AIRCRAFT
ACCIDENT INVESTIGATION BOARD
REPORT

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

VOLUME 4

TABS I thru N

AIRCRAFT
ACCIDENT INVESTIGATION BOARD
REPORT

COPY

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TECHNICAL OR ENGINEERING EVALUATIONS

J-1 UH-60 Black Hawk 88-26060

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J-5 F-15C 84-0025

TAB J-1

UH-60 BLACK HAWK 88-26060

0 4 MAY 1994

AMSEL-RD-NV-SE-EWD (SFAE-AV-AEC/25 Apr 1994) (70-1r) 1st End
Mr. R. Paolella and Ms. P. Lum/x44697 and x43211
SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

Director, Survivability Equipment Division

FOR PM-AEC, ATTN: SFAE-AV-AEC, 4300 Goodfellow Blvd. St. Louis, MO 63120-1798

1. A damaged ALQ-144 jammer was handcarried from PM-AEC St. Louis, MO to Survivability Equipment Division, Fort Monmouoh, NJ by Mr. Q. Rodriguez via DA Form 4137 to perform a failure analysis of the damaged equipment with certification by the participants.

2. Prior to performing any failure analysis photographs of the damaged "ALQ-144" was taken. As shown in the photos, the so called damaged system is not a damaged system but a **destroyed** subsupport assembly, which is part of the transmitter, T-1360A/ALQ-144A, a major component of the AN/ALQ-144A. The analysis was performed and the following damage assessment is being provided:

a. The subassembly and the remaining attached parts, motors, encoder discs, start relay EMI filter, harnesses, lower portions of source, and modulators were burnt to the extent that a failure analysis could not be made other than what was observed.

b. The subassembly was definitely part of AN/ALQ-144A. The lower portions of the infrared source, the low and high speed modulators and by the part numbers verified the A configuration, verified by the photos.

c. There were no particles, pieces and/or parts of the low speed modulator lens and of the outer window assembly which in essence is glass (silicon), was to be found with the remanence submitted.

d. There was no card cage which housed the 4 major circuit card assemblies (cca) (which included reprogrammable cca, A9) and the Estimated Time Indicator, even though the motors, filter, etc. were still intact. The cage screws were sheared and only the small bracket was remaining which seemed odd.

e. There was no bottom cover and any parts there of for analysis. No attachment screws inspection doors nameplates, etc.

f. There was no operator control unit.

g. The subassembly was disassembled and photos were taken of the components.

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

AMSEL-RD-NV-SE-EWD (SFAE-AV-AEC/25 Apr 1994) (70-1r) 1st End
Mr. R. Paolella and Ms. P. Lum/x44697 and x43211
SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

g. The subassembly was disassembled and photos were taken of the components.

3. The analysis was performed and certified by Mr. R. Paolella, Ms. P. Lum, Mr. H. Oshel and SGT A. Conlin, NV&ES Directorate.

4. The POCs for this action are Mr. R. Paolella and Ms P. Lum.

5. CECOM Bottom Line: THE SOLDIER.

Laurence P. DeCosimo

for ROBERT W. AUMUELLER
Director
Survivability Equipment Division

TAB J-1

UH-60 BLACK HAWK 88-26060

J-1a Failure Analysis, ALQ-144

J-1b Failure Analysis, APR-39(V)

J-1c Failure Analysis, ARC-164 J-1a

J-1d Failure Analysis, KIT-1C

J-1e Failure Analysis, AN/APX-100 J-1b

J-1f Memorandum, Have Quick I Capability

J-1g Failure Analysis, KYK-13

DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY COMMUNICATIONS-ELECTRONICS COMMAND
RESEARCH, DEVELOPMENT & ENGINEERING CENTER
NIGHT VISION & ELECTRONIC SENSORS DIRECTORATE
FORT MONMOUTH, NEW JERSEY 07703-5206

REPLY TO ATTENTION OF

12 MAY 1994

AMSEL-RD-NV-SE-RFCM (70-1r)

MEMORANDUM FOR Commander, PM-AEC, ATTN: SFAE-AV-AEC (Col. Thomas E. Reinkober) 4300 Goodfellow Blvd., St. Louis, MO 63120-1798

SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

1. The failure investigation on the CP-1597/APR-39(V) Digital Processor from Aircraft Tail Number 88-26060 has been completed. Due to the severe condition of the processor, operation could not be verified. The report notebook with photographic illustrations is available upon request. A brief summary outlining the plan of action is provided below.

2. The unit from aircraft tail number 60 was carefully dismantled and key component (i.e. ultraviolet Programmable Read Only Memory (UVPROMs) and Electronically Erasable Programmable Read Only Memory (EEPROMs)) integrated circuits (ICs) were extracted. This operation was performed in a different manner from that of the processor in aircraft tail number 87-26000, in attempt to determine the Operational Flight Program (OFP) and Emitter Identification Data (EID) Software versions of the processor.

3. Due to the condition of the processor caused by intense heat the PROMs were fused to each of their respective circuit card assemblies. Extrication from the processor was performed by physically prying the fused ICs from the CCA, in lieu cutting the pins on each IC.

4. In order to read the contents of memory of each IC, the chips were directly placed on the appropriate DATA I/O external interface adaptor. The DATA I/O was interfaced remotely with a Personal Computer (PC) loaded with PROMLINK Software.

5. The checksums for two programmable devices on CCA A5 (U2 and U12) were successfully recovered. Based on the recovered checksums matching that of known checksums for OFP 20.9, there is a high degree of probability that the aircraft was equipped with the correct version of operating software for the AN/APR-39A(V)1.

6. Attempts to recover software from the other various PROMS proved to be unsuccessful. The primary cause of failure of the ICs was a direct result of the intense heat which led to the melting of semiconductor/conformal coating materials.

6. Based on shadowing effects as a result of a fire, it can be determined that a label/sticker was located on the User Data Module (UDM) cover at the time of the crash. It is the opinion of the writer that the label was most probably the confidential identification label on the UDM cover.

CERTIFICATE

15 My 94

8

12 MAY 1994

AMSEL-RD-NV-SE-RFCM
SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

7. Based on the OFP version being identified as version 20.9, intersystem operation and known compatibilities between OFP and EID software versions, and the presence of a shadowing effect from a burned confidential label, the EID data programmed in the UDM was most probably EID 018 or 017.

8. For further information please contact Mr. John Reilly, at commercial (908) 544-2917, DSN 995-2917 located at Night Vision & Electronic Sensors Directorate.

9. CECOM Bottom Line: THE SOLDIER.

Lawrence P. DeCosimo
for ROBERT W. AUMUELLER
Director
Survivability Equipment Division

TAB J-1

UH-60 BLACK HAWK 88-26060

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AERONAUTICAL SYSTEMS CENTER (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

26 Apr 94

MEMORANDUM FOR PROJECT MANAGER, AVIATION ELECTRONIC COMBAT
ATTN: COL THOMAS E. REINKOBER
SFAE-AV-AEC
4300 GOODFELLOW BOULEVARD
ST LOUIS MO 63120-1798

FROM: WL/AAAI
2185 Avionics Circle
Wright Patterson AFB OH 45333-7301

SUBJECT: Failure analysis on Crash Damaged Electronic Equipment - INFORMATION MEMORANDUM

1. The subject equipment was picked up from your organization in St Louis MO on 25 Apr 94 and brought to the Navigation and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB OH to perform a failure analysis.

2. On 26 Apr 94 at 0800, technical experts from WL/AAAI, the 4950th Test Wing, and the National Air Intelligence Center (NAIC) had gathered to perform the required failure analysis. Upon opening the sealed package, a charred mass of electronics and melted metal was observed by all. Still pictures and a video were taken during this time. The "equipment" was identified as a RT 1518/ARC 164(v) and an Airborne Intercom Panel, melted together. It was not possible to ascertain the operational mode of the radio since many of the controls had burned/melted away. The hundreds digit of the frequency appears to be set at "2" The remaining digit settings were indeterminate. The toggle switch position on the AIC panel, from left to right, are: up, up, down, up, up, down, and down. Details on the functionality of these switch positions are being pursued. A sketch of the equipment with the relative positioning of the remaining switches/controls, photos, and a copy of the video can be made available upon request.

3. The equipment will be protected in a locked safe until disposition information is received from the Safety Board. If there are additional questions, please contact me at DSN 785-3455 or Ms. Diane Summers on DSN 785-4947.

Franklin Hutson

FRANKLIN T. HUTSON, Chief
Communications Technology Section
System Avionics Division

CERTIFICATE

15 May 94

WILLIAM L. [illegible]
Evidence Custodian
Incirlik Air Base, Turkey

TAB C

4-11

TAB J-1

UH-60 BLACK HAWK 88-26060

J-1a

J-1b

J-1c

J-1d

DEPARTMENT OF THE AIR FORCE
AIR INTELLIGENCE AGENCY

26 Apr 94

MEMORANDUM FOR AVIATION ELECTRONIC COMBAT
ATTN: SFAE-AV-AEC
Commander USACCSLA
ATTN: SELCL-EP
Tobyhanna Army Depot
ATTN: SDSTO-MC

FROM: AFCSC/CV
230 Hall Blvd Ste 126
San Antonio TX 78243-7075

SUBJECT: Analysis of KIT-1C, Serial Number Unknown - INFORMATION MEMORANDUM

1. The condition of the unit precluded any detailed analysis requested by Colonel Reinkober, Project Manager, Aviation Electronic Combat. The logic circuit card was charred and significant components 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).

2. The technical experts considered breaking the box open to determine the extent of the damage to the Power Conditioning Assembly. No value would be added by pursuing it, as the heart of the system is the logic card (E-GFN).

3. No determination could be made as to the condition of the KIT-1C prior to the accident. The unit should have zeroized after loss of power and with the extensive melting of components.

4. We could not determine whether the unit had been turned on at the time of the accident. The system power is controlled at the Control Head (IFF Control Box).

5. The six photographs depict (corresponding numbers on the back of each photo)

#1. Typical KIT-1C with a hand mount (without shock absorbing feet)

#2. Same configuration with KIT-1C installed, battery and fill port covers removed

#3. Same configuration, covers on

#4. Same configuration, side view

26065

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

Encl 12

4/12

#5. Crash unit, KIT-1C in the shock mount, front/side view

#6. Crash unit, side/rear view

6. Points of contact at AFCSC/LMMLC are Mr. Raymond Gamboa or Mr. Harry Frierson, DSN 977-2671/Comm (210)977-2671. The Tobyhanna Army Depot point of contact is SFC Donald McRae, DSN 795-6893/Comm (717) 894-6891.

ROBERT W. JENSEN, Colonel, USAF
Vice Commander

Attachments
1. Pictures

TAB J-1

UH-60 BLACK HAWK 88-26060

SUMMARY OF FINAL ENGINEERING INVESTIGATION REPORT
OF THE
AN/APX-100(V) RECOVERED FROM THE US ARMY UH-60 # 87-26000

A. Summary conclusions: The AN/APX-100(V) at issue has been thoroughly and exhaustively examined for any evidence which could provide an indication of the operational state of the AN/APX-100(V) at the time of the incident under investigation. 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 4 was operational at the time of the incident. An analysis of multiple components of the AN/APX-100(V) concluded that the box was subjected to an electrical overstress event (EOS). The EOS event could have occurred on weapon impact, A/C impact with the ground or during the ensuing fire. Based on the analysis of the physical evidence recovered it is the conclusion of the AN/APX-100(V) engineering investigation team that the AN/APX-100(V) was powered on at the time of the EOS incident. The investigation into the MODE 4 operational state has proven to be inconclusive in proving if MODE 4 was operational at the time of the EOS incident. Some evidence exists that indicates a MODE 4 caution condition was not present at the time of the EOS incident. A MODE 4 caution condition would be present if there were a AN/APX-100(V) MODE 4 hardware failure or if the codes entered into the AN/APX-100 were incompatible with the interrogator codes.

B. Condition as received: see "PRELIMINARY ENGINEERING INVESTIGATION REPORT OF THE AN/APX-100(V) RECOVERED FROM US ARMY UH-60 # 87-26000" dated 4 May 1994, attached hereto.

C. Observations of operational condition: see "PRELIMINARY ENGINEERING INVESTIGATION REPORT OF THE AN/APX-100(V) RECOVERED FROM US ARMY UH-60 # 87-26000" dated 4 May 1994, attached hereto.

D. Expedient repairs performed: see "PRELIMINARY ENGINEERING INVESTIGATION REPORT OF THE AN/APX-100(V) RECOVERED FROM US ARMY UH-60 # 87-26000" dated 4 May 1994, attached hereto.

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 5

To [illegible]	From [illegible]
Dept./Agency	Phone #
519 263-1171	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

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 [illegible] Iraq on 14 April 1994, and that this is a true and accurate copy of the [illegible] is kept in my records system.

23 May 94
Date

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

E. Engineering Report:

E.1. Engineering report of power "on" condition of the AN/APX-100(V) at issue:

Two candidate components of the AN/APX-100(V) power supply and associated circuitry were thoroughly examined for evidence which would provide some indication of the power on status of the AN/APX-100(V) at the time of the incident. These components were:

1. K1 Main power supply relay (located on the chassis)
2. A7-Z1 power supply clamping zener diode

The K1 power supply relay supplies aircraft power to the AN/APX-100(V) A7 power supply assembly. When the master control switch is placed in the "Normal", "Standby", or "Emergency" position, the K1 relay energizes, and +28vdc aircraft power is applied to the A7 power supply via K1 contacts A1-A2. A7-Z1, a 65 vdc zener diode with a 1.5 kilowatt peak power rating, is on the +28vdc line at the input of the A7 power supply and is directly connected to the +28vdc A/C power supplied by the K1 relay A1-A2 contacts. K1-Z1 diode provides a shunt to ground for any excessive voltage transients that may occur on the aircraft +28vdc power supply line. Scanning electron microscopic examination of a cross section of the A7-Z1 diode revealed it had been subjected to a high voltage short duration transient via the +28vdc line. Relay contacts A1-A2 of K1 power supply were removed and examined with a stereomicroscope and scanning electron microscope, and except for some heat damage were relatively unharmed, indicating that these normally open contacts were closed at the time the high voltage transient entered the AN/APX-100. In the closed position (power on) A1-A2 contacts would have provided a path for the transient to the A7-Z1 diode. Had the contacts been open (power off) at the time the transient occurred and the transient arced between these contacts the contacts would have exhibited evidence consistent with the transient arc. As the contacts were normal in appearance it can be safely assumed A1-A2 contacts were closed and therefore power was applied to the AN/APX-100 at the time of the EOS incident. The evidence presented here does not discriminate between the various power on states i.e. "Normal", "Standby", or "Emergency" as the circuit conditions are identical for all three power on states. In light of the recovered AWACS data though, which indicates that the AWACS was tracking the two UH-60 via MODE 2 interrogations, and supported by the physical evidence described herein it appears incontrovertible that the AN/APX-100(V) was powered on in the "Normal" position at the time of the incident under investigation.

E.2 Engineering Report of MODE 4 operational condition of the AN/APX-100(V) at issue.

The AN/APX-100(V) MODE 4 circuits were thoroughly examined via the schematics in an attempt to identify any components which could ascertain the operational state of MODE 4 at the time of the incident.

After an exhaustive search it was determined that there existed no circuitry which could be subjected to investigation that would provide conclusive evidence that MODE 4 was operational at the time of the incident. The only candidate component in the MODE 4 circuitry which could provide some indication of the MODE 4 operation is listed below.

1. A7-K1 MODE 4 caution relay

The focus of the investigation then shifted to A7-K1, the MODE 4 caution relay. Since there was no evidence available to ascertain the operational status of MODE 4 the investigation of MODE 4 focused on determining whether a MODE 4 caution condition existed at the time of the EOS incident. A MODE 4 caution would be present under the following conditions:

a. An AN/APX-100(V) MODE 4 hardware failure would energize A7-K1 and keep it energized for the duration of the mission

b. An invalid interrogation during the mission would momentarily (2.5 seconds) energize A7-K1 to provide a caution light to the A/C advisory panel.

Both of these scenarios assume the MODE 4 "AUDIO", "LIGHT", "OUT" front panel switch was in the "Audio" or "Light" position. In the "OUT" position no MODE 4 cautions would be provided. The results of the engineering investigation into A7-K1 follows. Initial electrical test of the relay indicated the relay was in its normally quiescent state. The normally closed contacts were closed and the normally open contacts were open. The resistance of the normally closed contacts measured less than 5 ohms. The coil windings were shorted. The X1 coil terminal was shorted to the B2 diode lead, most likely because of lead deformation as a result of mechanical damage.
Scanning electron microscope examination of the B2 and A2 leaves of the B2-B3 and A2-A3, the normally closed contact pairs, revealed damage, as a result of the electrical overstress seen throughout the box, that was consistent with the contacts being closed at the time of the incident i.e. no MODE 4 caution existed.

Evidence exists that during the fire the B2-B3 and the A2-A3 contacts were in the normally closed position i.e. no MODE 4 caution existed. Residue resulting from the fire coated the inside of the relay with the exception of the mating surface between the end stop and the relay switch arm. In addition, melted organic material from the interior of the relay flowed into the relay switching mechanism and solidified, holding the relay in its inactive state i.e. no MODE 4 caution existed. There was no evidence which indicated the relay was inoperative due to unrelated failure prior to the incident under investigation.

E.2. Engineering report summary:

It is the conclusion of the AN/APX-100(V) engineering investigation team that the AN/APX-100(V) at issue was powered on at the time of the EOS incident. Though there is no data available that would conclusively

prove that MODE 4 was fully operational, there has been no data recovered that would indicate otherwise. The following is offered in support of our findings.

1. The engineering investigation into the #1 main power supply relay and A7-Z1 zener diode, as discussed herein, provide conclusive physical evidence that power was applied to the AN/APX-100(V) at the time of the incident at issue.

2. The conclusion that power was applied is further supported by recovered ARINC data which indicates the AN/APX-100(V) was providing positive responses to a MODE 2 interrogation at the time of the incident.

3. The investigation into the MODE 4 caution relay provided no indication of a hardware failure or incompatible codes which would have resulted in a MODE 4 caution on the AN/APX-100(V) at the time of the DOB incident. There is no conclusive evidence that would indicate MODE 4 was functional at the time of the incident under investigation.

P. Date of report: 16 May 1994

K.M. Pafford, PMA-209P7
Deputy Program Manager
AN/APX-100(V)

[illegible letterhead]

13220
DP1011N/MS20
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.

2. 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

Copy to:
COMNAVAIRSYSCOM (PMA-209)

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To Col Reinkober	From Fafford
Co.	Co.
Dept.	Phone #
Fax #	Fax #

TOTAL P.01

TAB J-1

UH-60 BLACK HAWK 88-26060

24 May 1994

MEMORANDUM FOR RECORD

SUBJECT: Have Quick I Capability - Aircraft 88-26060 and 87-26000

1. Eagle Flight Detachment maintenance documents were reviewed to determine the Have Quick I communications capability of aircraft 88-26060 and 87-26000 at the time of the accident. Review included the DA Form 2408-17s (Aircraft Inventory Record) pertaining to each aircraft, technical manuals, and input from technical experts.

2. The DA Form 2408-17 pertaining to 88-26060 indicates that the aircraft had a RT-1518/ARC-164(V) UHF-FM radio set. (Atch 1, item 8) The last inventory was conducted on 1 Oct 93. The RT-1518/ARC-164(V) unit is Have Quick II capable. (Atch 2)

3. The DA Form 2408-17 pertaining to 87-26000 indicates that the aircraft had a RT-1167C/ARC-164 UHF-FM radio set. (Atch 5, item 8) The last inventory was conducted on 21 Nov 93. (Atch 3) The RT-1167C/ARC-164 unit is Have Quick I capable. (Atch 4)

Douglas C Sousa

DOUGLAS C. SOUSA
CW4, USA
Board Member

Atch
1 - DA Form 2408-17 (88-26060)
2 - Aviation Electronic Combat memo - Have Quick capabilities
3 - DA Form 2408-17 (87-26000)
4 - Extract from TM 55-1520-237-10

TAB J-1

UH-60 BLACK HAWK 88-26060

1. AREA	2. SERIAL NUMBER	3. AIRCRAFT TYPE	4. PAGE NO.	NO. OF PAGES
COCKPIT	88-26060	UH-60A	1	3

ITEM NO. a	NOMENCLATURE b	QTY REQD c	EQUIPMENT CHECKS d 1	2	3	4	5	6	7	8	9	10	11	12	LOCATION OR REMARKS
1	First Aid Kit - 6545-00-919-6650 ✓	2	2	2	2	2	2	2	2	2	2	2	2		Behind Pilot's & CoPilot's Seat
2	Fire Extinguisher - FR23-4-11848, 4210-00-555-8837 ✓	1	1	1	1	1	1	1	1	1	1	1	1		CoPilot's Seat
3	Barometric Altimeter - AAU-31/A-1 ✓	1	1	1	1	1	1	1	1	1	1	1	1		LH Side Instr. Panel
4	Barometric Altimeter - AAU-32A ✓	1	1	1	1	1	1	1	1	1	1	1	1		RH Side Instr. Panel
5	Crew Seat - D3801-2 ✓	2	2	2	2	2	2	2	2	2	2	2	2		Pilot & CoPilot
6	Aircraft Clock - ABU-11A ✓	2	2	2	2	2	2	2	2	2	2	2	2		LH & RH Side Instr. Panel
7	Receiver/Transmitter - RT-1300/ARC-186(V) ✓	2	2	2	2	2	2	2	2	2	2	2	3		Pilot's Seat Well
8	UHF-FM Radio Set - RT-1518/ARC-164(V) ✓	1	1	1	1	1	1	1	1	1	1	1	1		RH Center Console
9	Interphone Control - C6533/ARC ✓	1	1	1	1	1	[illegible]	1	1	1	1	1	1		LH Center Console
10	Interphone Control - C-6533/ARC ✓	1	1	1	1	1	1	1	1	1	1	1	1		RH Center Console
11	Receiver/Transmitter - RT-1115D/APN-209 ✓	1	1	1	1	1	1	1	1	1	1	1	1		LH Side Instr. Panel
12	Indicator Altimeter - ID-1917C/APN-209 ✓	1	1	1	1	1	1	1	1	1	1	1	1		RH Side Instr. Panel

VERIFY EACH EQUIPMENT CHECK BY ENTERING THE SIGNATURE AND GRADE OF THE PERSON PERFORMING THE INVENTORY.

(1) JUN 22 1988 Sikorsky Aircraft SIKORSKY 1017	(4) [signature] E5 25 AUG 88	(7) [signature] E-5 10 SEP 90	(10)
(2) [signature] 19 Jul 88 E-3	(5) [signature] E4 23 SEP 89	(8) James K. Ewin E7 16 APR 92	(11) [signature] E-6 10 OCT 9[illegible]
(3) [signature] 2662 25 AUG 1988	(6) [signature] E5 4 SEPT 90	(9) [signature] E-5 19 Sep 92	(12)

DA FORM 2408-17, 1 APR 62 AIRCRAFT INVENTORY RECORD (TM 38-750)

EXTRACT

I certify that I am the Records Custodian for the Accident Investigation Bo[ard] convened to investigate the crash of two U.S. Army Black Hawk helicopters in th[e] fly zone in northern Iraq on 14 April 1994, and that this is a true and accurate ext[ract] from *26060 Historical Records which is kept in [the] records system.

21 MAR
Date

[signature]
WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Tur[key]

HQII RT-1518C RT-1505H
HQII T-1518 RT-1505
HQI RT-1167 (C) and RT-1168 (C)
NON-HQ RT-1167 RT-1168

1. These radio sets are basically the same. There are some minor differences required to satisfy Army requirements.

a. The RT-1167 faceplate is of different construction than the RT-1168 faceplate. The RT-1167 faceplate has grommets and a different channel selector switch which enables it to be rain-proof. The RT-1167 actually gets a rain test in the factory. The RT-1168 gets humidity testing only, no rain.

b. The RT-1167 take command is an internal jumper on the flex cable. The RT-1168 brings take command out on two pins for the user to wire. Hence the external hookup and the flex cable are different.

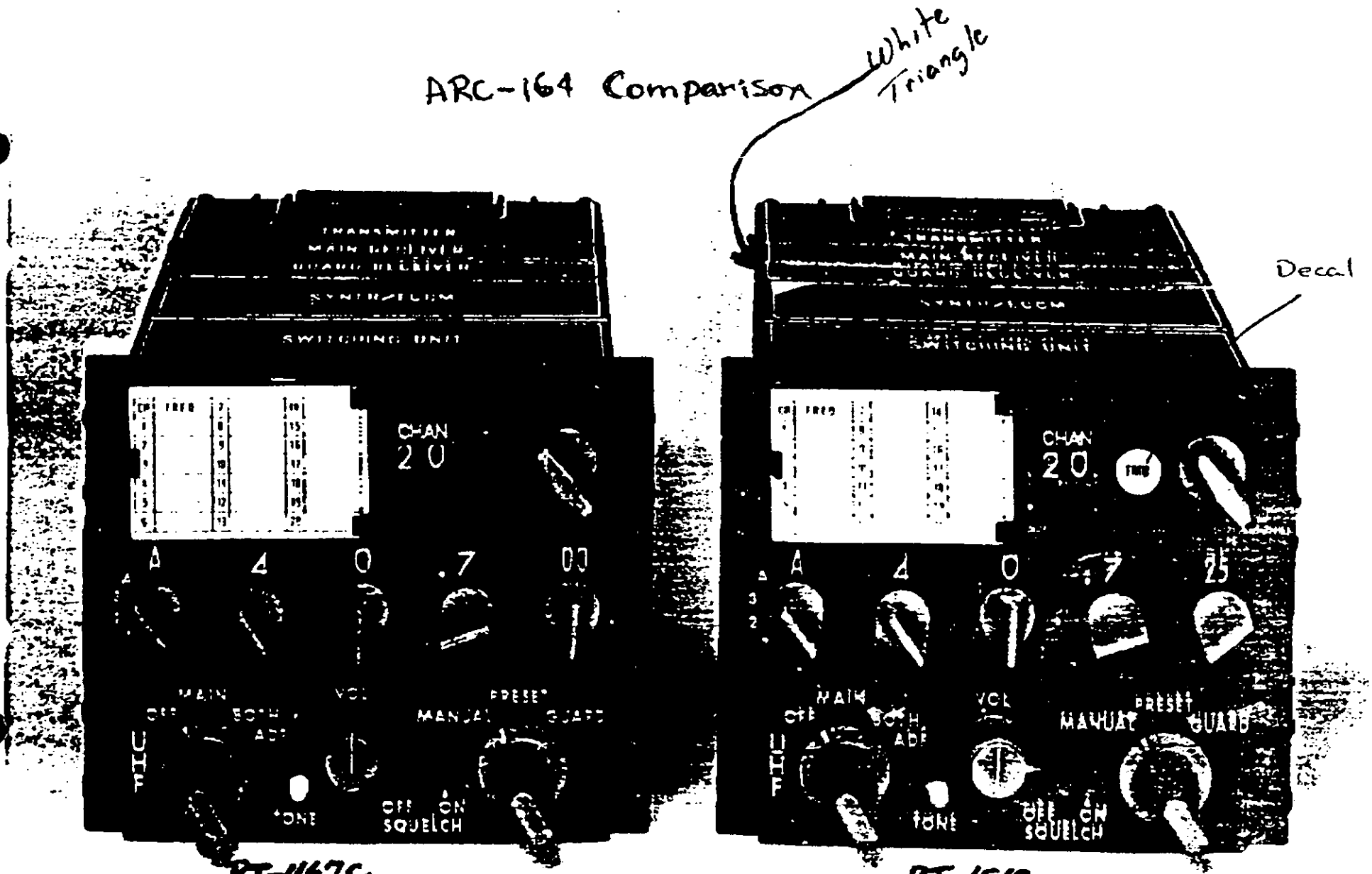
c. The RT-1167 has a different volume control that can't be turned all the way off. That's what the Army wanted.

d. The antenna connector for the RT-1167 is different from the one for the RT-1168. One is TPS and one is TNC, and I never can keep straight which is which. The RT-1167 connector is a 3-nub bayonet, but the RT-1168 connector screws on.

e. The RT-1167 has different audio settings from the RT-1168. These are field adjustments. The RT-1167 is set at 0.39 volts for modulation and 50 milliwattts for receive. The RT-1168 is set at 0.7 volts modulation and 240 milliwatts for receive.

2. Let me know if you need more information. Point of contact is Mr. Chris Cardinal. DSN: 992-5271

ARC-164 Comparison



UNCLASSIFIED

FAX FAX FAX FAX FAX FAX FAX FAX FAX FAX FAX

DATE 24 MAY 1994

OFFICE OF THE PROJECT MANAGER,
AVIATION ELECTRONIC COMBAT
ATTN: SFAE-AV-AEC
4300 GOODFELLOW BLVD
ST. LOUIS, MO 63120-1798
DSN 693-5527 COMM (314) 263-5527
DATAFAX: UNCLAS - DSN 693-1171/1172

TO: CW2 JOHN HALL

PHONE NO: 8-011-49-6371-47-2897

DATAFAX NO: 4-011-49-6371-47-9930

FROM: COL THOMAS E. REINKOBER

PHONE NO: (314) 263-5527

THE FOLLOWING TRANSMISSION CONTAINS 3 PAGES EXCLUSIVE OF THIS HEADER SHEET

UNCLASSIFIED

UNCLASSIFIED

FAX FAX FAX FAX FAX FAX FAX FAX FAX FAX FAX

DATE 19 APRIL1994

OFFICE OF THE PROJECT MANAGER,
AVIATION ELECTRONIC COMBAT
ATTN: SFAE-AV-AEC
4300 GOODFELLOW BLVD
ST. LOUIS, MO 63120-1798
DSN 693-5527 COMM (314) 263-5527
DATAFAX: UNCLAS - DSN 693-1171/1172

TO: CW2 JOHN HALL

PHONE NO:

DATAFAX NO: DSN 676-6061

FROM: COL REINKOBER

PHONE NO: (314) 263-5527

ATTACHED IS A DIAGRAM OF BOTH HAVE QUICK I AND HAVE QUICK II. THE EASIEST WAY TO DISTINGUISH BETWEEN THE TWO HAVE QUICK RADIOS IS ON THE SECOND SLICE, SYNTHESIZER/ECCM MODULE, YOU WILL NOTICE A WHITE TRIANGLE IN THE UPPER LEFT HAND CORNER OF THE SLICE. THE ONLY OTHER WAY YOU CAN DISTINGUISH IS ON THE NAMEPLATE ON THE BACK OF THE RADIO. THE HAVE QUICK I WILL BE RT 1167C/ARC-164; THE HAVE QUICK II WILL BE RT 1518/ARC-164.

COL REINKOBER

THE FOLLOWING TRANSMISSION CONTAINS 1 PAGES EXCLUSIVE OF THIS HEADER SHEET

UNCLASSIFIED

4 of 7

1. AREA	2. SERIAL NUMBER	3. AIRCRAFT TYPE	4. PAGE NO.	NO. OF PAGES
COCKPIT	87-26000	UH-60A	2	6

ITEM NO. a	NOMENCLATURE b	QTY REQD c	EQUIPMENT CHECKS d 1	2	3	4	5	6	7	8	9	10	11	12	LOCATION OR REMARKS
	Receiver/Transmitter - RT-1300/ARC-186(V)	2	2	2	2	2	2	2	2	2	2	2	2		Pilot's Seat Well
8	UHF-FM Radio Set - RT-1167C/ARC-164	1	1	1	1	1	1	1	1	1	1	1	1		RH Center Console
9	Interphone Control - C6533/ARC	1	1	1	1	1	1	1	1	1	1	1	1		LH Center Console
10	Interphone Control - C-6533/ARC	1	1	1	1	1	1	1	1	1	1	1	1		RH Center Console
11	Receiver/Transmitter - RT-1115B/APN-209	1	1	1	1	1	1	1	1	1	1	1	1		LH Side Instr. Panel
12	Indicator Altimeter - ID-1917A/APN-209	1	1	1	1	1	1	1	1	1	1	1	1		RH Side Instr. Panel

VERIFY EACH EQUIPMENT CHECK BY ENTERING THE SIGNATURE AND GRADE OF THE PERSON PERFORMING THE INVENTORY.

(1) SIKORSKY AIRCRAFT 812	(4) 25MAY88	(7) 5MAR91	(10) E-6 13NOV92
(2) 14 JAN 1988	(5) 25MAY88	(8) 5MAR92	(11) 21NOV93
(3) 14 JAN 1988	(6) 14MAR90	(9)	(12)

DA FORM 2408-17, 1 APR 62 — AIRCRAFT INVENTORY RECORD (TM 38-750)

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 #26000 Historical Records which is kept in my records system.

21 MAY 94
Date

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

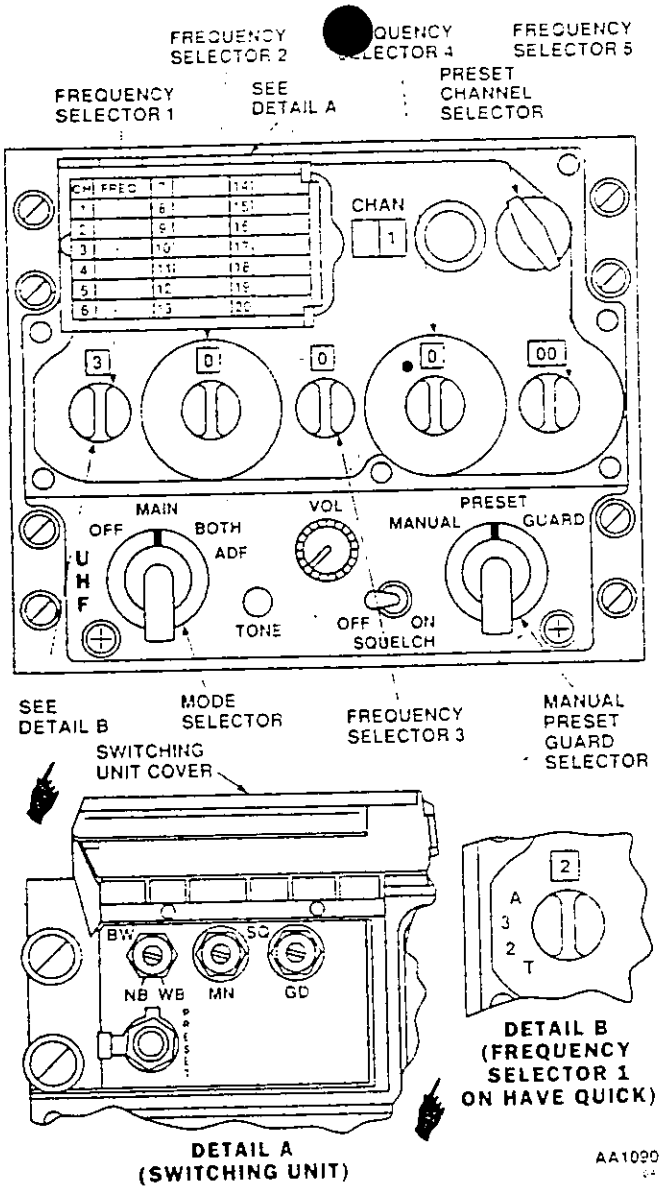


Figure 3-6. UHF Control, AN/ARC-164(V)

3-45. Emergency Mode AM or FM As Applicable.

a. Mode select switch - TR or DF.

b. Frequency mode selector switch - EMER AM or FM as applicable.

3-46. DF (Homing) Mode.

a. Mode select switch - DF.

b. Frequency control select switch - MAN or PRE.

3-47. Retransmission Mode.

Do a retransmission check as follows:

NOTE

Do not disable squelch when retransmit switches are in retransmit position. Squelch level is used to key transmitter for retransmission.

a. Establish two base stations at unrelated frequencies.

b. Set appropriate receiver-transmitter to desired retransmit frequency.

c. Place RADIO TRANSMISSION selector switch to radios to be used.

d. Establish communication between base stations through aircraft radios.

e. Note that selected frequencies are heard loud and clear and that received audio is present and clear at each crew station.

3-48. Stopping Procedure.

Mode Selector OFF.

3-49. Receiver-Transmitter Radio, RT-1167/ARC-164(V).

Receiver-Transmitter Radio, RT-1167/ARC-164(V) (Figure 3-6) is an airborne, ultra-high frequency (UHF), amplitude-modulated (am), radio transmitting-receiving (transceiver) set. It contains a multichannel, electronically tunable main transmitter and receiver, and a fixed-tuned guard receiver. The main transceiver operates on any one of 7,000 channels, spaced in 0.025 MHz units in the 225.000 to 399.975 MHz UHF military band. The guard receiver is tunable in the 238.000 to 248.000 MHz frequency range with crystal replacement and realignment. (Usually 243.000 MHz.) The radio set is primarily used for voice communications. An additional capability for retransmission allows use of the radio set as a relay link. Power to operate the ARC-164(V) radio is from the dc essential bus, through a circuit breaker, marked UHF-AM.

Table 3-1. Communication/navigation equipment (Sheet 1 of 2)

FACILITY	NOMENCLATURE	USE	RANGE	CONTROL LOCATION	REMARKS
Intercommunication	Interphone control C-6533/ARC	Intercommunication between crewmembers and control of navigation and communication radio.	Stations within helicopter	Cockpit lower console, crewchief/gunner's stations, and troop commander's station at center of cabin overhead with handset	
FM communications (If installed) UH	Radio set AN/ARC-114A VHF-FM No. 1	Two-way voice communications; FM and continuous-wave homing frequency range 30 through 75.95 MHz	*Line of sight	Lower console	FM NO. 1 transmitter may be used only in helicopters serial No. 79-23273 and subsequent and those helicopters modified by MOD 99-122 and 99-122-1.
FM communications (If installed) UH	Radio Set AN/ARC-114A VHF-FM No. 2	Same as No. 1 VHF-FM, except no homing is provided	-	Lower console	
VHF communications (If installed) UH	Radio Set AN/ARC-115A VHF-AM	Two-way voice communications in the frequency range of 116.000 through 149.975 MHz	*Line of sight	Lower console	Radio Set AN/ARC-115 may be installed on some helicopters
VHF AM and FM communications (If installed)	Radio Set AN/ARC-186(V) VHF-AM/FM	Two-way voice communications in the freq range 30.0 through 87.979 and 116.0 through 151.975. 108.0 through 115.975 receive only.	*Line of sight	Lower console UH ECM operator's station EH	VHF-FM No. 2 Provisional.
UHF communications	Radio-Transmitter Radio, RT-1167/ARC-164(V) UHF-AM	Two-way voice communications in the frequency range of 225.000 to 399.975 MHz	*Line of sight	Lower console UH DF operator's station EH	
	Radio, RT-1167C/ARC-164(V) UHF-AM	HAVE QUICK		Lower console UH	
Tunable diplexer EH	TD-1336/A	Allows narrow band use of guard channel		Beneath seat of copilot	

CERTIFICATION OF EXTRACT
I reviewed TM 55-1520-237-10
From that source document, I extracted the information contained in this extract. I certify the information contained herein is a true and accurate extract of that source document.
Douglas C Sousa
Signature
20 MAY 94 Douglas C Sousa / Accident Board
Date Name/Organization/Section

c. Turn preset channel selector switch to desired channel number.

d. Press and release PRESET switch.

e. Using a soft lead (erasable) pencil, record frequency selected for channel number used on card on front panel.

3-58. Retransmit.

Retransmission permits the helicopter to be used as an airborne relay link. To operate as a relay unit, additional installed equipment must be used (Figure 3-8).

a. Frequency - Select.

b. RADIO TRANSMISSION selector switch - Set to radio sets to be used.

c. Establish communication between each relay radio in helicopter and its counterpart radio link terminal station by using appropriate ICS TRANS selector.

3-59. Guard (Emergency) Operation.

a. MANUAL-PRESET-GUARD switch to GUARD.

b. ICS transmitter selector - Position 2.

c. Radio push-to-talk switch on cyclic stick or foot-operated push-to-talk switch - Press to talk.

3-60. Stopping Procedure.

Mode Selector - OFF.

3-60.1. Receiver-Transmitter Radio, RT-1167C/ARC-164(V).

Receiver-Transmitter Radio RT-1167C/ARC-164(V) (Figure 3-6) has the same functions and capabilities as the RT-1167/ARC-164(V) plus a HAVE QUICK mode of operation. Have QUICK is an antijamming mode which uses a frequency hopping scheme to change channels many times per second. Because the HQ mode depends on a precise time-of-day, both HQ radios must have synchronized clocks.

3-60.2. HAVE QUICK (HQ) System.

The HQ system provides a jam resistant capability through a frequency hopping technique. Frequency hopping is a technique in which the frequency being used for a given channel is automatically changed at some rate common to the transmitter and receiver. The jam resistance of the system is due to the automatic frequency changing and the pseudorandom pattern of frequencies used. In order to defeat this communications system, the jammer must find the frequency being used, jam it and then predict or find the next frequency. The HAVE QUICK modification adds the frequency hopping capability, yet it does not remove any of the previous capabilities of the radio. The HQ modified radios retain the standard, single frequency UHF voice mode of operations. This is referred to as the normal mode, while frequency hopping operation is called the anti-jam (AJ) mode. Several ingredients are necessary for successful system operations. These are:

a. Common frequency.

b. Time synchronization.

c. Common hopping pattern and rate.

d. Common net number.

The common frequencies have been programmed into all HQ radios. Time synchronization is provided via UHF radio and/or hardware by external time distribution system. A time-of-day (TOD) signal must be received from the time distribution system for each time the radio is turned on. The hopping pattern and hopping rate are determined by the operator inserted word-of-day (WOD). The WOD is a multi-digit code, common worldwide to all HAVE QUICK users. In the AJ mode, a communications channel is defined by a net number instead of a signal frequency as in the normal mode. Before operating in the AJ mode, the radio must be primed. This consists of setting the WOD, TOD, and net number. The AJ mode is then selected by placing the A-3-2-T knob to A.

3-60.3. A-3-2-T Knob (HQ Only).

a. A- Selects AJ mode (Figure 3-6).

b. 3- Allows manual selection of frequencies.

CERTIFICATION OF EXTRACT

I reviewed TM 55-1520-232-10. From that source document, I extracted the information contained in this extract. I certify the information contained herein is a true and accurate extract of that source document.

Douglas C Sousa
Signature

20 MAY 94 — DOUGLAS C SOUSA / Accident Board
Date — Name/Organization/Section

Table 3-1. Communication/navigation equipment (Sheet 2A of 2)

FACILITY	NOMEN-CLATURE	USE	RANGE	CONTROL LOCATION	REMARKS
Absolute altimeter	Radar Altimeter AN/ APN-209	Measures absolute altitude	0 to 1500 feet	Instrument panel	

NOTES

*Range of transmission of reception depends upon many variables including weather conditions, time of day, operating frequency, power of transmitter and altitude of the helicopter.

CERTIFICATION OF EXTRACT

I reviewed TM 55-1520-237-10
From that source document, I extracted the information contained in this extract. I certify the information contained herein is a true and accurate extract of that source document.

Douglas C Sousa
Signature

21 MAY 94 Douglas C Sousa / Accident Board
Date Name Organization Section

TAB J

TECHNICAL OR ENGINEERING EVALUATIONS

DEPARTMENT OF THE ARMY
TOBYHANNA ARMY DEPOT
11 MILITARY ROAD
TOBYHANNA, PENNSYLVANIA
18466-5110

REPLY TO ATTENTION OF

SDSTO-MS-T

23 May 1994

MEMORANDUM FOR Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798

SUBJECT: Analysis of Electronic Transfer Device, KYK-13

1. Two Electronic Transfer Devices, KYK-13s, Serial Numbers 20447 and 38971 were received for testing. Each KYK-13 was initially inspected to determine if key was stored in fill locations. Results of test are as follows:

SERIAL NUMBER	20447		38971	
FILL POSITION	RESULTS	LABELED	RESULTS	LABELED
1	KEY	10 MAY	KEY	10 MAY
2	NONE	BLANK	KEY	14A
3	NONE	BLANK	KEY	14B
4	KEY	14A	KEY	15A
5	KEY	14B	KEY	15B
6	KEY	KEK	KEY	KEK

2. A test position was set up using two Communication Security Equipment, TSEC/KY-58 and one Back-to-Back Test Set, ST-44. Key from POSITION 1 of KYK-13, Serial Number 20447 was loaded into the test position KY-58s and communications were established. This procedure was followed using the key stored in each position of both KYK-13s, obtaining the same results. Key from Position 1 of KYK-13, Serial Number 12447 was loaded in one KY-58 and key form Position 1 of KYK-13, Serial Number 38971 was loaded into the other KY-58 and communications were established. This procedure of loading one KY-58 with key from corresponding positions of one KYK-13 to other KYK-13 was performed with communications only being established, using keys from Position 6. Based on the above test, the two Electronic Transfer Devices, KYK-13s are operational and perform without malfunction.

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.

24 May 94
Date

LAURA A. ELLIS, SFC, USAF
Evidence Custodian, Incirlik Air Base, Turkey

SDSTO-NC-F
SUBJECT: Analysis of Electronic Transfer Device, RMR-13

3. Points of contact at Tobyhanna Army Depot are Mr. Ray D. Meyer and SFC Donald McRae, DSN 795-6880/6891 or Commercial (717) 894-6880/6891.

FOR THE COMMANDER:

R. GRANT REPPERT
LTC, OD
Director of Maintenance

4-56

TAB J-2

UH-60 BLACK HAWK 87-26000

J-2a Failure Analysis, ALQ-144

J-2b Failure Analysis, APR-39(V)

J-2c Failure Analysis, ARC-164

J-2d Failure Analysis, KY-58

J-2e Failure Analysis, AN/APX-100

J-2f Failure Analysis, ARC-186

J-2g Failure Analysis, KYK-13

(See Tab J-1g)

J-2a

. 2-144 -26000

Faxed 5/24/94

AMSEL-RD-NV-SE-EWD (70-1r) 23 MAY 1994

MEMORANDUM FOR Project Manager, Aviation Electronic Combat, ATTN: SFAE-AV-AEC-LM, LTC D. Brinson, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798

SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

1. References

a. Your letter, 25 April 1994, SAB, requesting a certification of the failure analysis of subject equipment was made.

b. Ist Endorsement to your letter, ref. 1.a, 11 May 1994, SAB.

b. Second crash damaged AN/ALQ-144A, hand carried from PM-AEC to NVES Directorate, 13 May 1994, for failure analysis.

2. This is to inform you that upon receipt of the second damaged AN/ALQ-144A, (which was actaully a transmitter and not an IRCM) the visual observation indicated that the assembly, T-1360A/ALQ-144A, was mainly intact, but was extremely burnt , damaged and destroyed to the extent that a failure analysis could not be determined and/or made without a complete system. The photgraphs taken of the the transmitter verified this conclusion, see enclosed photographs.

3. Since a failure analysis could not be made, a damaged assessment was performed on the assembly and also, on some of the major and critical individual components after it was disassembled. Enclosed is the damaged reports with photographs for your review and retention.

4. The assessment was performed and certified by Mr. R. Paolella, Ms. P. Lum and Mr. H. Oshel, NVES Directorate, X44697, x43211 and x44015, respectively, and that the reported reflects the actual damages found.

5. The POCs for this action are Mr. R. Paolella, and Ms. P. Lum.

6. CECOM Bottom Line: THE SOLDIER.

Encl

ROBERT W. AUMUELLER
Director
Survivability Equipment Division

REPLACEMENT OF ACCESS DOORS AND COVER (Continued)

INSTALLATION

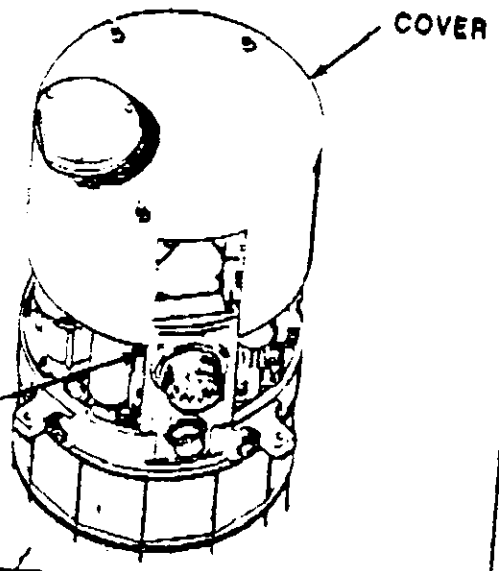
1 Replace the cover

- With the connector filter facing you, place the cover above the transmitter so the cover slot is above the connector/filter

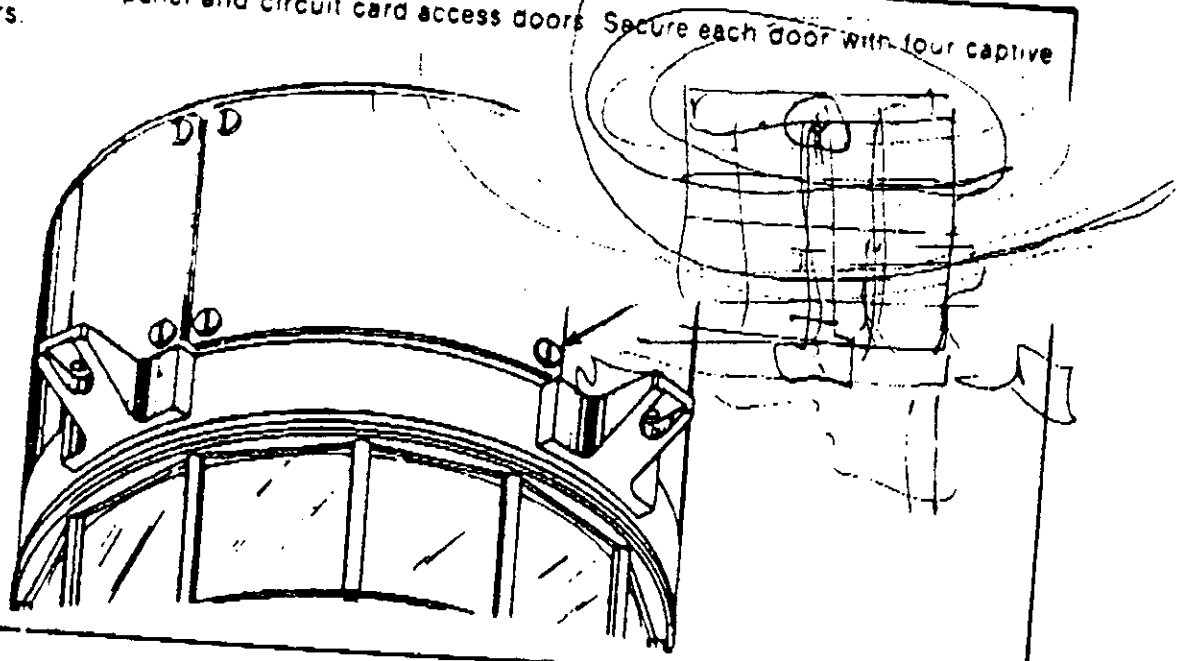
CAUTION

Ensure cover is properly seated to base assembly. Unseated cover will cause system overheating.

- Install the cover on the transmitter
- Tighten the three fasteners by turning them clockwise



2 Install the fault isolation panel and circuit card access doors. Secure each door with four captive 1/4-turn fasteners.



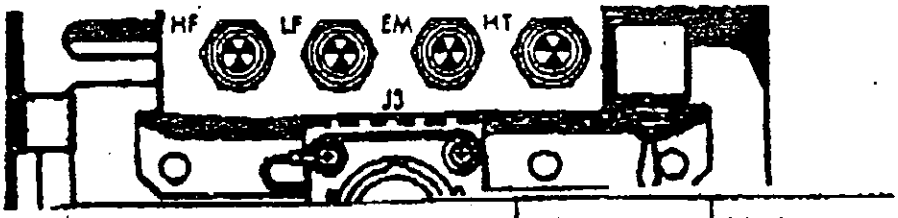
3 Turn the transmitter over and reinstall it on the mounting posts. Then reinstall the source and upper source contact assembly (paragraph 4-10).

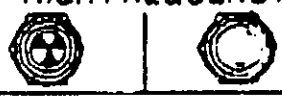
DAMAGE ASSESSMENT REPORT ON AN/ALQ-144A

TRANSMITTER, T-1360A/ALQ-144A

1. Background: The "damaged" transmitter was received 13 May 1994, from PM-AEC, With AF Form 52, dated 17 Apr 94, Tag No. 711, Site # 1, AC # 87-26000, and stating ALQ-144 (V) IRCM. From the transmitter nameplate the serial number was #980CC, a major component of the AN/ALQ-144A(V)1. The records showed that it was a spare transmitter built new by Lockheed Sanders, Inc. for CECOM spare requirements under contract no. DAAB07-89-C-S018. It was then delivered and shipped to A stock not as a system but as a CECOM asset at Tobyhanna Army Depot, PA 27 Aug 1992. At the time of shipment the Estimated Time Indicator had 26 hours of burn-in time.

2. The only component of the AN/ALQ-144(V) IRCM that was delivered to NV&ES Directorate was the transmitter assembly, for failure analysis. The other major components ,such as the operator control unit (OCU), and transit/carrying cases, were not delivered. The transmitter was so badly burnt and damaged, even though intact, that a failure analysis could not be made other than to say that with all the 4 Built In Test (BIT) indicators not tripped (normal operation), meant that the system experienced an instantaneous total failure of electrical power or the system may not have been turned on. This could only be verified by the position of the ON/OFF switch of the OCU which was not available and also by the setting of the IRCM circuit breakers located in the A/C cockpit. See the photo of BIT indicators of the transmitter upon receipt and the BIT functions NORMAL versus FAILURE shown below:



Indicator	Function	Normal	Malfunction
HF	Indicates whether the high frequency modulator is operating properly.	HIGH FREQUENCY 	
LF	Indicates whether the low frequency modulator is operating properly.	LOW FREQUENCY 	
EM	Indicates whether the source temperature is within the proper range.	EMISSION 	
HT	Indicates whether the transmitter operating temperature is within the proper range.	HIGH TEMPERATURE 	

2. The lower protective cover had a pierced hole about .720 inches in diameter. When traced through another hole was found, 630 inches in diameter, in the fan motor outer duct damaging the EMI filter of the motor. Some sort of projectile ripped through the cover and stopped at the motor. No fragments were found. See photo's.

3. All circuit card assemblies (CCA), A6, A7, A8, and A9, were badly burnt. The basic material started to disintegrate. The thumb wheel to reprogram the jam programs was totally destroyed and melted beyond recognition. It could not be determined what jam program was set. The card cage assembly was covered with a thick, (about 1/16 inches) of black residue, tar like looking material. The high/low speed motors, relay and EMI filter were also coated with this material. Nothing was coated externally, however, when the cover was removed the inside of the cover and the components were all coated. No chemical analysis was made of the coating. See photo.

4. Low speed modulator lens were totally destroyed. No lens pieces were found. The upper and lower bearing assemblies were intact. Bearings rotated and were not seized. The alignment pins on the upper bearing were sheared and one on the lower was also sheared. Such a condition could affect the torque of the motor causing the system to INOP and the Low Freq. BIT to trip, if the system was operating. See photo's.

5. High speed modulator slotted assembly was distorted and a few sections were broken off. The bearing package looked good and both bearings rotated freely. See photo's.

6. Outer window assembly support rods were broken and distorted in the same direction as though something that was rotating hit the assembly. There were no scrape marks on the top support plate. If scrape marks were present they indicate that the rotors are negative pitched when striking the support plate. Again, no pieces of any of the panes were found.

7. Two end extremes of the IR source with two broken pieces of the outer envelop were the only parts remaining of the assembly. See photo's.

8. Considering the damage caused by the crash and fire, the heat sink was still intact. The Estimated Time Indicator was so burnt that operating hours could not be determined. No further disassembling was necessary. See photo's.

9. The transmitter will be repacked and returned to PM-AEC, St. Louis, MO NLT 31 May 1994.

TAB J-2

UH-60 BLACK HAWK 87-26000

J-2a Failure Analysis, ALQ-144

J-2b Failure Analysis, APR-39(V)

J-2c Failure Analysis, ARC-164

J-2d Failure Analysis, KY-58

J-2e Failure Analysis, AN/APX-100

J-2f Failure Analysis, ARC-186

J-2g Failure Analysis, KYK-13

(See Tab J-1g)

J-2a

J-2b

~~FOR OFFICIAL USE ONLY~~

DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY COMMUNICATIONS-ELECTRONICS COMMAND
RESEARCH, DEVELOPMENT & ENGINEERING CENTER
NIGHT VISION & ELECTRONIC SENSORS DIRECTORATE
FORT MONMOUTH, NEW JERSEY 07703-5206

REPLY TO
ATTENTION OF

AMSEL-RD-NV-SE-RFCM (70-1r)

0 [illegible] 1994

MEMORANDUM FOR Commander, PM-AEC, ATTN: SFAE-AV-AEC (Col. Thomas E. Reinkober)
4300 Goodfellow Blvd., St. Louis, MO 63120-1798

SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

1. The failure analysis on one (1) of the two CP-1597/APR-39(V) Digital Processors forwarded for investigation has been completed. Due to the severe condition of the processors, operation could not be verified. The report notebook with photographic illustrations is available upon request. A brief summary outlining the plan of action is provided below.

2. The unit from aircraft tail number 00 was carefully dismantled and key component (i.e. ultraviolet Programmable Read Only Memory (UVPROMs) and Electronically Erasable Programmable Read Only Memory (EEPROMs)) integrated circuits (ICs) were extracted. This operation was performed in an attempt to determine the Operational Flight Program (OFP) and Emitter Identification Data (EID) Software versions of the processor.

3. Due to the condition of the processor caused by intense heat the PROMs were fused to each of their respective circuit card assemblies. Extrication from the CCA was performed by cutting the pins on each IC.

4. In order to read the contents of memory of each IC, an interconnection device was fabricated to interface the chips with a DATA I/O. The DATA I/O was interfaced remotely with a Personnel Computer (PC) loaded with PROMLINK Software.

5. Each attempt to recover software from the various PROMS was unsuccessful. The primary cause of failure of the ICs was a direct result of the intense heat which led to the melting of semiconductor/conformal coating materials.

6. Based on shadowing effects as a result of a fire, it can be determined that a label/sticker was located on the User Data Module (UDM) cover at the time of the crash. It is the opinion of the writer that the label was most probably the confidential identification label on the UDM cover.

7. Based on the condition of the first processor, recovery of software on the second processor appears slim. It is requested that further direction be given to determine course of action of the second processor.

~~FOR OFFICIAL USE ONLY~~

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

02 MAY 1994

AMSEL-RD-NV-SE-RFCM
SUBJECT: Failure Analysis on Crash Damaged Electronic Equipment

8. The POC at this activity is Mr. John Reilly, X42917, Night Vision & Electronic Sensors Directorate.

9. CECOM Bottom Line: THE SOLDIER.

ROBERT W. AUMUELLER
Director
Survivability Equipment Division

TAB J-2

UH-60 BLACK HAWK 87-26000

J-2a

J-2b

J-2c

DEPARTMENT OF THE AIR FORCE

WRIGHT LABORATORY (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

3 May 94

MEMORANDUM FOR PROJECT MANAGER, AVIATION ELECTRONIC COMBAT
ATTN: COL THOMAS E. REINKOBER
SFAE-AV-AEC
4300 GOODFELLOW BOULEVARD
ST LOUIS MO 63120-1798

FROM: WL/AAAI
2185 Avionics Circle
Wright Patterson AFB OH 45433-7301

SUBJECT: Failure Analysis on Second Crash Damaged Electronic Equipment - INFORMATION MEMORANDUM

1. The subject equipment was picked up from your organization in St Louis MO on 2 May 94 by Mr. Frank Hutson and brought to the Navigation and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB OH to perform a failure analysis.

2. On 3 May 94 at 0800, technical experts from the National Air Intelligence Center (NAIC), the 4950th Test Wing, and WL/AAAI had gathered to perform the requested analysis. Upon opening the container, a charred mass of electronics and melted metal was observed by all. Still pictures and a video were taken during this time. The equipment was identified as an RT 1167B/ARC-164(V) (i.e., UHF-only radio), an interphone box associated with the RT, and a standalone interphone box.

The front panel control settings and discernable characteristics of the RT 1167B/ARC-164(V) were observed:

a.	Frequency	= 247.200
b.	Preset	= 16
c.	Mode	= Both
d.	Volume	= unknown
e.	Squelch	= unknown
f.	Manual Squelch Pot	= horizontal setting
g.	Guard Squelch Pot	= horizontal setting

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

RECEIVED 5/2/94
TAB A

h. Load Switch = unknown
i. Bandwidth Pot = unknown
j. Synthesizer Module Serial No = SN 18479

The front panel control settings and discernable characteristics of the interphone box associated with the RT were observed:

a. Monitor Switch 1 = on
b. Monitor Switch 2 = off
c. Monitor Switch 3 = on
d. Monitor Switch 4 = on
e. Monitor Switch 5 = unknown (float condition; maybe off)
f. Aux Switch = unknown (float condition; maybe off)
g. Nav Switch = on
h. Volume = mid way
i. Transmitter Selector = unknown
j. Hot Mic = off
k. ID Plate Serial No = SN 2053

The front panel control settings and discernable characteristics of the standalone interphone box were observed:

a. Monitor Switch 1 = on
b. Monitor Switch 2 = off (sheared)
c. Monitor Switch 3 = on
d. Monitor Switch 4 = on (sheared)
e. Monitor Switch 5 = on (sheared)
f. Aux Switch = on
g. Nav Switch = on (sheared)
h. Volume = unknown
i. Transmitter Selector = #1
j. Hot Mic = off
k. National Stock No = 5821008717263 (RX/TX Subassembly)
l. National Stock No = 5821008797579 (Plate, Panel Assembly)
m. Appears the face plate was removed prior to this inspection--screws on each side of the face plate were missing

3. A sketch of the equipment, photos, and video can be made available upon request. The equipment will be protected in a locked safe until disposition information is received from the Safety Board. If there are additional questions, please contact the undersigned at DSN 785-2766 or Ms. Diane Summers at DSN 785-4947.

Denice S. Jacobs

DENICE S. JACOBS, Chief
CNI Concepts Exploration Section
System Avionics Division

TAB J-2

UH-60 BLACK HAWK 87-26000

DEPARTMENT OF THE ARMY
TOBYHANNA army DEPOT
11 MIDWAY ROAD
TOBYHANNA, PENNSYLVANIA
18466-5110

REPLY TO ATTENTION OF

SDSTO-MC-T

16 May 1994

MEMORANDUM FOR Project Manager, Aviation Electronic Combat
ATTN: SFAE-AV-AEC, 4300 Goodfellow Boulevard,
St. Louis, MO 63120-1798

SUBJECT: Analysis of Material from Crash Site

1. On initial inspection of material it was identified as the following:

a. Two each Communication Security Equipment TSEC/KY-58 units mounted with an Interface Adapter Z-AHQ (Exhibit A and B) which are used for secure radio communication.

b. One each Remote Control Unit (RCU) Z-AHP (Exhibit C) which is used to remote the front panel controls of the KY-58.

2. The condition of the units precluded detailed testing using the Automatic Test Equipment ST 58. All circuit cards were charred and there was significant melting of components.

3. An analysis was made on all switch settings for each exhibit.

Exhibit A: KY-58

FILL Switch: Position 1 (switch was bent & would not turn).

MODE Switch: C (Cipher) position.

VOLUME Switch: Broken and would not turn.

OFF/ON/TD (Time Delay) Switch: TD (Time Delay) and shaft was missing.

AUDIO IN Switch: Turned fully clockwise (maximum) position.

Z-AHQ

DIPHASE BASEBAND: BBV (Baseband VINSON)

FILTER Switch: OUT position.

20 May 94

SDSTO-MC-T
SUBJECT: Analysis of Material from Crash Site

PTT (Push-to-Talk): Burned out.

REMOTE/LOCAL Switch: In the REM (Remote) position.

Exhibit B: KY-58

FILL Switch: Missing

MODE Switch: P (Plain Text)

VOLUME Control: Can not turn.

OFF/ON/TD (Time Delay) Switch: Can not turn.

AUDIO IN Switch: Fully clockwise (maximum) position.

Z-AHP

BASEBAND Diphase Switch: DPV (Diphase VINSON)

FILTER Switch: OUT position.

PTT (Push to Talk) Switch: Burned out.

REMOTE/LOCAL Switch: REM (Remote) position.

Exhibit C: Remote Control Unit Z-AHP

MODE Switch: OP (Operate) position.

PLAIN/CIPHER Switch: C/RAD (Cipher/Radio) position with PLAIN blocked.

DELAY Switch: Down (Delay OFF) position.

FILL Switch: Position 2.

POWER Switch: OFF position (down).

ZEROIZE Switch: Down with cover closed (Non-Zeroize) position.

4. Visual examination of the Remote Control Unit Z-AHP (Exhibit C), power switch, found it in the OFF (down) position with its handle broken (sheared) off. On a operational Z-AHP, one must pull on the power switch handle (unlocking it) before moving it form the OFF to the ON position or from the ON to the OFF position. Once it has been

SDSTO-MC-T
SUBJECT: Analysis of Material from Crash Site

moved to ON or OFF it is locked into those positions when the switch handle is released. A test was performed on a Z-AHP (Exhibit D) by striking the POWER switch with a hammer, while it was in the locked ON position. The force of the blow caused the switch lever to be forced to the OFF position and bending it. No conclusion could be made by this test if the POWER switch on Exhibit C was in the ON position before it was damaged.

5. The enclosed photographs depict the following:

Photo #1: Front view of typical KY-58 with Z-AHQ Configuration.

Photo #2: Side view of typical KY-58 with Z-AHQ Configuration

Photo #3: Front view of Z-AHP (Remote Control Unit).

Photo #4: Rear view of Speech Security Equipment TSEC/KY-58.

Photo #5: Front view of Interface Adapter Assembly Z-AHQ.

Photo #6: Exhibit A, Speech Security Equipment TSEC/KY-58 and Interface Adapter Assembly Z-AHQ from crash site.

Photo #7: Exhibit B, Speech Security Equipment TSEC/KY-58 and Interface Adapter Assembly Z-AHQ from crash site.

Photo #8: Exhibit C, Remote Control Unit Z-AHP from crash site. Pointer, pointing to show power switch.

Photo #9: Exhibit D, Remote Control Unit Z-AHP used to determine if power switch can be force to off position. Pointer, pointing to the power switch.

6. Points of contact at Tobyhanna Army Depot are Mr. Ray D. Meyer and SFC Donald McRae, DSN 795-6880/6891 or Commercial (717) 894-6880/6891.

FOR THE COMMANDER

9 Encls

for R. GRANT REPPERT
LTC, OD
Director of Maintenance

TAB J-2

UH-60 BLACK HAWK 87-26000

PRELIMINARY ENGINEERING INVESTIGATION REPORT
OF THE
AN/APX-100(V) RECOVERED FROM US ARMY UH-60 # 87-26000

A. Summary of Investigation to Date: After 600 manhours of intensive engineering investigation at Naval Air Warfare Center, Aircraft Division, Indianapolis from 27 April 1994 through 4 May 1994 the AN/APX-100(V) engineering investigation team has been unable to arrive at any conclusions on the operational state of the subject AN/APX-100(V) at the time of the incident under investigation. Because of some unexplained component anomalies observed the investigation is continuing at the component and microcircuit level to ascertain whether or not components of the AN/APX-100(V) were on at the time of the incident. A synopsis of the our investigation to date is provided below.

B. Condition as received:
On 25 April 1994, Mr. Ken Fafford, Code PMA-209P7, Deputy Program Manager for the AN/APX-100(V), took custody of an AN/APX-100(V) (serial number unknown) recovered from the crash site of US Army UH-60 # 87-2600. The APX-100(V) was transported to the Naval Air Warfare Center, Aircraft Division, Indianapolis (NAWCADI) for an engineering investigation.

On 26 April 1994 an initial autopsy was performed on the subject AN/APX-100(V) to determine what physical evidence remained which could provide any indication of the operational state of the subject AN/APX-100(V) at the time of the incident and to document the condition to the AN/APX-100(V) as received. The results of that initial autopsy follows:

1. The AN/APX-100(V) at issue had been heavily involved in fire and had received substantial structural damage to both the exterior case and internal assemblies. Based on metallurgical testing it is estimated that the interior of the AN/APX-100(V) at issue was subjected to temperature of 700 to 1000 degrees Celsius.

2. The AN/APX-100(V) at issue exhibited evidence of structural damage as a result of physical impact.

3. All toggle switches on the AN/APX-100(V) at issue were so heavily damaged by fire that it is impossible to accurately determine their 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.

4. The majority of the MODE 1, 2 and 3A push button code switches are intact. Filament analysis of the MODE 1 and 3A incandescent bulbs may provide an indication of the status of the panel lighting of the APX-100(V) at the time of the incident dependent on the condition of the glass envelopes. The panel lighting may be controlled independent

4

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

of the APX-100 power depending on the particular A/C configuration so results of this testing may be inconclusive. Further analysis is forthcoming.

5. The Master control wafer switch was not received as part of the AN/APX-100(V) at issue. Analysis of this switch may have provided some indication of the operational status of the AN/APX-100(V) at issue, as it is the master power and control switch.

6. The antenna diversity toggle switch was not received as part of the AN/APX-100(V) at issue.

7. The MODE 4 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 is impossible to ascertain the position of the switch at the time of the incident.

8. K1 chassis relay, which, when provided a ground by the Master Control switch, provides A/C power to the APX-100(V) power supply was recovered intact and will undergo further analysis.

Attachment 1 to this report contains exhibits 001 through 040, the photographs taken during this initial autopsy.

C. Observations of operational condition:
Based on the conditions as received, there is are no expedient repairs which can be performed on the AN/APX-100(V) at issue to assist in determining the operational condition at the time of the incident.

D. Expedient repairs performed:
N/A

E. Engineering report:
The in-depth engineering investigation commenced on Wednesday 27 April 1994. The initial focus of the engineering investigation centered on the K1 power supply relay, the MODE 1, 2, 3A code switches and selected components from the A5 BIT control card. The following is a preliminary report of investigation of these components.

1. <u>MODE 1, MODE 2 and MODE 3/A CODE SWITCHES</u>

EXTERNAL VISUAL: Visual examination of the code switches while still in the front panel revealed extensive heat, flame and mechanical damage to switches. The left MODE 1 switch was partially destroyed mechanically. The right MODE 1 switch was intact but exhibited extensive heat damage. The MODE 2 and MODE 3/A code switches were intact but exhibited minor mechanical deformation and moderate heat damage. All the polymeric materials associated with the switch assemblies - wire insulation, epoxies, plastic housings, etc.

- were incinerated and missing. The glass windows were intact but badly burned.

The bulbs in the switches were intact but "deflated" by melting of the glass onto the filament support assembly. Each bulb was removed, documented and retained for subsequent examination.

X-RAY RADIOGRAPHY: X-ray radiographs were taken of a good reference code switch set in each of the eight positions for a comparison to the radiographs of the switches at issue. The radiographs show that the approximate damaged switch setting can be determined by comparison to the reference switch. The POSTULATED mode settings were ascertained in this manner and are listed below.

MODE 1:	X	5		
MODE 2:	5	4	1	7
MODE 3/A:	0	1	1	3

IT is important to note that these are postulated switch settings due to the extensive heat damage incurred by the AN/APX-100(V) at issue. The MODE 1 first switch setting was not determined because of damage.

2. A7 POWER SUPPLY K1 RELAY

EXTERNAL VISUAL: The K1 power supply relay was removed from the AN/APX-100 at issue and examined with a low power stereomicroscope. Visual examination revealed that the relay suffered severe heat damage and exhibited oxidation scale on the body. The solder seal of the relay was open on one side due to melting and several of the leads were displaced due to softening of the glass-to-metal seal.

X-RAY RADIOGRAPHY: Radiography of the K1 relay was inconclusive as to the cause of the failure. The radiograph did show that the internal components were intact and approximately in the "as manufactured" positions.

INTERNAL VISUAL: The relay was mechanically opened and examined with a low-power stereomicroscope. Examination revealed that the internal components were relatively unharmed, other than heat damage. Each of the contacts was removed and examined with a stereomicroscope and scanning electron microscope (STEM). Examination revealed that all contacts except the B3-B2 mating pair were normal in appearance. The B3-B2 mating pair exhibited localized heat damage characteristic of arcing failure. Detailed examination revealed the presence of arc spots and molten/splattered metal on the B2 contact that is commonly associated with high current electrical overstress of the contact.

METALLOGRAPHY: The B3-B2 contacts were mounted in an epoxy puck and metallographically prepared for examination with light and

electron microscopes. Metallographic and SEM examination revealed that both contacts exhibited fused metal and heat-affected zones characteristic of electrical overstress/arcing failure.

CONCLUSION: The K1 power supply B2-B3 relay contact mating pair suffered a recent, high current, sustained electrical overstress event, the source of which is unknown.

3. A5 BIT CONTROL CARD COMPONENTS

EXTERNAL VISUAL: Visual examination of the A5 BIT Control Card revealed that the printed circuit card was incinerated and that the microcircuits and discrete components were barely held in position by the fiberglass laminate of the PWB. Transistors Q9 and Q2 were removed from the assembly for detailed examination. The Q9 and Q2 transistor cans were intact but exhibited considerable oxidation.

ELECTRICAL TEST: Pin-to-pin curve tracer electrical testing disclosed that all leads on the two transistors were open circuits.

X-RAY RADIOGRAPHY: Radiography of the components was inconclusive.

INTERNAL VISUAL: The transistors were mechanically delidded and examined with a stereomicroscope and scanning electronic microscope. Stereomicroscope examination revealed that both bonding wires on Q9 were missing due to incineration and that the die exhibited melting in the center. The melting of the center of the die suggests that the component suffered a high current sustained electrical overstress. Examination of the Q2 transistor revealed similar observations with more overstress damage to the die.

CONCLUSION: The engineering investigation of the AN/APX-100(V) at issue continues. All data contained in this report is documented via photographic evidence including all stereomicroscopic and scanning electronic microscope photographs. A detailed report containing this data with all photographic evidence in addition to any other evidence uncovered will be provided at a future date.

DATE OF THIS REPORT: 4 MAY 1994

K.M. Fafford, PMA-209P7
Deputy Program Manager
AN/APX-100

41

STATEMENT OF FACTS

On 26 April 1994 the undersigned individuals participated, as part of a larger team, in an initial evaluation of the AN/APX-100(V) (serial number unknown) recovered from US Army UH-60 Blackhawk helicopter, tail number 87-2600, downed by friendly fire over northern Iraq. This initial evaluation was to determine what physical evidence remained as the result of the crash and subsequent fire which could provide any indication of the operational status of the AN/APX-100(V) at the time of the incident. This initial evaluation was not intended as a thorough failure analysis but as precursory inspection of the equipment to determine what evidence remained which could be subjected to a thorough analysis. The following discoveries were made:

1. The AN/APX-100(V) at issue had been heavily involved in fire and had received substantial structural damage to both the exterior case and internal assemblies.

2. The AN/APX-100(V) at issue exhibited evidence of structural damage as a result of physical impact.

3. All toggle switches on the AN/APX-100(V) at issue were so heavily damaged by fire that it is impossible to accurately determine their 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.

4. The majority of the MODE 1, 2 and 3A push button code switches are intact. Filament analysis of the MODE 1 and 3A incandescent bulbs may provide an indication of the status of the panel lighing of the APX-100(V) at the time of the incident dependent on the condition of the glass envelopes. The panel lighting may be controlled independent of the APX-100 power depending on the particular A/C configuration so results of this testing may be inconculsive. Further analysis is forthcoming.

5. The Master control wafer switch was either consumed by fire or lost on impact as it was not received as part of the AN/APX-100(V) at issue. Analysis of this switch may have provided some indication of the operational status of the AN/APX-100(V) at issue, as it is the master power and control switch.

6. The antenna diversity toggle switch was either consumed by fire or lost on impact as it was not received as part of the AN/APX-100(V) at issue.

7. The MODE 4 code wafer switch knob and shaft were present but the switch contacts, detents and switch body were consumed by fire or lost

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL	# of pages ▶ 2
To Col Reinhaker	From K. Fitton
Dept./Agency	Phone #
Fax # (314) 263-1171	Fax #
NSN 7540-01-317-7368 5099-101	GENERAL SERVICES ADMINISTRATION

15 May 94

WILLIAM ...

on impact. With only the knob and shaft remaining it is impossible to ascertain the position of the switch at the time of the incident.

8. K1 chassis relay, which, when provided a ground by the Master Control switch, provides A/C power to the APX-100(V) power supply. K1 relay was recovered intact and will undergo further analysis.

The AN/APX-100(V) at issue received substantial damage as a result of the incident. A thorough analysis of the K1 relay and the MODE 1 and 3/A code switches is being performed in an attempt to determine their operational status at the time of the incident and a detailed report will be issued at the conclusion of that analysis.

4/27/94
(signature) (date)
Mr. K.M. Fafford, NAWC INDPLS
Code PMA-209P7,1012B

(signature) (date)
Mr. Dick Blake, NADEP PNCLA
Code 313

4/27/94
(signature) (date)
Mr. Mike Bratcher, NAWC INDPLS
Code 306

4-27-94
(signature) (date)
Mr. Ray Creary, NADEP PNCLA
Code 94502

4/27/94
(signature) (date)
Mr. James Wilson, NAWC INDPLS
Code 704

TOTAL P.02

TAB J-2

UH-60 BLACK HAWK 87-26000

13 May 94

MEMORANDUM FOR PROJECT MANAGER, AVIATION ELECTRONIC COMBAT
ATTN: COL THOMAS E. REINKOBER
SFAE-AV-AEC
4300 GOODFELLOW BOULEVARD
ST LOUIS MO 63120-1798

FROM: WL/AAAI
2185 Avionics Circle
Wright Patterson AFB OH 45433-7301

SUBJECT: Failure Analysis on Third Crash Damaged Electronic Equipment - INFORMATION MEMORANDUM

1. The subject equipment was picked up from your organization in St Louis MO on 10 May 94 by Capt Rick Shute and brought to the Navigation and Information Transmission Branch (WL/AAAI), Wright Laboratory, Wright Patterson AFB OH to perform a failure analysis.

2. On 13 May 94 at 0800, technical experts from the National Air Intelligence Center (NAIC), the 4950th Test Wing, and WL/AAAI had gathered to perform the requested analysis. Upon opening the container, a charred mass of electronics and melted metal was observed by all. Still pictures and a video were taken during this time. The equipment was identified as a C-10604(V)/ARC-186(V) VHF FM control box, an interphone box associated with the ARC-186, and an unknown control panel.

The front panel control settings and discernable characteristics of the C-10604(V)6/ARC-186(V) VHF FM control box were observed:

a. Frequency (MHz) = 30.300
b. Preset = 1
c. Mode (preset/man/emer) = unknown (sheared)
d. Volume = maximum setting
e. Squelch = on
f. Directional Finding = on
g. Control WB/NB Switch = wideband mode

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.

13 May 94
Date

LAURA A. ELLIS, SrA, USAF
Evidence Custodian, Incirlik Air Base, Turkey

[redacted]

The front panel control markings and discernible circumstances of the interphone box associated with the [redacted] were as follows:

Top Row (from left to right):

a. Switch 1 = off (sheared)
b. Switch 2 = on
c. Switch 3 = on
d. Switch 4 = on
e. Switch 5 = unknown (float condition; maybe off)
f. Switch 6 = off
g. Switch 7 = off

Bottom Row:

h. Switch 8 = off
i. Mode = unknown (locked into place)
j. Volume = unknown (locked into place)

The unknown interphone box maybe an ADF control panel but this could not be confirmed.

3. A sketch of the equipment, photos, and video can be made available upon request. The equipment will be protected in a locked safe until disposition information is received from the Safety Board. If there are additional questions, please contact the undersigned at DSN 785-2766 or Ms. Diane Summers at DSN 785-4947.

Denice S. Jacobs

DENICE S. JACOBS, Chief
CNI Concepts Exploration Section
System Avionics Division

TAB J-2

UH-60 BLACK HAWK 87-26000

TAB J

TECHNICAL OR ENGINEERING EVALUATIONS

TAB J-3

E-3B AWACS

J-3a Certification

J-3b 552D OSS/OSTW Memorandum on Technical Analysis of AWACS AN/ARC-204A Radio System

CERTIFICATION

This certifies that no teardown or technical analysis was conducted on any of the components or subsystems of the E-3 AWACS, serial number 77-0351, that was flying in support of Operation Provide Comfort on 14 April 1994 during the crash of two US Army helicopters in the northern "No Fly Zone" of Iraq. This statement is made as part of the AFR 110-14 Accident Investigation of the helicopter accident.

[signature], Lt Col, USAF

Name

14 May 1994

Date

TAB J-3

E-3B AWACS

J-3a Certification

J-3b 552D OSS/OSTW Memorandum on Technical Analysis of AWACS AN/ARC-204A Radio System

J-3a

J-3b

DEPARTMENT OF THE AIR FORCE
552d OPERATIONS GROUP (ACC)
TINKER AIR FORCE BASE, OKLAHOMA

20 May 94

MEMORANDUM FOR HQ USAFE/SE/AIB
ATTENTION: Lt Col Bertram Pryor

FROM: 552 OSS/OSTW
7550 Sentry Blvd, Ste 21
Tinker AFB, OK 73145-9012

SUBJECT: Technical Analysis of AWACS AN/ARC-204 A (V) 2 UHF Radio System - INFORMATION MEMORANDUM

1. I , Staff Sergeant James L. Mattson, am an Instructor Communications Technician with 1700 hours on board the E-3 AWACS. My duties include the operation and maintenance of all E-3 communications systems to include Have Quick radios. I am currently assigned as the 552 OSS Tactics Office communications expert.

2. Based upon my experience and after reviewing Technical Order 1E-3A-43-1-1, USAF E-3 Mission System Operations (Attch 1), and the AWACS Communications Technician's Student Study Module, GT84-22 "Have Quick A Net" (Attch 2), I have concluded that the AN\ ARC-204 radios on board the USAF E-3 are Have Quick II systems. This capability allows the USAF E-3 to communicate with any other Have Quick I or Have Quick II user.

JAMES L. MATTSON, SSgt, USAF
NCOIC Tactics Training
552 Operational Support Squadron

2 Attachments:
1. T.O. Extract
2. GT84-22 Extract

31 May 94

Global Power for America

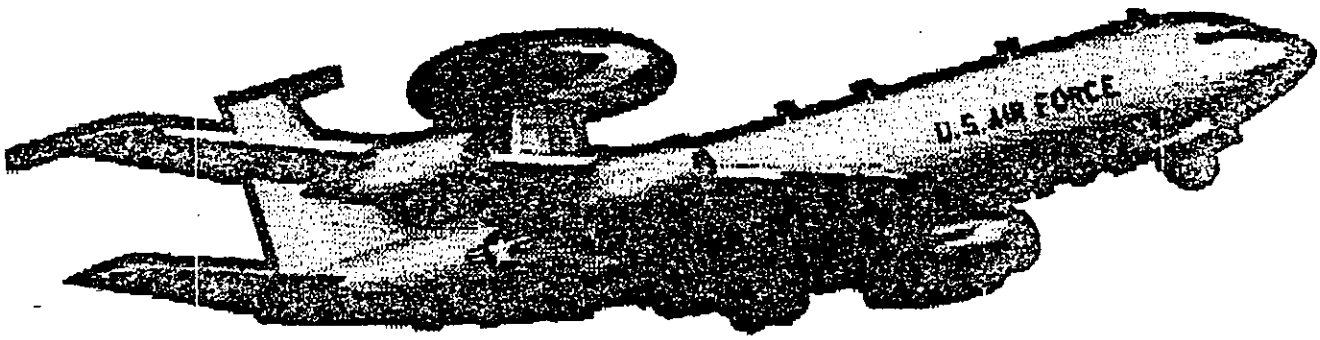
FLIGHT MANUAL

USAF SERIES

E-3B & E-3C

AIRCRAFT

MISSION SYSTEM OPERATIONS



Prepared By: Automated Technical Order System (ATOS)

This publication supersedes T.O. 1E-3A-43-1-1 dated 1 July 1982, 1E-3A-43-1-1S-67 dated 7 Dec 92, 1E-3A-43-1-1S-68 dated 21 May 93, 1E-3A-43-1-1S-69 dated 24 May 93, and all changes.

Commanders are responsible for bringing this publication to the attention of all Air Force personnel cleared for operation of subject aircraft.

See the Numerical Index T.O. 0-1-1-3 and Supplements thereto for current status of Flight Manuals, Safety Supplements, Operational Supplements, and Flight Crew Checklists.

THIS PUBLICATION IS INCOMPLETE WITHOUT T.O. 1E-3A-1 and T.O. 1E-3A-43-1-1-1.

Published under authority of the Secretary of the Air Force

ISSUE F 1 OCTOBER 1992

HAVE QUICK COMMUNICATIONS SYSTEM

HAVE QUICK consists of an ECCM modification to UHF radio channels, providing frequency hopping capability. Frequency hopping is a technique where the frequency being used for communication on a given link is rapidly changed many times per second. The purpose in doing this is to make it difficult to jam the link. Attempts to make observations to determine the frequency in use are made very difficult because, by the time the observation is complete, the communication link has been changed to another frequency. Part of the strength of HAVE QUICK is through changing frequencies in a "random" manner according to the Word of Day (WOD); this means that no pattern is evident to an observer and jamming is consequently more difficult.

Frequency hopping is implemented by storing within every HAVE QUICK terminal a pattern of frequencies (or channels) to be used for a given day, and the pattern is then utilized according to the Time of Day (TOD). For every time slot in the day where each time slot is a small part of a second, there is a specific channel which must be used for a given net, whether it is receiving or transmitting. Thus, HAVE QUICK terminals require some means to store the pattern for channel use on a given day, and also an accurate clock to control the timing of pattern use.

Because the particular frequency used at a particular instant depends on the precise time of day, both terminals of a HAVE QUICK communication link must have clocks which are synchronized. This basic requirement leads to the HAVE QUICK need for a time distribution and maintenance system. HAVE QUICK time may be set to any arbitrary time standard. However, as a practical convenience, Coordinated Universal Time (UTC) has been adopted as the time standard.

The usual operating mode for a UHF HAVE QUICK link is its normal mode where it uses any one of 7000 channels available to the UHF communication band. Operation of the radio in this manner is performed in bypass mode.

If jamming is encountered, HAVE QUICK radios can be switched to the ECCM mode and continue communication. In order to permit this switchover HAVE QUICK must be suitably initialized.

→ The basic HAVE QUICK system has been replaced with HAVE QUICK II and has the following capa-
→ bilities. In ECCM mode, HAVE QUICK II includes six forms of frequency hopping. A-Net is designed for maximum anti-jam (AJ) capability and uses the maximum number of frequencies. AWACS is A-Net capable using a cable modification. T-Net uses the least number of frequencies, does not expose the system's ultimate capability and is used primarily for training. Other nets available are NATO Frequency Managed A-Nets (FMA-Nets), Non-NATO Frequency managed A-Nets and Frequency Managed Training Nets (FMT-Nets). With each of these forms of frequency hopping a selection of communication nets is available, all of which carry frequency hopping characteristics and therefore AJ capability.

LESS 547 *Figure 1-175* ◀ WITH 547 *Figure 1-176* ◀ is a block diagram of HAVE QUICK. The diagram illustrates the audio and radio frequency paths together with the power source, keylines, and related items.

HAVE QUICK II also provides Multiple WOD (MWOD) storage and erase capability.

WITH 547 HAVE QUICK A-NET COMMUNICATION SYSTEM

The HAVE QUICK A-NET is designed for maximum anti-jam (AJ) capability and uses the maximum number of frequencies. Frequency hopping is implemented in the HAVE QUICK equipment by storing within each transceiver receiver-exciter module (REM) an algorithm which defines the frequency hopping pattern and provides the specific operating frequency at any precise time-of-day (TOD). Synchronization is accomplished by transmitting a synchronizing signal from one radio to another. This synchronizing signal is the TOD signal provided by the radio frequency oscillator (RFO). The RFO maintains system time after the TOD has been supplied to the RFO. HAVE QUICK A-NET operation in AJ mode must have the radio initialized with word-of-day (WOD), TOD and net number. The three WOD styles used are the standard (STD), multiple (MUL), and frequency managed training (FMT). The WOD function defines the algorithm used and the net number defines the operational communication net. TOD supplies the clock contained within each REM. TOD information needed to perform frequency hopping. ◀

HAVE QUICK CONTROLS AND INDICATORS

HAVE QUICK Controls and indicators are located on the communications console. The specific location of HAVE QUICK items on the communications console is depicted in LESS 547 *figure 1-177* ◀ WITH 547 *figure 1-178.* ◀

GT 84-12

CONTINUATION TRAINING MODULE

TYPE TRAINING: CT CONTINUATION TRAINING

TITLE: HAVE QUICK A NET

DESIGNATOR: TCM:HQAN

DATE: MAY 29 1992

RED LINE/INTERIM CHANGES			
CHANGE #	DATE	NAME/OFFICE SYMBOL	REMARKS

CMSS/TD [signature] Date May 21, 1992

USAF QA [signature] Date 29 May 92

SUPERSEDES: TCM:HQAN, date March 1991
SME: MSgt Bryant, 552 ACW/DOTMC
CURRICULUM DEVELOPER: Chuck Lashley, Boeing CMSS/TD
OPR: 552 ACW/DOT

CMSS/TD FORM 45D
January 9, 1989

HAVE QUICK A-NET (HQAN)

MODULE DESIGN AND INSTRUCTIONS

This is a self-paced module. The module begins with a brief introduction of the subject matter. This is followed by the module objectives you are expected to achieve when completing this module of instruction. Carefully read the objectives and keep them in mind as you study the remainder of the module. Following the objectives, the Have Quick A-Net (HQAN) equipment is explained as fully as the data available permits. The HQAN is completely different from the current Have Quick equipment so this area should be carefully studied. As you are studying the module also refer to the applicable sections of T.O. 1E-3A-43-1-1. There will be practice exercises at the end of the module. You may use the material in the module to answer the practice exercises. Complete the exercises before referring to the student feedback sheet. There is an open book module test requiring a minimum score of 85%. The closed book test will be administered by your squadron DOT personnel.

INTRODUCTION

The purpose of this module is to review the new Have Quick A-Net (HQAN) equipment being installed on the E-3. TCTO 1E-3-547, Installation of AN/ARC-204 A(V)2 UHF Radio System on E-3B/C Aircraft, will add this new equipment and is shown in the checklist as WITH 547. This permanent modification provides for four systems capable of operating on any Have Quick net. The HQAN system consists of four transceivers (including the Receiver Exciter Modules), two multicouplers, four transceiver power supplies, one Radio Frequency Oscillator, associated mounting bases, two antennas, and two Control Indicators. An AN/ARC-171 UHF transceiver (U20) and its associated equipment is dedicated to the Have Quick system to provide time-of-day (TOD) transmission and reception.

This module will aid you in maintaining your proficiency in operating or repairing the HQAN equipment. The module will provide the LRU functions, system interfacing, and BITE capabilities.

MODULE OBJECTIVES

TERMINAL OBJECTIVE: Using module TCM:HQAN (and T.O. 1E-3A-43-1-1 and T.O. 1E-3B-2-23-1, if available), provide the correct response to questions on Have Quick A-Net equipment involving the following performance statements. A score of 85% corrected to 100% is required.

TAB J

TECHNICAL OR ENGINEERING EVALUATIONS

DEPARTMENT OF THE AIR FORCE
AIR INTELLIGENCE AGENCY

26 Apr 94

MEMORANDUM FOR HQ USAFE/RSL
ATTENTION: Colonel David A. Duck Jr.

SUBJECT: Analysis of KIR-1C's, Serial Numbers 00936 and 01505

1. On 25 Apr 94., the Air Force Cryptologic Support Center (AFCSC) received and conducted a comprehensive operational test on two KIR-1C's, serial numbers 00936 and 01505. The tests were performed in accordance with the full maintenance document for the KIR-1C (KAM-527, Table 5-6). The procedure was witnessed by Mr. Raymond Gamboa, Mr. Harry Frierson, CMSgt Ramos (HQ USAFE), and Mr. Kent Martin.

2. No problems or deficiencies were observed throughout the test procedure. Both KIR-1Cs tested satisfactorily against a known KIT-1C (shop standards). Attachments 1 & 2 Depot Maintenance Operational Tests for KIR-1C, thoroughly tested every function of the devices, while the tester (ST-20) simulated aircraft functions. There were no records indicating units had been previously re-cycled through the depot for maintenance.

3. Both KIR-1C's have been re-certified and can be released to supply for stock.

4. Points of contact at LMMLC are Mr. Raymond Gamboa or Mr. Harry Frierson, DSN 977-2671/Comm (210) 977-2671.

ROBERT W. JENSEN, Colonel, USAF
Vice Commander

Attachments:
~~1. KAM-527A/TSEC, SN 00936~~ Withdrawn
~~2. KAM-527A/TSEC, SN 01505~~ with

cc:
Major Jeffrey Snyder

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.

7 May 94
Date

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

TAB J-4

F-15C 79-0025

J-4a Analysis, KIR-1C

J-4b Analysis, APX-76/IFF

J-4c AFLC/AFSC Form 49, Tear Down Deficiency Report, Radar Target Data Processor

J-4d Analysis, AAI Control Panel

J-4e Analysis, Interference Blanker

J-4a

J-4b

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFMC)

26 April 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION CAPT WHEELER

FROM: WR-ALC/LYPFS (John Huff)
380 2nd St. Ste 104
Robins AFB GA 31098-1638

SUBJECT: Mishap Investigation of F-15 APX-76 IFF Transponders - INFORMATION MEMORANDUM

1. Investigation of mishap exhibits has been completed. The following information is provided:

a. NSN: 5895-01-272-8047
NOUN: Receiver-Transmitter, IFF, RT 868 C/APX-76(V)
SERIAL NO: CLT 1203

b. NSN: 5895-01-273-1990
NOUN: Receiver-Transmitter, IFF, RT 868 D/APX-76(V)
SERIAL NO: OKJ-00199

2. The two Receiver-Transmitters were received at the depot, wrapped and sealed with tamper proof tape. The exhibits were opened in the presence of USAFE and WR-ALC representatives. Instructions from USAFE were to run the exhibits through functional LRU and SRU checks to determine if the units were serviceable.

3. Examination of our historical data base revealed we repaired unit S/N CLT-1203 at WR-ALC on 22 January 1993. Further examination did not show we had repaired S/N OKJ-00199. Upon opening the exhibits, following the LRU testing, we discovered S/N OKJ-00199 was a Hazeltine Company unit, as evidenced by a number of Hazeltine 'tamper proof' stickers on SRU's inside of the unit.

4. The exhibits were tested utilizing the minimum performance test in T.O. 12P4-2APX76-2, paragraph 3-175, page 3-175, change 13, dated 30 July 1993. Results of these tests are shown below.

a. S/N CLT-1203: This unit showed 152 hours of operating time on the elapsed time meter since the last depot repair cycle. This unit met all critical test requirements, with only minor deviations from depot T.O. requirements observed. These deviations were the blanking pulse duration time, receiver pre-selector alignment, and

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.
WILLIAM L. HARRIS, Capt, USAF, MSC
Evidence Custodian, Incirlik Air Base, Turkey
7 Jul 94
Date

the Sum channel sensitivity and GTC check. These are adjustments made at the using activity to allow the units to operate on the F-15 aircraft (depot requirements are for alignment to the F-4 aircraft). The observed output power was 61.8 dB, the receiver sensitivity was -78 dBm, and the transmitter output frequency was 1030.15 MHZ. After the LRU tests were completed, the cover was removed and the SRU tests were started. Instructions from HQUSAFE were to make any necessary adjustments to bring any out of tolerance readings into tolerance during the SRU tests, as the LRU tests had confirmed serviceability of the unit. During the SRU tests, a number of adjustments were required to bring the unit back to T.O. center of tolerance specifications. The receiver pre-selector had been adjusted in the field, evidenced by the RTV sealant being cut, and was adjusted back into tolerance. A number of variable resistors were found to have been adjusted in an attempt to meet the F-15 aircraft requirements. This is a very difficult job without the depot test equipment and easily leads to a marginal unit when completed by the field activity. During the SRU tests, all readings were brought back to center of tolerance where possible, resulting in increased transmitter power output and improved receiver sensitivity. The transmitter output power increased from 61.8 dB to 64 dB and the receiver sensitivity increased from -78 dBm to -81.5 dBm. The unit was then set up for the F-15 configuration due to the fact that it will be returned to a F-15 aircraft after the investigation is completed.

b. S/N OKJ-00199 This unit was not produced by WR-ALC. The unit had Hazeltine tamper proof stickers on the sub-assemblies. This unit also met all critical test requirements, with only minor deviations from depot T.O. requirements observed. These deviations were the blanking pulse duration time and the receiver pre-selector alignment. These are adjustments, as previously stated, made at the using activity to allow the units to operate on the F-15 aircraft (depot requirements are for alignment to the F-4 aircraft). The observed output power was 62 dB, the receiver sensitivity was -78.5 dBm, and the transmitter output frequency was 1030.4 MHZ. After the LRU tests were completed, the cover was removed and the SRU tests were started. Instructions from HQUSAFE were to make any necessary adjustments to bring any out of tolerance readings into tolerance during the SRU tests, as the LRU tests had confirmed serviceability of the unit. During the SRU tests, a number of adjustments were required to bring the unit back to T.O. center of tolerance specifications. Essentially, these were the same adjustments as required on S/N CLT-1203. A number of variable resistors were found to have been adjusted in an attempt to meet the F-15 aircraft requirements. As previously mentioned, this is a very difficult job without the depot test equipment and easily leads to a marginal unit when completed by the field

activity. During the SRU tests, all readings were brought back to center of tolerance where possible, resulting in improved receiver sensitivity. The receiver sensitivity increased from -78.5 dBm to -82.5 dBm. The unit was then set up for the F-15 configuration due to the fact that it too will be returned to a F-15 aircraft after the investigation is completed.

5. A copy of readings obtained during testing is available from this office if desired. They have not been included in this report for reasons of brevity and time constraints.

6. In conclusion, the exhibits were in good operating condition when received, and only required minor adjustment to bring back to maximum capability. We are returning these exhibits in well above average operating condition. We were happy to be of assistance in this investigation and if we can be of any assistance in the future please feel free to call us. Our point of contact is shown below.

7. WR-ALC/LYPFS point of contact is John Huff DSN 468-6841/ commercial (912) 926-6841.

John C. Huff

JOHN C. HUFF
Quality Assurance Specialist
Hardware Support Branch C
Directorate of Avionics Management

cc:
WR-ALC/LY
WR-ALC/LYP
WR-ALC/LYP-1
WR-ALC/LYPF
WR-ALC/LYLCE
WR-ALC/LYLCC
WR-ALC/LYL-1

TAB J-4

F-15C 79-0025

J-4a

J-4b

J-4c

TEARDOWN DEFICIENCY REPORT

Field	Entry
MIP NUMBER	
DATE OF INSPECTION	25 Apr 94
1. ACTIVITY PERFORMING INSPECTION	WR-ALC/LYPDB
2. INSPECTOR	Rodney Short, Albert Lewis
3. PRIORITY	
4. DEFICIENCY DATE	---
5. STATION SERIAL NUMBER	---
6. SUBMITTED BY	Capt Wheeler
7. EQUIPMENT SERIAL NUMBER	F-15C/79-0025
8. INSTALLED POSITION	
9. TMS OR MDS	N/A
10. SECTION OR PROPERTY CLASS	
11. SUB SYSTEM OR MODEL	
12. MAJOR ASSEMBLY, TYPE OR MODEL, NSN	Radar Target Data Processor
13. PRODUCT SERIAL NO.	
14. MINOR ASSEMBLY, NSN	
15. NOMENCLATURE OR PART, NSN	124200-1Ø5/5985-01-016-2209FX
16. REFERENCE NO.	
17. TYPE DEFICIENCY	
18. CONDITION	Good
19. PRIMARY CAUSE OF FAILURE	Test Station (See 28 below)
20. DISPOSITION	
21. MANUFACTURER, HOURS OR MILES SINCE NEW	Litton Systems Inc., Data Systems Div 3138 hours
22. FORMS RECEIVED WITH EQUIPMENT	AF Form 52
23. LAST USING ACTIVITY - NAME, ADDRESS, COMMAND	Incirlik AFB, Turkey
24. LAST OVERHAUL ACTIVITY, DATE, HOURS OR MILES SINCE OVERHAUL	
25. DATE REMOVED FROM SERVICE (DAY / MO / YR)	
26. NUMBER OF PRIOR OVERHAULS	
27. REASON FOR REMOVAL	

28. TEARDOWN DEFICIENCIES ANALYSES

PART NOMENCLATURE	PART SERIAL NUMBER	LOCATION, DESCRIPTION AND CONDITION

Radar Target Data Processor, Serial Number Ø274 was received in good visual condition. It was connected to the AIS Test Station and upon initial test run failed test number 1513 which is an ohms check. Retesting of the unit passed this section. However, unit failed test number 1525, which is also an ohms check. The unit was retested and again it passed this section. Unit ran good until section 5048 where again it failed. When we tried to rerun this unit it again failed test number 1525. We again went back and retested unit and it passed all AIS Testing. A second test run was started and a failure was detected at 2760. A retest could not confirm this failure and unit passed all test again. A third test was ran and UUT passed all test.

Unit was then sent to another area of shop for testing of SRU's.

Print outs of test are attached.

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.

7 May 94
Date

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

26 Apr 94
Final LRU operational check run completed after SRU checks complete. No discrepancies were found and print out is attached.

Rody L Short
Tony Besly

LRU test station clock battery inoperational - wrong date on runs. Capt Teresa Wheeler 4.1

pg 1

FORM

MEMORANDUM FOR HQ AFE/RSL
ATTENTION: CAPT WHEELER

20 APR 1994

FROM: WR-ALC
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJECT: Mishap Investigation of F-15 Radar Target Data Processors - INFORMATION MEMORANDUM

1. Attachment to Teardown Deficiency Report for LRU ser. no. 274

a. A1- P/N 124251-101 S/N 1411
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

b. A2- P/N 124252-102 S/N 570
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout. We replaced Q18 and Y1 for a suspected failure but found the problem to be adapter seating.

c. A3- P/N 124251-101 S/N 1411
No visual defects other than a missing guide pin which we replaced. No sign of any recent repairs. ADTS testing reported a shorted pin. Problem was traced to J1 pin 106 where 5 volts DC was applied to several IC's thru R3 which should have been 10K but was 100 ohm's from the factory. Circuit card ran good after R3 was replaced with a 10K resistor. See attached printout.

d. A4- P/N 124254-101 S/N 569
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

e. A5- P/N 124255-102 S/N 643
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

f. A6- P/N 124256-101 S/N 1298
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

g. A7- P/N 124250-104 S/N 657
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Analog station #25. See attached printout.

2. If there are any questions concerning the information provided, please contact Mr Billy Shirley at DSN 468-4910 or commercial 912-926-4910.

BILLY G. SHIRLEY, WG-12
Intergrated Electronics Mechanic

ANTHONY BUSBY, WS-12
Electronics Supervisor

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.

7 May 94
Date

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

MEMORANDUM FOR HQ USAFE/RSL
ATTENTION: CAPT WHEELER

26 Apr 94

FROM: WR-ALC
296 Cochran Street
Robins AFB, GA 31098-1622

SUBJECT: Radar Target Data Processor (RTDP) Out of Tolerance Conditions found during Shop Replaceable Unit (SRU) Testing

1. Engineering analysis of out of tolerance conditions has been completed.

a. NSN: 5896-01-016-2209
PN: 124200-105
SN: 1444

RTDP SN 1444 meet all functional test requirements at the Line Replaceable Unit (LRU) [Black Box] level. During individual SRU testing one circuit card assembly (CCA) A7 (PN 124250-104, SN 740) had an out of tolerance test condition caused by capacitor C12 which is used to filter noise out of the power supply.

EFFECT CAUSE BY C12 TO CCA:
- increased noise on ground

EFFECT TO SYSTEM PERFORMANCE:
- NONE

b. NSN: 5896-01-016-2209
PN: 124200-105
SN: 0274

RTDP SN 0274 meet all functional test requirements at the Line Replaceable Unit (LRU) [Black Box] level. During individual SRU testing two circuit card assemblies (CCA) A2 (PN 124252-102, SN 570), A3 (PN 124251-101, SN 1411) had an out of tolerance test conditions. A2 had a relay K1 which resistance measured high, and A3 had a resistor R3 which measured low.

EFFECT CAUSE BY K1 TO CCA A2:
- increased current through several Integrated Circuits (ICs) [components]

EFFECT TO SYSTEM PERFORMANCE:
- NONE

EFFECT CAUSE BY R3 TO CCA A3:
- possible delay of verification BIT Enable/Return

EFFECT TO SYSTEM PERFORMANCE:
- NONE

2. If there are any questions about the analysis performed, please contact Captain Albert Thompson at DSN 468-3594 or commercial 912-926-3594.

Albert F. Thompson
ALBERT F. THOMPSON
Captain, USAF
F-15 Chief Electrical Engineer

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.

7 May 94
Date

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

L1

TAB J-4

F-15C 79-0025

J-4a

J-4b

J-4c

J-4d

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFLC)
ROBINS AIR FORCE BASE, GEORGIA 31098-5149

2 May 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION MAJOR SNYDER

FROM: WR-ALC/LYPD (Tony Busby)
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJ: Mishap Investigation of AAI Control Panel

1. Investigation of mishap exhibits has been completed. The following information is provided:

a. NSN: 5895-01-044-4987
NOUN: AAI Control Panel
SERIAL NO: 0729

b. NSN: 5895-01-044-4987
NOUN: AAI Control Panel
SERIAL NO: 0642

2. The two AAI Control Panels were received at the depot sealed and wrapped with tape. The exhibits were opened in the presence of USAFE and WR-ALC representatives. Instructions from USAFE were to run the exhibits through functional LRU checks to determine if the units were serviceable.

3. Examination of our historical data base revealed we had not repaired S/N 0642 or S/N 0729 at this depot.

4. The exhibits were tested utilizing the minimum performance test in T.O. 12S1-2A-107 dated 15 Sep 1975, Change 23, 29 Nov 1992. These units passed all functional tests.

5. In conclusion, the exhibits S/N 0729 and S/N 0642 passed all minimum performance testing and visual inspection. Based on tests at our disposal, we consider these units serviceable. We were happy to be of assistance in this investigation and if we can be of any assistance in the future, please feel free to call us.

6. WR-ALC/LYPD point of contact is Robert Shiver or Tony Busby, DSN 468-2862/Commercial (912) 926-2862.

ANTHONY BUSBY
Foreman, Hardware Production Branch A

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.

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

Date

TAB J-4

F-15C 79-0025

J-4a Analysis, KIR-1C

J-4b Analysis, APX-76/IFF

J-4c AFLC/AFSC Form 49, Tear Down Deficiency Report, Radar Target Data Processor

J-4d Analysis, AAI Control Panel

J-4e Analysis, Interference Blanker

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFLC)
ROBINS AIR FORCE BASE, GEORGIA 31098-5149

3 May 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION MAJOR SNYDER

FROM: WR-ALC/LYPD (Tony Busby)
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJ: Mishap Investigation of Interference Blanker

1. The three Interference Blankers were received at approximately 10:30 A.M. on 02 May 94. They had been shipped using UPS. Items were shipped in one box with paper cushioning. Box was opened in the presence of USAFE and WR-ALC representatives. All three Interference Blankers were visually checked and appeared to be in good repair with the exception of serial number 0206 which had one cover screw loose and serial number 0687 had 3 chassis screws loose. These were structural discrepancies and have no effect on the performance of the boxes. Upon removal of cover for SRU runs, found S/N 0687 to have solder specs/metal shavings on inside. Serial number 0687 and 0650 had no edgeguard installed per T.O. 12P4-2A-113, Table 5-1, Change 11. Serial number 0650 had pin missing on card holder of A3CCA - pin was not located on inside of LRU. See Atch 1 - TDR Report.

2. Examination of our historical data base revealed that S/N 0206 had been repaired at depot in September of 1990. There has been over 2000 hours of operating time since depot repair. Serial numbers 0650 and 0687 had not been repaired at depot.

3. The exhibits were tested utilizing the minimum performance test in T.O. 12P4-2A-118-1 using program 48088110 dated 29 June 1989. All units passed functional test. Serial number 0206 needed to have two test repeated that failed marginally. See Atch 2 - Initial performance test results.

4. SRUs were checked on Analog Station and results were as follows:

a. S/N 0650 - A5 card had one resistor out of tolerance - All other SRUs passed. A5CCA passed in next higher assembly.

b. S/N 0206 - A6 card had one inactive pin smashed - All SRUs passed performance.

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.

7 May 94
Date

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

c. S/N 0687 - A8 card had metal shavings - All SRUs passed performance.

d. See Atch 3 - SRU performance test and evaluation.

5. In conclusion, the exhibits S/N 0206 and S/N 0650 passed all minimum performance testing and visual inspection. Based on tests at our disposal, we consider these units serviceable. Serial number 0687 needs thorough cleaning or depot service. See Atch 4 - Final LRU performance test.

6. We were happy to be of assistance in this investigation and if we can be of any assistance in the future, please feel free to call us.

7. WR-ALC/LYPD point of contact is Robert Mitchell or Tony Busby, DSN 468-2862/Commercial (912) 926-2862.

ANTHONY BUSBY
Foreman, Hardware Production Branch A

TAB J

TECHNICAL OR ENGINEERING EVALUATIONS

TAB J-5

F-15C 84-0025

J-5a Analysis, KIR-1C

J-5b Analysis, APX-76/IFF

J-5c AFLC/AFSC Form 49, Tear Down Deficiency Report, Radar Target Data Processor

J-5d Analysis, AAI Control Panel

J-5e Analysis, Interference Blanker

DEPARTMENT OF THE AIR FORCE
AIR INTELLIGENCE AGENCY

26 Apr 94

MEMORANDUM FOR HQ USAFE/RSL
ATTENTION: Colonel David A. Duck Jr.

SUBJECT: Analysis of KIR-1C's, Serial Numbers 00936 and 01505

1. On 25 Apr 94, the Air Force Cryptologic Support Center (AFCSC) received and conducted a comprehensive operational test on two KIR-1C's, serial numbers 00936 and 01505. The tests were performed in accordance with the full maintenance document for the KIR-1C (KAM-527, Table 5-6). The procedure was witnessed by Mr. Raymond Gamboa, Mr. Harry Frierson, CMSgt Ramos (HQ USAFE), and Mr. Kent Martin.

2. No problems or deficiencies were observed throughout the test procedure. Both KIR-1Cs tested satisfactorily against a known KIT-1C (shop standards). Attachments 1 & 2 Depot Maintenance Operational Tests for KIR-1C, thoroughly tested every function of the devices, while the tester (ST-20) simulated aircraft functions. There were no records indicating units had been previously re-cycled through the depot for maintenance.

3. Both KIR-1C's have been re-certified and can be released to supply for stock.

4. Points of contact at LMMLC are Mr. Raymond Gamboa or Mr. Harry Frierson, DSN 977-2671/Comm (210) 977-2671.

ROBERT W. JENSEN, Colonel, USAF
Vice Commander

Attachments:
1. KAM-527A/TSEC, SN 00936
2. KAM-527A/TSEC, SN 01505

cc:
Major Jeffrey Snyder

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.

17 May 94
Date

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

TAB J-5

F-15C 84-0025

J-5a Analysis, KIR-1C

J-5b Analysis, APX-76/IFF

J-5c AFLC/AFSC Form 49, Tear Down Deficiency Report, Radar Target Data Processor

J-5d Analysis, AAI Control Panel

J-5e Analysis, Interference Blanker

J-5a

J-5b

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFMC)

26 April 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION CAPT WHEELER

FROM: WR-ALC/LYPFS (John Huff)
380 2nd St. Ste 104
Robins AFB GA 31098-1638

SUBJECT: Mishap Investigation of F-15 APX-76 IFF Transponders - INFORMATION MEMORANDUM

1. Investigation of mishap exhibits has been completed. The following information is provided:

a. NSN: 5895-01-272-8047
NOUN: Receiver-Transmitter, IFF, RT 868 C/APX-76(V)
SERIAL NO: CLT 1203

b. NSN: 5895-01-273-1990
NOUN: Receiver-Transmitter, IFF, RT 868 D/APX-76(V)
SERIAL NO: OKJ-00199

2. The two Receiver-Transmitters were received at the depot, wrapped and sealed with tamper proof tape. The exhibits were opened in the presence of USAFE and WR-ALC representatives. Instructions from USAFE were to run the exhibits through functional LRU and SRU checks to determine if the units were serviceable.

3. Examination of our historical data base revealed we repaired unit S/N CLT-1203 at WR-ALC on 22 January 1993. Further examination did not show we had repaired S/N OKJ-00199. Upon opening the exhibits, following the LRU testing, we discovered S/N OKJ-00199 was a Hazeltine Company unit, as evidenced by a number of Hazeltine 'tamper proof' stickers on SRU's inside of the unit.

4. The exhibits were tested utilizing the minimum performance test in T.O. 12P4-2APX76-2, paragraph 3-175, page 3-175, change 13, dated 30 July 1993. Results of these tests are shown below.

a. S/N CLT-1203: This unit showed 152 hours of operating time on the elapsed time meter since the last depot repair cycle. This unit met all critical test requirements, with only minor deviations from depot T.O. requirements observed. These deviations were the blanking pulse duration time, receiver pre-selector alignment, and

CERTIFICATE
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WILLIAM L. HARRIS, Capt, USAF, MSC
Date

the Sum channel sensitivity and GTC check. These are adjustments made at the using activity to allow the units to operate on the F-15 aircraft (depot requirements are for alignment to the F-4 aircraft). The observed output power was 61.8 dB, the receiver sensitivity was -78 dBm, and the transmitter output frequency was 1030.15 MHZ. After the LRU tests were completed, the cover was removed and the SRU tests were started. Instructions from HQUSAFE were to make any necessary adjustments to bring any out of tolerance readings into tolerance during the SRU tests, as the LRU tests had confirmed serviceability of the unit. During the SRU tests, a number of adjustments were required to bring the unit back to T.O. center of tolerance specifications. The receiver pre-selector had been adjusted in the field, evidenced by the RTV sealant being cut, and was adjusted back into tolerance. A number of variable resistors were found to have been adjusted in an attempt to meet the F-15 aircraft requirements. This is a very difficult job without the depot test equipment and easily leads to a marginal unit when completed by the field activity. During the SRU tests, all readings were brought back to center of tolerance where possible, resulting in increased transmitter power output and improved receiver sensitivity. The transmitter output power increased from 61.8 dB to 64 dB and the receiver sensitivity increased from -78 dBm to -81.5 dBm. The unit was then set up for the F-15 configuration due to the fact that it will be returned to a F-15 aircraft after the investigation is completed.

b. S/N OKJ-00199 This unit was not produced by WR-ALC. The unit had Hazeltine tamper proof stickers on the sub-assemblies. This unit also met all critical test requirements, with only minor deviations from depot T.O. requirements observed. These deviations were the blanking pulse duration time and the receiver pre-selector alignment. These are adjustments, as previously stated, made at the using activity to allow the units to operate on the F-15 aircraft (depot requirements are for alignment to the F-4 aircraft). The observed output power was 62 dB, the receiver sensitivity was -78.5 dBm, and the transmitter output frequency was 1030.4 MHZ. After the LRU tests were completed, the cover was removed and the SRU tests were started. Instructions from HQUSAFE were to make any necessary adjustments to bring any out of tolerance readings into tolerance during the SRU tests, as the LRU tests had confirmed serviceability of the unit. During the SRU tests, a number of adjustments were required to bring the unit back to T.O. center of tolerance specifications. Essentially, these were the same adjustments as required on S/N CLT-1203. A number of variable resistors were found to have been adjusted in an attempt to meet the F-15 aircraft requirements. As previously mentioned, this is a very difficult job without the depot test equipment and easily leads to a marginal unit when completed by the field

activity. During the SRU tests, all readings were brought back to center of tolerance where possible, resulting in improved receiver sensitivity. The receiver sensitivity increased from -78.5 dBm to -82.5 dBm. The unit was then set up for the F-15 configuration due to the fact that it too will be returned to a F-15 aircraft after the investigation is completed.

5. A copy of readings obtained during testing is available from this office if desired. They have not been included in this report for reasons of brevity and time constraints.

6. In conclusion, the exhibits were in good operating condition when received, and only required minor adjustment to bring back to maximum capability. We are returning these exhibits in well above average operating condition. We were happy to be of assistance in this investigation and if we can be of any assistance in the future please feel free to call us. Our point of contact is shown below.

7. WR-ALC/LYPFS point of contact is John Huff DSN 468-6841/ commercial (912) 926-6841.

John C. Huff

JOHN C. HUFF
Quality Assurance Specialist
Hardware Support Branch C
Directorate of Avionics Management

cc:
WR-ALC/LY
WR-ALC/LYP
WR-ALC/LYP-1
WR-ALC/LYPF
WR-ALC/LYLCE
WR-ALC/LYLCC
WR-ALC/LYL-1

TAB J-5

F-15C 84-0025

J-5a Analysis, KIR-1C

J-5b Analysis, APX-76/IFF

J-5c AFLC/AFSC Form 49, Tear Down Deficiency Report, Radar Target Data Processor

J-5d Analysis, AAI Control Panel

J-5e Analysis, Interference Blanker

TEARDOWN DEFICIENCY REPORT

MIP NUMBER			DATE OF INSPECTION: 25 Apr 94
1. ACTIVITY PERFORMING INSPECTION: WR-ALC/LYPDB	2. INSPECTOR: Rodney Short, Albert Lewis	3. PRIORITY	4. DEFICIENCY DATE
5. STATION SERIAL NUMBER	6. SUBMITTED BY: Capt. Wheeler		7. EQUIPMENT SERIAL NUMBER: F-15C/84-0025
8. INSTALLED POSITION	9. TMS OR MDS: N/A	10. SECTION OR PROPERTY CLASS	11. SUB SYSTEM OR MODEL
12. MAJOR ASSEMBLY, TYPE OR MODEL, NSN: Radar Target Data Processor	13. PRODUCT SERIAL NO.	14. MINOR ASSEMBLY, NSN	
15. NOMENCLATURE OR PART, NSN: 124200-105		16. REFERENCE NO.	17. TYPE DEFICIENCY
18. CONDITION: Good	19. PRIMARY CAUSE OF FAILURE: No Failure		
20. DISPOSITION	21. MANUFACTURER, HOURS OR MILES SINCE NEW: Litton Systems Inc Data Systems Div 1034 hours		
22. FORMS RECEIVED WITH EQUIPMENT: AF Form 52	23. LAST USING ACTIVITY - NAME, ADDRESS, COMMAND: Incirlik AFB, Turkey		
24. LAST OVERHAUL ACTIVITY, DATE, HOURS OR MILES SINCE OVERHAUL			25. DATE REMOVED FROM SERVICE: DAY / MO / YR
26. NUMBER OF PRIOR OVERHAULS	27. REASON FOR REMOVAL		

28. TEARDOWN DEFICIENCIES ANALYSES

PART NOMENCLATURE	PART SERIAL NUMBER	LOCATION, DESCRIPTION AND CONDITION
Radar Target Data Processor,	Serial Number 1444 was received in good condition. Serial Number 1444 was connected to test set and passed all test. Unit was then sent to another area of the shop for testing of SRU's. Print out of test is attached.	

26 Apr 94

Final LRU operational check was completed after SRU checks complete. No discrepancies were found and print out is attached.

Rod S Short

Tony Bayly

CERTIFICATE

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

Date

LRU test station clock battery inoperational - wrong date on runs.

Capt Teresa Wheeler

FORM

MEMORANDUM FOR HQ USAFE/RSL
ATTENTION: CAPT WHEELER

26 APR 1994

FROM: WR-ALC
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJECT: Mishap Investigation of F-15 Radar Target Data Processors - INFORMATION MEMORANDUM

1. Attachment to Teardown Deficiency Report for LRU ser. no. 1444

a. A1- P/N 124251-102 S/N 3095
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

b. A2- P/N 124252-102 S/N 818
No visual defects found: No sign of any recent repairs. See attached printout. We replaced Q18, Q19 and Y1 for a suspected failure but found the problem to be adapter seating. K1 was changed for high resistance on test T2 S60 test TH. K1 fixed problem. Circuit card ran good on ADTS Digital station #4.

c. A3- P/N 124253-102 S/N 2154
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

d. A4- P/N 124254-101 S/N 1529
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

e. A5- P/N 124255-103 S/N 2842
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

f. A6- P/N 124256-101 S/N 750
No visual defects found. No sign of any recent repairs. Circuit card ran good on ADTS Digital station #4. See attached printout.

g. A7- P/N 124250-104 S/N 740
No visual defects found. No sign of any recent repairs. Failed T19.1 High 2.36138-01V. Replaced C12 and circuit card ran good on ADTS Analog station #25. See attached printout.

2. If there are any questions concerning the information provided, please contact Mr Billy Shirley at DSN 468-4910 or commercial 912-926-4910.

BILLY G. SHIRLEY, WG-12
Intergrated Electronics Mechanic

ANTHONY BUSBY, WS-12
Electronics Supervisor

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.

7 May 94
Date

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

MEMORANDUM FOR HQ USAFE/RSL
ATTENTION: CAPT WHEELER

26 Apr 94

FROM: WR-ALC
296 Cochran Street
Robins AFB, GA 31098-1622

SUBJECT: Radar Target Data Processor (RTDP) Out of Tolerance Conditions found during Shop Replaceable Unit (SRU) Testing

1. Engineering analysis of out of tolerance conditions has been completed.

a. NSN: 5896-01-016-2209
PN: 124200-105
SN: 1444

RTDP SN 1444 meet all functional test requirements at the Line Replaceable Unit (LRU) [Black Box] level. During individual SRU testing one circuit card assembly (CCA) A7 (PN 124250-104, SN 740) had an out of tolerance test condition caused by capacitor C12 which is used to filter noise out of the power supply.

EFFECT CAUSE BY C12 TO CCA:
- increased noise on ground

EFFECT TO SYSTEM PERFORMANCE:
- NONE

b. NSN: 5896-01-016-2209
PN: 124200-105
SN: 0274

RTDP SN 0274 meet all functional test requirements at the Line Replaceable Unit (LRU) [Black Box] level. During individual SRU testing two circuit card assemblies (CCA) A2 (PN 124252-102, SN 570), A3 (PN 124251-101, SN 1411) had an out of tolerance test conditions. A2 had a relay K1 which resistance measured high, and A3 had a resistor R3 which measured low.

EFFECT CAUSE BY K1 TO CCA A2:
- increased current through several Integrated Circuits (ICs) [components]

EFFECT TO SYSTEM PERFORMANCE:
- NONE

EFFECT CAUSE BY R3 TO CCA A3:
- possible delay of verification BIT Enable/Return

EFFECT TO SYSTEM PERFORMANCE:
- NONE

2. If there are any questions about the analysis performed, please contact Captain Albert Thompson at DSN 468-3594 or commercial 912-926-3594.

Albert F. Thompson

ALBERT F. THOMPSON
Captain, USAF
F-15 Chief Electrical Engineer

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.

2 May 04
Date

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

TAB J-5

F-15C 84-0025

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFLC)
ROBINS AIR FORCE BASE, GEORGIA 31098-5149

2 May 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION MAJOR SNYDER

FROM: WR-ALC/LYPD (Tony Busby)
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJ: Mishap Investigation of AAI Control Panel

1. Investigation of mishap exhibits has been completed. The following information is provided:

a. NSN: 5895-01-044-4987
NOUN: AAI Control Panel
SERIAL NO: 0729

b. NSN: 5895-01-044-4987
NOUN: AAI Control Panel
SERIAL NO: 0642

2. The two AAI Control Panels were received at the depot sealed and wrapped with tape. The exhibits were opened in the presence of USAFE and WR-ALC representatives. Instructions from USAFE were to run the exhibits through functional LRU checks to determine if the units were serviceable.

3. Examination of our historical data base revealed we had not repaired S/N 0642 or S/N 0729 at this depot.

4. The exhibits were tested utilizing the minimum performance test in T.O. 12S1-2A-107 dated 15 Sep 1975, Change 23, 29 Nov 1992. These units passed all functional tests.

5. In conclusion, the exhibits S/N 0729 and S/N 0642 passed all minimum performance testing and visual inspection. Based on tests at our disposal, we consider these units serviceable. We were happy to be of assistance in this investigation and if we can be of any assistance in the future, please feel free to call us.

6. WR-ALC/LYPD point of contact is Robert Shiver or Tony Busby, DSN 468-2862/Commercial (912) 926-2862.

ANTHONY BUSBY
Foreman, Hardware Production Branch A

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.

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

Date

TAB J-5

F-15C 84-0025

J-5a

J-5b

J-5c

J-5d

J-5e

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR LOGISTICS CENTER (AFLC)
ROBINS AIR FORCE BASE, GEORGIA 31098-5149

3 May 1994

MEMORANDUM FOR HQUSAFE/RSL
ATTENTION MAJOR SNYDER

FROM: WR-ALC/LYPD (Tony Busby)
380 2nd St. Ste 104
Robins AFB, GA 31098-1638

SUBJ: Mishap Investigation of Interference Blanker

1. The three Interference Blankers were received at approximately 10:30 A.M. on 02 May 94. They had been shipped using UPS. Items were shipped in one box with paper cushioning. Box was opened in the presence of USAFE and WR-ALC representatives. All three Interference Blankers were visually checked and appeared to be in good repair with the exception of serial number 0206 which had one cover screw loose and serial number 0687 had 3 chassis screws loose. These were structural discrepancies and have no effect on the performance of the boxes. Upon removal of cover for SRU runs, found S/N 0687 to have solder specs/metal shavings on inside. Serial number 0687 and 0650 had no edgeguard installed per T.O. 12P4-2A-113, Table 5-1, Change 11. Serial number 0650 had pin missing on card holder of A3CCA - pin was not located on inside of LRU. See Atch 1 - TDR Report.

2. Examination of our historical data base revealed that S/N 0206 had been repaired at depot in September of 1990. There has been over 2000 hours of operating time since depot repair. Serial numbers 0650 and 0687 had not been repaired at depot.

3. The exhibits were tested utilizing the minimum performance test in T.O. 12P4-2A-118-1 using program 48088110 dated 29 June 1989. All units passed functional test. Serial number 0206 needed to have two test repeated that failed marginally. See Atch 2 - Initial performance test results.

4. SRUs were checked on Analog Station and results were as follows:

a. S/N 0650 - A5 card had one resistor out of tolerance - All other SRUs passed. A5CCA passed in next higher assembly.

b. S/N 0206 - A6 card had one inactive pin smashed - All SRUs passed performance.

CERTIFICATE

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3 May 94
Date

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

c. S/N 0687 - A8 card had metal shavings - All SRUs passed performance.

d. See Atch 3 - SRU performance test and evaluation.

5. In conclusion, the exhibits S/N 0206 and S/N 0650 passed all minimum performance testing and visual inspection. Based on tests at our disposal, we consider these units serviceable. Serial number 0687 needs thorough cleaning or depot service. See Atch 4 - Final LRU performance test.

6. We were happy to be of assistance in this investigation and if we can be of any assistance in the future, please feel free to call us.

7. WR-ALC/LYPD point of contact is Robert Mitchell or Tony Busby, DSN 468-2862/Commercial (912) 926-2862.

ANTHONY BUSBY
Foreman, Hardware Production Branch A

AFR 110-14 AIRCRAFT ACCIDENT BOARD
INDEX OF TABS

TAB K

MILITARY FLIGHT PLANS

K-1 UH-60 Black Hawk 88-26060

K-2 UH-60 Black Hawk 87-26000

(See Tab K-1)

K-3 E-3B AWACS

K-4 F-15C 79-0025

(See Tab K-3a, b, d)

K-5 F-15C 84-0025

(See Tab K-3a, b, d)

FLIGHT PLAN - UÇUŞ PLANI

PRIORITY / ÖNCELİK DERECESİ — ADDRESSEE(S) / ADRES(LER)

≪ ≡ FF

≪ ≡

PLANIN ÇEKİLİŞ ZAMANI	PLANIN HAZIRLANDIĞI MEYDANIN KODU	PLANIN HAZIRLANIŞ ZAMANI

PLANIN TELSİZ VE UÇUŞ KULESİNE GÖNDERİLME ZAMANI	TELSİZ/KULENİN ALMA ZAMANI	PLANI ÇEKENİN İSMİ	PLANI ALANIN İSMİ

3 MESSAGE TYPE / MESAJ TİPİ: ≪ ≡ (FPL — 7 AIRCRAFT IDENTIFICATION / UÇAK TANITMA İŞARETİ: EAGLE Ø1 — 8 FLIGHT RULES / UÇUŞ KAİDELERİ: V — TYPE OF FLIGHT / UÇUŞ TİPİ: M ≪

9 NUMBER / NUMARA: Ø2 — TYPE OF AIRCRAFT / UÇAK TİPİ: H6Ø — WAKE TURBULANCE CAT. / TÜRBÜLANS SINIFI: / M — 10 EQUIPMENT / TEÇHİZAT: S/C ≪

13 DEPARTURE AERODROME / KALKIŞ MEYDANI: LTCC — TIME / ZAMAN: Ø52Ø ≪

15 CRUISING SPEED / UÇUŞ HIZI: NØ12Ø — LEVEL / SEVİYE: FLØ75 — ROUTE / YOL: LLTR 1,2,3,4, ZAKHO, TAOR, ZAKHO, LLTR 4,3,2,1

≪

16 DESTINATION AERODROME / GİDİŞ MEYDANI: LTCC — TOTAL EET / TOPLAM UÇUŞ SÜRESİ HR MIN: Ø8ØØ — ALTN AERODROME / YEDEK MEYDAN: — 2 ND. ALTN AERODROME / 2. YEDEK MEYDAN: ≪

18 OTHER INFORMATION / DİĞER BİLGİLER

REG ~~[illegible]~~ ~~[illegible]~~ OPR/U.S ARMY RMK/REQ J4 LTCC REQ LOW LEVEL AS NECESSARY MSN# A147Ø

) ≪

SUPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES) / EK BİLGİLER (BU KISIM UÇUŞ PLANINDA VERİLMEYECEKTİR)

19 ENDURANCE / YAKIT MİKTARI SÜRESİ HR MIN: E/Ø53Ø — PERSONS ON BOARD / UÇAKTAKİ KİŞİ SAYISI: P/Ø1Ø — EMERGENCY RADIO: R/ UHF U — VHF V — ELBA ~~E~~

SURVIVAL EQUIPMENT: POLAR / KUTUP — DESERT / ÇÖL — MARITIME / DENİZ — JUNGLE / ORMAN: S / P ~~D~~ ~~M~~ ~~J~~ — JACKETS: ~~J~~ / LIGHT L — FLUORES F — UHF U — VHF V

DINGIES / DİNGİ — NUMBER / NUMARA — CAPACITY / KAPASİTE — COVER C — COLOUR / RENK: ~~D~~ / ≪

AIRCRAFT COLOUR AND MARKINGS / UÇAĞIN RENGİ VE İŞARETLERİ

A / OD Green WITH AMERICAN FLAG

REMARKS / NOTLAR

N / ≪

BU BÖLÜM ÇEKİLMEYECEKTİR. - NOT FOR TRANSMISSION

UÇAĞIN ANA ÜSSÜ / AIRCRAFT HOME STATION	PİLOTUN İSMİ / NAME OF PILOT - IN - COMMAND	PİLOTUN İMZASI / SIGNATURE OF PILOT - IN - COMMAND
LTCC	McKenna	[signature]
PİLOTUN UÇUŞ ÖNCESİ KONTROLLARI / PILOT'S PRE - FLIGHT CHECK	METEOROLOJİ - METEOROLOGY / UÇUŞ İSTİDLAL RAPORUNU VERENİN İSİM VE İMZASI / NAME AND SIGNATURE OF THE OFFICAL FURNSIHING THE FORECAST FORMAT	TASDİK EDEN YETKİLİ ŞAHSIN İSMİ VE İMZASI / NAME AND SIGNATURE OF APPROVING AUTHORITY
NOTAMLAR / NOTAMS: ✓		
TAHDİTLİ HAVA SAHALARI / AIR SPACE RESTRICTIONS: ✓	175-1 LTAG	[signature]
GİDİŞ MEYDANI S/S YARDIMCILARI / AIRCRAFT/DEST. NAV. AIDS: ✓	HAKİKİ KALKIŞ ZAMANI / ACTUAL TIME OF DEPARTURE	
FORM - 66 1 OCAK 1986	HAKİKİ İNİŞ ZAMANI / ACTUAL TIME OF ARRIVAL	

Reduced - [illegible]

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.

7 May 94
Date

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

KALKIŞ MESAJ FORMU

ÖNCELİK DERECESİ :

..... FF ZAKHLY

MESAJIN ÇEKİLECEĞİ ADRESLER :

LTACYW ...ZAHM.....

MESAJIN ÇEKİLİŞ ZAMANI :

.....

MESAJI ÇEKEN MEYDANIN KODU :

.....

MESAJIN CİNSİ :

..... DEP EAGLE

UÇAK TANITMA İŞARETİ :

01 2XN-60

KALKIŞ ZAMANI :

0520Z

Hv. K. Form : 66A

HKY 15 - 23

******** UF-600SF ******* -COMM. JOURNAL- ****** DATE 1994-04-14 ***** TIME 08:27 **** P.1

MODE=MULTI-STATION XMT START=04-14 08:24 END=04-14 08:27

NO.	COM	ABBR.NO.	STATION NAME	DOC	GROUP	GROUP NAME
01	OK	*02	2BHM	01/01		
02	OK	*06	ESB	01/01		

-8.ANAJET US -

************************ -PANASONIC- ************************ - 870 4906- **********

******* UF-600SF ******* -COMM. JOURNAL- ****** DATE 1994-04-14 ***** TIME 08:04 **** P.1

MODE=MULTI-STATION NAT START=04-14 08:00 END=04-14 08:04

NO.	COM	ABBR.NO.	STATION NAME	DOC	GROUP	GROUP NAME
01	OK	*11	ESB.	03/03		
02	OK	*16	2BHM.	03/03		

-B.ANAJET US K.

********** -PANASONIC- ********** - 0 412 2243945- **********

ADRES	LTACYMYX	LTACZIZX		YDYX		YDYX	
UÇAK KODU	NUMARA	UÇAK TİPİ	KALKIŞ MEYDANI	ZAMAN		UÇUŞ HIZI	SEVİYE
FAGLE 41	02	H-60	LTCC	0520		N0120	FL075
TÜRBÜLANS	M	UÇUŞ KAİDESİ	V	UÇUŞ TİPİ	M	TEÇHİZAT	S/C
YOL	LLTR 1,2,3,4, ZAKHO, TAOR, ZAKHO, LLTR 4,3,2,1						

GİDİŞ MEYDANI	UÇUŞ SÜRESİ	YEDEK MEYDAN	
LTCC	08:00		

DİĞER BİLGİLER: REG 26001 26007 OPR/U-STIARMY
EMK/REQ J4 LTCC RFQ LOW LEVEL AS NECESSARY
USN # A1670

TAB K

MILITARY FLIGHT PLANS

TAB K

MILITARY FLIGHT PLANS

TAB K-3

E-3B AWACS

K-3a Extract from Operation PROVIDE COMFORT Air Tasking Order, PC 1103, 14 April 1994
(See also Classified Addendum)

K-3b Battle Staff Directive, 13 April 1994

K-3c E-3B AWACS Flight Orders, 13 April 1994

K-3d Daily Flying Schedule, 14 April 1994

K-3a

Extract of Operation PROVIDE COMFORT

Air Tasking Order, PC1103, 14 Apr 94

PART I. MISSION TASKING (ATO PC1103), 14 APR 94, (THURSDAY) THE FOLLOWING IS A KEY TO ALL SETS CONTAINED WITHIN THE AIR TASKING ORDER. ANY FIELD THAT DOES NOT CONTAIN DATE WILL BE REPLACED WITH A HYPHEN.

MISSN/MSN NO./NO. OF ACFT/MSN/SCL1/TOT/TGTLOC/

CALLSIGN/SIF2/REFUEL/TKR/

CALLSIGN/ARCT/TRACK/ALT/OFFLOAD/COMMENTS/TASKING/

NOTE: ALL FIELDS ARE ACCOUNTED FOR UNTIL THE LAST MANDATORY FIELD//

ALL TRAILING OPTIONAL FIELDS WITHOUT DATA ARE DROPPED//

PERIOD/ 140001Z TO 142359Z//

----------INCIRLIK----------

----------F-15----------

TASKUNIT/53FS//

MISSN/A1410/2/RECCE/412027299/0720Z-0845Z/

TIGER/1501, 1502/REFUEL/PUMA 22/0755Z/ROZ 02/A210/11K/

COMMENTS/TASKING: A, E//

***

----------AWACS E3----------

TASKUNIT/552ACW//

MISSN/A1430/1/AEW/0730Z-1330Z/ROZ 01/-/

SAVVY/0301/REFUEL/PUMA 33/1000Z/ROZ 01/A260/40K/

COMMENTS: COUGAR (MSN) SAVVY (AIRCREW)/

CERTIFICATE OF DECLASSIFICATION
I certify that the information contained in this document has been declassified from
SECRET to UNCLASSIFIED
15 May 94
Date
Donald G Norris
DONALD G NORRIS, GS-15, DAC
Declassification Team Chief, HQ USEUCOM

CERTIFICATION OF EXTRACT
I reviewed SEC ATO PC1103
From that source document. I extracted the information contained in this extract. I certify the information contained herein is a true and accurate extract of that source document.
15 May 94
Wayne Madge, Lt Col

SAVVY TAKEOFF TIME IS 0450Z./

BEGIN COORDINATION TO DATA LINK WITH/

GROUND SITES AT 0520Z. COMPLETE DATA LINK/

COORDINATION BY 0550Z.//

***

----------TANKERS KC135----------

***

MISSN/A1422/1/AAR/-/-/

PUMA 22/3502/0730Z-0940Z/ROZ 02/A210/

REFUEL/A1401/RAIDER/2F16/6K/0730Z JP4/BOOM/

A1410/TIGER/2F15/11K/0755Z/JP4/BOOM/

A1403/VIKING/2F16/6K/0810Z/JP4/BOOM/

A1411/CLAW/2F15/10K/0835Z/JP4/BOOM/

A1458/ELVIS 01/1EF111/9K/0930Z/JP4/BOOM/

COMMENTS: A/A TACAN 32Y-95Y//

MISSN/A1423/1/AAR/-/-/

PUMA 33/3503/0840Z-0940Z/ROZ O2/A250/

0955z-1025Z/ROZ 01/A260/

REFUEL/A1402/BRONCO/2F16/6K/0840Z/JP4/BOOM/

A1406/RHINO/2F4G/13K/0930Z/JP4/BOOM/

A1430/SAVVY/1E3/40K/1000Z/JP4/BOOM/

COMMENTS: A/A TACAN 33Y-96Y//

***

***

TASKUNIT/12AVN// ----------UH60----------DIYARBAKIR

MISSN/A1470/2/TRANSPORT/-/AR/

EAGLE 1,2/5530-1/LTCC-TAOR-LTCC/

DEP LTCC:	AR/	GATE 1:	AR/
ARR ZAKHU:	AR/		
DEP ZAKHU:	AR/	GATE 1:	AR/
ARR LTCC:	AR//		
COMMENTS:	MCC//		

***

----------COMMENTS----------

Part II. SPINS----------SPINS----------SPINS

***

B. DAY/BASE NO/AOR MODE 1: 14/5/52

SEE COMMENTS 3 FOR NON-AOR MODE ONES

***

3. MODE SQUAWKS-ALL ACFT MODE SQUAWKS

NOTE: THE FOLLOWING ARE NON AOR MODE ONES

MODE I - 43 - FIXED WING MODE I - 42 - ROTARY WING

MODE II - ON FRAG LINE

***

TAB K-3

E-3B AWACS

K-3a Extract from Operation PROVIDE COMFORT Air Tasking Order, PC 1103, 14 April 1994
(See also Classified Addendum)

K-3b Battle Staff Directive, 13 April 1994

K-3c E-3B AWACS Flight Orders, 13 April 1994

K-3d Daily Flying Schedule, 14 April 1994

K-3a

K-3b

COMBINED FORCES AIR COMPONENT (CFAC)
BATTLE STATE DIRECTIVE

~~SECRET~~

RPT NO:

DTG: 1500Z | 13 APR | 1994

SUBJ: CHANGE TO PC ATO #1103 14APR94 THURSDAY
AND PC DAILY SCHEDULE BSD #1

INFO	ACTION	COMPL	ADDRESSEES
\			CTF (281)
			CFAC (833)
			SBS (BATTLE CAB)
\			BS (MD)
\			TURKISH LIAISON (201)
			TURKISH CP (18)
\			FRAG (376)
\			INTEL (WOC)
			MAINT LO (MCC)
			WEATHER (525)
			COMM
			EOD (115)
			RAPIER
\			~~TANKER~~/SOF (525)
			RAPCON/GCI (525)
			628 MAS/ACC (500)
	\		SOC 1 (F-15)
\			SOC 1 (F-15E)
\			SOC 1 (JAG/F-1)
\	\		SOC 1 (EF-111)
\	\		SOC 2 (F-16/F-4G)
\	\		SOC 2 (HARRIER)
\	\		SOC 3 (39 SOW)
\	\		SOC 4 (AWACS)
			C-130 (918)
	\		TANKER OPS (HCR 5)
			C-12 (360)
\			VC-10 (6-8336)
\			CURRENT OPERATIONS

ATO: F-15 "CLAW", F-16s "BRONCO", "RAIDER", F-4G "RHINO", TUF-H "SAHIN", EF-111s "ELVIS 01", "ELVIS 02", KC-135s "PUMA 11-55", AWACS "SAVVY" ARE AFFECTED

"CLAW" MISSN/A1411/ SECOND REFUEL IS PUMA 33, ALL ELSE UNCHANGED

"BRONCO" MISSN/A1402/ REFUELINGS ARE IN ORDER PUMA 11, PUMA 22, PUMA 33. ALL ELSE UNCHANGED.

"RHINO" MISSN/A1406/ ··· 0835Z - 0925Z/

DELETE REFUEL PUMA 33. DELETE SECOND AOR DIP AND NORTHERN LOW FLY

"SAHIN" MISSN/A1460/ ··· 0840Z - 0900Z/ REFUEL/PUMA 11/0905Z ···

"ELVIS 01" MISSN/A1458/ ··· 0800Z - 0940Z/

DELETE REFUEL PUMA 22. DELETE SECOND AOR DIP AND SOUTHERN LOW FLY

"ELVIS 02" MISSN/A1459/ ··· 1205Z - 1310Z/

DELETE FIRST AOR DIP. DELETE REFUEL PUMA 44

ADD REFUEL/PUMA 55/1155Z/ROZ 02/A230/BK/

"PUMA 11" MISSN/A1421/ ··· 0730Z - 0850Z/ROZ 02/A230/
0905Z - 0925Z/ROZ 01/A260/

ADD REFUEL/A1402/BRONCO/2F16/6K/0840Z/JP4/BOOM/
A1460/SAHIN/4TUF4/2K/0905Z/JP4/BOOM/

"PUMA 22" MISSN/A1422/ ··· 0730Z - 0945Z/ROZ 02/A210/
REFUEL/A1401/RAIDER/2F16/5K/0730Z/JP4/BOOM/
DELETE A1458/ELVIS01/1EF111/9K/0930Z/JP4/BOOM/
ADD A1402/BRONCO/2F16/6K/0935Z/JP4/BOOM/

"PUMA 33" MISSN/A1423/ ··· 0930Z - 0955Z/ROZ 01/A260/
1010Z - 1120Z/ROZ 02/A250/

DELETE REFUEL/A1402/BRONCO/2F16/6K/0840Z/JP4/BOOM/

DELETE A1406/RHINO/2F4G/13K/0930Z/JP4/BOOM/
A1430/SAVVY/1E3/40K/0930Z/JP4/BOOM/

ADD A1411/CLAW/2F15/13K/1020Z/JP4/BOOM/

ADD A1402/BRONCO/2F16/7K/1035Z/JP4/BOOM/

"PUMA 44" MISSN/A1424/ DELETED
MISSN/D1424/ DELETED

- CONTINUED -

~~SECRET~~

CFAC/CC APPROVAL

MPC RELEASE [redacted]

REVISED FLOWSHEET ATTACHED

NUMBER OF COPIES MADE 26

CERTIFICATE OF DECLASSIFICATION

certify that the information contained in this document has been declassified from

SECRET to UNCLASSIFIED.

15 May 94

Donald G. Norris
DONALD G. NORRIS, GS-15, DAC
Declassification Team Chief, HQ USEUCOM

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

4

COMBINED FORCES AIR COMPONENT (CFACC)

BATTLE STAFF DIRECTIVE

~~SECRET~~

RPT NO:

DTG: 1500Z | 13APR | 1994

SUBJ: CHANGE TO PC ATO #1103 14APR94 THURSDAY
AND PC DAILY SCHEDULE (CONTINUED) BSD# 1

"PUMA 55" MISSN/A1425/··· 1145Z-1300Z/··· 1315Z-1335Z/···
ADD REFUEL/A1459/ELVIS 02/1EF111/8K/1155Z/JP4/300M/
"RAIDER" MISSN/A1401/··· 0740Z-0820Z/
REFUEL/PUMA 22/0730Z/ROZ 02/AZ10/5K
"SAVVY" MISSN/A1430/··· 0730Z-1330Z/ROZ 01/-/
REFUEL/PUMA 33/0930Z/ROZ 01/AZ60/40K/

PC DAILY SCHEDULE:
F-4G MSN# A1406 "RHINO" ETA 1015 (1+05 EARLIER)
EF-111 MSN# A1458 "ELVIS 01" ETA 1030 (1+05 EARLIER)
EF-111 MSN# A1459 "ELVIS 02" ETD 1105 (1+05 LATER)
ETA 1400 (+10 EARLIER)
TF-4 MSN# A1460 "SAHIN" ETD 0750 (+05 LATER)
ETA 1015 (+05 LATER)
KC-135 MSN# A1423 "PUMA 33" ETD 0830 (+50 LATER)
ETA 1220 (+55 LATER)
KC-135 MSN# A1424 "PUMA 44" DELETED
KC-135 MSN# D1424 "PUMA 44" DELETED

INFO	ACTION	COMPL	ADDRESSEES
\			CTF (281)
			CFAC (833)
			SBS (BATTLE CAB)
\			BS (MD)
\			TURKISH LIAISON (201)
			TURKISH CP (18)
\			FRAG (376)
\			INTEL (WOC)
			MAINT LO (MOC)
			WEATHER (525)
			COMM
			EOD (115)
			RAPIER
\			~~TOWER~~/SOF (525)
			RAPCON/GCI (525)
			628 MAS/ACC (500)
	\		SOC 1 (F-15)
\			SOC 1 (F-15E)
\			SOC 1 (JAG/F-1)
	\		SOC 1 (EF-111)
	\		SOC 2 (F-16/F-4G)
\			SOC 2 (HARRIER)
\			SOC 3 (39 SOW)
	\		SOC 4 (AWACS)
			C-130 (918)
	\		TANKER OPS (HGR 5)
			C-12 (360)
\			VC-10 (6-8336)
\			CURRENT OPERATIONS

~~SECRET~~

CFAC/OG APPROVAL

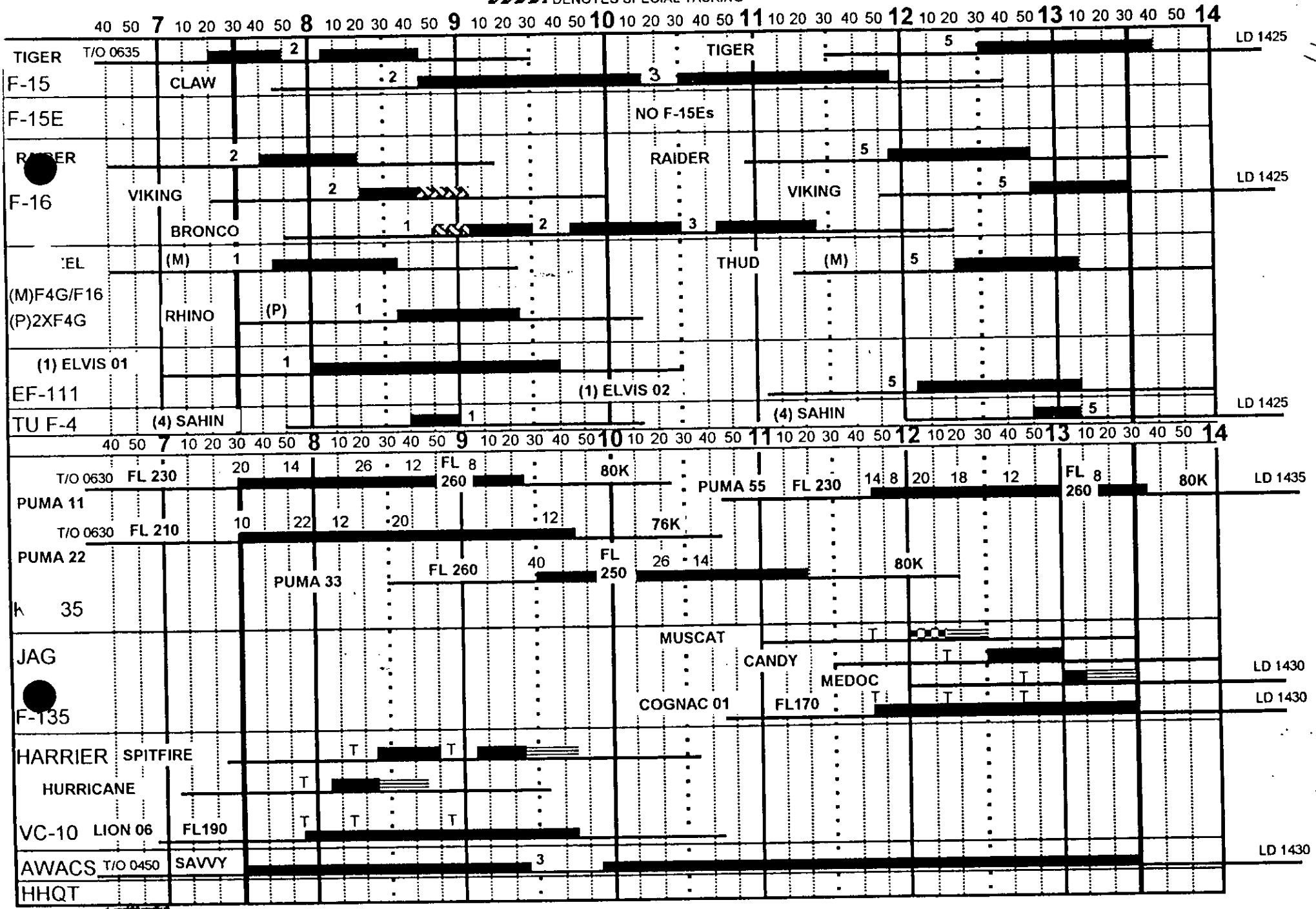
MPC RELEASE [redacted]

NUMBER OF COPIES MADE 26

DAY: THURSDAY DATE: 14 APR 94 ATO#: 1103

DENOTES NORTH LOW FLY
DENOTES SOUTH LOW FLY
DENOTES SPECIAL TASKING
DENOTES PRIMARY DCA (F15C/F15E/F16C)
DENOTES BACKUP DCA

LTAG:SUNRISE: 0306 SUNSET: 1612
LTAG:BMCT: 0239 EECT: 1639
TAOR:SUNRISE: 0236 SUNSET: 1540



CHANGE 1

TAB K-3

E-3B AWACS

K-3a Extract from Operation PROVIDE COMFORT Air Tasking Order, PC 1103, 14 April 1994
(See also Classified Addendum)

K-3b Battle Staff Directive, 13 April 1994

K-3c E-3B AWACS Flight Orders, 13 April 1994

K-3d Daily Flying Schedule, 14 April 1994

K-3a

K-3b

K-3c

FLIGHT AUTHORIZATION

PREPARED: 13 APR 94 | MISSION: DPC0094
DESTINATION | MSN TYPE | SCHED DEP DT/TM | SCHED ARR DT/TM | UNIT | AERO VEH
LTAG | 0-2 | 14 APR 94/A/R | 14 APR 94/A/R | 0963 | TBD

NAME	GRD	SSAN	CREW POSN	DUTY POSN	RMK	UNIT	CEC CLR	ARF INIT
[redacted]	CPT	[redacted]	AC	MPBE	*	0963	TS	231
	CPT		CP	MCBE		0963	TS	231
	CPT		INAV	INBE		0963	SEC	231
	~~TSG~~		~~ESE~~	~~EFBE~~		~~0963~~	~~TS~~	
	TSG		FE	MFBN		0963	TS	231
	MAJ		MCC	MAB1		0963	TS	231
	MAJ		MCC	MAB1		0963	TS	231
	CPT		SO	MAB2		0963	SEC	231
	CPT		IWO	IAB2		0963	SEC	231
	1LT		WO	MAB3		0963	SEC	231
	1LT		WO	MAB3		0963	TS	231
	CPT		IASO	MAC4		0963	TS	231
	SSG		~~A~~ASI	MABF		0963	SEC	231
	AMN		ACT	MABE		0963	SEC	231
	A1C		AOT	MABS		0963	SEC	231
	~~SrA~~		AST	MABS		0963	SEC	231
	TSG		IOSO	IKBE	#	0963	TS	231
	SRA		IOT	IAB7		0963	TS	231
	SSG		IOT	IAB7		0963	TS	231
	~~SSG~~		~~IODMT~~	~~IAB9~~		~~0963~~	~~SEC~~	
	SSG		IODMT	MAA9		0963	TS	231
	A1C		ART	MAB8		0963	SEC	231
	A1C		ARO	MABH		0963	SEC	231
	MAJ		DUKE	MZ		0CTF	TS	231
	1LT		CO	MAB3		0963	SEC	231

[redacted] 3706 2561 2649

START C/R | SHOW TIME | DEPART
ASRC | ASRC | LTAG

* = PILOT IN COMMAND
# = CLASSIFIED COURIER

REMARKS:
PEID CODE C
M-CONT
VARIATION IN ITINERARY AUTHORIZED

CALL SIGN: SAVVY01
IC/CC 5723400 302 7832
443010 02
408.26 409.26 50310Q 93T0A132

PERSONNEL ARE SUBJECT TO THE PROVISIONS OF THE UCMJ WHILE PERFORMING THIS DUTY

DATE OF ORDER	ORDER NUMBER	FOR THE COMMANDER
13 APR 94	P0006	

DESIGNATION AND LOCATION OF HEADQUARTERS: SIGNATURE ELEMENT OF ORDERS
DEPARTMENT OF THE AIR FORCE
[redacted]
INCIRLIK AB, TURKEY (DEPLOYED) | DETACHMENT COMMANDER

(Computer Generated)

RECORD COPY

Page Revised

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.

9 May 94
Date

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

PASSENGER MANIFEST

(Check applicable box) — NONREVENUE ☐ REVENUE ☐

1. CARRIER: USAF
2. AIRCRAFT NO.:
3. ORIGIN: LTAG
4. DESTINATION (Name and location): LTAG
5. MANIFEST NO.: 0001
6. TRIP NO./AND DATE: 0001 /
7. CABIN ATTENDANT: NONE

8. MANIFEST

LINE NO.	GRADE OR TITLE (A.)	U.S. ARMED FORCES PASSENGERS (Name and AFSN or SSAN) U.S. CIVILIANS AND FOREIGN NATIONALS (Name-Last, First, M.I. and Passport No.) (B.)	CHECKED BAGGAGE PIECES (C.)	CHECKED BAGGAGE WEIGHT (D.)	PASSENGER WEIGHT PLUS CABIN BAGGAGE (E.)	AUTHORITY AND/OR PRIORITY IDENTIFICATION (HQS., Order No., and Date) (F.)
1	1Lt	[redacted]				
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
		TOTALS				TOTAL WEIGHT PASSENGERS AND ALL BAGGAGE

9. ALL PASSENGERS AND BAGGAGE LISTED ON THIS ~~MANIFEST~~ HAVE BEEN LOADED.

DATE: 14 Apr 94 — MANIFEST PREPARED BY (Typed name, grade, title): Lillian Llanosierra MSgt USAF — SIGNATURE OF LOADING SUPERVISOR: Lillian Llanosierra

10. ALL PASSENGERS AND BAGGAGE LISTED ON THIS MANIFEST HAVE BEEN RECEIVED EXCEPT AS CIRCLED AND NOTED ON REVERSE.

DATE: 14 Apr 94 — PRINTED NAME, GRADE OR TITLE OF UNLOADING SUPERVISOR: [redacted] — SIGNATURE:

AF FORM 96 APR 88

Page reduced - will

TAB K

MILITARY FLIGHT PLANS

[redacted]

****

FLYING SCHEDULE FOR: THURSDAY 14 APR 94

AWACS SOF: [redacted]

TANKER SOF: [redacted]

****
****

SOF	AM AND PM	[redacted]	F-15	0605Z - 1630Z

****

DETCO MEETING	OG CONFERENCE ROOM	1300Z

****

CURRENT DOCUMENTS

ACO	APRIL CALENDAR	ARF
12 DEC 93	CHG 07	231

****

[redacted]

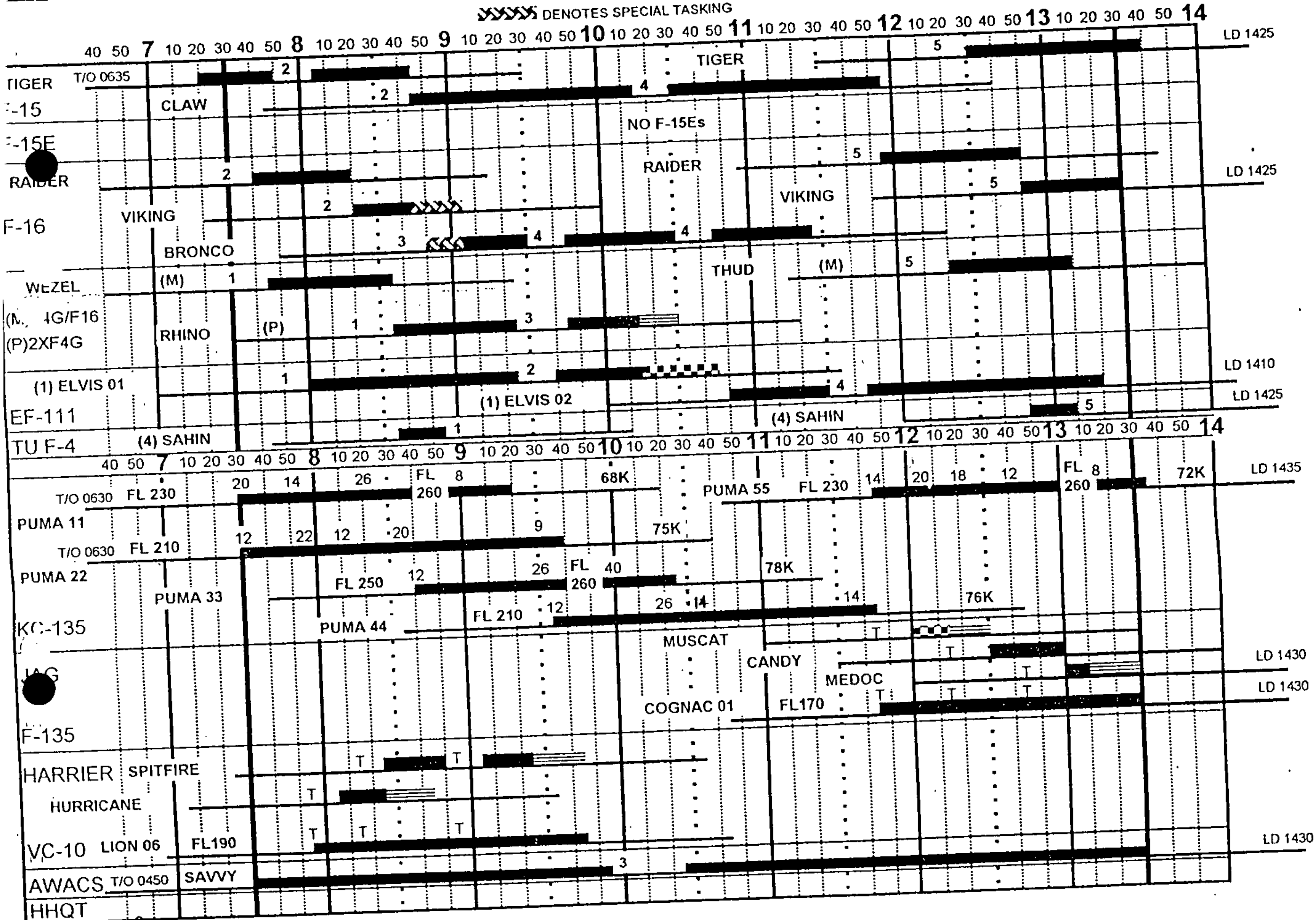
CERTIFICATE

[illegible]

DAY: THURSDAY DATE: 14 APR 94 ATO#: 1103

DENOTES NORTH LOW FLY
DENOTES SOUTH LOW FLY
DENOTES SPECIAL TASKING
DENOTES PRIMARY DCA (F15C/F15E/F16C)
DENOTES BACKUP DCA

LTAG:SUNRISE: 0300
LTAG:BMCT: 0239
EECT: 1639
TAOR:SUNRISE: 0236
SUNSET: 1540



[redacted]

DAILY AIRCRAFT FLYING SCHEDULE ALL TIMES ARE IN ZULU PROVIDE COMFORT SCHEDULE	DATE: 14 APR 94 DAY: THURSDAY	BASE CODE LTAG	SOF:	Prepared by: MSGT CHERYL O. TOMLINSON 39 TACG Scheduling Office EXT 6443/6122 PAGE 2

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	AREA	TIME	REMARKS
172	TF-4		A1460					0745		1010				-		-	
72	TF-4		A1460					0745		1010				-		-	
172	TF-4		A1460					0745	✓	1010	✓			-		-	
023	F-16		A1402	RECCE	BRONCO			0750	0749	1220	[illegible]			-		-	M3:2424
3	F-16		A1402					0750		1220				-		-	
00	KC-135		A1424	AAR	PUMA 44			0835		1245		DO NOT	EXIST			-	M3:2444
429	EF-111		A1459	RECCE	ELVIS 02			1000	1059	1410	1409			-		-	M3:2460
100	KC-135		A1425	AAR	PUMA 55			1045	[illegible]	1435	1655			-		-	M3:2455
100	KC-135		A1426	AAR	COGNAC 01			1045	1013	1430	[illegible]			-		-	M3:2401
023	F-16		B1401	RECCE	RAIDER			1055	[illegible]	1345	1250			-		-	M3:2420
023	F-16		B1401					1055		1345				-		-	
007	JAG		A1451	RECCE	MUSCAT			1100		1330		GAC	on	Runway		-	M3:2440
007	JAG		A1451					1100		1330		Sym		-		-	
207	C-12C		A1486	ARLFT	SPAR 53			1100	1411	1400	[illegible]			-		-	LTAG-LTCC-LTAG
561	F-4G		A1408	RECCE	THUD			1115	[illegible]	1400	1215			-		-	M3:2436
61	F-16		A1408					1115		1400				-		-	
007	JAG		A1450	RECCE	CANDY			1130	[illegible]	1400	1343			-		-	M3:2442
007	JAG		A1450					1130		1400				-		-	
53	F-15		B1410	RECCE	TIGER			1130	[illegible]	1425	[illegible]			-		-	M3:2410
053	F-15		B1410					1130		1425				-		-	
023	F-16		B1403	RECCE	VIKING			1150		1425			HHQ	-		-	M3:2426
023	F-16		B1403					1150		1425				-		-	
007	JAG		A1452	RECCE	MEDOC			1200	1200	1430	1417			-		-	M3: 2443
007	JAG		A1452					1200		1430				-		-	

USAFE FORM 438

39 TACG/DOT OVERPRINT

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
PROVIDE COMFORT SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39 TACG Scheduling Office
EXT 6443/6122 PAGE 3

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	TIME	REMARKS
172	TF-4		B1460	HVA	SAHIN			1200	1222	1425	1330			-		-	M3:2470
172	TF-4		B1460					1200		1425				-		-	
172	TF-4		B1460					1200		1425				-		-	
172	TF-4		B1460					1200		1425				-		-	
016	MH-60		A1466	SAR	PONY 21			A/R	1155	A/R		RON	at	DIYARBAKIR		-	ALERT
016	MH-60		A1466	SAR	PONY 22			A/R		A/R				-		-	ALERT
016	MH-60		A1467	SAR	PONY 23			A/R		A/R				-		-	ALERT
012	UH-60		A1470		EAGLE 01			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1470		EAGLE 02			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1471		EAGLE 03			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1471		EAGLE 04			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1472		EAGLE 05			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1473		EAGLE 06			A/R		A/R				-		-	LTCC-TAOR-LTCC
012	UH-60		A1474		EAGLE 07			A/R		A/R				-		-	MTF
012	UH-60		A1475		EAGLE 08			A/R		A/R				-		-	MTF
012	UH-60		A1476		EAGLE 09			A/R		A/R				-		-	MTF
012	UH-60		A1477		EAGLE 10			A/R		A/R				-		-	LTCC-LTAG
012	UH-60		A1477		EAGLE 11			A/R		A/R				-		-	LTCC-LTAG
012	UH-60		A1478		EAGLE 12			A/R		A/R				-		-	LTAG-LTAG
012	UH-60		A1478		EAGLE 13			A/R		A/R				-		-	LTAG-LTAG
012	UH-60		A1479		EAGLE 14			A/R	1304	A/R				-		-	LTAG-LTCC
012	UH-60		A1479		EAGLE 15			A/R		A/R				-		-	LTAG-LTCC
016	HC-130		A1480	SAR	GHOST 31			A/R	1300	A/R	2000	IFE	#3 ENG EOT			-	ALERT
016	HC-130		A1481	SAR	GHOST 32			A/R	1705	A/R	0422	5 Hour		-		-	ALERT

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
PROVIDE COMFORT SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39 TACG Scheduling Office
EXT 6443/6122 PAGE 4

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
207	C-12C		A1485	ARLFT	SPAR 52			A/R		A/R				-		-	LTAG-LTAC-LTAG
[illegible]	C-12C		A1487	ARLFT	SPAR 54			A/R		A/R				-		-	
207	C-12C		A1488	ARLFT	SPAR 55			A/R		A/R				-		-	
207	C-12C		A1489	ARLFT	SPAR 56			A/R		A/R				-		-	
[illegible]	E-3		C1431	AEW	SAVVY 9			A/R	1424	A/R	1620Z			-		-	
[illegible]	F-16		D1401	RECCE	RAIDER			A/R		A/R				-		-	
023	F-16		D1401					A/R		A/R				-		-	
023	F-16		D1402	RECCE	BRONCO			A/R		A/R				-		-	
023	F-16		D1402					A/R		A/R				-		-	
023	F-16		D1403	RECCE	VIKING			A/R		A/R				-		-	
023	F-16		D1403					A/R		A/R				-		-	
561	F-4G		D1405	RECCE	WEZEL			A/R		A/R				-		-	
561	F-16		D1405					A/R		A/R				-		-	
561	F-4G		D1406	RECCE	RHINO			A/R		A/R				-		-	
561	F-4G		D1406					A/R		A/R				-		-	
[illegible]	F-4G		D1408	RECCE	THUD			A/R		A/R				-		-	
[illegible]	F-16		D1408					A/R		A/R				-		-	
053	F-15		D1410	RECCE	TIGER			A/R		A/R				-		-	
[illegible]	F-15		D1410					A/R		A/R				-		-	
053	F-15		D1411	RECCE	CLAW			A/R		A/R				-		-	
053	F-15		D1411					A/R		A/R				-		-	
100	KC-135		D1421	AAR	PUMA 11			A/R 1430	1928	A/R	2220Z			-		-	
100	KC-135		D1422	AAR	PUMA 22			A/R		A/R				-		-	
100	KC-135		D1423	AAR	PUMA 33			A/R		A/R				-		-	

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
PROVIDE COMFORT SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39 TACG Scheduling Office
EXT 6443/6122 PAGE 1

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
207	C-12C		A1484	ARLFT	SPAR 51			0330	0332	0630	0606			-		-	LTAG-LTCC-LTAG
[redacted]	E-3		A1430	AEW	SAVVY			0450	0436	1430	1607			-		-	M3:2400
100	KC-135		A1421	AAR	PUMA 11			0630	0627	1020	1026			-		-	M3:2411
100	KC-135		A1422	AAR	PUMA 22			0630	0630	1040	1046			-		-	M3:2422
053	F-15		A1410	RECCE	TIGER			0635	0634	0930	1004			-		-	M3:2410
[illegible]	F-15		A1410					0635	↓	0930	↓			-		-	
023	F-16		A1401	RECCE	RAIDER			0640	0636	0915	0919			-		-	M3:2420
023	F-16		A1401					0640	↓	0915	↓			-		-	
561	F-4G		A1405	RECCE	WEZEL			0640	0642	0925	0924			-		-	M3:2432
561	F-16		A1405					0640	↓	0925	↓			-		-	
101	VC-10		A1427	AAR	LION 06			0655	0656	1045	1023			-		-	M3:2406
429	EF-111		A1458	RECCE	ELVIS 01			0700	0654	1135	1045			-		-	M3:2460
001	HARR		A1436	RECCE	HURRICANE			0705	0700	0935	0955			-		-	M3:2452
001	HARR		A1436					0705	↓	0935	↓			-		-	
023	F-16		A1403	RECCE	VIKING			0720	0728	1000	0951			-		-	M3:2426
023	F-16		A1403					0720	↓	1000	↓			-		-	
001	HARR		A1435	RECCE	SPITFIRE			0725	0720	1035	1034			-		-	M3:2450
001	HARR		A1435					0725	↓	1035	↓			-		-	
561	F-4G		A1406	RECCE	RHINO			0730	0731	1120	1116			-		-	M3:2430
561	F-4G		A1406					0730	↓	1120	↓			-		-	
100	KC-135		A1423	AAR	PUMA 33			[redacted]	0825	1125	1143			-		-	M3:2433
053	F-15		A1411	RECCE	CLAW			0745	[illegible]	1240	1305		LT MX	-	Life Support	-	M3:2412
053	F-15		A1411					0745	↓	1240	↓		GYM	-		-	
172	TF-4		A1460	HVA	SAHIN			0745	0803	1010	1003			-		-	M3:2470

USAFE FORM 438

39 TACG/DOT OVERPRINT

AC

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
PROVIDE COMFORT SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39 TACG Scheduling Office
EXT 6443/6122 PAGE 5

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
100	KC-135		D1424	AAR	PUMA 44			A/R		A/R				-		-	
100	KC-135		D1425	AAR	PUMA 55			A/R		A/R				-		-	
100	KC-135		D1426	AAR	COGNAC 01			A/R		A/R				-		-	
101	VC-10		D1427	AAR	LION 06			A/R		A/R				-		-	
552	E-3		D1430	AEW	SAVVY			A/R		A/R				-		-	
	HARR		D1435	RECCE	SPITFIRE			A/R		A/R				-		-	
001	HARR		D1435					A/R		A/R				-		-	
001	HARR		D1436	RECCE	HURRICANE			A/R		A/R				-		-	
001	HARR		D1436					A/R		A/R				-		-	
007	JAG		D1450	RECCE	CANDY			A/R		A/R				-		-	
007	JAG		D1450					A/R		A/R				-		-	
007	JAG		D1451	RECCE	MUSCAT			A/R		A/R				-		-	
007	JAG		D1451					A/R		A/R				-		-	
007	JAG		D1452	RECCE	MEDOC			A/R		A/R				-		-	
007	JAG		D1452					A/R		A/R				-		-	
429	EF-111		D1458	RECCE	ELVIS 01			A/R		A/R				-		-	
?	EF-111		D1459	RECCE	ELVIS 02			A/R		A/R				-		-	
207	C-12C		D1484	ARLFT	SPAR 51			A/R		A/R				-		-	LTAG-LTCC-LTAG
207	C-12C		D1486	ARLFT	SPAR 53			A/R		A/R				-		-	LTAG-LTCC-LTAG
023	F-16		E1401	RECCE	RAIDER			A/R		A/R				-		-	
023	F-16		E1401					A/R		A/R				-		-	
023	F-16		E1403	RECCE	VIKING			A/R		A/R				-		-	
023	F-16		E1403					A/R		A/R				-		-	
053	F-15		E1410	RECCE	TIGER			A/R		A/R				-		-	

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
PROVIDE COMFORT SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39 TACG Scheduling Office
EXT 6443/6122 PAGE 6

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
053	F-15		E1410					A/R		A/R				-		-	

USAFE FORM 438

39 TACG/DOT OVERPRINT

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
LOCAL SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39th OG Scheduling Office
EXT 6443/6122 PAGE 1

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	FLIGHT ROUTING AREA	TIME	AREA	TIME	REMARKS
023	F-16		T14001	BFM	DEMON 01			0630	0631	0730	0705			-		-	50 NM CIRCLE
[redacted]	F-16		T14002		02			0630	↓	0730	↓			-		-	
023	F-16		T14003	BFM	DEVIL 01			1030	1036	1130	1124			-		-	50 NM CIRCLE
023	F-16		T14004		02			1030	↓	1130	↓			-		-	
	HC-130		T14389		SHADOW 01			1615	/	2000	/	CX	LTD13	1615-2000	DAN	1615-2000	IT,LL,AR,AD,FORM
[illegible]	HC-130		T14390		SHADOW 02			1615	/	2000	/	↓	LTD13	1615-2000	DAN	1615-2000	IT,LL,AR,AD,FORM
016	MH-60		T14330		HAWK 21			1630	/	2000	/	↓	LTD13	1630-2000	DART	1630-2000	IT,ABCD,AR,NTAC
016	MH-60		T14331		HAWK 22			1630	/	2000	/	↓	LTD13	1630-2000	DART	1630-2000	IT,ABCD,AR,NTAC
023	F-16		T14005	BFM	SONIC 01			OPEN		OPEN			Due to Real World Conditions				50 NM CIRCLE
023	F-16		T14006		02			OPEN		OPEN				-		-	
023	F-16		T14007		03			OPEN		OPEN				-		-	
023	F-16		T14008		04			OPEN		OPEN				-		-	
007	JAGUAR		T14150		CHINON 01			OPEN		OPEN				-		-	MTF
007	JAGUAR		T14151		CHINON 02			OPEN		OPEN				-		-	MTF
053	F-15	F104	T14201		HORNET 01			OPEN	1459	OPEN	1530			-		-	MTF
	F-15		T14202		HORNET 02			OPEN		OPEN				-		-	MTF
004	HARR		T14250		ANGLIA			OPEN		OPEN				-		-	MTF
004	HARR		T14251		ANGLIA			OPEN		OPEN				-		-	MTF
[redacted]	MH-60		T14320		ROTOR 05			OPEN		OPEN				-		-	MODE 3: 05XX
016	MH-60		T14321		ROTOR 06			OPEN		OPEN				-		-	MODE 3: 05XX
016	MH-60		T14322		ROTOR 07			OPEN		OPEN				-		-	MODE 3: 05XX
016	MH-60		T14323		ROTOR 08			OPEN		OPEN				-		-	MODE 3: 05XX
016	HC-130		T14391		PROP 01			OPEN		OPEN				-		-	MTF
016	HC-130		T14392		PROP 02			OPEN		OPEN				-		-	MTF

USAFE FORM 438

39 TACG/DOT OVERPRINT

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
LOCAL SCHEDULE

DATE: 14 APR 94
DAY: THURSDAY

BASE CODE
LTAG

SOF:

Prepared by: MSGT CHERYL O. TOMLINSON
39th OG Scheduling Office
EXT 6443/6122 PAGE 2

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
016	MH-60		T14394		PONY 61			OPEN		OPEN				-		-	MTF
016	MH-60		T14395		PONY 62			OPEN		OPEN				-		-	MTF
016	MH-60		T14396		PONY 63			OPEN		OPEN				-		-	MTF
561	F-4G		T14398		MACH			OPEN		OPEN				-		-	MTF
561	F-4G		T14399		MACH			OPEN		OPEN				-		-	MTF
494	F-15E		T14590		SPEED			OPEN		OPEN				-		-	MTF
94	F-15E		T14591		SPEED			OPEN		OPEN				-		-	MTF
023	F-16		T14594		FALCON			OPEN		OPEN				-		-	MTF
023	F-16		T14595		FALCON			OPEN		OPEN				-		-	MTF
552	E-3		T14692		SENTRY			OPEN		OPEN				-		-	MTF
552	E-3		T14693		SENTRY			OPEN		OPEN				-		-	MTF
429	EF-111		T14790		ZAPPA 11			OPEN		OPEN				-		-	MTF
429	EF-111		T14791		ZAPPA 12			OPEN		OPEN				-		-	MTF
058	C-12		T14821		MOTT 10			OPEN		OPEN				-		-	MTF
016	MH-60		W14330		HAWK 21			OPEN		OPEN				-		-	
016	MH-60		W14331		HAWK 22			OPEN		OPEN				-		-	
016	HC-130		W14389		SHADOW 01			OPEN		OPEN				-		-	
16	HC-130		W14390		SHADOW 02			OPEN		OPEN				-		-	

DAILY AIRCRAFT FLYING SCHEDULE
ALL TIMES ARE IN ZULU
LOCAL SCHEDULE

DATE: 14 APR 94
DAY:

BASE CODE
LTAG

SOF:

Prepared by:
39th OG Scheduling Office
EXT 6443/6122 PAGE 1

UNIT	ACFT TYPE	TAIL #	MSN #	MSN TYPE	CALLSIGN	PILOT	WC	ETD	ATD	ETA	ATA	CONFIG	AREA	FLIGHT ROUTING TIME	FLIGHT ROUTING AREA	FLIGHT ROUTING TIME	REMARKS
494	F15E		DT		LYNX 01			0715	0729	0915	0854		TA	-		-	DT-7000-21
"	"		"		02			"		"			"	-		-	"
														-		-	
494	F15E		DT		LYNX 11			0810	0821	1010	1005		BI	-		-	DT-7000-21
"	"		"		12			"		"			"	-		-	"
														-		-	
494	F15E		DT		LYNX 01			1330	1341	1530	1507		TA	-		-	DT-7000-21
"	"		"		02			"		"			"	-		-	"
"	"		"		03			"		"			"	-		-	"
"	"		"		04			"		"			"	-		-	"
														-		-	
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USAFE FORM 438 9054

39 TACG/DOT OVERPRINT

TAB K

MILITARY FLIGHT PLANS

AFR 110-14 AIRCRAFT ACCIDENT BOARD
INDEX OF TABS

TAB L

DD FORM 365-4, WEIGHT AND BALANCE CLEARANCE FORM

L-1 UH-60 Black Hawk 88-26060

L-2 UH-60 Black Hawk 87-26000

L-3 E-3B AWACS

(This tab not used)

L-4 F-15C 79-0025

(This tab not used)

L-5 F-15C 84-0025

(This tab not used)

FORM F - WEIGHT & BAL CLEARANCE (TRANSPORT-HORIZONTAL) FORMAT: B1

DATE	MODEL/DESIGN	FROM	HOME BASE	GEAR MOM CHG
940301	UH-60A	AS FILED	DIYABARKIR	.0
MISSION	SERIAL NO	TO	PILOT	CONSTANT
ESSS 4 PAX	88-26060	AS FILED	AS FILED	1000

REMARKS

REF#3 P&CP
CE(2)
REF#4 CW/KITS 4EA
MRE 2 CTN
REF#5 M-60 (2)
M-16 (2)
REF#6 AMMO 7.62
CHAFF 10 EA

REF #10 JP/4 @ 6.5 MAIN
JP/4 @ 6.5 EXT

ITEM	WEIGHT	MOMENT
BASIC A/C From Chart C	11547	4102.3
Oil in Airplane	N/A	N/A
CREW: 4	800	204.0
4.EMERGENCY EQUIPMENT	160	68.0
5.WEAPONS	69	19.0
6.AMMO&CHAFF	75	21.0
OPERATING WEIGHT	12651	4414.3
TO. FUEL (822 GALS)	5430	1943.0
TOTAL AIRCRAFT WEIGHT	18081	6357.3

Corrections CMPT ITEM	WEIGHT	MOMENT

Less Expendables	WEIGHT	MOMENT
FUEL	1953	821.6

Distr of Allowable Load	WEIGHT	MOMENT
3 PAX STA 320.7	600	192.4
4 PAX STA 399.8	800	271.8
TAKEOFF (Uncorrected)	19481	6821.5
CORRECTIONS	0	.0
TAKEOFF (Corrected)	19481	6821.5
LESS EXPENDABLES	1953	821.6
LANDING (Fuel 3477 lbs)	17528	5999.9

	TAKEOFF	LANDING	FUEL
ALLOWABLE GROSS WT	20250	20250	—N/A—
SUBTRAHEND	18081	16128	———
ALLOWABLE LOAD	2169	4122	———

Zero Fuel WEIGHT: 14051
MOMENT: 4878.5
LIMITATIONS
341.0 - 365.4 CG: 347.2

(CG Data in INCHES)	LIMITATIONS	WITH CORR	NO CORR
TAKEOFF	342.4 - 361.5	N/A	350.2
LANDING	341.6 - 362.8	N/A	342.3

COMPUTED BY: [signature] WT. & BAL. AUTHORITY: [signature]
PILOT:

CERTIFICATE Redacted

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.

14 May 94
Date

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

TAB L

DD FORM 365-4, WEIGHT AND BALANCE CLEARANCE FORM

L-1 UH-60 Black Hawk 88-26060

L-2 UH-60 Black Hawk 87-26000

L-3 E-3B AWACS

(This tab not used)

L-4 F-15C 79-0025

(This tab not used)

L-5 F-15C 84-0025

(This tab not used)

FORM F - WEIGHT & BAL CLEARANCE (TRANSPORT-HORIZONTAL) FORMAT: B1

DATE	MODEL/DESIGN	FROM	HOME BASE	GEAR MOM CHG
940301	UH-60A	AS FILED	DIYARBAKIR	.0
MISSION	SERIAL NO	TO	PILOT	CONSTANT
ESSS 4 PAX	87-26000	AS FILED	AS FILED	1000

REMARKS
REF#3 P&CP
CE(2)
REF#4 CW KITS 4 EA
MRE 2 CTN
REF#5 M-60 (2)
M-16 (2)
REF#6 AMMO 7.62
CHAFF 10 EA

REF#10 JP/4 @ 6.5 LBS MAIN
JP/4 @ 6.5 LBS EXT

ITEM	WEIGHT	MOMENT
BASIC A/C From Chart C	11784	4191.1
Oil in Airplane	N/A	N/A
CREW: 4	800	204.0
4.EMERGENCY EQUIPMENT	160	68.0
5.WEAPONS	69	19.0
6.AMMO&CHAFF	75	21.0
OPERATING WEIGHT	12888	4503.1
TO. FUEL (822 GALS)	5430	1943.5
TOTAL AIRCRAFT WEIGHT	18318	6446.6

Corrections CMPT ITEM	WEIGHT	MOMENT

Distr of Allowable Load	WEIGHT	MOMENT
3 PAX STA 320.7	600	192.4
2 PAX STA 399.8	400	135.9

Less Expendables	WEIGHT	MOMENT
FUEL	1953	821.6

TAKEOFF (Uncorrected)	19318	6774.9
CORRECTIONS	0	.0
TAKEOFF (Corrected)	19318	6774.9
LESS EXPENDABLES	1953	821.6
LANDING (Fuel 3477 lbs)	17365	5953.3

	TAKEOFF	LANDING	FUEL
ALLOWABLE GROSS WT	20250	20250	—N/A—
SUBTRAHEND	18318	16365	———
ALLOWABLE LOAD	1932	3885	———

Zero Fuel WEIGHT: 13888
MOMENT: 4831.4
LIMITATIONS
341.0 - 365.5 CG: 347.9

(CG Data in INCHES)	LIMITATIONS	WITH CORR	NO CORR
TAKEOFF	342.5 - 361.4	N/A	350.7
LANDING	341.5 - 362.8	N/A	342.8

COMPUTED BY: [signature] WT. & BAL. AUTHORITY: [signature]
PILOT: _____

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.

14 May 94
Date

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

TAB L

DD FORM 365-4, WEIGHT AND BALANCE CLEARANCE FORM

L-1 UH-60 Black Hawk 88-26060

L-2 UH-60 Black Hawk 87-26000

L-3 E-3B AWACS

(This tab not used)

L-4 F-15C 79-0025

(This tab not used)

L-5 F-15C 84-0025

(This tab not used)

4-1-1

TAB L

DD FORM 365-4, WEIGHT AND BALANCE CLEARANCE FORM

TAB L

DD FORM 365-4, WEIGHT AND BALANCE CLEARANCE FORM

AFR 110-14 AIRCRAFT ACCIDENT BOARD
INDEX OF TABS

TAB M
CERTIFICATE OF DAMAGE

Equipment destroyed or missing as a result of the crash of two US Army UH-60 helicopters on 14 Apr 94, in northern Iraq, is as follows:

1. In accordance with TB 430002-3 (Maintenance Expenditure Limit for aircraft) SN 88-26060 and SN 87-26000 are designated damaged beyond economical repair. ($9,270,000.00)

2. The following equipment was totally destroyed by post crash fire:

a. One each, SATCOM communication system with antenna ($16,700.00)

b. Four each, M60 machine gun (SN 7192, 11856, 11765, 14246) ($23,152.00)

c. 600 rounds, M60 machine gun ammunition ($258.00)

d. Life support equipment consisting of the following:

(1) Four each, SPH 4 helmets ($885.00)

(2) Two each, vest, survival ($996.00)

(3) Two each, PRC112 survival radios (SN-unidentifiable) ($9,740.00)

e. Extended Range Fuel System ($254,000.00)

3. The following equipment was not found at the accident site and presumed pilfered or consumed by fire:

a. Four each, M16 rifles, SN 4794232, 4069525, 4797827, 4810081 ($1784.00)

b. Eight each 9MM pistols, SN 1165146A, 134192, 1344190, 1344188, 1344189, 1344196, 1344191, 1344195 ($1828.00)

c. Four each, ANVIS-6 night vision goggles, SN 0516A, 117B, 741A, 07549A ($29,676.00)

d. Two each, survival radios, (SNs unknown) ($9,740.00)

4. Total dollar cost of military property damage/loss is $9,618,759.00.

5. Source of values: Army Master Data File (AMDF)

LEN ROYER, LTC, AV
Technical Advisor

AFR 110-14 AIRCRAFT ACCIDENT BOARD
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TAB N

TRANSCRIPTS OF RECORDED COMMUNICATIONS

TAB N

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TAB N

TRANSCRIPTS OF RECORDED COMMUNICATIONS

DEPARTMENT OF THE AIR FORCE
AIR FORCE OFFICE OF SPECIAL INVESTIGATIONS

25 May 94

MEMORANDUM FOR ACCIDENT INVESTIGATION BOARD

FROM: AIR FORCE OFFICE OF SPECIAL INVESTIGATIONS
INVESTIGATIVE OPERATIONS CENTER/ENGINEERING SERVICES
(IOC/TSO - Capt Michael V. D'Ottavio)
226 Duncan Avenue, Suite 2100
Bolling AFB, DC 20332-0001

SUBJECT: Letter Report Detailing Audio Enhancement Work Performed - INFORMATION MEMORANDUM

1. INTRODUCTION

a. Following is a report detailing work performed by the Air Force Office of Investigations (AFOSI) Investigative Operations Center, Engineering Services Office (IOC/TSO) for the time period of 4 May 94 through 20 May 94. This letter report is outlined as follows:

Para No.	Topic
2.	Statement of Requirements/Objectives
3.	Methodologies Employed
4.	Procedures
5.	Conclusions
APPENDICES	Results

b. The office of IOC/TSO is responsible for providing audio and video (A/V) enhancement services for the AFOSI and National Level program support for critical mission needs. In this capacity, IOC/TSO built their A/V program with the assistance of Rome Laboratories Speech Processing Facility (RL/IRAA) located at Griffiss Air Force Base, New York. IOC/TSO has been a "beta" test site for RL and has assisted in the evaluation of different A/V enhancement products. Because of a strong working relationship with RL, IOC/TSO requested their support in performing the actions necessary to complete the tasking requested by the Accident Investigation Board investigating the downing of the two Blackhawk helicopters in Northern Iraq.

2. STATEMENT OF REQUIREMENTS/OBJECTIVES

a. The accident Investigation Board provided IOC/TSO with a video cassette tape from a camcorder that was used on board the AWACS aircraft located in the local area at the time of the accident. This video tape had a portion of the tape re-recorded. The re-recording cut into the tape at the 0728 to 0732 time period and overstamped the recording video during the time 0810 to 0814. The requirements passed to IOC/TSO were twofold. First, extract embedded audio for the specific time block of 0728 to 0732 from within the re-recorded audio track. Second, verify transcript as presented by National Air Intelligence Center (NAIC). From these requirements, the following objectives were developed as a road map to completing the tasking.

(1.) Evaluate tape for ability to extract audio from re-recorded session.
(2.) If possible, extract audio and add to transcript.
(3.) Evaluate completeness of transcript versus recorded information

c. In a final phase of analysis, Rome Laboratory engineers used advanced speaker identification algorithms to attempt to correlate an unidentified speaker.

d. The transcribed communications include ground to air, air to ground, and air to air exchanges between a number of speakers. The communications include both private and common interphone systems as well as HAVE-QUICK, SATCOM and normal UHF tactical. Synchronization tones for secure communications are audible before numerous transmissions. Many transmissions are very garbled and distorted. The greatest amount of distortion seems to be for air-to-air communications. Nonetheless, even very distorted transmissions are readable and understandable in many instances.

5. FINAL COMMENTS

a. As a result of our efforts in correcting the transcript, the Accident Investigation Board posed a few new questions. First, could we identify the voice that made the 0728 call, "EAGLE ONE...?" Yes, we could. The identification of the individual speaking at 0728, saying, "EAGLE ONE..." was determined to be DUKE. Second, could we determine from the tape whether that 0728 call was standard radio communications, HAVE-QUICK communications, or intercom communications. Again, we could and assessed the audio based on a lack of characteristic noise associated with both standard radio transmissions, HF or SATCOM communications, and HAVE QUICK communications? The radio call was determined to be over the intercom. Last, could we clarify other communications, centered around critical times provided by the Accident Investigation Board? These times were analyzed and transcribed as required. If there are any questions regarding this document, please call AFOSI - IOC/TSO at DSN 297-5266 or COMM (202)767-5266.

PETER GARRY, Colonel, USAF
Commander, IOC

cc: IOC/CC
IOC/CV
file

Following is a legend of the callsigns or abbreviations applicable to speakers on the tape.

ABBREVIATION	CALLSIGN
AA	AA (DOUBLE A)
AOR	AOR
ASO	ASO
CHE	CHEYENNE
COU	COUGAR
COU-M	COUGAR-MIKE (ALSO COUGAR ON MIKE)
CT	CT
DOG	MAD DOG
DUK	DUKE
DUKE	DUKE
EAG	EAGLE
EAGLE	EAGLE
FE	ENGINEER
F/D	FLIGHT DECK
LIO	LION
M/D	MAD DOG
MCC	MCC
MT	MT
PUM	PUMA
R/W	ROAD WARRIOR
RAI	RAIDER
RO	RO
SAVY	SAVVY
SAVY-OPS	SAVVY-OPS
SD	SD
TC	TC
TC-NATO	TC-NATO
TIG	TIGER
UI	UNIDENTIFIED
VIK	VIKING
WD	CHECK-IN

APPENDIX A - AUDIO TRACK TRANSCRIPT

Transcription Key/Legend Descriptions

The transcription of the communications follows a 'Time, To, From, Text' format. Header information appears as follows:

TIME	TO	FROM	TEXT

(EXAMPLE)

0600	COUGAR	RAIDER	Text appears here.

The following describes the transcription conventions used by the transcribers.

1M	1 word missing in the transmission
3-4M	3 or 4 words missing
1-2M/G	1 or 2 words missing/garbled (distorted)
2-3G	2 or 3 garbled/distorted words
XM	unknown number of words missing
XM/BLKD	unknown number of words are missing/blocked (by other speakers)
TWK	indicates audio is too weak.
(?WORD?) believes	transcribed words in question marks within parentheses indicates the transcriber this is what may be there, but is uncertain.
(??AUTOTOG??)	words in double question marks within parentheses indicates the transcriber believes this is what may be there, but is uncertain because the word is unknown or invalid.
(COU) or (COLD)	For callsigns, parentheses indicate the transcriber believes this is who is speaking even though the speaker does not identify his/her callsign. For words in text, the parentheses indicates that this word is understood or assumed to be present by the transcriber even though the word is not actually stated.
(?)	Indicates the transcriber hears a callsign but is unable to recover it.

((DOUBLE PARENTHESES DESIGNATE TRANSCRIBER COMMENTS))

AUDIO TRACK TRANSCRIPT

TIME	TO	FROM	TEXT
0614	ASO	T2	(CALL)
	ASO	T2	DID YOU GET MY ARROW?
	T2	ASO	NO
	ASO	T2	(XM/G/BLK) TRANSMISSION BLOCKED BY RECURRING TONE (LARGE AMPLITUDE TONE)
	T2	ASO	I MOVED TO .. (XM/G/BLK).. SAME TONE
	ASO	T2	OH, O.K.
	ASO	T2	DID YOU GET IT?
	T2	ASO	YEP
	ASO	T2	WHY IS THAT (**LOUD TONE** 1-2 XM/G/BLK) TALKED ABOUT ..(**LOUD TONE** 3-4 XM/G/BLK)..FOR SOME REASON THE (**LOUD TONE** XM/BLK) ON THE GROUND WILL RANDOMLY PUT (**LOUD TONE** XM/BLK).
	T2	ASO	(**LOUD TONE** XM/BLK)...HUH, THINGS SURE ARE A LITTLE DIFFERENT FROM WHEN (**LOUD TONE** XM/BLK)
0615	ASO	AA	(CALL)
	AA	ASO	GO AHEAD
	ASO	AA	ARE THERE ANY PERMANENT (?MARKERS or MARKINGS?) OUT THERE THAT YOU KNOW OF?
	AA	ASO	NOT THAT I KNOW OF, WHY?
	ASO	AA	JUST CURIOUS.
0620	ANYONE	EAGLE-1	ANYONE,...(XM/G/BLK)...EAGLE ONE
	UI	UI	EAGLE ONE IS (XM/G)...TOY ((or some syllable that sounds like OY)
0621	EAGLE-1	COUGAR	EAGLE ONE, COUGAR COPIES
0622	ASO	T4	(CALL)
	T4	ASO	(RETURNS CALL)
	ASO	T4	(2-3 XM/G/BLK) ... WHAT ABOUT THE HELO EE01?
	T4	ASO	OH, THAT'S A WEAPONS TRACK, THEY'LL TAKE CARE OF THAT.
0631	T2	ASO	(CALL)
	ASO	T2	GO AHEAD.
	T2	ASO	YOU SAY THE EAGLE TRACK IS WEAPONS...ITS NOT ON ANY DATA
	MCC	UI	(XM/G/BLK)...Background transmissions
	UI	MCC	GO AHEAD)...Background transmissions
	MCC	UI	(XM/G/BLK)...Background transmissions
	UI	MCC	THANK YOU...Background transmissions
	ASO	T2	YEAH, I KNOW. THEY'VE LANDED THERE. THEY'RE PROBABLY JUST WAITING FOR THEM TO COME UP AGAIN.
	T2	ASO	ROGER
0632	SD	WD	(CALL)
	WD	SD	GO AHEAD
	SD	WD	YEAH, (?GLEN?) I SUSPENDED EAGLE ..(1MX/G)..CAUSE THEY LANDED.
	WD	SD	O.K.

AUDIO TRACK TRANSCRIPT

TIME	TO	FROM	TEXT
0633	WD	SD	HEY, YOU GOT THE RADIOS?
	SD	WD	ROGER, THERE'S NO ONE ON THE RADIOS.
0634	FE	MCC	(CALL)
	MCC	FE	(RETURNS CALL)
	FE	MCC	YEAH, COULD WE COOL IT DOWN IN THE FORWARD SECTION, I GUESS, OR WHEREVER, WHERE THE WEAPONS PIT IS? COOL IT DOWN A LITTLE ALL OVER THE PLACE.
	MCC	FE	YEAH, I NOTICED THAT ALSO...(3-4 XM/G)
	FE	MCC	APPRECIATE IT
0640	(SD/WD)	(SD/WD)	(?JOE?) DO YOU HAVE POSITIVE MODE-4 ON ONE-ONE?
0641			(X/M/BLK)(PROBABLE REFERENCE TO PUMA-11)
	(SD/WD)	(WD)	NEGATIVE...EVERYBODY BUT HIM.
0642	COU	PUM-11	((CALLS)).
	PUM-11	COU	(1M/G) ((ANSWERS)).
	(COU)	PUM-11	(?LEVEL?) 2-5-O, ((1M/G)) EAST.
	(PUM-11)	(COU)	((2-3M/G)) (?CLEAN?).
	(COU)	PUM-11	((ACKNOWLEDGES)).
0644	UI	UI	((1-2G)).
	UI	(RAI)	((1M/G)).
	COU	RAI	((2-3M/G)).
	RAI	COU	(?CONTACT?).
0645	DUKE	M/D	((CALL)).
	DOG	DUKE	DOG, DUKE, GO.
	(DUKE)	(M/D)	THEY BE AIRBORNE ((SIC)).
	(M/D)	(DUKE)	ROGER, COPY.
	(DUKE)	(M/D)	HEY, IN CASE I DON'T GET TO...I DON'T SEE YOU LATER ON TODAY, I'M NOT GONNA ((SIC)) BE GOING WITH YOU SATURDAY.
	(M/D)	(DUKE)	COPY.
0646	UI	UI	((1-2G)).
	UI	UI	((1-2G)).
0647	COU	(?TIG?)	((XM/G)) 2-7-0.
	(?TIG?)	COU	CONTACT.
0648	COU	PUM-22	FLIGHT LEVEL 2-5-O.
	PUM-22	COU	CONTACT.
	COU	PUM-22	AND COUGAR, PUMA-22, WE'RE REQUESTING...
	UI	UI	(XM/G) ONE-ONE (2-3M/G) WE HAVE TO PUSH THE AUTOTOD.
	(COU)	(SD)	YEAH, TELL HIM TO PUSH THE AUTOTOD.

AUDIO TRACK TRANSCRIPT

TIME	TO	FROM	TEXT
	PUM-22	UI	((1-2M/G)).
	UI	(SD)	THREE-NINE-NINE DEC(IMAL) FOUR ZERO ((0649 REFERENCE TO FREQUENCY 399.40MHZ.))
0649	CT	SD	((CALL)).
	(SD)	C(T)	((CUTS OFF ANSWER TO SD'S CALL)).
	(CT)	(SD)	YEAH IS THE AUTOTOD TURNED ON?
	(SD)	(CT)	THAT'S AFFIRMATIVE.
	(CT)	(SD)	O.K., THANKS.
	SD	(WD)	AND SD, (I'VE) GOT A NEGATIVE MODE-4 ON ELVIS-01 FLIGHT ALSO.
	UI	UI	((XM/TWK)).
	F/D	MCC	AND FLIGHT DECK, MCC, JUST TO GIVE YOU A HEADS - UP ..WE'VE GOT A BUNCH OF AIRCRAFT AIRBORNE AND DUE WEST OF US 6(0) ((CORRECTS)) 50 MILES, COMING HOT ...((XM/G/BLKD BY NEXT TRANSMISSION)).
	UI	UI	((XM/G/BLKD)).
	UI	UI	((XM/TWK)).
	(F/D)	(MCC)	AND EVERBODY IS AT 27(000) OR BELOW.
0650	(MCC)	(F/D)	O.K.
	ASO	MCC	ASO, MCC ON THREE .
	(MCC)	(ASO)	GO AHEAD.
	(ASO)	(MCC)	YEAH, LOOKS LIKE THERE'S SOME RINGING THAT I DON'T REMEMBER WAS THERE BEFORE. I JUST STARTED SEEING THAT.
	(MCC)	(ASO)	ROGER, WAIT UNTIL WE COME OUT OF THE TURN.
	(ASO)	(MCC)	O.K., THANKS.
0651	COU	?	((1-2G/BLKD)) 2-7-0.
	?	COU	(?CONTACT?).
((CALLSIGN IS STATED TWICE, BUT IS EXTREMELY DISTORTED IN BOTH TRANSMISSIONS.))			
0652			
0653	UI	UI	((XM/TWK)).
0654	F/D	MCC	AND FLIGHT DECK, MCC, LOOKS LIKE WE GOT THE EAGLES 50 MILES IN TRAIL AND ABOUT 100 KNOTS CLOSURE. WE'LL PROBABLY HAVE TO TAKE ANOTHER ORBIT AND THEN..THEN WE'LL BE ABLE TO HEAD BACK..HEAD OUT TO THE EAST.
	(MCC)	(F/D)	O.K.
	COU	R/W	COUGAR, COUGAR, ROAD WARRIOR, ROAD WARRIOR. OVER.
	COU	EAGLE-1	COUGAR, EAGLE-ONE ((CALL)).
	R/W	COU	ROAD WARRIOR, COUGAR ROGER.

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0654 (cont.)	UI	UI	((1-2G/ VERY DISTORTED, PARTIALLY BLOCKED BY PREVIOUS TRANSMISSION. IT IS UNCLEAR IF THIS IS A RESPONSE TO EAGLE-ONE'S CALL TO COUGAR)).
	(COU)	EAGLE-1	ROGER, EAGLE-1 IS ((2-3M/G)) ENROUTE (WHISKEY TO) LIMA.
	UI	UI	((1-2M/G)).
	R/W	COU	ROAD WARRIOR THIS IS COUGAR, GO.
0655	R/W	SAVY-OPS	ROAD WARRIOR THIS IS SAVVY-OPS, CAN YOU COPY COUGAR?
	SAVY-OPS	R/W	AND SAVVY-OPS, ROAD WARRIOR, NEGATIVE.
	R/W	SAVY(OPS)	ROAD WARRIOR, THIS IS SAVVY.
	SAVY-OPS	R/W	AND SAVVY-OPS, ROAD WARRIOR, DOES COUGAR COPY ME?
	R/W	SAVY	AND ROAD WARRIOR THIS IS SAVVY, THAT'S AFFIRM(ATIVE), AFFIRM(ATIVE).
0656	COU	R/W	AND COUGAR, THIS IS ROAD WARRIOR PASSING IN THE BLIND. THIS FREQ(UENCY) IS NO GOOD FOR ME. TO ME IT SOUNDS LIKE SOMEONE HAS THEIR (?G.T.S?) HUNG UP. ALSO, I HAVEN'T HAD YOU ALL DAY AND I'VE HAD THIS OTHER BIRD UP.
	SAVY-OPS	COU	AND SAVVY-OPS, COUGAR, COULD YOU RELAY THAT, THEY ((ROAD WARRIOR)) WERE BROKEN.
	COU	SAVY	AND COUGAR, THIS IS SAVVY, ROAD WARRIOR WOULD LIKE TO SWITCH OVER TO ANOTHER FREQ(UENCY). STANDBY.
0657	F/D	MCC	AND FLIGHT DECK, MCC, IF YOU'LL LOOK TO YOUR LEFT, 1030, 14 MILES, YOU OUGHT TO HAVE A SINGLE TANK(ER)..YOU OUGHT TO HAVE SOME TANKERS..AND IN TRAIL OF THEM ABOUT 5 MILES SOME EAGLES...THEY'RE AT 25 ((CORRECTS)) 27000.
0658	UI	UI	((2-3M/G)).
	(SAVY)	(COU)	((XM/BLKD BY PREVIOUS TRANSMISSIONS)) MIKE-17 AND 18 SOUNDS GOOD TO ME.
	COU	(SAVY)	((XM/BLKD BY NEXT TRANSMISSION)).
	UI	UI	((2-3M/G)) TRAFFIC, 2-7-0, (?10 MILES?) ((2-3M/G)).
	UI	UI	(?ROGER?) ((1-2M/G)).
	UI	UI	AND ((3-4M/G)).
	(COU)	(SAVY)	AND THAT FREQ'S NO GOOD FOR ROAD WARRIOR. THEY WANT A NEW ONE ((XM/FADES)).
	UI	(COU)	O.K., WHATEVER THEY WANT...LET ME LOOK THOSE TWO FREQUENCIES THOUGH.
	(COU)	UI	O.K.
	UI	(COU)	THEY REALLY SHOULDN'T USE THIS ONE.
	UI	UI	((1-2M/G)).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0659	UI	(COU)	((2-3M/G)) WE'RE GOING TO NEED TO USE MIKE-1-7.
	(F/D)	(MCC)	((2-3M/G/BLKD)).
	(MCC)	(F/D)	YEAH, WE'RE ABOUT TO MAKE A TURN (?RIGHT?)..TO THE LEFT HERE IN A MINUTE. YOU WANT US TO ((XM/BLKD)).
	(F/D)	(MCC)	((XM/BLKD BY PREVIOUS TRANSMISSION)) TANKERS, AND SOME F-16'S, TO YOUR LEFT, 10 O'CLOCK..14 MILES (XM/BLKD).
	UI	UI	((2-3M/G)).
	(MCC)	(F/D)	(? YEAH, WE'RE AT..?).
	(F/D)	(MCC)	O.K. WHY DON'T YOU SET (XM/BLKD) TWO MINUTES AND COME BACK..COME BACK ((2-3G/BLKD)).
	UI	UI	((XM/BLKD MULTIPLE SPEAKERS HERE)).
	(MCC)	(F/D)	ROGER.
	SAVY-OPS	R/W	SAVVY-OPS THIS IS ROAD WARRIOR, DID NOT COPY BUT I'LL HOLD TO THINGS ON MIKE-1-7.
0700	(R/W)	SAVY	((XM/BLKD BY SUBSEQUENT TRANSMISSIONS)).
	CDMT	MCC	(CALL).
	(MCC)	(CDMT)	GO AHEAD, SIR.
	(CDMT)	(MCC)	YEAH, YOU GOT THE RECORD(ER) BUS?
	(MCC)	(CDMT)	I GOT IT SIR.
	(CDMT)	(MCC)	ALL RIGHT, THANKS.
	(MCC)	(MT)	HAVE FAITH.
	SAVY-OPS	R/W	AND SAVVY-OPS, ROAD WARRIOR, RELAY TO COUGAR, HOLD GOOD LINK.
	F/D	MCC	FLIGHT DECK, MCC, LET'S GO AHEAD AND START A CLEAR LEFT HAND TURN NOW ((XM/CUTS OUT)).
	(MCC)	(F/D)	(?IN A TURN?).
	COU	SAVY	COUGAR, SAVVY COPIES.
	UI	UI	((1-2G)).
	(WD)	(SD)	DID YOU GUYS ASSIGN MODE-2'S TO KEEP THE SYMBOLOGY OFF?
	(SD)	(WD)	THAT'S AFFIRM(ATIVE). IF YOU LOOK, ALL THE MODE-2'S ARE ASSIGNED.
0701	(SD)	WD	AND IF NEEDED, WE ((1-2M/G)) INITIATE HAVE-QUICK CHECKS? OR DO YOU WANT TO JUST WAIT?
	(WD)	(SD)	I HEARD THEM EARLIER. JUST WAIT. IT SHOULD HAVE WORKED.
	(SD)	(WD)	ROGER.
	(COU)	(PUM-11)	((XM/G)) RADIO CHECK.
	PUM-11	COU	PUMA-11, COUGAR, LOUD AND CLEAR.
	(COU)	UI	((XM/G/DISTORTED)) 10 MILES ((XM/DISTORTED)).
	UI	COU	((1M/DISTORTED CALLSIGN)) CONTACT.
	SAVVY-OPS	COU-M	SAVVY-OPS, SAVVY-OPS, COUGAR-MIKE ((CALL)).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0702	COU	SAVVY-OPS	COUGAR, SAVVY-OPS, GO AHEAD.
	SAVVY-OPS	COU-M	SAVVY-OPS, COUGAR-MIKE, WE ARE LEAVING THE ORBIT, AND PRESSING TO (?ARRIVE ONE?) AT THIS TIME. (?HOOKUP?) WHEN WE HAVE ESTABLISHED ORBIT.
	(COU-M)	SAVVY	SAVVY COPIES.
	UI	UI	((1-2M/G)).
0703	UI	UI	((1-2M/G)).
0704			
0705	(TIG-2)	TIG	TIGER, (?CHECK?)
	(TIG-2)	TIG	TIGER, CHECK.
	(TIG)	(TIG)-2	TWO. ((ACKNOWLEDGES)).
	COU	TIG	((XM/G/DISTORTED)).
	TIG	COU	LOUD AND CLEAR.
	(COU)	(TIG)	LOUD AND CLEAR ALSO.
	(WD)	(WD)	AOR, CHECK-IN.
	(COU)	AOR	((ACKNOWLEDGMENT)).
	UI	UI	((3-4M/G/EXTREMELY DISTORTED)).
	UI	(COU)	AND ((1M/G)) YOU CAN USE THE ((2-3M/G)). ((XM/WEAK)) ...FOR CHECK.
0706	COU	UI	((XM/G/VERY DISTORTED)).
	UI	(COU)	((3-4M/G/DISTORTED)).
0707	(TIG-2)	(TIG)	(?TURNING?)
0708	(TIG)	(TIG)-2	TWO.
0709	UI	RAI	RAIDERS, ((3-4M/G)).
	AOR	(COU)	RAIDERS ARE COMING OVER.
	UI	RAI	RAIDER ((3-4M/G)).
	COU	RAI	(CALL).
	RAI	COU	RAIDER, COUGAR, RADAR CONTACT.
	(COU)	RAI	CHECK LOUD AND CLEAR.
	(COU)	RAI	((XM/G/VERY DISTORTED)).
	(COU)	RAI	RAIDER.
	(RAI)	(COU)	((2-3M/G)).
0710	(COU)	(RAI)	((1-2M/G PROBABLE ACKNOWLEDGMENT)).
	F/D	MCC	THEY SAY THEY'RE TO THE NORTH OF US, LEFT, 9 O'CLOCK, SOME WEASELS, SLIGHTLY LOW, 27000, PROBABLY ABOUT ...ABOUT 4 MILES OUT.
	(MCC)	(F/D)	ALL RIGHT, LOOKING FOR THEM.
	(F/D)	(MCC)	LEFT, 10 O'CLOCK, 3 MILES, SLIGHTLY LOW, 27000.

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
	(FD)	(F/D)	HEADSETS...HEADSETS ON.
	(F/D)	(FD)	O.K.
	(MCC)	(F/D)	LOOKS LIKE (?BOTH OF THEM?).
	(F/D)	(MCC)	PROBABLY.
	(F/D)	(MCC)	WE'RE NOT PAINTING ANY RADAR ON THEM.
0711	(F/D)	(MCC)	WE'VE GOT A SINGLE IFF SQUAWK.
	(MCC)	(F/D)	((2-3M/G)).
	(F/D)	(MCC)	THE OTHER ONE COULD BE RIGHT BEHIND HIM.
	UI	(MCC)	WHAT'S THAT HOSTILE TRACK THERE FLYING AT DIYARBAKIR OR SOMETHING?
	(MCC)	(ASO)	(?F/A-18?).
	(ASO)	(MCC)	O.K.
	(MCC)	(ASO)	SOMETIMES THE TURKS HIT UP THEIR WEAPONS THEIR FIGHTERS LIKE THAT.
	UI	UI	((1-2M/WK)).
	(ASO)	(MCC)	AND NOBODY QUESTIONS THAT ON THE GROUND?
	(MCC)	(ASO)	THEY'VE DONE IT SINCE I'VE BEEN COMING HERE.
	(ASO)	(MCC)	WHAT?
	(MCC)	UI	YEAH, IT'S THEIR (?S.F.K./S.O.K.?) IT'S WHAT THEY CALL THEIR SPECIAL.
0712	(MCC)	(ASO)	THAT'S A SPECIAL MISSION THAT'S NOT GOING INTO IRAQ.
	(ASO)	(MCC)	ANOTHER CATEGORY OF SPECIAL MISSION.
	COU	UI	((3-4M/G)).
	UI	(COU)	((XM/G/DISTORTED)) 0-3-0, ((1-2M/G)) SOUTHWEST, ALTITUDE UNKNOWN.
0713	UI	UI	((1-2M/G)).
	UI	UI	((?GOT ONE?)).
0714			
0715	(COU)	TIG	((2-3M/G/DISTORTED)).
	ART	ASO	(CALL).
	(ASO)	(ART)	GO AHEAD.
	(ART)	(ASO)	AM I CLEARED LIMITED L.V.D.).
	(ASO)	(ART)	LIMITED, YES.
	(ART)	(ASO)	ROGER.
	AA	(ASO)	YOU WANT TO GO AHEAD AND PUT SOME FILTERS BLANKED IN.
	(ASO)	(AA)	(1M/G) ((PROBABLY ACKNOWLEDGING)).
0716	(WD)	(SD)	WEAPONS ARE BASE NUMBER 5 IF YOU HAVEN'T ALREADY DUG THAT OUT.
0717	UI	(ASO)	((1-2M/G)).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0718	MCC	AA	(CALL). ((SAYS DOUBLE-A))
	SD	AA	(CALL).
	UI	RAI	((XM/G/DISTORTED)).
	UI	UI	((XM/BLKD)) CAN YOU GET IT UP PLEASE?
	COU	PUM-22	((CALL)).
0719	PUM-22	COU	GO.
	(COU)	(PUM-22)	((XM/G/DISTORTED))2-1-0.
	(PUM-22)	(COU)	STANDBY.
	UI	UI	(?RAIDER?).
	(MCC)	UI	WHAT'S HE WANT?
	UI	(COU)	(?HE WANTS TO DESCEND TO?) TWO-ONE-ZERO (2-1-0).
	UI-2	MCC	((POSSIBLY ACKNOWLEDGING PREVIOUS TRANSMISSION.)
	(MCC)	(FE)	YEAH, MID ZONE..IT'D BE KINDA ((SIC)) HARD TO TRY CONTROLLING THE...
	PUM-22	(COU)	PUMA-TWO-TWO (?CLEARED TACTICAL?).
	(COU)	(PUM)-22	TWO-TWO ((2-3G/BLKD)).
	UI	UI	((1M/G)).
	(MCC)	(FE)	((CONTINUED FROM ABOVE))...INDICATORS..I'M HAVING A HARD TIME JUDGING. I'M TRYING TO KEEP IT AS COMFORTABLE AS POSSIBLE..
	(FE)	(MCC)	O.K., I WAS OFF LINE TALKING TO SOMEBODY ELSE, BUT I UNDERSTAND THE SURVEILLANCE SECTION IS PRETTY COLD?
	(MCC)	(FE)	YEAH, SOMEBODY CALLED UP AND SAID THEY'RE GETTING (COLD).
	COU	UI-3	(?COUGAR, COUGAR?) ((1-2G)).
	UI-3	COU	(?COUGAR?).
	UI-2	(MCC)	O.K.
	(MCC)	(FE)	((XM/FADES IN))SO JUST TO LET YOU KNOW, I'M TRYING ((XM/CUTS OUT)) COMFORTABLE.
0720	UI	UI	((1M/KEYED MICROPHONE)).
	UI	UI	(?COPY?).
	UI	UI	((2-3G)).
	UI-3	(COU)	(3-4G) (?SPOILER FOR YOU?).
	(MCC)	(FE)	IF YOU COULD COOL THE....
	(FE)	(MCC)	((CONTINUES FROM PREVIOUS TRANSMISSION))...THE FRONT SECTION...
	(M/D)	(COU)	(? HAVE COUGAR READBACK?).
	(MCC)	(FE)	((CONTINUES COOLING DISCUSSION))...THE FRONT SECTION...
	(TIG)	COU	COUGAR HAS HIM LOUD AND CLEAR.
	DOG	(TIG)	LOUD AND CLEAR. DOG, SAY AGAIN.
	(TIG)	COU	COUGAR, MEET YOUR TANKER (?AT SOUTH?) SPOILER 40.
	((COUGAR MAY BE RELAYING COMMANDS OR HAVING COMMANDS RELAYED))		
	(MCC)	UI-2	((XM/BLKD))..THE WEAPONS BIN.
	(M/D)	(TIG)	TIGER.

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0720	(MCC)	UI-4	WEAPONS BIN IS MID-SECTION.
(cont.)	UI-4	(MCC)	NO. I DON'T BELIEVE SO.
	UI	UI	((3-4G)).
	UI-4	(MCC)	RIGHT NEXT TO [redacted]
	DUKE	(COU)	WEASELS COMING OVER TO YOU ON YOUR ACTIVE.
0721	(MCC)	UI-4	YEAH. THE C.S.O. AREA AND THE C.D.M.T. IS IN FRONT OR FORWARD. A.S.T.'S AND W.D.'S ARE MID, AND THE CREW REST AREA IS THE AFT.
	UI-4	(MCC)	THE MID-SECTION THERMOSTAT IS NEXT TO 0721 THE A.O.'S ((CORRECTS)) A.S.O.'S SCOPE. WE CAN TALK ABOUT THIS LATER.
0722	F/D	UI-5	FLIGHT DECK, IS EVERYBODY ON HEADSET?
0723	UI-5	(F/D)	AFFIRMATIVE.
	UI-5	(F/D)	AFFIRM(ATIVE) ((WEAKER. DIFFERENT SPEAKER ON FLIGHT DECK)).
	(F/D)	UI-5	COPY.
	(PUMA-22)	?PUMA-11?	(?PUMA-ONE-ONE PUSH TEN?).
	UI	UI	((KEYED MICROPHONE ONLY)).
0724	COU	UI	COUGAR ((XM/G)) ONE-ONE ((2-3G)).
	UI	COU	COUGAR.
0725	UI	TIG	TIGER (XM/G) SPOILER ZERO-TWO-ZERO (XM/G) LOW AND SLOW.
	(TIG)	UI	((3-4G)).
	SD	ASO	((CALLS)).
	ASO	SD	((ANSWERING ASO)).
	(SD)	(ASO)	YEAH. THE VIDEO-CAM IS STILL RUNNING. WE CAN TURN IT OFF NOW. THEY'RE OUT OF THERE.
	(ASO)	(SD)	SAY AGAIN.
	(SD)	(ASO)	THE VIDEO-CAM IS STILL RUNNING BUT THE TURKS LEFT.
	(ASO)	(SD)	O.K.
((VIDEO TAPE APPEARS TO HAVE BEEN TURNED OFF HERE FROM 0725 TO 0727. TAPE IS TURNED ON JUST PRIOR TO NEXT TRANSMISSION))			
	UI	UI-6	TURN (?OFF/ON?) THE TAPE.
	UI	UI	((1-2G/DISTORTED/CUT OFF)).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0728	UI	UI	(?RADAR'S STILL TRACKING?).
	UI	UI	(?TWO HINDS?).
	UI	UI	(?HIND?).
	UI	UI	(?UNDERSTAND A HIP?)
	UI	UI	(?COPY COUGAR ?)??
	UI	UI	SAY AGAIN.
	EAG-1	UI	((WEAK CALL/BLKD BY NEXT TRANSMISSION))
	(TIG)	COU	COUGAR COPIES, (?HIP?).
0810	((TAPE SIGNAL CHARACTERISTIC CHANGES AT THIS POINT))		
0811	UI	UI	((1M/G)).
	UI	UI	((1M/G)).
	UI	COU-M	((EXTREMELY WEAK CALL AT END OF PREVIOUS TRANSMISSION.))
	DOG	DUKE	((CALLS, PARTIALLY BLOCKED BY NEXT TRANSMISSION.))
	COU	RAI-1	RAIDER-1, BACKUP FREQ(UENCY).
	(RAI-1)	COU	SURE, JUST A SECOND.
	(RAI-1)	COU	COUGAR COPIES.
	UI	COU	COUGAR, PICTURE, A SINGLE GROUP, SPOILER, 170, 15.
0812	COU	UI	O.K., GIVE ME AN ARROW THERE.
	COU-M	UI	(CALL) (XM/EXTREMELY WEAK).
	(COU)	UI	ALPHA, THE BULLSEYE, 340 (?AT?) 20.
0813	(TIG-2)	TIG	HOT RIGHT.
	(TIG)	(TIG)-2	TWO. ((ACKNOWLEDGING COMMAND FROM LEAD)).
0814	(TIG)	COU	PICTURE A SINGLE GROUP, SPOILER, 180, 12.
	(COU)	TIG	TIGER ((ACKNOWLEDGING)).
	(TIG-2)	TIG-1	BUDDY SPIKE, 2-7-0.
	(TIG)	COU	PICTURE A SINGLE GROUP, SOUTH, SPOILER, 15. ((VOICE AUDIBLE IN BACKGROUND))
	COU	CHE-30	((CALLS)).
	CHE-30	COU	LOUD AND CLEAR.
	(COU)	(CHE-30)	((POSSIBLE FOREIGN LANGUAGE))..(?MISSION HOTEL-ALPHA-YANKEE?)
	(CHE-30)	UI	((POSSIBLE FOREIGN LANGUAGE))
	DUKE	M/D	DUKE, MAD DOG ((CALLS)).
	DOG	DUKE	(THIS IS) DUKE, DUKE, (MAD) DOG GO.
	(DUKE)	(M/D)	AS ABHORRENT AS IT MAY BE TO YOU, YOU MIGHT WANT TO START WRITING DOWN SEQUENCE OF EVENTS AND THINGS LIKE THAT..JUST SO YOU CAN HAVE IT AVAILABLE WHEN YOU COME DOWN 'CAUSE THEY'RE OBVIOUSLY GONNA ((SIC)) WANT IT.
			((VIDEO TAPE TIME JUMPS BACK TO 0732 HERE))

AUDIO TRACK TRANSCRIPT

(CONTINUED)

TIME	TO	FROM	TEXT
0732	UI	UI	(1M/G).
	UI	COU	STANDING BY.
	SAV-OPS	COU-M	((CALLS)).
	ASO		TC-NATO ((CALL)).
			((FOREIGN SPEAKER CALLING ASO IS HOST NATION CONTROLLER))
	(TC-N)	ASO	(ANSWERS CALL).
	(ASO)	(TC-N)	TRACK NUMBER KILO KILO 126 IS UNKNOWN.
			((SAME FOREIGN SPEAKER))
	SAV-OPS	COU-M	((CALL)).
	(TC-N)	(ASO)	KILO KILO 1-2-6?
	(ASO)	(TC-N)	COPY.
	(ASO)	(TC-N)	NEAR KILO KILO ZERO ((CUTS OUT)).
	MCC	(F/D)	YOU MIGHT WANT TO WAIT UNTIL WE COME OUT OF THIS TURN.
	UI	(ASO)	O.K., JUST A MINUTE.
	PUM-22	COU	CONFIRM WORKING WEST.
	(PUM-22)	(COU)	THEY'RE COMING AROUND THE (XM/CUTS OUT).
	COU	PUM-22	COUGAR, PUMA-22 DID YOU CALL?
	(PUM-22)	(COU)	YEAH, I'D LIKE YOU TO WORK WEST...
	(COU)	(PUM-22)	((1-2G)).
	SAV-OPS	COU-M	((CALL)).
0733	TC	ASO	WE DON'T KNOW RIGHT NOW.
	RO	MCC	AND RO, MCC, WE STILL DON'T HAVE ANY CONTACT WITH THEM. WE NEED TO PASS THAT. WHAT'S THE STATUS OF THE OTHER SATCOM.
	(MCC)	(RO)	I'LL HAVE TO WAIT FOR THE C.T. TO COME UP HERE.
	(MCC)	(RO)	THAT'S THE GOOD SATCOM THAT YOU HAVE...
	UI	UI	((1-2WK)).
	ASO	(TC)	I FOUND ARROW.
	UI	UI	(?ANY STATION, ANY STATION?) ((THIS TRANSMISSION IS SIMULTANEOUS IN BACKGROUND OF CONVERSATION BETWEEN TC AND ASO))
	(TC)	(ASO)	O.K., I, I DON'T..WE DON'T KNOW WHO THAT IS, BUT WE'RE ARE LOOKING.
	(ASO)	(TC)	COPY.
	PUM-22	(COU)	PUMA-22 CHECK (?PAIRING?).
	MCC	RO	STANDBY, I'LL TRY TO RETUNE.
	(RO)	MCC	((ACKNOWLEDGES)).
0734	(COU)	PUM-22	PUMA-22, GOOD (?PAIR?).
	(COU)	(PUM)-22	AND (PUMA)-22 LEVEL (3-4G/BLKD).
	(PUM-22)	(COU)	(2-3G/BLKD) GET AN ALTITUDE.
	UI	(ASO)	(2-3G/BLKD) I'LL CHECK YOUR (?NAV?).
	UI	UI	(1-2G/BLKD).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0734	(ASO)	UI	(2-3G/BLKD) (?DO YOU WANT?)?
(cont.)	(PUM-22)	(COU)	((XM/BLKD)) AND ANY OTHER INFORMATION.
	UI	(ASO)	PROBABLY ABOUT A ZERO-NINE..
	(COU)	(PUM)-22	TWO-TWO (2-3G).
	UI	(ASO)	...TO ABOUT A...
	UI	UI	(?RADAR'S) (3-4G).
	UI	(ASO)	...THREE MAYBE..TWO-TWO OR TWO-THREE?
	(COU)	(PUM-22)	ROGER, STANDBY.
	(PUM-22)	COU	O.K., ASK HIM FOR AN ALTITUDE SIR.
	COU	(TIG)	((1M/G)) SPLASH TWO HINDS.
0735	MCC	(RO)	O.K. MCC, TRY SATCOM AGAIN.
	UI	(ASO)	PERFECT.
	UI	UI	((XM/G)) CHECK THE ((XM/WK)) RADIO ((1-2WK)).
	UI	(TIG)	(?RAIDER?), CHECK THE (?PICTURE?) ((1M)).
	UI	TIG	TIGER.
	COU-M	UI	((WEAK CALL)).
	COU	TIG	GO AHEAD.
	(TIG)	(COU)	((3-4G)).
	(COU)	(TIG)	SAY AGAIN.
	(TIG)	(COU)	SAY ALTITUDE OF ENGAGE, ALTITUDE OF ENGAGEMENT.
	COU	UI	(XM/WK) SIGNAL CHECK.
	(COU)	(TIG)	BELOW 500 FEET.
	(MCC)	(RO)	STANDBY SIR, WE'RE CHECKING THE OTHER SET
	(?SAV-OPS?)	UI	((XM/G/BLKD)) SIGNAL CHECK.
	SUR	MCC	LET'S KEEP AN EYE ON IRAQ. THEY MAY TRY TO HAVE SOME KIND OF RESPONSE.
	(MCC)	(SUR)	ROGER THAT.
0736	M/D	DUKE	(CALL).
	UI	UI	((1-2M/G/WK)).
	SD	AOR	((CALL))
	(AOR)	(SD)	GO AHEAD.
	(SD)	(AOR)	YEAH, CAN YOU HAVE THE R.O. CHECK MY ALPHA (?PUSH?) REAL QUICK. I'M GETTING SAVVY-OPS CHECKING IN ON SATCOM.
	(AOR)	(SD)	YEAH, I'VE GOT THE SAME UP HERE. WE ((XM/G/BLKD)).
	UI	UI	((XM/G)) DO YOU NEED ((2-3M/G)).
	(AOR)	(SD)	YEAH, HOLD ON.
	(SD)	(AOR)	O.K.
	(SD)	(AOR)	((3-4M/G)).
	(AOR)	(SD)	YEAH.
	UI	UI	(?VIKING CHECK?).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0737	UI	UI	TWO.
	SD	(AOR)	O.K., SD.
	(AOR)	(SD)	COPY, WE'RE CLEAR ON IT.
	COU	(TIG)	((1-2M/G)) THE COORDINATES?
	(TIG)	(COU)	NEGATIVE. SAY AGAIN COORDINATES.
	(COU)	(TIG)	THE FIRST HIND, COORDINATES N36.469 , E44.043 .
	(TIG)	COU	COUGAR COPIES.
	UI	UI	((1-2M/G)) SAY STATUS.
	UI	UI	((2-3M/G)) (?ON TWO?).
	TIG	(COU)	((CALL CUTS OUT)).
	UI	UI	WANT TO TRY?
	TIG	(COU)	RAIDER IS ((1-2M/G)) POSITION, 15.
	(COU)	TIG	TIGER IS CONTACT.
0738	SAVY-OPS	(COU-M)	SAVVY-OPS ((CUT OFF)).
	(TIG)	(COU)	((2-3M/G)).
	COU	TIG-2	((CALL)).
	(SAVY)	(COU-M)	((BLKD BY NEXT TRANSMISSION))..MIKE..
	(TIG-2)	COU	GO AHEAD.
	(COU)	(TIG-2)	COORDINATES..(N)36.451 , (E)44.052.
	(SAVY-OPS)	(COU-)M	((XM/BLKD BY PREVIOUS TRANSMISSION))..PASS ON TO MAD DOG..
	(TIG-2)	COU	COUGAR COPIES.
	(SAVY-OPS)	(COU-M)	..((CONTINUES FROM ABOVE)).. HIND HELICOPTERS. I REPEAT, TIGER SPLASH TWO HIND (1M/BLKD) TIME 07:30 .
	UI	(COU)	(?CONTACT?), ONE APIECE THERE.
	SD	UI	((XM/G/DISTORTED)) COORDINATES ((1-2M/G)).
0739	UI	UI	((XM/G))
	SD	(AOR)	YOU ON HAVE-QUICK WITH THOSE TIGERS?
	(AOR)	(SD)	THAT'S AFFIRM(ATIVE).
	TIG/RAI	COU	TIGER/RAIDER, COUGAR (?PICTURE CLEAN?).
	(COU)	RAI	RAIDER ((ACKNOWLEDGES)).
	(COU)	TIG	TIGER ((ACKNOWLEDGES)).
	UI	UI	((1-2M/BLKD BY PREVIOUS TRANSMISSIONS)) READ YOU LOUD AND CLEAR.
	UI	UI	YEAH, IT'S (?ON THIS ONE?).
	UI	UI	COPY.
	UI	UI	((XM/G/DISTORTED)).
	UI	UI	ROGER.
	UI	UI	(?I NEED THE ?) ((BLKD BY BELOW)).
	UI	UI	((1-2M/ POSSIBLE FOREIGN LANGUAGE)).
	UI	UI	YEAH KINDA. ((SIC))
	UI	UI	LET ME CALL YOU SLUGGER.
	UI	UI	O.K.
	SAVY-OPS	COU-M	((CALL BLOCKED BY NEXT TRANSMISSION)).

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0739	MCC	UI	(?ART?)'S OFF HEADSET.
(cont.)	UI	UI	((1-2M/G)).
	(SD)	UI	(1-2M/G) (?ART'S) OFF HEADSET.
	UI	(SD)	COPY.
	DOG	DUKE	((CALL)).
0740	COU	SAVY-OPS	COUGAR, SAVVY-OPS RADIO CHECK.
	SAVY-OPS	COU	((BLOCKED ANSWER)).
	COU	TIG	COUGAR, TIGER ((CALL)).
	(TIG)	COU	COUGAR ((ANSWERS)).
	(COU)	(TIG)	THAT'S PUMA-22 WITH THE (1M/G)(?A.R.?).
	(TIG)	(COU)	AFFIRMATIVE.
	(COU)	(TIG)	((XM/G/VERY DISTORTED)) EARLY.
	SAVY-OPS	(COU-M)	((BLOCKED BY PREVIOUS TRANSMISSION)).
	(TIG)	COU	COUGAR COPIES.
	(TIG)	UI	(?RADAR?) COPIES ((2-3M/G)).
	UI	TIG	TIGER ((ACKNOWLEDGMENT)).
	UI	UI	((XM/G/BLKD)).
	(TIG-2)	TIG	TIGER (?TURNING?) LEFT.
	VIK	COU	VIKING, COUGAR, CONTACT.
0741	SAVY-OPS	COU	SAVVY-OPS, COUGAR ON MIKE, HOW COPY?
	SAVY-OPS	COU	SAVVY-OPS, SAVVY-OPS, COUGAR ON MIKE .((BLKD BY NEXT TRANSMISSION BUT CONTINUES))..
	UI	UI	O.K. WE CAN PROBABLY TURN THE RECORDER OFF.
	(SAVY)	(COU-M)	...((CONTINUED FROM ABOVE))..PLEASE PASS TO MAD DOG ((XM/CUTS OUT HERE)). ((RECORDER APPARENTLY SHUT OFF UNTIL..))
0757	UI	UI	FLYING SIX PUMA, CHECK (?PAIRING?).
	UI	UI	((1-2M/G)).
0758	UI	COU	SINGLE GROUP, SOUTH, SPOILER 15.
	DOG	DUKE	((CALL)).
	DUKE	(M/D)	GO DUKE.
	COU	(?LIO?)	COUGAR (?LION?) REPEAT (1M/G).
	(LIO)	(COU)	YEAH, REQUEST CHECK SQUAWK.
	(M/D)	(DUKE)	((XM/BLKD)) IDEA..BUT GOING INDIRECT ((XM/BLKD)).
	(?LIO-6?)	(COU)	NEGATIVE SQUAWK AT THIS TIME (?LION-6?).
	(COU)	(LIO-6)	((3-4M/G)).
	(LIO-6)	COU	(?ACKNOWLEDGES?).
	(DUKE)	(M/D)	ROGER, WE WANT THE RECCE TO GO OVER AND TAKE A PICTURE, AND WE ALSO WANT THEM TO TAKE A LOOK ((XM/CUTS OUT)).
	UI	COU	COUGAR, GROUP SOUTH (1M/G)...SOUTH SPOILER 12.

AUDIO TRACK TRANSCRIPT
(CONTINUED)

TIME	TO	FROM	TEXT
0759	AOR	(SD)	((XM/BLKD BY ABOVE)) DID YOU COPY THAT?
	(SD)	AOR	((ACKNOWLEDGES)).
	(AOR)	(SD)	O.K. WE WANT THE RECCE BIRD TO GO AND SEE IF THEY CAN TAKE SOME PICTURES AND ALSO LOOK FOR SURVIVORS.
	(SD)	AOR	((ACKNOWLEDGES)).
	SD	?	(?TANKS?), I'M GONNA ((sic)) PUT IN A COUPLE OF SPECIAL POINTS AT THOSE COORDINATES. I'M GONNA MAKE THEM H.N.'s ((HOSTILE NEUTRALIZED)), THE LITTLE RED SQUARES.
	UI	(SD)	THAT WOULD BE APPROPRIATE, HOSTILE NEUTRALIZED.
0800	TIG-2	(TIG-1)	WHAT'S YOUR TOTAL?
	(TIG-1)	(TIG-2)	23.
	UI	COU	COUGAR, SINGLE GROUP, SOUTH SPOILER 15.
0801			**END OF TRANSCRIPT**

```
::::::::::::::
e1#1.result
::::::::::::::
   cou      coum     duk      mcc      md       rw       sav
 1.0636   1.0000   1.0797   1.1441   1.0622   1.0084   1.0231 /roo_u2/norm/osi/res8/e1#1.acc.res
 2.7181   3.8424   1.0000   1.0127   2.3257   2.2448   2.8146 /roo_u2/norm/osi/res8/e1#1.cep.res
 1.0267   1.0298   1.0834   1.0875   1.0456   1.0291   1.0000 /roo_u2/norm/osi/res8/e1#1.del.res
 1.1405   1.2754   1.0387   1.6942   1.0622   1.2592   1.0000 /roo_u2/norm/osi/res8/e1#1.rst.res
 2.5286   3.4283   1.0000   1.0046   2.1755   2.0958   2.5414 /roo_u2/norm/osi/res8/e1#1.win.res
 8.4774  10.5758   5.2019   5.9431   7.6712   7.6373   8.3792
First choice : duk
Second choice: mcc
Third choice : rw
::::::::::::::
e1#2.result
::::::::::::::
   cou      coum     duk      mcc      md       rw       sav
 1.0634   1.0000   1.0795   1.1440   1.0621   1.0084   1.0230 /roo_u2/norm/osi/res8/e1#2.acc.res
 2.7180   3.8423   1.0000   1.0127   2.3256   2.2447   2.8145 /roo_u2/norm/osi/res8/e1#2.cep.res
 1.0267   1.0298   1.0835   1.0876   1.0456   1.0291   1.0000 /roo_u2/norm/osi/res8/e1#2.del.res
 1.1404   1.2754   1.0387   1.6944   1.0622   1.2591   1.0000 /roo_u2/norm/osi/res8/e1#2.rst.res
 2.5285   3.4281   1.0000   1.0046   2.1755   2.0957   2.5413 /roo_u2/norm/osi/res8/e1#2.win.res
 8.4770  10.5756   5.2017   5.9431   7.6710   7.6370   8.3788
First choice : duk
Second choice: mcc
Third choice : rw
::::::::::::::
e1#3.result
::::::::::::::
   cou      coum     duk      mcc      md       rw       sav
 1.0634   1.0000   1.0795   1.1439   1.0621   1.0083   1.0230 /roo_u2/norm/osi/res8/e1#3.acc.res
 2.7180   3.8422   1.0000   1.0127   2.3256   2.2447   2.8145 /roo_u2/norm/osi/res8/e1#3.cep.res
 1.0267   1.0299   1.0835   1.0876   1.0457   1.0291   1.0000 /roo_u2/norm/osi/res8/e1#3.del.res
 1.1404   1.2754   1.0386   1.6944   1.0621   1.2591   1.0000 /roo_u2/norm/osi/res8/e1#3.rst.res
 2.5285   3.4280   1.0000   1.0046   2.1754   2.0957   2.5413 /roo_u2/norm/osi/res8/e1#3.win.res
 8.4768  10.5754   5.2016   5.9432   7.6709   7.6369   8.3787
First choice : duk
Second choice: mcc
Third choice : rw
::::::::::::::
e1#4.result
::::::::::::::
   cou      coum     duk      mcc      md       rw       sav
 1.0658   1.0000   1.0805   1.1467   1.0664   1.0115   1.0257 /roo_u2/norm/osi/res8/e1#4.acc.res
 2.7193   3.8444   1.0000   1.0128   2.3266   2.2455   2.8157 /roo_u2/norm/osi/res8/e1#4.cep.res
 1.0245   1.0277   1.0815   1.0866   1.0445   1.0270   1.0000 /roo_u2/norm/osi/res8/e1#4.del.res
 1.1427   1.2762   1.0391   1.6943   1.0646   1.2615   1.0000 /roo_u2/norm/osi/res8/e1#4.rst.res
 2.5295   3.4298   1.0000   1.0046   2.1763   2.0964   2.5422 /roo_u2/norm/osi/res8/e1#4.win.res
 8.4819  10.5781   5.2010   5.9450   7.6784   7.6420   8.3835
First choice : duk
Second choice: mcc
Third choice : rw
```

APPENDIX C: AUDIO RETRIEVAL STEP-BY-STEP PROCEDURES

EQUIPMENT:

2 Panasonic AG - 1960 Video Cassette Recorder (VCR).....VHS Format
Magnet
Mounting Hardware for Positioning Magnet inside VCR
TASCAM DA - 30 Digital Audio Tape (DAT) Recorder
SONY 19" Color Monitor

PROCEDURES:

NOTE: Until this attempt, this set of procedures had only been accomplished with audio tapes. Although this is a video tape, the procedures are generally the same. Both audio and video tapes are comprised of magnetic media. Primary differences are the size of the tape (i.e. width - audio tape is approximately 3/8", video tape is 1/2") and the format in which the data is laid on the tape.

PURPOSE/THEORY

The primary purpose of the procedures outlined is to perform an erasure of the re-recorded audio in an attempt to strip out the old recording. To do this, all audio is passed across a magnetic head in attempt to accomplish two things:

a. Erase re-recorded information
b. Re-align old recording elements still present on the tape. With magnetic fields and tape dynamics, old particles actually have a memory. That is, they tend to move back to a previous position, the last previous position.

These two tasks are accomplished simultaneously. Once passed across the magnet, the audio is then recorded to a DAT for play back and analysis. These procedures are accomplished as many times as is necessary in order to optimize the erasure of the re-recorded signal, while at the same time, minimizing the erasure of the "lost" information. When a final audio copy is ready for analysis, Sound Stage software will be used to amplify those signals that are available. If record levels are of sufficient amplitude, information should be audible.

SUNDAY - 22 May 94

1. 1200 - 1400: Make copy of original tape
   a. Original tape labeled..... "Original AWACS Video Tape - 14 Apr 94"

2. 1400 - 1500: Play back copy and verify original was copied.
   a. Identify key points on recording and verify information is available.
   b. Write protect, label, and store the copy for shipping.

3. 1500 - 1600: Make test tapes
   a. Make two to four test tapes. Each of about 3 - 5 minutes duration.
      - Record known audio
      - Re-record over a portion of the known data
      - Repeat 2 to 3 times
      - Verify test tapes are ready for being operated on

4. 1600 - 1800: Prepare one VCR for modification and modify
   a. Remove casing of one VCR.
   b. Inspect hardware housings and inner mechanisms for best placement of magnet
   c. Adapt magnet to fittings to allow magnet to fit in VCR in line with the directional flow of the video tape.

5. 1800 - 1930: Mount magnet inside VCR prior to audio head, just after video head.
   a. Magnet position is crucial to the success of this test.
   b. Stereo recording creates two audio tracks. Both tracks are located at the bottom of the tape (see Figure 1.) as it passes across the audio head.
   c. For standard stereo recordings (this recording is verified as standard), the affects of re-recording are as follows:
      i. Both audio tracks are initially passed across the "main" erase head.
         - This essentially performs a "gross" erasure of all information on the tape (video and audio)
      ii. Track 1 (labeled A2) is then passed through a second erase head for the purpose of recording. If this track is not passed across a separate erase head, no recording takes place.
      iii. Track 2 (labeled A1) does not pass across a second erase head.

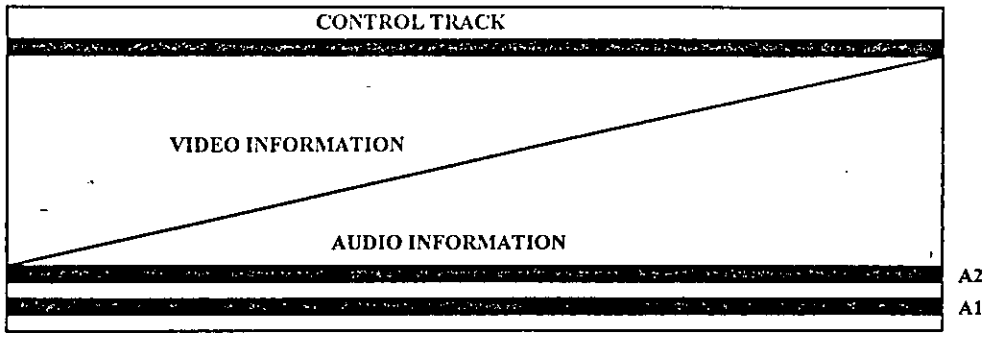

Figure 1. Video Tape Recording Characteristics and Track Information

MONDAY - 23 May 94

1. 0700 - 0930: Set up all equipment
   a. Connect VCR to DAT
      - Load DAT with blank tape for recording and play back
      - A DAT recording will be the data used for manipulation once all over recorded data is erased.
   b. Verify DAT records from VCR input
   c. Connect monitor in-line
   d. Verify monitor displays needed information and DAT records

2. 0930 - 1200: Run test tapes through VCR setup
   a. Verify magnet is right size (physical size)
   b. Verify no obstruction that may cause recording problems
   c. Verify magnet is not close to "Control Track"
      - If magnet affects "Control Track" in any way, all information will be lost due to a loss of synchronization information
   d. Make adjustments where needed. This set of adjustments is for the purpose of properly aligning the magnet, such that no physical damage is done to the VHS tape.
   e. Performed these steps five times before one complete run was made with no damage to the tape

3. 1300 - :1500: Perform test tape audio extraction
   a. Three tapes available for testing prior to performing actual audio extraction.
   b. First tape was passed through magnetic field.
      - No permanent damage to tape
      - No permanent damage to audio or video signals
      - Playback recording not of sufficient amplitude to hear any audio other than the re-recorded information (i.e. 0810 - 0814 audio)
   c. Same tape passed through again
      - Re-recorded audio was considerably lower in amplitude.
      - Still no original audio available
   d. Same tape passed a third time
      - Same results, low re-recorded audio, no original audio
   e. Adjust magnet and place a few millimeters closer to tape
      - Step through procedures with second test tape
      - This test tape was run through the setup a total of four times. The same results as above occurred with the exception of the fact that this time, all re-recorded audio was lost. No original audio was found.
   f. Adjust magnet one more time (approximately 2 millimeters).
      - Tape physically destroyed. Knocked off effort to extract audio.

4. Conclusions
   a. This procedure was a new procedure in that it had never been accomplished with video tape media.
   b. Previous attempts at retrieving audio from audio cassette tapes was successful. This should have followed in the same vein.
   c. Test was not accomplished on original, as the tape would have been physically destroyed and no audio retrieved at all. The individuals at Rome Laboratory were quite helpful through this whole process. It was their expertise that helped develop this attempted solution, and their expertise that enabled us to get as far as we did. The original tape was preserved and is being sent back to your offices.

TAB N

TRANSCRIPTS OF RECORDED COMMUNICATIONS

TRANSCRIPT OF VIDEOTAPE
AIRCRAFT 79-0025
(TIGER 2)
APRIL 14, 1994

(Tape starts with inaudible comment)

FLIGHT LEAD: (Tiger 1)	Tiger 1, splash one Hind. Tiger 2, you're engaged with the second one. He's off my nose two miles, right past the fire ball. Two, call in. One's off left.
WINGMAN: (Tiger 2)	In hot.
FLIGHT LEAD:	Copy. Tiger 1, splash one Hind. Tiger 2 is engaged, Cougar.
COUGAR:	Cougar copies. Splash one Hind.
FLIGHT LEAD:	He's in a left-hand turn, low.
WINGMAN:	Tiger 2, splash second Hind.
FLIGHT LEAD:	Splash two, Tiger 2, come off south.
WINGMAN:	[Offensive Remark Deleted]
COUGAR:	(Inaudible) Hind.
FLIGHT LEAD:	Say again?
WINGMAN:	[Offensive Remark Deleted] (PAUSE) Off south. Master arm safe.
FLIGHT LEAD:	One is master arm safe. Visual...right side...tactical..... climb. (PAUSE) I never got my tape off.
WINGMAN:	I got it. Don't worry. Two, I'm blind, passing 11.
FLIGHT LEAD:	Okay, coming under your nose. Check right to 240.
WINGMAN:	Visual. (PAUSE) Recommend we go do a pass over that and film it.

(TAPE OFF)

(TAPE ON)

FLIGHT LEAD: Two, posit.

WINGMAN: Coming off ....right. (PAUSE) Two's coming in behind you.

RAIDER FLT: (Inaudible) (possibly "Cougar, Raider Flt...") Detroit, picture.

COUGAR: Raider, Cougar, picture clean. (PAUSE) Tiger.

FLIGHT LEAD: Cougar, Tiger, go ahead.

COUGAR: Say altitude of splashed bandits.

FLIGHT LEAD: Say again.

COUGAR: Say altitude when engaged. (PAUSE) Altitude of engagement.

FLIGHT LEAD: ... below 500 feet.

WINGMAN: (Talking to Tape) We're running out.....up the valley. I'm going to keep the mountain (Inaudible word) up. This smoke--right-hand smoke is mine. Left hand smoke is [Flight Lead's]. I'm going to get the.... (PAUSE).....There's one of them. Here comes the second one.

FLIGHT LEAD: And Two, One's in behind you.

WINGMAN: Copy. (PAUSE) Nobody's there. Nobody could survive that.

(TAPE OFF)

(TAPE ON)

WINGMAN: Long estimate 3645 44035.

Tiger Two's, visual, in the aux.

Okay, reading out Mark 1 36451 44052.

FLIGHT LEAD: One's pulling it back 7,000.

WEZEL: Wezel checking (Inaudible word).

COUGAR: Wezel, Cougar, radar contact.

WEZEL: Wezel, Detroit.

COUGAR: Cougar, picture clean.

FLIGHT LEAD: Tiger.

(TAPE OFF)

(TAPE ON)

WINGMAN (Talking to tape) Okay, tape's coming back on.

COUGAR: Cougar, picture clean.

WINGMAN (Talking to tape) Turn down the radio here...

Okay, Recapping--as we entered the AOR, we were running basically to the southeast. We had an opportunity to look down those valleys that run northwest, southeast.

As we approached the Gate, I picked up a helicopter tracking north westbound. I could tell it was a helicopter because we were only getting about 130 knots. As we came in, we picked up tail-on looking at a guy out there about 30 miles where we initially picked him up. He was tracking--we were looking at a tail aspect looking at 130 knots pretty steady, broke the lock, [FLIGHT LEAD] went down to do a VID as briefed.. I did an S-turn back behind him. He came down and went for an ID on the helicopters. Initially, he called it a Hind. Then he says--No, it's a Hip. He says--Negative, it's a Hind. And about that time he's....

CLAW FLIGHT: Tiger, Claw.

FLIGHT LEAD: Claw.....

(TAPE OFF)

(TAPE ON)

WINGMAN (Talking to tape) As briefed, I did an S-turn back and forth behind him to get spacing. I was about 3 1/2 miles back. He came

through, made the initial pass, called them initially Hinds and said-No, Hip, then came back and said--Confirm Hind. I was looking down. I did not go as low as he did on that initial pass. I was looking at shadows. It appeared to be a Hind to me. As I pulled off, he confirmed they were Hinds. He made the call "Hind", talked to AWACS, came back around. He circled to the south. I circled to the north. Basically, he came in, took the first one out with an AMRAAM. Film. I ran the camera from back here so we ought to be able to have film of that. He called off. I called in with a heater and shot mine. Can't tell if his made any reaction at all. Mine was heading for high terrain off to the left. The AIM-9 pulled a good deal of lead to the point that I thought it might be going for hot rock and then it slammed back in and took them out.

Flew over the crash site twice; once to get a mark east to west--excuse me, once to get a mark west to east; the second time to get a mark, look at the wreckage east to west. Saw no survivors. Looked like the helicopter pretty much came apart when they were hit. From looking at the pointy talky they give me in the cockpit here, I can confirm that what I saw appeared to be a Hind and that [FLIGHT LEAD] was close enough to eyeball it and see that they had ordnance on the wing stations. Tape's coming back off.

TAPE ENDS

REPORTER'S CERTIFICATE

The videotape from Aircraft 79-0025 (Tiger 2), April 14, 1994, was reviewed and transcribed by me and the foregoing transcript is a true, accurate and verbatim account of that videotape.

Maureen A. Nation

MAUREEN A. NATION, DAFC
Court Reporter
Incirlik Air Base, Turkey

TAB N

TRANSCRIPTS OF RECORDED COMMUNICATIONS