHALATION OR INGESTION. WASH THOROUGHLY AFTER HANDLING.**

**WARNING**

**RESPIRATORY PROTECTION IS REQUIRED WHEN USING PRIMER P/N MIL-P-23377. THIS MATERIAL CONTAINS CHROMATE. REPEATED OVEREXPOSURE TO CHROMATE CAN CAUSE LUNG CANCER. AVOID EYE OR SKIN CONTACT. KEEP EPOXY PRIMER AWAY FROM ALL SOURCES OF IGNITION. USE IN WELL-VENTILATED AREAS.**

**WARNING**

**LACQUER P/N A-A-3164 (REPLACED TT-L-20) IS FLAMMABLE. KEEP AWAY FROM ALL SOURCES OF IGNITION AND OXIDIZERS. AVOID EYE OR SKIN CONTACT. AVOID INHALATION AND INGESTION. USE IN WELL-VENTILATED AREA. WASH THOROUGHLY AFTER HANDLING.**

- l. Remove doubler, file radius on squared edges, deburr, and treat with Alodine 1200 P/N MIL-C-81706. Prime using epoxy primer P/N MIL-P-23377 and paint with flat dark gray lacquer paint P/N A—A-3164.

**WARNING**

**AVOID EYE AND SKIN CONTACT WITH SEALING COMPOUND P/N MIL-S-81733. AVOID INHALATION OR INGESTION. WASH HANDS THOROUGHLY AFTER HANDLING.**

- m. Apply a thin coat of sealing compound P/N MIL-S-81733 to inside of doubler and install on airframe.
- n. Install two bolts (Item 2) retained from step 7.g., two machine screws P/N NAS517-3-3 (Item 3), nuts P/N MS21042L3, washers P/N AN960PD10L, and 12 remaining rivets P/N CR3213-4-3 (Item 4).
- o. Install LC nut (anchor nut) (Item 3) and leather hand hold.
- p. Install 14 degree frame forward cover.

**\*\* Q.A. (1) REQUIRED AT THIS POINT \*\***

(Give concise description of what needs to be done. Include any illustrations as necessary and give step-by-step instructions for performing all inspections, replacements, retrofit changes, etc., required by the TCTO.)

**8. SUPPLEMENTAL INFORMATION.****a. OPERATIONAL CHECKOUT REQUIREMENTS.**

Not applicable.

**b. WEIGHT AND BALANCE INFORMATION.**

No effect.

(If this TCTO involves only adjustment or procedure, use the statement "no effect." If the weight change is less than five pounds, and the center of gravity and the Chart A basic weight checklist are not affected by relocation of items, state "negligible"; otherwise, state "as follows" and use the following format.)

<u>ITEMS ADDED</u>	<u>WEIGHT</u>	<u>ARM</u>	<u>MOMENT/100</u>
XXXX	+/-XXX	XXX	+/-X.X

**c. TECHNICAL MANUALS AFFECTED.**

Not applicable.

(If this TCTO affects a published T.O., include the T.O. number, date of latest revision, and tracking number of the CG-22, SICR, or Technical Publication Deficiency Report (TPDR). If this TCTO affects a published ACMS MPC, include the MPC number, revision date, and tracking number of the CG-22 or TPDR. If maintenance or operational procedures will be changed, or added, include Technical Order Page Supplement (TOPS).)

**d. TRAINING EQUIPMENT AFFECTED.**

Not applicable.

(If this TCTO affects the aircraft simulator, hot mock-up, or other training aids, include a statement describing the change in configuration or performance of the training equipment.)

**9. RECORDS.****a. ACTION REQUIRED ON MAINTENANCE RECORDS.**

The applicable (airframe MGB, engine, stator vane actuator, dampener, etc.) SCHR will be automatically updated upon completion of TCTO XXX-XXX.

**b. ACTION REQUIRED ON SUPPLY RECORDS.**

Not applicable.

(Changes to IPB, stock cards, etc.)

**c. MODIFICATION IDENTIFICATION MARKINGS.**

Not applicable.

(Specific markings if required. For example "TCTO number stenciled next to nameplate" or "mark out number 6 on the modification plate.")

**10. ARSC CUSTOMER SATISFACTION SURVEY.**

Submit Customer Satisfaction Survey via the ARSC website at <http://cgweb.eisd.arsc.uscg.mil/qa/survey/survey.html>.

Encl. (2) to COMDTINST M13020.1F

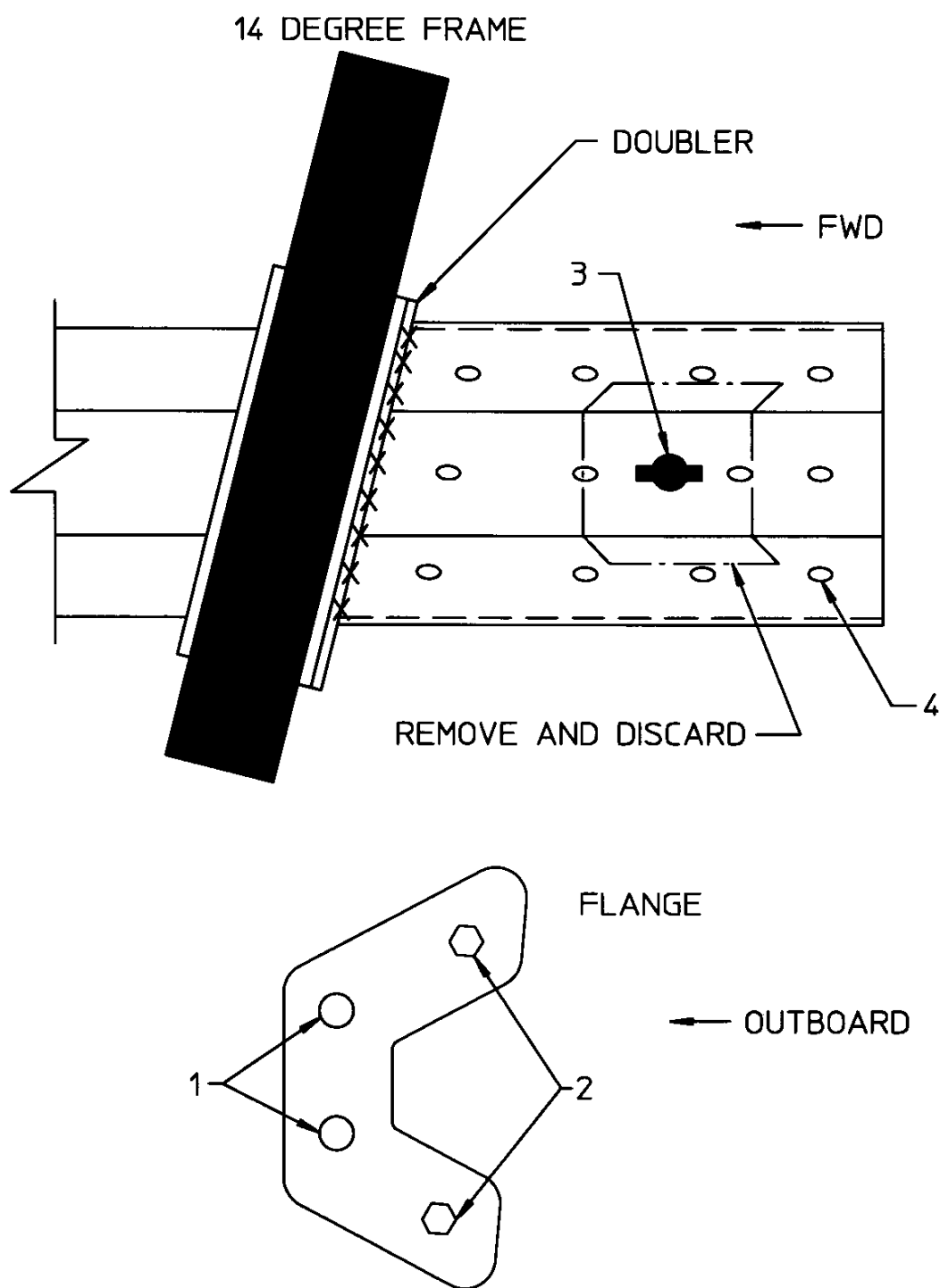


Figure 1.

### **WARNING**

**THIS IS A SAMPLE OF A WARNING. ALL TEXT IS IN BOLD. THERE IS NO LINE BETWEEN THE HEADING AND THE FIRST LINE OF TEXT. IT IS TYPED IN ALL CAPITAL LETTERS AND TEXT IS FULLY JUSTIFIED. THE HEADING OF A WARNING IS IN 12 PITCH PROPORTIONAL TYPE AND THE BODY IS 10 PITCH PROPORTIONAL.**

### **CAUTION**

THIS IS A SAMPLE OF A CAUTION. ONLY THE HEADING IS IN BOLD. THERE IS NO LINE BETWEEN THE HEADING AND THE FIRST LINE OF TEXT. IT IS TYPED IN ALL CAPITAL LETTERS AND TEXT IS FULLY JUSTIFIED. THE HEADING OF A CAUTION IS IN 12 PITCH PROPORTIONAL TYPE AND THE BODY IS 10 PITCH PROPORTIONAL.

### **NOTE:**

This is a sample of a note. The text is typed fully justified. The word note appears at the beginning of the first line of text and not as a heading. The word note is bold and capitalized, the entire note is 10 pitch proportional type.

### **NOTE:**

The first page of the TCTO acts as a cover sheet. Start typing the text of the TCTO on page 2. The TCTO number (TCTO: H65-XXXXXX) will be located in the upper right-hand corner of the header and the page number (Page 2 of 4) will be located in the bottom right-hand corner of the footer starting on page 2.

### **NOTE:**

Enclosures should be restricted to excerpts from other publications. Identify enclosures with the TCTO number to which attached, such as ENCLOSURE (43) to TCTO H65-XXXXXX. Figures should be numbered (1), (2), etc., and appear in the same sequence as referred to in the body of the TCTO. Photographs and drawings should appear as FIGURES and be included in the page numbering sequence. Drawings should include a reference to the drawing number.

**Encl. (2) to COMDTINST M13020.1F**

- A.** Draft TCTOs may be submitted in hard copy or electronic media from field units, prime units, or Government contractors. Due to the variety of media types and file formats available, please contact ARSC Technical Publications Section (252) 335-6829 prior to sending any form of electronic media.
- B.** Use short, concise sentences, ensuring they are technically accurate.
- C.** The use of CG common acronyms is acceptable. It is not necessary to write out the long version of IAW, QA, TCTO, UR, CGAS, AFTO, etc.
- D.** The use of diagrams and tables is encouraged. However, ensure they are referenced in the text of the TCTO. Diagrams will be re-drawn by ARSC staff, in most cases.
- E.** The following guidelines apply for photographs:
  - 1. Submit unprocessed film or negatives.
  - 2. If using 120 black and white format, use KODAK Verichrome 125.
  - 3. If using 35mm or 120 color formats, use KODAK Gold 100.
  - 4. If using 35mm black and white format, use KODAK T-MAX-100 or T-MAX-400.
  - 5. ARSC photo lab has the ability to process these films and will be able to produce better quality TCTO photographs if these guidelines are followed.
  - 6. Illustrations and comments which identify areas and or parts on photographs can be made if you send a photograph, but will only be used to assist ARSC's illustrators in preparing a final copy.
  - 7. Use adequate lighting with a contrasting background when taking photographs.
  - 8. Never take a photograph of an area larger than necessary to convey your message.
- F.** When providing dimensions in the text of a TCTO or on diagrams, use the following guidelines:
  - 1. All dimensions shall be listed in SAE format (inches and feet), with metric dimensions added in parentheses if required.
  - 2. Use two letter abbreviations for dimensions.
  - 3. For hand layout, cutting, and general metal work, mark all dimensions to the nearest 0.01 inch and/or 0.1 millimeter.
  - 4. For machining operations, mark all dimensions to the nearest 0.001 inch and/or 0.01 millimeter.
  - 5. If a given dimension is less than 1, place a 0. to the left of the decimal point. For example, write a 0.15 instead of .15.
  - 6. Ensure the same accuracy is used for a given dimension between text and diagram. For example, do not list a dimension of 0.12 in. in the text and indicate the same dimension on the diagram as 0.124 in.
  - 7. Drill bits should be referred to as No. \_\_\_\_\_ or size \_\_\_\_\_.
- G.** Always write in the present tense.
- H.** If Q.A. inspections are required, always show a line item estimate for Q.A. labor-hour and skill requirements in the Personnel Information (paragraph 6.b.) of your TCTO.
- I.** TCTO number and work order number for all TCTOs will be obtained from ARSC Technical Publications Section, (252) 335-6622 and shall be included in the header of the TCTO. (See page 2 of this enclosure.)

## SAMPLE MESSAGE TCTO

PP  
UNCLASSIFIED

FM COGARD ARSC ELIZABETH CITY NC//ENG//  
TO AIG XXXXXXXXXXXX  
AIG XXXXXXXXXXXX  
INFO COMDT COGARD WASHINGTON DC//G-SEA//  
COGARD ARSC ELIZABETH CITY NC//ACMS//  
COGARD ARSC ELIZABETH CITY NC  
XXXXXX (INCLUDE USAF, USN, MANUFACTURER AS APPROPRIATE TO ACFT TYPE)  
BT

UNCLAS //N13052//

SUBJ: CG MESSAGE TCTO SUBJECT

A. REFERENCES AS REQUIRED.

1. APPLICATION. STATE THE AIRCRAFT TYPE AND/OR EQUIPMENT AFFECTED BY THE TCTO.
2. PURPOSE. EXPLAIN CONCISELY THE INTENT OF THE TCTO, INCLUDING REASONS FOR ANY INSPECTION OR REPLACEMENT REQUIRED.
3. TCTO COORDINATOR. PROVIDE THE NAME AND PHONE NUMBER OF PERSON(S) COGNIZANT OF THE TCTO REQUIREMENTS.
4. WHEN TO BE ACCOMPLISHED. ESTABLISH A TIME LIMIT DEPENDENT ON URGENCY. (FOR EXAMPLE – "WITHIN 15 CALENDAR DAYS" OR "WITHIN 15 FLIGHT HRS".)
5. BY WHOM TO BE ACCOMPLISHED. STATE AT WHAT LEVEL THE WORK WILL BE PERFORMED (ARSC, UNIT, CFT, ETC.).
6. WHAT IS REQUIRED.

A. SUPPLY INFORMATION AND REQUIREMENTS. LIST ALL PARTS AND OTHER SUPPLIES NEEDED TO COMPLETE THE TCTO. INCLUDE QUANTITY, NSN, MANUFACTURER'S PART NUMBER, AND SOURCE OF SUPPLY FOR EACH PART. SPELL-OUT ANY SPECIAL INSTRUCTIONS FOR REQUISITION OF PARTS. (READ IN 5 COLUMNS.)

QTY	NSN	PART NUMBER	NOMENCLATURE	SOURCE
-----	-----	-------------	--------------	--------

B. PERSONNEL INFORMATION AND REQUIREMENTS. (READ IN 3 COLUMNS.) (COMPLETE AS APPROPRIATE FOR THE TASK INVOLVED.)

WORK PHASE	SKILL	LABOR-HRS.
INSPECTION	AVT	0.5
REMOVAL/INSTALLATION/QA	AVT	3.0
OPERATIONAL CHECKOUT	PILOT/AVT	1.0

7. HOW WORK IS ACCOMPLISHED. GIVE STEP-BY-STEP PROCEDURE INCLUDING COMPLETE LIST OF SPECIAL TOOLS REQUIRED AND INSTRUCTIONS ON DISPOSITION OF REMOVED PARTS AND MATERIALS.

8. SUPPLEMENTAL INFORMATION.

**Encl. (2) to COMDTINST M13020.1F**

A. OPERATIONAL CHECKOUT REQUIREMENTS. DESCRIBE CHECKOUT PROCEDURES WHEN THEY ARE REQUIRED.

B. WEIGHT AND BALANCE INFORMATION. PROVIDE WEIGHT AND BALANCE CHANGES WHEN THE WEIGHT AND BALANCE ARE AFFECTED.

C. TECHNICAL MANUALS AFFECTED. LIST ALL TECHNICAL MANUALS THAT WILL BE AFFECTED BY THE TCTO.

D. TRAINING EQUIPMENT AFFECTED. INDICATE ANY TRAINING EQUIPMENT THAT WILL REQUIRE MODIFICATION.

9. RECORDS. SPECIFY ALL RECORDS THAT ARE TO BE UPDATED.

A. ACTION REQUIRED ON MAINTENANCE RECORDS. INCLUDE THE FOLLOWING STATEMENT. "THE AIRFRAME SIGNIFICANT COMPONENT HISTORY RECORD (SCHR) WILL BE ELECTRONICALLY UPDATED UPON COMPLETION OF THE TCTO."

B. ACTION REQUIRED ON SUPPLY RECORDS. STATE THE SUPPLY RECORD AFFECTED AND WHAT ACTION IS TO BE TAKEN ON THAT RECORD.

BT

DRAFTED BY: J. M. WIZARD, CWO2, USCG, ARSC, X6XXX

RELEASED BY: E. J. OVERSEER, CDR, USCG, ARSC, X6XXX

# **DOD TECHNICAL ORDER SYSTEM**

## **THE AIR FORCE T.O. SYSTEM**

### **A. TYPES OF TECHNICAL ORDERS.**

#### **NOTE**

The Air Force Technical Order system is the only official medium for disseminating technical information, instructions, and safety procedures for the operation, maintenance, inspection, and modification of Air Force equipment and materiel. Exception: Where Aviation Computerized Maintenance System (ACMS) or a Coast Guard publication is available.

1. Technical Manuals. These manuals cover installation, operation, maintenance, and handling of Air Force equipment and materiel. Complex systems or equipment requiring a specific type of manual, such as a maintenance manual or a parts breakdown, may be published in sections. Each section constitutes a separate publication with a separate T.O. number. For less complex items, specific types of instructions are published in a single manual. The "Aircraft Manuals" series is the class of technical manuals most often used by maintenance personnel.
2. Reference Manuals.
  - a. 0-1-CD-1 — List of Applicable Publications for the Numerical Index Requirements Table
  - b. 0-4-6-2-CD-1 — Equipment Numbers to Technical Order Numbers
  - c. 00-5-1 — AF Technical Order System
  - d. 00-5-2 — Technical Order Distribution System
  - e. 00-5-18 — USAF Technical Order Numbering System

### **B. METHODS FOR UPDATING TECHNICAL ORDERS.**

1. Changes.
  - a. Changes are issued when only parts of the existing T.O.s are affected. The changed pages replace the corresponding numbered pages, and all replaced pages must be removed from the T.O. and discarded. Changes containing foldout pages are assembled with the foldout pages at the back of the change.
  - b. Changed pages are identified by referring to the List of Effective Pages (back side of title page), which indicates the change number and/or change dates. The change number is printed in the lower corner of the changed page with the page number. Changes in the text are indicated by a heavy black line in the outer margin opposite the changed part of the text.
  - c. A new title page will be issued with each change. The new title page will bear the basic T.O. date as well as the change number and the date of the change.
2. Technical Order Page Supplement (TOPS).
  - a. A TOPS (green page) is different from a standard change in that it supplements rather than replaces an individual page in a technical order. A TOPS page is filed in the T.O. facing the affected T.O. page.
  - b. The T.O. number of a TOPS is the same as the basic technical order. Each TOPS is identified by a TOPS number and date printed under the basic T.O. date on the TOPS title page. Technical order page supplements for each T.O. will be numbered sequentially starting with the number TP-1.

**Encl. (3) to COMDTINST M13020.1F**

- c. A revision will supersede all active TOPS. The TOPS active at the time the revision is issued will be listed in the supersedure notice. If data in a superseded TOPS is not included in the revision but is still valid, a new TOPS will be issued concurrently with this revision to include this data. If a standard change supersedes all active TOPS, previous TOPS will be listed in the supersedure notice.
- 3. Revisions.
  - a. A revision is a complete new edition of an existing T.O. and has a new basic date. It includes existing changes and replaces any supplements listed in the replacement note on the title page. Normally, a T.O. is revised when the pages affected by existing changes, in addition to pages requiring change, total 50% or more of the technical order.
  - b. Black vertical borderline symbols indicate current changes in the text of a revision which were not previously published as T.O. changes or supplements.
- 4. Supplements.
  - a. Supplements are issued to augment or change data in the basic T.O.s that are not adaptable to the inclusion of individual change pages.
  - b. Supplements may be cumulative or noncumulative. Cumulative supplements include all data in supplements previously issued and supersede the preceding supplements. Noncumulative supplements do not include information in supplements previously issued and do not supersede a preceding supplement. When a basic T.O. is replaced by a revision, the revision normally includes all the essential information in outstanding supplements. Flight manuals are supplemented by Safety Supplements or Operational Supplements.
- 5. Appendixes. Appendixes are used to include materiel in a T.O. that is not a part of the normal sequence outlined in the table of contents. These include tables, charts, etc.
- 6. Rescissions. T.O.s are rescinded when the information contained therein is no longer required or is incorporated in other publications.

**C. TECHNICAL ORDER CATEGORIES.** (Refer to T.O. 00-5-18 for further breakdown.)

<u>T.O. CATEGORY</u>	<u>TITLE</u>
0	Numerical Index and Requirements Tables, Numerical Index, Alphabetical Indexes, and Cross Reference Table Technical Orders
00	General Technical Orders
1	Aircraft Technical Orders
2	Airborne Engine Technical Orders
3	Aircraft Propellers and Associated Equipment Technical Orders
4	Aircraft Landing Gear Components and Associated Equipment Technical Orders
5	Airborne Instrument Technical Orders
6	Aircraft Missile Fuel Systems and Equipment Technical Orders
7	Airborne Engine Lubricating Systems and Associated Equipment Technical Orders
8	Airborne Electrical Systems Technical Orders

**Encl. (3) to COMDTINST M13020.1F**

<u>T.O. CATEGORY</u>	<u>TITLE</u>
9	Airborne Hydraulic, Pneumatics and Vacuum Systems Technical Orders
10	Photographic Equipment, Supplies, and Sensitized Materials Technical Orders
11	Armament Technical Orders
12	Airborne Electronic Equipment Technical Orders
13	Aircraft Furnishings, Cargo Loading and Aerial Delivery, and Firefighting Equipment Technical Orders
14	Deceleration Devices, Personal and Survival Equipment Technical Orders
15	Aircraft and Missile Temperature Control, Pressurizing, Air Conditioning, Heating, Ice Eliminating, and Oxygen Equipment Technical Orders
16	Airborne Mechanical Equipment Technical Orders
21	Guided Missile Technical Orders
22	Aerospace Technical Orders
32	Standard and Special Tools Technical Orders
33	General Purpose Test and Associated Equipment Technical Orders
35	Ground Handling, Support and Base Operating Equipment Technical Orders
36	Vehicles, Construction and Materials Handling Equipment, and Equipment and Components Technical Orders
37	Fuel, Oil, Propellant Handling and Associated Equipment Technical Orders
38	Non-Aeronautical Engines and Components Technical Orders
39	Watercraft and Associated Equipment Technical Orders
40	Commercial Air Conditioning, Heating, Plumbing, Refrigerating, Ventilating, and Water Treating Equipment Technical Orders
41	Subsistence and Food Service Equipment Technical Orders
42	Chemical, Oxygen, Metal, Textile, Fuels, Cordage, Lumber, and Rubber Materials (Dopes, Cleaning Compounds, Glues, Gases, Lubricants, Paints, Plastics, and so forth) Technical Orders
43	Training Devices and Associated Equipment Technical Orders
44	Common Hardware Equipment Technical Orders
45	Railroad and Associated Equipment Technical Orders
46	Office, Duplicating, Printing and Binding Equipment Technical Orders

**Encl. (3) to COMDTINST M13020.1F**

<u>T.O. CATEGORY</u>	<u>TITLE</u>
47	Agricultural Equipment Technical Orders
48	Laundry and Dry Cleaning Equipment Technical Orders
49	Optical, Instruments, Timekeeping, and Navigation Equipment Technical Orders
50	Special Service Equipment Technical Orders
51	General Purpose Automatic Test Systems (GPATS) and Versatile Automatic Test Systems (VATES) Technical Orders
60	Explosive Ordnance Disposal Technical Orders

**D. TYPES OF TECHNICAL ORDERS.**

<u>T.O. CATEGORY</u>	<u>TITLE</u>
01	List of Applicable Publications (LOAP) Unit
06 thru 09	Work Unit Code Manual
1	Flight Manual
2	Maintenance Instructions
3	Structural Repair Instructions
4	Parts Catalog
5	Basic Weight Checklist and Landing Data
6	Inspection Requirements
7	Winterization Instructions
8	Checkout Manuals
9	Cargo Loading
10	Power Package Build-up Instructions
11	Power Package Build-up Instructions
12	Maintenance Materiel Management Manual
13	Weapons Loading Manual
14	Atomic Loading and In-flight
15	Assembly, Test, and Storage Procedures
16	Atomic Loading and In-Flight (See 0-1-11N)
17	Storage of Aircraft
18	Field Maintenance of Airborne Materiel
19	Conversion Instructions
20	Reserved
21	Aircraft Inventory Record Master Guide
22	Reserved

**Encl. (3) to COMDTINST M13020.1F**

<u>T.O. CATEGORY</u>	<u>TITLE</u>
23	Corrosion Control
24	Reserved
25	Air Crew Weapon Delivery Manuals (See TO 0-1-11N)
26	Air Crew Weapon Delivery Manuals (See TO 0-1-11N)
27	Air Crew Weapon Delivery Manuals (See TO 0-1-11N)
28	Air Crew Weapon Delivery Manuals (See TO 0-1-11N)
29	Air Crew Weapon Delivery Manuals (See TO 0-1-11N)
30	Air Crew Weapon Delivery Manuals (Air-to-Ground) (See TO 0-1-11N)
31	Air Crew Weapon Delivery Manuals (Automatic Toss Bomb Computing System) (See TO 0-1-11N)
32	In-Flight Maintenance Manual
33	Conventional Munitions Loading
33-1	Conventional Munitions Loading-Tactical Missions
33-2	Conventional Munitions Loading-Strategic Missions
33-3	Conventional Munitions Loading-Defense Missions
33-4	Conventional Munitions Loading-Transport Missions
34	Conventional Munitions Delivery
34-1	Conventional Munitions Delivery-Tactical Missions
34-2	Conventional Munitions Delivery-Strategic Missions
34-3	Conventional Munitions Delivery-Defense Missions
34-4	Conventional Munitions Delivery-Transport Missions
35	Non-Munitions Accessories
36	Non-Destructive Inspection Manuals
37	Calibration and Measurement
38-100	Reserved

**THE NAVY T.O. SYSTEM****A. TYPES OF TECHNICAL ORDERS.****NOTE**

The Navy Technical Order system is the only official medium for disseminating technical information, instructions, and safety procedures for the operation, maintenance, inspection, and modification of Navy equipment and materiel. Exception: Where ACMS or a Coast Guard publication is available.

1. Technical Manuals/Work Packages/Directives. These manuals cover installation, operation, maintenance, and handling of Navy equipment and materiel. Complex systems or equipment requiring a specific type of manual, such as a maintenance manual or a parts breakdown,

**Encl. (3) to COMDTINST M13020.1F**

may be published in sections called work packages. For less complex items, specific types of instructions are published in a single manual. The "Aircraft Manuals" series is the class of technical manuals most often used by maintenance personnel.

2. Reference Manuals.

- a. 00-25-100 - Naval Air Systems Command Technical Manual Program
- b. 00-500A - Naval Aeronautic Part Number Technical Manual Index
- c. N0000-00-IDX-000 - Navy Standard Technical Manual Identification Numbering System

**B. METHODS FOR UPDATING TECHNICAL MANUALS.**

1. Changes.

- a. Changes are issued when only parts of the existing manual are affected. The changed pages replace the corresponding numbered pages, and all replaced pages must be removed from the manual and discarded. Changes containing foldout pages are assembled with the foldout pages at the back of the change.
- b. Changed pages are identified by referring to the List of Effective Pages (back side of title page), which indicates the change number and/or change dates. The change number is printed in the lower corner of the changed page with the page number. Changes in the text are indicated by a heavy black line in the outer margin opposite the changed part of the text.
- c. A new title page will be issued with each change. The new title page will bear the basic manual date as well as the change number and the date of the change.

2. RAC (Rapid Action Change)

- a. Distributed by expedited means to all units under distribution for the publication. RACs normally involve possible safety of flight or faulty equipment items.

3. IRAC (Interim Rapid Action Change)

- a. Normally distributed in a message format. Will require immediate action.

**C. MANUAL CATEGORIES.**

**NOTE**

The Navy uses the standard NAVAIR numbering system and TIMINS numbering system. Due to the complexity of the TIMINS numbering system, refer to the N0000-00-IDX-000 Manual for the breakdown of the TIMINS number.

1. 00 Series - General.

NAVAIR NUMBER		TIMINS NUMBER
00-25	Management and Procedures Manuals	
00-75	Air Safety	
00-80	DCNO (AIR) Aviation Training Literature	
00-85	Protective Packaging and Preservation (See 15 Series also)	
00-100	Evaluation Program of Aviation Shore Facilities	
00-110	Standard Aircraft Characteristics	
00-130	Joint Munitions Manuals	

## Encl. (3) to COMDTINST M13020.1F

## NAVAIR NUMBER

TIMINS  
NUMBER

## Naval Aeronautical Publications Index

00-500A	Equipment Applicability List
00-500AV	Avionics Change Cross Reference
00-500B	Aircraft Application List
00-500C	Directives Application List
00-500M	Microfilm Cross Reference Index
00-500P	Publication Distribution Index
00-500SE	Support Equipment Cross Reference
01-700	Airborne Weapons/Stores, Conventional/Nuclear, Check Lists/Stores, Reliability Cards/Manuals

## NAVSUP PUB

2002	Navy Stock List of Publications and Forms
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2. 01 Series - Aircraft, Missiles, Targets, and Drones.

## TIMINS NUMBER

01-AGM84	McDonnell-Douglas - AGM-84A Harpoon Missile	
01-AIM54	Hughes Aircraft - AIM-54A Phoenix Missile	
01-ARGM84	McDonnell-Douglas - RGM-84A Harpoon Missile	
01-AV8	Hawker-Siddeley - AV-8A Harrier	
	Hawker-Siddeley - AV-8B Harrier	A1-AV8
01-CH47	Boeing-Vertol - CH-47C Chinook	
01-C9B	McDonnell-Douglas - C-9B Skytrain II	
01-E2	Grumman - E-2 Hawkeye	
01-F14	Grumman - F-14 Tomcat	
01-F18	McDonnell-Douglas - F-18 Hornet	A1-F18
01-H53	Sikorsky - H-53 Sea Stallion	A1-H53
01-H60	Sikorsky - H-60 Sea Hawk	A1-H60
01-MQM	Northrop - MQM-74C Chukar II Missile Target	
01-S3	Lockheed - S-3 Viking	
01-T34	Beech - T-34 Mentor	
01-VH3	Sikorsky - VH-3D Sea King	
01-1A	General Engineering Series	
01-5	General Dynamics	
01-15	Naval Avionics Center, Indianapolis	

**Encl. (3) to COMDTINST M13020.1F**

01-30	Northrop
01-40	McDonnell-Douglas (Douglas)
01-45	Vought Aerospace Corporation
01-50	Raytheon
01-60	Rockwell International Corporation
01-75	Lockheed
01-80	NWC, China Lake
01-85	Grumman
01-90	Beech
01-100	Ryan
01-110	Bell
01-115	Fairchild
01-140	Piper
01-230	Sikorsky
01-245	McDonnell-Douglas (McDonnell)
01-250	Boeing-Vertol
01-260	Kaman
01-265	Raytheon

3. 01-600 Series - NATO Aircraft Cross Servicing Schedules.

01-600	American-British-Canadian-French
01-610	Canada
01-620	France
01-660	United Kingdom

4. 01-700 Series - Special Check Lists.5. 02 Series - Power Plants.

02-1	Aircraft Engines - General	A1-700
02A	Reciprocating Engines	A1-710
02A-10	Pratt and Whitney	
02A-35	Wright	
02A-40	Teledyne	
02 B	Jet Propulsion Engines	A1-720
02B-5	Detroit Diesel, Allison Division	
02B-10	Pratt and Whitney	

**Encl. (3) to COMDTINST M13020.1F**

02B-15	Lycoming	
02B-20	Pratt and Whitney Aircraft of Canada, Limited	
02B-25A	Garrett Turbine Engine Company	
02B-30	Williams Research	
02B-35	Wright	
02B-40	Teledyne	
02B-70	Rolls Royce	
02B-105	General Electric	A1-T700
		A1-F404
02B-110	Westinghouse	

**6. 03 Series - Accessories.**

03-1	General	A1-400
03-5	Electrical Equipment	A1-210
03-10	Fuel System	A1-470
03-15	Oil Systems	A1-750
03-20	Propellers and Accessories Equipment	A1-800
03-25	Wheels, Brakes, Struts, and Related Equipment	A1-420
03-30	Air and Hydraulic Equipment	A1-440
03-35	Ice Eliminating Equipment	A1-450
03-40	Control Units	A1-650
03-45	Fire Extinguishers and Related Equipment	A1-610
03-50	Oxygen Equipment	A1-460
03-55	Carbon Dioxide Fire Extinguisher Inflation	A1-600
03-60	Purging Equipment	A1-620
03-65	Pickup Equipment	A1-400
03-70	Heaters and Related Equipment	A1-640
03-75	Temperature Control Systems and Related Equipment	A1-650
03-80	Cabin Pressurizing Equipment	A1-460
03-85	Afterburners and Related Equipment	A1-790
03-90	Loading Equipment	A1-480
03-95	Helicopter Rotor and Related Equipment	A1-810
03-100	In-Flight Refueling Equipment	A1-470
03-105	Turbine Starters	A1-725

**Encl. (3) to COMDTINST M13020.1F**

03-110	Jet Engine Fuel Systems and Related Equipment	A1-760
03-600	Accessories Series Maintenance Requirements Cards	A1-640XX-MRC
7.	<u>04 Series - Aircraft Hardware and Rubber Materiel.</u>	
8.	<u>05 Series - Instruments.</u>	
05-1	General	AN-000
05-5	Tachometers	AN-524
05-10	Airspeed Indicators	AN-120
05-15	Aircraft Compasses	AN-310
05-20	Flight Instruments	AN-100
05-25	Drift Meters	AN-800
05-30	Altimeters	AN-110
05-35	Navigation Equipment	AN-400
05-40	Thermometers	AN-512
05-45	Automatic Pilots, Stabilization Systems, and Related Equipment	AN-300
05-50	Pitot-Static and Power Venturi Tubes	AN-860
05-55	Self-Synchronous Instruments	AN-370
05-60	Electric Circuit Instruments	AN-700
05-65	Fuel Flow Meters and Content Gages	AN-610
05-70	Pressure Systems, Gages, Indicators, and Transmitters	AN-560
05-75	Engine Gage Units	AN-511
05-80	Suction Gages	AN-900
05-85	Ignition and Engine Analyzers	AG-501
05-90	Signal Assemblies	AN-500
05-95	Test Equipment	AG-500
05-105	Test Equipment	AG-600
9.	<u>06 Series - Fuels, Lubricants and Gases.</u>	
10.	<u>07 Series - Dopes and Paints (See 15 Series also).</u>	AG-365
11.	<u>08 Series - Electronics, Airfield Lighting, and Related Accessories (See 16 and 19 Series also).</u>	
08-5	Radio, Radar	
08-10	Transmitter, Receiver	
08-20	Airfield Lighting Equipment	

**Encl. (3) to COMDTINST M13020.1F**

08-25	Instruments
08-35	Joint Nomenclature Radio Components
08-45	Commercial British and Navy Radio Equipment

12. 09 Series - Instructional Equipment and Training Aids (See 01 and 28 Series also).13. 10 Series - Photography.

10-1	General	AP-000
10-10	Camera Equipment	AP-100
10-20	Projection Equipment	AP-300
10-25	Photo Lab Equipment	AP-200
10-30	Interpretation Equipment	AP-410
10-35	Photographic Keys	AP-400
10-50	Photo Test Equipment	AP-270

14. 11 Series - Aviation Armament/Ordnance and Accessories.

11-1	General	AW-000
11-5	Bombs, Depth Charges, and Accessories	AW-382
11-10	Gun Mounts and Gun Accessories	AW-380
11-15	Pyrotechnics and Accessories	AW-052
11-30	Dispensers	AW-390
11-45	Gun Turrets, Components, and Accessories	AW-300
11-55	Tow Targets and Accessories	AW-141
11-60	Automatic Flight Control Equipment	AW-235
11-70	Armament Control Systems, Components, and Accessories	AW-240
11-75	Missiles and Related Accessories	AW-800
11-80	Mines, Mine Sweeping, and Accessories	AW-550
11-85	Rockets and Accessories	AW-040
11-95	Guns, Gunpods, and Accessories	AW-380
11-100	Cartridge Actuating Devices	
11-110	Aircraft Boresights	
11-120	Ship Weapons Installation	
11-140	Pre-Loaded Weapons Uninstalled Suspension Equipment	
11-265	Production Line Maintenance	AW-240XX-MMI

**Encl. (3) to COMDTINST M13020.1F**

	11-600	Aviation Armament Series Maintenance Requirements Cards	AW-800XX-MRC
	11N	Armament, Nuclear	AW-080
15.	<u>13 Series - Parachute and Personal Survival Equipment.</u>		AS-000
16.	<u>15 Series - Standard Preservation and Packaging Instructions (See 00-85 Series also).</u>		
	15-01	Aircraft and Airframes	A1-F18XX-PPI
	15-02	Aircraft Engines	A1-F40XX-PPI
	15-03	Accessories	A1-650XX-PPI
	15-05	Instruments	A1-524XX-PPI
	15-16	Electronics	AE-450XX-PPI
17.	<u>16 Series - Electronics (See 08 Series also).</u>		
	16-1	General	AE-000
	16-5	Radio, Radar	
	16-30	Joint Nomenclature (Electronic Test Equipment)	
	16-35	Joint Nomenclature (Electronic Test Components)	
	16-40	Signal Corps - Nomenclature Radio Equipment	
	16-45	Commercial British and Navy Electronic Test Equipment	
	16-50	Automatic and Semi-Automatic Electronic Checkout Equipment	AE-190/ AE-398
	16-75	Test Tapes	
	16-80	Test Set Cards/Overlays and Punched Cards	AE-190XX-TSC
	16-300	Certification Procedures (Security Equipment)	AE-180XX-ECI
	16-600	Electronic Series Maintenance Requirements Cards	AE-170XX-MRC
18.	<u>17 Series - Machinery, Tools, and Test Equipment.</u>		
	17-1	Shop and Warehouse Machinery	AG-200
	17-5	Shop and Warehouse Machinery, Powered Tools, and Equipment	
	17-10	Shop and Warehouse Machinery, Non-powered Tools and Equipment	
	17-15	Lab and Shop Test and Inspection Equipment (See 05-95 Series also)	AG-600
	17-20	Instrument Calibration Procedures	
	17-25	Measurement System Operation Procedures	

**Encl. (3) to COMDTINST M13020.1F**

- |        |   |              |
|--------|---|--------------|
| 17-35  | Miscellaneous Calibration Procedures and Metrology Requirements Lists |              |
| 17-40  | MIARS Equipment   |              |
| 17-75  | Testers and Test Card Sets  |              |
| 17-600 | Support Equipment Maintenance Requirement Cards                       | AG-200XX-MRC |
19. 19 Series - Ground Servicing and Mobile Equipment (See 08-20 Series also).
- |         |  |              |
|---------|--|--------------|
| 19-1    | General  | AG-000       |
| 19-5    | Oxygen Equipment                                 | AG-100       |
| 19-10   | Airfield Lighting Equipment                      | AG-260       |
| 19-15   | Platform and Scaffolds                           | AG-220       |
| 19-20   | Portable Shop Equipment                          | AG-200       |
| 19-25   | Fire Truck, Miscellaneous Trucks, and Trailers   | AG-310       |
| 19-30   | Field Starters (Mobile)                          | AG-320       |
| 19-35   | Air Compressor (Other than Power Plant)          | GS-210       |
| 19-40   | Tractors and Aircraft Towing                     | AG-305       |
| 19-45   | Mobile Electric Power Plants                     | AG-320       |
| 19-50   | Generators for other than Power Plants           | AG-110       |
| 19-60   | Portable Heaters and Coolers                     | AG-160       |
| 19-70   | Airplane Hydraulic Jacks                         | AG-250       |
| 19-75   | Generator Skid or Trailer Mounted (Gas/Nitrogen) | AG-750       |
| 19-80   | Motorized Materiel Handling Equipment            | AG-300       |
| 19-95   | Transporting and Loading Equipment Configuration | AG-800       |
| 19-100  | Handling Equipment                               | AG-810       |
| 19-105  | Gas Turbine Compressors and/or Power Units       | AG-850       |
| 19-110A | Blower-Gasoline Driven                           | AG-900       |
| 19-600  | Support Equipment Maintenance Requirements Cards | AG-850XX-MRC |
20. 28 Series - Instructional Equipment and Training Aids (See 09 Series also).
- |  |  |        |
|--|--|--------|
|  |  | A8-300 |
|--|--|--------|
21. 50 Series - Meteorology DCNO (Air) (See 16 Series also).
- |       |  |        |
|-------|--|--------|
|       |  | AM-000 |
| 50-1  | Text and Reference Material, Climatological Information, Directive Material, General Information, Techniques, and Procedures | AM-005 |
| 50-30 | Meteorological and Aerological Weather Equipment   | AM-400 |
22. 51 Series - Ship Installations.

**Encl. (3) to COMDTINST M13020.1F**

51-5	Arresting and Barrier Gear	AD-100
51-15	Catapults	
51-25	Catapult Support Gear	AD-200
51-35	Homing Devices and Beacons	AE-175
51-40	Landing/Lighting Systems	AD-600
51-50	Visual Landing Aids	AD-400
51-60	Pilot-LSO Landing Aids, Auxiliary Landing Fields and Maps	
51-70	Jet Blast Deflectors	

Encl. (4) to COMDTINST M13020.1F

## **SAMPLE LETTER FOR AIRCRAFT MAINTENANCE RELEASE AUTHORITY**

U.S. Department of  
Homeland Security

United States  
Coast Guard



Commanding Officer  
United States Coast Guard  
Air Station

Sacramento, CA  
Staff Symbol:  
Phone: (916) 643-2796  
FAX:

From: CDR A. B. WHITE,USCG  
CG AIRSTA, Acting

To:

Subj: AIRCRAFT MAINTENANCE RELEASE AUTHORITY

Ref: (a) Coast Guard Air Operations Manual, COMDTINST M3710.1 (series)  
(b) Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1 (series)

1. In accordance with reference (b), you are authorized to release aircraft assigned to this Aviation Unit for flight after corrective maintenance has been performed. As such, you are directed to familiarize yourself with the duties described in reference (a) and reference (b).

2. You are authorized to release aircraft for flight. Additionally, you may authorize Carry Forwards (CFs), Parts Pending (PP), and aircraft cannibalization. The authority to release grounded aircraft for flight is an extremely serious responsibility. It requires thorough and complete understanding of the maintenance/mechanical discrepancy, the corrective action taken, and the quality of that action; i.e., was it the correct action properly completed?; who did the maintenance?; who QA'd it?; and under what circumstances? Your shipmates will be relying on your professionalism and sound judgment. Never lose sight of the seriousness of the special trust, which I have placed upon you.

3. This authority is not to be delegated. You may pass your authorization by any appropriate communications channel if you can satisfy yourself that the above provisions have been complied with.

#

Figure 1. Sample Letter for Aircraft Maintenance Release Authority



## ATA SPECIFICATION 100

- A. The Air Transport Association of America Specification 100 provides a standard for the presentation of manufacturers' technical data for aircraft, engines, and components. It establishes policy and standards applicable to the commercial manuals the Coast Guard has received with the HU-25 and HH-65 aircraft. The specification is also used in part for numbering of chapters for the Aviation Computerized Maintenance System (ACMS).

### NOTE

The Standard Breakdown (paragraph C) has been modified to incorporate the standards of MIL-STD-1808.

## B. DEFINITIONS.

1. Publication contents are organized on four levels; Aircraft Group, System/Chapter, Sub-System, and Unit/Subject.

**GROUP.** Those primary divisions of a publication which enable broad separation of content. Typical of this division is the separation between Airframe Systems and the aircraft Power Plant.

**SYSTEM/CHAPTER.** Those secondary divisions which permit the subject matter within the Group to be discussed separately.

### NOTE

The Systems are also known as Chapters of a manual. Each Chapter is assigned the first element in the standard numbering system (described below).

**SUB-SYSTEM/SECTION.** Those tertiary divisions which permit a system to be broken into sub-systems. Sub-systems or sections shall be identified by the second element in the standard numbering system.

**UNIT/SUBJECT.** Those final divisions which permit the identification of the individual units in a system or sub-system. Subjects shall be identified by the third element in the standard numbering system.

### NOTE

Unit/Subject numbers are not preassigned; these numbers and their sequence may be selected by the manufacturer to fit the coverage requirements of their publication.

**(SYSTEM/CHAPTER) (SUB-SYSTEM/SECTION) (UNIT/SUBJECT).** This term describes the complete number when it is referred to as a whole. For example, the number 29-31-03, which contains elements on all levels, may be called the chapter/section/subject number for easier identification and reference.

## C. STANDARD BREAKDOWN.

1. Group Aircraft

<u>Systems/Chapter</u>	<u>Title</u>
00	Aircraft-General
01 thru 04	Reserved
05	Time Limits/Maintenance Check
06	Dimensions and Areas
07	Lifting and Shoring
08	Leveling and Weighing

**Encl. (5) to COMDTINST M13020.1F**

<u>Systems/Chapter</u>	<u>Title</u>
09	Towing and Taxiing
10	Parking, Mooring, Storage and Return to Service
11	Placards and Markings
12	Servicing
13	Equipment Storage
14	Aircraft Loading and Off-Loading
15	Support Equipment
16	Siting Insulation
17	Preparation for Use and Shipment
18	Weapons Instrumentation
19	Reserved

**2. Group Airframe Systems**

<u>Systems/Chapter</u>	<u>Title</u>
20	Standard Practices Airframe
21	Air Conditioning
22	Auto Flight
23	Communications
24	Electrical Power
25	Equipment/Furnishings
26	Fire Protection
27	Flight Controls
28	Fuel
29	Hydraulic Power
30	Ice and Rain Protection
31	Indicating and Recording Systems
32	Landing Gear
33	Lights
34	Navigation
35	Oxygen
36	Pneumatics
37	Vacuum
38	Water/Waste

**Encl. (5) to COMDTINST M13020.1F**

<u>Systems/Chapter</u>	<u>Title</u>
39	Electrical/Electronic Components and Multifunction Units
40	Standard Practices - Integrated Avionics
41	Water Ballast
42	Integrated Avionics Architecture
43	Communications - Staff
44	In-Flight Refueling - Tanker
45	Central Maintenance System (CMS)
46	System Integration and Display
47	Liquid/Gaseous Nitrogen
48	Reserved
49	Airborne Auxiliary Power
51	Standard Practices and Structures General
52	Doors
53	Fuselage
54	Nacelles/Pylons
55	Stabilizers
56	Windows
57	Wings
58 and 59	Reserved

**3. Group Propeller**

<u>Systems/Chapter</u>	<u>Title</u>
60	Standard Practices Propeller
61	Propellers
62	Rotors
63	Rotor Drive(s)
64	Tail Rotor
65	Tail Rotor Drive
66	Folding Blades/Pylon
67	Rotors Flight Control
68 and 69	Reserved

**4. Group Power Plant**

**Encl. (5) to COMDTINST M13020.1F**

<u>Systems/Chapter</u>	<u>Title</u>
70	Standard Practices Engines
71	Power Plant 72 Engine
72	Engine Turbine/Turboprop
72	Engine Reciprocating
73	Engine Fuel and Control
74	Ignition
75	Air
76	Engine Controls
77	Engine Indicating
78	Exhaust
79	Oil
80	Starting
81	Turbines
82	Water Injection
83	Accessory Gear-Boxes
84	Propulsion Augmentation
85 thru 90	Reserved

**5. Miscellaneous**

<u>Systems/Chapter</u>	<u>Title</u>
91	Charts
92	Electrical Power Multiplexing
93	Electronic Warfare
94	Weapon System
95	Crew Escape and Safety
96	Missiles, Drones and Telemetry
97	Image Recording
98	Meteorological and Atmospheric Research
99	Surveillance

- D. STANDARD NUMBERING SYSTEM.** The numbering system is a conventional class-number breakdown. It provides a means for dividing materiel into Chapter, Section, Subject, and Page. The number is composed of three elements which consist of two digits each.

## Encl. (5) to COMDTINST M13020.1F

FIRST ELEMENT	SECOND ELEMENT	THIRD ELEMENT	
CHAPTER (SYSTEM)	SECTION (SUB-SYSTEM)	SUBJECT (UNIT)	COVERAGE
26 -	00 -	00	
(SYSTEM) "FIRE PROTECTION"			Materiel which is applicable to the system as a whole.
26 -	20 -	00	
	(SUB-SYSTEM) "EXTINGUISHING"		Materiel which is applicable to Sub-System as a whole.
26 -	22 -	00	
	(SUB-SUB-SYSTEM) "ENGINE FIRE EXTINGUISHING"		Materiel which is applicable to Sub-Sub System as a whole. This number (digit) is assigned by the manufacturer.
26 -	22 -	03	
		(UNIT) "BOTTLES"	Materiel which is applicable to a specific unit of the Sub-Sub-System. Both digits are assigned by the manufacturer.

**E. SPECIFIC PUBLICATIONS**

<u>Code</u>	<u>HU-25</u>	<u>HH-65</u>
LOAP	TIMOS MPI	TIMOS MPI
Aircraft Maintenance Manual	1U-25A-2	1H-65A-2-1
Wiring Manual	1U-25A-2-9	1H-65A-2-2
Structural Repair Manual	1U-25A-3	1H-65A-3
Illustrated Parts Catalog	1U-25A-4	1H-65A-4
Component Maintenance Manual	1U-25A-11 (Series)	1H-65A-11(Series)
Tool Equipment Manual	32A-25A-2	32H-65A2
Weight and Balance Manual	1U-25-5	01-1B-50
Non-Destructive Testing	1U-25A-36	1H-65A-36
Corrosion Control Manual	1U-25A-23	
Avionics Maintenance	1U-25A-2-8	1H-65A-2-3
Ground Support	35U-25A-2	
Engine Manual	2J-ATF3-2-2	1H-65A-11-72-2B2
Tool, Equipment, and Component Maint.	32A-ATF3-2	
Power Plant Build-Up	2J-ATF3-10	
Engine Overhaul Manual		1H-65A-11-72-11B2

**Encl. (5) to COMDTINST M13020.1F**

Engine Light Maintenance Manual	2J-ATF3-2-1	
Engine Heavy Maintenance Manual	2J-ATF3-2-2	
Inspection and Repair Manual	2J-ATF3-2-3	
Engine Illustrated Parts Catalog	2J-ATF3-4	1H-65A-11-72-4B-2
Aircraft Overhaul Manual		1H-65A-101

## RECOMMENDATIONS FOR AVIONICS TECHNICAL LIBRARIES

### A. USCG PUBLICATIONS.

Number	Title
	Aeronautical Engineering Newsletters
COMDTINST M10550.25 (series)	Electronics Manual
COMDTINST M13020.1 (series)	Aeronautical Engineering Maintenance Management Manual
COMDTINST M2000.3 (series)	Telecommunications Manual (TCM)
COMDTINST M5100.47 (series)	Safety and Environmental Health Manual

### B. COMMERCIAL PUBLICATIONS.

Title	Publisher
Reference Data for Radio Engineering	Howard W. Sams
Dictionary of Physics and Electronics	D. Van Nostrand, Co.
Aircraft Electricity and Electronics, Bert McKinley	McGraw Hill Book, Co.
Radar Technology, Eli Brookner	ARTECH House, Inc.
Logistics Engineering and Management, Benjamin S. Blanchard	Prentice-Hall
Avionics Navigation Systems	John Wiley & Sons, Inc. Kayton & Fried, Editors
IEEE Standard Dictionary of Institute of Electrical and Electronic Terms and Electronic Engineers, Inc.	IEEE
Standard Handbook for Electrical Engineers, Finks & Carroll	McGraw Hill Book, Co
Electronic Engineers Handbook, Finks	McGraw Hill Book, Co.
Introduction to Radar Systems, Merrill I. Skolnik	McGraw Hill Book, Co.
Electrical Engineers Master Catalogue United Technical	Finks Publications
Specification for Manufacturers' Air Transport Association A.T.A. Spec. No. 100	Technical Data of America

### C. NAVY PUBLICATIONS.

Number	Title
NAVAIR 00-500A	Naval Aeronautical Publications Index, Equipment Applicability List
NAVAIR 01-1A-505	Installation Practices for Aircraft Electric and Electronic Wiring

**Encl. (6) to COMDTINST M13020.1F**

Number	Title
NAVAIR 16-1-521	Reduction of Radio Interference in Aircraft, Installation and Maintenance Practices
NAVAIR 16-1-540	Avionic Cleaning and Corrosion Control Organizational Intermediate Maintenance

**D. AIR FORCE TECHNICAL ORDERS.**

Number	Title
00-20-14	AF Metrology and Calibration Program
00-25-234	General Shop Practices for the Repair, Maintenance, and Test of Electronic Equipment
00-25-251	Installation, Operation, Maintenance, Care, and Handling Instructions General - Microwave, Magnetron, and Electron Tubes
1-1-24	Maintenance Repair and Electrical Requirements for Fiberglass Airborne Radomes
1-1A-14	Installation Practices for Aircraft Electric and Electronic Wiring
12R-2-122	General Maintenance, Installation Instruction - Aircraft Fixed Wire Antennas
31-1-141-1 Thru -15	Basic Electronics Technology and Testing Practices

**E. MILITARY STANDARDS**

Number	Title
MIL-W-5088L	Wiring, Aerospace Vehicle

## SOFTWARE CHANGE PROCEDURE

- A.** Proposed changes to aircraft software and problems and discrepancies with the aircraft software shall be submitted to the appropriate Stan Unit using the Software Trouble Report (see Figure 1.). The Stan Unit will review, consolidate, and forward all proposed changes to the designated Software Support Activity (SSA).
- B.** The SSA will confer with the Stan Unit, Commandant (G-SEA), and Commandant (G-OCA) to determine when an Operational Advisory Group (OAG) will convene. The OAG consists of representatives from Commandant (G-WKS), Commandant (G-OCA), Commandant (G-SEA), Stan Unit, ATTC, Prime Unit, ARSC, the SSA, and each affected unit. The OAG will evaluate and prioritize the proposed changes.
- C.** The SSA will perform an initial analysis to determine feasibility of the proposals. A package of changes and their initial analysis will be forwarded for Headquarters Aircraft Configuration Control Board (ACCB) Phase I review.
- D.** The ACCB will review the package and accept or reject each item individually. The ACCB gives the SSA the approval to proceed with development.
- E.** The SSA will develop the software change. The SSA will coordinate with the Prime Unit to perform both a ground test and a flight test of the software.
- F.** Prime Unit will send an evaluation report to ARSC. ARSC will make their recommendation and produce a draft TCTO for ACCB (Phase II) review.
- G.** With final approval, Commandant (G-SEA) will direct ARSC to complete and publish the TCTO. Commandant (G-SEA) will coordinate manual updates, software shipping and loading.

Encl. (7) to COMDTINST M13020.1F

## SOFTWARE TROUBLE REPORT

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To:		SEND INFO COPIES TO:  PRIME UNIT  ARSC  G-SEA
2. Originator		3. Date Submitted
		4. ORIGINATOR PRIORITY <input type="checkbox"/> EMERGENCY <input type="checkbox"/> URGENT <input type="checkbox"/> ROUTINE
5. STR Title		6. Aircraft Type, Bureau No.
7. Program ID No. & Rev Letter	8. A/C System	9. Reply Requested? <input type="checkbox"/> Yes <input type="checkbox"/> No
10. Description of Requested Change or Trouble:		
11. Mission Impact Assessment		
12. Authorizing Signature, Title		13. Date

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Figure 1. Software Trouble Report