P 012100Z JUL 87
FM 41RWRW MCCLELLAN AFB CA//DO//
TO RUAKDPB/38ARRS OSAN AB KOR//DO//
INFO RHCUAAA/23AF SCOTT AFB IL//DOV//
RUWMHKA/71ARRS ELMENDORF AFB AK//DO//
RHAKAAA/33ARRS KADENA AB JA//DO//
RHMQAAA/31ARRS CLARK AB JA//DO//
RUCIPGA/DET 5 41RWRW TYNDALL AFB FL//DO//
RUCLFFA/DET 11 41RWRW MYRTLE BEACH AFB SC//DO//
RUCLBVA/DET 15 41RWRW PATRICK AFB FL//DO//
RUVRAAA/WRALC ROBINS AFB GA//MMEDT//
BT
UNCLAS
SUBJ: H-3 HIGH TORQUE

OPS		X
SCH		X
DOT		✓
DOV		X
SE		X
LG		✓
GA		
SEC		
File		
Suspense:		
Return To:		

1. FOLLOWING OUR TELEPHONE CONVERSATION CONCERNING THE GROUNDING OF 2 HELICOPTERS FOR HIGH TORQUE, I CONTACTED 23 AF/DOV (SMSGT WHITMER).

2. SMSGT WHITMER AGREED THAT IF YOU HAVE A CONFIRMED TORQUE CELL ERROR (MGB) FROM 6-10% ABOVE COMPUTED TORQUE DURING YOUR POWER CHECK OR YOU HAVE AN EXCEPTIONAL ENGINE (IAW T.O. 1H-3(C)E-1S-165) THE AIR-

CRAFT IS CLEARED TO FLY.
PAGE 2 RUVMAAA7214 UNCLAS
3. NORMALLY, THE TORQUE CELL ERROR WILL BE DETECTED IN THE 104-123% TORQUE RANGE. HOWEVER, IF CLIMATIC CONDITIONS PREVENT YOU FROM BEING

ABLE TO OBTAIN 104-123% TORQUE THE ERROR MAY OR MAY NOT BE INDICATED.

4. THEREFORE THE AIRCRAFT IS CLEARED TO FLY IF THE INDICATED TORQUE ISN'T GREATER THAN 10% ABOVE THE COMPUTED TORQUE AND THE ACTUAL POWER

AVAILABLE CAN BE CONFIRMED BY THE FUEL FLOW.
5. ACTUAL POWER AVAILABLE CAN BE CONFIRMED FROM THE FUEL FLOW BY

PRIORITY PAGE 1

7-002

USING FIGURE A-6 IN THE DASH 1. TO FIGURE THE ACTUAL POWER AVAILABLE

ENTER THE INDICATED TORQUE VS FUEL FLOW CHART (FIG A-6) ON THE LEFT SIDE (FUEL FLOW - 100LB/HR). MATCH THE ENGINE FUEL FLOW. THEN PROCEED HORIZONTALLY TO THE PRESSURE ALTITUDE FOR YOUR CONDITIONS. NEXT PROCEED DOWN VERTICALLY TO THE INDICATED TORQUE-PERCENT LINE. THIS IS THE ACTUAL POWER AVAILABLE. REMEMBER THAT NOTE 2 ON THE CHART DOESN'T APPLY SINCE YOU ARE NOT TRYING TO PREDICT FUEL FLOW FOR GIVEN

CONDITIONS.
6. ONCE YOU HAVE DETERMINED THE ACTUAL TORQUE AVAILABLE THE FOLLOWING RESTRICTIONS APPLY. ACTUAL TORQUE MUST BE WITHIN PLUS OR MINUS 5% OF COMPUTED TORQUE. THE TORQUE CELL ERROR WILL NOT EXCEED 10% TORQUE ABOVE ACTUAL TORQUE.
7. THESE PROCEDURES APPLY ONLY TO AN AIRCRAFT THAT HAS A CONFIRMED
PAGE 3 RUVMAAA7214 UNCLAS
TORQUE CELL (MGB) ERROR FROM 6-10% HIGH.
8. THE POC FOR ANY QUESTIONS CONCERNING THESE PROCEDURES IS THE 41 RWRW/DOV, TSGT LEHMAN, AV633-4412. THIS IS A DO/LG COORDINATED MESSAGE. LG POC IS MSGT STUBBLEFIELD, AV633-5170.
BT
#7214

OPERATIONAL SUPPLEMENT

POSTED 19 JUN 87

FLIGHT MANUAL

USAF SERIES

CH-3E AND HH-3E

HELICOPTERS

15 JUN 1987

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS SUPPLEMENT TO THE ATTENTION OF ALL AFFECTED AF PERSONNEL

Published under authority of the Secretary of the Air Force

26 MAY 1987

SHORT TITLE: PROCEDURES

1. PURPOSE. To provide aircrew members with current information.

2. INSTRUCTIONS. Page 7-4, paragraph Higher Than Predicted Engine Performance is amended, in its entirety, to read as follows:

Higher Than Predicted Engine Performance

If higher than predicted engine performance values occur, comply with torque system check, this section.

If maintenance actions validate the torque indicating system as being accurate, and the engine is verified by the run test sheet as an exceptional engine, the torque indications are considered reliable. Maintenance will annotate the aircraft forms to reflect actual engine performance parameters. The aircraft may be operated with this condition provided engine performance does not exceed, lower than 5% or higher than 10% of predicted torque. For flight and approach planning factors, however, fuel flow must confirm the predicted charted values specified in the flight manual performance data.

THE END

FLIGHT MANUAL SAFETY SUPPLEMENT, AND OPERATIONAL SUPPLEMENT STATUS

This page is published with each Safety and Operational Supplement. It provides a comprehensive listing of the current Flight Manuals, Flight Crew Checklist, Safety Supplements, and Operational Supplements. If you are missing any publications listed on this page, see your Publications Distributions Officer and get your copy.

FLIGHT MANUAL	DATE	CHANGE NO.
1H-3(C)E-1	1 Sep 83 14 AUG 86	Original #1

FLIGHT CREW CHECKLIST	DATE	CHANGE NO.
1H-3(C)E-1CL-1	1 Sep 83	Original
1H-3(C)E-1CL-2	1 Sep 83	Original

CURRENT SUPPLEMENTS

NUMBER	DATE	SHORT TITLE	FLIGHT MANUAL PAGES AFFECTED
S-160	2 Jul 86	AN/APR-39(V)-1 Radar Warning System	Sec II & IV
S-161	18 Sep 86	VHF Communication System	Sec I & IV
S-162	15 Oct 86	Fuel Cell Modification	Sec I
S-163	13 Mar 87	UHF Communication System	Sec IV
S-164	16 Apr 87	WARNINGS	Sec IV
S-165	26 May 87	Procedures	Sec VII

REPLACED/RESCINDED SUPPLEMENTS

NUMBER	DATE	DISPOSITION

OPERATIONAL SUPPLEMENT

FLIGHT MANUAL

POSTED 6 MAY 87

USAF SERIES

CH-3E AND HH-3E

30 APR 1987

HELICOPTERS

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS SUPPLEMENT TO THE ATTENTION OF ALL AFFECTED AF PERSONNEL

Published under authority of the Secretary of the Air Force

16 APRIL 1987

SHORT TITLE: WARNINGS

1. PURPOSE. To provide air crew members with current information.

2. INSTRUCTIONS:

a. Page 4-74 is amended to add prior to paragraph titled "Pilot's Hoist Controls," the following warning:

WARNING

Failure of the power reel up-limit switch and misadjustment/failure of the intermediate switch may result in damage to the cargo compartment and possible serious injury to the hoist operator.

b. Page 4-78 is amended to add prior to paragraph titled "Crewman's Cargo Loading Winch Controls", the following warning:

WARNING

Failure of the power reel up-limit switch and misadjustment/failure of the intermediate switch may result in damage to the cargo compartment and possible serious injury to the hoist operator.

THE END

FLIGHT MANUAL, SAFETY SUPPLEMENT, AND OPERATIONAL SUPPLEMENT STATUS

This page is published with each Safety and Operational Supplement. It provides a comprehensive listing of the current Flight Manuals, Flight Crew Checklist, Safety Supplements, and Operational Supplements. If you are missing any publications listed on this page, see your Publications Distributions Officer and get your copy.

FLIGHT MANUAL	DATE	CHANGE NO.
1H-3(C)E-1	1 Sep 88 14 Aug 86	Original #1

FLIGHT CREW CHECKLIST	DATE	CHANGE NO.
1H-3(C)E-1CL-1	1 Sep 88	Original
1H-3(C)E-1CL-2	1 Sep 88	Original

CURRENT SUPPLEMENTS

NUMBER	DATE	SHORT TITLE	FLIGHT MANUAL PAGES AFFECTED
1S-160	2 Jul 86	AN/APR-39(V)-1 Radar Warning System	Sec II & IV
1S-161	18 Sep 86	VHF Communication System	Sec I & IV
1S-162	15 Oct 86	Fuel Cell Modification	Sec I
1SS-163	13 Mar 87	UHF Communication System	Sec IV
1SS-164	16 Apr 87	WARNINGS	Sec IV

REPLACED/RESCINDED SUPPLEMENTS

NUMBER	DATE	DISPOSITION

OPERATIONAL SUPPLEMENT

FLIGHT MANUAL

POSTED 9 APR 87

USAF SERIES

CH-3E AND HH-3E

HELICOPTERS

3 APR 1987

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983.

Published under authority of the Secretary of the Air Force

13 MARCH 1987

SHORT TITLE: UHF COMMUNICATION SYSTEM

1. PURPOSE. To provide data for aircraft modified by TCTO 1H-3-766, modification of AN/ARC-164(V) Radio.

2. INSTRUCTIONS.

a. Page 4-24, of the basic publication, is amended to add prior to paragraph titled "Backup UHF Command Set (AN/ARC-108)" the following text:

UHF COMMAND RADIO AN/ARC-164(V) (MODIFIED BY TCTO 1H-3-766)

Description.

The system consists of a modification to selected airborne and groundbased radios, providing them with frequency hopping capability. Frequency hopping is a technique where the channel of frequency being used for communication on a given link is rapidly changed many times per second. The purpose for doing this is to make it difficult for an adversary to jam the link since the operator cannot determine which channel is being used. By the time determination is made as to which channel is being used, the communication link has changed to another channel. Part of the strength of this system comes from the use of channels in an apparently random manner; this means that no pattern is evident to the external observer and jamming is consequently more difficult.

The frequency hopping scheme is implemented in the equipment by storing within every radio a Word-Of-the-Day (WOD) which establishes frequency patterns and rates of hopping for a given day, which is 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, the radios require some means to store the pattern for channel use on a given day, and also an accurate clock to control the times at which the pattern is consulted.

It is clear that both radios of a communication link must have clocks which must also be synchronized, because the particular frequency used at a particular instant depends on the precise TOD. This basic requirement leads to the need for a time distribution and maintenance system. As a matter of principle, time may be set to any arbitrary time standard, however, as a practical convenience, Universal Time Coordinated (UTC) has been adopted as the time standard. This permits the use of satellites as one means of obtaining time, and current plans make use of the TRANSIT satellite system.

This modification enhances the operational use of the present equipment and increases its jam resistance. These improvements are implemented through the use of an Expanded Memory Board (EMB). The EMB is a direct replacement for the existing memory board contained in the synthesizer/ECCM slice. The EMB will restore presets 15 - 19 for operational use, allow the storage and use of up to six WOD's (MWODs), improve the VINSON interface, and provide frequency management.

System Operation.

The usual operating mode for the radio will be its normal mode where it uses any one of the 7000 channels available to the UHF communication band. Use and operation of the radio will be done in the same manner as currently done. The radio set provides a 7000 channel UHF tuneable receiver; an auxiliary guard receiver (nominally 243.000 MHz, tunable from 238.000 to 248.000 MHz, with crystal replacement and realignment), and a 7000 channel, 10-watt carrier transmitter for normal AM voice communications and communications in the AJ mode of operation.

If jamming is encountered, the radios will be able to switch over to the AJ mode and continue their communication. In order to permit this switchover the radios will have to be suitably "primed" and this is usually done prior to takeoff.

The system also has a capability termed Multi-Channel Operation (conferencing). This permits a receiver to accept two simultaneous transmissions on the same net while avoiding the beat note which is typically present under normal operation and which prevents the listener from understanding either transmission. The technique is implemented in the transmitter where it is recognized whether or not the net is already in use. If so, the transmitter side steps by one 25 KHz channel. Since the receiver has a wideband mode the second signal is received in addition to the original. The multi-channel capability can be selected by the WOD and is applicable only in the ECCM mode.

All the controls of the modified AN/ARC-164 retain the same functions except as follows:

a. 200/300 MHz Selector Knob (A-3-2-T Switch).

(1) - "A" position selects AJ mode.

(2) - Selects 100's digit frequency (either 2 or 3) in Normal mode.

(3) - "T" position selects input of a new Time-Of-Day (TOD) for up to 1 minute after being selected. The "T" position is a momentary, spring-return position. "T" position, in conjunction with simultaneously

pressing TONE switch, is used for emergency start-up of TOD clock when TOD is not available from external sources. This TOD will not be synchronized to Universal Coordinated Time (UTC).

NOTE

The radio will automatically accept the first (TOD) signal it receives after power-up. If the operator requires a new TOD after this initial synchronization, he must momentarily rotate this switch to the "T" position. The system will then accept a new TOD for a period of one minute.

b. Preset Channel Selector Switch. Select one of 14 to 19 preset channels in either active or normal mode. The precise number of presets available for use depends upon the type of WOD loaded into the radio. If a WOD is loaded into the radio, presets 15-20 can not be used depending upon the WOD length. If an MWOD is loaded into the radio, preset 20 can not be used. Presets 1 through 19 are available for use.

c. Tone Switch. Prior to TOD reception there is no change, it operates as a 1020 Hz tone transmission switch. After TOD has been received, it will transmit TOD followed by 1020 Hz tone on the selected frequency. In conjunction with the A-3-2-T switch, it starts the TOD clock within the radio. This is done by simultaneously selecting the T position and depressing the Tone button.

d. Preset Switch. Stores selected frequency in selected preset channels in Normal Mode, and WOD in AJ mode. HQ WOD storage starts in preset 20 and may extend through preset 15. MWOD storage is in preset 20.

Operational Procedures.

Existing capabilities of the radios are preserved to the maximum extent possible when the radios are operated in their normal mode, and no new procedures are required for normal radio operation.

NOTE

To operate in the AJ mode, the radios must first be initialized ("primed"), this requires setting into the radio three control entries, i.e., Time of Day, Word of Day, and net number.

TIME OF DAY (TOD)

Correct TOD may be transmitted to a modified AN/ARC-164 by feeding the receiver with a radio signal carrying the proper time modulation. The signal may be provided by another modified radio which has the correct time, or it may be provided by the ground-based clock SG-1192/TRC.

TOD entry must be done after the radio is switched on. The clock inside the radio loses time when the radio is switched off. TOD entry would normally be done on the ground prior to take-off, although it can be easily done while in flight. This feature also permits time corrections in flight, when necessary.

It is possible to transmit and receive timing information in both normal and AJ modes, by momentarily depressing the TONE button. In normal mode, a complete TOD message is transmitted, while in the AJ mode only an updating time-tick is used. The purpose of the AJ mode time transmission is to allow a time update to take place in the event that a radio is drifting out of synchronization. An operator will know that his radio requires an update when incoming messages from several different radios have a poor sound quality. If incoming messages from only one radio sounds poor, then it is that radio which requires an update.

TIME OF DAY (TOD) AND TOD UPDATE RECEPTION

a. Normal Mode. The radio will automatically accept only the first TOD message received after power-up, whenever it occurs. Subsequent messages will be ignored unless the operator first selects the "T" position on the A-3-2-T switch. To receive time in normal mode, rotate the A-3-2-T switch to the "T" position and return to a normal channel (either manual or preset) on which TOD is being transmitted.

b. AJ Mode. To receive a time update in AJ mode, rotate the A-3-2-T switch to the "T" position and then back to the "A" position.

NOTE

- Depressing the tone button will send out a TOD update if in the active mode or a complete TOD message if in the normal mode.
- When the "T" position is selected, the radio will accept the next TOD received in either normal or active mode provided that it arrives within one minute of the time the "T" position has been selected.

WORD OF DAY (WOD)

NOTE

There are two types of WODs available: WOD and MWOD. The WOD is the present single WOD whose entry is described in paragraph a. MWOD is similar to the WOD except a date tag is added. In addition, up to six MWODs can be loaded into the radio.

The entry of WOD is done by making use of one or more of the channel presets 20 through 15, available to the AN/ARC-164 UHF radio. For new WOD entry, the same method is used as in entering preset frequencies in the normal mode, i.e., the radio is set to the preset mode starting at preset channel 20. The WOD is set on the manual frequency indicators, the preset entry button is depressed to enter the data into the preset memory. The operator then selects preset channels 19, 18, etc. and continues entering WOD into preset memory. After doing this for each appropriate channel, select channel 20 to initiate transfer of the WOD from the non-volatile preset channel memory to the volatile WOD memory. A single or double beep will be heard when channel 20 is selected. A single beep indicates that the WOD element is in the next lower channel. Progressively select the next lower channel until a double beep is heard indicating that all WOD elements have been transferred to the volatile memory.

When the radio is switched off, the MWOD data is not lost but stored in a non-volatile memory in the switching unit. When the radio is switched on, the MWOD must be transferred from the non-volatile memory in the switching unit to the receiver-transmitter. This is done by selecting the preset mode and starting with preset channel 20, rotating by preset channel switch backwards. The operator will hear a single or double beep, a single beep indicates that entry of WOD is not complete but has been transferred and accepted. After the single beep is heard, the operator selects preset 19, 18, etc. and continues transferring WOD until a double beep is heard. The double beep indicates WOD transfer is complete.

Net Number. Once TOD and WOD have been entered any valid AJ net number may be selected by using the frequency selector knobs.

MULTIPLE WORD-OF-DAY

NOTE

During the transition from single to multiple WOD operation, the single WOD method is still available. The method of operation for single WOD is contained in existing HQ Technical Manuals, the method of operation for multiple WOD follows:

MWOD capability allows for up to six WODs to be loaded at one time, and each WOD will be tagged with a unique date code. When the current operational data is updated in the radio, the code generator will automatically be reinitialized with a new WOD having the same date. WOD elements are entered into memory locations accessed by the CHAN switch (channels 20 through 15). The elements are not stored in the front panel preset memory, they are stored in the non-volatile memory located in the SYNTH/ECCM slice. Channel 14 is used to enter the date code necessary for implementation of the WOD. Channel 1 is used for entering the current operational date.

WOD data is not stored in the front panel memory. Since the WOD elements are stored in the non-volatile memory locations accessed by the CHAN switch, they are entered with the TONE switch while in manual mode. If the radio is switched off or power is lost after entry of WOD and date codes, the data will not be lost. Therefore, all of the information entered will remain intact until manually changed.

Multiple WODs may be entered in the MWOD system, therefore, a date code is associated with each new WOD which specifies the day of the month it is to be utilized. The date is required to uniquely identify the

appropriate WOD when reinitializing the code generator at midnight transitions. After the first complete WOD is entered, the corresponding date codes are entered by using the CHAN switch to select channel 14. The date code is then entered as follows:

a. Day of the month date code entry for the WOD is represented by the format 3AB.000, where A = tens (0, 1, 2, or 3), and B = units (0 through 9). Examples: 301.000 = first day of month, 331.000 = thirty-first day of the month. The date tag appears on the WOD tape.

b. The frequency switches are used to enter the applicable date codes.

c. Press TONE switch. A double beep tone will sound indicating that the date code is now entered.

One complete WOD has now been entered. To enter additional WODs, reselect channel 20, and perform the previous steps. The radio will retain the six most recently entered WODs. Previously entered WODs which are no longer among the six most recent are erased. If a WOD is entered having a duplicate date as one which was previously entered, the new entry will take precedence and will be identified as being the most recent entry. Once the WOD information has been entered, the operational date must be entered.

The operational date is the current (GMT) date, and must be entered into the system so the radio can select one of the WODs for code generator initialization. If the aircraft is powered down after the MWODs are loaded, the MWODs will not be lost, but the operational date will. If TOD is being received from a radio source, there is no need to enter the current data in channel 1 because the radio will receive the operational date (day-of-year, year) as part of the TOD message.

NOTE

Determination of EMB presence in the radio. After powering-up the radio, initiate the following steps:

a. Select a frequency of 220.0XX MHz,
XX can be 00, 25, 50, or 75.

b. Select preset channel 20 and preset mode.

c. Depress the red preset Load button.
A single beep should be heard, if not, return to step 1 and select a different value for XX.

Select preset channel 19.
If one or two beeps is heard, the radio is not equipped with an EMB. If no beeps (s) are heard, the radio contains an EMB.

NET NUMBER

The net number is used in the Active mode in the same fashion as a non-AJ mode frequency. The net number is A00.0XX to A99.9XX. The net number is five digits long (all five must be employed) and the last two digits (XX) select which one of the three frequency tables stored in the radio will be used. Specifically, 00 selects the original frequency table, 25 selects a new frequency table tailored for use in NATO-Europe, 50 selects a new frequency table for use throughout the world except in NATO-Europe, and 75 constitutes a set of invalid net numbers and will result in a pulsating warning tone. Radios with the same net number, WOD, and TOD will be able to communicate in the AJ mode.

Operation of the AN/ARC-164 in the AJ Mode

1. Rotate function control switch to the main or both position.

2. Select preset position with the mode control switch.

3. Enter word of day in presets 20 thru 15 (starting with preset 20 and working back).

4. Select manual or preset position with the mode control switch.

5. Enter TOD by selecting frequency on which TOD is being transmitted or by requesting a TOD transmission.

6. Select AJ net number on frequency selector knobs or any preset designated for AJ use.
7. Select A on the A-3-2-T switch.

NOTE

The radio may now be operated in the normal mode by deselecting the "A" position and selecting the designed frequency. A preset channel may also be selected. To return to the AJ mode the operator must select the desired AJ net and then select "A" on the A-3-2-T switch. An audible tone will be heard in the headset when the AJ mode is improperly selected. The tone will be heard when the AJ mode is selected and:

- An invalid AJ net is selected or;
- TOD has not been initially received, or;
- WOD of day has not been entered.

If the function switch is on "Both" (T/R &G) and the AJ mode is selected, any transmission heard on the Guard channel will mix with AJ mode. If Guard channel is being jammed, operator should then select "Main" (T/R) on the function switch.

THE END

FLIGHT MANUAL, SAFETY SUPPLEMENT, AND OPERATIONAL SUPPLEMENT STATUS

This page is published with each Safety and Operational Supplement. It provides a comprehensive listing of the current Flight Manuals, Flight Crew Checklist, Safety Supplements, and Operational Supplements. If you are missing any publications listed on this page, see your Publications Distribution Officer and get your copy.

FLIGHT MANUAL	DATE	CHANGE NO.
TO 1H-3(C)E-1	1 Sep 83 14 AUG 86	Original 1

FLIGHT CREW CHECKLIST	DATE	CHANGE NO.
TO 1H-3(C)E-1CL-1	1 Sep 83	Original
TO 1H-3(C)E-1CL-2	1 Sep 83	Original

CURRENT SUPPLEMENTS

NUMBER	DATE	SHORT TITLE	FLIGHT MANUAL PAGES AFFECTED
S-160	2 Jul 86	AN/APR-39(V)-1 Radar Warning System	Sec II & IV
S-161	17 Sep 86	VHF Communication System	Sec I & IV
S-162	15 Oct 86	Fuel Cell Modification	Sec I
S-163	13 Mar 87	UHF Communication System	Sec IV

REPLACE/RESCINDED SUPPLEMENTS

NUMBER	DATE	DISPOSITION

OPERATIONAL SUPPLEMENT

POSTED 22 OCT 86

FLIGHT MANUAL

21 OCT 1986

USAF SERIES

CH-3E AND HH-3E

HELICOPTERS

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983. Reference to this supplement will be made on the title page of the basic publication by personnel responsible for maintaining the publication in current status.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS SUPPLEMENT TO THE ATTENTION OF ALL AFFECTED AF PERSONNEL

Published under authority of the Secretary of the Air Force

15 OCTOBER 1986

SHORT TITLE: FUEL CELL MODIFICATION

1. PURPOSE. To provide aircrew members with information for helicopters modified by TCTO 1H-3-778, Installation of Self-sealing fuel cells and explosion suppressant foam.

2. INSTRUCTIONS.

a. Page 1-34, FUEL TANKS, is amended to add the following:

After compliance with TCTO 1H-3-778, all CH-3E and HH-3E helicopters are equipped with two self-sealing type fuel cells in each main fuel tank, with polyurethane foam installed in the fuel cells.

b. Page 1-37 is amended to delete Figure 1-27 after compliance with TCTO 1H-3-778.

c. Page 1-41 AUXILIARY FUEL SYSTEMS, is amended to delete "1-27" in last sentence after compliance with TCTO 1H-3-778.

THE END

FLIGHT MANUAL, SAFETY SUPPLEMENT, AND OPERATIONAL SUPPLEMENT STATUS

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FLIGHT MANUAL	DATE	CHANGE NO.
TO 1H-3(C)E-1	1 Sep 83	Original

FLIGHT CREW CHECKLIST	DATE	CHANGE NO.
TO 1H-3(C)E-1CL-1	1 Sep 83	Original
TO 1H-3(C)E-1CL-2	1 Sep 83	Original

CURRENT SUPPLEMENTS

NUMBER	DATE	SHORT TITLE	FLIGHT MANUAL PAGES AFFECTED
S-152	11 Jan 85	Torque System Check	-
S-153	24 Jul 85	Cargo Sling	2-12
S-154	25 Jul 85	External Tank Jettison	5-8
S-155	22 Aug 85	Cargo Sling checklist	8-7
SS-156	3 Feb 86	Fuel Control Failure	See III
S-158	21 Mar 86	Splice Plate Assembly	Sec IV
SS-159	21 Mar 86	Engine Performance	Sec VII
S-160	2 Jul 86	AN/APR-39(V)-1 Radar Warning System	Sec II & IV
S-161	17 Sep 86	VHF Communication System	Sec I & IV
S-162	15 Oct 86	Fuel Cell Modification	Sec I

REPLACE/RESCINDED SUPPLEMENTS

NUMBER	DATE	DISPOSITION

OPERATIONAL SUPPLEMENT

POSTED 16 OCT 86

FLIGHT MANUAL

USAF SERIES

CH-3E

HH-3E

HELICOPTERS

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983. Reference to this supplement will be made on the title page of the basic publication by personnel responsible for maintaining the publication in current status.

Published under authority of the Secretary of the Air Force

18 SEPTEMBER 1986

SHORT TITLE: VHF COMMUNICATION SYSTEM

1. PURPOSE. To provide information for helicopters modified by TO 1H-3-726, Installation of AN/ARC-186(V) VHF AM/FM Radio.

2. INSTRUCTIONS.

a. Pages ~~1-24 and~~ 1-25, figures 1-17 and 1-18 are amended to add COMM and VHF control panel views as shown in Figure 1 of this supplement.

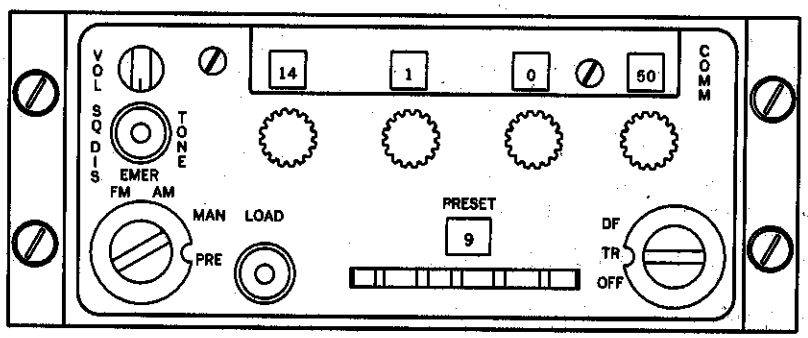

Figure 1. AN/ARC-186(V) Radio Set Control Modified By TCTO 1H-3-726

b. Page 1-58, figure 1-38 (sheet 2 of 2) is amended to add a ⚠1 beside FM-622A and a ⚠2 beside VHF-101, also at bottom of the figure add the following:

⚠1 FM-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

⚠2 VHF-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

c. Page 4-9, figure 4-3 is amended to add a ⚠1 beside FM-622A in the eighth entry and a ⚠2 beside VHF-101 in the ninth entry, also at bottom of the figure add the following:

⚠1 FM-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

⚠2 VHF-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

d. Page 4-11, figure 4-4 is amended to add a ⚠1 beside VHF-101 VHF radio item No. 7 and a ⚠2 beside FM-622A item No. 8, also at bottom of the page add the following:

⚠1 VHF-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

⚠2 FM-AN/ARC-186(V) HELICOPTERS MODIFIED BY TCTO 1H-3-726.

e. Page 4-26 is amended to add after VHF Command Set (VHF-101) Operation paragraph information as follows:

VHF/FM-COMMAND SET (AN/ARC-186(V)) (HELICOPTERS MODIFIED BY TCTO 1H-3-726)

The VHF-FM-AN/ARC-186(V) radio set consists of a remote mounted rt, radio set control, and mounting base. Normal and secure voice communication is available in the 30.00- to 87.975-MHz band. All reception and transmission for this system is routed through the intercommunication station control panel. The transmitter/power amplifier combination provides the necessary gain and leveling to produce 10 watts output under normal operating conditions. A filter and tr switch, part of the transmitter assembly, provide electronic switching to one of the antenna rf connectors and filtering for transmission. Channel spacing in all frequency bands is at 25 kHz increments from the radio set control. Twenty channels may be preset in addition to the preset FM guard frequencies. Operations may be either narrow band, 6 dB bandwidth of 22 kHz, or wide band, 6 dB bandwidth at 60 kHz.

A radio set control on the center console provides operating control for the VHF command radio. The controls consist of a volume control, a squelch disable/tone select switch, frequency control/emergency select switch, load switch, preset channel selector, preset channel indicator, mode select switch, four rt frequency select switches and bandwidth switch. The volume control adjusts volume adjustments. The squelch disable/tone select enables or disables squelch and transmit tones of approximately 1000 Hz. A frequency control/emergency select switch enables preset (PRE) or manual (MAN) frequency selection for normal voice functions. The EMER AM and EMER FM positions provide voice reception and transmission on prestored guard channels. The load switch puts a manually selected frequency into a selected preset channel. A preset channel selector rotary switch provides the capability of selecting preset channels from 1 to 20 and displaying the selection in a preset FM homing. A 3-position rotary mode select switch, depending on its set position, can disable the rt, enable transmit/receive modes, and provide ADF or FM homing. Four selector switches provide rt frequencies in 0.025 MHz increments and displays the readings in indicator windows. Wide-band/narrow-band capabilities are provided through use of the bandwidth switch. The set receives power marked FM, located on the co-pilot's overhead circuit breaker panel.

VHF/FM Radio Set AN/ARC-186(V) Operation.

To operate the radio set:

1. Place the mode switch to the TR or DF position to receive or to transmit.
2. Select the mode of operation desired (AM or FM).

NOTE

Keying the microphone for voice transmission when in the DF mode will disable the homing function while the mike is keyed. Reception while in DF mode may be distorted due to the direction finding equipment operation.

3. Select the desired operating frequency.
4. Adjust the SQ and VOL as necessary.
5. Place the mode switch in the OFF position.

To transmit:

1. Transmitter selector knob - FM.
2. Microphone trigger switch DEPRESS, SPEAK INTO MICROPHONE.

To turn set off:

1. Mode selector switch - OFF.

VHF COMMAND SET (VHF-AM-AN/ARC-186(V)) (MODIFIED BY TCTO 1H-3-726)

The VHF AM-AN/ARC-186(V) radio consists of a remote mounted rt, radio set control and mounting base. The transmitter/power amplifier combination provides the necessary gain and leveling to produce 10 watts output under normal operating conditions. A filter and tr switch, part of the transmitter assembly, provides electronic switching to one of the antenna rf connectors and filtering for transmission. All operating voltages are internally generated from a single -28-V dc input. VHF AM Radio Set AN/ARC-186(V) provides normal and secure voice communication capability. The AM band covers the frequencies of 116.000 to 151.975 MHz. Reception only is available in the 108.000- to 115.975-MHz range. Radio relay and automatic direction finding in the AM band are available. Channel spacing in all frequency bands is at 25 kHz increments. Twenty channels may be preset in addition to the present AM guard frequencies. Operation may be either narrow band, 6 dB bandwidth of 22 kHz, or wide band, 6 dB bandwidth at 60 kHz. A radio set control on the center console provides operating radio set control for the VHF command radio. The controls consist of a volume control knob, a squelch disable tone/select switch, frequency control/emergency select switch, load switch, preset channel selector, preset channel indicator, mode select switch, four rt frequency select knobs and bandwidth switch. The volume control knob allows for volume adjustments. The squelch disable/tone select switch is provided to enable or disable squelch and transmit tones of approximately 1000 Hz. A frequency control/emergency select switch enables preset (PRE) or manual (MAN) frequency selection providing normal voice functions. The EMER AM and EMER FM positions provide voice reception, and transmission on prestored guard channels. The load switch, when depressed provides provisions to put a manually selected frequency into a selected preset channel. A preset channel selector rotary switch provides the capability of selecting preset channels from 1 to 20, and displaying the selection in a preset FM homing. A 3-position rotary mode select switch, depending on its set position, can disable the rt, enable transmit/receive modes, and provide ADF or FM homing. Four selector knobs provide rt frequencies in 0.025 MHz increments and display the readings in indicator windows. Wide-band/narrow-band capabilities are provided through use of the bandwidth switch. The ARC-186(V) is protected by two circuit breakers, marked VHF, located on the dc essential bus portion of the AC nonessential bus circuit breaker panel.

VHF COMMAND SET (VHF-AM-AN/ARC-186(V)) OPERATION

To put the VHF command radio into operation:

1. Place the mode switch in the TR or DF position to receive or to transmit.
2. Select the mode of operation desired (AM or FM).

NOTE

Keying the microphone for voice transmission when in the D/F mode will disable the homing function while the mike is keyed. Reception while in DF mode may be distorted due to the direction finding equipment operation.

3. Select the desired operating frequency.
4. Adjust the SQ and VOL control.
5. Set the mode switch to the OFF position.

To transmit:

1. Transmitter selector knob - VHF.
2. Microphone trigger switch - DEPRESS; SPEAK INTO MICROPHONE.

To turn set off:

1. Turn mode switch - OFF.

f. Page 4-27, the right-hand column, the "VHF DIRECTION FINDER (AN/ARA-25)" paragraph is amended as follows:

In the second line, after VHF-101 add or (AN/ARC-186(V) for aircraft modified by TCTO 1H-3-726).

Step 2 add item a. OFF-TR-DF switch (VHF-COMM radio set control) - TR. (for aircraft modified by TCTO 1H-3-726).

g. Page 4-40 is amended to add after FM-622A in SECURE SPEECH KY-28 SYSTEM paragraph to read "AN/ARC-186(V). " (for aircraft modified by TCTO 1H-3-726).

h. Page 4-43 figure 4-13 is amended to add reference to VHF-101 "AN/ARC-186(V)." (for aircraft modified by TCTO 1H-3-726).

i. Index 15, Alphabetical Index is amended to add after VHF Command Set (VHF-101), VHF Command Set (VHF-186.)

j. Index 6, Alphabetical Index is amended to add after FM Command Set (FM-622A), FM Command Set (FM-186).

THE END

OPERATIONAL SUPPLEMENT

FLIGHT MANUAL

03 SEP 1986
POSTED 16 SEP 86

USAF SERIES

CH-3E AND HH-3E

HELICOPTERS

THIS PUBLICATION SUPPLEMENTS TO 1H-3(C)E-1 DATED 1 SEPTEMBER 1983.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS SUPPLEMENT TO THE ATTENTION OF ALL AFFECTED AF PERSONNEL

Published under authority of the Secretary of the Air Force

2 JULY 1986

SHORT TITLE: AN/APR-39(V)-1 RADAR WARNING SYSTEM

1. PURPOSE. To provide aircrew members with current information.

2. INSTRUCTIONS.

a. Page 2 - 25, BEFORE TAKEOFF is amended to change item 4 to read as shown herein:

4. Navigation equipment/RWR - "CHECKED AND SET " (P, CP)FE

b. Page 2 - 43, ENGINE SHUTDOWN is amended to change item 2 to read as shown herein:

2. Navigation sets, unnecessary radios, RWR, and doppler - "OFF " (CP)

c. Page 4-1, AUXILIARY EQUIPMENT, Table of Contents is amended to add the following information preceding LIGHTING EQUIPMENT:

AN/APR-39(V)-1 RWR SYSTEM .....4 - 54

d. Page 4 - 10, figure 4 - 3 (sheet 2) is amended to add the following information:

TYPE	DESIGNATION	FUNCTION	PRIMARY OPERATOR	RANGE	LOCATION OF CONTROL
Radar Warning System	AN/APR-39 (V)-1	Detects radar emitters	Pilot and copilot		Control unit on cockpit console

✓e. Page 4 - 54 is amended to add the following information preceding LIGHTING EQUIPMENT as shown herein:

AN/APR-39(V)-1 RADAR WARNING SET.

The an/APR-39(V)-1 is a passive, omnidirectional radar warning set. The equipment receives and displays to the cockpit crew, information concerning radars usually associated with hostile fire-control radars in E, R, G, H, I and J frequency bands (wideband). Provides visual and aural indications of presence and direction to emitters. Aural indications are received at pilot and copilot crew stations only.

The system also accepts missile guidance radar signals in C and D frequency bands (low-band). When a low-band signal is time-coincident (correlated) with a tracking radar signal, the equipment identifies the combination as an activated SAM radar complex. In this case, visual and aural displays are uniquely identified to warn observer an emitter has become a potential threat.

The AN/APR-39(V)-1 is powered by a 5 AMP 28 VDC circuit breaker labeled radar warning, located on co-pilots overhead DC essential bus panel.

OPERATING CONTROLS Control Unit.

Figure 1 shows front view of control unit. The control unit is mounted on the cockpit console.

A clear plastics guard is mounted to front panel to protect controls and switches from accidental movement or damage.

Indicator

Figure 2 shows front view of indicator. The indicator is mounted on top and left center of instrument panel. On front of indicator is direction display screen (CRT display). The normally dark screen will light with a line-of-bearing strobe indicating distance and direction of detected radar threat. A brilliance control knob (BRIL) is located in upper right-hand corner of indicator. In upper left-hand corner is the missile alert lamp (MA) that can be covered or uncovered by MA lamp shield. In lower right-hand corner is variable filter dial which when turned in direction of NIGHT or DAY will screen the illumination of CRT.

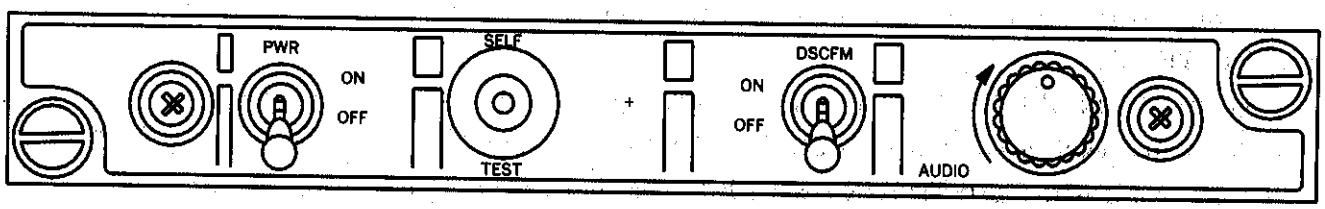

Figure 1. Control Panel, Front View

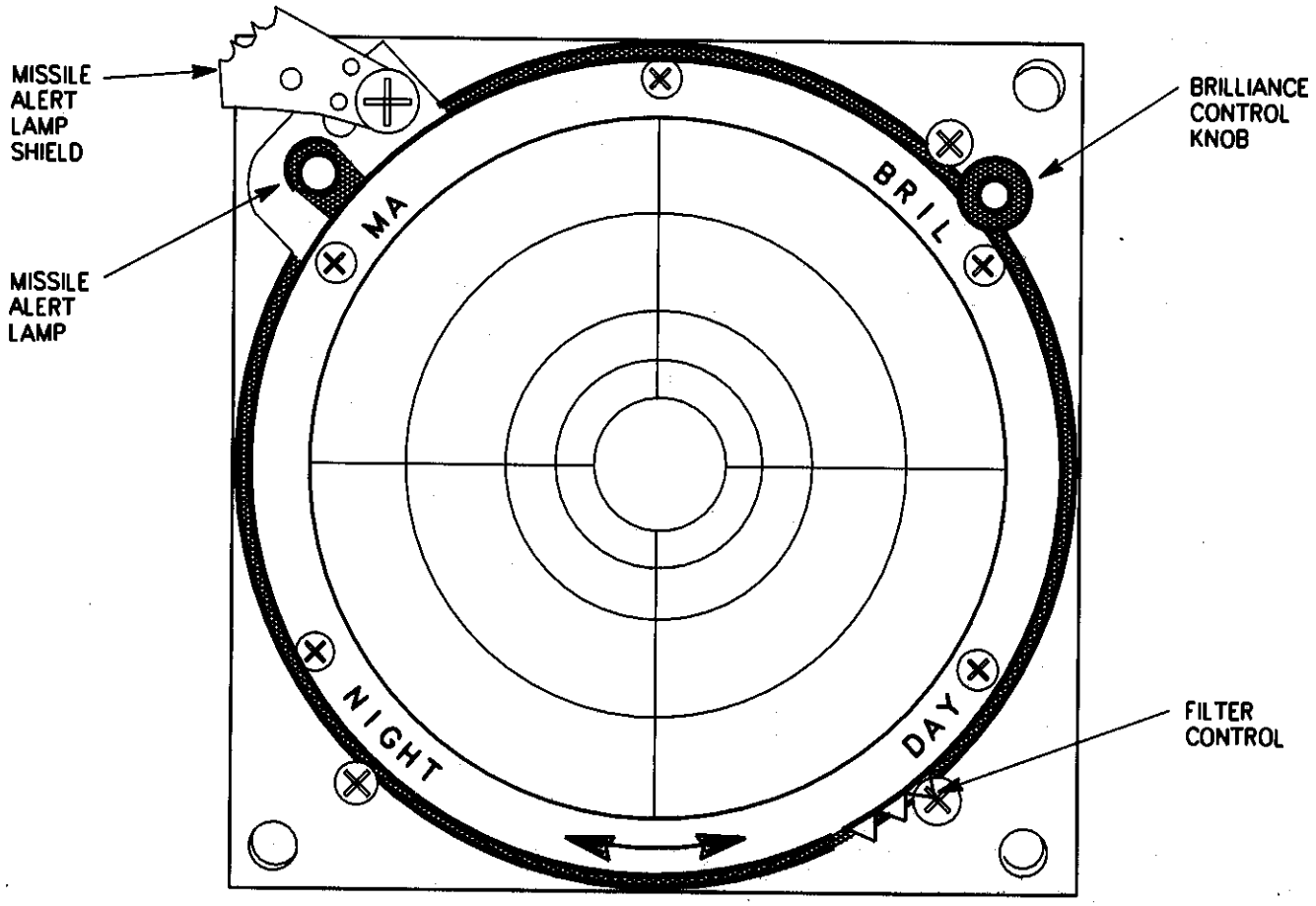

Figure 2. Radar Signal Indicator IP-1150/APR-39(V)
Front View

To place the AN/APR-39(V)-1 System in operation, proceed as follows:

CAUTION

To prevent damage to the receiver detector crystals, assure AN/APR-39(V)-1 antennas are at least 60 yards from active groundbased radar antennas or 6 yards from active airborne radar antennas. Allow an extra margin for new, unusual, or high-powered emitters.

1. Insure 5 amp circuit breaker on copilots overhead essential DC circuit breaker panel is pushed in.
2. Set PWR switch (figure 1) to ON, and allow a minimum of 30 seconds for equipment to become fully operational.
3. DSCRM Switch - OFF.
4. Self Test Switch - Press and hold.
   a. Fwd and aft strobes appear.
   b. Within 6 seconds alarm audio and MA lamp flashes.

5. Self Test Switch - Release.
6. DSCRM Switch - ON.
7. Self Test Switch - Press and hold.
   a. Within 4 seconds fwd or aft strobe appears.
   b. Within 6 seconds the other strobe appears and audio frequency will double.
   c. Several seconds later alarm audio sounds and MA lamp starts flashing.
8. Self Test switch - Release.

NOTE

Check BRIL and AUDIO contril cw and ccw for maximum and mimimum. Adjust as desired for crew comfort.

9. Manipulate DSCRM switch in accordance with mission requirements.
10. Shutdown equipment by placing PWR switch in OFF position.

Operation Modes.

The equipment may be operated in either the descriminator off mode or the descriminator on mode.

CAUTION

Display strobe lengths indicated only received signal amplitude. Since many varibles can affect the atmospheric attenuation of the signals, strobe length should not be interpreted as being directly indicative of distance to the emitter.

Discriminator off Mode.

When operated in descriminator off mode, the DSCRM switch is placed in OFF position. In this mode all high band received signals with an amplitude greater than the predetermined threshold level are displayed in CRT and an audio signal, representative of combined amplitudes and pulse repetition frequencies (PRF's), is present at the headset. The displays indicate total radar environment in which aircraft is operating. Each radial strobe on the CRT is a line of bearing to active emitter. When a SAM radar complex becomes a threat to the aircraft (low band signals correlated with high band signals), the unique alarm audio is superimposed on the PRF audio signal and MA lamp and associated strobe start flashing. Lengths of stobes and audio levels depend on the relative strength of intercepted signals. A typical display when operating in the discriminator off mode is shown in figure 3.

NOTE

In this mode, received low band signals which are not correlated with a wide band intercept will cause MA lamp to flash and an alarm audio will be present.

Discriminator on Mode.

When operating in the discriminator on mode, the DSCRM switch is placed in the ON position. In this mode, signals are processed to determine their conformance to certain threat-associated criteria:

a. The signal level must be greater than the minimum threshhold level.

b. Pulse width must be less than the maximum pulse width.

c. PRF must be greater than the minimum pulses per second (PPS).

d. The pulse train must exist with not less than minimum pulse train persistence.

e. The CRT display is divided into eight sectors. Strobes are displayed only in sectors which receive signals meeting threat criterias. This reduces display clutter by eliminating low-level and wide-pulse-width signals and by selective sector display. Intercepts which meet these requirements are displayed as described in above.

NOTE

In this mode, uncorrelated low band signals will not give any indications.

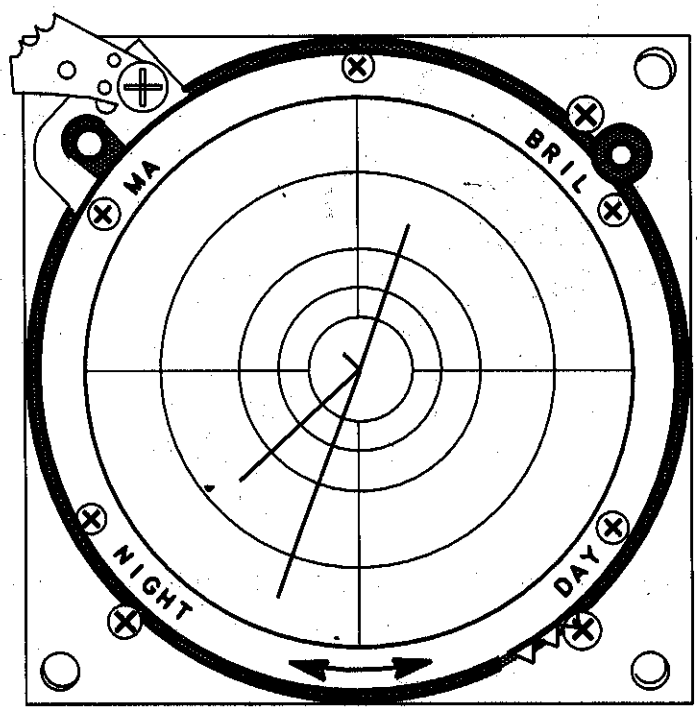

Figure 3. Typical Discriminator Off Mode Display

1. FORWARD RIGHT SPIRAL ANTENNA. Mounted on outside airframe. Picks up high band signals and relays them to the forward radar receiver.
2. AFT RADAR RECEIVER. Mounted on inside airframe in tail pylon. Filters, detects, and amplifies the signals received by the spiral antennas.
3. BLADE ANTENNA. Mounted on underside of tail pylon. Picks up low band signals and relays them to the comparator.
4. COMPARATOR. Mounted on inside airframe. Electronically decides whether an incoming signal is a threat or a nonthreat.
5. RADAR SIGNAL INDICATOR. Mounted on instrument panel. Alerts the aircraft operator, or other observer, to the presence of a signal. Warning light, located on upper left corner of indicator, flashes when an activated SAM site is detected.

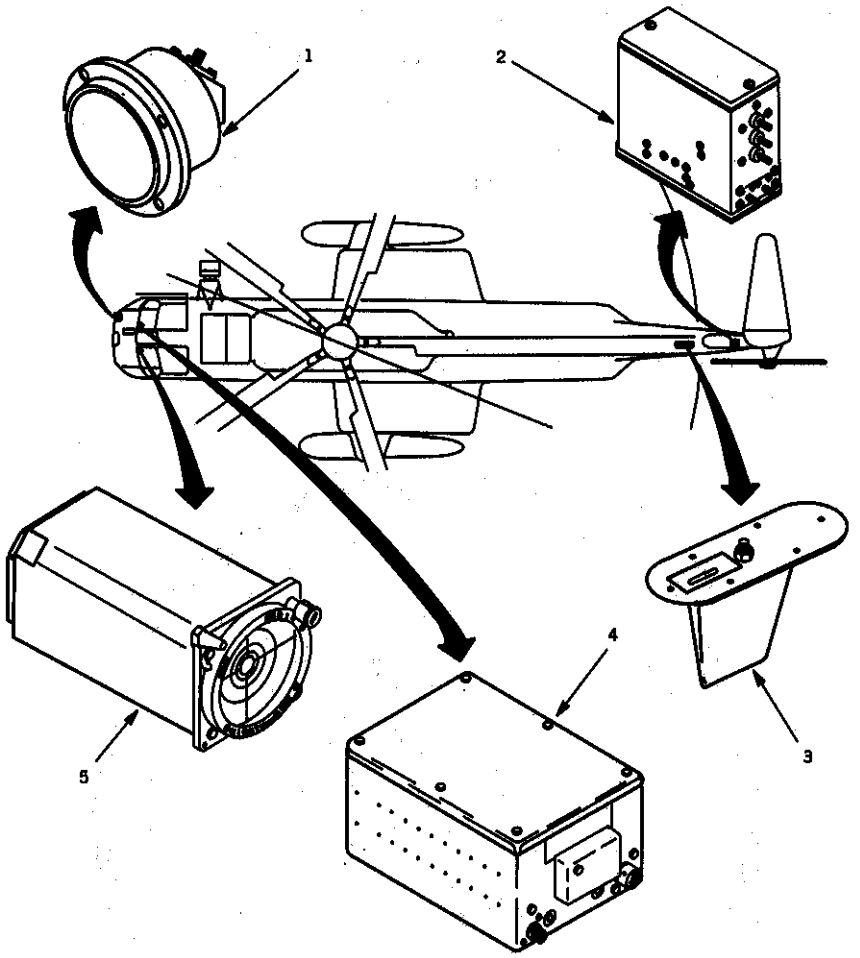

Figure 4. Location and Description of Major Components (Sheet 1 of 2)

1. FORWARD RADAR RECEIVER. Mounted on inside airframe. Filters, detects, and amplifies the signals received by the spiral antennas.
2. AFT RIGHT SPIRAL ANTENNA. Mounted on outside airframe. Picks up high band signals and relays them to the aft radar receiver.
3. AFT LEFT SPIRAL ANTENNA. Mounted on outside airframe. Picks up high band signals and relays them to the aft radar receiver.
4. CONTROL UNIT. Mounted on cockpit console. Contains switching functions for self-tests and select mode of operation. Turns radar set on and off, and regulates audio alarm level.
5. FORWARD LEFT SPIRAL ANTENNA. Mounted on outside airframe. Picks up high band signals and relays them to the forward radar receiver.

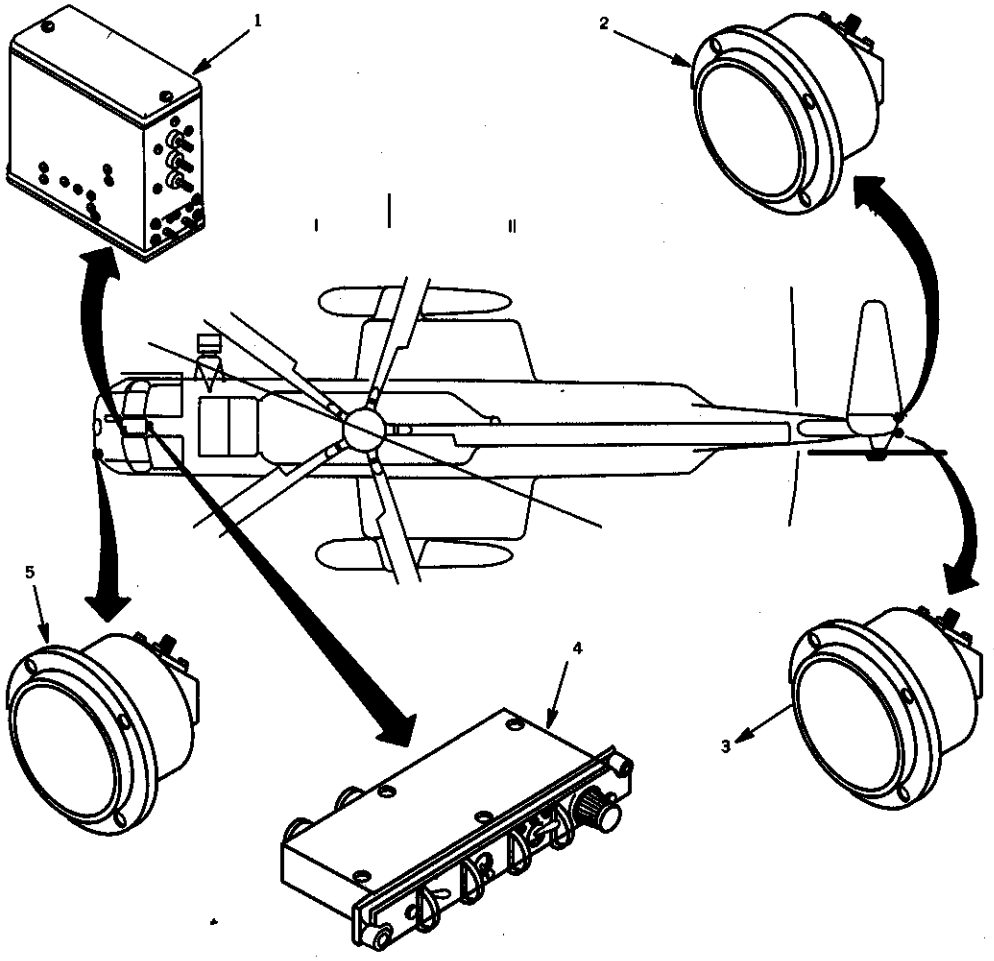

Figure 4. Location and description of Major components (Sheet 2 of 2)

f. Changes to the PILOT'S FLIGHT CREW CHECKLIST (TO 1H-3(C)E-1CL-1) are reproduced so that appropriate pages may be cut out and inserted in the binder over the existing pages, pending change to manual and checklist. Reference to this supplement shall be made on the title page of the checklist.

THE END

Fitz

T.O. 1H-3(C)E-1

FLIGHT MANUAL

USAF SERIES

CH-3E AND HH-3E

HELICOPTERS

NOw63003730F
F09603-84-C-0322

REPOSTED 9 MAR 87
IS-160 16 SEP 86
IS-161 16 OCT 86
IS-162 22 OCT 86
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IS-164 6 MAY 87
IS-165 19 JAN 87

12 MAR 1987

This publication supersedes Operational Supplements T.O. 1H-3(C)E-1S-152, dated 11 January 1985, T.O. 1H-3(C)E-1S-153, dated 24 July 1985, T.O. 1H-3(C)E-1S-154, dated 25 July 1985, T.O. 1H-3(C)E-1S-155, dated 22 August 1985, Safety Supplement T.O. 1H-3(C)E-1SS-156, dated 3 February 1986, Operational Supplement T.O. 1H-3(C)E-1S-158, dated 21 March 1986, and Safety Supplement T.O. 1H-3(C)E-1SS-159, dated 21 March 1986.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS PUBLICATION TO THE ATTENTION OF ALL AFFECTED PERSONNEL

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

1 SEPTEMBER 1983
CHANGE 1 – 14 AUGUST 1986

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original . . . . 0 . . . 1 Sep 1983
Change . . . . 1 . . 14 Aug 1986

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 512 CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Title	1
A	1
i — ii	0
iii	1
iv — vii	0
viii Blank	0
1-1 — 1-19	0
1-20	1
1-23	0
1-24	1
1-25 — 1-26	0
1-27 Blank	0
1-28 — 1-30	0
1-31 — 1-32	1
1-33 — 1-39	0
1-40	1
1-41 — 1-44	0
1-45	1
1-46 — 1-47	0
1-48 — 1-49	1
1-50 — 1-55	0
1-56 — 1-58	1
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*Zero in this column indicates an original page.

USAF

TABLE OF CONTENTS

I Always Know Where I'm Going On

I Will If I Read THIS

SCOPE. This manual contains the necessary information for safe and efficient operation of the CH-3E and HH-3E helicopters. These instructions provide you with a general knowledge of the helicopter, its characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized, and therefore, basic flight principles are avoided.

PERMISSIBLE OPERATIONS. The Flight Manual takes a positive approach and normally states only what you can do. Unusual operations or configurations (such as asymmetrical loading) are prohibited unless specifically covered herein. Clearance must be obtained from the Flight Manual Manager WRALC, Attn: MMSRE before any questionable operation is attempted which is not specifically permitted in this manual. Items in the manual not applicable to the model, series or configuration being operated may be omitted.

HOW TO BE ASSURED OF HAVING THE LATEST DATA. Refer to the basic index T.O. 0-1-1-5 and supplements thereto for current status of Flight Manuals, Safety and Operational Supplements, and Checklists. Its frequency of issue and brevity assures an accurate, up-to-date listing of these publications.

SAFETY SUPPLEMENTS. Information involving safety will be promptly forwarded to you by Safety Supplements. Supplements covering loss of life will get to you in 48 hours by TWX, and those concerning serious damage to equipment within 10 days by mail. The title page of the Flight Manual and the title block of each Safety Supplement should be checked to determine the effect they may have on existing supplements. You must remain constantly aware of the status of all supplements. Current supplements must be complied with, but there is no point in restricting your operation by complying with a replaced or rescinded supplement.

OPERATIONAL SUPPLEMENTS. Information involving changes to operating procedures will be forwarded to you by operational supplements. The procedure for handling operational supplements is the same as for safety supplements.

CHECKLISTS. The Flight Manual contains only amplified checklists. Condensed checklists have been issued as separate technical orders. See the back of the title page for the T.O. number of your latest checklist. Line items in the Flight Manual and checklists are identical with respect to arrangement and item number. Whenever a Safety Supplement affects the condensed checklist, write in the applicable change on the affected checklist page. As soon as possible, a new checklist page, incorporating the supplement will be issued. This will keep handwritten entries of Safety Supplement information in your checklist to a minimum.

HOW TO GET PERSONAL COPIES. Each flight crewmember is entitled to personal copies of the Flight Manual, Safety Supplements, Operational

Supplements and Checklist. The required quantities should be ordered before you need them to assure their prompt receipt. Check with your supply personnel. It is their job to fulfill your Technical Order request. Basically, you must order the required quantities on the Publication Requirement Table (T.O. 0-1-1-5). Technical Orders 00-5-1 and 00-5-2 give detailed information for properly ordering these publications. Make sure a system is established at your base to deliver the publications to the flight crews immediately upon receipt.

Loose leaf binders, and sectionalized tabs, available through local purchase, are available for use with your manual. These are obtained through local purchase procedures and are listed in the Federal Supply Schedule (FSC Group 75, Office Supplies, Part 1). Binders are also available for carrying your condensed checklist. These binders contain plastic envelopes into which indivdual checklist pages are inserted. They are available in two capacities and are obtained through normal Air Force supply, Class 7510. Check with your supply personnel for assistance in securing these items.

WARNINGS, CAUTIONS, AND NOTES. The following definitions apply to Warnings, Cautions, and Notes found throughout the manual.

WARNING	Operating procedures, techniques, etc, which will result in personal injury or loss of life if not carefully followed.
CAUTION	Operating procedures, techniques, etc. which will result in damage to equipment if not carefully followed.
NOTE	An operating procedure, technique, etc. which is considered essential to emphasize.

Two or more Warnings, Cautions, or Notes placed in sequence are denoted by the use of a large dot on the left margin. The heading (WARNING, CAUTION, or NOTE) is not repeated.

USE OF SHALL, WILL, SHOULD, AND MAY. The words shall or will are used to indicate a mandatory requirement. The word should is used to indicate a nonmandatory desired or preferred method of accomplishment, and the word may is used to indicate an acceptable or suggested means of accomplishment.

YOUR RESPONSIBILITY - TO LET US KNOW. Every effort is made to keep the Flight Manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this manual or any phase of the Flight Manual program are welcomed. These should be forwarded through your command headquarters to Warner Robins Air Logistics Center, Robins AFB, GA. 31098, Attn: MMEDF.

HELICOPTER DESIGNATION CODES. Major differences between individual or groups of helicopters covered in this manual are identified by designated number code symbols that appear in the text or on illustrations. The code number either appears at the top right corner, either opposite or above the paragraph heading, or within the text. If more than one paragraph in succession concerns the same series helicopters, the code will be repeated for each successive paragraph. The code will appear in warnings, cautions, and notes in the same manner as within text. In steps of procedure, the code shall follow the step. Paragraphs that are applicable to all series helicopters are not identified with a designation code. A black arrow between codes indicates "through", and a black arrow following a code indicates "and subsequent." The following designation codes are provided for this manual.

CODE	SERIAL NUMBERS
	MODEL CH-3E HELICOPTERS
1	62-12578, 62-12580, AND 62-12581
2	63-9676
3	63-9679
4	63-9683
5	63-9686, 63-9687, 63-9688, 63-9690 AND 63-4691
6	64-14221
7	64-14223
8	64-14224, 64-14225, AND 64-14226
9	64-14228
10	64-14234 AND 64-14235
11	64-5690 AND 65-5692
12	65-5693
13	65-5695 AND 65-5696

CODE	SERIAL NUMBERS
	MODEL CH-3E HELICOPTERS
14	65-5697 THRU 65-5700
15	65-12788 THRU 65-12800
16	66-13285
17	66-13291 THRU 66-13293 AND 66-13296
18	67-14703
19	67-14705
20	67-14707
21	67-14718 THRU 67-14720
22	68-8282
23	64-14230 AND 64-14232

CODE	SERIAL NUMBERS
	MODEL HH-3E HELICOPTERS
24	65-12777, 65-12780, 65-12781, 65-12783, 65-12784 AND 65-12787
25	66-13284
26	66-13286
27	66-13290
28	67-14704
29	67-14706
30	67-14708, 67-14709 AND 67-14711 THRU 67-14717
31	67-14722 THRU 67-14725
32	69-5798 THRU 69-5812

GLOSSARY OF TERMS AND ABBREVIATIONS

AC — Alternating current

ACCELERATION — The rate of change of velocity

ADF — Automatic direction finder

AFCS — Automatic flight control system

AIRSPEED

KCAS — Knots calibrated airspeed

KIAS — Knots indicated airspeed

KTAS — Knots true airspeed

ALT — Altitude

APU — Auxiliary power unit

BAR ALT — Barometric altitude control

BDHI — Bearing distance heading indicator

BLADE TIP STALL — Beginning of blade stall. Occurs at tip of retreating blade due to its high angle of attack and low forward velocity.

BLADE STALL — A stall that begins at the tip of the blade and works progressively inboard as the conditions which cause it increase in severity.

FULL BLADE STALL — Blade stall that is allowed to fully develop causing loss of control and an upward left pitch of the helicopter.

INCIPIENT BLADE STALL — Blade tip stall

BOTTOMING — The engine is considered as bottoming during deceleration whenever a minimum fuel flow to compression-discharge pressure condition is attained.

BUOYANCY — The upward force exerted by water on a floating or immersed body by a fluid.

^{o}C — Degrees Centigrade

CAS — Calibrated airspeed

CDI — Course deviation indicator

CENTER OF GRAVITY (CG) — The center of gravity is the point about which a helicopter would balance if suspended.

CG — Center of gravity

COLLECTIVE — The increasing or decreasing of pitch on all the main rotor blades simultaneously. Also short for collective lever.

CYCLIC — The changing of pitch of each main rotor blade individually as it makes a complete rotation or cycle. Also short for cyclic stick.

DC — Direct current

DG — Directional gyro

GLOSSARY OF TERMS AND ABBREVIATIONS (Cont)

DRAFT — The depth of water the helicopter draws or requires to float.

DRAG DIVERGENCY — Beginning of blade tip stall.

DROOP — Characteristic built into speed control for speed stability and load sharing. When in the governing range steady state N_f will decrease in proportion to engine load at a fixed N_f setting. On this installation the droop is 8.5% N_f from no load to full load conditions.

DECAY — Loss of N_r beyond droop, resulting from a power requirement in excess of power available.

EXCESS BUOYANCY — Buoyancy in excess of that required to float.

°F — Degrees Fahrenheit

FOD — Foreign object damage

FPM — Feet per minute

FT — Feet

FT/MIN — Feet per minute

GAL — Gallons

GCA — Ground-controlled approach

GSI — Glide slope indicator

GW — Gross weight

HR — Hour

HYDROSTATIC ROLL ANGLE — Angle of roll when helicopter is on water.

H-V — Height velocity

IAS — Indicated airspeed

IBIS — Inflight blade inspection system

IGE — In ground effect

IN — Inches

INV — Inverter

KTS — Knots

KVA — Kilovolt-amperes

LAT — Latitude

LB — Pound(s)

LB/GAL — Pound per gallon

LB/HR — Pound per hour

LOAD FACTOR — A factor representing the ratio of weight or pressure of a specified load or force to a standard weight or pressure. The load factor may represent the ratio of the total weight of the helicopter to a weight or pressure imposed by aerodynamic forces, inertia forces, or ground effect.

MAG — Magnetic slaved compass

MAX — Maximum

MEAN WATERLINE — The mean of the highest and lowest waterline for a given set of conditions, gross weight, sea state, etc.

MIN — Minutes/Minimum

MSL — Mean sea level

N_f — Power turbine speed (rpm)

N_g — Gas generator speed

N_r — Rotor speed (rpm)

OAT — Free air, ambient or outside air temperature.

OGE — Out of ground effect (for the CH-3E, and HH-3E, this means hovering approximately 50 feet wheel height or higher)

P_2 — Compressor inlet total pressure

GLOSSARY OF TERMS AND ABBREVIATIONS (Cont)

P_3 — Compressor discharge pressure

PRESS — Pressure

PSI — Pounds per square inch

Q — Torque

R/C — Rate of climb

R/D — Rate of descent

RIGHTING MOMENT — A moment that tends to restore the helicopter to a previous position after an angular displacement on water about one of its axes.

RPM — Revolutions per minute

SEA STATE — Condition of water surface in terms of wind, wave height, wave length, etc.

SERVICE CEILING — Maximum altitude at which a rate of climb 100 FPM can be maintained.

SL — Sea level

STD DAY — Standard day atmospheric conditions

T_2 — Compressor inlet air temperature

OAT may be used in place of T_2 in this manual as T_2 is not indicated in the cockpit.

T_5 — Power turbine inlet temperature

TAS — True airspeed

TEMP — Temperature

TOLD — Takeoff and landing data

TOPPING — A procedure for adjusting engine fuel control to achieve engine performance at maximum operating limits.

TORQUE — Turning force or moment.

TORQUE POWER INDICATION — An indication of power input being delivered to the gear box by the engines.

TRIM ANGLE — The angle at which the helicopter's hull rests on the water.

UTI — Utility

VA — Volt amperes

VAC — Volts alternating current

WATERLINE — The line of intersection between the surface of the water and the side of the helicopter hull when the helicopter is afloat.

WAVE LENGTH — The distance between two successive wave crests.

W_f — Fuel flow

W_f/P_3 — Ratio of weight of fuel flow to be burned to compressor discharge pressure or amount of air available for combustion and cooling.

WL — Water line

XMFR RECT — Transformer rectifier

$\frac{1}{\sqrt{\sigma}}$ — The reciprocal of the square root of density ratio, at the appropriate density altitude. The greek letter sigma (σ) is used to represent the density ratio.

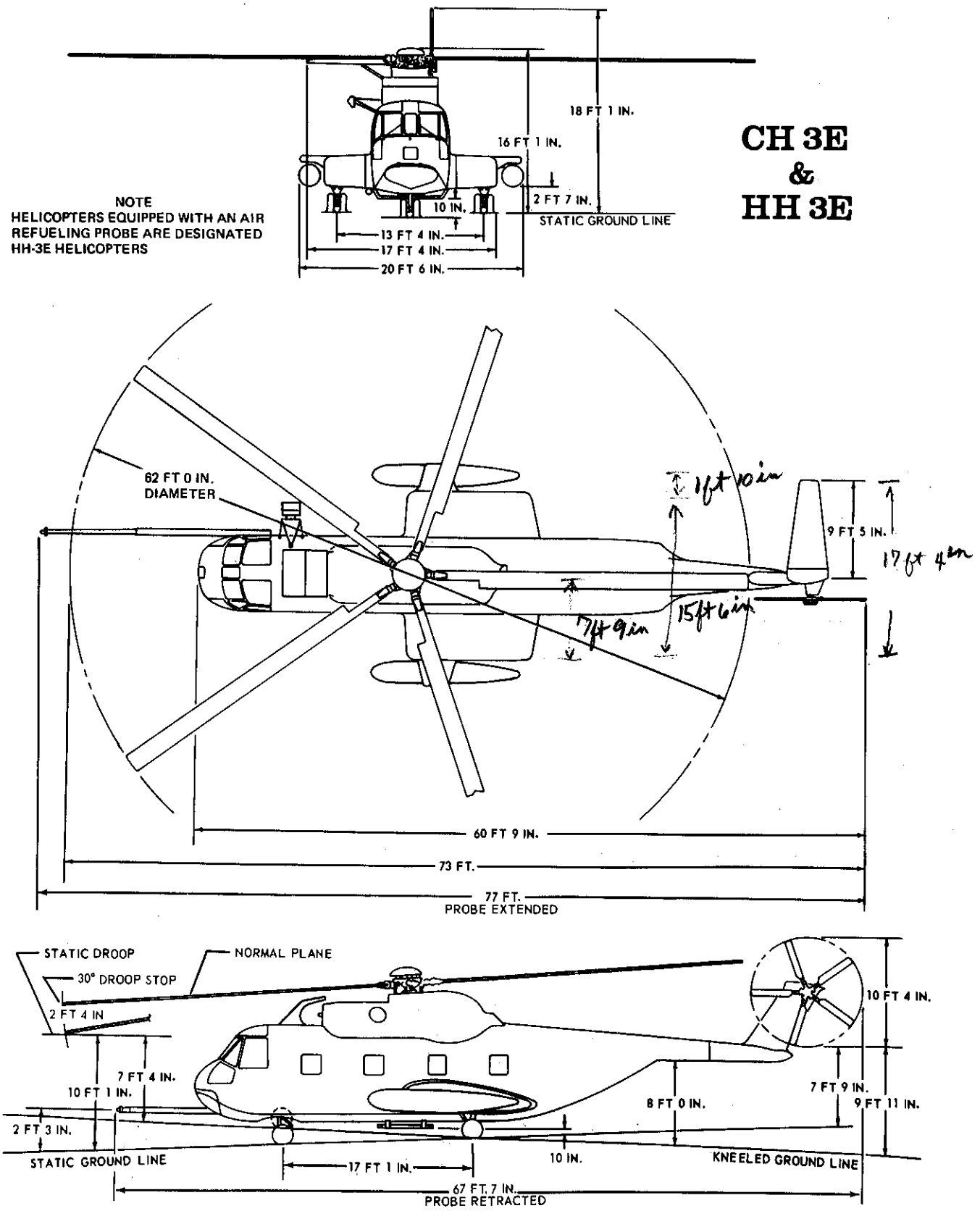

Figure 1-1. Three View and Dimensions