AIRCRAFT
ACCIDENT INVESTIGATION BOARD
REPORT

US ARMY UH-60
BLACK HAWK HELICOPTERS
87-26000 AND 88-26060

VOLUME 5

TABS O thru O-3a

AIRCRAFT
ACCIDENT INVESTIGATION BOARD
REPORT

COPY

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AFR 110-14 AIRCRAFT ACCIDENT BOARD
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TAB O

ADDITIONAL SUBSTANTIATING DATA REPORTS O-1

TAB O-1

UH-60 BLACK HAWK 88-26060

O-1a Maintenance Technical Report

O-1b IFF Technical Report

TECHNICAL REPORT

BLACK HAWK MAINTENANCE

AIRCRAFT EVALUATED: UH-60 Black Hawk, Serial Number 88-26060

INCIDENT DATE: 14 April 1994

1. INTRODUCTION:

The purpose of this evaluation was to determine the airworthiness, capability and effectiveness of the U.S. Army helicopter, UH-60, Black Hawk, serial number 88-26060. The helicopter was assigned to Eagle Flight Detachment, C Company, 6th Battalion, 159th Aviation Battalion. It was deployed to Diyarbakir Air Base, Turkey on 14 June 1993. It had a total of 1222.0 flight hours on the airframe prior to departing on the last mission. (TAB H1a/blk.11)

II. BACKGROUND:

This technical report was prepared for the official AFR 110-14 aircraft accident investigation into the facts and circumstances surrounding the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in the northern No-Fly Zone of Iraq on 14 April 1994. It reports the technical evaluation processes and determinations regarding the air worthiness and serviceability of the UH-60 Black Hawk helicopter, serial number 88-26060, which was involved in the mishap.

III. EVALUATION:

This evaluation included review of the maintenance records of the helicopter, the results of the Department of Defense laboratory test analyses conducted on aircraft components recovered from the wreckage, and the testimony of Eagle Flight's military and civilian maintenance personnel. Maintenance procedures and the qualifications, experience and supervision of maintenance personnel were also evaluated.

All the available aircraft maintenance records were reviewed. These records, consisting of the Department of the Army (DA) 2408 series are listed below:

(a) The helicopter's 30 day file for the period 16 March 1994 - 15 April 1994 and the six month file for the period 16 September 1993 - 15 March 1994--

DA Form 2408-13 Aircraft Status Information Record
DA Form 2408-13-1 Aircraft Inspection and Maintenance Record
DA Form 2408-13-2 Related Maintenance Actions Record

(b) Historical Maintenance File with--

DA Form 2408-5	Equipment Modification Record
DA Form 2408-5-1	Equipment Modification Record (Component)
DA Form 2408-15	Historical Record for Aircraft
DA Form 2408-15-1	Warranty Identification Card
DA Form 2408-16	Aircraft Component Historical Record
DA Form 2408-16-1	History Recorder, Component, Module Record
DA Form 2408-17	Aircraft Inventory Record
DA Form 2408-19-2	T700 Turbine Engine Analysis Check Records
DA Form 2408-19-3	T700 Engine Component Operating Hours Record
DA Form 2408-20	Oil Analysis Log

Aircraft Survivability Equipment (ASE) installed onboard the UH-60 was one ALQ-144 (Infrared Countermeasures Set), one APR-39 (Radar Warning Receiver), and one M130 (Chaff Dispenser).

Several items of Aircraft Survivability Equipment (ASE) and avionics equipment were recovered from the crash site and forwarded to Department of Defense test facilities for laboratory analysis. (Atch 1) Aircraft Survivability Equipment (ASE) components recovered from the crash site included the ALQ-144 (Infra-red Countermeasures Set), and a CF-1597 Digital Processor Unit for the APR 39 (Radar Warning Receiver). Avionics components recovered from the crash site were the AN/APX-100 (Transponder), one RT 1518B/ARC-164(V)(UHF Radio), one C-6533 (Intercommunications System Control Panels), and one Kit 1C (Cryptographic Computer). M130 (Chaff Dispenser) was destroyed in the post crash fire.

Interviews were conducted with military maintenance and flight personnel and Serv-Air, Inc. civilian contract maintenance personnel to determine what equipment discrepancies, if any, may have contributed to the accident.

Aircraft Survivability Equipment (ASE) and avionics equipment maintenance and test procedures performed by the military maintenance personnel and the contract maintenance personnel were evaluated on-site at Diyarbakir AB, Turkey for compliance with applicable Army technical manuals and directives. (Atch 2)

IV. DETERMINATION:

Analysis of maintenance documentation and component test results is divided into two subsections, General Aircraft Systems and Mission Systems. General Aircraft Systems include fundamental systems necessary for aircraft flight. Mission Systems include systems necessary to perform communications, navigation and aircraft survivability functions.

The most current maintenance documents for this aircraft, could not be reviewed because they were destroyed in the crash. Army directives require that current maintenance forms,

DA Form 2408-13 (Aircraft Status Information Record), DA Form 2408-13-1 (Aircraft Inspection and Maintenance Record), and DA Form 2408-13-2 (Related Maintenance Actions Record)) be kept on the board the aircraft in the logbook. (Atch 3)

The 2408-13 lists the current status of the aircraft (flyable or non-flyable) based on the discrepancies recorded on the other two forms, the total airframe hours, and the hours of the next phase inspection. The 2408-13 is closed out at the end of each mission day (24 hour day the aircraft flies), and the data reentered on a new form for the next mission day. Review of the closed out form, dated 13 April 1994, showed that the aircraft was in a flyable condition. (TAB H1a)

The 2408-13-1 and 2408-13-2 forms are kept on board the aircraft for seven mission days. These documents contained a complete list of all open, (non-grounding) discrepancies. After seven mission days, all of the open entries are carried forward to new forms. The old forms are removed from the aircraft logbook and stored in the 30 day maintenance files. (Atch 3)

Open discrepancies, that existed on the the forms in the 30 day file, would have been carried forward to the records in the log book. A summarized list of those discrepencies is attached. (Atch 5)

The seven day mission period for serial number 88-26060 began with the last records (DA Form 2408-13-1 & -2) close-out on 10 April 1994. (TAB H1b) The maintenance records for 11 April 1994 through 14 April 1994 were maintained in the aircraft log book and were destroyed in the accident.

Discrepancies which were open as of the records close-out on 10 April 1994, and which may have existed during the 14 April 1994 mission are discussed below. Maintenance personnel were not able to recall which, if any, of these discrepancies had been corrected. (TAB V59/p1, para 4) Other non-grounding discrepancies may have been added to the on-board forms after 10 April 1994.

A. GENERAL AIRCRAFT SYSTEMS

The maintenance 30 day file revealed open discrepancies involving general aircraft systems. There were no open discrepancies involving the engines or other aircraft systems that could be related to this accident.

The helicopter did have one "Circle Red X" operating restriction, for a Department of the Army directed modification, that added an Auxiliary Fuel Management System (AFMS) to the Extended Range Fuel System (ERFS). (TAB H1a/blk.10) This modification is designed to provide a warning for any imbalance problems that may arise between the two auxiliary fuel tanks. The operating restriction directs that the pilots not use the AFMS as a fuel quantity indicator. (Atch 4/p2, para 2)

Available records entered in the 30 day file, that were carried forward from the closed out forms,show this aircraft had seventeen discrepancies related to general aircraft systems. These discrepancies should have been entered in the log book forms destroyed in the crash. The writeups included nine airframe discrepancies (e.g., worn or cracked cowlings or bushings), four electrical (e.g., light bulb inoperative), one scheduled inspection (250 hour stabilator inspection due), one administrative serial number correction, and the operating restriction noted above. (Atch 5; TAB H1b) One discrepency (oil sample due), that was carried forward from the closed out forms, was documented as completed on the DA Form 2408-20 in the historical records. (TAB H1d) The discrepancies carried forward, did not affect the airworthiness or mission capability of the helicopter. (TAB V49/p2, para 2)

All modification work orders had been completed. (TAB H1c) Unscheduled maintenance performed prior to the accident was limited to minor procedures (e.g., antenna repair), and does not appear to be related to the accident. (TAB H1b)

Testing and teardown analysis after the accident was not accomplished on the power plant (engines), hydraulic, electric or mechanical systems due to the extensive damage. These systems do not appear to be related to the accident.

Post-crash fuel, hydraulic fluid, and oil samples were not taken from the aircraft because of the extensive damage to components caused by impact and post-crash fires. Engine, fuel, hydraulic and lubrication systems do not appear to be related to the accident.

B. MISSION SYSTEMS

Aircraft Survivability Equipment (ASE). The onboard Aircraft survivability Equipment (ASE) was not designed to protect the helicopter against AIM-9 or AMRAAM missiles carried by F-15 Fighter aircraft. (Atch 6 Tech Report)

All ASE components that were recovered were severely damaged. All components were originally sent to the Office of the Project Manager, Aviation Electronic Combat, St. Louis, Missouri, for forwarding to Department of Defense testing laboratories. (Atch 1) Teardown analysis continues; available results are detailed below .

ASE components sent for teardown analysis included components of the ALQ 144 (Infrared Countermeasures Set), and the APR 39 (Radar Warning Receiver). (Atch 1) Analysis of the ALQ 144 revealed that the subassembly and the remaining attached parts, motors, encoder discs, start relay, EMI filter, harness, lower portions of source [signal generator], and modulators were burned to the extent that a failure analysis could not be made. (TAB J1a/p1, para 2a) The APR 39 analysis revealed that the component had the proper operational flight program (the computer software) and the correct User Data Module (the computer threat library). (TAB J1b/p1-2)

Avionics. All avionics components that were recovered were severely damaged. All components were originally sent to the Office of the Project Manager, U.S. Army Aviation Electronic Combat, St. Louis, Missouri, for forwarding to Department of Defense directed laboratories. (Atch 1) Teardown analysis continues; available results are detailed below .

Avionics components sent for teardown analysis include the AN/APX-100 (Transponder), one ARC 164 (UHF radio), one Kit 1C (Cryptographic Computer) (Atch 1)

Analysis of the AN/APX-100 (Transponder) is pending completion (TAB J1e). Data analysis of magnetic tapes recording the events of the AWACS mission airborne during this aircraft's last flight indicate that the transponder was on and transmitting properly, in Mode I and Mode II. No data was available concerning Mode IV, the encrypted friendly code function, as no interrogation of the helicopters Mode IV was done by the AWACS crew. (TAB O3f)

Due to the damage to the ARC 164 (UHF radio), it was not possible to ascertain the operational condition of the unit at the time of the accident. (TAB J1c/p1, para 2) The hundreds digit of the frequency appeared to be set at "2." The remaining digit settings could not be determined. (TAB J1c/p1, para 2)

The Kit 1C analysis revealed that no determination could be made about the condition of the component prior to the accident, or whether the unit was turned on at the time of the accident. The logic card was charred and significant components were melted. Additionally, wiring was melted and fused so that any attempt to apply power to the unit would have resulted in damage to the tester (ST-20). No additional functional information could be determined. (TAB J1d/p1, para 3) However, data analysis of magnetic tapes recording the events of the AWACS mission airborne during this aircraft's last flight indicates that the transponder was on and transmitting properly, in Mode I and Mode II. No data was available concerning Mode IV, the encrypted friendly code function, as no interrogation of the helicopters Mode IV was done by the AWACS crew. (TAB O3f)

C. PROCEDURES

The aircraft crew chief conducted the preflight servicing. (TAB V54/p3, para 1) In accordance with Army directives, the Pilot In Command is responsible for ensuring the aircraft is properly serviced. (TAB AA15/p7) Servicing records pertaining to refueling, replenishing component fluid levels, and the daily scheduled inspections, were carried in the aircraft logbooks IAW DA Pam 738-751, page 32, para 2-2, and were destroyed in the accident.

Training records show that the crew chief was experienced and properly qualified. (TAB T1b) Testimony presented to the Board indicates the Serv-Air, Inc. contractor maintenance personnel were experienced and properly qualified. (TAB V59/p1, para 1; V60/p1, para 3; V61/p1, para 2)

The crew chief was responsible for entering (keying) the correct Mode IV (Identification Friend or Foe [IFF])code, into the aircraft's Kit 1C, Cryptographic Computer. (TAB V48/p7, para 2) The Mode IV code is changed every day. If the wrong code is entered into the Kit 1C, then the aircraft can not correctly reply to Mode IV interrogations from other friendly aircraft (e.g. AWACS, fighters). There is no procedure or requirement to record the keying process, so there was no definitive way to determine whether the correct Mode IV code was properly entered prior to the mission on 14 April 1994. However the transponder has a self test feature that warns the pilot if the Mode IV did not accept or retain the encryption. The crew chief who loaded the codes and the pilots who would have performed the self test were killed in the crash on 14 April 1994. (TAB X06,X13,X09)

A representative of the Office of the Project Manager, U.S. Army Aviation Electronic Combat, St. Louis, Missouri, evaluated the other Eagle Flight crew chiefs on 28 April 1994. He determined that they were all performing the Mode IV keying procedure in accordance with the applicable technical manuals. (Atch 2)

No other maintenance personnel or supervision factors appear to be related to the accident.

Douglas C Sousa

DOUGLAS C. SOUSA, CW4, USA
Accident Investigation Board

5 Attachments

1. Teardown Analysis Facilities
2. Tech Adv Report
3. Maintenance Documentation
4. Airworthiness Release
5. Acft Status Insp and Maint Record
6. Infrared and Radar Countermeasures

Accident Investigation Board 14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Teardown Analysis of UH-60 Black Hawk Components -- Facilities

1. Aircraft Survivability Equipment (ASE) and Avionics components recovered from the crash sites of U.S. Army Black Hawks helicopters serial numbers 87-26000 and 88-26060 were forwarded for technical analysis.

2. Components were forwarded to the Office of the Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC, 4300 Goodfellow Blvd., St Louis, MO 63120-1798. That office forwarded components to appropriate laboratories for analysis as follows:

a. Arc/164. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

b. ICS/C-6533. Navigational and Information Transmission Branch (W/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

c. Kit 1C. AFCSC/CV, 230 Hall Blvd Sto 126, San Antonio, TX 78243-7075, Acft 88-26060.

d. Apr 39 V Digital processor. HQ, USAR Com-Elec Cmd, Research Development and Engineering Center, NV & E Sensor Directorate, Ft. Monmouth, NJ 7703-5205, Acft 87-26000 and 88-26060.

e. APX-100. Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, Acft 87-26000 and 88-26060.

f. AN/A1Q 144A. Robert W. Aamueller, Survivability Equipment Division, Ft. Monmouth, NJ 07703-5205, Acft 87-26000 and 88-26060.

g. AN/Arc 186. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000.

h. KY 58. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

i. KY 58 control. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

POST ACCIDENT INSPECTION
EAGLE FLIGHT DETACHMENT
AVIONICS OPERATION AND MAINTENANCE

1. Detailed operational testing and operational evaluation was accomplished on aircraft survivability and communications equipment installed on 4 UH-60A Black Hawk utility helicopters assigned to Eagle Flight detachment located at Diyarbakir Air Base, Turkey. Testing and evaluation was performed on 28 April 1994 by CW2 John Hall, Project Executive Office Division, Aviation Electronic Combat, St. Louis, Missouri, and SSG Freddie Holmes, 4th Bde, 3d Infantry Division (Mech), Giebelstadt, Germany. The purpose of the testing was to determine the operational status of the aircraft, identify maintenance deficiencies, and evaluate maintenance personnel knowledge of maintenance procedures on communication and aircraft survivability equipment. Aircraft inspected were serial numbers 87-24656, 87-26001, 87-24555, 87-24634.

2. Items checked.

a. AN/ALQ - 144A Passive Infra Red (IR) Counter Measure System. Provides helicopter protection against 1st and 2nd generation IR missiles operating in bands 1, 2, 3, and 4. Areas covered:

(1) System Operation

(2) Jam Code Setting

(3) Air crew knowledge

(4) Unit equipment testing procedures at Aviation Unit Maintenance (AVUM) level and Aviation Intermediate Maintenance (AVIM) level.

b. M130 Chaff Dispenser system. Provides aircraft protection against radio frequency (RF) systems by dispensing RF reflective material into the atmosphere to inhibit threat radar lock, on aircraft. Areas covered:

(1) System Operation

(2) Program Salvo/Burst Setting

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

c. AN/APR-39 A(V)1 Radar Warning Receiver System. Detects RF radar signal and provides the air crew a visual display of threat radar signal. Areas Covered:

(1) System Operation

(2) System Installation

(3) Emitter Identification Data Version Number

(4) Air crew knowledge

(5) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

d. ARC-164 HAVE QUICK I (HQI) UHF Radio. Provides UHF Amplitude Modulated air-to-air and air-to-ground radio communications and communications on Guard (emergency frequency). The ARC-164 has a HAVE QUICK mode (anti jam) which uses a frequency hopping method to change the frequency selected many times a second. Areas covered:

(1) System Operation

(2) Air crew knowledge

(3) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

e. AN/APX-100 Transponder System. Provides automatic radar identification of the aircraft to all suitably equipped challenging aircraft, surface and ground facilities within the operating range of the system. Areas covered:

(1) System Operation

(2) Code Setting Procedure

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

3. Results of testing and evaluation.

a. AN/ALQ-144A (para 2a.) All areas inspected were being correctly accomplished in accordance with TM 11-5865-20-12 and TM 55-1520-237-10.

b. M130 (para 2b). All areas inspected were being correctly accomplished in accordance with TM 9-1095-206-23, TM 9-4940-497-13 and TM 55-1520-237-10.

c. AN/APR-39 A(V)1 (para 2c.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. However the AN/APR-39 A(V)1 self-test on aircraft 87-24634 indicated the processor failed the memory test. Eagle maintenance personnel changed processor. The AN/APR-39 A(V)1 on aircraft 87-24634 passed the self-test. Self-test will test the IP1150/display, processor, and front/rear receivers.

d. ARC-164 HQ1 (para 2d.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. HQI is installed on the 4 UH 60 aircraft evaluated. The F-15 aircraft and AWACS aircraft are equipped with HQII. The ARC-164 HQI is not compatible with the ARC-164 HQII; however, ARC-164 with HQII can be adjusted to be compatible at the unit level to operate with the ARC-164 HQI.

e. AN/APX-100 (para 2e.) All areas inspected were being correctly accomplished in accordance with TM 11-5895-1199-12 and TM 55-1520-237-10.

4. Determination.

a. Prior to the repair of the AN/APR 39 A(V)1 RWR, unit, communication and aircraft survivability equipment (avionics) was at a 96% operational rate. Unit had a 100 percent operational rate for avionics upon completion of inspection.

b. Unit personnel were operationally knowledgeable on all communication and aircraft survivability equipment systems. System operation and maintenance status on all communication and aircraft survivability equipment was found to be correctly accomplished. The processor which failed were the only piece of equipment that was not found to be fully operational. As stated previously, it was replaced by maintenance personnel which made the system operational. There was an Army school trained Electronic Warfare Officer (EWO) who was assigned to Eagle Flight Detachment, on-board the lead UH-60 helicopter at the time of the accident. One of his responsibilities was to insure unit personnel were knowledgeable on the operation of aircraft survivability equipment.

JOHN B. HALL
CW2, USA
Aviation Technical Adviser

STATEMENT OF QUALIFICATIONS

I am CW2 John B. Hall, assigned to the Project Executive Office Project Manager Aviation Electronic Combat (PM AEC), St. Louis, MO. as an electronic warfare officer. I am a technical advisor to the AFR 110-14 Accident Board investigating the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in northern no-fly zone of Iraq on 14 Apr 94. I have attended the Navy Electronic warfare course at Pensacola Naval Air Station and the Multi-Spectral Electronic Warfare course at George Washington University. I have served 2 years as a electronic warfare officer at battalion and brigade level. I have served 2 years as an assistant program manager at PM AEC with the task of training electronic warfare officers and assisting in the development of advanced electronic warfare equipment.

14 MAY 94
(DATE)

John B Hall
JOHN B. HALL, CW2, USA

Accident Investigation Board 14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Army Aviation Maintenance Documentation

1. The following is an explanation of the DA PAM 738-751 -- FUNCTIONAL USERS MANUAL FOR THE ARMY MAINTENANCE MANAGEMENT SYSTEM-AVIATION (TAMMS-A) as it pertains to U.S. Army Aviation Maintenance Forms Disposition.

2. DA PAM 738-751 requires that the Equipment Logbook Assembly (logbook) **will be** located in the aircraft during its operation. In addition to other publications and forms (DA Form 2408-12 [Army Aviator's Flight Record], DA Form 2408-31 [Aircraft Identification Card], DD Form 1896 [Jet Fuel Identaplate], etc.) the logbook contains the following maintenance forms :

a. DA Form 2408-13	Aircraft Status Information Record
b. DA Form 2408-13-1	Aircraft Inspection and Maintenance Record
c. DA Form 2408-13-2	Related Maintenance Actions Record
d. DA Form 2408-14	Uncorrected Fault Record
e. DA Form 2408-18	Equipment Inspection List

3. After the last flight of the mission day, the DA Form 2408-13 will be closed out by entering the flight time, landings, touch-down autorotations, and so forth. When the forms are removed from the logbook, the open faults appearing in the Fault Information blocks will be carried forward to the new DA Form 2408-13-1 or re-entered on the DA Form 1408-14. The decision to re-enter a fault to the DA Form 1408-14 will be made by the unit or activity commander, equal management or supervisor in contract support maintenance, or his or her designated representive. A new DA Form 2408-13 with the current data entered is put in the logbook for the next mission day.

4. The old form is removed and stored for a total of seven months. It is retained in a 30 day file, and then that file is kept in the unit or activity for six additional months, with the aircraft historical records. As each month is added to the file, the seventh month may be destroyed. The Army Aviation equipment reporting period (30 day) is from the 16th of a calendar month thru the 15th of the following month.

5. To prevent unneccessary reentering of information and faults on a new form every mission day, DA Form 2408-13-1 (&-2) completed forms need not be closed out and removed at the end of the mission day. However, the forms will be closed out at the end of the seventh mission day. The forms will also be removed after completion of extensive maintenance, such as intermediate, periodic, phase maintenance inspections, and maintenance test flights.

Accident Investigation Board
SUBJECT: Army Aviation Maintenance Documentation

6. Historical, helicopter maintenance and equipment/components forms and records, are **not** kept in the aircraft. These forms, listed below, are kept in the maintenance office or suitable office for easy access by those maintenance personnel who perform organization and support maintnenance, and quality control functions of aircraft and aviation assoociated equipment, and related forms and records.

a. DA Form 2408-5	Equipment Modification Record
b. DA Form 2408-5-1	Equipment Modification Record (Component)
c. DA Form 2408-15	Historical Record for Aircraft
d. DA Form 2408-15-1	Warranty Identification Card
e. DA Form 2408-16	Aircraft Component Historical Record
f. DA Form 2408-16-1	History Recorder, Component, Module Record
g. DA Form 2408-17	Aircraft Inventory Record
h. DA Form 2408-19-2	T700 Turbine Engine Analysis Check Records
i. DA Form 2408-19-3	T700 Engine Component Operating Hours Record
j. DA Form 2408-20	Oil Analysis Log

Douglas C Sousa

CW4 Douglas C Sousa
UH-60 Maintenance Test Pilot
Mishap Investigation Board

DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY AVIATION AND TROOP COMMAND
4300 GOODFELLOW BOULEVARD, ST. LOUIS, MO 63120-1798

REPLY TO ATTENTION OF

01 DEC 1993 | R-1
8 Nov 93

AMSAT-R-ECU (70-62b)

MEMORANDUM FOR

Commander, 200th Theater Army Materiel Management Center, Unit 23203, ATTN: SFC Zimmerman, APO AE 09263
Project Manager, Utility Helicopters, ATTN: SFAE-AV-BH, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798

SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

1. References:

a. Technical Manual 55-1520-237-10, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Operator's Manual for UH-60A Helicopters.

b. Technical Manual 55-1520-237-CL, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Operator's and Crewmember's Checklist, UH-60A Helicopters.

c. Technical Manual 55-1520-237-MTF, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Maintenance Test Flight Manual, UH-60A, UH-60L, and EH-60A Helicopters.

d. Technical Manual 55-1520-237-23, Headquarters, Department of the Army, 29 Aug 89, subject: Aviation Unit and Intermediate Maintenance Manual for Army UH-60A and EH-60A, and UH-60L Helicopters.

e. Technical Manual, Operation and Maintenance Manual, Auxiliary Fuel Monitoring System for the UH-60A/L Helicopters.

2. This memorandum constitutes an Airworthiness Release (AWR) in accordance with (IAW) Army Regulation (AR) 70-62 to install the Auxiliary Fuel Monitoring System (AFMS) on UH-60 A/L aircraft.

3. The UH-60 helicopter is a production UH-60A/L described in reference 1a with exceptions noted on the applicable DD Form 250 acceptance document. The AFMS is described in reference 1e.

4. Operations and Restrictions.

a. The helicopter shall be operated IAW the referenced 1a

CERTIFICATE

I certify that I am the Records Custodian for the Accident Investigation Board convened to investigate the crash of two U.S. Army Black Hawk helicopters in the no fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate copy of the record which is kept in my records system.

15 Aug 94
Date

WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

01 DEC 1993 |R-1

AMSAT-R-ECU (70-62b) 8 Nov 93
SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

manual and this document. In the event of a conflict between these two documents, the information in this release shall prevail.

b. The AFMS is not to be used as a fuel quantity indicator. Its purpose is to indicate an out of balance situation while utilizing the Extended Range Fuel System. Pilots should not use the AFMS to conduct mission planning. |R-1

5. Special Inspections and Instructions:

a. A daily visual inspection shall be made of the subject installation to ensure that no progressive structural deterioration is occurring, that there is no loss of security and that no damage to the host helicopter exists. Any occurrence of the preceding shall be corrected prior to further flight operations.

b. In the event any operating limit is exceeded in addition to the normal entry on DD Form 2408-13, appropriate inspection plus special inspection for security and condition of modifications shall be performed prior to next flight. Any incident or malfunction of the aircraft suspected of being related to these configuration modifications shall be reported immediately to this headquarters, ATTN: AMSAT-R-ECU, Mr. Greg Kirchhofer, DSN 693-1687, or commercial (314) 263-1687.

c. This aircraft shall be returned to standard configuration prior to transfer or turn-in to an overhaul facility.

d. The aircraft shall be maintained IAW all applicable Maintenance Manuals and associated Aviation Safety Action Messages and Safety of Flight Messages. Any discrepancies shall be evaluated/repaired prior to next flight to ensure continued airworthiness of the helicopter.

6. Aircraft Logbook Entries.

a. In accordance with Department of the Army (DA) Pamphlet 738-751, the following entries shall be made on the DA Form 2408-13-1/2408-13-1-E and shall be perpetuated on each form during the period of installation or until superseded by another airworthiness release, or until reason for limitation is removed.

(1) Place a circled red "X" on the form IAW DA Pamphlet 738-751. In the fault information block make the following entry: "Operate within the limitations and restrictions specified in the enclosed airworthiness release dated 01 DEC 1993. For DA Form 1352 reporting purposes, the above write ups shall not cause the aircraft to be reported as Partially Mission Capable (PMC).

01 DEC 19[illegible] R-1
8 Nov 93

AMSAT-R-ECU (70-62D)
SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

Aircraft which are nonstandard configured and operating under this release may be reported as Fully Mission Capable (FMC).

(2) The remaining blocks in the fault information block will be completed per DA Pamphlet 738-751.

b. The above entry shall be cleared upon return of the aircraft to standard configuration. It is acceptable for the local commander or maintenance officer to assume responsibility for the above daily inspection entry by means other than the logbook entry.

c. An exact copy of this AWR describing the operating procedure, limitations, and restrictions will be inserted in the aircraft logbook and another copy inserted in the helicopter aircraft historical records.

7. This Airworthiness Release is terminated upon transfer of the helicopter, changes in configuration of the subject equipment, or issuance of a later release. This airworthiness release does not cancel any previously issued releases.

DANIEL M. McENEANY
Associate Director for Systems
Aviation RDEC

Aircraft Accident Board

14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Aircraft Status Inspection and Maintenance Record

1. Detailed below are maintenance writeups pertaining to UH-60 Black Hawks, serial numbers 88-26060 and 87-26000. These writeups were extracted from maintenance files obtained from Eagle Flight Detachment, Diyarbakir AB, Turkey.

2. 88-26060. Writeups open and carried forward (C/F) to the 30 day file on 10 Apr 94:

a. CO/P center map light inop (6620-01-253-0143) 13 Oct 93 1054.8.
b. #1 Eng ECU P/N not installed on eng 2408-16-1 23 Oct 93 1054.8
c. L/H cargo door window weld brushing worn 10 Nov 93 1054.8
d. R/H cargo door window weld bushing worn 10 Nov 93 1054.8
e. Gunners window vent lever not installed 10 Nov 93 1054.8
f. #1 Eng cowling nylon bumpers cracked 10 Nov 93 1054.8
g. #2 Eng cowling nylon bumpers cracked 10 Nov 93 1054.8
h. Lower tailboom step rotates forward 11 Dec 93 1090.2
i. L/H relay panel not EME modified IAW MWO 1-1520 237-50-59 12 Feb 94 1142.4
j. Pin filter adapters RMVD from cant/advisory panel system no longer EME modified IAW MWO 1-1520-237-50-59 12 Feb 94 1142.4
k. (X) Operate within the limitations and restrictions specified in the enclosed AWR dated 1 Dec 93 22 Feb 94 1147.6
l. L/H stab corner need hysoled 9 Mar 94 1156.9
m. Mode 4 chk due 1189.1 acft hrs 25 Mar 94 1630 1189. (Witness testimony revealed that this check was the regularly scheduled 25 hour inspection. The check was accomplished on 13 April 1994. (TAB V51/p2, para 4-5))
n. Gyromagnetic and standby compass swing due April 94 31 Mar 94 1198.4 1198.4
o. Zues fastener not installed on R/S step fairing door 3 Apr 94 0820 1198.4
p. 25 hr oil samples due at 1213.4 acft hrs 4 Apr 94 1202.0 0930
q. 250 hr stab insp due 1212.4 acft hrs 4 Apr 94 1540 1202.0
r. Flt 3 PLS UHF radio inop 8 Apr 94 1600 1206.7

3. 87-26000. Writeups open and carried forward (C/F) to the 30 day file on 5 Apr 94:

a. Pin filter adapters removed from SAS-1 FPS, Computer A/C not EME modified 14 Jul 93 968.1
b. Antenna on R/H side tail cone section numbered 6B-6T-19 outboard edge deteriorated 26 Oct 93 1076.3
c. Soundproofing screw insert broken on L/H side 20 Nov 93 1127.1

Aircraft Accident Board
SUBJECT: Aircraft Status Inspection and Maintenance Record

d. Removed pin filter adapters from #1 and #2 stab amps system no longer EME modified IAW MWO 1-1520-237-50-59 26 Nov 93 1146.3 C/F 5 Apr 94

e. Rad alt reads 0 at stabilized 10' Hover on both pointer 2 digits 22 Feb 94 1199.2

f. (X) Operate within the limitations and restrictions specified in the enclosed MWR dated 1 Dec 93, 22 Feb 94 1199.2

g. DC ESS bus caution light illuminates when batter switch is turned on 4 Apr 94 1617 1232.1

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

DEPARTMENT OF THE ARMY
PRO. MANAGER, AVIATION ELECTRONIC C' AT
4300 GO FELLOW BOULEVARD, ST. LOUIS, MO 6. -1798

REPLY TO
ATTENTION OF

SFAE-AV-AEC-T 18 May 1994

MEMORANDUM FOR ACCIDENT INVESTIGATION BOARD

Subject: UH-60 Infrared and Radar Countermeasures Effects on Shoot Down

1. The potential for the Infrared and Radar Countermeasures installed on UH-60 tail number 87-26000 and tail number 87-26060 to counter the weapons fired on them during the incident of 14 April 1994 was evaluated. The specific characteristics and performance of the weapons and countermeasures equipment were considered in this evaluation but will not be discussed here because of the classification of this information. The following is an unclassified summary of the conclusions which resulted from this evaluation.

Infrared Countermeasures
The AN/ALQ-144A Infrared Jammer was not design for and could not have countered the infrared missile used. The operating characteristics of the missile and the geometry of the engagement were outside the effectiveness range of this countermeasure.

Radar Countermeasures
The Radar Countermeasures on subject aircraft consist of the AN/APR-39A(V)1 Radar Signal Detecting Set and the M-130 General Purpose Dispenser loaded with the M-1 Chaff Cartridge. These two systems were not designed to and could not have countered the radar missile used. The operating characteristics of the engaging aircraft's radar and the missile operating characteristics were outside the effectiveness range of this countermeasure combination.

2. The overall conclusion of our evaluation is that the subject countermeasures were not designed to counter the sophisticated weapons used in this incident and could not have prevented the shoot down.

William R. Nicholson
Chief Tech Mgmt Div
Aviation Electronic Combat Project Manager

18 May 94

STATEMENT OF QUALIFICATIONS

I am CW4 Douglas C Sousa, assigned to C Co, 7-227th Avn, Hanau Germany, as UH-60 Maintenance Test Pilot (MTP). I am a Board Member to the AFR 110-14 Accident Board, investigating the crash of two U.S. Army Black Hawk helicopters and the possible involvement of U.S. fighter aircraft in the crash of these helicopters in the northern No-Fly-Zone of Iraq on 14 April 1994. I graduated from the U.S. Army Maintenance Management/Maintenance Pilot Course (MM/MTPC) in 1991, and have had one, 1-year tour in Korea and have completed about 15 months of a tour in Germany, as an MTP in Black Hawks. I have more than 23 years of flight experience with the U.S. Army and Army Reserves, and have a total of more than 7000 hours of flight time.

Douglas C Sousa 18 MAY 94

DOUGLAS C. SOUSA, CW4, USA

O-1a

O-1b

TAB O-1

UH-60 BLACK HAWK 88-26060

O-1a Maintenance Technical Report

O-1b IFF Technical Report

TECHNICAL REPORT

UH-60 BLACK HAWK IDENTIFICATION-FRIEND-OR-FOE (IFF) SYSTEM

Aircraft Evaluated: UH-60 Black Hawk, Serial Number 88-26060

Incident Date: 14 April 1994

I. INTRODUCTION: The purpose of this evaluation was to determine the serviceability of the Identification-Friend-or-Foe (IFF) system on the UH-60 Black Hawk aircraft, serial numbers 88-26060.

II. BACKGROUND: This technical report was prepared for the official AFR 110-14 aircraft accident investigation into the facts and circumstances surrounding the crash of two US Army UH-60 Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in the northern No-Fly Zone of Iraq on 14 April 1994. Aircraft 88-26060 arrived at Diyarbakir AB, Turkey on 14 June 1993, and had a total of 1222.0 flight hours on the airframe prior to the last mission.

III. EVALUATION: A review of the historical maintenance records for each aircraft was completed. This review included the available DA Form 2408-13 series aircraft maintenance records, aircraft historical records, and witness testimony. The purpose of the review was to identify discrepancies documented on the IFF system.

Specific maintenance procedures with possible relevance to the mishap were investigated. The Eagle Flight Detachment policies and procedures were evaluated for compliance with Department of the Army directives. (Atch 1)

Available components from the IFF system were examined to determine serviceability. Items recovered from the wreckage of 88-26060 included the AN/APX-100 (Transponder) and the KIT 1C (Crytopraphic Computer). These components were sent to Department of Defense test facilities for laboratory analysis. (Atch 2) The KYK-13s (Electronic Transfer Device) which should have been used to load the Mode IV code for 14 April 1994 into the AN/APX-100 were sent on 18 May 1994 to Tobyhana Army Depot for laboratory analysis.

IV. DETERMINATION:

A. BACKGROUND. The following information is derived from DOD AIMS 86-100, May 1987, Department of the Army Technical Manual 55-1520-237-10, 8 January 1988, w/changes 1-20.

The IFF system consists of the AN/APX-100 (Transponder), the Kit 1C (Cryptographic Computer), and two omnidirectional antennas, one installed on the top fairing between engine exhaust ports (top center of the aircraft, behind the rotor blade mast), and one on the lower fuselage in the center portion of the aircraft, under the transmission section. (TAB AA20/p3-63, para3-158)

The AN/APX-100 Transponder set provides automatic radar identification of a aircraft to all suitably equipped challenging aircraft and surface or ground facilities within the operational range of the system, provided a compatible code is entered into the interrogation system and into the transponding system. (TAB AA20/p3-63, para3-157)

The system receives, decodes and responds to interrogations of operational codes Mode I, II, IIIA, IIIC and IV. The AN/APX-100 also can transmit specially coded identification

of position and emergency signals to interrogating stations, if conditions warrant. (TAB AA20/p3-63, para3-157)

There are five independent coding modes available to the operator. The first three may be used independently or in combination: Mode I provides 32 possible code combinations and is a nonsecure method for an interrogating system to track aircraft or ships. Mode II provides 4096 possible code combinations to the interrogator; it is used to track a specific aircraft. Mode III/A provides a geographic identification of the aircraft's position to an interrogating station. Mode III/C will indicate pressure altitude, to the nearest 100 ft increment, of the aircraft being interrogated. (TAB AA20/p3-63, para3-157)

Mode IV is an encrypted secure mode that transmits a coded pulse to an interrogating system to identify a friendly aircraft. A compatible code for the operational time period must be loaded into the interrogating system's KIR 1C and the transponding system's KIT 1C for the interrogator to receive a friendly indication. (TAB AA21/p2-3, para2-4.2, p4-8, para4-6.1)

The AN/APX-100 transponder provides two indications to assist the aircraft operator in evaluating the effectiveness of the transponder's response to an interrogating signal. The "reply light" on the transponder will illuminate if a compatible code has been received and a response is being transmitted; there is also an audio tone in the operator's head set to indicate that the transponder system has been interrogated by an incompatible Mode IV code. In addition, the aircraft Master Caution light will illuminate, along with a specific Mode IV segment light on the caution advisory warning panel, to alert the crew if the transponder has not replied to the Mode IV interrogation.(TAB AA21/p4-7,para4-5.1.5, p4-8, para4-5.2.1)

The current Mode IV code must be loaded into the transponder prior to each mission. The Mode IV codes for each day of any given month are imprinted on paper tape. There is an individual tape segment for each day of the month. The first step in loading the Mode IV code into the transponder is to load the code for the day into the KYK-13 (Electronic Transfer Device). The KYK-13 is loaded by connecting a KOI-18 (Tape Reader) to the KYK-13, inserting the coded paper tape, and running the tape through the KOI-18. The loaded KYK-13 is then disconnected. (TAB AA21/p4-21, para4-16.3)

The KYK-13 is connected (with a plug-on data transfer cable) to the KIT 1C (Cryptographic Computer) in the aircraft. When the proper switch on the KYK-13 is turned to the load position, the code is passed from the KYK-13 to the KIT 1C. The Mode IV code is then loaded and available for access by the transponder. If the KIT 1C was not loaded properly, the aircraft Master Caution light will illuminate, along with a specific Mode IV segment light on the caution advisory warning panel, to alert the crew that the transponder has not accepted the code. (TAB V60/p3, para4)

It is possible to load the codes for two consecutive days into the KIT 1C. If pending operational requirements will make it impossible to reload the Mode IV code prior to the beginning of the next day, two days of codes would be loaded. At the end of the first day, the next day's Mode IV code may be selected by using the code A/B switch on the transponder. Failure to change to the new day's code at the end of the first day will make the system's Mode IV code incompatible with other Mode IV systems during the second day. (TAB AA21/p4-9, para4-6.3)

B. HISTORICAL RECORDS REVIEW

A review of the 30-day and 6-month historical maintenance files revealed that seven discrepancies relating to the Transponder or Mode IV were noted during the preceding seven month period. (TAB H1b) A summary of those discrepancies and the corrective action taken follows:

13 November 1993

"Mode IV check due. Aircraft failed check." [Aircraft did not fly again until 18 November 1993.]

The aircraft check would have been accomplished by requesting a Mode IV interrogation from AWACS. (TAB V48/p3, para3) No evidence is available concerning the cause of the failure. No specific corrective action was noted. The transponder was checked again on the next flight. The failure of the Mode IV check on 13 November 1993 cannot be further explained given the available evidence. The transponder unit was later replaced. (see 14 December 1993, below)

18 November 1993

"Mode IV check due. Completed." [Checked and found to be operating properly.]

The aircraft Mode IV was checked again on the next flight. The Mode IV functioned properly. There is no evidence available to further explain the successful completion of this check, following the failure on the prior flight.

14 December 1993

"Transponder failed self-test. Replaced the transponder and repaired wiring."

The transponder self-test is accomplished during the preflight procedures. In this instance, the transponder failed the test. The corrective action was to replace the transponder and repair wiring. No further information concerning the nature of the wiring repair is available. If the transponder had not been replaced, the Mode IV would not have functioned.

27 December 1993

"Incorrect main knob. Replaced knob."

Depending upon the nature of the irregularity, an incorrect main knob could affect the switch operations (e.g., slipping). There is no evidence available as to the nature of the irregularity of this particular knob. The knob was replaced with the correct unit.

25 January 1994

"Transponder Mode II set button Number 4 is stuck. Cleaned the button."

A stuck set button would prevent Mode II from being set to the proper code. Cleaning the set button corrects the deficiency and allows entry of the full range of Mode II codes. The deficiency would not affect the operation of other transponder modes.

19 March 1994

"IFF light and master caution comes on during flight. Check found OK."

A Mode IV "reply light" on the transponder will illuminate if a compatible code has been received and a response is being transmitted. The aircraft Master Caution light will illuminate, along with a specific Mode IV segment light on the caution advisory warning panel, to alert the crew if the transponder has not replied to the Mode IV interrogation.

The lights could also come on if there is a transponder hardware problem. (TAB J2b/p3) The corrective action appears to have been a further in-flight operational check of the Mode IV, which is normally accomplished by requesting a Mode IV interrogation by AWACS. In this instance, a check of some type indicated that the system was functioning properly.

28 March 1994

> "Transponder inop; acft restricted from IMC [instrument meteorological conditions]. Repaired wiring to transponder control head."

A wiring deficiency in the transponder control head will render the transponder inoperable. Left uncorrected, the transponder would continue to be inoperable. In this case, the wiring was repaired. The evidence shows that the transponder functioned properly after the corrective action was taken. In particular, the Mode IV was tested on 13 April by requesting interrogation from AWACS, and was found to be functioning properly. (TAB V51/p2, para5)

Review of the maintenance records revealed no other discrepancies that could be related to the accident.

C. PILOT/MAINTENANCE PERSONNEL ASSESSMENT.

Interviews with Eagle Flight Detachment pilots and maintenance personnel revealed that the aircraft avionics (including the transponder and Kit 1C) were functioning properly prior to 14 April 1994. (TAB V49/p2, para3; V48/p3, para3; V59/p1, para4; V61/p1, para3) One pilot testified that the Mode IV was tested on 13 April by requesting interrogation from AWACS, and was found to be functioning properly. (TAB V51/p2,

para5) There is no evidence that Mode IV checks were made with AWACS on 14 April 1994.

On 28 April 1994, the supervision of maintenance personnel, and maintenance policies and procedures used by Eagle Flight Detachment were evaluated and found to be in accordance with applicable Army policies and technical manuals. (Atch 1)

D. TEARDOWN ANALYSIS.

The aircraft's transponder and KIT 1C were removed from the crash site and sent for teardown analysis. The transponder was sent to the Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, for teardown analysis, and the KIT 1C was sent to the Air Force Cryptologic Support Center, Kelly AFB, Texas. (Atch 2)

The analysis of the IFF transponder has not been provided. The teardown analysis facility estimates that the examination will be completed by 25 May 1994.

The analysis of the KIT 1C revealed that the component was damaged to the extent that no determination could be made as to the serviceability of the unit prior to the crash. The logic card was charred and significant components were melted. Additionally, wiring was melted and fused so that any attempt to apply power to the unit would have resulted in damage to the tester (ST-20). No additional functional information could be determined. (TAB J1d/p1, para3)

Results of the teardown analysis of the KYK-13s (Electronic Transfer Device) have not been received. However, there is no independent evidence which indicates that these units were not functioning properly. There is evidence that the KYK-13s were functioning

properly both before and after the accident, which suggests that the units were functioning properly on the day of the accident. On 13 April 1994, one of the KYK-13s was used to load the Mode IV code that was later successfully tested by AWACS interrogation. (TAB V51/p2, para5) On 28 April 1994, one of the KYK-13s was selected and used to load the Mode IV code into a UH-60 Black Hawk. The unit functioned properly and the code was loaded correctly. (Atch 1)

V. PROCEDURES. Specific issues concerning keying Mode IV into the IFF system prior to flight, the operational check of Mode IV prior to flight, and shut-down procedures during enroute stops are addressed in a separate technical report. (TAB O1c)

JOHN B. HALL
CW2, USA
TECHNICAL ADVISOR

Atch
1 Tech adv inspection
2 Teardown Analysis Facilities
3 Tech Adv Qualifications

Accident Investigation Board 14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Teardown Analysis of UH-60 Black Hawk Components -- Facilities

1. Aircraft Survivability Equipment (ASE) and Avionics components recovered from the crash sites of U.S. Army Black Hawks helicopters serial numbers 87-26000 and 88-26060 were forwarded for technical analysis.

2. Components were forwarded to the Office of the Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC, 4300 Goodfellow Blvd., St Louis, MO 63120-1798. That office forwarded components to appropriate laboratories for analysis as follows:

a. Arc/164. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

b. ICS/C-6533. Navigational and Information Transmission Branch (W/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

c. Kit 1C. AFCSC/CV, 230 Hall Blvd Sto 126, San Antonio, TX 78243-7075, Acft 88-26060.

d. Apr 39 V Digital processor. HQ, USAR Com-Elec Cmd, Research Development and Engineering Center, NV & E Sensor Directorate, Ft. Monmouth, NJ 7703-5205, Acft 87-26000 and 88-26060.

e. APX-100. Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, Acft 87-26000 and 88-26060.

f. AN/A1Q 144A. Robert W. Aamueller, Survivability Equipment Division, Ft. Monmouth, NJ 07703-5205, Acft 87-26000 and 88-26060.

g. AN/Arc 186. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000.

h. KY 58. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

i. KY 58 control. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

Douglas C. Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

POST ACCIDENT INSPECTION
EAGLE FLIGHT DETACHMENT
AVIONICS OPERATION AND MAINTENANCE

1. Detailed operational testing and operational evaluation was accomplished on aircraft survivability and communications equipment installed on 4 UH-60A Black Hawk utility helicopters assigned to Eagle Flight detachment located at Diyarbakir Air Base, Turkey. Testing and evaluation was performed on 28 April 1994 by CW2 John Hall, Project Executive Office Division, Aviation Electronic Combat, St. Louis, Missouri, and SSG Freddie Holmes, 4th Bde, 3d Infantry Division (Mech), Giebelstadt, Germany. The purpose of the testing was to determine the operational status of the aircraft, identify maintenance deficiencies, and evaluate maintenance personnel knowledge of maintenance procedures on communication and aircraft survivability equipment. Aircraft inspected were serial numbers 87-24656, 87-26001, 87-24555, 87-24634.

2. Items checked.

a. AN/ALQ - 144A Passive Infra Red (IR) Counter Measure System. Provides helicopter protection against 1st and 2nd generation IR missiles operating in bands 1, 2, 3, and 4. Areas covered:

(1) System Operation

(2) Jam Code Setting

(3) Air crew knowledge

(4) Unit equipment testing procedures at Aviation Unit Maintenance (AVUM) level and Aviation Intermediate Maintenance (AVIM) level.

b. M130 Chaff Dispenser system. Provides aircraft protection against radio frequency (RF) systems by dispensing RF reflective material into the atmosphere to inhibit threat radar lock, on aircraft. Areas covered:

(1) System Operation

(2) Program Salvo/Burst Setting

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

c. AN/APR-39 A(V)1 Radar Warning Receiver System. Detects RF radar signal and provides the air crew a visual display of threat radar signal. Areas Covered:

(1) System Operation

(2) System Installation

(3) Emitter Identification Data Version Number

(4) Air crew knowledge

(5) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

d. ARC-164 HAVE QUICK I (HQI) UHF Radio. Provides UHF Amplitude Modulated air-to-air and air-to-ground radio communications and communications on Guard (emergency frequency). The ARC-164 has a HAVE QUICK mode (anti jam) which uses a frequency hopping method to change the frequency selected many times a second. Areas covered:

(1) System Operation

(2) Air crew knowledge

(3) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

e. AN/APX-100 Transponder System. Provides automatic radar identification of the aircraft to all suitably equipped challenging aircraft, surface and ground facilities within the operating range of the system. Areas covered:

(1) System Operation

(2) Code Setting Procedure

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

3. Results of testing and evaluation.

a. AN/ALQ-144A (para 2a.) All areas inspected were being correctly accomplished in accordance with TM 11-5865-20-12 and TM 55-1520-237-10.

b. M130 (para 2b). All areas inspected were being correctly accomplished in accordance with TM 9-1095-206-23, TM 9-4940-497-13 and TM 55-1520-237-10.

c. AN/APR-39 A(V)1 (para 2c.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. However the AN/APR-39 A(V)1 self-test on aircraft 87-24634 indicated the processor failed the memory test. Eagle maintenance personnel changed processor. The AN/APR-39 A(V)1 on aircraft 87-24634 passed the self-test. Self-test will test the IP1150/display, processor, and front/rear receivers.

d. ARC-164 HQ1 (para 2d.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. HQI is installed on the 4 UH 60 aircraft evaluated. The F-15 aircraft and AWACS aircraft are equipped with HQII. The ARC-164 HQI is not compatible with the ARC-164 HQII; however, ARC-164 with HQII can be adjusted to be compatible at the unit level to operate with the ARC-164 HQI.

e. AN/APX-100 (para 2e.) All areas inspected were being correctly accomplished in accordance with TM 11-5895-1199-12 and TM 55-1520-237-10.

4. Determination.

a. Prior to the repair of the AN/APR 39 A(V)1 RWR, unit, communication and aircraft survivability equipment (avionics) was at a 96% operational rate. Unit had a 100 percent operational rate for avionics upon completion of inspection.

b. Unit personnel were operationally knowledgeable on all communication and aircraft survivability equipment systems. System operation and maintenance status on all communication and aircraft survivability equipment was found to be correctly accomplished. The processor which failed were the only piece of equipment that was not found to be fully operational. As stated previously, it was replaced by maintenance personnel which made the system operational. There was an Army school trained Electronic Warfare Officer (EWO) who was assigned to Eagle Flight Detachment, on-board the lead UH-60 helicopter at the time of the accident. One of his responsibilities was to insure unit personnel were knowledgeable on the operation of aircraft survivability equipment.

JOHN B. HALL
CW2, USA
Aviation Technical Adviser

STATEMENT OF QUALIFICATIONS

I am CW2 John B. Hall, assigned to the Project Executive Office Project Manager Aviation Electronic Combat (PM AEC), St. Louis, MO. as an electronic warfare officer. I am a technical advisor to the AFR 110-14 Accident Board investigating the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in northern no-fly zone of Iraq on 14 Apr 94. I have attended the Navy Electronic warfare course at Pensacola Naval Air Station and the Multi-Spectral Electronic Warfare course at George Washington University. I have served 2 years as a electronic warfare officer at battalion and brigade level. I have served 2 years as an assistant program manager at PM AEC with the task of training electronic warfare officers and assisting in the development of advanced electronic warfare equipment.

14 MAY 94
(DATE)

John B Hall
JOHN B. HALL, CW2, USA

TAB O

ADDITIONAL SUBSTANTIATING DATA REPORTS O-1

O-2

TAB O-2

UH-60 BLACK HAWK 87-26000

O-2a Maintenance Technical Report

O-2b IFF Technical Report

TECHNICAL REPORT

BLACK HAWK MAINTENANCE

AIRCRAFT EVALUATED: UH-60 Black Hawk, Serial Number 87-26000

INCIDENT DATE: 14 April 1994

1. INTRODUCTION:

The purpose of this evaluation was to determine the airworthiness, capability and effectiveness of the U.S. Army helicopter, UH-60, Black Hawk, serial number 87-26000. The helicopter was assigned to Eagle Flight Detachment, C Company, 6th Battalion, 159th Aviation Battalion. It was deployed to Diyarbakir Air Base, Turkey on 14 June 1993. It had a total of 1247.3 flight hours on the airframe prior to departing on the last mission. (TAB H2a/blk.11)

II. BACKGROUND:

This technical report was prepared for the official AFR 110-14 aircraft accident investigation into the facts and circumstances surrounding the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in the northern No-Fly Zone of Iraq on 14 April 1994. It reports the technical evaluation processes and determinations regarding the air worthiness and serviceability of the UH-60 Black Hawk helicopter, serial number 87-26000, which was involved in the mishap.

III. EVALUATION:

This evaluation included review of the maintenance records of the helicopter, the results of the Department of Defense laboratory test analyses conducted on aircraft components recovered from the wreckage, and the testimony of Eagle Flight's military and civilian maintenance personnel. Maintenance procedures and the qualifications, experience and supervision of maintenance personnel were also evaluated.

All the available aircraft maintenance records were reviewed. These records, consisting of the Department of the Army (DA) 2408 series are listed below:

(a) The helicopter's 30 day file for the period 16 March 1994 - 15 April 1994 and the six month file for the period 16 September 1993 - 15 March 1994--

DA Form 2408-13	Aircraft Status Information Record
DA Form 2408-13-1	Aircraft Inspection and Maintenance Record

DA Form 2408-13-2 Related Maintenance Actions Record

(b) Historical Maintenance File with--

DA Form 2408-5	Equipment Modification Record
DA Form 2408-5-1	Equipment Modification Record (Component)
DA Form 2408-15	Historical Record for Aircraft
DA Form 2408-15-1	Warranty Identification Card
DA Form 2408-16	Aircraft Component Historical Record
DA Form 2408-16-1	History Recorder, Component, Module Record
DA Form 2408-17	Aircraft Inventory Record
DA Form 2408-19-2	T700 Turbine Engine Analysis Check Records
DA Form 2408-19-3	T700 Engine Component Operating Hours Record
DA Form 2408-20	Oil Analysis Log

Aircraft Survivability Equipment (ASE) onboard the UH-60 was one ALQ-144 (Infrared Countermeasures Set), one APR-39 (Radar Warning Receiver), and one M130 (Chaff Dispenser). Several items of Aircraft Survivability Equipment (ASE) and avionics equipment were recovered from the crash site and forwarded to Department of Defense test facilities for laboratory analysis. (Atch 1) Aircraft Survivability Equipment (ASE) components recovered from the crash site included the ALQ-144 (Infra-red Countermeasures Set), and a CF-1597 Digital Processor Unit for the APR 39 (Radar Warning Receiver). Avionics components recovered from the crash site were the AN/APX-100 (Transponder), one RT 1518B/ARC-164(V)(UHF Radio), two C-6533s (Intercommunications System Control Panels), one KY 58 (Secure Communications Radio), and one ARC 186 (FM Radio). The M130 (Chaff Dispenser) was destroyed by post crash fire. Interviews were conducted with military maintenance and flight personnel and Serv-Air, Inc. civilian contract maintenance personnel to determine what equipment discrepancies, if any, may have contributed to the accident.

Aircraft Survivability Equipment (ASE) and avionics equipment maintenance and test procedures performed by the military maintenance personnel and the contract maintenance personnel were evaluated on-site at Diyarbakir AB, Turkey for compliance with applicable Army technical manuals and directives. (Atch 2)

IV. DETERMINATION:

Analysis of maintenance documentation and component test results is divided into two subsections, General Aircraft Systems and Mission Systems. General Aircraft Systems include fundamental systems necessary for aircraft flight. Mission Systems include systems necessary to perform communications, navigation and aircraft survivability functions.

The most current maintenance documents for this aircraft, could not be reviewed because they were destroyed in the crash. Army directives require that current maintenance forms, DA Form 2408-13 (Aircraft Status Information Record), DA Form 2408-13-1 (Aircraft

Inspection and Maintenance Record), and DA Form 2408-13-2 (Related Maintenance Actions Record)) be kept on the board the aircraft in the logbook. (Atch 3)

The 2408-13 lists the current status of the aircraft (flyable or non-flyable), based on the discrepancies recorded on the other two forms, the total airframe hours, and the hours of the next phase inspection. The 2408-13 is closed out at the end of each mission day (24 hour day the aircraft flies), and the data reentered on a new form for the next mission day. Review of the closed out form, dated 11 April 1994, showed that the aircraft was in a flyable condition. (Atch 3)

The 2408-13-1 and 2408-13-2 forms are kept on board the aircraft for seven mission days. These documents contained a complete list of all open, (non-grounding) discrepancies. After seven mission days, all of the open entries are carried forward to new forms. The old forms are removed from the aircraft logbook and stored in the 30 day maintenance files. (Atch 3)

Open discrepancies, that existed on the the forms in the 30 day file, would have been carried forward to the records in the log book. A summarized list of those discrepencies is attached. (Atch 5)

The seven day mission period for serial number 87-26000 began with the last records close-out on 4 April 1994. (TAB H2b) The maintenance records for 5 April 1994 through 14 April 1994 were maintained in the aircraft log book and were destroyed in the accident.

Discrepancies which were open as of the records close-out on 4 April 1994, and which may have existed during the 14 April 1994 mission are discussed below. Maintenance personnel were not able to recall which, if any, of these discrepancies had been corrected. (TAB V59/p1, para4) Other non-grounding discrepancies may have been added to the on-board forms after 4 April 1994.

A. GENERAL AIRCRAFT SYSTEMS

The maintenance 30 day file revealed open discrepancies involving general aircraft systems. There were no open discrepancies involving the engines or other aircraft systems that could be related to this accident.

The helicopter did have one "Circle Red X" operating restriction, for a Department of the Army directed modification, that added an Auxiliary Fuel Management System (AFMS) to the Extended Range Fuel System (ERFS). (TAB H2a/blk.10) This modification is designed to provide a warning for any imbalance problems that may arise between the two auxiliary fuel tanks. The operating restriction directs that the pilots not use the AFMS as a fuel quantity indicator. (Atch 5/p2, para2)

Available records entered in the 30 day file, that were carried forward from the closed out forms, show this aircraft had six discrepancies related to general aircraft systems. These discrepancies should have been entered in the log book forms, destroyed in the crash.

They included one airframe discrepancy (soundproofing screw insert broken), four electrical write-ups (e.g., radar altimeter reads 0 at 10 foot hover), and the operating restriction noted above. (Atch 5; H2b) These discrepancies did not affect the airworthiness or mission capability of the helicopter. (TAB V49/p2, para2)

All modification work orders had been completed. (TAB H2c) Unscheduled maintenance performed prior to the accident was limited to minor procedures (e.g., antenna repair), and does not appear to be related to the accident. (TAB H2b)

Testing and teardown analysis was not accomplished on the power plant (engines), hydraulic, electric or mechanical systems due to the extensive damage. These systems do not appear to be related to the accident.

Post-crash fuel, hydraulic fluid, and oil samples were not taken from the aircraft because of the extensive damage to components caused by impact and post-crash fires. Engine, fuel, hydraulic and lubrication systems do not appear to be related to the accident.

B. MISSION SYSTEMS

Aircraft Survivability Equipment (ASE). The onboard Aircraft Survivability Equipment (ASE) was not designed to protect the helicopter against AIM-9 or AMRAAM Missiles carried by F-15 Fighter aircraft. (Atch 6 Tech Report)

All ASE components that were recovered were severely damaged. All components were originally sent to the Office of the Project Manager, U.S. Army Aviation Electronic Combat, St. Louis, Missouri, for forwarding to Department of Defense testing laboratories. (Atch 1) Teardown analysis continues; available results are detailed below .

ASE components sent for teardown analysis included components of the ALQ 144 (Infrared Countermeasures Set), and the APR 39 (Radar Warning Receiver). (Atch 1) Results of analysis of the ALQ 144 is pending completion. (TAB J2a) Due to impact and fire damage, the APR 39 analysis revealed no information concerning the condition of the component at the time of the accident. (TAB J2b/p1)

Avionics. All avionics components that were recovered were severely damaged. All components were originally sent to the Office of the Project Manager, Combat Electronics Systems, US Army Aviation and Troop Command, St. Louis, Missouri, for forwarding to Department of Defense directed laboratories. (Atch 1) Teardown analysis continues; available results are detailed below .

Avionics components sent for teardown analysis include the AN/APX-100 (Transponder), one ARC 164 (UHF radio), one KY 58 (Secure Communications Radio), and one ARC 186 (FM Radio). (Atch 1)

Due to the damage to the AN/APX-100 (Transponder) , it was not possible to ascertain the operational condition of the unit at the time of the accident. (TAB J2e/p1, para1) However, data analysis of magnetic tapes recording the events of the AWACS mission airborne during this aircraft's last flight indicate that the transponder was on and transmitting properly, in Mode I and Mode II. No data was available concerning Mode IV, the encrypted friendly code function, as no interrogation of the helicopters Mode IV was done by the AWACS crew. (TAB O3f)

It was not possible to determine the operational condition of the ARC 164 UHF radio due to the damage to the components. (TAB J2c) Front panel control settings and discernible characteristics included a frequency setting of 247.2. (TAB J2c/p1, para2)

Results of analysis for the KY 58 (Voice Security System) is pending completion. (TAB J2d)

C. PROCEDURES

The aircraft crew chief conducted the preflight servicing. (TAB V54/p3, para1) In accordance with Army directives, the Pilot In Command is responsible for ensuring the aircraft is properly serviced. (TAB AA15/p7) Servicing records, pertaining to refueling, replenishing component fluid levels, and the daily scheduled inspections, were carried in the aircraft logbooks IAW DA Pam 738-751, page 32, para 2-2, and were destroyed in the accident.

Training records show that the crew chief was experienced and properly qualified. (TAB T2b) Testimony presented to the Board indicates the Serv-Air, Inc. contractor maintenance personnel were experienced and properly qualified. (TAB V59/p1, para1; V60/p1, para3; V61/p1, para2)

The crew chief was responsible for entering (keying) the correct Mode IV (Identification Friend or Foe [IFF])code, into the aircraft's Kit 1C, Cryptographic Computer. (TAB V48/p7, para2) The Mode IV code is changed every day. If the wrong code is entered into the Kit 1C, then the aircraft can not correctly reply to Mode IV interrogations from other friendly aircraft (e.g. AWACS, fighters). There is no procedure or requirement to record the keying process, so there was no definitive way to determine whether the correct Mode IV code was properly entered prior to the mission on 14 April 1994. However the transponder has a self test feature that warns the pilot if the Mode IV did not accept or retain the encryption. The crewchief who loaded the codes and the pilots who would have performed the self test were killed in the crash on 14 April 1994. (TAB X17,X11,X14)

A representative of the U.S. Army Aviation Electronic Combat, St. Louis, Missouri, evaluated the other Eagle Flight crew chiefs on 28 April 1994. He determined that they were all performing the Mode IV keying procedure in accordance with the applicable technical manuals. (Atch 2)
No other maintenance personnel or supervision factors appear to be related to the accident.

Douglas C Sousa

DOUGLAS C. SOUSA, CW4, USA
Mishap Investigation Board

5 Attachments

1. Teardown Analysis Facilities
2. Tech Adv Report
3. Maintenance Documentation
4. Airworthiness Release
5. Acft Status Insp and Maint Record
6. Infrared and Radar Countermeasures

Accident Investigation Board

14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Teardown Analysis of UH-60 Black Hawk Components -- Facilities

1. Aircraft Survivability Equipment (ASE) and Avionics components recovered from the crash sites of U.S. Army Black Hawks helicopters serial numbers 87-26000 and 88-26060 were forwarded for technical analysis.

2. Components were forwarded to the Office of the Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC, 4300 Goodfellow Blvd., St Louis, MO 63120-1798. That office forwarded components to appropriate laboratories for analysis as follows:

a. Arc/164. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

b. ICS/C-6533. Navigational and Information Transmission Branch (W/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

c. Kit 1C. AFCSC/CV, 230 Hall Blvd Sto 126, San Antonio, TX 78243-7075, Acft 88-26060.

d. Apr 39 V Digital processor. HQ, USAR Com-Elec Cmd, Research Development and Engineering Center, NV & E Sensor Directorate, Ft. Monmouth, NJ 7703-5205, Acft 87-26000 and 88-26060.

e. APX-100. Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, Acft 87-26000 and 88-26060.

f. AN/A1Q 144A. Robert W. Aamueller, Survivability Equipment Division, Ft. Monmouth, NJ 07703-5205, Acft 87-26000 and 88-26060.

g. AN/Arc 186. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000.

h. KY 58. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

i. KY 58 control. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

POST ACCIDENT INSPECTION
EAGLE FLIGHT DETACHMENT
AVIONICS OPERATION AND MAINTENANCE

1. Detailed operational testing and operational evaluation was accomplished on aircraft survivability and communications equipment installed on 4 UH-60A Black Hawk utility helicopters assigned to Eagle Flight detachment located at Diyarbakir Air Base, Turkey. Testing and evaluation was performed on 28 April 1994 by CW2 John Hall, Project Executive Office Division, Aviation Electronic Combat, St. Louis, Missouri, and SSG Freddie Holmes, 4th Bde, 3d Infantry Division (Mech), Giebelstadt, Germany. The purpose of the testing was to determine the operational status of the aircraft, identify maintenance deficiencies, and evaluate maintenance personnel knowledge of maintenance procedures on communication and aircraft survivability equipment. Aircraft inspected were serial numbers 87-24656, 87-26001, 87-24555, 87-24634.

2. Items checked.

a. AN/ALQ - 144A Passive Infra Red (IR) Counter Measure System. Provides helicopter protection against 1st and 2nd generation IR missiles operating in bands 1, 2, 3, and 4. Areas covered:

(1) System Operation

(2) Jam Code Setting

(3) Air crew knowledge

(4) Unit equipment testing procedures at Aviation Unit Maintenance (AVUM) level and Aviation Intermediate Maintenance (AVIM) level.

b. M130 Chaff Dispenser system. Provides aircraft protection against radio frequency (RF) systems by dispensing RF reflective material into the atmosphere to inhibit threat radar lock, on aircraft. Areas covered:

(1) System Operation

(2) Program Salvo/Burst Setting

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

c. AN/APR-39 A(V)1 Radar Warning Receiver System. Detects RF radar signal and provides the air crew a visual display of threat radar signal. Areas Covered:

(1) System Operation

(2) System Installation

(3) Emitter Identification Data Version Number

(4) Air crew knowledge

(5) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

d. ARC-164 HAVE QUICK I (HQI) UHF Radio. Provides UHF Amplitude Modulated air-to-air and air-to-ground radio communications and communications on Guard (emergency frequency). The ARC-164 has a HAVE QUICK mode (anti jam) which uses a frequency hopping method to change the frequency selected many times a second. Areas covered:

(1) System Operation

(2) Air crew knowledge

(3) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

e. AN/APX-100 Transponder System. Provides automatic radar identification of the aircraft to all suitably equipped challenging aircraft, surface and ground facilities within the operating range of the system. Areas covered:

(1) System Operation

(2) Code Setting Procedure

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

3. Results of testing and evaluation.

a. AN/ALQ-144A (para 2a.) All areas inspected were being correctly accomplished in accordance with TM 11-5865-20-12 and TM 55-1520-237-10.

b. M130 (para 2b). All areas inspected were being correctly accomplished in accordance with TM 9-1095-206-23, TM 9-4940-497-13 and TM 55-1520-237-10.

c. AN/APR-39 A(V)1 (para 2c.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. However the AN/APR-39 A(V)1 self-test on aircraft 87-24634 indicated the processor failed the memory test. Eagle maintenance personnel changed processor. The AN/APR-39 A(V)1 on aircraft 87-24634 passed the self-test. Self-test will test the IP1150/display, processor, and front/rear receivers.

d. ARC-164 HQ1 (para 2d.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. HQI is installed on the 4 UH 60 aircraft evaluated. The F-15 aircraft and AWACS aircraft are equipped with HQII. The ARC-164 HQI is not compatible with the ARC-164 HQII; however, ARC-164 with HQII can be adjusted to be compatible at the unit level to operate with the ARC-164 HQI.

e. AN/APX-100 (para 2e.) All areas inspected were being correctly accomplished in accordance with TM 11-5895-1199-12 and TM 55-1520-237-10.

4. Determination.

a. Prior to the repair of the AN/APR 39 A(V)1 RWR, unit, communication and aircraft survivability equipment (avionics) was at a 96% operational rate. Unit had a 100 percent operational rate for avionics upon completion of inspection.

b. Unit personnel were operationally knowledgeable on all communication and aircraft survivability equipment systems. System operation and maintenance status on all communication and aircraft survivability equipment was found to be correctly accomplished. The processor which failed were the only piece of equipment that was not found to be fully operational. As stated previously, it was replaced by maintenance personnel which made the system operational. There was an Army school trained Electronic Warfare Officer (EWO) who was assigned to Eagle Flight Detachment, on-board the lead UH-60 helicopter at the time of the accident. One of his responsibilities was to insure unit personnel were knowledgeable on the operation of aircraft survivability equipment.

JOHN B. HALL
CW2, USA
Aviation Technical Adviser

STATEMENT OF QUALIFICATIONS

I am CW2 John B. Hall, assigned to the Project Executive Office Project Manager Aviation Electronic Combat (PM AEC), St. Louis, MO. as an electronic warfare officer. I am a technical advisor to the AFR 110-14 Accident Board investigating the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in northern no-fly zone of Iraq on 14 Apr 94. I have attended the Navy Electronic warfare course at Pensacola Naval Air Station and the Multi-Spectral Electronic Warfare course at George Washington University. I have served 2 years as a electronic warfare officer at battalion and brigade level. I have served 2 years as an assistant program manager at PM AEC with the task of training electronic warfare officers and assisting in the development of advanced electronic warfare equipment.

18 May 94
(DATE)

John B Hall
JOHN B. HALL, CW2, USA

Accident Investigation Board 14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Army Aviation Maintenance Documentation

1. The following is an explanation of the DA PAM 738-751 -- FUNCTIONAL USERS MANUAL FOR THE ARMY MAINTENANCE MANAGEMENT SYSTEM-AVIATION (TAMMS-A) as it pertains to U.S. Army Aviation Maintenance Forms Disposition.

2. DA PAM 738-751 requires that the Equipment Logbook Assembly (logbook) **will be** located in the aircraft during its operation. In addition to other publications and forms (DA Form 2408-12 [Army Aviator's Flight Record], DA Form 2408-31 [Aircraft Identification Card], DD Form 1896 [Jet Fuel Identaplate], etc.) the logbook contains the following maintenance forms :

a. DA Form 2408-13	Aircraft Status Information Record
b. DA Form 2408-13-1	Aircraft Inspection and Maintenance Record
c. DA Form 2408-13-2	Related Maintenance Actions Record
d. DA Form 2408-14	Uncorrected Fault Record
e. DA Form 2408-18	Equipment Inspection List

3. After the last flight of the mission day, the DA Form 2408-13 will be closed out by entering the flight time, landings, touch-down autorotations, and so forth. When the forms are removed from the logbook, the open faults appearing in the Fault Information blocks will be carried forward to the new DA Form 2408-13-1 or re-entered on the DA Form 1408-14. The decision to re-enter a fault to the DA Form 1408-14 will be made by the unit or activity commander, equal management or supervisor in contract support maintenance, or his or her designated representive. A new DA Form 2408-13 with the current data entered is put in the logbook for the next mission day.

4. The old form is removed and stored for a total of seven months. It is retained in a 30 day file, and then that file is kept in the unit or activity for six additional months, with the aircraft historical records. As each month is added to the file, the seventh month may be destroyed. The Army Aviation equipment reporting period (30 day) is from the 16th of a calendar month thru the 15th of the following month.

5. To prevent unneccessary reentering of information and faults on a new form every mission day, DA Form 2408-13-1 (&-2) completed forms need not be closed out and removed at the end of the mission day. However, the forms will be closed out at the end of the seventh mission day. The forms will also be removed after completion of extensive maintenance, such as intermediate, periodic, phase maintenance inspections, and maintenance test flights.

Accident Investigation Board
SUBJECT: Army Aviation Maintenance Documentation

6. Historical, helicopter maintenance and equipment/components forms and records, are **not** kept in the aircraft. These forms, listed below, are kept in the maintenance office or suitable office for easy access by those maintenance personnel who perform organization and support maintnenance, and quality control functions of aircraft and aviation assoociated equipment, and related forms and records.

a. DA Form 2408-5	Equipment Modification Record
b. DA Form 2408-5-1	Equipment Modification Record (Component)
c. DA Form 2408-15	Historical Record for Aircraft
d. DA Form 2408-15-1	Warranty Identification Card
e. DA Form 2408-16	Aircraft Component Historical Record
f. DA Form 2408-16-1	History Recorder, Component, Module Record
g. DA Form 2408-17	Aircraft Inventory Record
h. DA Form 2408-19-2	T700 Turbine Engine Analysis Check Records
i. DA Form 2408-19-3	T700 Engine Component Operating Hours Record
j. DA Form 2408-20	Oil Analysis Log

Douglas C Sousa

CW4 Douglas C Sousa
UH-60 Maintenance Test Pilot
Mishap Investigation Board

DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY AVIATION AND TROOP COMMAND
4300 GOODFELLOW BOULEVARD, ST. LOUIS, MO 63120-1798

REPLY TO ATTENTION OF

01 DEC 1993 | R-1

AMSAT-R-ECU (70-62b) 8 Nov 93

MEMORANDUM FOR

Commander, 200th Theater Army Materiel Management Center, Unit 23203, ATTN: SFC Zimmerman, APO AE 09263
Project Manager, Utility Helicopters, ATTN: SFAE-AV-BH, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798

SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

1. References:

a. Technical Manual 55-1520-237-10, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Operator's Manual for UH-60A Helicopters.

b. Technical Manual 55-1520-237-CL, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Operator's and Crewmember's Checklist, UH-60A Helicopters.

c. Technical Manual 55-1520-237-MTF, Headquarters, Department of the Army, 8 Jan 88, with all changes, subject: Maintenance Test Flight Manual, UH-60A, UH-60L, and EH-60A Helicopters.

d. Technical Manual 55-1520-237-23, Headquarters, Department of the Army, 29 Aug 89, subject: Aviation Unit and Intermediate Maintenance Manual for Army UH-60A and EH-60A, and UH-60L Helicopters.

e. Technical Manual, Operation and Maintenance Manual, Auxiliary Fuel Monitoring System for the UH-60A/L Helicopters.

2. This memorandum constitutes an Airworthiness Release (AWR) in accordance with (IAW) Army Regulation (AR) 70-62 to install the Auxiliary Fuel Monitoring System (AFMS) on UH-60 A/L aircraft.

3. The UH-60 helicopter is a production UH-60A/L described in reference 1a with exceptions noted on the applicable DD Form 250 acceptance document. The AFMS is described in reference 1e.

4. Operations and Restrictions.

a. The helicopter shall be operated IAW the referenced 1a

CERTIFICATE

I certify that I am the Records Custodian for the Accident Investigation Board convened to investigate the crash of two U.S. Army Black Hawk helicopters in the no fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate copy of the record which is kept in my records system.

15 May 94
Date

WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

01 DEC 1993 |R-1
8 Nov 93

AMSAT-R-ECU (70-62b)
SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

manual and this document. In the event of a conflict between these two documents, the information in this release shall prevail.

b. The AFMS is not to be used as a fuel quantity indicator. Its purpose is to indicate an out of balance situation while utilizing the Extended Range Fuel System. Pilots should not use the AFMS to conduct mission planning. |R-1

5. Special Inspections and Instructions:

a. A daily visual inspection shall be made of the subject installation to ensure that no progressive structural deterioration is occurring, that there is no loss of security and that no damage to the host helicopter exists. Any occurrence of the preceding shall be corrected prior to further flight operations.

b. In the event any operating limit is exceeded in addition to the normal entry on DD Form 2408-13, appropriate inspection plus special inspection for security and condition of modifications shall be performed prior to next flight. Any incident or malfunction of the aircraft suspected of being related to these configuration modifications shall be reported immediately to this headquarters, ATTN: AMSAT-R-ECU, Mr. Greg Kirchhofer, DSN 693-1687, or commercial (314) 263-1687.

c. This aircraft shall be returned to standard configuration prior to transfer or turn-in to an overhaul facility.

d. The aircraft shall be maintained IAW all applicable Maintenance Manuals and associated Aviation Safety Action Messages and Safety of Flight Messages. Any discrepancies shall be evaluated/repaired prior to next flight to ensure continued airworthiness of the helicopter.

6. Aircraft Logbook Entries.

a. In accordance with Department of the Army (DA) Pamphlet 738-751, the following entries shall be made on the DA Form 2408-13-1/2408-13-1-E and shall be perpetuated on each form during the period of installation or until superseded by another airworthiness release, or until reason for limitation is removed.

(1) Place a circled red "X" on the form IAW DA Pamphlet 738-751. In the fault information block make the following entry: "Operate within the limitations and restrictions specified in the enclosed airworthiness release dated 01 DEC 1993. For DA Form 1352 reporting purposes, the above write ups shall not cause the aircraft to be reported as Partially Mission Capable (PMC).

01 DEC 19:: R-1
8 Nov 93

AMSAT-R-ECU (70-62b)
SUBJECT: Airworthiness Release for Auxiliary Fuel Monitoring System (AFMS) on UH-60A/L Aircraft

Aircraft which are nonstandard configured and operating under this release may be reported as Fully Mission Capable (FMC).

(2) The remaining blocks in the fault information block will be completed per DA Pamphlet 738-751.

b. The above entry shall be cleared upon return of the aircraft to standard configuration. It is acceptable for the local commander or maintenance officer to assume responsibility for the above daily inspection entry by means other than the logbook entry.

c. An exact copy of this AWR describing the operating procedure, limitations, and restrictions will be inserted in the aircraft logbook and another copy inserted in the helicopter aircraft historical records.

7. This Airworthiness Release is terminated upon transfer of the helicopter, changes in configuration of the subject equipment, or issuance of a later release. This airworthiness release does not cancel any previously issued releases.

DANIEL M. McENEANY
Associate Director for Systems
Aviation RDEC

Aircraft Accident Board

14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Aircraft Status Inspection and Maintenance Record

1. Detailed below are maintenance writeups pertaining to UH-60 Black Hawks, serial numbers 88-26060 and 87-26000. These writeups were extracted from maintenance files obtained from Eagle Flight Detachment, Diyarbakir AB, Turkey.

2. 88-26060. Writeups open and carried forward (C/F) to the 30 day file on 10 Apr 94:

a. CO/P center map light inop (6620-01-253-0143) 13 Oct 93 1054.8.
b. #1 Eng ECU P/N not installed on eng 2408-16-1 23 Oct 93 1054.8
c. L/H cargo door window weld brushing worn 10 Nov 93 1054.8
d. R/H cargo door window weld bushing worn 10 Nov,93 1054.8
e. Gunners window vent lever not installed 10 Nov 93 1054.8
f. #1 Eng cowling nylon bumpers cracked 10 Nov 93 1054.8
g. #2 Eng cowling nylon bumpers cracked 10 Nov 93 1054.8
h. Lower tailboom step rotates forward 11 Dec 93 1090.2
i. L/H relay panel not EME modified IAW MWO 1-1520 237-50-59 12 Feb 94 1142.4
j. Pin filter adapters RMVD from cant/advisory panel system no longer EME modified IAW MWO 1-1520-237-50-59 12 Feb 94 1142.4
k. (X) Operate within the limitations and restrictions specified in the enclosed AWR dated 1 Dec 93 22 Feb 94 1147.6
l. L/H stab corner need hysoled 9 Mar 94 1156.9
m. Mode 4 chk due 1189.1 acft hrs 25 Mar 94 1630 1189. (Witness testimony revealed that this check was the regularly scheduled 25 hour inspection. The check was accomplished on 13 April 1994. (TAB V51/p2, para 4-5))
n. Gyromagnetic and standby compass swing due April 94 31 Mar 94 1198.4 1198.4
o. Zues fastener not installed on R/S step fairing door 3 Apr 94 0820 1198.4
p. 25 hr oil samples due at 1213.4 acft hrs 4 Apr 94 1202.0 0930
q. 250 hr stab insp due 1212.4 acft hrs 4 Apr 94 1540 1202.0
r. Flt 3 PLS UHF radio inop 8 Apr 94 1600 1206.7

3. 87-26000. Writeups open and carried forward (C/F) to the 30 day file on 5 Apr 94:

a. Pin filter adapters removed from SAS-1 FPS, Computer A/C not EME modified 14 Jul 93 968.1
b. Antenna on R/H side tail cone section numbered 6B-6T-19 outboard edge deteriorated 26 Oct 93 1076.3
c. Soundproofing screw insert broken on L/H side 20 Nov 93 1127.1

Aircraft Accident Board
SUBJECT: Aircraft Status Inspection and Maintenance Record

d. Removed pin filter adapters from #1 and #2 stab amps system no longer EME modified IAW MWO 1-1520-237-50-59 26 Nov 93 1146.3 C/F 5 Apr 94

e. Rad alt reads 0 at stabilized 10' Hover on both pointer 2 digits 22 Feb 94 1199.2

f. (X) Operate within the limitations and restrictions specified in the enclosed MWR dated 1 Dec 93, 22 Feb 94 1199.2

g. DC ESS bus caution light illuminates when batter switch is turned on 4 Apr 94 1617 1232.1

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

DEPARTMENT OF THE ARMY
PROJ MANAGER, AVIATION ELECTRONIC CO AT
GOU ELLOW BOULEVARD, ST. LOUIS, MO 6 -1798

REPLY TO ATTENTION OF

SFAE-AV-AEC-T

18 May 1994

MEMORANDUM FOR ACCIDENT INVESTIGATION BOARD

Subject: UH-60 Infrared and Radar Countermeasures Effects on Shoot Down

1. The potential for the Infrared and Radar Countermeasures installed on UH-60 tail number 87-26000 and tail number 87-26060 to counter the weapons fired on them during the incident of 14 April 1994 was evaluated. The specific characteristics and performance of the weapons and countermeasures equipment were considered in this evaluation but will not be discussed here because of the classification of this information. The following is an unclassified summary of the conclusions which resulted from this evaluation.

Infrared Countermeasures

The AN/ALQ-144A Infrared Jammer was not design for and could not have countered the infrared missile used. The operating characteristics of the missile and the geometry of the engagement were outside the effectiveness range of this countermeasure.

Radar Countermeasures

The Radar Countermeasures on subject aircraft consist of the AN/APR-39A(V)1 Radar Signal Detecting Set and the M-130 General Purpose Dispenser loaded with the M-1 Chaff Cartridge. These two systems were not designed to and could not have countered the radar missile used. The operating characteristics of the engaging aircraft's radar and the missile operating characteristics were outside the effectiveness range of this countermeasure combination.

2. The overall conclusion of our evaluation is that the subject countermeasures were not designed to counter the sophisticated weapons used in this incident and could not have prevented the shoot down.

William R. Nicholson
Chief Tech Mgmt Div
Aviation Electronic Combat Project Manager

18 May 94

STATEMENT OF QUALIFICATIONS

I am CW4 Douglas C Sousa, assigned to C Co, 7-227th Avn, Hanau Germany, as UH-60 Maintenance Test Pilot (MTP). I am a Board Member to the AFR 110-14 Accident Board, investigating the crash of two U.S. Army Black Hawk helicopters and the possible involvement of U.S. fighter aircraft in the crash of these helicopters in the northern No-Fly-Zone of Iraq on 14 April 1994. I graduated from the U.S. Army Maintenance Management/Maintenance Pilot Course (MM/MTPC) in 1991, and have had one, 1-year tour in Korea and have completed about 15 months of a tour in Germany, as an MTP in Black Hawks. I have more than 23 years of flight experience with the U.S. Army and Army Reserves, and have a total of more than 7000 hours of flight time.

Douglas C Sousa 18 MAY 94

DOUGLAS C. SOUSA, CW4, USA

O-2a

TAB O-2

UH-60 BLACK HAWK 87-26000 O-2b

O-2a Maintenance Technical Report

O-2b IFF Technical Report

TECHNICAL REPORT

UH-60 BLACK HAWK IDENTIFICATION-FRIEND-OR-FOE (IFF) SYSTEM

Aircraft Evaluated: UH-60 Black Hawk, Serial Number 87-26000

Incident Date: 14 April 1994

I. INTRODUCTION: The purpose of this evaluation was to determine the serviceability of the Identification-Friend-or-Foe (IFF) system on the UH-60 Black Hawk aircraft, serial numbers 87-26000.

II. BACKGROUND: This technical report was prepared for the official AFR 110-14 aircraft accident investigation into the facts and circumstances surrounding the crash of two US Army UH-60 Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in the northern No-Fly Zone of Iraq on 14 April 1994. Aircraft 87-26000 arrived at Diyarbakir AB, Turkey on 14 June 1993, and had a total of 1247.3 flight hours on the airframe prior to the last mission.

III. EVALUATION: A review of the historical maintenance records for each aircraft was completed. This review included the available DA Form 2408-13 series aircraft maintenance records, aircraft historical records, and witness testimony. The purpose of the review was to identify discrepancies documented on the IFF system.

Specific maintenance procedures with possible relevance to the mishap were investigated. The Eagle Flight Detachment policies and procedures were evaluated for compliance with Department of the Army directives. (Atch 1)

Available components from the IFF system were examined to determine serviceability. Items recovered from the wreckage of 87-26000 included the AN/APX-100 (Transponder). This component was sent to a Department of Defense test facility for laboratory analysis. (Atch 2) The KYK-13s (Electronic Transfer Device) which should have been used to load the Mode IV code for 14 April 1994 into the AN/APX-100 were sent on 18 May 1994 to Tobyhana Army Depot for laboratory analysis.

IV. DETERMINATION:

A. BACKGROUND. The following information is derived from DOD AIMS 86-100, May 1987, Department of the Army Technical Manual 55-1520-237-10, 8 January 1988, w/changes 1-20.

The IFF system consists of the AN/APX-100 (Transponder), the Kit 1C (Cryptographic Computer), and two omnidirectional antennas, one installed on the top fairing between engine exhaust ports (top center of the aircraft, behind the rotor blade mast), and one on the lower fuselage in the center portion of the aircraft, under the transmission section. TAB AA20/p3-63, para3-158)

The AN/APX-100 Transponder set provides automatic radar identification of a aircraft to all suitably equipped challenging aircraft and surface or ground facilities within the operational range of the system, provided a compatible code is entered into the interrogation system and into the transponding system. (TAB AA20/p3, para3-157)

The system receives, decodes and responds to interrogations of operational codes Mode I, II, IIIA, IIIC and IV. The AN/APX-100 also can transmit specially coded identification of position and emergency signals to interrogating stations, if conditions warrant. (TAB AA20/p3-63, para3-157)

There are five independent coding modes available to the operator. The first three may be used independently or in combination: Mode I provides 32 possible code combinations and is a nonsecure method for an interrogating system to track aircraft or ships. Mode II provides 4096 possible code combinations to the interrogator; it is used to track a specific aircraft. Mode III/A provides a geographic identification of the aircraft's position to an interrogating station. Mode III/C will indicate pressure altitude, to the nearest 100 ft increment, of the aircraft being interrogated. (TAB AA20/p3-63, para3-157)

Mode IV is an encrypted secure mode that transmits a coded pulse to an interrogating system to identify a friendly aircraft. A compatible code for the operational time period must be loaded into the interrogating system's KIR 1C and the transponding system's KIT 1C for the interrogator to receive a friendly indication. (TAB AA21/p2-3, para2-4.2, p4-8, para4-6.1)

The AN/APX-100 transponder provides two indications to assist the aircraft operator in evaluating the effectiveness of the transponder's response to an interrogating signal. The "reply light" on the transponder will illuminate if a compatible code has been received and a response is being transmitted; there is also an audio tone in the operator's head set to indicate that the transponder system has been interrogated by an incompatible Mode IV code. In addition, the aircraft Master Caution light will illuminate, along with a specific Mode IV segment light on the caution advisory warning panel, to alert the crew if the

transponder has not replied to the Mode IV interrogation.(TAB AA21/p4-7, para4-5.1.5, p4-8, para4-5.2.1)

The current Mode IV code must be loaded into the transponder prior to each mission. The Mode IV codes for each day of any given month are imprinted on paper tape. There is an individual tape segment for each day of the month. The first step in loading the Mode IV code into the transponder is to load the code for the day into the KYK-13 (Electronic Transfer Device). The KYK-13 is loaded by connecting a KOI-18 (Tape Reader) to the KYK-13, inserting the coded paper tape, and running the tape through the KOI-18. The loaded KYK-13 is then disconnected. (TAB AA21/p4-21, para4-16.3)

The KYK-13 is connected (with a plug-on data transfer cable) to the KIT 1C (Cryptographic Computer) in the aircraft. When the proper switch on the KYK-13 is turned to the load position, the code is passed from the KYK-13 to the KIT 1C. The Mode IV code is then loaded and available for access by the transponder. If the KIT 1C was not loaded properly, the aircraft Master Caution light will illuminate, along with a specific Mode IV segment light on the caution advisory warning panel, to alert the crew that the transponder has not accepted the code. (TAB V60/p3, para4)

It is possible to load the codes for two consecutive days into the KIT 1C. If pending operational requirements will make it impossible to reload the Mode IV code prior to the beginning of the next day, two days of codes would be loaded. At the end of the first day, the next day's Mode IV code may be selected by using the code A/B switch on the transponder. Failure to change to the new day's code at the end of the first day will make the system's Mode IV code incompatible with other Mode IV systems during the second day. (TAB AA21/p4-9, para4-6.3)

B. HISTORICAL RECORDS REVIEW

A review of the 30-day and 6-month historical maintenance files revealed that one discrepancy relating to the Transponder or Mode IV was noted during the preceding seven month period. (TAB H2b) The text of that discrepancy write-up and the corrective action recorded follows:

25 January 1994

"Transponder Mode IV does not hold code. Replaced batteries."

Weakened batteries would prevent the transponder from retaining the Mode IV code when aircraft engines are shut down. Replacing the batteries is the proper corrective action. In this instance, the battery change corrected the problem and the transponder worked properly.

Review of the maintenance records revealed no other discrepancies that could have contributed to the accident.

C. PILOT/MAINTENANCE PERSONNEL ASSESSMENT.

Interviews with Eagle Flight Detachment pilots and maintenance personnel revealed that the aircraft avionics (including the transponder and Kit 1C) were functioning properly prior to 14 April 1994. (TAB V49/p2, para3;V48/p3, para3; V59/p1, para4) There is no evidence that Mode IV checks were made with AWACS on 14 April 1994. (TAB Z4)

On 28 April 1994, the supervision of maintenance personnel, and maintenance policies and procedures used by Eagle Flight Detachment were evaluated and found to be in accordance with applicable Army policies and technical manuals. (Atch 1)

D. TEARDOWN ANALYSIS.

The aircraft's transponder was removed from the crash site and sent for teardown analysis. The transponder was sent to the Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, for teardown analysis.

The results of the teardown analysis of the IFF transponder have been provided. The focus of the engineering investigation was to determine whether the AN/APX-100 (V) was powered on and if so, whether or not MODE IV was operational at the time of the incident.

Based on the analysis of the physical evidence recovered, it was concluded that the transponder was powered on at the time of the accident. The transponder's K1 main power supply relay was relatively unharmed in the accident and was analyzed. (TAB J2b/p2) examination of the electrical relay contacts in these components revealed that the contacts were in the closed (power on) position at the time of the incident. (TAB J2b/p2, para2) Taken with the AWACS data which indicates that AWACS was tracking the two UH-60 Black Hawks via Mode II interrogations, it is appears that the transponder was powered on at the time of the incident. (TAB J2b/p2, para2)

The transponder was also examined in order to determine mode and code settings. All toggle switches on the transponder were so heavily damaged by fire that it was not possible to determine switch positions at the time of the incident. All mechanical detents

and the switch bodies of the toggle switches were lost as a result of the fire. (TAB J2b/p1, para3)

The Mode IV code wafer switch knob and shaft were present but the switch contacts, detents and switch body were consumed by fire. With only the knob and shaft remaining, it was not possible to determine the position of the switch at the time of the incident. (TAB J2b/p2, para2)

Mode settings for Modes I, II, and IIIA were postulated. X-ray radiographs were taken of a functioning transponder. (TAB J2b/p3, para2) Specific radiographs were taken of the code switches in each of the eight possible positions. These radiographs were then compared to the radiographs which were taken of the switches from this aircraft's transponder. The radiographs show that the approximate switch setting of the incident aircraft can be determined by comparison to the switch settings on the functioning transponder. Postulated mode and code settings were ascertained in this manner and are listed as follows: Mode I - x 5; Mode II - 5 4 1 7; Mode IIIA - 0 1 3. (TAB J2b/p3, para2)

Although not discussed in the teardown analysis report, the postulated mode settings are not consistent with other evidence pertaining to these Mode settings. AWACS interrogated the UH-60 Black Hawk Mode I and found the aircraft was squawking 42. (TAB Z4a) If the aircraft had been squawking code X 5 on Mode I, that interrogated code would have been annotated in the AWACS data tapes. There is no record of an X 5 Mode I interrogation by AWACS (TAB Z4), so the postulated setting appears incorrect.

The same analysis applies to the postulated Mode II code setting. AWACS interrogated Mode II and found the UH-60 Black Hawk aircraft were squawking codes 5130 and 5131

on Mode II. If the helicopter had been squawking code 5417 Mode II, the AWACS would have detected that code and the interrogation would have been annotated in the AWACS data tapes. There is no 5417 Mode II interrogation in the AWACS data tapes (TAB O3f/Q10; Z4), so the postulated setting appears incorrect.

The postulated setting of Mode IIIA is not relevant as the evidence indicates that the Mode IIIA is not used; it was not interrogated by AWACS. (TAB O3f; Z4)

The X-ray radiograph procedures discussed above could provide no information regarding the Mode IV operational status since it is set electronically, not by switch positions.

The Mode IV circuits were examined in order to determine, if possible, the operational state of the Mode IV. In particular, the A7-Z1 Mode IV caution relay was analyzed to determine whether a Mode IV caution condition (Mode IV caution light illuminated) existed at the time of the incident. (TAB J2b/p3, para2) A Mode IV caution light would have illuminated if there were a transponder hardware failure or if the code entered into the transponder were incompatible with the interrogator's code. The Mode IV caution light stays illuminated until the transponder is turned off. If the switch is moved back to the "audio" or the "light" position, the caution light will return. (TAB AA20/p3-63, para3-157; Atch 3)

Analysis of the electrical relay contacts revealed that the contacts were in the closed position at the time of the incident. This means that the Mode IV caution light was not illuminated, which in turn indicates that there was no transponder hardware failure and no incompatible (unfriendly) interrogation. However, the teardown analysis could not conclusively determine that the Mode IV was fully operational. (TAB J2b/p4, para3)

Results of the teardown analysis of the KYK-13s (Electronic Transfer Device) have not been received. There is no independent evidence which indicates that these units were not functioning properly.

V. PROCEDURES. Specific issues concerning keying Mode IV into the IFF system prior to flight, the operational check of Mode IV prior to flight, and shut-down procedures during enroute stops are addressed in a separate technical report. (TAB O1c)

JOHN B. HALL
CW2, USA
TECHNICAL ADVISOR

Atch
1 Tech adv inspection
2 Teardown Analysis Facilities
3 Failure analysis - APX-100
4 Tech Adv Qualifications

Accident Investigation Board 14 May 94

MEMORANDUM FOR RECORD
SUBJECT: Teardown Analysis of UH-60 Black Hawk Components -- Facilities

1. Aircraft Survivability Equipment (ASE) and Avionics components recovered from the crash sites of U.S. Army Black Hawks helicopters serial numbers 87-26000 and 88-26060 were forwarded for technical analysis.

2. Components were forwarded to the Office of the Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC, 4300 Goodfellow Blvd., St Louis, MO 63120-1798. That office forwarded components to appropriate laboratories for analysis as follows:

a. Arc/164. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

b. ICS/C-6533. Navigational and Information Transmission Branch (W/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000 and 88-26060.

c. Kit 1C. AFCSC/CV, 230 Hall Blvd Sto 126, San Antonio, TX 78243-7075, Acft 88-26060.

d. Apr 39 V Digital processor. HQ, USAR Com-Elec Cmd, Research Development and Engineering Center, NV & E Sensor Directorate, Ft. Monmouth, NJ 7703-5205, Acft 87-26000 and 88-26060.

e. APX-100. Naval Air Warfare Center, Aircraft Division, Indianapolis, IN, Acft 87-26000 and 88-26060.

f. AN/A1Q 144A. Robert W. Aamueller, Survivability Equipment Division, Ft. Monmouth, NJ 07703-5205, Acft 87-26000 and 88-26060.

g. AN/Arc 186. Navigational and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB, Ohio, ACFT 87-26000.

h. KY 58. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

i. KY 58 control. US Army Depot, ATTN: SDSTO-MC, Tobyhanna, PA.

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
UH-60 Maintenance Test Pilot
Accident Investigation Board

POST ACCIDENT INSPECTION
EAGLE FLIGHT DETACHMENT
AVIONICS OPERATION AND MAINTENANCE

1. Detailed operational testing and operational evaluation was accomplished on aircraft survivability and communications equipment installed on 4 UH-60A Black Hawk utility helicopters assigned to Eagle Flight detachment located at Diyarbakir Air Base, Turkey. Testing and evaluation was performed on 28 April 1994 by CW2 John Hall, Project Executive Office Division, Aviation Electronic Combat, St. Louis, Missouri, and SSG Freddie Holmes, 4th Bde, 3d Infantry Division (Mech), Giebelstadt, Germany. The purpose of the testing was to determine the operational status of the aircraft, identify maintenance deficiencies, and evaluate maintenance personnel knowledge of maintenance procedures on communication and aircraft survivability equipment. Aircraft inspected were serial numbers 87-24656, 87-26001, 87-24555, 87-24634.

2. Items checked.

a. AN/ALQ - 144A Passive Infra Red (IR) Counter Measure System. Provides helicopter protection against 1st and 2nd generation IR missiles operating in bands 1, 2, 3, and 4. Areas covered:

(1) System Operation

(2) Jam Code Setting

(3) Air crew knowledge

(4) Unit equipment testing procedures at Aviation Unit Maintenance (AVUM) level and Aviation Intermediate Maintenance (AVIM) level.

b. M130 Chaff Dispenser system. Provides aircraft protection against radio frequency (RF) systems by dispensing RF reflective material into the atmosphere to inhibit threat radar lock, on aircraft. Areas covered:

(1) System Operation

(2) Program Salvo/Burst Setting

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

c. AN/APR-39 A(V)1 Radar Warning Receiver System. Detects RF radar signal and provides the air crew a visual display of threat radar signal. Areas Covered:

(1) System Operation

(2) System Installation

(3) Emitter Identification Data Version Number

(4) Air crew knowledge

(5) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

d. ARC-164 HAVE QUICK I (HQI) UHF Radio. Provides UHF Amplitude Modulated air-to-air and air-to-ground radio communications and communications on Guard (emergency frequency). The ARC-164 has a HAVE QUICK mode (anti jam) which uses a frequency hopping method to change the frequency selected many times a second. Areas covered:

(1) System Operation

(2) Air crew knowledge

(3) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

e. AN/APX-100 Transponder System. Provides automatic radar identification of the aircraft to all suitably equipped challenging aircraft, surface and ground facilities within the operating range of the system. Areas covered:

(1) System Operation

(2) Code Setting Procedure

(3) Air crew knowledge

(4) Unit Equipment testing procedures at (AVUM) and (AVIM) level.

3. Results of testing and evaluation.

a. AN/ALQ-144A (para 2a.) All areas inspected were being correctly accomplished in accordance with TM 11-5865-20-12 and TM 55-1520-237-10.

b. M130 (para 2b). All areas inspected were being correctly accomplished in accordance with TM 9-1095-206-23, TM 9-4940-497-13 and TM 55-1520-237-10.

c. AN/APR-39 A(V)1 (para 2c.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. However the AN/APR-39 A(V)1 self-test on aircraft 87-24634 indicated the processor failed the memory test. Eagle maintenance personnel changed processor. The AN/APR-39 A(V)1 on aircraft 87-24634 passed the self-test. Self-test will test the IP1150/display, processor, and front/rear receivers.

d. ARC-164 HQ1 (para 2d.) All areas inspected were being correctly accomplished in accordance with appropriate maintenance and operator manuals. HQI is installed on the 4 UH 60 aircraft evaluated. The F-15 aircraft and AWACS aircraft are equipped with HQII. The ARC-164 HQI is not compatible with the ARC-164 HQII; however, ARC-164 with HQII can be adjusted to be compatible at the unit level to operate with the ARC-164 HQI.

e. AN/APX-100 (para 2e.) All areas inspected were being correctly accomplished in accordance with TM 11-5895-1199-12 and TM 55-1520-237-10.

4. Determination.

a. Prior to the repair of the AN/APR 39 A(V)1 RWR, unit, communication and aircraft survivability equipment (avionics) was at a 96% operational rate. Unit had a 100 percent operational rate for avionics upon completion of inspection.

b. Unit personnel were operationally knowledgeable on all communication and aircraft survivability equipment systems. System operation and maintenance status on all communication and aircraft survivability equipment was found to be correctly accomplished. The processor which failed were the only piece of equipment that was not found to be fully operational. As stated previously, it was replaced by maintenance personnel which made the system operational. There was an Army school trained Electronic Warfare Officer (EWO) who was assigned to Eagle Flight Detachment, on-board the lead UH-60 helicopter at the time of the accident. One of his responsibilities was to insure unit personnel were knowledgeable on the operation of aircraft survivability equipment.

JOHN B. HALL
CW2, USA
Aviation Technical Adviser

DEPARTMENT OF THE NAVY
NAVAL AIR WARFARE CENTER
AIRCRAFT DIVISION
INDIANAPOLIS, INDIANA 46219-2189

IN REPLY REFER TO
13290
DP1011N/MS26
20 MAY 94

From: Commanding Officer, Naval Air Warfare Center Aircraft Division, Indianapolis
To: Project Manager, Aviation ELectronic Combat (SFAE-AV-AEC)

Subj: FAILURE ANALYSIS ON CRASH DAMAGED ELECTRONIC EQUIPMENT

Ref: (a) Summary of Final Engineering Investigation Report of the APX-100(V) recovered from the U.S. Army AH-60 #87-2600 dtd 16 May 94

(b) Phoncon NAWCAD Indianapolis (DP1011N) Ken Fafford/Dept of the Army COL T. Reinkober (SFAE-AV-AEC) of 20 May 94

1. To further clarify reference (a), and in response to reference (b), the following data is provided:

a. If the KIT-1C Mode 4 code is zeroed by the AN/APX-100 MODE 4 ZEROIZE switch, or if the KIT-1C fails its internal BIT, the Mode 4 caution relay will be latched in its active state (ON).

b. A Mode 4 caution can only be suppressed by placing the MODE 4 AUDIO/LIGHT/OUT switch of the APX-100 in the "OUT" position. If the MODE 4 AUDIO/LIGHT/OUT switch is returned to either the "AUDIO" or the "LIGHT" positions, the MODE 4 caution indication will return.

3. An analysis of the interrogation geometry data of the incident at issue, provided by SFAE-AV-AEC on 20 May 1994, has been performed by engineering personnel from the Naval Air Warfare Center Aircraft Division, Indianapolis and the APX-100 Manufacturer. Based on the data provided, there is a very high probability no "Inline Interrogation Problem" existed at the time of the incident under investigation.

James B. Russell
JAMES B. RUSSELL
By direction

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TOTAL P.01

STATEMENT OF QUALIFICATIONS

I am CW2 John B. Hall, assigned to the Project Executive Office Project Manager Aviation Electronic Combat (PM AEC), St. Louis, MO. as an electronic warfare officer. I am a technical advisor to the AFR 110-14 Accident Board investigating the crash of two US Army Black Hawk helicopters and the possible involvement of US fighter aircraft in the crash of these helicopters in northern no-fly zone of Iraq on 14 Apr 94. I have attended the Navy Electronic warfare course at Pensacola Naval Air Station and the Multi-Spectral Electronic Warfare course at George Washington University. I have served 2 years as a electronic warfare officer at battalion and brigade level. I have served 2 years as an assistant program manager at PM AEC with the task of training electronic warfare officers and assisting in the development of advanced electronic warfare equipment.

14 MAY 94
(DATE)

John B Hall
JOHN B. HALL, CW2, USA

TAB O

E-3B AWACS

O-3a Initial and Upgrade Qualification Training Technical Report

O-3b Mission Qualification Training Technical Report

O-3c Continuation Training Technical Report

O-3d Theater Training Technical Report

(See also Classified Addendum)

O-3e Maintenance Technical Report

O-3f Data Reduction Technical Report

(See also Classified Addendum)

TECHNICAL REPORT
E-3 AWACS INITIAL AND UPGRADE QUALIFICATION TRAINING

I. INTRODUCTION:

The purpose of this evaluation was to determine the relevance and effectiveness of the E-3 AWACS Initial Qualification Training (IQT) and Upgrade Training (UGT) programs in supporting E-3 AWACS operational missions in Operation Provide Comfort (OPC). IQT and UGT programs are intended to prepare aircrew members to perform non-tactical duties in the aircraft, although much of the training does by its nature, include tactics, techniques, and tactical employment. IQT and UGT are formal courses, and are administered by the two AWACS formal training squadrons, one teaching academic and Aircrew Training Device (ATD) portions, the other the flying instruction. All E-3 aircrew members are graduates of IQT or UGT programs. Subsequent to IQT, all E-3 aircrew members complete Mission Qualification Training (TAB O3b), are entered into Continuation Training (TAB O3c), and must complete applicable Theater Training (TAB O3d) prior to deployment to the OPC theater.

II. BACKGROUND:

E-3 AWACS crew members aboard a US E-3 aircraft, serial number 77-0351, were performing airborne warning and control duties during the crash of two US Army Black Hawk helicopters, serial numbers 88-26060 and 87-26000, in the northern "No Fly Zone" of Iraq on 14 April 1994. An AFR 110-14 Accident Investigation Board is examining the possible involvement of US F-15 fighter aircraft, serial numbers 79-0025 and 84-0025, in the crash of these helicopters.

III. EVALUATION:

This evaluation included the review of IQT and UGT syllabi and associated primary courseware for the Mission Crew Commander (MCC) course, Senior Directory (SD) course, Air Surveillance Officer (ASO) course, and Weapons Director (WD) course. IQT and UGT courses consist of academics, Aircrew Training Device (ATD) training (also referred to as simulator training), and flying training. Academic training objectives and associated courseware modules were thoroughly reviewed. Objectives for the simulator sessions, which primarily support associated academic modules, were reviewed. Flying training objectives were reviewed, but they are broad and the actual training accomplished may be different for each flying sortie and is in part dependent upon the number and type of external resources (such as fighter sorties) available for that particular training flight.

IV. DETERMINATION:

A. Mission Crew Commander IQT Course. The MCC course, ACC Syllabus E3000BQOBX, consists of 150.5 hours of academics, 42.5 hours of ATD, and 10 E-3 flight sorties. (Atch 1) The course comprehensively covers MCC duties and responsibilities, E-3 roles and missions, E-3 systems, operating procedures to include monitoring weapons and surveillance sections, and E-3 employment in various missions. Mission types include tactical air operations, North American

Air Defense (NORAD), joint operations, and counter drug operations. Academic areas are practiced and reinforced in the simulator and in-flight. MCC leadership is emphasized including safety of operations, leadership of the crew, technical qualifications, teamwork, and integrity. (Atch 2) Despite emphasis on the MCC's leadership role as the leader of the AWACS mission, courseware indicates there are practical limits imposed to MCC authority, largely because the E-3 is normally an extension of an existing command and control (C2) system. (Atch 3)

B. Senior Director UGT Course. The SD course, ACC Syllabus E3000UOOSX, consists of 10 hours of academics, one simulator session for 3 hours, and six E-3 flights. (Atch 4) SD candidates must be mission ready WDs with a minimum flight experience of 600 hours. SD academics cover E-3 systems knowledge, but there are no specific objectives on responsibilities and authorities as the leader of the weapons team or on air battle management. Weapons team management instruction is included in the flying portion of the training, and is addressed during mission planning, in-flight, and post mission debriefing. Air battle management is addressed and practiced hands-on during the follow-on Mission Qualification Training (MQT). (TAB O3b)

C. Air Surveillance Officer IQT Course. The ASO course, ACC Syllabus E3000BQOGX, consists of 236 hours of academics, 148 hours ATD, and 10 E-3 flights. (Atch 5) The course thoroughly covers console operations, computer and communications, track/tell, identification friend or foe (IFF) systems , radar, identification procedures, data nets, electronic counter measures/electronic counter counter measures (ECM/ECCM), and system integration. Simulator and flight training reinforces academics. In the track/tell academic module, ASOs are taught to maintain an accurate air picture. Guidance includes dropping track symbology when not needed and insuring that all symbology has associated data (i.e. radar and/or IFF sensor) trails. (Atch 6)

D. Weapons Director IQT Course. The WD course, ACC Syllabus E-3000BQODX, consists of 133.5 hours of academics, 143 hours ATD, and 8 E-3 flights. (Atch 7) The course covers the continuum of aircraft control from advisory control techniques and procedures, where the controller provides traffic advisories and other information but does is not directive, to close control, where the WD is directive to the aircraft. Emphasis is almost exclusively on fighter aircraft operations and fighter support operations, such as air refueling tankers. The advisory control courseware addresses advisory control hands-on training in two simulator sessions, however only fighter aircraft are presented for hands-on practice. Advisory control academic material referenced in the courseware in fact addresses close control of a fighter mission, and academic training does not specifically address flight following procedures or techniques which would be applicable to AWACS support of helicopter operations, particularly when helicopters are operating in a vulnerable hostile environment. Other academic areas covered include intercepting high fast targets; fighter capabilities; the fighter/WD team concept and responsibilities; air refueling; air combat training; strategic defense; composite force; SD/WD roles; and E-3 mission systems knowledge to include Mode IV IFF. Simulator training objectives reinforce academics and include identifying and tracking aircraft, flight safety, multiple continuum of control fighter missions, air refueling missions, strategic defense and composite force missions. Composite force missions train WDs in tactical scenarios and include missions such as fighter strike, offensive counter air, defensive counter air, close air support, reconnaissance, suppression of enemy air defenses, search and rescue (SAR) missions, IFF checks for controlled aircraft, and

coordinating internal handovers with other WDs. The only hands-on training opportunities with helicopters, as an element in the training objective, are in SAR.

E. E-3 AWACS IQT and UGT. Courses comprehensively address those tasks needed to attain Basic Qualified (BQ) in the E-3 AWACS. These courses, combined with the follow-on MQT and Theater Training , provide a sound basis for most of the tasks, roles, and missions demanded of E-3 AWACS aircrews in OPC operations. However, SD academics on weapons team leadership and responsibility, and WD instruction and practical training on flight following helicopter operations, are not taught in these courses or in the follow-on Mission Qualification Training courses. (TAB O3b)

BERTRAM H. PRYOR, JR., Lt Col, USAF
Technical Advisor, AWACS Systems

7 Atchs

1. Extract, ACC Course Syllabus E3000BQOBX, Mission Crew Commander, Jun 1992
2. Extract, MCC Course IQT Trainee Guide MIS:BK01 (REV A)
3. Extract, MCC Course IQT Trainee Guide MIS:BK01 (REV A)
4. Extract, ACC Course Syllabus E3000UOOSX, Senior Director, Nov 1993
5. Extract, ACC Course Syllabus E3000BQOGX, Air Surveillance Officer, Nov 1993
6. Extract, ASO Course IQT Trainee Guide AIS:BK03 REV A
7. Extract, ACC Course Syllabus E3000BQODX, Weapons Director, Jun 1992

CERTIFICATION

I am Lt Col Bertram H. Pryor, Jr., assigned to the 552 Air Control Wing, Tinker AFB, Ok as the Director of Wing Requirements. I am a Technical Advisor to the AFR 110-14 Accident Board, investigating the crash of two U.S. Army Black Hawk helicopters and the possible involvement of U.S. F-15 fighter aircraft and U.S. E-3 AWACS aircraft in the crash of these helicopters in the northern "No Fly Zone" of Iraq on 14 April 1994. I have held various positions as an AWACS crew member and staff officer over the past 15 years. I have been qualified as an AWACS Weapons Director, Senior Director, and Instructor Mission Crew Commander. I have held AWACS-related staff positions as 552d Wing Simulation Training Officer, Chief of Airborne Training at HQ Tactical Air Command, and 552d Wing Chief of Operations Training. I have served as an AWACS Flight Commander and AWAC Squadron Deputy Commander. I served as the USCENTAF senior AWACS planner for Operation Desert Storm, and flew 20 combat support AWACS missions. I am currently a mission ready E-3 Mission Crew Commander with over 2800 hours in the E-3 aircraft. In my capacity as AWACS Systems Technical Advisor, I reviewed the materials used in various AWACS operations training programs including:

The syllabus and course materials for the Initial Qualification, Mission Qualification, and Upgrade Training programs for the following E-3 crew positions: Mission Crew Commander, Senior Director, Weapons Director, and Air Surveillance Officer.

AWACS continuation training program requirements.

The AWACS Theater Training program and associated courseware prepared by the 552 ACW and applicable to Operation Provide Comfort.

The individual training records, flight evaluation folders, and AFORMS training completion products for all crew members of the incident E-3 crew.

In all, I estimate I reviewed over 3,000 pages of material over a 14 day period. This report summarizes my review of this material.

15 May 1994
(Date)

Bertram H. Pryor, Jr.
(Signature)

DEPARTMENT OF THE AIR FORCE
Headquarters Air Combat Command
Langley Air Force Base, Virginia 23665-5001

ACC SYLLABUS
Course No. E3000BQOBX

USAF OPERATIONAL TRAINING COURSE

E-3 MISSION CREW COMMANDER

JUNE 1992

INTRODUCTION

This syllabus prescribes the overall training strategy and approximate amount of instruction required for a student having the entry prerequisites to attain the course goals and graduate. Units tasked to implement this syllabus are responsible for ensuring that each student graduated possesses the attitudes, knowledge, skills, and levels of proficiency set forth in the course training standards. Within syllabus and other directive constraints, the amount and level of training devoted to mission elements, events, subjects or phases should be adjusted, as required, to meet the needs of individual students. Notwithstanding HQ ACC/DO approval, this syllabus does not take precedence over applicable governing directives. Instructions governing publication and revision of ACC syllabi are contained in ACCR 8-1.

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OCR: Boeing CMSS/TD, Tinker AFB, OK 73145-6503
DISTRIBUTION:

CHAPTER 1

COURSE ACCOUNTING

SECTION A - COURSE DESCRIPTION

1-1. COURSE TITLE/NUMBER. USAF Operational Training Course, E-3 Mission Crew Commander (MCC) Basic Qualification Course, E3000BQOBX.

1-2. COURSE ENTRY PREREQUISITES. The following requirements will be completed prior to the formal course start date for the track being entered. The MCC course is divided into two tracks.

a. Common prerequisites:

(1) Major or major selectee.

(2) Current physiological training.

(3) Completed Basic Survival Training course S-V80 and Water Survival course S-V90-A.

(4) Top Secret security clearance and SBI paperwork submitted.

(5) Completed Life Support Training at Tinker AFB.

(6) Physically qualified for flight duty per Class III medical standards.

(7) Military drivers license.

(8) Qualified in small arms training (handgun).

(9) Passport in hand or being processed.

b. Track 1 prerequisites for upgrade to MCC from another E-3 position, or requalification of a former MCC (IAW ACCM 51-60, Volume II):

(1) Must be a previously qualified E-3 MCC or a currently or previously qualified E-3 ASO, SD, WD or equivalent NATO E-3 aircrew position.

(2) Must have 600 E-3 flight hours. Personnel with fewer than 600 hours will use Track 2.

c. Track 2 prerequisites for 17XX personnel with little or no E-3 experience:

(1) Graduate of an accredited weapons control school.

(2) Have AFSC 1711/1716 with one year experience in an automated radar system (SAGE, BUIC, 407L, 412L preferred).

1-3. PURPOSE AND GRADUATE STATUS.

a. The purpose of this course is to train personnel meeting course prerequisites to basic qualification (BQ) status in the Mission Crew Commander crew position in the E-3. Graduates receive an E-3 rating of BQ IAW ACCM 51-60, Volume II.

b. An MCC who is upgrading from another E-3 position (Track 1) will allow the previous qualification to lapse. The previous qualifications will be deleted from AFORMS and the student will be reported in AFORMS and SORTS as "Unqualified MCC".

1-4. LOCATION. 552 Air Control Wing, Tinker AFB, Oklahoma.

1-5. DURATION.

a. Track 1 will be 49 training days divided into 21 ground training days and 28 flying training days.

b. Track 2 will be 55 training days divided into 21 ground training days and 34 flying training days.

1-6. AMOUNT.

	HOURS TRACK 1	HOURS TRACK 2
a. Academic Hours: (does not include unsupervised study time)	150.5	150.5
b. Aircrew Training Device Hours:	42.5	42.5
c. Flying Sorties/Hours:	(8 sorties) 180	(10 sorties) 224
d. Total:	373.0	417.0

BLOCK I - INTRODUCTION

1.1 WELCOME AND ORIENTATION — LECTURE 2.0 HOURS
MIP:WO01
CLASSROOM

An introduction to the course, 552 TS, administrative procedures and student responsibilities. An overview of the academic, simulator and flight portions of the course and the course objectives. A discussion with the 552 ACW/CC, CV or DO on the MCC and his/her position in the Wing as a commander.

1.2 E-3 ROLES AND MISSIONS — SELF-STUDY/GUIDED DISCUSSION 3.0 HOURS
MIP:RM01
CLASSROOM

An overview of USAF missions and specialized tasks and the E-3's role in them as an essential element of national policy. Includes analysis of historical case studies of E-3 employment.

1.3 POSTING AND USE OF PUBLICATIONS — DEMONSTRATION-PERFORMANCE 5.5 HOURS
MIP:PB01
CLASSROOM

In-depth, hands on training on posting aircrew publications and an overview of the contents of each publication and how they are used. Includes evaluation on posting of sample publications.

1.4 552 ACW ORGANIZATION AND FUNCTIONS — LECTURE/TOUR 2.0 HOURS
MIP:ORG 1
CLASSROOM/TOUR

An overview of the organizational structure and functions of the 552 ACW including the agencies which support E-3 operations. Includes a guided tour of Wing facilities.

1.5 MCC DUTIES AND RESPONSIBILITIES — READING/GUIDED DISCUSSION 2.0 HOURS
MIP:MCC 1
CLASSROOM

An overview of the MCC's role as leader and manager of the E-3 mission.

1.6 BLOCK I TEST — EVALUATION 3.0 HOURS
MIE:BK01
CLASSROOM

Open and closed book test of all Block I knowledge objectives.

BLOCK II - E-3 SYSTEMS

2.1 FLIGHT LINE RULES — LECTURE/TOUR 1.0 HOUR
MIP:FL01
CLASSROOM/STATIC AIRCRAFT

An overview of flightline safety and security rules prior to students' first trip to the flightline. Tour is included as part of next lesson (2.2).

2.2 AWACS GENERAL CHARACTERISTICS — READING/DEMO/TOUR 2.0 HOURS
MIP:TR01
CLASSROOM/STATIC AIRCRAFT

An overview of all E-3 systems and crew with a walk-through tour of a static aircraft. Includes demonstration of crew support equipment. Prerequisite for ATD session MIA:TR01.

2.3 DATA PROCESSING AND DISPLAY SYSTEM — READING/GUIDED DISCUSSION 6.0 HOURS
MIS:DP01
CLASSROOM

Basic description of data processing and display system from technical order and positional handbook with discussion reinforcement.

2.4 USING THE DATA PROCESSING AND DISPLAY SYSTEM — READING/DEMO-PERF 5.5 HOURS
MIP:DP02
CLASSROOM/MISSION SIMULATOR

A two-part lesson covering simulator safety, console familiarization, and basic switch actions and displays (computer interface). Prerequisite for ATD sessions MIA:DP02 and MIA:DP03.

2A SYSTEMS PROGRESS TEST A — EVALUATION 1.5 HOURS
MIE:BK2A
CLASSROOM

Comprehensive open and closed book test of knowledge objectives of lessons 2.1, 2.2, 2.3 and 2.4.

2.5 E-3 COMMUNICATIONS SYSTEMS — READING/GUIDED DISCUSSION 4.0 HOURS
MIS:CS01
CLASSROOM

Basic description of E-3 internal and external voice and secure communication systems from technical order and other references with discussion reinforcement.

2.6 USING E-3 COMMUNICATIONS — READING/DEMO-PERF 4.0 HOURS
MIP:CS02
CLASSROOM/MISSION SIMULATOR

Hands-on training in the use of the Audio Distribution System, the communications worksheet, and software aids to communications management. A prerequisite for ATD session MIA:CS02.

2B SYSTEMS PROGRESS TEST B — EVALUATION 1.0 HOUR
MIE:BK2B
CLASSROOM

Comprehensive open and closed book test of knowledge objectives of lessons 2.5 and 2.6.

2.7 E-3 SENSORS — READING/GUIDED DISCUSSION 4.0 HOURS
MIS:SS01
CLASSROOM

Basic description of E-3 radar, IFF, and other sensors from technical orders and other references with discussion reinforcement.

2.8 USING E-3 SENSORS — READING/DEMO-PERF 4.0 HOURS
MIP:SS02
CLASSROOM/MISSION SIMULATOR

Hands-on training in the use of sensor displays and software aids to monitor performance/configuration. A prerequisite for ATD session MIA:SS02.

2C SYSTEMS PROGRESS TEST C — EVALUATION 1.0 HOUR
MIE:BK2C
CLASSROOM

Comprehensive open and closed book test of knowledge objectives of lessons 2.7 and 2.8.

2.9 E-3 DATA LINKS — READING/GUIDED DISCUSSION 4.0 HOURS
MIP:DL01
CLASSROOM

Basic description of E-3 data communications systems and data exchange procedures from technical orders, positional handbook, and other references with discussion reinforcement.

2.10 USING E-3 DATA LINKS — READING/DEMO-PERF 3.0 HOURS
MIP:DL02
CLASSROOM/MISSION SIMULATOR

Hands-on training in the use of data link information and the software aids to monitor configuration and status. Prerequisite for ATD session MIA:DL02.

2.11 SYSTEMS INTEGRATION — READING/GUIDED DISCUSSION 2.0 HOURS
MIP:SI01
CLASSROOM

Summary of systems block and discussion of the integration of all E-3 systems as they relate to mission objectives.

2.12 BLOCK II TEST — EVALUATION 2.0 HOURS
MIE:BK02
CLASSROOM

Open and closed book test including survey coverage of objectives from the first half of the block and comprehensive coverage of the knowledge objectives from the second half of the block.

BLOCK III - OPERATING PROCEDURES

3.1 SURVEILLANCE - READING/SEMINAR 4.0 HOURS
MIP:SP01
CLASSROOM

Basic description of surveillance section duties and responsibilities from reading and seminar with instructors.

3.2 MONITORING SURVEILLANCE — READING/DEMO-PERF 1.0 HOUR
MIP:SP02
CLASSROOM/MISSION SIMULATOR

Hands-on training in the use of surveillance related switch actions and displays. Prerequisite for ATD session MIA:SP02.

3/S BLOCK III SURVEILLANCE PROGRESS TEST — EVALUATION 1.5 HOURS
MIE:BK3S
CLASSROOM

Comprehensive open and closed book test on surveillance knowledge objectives.

3.3 WEAPONS CONTROL — READING/SEMINAR 4.0 HOURS
MIP:WP01
CLASSROOM

Basic description of weapons control section duties and responsibilities from reading and seminar with instructors.

3.4 MONITORING WEAPONS CONTROL — READING/DEMO-PERF 2.0 HOURS
MIP:WP02
CLASSROOM/MISSION SIMULATOR

Hands-on training in the use of weapons related switch actions and displays. Prerequisite for ATD session MIA:WP02.

3/W BLOCK III WEAPONS PROGRESS TEST — EVALUATION 1.5 HOURS
MIE:BK3W
CLASSROOM

Comprehensive open and closed book test on weapons control knowledge objectives.

3.5 EQUIPMENT SUPPORT RESPONSIBILITIES — ASSIGNED READING 3.0 HOURS
MIS:EQ01
CLASSROOM

Basic description of equipment support duties and responsibilities of E-3 technicians from technical order and other references. Prerequisite for and supports MIP:EQ02.

3.6 EQUIPMENT TROUBLESHOOTING — READING/SEMINAR 6.0 HOURS
MIP:EQ02
CLASSROOM

Interactive lesson which introduces the problem solving process to resolve equipment malfunctions using seminars with instructor technicians and case studies to analyze typical problems.

3.7 EMERGENCY PROCEDURES — READING/DEMO-PERF/TOUR 2.0 HOURS
MIP:EP01
CLASSROOM/STATIC AIRCRAFT

Comprehensive study of emergency equipment, procedures and drills followed by a walk-through tour of an aircraft and inspection of emergency equipment. A prerequisite for and includes ATD session MIA:EP01.

3/E BLOCK III EQUIPMENT/EMERGENCY PROGRESS TEST — EVALUATION 1.5 HOURS
MIE:BK3E
CLASSROOM

Comprehensive open and closed book test on equipment support and emergency procedures knowledge objectives.

3.8 T.O./CHECKLIST PROCEDURES — READING/DISCUSSION 6.5 HOURS
MIP:CL01
CLASSROOM

Comprehensive overview of MCC flight procedures as they relate to crew functions, computer interface and mission objectives. Prerequisite for block simulator evaluation MIQ:BK03 which uses a normal flight profile to evaluate block performance objectives.

3.9 FLIGHT OPERATIONS — READING/SEMINAR
MIP:FO01 — 4.0 HOURS
CLASSROOM

Basic description of the duties and responsibilities of the flight crew with emphasis on those areas requiring close coordination with the MCC. Seminar with an instructor pilot.

3.10 OPERATIONS SECURITY — READING/SEMINAR/DEMO-PERF
MIP:OS01 — 5.0 HOURS
CLASSROOM

Overview of operations security requirements and procedures. Includes hands-on training with authentication and encryption/decryption systems.

3.11 E-3 TACTICS — READING/DISCUSSION
MIP:MT01 — 3.0 HOURS
CLASSROOM

Basic introduction to E-3 employment and survival tactics in hostile environments, emphasizing planning as the key to survival.

3.12 MISSION PLANNING AND POST-MISSION PROCEDURES — READING/PRACTICUM
MIP:MP01 — 9.0 HOURS
CLASSROOM/MISSION PLANNING ROOM

Comprehensive study of mission planning requirements followed by observation of actual planning in progress and tour of local agencies involved in the planning process. Also includes overview of MCC's post-mission responsibilities.

3.13 BLOCK III TEST — EVALUATION
MIE:BK03 — 3.0 HOURS
CLASSROOM

Open and closed book test including survey coverage of objectives from the first half of the block and comprehensive coverage of the knowledge objectives from the second half of the block.

CRITIQUE AND 966 AWACTS INTRO — SEMINAR
MIP:CRIT — 5.0 HOURS
CLASSROOM

Critique of the ground training phase followed by an introduction to the 966 AWACTS, the flying phase of training, and a tour of 966 AWACTS facilities. Students may also begin planning for their first flying sortie.

BLOCK IV - MISSION OPERATIONS/EMPLOYMENT

4.1 MISSION 101/201 — SELF-STUDY N/A *
MIS:M201
NONE
* INCLUDED IN FLIGHT TIME

Student preparation for mission 101/201.

4.2 TACTICAL AIR OPERATIONS — ASSIGNED READING 6.0 HOURS
MIS:TA01
SELF-STUDY AREA

Basic introduction to the E-3's role in support of tactical air operations from reading of assigned references.

4.3 MISSION 102/202 — SELF-STUDY N/A *
MIS:M202
NONE

Student preparation for mission 102/202.

4.4 NORAD OPERATIONS — ASSIGNED READING 6.0 HOURS
MIS:NO01
SELF-STUDY AREA

Basic introduction to the E-3's role in support of NORAD air defense operations from reading of assigned references.

4.5 MISSION 103/203 — SELF-STUDY N/A *
MIS:M203
NONE

Student preparation for mission 103/203.

4.6 JOINT OPERATIONS — ASSIGNED READING 6.0 HOURS
MIS:JO01
SELF-STUDY AREA

Basic introduction to the E-3's role in support of joint operations worldwide from reading of assigned references.

4.7 MISSION 104/204 — SELF-STUDY N/A *
MIS:M204
NONE

Student preparation for mission 104/204.

4.8 COUNTER DRUG OPERATIONS — ASSIGNED READING
MIS:CO01 — 6.0 HOURS
SELF-STUDY AREA

Basic introduction to the E-3's role in support of drug interdiction program.

4/T BLOCK IV TEST — EVALUATION
MIE:BK04 — 2.0 HOURS
CLASSROOM

Closed book test of Block IV knowledge objectives.

4.9 MISSION 205 — SELF-STUDY
MIS:M205 — N/A *
NONE

Student preparation for mission 205.

4.10 MISSION 105/206 — SELF-STUDY
MIS:M206 — N/A *
NONE

Student preparation for mission 105/206.

4.11 MISSION 207 — SELF-STUDY
MIS:M207 — N/A *
NONE

Student preparation for mission 207.

4.12 MISSION 106/208 — SELF-STUDY
MIS:M208 — N/A *
NONE

Student preparation for mission 106/208.

4.13 MISSION 107/209 — SELF-STUDY
MIS:M209 — N/A *
NONE

Student preparation for block evaluation.

4.14 DYNAMIC OBJECTIVES — SELF-STUDY
MIS:DYNO — N/A *
NONE

Student preparation to perform dynamic flight objectives (i.e., those which can't be scheduled to occur.)

evaluations, are programmed for SIM training. Students must demonstrate required proficiency in all mission tasks before progressing to flight training.

SECTION B - AIRCREW TRAINING DEVICE SESSION DESCRIPTIONS

4-5. ATD sessions are listed by lesson number, subject, instructor to student ratio, alphanumeric identifier, nominal time to complete, device required, and concise narrative of content.

BLOCK II - E-3 SYSTEMS

2.1/2.2 E-3 WALK THROUGH TOUR — 1:4 RATIO, 3.5 HOURS
MIA:TR01
ACFT (Static Aircraft)

A tour of a static E-3 aircraft, concentrating on major systems, equipment layout, crew positions and crew accommodations. Also introduces students to procedures for entering the flightline restricted area. MIP:FL01 and MIP:TR01 are prerequisites.

2.4 USING THE DATA PROCESSING AND DISPLAY SYSTEM — 1:2 RATIO, 4.0 HOURS
MIA:DP02
SIM (Mission Simulator)

First of two simulator sessions covering basic computer interface. Includes introduction to the simulator and simulator emergency procedures, console checkout and setup, console features, alarms/alerts, error messages, switch action rules and assigning the console. Prerequisite is MIP:DP02, Part A.

2.4 USING THE DATA PROCESSING AND DISPLAY SYSTEM — 1:2 RATIO, 4.0 HOURS
MIA:DP03
SIM

Second session on basic computer interface. Includes line, circle, arrow, message, E-3 track TD, coordinates, TD index and TD update along with lesson evaluation for lesson 2.4. Prerequisite is MIP:DP02, Part B.

2.6 USING E-3 COMMUNICATIONS — 1:2 RATIO, 4.0 HOURS
MIA:CS02
SIM

Provides computer interface objectives for communications. Includes audio distribution system, mission ADS panel checkout, setup and operation, UHF Frequency TD, and UHF tune. Prerequisite is MIP:CS02.

2.8 USING E-3 SENSORS 1:2 RATIO
MIA:SS02 4.0 HOURS
SIM

Provides hands-on training on computer interface objectives for sensor operation. Includes sensor data, strobes, Sector/Subsector SD, Sector/Subsector Definition TD, Subsector Status TDs, System Counts TD, ECM SDs, and PDA. Prerequisite is MIP:SS02.

2.10 USING E-3 DATA LINKS 1:2 RATIO
MIA:DL02 4.0 HOURS
SIM

Includes net participants and cross-told data, remote attentions, Net Participants TD, Crosstold Track TDs, Free Text Message and Message Summary TD, ESM, EWI, commands, other designators, external arrows, relief handover, WILCO/CANTCO and request/assign SIF. Prerequisite is MIP:DL02.

2.12 BLOCK II SIMULATOR EVALUATION 1:2 RATIO
MIQ:BK02 4.0 HOURS
SIM

Evaluation of all computer interface performance objectives in Block II.

BLOCK III - OPERATING PROCEDURES

3.2 MONITORING SURVEILLANCE 1:2 RATIO
MIA:SP02 4.0 HOURS
SIM

Includes track data, track attentions, system track TDs, Operational Conditions TD, Area Definition TD, initiate/reinitiate/drop tracks, defining/deleting areas, Request SIF and Mode 4 request. Prerequisite is MIP:SP02.

3.4 MONITORING WEAPONS CONTROL 1:2 RATIO
MIA:WP02 4.0 HOURS
SIM

Includes weapons track data and SDs, Tactical Bearing and Range, Special Points, Order of Battle, Locate SIF, Bearing and Range, Corridor IFF, Assign/Defer, and RCT displays. Prerequisite is MIP:WP02.

3.7 EMERGENCY PROCEDURES — 1:4 RATIO
MIA:EP01 — 3.0 HOURS
ACFT

A tour of a static E-3 aircraft, concentrating on the location and use of emergency equipment and the conduct of emergency drills. Prerequisite is MIP:EP01.

3/V BLOCK III SIMULATOR EVALUATION — 1:2 RATIO
MIQ:BK03 — 4.0 HOURS
SIM

Evaluation of all computer interface performance objectives in Block III as well as in the use of the positional checklist on a typical CONUS mission sortie.

4-6. SIMULATOR TASKS. The student is required to demonstrate progress according to the following task list. More detailed and specific sub-objectives are described in course training documents and the student study guide. Failure to attain the overall grade by the end of each block indicated may result in NE/SNP and initiation of supervisory actions directed in Chapter 2.

ATD TASKS	**STANDARD**
MIA:DP02 — USING THE DPDS, PART A	N/A
This session is devoted to demonstration and practice and no grade is required.	
MIA:DP03 — USING THE DPDS, PART B	2
Feature/category selection	2
SDC turn on and checkout	2
Console assignment	2
Interpret Console Assignment TD	2
Interpret Augmented Console Assignment TD	2
Perform Line SA	2
Perform Circle SA	2
Perform Arrow SA	2
Perform Message SA	2
Interpret E-3 Track TD	3
Perform Coordinates SA	2

Perform TD Index SA	2
Perform TD Update	2
MIA:CS02 – USING E-3 COMM SYSTEMS	2
SDC turn on and checkout	2
MAP set up and checkout	3
Operate ADS	3
Interpret UHF Frequency TD	2
Perform UHF Tune	2
Interpret UHF Tune TD	2
Interpret UHF Radio TD	2
MIA:SS02 – USING E-3 SENSORS	2
Select and identify sensor data	2
Locate and identify emergency sensor data	3
Select and identify strobe data	2
Display, interpret and clear Sector/Subsector SD	3
Interpret Sector Definition TD	2
Interpret Subsector Definition TD	2
Interpret Radar Subsector Status TD	2
Interpret IFF Subsector Status TD	2
Interpret System Counts TD	3
Display Radar ECM SD	1
Display IFF ECM SD	1
Display PDA SD and TD	1
MIA:DL02 – USING E-3 DATA LINKS	2
Display and interpret Net Participants SD	2
Display and interpret Special Points SD	2
Display and interpret Crosstold Air Tracks	2

Display and interpret Crosstold Surface Tracks	2
Display and interpret TADIL-A data	2
Display and interpret JTIDS data	2
Display and interpret Net Participants TD	2
Display and interpret Remote Track/Special Point TD	2
Perform Free Text Message SA	2
Display and clear ESM SD	1
Display ESM Track TD	1
Display EWI Track TD	1
Perform RN/DES/NTN SA	2
Send Arrow to external facility	3
Perform WILCO/CANTCO SA	1
Issue Commands to net participants	1
MIQ:BK02 BLOCK II EVALUATION	2
Cumulative mission elements and their standards from DP03, CS02, SS02 and DL02 above.	
MIA:SP02 – MONITORING SURVEILLANCE	2
Display IDBO areas	2
Interpret Friendly track blocks	2
Interpret Hostile/Unknown/Faker track blocks	2
Interpret System Track TD	2
Display Local Track SIF Codes TD	1
Interpret Operational Conditions TD	2
Display Area Definition TD	1
Define, display, clear, delete areas	2
Initiate, reinitiate, drop tracks	1
Request SIF	3

MIA:WP02 — MONITORING WEAPONS	2
Display WEAPONS AIRBASES SD	2
Display STOPR/BASES SD	2
Display Special Points	2
Display and interpret Special Mission/Interceptor track blocks	2
Obtain Tactical Bearing and Range	3
Define and delete Special Points	2
Display, update, delete, clear Order of Battle data	2
Perform Locate SIF SA	2
Obtain Bearing and Range	2
Perform Corridor IFF SA	2
MIQ:BK03 BLOCK III EVALUATION	2
Cumulative mission elements and their standards from SP02 and WP02 above plus the following:	
Use positional checklists	1

MISSION TASKS	TRACK 1							
	M101	M102	M103	M104	M105	M106	M107	M108
DIRECT MISSION PLANNING	1	1	2	P	P	P	2	FLIGHT EVALUATION
PERFORM PRE-MISSION REQUIREMENTS	1	2	P	P	P	P	2	
PERFORM PREFLIGHT PROCEDURES	1	2	P	P	P	P	2	
PERFORM START PROCEDURES	1	2	P	P	P	P	2	
PERFORM TAKEOFF PROCEDURES	1	2	P	P	P	P	2	
PERFORM OUTBOUND PROCEDURES	D	1	1	1	2	P	2	
DIRECT AWACS MONITOR	-	D	1	2	P	P	2	
PERFORM ASSUMING STATION	-	-	D	1	2	P	2	
PERFORM ON STATION PROCEDURES	-	-	-	D	1	2	2	
PERFORM EMERGENCY PROCEDURES	D	1	1	1	2	3	3	
TERMINATE STATION OPERATIONS	-	-	-	D	1	2	2	
PERFORM INBOUND PROCEDURES	-	-	-	D	1	2	2	
PERFORM DESCENT PROCEDURES	-	-	-	D	2	P	2	
PERFORM DEPARTING AIRPLANE	-	-	D	1	2	P	2	
PERFORM POST MISSION REQUIREMENTS	D	1	1	1	2	P	2	
OVERALL GRADE	1	1	1	1	2	2	2	

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MCC IQT FLYING MATRIX

FIGURE 1

MISSION TASKS	TRACK 2									
	M201	M202	M203	M204	M205	M206	M207	M208	M209	M210
DIRECT MISSION PLANNING	1	1	2	P	P	P	P	P	2	FLIGHT EVALUATION
PERFORM PRE-MISSION REQUIREMENTS	1	2	P	P	P	P	P	P	2	
PERFORM PREFLIGHT PROCEDURES	1	2	P	P	P	P	P	P	2	
PERFORM START PROCEDURES	1	2	P	P	P	P	P	P	2	
PERFORM TAKEOFF PROCEDURES	1	2	P	P	P	P	P	P	2	
PERFORM OUTBOUND PROCEDURES	D	1	1	1	2	P	P	P	2	
DIRECT AWACS MONITOR	-	D	1	2	P	P	P	P	2	
PERFORM ASSUMING STATION	-	-	D	1	1	2	P	P	2	
PERFORM ON STATION PROCEDURES	-	-	-	D	1	1	1	2	2	
PERFORM EMERGENCY PROCEDURES	D	1	1	1	2	2	2	3	3	
TERMINATE STATION OPERATIONS	-	-	-	-	D	1	2	P	2	
PERFORM INBOUND PROCEDURES	-	-	-	-	D	1	2	P	2	
PERFORM DESCENT PROCEDURES	-	-	-	D	1	2	P	P	2	
PERFORM DEPARTING AIRPLANE	-	-	D	1	2	P	P	P	2	
PERFORM POST MISSION REQUIREMENTS	-D	1	1	1	1	2	P	P	2	
OVERALL GRADE	1	1	1	1	1	2	2	2	2	

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MCC IQT FLYING MATRIX

FIGURE 2

DYNAMIC TASKS	TRACK 1 & 2			
	OPPORTUNITIES			
	1ST	2ND	3RD	4TH
CONDUCT RON / TDY MISSION	1	2	P	P
HANDLE RECALL / NO SHOWS	1	2	P	P
HOST DV'S	2	P	P	P
USE SURVIVAL EQUIPMENT	1	2	P	P
EQUIPMENT / SYSTEM MALFUNCTIONS	1	1	1	2
USE DATA LINKS	1	1	1	2
DATA BASE UPDATES	1	2	P	P
WEAPONS CONTROL ACTIVITY	1	1	2	P
PERFORM AR PROCEDURES	1	2	P	P

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MCC IQT FLYING MATRIX

FIGURE 3

SECTION B - MISSION DESCRIPTIONS

5-5. GENERAL. A typical E-3 training sortie requires three training days to complete as follows:

Day 1	Mission Planning	8.0 Hours
Day 2	Prebrief/Preflight	2.5 Hours
	Sortie	8.0 Hours
	Mission Debriefs	1.5 Hours
Day 3	Training Debrief	2.0 Hours
	Total:	22.0 Hours

a. A typical mission includes a premission briefing, preflight, two hours enroute to orbit, four hours on orbit, two hours return to base and post-flight debriefing. Though this is a typical sortie, actual sorties may vary from 6 hours to 12 hours.

b. RONs normally are 2-3 days of scheduled flying training with an assigned fighter wing. Day 1 is spent on mission planning which will be utilized for all days of scheduled flying. Days 2 and 3 are fly dates with RONs at the assigned fighter wing for face-to-face debriefs and briefs for the following day's flight. Day 4 is final flying activity, return to Tinker, and mission debrief for the E-3 crew members.

5-6. FLIGHT TRAINING. Flight training is listed by lesson number, short subject, nominal time for completion, alphanumeric identifier and concise narrative of content. Criterion objectives for each mission are provided to the student in the student study guide. The instructor to student ratio is 1:1.

BLOCK IV - MISSION OPERATIONS/EMPLOYMENT

4.1 MISSION 101/201 - MISSION PLANNING, PREPARATION FOR TAKEOFF AND FLIGHT FAMILIARIZATION — 22 HOURS

M201

This is the same mission for both tracks. Student is introduced to Outbound Procedures, AWACS Monitor Procedures, Emergency Procedures, and Post-Mission Procedures. Student is evaluated on Mission Planning, Premission Procedures, Preflight Procedures, Start Procedures and Takeoff Procedures. No student practice is planned.

4.3 MISSION 102/202 - OUTBOUND, EMERGENCY PROCEDURES AND POST-MISSION RESPONSIBILITIES — 22 HOURS

M202

This is the same mission for both tracks. Student is introduced to further Outbound Procedures. Student is evaluated on Mission Planning, Premission Procedures, Preflight Procedures, Start Procedures, Takeoff Procedures, early Outbound Procedures, AWACS Monitor Procedures,

Emergency Procedures and Post-Mission Procedures. No student practice is planned.

4.5 MISSION 103/203 - OUTBOUND COMPLETION 22 HOURS
M203

This is the same mission for both tracks. Student is introduced to Station Assumption Procedures and Departing the Airplane Procedures. Student is evaluated on Mission Planning, Outbound Procedures, Emergency Procedures, and Post-Mission Procedures. Student practices Premission Procedures, Preflight, Start Procedures, and Takeoff Procedures.

4.7 MISSION 104/204 - ASSUMING STATION, DEPARTING THE AIRPLANE 22 HOURS
M204

This is the same mission for both tracks. Student is introduced to On-Station Procedures and Descent/Landing procedures. Student is evaluated on Outbound Procedures, Station Assumption, Emergency Procedures, Departing the Airplane and Post-Mission Procedures. Student practices Mission Planning, Premission Procedures, Preflight, Start Procedures and Takeoff Procedures.

4.9 MISSION 205 - ON STATION, DESCENT/LANDING 22 HOURS
M205

For Track 2 students. Student is introduced to Inbound Procedures. Student is evaluated on Outbound Procedures, Station Assumption, On-Station Procedures, Emergency Procedures, Descent/Landing Procedures, Departing the Airplane, and Post-Mission Procedures. Student practices Mission Planning, Premission Procedures, Preflight, Start Procedures, and Takeoff Procedures.

4.10 MISSION 105/206 - ENROUTE INBOUND 22 HOURS
M206

M205 and M206 are combined for M105 for the Track 1 student. Student is introduced to Station Transfer Procedures. Student is evaluated on Station Assumption, On Station Procedures, Emergency Procedures, Inbound Procedures, Descent/Landing Procedures and Post-Mission Procedures. Student practices Mission Planning, Premission Procedures, Preflight, Start Procedures, Takeoff Procedures, Outbound Procedures, and Departing the Airplane.

4.11 MISSION 207 - TRANSFERRING STATION 22 HOURS
M207

For Track 2 students. All tasks have been introduced. Student is evaluated on On-Station Procedures, Emergency Procedures, Station Transfer, and Inbound Procedures. Student practices the remainder of mission tasks.

4.12 MISSION 106/208 — COMPLETING PROFICIENCY REQUIREMENTS 22 HOURS
M208

M207 and M208 are combined for M106 for the Track 1 student. This is the final training mission before the block evaluation. All tasks have been introduced. Student is evaluated on On—Station Procedures, Emergency Procedures, and Station Transfer. Student practices the remainder of mission tasks.

4.13 MISSION 107/209 — BLOCK EVALUATION 24 HOURS
M209

M107 for the Track 1 student and M209 for the Track 2 student are identical. Student is evaluated on all task objectives for the block (flying phase) and is responsible for the entire mission.

QUALIFICATION EVALUATION 24 HOURS
M210/M108

Student is evaluated by 552 ACW Standardization/Evaluation IAW ACCR 60—2 criteria. Open and closed book Stan/Eval tests are prerequisites.

INITIAL QUALIFICATION TRAINING

E-3 MISSION CREW COMMANDER
(G1711/16)
BLOCK I
INTRODUCTION

MAY 1993

AIR COMBAT COMMAND

This document is primarily intended to be used by managers and training developers to identify training and proficiency requirements but is useful to give you some idea of the depth and breadth of the duties performed by the MCC. At some time during your assignment as an MCC you will receive training on every item in this list. A great deal of it will be during this course.

Other Sources

In addition to this relatively permanent guidance there are other more perishable, short-term sources. Among them are the Wing Commander's written/oral policy, Operational Read Files (ORF), and the Flight Crew Information File (FCIF). The read files are available in the 966 AWACTS Operational Readiness Center (ORC) upstairs. While not required reading for this lesson, due to the perishable nature of the information, you should get into the habit of reviewing them on a regular basis.

Wing Commander Policy. During your career in AWACS you will likely receive many briefings, perhaps some letters, and will review directives which outline the Wing Commander's policy on AC and MCC leadership capabilities. Among these, some of the guidelines the Wing's leadership considers most helpful in your duties as a commander include:

1. Safety of Operations. Do not deviate from ACC's high safety standards and do not permit any action which jeopardizes safety, violates flying directives, or fails the test of good judgement. The following points are from the Wing Commander's Safety Guidelines, which are briefed prior to every mission:

- Safe, successful operation is our goal on all peacetime missions.
- Aircraft commanders and mission crew commanders take charge and ensure missions are planned and executed IAW technical orders and directives.
- Use sound judgement and common sense when the unexpected occurs.
- Be vigilant; stop unsafe acts and activity when and where you find them.
- If it doesn't "feel right" then you probably shouldn't be doing it. When you have this "feeling", stop, evaluate, then act.
- Safety is an attitude, a measure of discipline and professionalism. Implementation of this attitude will ensure successful flight operations.

2. Leadership. You are responsible for and to your crew, and you are a commander 24 hours a day, 7 days a week.

3. Technical Qualification. Safe, effective operations rely on technical ability, so you must set high standards and continuously study and prepare to do the job better.

4. Teamwork. Only a well-led team effort can get the most out of our complex system, so you must teach, demand and exemplify teamwork.

5. Integrity. This must be your code as an officer, leader and commander.

In addition to these direct expressions of policy, you may also receive oral policy guidance through the command chain. Media such as staff meetings, commanders' calls, seminars and continuation training all may be used to disseminate policy changes and guidance. Because of the size of the organization and frequent deployments and/or flying missions it is easy to miss or overlook some of this guidance. This makes it wise to take an active role in seeking out this type of information frequently, especially if you have been away for a while.

ORF/FCIF. Temporary or short-term changes to policy and procedures will normally be disseminated in Operational Read Files and the Flight Crew Information File. These usually result from identified problems or when clarification of an existing policy is required, and they are a rapid means of providing the change until formal directives may be updated. You are required to review these sources every time you fly and should develop the habit of checking them regularly even when you aren't flying.

Review the Mission Operations Read File (MORF), Squadron Operations Read File (SORF) and FCIF located in the 966 AWACTS Operations Readiness Center (ORC)

From this point on you will be responsible for the information in these files and you should review them often. Any policy guidance currently in them will be discussed in class.

DUTIES AND RESPONSIBILITIES

Even though we have chosen to break down the description of MCC duties and responsibilities into peacetime and wartime, a major portion of these duties is performed in much the same way regardless of conditions. This is largely because of Air Combat Command's policy of training as we intend to fight. The primary difference is in objectives: the peacetime mission focuses on maximizing training while the wartime mission emphasizes mission accomplishment and survival. While you will receive a basic introduction into operational employment in this IQT course, the bulk of employment training will be provided in MQT and your IQT will concentrate on the routine CONUS mission sortie. This is the basis for the MCC's peacetime duties and responsibilities.

Wartime

Under wartime conditions Planning and Mission Accomplishment become the key duty areas with Survival supplanting any peacetime Security and Safety considerations. **Battle management** becomes the key factor in mission accomplishment. **Planning** goes hand-in-hand with this function since the MCC and crew must understand battle plans, airspace control and regulation procedures, enemy and friendly order of battle, and authorities in order to execute command and control of the air battle. The major thrust of mission qualification training (MQT) will be to prepare you to perform operational missions, so we will not dwell on this subject further in this lesson.

MCC's AUTHORITY

Despite command emphasis on the MCC's role as the leader of the E-3 mission there are practical limits to his/her authority, largely because of the E-3's primary role as an airborne extension of an existing command and control system. Even with its significant sensor, data processing and communications capabilities, the E-3 cannot provide the MCC the same amount and degree of information available to a ground-based commander. Organizationally, the E-3 is placed at a rather low level in the Air Force Air Control System hierarchy in the planning and tasking of air operations because of these practical limitations. The MCC's authority, thus, is commensurate with this level in the hierarchy.

The effective MCC must quickly and accurately make those decisions within his/her authority, must forward decisions to appropriate command levels that are not within his/her authority, and must have the wisdom to know the difference. This is the ultimate purpose of this lesson. Throughout this course you will learn the multitude of duties and responsibilities which comprise the MCC's "job" but the decision-making ability will be developed only through experience and practice.

So we will attempt, based on published directives, to define what you can do. Through a process of elimination, then, you will have to determine what you can't do and act accordingly. Let's look at the authority spelled out in MCR 55-3.

Either the AC or MCC may excuse an aircrew member from attending the mission planning briefings.

The MCC designates aircrew members to provide AWACS monitor traffic advisories to the flight crew.

The MCC, after coordination with the AC, conducts emergency drills, corrects on-the-spot, and debriefs performance. After coordination with the MCC, the AC initiates emergency drills and terminates them by PA announcement, IAW MCR 55-3.

MIS:MCC1, 1 May 93

15 May 94

The MCC, with the coordination of the AC, may direct alternate missions in the event of equipment malfunction or inability to complete the primary mission. This generally applies to the peacetime CONUS mission. Neither the AC nor MCC may abort a mission due to mission equipment malfunctions without squadron/command approval/concurrence. For peacetime training missions this is usually because of factors outside the AC and MCC's area of responsibility such as the flying-hour program and utilization rates. For operational missions this is usually because the command agency must arrange orderly replacement action to continue mission support.

The MCC approves downtime for unscheduled maintenance. Local procedures may further define this authority in terms of duration or types of malfunctions.

The MCC must approve/coordinate all orbit changes and will be briefed by the navigator on the type of pattern, orbit entry, and any updates to the NCS which may upset the radar picture. The AC must coordinate any changes to orbit parameters (duration, pattern, altitude) based on fuel or performance.

The MCC may approve continued operation of malfunctioning equipment that could affect the mission. Caution must be used when exercising this authority. In most cases, continued operation of malfunctioning equipment will result in further deterioration or even abrupt failure. The advice of the airborne technician should be a large factor when making such a decision.

The MCC directs mission intercom net assignments and must approve any deviations. This assures optimum, centralized management of scarce communications resources and avoids confusion.

The MCC is the only mission crew member authorized to use the PA system.

The MCC assigns crew members to assist passengers and to assist the flight engineer in securing baggage.

After assessing the impact of mission equipment limitations, the MCC may adjust mission tasking as necessary. This is a very ambiguous statement. If limitations, such as lack of IFF, impact on the ability to meet FAA regulations or other restrictions to operations, obviously the mission tasks must be adjusted. Anytime a task cannot be completed safely or directives would have to be violated to complete it, then this task should be omitted. Otherwise, this authority must relate back to that for directing alternate missions. In other words, the adjustment may not entail aborting the mission or eliminating all mission activities, unless coordination with ground maintenance is effected and squadron/command approval/concurrence is given.

The MCC designates crew members to provide security for classified material and tapes at locations where US security personnel are not available.

The MCC and AC assign crew members to clean the aircraft interior after missions.

During static displays, the AC and MCC direct safety and security precautions to protect the aircraft, passengers and crew.

Only the MCC may declare the E-3 on-station, after all station assumption requirements are met. Likewise, only he/she may declare off-station either because mission tasking has been completed or station-keeping requirements cannot be maintained. A clear distinction must be made between "declaring off station" and "departing the station" as discussed in MCR 55-3.. The decision on when to depart the station relates to aircraft operations and can only be made by the AC.

Notably absent are any authorities related to flight safety and aircraft operations. Authority in these areas rests solely with the aircraft commander who, nonetheless, is required to coordinate with the MCC on any actions which may directly affect the mission. Included in this area are such functions as changes in orbit and extensions of station time which, while they may be essential to support the mission, may not be sound for reasons unknown to the MCC.

SUMMARY

During the classroom session of this lesson you will participate in a guided discussion to further develop your comprehension of this subject. A major feature of this discussion will be the consideration of operational situations where you and your fellow students will examine decisions made or actions taken to determine if the MCC acted appropriately and within his/her authority. It is intended to stimulate serious thought about how the MCC discharges his/her leadership responsibilities and, like the real world, there may not be a right and wrong answer, only what works.

Your practice toward meeting the objectives of this lesson will be provided in class. Your instructor will have you identify duties which either do or do not belong to the MCC in addition to working on the scenarios described above. For this reason, there are no study questions included in this lesson.

DEPARTMENT OF THE AIR FORCE
Headquarters Air Combat Command
Langley Air Force Base, Virginia 23665-5001

ACC SYLLABUS
Course E3000UOOSX

USAF BASIC OPERATIONAL TRAINING COURSE

E-3 SENIOR DIRECTOR

NOVEMBER 1993

INTRODUCTION

This syllabus prescribes the overall training strategy and approximate amount of instruction required for a student having the entry prerequisites to attain the course goals and graduate. Units tasked to implement this syllabus are responsible for ensuring that each student graduated possesses the attitudes, knowledge, skills and proficiencies set forth in the course training standards. Within syllabus and other directive constraints, the amount and level of training devoted to mission elements, events, subjects, or phases should be adjusted, as required, to meet the needs of the students. This syllabus does not take precedence over applicable governing directives. Instructions governing publication and revision of ACC syllabi are contained in ACCR 8-1.

JOHN M. LOH
General, USAF
Commander

LAWRENCE E. BOESE, Major General, USAF
Director of Operations

Supersedes: E3000UOOSX, June 1992
OPR: ACC/DOYA
OPDR: Det 6, 4444 OS (E-3 OTD Team), Tinker AFB, OK 73145-9021
OCR: Boeing, CMSS/TD
DISTRIBUTION: Y

[redacted]

EXTRACT

I certify that I am the Records Custodian for the Accident Investigation Board convened to investigate the crash of two U.S. Army Black Hawk helicopters in the no fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate extract from ACC Course Syllabus, E-3 Senior Director which is kept in my records system.

5 May 94
Date

WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

CHAPTER 1

COURSE ACCOUNTING

SECTION A - COURSE DESCRIPTION

1-1. COURSE TITLE/NUMBER. USAF Operational Training Course, E-3 Senior Director, E3000UOOSX.

1-2. COURSE ENTRY PREREQUISITES.

a. Completion of E-3 Weapons Director Course, E3000BQODX.

b. Currently qualified Weapons Director with AFSC G1745G.

c. Minimum flight experience must be 600 hours in E-3 as a Weapons Director.

d. Nominated IAW 552 ACWR 51-1.

1-3. PURPOSE AND GRADUATE STATUS. To train personnel meeting the course prerequisites to basic qualification (BQ) status in the Senior Director crew position on the E-3. Graduates receive an E-3 rating of BQ IAW MCR 51-60, Volume 2.

1-4. LOCATION. 552 ACW, Tinker AFB, Oklahoma.

1-5. DURATION. 26 Training days divided into 5 ground training days (GTDs) and 21 flying training days (FTDs).

1-6. AMOUNT.

Type of Training	Hours
Academic	10.0
Aircrew Training Device	3.0
Flying - 6 Sorties	129.0
Total Syllabus Time	142.0

Table 1-1 Syllabus Training Hours

CHAPTER 3

ACADEMIC TRAINING

SECTION A - SPECIAL INSTRUCTIONS

3-1. CONTENT. This chapter outlines the subjects to be covered in each academic block and unit of instruction. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide.

3-2. FACILITY REQUIREMENTS. A classroom environment capable of supporting six (6) students is required. This facility will house related equipment and provide facilities for private student study and counseling sessions.

3-3. INSTRUCTIONAL METHOD/MEDIA. The primary method is lecture and classroom discussion, supported by printed self-study material (SSM). These materials include student texts; Air Combat Command, and 552 Air Control Wing regulations, manuals, handbooks, and pamphlets; and Air Force technical orders.

3-4. ACADEMIC EVALUATIONS. Evaluations are included to measure student progress and ensure effectiveness of the course. The academic evaluation uses multiple choice and matching questions. The examination will be reviewed and critiqued following the test period.

SECTION B - ACADEMIC DESCRIPTIONS

3-5. ACADEMIC TRAINING. Academic training is listed by lesson number, subject, instructional method, alphanumeric identifier, nominal time for completion, facility and concise narrative of content.

The instructor to student ratio for academics is 1:4.

BLOCK I - SYSTEM ACADEMICS

1.1 COMMUNICATIONS — LECTURE/DISCUSSION
ZUP:COMM
CLASSROOM — 2.5 HOURS

Provides a review of E-3 communications equipment capabilities, software, and procedures. Includes a discussion period designed to discuss application of materials to the E-3 mission.

1.2 E-3 SENSORS — LECTURE/DISCUSSION
ZUP:SENR
CLASSROOM — 2.0 HOURS

Provides a background in E-3 primary and secondary sensor capabilities, limitation, software to control sensors, and procedures to determine sensor status. The lecture is followed with a discussion of mission application for the Senior Director.

1.3 E-3 DATA SYSTEMS LECTURE/DISCUSSION
ZUP:COMP
CLASSROOM 2.0 HOURS

The students receive instruction on E-3 computer systems capabilities and limitations, software, displays, and procedures. The lecture is followed by discussion on how the data systems are used to perform SD tasks.

1.4 E-3 SYSTEMS INTEGRATION LECTURE/DISCUSSION
ZUP:SYIG
CLASSROOM 2.5 HOURS

This lecture ties the E-3 systems together and provides instruction on how the total system is used to supervise the weapons mission. The following discussion is based on a discussion of situations which required the student to use total system knowledge.

BLOCK I TEST WRITTEN EXAMINATION
ZUE:BK01
CLASSROOM 1.0 HOUR

This is a closed book examination consisting of multiple choice and matching questions testing academic objectives from lessons 1.1, 1.2, 1.3, and 1.4.

CHAPTER 4

DEVICE TRAINING

SECTION A - SPECIAL INSTRUCTIONS

4-1. CONTENT. This chapter outlines the performance training to be conducted in aircrew training devices in each unit and block of instruction. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide. The objectives are based on skills and proficiency requirements from the Senior Director task listing.

4-2. DEVICE REQUIREMENTS. ATD sessions are conducted in the E-3 mission simulator. Students will utilize available simulator training time and will not have dedicated simulator tapes.

4-3. INSTRUCTIONAL METHOD/MEDIA. Demonstration-performance is the preferred method for all ATD instruction. Instructors will provide a demonstration of each task followed by student practice and critique. Instruction will be provided on 1:1 instructor to student ratio.

4-4. PERFORMANCE EVALUATION. Performance objectives will be evaluated using the grading criteria in Chapter 2. Students must demonstrate required proficiency in scheduled ATD tasks before progressing to flight training.

SECTION B- AIRCREW TRAINING DEVICE SESSION DESCRIPTIONS

4-5. ATD SESSION. The ATD session is listed by lesson number, subject, instructor to student ratio, alphanumeric identifier, device required, nominal time to complete and mission description.

BLOCK II

2.1 SIMULATOR TRAINING	1:1 RATIO
ZUP:SIM1	
SIMULATOR	3.0 HOURS

Session provides demonstration and practice on software functions and weapons procedures including communications, sensors, computer, and weapons systems procedures.

4-6 ATD TASKS. The student is required to demonstrate progress in accordance with the following task list. Failure to attain the overall grade by the end of each block indicated may result in non-effective/student non-progression (NE/SNP) and initiation of supervisory actions directed in Chapter 2.

BLOCK	TASK	STANDARD
I	SYSTEMS ACADEMICS (NOT APPLICABLE)	
II	WEAPONS PROCEDURES	
	Communications Procedures	2
	Sensor Verification	2
	Data/Display Verification	2
	Airspace Procedures	2

Table 4-1 ATD Task Standards (Sheet 1 of 1)

CHAPTER 5

FLYING TRAINING

SECTION A - SPECIAL INSTRUCTIONS

5-1. CONTENT. This chapter outlines the training to be conducted on each flying mission and describes required student progress. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide.

5-2. AIRCRAFT REQUIREMENTS. An E-3B/C aircraft with the crew configuration required by MCR 55-33, Chapter 3, will be used for all training sorties.

5-3. INSTRUCTIONAL METHOD/MEDIA. The demonstration-performance method will be used for all flight instruction. The training is designed to proceed using the flying matrix in Figure 5-1. Task areas are listed on the left side and the sortie numbers across the top. Within the matrix a "D" indicates where the instructor will demonstrate or lead the student through a procedure or task. A "P" stands for relevant practice and appears where the student performs the task for practice rather than evaluation. When a number appears an evaluation is scheduled. This building block approach is used to allow the demonstration-performance method of explanation, demonstration, supervised performance, and evaluation to be applied to develop student skills. Students may progress at a faster or slower rate as long as the minimum training requirements of Chapter 2 are met. All instruction will be conducted by a fully qualified Instructor Senior Director.

5-4. EVALUATIONS.

a. Student performance will be certified on certain mission tasks in accordance with the flying matrix, Figure 5-1. The number on the matrix indicates the ACC standard for that task. Student performance will be graded on the preprinted ACC Form 206 for that mission. Student failure or non-performance will be indicated on the ACC Form 206 and action taken IAW Chapter 2 of this syllabus.

b. The student's instructor will determine achievement of course training standards in each major section and will enter the following statement in the remarks section of the final ACC Form 206 for that major section: "Course Training Standards Achieved for Block III". Overall standard achievement will be entered on TAC Form 89, Flying Training Record.

SENIOR DIRECTOR
FLIGHT TRAINING MATRIX 1 MISSION PLANNING

TASK	M101	M102	M103	M104	M105	TASK CERT
COMPILE MISSION DATA	P	P	2			
EXTRACT MISSION DATA	P	P	2			
ASSIGN CONTROL MISSION	P	P	2			
DETERMINE SOFTWARE REQUIREMENTS	P	P	2			
COMPLETE MISSION DOCUMENTS	P	P	2			
COMPILE COMMUNICATIONS REQ	P	P	2			
CONFIRM MISSION RESOURCES	D/P	P	2			
COMPLETE CONTROLLER/FIGHTER BRIEFS	D/P	P	2			
COORDINATE AIRSPACE USE	D/P	P	2			
BRIEF MCC ON WEAPONS MSN	D/P	P	P	P	2	
BRIEF MCC ON MSN PLAN	D/P	P	2			
COORDINATE MSN W/ASO	D/P	P	2			
COORD COMPUTER REQS WITH CDMT	D/P	P	2			
COORD COMMUNICATIONS W/CSO-CT	D/P	P	2			
COORDINATE E-3 A/R W/NAV	D/P	P	2			
BRIEF MSN W/BD/BDT	D/P	2				
EXTRACT DATA FCIF/MORF	D/P	P	P	2		

Table 5-1 Standard Mission Tasks (Sheet 1 of 4)

SENIOR DIRECTOR
FLIGHT TRAINING MATRIX 2 - FLIGHT

TASK	M101	M102	M103	M104	M105	TASK CERT
RESPOND TO FORECAST WEATHER	D/P	P	P	P	2	
CONFIGURE SDC FOR MSN	P	P	P	2		
CONFIGURE COMM FOR MSN	P	P	2			
CONDUCT OUTBOUND BRIEFING	P	P	2			
VERIFY DATA BASE ACCURACY	P	P	2			
VERIFY MISSION COMM	D/P	2				
ESTABLISH COMM W/EXT AGENCIES	D/P	P	2			
SUPERVISE AWACS MONITOR	P	2				
CONFIRM PRIMARY/SEC SENSORS	P	2				
PERFORM CORRELATION CHECK	P	2				
PERFORM SECTION SUPERVISION	P	P	2			
SUPERVISE SECTION EMERGENCY PROCEDURES	D	P	P	2		

Table 5-1 Standard Mission Tasks (Sheet 2 of 4)

SENIOR DIRECTOR
FLIGHT TRAINING MATRIX 3 - ON STATION

TASK	M101	M102	M103	M104	M105	TASK CERT
PROVIDE E-3 MISSION DATA (EXT)	P	P	P	P	2	
REQUEST MISSION DATA (EXT)	P	P	P	P	2	
PROVIDE CREW W/MSN DATA	P	P	P	P	2	
RESPOND TO COMM LOSS*	P	P	P	P	2	
RESPOND TO COMPUTER LOSS*	P	P	P	P	2	
RESPOND TO SENSOR LOSS*	P	P	P	P	2	
ALLOCATE ASSIGNED RESOURCES	D/P	P	P	P	2	
ASSIGN RESOURCES FOR CONTROL	D/P	P	P	P	2	
COORD TRANSFER OF RESOURCES	D	P	P	P	3	
COMPLY W/AIRSPACE PROC	D	P	P	P	2	
OPERATE W/I CONT OF CONTROL	D	P	P	P	2	
COMPLETE FORMS AND LOGS	D	P	P	2		

Table 5-1 Standard Mission Tasks (Sheet 3 of 4)

NOTE: ASTERISK DENOTES TASKS WHICH CANNOT BE SCHEDULED ON A GIVEN MISSION.

SENIOR DIRECTOR
FLIGHT TRAINING MATRIX 4 - POST MISSION

TASK	M101	M102	M103	M104	M105	TASK CERT
COMPLETE E-3 A/R REQ	P	2				
COMPLETE STATION ASSUMPTION REQ*	D/P	P	P	P	2	
TERMINATE STATION ACTIVITIES	D/P	P	2			
PERFORM INBOUND PROCEDURES	P	P	P	2		
DEBRIEF MSN W/CREW	D	P	P	2		
DEBRIEF MSN W/EXT AGENCY	P	P	P	P	2	

Table 5-1 Standard Mission Tasks (Sheet 4 of 4)

NOTE: ASTERISK DENOTES TASKS WHICH CANNOT BE SCHEDULED ON A GIVEN MISSION.

SECTION B - MISSION DESCRIPTIONS

5-5. GENERAL

a. A typical E-3 training sortie requires three training days to complete as indicated in table 5-3 below.

TRNG DAY	EVENT	HOURS
1	Mission Planning	8.0
2	Prebrief/Preflight	2.5
2	Sortie	8.0
2	Maintenance/Operations Debriefs	1.0
3	Student Critique/Debrief	2.0
TOTAL		21.5

Table 5-2 E-3 Mission Time Requirements

b. A typical mission includes a pre-brief, preflight, two hours enroute to orbit, four hours on orbit, two hours return to base and post-flight debriefings. Though this is a typical sortie, actual sortie time may vary from 6 to 12 hours.

5-6. FLIGHT TRAINING. Flight training is listed by lesson number, nominal time for completion, type of aircraft required, and mission objective. Criterion objectives for each mission are provided to the student in the trainee guide. The instructor to student ratio is 1:1.

BLOCK III

M101
E-3 B/C 21.5 HOURS

The student is introduced to and practices the Senior Director tasks in accordance with the Flying Training Matrix. Tasks concentrate on mission aspects which are unique to the Senior Director as supervisor of the weapons team.

M102
E-3 B/C 21.5 HOURS

The student conducts mission planning, and flight and postflight activities as indicated by the Flying Training Matrix and mission profile. Certifications are conducted on tasks which have entry level skills and are less complex. The Form 206 is annotated for each of these tasks.

M103
E-3 B/C 21.5 HOURS

The training continues on the tasks as indicated in the Flying Training Matrix. Skills maintenance is performed on tasks where objective standards have been previously met and certified. Most mission planning tasks should be certified by the completion of this mission.

M104
E-3 B/C 21.5 HOURS

Practice and skill maintenance continues on all tasks. On-station tasks receive training priorities as indicated on the Flying Training Matrix. Certification should be completed on mission planning, flight, and postflight tasks.

M105
E-3 B/C 21.5 HOURS

This is the final training flight. The student should be at objective standards on all tasks and the instructor will observe the total mission integration as well as certifying the remaining tasks.

M106
E-3 B/C 21.5 HOURS

This sortie is dedicated to flight evaluation conducted by 552 OG/OGV in accordance with MCR 60-2, Vol IX.

DEPARTMENT OF THE AIR FORCE
Headquarters Air Combat Command
Langley Air Force Base, Virginia 23665-5001

ACC SYLLABUS
Course E3000BQOGX

USAF BASIC OPERATIONAL TRAINING COURSE

E-3 AIR SURVEILLANCE OFFICER

NOVEMBER 1993

INTRODUCTION

This syllabus prescribes the overall training strategy and approximate amount of instruction required for a student having the entry prerequisites to attain the course goals and graduate. Units tasked to implement this syllabus are responsible for ensuring that each student graduated possesses the attitudes, knowledge, skills and proficiencies set forth in the course training standards. Within syllabus and other directive constraints, the amount and level of training devoted to mission elements, events, subjects, or phases should be adjusted, as required, to meet the needs of the students. This syllabus does not take precedence over applicable governing directives. Instructions governing publication and revision of ACC syllabi are contained in ACCR 8-1.

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OPR: ACC/DOYA
OPDR: Det 6, 4444 OS (E-3 OTD Team), Tinker AFB, OK 73145-9021
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DISTRIBUTION: X

EXTRACT
I certify that I am the Records Custodian for the Accident Investigation Board convened to investigate the crash of two U.S. Army Black Hawk helicopters in the no fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate extract from
ACC Course Syllabus, E-3 Air Surveillance Officer
which is kept in my records system.
5 May 94
Date
WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

1-6. AMOUNT.

Type of Training	Hours
Academic	236.0
Aircrew Training Device	148.0
Flying - 10 Sorties	245.0
Total Syllabus Time	629.0

Table 1-1 Syllabus Training Hours

SECTION B - FLYING INVENTORY

1-7. INVENTORY.

STUDENT		DIRECT UE SUPPORT		OTHER SUPPORT	
SORTIES	HOURS	SORTIES	HOURS	SORTIES	HOURS
M101	8.0	(NONE)		JAMMER	
M102	8.0				
M103	8.0				
M104	8.0				
M105	8.0				
M106	8.0				
M107	8.0				
M108	8.0				
M109	8.0				
M110 (Eval)	8.0				
10 - Total	80.0				
SSR - 11.1 (10+0+1.1)*					

Table 1-2 Flying Inventory

* SSR (Student Sortie Requirement) = Student + Direct Support + Refly Rate Sorties. Refly rate = .11

ECM support is needed from one or more ECM-capable aircraft during four of the sorties M101-M109 to complete ECCM training. If ECM-capable aircraft are not available then sim ECM may be generated on live missions to complete the ECCM training.

SECTION C - AIRCREW TRAINING DEVICE INVENTORY

1-8. INVENTORY.

DEVICE	SESSIONS	HOURS
Static E-3	1	2.0
Mission Simulator	50	146.0
Total	51	148.0

Table 1-3 ATD Inventory

SECTION D - ACADEMIC INVENTORY

1-9. INVENTORY.

BLOCK	TITLE	HOURS
I	INTRODUCTION	19.0
II	COMPUTER AND COMMUNICATIONS	13.5
III	TRACK/TELL	10.0
IV	IFF (INCLUDING MID-COURSE TEST)	35.0
V	RADAR	57.5
VI	IDENTIFICATION	12.0
VII	DATA NETS	20.0
VIII	ECM/ECCM	17.0
IX	SYSTEMS INTEGRATION (INCLUDING END-OF-COURSE TEST)	52.0
TOTAL		236.0

Table 1-4 Academic Inventory

SECTION E - WEAPONS INVENTORY (Not Applicable)

CHAPTER 3

ACADEMIC TRAINING

SECTION A - SPECIAL INSTRUCTIONS

3-1. CONTENT. This chapter outlines the subjects to be covered in each academic block and unit of instruction. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide.

3-2. FACILITY REQUIREMENTS. A classroom environment capable of supporting six (6) students is required. This facility will house related equipment and provide facilities for private student study and counseling sessions.

3-3. INSTRUCTIONAL METHOD/MEDIA. The primary method is lecture and classroom discussion, supported by printed self-study material (SSM). These materials include student texts; Air Combat Command, and 552 Air Control Wing regulations, manuals, handbooks, and pamphlets; and Air Force technical orders.

3-4. ACADEMIC EVALUATIONS. Periodic evaluations are included to measure the student progression and to ensure the effectiveness of the course. Some evaluations are at the lesson level, others cover entire blocks and an end-of-course is used to sample retention. All testing will be conducted using written examinations that include matching, multiple choice and completion questions. Each examination will be reviewed and critiqued to 100% following the test period.

SECTION B - ACADEMIC DESCRIPTIONS

3-5. ACADEMIC TRAINING. Academic training is listed by lesson number, subject, instructional method, alphanumeric identifier, nominal time for completion, facility and concise narrative of content. Study materials are provided for self-study within each lesson. Classified materials will be made available by the assigned instructor. Self-study requirements prior to the scheduled classroom session will be provided in course schedules.

The instructor to student ratio for academics is 1:6.

BLOCK I - INTRODUCTION

1.1 INTRODUCTION — LECTURE
AIP:11IN — 1.0 HOUR
CLASSROOM

Explains student's responsibilities and chain of command, gives an overview of the course, and reviews administrative procedures.

1.2 POSTING AND USING PUBLICATIONS — SELF STUDY/LECTURE
AIP:12PB — DEMO-PERFORMANCE
CLASSROOM — 3.0 HOURS

A review of the purpose, use and content of issued publications followed by posting and methods of making changes.

1.3 AIRCRAFT AND SIMULATOR INTRO — SELF STUDY/LECTURE
AIP:13TR — 2.0 HOURS
CLASSROOM

A short overview of the simulator layout and flightline areas and a tour of the simulators and the training aircraft.

1.4 E-3 CREW — SELF STUDY/LECTURE
AIP:14CR — 1.0 HOUR
CLASSROOM

Discussion of each flight crew and mission crew position.

1.5 CONSOLE INTRODUCTION — SELF STUDY/LECTURE
AIP:15SD — 1.0 HOUR
CLASSROOM

Explanation of the basic SDC components with basic symbols and color grouping.

1.6 SDC CHECKOUT — SELF STUDY/LECTURE
AIP:16CK — 1.0 HOUR
CLASSROOM

Discussion on the use of the checklist to complete a console checkout.

1.7 SWITCH ACTION INTRODUCTION — SELF STUDY/LECTURE
AIP:17SA — 2.0 HOURS
CLASSROOM

Introduction to how switch actions are performed with menus, Alarms/alerts, error messages and flow diagrams.

1.8 ASSIGN CONSOLE — SELF STUDY/LECTURE
AIP:18AS — 2.0 HOURS
CLASSROOM

Use of the Assign Console switch action with an explanation of tabular displays, updating TDs and the Console Assignment and Augmented Console Assignment TDs.

1.9 BASIC SWITCH ACTIONS — SELF STUDY/LECTURE
AIP:19SA — 3.0 HOURS
CLASSROOM

Creating lines and circles, sending arrows and messages, defining and locating special points, use of the Special Point TD and determine bearing and ranges.

BLOCK I TEST — WRITTEN EXAMINATION
AIE:BK11 — 3.0 HOURS
CLASSROOM

Question and answer period, closed and open book test on all Block I academic objectives. Critiqued to 100%.

BLOCK II - COMPUTER AND COMMUNICATIONS

2.1 COMPUTER INTRODUCTION — SELF STUDY/LECTURE
AIP:21CP — 2.0 HOURS
CLASSROOM

An introduction to the basic computer terms, hardware and software.

2.2 COORDINATES, ORIGINS AND MAPS — SELF STUDY/LECTURE
AIP:22CC — 2.5 HOURS
CLASSROOM

Review of coordinate systems, an explanation of the coordinate switch actions, selection and changing maps and origins.

2.3 RESTRICTED AREAS AND ORDER OF BATTLE — SELF STUDY/LECTURE
AIP:23RA — 1.5 HOURS
CLASSROOM

Explanation of restricted areas and order of battle displays and switch action.

2.4 COMMUNICATIONS CAPABILITIES — SELF STUDY/LECTURE
AIP:24CA — 1.5 HOURS
CLASSROOM

General explanation of E-3 communications capabilities with surveillance communication procedures.

2.5 MISSION ADS PANEL — SELF STUDY/SOUND ON SLIDE
AIP:25AD — 1.5 HOURS
CLASSROOM1.5

Detailed discussion of all facets of the mission ADS panel.

2.6 USING THE E-3 COMMUNICATIONS — SELF STUDY/DEMO-PERFORMANCE
AIP:26RT — 1.5 HOURS
CLASSROOM

A discussion of R/T terms, how to use the KTA 2000 authenticator, and changing frequencies through the MCC and by UHF tune.

BLOCK II TEST — WRITTEN EXAMINATION
AIE:BK21 — 3.0 HOURS
CLASSROOM

Question and answer period, closed and open book test on all Block II academic objectives. Critiqued to 100%.

BLOCK III - TRACK/TELL

3.1 TRACK INITIATION AND MAINTENANCE — SELF STUDY/LECTURE
AIP:31IN — 2.0 HOURS
CLASSROOM

A detailed discussion of tracking symbols, automatic and manual track initiation, and track updates and dropping.

3.2 TRACKING DISPLAYS — SELF STUDY/LECTURE
AIP:32TD — 1.5 HOURS
CLASSROOM

A complete discussion of the System Track TD, Local System Track SIF Codes TD, surface and air track symbols, local track attentions, and how to control post mission debriefing.

3.3 TRACKING SUPERVISION — SELF STUDY/LECTURE
AIP:33TS — 1.5 HOURS
CLASSROOM

Discussion of tracking capabilities, AST responsibilities, tracking displays and the use of area monitoring.

3.4 AWACS MONITOR — SELF STUDY/LECTURE
AIP:34MN — 1.0 HOUR
CLASSROOM

Discussion of AWACS Monitor duties and responsibilities.

3.5 VOICE TELL — SELF STUDY/LECTURE
AIP:35TL — 1.0 HOUR
CLASSROOM

A discussion on the requirements and procedures of voice tell.

BLOCK II TEST — WRITTEN EXAMINATION
AIE:BK31 — 3.0 HOURS
CLASSROOM

Question and answer period, closed and open book test on all Block III academic objectives. Critiqued to 100%.

BLOCK IV - IFF

4.1 IFF SYSTEM OPERATION — SELF STUDY/LECTURE
AIP:41IF — 5.0 HOURS
CLASSROOM

A detailed discussion on the IFF system capabilities and limitations. A general discussion of IFF equipment with optimum parameters and use of the E-3 Track TD.

LESSON 4.1 TEST — WRITTEN EXAMINATION
AIE:41IF — 1.0 HOUR
CLASSROOM

Closed book test on all lesson academic objectives.

4.2 SECTORS/SUBSECTORS — SELF STUDY/LECTURE
AIP:42SE — 6.0 HOURS
CLASSROOM

A detailed discussion on the use of sectors, fixed and moving subsectors, sector and subsector Definition TDs, Sector/Subsector SD, Define Sector and Subsector switch actions with the Clear/Move switch action.

LESSON 4.2 TEST — WRITTEN EXAMINATION
AIE:42SE — 1.0 HOUR
CLASSROOM

Closed book test on all lesson academic objectives.

4.3 IFF TRANSFER AND CHECKOUT — SELF STUDY/LECTURE
AIP:43CK — 6.0 HOURS
CLASSROOM

A detailed discussion of IFF transfer procedures, displays, equipment and associated checklist.

LESSON 4.3 TEST — WRITTEN EXAMINATION
AIE:43CK — 1.0 HOUR
CLASSROOM

Closed book test on all lesson academic objectives.

4.4 IFF OPERATIONS AND TROUBLESHOOTING — SELF STUDY/LECTURE
AIP:44OP — 4.0 HOURS
CLASSROOM

Discussion on normal IFF operations, including use of E-3 Track TD, TD 48I and 49, horizon grazing chart. Indications and corrections for IFF troubleshooting and procedures for configuring the IFF for AR and inbound.

LESSON 4.4 TEST — WRITTEN EXAMINATION
AIE:44OP — 1.0 HOUR
CLASSROOM

Closed book test on all lesson academic objectives.

4.5 IFF SWITCH ACTIONS — SELF STUDY/LECTURE
AIP:45SA — 4.0 HOURS
CLASSROOM

An explanation of general IFF use switch actions including, IFF Corridor, Request SIF SD, Locate SIF, Track Mode Control and Auto Full Scan.

MID-COURSE REVIEW — DISCUSSION
AIP:4MID — 2.0 HOURS
CLASSROOM

A question and answer period on all Blocks I - IV academic material.

BLOCK IV TEST — WRITTEN EXAMINATION
AIE:BK41 — 1.5 HOURS
CLASSROOM

A closed book test on all Block IV academic objectives and critiqued to 100%.

MID-COURSE TEST — WRITTEN EXAMINATION
AIE:MID1 — 2.5 HOURS
CLASSROOM

A closed book test on selected objectives from Block I - IV, and a critique of the test to 100%.

BLOCK V - RADAR

5.1 AIR RADAR — SELF STUDY/LECTURE
AIP:51RA — 14.0 HOURS
CLASSROOM

A detailed discussion on radar fundamentals, E-3 radar detection capabilities including BTH and PD radar characteristics acronyms and terms.

LESSON 5.1 TEST — WRITTEN EXAMINATION
AIE:51RA — 1.0 HOUR
CLASSROOM

Closed book test on all lesson academic objectives.

5.2 SURFACE RADAR — SELF STUDY/LECTURE
AIE:52MA — 2.0 HOURS
CLASSROOM

A detailed discussion on the enhanced BTH surface detection capabilities and procedures.

LESSON 5.2 TEST — WRITTEN EXAMINATION
AIE:52MA — 1.0 HOUR
CLASSROOM

A closed book test on all lesson academic objectives.

5.3 RADAR CONTROL/TDs — SELF STUDY/LECTURE
AIP:53RC — 9.0 HOURS
CLASSROOM

A detailed discussion on adjusting the air and surface radars with TD 48 and TD 49. Modes and adjustment parameter options and effects are discussed.

LESSON 5.3 TEST — WRITTEN EXAMINATION
AIE:53RC — 1.0 HOUR
CLASSROOM

A written closed book test on all lesson academic objectives.

5.4 RADAR CONTROL/SECTOR — SELF STUDY/LECTURE
AIE:54SC — 2.5 HOURS
CLASSROOM

A discussion on the use of sectors and subsectors to control the radar.

LESSON 5.4 TEST — WRITTEN EXAMINATION
AIE:54SC — 1.0 HOUR
CLASSROOM

Written closed book test on all lesson academic objectives.

5.5 SIGNAL FLOW AND CFAR — SELF STUDY/LECTURE
AIP:55SF — 6.0 HOURS
CLASSROOM

A detailed discussion of the radar signal flow and the effects of TD 48 parameter changes.

LESSON 5.5 TEST — WRITTEN EXAMINATION
AIE:55SF — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

5.6 LVD — SELF STUDY/LECTURE
AIP:56LV — 4.0 HOURS
CLASSROOM

A detailed discussion of Low Velocity Detection procedures and capabilities.

LESSON 5.6 TEST — WRITTEN EXAMINATION
AIE:56LV — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

5.7 RADAR CHECKOUT — SELF STUDY/LECTURE
AIP:57CK — 3.0 HOURS
CLASSROOM

A discussion on displays, procedures and checklist used for radar checkout.

LESSON 5.7 TEST — WRITTEN EXAMINATION
AIE:57CK — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

5.8 RADAR OPERATION — SELF STUDY/LECTURE
AIP:58OP — 3.0 HOURS
CLASSROOM

A discussion on procedures for height checks, sensor correlation checks and radar optimization.

LESSON 5.8 TEST — WRITTEN EXAMINATION
AIE:58OP — 2.0 HOUR
CLASSROOM

A written test on all lesson academic objectives and a classroom performance evaluation on radar planning.

5.9 RADAR DEGRADATION — SELF STUDY/LECTURE
AIP:59RD — 2.0 HOURS
CLASSROOM

A discussion on recognizing degraded radar and associated corrective actions.

BLOCK V TEST — WRITTEN EXAMINATION
AIE:BK51 — 3.0 HOURS
CLASSROOM

A question and answer period, written test on all block academic objectives and critique of the test.

BLOCK VI - IDENTIFICATION

6.1 E-3 IDENTIFICATION CAPABILITIES — SELF STUDY/LECTURE
AIP:61DC — 2.0 HOURS
CLASSROOM

A discussion on the identification process, the E-3 subfunctions and mechanics available to perform identification of air and surface tracks.

6.2 IDENTIFICATION WITH IDBO AND MODE 4 — SELF STUDY/LECTURE
AIP:62ID — 2.0 HOURS
CLASSROOM

A detailed discussion of the IDBO and Mode 4 identification subfunctions.

6.3 SIF IDENTIFICATION — SELF STUDY/LECTURE
AIP:63SF — 3.0 HOURS
CLASSROOM

A discussion of the displays and switch actions required for the ID SIF air and surface and SIF/Time identification subfunctions.

6.4 IDENTIFICATION MECHANICS — SELF STUDY/LECTURE
AIP:64MC — 2.0 HOURS
CLASSROOM

A discussion to tie the subfunction together and on the mechanics of planning and performing identification using the identification subfunctions.

BLOCK VI TEST — WRITTEN EXAMINATION
AIE:BK61 — 3.0 HOURS
CLASSROOM

A question and answer period, written test on all Block VI academic objectives and a critique of the test.

BLOCK VII - DATA NETS

7.1 NET INTRODUCTION — SELF STUDY/LECTURE
AIP:71NI — 3.0 HOURS
CLASSROOM

An introduction to data nets including general capabilities and limitations, terminology, mission equipment, crew member responsibilities, and net operations software requirements.

LESSON 7.1 TEST — WRITTEN EXAMINATION
AIE:71NI — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

7.2 CONTROLLING NET FUNCTIONS — SELF STUDY/LECTURE
AIP:72CN — 2.0 HOURS
CLASSROOM

A discussion of the switch actions and displays used in controlling data exchange including the Net Participants TD, Filter TDs, and the Assign Net Participants and Communication Filter switch actions.

LESSON 7.2 TEST — WRITTEN EXAMINATION
AIE:72CN — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

7.3 NET MANAGEMENT — SELF STUDY/LECTURE
AIP:73NM — 4.0 HOURS
CLASSROOM

A discussion on net management to include category switches, special points and remote tracks, messages, requesting and forcing data and requesting ESM.

7.4 NET PLANNING — SELF STUDY/DEMO-PERFORMANCE
AIP:74NP — 2.0 HOURS
CLASSROOM

An explanation and exercise on the use of OPTASKLINKS and the JTIDS Network Library to plan data net operations.

LESSON 7.4 TEST — WRITTEN EXAMINATION
AIE:74NP — 1.0 HOUR
CLASSROOM

A written test on all lesson academic objectives.

7.5 OPERATING THE NETS — SELF STUDY/LECTURE
AIP:75OP — 3.0 HOURS
CLASSROOM

A detailed discussion on the operation of the data nets to include data registration, coordination/reports, resolution of link problems, configurations for AR, use of X-ray code, and the EWI TD.

BLOCK VII TEST — WRITTEN EXAMINATION
AIE:BK71 — 3.0 HOURS
CLASSROOM

A question and answer period, written test on all block academic objectives, and a critique of the test.

BLOCK VIII - ECM/ECCM

8.1 RADAR AND IFF ECM DISPLAYS — SELF STUDY/LECTURE
AIP:81DS — 3.0 HOURS
CLASSROOM

A discussion of general ECM/ECCM displays including the ECM detect alert, the Surveillance Systems Counts TD, strobes, Power Level SD, and the Radar/IFF ECM SD.

8.2 SELF-PASSIVE TRACKING — SELF STUDY/LECTURE
AIP:82SP — 2.0 HOURS
CLASSROOM

A classified discussion on the Self Passive Tracking Program and procedures associated with it.

8.3 COOPERATIVE PASSIVE TRACKING — SELF STUDY/LECTURE
AIP:83CP — 3.0 HOURS
CLASSROOM

A classified discussion on cooperative passive tracking including control of strobe data, scoring ghosts and validating tracks.

8.4 COUNTERING THE EFFECTS OF ECM — SELF STUDY/LECTURE
AIP:84EC — 3.0 HOURS
CLASSROOM

A general discussion of countering the effects of radar, IFF and communication ECM.

8.5 ELECTRONICS SUPPORT SYSTEM — SELF STUDY/LECTURE
AIP:85ES — 3.0 HOURS
CLASSROOM

A detailed discussion on the capabilities and procedures for the use of the ESS.

BLOCK VIII TEST — WRITTEN EXAMINATION
AIE:BK01 — 3.0 HOURS
CLASSROOM

A question and answer period, written test on all block academic objectives and a critique of the test.

BLOCK IX - SYSTEM INTEGRATION

9.1 PLANNING — CASE STUDY
AIP:91PN — 8.0 HOURS
CLASSROOM

A review of overall sensor planning with case studies using typical mission planning documents.

9.2 TROUBLESHOOTING — PRACTICAL EXERCISE
AIP:92TS — 6.0 HOURS
CLASSROOM

Practical exercises in troubleshooting sensors with overall review of troubleshooting communications, data nets and sensors.

9.3 MISSION INTEGRATION — LECTURE/PLANNING
AIP:93MI — 27.0 HOURS
CLASSROOM

An explanation of how the integrated scenarios will be conducted using the specialized ASO IQT tape. Student will plan, brief, and be briefed on the scenario.

9.4 EMERGENCY EQUIPMENT — SELF STUDY/DISCUSSION
AIP:94EM — 2.0 HOURS
CLASSROOM

An explanation of what emergency equipment is available, where it is located, and procedures for its use.

BLOCK IX TEST — WRITTEN EXAMINATION
AIE:BK91 — 3.0 HOURS
CLASSROOM

A question and answer period, written test on all block academic objectives and a critique of the test.

END-OF-COURSE TEST — WRITTEN EXAMINATION
AIE:EOC1 — 6.0 HOURS
CLASSROOM

A question and answer period, written test on selected course objectives, and a critique of the test.

CHAPTER 4

DEVICE TRAINING

SECTION A - SPECIAL INSTRUCTIONS

4-1. CONTENT. This chapter outlines the performance training to be conducted in aircrew training devices in each unit and block of instruction. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide. The objectives are based on skills and proficiency requirements from the Air Surveillance Officer task listing.

4-2. DEVICE REQUIREMENTS. ATD sessions are conducted in the E-3 mission simulator and a static, powered E-3 on the ramp. The simulator will require dedicated scheduling for Block IX lessons.

4-3. INSTRUCTIONAL METHOD/MEDIA. Demonstration-performance is the preferred method for all ATD instruction. Printed materials including student study guides with simulator worksheets are provided to guide practice. Performance lesson plans are provided to assist the instructor with timing and structure. A 1:2 instructor to student ratio is planned with two exceptions; (1) Block IX is planned for a 1:1 ratio; (2) skills maintenance periods are planned for a 1:4 ratio.

4-4. PERFORMANCE EVALUATION. Performance objectives will be evaluated using the grading criteria in Chapter 2. Students must demonstrate required proficiency in scheduled ATD tasks before progressing to flight training. Block evaluations will measure overall performance.

SECTION B- AIRCREW TRAINING DEVICE SESSION DESCRIPTIONS

4-5. ATD SESSIONS. ATD sessions are listed by lesson number, subject, instructor to student ratio, alphanumeric identifier, device required, nominal time to complete and mission description.

BLOCK I

1.1 SDC INTRODUCTION — 1:2 RATIO
AIA:1S1 — 3.0 HOURS
SIMULATOR

Students are trained on the basic SDC controls and console checkout procedures.

1.2 CONSOLE ASSIGNMENT — 1:2 RATIO
AIA:1S2 — 2.0 HOURS
SIMULATOR

Students are trained on console assignment, TD display and update, and a basic introduction to symbology.

1.3 BASIC SWITCH ACTIONS 1:2 RATIO
AIA:1S3 3.0 HOURS
SIMULATOR

How to display and input lines, circles, arrows, messages and special points.

1.4 BLOCK I EVALUATION 1:2 RATIO
AIQ:1S4 2.0 HOURS
SIMULATOR

Performance evaluation on all block performance objectives.

BLOCK II

2.1 COORDINATES, MAPS AND ORIGINS 1:2 RATIO
AIA:2S1 3.0 HOURS
SIMULATOR

Training on coordinates, maps, origins, and changing altitude bands.

2.2 RESTRICTED AREAS AND ORDER OF BATTLE 1:2 RATIO
AIA:2S2 3.0 HOURS
SIMULATOR

Training on restricted areas and order of battle with a review of Block I performance training.

2.3 MISSION ADS 1:2 RATIO
AIA:2S3 2.0 HOURS
SIMULATOR

Training on use of the mission ADS panel and changing frequencies with UHF tune.

2.4 BLOCK II EVALUATION 1:2 RATIO
AIQ:2S4 2.0 HOURS
SIMULATOR

Performance evaluation on all block performance objectives.

BLOCK III

3.1 TRACK INITIATION AND MAINTENANCE 1:2 RATIO
AIA:3S1 3.0 HOURS
SIMULATOR

Training on initiation, updating and dropping of tracks. Demonstration and practice of ATI.

3.2 TRACKING DISPLAYS 1:2 RATIO
AIA:3S2 3.0 HOURS
SIMULATOR

Evaluation of track initiation and track maintenance and training on Local System Track and SIF Codes TDs, Track Blocks and Post Mission Debriefing.

3.3 TRACKING DISPLAYS 1:2 RATIO
AIA:3S3 3.0 HOURS
SIMULATOR

Practice and evaluation of tracking displays and introduction to area monitoring.

3.4 BLOCK III EVALUATION 1:2 RATIO
AIQ:3S4 3.0 HOURS
SIMULATOR

Performance evaluation of all block performance objectives.

SKILLS MAINTENANCE I 1:4 RATIO
AIA:SKM1 3.0 HOURS
SIMULATOR

Practice of all Blocks I - III performance objectives.

BLOCK IV

4.1 IFF SECTORS/SUBSECTORS 1:2 RATIO
AIA:4S1 3.0 HOURS
SIMULATOR

Demonstration and practice of assigning sectors and subsectors with situation and tabular displays.

4.2 IFF TRANSFER/CHECKOUT 1:2 RATIO
AIA:4S2 3.0 HOURS
SIMULATOR

Practice of sectors and subsectors with an introduction to IFF transfer and checkout.

4.3 IFF SECTORS/CHECKOUT PRACTICE 1:2 RATIO
AIA:4S3 3.0 HOURS
SIMULATOR

Practice on sectors, subsectors and IFF checkout.

4.4 IFF CHECKOUT AND OPERATIONS 1:2 RATIO
AIA:4S4 3.0 HOURS
SIMULATOR

Practice on IFF transfer/checkout and sectors and subsectors. Evaluation on IFF transfer/checkout and introduction to corridor IFF.

4.5 IFF OPERATIONS/TROUBLESHOOTING 1:2 RATIO
AIA:4S5 3.0 HOURS
SIMULATOR

Practice on IFF transfer/checkout and operations. Evaluation on IFF transfer/checkout and introduction to corridor IFF.

4.6 IFF OPERATIONS PRACTICE 1:2 RATIO
AIA:4S6 3.0 HOURS
SIMULATOR

Practice on IFF operations and introduction to Track Mode Control, Request SIF and Locate SIF.

4.7 IFF PERFORMANCE EVALUATION 1:2 RATIO
AIQ:4S7 3.0 HOURS
SIMULATOR

Performance evaluation of IFF transfer/checkout, sectors, subsectors and operations, including use of track mode control, Locate SIF and Request SIF actions.

SKILLS MAINTENANCE 2 1:4 RATIO
AIA:SKM2 3.0 HOURS
SIMULATOR

Practice of all Blocks I-IV performance objectives.

BLOCK V

5.1 RADAR CONTROL - SESSION 1 1:2 RATIO
AIA:5S1 3.0 HOURS
SIMULATOR

Introduction to the Subsector Status and Surveillance Systems Counts TDs with basic controls of the radar.

5.2 RADAR CONTROL - SESSION 2 1:2 RATIO
AIA:5S2 3.0 HOURS
SIMULATOR

Practice on radar control using parameters available in Subsector Status and Surveillance Systems Counts TD. Introduction to special sensor modes.

5.3 RADAR CONTROL - SESSION 3 1:2 RATIO
AIA:5S3 3.0 HOURS
SIMULATOR

Guided practice on radar controls for basic radar requirements. Evaluation of special sensor modes.

5.4 RADAR CONTROL - SESSION 4 1:2 RATIO
AIA:5S4 3.0 HOURS
SIMULATOR

Review of basic radar requirements with application to mission situations.

5.5 RADAR CONTROL - SESSION 5 1:2 RATIO
AIA:5S5 3.0 HOURS
SIMULATOR

Introduction to LVD operations and radar checkout.

5.6 RADAR CONTROL - SESSION 6 1:2 RATIO
AIA:5S6 3.0 HOURS
SIMULATOR

Practice and evaluation of basic radar parameters, introduction to radar optimization and height checks, and practice on LVD.

5.7 RADAR CONTROL SESSION - 7 1:2 RATIO
AIA:5S7 3.0 HOURS
SIMULATOR

Practice on radar checkout, LVD, radar optimization and height checks.

5.8 BLOCK V EVALUATION 1:2 RATIO
AIQ:5S8 3.0 HOURS
SIMULATOR

Practice and evaluation on block performance objectives.

BLOCK VI

6.1 IDENTIFICATION SUBFUNCTIONS 1:2 RATIO
AIA:6S1 3.0 HOURS
SIMULATOR

Training on configuring the identification subfunctions and use of the IDBO subfunction.

6.2 SUBFUNCTION BASICS 1:2 RATIO
AIA:6S2 3.0 HOURS
SIMULATOR

Training on ID SIF air and surface, and SIF/Time subfunctions.

6.3 PERFORMING IDENTIFICATION 1:2 RATIO
AIA:6S3 3.0 HOURS
SIMULATOR

Training on the use of the subfunctions to perform identification.

6.4 BLOCK VI EVALUATION 1:2 RATIO
AIA:6S4 3.0 HOURS
SIMULATOR

A performance evaluation of all block performance objectives.

SKILLS MAINTENANCE 3 1:4 RATIO
AIA:SKM3 3.0 HOURS
SIMULATOR

Practice of all Blocks I-VI performance objectives.

BLOCK VII

7.1 NET PARTICIPANTS TD 1:2 RATIO
AIA:7S1 3.0 HOURS
SIMULATOR

Training on the use of the Net Participants TD and filters.

7.2 NET DISPLAYS 1:2 RATIO
AIA:7S2 3.0 HOURS
SIMULATOR

Training on net displays, Remote Track TD, JTIDS messages, requesting data, tell coordination and ESM displays.

7.3 NET OPERATIONS — 1:2 RATIO
AIA:7S3 — 3.0 HOURS
SIMULATOR

Evaluation on Net Participants TD use; practice on net displays, and training on net correlation checks and data registration.

7.4 NET OPERATIONS PRACTICE — 1:2 RATIO
AIA:7S4 — 3.0 HOURS
SIMULATOR

Practice on net displays, coordination, correlation, and data registration; training on EWI TD.

7.5 BLOCK VII EVALUATION — 1:2 RATIO
AIQ:7S5 — 3.0 HOURS
SIMULATOR

Practice on net displays and operations followed by a performance test on all block performance objectives.

BLOCK VIII

8.1 ECM DISPLAYS — 1:2 RATIO
AIA:8S1 — 3.0 HOURS
SIMULATOR

Training on ECM displays.

8.2 PASSIVE TRACKING — 1:2 RATIO
AIA:8S2 — 3.0 HOURS
SIMULATOR

Training on passive tracking displays and procedures.

8.3 ESS — 1:2 RATIO
AIA:8S3 — 3.0 HOURS
SIMULATOR

Training on ESS operations and procedures.

SKILLS MAINTENANCE 4 — 1:4 RATIO
AIA:SKM4 — 3.0 HOURS
SIMULATOR

Practice of all course performance objectives.

BLOCK IX

9.1 SCENARIO DEMONSTRATION 1:2 RATIO
AIA:9S1 3.0 HOURS
SIMULATOR

Demonstration of mission integrated operations.

9.2 SCENARIO PRACTICE 1:1 RATIO
AIA:9S2 3.0 HOURS
SIMULATOR

Practice for two students on integrated operations with remaining students observing.

9.3 BLOCK IX EVALUATION 1:1 RATIO
AIQ:9S3 3.0 HOURS
SIMULATOR

Performance evaluation of all block performance objectives.

9.4 EMERGENCY EQUIPMENT 1:2 RATIO
AIA:94EM 2.0 HOURS
AIRCRAFT

Training on emergency equipment and aircraft evacuation using a static powered aircraft.

4-6 ATD TASKS. The student is required to demonstrate progress in accordance with the following task list. Failure to attain the overall grade by the end of each block indicated may result in non-effective/student non-progression (NE/SNP) and initiation of supervisory actions directed in Chapter 2.

CHAPTER 5

FLYING TRAINING

SECTION A - SPECIAL INSTRUCTIONS

5-1. CONTENT. This chapter outlines the training to be conducted on each flying mission and describes required student progress. Specific criterion objectives are provided in course training documents and are provided to the student in a trainee guide.

5-2. AIRCRAFT REQUIREMENTS. An E-3B/C aircraft with the crew configuration required by MCR 55-33, Chapter 3, will be used for all training sorties.

5-3. INSTRUCTIONAL METHOD/MEDIA. The demonstration-performance method will be used for all flight instruction. The training is designed to proceed using the flying matrix in Figure 5-1. Task areas are listed on the left side and the sortie numbers across the top. Within the matrix a "D" indicates where the instructor will demonstrate or lead the student through a procedures or task. A "P" stands for relevant practice and appears where the student performs the task for practice rather than evaluation. When a number appears an evaluation is scheduled. This building block approach is used to allow the demonstration-performance method of explanation, demonstration, supervised performance and evaluation to be applied to develop student skills. Students may progress at a faster or slower rate as long as the minimum training requirements of Chapter 2 are met. All instruction will be conducted by a fully qualified Instructor Air Surveillance Officer.

5-4. EVALUATIONS.

a. Student performance will be certified on certain mission tasks in accordance with the flying matrix, Figure 5-1. The number on the matrix indicates the ACC standard for that task. Student performance will be graded on the preprinted ACC Form 206 for that mission. Student failure or non-performance will be indicated on the ACC Form 206 and action IAW Chapter 2 of this syllabus.

b. The student's instructor will determine achievement of course training standards in each major section and will enter the following statement in the remarks section of the final ACC Form 206 for that major section: "Course Training Standards Achieved for Block X". Overall standard achievement will be entered on ACC Form 89, Flying Training Record.

TASK	M101	M102	M103	M104	M105	M106	M107	M108	M109	EVAL
MISSION PLANNING	D	P	P	P			2			2
FCIF/MORF/FORMS	DP	P	2							2
EXTRACT TIMING AND DUTIES	DP	P	P	2						2
EXTRACT LESSONS LEARNED	DP	P	P	2						2
WEAPONS AND FLIGHT CREW COORD	DP	P	P	2						2
PLAN SENSORS	P	P	P	2						2
PLAN TRACKING	DP	P	P	2						2
PLAN DISPLAY INPUTS	DP	P	P	2						2
PLAN IDENTIFICATION	DP	P	P	2						2
PLAN MAP/CCCS ORIGIN DATA	DP	P	P	2						2
PLAN COMM TO EXTERNAL AGENCIES	DP	P	P	P	2					2
PLAN INTERNAL COMM	DP	P	P	2						2
PLAN SPECIAL COMM REQUIREMENTS	DP	P	P	2						2
PLAN CONSOLE COMM	D	P	P	P	2					2
COORDINATE COMSEC	DP	P	P	2						2
PLAN DATA NETS	DP	P	P	2						2
PLAN VOICE TELL	D	P	P	2						2
PLAN CUSTOMS (SEE NOTE 1)	D			P		P		2		2
BRIEF MCC	D	P	P	P	2					2
ASSIGN AST DUTIES	D	P	P	P	2					2
PLAN FOR CONTINGENCY	D	P	P	2						2
BRIEF SURVEILLANCE MISSION	D	P	P	P	2					2
PRE-MISSION	DP	P	2							2
REPORT FOR FLIGHT	DP	P	2							2
UPDATE MISSION PLAN	DP	P	2							2

Table 5-1 Standard Mission Tasks (Sheet 1 of 4)

TASK	M1001	M1002	M1003	M1004	M1005	M1006	M1007	M1008	M1009	EVAL
PRE-FLIGHT	DP	P	2							2
ADJUST AND STOW GEAR	DP	P	2							2
PRE-FLIGHT SEAT/OXYGEN	DP	P	2							2
PRE-FLIGHT TEMPLATE/ADS	P	P	2							2
CHECK 781'S	DP	P	2							2
BEFORE START CHECKLIST	P	2								2
PREPARE FOR ON STATION	DP	P	P	P	P	P	P		2	2
INITIATE CONSOLE OPERATIONS	2								2	2
INITIATE IFF OPERATIONS	P	P	P	P	2				2	2
INITIATE RADAR	P	P	P	P	P	P	2		2	2
CONFIGURE DATA BASE	P	P	P	P	2				2	2
ENSURE AST TASKS COMPLETE	DP	P	P	P	2				2	2
CONFIGURE ESS			D	P	2				2	2
ADJUST MISSION PLAN			D	P	P	P	P	2	2	2
COMPLETE ON STATION REPORTS	DP	P	P	2					2	2
ON STATION REQUIREMENTS	DP	P	P	P	P	P	P		2	2
CONTROL SENSORS	D	P	P	P	P	P	P	2	2	2
RECOGNIZE SENSOR ECM (NOTE 1)		DP		P		2			2	2
PERFORM INT/EXT COMMUNICATIONS	DP	P	P	P	2				2	2
COORDINATE FREQ CHANGE	DP	P	2						2	2
SUPERVISE SURVEILLANCE TEAM	DP	P	P	P	P	P	P	2	2	2
A. TRACKING	DP	P	P	P	P	P	2		2	2
B. IDENTIFICATION	DP	P	P	P	P	P	2		2	2
C. VOICE TELL	DP	P	P	P	P	P	2		2	2
D. ECCM (NOTE 1)		DP		P		2			2	2

Table 5-1 Standard Mission Tasks (Sheet 2 of 4)

TASK	M101	M102	M103	M104	M105	M106	M107	M108	M109	EVAL
E. DATA LINK OPERATIONS				DP	P	P	P	P	2	2
UPDATE DATA BASE (CHANGES)	DP	P	P	P	2				2	2
MANAGE DATA NETS				DP	P	P	P		2	2
ESTABLISH FILTERS						2			2	2
DATA LINK CORRELATION					P	P	2		2	2
ACTIVATE NET OPERATIONS					P	P	2		2	2
MANAGE DATA NETS				DP	P	P	P	2	2	2
A. IDENTIFY LINK PROBLEMS				DP	2				2	2
B. RESOLVE LINK PROBLEMS				DP	P	P	P	2	2	2
C. UPDATE DATA BASE				DP	2				2	2
D. COORDINATE NET EXIT				DP	P	2			2	2
E. REPORT/LOG				DP	P	2			2	2
PREPARE FOR AR (NOTE 1)		DP		P		2			2	2
INBOUND ENROUTE/DESCENT	D	P	P	2					2	2
BEFORE LEAVING A/C	DP	P	2							2
POST MISSION	DP	2							2	2
LESSONS LEARNED	DP	P	P	2					2	2
LOCATE/OPERATE EMERGENCY EQUIPMENT	DP	P	P	P	P	P			3	3
LOCATE EQUIPMENT	DP	P	P	P	3					3
USE OF EQUIPMENT			DP	P	3					3
OPEN ENTRY DOOR				DP	P	3				3
PREPARE FOR DITCHING						DP	3			3
LOSS OF PRESS/FIRE/SMOKE/FUMES				DP	3					3
PREPARE FOR CRASH LANDING					DP	3				3
REMOVE OVERWING HATCH		DP	P		3					3

Table 5-1 Standard Mission Tasks (Sheet 3 of 4)

TASK	M101	M102	M103	M104	M105	M106	M107	M108	M109	EVAL
PREPARE FOR NUCLEAR EVENT					DP	3				3
OVERHEATED CONSOLE				DP	P	3				3
RECHARGE PORTABLE OXYGEN BOTTLE				DP	P	3				3

Table 5-1 Standard Mission Tasks (Sheet 4 of 4)

NOTE 1: TASKS REQUIRE SUPPORT SCHEDULED AND CONDUCTED BY EXTERNAL AGENCIES. SPECIFIC FLIGHTS ARE SHOWN ON MATRIX TO REFLECT THE NUMBER OF PRACTICES PLANNED.

SECTION B - MISSION DESCRIPTIONS

5-5. GENERAL

a. A typical E-3 training sortie requires three training days to complete as indicated in table 5-3 below.

TRNG DAY	EVENT	HOURS
1	Pre-Mission Planning	3.0
2	Mission Planning	8.0
3	Prebrief/Preflight	2.5
3	Sortie	8.0
3	Maintenance/Operations Debriefs	1.0
4	Student Critique/Debrief	2.0
TOTAL		24.5

Table 5-2 E-3 Mission Time Requirements

b. A typical mission includes a pre-brief, preflight, two hours enroute to orbit, four hours on orbit, two hours return to base and post-flight debriefings. Though this is a typical sortie, actual sortie time may vary from 6 to 12 hours.

5-6. FLIGHT TRAINING. Flight training is listed by lesson number, nominal time for completion, type of aircraft required, and mission objective. Criterion objectives for each mission are provided to the student in the trainee guide. The instructor to student ratio is 1:1.

BLOCK X

M101 24.5 hours
E-3B/C

Student is introduced to mission planning, premission requirements, preflight procedures, preparing to assume station tasks, on station tasks, inbound enroute/descent, before leaving aircraft, post mission lessons learned and selected emergency equipment. Student is certified on initiating console operations.

M102 24.5 HOURS
E-3B/C

Student is introduced to selected on station procedures, preparation for AR, and a selected emergency procedure. All tasks previously introduced are practiced. Before start and post mission procedures are certified.

M103 24.5 HOURS
E-3B/C

Student is introduced to one new procedure for preparing for on-station and a selected emergency procedure. Tasks previously introduced but not certified are practiced. Student is certified on one portion of mission planning, pre-mission procedures, pre-flight procedures, one on station requirement and before leaving aircraft requirements.

M104 24.5 HOURS
E-3B/C

Student is introduced to managing data net procedures and several emergency procedures. Tasks previously introduced but not certified are practiced. Student is certified on most of the mission planning tasks, on station reports, inbound enroute/descent procedures, lessons learned and one emergency procedure.

M105 24.5 HOURS
E-3B/C

Student is introduced to selected emergency procedures. Tasks previously introduced but not certified are practiced. Student is certified on the remaining mission planning tasks, preparing on-station tasks, on station procedures, link operations, and selected emergency procedures.

M106 24.5 HOURS
E-3B/C

Student is introduced to preparing for ditching procedures. Tasks not previously certified are practiced. Student is certified on selected on-station requirements, data net procedures, and emergency equipment procedures.

M107 24.5 HOURS
E-3B/C

Tasks not previously certified are practiced. Planning customs, initiating radar, supervising the surveillance team, data net procedures and preparing for ditching are certified.

M108 24.5 HOURS
E-3B/C

Adjusting the mission plan, controlling sensors, and managing data nets are certified.

M109 24.5 HOURS
E-3B/C

All tasks from preparing for on-station to emergency procedures are evaluated.

M110 24.5 HOURS
E-3B/C

Performance of all tasks is evaluated by a Standardization Evaluation Flight Examiner.

Surveillance Team Responsibilities

As we said before, your surveillance team provides the tracking for your mission. This can be done very successfully if you understand the tools they use, their capabilities and responsibilities.

Starting from the lower level, the AST is basically taught to track and tell. After an AST gains experience as an AST he may be upgraded to the AAST position. If you have an AAST on your crew, your supervisory duties in the tracking area may be minimized. The instructor will talk more about the tracking duties of the surveillance team.

Read paragraph 5-3b(2) and (3) of MCR 55-33 on AAST and AST responsibilities

TRACKING PROBLEMS

Your objective is to have all data trails in your area of responsibility (AOR) with symbology and valid IDs and all symbology to have data trails. Tracks that are not needed should be dropped and new inbound tracks should be initiated as they enter the AOR. Add a training AST and a distracted crew member and your air picture does not meet your objective. Your real problem now is not just the lack of good tracking. The reports to any external agencies are in error if the symbology is in error. Sensor data does not get reported. Symbology is reported. The instructor will review some of the things you will see and how to correct them.

Area Monitoring

On some missions, you may have a tracking requirement to make sure aircraft stay out of a particular airspace. On the other hand, you may be asked to assist in ensuring that aircraft stay in an airspace. You have an excellent monitoring capability for both of these requirements through use of the Area Monitor switch action. This capability also includes the ability to monitor the track quality of another unit's tracks. Note this is another use of an area created by the Area Define/ Delete switch action.

Read about the Area Monitor switch action in Section III of 552 ACWHB 55-1, Volume III

EXTRACT

I certify that I am the Records Custodian for the Accident Investigation Board convened to investigate the crash of two U.S. Army Black Hawk helicopters in the no fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate extract from ASO IQT TRAINEE Guide, AIS:BK03 which is kept in my records system.

11 May 94
Date

WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

DEPARTMENT OF THE AIR FORCE
Headquarters Air Combat Command
Langley Air Force Base, Virginia 23665-5001

ACC SYLLABUS
Course No. E3000BQODX

USAF OPERATIONAL TRAINING COURSE
E-3 WEAPONS DIRECTOR

JUNE 1992

INTRODUCTION

This syllabus prescribes the overall training strategy and approximate amount of instruction required for a student having the entry prerequisites to attain the course goals and graduate. Units tasked to implement this syllabus are responsible for ensuring that each student graduated possesses the attitudes, knowledge, skills, and levels of proficiency set forth in the course training standards. Within syllabus and other directive constraints, the amount and level of training devoted to mission elements, events, subjects, or phases should be adjusted, as required, to meet the needs of individual students. Notwithstanding HQ ACC/DO approval, this syllabus does not take precedence over applicable governing directives. Instructions governing publication and revision of ACC syllabi are contained in ACCR 8-1.

JOHN M. LOH
General, USAF
Commander

LAWRENCE E. BOESE, Major General, USAF
Deputy Chief of Staff, Operations

Supersedes: WD TAC Syllabus E3000BQODX, April 1987
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EXTRACT

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5 May 94
Date

WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey

CHAPTER 1

COURSE ACCOUNTING

SECTION A - COURSE DESCRIPTION

1-1. COURSE TITLE/NUMBER. USAF Operational Training Course, E-3 Weapons Director, E3000BQODX.

1-2. COURSE ENTRY PREREQUISITES.

a. Graduate from ATC course E30BP1741X, Air Weapons Controller Fundamentals, and an automated system qualification training course (either ACC 1741BOO or ACC 1741FOL) or have one year experience in an automated system.

b. Medical: Must be physically qualified for flight duty per Class III medical standards.

c. Physiological Training: Current physiological training, original chamber (3 days) or a current TTB refresher which will not expire until after training completion date. Members are required to handcarry completed AF Form 1042 (mandatory) and AF Form 702 (if applicable).

d. Survival Training: Complete basic survival training course S-V80-A and water survival course S-V90-A before arriving Tinker AFB.

e. Complete Life Support Training at Tinker AFB.

f. Special Requirements:

(1) SECRET security clearance completed by class start date.

(2) Military drivers license, if obtainable at present duty location.

(3) Qualified in small arms training.

(4) Passport in hand or action initiated to obtain passport before departure from present duty location.

1-3. PURPOSE AND GRADUATE STATUS. To train personnel meeting course prerequisites to basic qualification (BQ) status in the Weapons Director crew position in the E-3. Graduates receive an E-3 rating of BQ IAW ACCR 51-60.

1-4. LOCATION. 552 Air Control Wing, Tinker AFB, Oklahoma.

1-5. DURATION. 77 training days divided into 47 ground training days (GTDs) and 30 flying training days (FTDs).

1-6. AMOUNT.

a. Academic Hours: 133.5.

b. Aircrew Training Device Hours: 143.0.

c. Flying Sorties/Hours: 8 sorties/172.0 hours.

SECTION B - FLYING INVENTORY

1-7. INVENTORY. The following chart shows the average number of effective sorties required by each student.

STUDENT		DIRECT UE SUPPORT		OTHER SUPPORT	
SORTIES	HOURS	SORTIES	HOURS	SORTIES	HOURS
M - 101	8.0	(NONE)		*FIGHTERS	
M - 102	8.0				
M - 103	8.0				
M - 104	8.0				
M - 105	8.0				
M - 106	8.0				
M - 107	8.0				
M - 108	8.0				
10 TOTAL	64.0 **				
SSR - 8.88(8+0+.88)					

C1693Da 7/2/92

* A MINIMUM OF TWO AIRCRAFT MUST BE CONTROLLED, ONE OF WHICH MUST BE A FIGHTER. FIGHTER SUPPORT IS REQUIRED FOR ALL MISSIONS.

** HOURS REFLECT ONLY FLYING TIME. ACTUAL HOURS, INCLUDING MISSION PLANNING AND POST-MISSION PERFORMANCE REVIEW, TOTAL 172 HOURS.

SSR (Student Sortie Requirement) = Student + Direct Support + Refly Rate Sorties. Refly Rate: .11

SECTION C - DEVICE TRAINING INVENTORY

1-8. INVENTORY.

a. Mission Simulator: 47 sessions/141.0.

b. Static E-3 Aircraft: 1 session/2.0 hours.

c. Total: 48 sessions/143.0 hours.

SECTION D - ACADEMIC INVENTORY

1-9. INVENTORY.

		HOURS
a.	BLOCK I, INTRODUCTION, COMPUTER, COMMUNICATIONS AND MISSION PLANNING	42.0
b.	BLOCK II, CONTINUUM OF CONTROL	40.5
c.	BLOCK III, AIR REFUELING	13.5
d.	BLOCK IV, ACT/DACT	7.0
e.	BLOCK V, STRATEGIC DEFENSE	6.0
f.	BLOCK VI, COMPOSITE FORCE TRAINING	12.5
g.	BLOCK VII, FLYING TRAINING	12.0
	TOTAL	133.5

SECTION E - WEAPONS INVENTORY (NOT APPLICABLE)

CHAPTER 3

ACADEMIC TRAINING

SECTION A - SPECIAL INSTRUCTIONS

3-1. CONTENT. This chapter outlines the subjects to be covered in each academic block and unit of instruction. Specific criterion objectives are provided in course training documents and are provided to the students in a student study guide.

3-2. FACILITY REQUIREMENTS. A classroom environment capable of supporting eight students is required. This facility will house related equipment and provide facilities for private student study and counseling sessions.

3-3. INSTRUCTIONAL METHOD/MEDIA. The primary academic method is lecture and classroom supplemented with discussion, supported by printed self-study materials (SSM). These materials include student texts, Air Combat Command and 552 Air Control Wing regulations and handbooks, and Air Force technical orders.

3-4. ACADEMIC EVALUATION. Periodic evaluations are included to measure the student progression and to ensure the effectiveness of the course. Some evaluations are at the lesson level, others cover entire blocks and an end-of-course is used to sample retention. All testing will be conducted using written examinations that include cluster true/false, matching, multiple-choice and completion questions. Each examination will be reviewed and critiqued to 100% following the test period.

SECTION B - ACADEMIC DESCRIPTIONS

3-5. ACADEMIC TRAINING. Academic training is listed by lesson number, subject, instructional method, alphanumeric identifier, nominal time for completion, facility and concise narrative of content. Study materials are provided for self-study within each lesson. Classified materials will be made available by the assigned instructor. Self-study requirements prior to the scheduled classroom session will be provided in course schedules. The maximum instructor to student ratio for academics is 1:8.

BLOCK I - INTRODUCTION, COMPUTER COMMUNICATIONS AND MISSION PLANNING

1.1 WELCOME AND ORIENTATION — LECTURE/DISCUSSION
WIP:WO01 — 1.0 HOUR
CLASSROOM

Introduces student to course materials and procedures and outlines student and instructor responsibilities.

1.2 POSTING AND USE OF PUBLICATIONS — ASSIGNED READINGS/LECTURE/WORKBOOK DEMO–PERFORMANCE 5.0 HOURS
WIP:PP01
CLASSROOM

Explains procedures for posting and using publications necessary for Weapons Directors duties.

1.3 SAFETY AND SECURITY — ASSIGNED READINGS/LECTURE 1.0 HOUR
WIP:SS01
CLASSROOM

Provides student overview of simulator layout, safety and evacuation procedures. OPSEC/COMSEC principles are also introduced.

1.4 CONSOLE FAMILIARIZATION AND SIMULATOR ORIENTATION — ASSIGNED READINGS/LECTURE/DISCUSSION 4.0 HOURS
WIP:CF01
CLASSROOM

Prepares student for use of SDC and ADS. Introduces tabular displays, entry/edit lines and menus, cautions, alarms/alerts and error messages.

1.5 MISSION PLANNING MECHANICS — ASSIGNED READINGS/LECTURE/DISCUSSION/DEMO–PERFORMANCE 3.0 HOURS
WIP:MP01
CLASSROOM

Introduction to FAA LOAs, mission packages and aeronautical charts. Explains data base elements necessary to display, on console, assigned airspaces/coordinates for a typical AWACS mission.

1.6 INTRACREW COORDINATION — ASSIGNED READINGS/LECTURE/DISCUSSION 4.0 HOURS
WIP:IC01
CLASSROOM

Instruction focuses on internal E–3 communications capabilities and limitations, nets/intercom, functions/restrictions of ADS components, and communicating via Arrow and Message switch actions.

BLOCK I TEST I — WRITTEN EXAMINATION 2.0 HOURS
WIE:B1T1
CLASSROOM

Closed book test on Lessons 1.1 – 1.4 academic objectives. Critiqued to 100%.

1.7 MISSION PREPARATION AND REFERENCE POINT SWITCH ACTIONS — ASSIGNED READINGS/LECTURE/DISCUSSION 6.0 HOURS
WIP:MR01
CLASSROOM

Introduces tasks involved in depicting elements on the WD's console that define the limitations/reference points involved in a mission. Review of airspace types, characteristics and limitations. Addresses pre–mission set up of IFF Identification zones.

1.8 IDENTIFYING AND TRACKING AIRCRAFT — ASSIGNED READINGS/
WIP:IT01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Teaches techniques to apply the identification aids learned in the previous lesson. Introduces the use of computer to positively identify and maintain tracking on aircraft returns. Discusses Track Blocks and tracking problems.

1.9 EXTERNAL COORDINATION/COMMUNICATION — ASSIGNED READINGS/
WIP:EC01 — LECTURE/DISCUSSION
CLASSROOM — 3.0 HOURS

Introduces communication with external agencies, including FAA coordination. Explains in detail how the ADS panel operates, its limitations and capabilities with regard to external agencies. Discusses aircraft check-in, R/T, RTB procedures and Mode IV checks.

1.10 FLIGHT SAFETY AND EMERGENCY PROCEDURES — ASSIGNED READINGS/
WIP:FE01 — LECTURE/DISCUSSION
CLASSROOM — 6.0 HOURS

Extends the previous lesson in the sense that it involves communication in an emergency situation. Emergency aircrew aids, emergency actions, SAR procedures and emergency sensors/switch actions are covered. Additionally, Mission Reports/Logs/Forms are discussed.

BLOCK I TEST II — WRITTEN EXAMINATION
WIE:B1T2 — 2.0 HOURS
CLASSROOM

Closed book test on all academic objectives for Lessons 1.5 – 1.10. Critiqued to 100%.

BLOCK II – CONTINUUM OF CONTROL

2.1 ADVISORY CONTROL — ASSIGNED READINGS/
WIP:AC01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Overview of Continuum of Control with a detailed discussion of Advisory Control. Emphasis on intercept R/T, mission use of radios; JR 55-79 Training Rules. Explains RCT Initialization TD, Commit S/A and RCT Mission TD.

2.2 DATA LINK AND ASSOCIATED SWITCH ACTIONS — ASSIGNED READINGS/
WIP:DL01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Explains data link procedures and troubleshooting. Ties switch actions of previous lesson to Data Link switch actions. Emphasis on RCT Mission TD.

2.3 BROADCAST CONTROL — ASSIGNED READINGS/
WIP:BC01 — LECTURE/DISCUSSION
CLASSROOM — 3.0 HOURS

Explains broadcast control basics, pre-mission preparation and procedures. Incorporates Zody point and Bullseye options of Line switch action and Armament Update/Override switch action.

2.4 TACTICAL CONTROL — ASSIGNED READINGS/
WIP:TC01 — LECTURE/DISCUSSION
CLASSROOM — 2.0 HOURS

Explains tactical control basics, pre-mission preparation, elements, procedures and formations.

2.5 E-3 MISSION COMMUNICATIONS — ASSIGNED READINGS/
WIP:MC01 — LECTURE/DISCUSSION
CLASSROOM — 2.0 HOURS

Describes capabilities, procedures, limitations, hardware of Have Quick communications system.

2.6 CLOSE CONTROL BASICS — ASSIGNED READINGS/
WIP:CC01 — LECTURE/DISCUSSION
CLASSROOM — 4.0 HOURS

Reviews Continuum of Control. Introduces cutoff and stern geometry. Explains usage of "V" option of Commit switch action, Present Altitude S/A, Track Altitude S/A and Intercept Line S/A.

2.7 COMPUTER BASICS — ASSIGNED READINGS/
WIP:CB01 — LECTURE/DISCUSSION
CLASSROOM — 1.5 HOURS

Describes basic capabilities, procedures, limitations, hardware and software of E-3 computer system.

2.8 MISSION VARIATIONS — ASSIGNED READINGS/
WIP:MV01 — LECTURE/DISCUSSION
CLASSROOM — 2.0 HOURS

Discussion of unforeseen variables involving aircraft problems, airspace limitations, tactics, coordination and E-3 equipment. Emphasis placed on good judgment and proper evaluation of each situation for appropriate actions to counter/adapt to mission variables.

2.9 RADAR BASICS AND HIGH FAST FLYER THREAT — ASSIGNED READINGS/
WIP:RB01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Instruction provided by ASO on ASO responsibilities and procedures followed by an ART briefing on ART responsibilities, the E-3 radar and IFF sensor systems. Explanation of radar jamming countermeasures. IWD briefs fly ups/high fast flyer threat, tactics, communications, threat levels, concept of mutual support and evaluation of tracks.

2.10 SAC TRAINING RULES, 2v1s — ASSIGNED READINGS/
WIP:CC02 — LECTURE/DISCUSSION
CLASSROOM — 4.0 HOURS

Explains conduct of close control 2v1 intercepts against SAC targets using training rules, tactics, procedures and separation criteria.

2.11 FIGHTER PERSPECTIVES AND WD RESPONSIBILITIES — ASSIGNED READINGS/
WIP:FP01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Discusses aircraft characteristics, armament capabilities, fire control systems and radar angle limits of friendly fighters. Outlines the division of responsibilities between fighters/pilots and weapons directors with regard to check-in, recovery and the continuum of control. Discusses HCA versus Aspect Angle.

BLOCK II TEST — WRITTEN EXAMINATION
WIE:BK02 — 2.0 HOURS
CLASSROOM

Closed book test on Lessons 2.1 - 2.11 academic objectives. Critiqued to 100%.

BLOCK III - AIR REFUELING

3.1 AIR REFUELING BASICS/RECEIVER TURN-ON RENDEZVOUS — ASSIGNED READINGS/
WIP:AR01 — LECTURE/DISCUSSION
CLASSROOM — 5.0 HOURS

Introduces basics of air refueling such as standards, safety, priorities, FAA requirements. Teaches receiver turn-on air refueling procedures, R/T, mission planning and geometry.

3.2 AIR REFUELING POINT PARALLEL RENDEZVOUS — VIDEO/ASSIGNED READINGS/
WIP:AR02 — LECTURE/DISCUSSION
CLASSROOM — 4.0 HOURS

Explains air refueling point parallel procedures, R/T, SID displays and switch actions. Provides worksheet for solving slant range with aircrew aids. Emergency refueling is also discussed.

3.3 AIR REFUELING RENDEZVOUS CORRECTION TECHNIQUES — ASSIGNED READINGS/ LECTURE/DISCUSSION 3.0 HOURS
WIP:AR03
CLASSROOM

Teaches adjustments for positioning for various air refueling problems. Enhances previous lesson on subject of emergency refuelings. Discusses EMCON levels and procedures for receiver without AI radar.

BLOCK III TEST — WRITTEN EXAMINATION 1.5 HOURS
WIE:BK03
CLASSROOM

Closed book test on Lessons 3.1 – 3.3 academic objectives. Critiqued to 100%.

BLOCK IV – ACT/DACT

4.1 AIR COMBAT — ASSIGNED READINGS/LECTURE/ VIDEO/DISCUSSION 6.0 HOURS
WIP:AD01
CLASSROOM

Detailed discussion on ACT/DACT, R/T, formations, tactics and aspect geometry. Academic lesson taught over a two day period.

BLOCK IV TEST — WRITTEN EXAMINATION 1.0 HOUR
WIE:BK04
CLASSROOM

Closed book test on Lesson 4.1 academic objectives. Critiqued to 100%.

BLOCK V – STRATEGIC DEFENSE

5.1 STRATEGIC DEFENSE — ASSIGNED READINGS/LECTURE VIDEO/DISCUSSION 3.0 HOURS
WIP:SD01
CLASSROOM

Discusses Strategic Defense procedures, E–3 role, hijacking procedures, threat assessment and reasons for Strategic Defense.

5.2 COMMUNICATIONS JAMMING COUNTERMEASURES — ASSIGNED READINGS/ LECTURE/DISCUSSION 3.0 HOURS
WIP:CJ01
CLASSROOM

Discussion of comm jamming countermeasures and the use of data link, concise R/T, brevity codes, secure radios, Have Quick, simulcast and authenticators.

BLOCK VI - COMPOSITE FORCE

6.1 STRIKE AND COMPOSITE FORCE TRAINING — ASSIGNED READINGS/ LECTURE/DISCUSSION 11.0 HOURS
WIP:SP01
CLASSROOM

Detailed discussion on strike force and composite force missions covering four academic lectures. Covers ROE, R/T, discussion of various mission types, ATO, WD coordination, WD priorities and WD responsibilities and mission procedures.

BLOCKS V AND VI TEST — WRITTEN EXAMINATION 1.5 HOURS
WIE:T5/6
CLASSROOM

Classified closed book examination on Lessons 5.1 - 5.2 and Lesson 6.1 academic objectives. Critiqued to 100%.

BLOCK VII - FLYING TRAINING

7.1 MISSION PLANNING FOR LIVE FLIGHT — ASSIGNED READING ONE-ON-ONE INSTRUCTION 6.0 HOURS
WIO:PL01
MISSION PLANNING CLASSROOM

Designed to familiarize student with actual mission planning elements used in flying training. Builds on to the knowledge student acquired in previous blocks about basic mission planning skills.

7.2 FLIGHT TRAINING PROCEDURES — ASSIGNED READING ONE-ON-ONE INSTRUCTION 6.0 HOURS
WIO:FT01
CLASSROOM

Covers preflight tasks, E-3 crew communications, outbound activities, air-to-air training, safety, AWACS Monitor, E-3 refueling, emergency procedures and mission logs. Some of these tasks were covered in previous blocks but have not been accomplished in a flying environment.

CHAPTER 4

DEVICE TRAINING

SECTION A - SPECIAL INSTRUCTIONS

4-1. CONTENT. This chapter outlines the performance training to be conducted in aircrew training devices in each unit and block of instruction. Specific criterion objectives are provided in course training documents and are provided to the students in a student study guide. These objectives are based on skills and proficiency requirements from the Weapons Director task listing.

4-2. FACILITY REQUIREMENTS. ATD sessions are conducted in the E-3 mission simulator and a static, powered E-3 on the ramp. The simulator will require dedicated scheduling for all lessons.

4-3. INSTRUCTIONAL METHOD/MEDIA. Demonstration-performance is the preferred method for all ATD instruction. Printed materials including simulator training packages are provided to guide practice. Performance lesson plans are provided to assist the instructor with timing and structure. A 1:2 instructor to student ratio is planned for all ATD instruction except the DOV simulator evaluation where the ratio is 1:1, and flight training procedures on the static E-3 where the ratio is 1:4.

4-4. PERFORMANCE EVALUATIONS. All performance objectives will be evaluated to measure student progression and course effectiveness. Objectives will be evaluated after the required amount of practice has been completed as indicated by the performance lesson plan. Block evaluations will measure overall performance. The grading criteria described in Chapter 2 will be used for all ATD sessions. Students must demonstrate required proficiency in all tasks before progressing to flying training.

SECTION B - AIRCREW TRAINING DEVICE (ATD) SESSION DESCRIPTIONS

4-5. ATD SESSIONS. ATD sessions are listed by lesson number, subject, instructor to student ratio, alphanumeric identifier, nominal time to complete, device required and concise narrative of content.

BLOCK I - INTRODUCTION, COMPUTER, COMMUNICATIONS AND MISSION PLANNING

1.3 SAFETY AND SECURITY 1:2 RATIO
WIA:1TOR .5 HOUR
SIMULATOR

Familiarizes student with safety requirements, safety board, safety equipment and evacuation procedures for the simulators.

1.4 CONSOLE FAMILIARIZATION AND SIMULATOR ORIENTATION 1:2 RATIO
WIA:S101 3.0 HOURS
SIMULATOR

Introduction of basic SDC components, Category/Feature select switches, sensor symbols, SDC cautions, console assignment, menus, alarms/alerts and error messages.

1.5 MISSION PLANNING MECHANICS 1:2 RATIO
WIA:S102 3.0 HOURS
SIMULATOR

Incorporates data base elements from a mission package and use of FAA LOAs and source documents. Includes display and input of lines, circles and coordinates.

1.6 INTRACREW COORDINATION 1:2 RATIO
WIA:S103 3.0 HOURS
SIMULATOR

Training on use of headset, ADS panel, aircrew aids, Message and Arrow switch actions for console-to-console communication.

1.7 MISSION PREPARATION AND REFERENCE POINT SWITCH ACTIONS 1:2 RATIO
WIA:S104/WIA:S105 6.0 HOURS
SIMULATOR

Training on Restricted Areas, Initialize Special Point, CAPs, Bearing and Range SIDs/TDs, Area Define/Delete, Reference Number Designators/NATO Track Numbers, Locate SIF, Corridor IFF and Mode C Corridors.

1.8 IDENTIFYING AND TRACKING AIRCRAFT 1:2 RATIO
WIA:S106/WIA:S107 6.0 HOURS
SIMULATOR

Training on Request SIF, initiating and maintaining symbology, reinitiating symbology, track blocks, Track TDs, Radar/IFF Tracking, Assign SIF, Assign/Defer switch actions.

1.9 EXTERNAL COORDINATION/COMMUNICATION 1:2 RATIO
WIA:S108 3.0 HOURS
SIMULATOR

Training on check out/setup of ADS, communication with ATC facilities/ R/T for check-in/handoff/recovery procedures, ATC clearances and Mode IV checks.

1.10 FLIGHT SAFETY AND EMERGENCY PROCEDURES 1:2 RATIO
WIA:S109, WIA:S110, WIA:S111, WIQ:S112 12.0 HOURS
SIMULATOR

Training on safety and emergency procedures, FAA and military standards, inflight separation, emergency sensors and switch actions, emergency assistance. Use of mission logs to document simulated missions. Performance evaluation during last sim session.

BLOCK II — CONTINUUM OF CONTROL

2.1 ADVISORY CONTROL 1:2 RATIO
WIA:S201 3.0 HOURS
SIMULATOR

Training on intercept safety and ROE/Training Rules IAW JR 55-79 and FAA Directives, BFM/Advisory control missions, Commit S/A, RCT Mission TDs and RCT Initialization TD. Includes mission use of radios, pre-mission brief and use of brevity code words.

2.2 DATA LINK AND ASSOCIATED SWITCH ACTIONS 1:2 RATIO
WIA:S202 3.0 HOURS
SIMULATOR

Conduct a data link mission with mission briefing, mission requirements, safety and troubleshooting. Training on the following switch actions: Manual Guidance, Command Tracking, Track Types, Alter Control, CAP, RCT Mode Control, Recovery Airbase and RTB. Verification of switch actions in RCT Mission TD.

2.3 BROADCAST CONTROL 1:2 RATIO
WIA:S203 3.0 HOURS
SIMULATOR

Training on Broadcast Control procedures, Zody point and Bullseye options of Line S/A, Armament Update/Override S/A and Augmented RCT Mission TD.

2.4 TACTICAL CONTROL 1:2 RATIO
WIA:S204 3.0 HOURS
SIMULATOR

Training on Tactical Control procedures with assigned air-to-air fighters and selected tactics.

2.6 CLOSE CONTROL BASICS 1:2 RATIO
WIA:S205 3.0 HOURS
SIMULATOR

Demonstration and practice of Close Control cutoffs and sterns. Incorporates use of Commit S/A "V" option, Present/Target Altitude S/A, Track Altitude S/A and Intercept Line S/A.

2.8 MISSION VARIATIONS 1:2 RATIO
WIA:S206 3.0 HOURS
SIMULATOR

Continuation of close control sterns and cutoffs with the addition of mission variables involving aircraft problems, airspace limitations, tactics, coordination and E-3 equipment.

2.9 RADAR BASICS AND HIGH FAST FLYER 1:2 RATIO
WIA:S207 3.0 HOURS
SIMULATOR

Training of close control intercepts which incorporate high/low transition, target evasion, high/fast fliers, radar jamming and stranger traffic.

2.10 SAC TRAINING RULES, 2v1s 1:2 RATIO
WIA:S208 3.0 HOURS
SIMULATOR

Practice for 2v1 close control intercepts against SAC targets. Intercepts will conform to training rules, meet separation criteria and include cutoffs and sterns.

2.11 FIGHTER PERSPECTIVES AND CAPABILITIES 1:2 RATIO
WIA:S209, WIA:S210, WIA:S211, WIQ:S212 12.0 HOURS
SIMULATOR

Demonstration and practice of close control 2v1 intercepts with dissimilar fighter aircraft within the various levels of the continuum of control. Sterns, cutoffs, high/low transition and high/ fast targets will be part of the intercepts. Last sim session evaluates 1v1 cutoff and stern transition missions.

BLOCK III - AIR REFUELING

3.1 AIR REFUELING BASICS/RECEIVER TURN-ON RENDEZVOUS 1:2 RATIO
WIA:S301 3.0 HOURS
SIMULATOR

Training on basic air refueling procedures and receiver turn-on rendezvous.

3.2 AIR REFUELING POINT PARALLEL RENDEZVOUS 1:2 RATIO
WIA:S302 3.0 HOURS
SIMULATOR

Training on point parallel rendezvous, slant range, 150/30 and 90/90 rendezvous set ups.

3.3 AIR REFUELING RENDEZVOUS CORRECTION TECHNIQUES 1:2 RATIO
WIA:S303, WIA:S304, WIQ:S305 9.0 HOURS
SIMULATOR

Training on air refueling problems which require positioning adjustments to correct. Practice of emergency air refueling rendezvous, EMCON procedures and rendezvous with receivers which do not have AI radar capability. Last sim session evaluates air refueling rendezvous procedures.

BLOCK IV - ACT/DACT

4.1 AIR COMBAT 1:2 RATIO
WIA:S401, WIA:S402, WIA:S403, WIQ:S404 12.0 HOURS
SIMULATOR

Demonstration, performance and practice of ACT/DACT objectives over four simulator sessions. Final session will include an evaluation of block performance objectives.

BLOCK V - STRATEGIC DEFENSE

5.1 STRATEGIC DEFENSE 1:2 RATIO
WIA:S501 3.0 HOURS
SIMULATOR

Demonstration and practice of Strategic Defense basics.

5.2 COMMUNICATIONS JAMMING COUNTERMEASURES 1:2 RATIO
WIA:S502, WIA:S503, WIQ:S504 9.0 HOURS
SIMULATOR

Training built upon from previous simulator session. Demonstration performance and practice of strategic defense scenarios with application of DEFCON/ROE threat warning and authenticators. Last simulator session will be an evaluation of block performance objectives.

BLOCK VI - COMPOSITE FORCE

6.1 STRIKE AND COMPOSITE FORCE TRAINING 1:2 RATIO
WIA:S601, WIA:S602, WIA:S603, WIA:S604
WIA:S605, WIA:S606, WIA:S607, WIA:S608 26.0 HOURS
SIMULATOR

First four simulator sessions train strike force elements only. The last four sessions increase in difficulty with composite force training.

DOV SIM PERFORMANCE EVALUATION 1:1 RATIO
DOV SIM EVAL 3.5 HOURS
SIMULATOR

Students are given a performance evaluation in the simulator by DOV personnel.

BLOCK VII - FLYING TRAINING

7.2 FLIGHT TRAINING PROCEDURES 1:4 RATIO
WIA:FT01 2.0 HOURS
E-3B/C STATIC

Training occurs in a powered-up, static E-3. Aircraft equipment, stowage of personal equipment, takeoff, landing and emergency procedures will be explained by the instructor.

4-6. ATD TASKS. The student is required to demonstrate progress in accordance with the following task list. Failure to attain the overall grade by the end of each block indicated may result in non-effective/ student non-progression (NE/SNP) and initiation of supervisory actions directed in Chapter 2.

ATD TASKS	STANDARD
BLOCK I - INTRODUCTION, COMPUTER COMMUNICATIONS AND MISSION PLANNING	
1. Identify simulator evacuation routes/marshalling areas	3
2. Identify safety board items/Halon systems	2
3. Operate SDC panels	2
4. Checkout SDC	2
5. Assign the console	2
6. Display and page through TD Index	2
7. Demonstrate use, options and explain displays of:	
a. Line S/A	2
b. Circle S/A	2
c. Coordinate S/A	2
d. Tactical B/R	2
8. Depict/check data base elements	2
9. Convert and display coordinates	2
10. Configure/operate ADS panel	2
11. Send arrows and messages; demonstrate time hack function of Arrow S/A	2
12. Demonstrate use and functions of Restricted Area S/A and Initialize Special Point S/A	2
13. Display SID and TDs of Bearing/Range S/A	2
14. Locate tracks/display track designators with the reference number designator/NATO track number Situation Display S/A	2
15. Create/move special points	2
16. Add and delete airbases with Add/Delete Airbase S/A	2
17. Create/move areas with Area Define/Delete S/A	2
18. Load aircraft modes/codes using Locate SIF S/A	2
19. Create IFF corridor using Corridor IFF S/A	2
20. Interrogate IFF/SIF codes using Request SIF S/A	2
21. Initiate system track symbology, correct ID of track	2
22. Maintain tracking, change ID and recall track using Reinitiate S/A	2
23. Select radar or IFF tracking	2
24. Assign modes/codes using Assign SIF	2
25. Transfer or accept tracking responsibilities	2

26.	Extract information from track block and Track TD	2
27.	Verify checkout/operate radios/ADS	2
28.	Establish communications with external agency/aircraft	2
29.	Coordinate traversals, handoffs/recoveries and emergencies with ATC	2
30.	Provide inflight separation	2
31.	Provide airspace integrity and navigational assistance	2
32.	Provide emergency assistance/respond to downed aircraft, monitor guard radio	2
33.	Complete Weapons Director Log	2
34.	Perform flight follow of aircraft	2

BLOCK II - CONTINUUM OF CONTROL

1.	Load RCT Initialization TD	2
2.	Provide advisory control to aircraft	2
3.	Respond to emergencies	2
4.	Make safety calls	2
5.	Initiate Commit S/A	2
6.	Verify and identify information in RCT Mission TD	2
7.	Communicate with brevity terms	2
8.	Adhere to ROE/Training Rules and FAA Directives	2
9.	Conduct an intercept via data link	2
10.	Input manual guidance	2
11.	Verify Alter Control switch actions via track block	2
12.	Initiate/verify Alter Control S/A	2
13.	Initiate/verify RTB S/A	2
14.	Initiate/verify CAP S/A	2
15.	Initiate/verify Command Tracking S/A	2
16.	Verify RCT Mode Control	2
17.	Provide broadcast control	2
18.	Demonstrate Zody and Bullseye points	2
19.	Maintain fighter status/fuel configuration	2
20.	Demonstrate and verify armament update/override	2
21.	Identify Augmented RCT Mission TD Fields	2
22.	Provide tactical control	2
23.	Recognize and transmit formations and tactics	2
24.	Pass information within priorities	2
25.	Report traffic	2
26.	Provide close control	2
27.	Perform cutoff geometry with Commit S/A	2
28.	Input Present Target Altitude S/A	2
29.	Input Track Altitude Override S/A	2
30.	Display Intercept line	2
31.	Provide stern geometry with "V" option of Commit S/A	2
32.	Conduct single frequency 1v1 intercepts with:	
	a. High/low transition fighter	2
	b. Target evasion	2
	c. High/fast flyer target	2
	d. Aircraft experiencing unreliable radar/radar jamming	2
33.	Perform 2v1 intercepts with SAC targets	2
34.	Perform 2v1 intercepts with dissimilar aircraft	2
35.	Perform cutoffs with reattacks	2

BLOCK III - AIR REFUELING

1.	Conduct and complete receiver turn-on air refueling	2
2.	Commit with "S" option of Commit S/A	2
3.	Release receiver to boom frequency	2
4.	Rollout receiver 1-3 NM in trail of tanker	2
5.	Complete a rendezvous with receiver in tow	2
6.	Conduct a rendezvous with two simultaneous receivers committed to tanker	2
7.	Observe/apply EMCON procedures	2
8.	Conduct point-parallel rendezvous	2
9.	Brief rendezvous procedures at check-in	2
10.	Display IP, CP and bearing/range	2
11.	Correct rendezvous geometry inside 40 miles	2
12.	Conduct emergency rendezvous	2
13.	Perform 150/30 and 90/90 rendezvous	2
14.	Compute point parallel rendezvous with slant range chart	2
15.	Conduct air refueling missions which require corrective techniques for the following:	2
	a. Pop-ups	
	b. Tanker overrun	
	c. Offset problem	
	d. Sandwich situation with multiple receivers	
	e. Airspace limitations/altitude disparities	
	f. Receivers with live armament	
	g. Co-altitude traversal	
	h. WX	

BLOCK IV - ACT/DACT

1.	Conduct 2v2 air combat training missions	2
2.	Control aircraft on separate frequencies	2
3.	Identify formations/tactics	2
4.	Pass shots on WD coordination frequency	2
5.	Adapt mission to loss of airspace	2
6.	Coordinate with ground controller/ATC	2
7.	Correct/coordinate spillouts	2
8.	Complete engagements with varying tactics	2

BLOCK V – STRATEGIC DEFENSE

1.	Conduct intercept with unidentified target for strategic defense mission	2
2.	Provide lane defense of a strategic area	2
3.	Man a CAP position	2
4.	Assess threat for pairing	2
5.	Conduct Mode IV check	2
6.	Apply current DEFCON/ROE	2
7.	Complete aircraft check–in and initial brief with fighter	2
8.	Control two sets of fighters (tied) simultaneously	2
9.	Control two sets of fighters (15 NM trail) against same target	2
10.	Control fighters and adapt when targets cross	2
11.	Intercept high/low target split	2
12.	Authenticate using KTA 2000	2
13.	Coordinate with another WD for target assignment	2
14.	Give picture brief/threat warning	2

BLOCK VI – COMPOSITE FORCE TRAINING

1.	Conduct strike package missions	2
2.	Maintain tracking within 5 NM of sensor returns	2
3.	Report threats before 10 NM	2
4.	Pass mission information within priorities	2
5.	Update and relay status of aircraft to proper authorities	2
6.	Relay reports, requests and critical information to proper authorities within priorities	2
7.	Control strike package with seven aircraft	2
8.	Check–in on strike frequency and place symbology on lead element	2
9.	Record fence check–in, egress status	2
10.	Pass inflight reports to ABCCC	2
11.	Provide marshalling assistance	2
12.	Provide IFF/SIF checks	2
13.	Control one portion of a composite force mission	2
14.	Coordinate mission changes with ground agencies	2
15.	Break air tasking order	2
16.	Apply intelligence information to mission types	2
17.	Employ countermeasures	2
18.	Control CAP/DCA aircraft	2
19.	Apply intelligence information to mission types, threats and AOB	2
20.	Coordinate internal handovers with other WDs	2

CHAPTER 5

FLYING TRAINING

SECTION A - SPECIAL INSTRUCTIONS

5-1. CONTENT. This chapter outlines the training to be conducted on each flying mission and describes required student progress. Specific criterion objectives are provided in course training documents and are provided to the students in a student study guide.

5-2. AIRCRAFT REQUIREMENTS. An E-3 aircraft with the crew configuration required by ACCR 55-3, Chapter 3, will be used for all training sorties.

5-3. INSTRUCTIONAL METHOD/MEDIA. The performance-demonstration method will be used for all flight instruction. The training is designed to proceed using the flying matrix in Figure 5-1. Task areas are listed on the left side and the sortie numbers across the top. Within the matrix a "D" indicates where the instructor will demonstrate or lead the student through a procedure or task. A "P" stands for relevant practice and appears where the student performs the task for practice rather than evaluation. When a number appears an evaluation is scheduled. This building block approach is used to allow the demonstration-performance method of explanation, demonstration, supervised performance and evaluation to be applied to develop student skills. Students may progress at a faster or slower rate as long as the minimum training requirements of Chapter 2 are met. All instruction will be conducted by a fully qualified Instructor Weapons Director.

5-4. EVALUATIONS.

a. Student performance will be certified on certain mission tasks in accordance with the flying matrix, Figure 5-1. The number on the matrix indicates the ACC standard for that task. Student performance will be graded on the preprinted ACC Form 206 for that mission. Student failure or non-performance will be indicated on the ACC Form 206 and action taken IAW Chapter 2 of this syllabus.

b. The student's instructor will determine achievement of course training standards in each major section and will enter the following statements in the remarks section of the final ACC Form 206 for that major section of training: "Course Training Standards Achieved for Block VII." Overall standard achieved will be entered on ACC Form 89, Flying Training Record.

WEAPONS DIRECTOR

BLOCK VII MATRIX

OBJECTIVE	M101	M102	M103	M104	M105	M106	M107	M108
7.1.1 MORF/FCIF	D	P	2					STANDARDIZATION EVALUATION FLIGHT
7.1.2 Mission Research	D	P	P	2				
7.1.3 Data Base Check	D	P	2					
7.1.4 Fact Sheet/ Lessons Learned	D	P	P	2				
7.1.5 Map Prep	D	P	2					
7.1.6 MCM 3-1 Tactics		D	P	P	P	2		
7.1.7 WD/NAV A/R Coordination*		D	P	2				
7.1.8 Pilot/WD Brief	D	P	P	P	2			
7.2.1 Pre-Flight	D	2						
7.2.2 Crew Coordination	D	P	P	P	P	2		
7.2.3 Outbound Console/ Comm Checkout	D	P	2					
7.2.4 Handoff/Check-In	P	P	P	2				
7.2.5 Target Brief	P	P	P	2				
7.2.6 Tracking	P	P	P	2				
7.2.7 Communication Guidelines	D	P	P	P	P	P	2	
7.2.8 Safety/TR	P	P	P	P	P	P	2	
7.2.9 Recovery	P	P	P	2				
7.2.10 AWACS Monitor		D	P	2				
7.2.11 WD Assisted A/R*		D	P	2				
7.2.12 Overall MSN Standards	D	P	P	P	P	P	2	
7.2.13 WD Logs	D	P	2					

FIGURE 5-1 (Sheet 1 of 2)

WEAPONS DIRECTOR

BLOCK VII MATRIX

OBJECTIVE	M101	M102	M103	M104	M105	M106	M107	M108
7.2.14 Post Flt Duties	D	P	2					STANDARDIZATION / EVALUATION FLIGHT
7.2.15 Emergency Actions	D	P	P	P	P	P	2	
7.2.16 Classified Documents Security	D	P	P	P	P	P	2	
7.2.17 E-3 Refueling Procedures *	D	P	P	2				

"*" indicates Schedule TBD

"D" indicates the instructor demonstrates or leads the student through the task.

"P" indicates the task the student is to practice.

"1, 2, or 3" indicates the level (TAC Standard) which the student must perform the identified task to be certified.

NOTE: When a student fails to meet the standards of one objective, this does not mean the student failed the flight.

FIGURE 5-1 (Sheet 2 of 2)

SECTION B - MISSION DESCRIPTIONS

5-5. GENERAL.

a. A typical E-3 training sortie requires three training days to complete:

Day 1	Mission Planning	8.0 Hours
Day 2	a. Prebrief	1.0 Hour
	b. Preflight	1.5 Hours
	c. Sortie	8.0 Hours
	d. Mission Debriefs	2.0 Hours
Day 3	Crew Member Performance Debrief	1.0 Hour
	Total	21.5 Hours

b. A typical mission includes a pre-mission briefing, pre-flight, two hours enroute to orbit, four hours on orbit, two hours return to base, post-flight debriefing. Though this is a typical sortie, actual sorties may vary from 6 hours to 12 hours.

c. RONs normally are 2-4 days of scheduled flying training with an assigned fighter wing. Day 1 is spent on mission planning which will be utilized for all days of scheduled flying. Days 2 and 3 are fly dates with RONs at the assigned fighter wing for face-to-face debriefs and briefs for the following day's flight. Day 4 is final flying activity, return to Tinker, and mission debrief for the E-3 crew members.

5-6. FLIGHT TRAINING. Flight training is listed by lesson number, nominal time for completion, type of aircraft required and a concise narrative of content. Criterion objectives for each mission are provided to the student in the student study guide. The instructor/student ratio is 1:1.

BLOCK VII

M101 21.5 HOURS
E-3B/C

Student is introduced to mission planning, pre-mission requirements, pre-flight procedures, outbound/inbound operations, communications in an airborne environment, inflight emergency procedures and E-3 refueling (if tanker is available).

M102 21.5 HOURS
E-3B/C

Student becomes more actively involved in mission planning. Student is certified on pre-flight task. New tasks introduced are MCM 3-1 tactics, WD Nav coordination, WD assisted A/R, AWACS Monitor. **NOTE:** Tasks associated with E-3 A/R can only be accomplished if the A/R mission is scheduled.

M103 21.5 HOURS
E-3B/C

Student practices tasks previously introduced to. No new tasks are introduced. Other tasks such as MORF/FCIF, data base check, map preparation, outbound console/comm checkout, WD logs and post flight duties are certified.

M104 21.5 HOURS
E-3B/C

Practice is continued on tasks not previously certified. No new tasks are introduced. Mission research, fact sheet/lessons learned, WD/NAV/AR coordination, handoff/check in, target brief tracking, recovery, AWACS monitor, WD assisted A/R and E-3 refueling procedures are certified.

M105 21.5 HOURS
E-3B/C

Tasks related to MCM 3-1 tactics, crew coordination, communication, safety/TR, overall mission standards, emergency actions and security continue to be practiced. Two tasks: Pilot/WD Brief and E-3 refueling procedures are certified, provided there is an E-3 A/R.

M106 21.5 HOURS
E-3B/C

Tactics and crew coordination are certified. Remaining tasks continue to be practiced. Any deficiencies in tasks previously certified will be noted.

M107 21.5 HOURS
E-3B/C

Final flight before DOV evaluation. Emergency action, safety/TR, security, communication and overall mission standards are evaluated.

M108 21.5 HOURS
E-3B/C

Flight evaluation by Stan/Eval.