

②

AD-A210 049

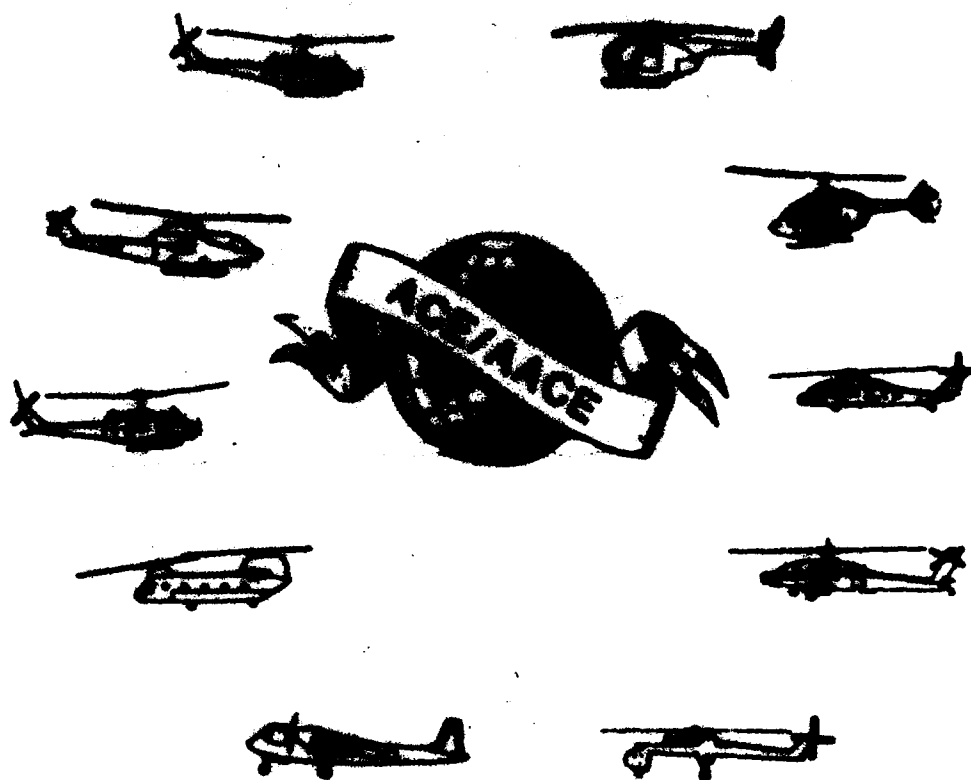
SDTIC
ELECTE
JUL 13 1989
H

[illegible]

U.S. ARMY AVIATION SYSTEMS COMMAND

DISTRIBUTION STATEMENT A

**Approved for public release;
Distribution Unlimited**



**DEPOT ENGINEERING AND RCM SUPPORT OFFICE—
CORPUS CHRISTI, TEXAS**

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NTIAC-85-2			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION NTIAC Southwest Research Institute		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION U.S. Army Aviation Systems Command		
6c. ADDRESS (City, State, and ZIP Code) P.O. Drawer 28510 San Antonio, TX 78284			7b. ADDRESS (City, State, and ZIP Code) Depot Engineering & RCM Support Office CCAD Corpus Christi, TX 78419-6195		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Defense Logistics Agency		8b. OFFICE SYMBOL (If applicable) DTIC-DF	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER DLA900-84-C-0910, CLIN 0001AJ		
8c. ADDRESS (City, State, and ZIP Code) Cameron Station Alexandria, VA 22304			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) ACE/AACE Inspection and Analysis Handbook <i>Part III Profiling</i>					
12. PERSONAL AUTHOR(S) D.C. Brauer, D. Henry, G.A. Matzkanin					
13a. TYPE OF REPORT Handbook		13b. TIME COVERED FROM 6/27/84 TO 6/30/85		14. DATE OF REPORT (Year, Month, Day) June 30, 1985	
15. PAGE COUNT 126					
16. SUPPLEMENTARY NOTATION Prepared as a Special Task for the Nondestructive Testing Information Analysis Center.					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Aircraft Inspection , Nondestructive Testing. Depot Maintenance		
			Reliability , Maintainability Corrosion (TED)		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This is the Airframe Condition Evaluation and Aircraft Analytical Corrosion Evaluation (ACE/AACE) inspection and analysis handbook which was prepared to provide U.S. Army Aviation Systems Command (AVSCOM) managers, commanders of operational units, engineers, team members, and others with a practical reference document of criteria, guidelines, and other information applicable to the ACE/AACE program. The handbook is in three parts: Part I-Management, Part II-Engineering, and Part III-Profiling.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL			22b. TELEPHONE (Include Area Code)		22c. OFFICE SYMBOL

DD Form 1473, JUN 85

Previous editions are obsolete.

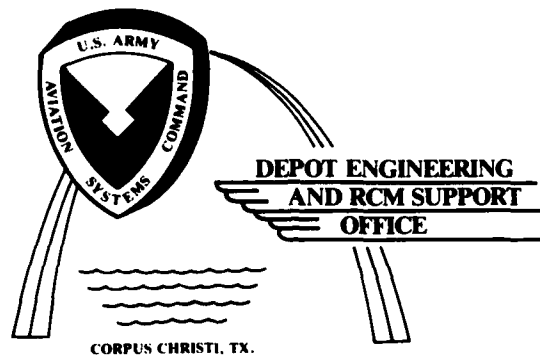
SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

NTIAC-85-2

ACE/AACE INSPECTION AND ANALYSIS HANDBOOK

PART III - PROFILING



Prepared as a Special Task under the auspices of the
Nondestructive Testing Information Analysis Center
for

U.S. ARMY AVIATION SYSTEMS COMMAND

APRIL 1985

89 7 11 039

TABLE OF CONTENTS - PART III

	PAGE
1.0 INTRODUCTION TO PART III - PROFILING	1
2.0 ACE PROFILING GUIDELINES	3
Figure 2-1 UH-1 Preparation for ACE	4
Table 2-1 Estimated ACE Examination Times	3
• Evaluation Conduct	4
Table 2-2 Matrix of ACE Indicators	5-8
Table 2-3 ACE Condition Codes	9
Table 2-4 Condition Codes Criteria	10
3.0 AACE PROFILING GUIDELINES	13
Figure 3-1 AH-1/TH-1 Preparation for AACE	14
Table 3-1 Estimated ACE/AACE Examination Times	13
• Inspection Conduct	14
Table 3-2 Matrix of AACE Indicators	16-18
Table 3-3 AACE Indicator Corrosion Codes and Criteria	19
APPENDIX A - FORMS AND COMPLETION DATA	A-1
APPENDIX B - ARMY AIRCRAFT LOGBOOK LIST	B-1
APPENDIX C - CORROSION FORMS AND CAUSES	C-1
APPENDIX D - WORLD TRAVELER DATA	D-1



Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification _____	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

1.0 INTRODUCTION TO PART III - PROFILING

The actual profiling of aircraft in the Airframe Condition Evaluation (ACE)/Aircraft Analytical Corrosion Evaluation (AACE) program is performed by the ACE/AACE team. The team's objective is to acquire fielded aircraft information to provide a data base whereby management decisions regarding aircraft depot induction for programmed depot maintenance can be made. This part of the handbook provides guidelines and criteria for performing the tasks required of the ACE/AACE team.

This part is designed to be compatible with the two other parts of this handbook. Part I delineates the various interrelated management aspects of reliability-centered maintenance, on-condition maintenance, and ACE/AACE. Part II delineates the various technical aspects involved in the planning and analysis of the ACE/AACE program.

2.0 ACE PROFILING GUIDELINES

Profiling an aircraft in accordance with the airframe condition evaluation (ACE) procedure involves carefully examining the airframe structure for symptoms of possible hidden defects. Pre-selected indicators and condition codes form the basis for conducting the evaluation. The criteria for selecting airframe indicators are, in part, based upon providing simplicity of evaluation conduct. Therefore, the indicators are easily detected and readily accessible. The estimated times to complete an ACE profile for specific aircraft are presented in Table 2-1. The ACE procedure does *not* in any way apply to aircraft that experience damage from combat operations, crashes, or accidents.

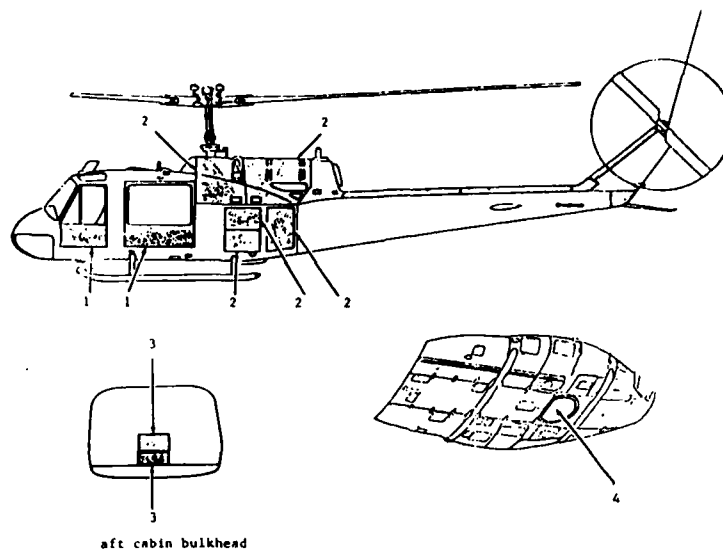
Table 2-1 Estimated ACE Examination Times

Aircraft Type	Time (hrs. min.)
OH-6	1:05
OH-58	1:05
U-21	1:00
OV-1	1:00
AH-1	2:05
UH-1	1:35
UH-60	2:45
CH-47	3:05
CH-54	2:30

Before evaluation of the airframe indicators, specified sections of the aircraft are exposed for viewing. All aircraft disassembly is performed by the operational unit, not the ACE/AACE team. The minimum desirable working team to be provided by the operational unit to aid in the evaluation is a unit technical inspector and the aircraft crew chief. For the evaluation, the unit technical inspector places the aircraft on a RED X. Upon evaluation completion, the aircraft is returned to an appropriate status. Figure 2-1 provides an example of an aircraft preparation for ACE.

The following equipment is possessed by each ACE profiler during aircraft evaluation:

- Two inspection mirrors.
- Two three cell flashlights and spare batteries.
- One honeycomb sounding tool.
- Any technical manuals, Army administrative publications (i.e. regulations), and administrative publications of the Command, if needed.



1. Unlock all doors. (Item 1)
2. Open all cowling and access doors. (Item 2)
3. Open overhead circuit breaker in cockpit area.
4. Remove seats in cargo area if installed.
5. Remove sound proofing in cabin (aft bulkhead and center roof area).
6. Remove two (2) panels from center aft cabin bulkhead. (Item 3)
7. Remove cargo hook from hellhole area if installed. (Item 4)

Figure 2-1 UH-1 Preparation for ACE

Evaluation Conduct

The indicators and applicable condition codes selected for each aircraft are used to evaluate the basic airframe in an effort to detect general progressive deterioration of the airframe, regardless of cause (i.e., normal wear, overstressing, climatic conditions, etc.). The ACE/AACE team examines the aircraft in an orderly manner, thereby accomplishing the evaluation, and records the results using condition codes preestablished for each indicator. This is done in accordance with AVSCOM Pamphlet series 750-1, and the ACE worksheets provided therein, developed by the, Depot Engineering and RCM Support Office. Each pamphlet delineates, in a systematic order, the airframe indicators and applicable condition codes selected for profiling a specific type of aircraft.

The matrix presented in Table 2-2 provides a comparison of all current indicators for the various aircraft participating in the ACE program. These indicators are provided on the worksheets contained in the aircraft AVSCOM 750-1 Pamphlet series.

Table 2-2 Matrix of ACE Indicators

<u>ACE Indicators</u> (Generalized)	Aircraft	AH-1G/Q/S	UH-1B/C/M	CH-47A/B/C/D	OH-6A	U-21 & OV-1	CH-54A/B	UH-1H/V	OH-58A/C	UH-60A
Indicators										
Paint Condition	•	•	•	•	•	•	•	•	•	•
Honeycomb Panels	•	•	•					•	•	•
Transparencies	•		•	•					•	•
Lift Beam, Webs and Loose Hi-shears	•	•						•		
Tail Rotor Drive Shaft Hanger Support Inserts	•									
Overall Condition	•	•	•	•	•	•	•	•	•	•
Aft Fuselage Vertical Web			•							
Tailboom Skin			•					•	•	
Rylon Assy, Horizontal Angles, Webs, Rivets, Panels, L/H, R/H	•	•	•				•	•		
Tailboom Attach Fittings	•	•	•	•					•	
Nose Section Structure, Panels	•		•				•		•	•
Center Section Structure, Panels				•			•			
Aft Section Structure, Panels	•		•							
Upper Tunnel Area				•						
Rotor Head Assy Mounting Platforms Beams L & R, and Floor					•					
Control Column					•				•	
Fwd Keel Beam					•					
Firewall, Engine, Fuel Cell					•	•		•		
Aft Ring Bulkhead					•					
Passenger Compartment, L/H, R/H, Vertical Webs					•					
Upper External Longerons R/H, L/H					•				•	
Aft Fuselage Skin			•		•			•		
Door Hinge Fwd and Aft L/H, R/H					•					
Passenger Compartment Flooring, Panels, Bulkhead Interior/Exterior					•				•	
Battery Compartment					•	•			•	

Table 2-2 Matrix of ACE Indicators (Cont'd)

ACE Indicators (Generalized) Indicators	Aircraft									
	AH-1G/Q/S	UH-1B/C/H	CH-47A/B/C/D	OH-6A	U-21 & OV-1	CH-54A/B	UH-1H/V	OH-58A/C	UH-60A	
Formers (Bulkheads)					•					
Main Spar Left, Right					•					
Fuselage to Spar Attach Straps					•					
Horizontal Stabilizer Attach Fittings					•					
Vertical Fin Attach Fittings					•					
Aft, Fwd Landing Gear Attach Fittings, R/H, L/H				•	•				•	
Wing Attach Fittings					•					
Engine Mounts			•	•	•				•	
Tail Cone Assy, Skin, Bulkheads						•			•	
Fwd, Aft, and Main Hoist Attach Fittings						•				
Canted Bulkhead and Split Deck Assy							•			
Aft Fuselage Bulkhead Fitting, L/H, R/H							•			
Cabin Roof Beam								•		
Lower Fuselage Honeycomb, Interior, and Exterior								•		
Roof Honeycomb, Panel, Interior, and Exterior								•		
Fwd, Aft Transmission Support Brackets, L/H, R/H								•	•	
Fwd, Aft Fuel Cell Bulkhead, Panels	•	•						•		
Aft Fuselage Upper Longerons, Webs				•				•		
Fwd, Aft Fuel Cell Honeycomb Shell, L/H, R/H		•					•	•		
Cockpit Floor Panels, Supports	•			•				•		
Aft Fuselage Lower Stringers FS								•		
Electrical Wiring, Coaxial Cable, Bundles	•	•		•			•	•		
Tailcone Structure, Exterior								•		
Nose Door and Cockpit Door Panels									•	
Avionics/Electronics Compartment, Panels, Flooring	•								•	
Fwd Cockpit, Door Frames, Posts, Tracks, L/H, R/H				•			•	•	•	

Table 2-2 Matrix of ACE Indicators (Cont'd)

ACE Indicators (Generalized) Indicators	Aircraft								
	AH-1G/Q/S	UH-1B/C/M	CH-47A/B/C/D	OH-6A	U-21 & OV-1	CH-54A/B	UH-1H/V	OH-58A/C	UH-60A
Fwd Landing Gear					•				•
Aft, Cargo Door Tracks, Posts, Frames, L/H, R/H		•					•	•	•
Fuselage Frames									•
Transmission Support Beams			•						•
Aft Fuselage Floor Panel									•
Cargo Hook Support Beam, Fittings									•
Fuselage Skins, Panels			•						•
Storage Compartment Floors									•
Transition Bulkheads			•						•
Aft, Cargo, Door Post, Interior and Exterior		•		•			•	•	
Ammo Compartment	•								
Structural Panel Forward of Stub Wing	•								
Canopy Striker Plates	•								
XM-28 Floor	•								
Hydraulic Compartment	•								
Deck Areas, Panels	•								
Transmission Compartment, Flooring	•								
Oil Cooler, Flooring, Panels	•								
Lower, Upper Aft Cabin Bulkhead, Panels, L/H, R/H		•							
Fuel Cell Outboard Panels, R/H, L/H		•					•		
Fifth Mount Attach Area		•							
Fuel Cell Inboard Panel, L/H, R/H Hellhole		•							
Corrosion, Flooring, Castings			•						
Fwd Upper, Lower Canted Frame							•		
Strut Center Beam Attach Fittings, L/H, R/H							•		
Mast Support Structure Fitting, Panels							•		

Table 2-2 Matrix of ACE Indicators (Cont'd)

<u>ACE Indicators</u> (Generalized) Indicators	Aircraft							
	AH-1G/Q/S	UH-1B/C/H	CH-47A/B/C/D	OH-6A	U-21 & OV-1	CH-54A/B	UH-1H/V	OH-58A/C
Outboard Fuel Cell Bulkhead, L/H, R/H							•	
Fwd, Aft Main Beam, L/H, R/H							•	
Center Post Assy								•
Cockpit Fuselage Shells, Interior/Exterior, L/H, R/H								•
Passenger Seat Panels								•
Transition Fuselage, Skin, Bulkheads								•
Roof Skin								•

The condition codes are used to identify the condition of the indicator being evaluated. They identify "what can go wrong" and/or "how bad it is." The selection of a condition code by the ACE/AACE team dictates the indicator weight (numerical value) used in formulating the aircraft profile index. However, the ACE/AACE team does not have knowledge as to what the current indicator weights are. Table 2-3 presents the condition codes with Table 2-4 delineating the criteria for condition code selection.

An example of an indicator is paint condition. Paint is normally the only protective cover available for an aircraft; it must therefore fully cover all outer surfaces of the aircraft except for the transparencies. The exterior paint performs two primary functions: (1) protect the outer surfaces from the corrosive effects of the weather and (2) camouflage the helicopter. Paint in good condition also performs the secondary function of adding eye appeal and giving the appearance of a well maintained aircraft. Based on the criteria shown for paint in Table 2-4, the ACE/AACE team determines the applicable condition code to be circled.

Table 2-3. ACE Condition Codes

A - Worn Excessively	M - Good
B - Buckled	N - Loose
C - Deteriorated	P - Bent
D - Corroded	Q - Minor
E - Cracked	R - No Defect
F - Misaligned	S - Delaminated
G - Loose Rivets	T - Improper Hardware
H - Major	U - Dent
I - Oxidized	X - Scratch
J - Punctured	Y - Temporary Repair
K - Poor	Z - Bolts in lieu of Rivets
L - Fair	

The evaluation proceeds in respect to the order of indicators on the applicable ACE worksheet(s) following a counterclockwise motion about the aircraft. The ACE/AACE team proceeds through the profile until an indicator deficiency is found. At this point, the applicable condition code is determined and circled on the worksheet. This process continues until the profile is completed.

Any safety-of-flight items that are discovered during the profile should be verbally brought to the attention of the unit technical inspector. In no case does the ACE/AACE team ground or suggest that an aircraft be grounded; this is a decision to be made by the unit technical inspector and/or maintenance officer.

Table 2-4 Condition Codes Criteria

INDICATOR Nomenclature	CONDITION	ACE CODE	NEGLECTIBLE DEFECT	RECORDABLE DEFECT
BONDED PANELS	DELAMINATED	S	DELAMINATED AREA NO LARGER THAN TWO (2) SQ. INCHES IN SIZE & NO MORE THAN THREE DELAMINATED AREAS IN EACH POCKET.	DELAMINATED AREAS THAT EXCEED NEGLECTIBLE DEFECTS.
	DETERIORATE	C	NONE NOTE: CORE CORROSION WILL SOUND LIKE DELAMINATION WHEN TAPPING AND SPRING TO THE TOUCH.	INTERNAL CORES CORRODED OR CONTAMINATED WITH WATER, OIL, FUEL, HYDRAULIC FLUID, ETC. IF REQUIRED, VERIFY CONTAMINATION BY DRILLING A .040 INCH HOLE AT BOTTOM OF SUSPECTED DETERIORATED AREA. IF CONTAMINATED, LIQUID WILL COME OUT THE HOLE.
	TEMPORARY REPAIR	Y	ADHESIVE BONDED OR SEALED PATCHES WHICH EXAMINE LIKE THE ORIGINAL PANEL ARE CONSIDERED PERMANENT REPAIRS AND SHALL NOT BE MARKED.	INJECTIONS OR FILLS, LARGER THAN 3/16 IN. IN DIAMETER, UNBONDED LAP PATCHES, DELAMINATED PATCHES, IMPROPER PATCH MATERIAL, REPAIRS OF POOR QUALITY OF WORKMANSHIP, MORE THAN ONE REPAIR PER POCKET.
	PUNCTURED	J	NONE	OPENING IN FACING OF PANEL (NORMALLY ROUND HOLE).
	CORRODED	D	CORROSION RESIDUE ON SURFACE THAT CAN BE REMOVED BY RUBBING WITH A CLOTH AND NO PITTING OF THE METAL CAN BE SEEN.	CAN NOT REMOVE SURFACE CORROSION RESIDUE WITH CLOTH. METAL IS PITTED UNDER CORROSION.
	DENTS	U	DAMAGE NOT EXCEEDING 10% OF SURFACE AREA OF ONE POCKET. NO MORE THAN FIVE DENTS IN ANY THREE (3) SQUARE INCH AREA WITH NO VOIDS. SIZE SHALL NOT EXCEED 1/8 INCHES IN DIAMETER OR TWO INCHES IN LENGTH. DEPTH SHALL NOT BE GREATER THAN .002 INCH.	DAMAGE EXCEEDING NEGLECTIBLE DEFECTS.
	LOOSE	G	SINGLE LOOSE RIVET IN EACH ROW IS ACCEPTABLE.	INDICATIONS OF LOOSE RIVETS, VISIBLE WEAR RESIDUE (DARK RING) AROUND HEAD, DETERIORATED PAINT AND PRIMER AROUND HEAD, GROUP OF SEVERAL CONSECUTIVE RIVETS TIPPED IN SAME DIRECTION, VISIBLE SPACE UNDER HEAD, AND/OR MOVE RIVET WITH FINGER PRESSURE. IF RIVET IS MISSING, MARK AS LOOSE RIVET AND MAKE NOTE OF THIS IN REMARKS SECTION.
SHEET METAL, FORGINGS, CASTINGS, JOINTS, & SPARS	CRACKED	E	NONE	ANY CRACKS IN SPECIFIED AREA. NOTE: FOR FORGINGS, CASTINGS, JOINTS AND SPARS, VERIFY CRACKS BY DYE PENETRANT INSPECTION IF POSSIBLE.
	LOOSE RIVET	G	SINGLE LOOSE RIVET WILL BE ACCEPTABLE.	INDICATIONS OF LOOSE RIVETS, VISIBLE WEAR RESIDUE (DARK RING) AROUND HEAD, DETERIORATED PAINT AND PRIMER AROUND HEAD, GROUP OF SEVERAL CONSECUTIVE RIVETS TIPPED IN SAME DIRECTION, VISIBLE SPACE UNDER HEAD, AND/OR MOVE RIVET WITH FINGER PRESSURE.
	BUCKLED	B	NONE	SHEET METAL THAT HAS BEEN WARPED, KINKED, DEFORMED BY AN EXTERNAL FORCE.
	TEMPORARY REPAIR	Y	REPAIRS AUTHORIZED BY EXISTING TECHNICAL DATA AND OF GOOD QUALITY WHICH CORRECT A DAMAGED AREA. THESE REPAIRS ARE CONSIDERED PERMANENT REPAIRS AND SHALL NOT BE MARKED.	REPAIRS WHICH ARE NOT EQUAL TO OR BETTER THAN THE ORIGINAL STRUCTURE.
	CORRODED	D	SURFACE CORROSION WHICH CAN BE WIPED AWAY WITH A CLOTH AND PITTING DEPTH IS 10% OR LESS THAN THE MATERIAL THICKNESS. AREA OF CORROSION SHALL BE 10% OR LESS THAN THE SURFACE AREA OF THE PART.	CORROSION WHICH CAN NOT BE WIPED AWAY AND/OR PITTING IS OVER 10% OF MATERIAL THICKNESS. CORRODED AREA IS MORE THAN 10% OF THE TOTAL SURFACE OF THE PART.
	BOLTS IN FIELD OF RIVETS	Z	NONE NOTE: IF UNACCEPTABLE BOLTS HAVE BEEN INSTALLED AND THE ACE INDICATOR DOES NOT HAVE THE CODE FOR IMPROPER HARDWARE, USE THIS CODE TO SHOW DEFECT.	CLOSE TOLERANCE BOLTS LISTED IN APPENDIX H ARE ACCEPTABLE SUBSTITUTES FOR HI-SHEAR RIVETS AND HI-LOCK FASTENERS. IF ANY OF THESE BOLTS HAVE BEEN INSTALLED IN A CRITICAL AREA, E.G., HIGH STRESS AREAS OR INTERCHANGEABLE (HARD) POINTS, MARK THIS CODE.
	IMPROPER HARDWARE	T	NONE	ANY HARDWARE USED AS A SUBSTITUTE FOR ORIGINAL HARDWARE AND HAS NOT BEEN APPROVED BY EXISTING TECHNICAL DATA. EXAMPLE: UNAPPROVED BOLTS REPLACING HI-SHEAR RIVETS OR HI-LOCK FASTENERS.
	SCRATCHED	A	SUPERFICIAL SCRATCHES WHICH ARE NOT DEEPER THAN 10% OF MATERIAL THICKNESS OR LESS THAN .010 INCH DEEP.	SCRATCHES WHICH WILL EXCEED 10% OF THE MATERIAL THICKNESS OR OVER .010 INCH DEEP AFTER CLEANUP.
WIRING	DETERIORATED	C	NONE	CABLE INSULATION WHICH IS OIL & HYDRAULIC FLUID SOAKED (CHECK CABLE BY ROLLING INSULATION BETWEEN THUMB & INDEX FINGER. IF INSULATION ROLLS FREE OF WIRING, THE CABLE IS DETERIORATED). DISCOLORED WIRES (BROWN OR GREY) INDICATE OVERHEATING. IF DISCOLORATION IS MORE THAN THREE (3) INCHES ON ANY WIRE, MARK WIRE DETERIORATED.
	CRACKED	E	CRACKED INSULATION ON ONE WIRE IN ANY ONE BUNDLE.	CRACKED INSULATION ON TWO (2) OR MORE WIRES IN ANY BUNDLE.
	TEMPORARY REPAIR	Y	REPAIRS WHICH ARE OF GOOD QUALITY AND PREVENT CONTAMINATION AND WEAR.	REPAIRS NOT MEETING NEGLECTIBLE DEFECT CRITERIA. WIRE BUNDLES IN WHICH ALL WIRES HAVE BEEN SPLICED AT ONE LOCATION.
PAINT	GOOD	M		PAINT COVERAGE COMPLETE. FEW CRACKS ON PAINT OR RIVET HEADS.
	FAIR	L		GENERAL CRACKING OF PAINT ON RIVET HEADS. MOST RIVET HEADS STILL COVERED. FLAT SURFACES NEARLY COMPLETELY COVERED.
	POOR	K		MOST RIVET HEADS PARTLY BARE. SOME CHIPPING OF PAINT ON APPROXIMATELY 1/3 OF EXTERIOR SURFACE. PAINT CHECKED ON FLAT SURFACES ON 1/3 OF EXTENSION.
	DETERIORATED	C		MORE THAN 1/3 OF EXTERIOR SURFACES CHIPPING OF PAINT. MOST RIVET HEADS BARE. PAINT CRACKED WITH WHITE CRACKS EXTENDING SOMEWHAT.

In evaluating repairs, special care should be taken to distinguish permanent repairs from temporary repairs. Each repair of a defect (for example, punctures, cracks, dents, contamination, and delamination) in an indicator area is evaluated on its own merit. Authorized permanent repairs are not repaired or replaced and, therefore, no weighted condition codes are marked (unless they exceed one repair per pocket on bonded panels) on the ACE worksheet; temporary repairs are assessed points via applicable condition codes. The following are definitions of permanent and temporary repair.

Permanent Repair - A repair authorized by existing technical data and of good appearance which is sufficient to compensate for the damaged area. Wiring repair is of a nature to disallow contamination and shorts. Sheet metal repairs are standard with quality built in (edge distance, size and number of rivets, spacing and coatings). Honeycomb structure repairs are high quality bonded patches or fills. Patches on panels do not exceed one patch per pocket. (Additional patches change the rigidity of the panel and cause premature failure of adjacent structure.) Permanent repairs are not considered as detracting from the structural, sheet metal or electrical integrity of the aircraft.

Temporary Repair — Any repair not meeting the above criteria and not equal to the original structure, sheet metal, or wiring standards (including only one repair per pocket on bonded panel).

Once the worksheet(s) for a specific profile are completed, the information is transferred onto a summary form. To ensure the validity of all data gathered, the ACE/AACE team leader must sign all completed worksheets and the summary form. Appendix A contains an example of a worksheet and summary form and the codes needed to complete all the forms. Appendix B identifies various Army forms that may be used by an ACE profiler.

Performance of ACE qualifies for the significant historical data criteria of TM 38-750 therefore, performance of the evaluation should be documented on DA Form 2408-15 (see Appendix B). The standard entry is as follows:

OCM/ACE PERFORMED _____ A/C RS, AT _____ BY ACE

TEAM MEMBER _____ AVSCOM OCM SEC. ST. LOUIS, MO.

Upon completion of the aircraft profile, the master record, worksheets, and summary forms are sent to the following address for data compilation:

Commander
U.S. Army Aviation Systems Command
ATTN: AMSAV-MPDOP
4300 Goodfellow Blvd.
St. Louis, MO 63120

3.0 AACE PROFILING GUIDELINES

Profiling an aircraft in accordance with the aircraft analytical corrosion evaluation (AACE) procedure involves carefully examining the basic aircraft structure for corrosion defects. As with the airframe condition evaluation (ACE), pre-selected indicators and applicable corrosion codes are used to assess the exterior areas of components, both structural and dynamic. The criteria for selecting corrosion indicators are, in part, based upon providing simplicity of inspection conduct. Therefore, the indicators are easily detected and readily accessible. Table 3-1 presents the estimated times to complete an ACE/AACE profile for specific aircraft. The inspection does *not* apply in any way to aircraft that experience damage from combat operations, crashes, or accidents. The AACE inspection is performed in conjunction with the ACE by the ACE/AACE team.

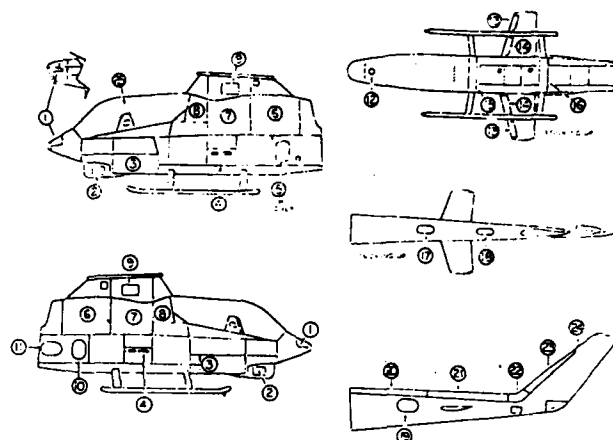
Table 3-1 Estimated ACE/AACE Examination Times

Aircraft Type	Time (hrs. min.)
	(ACE) + (AACE)
OH-58	1:05 + 2:00
AH-1	2:05 + 2:00
UH-1	1:35 + 2:00
UH-60	2:45 + 2:00
CH-47	3:05 + 2:00

Before inspection of the corrosion indicators, specified sections of the aircraft are exposed for viewing. All aircraft disassembly is performed by the operational unit, not the ACE/AACE team. The minimum desirable working team to be provided by the operational unit to aid in the inspection is a unit technical inspector and the aircraft crew chief. For the inspection, the unit technical inspector places the aircraft on a RED X. Upon inspection completion, the aircraft is returned to an appropriate status. Figure 3-1 provides an example of an aircraft preparation for AACE inspection.

The following equipment is possessed by each AACE profiler during aircraft inspection:

- Two inspection mirrors.
- Two three cell flashlights and spare batteries.
- One honeycomb sounding tool.
- Two rigid bristle brushes.
- Any technical manuals, Army administrative publications (i.e. regulations) and administrative publications of the Command, if needed.



- | | |
|--|---|
| 1. Open nose door | 13. Remove wing outboard covers (L/H & R/H) |
| 2. *Open turret access doors (L/H and R/H) | 14. Remove wing inboard covers (L/H & R/H) |
| 3. *Open ammunition compartment doors
Remove ammunition drums (L/H & R/H) | 15. Remove forward crosstube fairing |
| 4. *Remove access panels (L/H & R/H) | 16. Remove aft crosstube fairing |
| 5. *Remove oil cooler duct | 17. Open tailboom access door |
| 6. *Open engine cowl doors (L/H & R/H) | 18. Open tailboom access door |
| 7. *Open pylon cowl doors (L/H & R/H) | 19. Open avionics compartment door |
| 8. Open access doors (L/H & R/H) | 20. Open drive shaft forward cover |
| 9. Open access doors (L/H & R/H) | 21. Open drive shaft aft cover |
| 10. Remove oil cooler duct panel | 22. Open gearbox cover |
| 11. *Remove aft battery compartment panel | 23. Open fin drive shaft cover |
| 12. Remove nose interior access panel | 24. Remove gearbox fairing |
| | 25. Open pilot's and gunner's canopy |

* Also removed for ACE

Figure 3-1 AH-1/TH-1 Preparation for AACE

Inspection Conduct

The indicators and applicable corrosion codes selected for each aircraft in the AACE program are used to inspect the basic fuselage structural members and dynamic components and component structures in an effort to detect general progressive deterioration of the aircraft due to the effects of corrosion. The ACE/AACE team examines the aircraft in an orderly manner, thereby accomplishing the inspection profile, and records the results using corrosion codes preestablished for each indicator. This is done in accordance with AVSCOM Pamphlet series 750-2, and the AACE worksheets provided therein, developed by the Depot Engineering and RCM Support Office. Each pamphlet delineates, in a systematic order, the indicators and corrosion codes selected for profiling a specific type of aircraft.

The matrix presented in Table 3-2 provides a comparison of all current indicators for the various aircraft participating in the AACE program. These indicators are provided for profilers on the worksheets contained in the applicable aircraft AVSCOM 750-2 Pamphlet.

The corrosion codes are used to identify the condition of the indicator being inspected. Corrosion codes identify the level of maintenance and action needed. The selection of a corrosion code by the ACE/AACE team dictates the indicator weight (numerical value) for use in formulating the aircraft profile index. However, the ACE/AACE team does not have knowledge as to what the current indicator weights are. Table 3-3 presents the criteria corresponding to the various corrosion codes.

Appendix C provides material delineating the types and forms of corrosion as well as general guidelines for the examination and removal of corrosion. This appendix should be addressed, as needed, to maintain a consistent familiarization with corrosion characteristics.

The inspection proceeds in respect to the order of indicators on the applicable AACE worksheet(s) following a counterclockwise motion about the aircraft. The ACE/AACE team proceeds through the profile until an indicator deficiency is found. At this point, the applicable corrosion code is determined and circled on the worksheet. This process continues until the profile is completed.

Any safety-of-flight items that are discovered during the profile should be verbally brought to the attention of the unit technical inspector. In no case does the ACE/AACE team ground or suggest that an aircraft be grounded; this is a decision to be made by the unit technical inspector and/or maintenance officer.

Once the worksheet(s) for a specific profile are completed, the information is transferred onto a summary form. To ensure the validity of all data gathered, the ACE/AACE team leader must sign all completed AACE worksheets and summary forms. Appendix A contains an example of the worksheets and summary forms and also the codes needed to complete all the forms. Appendix B identifies various Army forms that may be used by an AACE profiler.

Table 3-2 Matrix of AACE Indicators

Indicators	AACE Indicators (Generalized)						
	Aircraft	UH-1H/V	AH-1/TB-1	UH-1B/C/M	OH-58A/C	CH-47 A/B/C/D	UH-60A
Nose Structure and Skin	•	•	•	•	•		
XM-28 Fuselage Attach Points		•					
Gunners Floor Area		•					
Ammo Compartment Structures		•					
Ammo Compartment Electrical		•					
Pilots, Passenger, and Cargo Floor Areas, Above/Under		•		•	•	•	
Pilots Compartment Aft Bulkhead		•					
Hydraulic Compartment		•	•				
Stub Wing L/H and R/H		•					
Pylon Area, Supports	•	•		•			•
Deck Areas	•	•	•		•		
Oil Cooler Compartment		•					
Fuselage Exterior Skin L/H and R/H		•		•	•		
Avionics Compartment		•		•	•		
Tailboom Attach Fittings		•	•	•			
Tailboom Attach Bulkhead		•	•				
Transmission Compartment		•	•		•	•	
Main Transmission	•	•	•	•	•	•	•
Main Rotor Blades	•	•	•	•			•
Main Rotor Hub Assy	•	•	•	•	•	•	•
Servo Flight Control Tubes	•	•	•	•			
Mast Assy	•	•	•	•	•	•	•
Swashplate, Support, Scissors, & Sleeve Assy	•	•	•	•	•	•	•
Short Shaft Assy and Engine		•	•	•	•	•	•

Table 3-2 Matrix of AACE Indicators (Cont'd)

Indicators	AACE Indicators (Generalized)						
	Aircraft	UH-1H/V	AH-1/TB-1	UH-1B/C/M	OH-58A/C	CH-47 A/B/C/D	UH-60A
Tail Rotor Drive Shafting and Hanger Brackets	•	•	•	•	•	•	•
42° and 90° Gear Box Assy	•	•	•	•			
Tailboom Fin and Horiz Stabilizer Assy	•	•	•	•			
Tailboom Internal and External	•	•	•	•			
Pilots, Crew, and Cargo Doors	•		•	•			•
Forward Tie Down Attach Fitting	•						
Auxiliary Fuel Fittings	•						
Forward and Aft Tunnel Areas	•	•	•				
Forward, Center, and Aft Skin Areas	•	•	•		•		•
Forward Main Beam Panel Area	•		•				
Pylon Panels, Fwd and Aft	•						
Main Lift Beam Assy	•	•	•	•			
Aft Cabin Lower and Upper Panels	•		•				
Upper Cap Angle	•						
Radio Compartment Upper and Lower	•						
Electrical Compartments, Panels, Flooring	•			•			•
Battery Compartments, Panels, Flooring	•				•		
Canted Bulkhead and Split Deck Area	•						
External Stores	•						
Fwd Jacking and Mooring Fixture, L/H, R/H			•				
Lower Skin Between Tunnel Areas			•				
Fuel Cell Inboard, Outboard Panel Areas			•				
Equipment Compartments			•		•		
Pylon Assy and Fifth Mount Support Area			•				

Table 3-2 Matrix of AACE Indicators (Cont'd)

Indicators	AACE Indicators (Generalized)						
	Aircraft	UH-1H/V	AH-1/TB-1	UH-1B/C/M	OH-58A/C	CH-47 A/B/C/D	UH-60A
Overhead Circuit Panel				•			
Aft, Fwd Crosstube Attach Areas				•			
Center Post Installation				•			
Root Sections, Panels				•			
Cyclic and Collective Control				•	•	•	
Aft, Fwd Fuselage, Internal				•			
Tail Rotor and Hub				•			•
Bulkhead Installation				•			
Tailcone Structure, Int/Ext.							•
Cargo Hook and Support Beam							•
Fwd, Aft Landing Gear and Attach Pts					•	•	
Stabilator						•	
Storage Shelf						•	
Fwd, Aft Transition Structure, Internal						•	
Overhead Tunnel Areas					•		
Cargo Ramp and Castings					•		
Formers and Surroundings					•		
Fuel Pod					•		
Rescue Hatch Area					•		
Fuselage Structure, Companionway/Cargo Floor Access					•		

Table 3-3 AACE Indicator Corrosion Codes and Criteria

STRUCTURAL MEMBERS	AACE SYMBOL	CORROSION CRITERIA									
			(A)	(B)	(C)	(D)	(E)	(F)			
SKINS, WEBS, COVERS, COLLINGS, AND FAIRINGS		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	10-100% AND	1-10% AND	10-100% AND	1-10% AND	10-100% AND	1-10% AND	1-10% AND	1-10% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT SURFACE AREA	50-100%	25-50%	10-50%	10-25%	1-10%	1-10%			
LONGERONS, CAPS, STRINGERS		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	25-100% AND OR	1-25% AND	25-100% AND	1-25% AND	25-100% AND	1-25% AND	1-25% AND	1-25% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT LENGTH	30-50%	50-100%	10-30%	10-30%	1-10%	1-10%			
BULKHEADS, FORMERS, DECKS, AND SHELVES		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	10-100% AND OR	1-10% AND	10-100% AND	1-10% AND	10-100% AND	1-10% AND	1-10% AND	1-10% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT SURFACE AREA	30-50%	30-50%	30-50%	20-30%	1-20%	1-20%			
COMPOSITE PANELS (SOLID AND HONEYCOMB)		CORE CORROSION, IN SQUARE INCHES OF SURFACE AREA	GREATER THAN 12 SQ. IN. OR	NONE	6-12 SQ. IN. AND	NONE	NO GREATER THAN 5 SQ. IN. AND	NO GREATER THAN 5 SQ. IN. AND	NO GREATER THAN 5 SQ. IN. AND	NO GREATER THAN 5 SQ. IN. AND	
		SURFACE CORROSION, EXPRESSED AS A PERCENTAGE OF SURFACE AREA	60-100%	25-60%	0-25%	10-25%	0-10%	1-10%			
HOUSINGS, CASES, FITTINGS, AND SUPPORTS (CASTINGS AND FORGINGS)		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	10-100% AND OR	1-10% AND	10-100% AND	1-10% AND	10-100% AND	1-10% AND	1-10% AND	1-10% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT SURFACE AREA	25-40%	25-40%	15-25%	15-25%	1-15%	1-15%			
FASTENERS - BOLTS, INSERTS, NUTS, AND RIVETS		AREA OF CORROSION PITTING, EXPRESSED AS A PERCENTAGE OF VISIBLE SURFACE AREA	10-100% AND	1-10% AND	10-100% AND	1-10% AND	10-100% AND	1-10% AND	1-10% AND	1-10% AND	
		AMOUNT OF AFFECTED FASTENERS, EXPRESSED AS A PERCENTAGE OF THE TOTAL NUMBER OF FASTENERS IN THE INDICATOR	20-100%	20-30%	10-20%	10-20%	1-10%	1-10%			
SHAFTS AND TUBES		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	5-100% AND	1-5% AND	5-100% AND	1-5% AND	5-100% AND	1-5% AND	1-5% AND	1-5% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENTS SURFACE AREA	30-100%	20-30%	10-20%	10-20%	1-10%	1-10%			
STIFFENERS, ANGLES, DOUBLES, AND GUSSETS		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	10-100% AND OR	1-10% AND	10-100% AND	1-10% AND	10-100% AND	1-10% AND	1-10% AND	1-10% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT SURFACE AREA	30-50%	30-50%	15-30%	15-30%	1-15%	1-15%			
HAULIC COMPONENTS, SKIDS, AND LANDING GEAR		CORROSION DEPTH, EXPRESSED AS A PERCENTAGE OF METAL THICKNESS	5-100% AND	1-5% AND	5-100% AND	1-5% AND	5-100% AND	1-5% AND	1-5% AND	1-5% AND	
		CORROSION COVERAGE, EXPRESSED AS A PERCENTAGE OF COMPONENT SURFACE AREA	20-100%	20-100%	10-20%	10-20%	1-10%	1-10%			
ELECTRICAL CONNECTORS, COMPONENTS, AND WIRING		CORROSION ON WIRING?	OVER 7 WIRES OR	NO OR	4-7 WIRES OR	NO OR	1-3 WIRES OR	NO OR	NO OR	NO OR	
		AREA OF CORROSION PITTING, EXPRESSED AS A PERCENTAGE OF VISIBLE SURFACE AREA OF ITEM	5-100% AND	1-5% AND	5-100% AND	1-5% AND	5-100% AND	1-5% AND			
		AMOUNT OF AFFECTED HARDWARE, EXPRESSED AS A PERCENTAGE OF TOTAL NUMBER OF ELECTRICAL ITEMS IN THE INDICATOR	50-100%	50-100%	30-50%	30-50%	1-30%	1-30%			

Performance of AACE qualifies for the significant historical data criteria of TM 38-750; therefore, accomplishment of the inspection is entered on DA Form 2408-15 (see Appendix B). The standard entry is as follows:

OCM/ACE PERFORMED _____ A/C RS, AT _____ BY ACE

TEAM MEMBER _____ AVSCOM OCM SEC. ST. LOUIS, MO.

Upon completion of the aircraft profile, the master record, worksheets, and summary sheets are sent to the following address for data compilation:

Commander
U.S. Army Aviation Systems Command
ATTN: AMSAV-MPDOP
4300 Goodfellow Blvd.
St. Louis, MO 63120

APPENDIX A

FORMS AND COMPLETION DATA

This appendix contains an example of both an ACE and AACE worksheet and summary form. It also contains the geographical codes, command codes, aircraft special mission codes, and Julian date calendar needed to complete the ACE/AACE worksheets and summary forms.

ACE Worksheet
(Example, page 1 of 2)

AIRFRAME CONDITION EVALUATION (ACE) UH-1B/C/M TUV AVSCOM PAM 750-1 (4)		MASTER	EAM	UNIT	AREA	LOCATION
Card Col	PROFILE	INDICATOR NOMENCLATURE				ITEM
01	T U W	TYPE/MODEL/SERIES				1
02-08		SERIAL NUMBER				2
09		SPECIAL MISSION				3
10		MAJOR COMMAND				4
11-12		GEOGRAPHICAL LOCATION				5
13-16		JULIAN DATE OF ACE				6
17	N O	A/C NEW OR OVERHAULED				7
18	C N P S K	O/H BY				8
19-22		A/C HRS AT TIME OF OVERHAUL				9
23-26		JULIAN DATE OF OVERHAUL				10
27-30		TOTAL HRS ON A/C				11
31	C K L M	OVERALL CONDITION				12
32	C K L M	PAINT CONDITION				13
33	E G F Y R	CARGO DOOR POST UPPER & LOWER L/H				14
34	E G B Y R	CARGO DOOR UPPER FRAME L/H				15
35	S C Y J D U R	UPPER AFT CABIN BULKHEAD PANEL L/H				16
36	S C Y J D U R	FUEL CELL FORWARD BULKHEAD PANEL L/H				16
37	S C Y J D U R	UPPER AFT CABIN BULKHEAD CENTER PANEL				16
38	S C Y J D U R	UPPER AFT CABIN BULKHEAD PANEL R/H				16
39	S C Y J D U R	FUEL CELL FORWARD BULKHEAD PANEL R/H				16
40	S C Y J D U R	FUEL CELL UPPER OUTBOARD PANEL L/H				16
41	S C Y J D U R	FUEL CELL CENTER OUTBOARD PANEL L/H				16
42	S C Y J D U R	FUEL CELL LOWER OUTBOARD PANEL L/H				16
43	S C Y J D U R	FUEL CELL UPPER AFT BULKHEAD L/H				16
44	S C Y J D U R	FUEL CELL LOWER AFT BULKHEAD L/H				16
45	E A Y R	UPPER AFT DOOR TRACK L/H & R/H				17
46	E A Y R	LOWER AFT DOOR TRACK L/H & R/H				17
47	S C Y J D U R	WORK DECK PANEL L/H				16
48	C E Y R	WIRE BUNDLES, AVIONICS COMPARTMENT				25
49	E G B Y R	AFT FUSELAGE VERTICAL WEB				18
50	E G B Y R	TAILBOOM VERTICAL SKIN				19
51	E G Z R	TAILBOOM ATTACH FITTING UPPER & LOWER L/H				20
52	E G Z R	TAILBOOM ATTACH FITTING UPPER & LOWER R/H				20
53	S C Y J D U R	FUEL CELL AFT BULKHEAD PANEL R/H				16
54	S C Y J D U R	FUEL CELL UPPER OUTBOARD PANEL R/H				16
55	S C Y J D U R	FUEL CELL LOWER OUTBOARD PANEL R/H				16
56	S C Y J D U R	WORK DECK PANEL R/H				16
57	S C Y J D U R	CENTER SERVICE (ENGINE) DECK				16
58	E G B Y R	PYLON ASSEMBLY HORIZONTAL WEBS, L/H & R/H				21
59	E G Y R	FIFTH MOUNT ATTACH AREA				22
60	E G Y T Z R	LIFT BEAM, WEBS AND LOOSE HI-SHEARS				23
61	S C Y J D U R	ROOF DECK PANEL				16
62	E G B Y A R	CARGO DOOR UPPER FRAME R/H				15
NAME PROFILER		RECORDS				

AACE Worksheet
(Example, page 1 of 2)

AIRCRAFT ANALYTICAL CORROSION EVALUATION (AACE) OH-59A/C AVSCOM RAN 750-2(2)		MASTER	EAM	UNIT	AREA	LOCATION
CARD COL	PROFILE	INDICATOR NOMENCLATURE				ITEM
01		TYPE/MODEL/SERIES				1
02-08		SERIAL NUMBER				2
09		SPECIAL MISSION				3
10		MAJOR COMMAND				4
11-12		PRESENT LOCATION OF A/C				5
13-16		JULIAN DATE OF INSPECTION				6
17-20		JULIAN DATE ENTERING PRESENT LOCATION				7
21-24		JULIAN DATE ENTERING PREVIOUS LOCATION				8
25		PREVIOUS MAJOR COMMAND				9
26-27		PREVIOUS GEOGRAPHICAL LOCATION				10
28-31		TOTAL HOURS ON A/C				11
32	A B C D E F R	NOSE SECTION				12
33	A B C D E F R	FUSELAGE BOTTOM, FORWARD OF CROSSTUBE				13
34	A B C D E F R	FORWARD CROSSTUBE ATTACH AREA				14
35	A B C D E F R	FUSELAGE BOTTOM, BETWEEN CROSSTUBES				13
36	A B C D E F R	AFT CROSSTUBE ATTACH AREA				14
37	A B C D E F R	FUSELAGE BOTTOM, BETWEEN CROSSTUBE & TAILBOOM				13
38	A B C D E F R	COPILOT'S DOOR AND DOORFRAME AREA				15
39	A B C D E F R	COPILOT'S FLOOR AND SEAT AREA				16
40	A B C D E F R	OVERHEAD CIRCUIT BREAKER				17
41	A B C D E F R	BULKHEAD INSTALLATION, L/H				18
42	A B C D E F R	LEFT PASSENGER DOOR AND DOORFRAME AREA				15
43	A B C D E F R	CENTERPOST INSTALLATION, L/H				19
44	A B C D E F R	PASSENGER FLOOR, SEAT, & SEATBACK INSTALL, L/H				20
45	A B C D E F R	UPPER CABIN ROOFBEAM				21
46	A B C D E F R	AVIONICS COMPARTMENT				22
47	A B C D E F R	LEFT ROOF SECTION, FORWARD OF FIREWALL				23
48	A B C D E F R	CYCLIC & COLLECTIVE CONTROLS INSTALLATION				24
49	A B C D E F R	LEFT ROOF SECTION, BETWEEN FIREWALLS				23
50	A B C D E F R	AFT FUSELAGE, L/H				25
51	A B C D E F R	ROOF SECTION, FIREWALL TO TAILBOOM				23
52	A B C D E F R	BATTERY COMPARTMENT				26
53	A B C D E F R	TAILBOOM EXTERIOR				27
54	A B C D E F R	TAILROTOR DRIVE SHAFTING				28
55	A B C D E F R	TAILROTOR HANGER BRACKETS				29
56	A B C D E F R	90 DEGREE GEARBOX AND ATTACH AREA				30
57	A B C D E F R	TAILROTOR AND HUB				31
58	A B C D E F R	TAILBOOM FIN AND HORIZONTAL STABILIZER				32
59	A B C D E F R	TAILBOOM ATTACH FITTINGS				33
60	A B C D E F R	AFT FUSELAGE, INTERNAL				34
NAME PROFILER			RECORDS			

ACE Summary Form (Example)

FY		COMMAND		LOCATION		AIRCRAFT CONDITION EVALUATION (ACE) SUMMARY												PAGE OF PAGES						
79		N		ISLIP, NY														N						
MDS		SERIAL NUMBER		SM		LOC CODE		ACE DATE		HOURS @ O/N														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
E	6	6	1	5	2	2	2	0	N	B	F	8	2	1	1	N								
INDICATOR PROFILE CODE																								
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45		
				2	3	1	2	L	L	L		M						E						
INDICATOR PROFILE CODE																								
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
INDICATOR PROFILE CODE																								
71	72	73	74	75	76	77	78	79	80															
								B																
REMARKS																								
S A M P L E																								
SIGNATURE																								
A. PROFILER																								
DATE																								
30 JUL 78																								

AACE Summary Form (Example)

AIRCRAFT ANALYTICAL CORROSION EVALUATION																																																												PAGE OF PAGES
FY	COMMAND								LOCATION																										COMPONENT																									
	SERIAL NUMBER								SM	LOC CODE				AAEE DATE				DATE ENTER PRS LOC				DATE ENTER PRV LOC																																						
2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																					
TOTAL HRS ON A/C																								AIRCRAFT ANALYTICAL CORROSION CODE																																				
PRV LOC CODE	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49																																			
TOTAL HRS ON A/C																								AIRCRAFT ANALYTICAL CORROSION CODE																																				
PRV LOC CODE	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72																																					
AIRCRAFT ANALYTICAL CORROSION CODE								REMARKS																																																				
73	74	75	76	77	78	79	80																																																					

PROFILERS SIGNATURE _____

Data Recording Codes

Geographical Location Codes (States)

AL Alabama	HI Hawaii	MA Massachusetts	NM New Mexico	SD South Dakota
AK Alaska	ID Idaho	MI Michigan	NY New York	TN Tennessee
AZ Arizona	IL Illinois	MN Minnesota	NC North Carolina	TX Texas
AR Arkansas	IN Indiana	MS Mississippi	ND North Dakota	UT Utah
CA California	IA Iowa	MO Missouri	OH Ohio	VT Vermont
CO Colorado	KS Kansas	MT Montana	OK Oklahoma	VA Virginia
CT Connecticut	KY Kentucky	NE Nebraska	OR Oregon	WA Washington
DE Delaware	LA Louisiana	NV Nevada	PA Pennsylvania	WV West Virginia
FL Florida	ME Maine	NH New Hampshire	RI Rhode Island	WI Wisconsin
GA Georgia	MD Maryland	NJ New Jersey	SC South Carolina	WY Wyoming

Geographical Location Codes

<u>Europe</u>	<u>Pacific</u>	<u>Southern</u>
BZ Belgium	AY Japan	AX Panama
CZ Germany	BY Kwajalein	BX Puerto Rico
DZ Greece	CY Korea	
EZ Italy		
FZ Turkey		

Command Codes

A - DARCOM	H - BLANK	R - US ARMY RESERVE
B - BAILED	J - JAPAN	S - STORED
C - TSARCOM (NICP)	K - MLDFCMD (KAWJALEIN)	T - TRADOC
D - DCSPER	L - LOANED	U - EIGHTH US ARMY KOREA
E - USAREUR	M - MDW	V - USARSO
F - FORSCOM	N - US ARMY NATIONAL GUARD	W - OTHER: REDCOM, TSG, HEALTH SVC
G - BLANK	P - WESTCOM	X - STATE DEPARTMENT

Aircraft Special Mission Codes

2 - Reserved	6 - Fire Equipped
3 - Non Standard Paint	7 - Electronic Equipped
4 - VIP/AC	8 - Weapon Equipped
5 - Medivac Equipped	0 - Standard Configuration

JULIAN DATE CALENDAR

(PERPETUAL)

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Day
1	001	032	060	091	121	152	182	213	244	274	305	335	1
2	002	033	061	092	122	153	183	214	245	275	306	336	2
3	003	034	062	093	123	154	184	215	246	276	307	337	3
4	004	035	063	094	124	155	185	216	247	277	308	338	4
5	005	036	064	095	125	156	186	217	248	278	309	339	5
6	006	037	065	096	126	157	187	218	249	279	310	340	6
7	007	038	066	097	127	158	188	219	250	280	311	341	7
8	008	039	067	098	128	159	189	220	251	281	312	342	8
9	009	040	068	099	129	160	190	221	252	282	313	343	9
10	010	041	069	100	130	161	191	222	253	283	314	344	10
11	011	042	070	101	131	162	192	223	254	284	315	345	11
12	012	043	071	102	132	163	193	224	255	285	316	346	12
13	013	044	072	103	133	164	194	225	256	286	317	347	13
14	014	045	073	104	134	165	195	226	257	287	318	348	14
15	015	046	074	105	135	166	196	227	258	288	319	349	15
16	016	047	075	106	136	167	197	228	259	289	320	350	16
17	017	048	076	107	137	168	198	229	260	290	321	351	17
18	018	049	077	108	138	169	199	230	261	291	322	352	18
19	019	050	078	109	139	170	200	231	262	292	323	353	19
20	020	051	079	110	140	171	201	232	263	293	324	354	20
21	021	052	080	111	141	172	202	233	264	294	325	355	21
22	022	053	081	112	142	173	203	234	265	295	326	356	22
23	023	054	082	113	143	174	204	235	266	296	327	357	23
24	024	055	083	114	144	175	205	236	267	297	328	358	24
25	025	056	084	115	145	176	206	237	268	298	329	359	25
26	026	057	085	116	146	177	207	238	269	299	330	360	26
27	027	058	086	117	147	178	208	239	270	300	331	361	27
28	028	059	087	118	148	179	209	240	271	301	332	362	28
29	029		088	119	149	180	210	241	272	302	333	363	29
30	030		089	120	150	181	211	242	273	303	334	364	30
31	031		090		151		212	243		304		365	31

FOR LEAP YEAR USE REVERSE SIDE

JULIAN DATE CALENDAR

FOR LEAP YEARS ONLY

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Day
1	001	032	061	092	122	153	183	214	245	275	306	336	1
2	002	033	062	093	123	154	184	215	246	276	307	337	2
3	003	034	063	094	124	155	185	216	247	277	308	338	3
4	004	035	064	095	125	156	186	217	248	278	309	339	4
5	005	036	065	096	126	157	187	218	249	279	310	340	5
6	006	037	066	097	127	158	188	219	250	280	311	341	6
7	007	038	067	098	128	159	189	220	251	281	312	342	7
8	008	039	068	099	129	160	190	221	252	282	313	343	8
9	009	040	069	100	130	161	191	222	253	283	314	344	9
10	010	041	070	101	131	162	192	223	254	284	315	345	10
11	011	042	071	102	132	163	193	224	255	285	316	346	11
12	012	043	072	103	133	164	194	225	256	286	317	347	12
13	013	044	073	104	134	165	195	226	257	287	318	348	13
14	014	045	074	105	135	166	196	227	258	288	319	349	14
15	015	046	075	106	136	167	197	228	259	289	320	350	15
16	016	047	076	107	137	168	198	229	260	290	321	351	16
17	017	048	077	108	138	169	199	230	261	291	322	352	17
18	018	049	078	109	139	170	200	231	262	292	323	353	18
19	019	050	079	110	140	171	201	232	263	293	324	354	19
20	020	051	080	111	141	172	202	233	264	294	325	355	20
21	021	052	081	112	142	173	203	234	265	295	326	356	21
22	022	053	082	113	143	174	204	235	266	296	327	357	22
23	023	054	083	114	144	175	205	236	267	297	328	358	23
24	024	055	084	115	145	176	206	237	268	298	329	359	24
25	025	056	085	116	146	177	207	238	269	299	330	360	25
26	026	057	086	117	147	178	208	239	270	300	331	361	26
27	027	058	087	118	148	179	209	240	271	301	332	362	27
28	028	059	088	119	149	180	210	241	272	302	333	363	28
29	029	060	089	120	150	181	211	242	273	303	334	364	29
30	030		090	121	151	182	212	243	274	304	335	365	30
31	031		091		152		213	244		305		366	31

(USE IN 1964, 1968, 1972, etc.)

APPENDIX B

ARMY AIRCRAFT LOGBOOK LIST

This appendix contains a listing of forms used within Army aviation having information and data relevant to the planning and analysis and aircraft profiling performed in ACE/AACE.

Army Aircraft Logbook Forms

Form number	Title	Use	Disposition
DA Form 2408	Equipment Log Assembly (Records)	Gives a reference to symbols used in logbook.	Remains in front of logbook.
DA Form 2408-4	Weapon Record Data	To provide a continuous record of firings and component replacements on armament system and subsystems. Maintained in the aircraft logbook on which the armament is mounted.	Form attached to weapon when evacuated or stored. Form destroyed and new one initiated upon overhaul or rebuild of weapon. Form filed, data transferred to new form. Filled form retained 90 days or until new form is filled, whichever occurs first, then destroyed.
DA Form 2408-5	Equipment Modification Record	To record data about modification on assemblies or components.	In logbook for equipment on which assembly is installed. Accompanies assembly when it is removed and placed on another end item.
DA Form 2408-9	Equipment Control Record	To provide initial basic equipment acceptance and identification information. Also provides means for updating information on ownership, location, usage, transfers, gains, losses, overhaul and rebuild, and disposition.	Disposition varies in accordance with form use. Instructions contained in TM 38-750 and TM 38-750-1.
DA Form 2408-12	Army Aviator's Flight Record	To record aircraft time and mission, and to record duty and type of flight performed by the aviator and crew.	Sent to the operations office at the end of each day. Destroyed after 3 months.
DA Form 2408-13	Aircraft Inspection and Maintenance Record	To record aircraft faults and action taken to correct them; to show flying hours, maintenance performed, and when inspections become due.	Sent at the end of each day to the aircraft maintenance office of the activity maintaining the aircraft. Destroyed after 6 months.
DA Form 2408-14	Uncorrected Fault Record	To list uncorrected faults on aircraft, including overdue replacement of components.	Destroyed 6 months after date of last entry.
DA Form 2408-15	Historical Record for Aircraft	To record historical data about an aircraft.	Permanent record in logbook, accompanies aircraft on transfer.
DA Form 2408-16	Aircraft Component Historical Record	To record historical data about aircraft components.	Permanent record in aircraft logbook; accompanies component on transfer.
DA Form 2408-17	Aircraft Inventory Record	Lists all property assigned to an aircraft, used to record periodic inventories of property.	A permanent part of the aircraft logbook.
DA Form 2408-18	Equipment Inspection List	To record most inspections on aircraft and components; provides record of component replacement.	Permanent record in logbook; accompanies aircraft on transfer.
DA Form 2408-19	Aircraft Engine Turbine Wheel Historical Record	To determine whether the turbine wheel can be overhauled or not and which of its parts should be replaced.	Retained with the turbine wheel throughout its service life.

APPENDIX C

CORROSION FORMS AND CAUSES

This appendix contains general information to familiarize a profiler with the nature, appearance, and causes of the various forms of corrosion.

CORROSION FORMS AND CAUSES

Corrosion is caused by the presence of salt in moist air, certain chemicals in water, elements in metal, treatment of parts, and contact of dissimilar metals. High temperature and moisture are drivers of fungus and bacterial growth which produce acids and other products which expedite corrosion etching of surfaces and oxidation. Corrosion is normally not as prevalent on painted, clad, or plated surfaces. The following types of corrosion are encountered:

- **Superficial Corrosion** - This type is the least serious on alclad parts. After deposits are removed, an etching is noticeable which results in the clad surface having a series of hills and valleys. Provided the etching has not reached the core, the effect on the strength of the metal is negligible. Corrosion of this same type on non-clad alloy parts is serious.
- **Intergranular Corrosion** - This type of corrosion is not easily detected. It is caused by imperfect heat treatment and occurs mostly in unclad structural aluminum alloy parts. It is the most dangerous form of corrosion for sheet stock because the strength of the metal is lowered without visible structural indicators.
- **Stress Corrosion** - This type occurs in a part along the line of grain flow if the part is stressed too high without proper heat treatment.
- **Galvanic Corrosion** - This type of corrosion occurs when dissimilar metals are in contact and an electrolyte is present at the joint between the metals. For example, aluminum and magnesium skins riveted together form a galvanic couple if moisture and contamination are present. When aluminum pieces are attached with steel bolts or screws, galvanic corrosion occurs between the aluminum and the steel. Table C-1 presents a galvanic series chart. Metals close together, as illustrated in the table, have no strong tendency to produce galvanic corrosion and are relatively safe to use in contact with each other. The coupling of metals and the distance from each other in the table dictate the galvanic or accelerated corrosion of the metal higher on the table. The farther apart the metals are in the table, the greater is the galvanic tendency, as determined by measurement of the electrical potential difference between them.
- **Hydroscopic Material Corrosion** - This type of corrosion is caused by such materials as sponge rubber, felt, cork, etc., absorbing water and holding it in contact with the part.

Table C-1 Galvanic Series

MAGNESIUM			
MAGNESIUM ALLOYS			
ZINC			
CADMIUM			
ALUMINUM ALLOYS			
STEEL			
CAST IRON			
TIN			
COPPER			
BRONZE			
COPPER-NICKEL ALLOYS			
TITANIUM			
MONEL			
NICKEL			
INCONEL			
STAINLESS STEEL			
SILVER			
PLATINUM			
GOLD			

In general, two metal in contact with one another will corrode more actively the farther they are from one another in this table and.....

Less actively when nearer one another in this table.

Of the pair, the metal nearer the top of the table will experience the greater amount of corrosion.

The extent and form of corrosion is determined primarily through visual and dimensional nondestructive inspection methods. A secondary method is penetrating radiation (radiography), but this method is not commonly used. When examining corrosion, a fine pointed instrument is used to test the area, but caution must be taken to not further damage the area. It may be necessary to remove scales and powdery deposits before examination can occur.

Indicators of corrosion include brinelling, fretting, scuffing, slatting, galling, etching, abrading, etc. For example, electrolytic action causes the formation of slats and deep etching of surfaces. This occurs at riveted and bolted joints, bearings, slides, and screw threads. Table C-2 provides a list of alloys commonly used in aircraft structure and identifies the nature and appearance of corrosion as it occurs on each alloy.

To remove corrosion from steel alloys, the following methods are applicable: hot-alkali soak, abrasive-blast, wire brush, grind, phosphoric acid treatment, flame descale, etc. Caution is needed when removing corrosion to prevent possible dust explosions. Goggles or a face shield should be worn when utilizing wire brush, grinder, or abrasive-blast removal methods.

To remove corrosion from aluminum-base alloy materials, chromic acid treatment is applicable. Anodic treatment by the chromic acid process increases corrosion resistance and provides a surface that ensures proper adherence of finishes, (for example, paint).

Table C-2 Nature and Appearance of Corrosion

ALLOYS	TYPE OF ATTACK TO WHICH ALLOY IS SUSCEPTIBLE	APPEARANCE OF CORROSION PRODUCT
Aluminum Alloy	Surface pitting, intergranular and exfoliation.	White or gray powder.
Titanium Alloy	Highly corrosion resistant. Extended or repeated contact with chlorinated solvents may result in degradation of the metals structural properties.	No visible corrosion products.
Magnesium Alloy	Highly susceptible to pitting.	White powdery snow-like mounds, and white spots on surface.
Low Alloy Steel (4000-8000 series)	Surface oxidation and pitting, surface and intergranular.	Reddish-brown oxide (rust).
Corrosion Resistant Steel (CRES) (300-400 series)	Intergranular corrosion (due to improper heat treatment). Some tendency to pitting in marine.	Corrosion evidenced by surface; sometimes by red, brown or black skin.
Nickel-base Alloy (Inconel)	Generally has good corrosion-resistant qualities. Sometimes susceptible to pitting.	Green powdery deposit.
Copper-base Alloy Brass, Bronze	Surface and intergranular corrosion.	Blue or blue-green powder deposit.
Cadmium (used as protective plating for steel)	Good corrosion resistance. If attack occurs, will protect steel from attack.	From white powdery corrosion products to brown or black molting of the surface.
Chromium (used as a wear-resistant plating for steels)	Subject to pitting in chloride environments.	Chromium, being cathodic to steel, does not corrode itself, but promotes rusting of steel where pits occur in the coating.

APPENDIX D

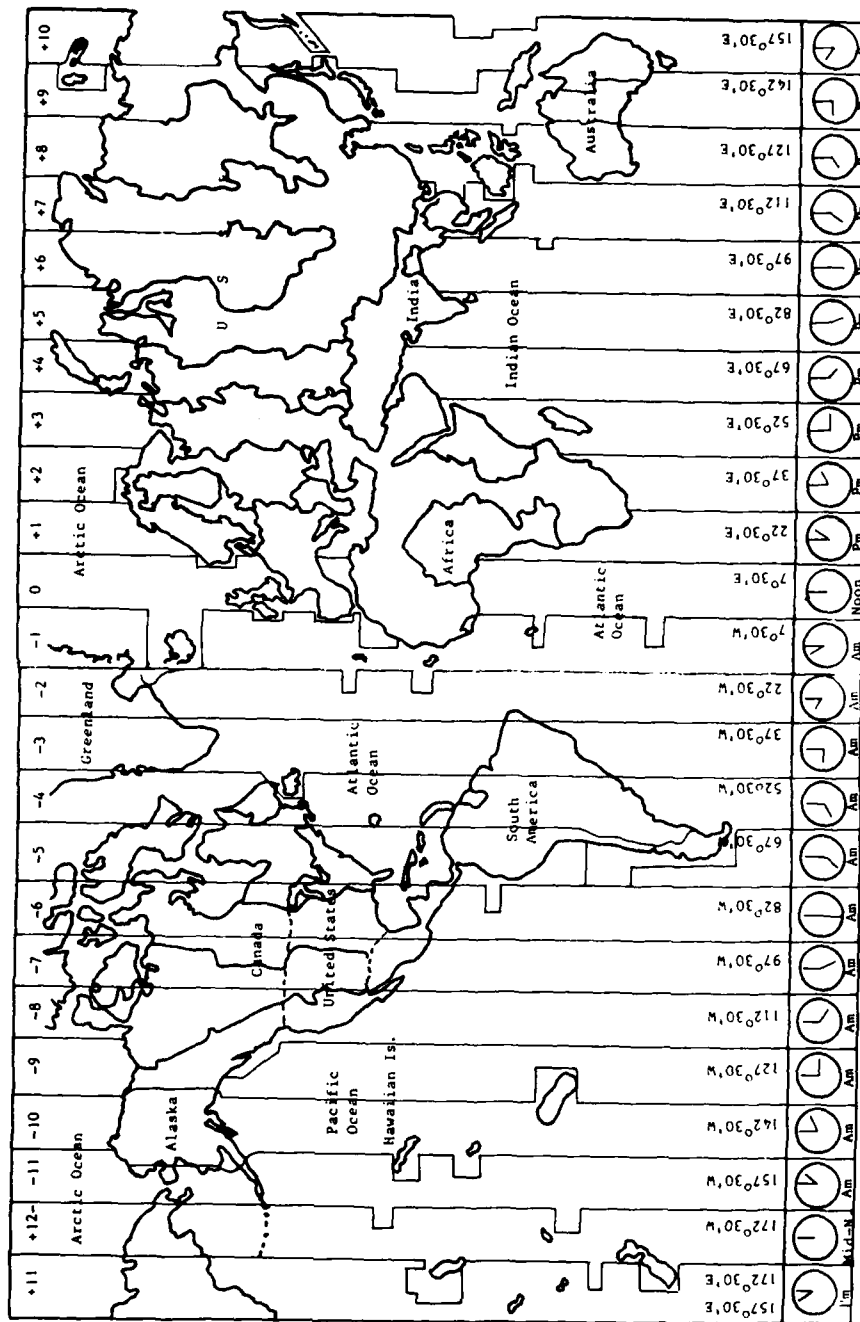
WORLD TRAVELER DATA

This appendix contains selected data to assist in the travel required for ACE/AACE.

Included are:

- World Time Zone Map
- World Monetary Systems List
- Unit Conversion Tables
- World Army Aircraft Deployment Matrix

WorldTime Zones



Monetary Systems

COUNTRY	MONETARY UNIT	COUNTRY	MONETARY UNIT
Afghanistan	Afghani	Laos	New Kip
Albania	Lek	Lebanon	Pound
Algeria	Dinar	Lesotho	Loti
Argentina	New Peso	Liberia	Dollar
Australia	Dollar	Libya	Dinar
Austria	Schilling	Liechtenstein	Franc
Bahamas	Dollar	Luxembourg	Franc
Bahrain	Dinar	Madagascar	Franc
Bangladesh	Taka	Malawi	Kwacha
Barbados	Dollar	Malaysia	Ringgit
Belgium	Franc	Maldives	Rupee
Belize	Dollar	Mali	Franc
Benin	CFA Franc	Malta	Pound
Bermuda	Dollar	Mauritania	Ouguiya
Bolivia	Peso	Mauritius	Rupee
Botswana	Pula	Mexico	Peso
Brazil	Cruzeiro	Monaco	Franc
Bulgaria	Lev	Mongolia	Tugrik
Burma	Kyat	Morocco	Dirham
Burundi	Franc	Mozambique	Metical
Cameroon	CFA Franc	Nepal	Rupee
Canada	Dollar	Netherlands	Guilder
Central African Emp.	CFA Franc	New Zealand	Dollar
Chad	CFA Franc	Nicaragua	Cordoba
Chile	Peso	Niger	CFA Franc
China	Yuan	Nigeria	Naira
Colombia	Peso	Norway	Krone
Congo	CFA Franc	Oman	Rial
Costa Rica	Colon	Pakistan	Rupee
Cuba	Peso	Panama	Balboa
Cyprus	Pound	Paraguay	Quarani
Czechoslovakia	Koruna	Peru	Sol
Denmark	Krone	Philippines	Peso
Dominican Rep.	Peso	Poland	Zloty
Ecuador	Sucre	Portugal	Escudo
Egypt	Pound	Qatar	Riyal
El Salvador	Colon	Rumania	Leu
Equat. Guinea	Ekuele	Rwanda	Franc
Ethiopia	Birr	Saudi Arabia	Riyal
Fiji	Dollar	Senegal	CFA Franc
Finland	Markka	Sierra Leone	Leone
France	Franc	Singapore	Dollar
Gabon	CFA Franc	Somalia	Shilling
Gambia	Dalasi	South Africa	Rand
Germany, East	D-Mark	Spain	Peseta
Germany, West	D-Mark	Sri Lanka	Rupee
Ghana	Cedi	Sudan	Pound
Greece	Drachma	Swaziland	Lilangeni
Grenada	Dollar	Sweden	Krona
Guatemala	Quetzal	Switzerland	Franc
Guinea	Sylli	Syria	Pound
Guinea-Bissau	Escudo	Taiwan	Dollar
Guyana	Dollar	Tanzania	Shilling
Haiti	Gourde	Thailand	Baht
Honduras	Lempira	Togo	CFA Franc
Hong Kong	Dollar	Trinidad and Tobago	Dollar
Hungary	Forint	Tunisia	Diner
Iceland	Krona	Turkey	Lira
India	Rupee	Uganda	Shilling
Indonesia	Rupiah	United Arab Emirates	Dirham
Iran	Rial	United Kingdom	Pound
Iraq	Dinar	United States	Dollar
Ireland	Pound	Upper Volta	CFA France
Israel	Shekel	Uruguay	Peso
Italy	Lira	USSR	Ruble
Ivory Coast	CFA Franc	Venezuela	Bolivar
Jamaica	Dollar	Vietnam	Dong
Japan	Yen	Western Samoa	Tala
Jordan	Dinar	Yemen	Dinar
Kampuchea	Riel	Yemen, Dem.	Dinar
Kenya	Shilling	Yugoslavia	Dinar
Korea, North	Won	Zaire	Zaire
Korea, South	Won	Zambia	Kwacha
Kuwait	Dinar	Zimbabwe	Dollar

Standard Unit Conversion Tables

U.S. English Units to SI Units

TO CONVERT FROM	TO	MULTIPLY BY
(Acceleration) foot/second ² (ft/s ²) inch/second ² (in/s ²)	meter/second ² (m/s ²) meter/second ² (m/s ²)	$3.048 \times 10^{-1}^*$ $2.54 \times 10^{-2}^*$
(Area) foot ² (ft ²) inch ² (in ²) yard ² (yd ²)	meter ² (m ²) meter ² (m ²) meter ² (m ²)	9.2903×10^{-2} 6.4516×10^{-4} 8.3613×10^{-1}
(Density) pound mass/inch ³ (lbm/in ³) pound mass/foot ³ (lbm/ft ³)	kilogram/meter ³ (kg/m ³) kilogram/meter ³ (kg/m ³)	2.7660×10^4 1.6018×10
(Energy, Work) British thermal unit (Btu) foot-pound force (ft · lbf) kilowatt-hour (kw · h)	joule (J) joule (J) joule (J)	1.0544×10^1 1.3558 $3.60 \times 10^6^*$
(Force) kip (1000 lbf) pound force (lbf) ounce force	newton (N) newton (N) newton (N)	4.4482×10^3 4.4482 2.7801×10^{-1}
(Length) foot (ft) inch (in) mile (mi.) (U.S. statute) mile (mi.) (international nautical) yard (yd)	meter (m) meter (m) meter (m) meter (m) meter (m)	$3.048 \times 10^{-1}^*$ $2.54 \times 10^{-2}^*$ 1.6093×10^3 1.852×10^3 $9.144 \times 10^{-1}^*$
(Mass) pound mass (lbm) slug (lb · s ² /ft) ton (2000 lbm)	kilogram (kg) kilogram (kg) kilogram (kg)	4.5359×10^{-1} 1.4594×10 9.0718×10^2
(Power) foot-pound/minute (ft · lbf/min) horsepower (550 ft · lbf/s)	watt (W) watt (W)	2.2597×10^{-2} 7.4570×10^{-2}
(Pressure, stress) atmosphere (std) (14.7 lbf/in ²) pound/foot ² (lbf/ft ²) pound/inch ² (lbf/in ² or psi)	newton/meter ² (N/m ² or Pa) newton/meter ² (N/m ² or Pa) newton/meter ² (N/m ² or Pa)	1.0133×10^5 4.7880×10 6.8948×10^3
(Velocity) foot/minute (ft/min) foot/second (ft/s) knot (nautical mi/h) mile/hour (mi/h) mile/hour (mi/h) mile/second (mi/s)	meter/second (m/s) meter/second (m/s) meter/second (m/s) meter/second (m/s) kilometer/hour (km/h) kilometer/second (km/s)	$5.08 \times 10^{-3}^*$ $3.048 \times 10^{-1}^*$ 5.1444×10^{-1} $4.4704 \times 10^{-1}^*$ 1.6093 1.6093
(Viscosity) foot ² /second (ft ² /s) pound-mass/foot-second (lb _m /ft · s) pound-force-second/foot ² (lbf · s/ft ²)	meter ² /second (m ² /s) pascal-second (Pa · s) pascal-second (Pa · s)	9.2903×10^{-2} 1.4882 4.788×10

* Exact value

UNITS OF TEMPERATURE		
TO CONVERT FROM	TO	MULTIPLY BY
(Fahrenheit)	$^{\circ}\text{F} = (9/5) ^{\circ}\text{C} + 32$	
(Celcius)	$^{\circ}\text{C} = (5/9) (^{\circ}\text{F} - 32)$	
(Kelvin)	$^{\circ}\text{K} = ^{\circ}\text{C} + 273.16$	
(Rankine)	$^{\circ}\text{R} = ^{\circ}\text{F} + 459.69$	

UNITS OF TORQUE		
lb. in.	gram cm.	1152.128
lb. ft.	gram cm.	13.826
lb. ft.	kp meter	0.1383
oz. in.	gram cm.	72.008
oz. in.	lb. ft.	0.005208

FRACTION AND DECIMAL EQUIVALENTS			
$\frac{1}{64} = .015625$	$\frac{17}{64} = .265625$	$\frac{33}{64} = .515625$	$\frac{49}{64} = .765625$
$\frac{1}{32} = .03125$	$\frac{9}{32} = .28125$	$\frac{17}{32} = .53125$	$\frac{25}{32} = .78125$
$\frac{3}{64} = .046875$	$\frac{19}{64} = .296875$	$\frac{35}{64} = .546875$	$\frac{51}{64} = .796875$
$\frac{1}{16} = .0625$	$\frac{5}{16} = .3125$	$\frac{9}{16} = .5625$	$\frac{13}{16} = .8125$
$\frac{5}{64} = .078125$	$\frac{21}{64} = .328125$	$\frac{37}{64} = .578125$	$\frac{53}{64} = .828125$
$\frac{3}{32} = .09375$	$\frac{11}{32} = .34375$	$\frac{19}{32} = .59375$	$\frac{27}{32} = .84375$
$\frac{7}{64} = .109375$	$\frac{23}{64} = .359375$	$\frac{39}{64} = .609375$	$\frac{55}{64} = .859375$
$\frac{1}{8} = .125$	$\frac{3}{8} = .375$	$\frac{5}{8} = .625$	$\frac{7}{8} = .875$
$\frac{9}{64} = .140625$	$\frac{25}{64} = .390625$	$\frac{41}{64} = .640625$	$\frac{57}{64} = .890625$
$\frac{5}{32} = .15625$	$\frac{13}{32} = .40625$	$\frac{21}{32} = .65625$	$\frac{29}{32} = .90625$
$\frac{11}{64} = .171875$	$\frac{27}{64} = .421875$	$\frac{43}{64} = .671875$	$\frac{59}{64} = .921875$
$\frac{3}{16} = .1875$	$\frac{7}{16} = .4375$	$\frac{11}{16} = .6875$	$\frac{15}{16} = .9375$
$\frac{13}{64} = .203125$	$\frac{29}{64} = .453125$	$\frac{45}{64} = .703125$	$\frac{61}{64} = .953125$
$\frac{7}{32} = .21875$	$\frac{15}{32} = .46875$	$\frac{23}{32} = .71875$	$\frac{31}{32} = .96875$
$\frac{15}{64} = .234375$	$\frac{31}{64} = .484375$	$\frac{47}{64} = .734375$	$\frac{63}{64} = .984375$
$\frac{1}{4} = .25$	$\frac{1}{2} = .5$	$\frac{3}{4} = .75$	$1 = 1.$

SI Units and Symbols

BASE UNITS			
QUANTITY	UNIT	SI SYMBOL	FORMULA
length	meter	m	...
mass	kilogram	kg	...
time	second	s	...
electric current	ampere	A	...
thermodynamic temperature	kelvin	K	...
amount of substance	mole	mol	...
luminous intensity	candela	cd	...
SUPPLEMENTARY UNITS:			
plane angle	radian	rad	...
solid angle	steradian	sr	...
DERIVED UNITS:			
acceleration	meter per second squared	...	m/s^2
angular acceleration	radian per second squared	...	rad/s^2
angular velocity	radian per second	...	rad/s
area	square meter	...	m^2
density	kilogram per cubic meter	...	kg/m^3
electric potential difference	volt	V	W/A
electric resistance	ohm	Ω	V/A
energy	joule	J	$N \cdot m$
entropy	joule per kelvin	...	J/K
force	newton	N	$kg \cdot m/s^2$
frequency	hertz	Hz	$1/s$
magnetomotive force	ampere	A	...
power	watt	W	J/s
pressure	pascal	Pa	N/m^2
quantity of electricity	coulomb	C	$A \cdot s$
quantity of heat	joule	J	$N \cdot m$
radiant intensity	watt per steradian	...	W/sr
specific heat	joule per kilogram-kelvin	...	$J/kg \cdot K$
stress	pascal	Pa	N/m^2
thermal conductivity	watt per meter-kelvin	...	$W/m \cdot K$
velocity	meter per second	...	m/s
viscosity, dynamic	pascal-second	...	$Pa \cdot s$
viscosity, kinematic	square meter per second	...	m^2/s
volume	cubic meter	...	m^3
work	joule	J	$N \cdot m$
SI PREFIXES			
MULTIPLICATION FACTORS	PREFIX	SI SYMBOL	
1 000 000 000 000 = 10^{12}	tera	T	
1 000 000 000 = 10^9	giga	G	
1 000 000 = 10^6	mega	M	
1 000 = 10^3	kilo	k	
100 = 10^2	hecto	h	
10 = 10^1	deka	da	
0.1 = 10^{-1}	deci	d	
0.01 = 10^{-2}	centi	c	
0.001 = 10^{-3}	milli	m	
0.000 001 = 10^{-6}	micro	μ	
0.000 000 001 = 10^{-9}	nano	n	
0.000 000 000 001 = 10^{-12}	pico	p	
0.000 000 000 000 001 = 10^{-15}	femto	f	
0.000 000 000 000 000 001 = 10^{-18}	atto	a	

Army Aircraft Deployment

Location	A/TH-1C	AM-15	AM-64A	CR-47A	CR-47B	CR-47C	CR-47D	CR-54A	CR-54B	OR-58A	OR-58B	OR-58C	OR-6A	OV-10C	OV-10D	RV-10D	U-21A	U-21F	U-21C	RU-21A	RU-21B	RU-21C	RU-21H	UR-1B	UR-1C	UR-1H	UR-1H	UR-1V	UR-60A	Total
UNITED STATES																														
ALABAMA																														
Pt. Rucker		66					15					73	6		6		7													
Montgomery																														
St. Clair Co. Airport												3																		
Anniston Calhoun Co.												3					3													
Birmingham Muni Airport									10				8																	
Nedstone AAF	4																													
Bates Field													2																	
ALASKA																														
Alaska		9		16				4	26																					
ARIZONA																														
Payson AAF		8										12																		
Libby AAF												4																		
Logan AAF		1																												
ARKANSAS																														
Camp Robinson AAF												13																		
Adam Field																														
CALIFORNIA																														
Van Airline APTC							3					31																		
Fresno AAF	45											55																		
Edwards AFB	1						2					1																		
Fresno Airport												3																		
Fresno Airport																														
Hamilton AFB																														
Stockton Metro Airport				15								7																		
McChesney AFB												2																		
Ames AFB																														
Logan Airport																														
COLORADO																														
Navajo AAF		26					10					37																		
Buckley AMCB																														
Buckley AMCB	1	7										18																		

Location	A/TN-1G	AR-1S	CH-47A	CH-47B	CH-47C	CH-54A	CH-54B	OR-58A	OR-58B	OR-58C	OR-6A	OV-1C	OV-1D	RV-1D	U-21A	U-21F	RU-21A	RU-21B	RU-21C	RU-21H	UH-1B	UH-1C	UH-1H	UH-1M	UH-1V	UH-60A	Total
<u>CONNECTICUT</u>																											
Groton/New London Airport																											
Bradley Intl. Airport							10																2				2
<u>DELAWARE</u>																											
Greater Wilmington Airport																							26				29
<u>FLORIDA</u>																											
Craig Field Municipal Airport	2	13																					29	6			74
Orlando Jetport											23					1							6				17
McDill AFB																11						4					15
Opaloka Airport																	2										6
<u>GEORGIA</u>																							1	5			6
Bush Field																							2				3
Winder-Barrow													14														14
Dobbins AFB											3		14										4				21
Charlie Brown Airport																4							4				8
Hunter AMF & Ft. Stewart	30		16		10			40					12		10							31				16	165
Lewson AMF Ft. Benning								8							1							13			26	6	56
<u>HAWAII</u>																											
Kanali	51				16				60						1								70		6		237
<u>IDAHO</u>																											
Boise Muni Airport								14							1								18	12			45
<u>ILLINOIS</u>																											
Decatur Airport								10															14				24
Midway Airport								9															16				24
Glenview MAS								4															34				38
Glenview NAS																1							3				4
Scott AFB																											26
Park Bt-State Airport																							8				8
<u>INDIANA</u>																											
Shelby Co. Airport								32															17				49
<u>IOWA</u>																1							2				3
Indianapolis Intl. Airport																											
<u>KANSAS</u>																											
Wichita Muni Airport																							21				21
<u>KENTUCKY</u>																											
Covington Muni Airport																											25

Army Aircraft Deployment (Cont'd)

Location	Aircraft	AH-1S	AH-64A	CH-47A	CH-47B	CH-47C	CH-54A	CH-54B	OH-58A	OH-58B	OH-58C	OH-6A	OV-10	OV-10	RV-10	U-21A	U-21F	U-21C	RU-21A	RU-21B	RU-21C	RU-21B	RU-21C	UH-1B	UH-1C	UH-1H	UH-1H	UH-60A	Total		
<u>IOWA CONT'D</u>																															
Boone Airport									4																				25		
Des Moines Muni Airport									4																				9		
Marshall AAF		30							37																				124		
Industrial Airport																													14		
Forbes AFB				13			10		6																				25		
<u>KENTUCKY</u>																															
Capital City Airport									6																				39		
Goodman AAF									6																				22		
Campbell AAF		90				54			30		66	26																	131		
Bowman Field																													7		
<u>LOUISIANA</u>																															
Lakefront Airport									12																				31		
Acadiana Regional Airport																													11		
Polk AAF		9							20																				60		
<u>MAINE</u>																															
Bangor Intl. Airport									3																				32		
<u>MARYLAND</u>																															
Phillips AAF																													6		
Weide AAF		7																											51		
Tipton AAF									15																				39		
Hagerstown Muni Airport									4																				10		
<u>MASSACHUSETTS</u>																															
Moore AAF									13																				34		
Otis AMCB																													36		
Westover AFB																													5		
<u>MICHIGAN</u>																															
Abrams Muni Airport									18																				62		
Selfridge AMCB																													5		
Oakland Pontiac Airport																													1		
<u>MINNESOTA</u>																															
Downtown Airport									24																				37		
Downtown Airport									11																				23		

[illegible]

Location	Aircraft	AR-15	CR-47A	CR-47B	CR-47C	CR-47D	CR-54A	CR-54B	CR-58A	CR-58B	CR-58C	OR-6A	OV-6A	OV-1C	OV-1D	D-21A	D-21F	D-21C	RB-21B	RB-1B	RB-1C	RB-1E	RB-1F	RB-6A	Total
<u>NEW YORK CONT'D</u>																									
Long Island McAtthur Airport Mgr A												34										16		50	
Shenley-Bach AAF																						2		2	
Seneca AAF																						2		2	
<u>NORTH CAROLINA</u>																									
Bovine Co. Airport										11												6	10	23	
Balsigh-Burham Airport										11												6	3	35	
Simons AAF		4								41	42											62		264	
<u>NORTH DAKOTA</u>		48			14							5										11		16	
Simanch Nmal Airport																									
<u>OHIO</u>																									
Lorain Co. Regional Airport																						3	1	6	
Akron-Canton Airport										18												20	8	2	
Don Scott Field		2								23												12	13	55	
Columbus Nmal Airport										3												3		8	
<u>OKLAHOMA</u>																									
Gen Howell Midcow Airport										10												28		38	
Max Herzhelmer Airport										4											1	6		11	
Benny Post AAF				16						20												17	4	59	
Tulsa Intl Airport												24												24	
<u>OREGON</u>																									
McMurry Field										10					11							8		29	
<u>PENNSYLVANIA</u>																									
Washington County Airport												13										9	9	31	
Muir AAF			4				10					29				2						34		63	
Chambersburg Nmal Airport																						1		1	
Willow Grove MAF										6												9		13	
<u>RHODE ISLAND</u>																									
Quonset Airport												11										7	9	27	
<u>SOUTH CAROLINA</u>																									
McGhee AFB										17												15	9	41	
Columbia Metro Airport																						3	4	13	
<u>SOUTH DAKOTA</u>																									

Location	Altoona	A/TH-1C	AR-15	AR-66A	CR-47A	CR-47B	CR-47C	CR-47D	CR-54A	CR-54B	CR-58A	CR-58B	CR-58C	OR-6A	OV-6A	OV-1C	OV-1D	RV-1D	U-21A	U-21B	U-21C	RU-21A	RU-21B	RU-21C	RU-21H	UH-1B	UH-1C	UH-1H	UH-1H	UH-1V	UH-60A	Total	
TENNESSEE																																	
Bartlett Airport																																58	
McGhee-Tyson AFB			5											24	6													7	9			22	
TEXAS																																	
Dallas MAF					13					13																		31				57	
Booke Airport																												2		6		7	
Eastwood Fld														1																		3	
Wood AAF & Robert Gray AAF			118		16					71	65							10		5								123		5		413	
R. E. Mueller Muni Airport										18																	11	6				28	
Ellington AFB			3		5					3																	2	2				12	
Wurtsmith AAF										16																	10					26	
Randolph AFB																												3	3			3	
San Antonio Int. Airport																												6				6	
Kelly Muni Airport																												3		5		8	
Biggs AAF										10	10								1									27				57	
New Braunfels Airport																																	
WAS Corpus Christi																																	
UTAH																																	
Salt Lake City Intl Airport																																	
Altoona F2			1	7										16														12	9			45	
Michael AAF																												3				4	
VIRGINIA																																	
Berlington Intl Airport														11																		19	
VIRGINIA																																	
Davidson AAF			2											1																			
Byrd Intl Airport														13					6	5						3		44			3	70	
Petersburg Muni Airport																												36				49	
Langley AFB																												3				3	
Palmer AAF			4											6														20		4	4		
Palmer AAF														2														4				6	
WASHINGTON																																	
Sequoiah Co. Paline Field					22																								4				27
Grey AAF			50								30	44							3									25	7	31	206		27
Grey AAF			5								12																	5	12			34	

Army Aircraft Deployment (Cont'd)

Location	Aircraft	A/TB-1C	AM-15	AM-64A	CH-47A	CH-47B	CH-47C	CH-47D	CH-54A	CH-54B	OH-58A	OH-58B	OH-58C	OH-6A	OV-10	OV-1D	RV-1D	U-21A	U-21F	U-21C	RU-21A	RU-21B	RU-21C	RU-21H	UH-1B	UH-1C	UH-1H	UH-1H	UH-1V	UH-60A	Total
WASHINGTON COMB'D																															
Spokane Intl Airport																															6
WEST VIRGINIA																															
Wood City AFB																															21
WISCONSIN																															
Truett Field																															26
West Bend Airport																															15
Wendover Airport																															—
WYOMING																															
Chapman Heli Airport																															13
JAPAN																															
Camp Zama AFB																															8
KOREA																															
Seoul																															289
THAILAND																															
Bangkok																															3
PHILIPPINE																															
Albrook AFB																															50
PUERTO RICO																															
Isle Grande Airport																															17
Christiansted St. Croix																															2
Pt. Buchanan																															1
EUROPE																															
Caracas Belgium																															2
Wiesbaden																															7
Sandofen Coleman BNS																															34
Sandofen Coleman BNA																															14
Sandofen Coleman BBS																															12
Sandofen Coleman BBA																															20
Pirmasens																															10
Landstuhl																															6
Manstein																															7
Berlin																															6
Bad Kreuznach																															36
Kiel																															37

[illegible]

Army Aircraft Deployment (Cont'd)

Location	Aircraft	AR-1S	AR-64A	CR-47A	CR-47B	CR-47C	CR-47D	CR-54A	CR-54B	CR-58A	CR-58B	CR-58C	OR-6A	OV-6A	OV-1C	OV-1D	AR-1D	U-21A	U-21P	U-21G	RU-21A	RU-21B	RU-21C	RU-21R	UN-1B	UN-1C	UN-1H	UN-1M	UN-1V	UN-60A	Total
EUROPE CONT'D																															
Bremen										4																		3			7
Bremen																											6				6
Bad Tole																											2				2
Echterdingen										20																		4			20
Echterdingen																			1												5
Echterdingen																															26
Schwabisch Mall							20																					2			21
Schwabisch Mall																			1									3			4
Goppingen																											2				6
Schwabisch, Osnend																											15				15
Augsburg																													7		7
Augsburg																															3