

INITIAL
NAVY TRAINING SYSTEM PLAN
FOR THE
ADVANCED MISSION
COMPUTER AND DISPLAYS
DECEMBER 1997

Enclosure (1)

ADVANCED MISSION COMPUTER AND DISPLAYS

EXECUTIVE SUMMARY

This Initial Navy Training System Plan (INTSP) for the Advanced Mission Computer and Displays (AMC&D) was developed by the Naval Air Systems Command (3.4.1) using the Training Planning Process Methodology (TRPPM). It provides early-on estimates of the manpower, personnel, and training system requirements to support and sustain the AMC&D. It also contains appropriate and pertinent data required to make accurate decisions and assessments concerning design and manning alternatives for the AMC&D.

The AMC&D is designated as an Acquisition Category III program and is currently in the Concept Exploration phase. A Milestone I/II decision is scheduled for second quarter FY98. Limited Rate Initial Production deliveries for F/A-18E/F are scheduled for second quarter FY02 through third quarter FY03. The AMC&D program is a potential joint service program with the Air Force and Army.

The AMC&D will be designed as the standard mission computer and display system for Naval aviation. AMC&D is an avionics suite that is targeted to replace existing displays based on older cathode-ray tube technology and the AN/AYK-14(V) Mission Computer. AMC&D will not only replace current fleet equipment but also provide advanced operational capability for aircraft not currently equipped with displays and/or mission computers. The AMC&D system will maximize commonality across user aircraft.

The maintenance concept is planned to be a two-level maintenance concept, organizational and depot. Comprehensive built-in test functions will be utilized during all phases of the AMC&D system operation. Depot level maintenance will be performed by the Original Equipment Manufacturer (OEM).

The manpower requirements for the AMC&D are well within the capabilities of the Navy's existing rating structure. No additional manpower will be required. Maintenance of the system will be performed by currently assigned Navy Aviation Electronics Technicians (AT). Operators of the system will be the pilots of the prospective aircraft.

The AMC&D training program will consist of operator and maintenance training. The contractor will develop operator and maintenance training courses and provide initial operator and maintenance training to government personnel for Operational Assessment, Technical, and Operational Evaluations. The contractor will also develop the training source data for Follow-on Test and Evaluation (FOT&E) to be conducted by the aircraft platform. Training in support of aircraft and cadre instructors will be developed as required through the platform Engineering Change Proposal process. Pilot training will be integrated into the existing pilot training syllabus for each of the prospective aircraft platforms. Follow-on maintenance training for ATs will be integrated into existing courses.

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LIST OF ACRONYMS

AMC	Advanced Mission Computer
AMC&D	Advanced Mission Computer and Displays
AMIST	Aviation Maintenance In-Service Training
AMTCS	Aviation Maintenance Training Continuum System
ASW	Anti-Submarine Warfare
AT	Aviation Electronics Technician
CBT	Computer-Based Training
DH	Display Heads
DPC	Display Processor Computer
ECP	Engineering Change Proposal
EMD	Engineering and Manufacturing Development
FOT&E	Follow-On Test and Evaluation
INTSP	Initial Navy Training System Plan
LRIP	Limited Rate Initial Production
MDI	Multipurpose Display Indicator
MDRI	Multipurpose Display Repeater Indicator
MNS	Mission Needs Statement
MTBOMF	Mean Time Between Operational Mission Failure
MPCD	Multi-Purpose Color Display
MTIP	Maintenance Training Improvement Program
NATOPS	Naval Air Training and Operating Standardization
NEC	Navy Enlisted Classification
OEM	Original Equipment Manufacturer
OPEVAL	Operational Evaluation
OT	Operational Test
TACMAN	Tactical Manual
TECHEVAL	Technical Evaluation
TRPPM	Training Planning Process Methodology
WRA	Weapon Replaceable Assembly

ADVANCED MISSION COMPUTER AND DISPLAYS

PREFACE

This is the first iteration of the Initial Navy Training System Plan (INTSP) for the Advanced Mission Computer and Displays (AMC&D). It includes the proposed training sites, training equipment, training course information, and billet and personnel requirements.

This INTSP is a product of the Training Planning Process Methodology (TRPPM), which is the Navy's replacement for the Hardware/Manpower (HARDMAN) Integration Program Methodology. As such, the format of this document is somewhat different than its predecessor, the HARDMAN Concept Document. However, their purposes are identical.

D. SYSTEM DESCRIPTION

1. Operational Uses. The Advanced Mission Computer and Displays (AMC&D) will provide capabilities commensurate with modern glass cockpits. Ever-increasing digital combat information and information density require high speed processors and displays capable of processing, maintaining, and presenting this information. In addition, enhanced graphics processing is essential to provide vivid color to aid in distinguishing features between overlays and background. The AMC&D will provide the aircrew with easily assimilated graphical, textual, and active sensor video presentation of the aircraft's flight information and tactical situation under all lighting conditions. This includes sensor information such as acoustic wave forms from Anti-Submarine Warfare (ASW) systems, Forward Looking Infrared Radar, mission radar or weather radar, digital maps, and flight avionics information. This information is critical for analysis and decision making. The missions enhanced by improved performance and flexibility include air-to-air, air-to-ground, close air support, combat search and rescue, special operations, ASW, Night Sure Fire System, and Vertical Replenishment/ferry.

The Tactical Aircraft Moving Map Capability Program's Mission Needs Statement (MNS), M061-88-94 dated 2 December 1994, defines the needs for the efficient assimilation, correlation, and display of large amounts of information including tactical situation, mission status, aircraft performance, weapons status, and sensor information. The principal benefits described in the MNS are increased mission effectiveness and earlier threat assessment. These benefits include improved situational awareness, reduced aircrew workload, and enhanced capability for precision navigation, targeting, obstacle avoidance, and mission re-planning. The AMC&D Acquisition Plan/Acquisition Strategy Report further describes the need for the development of a mission computer with a family of displays for both new production aircraft and the retrofit of existing aircraft aging or obsolete systems.

2. Foreign Military Sales. No foreign military sales or other service procurements are planned at this time.

E. DEVELOPMENTAL TEST AND OPERATIONAL TEST. Technical Evaluation (TECHEVAL) for the AMC&D is scheduled for the second quarter FY02. Operational Evaluation (OPEVAL) is scheduled for first quarter FY03.

F. AIRCRAFT AND/OR EQUIPMENT/SYSTEM/SUBSYSTEM REPLACED. As of this writing, the planned users of the AMC&D are F/A-18E/F Lot 25 and above aircraft. The AMC&D will replace existing systems as displayed in the following table:

AIRCRAFT	NEW	REPLACED
F/A-18 E/F	AMC	AN/AYK-14(V)
F/A-18 E/F	DPC	AN/AYK-14(V)

AIRCRAFT	NEW	REPLACED
F/A-18 E/F	5 X 5 DH	MDI/MDRI

G. DESCRIPTION OF NEW DEVELOPMENT

1. Functional Description. The AMC&D will consist of an Advanced Mission Computer (AMC), a Display Processor Computer (DPC), a family of Display Heads (DH), and a High Speed Data Bus architecture. Large amounts of information critical to the aircrew's mission is now available from on and off-board sensors and from multiple linked databases. This information must be fused in the aircraft and presented on cockpit and aircrew displays to effectively use the aircrew's capabilities to quickly assess and respond to the tactical situation. The AMC&D are required to present high volumes of data and imagery necessary to perform the critical mission functions such as surveillance, reconnaissance, precision strike, terrain following navigation, targeting, weapon delivery, and battle damage assessment. The AMC and DPC will replace existing mission computer-processing systems and be capable of supporting display processing modules in the same chassis. This capability will provide users with the ability to backup critical display processing capabilities of the DPC within the AMC. The reverse will also be possible, thereby providing backup mission processing capability within the DPC. Additional processing throughput, backplane bandwidth, and Input-Output bandwidth are required to implement new requirements for tactical aircraft.

2. Physical Description. The AMC&D will use a modular approach based on functional building blocks. Shop Replaceable Assemblies will be common between the AMC and DPC. The Interfaces between the functional blocks will use Open System Architecture permitting technology insertion at the module level while preserving form, fit, and function at the Weapon Replaceable Assembly (WRA) level. The AMC&D AMC and DPC form factor will be the same as the current AN/AYK-14(V) Standard Airborne Computer. The AMC&D will develop a baseline 5 x 5 DH, which will replace the current F/A-18 Multipurpose Display Indicator (MDI), Multipurpose Display Repeater Indicator (MDRI), and possibly the Multipurpose Color Display (MPCD) 5" x 5" DHs. There will be separate Engineering Manufacturing Development (EMD) options to develop 6.25" x 6.25", 8" x 6", and 4" x 4" display heads. The AMC&D AMC, DPC, and DHs will conform to size and weight of the aircraft on which it is installed. Provisions for larger display provided as part of the mechanization of the tactical F/A-18F (emerging requirements possible for 8 x 10 inch display in the rear cockpit).

3. New Development Introduction. Installation of the AMC&D system will occur via the standard ECP process.

4. Significant Interfaces. The integration of the AMC&D into the aircraft avionics suite will be a complex interface with numerous aircraft systems. Due to the complex technical integration it is crucial that the developer of the AMC&D completely understand this complex interface. The acquisition of the AMC&D will be sole source contract award to the Boeing

Company, McDonnell Aircraft and Missile Systems, for EMD and integration into the F/A-18E/F aircraft.

5. New Features, Configurations, or Material. The AMC&D will provide improved displays and processors capable of assimilating graphical, textual, and active sensor video presentation of the aircraft's flight information and tactical situation. The AMC&D will also provide an advanced operational processing capability in the form of near real-time data, enabling pilots to identify friend, foe, allied, and neutral ground combat vehicles, aircraft, and ships. Additionally the aircrew will have the ability to avoid threats and re-plan the mission and target selection in-flight, and improve bomb damage assessment not currently available with today's displays and mission computers.

The AMC larger core processor will provide for additional processing throughput, backplane bandwidth, and Input-Output bandwidth. Additional display processing throughput and increased data transfer rates between the display processor and the mission computer are required to implement new requirements for tactical aircraft such as the F/A-18E/F. Implementation of new requirements such as F/A-18E/F will require major additions to the existing Operational Flight Program. These new additions will require major increases in display processor hardware performance. The DPC will be designed to be programmable and upgradeable in order to support future DH technology and symbol sets.

H. CONCEPTS

1. Operational Concept. The system will be operated by pilots and weapon system operators within the F/A-18, or other aircrew (i.e., BCN, co-pilot) depending on the aircraft platform. The AMC&D operator functions will be similar to those of the existing systems it is replacing. As a result, squadrons receiving AMC&D will require no additional operators.

2. Maintenance Concept. The AMC&D system includes a two level maintenance concept, organizational to depot, where depot is the Original Equipment Manufacturer (OEM). The AMC&D system will not require calibration or any peculiar support equipment.

(a) Organizational. Organizational level maintenance for the AMC&D will consist of inspection, fault isolation, and removal and replacement of WRAs.

(1) Preventive Maintenance. Preventive maintenance will be conducted at specified intervals in accordance with procedures to be established by Periodic Maintenance Requirements Manual. Preventive maintenance will consist of corrosion inspections and cleaning.

(2) Corrective Maintenance. The AMC&D system will use Built-In Test for functional checkout and to fault isolate to a malfunctioning WRA at the aircraft platform for removal and replacement at the organizational level. The failed unit will be removed and replaced with a serviceable unit and the failed unit will be returned to the OEM.

(b) **Intermediate.** Intermediate level maintenance is not anticipated for the acquisition, therefore, no intermediate level support equipment, automated test equipment, or test program sets will be required.

(c) **Depot.** Depot level maintenance will be performed by the OEM during the period of the warranty.

(d) **Warranty.** The AMC&D availability and reliability will be ensured via a warranty that has Mean Time Between Failure and Mean Time Between Demand operational availability performance requirements.

(e) **Interim Maintenance.** No interim maintenance support will be required.

3. Manning Concept. The manpower requirements for the AMC&D system are well within the capabilities of the Navy's existing officer and enlisted rating structure. Operators of the system will be the same (existing) operators as for the predecessor systems. Maintainers will come from the squadron's standard complement of Navy Aviation Electronics Technicians (AT) with F/A-18E/F Navy Enlisted Classifications (NEC) codes 8341 and 8841.

(a) **Estimated Maintenance.** The Mean Time Between Operational Mission Failure (MTBOMF) objectives for the AMC&D system are 1800 operating hours for the AMC, and 1900 hours for the DPC. Although this represents significantly less maintenance workload when compared to the predecessor systems, the predecessor's workload is not of sufficient magnitude to reduce a full maintenance man-year. Therefore, the AMC&D will not increase or decrease maintenance personnel requirements in the squadrons receiving it.

(b) **Proposed Utilization.** Since the AMC&D will be an integral part of the specific aircraft platforms, its utilization rate will be identical to that of the various aircraft platforms identified. The utilization rate of the various aircraft can be found in the appropriate Weapon System Planning Document for that specific aircraft.

(c) **Recommended Qualitative and Quantitative Manpower Requirements.** The existing manpower that will support and sustain the AMC&D system include the following:

(1) **Officer.** The operator functions associated with the AMC&D will not generate the need for additional manpower requirements. AMC&D operators will be as follows:

POSITION / AIRCRAFT	DESIGNATOR	NOBC	CREW RATIO	SEAT FACTOR
Navy Pilot F/A-18E	1311	8501	1.58	1
Navy Pilot F/A-18F	1311	8501	1.58	1
Navy WSO F/A-18F	1321	8501	1.58	1

(2) **Enlisted.** Based on the estimated maintenance man-hours of the AMC&D, its introduction will not change manpower requirements at the organizational level. The NEC codes of the existing enlisted maintenance personnel that will be associated with the maintenance of the AMC&D are as follows:

NEC	TITLE	AIRCRAFT
8841	Systems Organizational Level Apprentice Maintenance Technician	F/A-18E/F
8341	Systems Organizational Career Maintenance Technician	F/A-18E/F

4. Training Concept. The AMC&D training program will consist of both operator and maintenance training. Initial training will be provided by the AMC&D contractor. Operator and maintenance follow-on training will be integrated into the existing training syllabus for the F/A-18E/F aircraft.

(a) **Initial Training.** The contractor will provide initial operator and maintenance training to government personnel for operational assessment, TECHEVAL, and OPEVAL. The contractor will develop the training source data for Follow-On Test and Evaluation (FOT&E) personnel, and the initial cadre of fleet personnel. Training in support of aircraft FOT&E will be developed as required through the platform Engineering Change Proposal (ECP) process. The contractor will structure initial training based upon Navy requirements for Fleet Replacement Squadron introduction and any identified follow-on training requirements that emerge during developmental testing. The initial training will include any proposed changes to the F/A-18 Naval Air Training and Operating Standardization (NATOPS) and Tactical Manuals (TACMANs). During Operational Test (OT), the Navy will review proposed training materials prior to the Operational Test Requirements Review. The contractor will provide for change incorporation of identified training deficiencies prior to OT.

(1) **Operator.** Initial AMC&D system operator training will be developed and conducted by the contractor to support personnel involved in operational assessment, TECHEVAL, and OPEVAL.

(2) **Maintenance.** Initial AMC&D system maintenance training will be developed and conducted by the contractor to support personnel involved in operational assessment, TECHEVAL, and OPEVAL. Initial AMC&D system maintenance training will be conducted by the integration contractor team performing the ECP installation.

(b) Follow-on Training

(1) **Operator.** AMC&D pilot training will be integrated into the existing pilot training syllabus. No increase or decrease to student throughput is projected.

AIRCRAFT	COURSE NUMBER	COURSE TITLE
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AIRCRAFT	COURSE NUMBER	COURSE TITLE
F/A-18	D/E-2A-0601	F/A-18 Fleet Replacement Pilot Category 1
F/A-18	D/E-2A-0602	F/A-18 Fleet Replacement Pilot Category 2A
F/A-18	D/E-2A-0604	F/A-18 Fleet Replacement Pilot Category 3A
F/A-18	D/E-2A-0606	F/A-18 Fleet Replacement Pilot Category 4

(2) **Maintainer.** Maintenance training will be integrated into the following existing courses:

AIRCRAFT	COURSE NUMBER	COURSE TITLE
F/A-18E/F	C-102-9978	F/A-18E/F Avionics Systems (Career) Organizational Level Maintenance
F/A-18E/F	C-102-9977	F/A-18E/F Avionics Systems (Initial) Organizational Level Maintenance

(c) **Student Profiles**

SKILL IDENTIFIER	PREREQUISITE SKILL AND KNOWLEDGE REQUIREMENTS
AT	<ul style="list-style-type: none"> ° C-100-2020, Avionics Common Core Class A1 ° C-100-2018, Avionics Technician O Level Class A1

(d) **Training Pipelines.** No new training pipelines or tracks will be required for the AMC&D system.

I. ONBOARD (IN-SERVICE) TRAINING

1. Proficiency or Other Training Organic to the New Development. The Maintenance Training Improvement Program (MTIP) will be used to establish an effective and efficient training system that is responsive to fleet training requirements.

(a) **Maintenance Training Improvement Program.** The MTIP will be used to establish an effective and efficient training system that is responsive to fleet training requirements. MTIP is a training management tool that, through diagnostic testing, identifies individual training deficiencies at both the organizational and intermediate levels of maintenance. MTIP is the comprehensive testing of one's knowledge. It consists of a bank of test questions that are managed through automated data processing. The Deputy Chief of Staff for Training will assist in

the development of MTIP by providing those question banks (software) already developed by the Navy. MTIP will be implemented in accordance with OPNAVINST 4790.2F. MTIP will allow increased effectiveness in the application of training resources through identification of skills and knowledge deficiencies at the activity, work center, or individual technician level. Remedial training will be concentrated where needed to combat identified skill and knowledge shortfalls.

(b) Aviation Maintenance In-Service Training. Aviation Maintenance In-Service Training (AMIST) is intended to support the Fleet training requirements now satisfied by MTIP, and in that sense is the planned replacement. However, it is structured very differently, and will function as an integral part of the new Aviation Maintenance Training Continuum System (AMTCS) that will replace the existing aviation maintenance training structure. AMIST will provide standardized instruction to bridge the training gaps between initial and career training. With the implementation of AMIST, the technician will be provided the training required to maintain a level of proficiency necessary to effectively perform the required tasks to reflect a career progression.

AMTCS redesigns the aviation training process (training continuum), and introduces Computer-Based Training (CBT) throughout the Navy technical training process. The application and adoption of recent advances in computer hardware and software technology have enabled CBT with its basic elements of Computer Managed Instruction, Computer Aided Instruction, and Interactive Courseware to be integrated into the training continuum and provide essential support for standardizing technical training.

2. Personnel Qualification Standards. NA.

3. Other Onboard or In-service Training Packages. NA.

J. LOGISTICS SUPPORT

1. Manufacturer and Contract Numbers

CONTRACT NUMBER	MANUFACTURER	ADDRESS
TBD	The Boeing Company, McDonnell Aircraft and Missile Systems	P.O. Box 516 St. Louis, MO 63166

2. Program Documentation. The Integrated Logistics Support Plan or Operational Requirements Document have not been approved. However, program go-ahead was authorized by N880.

3. Technical Data Plan. The OEM will provide source data for integrating contractors to allow technical manuals to be updated. The source data will include instructions for organizational level maintenance for installation, fault isolation, operation, servicing, calibration, testing, repair, and removal and replacement to the WRA. Technical Manual source data will be

developed and delivered to the aircraft platform to allow the aircraft contractors to satisfactorily incorporate AMC&D information into the following technical manuals:

- Operation and maintenance manuals with illustrated parts breakdown
- NATOPS manual
- Flight crew checklist
- Appropriate TACMANs

The contractor will ensure technical manual source data is included in the contractor's configuration control program and will modify technical manual source data to reflect all changes to the AMC&D system. Technical manual development will be based on the AMC&D statement of work and be traceable to the operator and maintainer tasks developed through the LMI program. The contractor developed data will be delivered in electronic media, which will consist of text and graphics files.

4. Test Sets, Tools, and Test Equipment. Built-In Test and manual procedures will be developed to fault detect and isolate WRA failures without the use of additional support equipment nor special tools at the organizational level. No organizational level peculiar support equipment will be required.

5. Human Systems Integration. Human engineering, manpower, personnel, training, and safety processes, including the application of engineering principles and best practices, will be employed by the AMC&D program. These domain efforts will identify and implement requirements for operator and maintainer-system interfaces that will be addressed in system design, development, and support.

K. SCHEDULES

1. Schedule of Events

(a) Installation and Delivery Schedules. Installation of the AMC&D system will occur via the standard ECP process. Initial Operational Capability will be achieved when the AMC&D is installed in a single aircraft with a minimum the logistic resources required for maintenance. Limited Rate Initial Production (LRIP) deliveries for F/A-18 E/F are scheduled for second quarter FY02 through third quarter FY03. The following table details the number of systems being delivered under the LRIP initiative.

AMC&D DELIVERY SCHEDULE				
	AMC	DPC	DH	FY
LRIP Option 1	58	58	200	01
LRIP Option 2	60	60	150	02
LRIP Option 3	60	60	163	03

(b) **Ready for Operational Use Schedule.** The AMC&D system will be ready for use once aircraft installation is complete.

(c) **Time Required to Install at Operational Sites.** Installation time will be dependent upon aircraft platform.

(d) **Foreign Military Sales and Other Source Delivery Schedule.** NA.

(e) **Training Device and Delivery Schedule.** None required.

L. GOVERNMENT FURNISHED EQUIPMENT AND CONTRACTOR FURNISHED EQUIPMENT TRAINING REQUIREMENTS. NA.

M. RELATED NTSPs AND OTHER APPLICABLE DOCUMENTS

DOCUMENT OR NTSP TITLE	DOCUMENT OR NTSP NUMBER	PDA CODE	STATUS
F/A-18E/F	A-50-9201A/A	PMA265	Approved April 95

APPENDIX A - POINTS OF CONTACT

NAME, ACTIVITY, CODE	FUNCTION	TELEPHONE NUMBERS COMMERCIAL, DSN, FAX INTERNET ADDRESS
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CDR Q. Hodge CNO N122	Aviation Manpower	(703) 614-5364, DSN 224
LCDR E. Hawkins CINCLANTFLT N721	Aviation NTSP Manager	(804) 445-7853, DSN 565 (804) 445-7849 (fax)
LT Takamnya CINCPACFLT N321	Fleet Training Readiness	(808) 471-6965, DSN 474
CAPT J. S. Batog NAVAIRSYSCOM PMA209	Program Manager Air Combat Electronics	(301) 757-6464, DSN 757 batogjs@nimitz.mram.navair.navy.mil
Kathy Talton NAVAIRSYSCOM PMA209C	Program Manager, AMC&D	(301) 757-6457, DSN 757
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Mr. E. Scheye CNET N252	Aviation NTSP Manager	(904) 452-4059, DSN 992
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CAPT S. Davis BUPERS PERS-4B	Deputy Assistant, Chief Of Military Personnel Distribution	(703) 614-3454, DSN 224
CDR Lineberg BUPERS PERS-404	Head, Aviation Assignment Branch	(703) 693-1370, DSN 223

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NAME, ACTIVITY, CODE	FUNCTION	TELEPHONE NUMBERS COMMERCIAL, DSN, FAX INTERNET ADDRESS
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Mr. Bruce Colby NAVAIRSYSCOM 3.4.1	Front-End Analysis Manager	(301) 757-2635, DSN 757 (301) 342-4723 (fax) colby_bruce%pax8b@mr.nawcad.navy.mil
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