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ANALYSIS OF UNITED STATES AIR FORCE AIRCRAFT

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ACCUMULATORS(U) AERONAUTICAL SYSTEMS DIV

WRIGHT-PATTERSON AFB OH F E POAST ET AL. NOV 82

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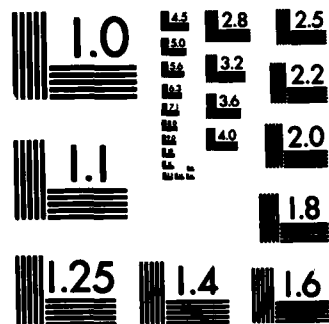
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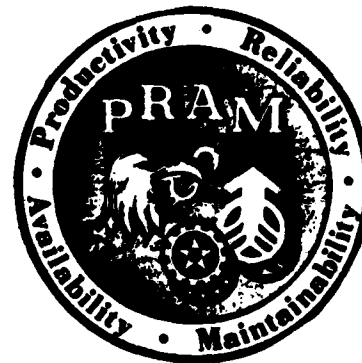
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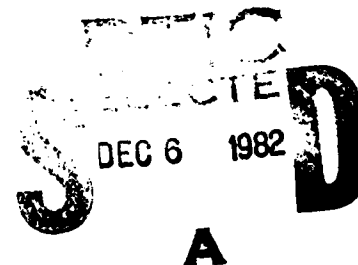


ANALYSIS OF UNITED STATES AIR FORCE AIRCRAFT ACCUMULATORS

PRODUCTIVITY, RELIABILITY, AVAILABILITY,
AND MAINTAINABILITY PROGRAM OFFICE

NOVEMBER 1982

FINAL REPORT FOR PERIOD MARCH - APRIL 1982



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UNITED STATES AIR FORCE
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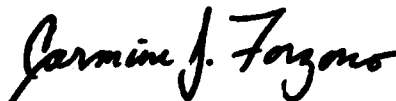
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FRANCIS E. POAST
Program Manager



CARMINE J. FORZONO, Capt, USAFR
Mechanical Engineer

FOR THE COMMANDER



ELBERT C. PARKER, COL, USAF
Director, PRAM Program Office

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report summarizes USAF aircraft hydraulic system accumulator installations and failure history. The purpose of this effort was to identify and select an appropriate installation for flight test of an improved accumulator of the metal bellows design. A test aircraft installation was identified. ←		

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PREFACE

This report summarizes the results of identifying and analyzing United States Air Force (USAF) aircraft hydraulic accumulators. The goal was to identify an aircraft that had an accumulator with high maintenance requirements and physical characteristics similar to a newly designed low maintenance accumulator. This aircraft would be used as the test-bed for the new accumulator. The analysis was accomplished by USAF Reserve Officers and sponsored by the Productivity, Reliability, Availability and Maintainability (PRAM) Program Office of the Aeronautical Systems Division (ASD), Wright-Patterson Air Force Base, Ohio 45433.

The work reported herein was performed during the period March through April 1982, under the direction of the author, Captain Carmine J. Forzono, USAFR (ASD/XOR).

The author wishes to thank the following reservists: Major Thomas Gardner, Major Ron Harvey, Captain Franklin Denyse, and 1Lt Fred Roberts for their assistance in compiling some of the data found in this report. Appreciation is also extended to Mrs. Emily Patrick (AFALD/PTD) for her help in obtaining many of the required drawings.



A

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SECTION I

INTRODUCTION

Included within this report is the description of the processes undertaken and the information gathered to identify the test-bed aircraft for a new low maintenance accumulator. The project required that all accumulators on USAF aircraft be identified, their maintenance history be established, and their dimensional characteristics be recorded. With these factors known, a particular accumulator on a specific aircraft would be recommended as the most favorable candidate for replacement with the new low maintenance accumulator for flight testing.

1. Objective and Overall Approach

The goal was to identify a USAF aircraft that had an accumulator with a poor maintenance history. It was hoped that the identified accumulator would be compatible with the size of the new low maintenance accumulator being developed by the Aero Propulsion Laboratory. Two of these new accumulators were being built. Both were 100 cubic inches in volume. One was going to be laboratory tested by the Aero Propulsion Laboratory, the other flight tested. It is the latter one that this report addresses. These two accumulators were developed as a result of the work recorded in another report titled "Low Maintenance Hydraulic Accumulator" (AFWAL-TR-81-2031). The AFWAL-TR-81-2031 report contains detailed descriptions of the design of these low maintenance accumulators. A copy of the abstract from this report is presented below:

"This report presents the results of a program to develop a low maintenance accumulator, compatible with current MS envelopes and competitive in cost with conventional accumulators. The purpose of the program was to select and develop a metal bellows configuration/concept to replace the conventional moving piston and seal of conventional accumulators. The selected bellows is of welded construction and welded in place to allow bellows movement identical to piston movement. The accumulator housing is of welded construction to eliminate all possible leak points. The program goal was to develop an accumulator to provide a ten year unserviced life. Test results indicate an accumulator design is possible to achieve a service life of six to ten years based on installation on a F-16 aircraft."

2. Note

There were a few constraints in this analysis to identify a likely flight test aircraft for the new low maintenance accumulator. The first and most severe was that of time. The sponsor desired a quick response (no more than one month). It was hoped that an answer could be provided at the end of a two week reserve tour that began on 8 March 1982; however, due to computer run problems, only a first-cut verbal answer was provided at that time. This report, written in the second week of April 1982, presents the final recommendation. The time factor prevented a more extensive search of technical orders and the acquiring of all accumulator drawings, but this did not adversely effect the end results.

Another constraint was finding an accumulator near 100 cubic inches in gas volume. Although 100 cubic inches was not a firm requirement by PRAM Program Office, it was used as a norm.

SECTION II

APPROACH

To accomplish the task of this report, five basic elements had to be accomplished. First, the USAF aircraft involved had to be identified. Second, the accumulators on those aircraft had to be identified. Third, the maintenance data/history of each accumulator had to be recorded. Fourth, part numbers were needed to obtain drawings from which accumulator sizes could be obtained. The last element involved the actual review of information gathered and recommendation of an aircraft/accumulator location for the new low maintenance accumulator.

1. Aircraft Involved

It was decided to investigate only accumulators on aircraft that were relatively modern, in present use by the active USAF, and potential candidates for some type of retrofit with these new low maintenance accumulators, if practicable. The following aircraft were selected:

KC-135A	C-141
RC-135A & C	C-130, B & E
WC-135B	F-111A, D, E & F
A-7D	FB-111A
A-10	F-15
B52G & H	F-4C, D & E
C-5A	F-16A & B

2. Accumulator Identification

It was felt that the best approach toward identifying the accumulators on each aircraft was to review the individual aircraft Work Unit Code (WUC) Manuals. Each of these manuals is

denoted as a technical order (T.O.) for each aircraft; eg, T.O. 1C-5A-06. They are all known as the Dash 6 T.O. for each specific aircraft. An attempt was made at using other aircraft T.O.s, like those dealing with hydraulic or landing gear maintenance and description; however, these efforts were very tedious and proved unsuccessful. Also, by obtaining the WUC for each accumulator, the task of obtaining maintenance data was made easier.

3. Maintenance Data

The AFLC Q-D056B computer maintenance reporting system was used in obtaining maintenance data on each accumulator. With the WUCs known, it was just a matter of pulling microfiche sheets from specific reports to obtain data.

The HQ AFLC/LOE (B06) report "Maintenance Actions, Man-hours and Aborts by Work Unit Code" was the major report used. A description of this report can be found in Appendix C. A sample of the data presented in this B06 report is shown in Figure 1. Each report contains data for six months. To provide a more reliable Mean Time Between Maintenance (MTBM) figure, a two-year time span was used. To accomplish this, four consecutive six-month microfiche histories were recorded and used to get the final two year MTBM.

Follow the steps and explanations below to better understand the process.

(1) With the WUC and aircraft known, the B06 data was obtained. For example, in Figure 1 the aircraft is the RC-135A

RC-135A

MAINTENANCE ACTIONS, MANHOUS, AND ABORTS BY WORK UNIT PERIOD ENDING 01DEC31									
ALC: OALC TYP EOP: ACF EAD: AC135A WUC: 13COF									
WUC	MOON	MONTH	INV	TIME	ADD	FAIL	MAINT ACTION	TYPE-1	TOTAL
13COF ANTI-SEIZ VALVE									
CAV OP	ACT LMT USE	100	100	100	100	1	1	2	2
CAV OP	ACT LMT USE	100	100	100	100	1	1	2	2
TOTALS									4
13COF DEPOSIT VALVE									
CAV OP	ACT LMT USE	100	100	100	100	2	2	5	5
CAV OP	ACT LMT USE	100	100	100	100	2	2	5	5
TOTALS									10
13COL PRESS-RELIEF VALVE									
CAV OP	ACT LMT USE	100	100	100	100	1	1	2	2
CAV OP	ACT LMT USE	100	100	100	100	1	1	2	2
TOTALS									4
13CON RESERVE BRASS ASSEMBLY									
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
TOTALS									2
13COP ACCUM-SELECTOR VALVE									
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
TOTALS									2
13COT RELIEF VALVE									
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
TOTALS									2
13CUX SUBSYSTEM SUMMARY									
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
TOTALS									2
13D40-16 INEL MECH ASSEMBLY									
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
CAV OP	ACT LMT USE	100	100	100	100	1	1	1	1
TOTALS									2

Figure 1 - Sample B06 Data

and WUC is 13 CBM. The six month average MTBM (Type -1) is 809. The MTBM (total) figure is not used because it includes all maintenance actions such as moving the accumulator to get to another part. MTBM (Type -1) only includes maintenance actions resulting from a failure. The total number of failures, "3", and total operating time, "2425", was also recorded.

(2) Since the data shown in Figure 1 only provided six months of information, the previous three six-month periods of data were also recorded for each accumulator on each aircraft. The compiling of all this data, including the MTBM, number of failures, and total operating time for six-month periods for the accumulators, on all aircraft studied, is presented in Appendix B.

(3) To get a two year average MTBM, the two year total of operating hours was divided by the two year total of failures. These MTBMs are found at the bottom of each sheet presented in Appendix B.

The original B06 and other D056 reports can be viewed or obtained from Headquarters Air Force Logistics Command (HQ AFLC). The AFLC personnel that provided assistance in obtaining these reports were Chuck Gross and Bob Newman, of AFLC/LOEP, Wright-Patterson Air Force Base (W-PAFB), Ohio 45433 ((513) 257-2257/6060).

4. Obtaining Part Numbers

Getting a match between the WUC, which leads to the maintenance data, and a part number (P/N), was somewhat difficult.

The personnel responsible for the D056 system advised that there was no correlation in this report between WUCs and P/Ns. The Illustrated Parts Breakdown (IPB) T.O.s were searched in an effort to match up brief WUC descriptions with drawings in the same IPBs to get P/Ns. This was extremely difficult and unreliable. D056 personnel advised that the B05 report, "Summarized Maintenance Actions for Selected WUCs", had in it's output, part numbers. It should be recalled that P/Ns were needed to get the drawings of the accumulators so that their sizes could be obtained. A description of the B05 report and a sample of its six month microfiche output can be found in Appendix C.

Unfortunately, the six month microfiche B05 report only reports data on WUCs that have fallen below their recommended MTBM. Very few accumulators had this reputation. It was then discovered that a full year special computer run could be obtained that would print out B05 data on each WUC regardless of the MTBM. A sample of this B05 data is shown in Figures 2a, 2b, and 2c. As shown in these figures, the Emergency Brake Accumulator, WUC 13DEC had four different part numbered accumulators associated with it: 1356633402, 60001-3, 600013 and MS287973. The P/Ns 60001-3 and 600013 are the same, except the "-" was left out in the latter. This one year B05 computer output worked out quite well for obtaining part numbers of accumulators. However, some accumulators did not receive any maintenance during that one year and, therefore, part numbers could not be obtained. These were apparently accumulators with very

SUMMARIZED MAINTENANCE ACTIONS FOR SELECTED WORK UNIT CCDES
PERIOD ENDING 82FE828
82/04/04 Q-D0568-8J5-WK-417 PAGE 1
RCS: LOG-LOE(AR)7179

ALCISHALC RCN: MC2764 TYP EDP: ACF EAD: A010A WUC: 13DEC

PART I - ON EQUIPMENT ACTIONS

--HOW MALFUNCTION-- CODE	CURR MC UNIT COUNT		TWELVE MONTH UNIT COUNT		F REPF	-----TWELVE MONTH UNIT COUNT BY ACTION TAKEN-----		EMJ OTHER			TWELVE MONTH HOURS					
	FAIL	OTHMAL	FAIL	OTHMAL		RETH	ATCH	G	KL	Z		CRSM	CLN	V	X	S
TYPE 1																
870 BROKEN	1		2													8.2
127 ADJUST IMPROP			6													12.5
135 STUCK OR JAM			1													3.0
178 CORR-MILD/MOD	3		36										34			26.8
190 CRACKED	1		1													22.0
374 INTERNAL FAIL			4													20.9
381 LEAKING	4		36													420.6
525 PRESS INCORRECT			1													15.8
561 CANT ADJUST			1													14.0
651 AIR IN SYSTEM			1													8.0
730 LOOSE	7	2	87	8												1.3
TOTAL			2													553.1
TYPE 2																
165 BOLTS LOOSE	1		6													9.3
106 BOLTS MISSING			1													.5
108 BKKM SAFETY MR			1													.3
230 DIRTY																1.1
948 OPER ERROR	1		8													8.0
TOTAL																19.2
TYPE 6																
799 NO DEFECT																114.8
800 NO D FAC MAIN																21.5
805 NO DEF NOC																2.0
TOTAL																139.3
WUC TOTAL																
12 MONTHS UNITS & MANHOURS FOR OTHER ACTIONS	7	3	87	16	46	17	13	34	6	21	2	139	2	139	718.6	HOURS

COMMAND	BASE	27	7	27	7	27	7	8	6	13	4	1	97.9
AFE BENTWTRS	RAF UK	27	7	27	7	27	7	8	6	13	4	1	43
	TOTAL	27	7	27	7	27	7	8	6	13	4	1	97.9
AFR BARKSDALE	AFB L	2	2	2	2	2	2	2	2	2	2	1	28.7
AFR GRISSOM	AFE IND	1	2	1	2	1	2	2	2	1	1	1	1.0
	TOTAL	1	2	1	2	1	2	2	2	1	1	1	29.7
ANG BRADLEY	NG CON	1	1	1	1	1	1	1	1	1	1	1	8.8
ANG MARTIN	NG MD	3	3	3	3	3	3	3	3	3	3	3	2.8
	TOTAL	4	4	4	4	4	4	4	4	4	4	4	10.8
LOG SWALC	MOD	2	2	2	2	2	2	2	2	2	2	2	1.0
	TOTAL	2	2	2	2	2	2	2	2	2	2	2	1.0
TAC DAVIS	MON AFB A	13	5	13	5	13	5	5	3	12	4	4	121.2
TAC ENGLAND	AFB LA	21	2	21	2	20	2	20	1	15	11	11	315.0
TAC MRTL	9CH AB SC	19	7	19	7	3	2	3	3	15	2	2	135.8
	TOTAL	53	7	53	7	34	7	7	7	15	2	19	572.0
MUC TOTAL		87	16	87	16	46	17	17	13	34	6	21	710.6

Figure 2(a) - Sample B05 Data

ACUMULATOR EMERG BK
PART II - SHOP ACTIONS

FSC 1650 P/N 1356633402) - MIN/4MC 000996271

---MON	HAL	FUNCTION	---	REPAIR		ADJUST		CLN/TEST/CRSN		SRVCBL		-----RTS & CONDEMNED-----					TOTAL		DELATED
				CODE	NOON	UNITS	HOURS	UNITS	HOURS	VZ	UNITS	HOURS	UNITS	HOURS	1	2-6	7-8	9	
381	LEAKING	*TOTAL*		1	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	14.8	0.0
				1	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	30.0	0.0

[illegible]

FSC 1650 P/N 660J1-3 - MIIN/HMC 005846178

CODE	MALFUNCTION	REPAIR		ADJUST		CLN/TEST/CRSN		SRVC8LE		-----NRTS & CONDEMNED-----					TOTAL		DELAYED	
		UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	1	2-6	7-8	9	UNITS	HOURS	COMM
381	LEAKING	5	56.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1	16.0	
325	PRESS INCORRECT	1	4.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1	4.0	
551	AIR IN SYSTEM	2	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2	8.0	
	TOTAL	8	88.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	8	88.5	

[illegible]

FSC 1656 P/N 603013 - MIIN/MHC 005A-617A

--WOM MODE	MALFUNCTION-- MOUN	REPAIR AFG		ADJUST KL		CKN/TEST/CRSM VXZ		SRVCBL BJ		-----NRTS & CONDENSED-----			TOTAL		DELAYED CDMN	
		UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	1	2-6	7-8	9	UNITS	HOURS	UNITS
681	LEAKING	17	94.3	0	0	0	0	0	0	1	1.4	1.4	18	95.7	1	3.9
	TOTAL	17	94.3	0	0	0	0	0	0	1	1.4	1.4	18	95.7	1	3.9

[illegible]

FSC 1650 P/N HS287973 - N12N/HMC 0805555130

-HOW YAL FUNCTION ODE	REPAIR AFG		ADJUST KL		CLN/TEST/CRSN VIZ		SRVCLBL SJ		-----NRTS & CONDEMNED-----			TOTAL		DELAYED CONN		
	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	1	2-6	7-8	9	UNITS	HOURS	UNITS	HOURS
81 LEAKING	1	15.2			.0	.0		.0					1	15.2		.0
59 NO DEFECT		.0		.0	.0	.0	1	2.3				.0	2	2.3		.0
TOTAL	1	15.2		.0	.0	.0	1	2.3				.0	2	17.5		.0

Figure 2(b) - Sample B05 Data

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SUMMARIZED MAINTENANCE ACTIONS FOR SELECTED WORK UNIT CCDES

82/04/84 Q-00568-905-WK-N17 PAGE 3
RCS: LOG-LOE(AR)7179

ALC:SNALC RCN: WC2764 TYP EOP: ACF EAD: A310A WUC: 13DEC PERIOD ENDING 02FEB29

CAT IND C

ACUMULATOR ENERG BK
PART II - SHOP ACTIONS

BHVN	BENTMTRS	RAF UK	1	15.2	.0	UNITS	FSC 1650	P/N 084230301	UNITS	FSC 1650	P/N 084230301	UNITS	FSC 1650	P/N 135658323	UNITS	FSC 6178	P/N 680813	UNITS	.0	2	17.5	.0	2	17.5	.0			
	TOTAL		1	15.2	.0															.0	2	17.5	.0	2	17.5	.0		
	FSC 1650		P/N 084230301	UNITS	1	UNITS	FSC 1650	P/N 084230301	UNITS	FSC 1650	P/N 084230301	UNITS	FSC 1650	P/N 135658323	UNITS	FSC 1650	P/N 135658323	UNITS		.0	2	17.5		.0	2	17.5		.0
	FSC 1650		P/N 084230321	UNITS	1	UNITS	FSC 1650	P/N 084230321	UNITS	FSC 1650	P/N 084230321	UNITS	FSC 1650	P/N 135658323	UNITS	FSC 1650	P/N 135658323	UNITS		.0	2	17.5		.0	2	17.5		.0
	FSC 1650		P/N 5456A	UNITS	1	UNITS	FSC 1650	P/N 5456A	UNITS	FSC 1650	P/N 5456A	UNITS	FSC 1650	P/N 135658323	UNITS	FSC 1650	P/N 135658323	UNITS		.0	2	17.5		.0	2	17.5		.0

CODE	NOUN	REPAIR	ADJUST	CLM/TEST/CRSN	SRVABLE	1	2-6	7-9	9	TOTAL	DELATED
301	LEAKING	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS
799	NO DEFECT	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS
TOTAL		4	44.0	.0	.0	.0	.0	.0	.0	4	44.0
TOTAL		4	44.0	.0	.0	.0	.0	.0	.0	5	47.0

BASE	NOUN	REPAIR	ADJUST	CLM/TEST/CRSN	SRVABLE	1	2-6	7-9	9	TOTAL	DELATED
ANUS	BARKSDALE AFB LA	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS
GAMH	ENGLAND AFB LA	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS
TOTAL		4	44.0	.0	.0	.0	.0	.0	.0	5	47.0
TOTAL		4	44.0	.0	.0	.0	.0	.0	.0	5	47.0

WUC	TOTAL	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS	UNITS	HOURS
WUC	TOTAL	31	237.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
WUC	TOTAL	31	237.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
WUC	TOTAL	31	237.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Figure 2(c) - Sample B05 Data

high MTBMs or were on a fleet of aircraft that had very low operating hours for the year. A two year printout was requested to resolve these few oddities; however, only one year's data is kept on the computer.

The total compilation of P/Ns obtained for specific WUC is presented on data sheets found in Appendix A.

5. Reviewing the Data

This last part of the report deals with reviewing the maintenance history, accumulator physical characteristics, developing results, conclusions, and recommendations.

SECTION III

RESULTS

The data presented in Appendix A provides the greatest amount of information on the accumulators. There is one sheet per aircraft type. On the left of each sheet is the WUC of each accumulator on that aircraft. These are followed to the right by the P/N(s), vendor code, gas volume, length, diameter, and two year average MTBM for each accumulator. Some blocks are not filled in because the drawings were not available at the Engineering Data Office (AFALD/PTD) at W-PAFB, OH. As explained earlier, the computer only stores one year of B05 data, and, therefore, a few P/Ns are missing.

Figure 3 presents aircraft having accumulators with a two year average MTBM of less than 2000 operating hours. This figure of 2000 operating hours was arbitrarily chosen. It was felt that by looking only at accumulators with low MTBMs the best test-bed aircraft would be identified. Also, the PRAM sponsor felt that it would be best to flight test the new low maintenance accumulator in place of an accumulator that had a proven history of a low MTBM. In this way, a successful flight test might be followed by a retrofit of that particular fleet of aircraft.

The KC-135/RC-135 series of aircraft have the largest number of accumulators with the lowest MTBMs, as is shown in Figure 3. The other important fact concerning these KC-135/RC-135 accumulators is that they match the 100 cubic inch size of the newly designed low maintenance accumulator.

MTBM VS. AIRCRAFT ACCUMULATORS (2000 HRS AND BELOW ONLY)

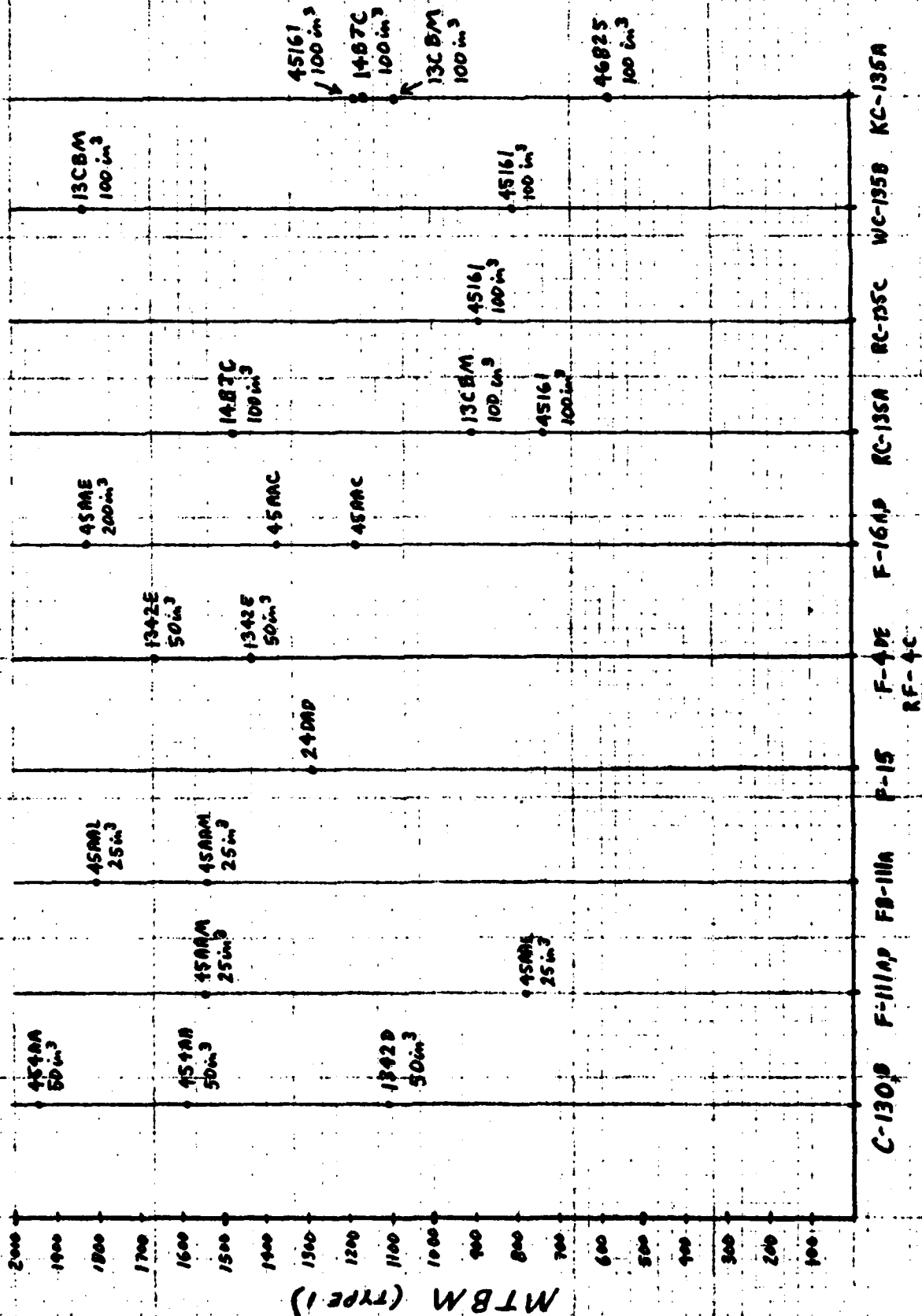


Figure 3 - MTBM VS. Aircraft Accumulators

SECTION IV

CONCLUSION

The goal of this report is to investigate the accumulators found on most USAF aircraft, to record their maintenance history and physical characteristics, and to identify accumulators with low MTBFs that had physical characteristics similar to the newly designed low maintenance accumulator. This goal was accomplished. The major compilation of data presented in this report is found in Appendix A.

Conclusions are:

(1) The KC/RC-135 series aircraft have the most accumulators with the lowest MTBM values, and are physically similar to the newly designed low maintenance accumulator.

(2) Accumulators have a very broad range of MTBM values; ranging from lows of 570 and 778 MTBM on the KC-135A and F-111B aircraft, respectively to highs of 23,664 and 105,053 MTBM on the A-7 and C-5A aircraft respectively.

SECTION VI

RECOMMENDATIONS

Recommend that the boom system accumulator (WUC 46825) on the KC-135 series aircraft be given serious consideration as the flight test installation for the new low maintenance accumulator. The accumulators on these aircraft have the worst maintenance history, and their sizes are compatible with the new design. There are approximately 640 KC-135A aircraft, 20 WC-135A aircraft and 25 RC-135 aircraft. With this number of accumulators in service, there might well prove to be a possible retrofit candidate if the testing demonstrates a sizable reduction in maintenance costs.

Recommend that the low maintenance accumulator test program include an investigation as to why some accumulators have such high MTBMs. Many are over 10,000 aircraft operating hours.

Lastly, recommend this report be provided to hydraulic engineers and designers throughout industry and the government as it represents the only effort to analyze and compare historical data on hydraulic accumulator operating experience.

APPENDIX A
COMPILATION OF
ACCUMULATOR MTBM HISTORICAL DATA

Published By:

PRAM
ASD/RA
Wright-Patterson AFB, OH 45433
AV 785-6632

RC-135 (A,C)
KC-135 A
WC-135 B

ACCUMULATOR DATA FOR

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³		LENGTH in.	DIA. in.	MTBM TYPE 1
			MAX	MIN			
13CBM	Reserve Brake	S 513-100 (89307) MS 28700-4 1008700-4 (77068) 1356-542903 (92003)	108	92	20 3/8 20 3/8	3 3/16	RC-135A; - 908 RC-135C; - 2,620 KC-135A; - 1,092 WC-135B; - 1,831
14BJC	Rudder	S 513-100 (89307) MS 28700-4 1008700-4 (77068) 1356-542903 (92003)	108	92	20 3/8 20 3/8	3 3/16	RC-135A; - 1,476 RC-135C; - 3,556 KC-135A; - 1,153 WC-135B; - 2,508
45161	Hyd System	MS 28700-4 S 513-100 (89307) MS 28700-2,3 S 513-50 (89307) 1356-512465 (92003)	108	92 46	20 3/8 20 3/8 20 3/8 12 1/2	3 3/16 2 1/2	RC-135A; 738 RC-135C; 889 KC-135A; 1,166 WC-135B; 806
46825	Air Refueling Sys, Boom	MS 28700-4 S 513-100 (89307) 1356-512471 (92003) 1008700-4 (77068)	108	92	20 3/8 20 3/8	3 3/16	RC-135A; ∞ ? RC-135C; 2,489 KC-135A; 570
69YKE	Cable Cutter	MS 28700-1	27	23	12.5	2.25	RC-135C; 9,958 KC-135A; 2,740
46994	Air Refueling Receiver	MS 28700- 1356-542903 (92003)	27	23	12.5	2.25	RC-135C; 16,586 KC-135A; 5,586
69Y40							RC-135C; 6,224 KC-135B; 5,376

ACCUMULATOR DATA FOR

A-7D

MTBM
Tan 80-Dec 81
TYPE 1

ACCUM. WUCS	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	LENGTH in. in.	DIA. in. in.	MTBM
13CAC	Emergency Landing Gear	215-22102-10 (80378) 3119820-10	154.6	17	4.5	7,227
13EBJ	Brake	1008594-(77068)	25	10.76	2.375	1,994
13ECC	Emergency Brake system	215-22102-9 (80378) 3119820-8	65	11	4.5	4,688
45AAG	PC #1 and RAT	60000-1 (89307) MS 28797-1	26.2 27	12.5 12.5	2.25 2.25	23,664
45BAH	PC #2 and Arrest. Gear	1008594 (77068) 60000-1 (89307) 1356-633498 (92003)	26.2	10.76 12.5	2.37 2.25	3,855
45CAH	PC #3 and Emerg. Flap Actuator System	210-32523-4 (80378) 60000-1 (89307) MS 28797-1	27 26.2 27	12.5 12.5 12.5	2.25 2.25 2.25	2,514

ACCUMULATOR DATA FOR A-10 A

MTBM
(Jan 80-Dec 81)
TYPE 1

ACCUM. WUCS	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	AVG	LENGTH in.	DIA. in.	MTBM
13 DEC	Emergency Brake	MS 287973-3 60001-3 (89307) 1356633402	54 46	50	12.5 12.5	3.187 3.167	5291
13 GBC	Emergency Landing Gear Extension	60001-3 (89307)		50	12.5	3.187	14488
45 ACT	Left Hand HVO Sys Boot Strap	~~1711089003~~ (Res) ~~1618 T 100-12~~ (Res) 2730621 (92003)					8693
45 DET	Right Hand HVO Sys Boot Strap						8451

ACCUMULATOR DATA FOR B-52 (G,H)

MTBM
TYPE 1

LENGTH DIA. in. in.

GAS VOL. in³ MIN AVG

PART NUM. (Vendor Code)

USE/LOCATION

ACCUM.
WUCS

13 EEG	Brakes	MS 28700-3 S 513-50-1 (89307) 1356-542901 (92003)	54	46	50	12.5 12.5	3 3/16	G-6298 H-5588
14 FGG	Rubber Elev	MS 28700-1 1356-552092 (92003) 1356-583321 (92003)	27	23	25	12.5 12.5	2 1/4 2 1/4	G-5868 H-3970
14 F6J								G-129,116
45 CBX	OUTBOARD WING HYD	MS 28700-1 1356-542897 (92003)	27	23	25	12 1/2	2 1/4	G-4611 H-6286
46 GCT	Air Refuel							G-3489 H-4715

C-SA

ACCUMULATOR DATA FOR

MTBM
JAN 80-DEC 81)
TYPE 1

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	LENGTH in. in.	DIA. in. in.	MTBM JAN 80-DEC 81) TYPE 1
11 LCH	Crew Door	MS 28700-5 1356-583318 (92003)	216 184	36 1/8	3 3/16	5,529
13 AGN	MLG Door - Emergency unlock	4H90620-103 (98897)	500	61	5.2	13,702
13 BDS	MLG Door Emergency unlock	MS 28700-5 1356-583318 (92003)	216 184	36 1/8	3 3/16	105,053
13 ECV	MLG Brake	4H90600-109A (98897) 2660396 M1 (92003)	416 365	32.62 32.62	4.75 4.8	3,502
13 FCU	MLG Steering	4H90600-107A (98897) 2660394 M1 (92003)	108 92	17.18 17.18	3.25 3.34	17,509
45 LAH	HYD System #1	4H90620-103 (98897)	500	61	5.2	11,672

C-SA

ACCUMULATOR DATA FOR

MTBM

ACCUM. WUCs

USE/LOCATION

PART NUM. (Vendor Code)

GAS VOL. in³

MAX

MIN

AVG

LENGTH in.

DIA. in.

TYPE I

45LCH	HVU Sys #4	4H90620-103 (98897)				500	61	5-2	13131
45LER	RAT Emergency Sys	4H90600-107H (98897)	108	92	100	1718	3.25		52527

ACCUMULATOR DATA FOR C-141

MTBM
Jan 80-Dec 81)
TYPE 1

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	AVG	LENGTH in.	DIA. in.	MTBM TYPE 1
14 ECK	Elevator Control	1356-593105 (92003) 920108 (93835)	—	5	5.84	1.81	14,295
24 FAE	Aux. Power Plant	1356-593105 (PARKER HANNIFIN) [70911-2-43-3] 1356-583320 (92003) MC8181 (76050)		5	5.84	1.81	18,095
45 CDO	Hydraulic System #3	1356-593105 (PARKER HANNIFIN) 1356-583320 (92003)		5	5.84	1.81	2,888

ACCUMULATOR DATA FOR C-130 (-, B, 4E)

MTBM
DIA. (Jan 80-Dec 81)
TYPE 1

ACCUM. WUCS	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	AVG	LENGTH in.	DIA. in.	MTBM TYPE 1
1342D	Brakes	S 512-50-2 (89307) MS 28700-2 1356-583315 (92003) 8425-101 (14775)	→ 54 46	50	20 3/8 20 3/8	2.25 2 1/4	- 3,202 B-1,112 E-3,731
454AA	Hyd. Utility System	S 512-50-2 (89307) MS 28700-2 1356-583315 (92003) 8421-101 (14775)	→ 54 46	50	20 3/8 20 3/8	2 1/4 2 1/4	- 1,746 B-1,580 E-2,079
454AB	Hyd. Booster System	S 512-50-2 (89307) MS 28700-2 1356-583315 (92003) 8422-001 (14775)	→ 54 46	50	20 3/8 20 3/8	2 1/4 2 1/2	2,836 B-2,427 E-5,096
454AC	Emergency Sys.	S 512-50-2 (89307) MS 28700-2 1356-573079 (92003) 8422-001 (14775)	→ 54 46	50	20 3/8 20 3/8	2 1/4 2 1/4	7,090 B-5,528 E-7,074
454AD	Auxiliary Hyd. Sys.	MS 28700-1 1356-552092 (92003)	27 23 27	25	12 1/2 12 1/2	2 1/4 2 1/4	VERY HIGH B-3,109 E-3,885

ACCUMULATOR DATA FOR C-130B (Drone Retrieval System)

MTBM
 (Jan 80-Dec 81)
 TYPE 1

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN AVG	LENGTH DIA. in. in. in.	MTBM (Jan 80-Dec 81) TYPE 1
178DW	Aerial Rec Supr Winch				1448
17HNM	Aerial Rec Outr Darg				543
17LAS	ATM HYO Recovery				869

F-111(A, D, E, F)

ACCUMULATOR DATA FOR

ACCUM.
NUCS

MTBM
75 n 80-Dec 81)
TYPE 1

LENGTH DIA. in.
in.

GAS VOL. in³
MIN AVG

PART NUM. (Vendor Code)

USE/LOCATION

45AAK	Brake	2660075 M6 (92003)			75	16	3.14	A - 3506 D - 3842 E - 19270 F - 8217
45AAL	DAMPER SERVO	2660075 M4 (92003)			25	11.19	2.18	A - 3068 D - 786 E - 2835 F - 5136
45AAM	HORIZONTAL STAB	2660075 M4 (92003)			25	1617	2.17	A - 1550 D - 1520 E - 2336 F - 3573

ACCUMULATOR DATA FOR F-111(B) A

MTBM
Jan 80-Dec 81
TYPE 1

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³ MAX MIN	AVG	LENGTH in.	DIA. in.	
4SAAK	Brake	2660075 M6 (92003)		75	16	3.14	4907
4SAAL	DAMPER SERVO	2660075 M4 (92003)		25	11.19	2.18	1808
4SAAM	HORIZONTAL STAB	2660075 M4 (92003) SC-300-000		25	11.19	2.18	1544

F-15

ACCUMULATOR DATA FOR

MTBM

DIA. (Jan 80-Dec 81)

TYPE 1

LENGTH in.

AVG

GAS VOL. in³

PART NUM. (Vendor Code)

USE/LOCATION

ACCUM. WUCs

12CBP	Canopy	893904 (Walter Kiddle, 33525) [T.O. 901-2-57-3] 2710028 (Parker Hannifin, 92003) [T.O. 901-2-58-3]			50	20.2	2.08	3705
24DAD	Jet Fuel Starter (THERE ARE TWO) (SAME SIZE)	2710996-2 (Parker Hannifin, 92003) T.O. 901-2-56-3						1,290

ACCUMULATOR DATA FOR F-4 (C, B, & E) & RF-FC

ACCUM. WUCs	USE/LOCATION	PART NUM. (Vendor Code)	GAS VOL. in ³			LENGTH in.	DIA. in.	MTBM	
			MAX	MIN	AVG			TYPE 1	TYPE 1
1342E	Brakes	MS 28797-3 60001-3 (89307) 1356-633402 M1 (92003)	54	46	50	12.5	3.187	C - 2802 D - 1667 E - 1654 RF - 1,432	
4511E *	Hyd. System	No B4 Data to go at PHs						C - ∞ D - 59,459 E - 59,135 RF - 150,986	
4512C *	Hyd. System	"						C - ∞ D - 16,216 E - 14,784 RF - 19,873	
4513D *	Hyd. Activity Sys.	"						C - ∞ D - 178,378 E - 47,308 RF - N/A	
* No B4 Data									

ACCUMULATOR DATA FOR F-16 A, B

ACCUM. WUCS USE/LOCATION PART NUM. (Vendor Code) GAS VOL. in³ LENGTH in. DIA. in. MTBM TYPE 1

45AAC	Flight Control System	8-8421-030-2 (YORK INTL) [70.9HI-263-2] 1356-583324M1 (PARKER HANNIFIN) [70.9HI-2-5-143]					A 1,184 B 1,363
45AAD	Reserve System						A 6,396 B 5,964
45AAE	Brakes and Jet Fuel Starter	2750534M1 (PARKER HANNIFIN) [70.9HI-2-62-2]	200				A 1,827 B 3,976
45AAF	Deceleration Parachute						A Very High B N/A

APPENDIX B
ACCUMULATOR MTBM
HISTORICAL DATA

Published By:

PRAM
ASD/RA
Wright-Patterson AFB, OH 45433 31
AV 785-6632

TWO YEAR AVERAGE MTBM (TYPE 1) FOR KC-135A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: 13 CDM QPA: 1 MTBM FAIL.	WUC: 14 BJC QPA: 2 MTBM FAIL.	WUC: 45/61 QPA: 1 MTBM FAIL.	WUC: 46825 QPA: 1 MTBM FAIL.	WUC: 6946 QPA: 1 MTBM FAIL.
JUL - DEC 81	107,900	972 111	884 248	1023 105	559 193	1346 80
JAN - JUN 81	108,842	1134 96	1022 192	1369 80	660 165	1413 77
JUL - DEC 80	104,858	1059 99	1256 187	1018 103	535 196	— 0
JAN - JUN 80	108,543	1233 88	1518 143	1348 81	540 201	— 0
TOTALS	430,143	394	746	369	752	157
TWO YEAR AVG. MTBMs	1092	4,153	1166	570	2740	

(about 640 aircraft)
as of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR KC-135A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>69 YSO</u> QPA: <u>1</u> MTBM FAIL.	WUC: <u>69 Y40</u> QPA: <u>1</u> MTBM FAIL.	WUC: _____ QPA: _____ MTBM FAIL.	WUC: _____ QPA: _____ MTBM FAIL.	WUC: _____ QPA: _____ MTBM FAIL.
JUL - DEC 81	<u>107,910</u>	_____	<u>1346</u> <u>80</u>	_____	_____	_____
JAN - JUN 81	<u>108,842</u>	_____	_____ <u>0</u>	_____	_____	_____
JUL - DEC 80	<u>104,858</u>	<u>1362</u> <u>77</u>	_____ <u>0</u>	_____	_____	_____
JAN - JUN 80	<u>108,573</u>	_____ <u>0</u>	_____ <u>0</u>	_____	_____	_____
TOTALS	<u>430,143</u>	<u>77</u>	<u>80</u>	_____	_____	_____
TWO YEAR AVG. MTBMs		<u>5,586</u>	<u>5,376</u>	_____	_____	_____

TWO YEAR AVERAGE MTBM (TYPE 1) FOR RC-135A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 CBM</u> QPA: <u>1</u> MTBM	WUC: <u>14 BJC</u> QPA: <u>2</u> MTBM	WUC: <u>45161</u> QPA: <u>1</u> MTBM	WUC: <u>46825</u> QPA: <u>1</u> MTBM	WUC: _____ QPA: _____ MTBM
		RESERVE DPAKE	RUDDER	HYD SYS	AIR REFUEL	FAIL.
JUL - DEC 81	<u>2425</u>	<u>809</u> 3	<u>694</u> 7	<u>0</u>	<u>0</u>	FAIL.
JAN - JUN 81	<u>2862</u>	<u>955</u> 3	<u>5730</u> 1	<u>358</u> 8	<u>0</u>	FAIL.
JUL - DEC 80	<u>3617</u>	<u>1206</u> 3	<u>1448</u> 5	<u>905</u> 4	<u>0</u>	FAIL.
JAN - JUN 80	<u>2902</u>	<u>726</u> 4	<u>1935</u> 3	<u>726</u> 4	<u>0</u>	FAIL.
TOTALS	<u>11,808</u>	<u>13</u>	<u>16</u>	<u>16</u>	<u>0</u>	FAIL.
TWO YEAR AVG. MTBMs		<u>908</u>	<u>1476</u>	<u>738</u>		

(about 20 aircraft, as of Dec 81)

(Page 1 of 2)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR RC-135C ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 CBM</u> QPA: <u>1</u> MTBM	WUC: <u>14 BJC</u> QPA: <u>2</u> MTBM	WUC: <u>45161</u> QPA: <u>1</u> MTBM	WUC: <u>46825</u> QPA: <u>1</u> MTBM	WUC: <u>69YKE</u> QPA: <u>1</u> MTBM
		RESERVE BRAKE	RUDDER	HYD SYS	AIR REFUEL	FAIL.
JUL - DEC 81	<u>7335</u>	<u>1</u> <u>5695</u>	<u>5</u> <u>2847</u>	<u>11</u> <u>670</u>	<u>9</u> <u>814</u>	<u>0</u>
JAN - JUN 81	<u>13,203</u>	<u>9</u> <u>1467</u>	<u>12</u> <u>2201</u>	<u>20</u> <u>660</u>	<u>2</u> <u>6603</u>	<u>0</u>
JUL - DEC 80	<u>14,648</u>	<u>7</u> <u>2096</u>	<u>5</u> <u>5859</u>	<u>14</u> <u>1046</u>	<u>5</u> <u>2930</u>	<u>0</u>
JAN - JUN 80	<u>14,602</u>	<u>2</u> <u>7301</u>	<u>6</u> <u>4867</u>	<u>11</u> <u>1327</u>	<u>4</u> <u>3651</u>	<u>5</u> <u>2716</u>
TOTALS	<u>49,788</u>	<u>19</u>	<u>28</u>	<u>56</u>	<u>20</u>	<u>5</u>
TWO YEAR AVG. MTBMs		<u>2,620</u>	<u>3,556</u>	<u>889</u>	<u>2,189</u>	<u>9,958</u>

(about 25 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR RC-135C ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>69750</u> QPA: <u>1</u> MTBM <u>7343</u>	WUC: <u>69740</u> QPA: <u>1</u> MTBM <u>3672</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>
JUL - DEC 81	<u>7335</u>	<u>1</u> <u>7343</u>	<u>2</u> <u>3672</u>	<u> </u>	<u> </u>	<u> </u>
JAN - JUN 81	<u>13203</u>	<u>0</u>	<u>0</u>	<u> </u>	<u> </u>	<u> </u>
JUL - DEC 80	<u>14648</u>	<u>2</u> <u>8038</u>	<u>2</u> <u>8038</u>	<u> </u>	<u> </u>	<u> </u>
JAN - JUN 80	<u>14602</u>	<u>0</u>	<u>4</u> <u>4074</u>	<u> </u>	<u> </u>	<u> </u>
TOTALS	<u>49788</u>	<u>3</u>	<u>8</u>	<u> </u>	<u> </u>	<u> </u>
TWO YEAR AVG. MTBMs		<u>16,596</u>	<u>6,224</u>	<u> </u>	<u> </u>	<u> </u>

TWO YEAR AVERAGE MTBM (TYPE 1) FOR WC-135B ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 CBM</u> QPA: <u>1</u> MTBM	RESERVE BRAKE	WUC: <u>14 BJC</u> QPA: <u>2</u> MTBM	RAIDER	WUC: <u>45161</u> QPA: <u>1</u> MTBM	HYA SW	WUC: <u> </u> QPA: <u> </u> MTBM	WUC: <u> </u> QPA: <u> </u> MTBM	FAIL.	FAIL.	FAIL.
JUL - DEC 81	<u>5,154</u>	<u>5156</u>	<u>1</u>	<u>2063</u>	<u>4</u>	<u>5156</u>	<u>1</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
JAN - JUN 81	<u>4,601</u>	<u>4603</u>	<u>1</u>	<u>1315</u>	<u>7</u>	<u>767</u>	<u>6</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
37 JUL - DEC 80	<u>5,123</u>	<u>1708</u>	<u>3</u>	<u>3415</u>	<u>3</u>	<u>466</u>	<u>11</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
JAN - JUN 80	<u>5,267</u>	<u>878</u>	<u>6</u>	<u>5267</u>	<u>2</u>	<u>752</u>	<u>7</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTALS	<u>20,145</u>		<u>11</u>		<u>16</u>		<u>25</u>					
TWO YEAR AVG. MTBMs		<u>1,831</u>		<u>2,518</u>		<u>806</u>						

(about 17 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR A-7D ACCUMULATORS

Page 1 of 2

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 CAC</u> QPA: <u>1</u> EMER. L.G. MTBM	WUC: <u>13 EBJ</u> QPA: <u>1</u> EMER. L.G. MTBM	WUC: <u>13 ECC</u> QPA: <u>1</u> EMER. L.G. MTBM	WUC: <u>15 AAG</u> QPA: <u>3</u> PC#1 RAT MTBM	WUC: <u>45 BAH</u> QPA: <u>1</u> PC#2 MTBM
JUL - DEC 81	<u>39,977</u>	<u>9995</u> 4	<u>2104</u> 19	<u>3998</u> 10	<u>19989</u> 6	<u>4997</u> 8
JAN - JUN 81	<u>40,717</u>	<u>4072</u> 10	<u>1697</u> 24	<u>6787</u> 6	<u>12,216</u> 10	<u>2909</u> 14
JUL - DEC 80	<u>46,574</u>	<u>9315</u> 5	<u>1663</u> 28	<u>4657</u> 10	<u>46574</u> 3	<u>3881</u> 12
JAN - JUN 80	<u>46,191</u>	<u>9238</u> 5	<u>2887</u> 16	<u>3299</u> 11	<u>46191</u> 3	<u>4199</u> 11
TOTALS	<u>173,459</u>	<u>24</u>	<u>87</u>	<u>37</u>	<u>22</u>	<u>45</u>
TWO YEAR AVG. MTBM ₀		<u>7,227</u>	<u>1,994</u>	<u>4,681</u>	<u>23,664</u>	<u>3,855</u>

(About 360 aircraft)
as of Dec 81

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45 CAH</u> QPA: <u>1</u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>
JUL - DEC 81	<u>39,977</u>	<u>2665</u> <u>15</u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>
JAN - JUN 81	<u>40,717</u>	<u>2262</u> <u>18</u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>
JUL - DEC 80	<u>46,574</u>	<u>3327</u> <u>14</u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>
JAN - JUN 80	<u>46,191</u>	<u>2100</u> <u>22</u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>	<u> </u> <u> </u>
TOTALS	<u>173,959</u>	<u>69</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TWO YEAR AVG. MTBMs		<u>2,514</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

(about 360 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR A-10 ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 DEC</u> QPA: <u>2</u> MTBM	WUC: <u>13 GBC</u> QPA: <u>1</u> MTBM	WUC: <u>45 ACT</u> QPA: <u>1</u> MTBM	WUC: <u>45 GCT</u> QPA: <u>1</u> MTBM	WUC: _____ QPA: _____ MTBM
JUL - DEC 81	<u>93642</u>	<u>4459</u> 42 <u>4459</u>	<u>15607</u> 6 <u>15607</u>	<u>10405</u> 9 <u>10405</u>	<u>10405</u> 9 <u>10405</u>	_____
JAN - JUN 81	<u>81533</u>	<u>4530</u> 36 <u>4530</u>	<u>9060</u> 9 <u>9060</u>	<u>8154</u> 10 <u>8154</u>	<u>5824</u> 14 <u>5824</u>	_____
JUL - DEC 80	<u>70555</u>	<u>8819</u> 16 <u>8819</u>	<u>23518</u> 3 <u>23518</u>	<u>23518</u> 3 <u>23518</u>	<u>10079</u> 7 <u>10079</u>	_____
JAN - JUN 80	<u>58514</u>	<u>5573</u> 21 <u>5573</u>	<u>19505</u> 3 <u>19505</u>	<u>4501</u> 13 <u>4501</u>	<u>9752</u> 6 <u>9752</u>	_____
TOTALS	<u>304244</u>	<u>115</u>	<u>21</u>	<u>35</u>	<u>36</u>	_____
TWO YEAR AVG. MTBMs		<u>5291</u>	<u>14488</u>	<u>8693</u>	<u>8451</u>	_____

(About 500 ACFT
As of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR B-52 G ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13EEG</u> QPA: <u>4</u> MTBM FAIL.	WUC: <u>14FGG</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>14F6J</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>45CBX</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>46GCJ</u> QPA: <u>1</u> MTBM FAIL.
JUL - DEC 81	<u>32,275</u>	<u>6456</u> <u>20</u>	<u>8070</u> <u>8</u>	<u>—</u> <u>0</u>	<u>5869</u> <u>11</u>	<u>6456</u> <u>5</u>
JAN - JUN 81	<u>32,844</u>	<u>18770</u> <u>7</u>	<u>4380</u> <u>15</u>	<u>—</u> <u>0</u>	<u>4492</u> <u>15</u>	<u>1825</u> <u>18</u>
JUL - DEC 80	<u>31,724</u>	<u>7050</u> <u>18</u>	<u>9064</u> <u>7</u>	<u>63448</u> <u>1</u>	<u>3966</u> <u>16</u>	<u>5287</u> <u>6</u>
JAN - JUN 80	<u>32,273</u>	<u>3485</u> <u>37</u>	<u>4605</u> <u>14</u>	<u>—</u> <u>—</u>	<u>4605</u> <u>14</u>	<u>4030</u> <u>8</u>
TOTALS	<u>129,116</u>	<u>82</u>	<u>44</u>	<u>1</u>	<u>56</u>	<u>37</u>
TWO YEAR AVG. MTBMs		<u>6,298</u>	<u>5868</u>	<u>129,116</u>	<u>4,611</u>	<u>3489</u>

(about 170 aircraft)
as of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR B-52H ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13 EEC</u> QPA: <u>4</u> MTBM FAIL.	WUC: <u>14 FGG</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>45 CBX</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>46 GCT</u> QPA: <u>1</u> MTBM FAIL.	WUC: _____ QPA: _____ MTBM FAIL.
JUL - DEC 81	<u>19,235</u>	<u>12,825</u> <u>6</u>	<u>6,413</u> <u>6</u>	<u>12,825</u> <u>3</u>	<u>3,206</u> <u>6</u>	_____
JAN - JUN 81	<u>19,628</u>	<u>3,739</u> <u>21</u>	<u>5,609</u> <u>7</u>	<u>4,908</u> <u>8</u>	<u>9,816</u> <u>2</u>	_____
JUL - DEC 80	<u>18,264</u>	<u>6,641</u> <u>11</u>	<u>6,088</u> <u>6</u>	<u>7,306</u> <u>5</u>	<u>3,653</u> <u>5</u>	_____
JAN - JUN 80	<u>18,316</u>	<u>4,579</u> <u>16</u>	<u>19,28</u> <u>19</u>	<u>4,579</u> <u>8</u>	<u>6,105</u> <u>3</u>	_____
TOTALS	<u>75,443</u>	<u>54</u>	<u>38</u>	<u>24</u>	<u>16</u>	_____
TWO YEAR AVG. MTBMs		<u>5,588</u>	<u>3,970</u>	<u>6,286</u>	<u>4,715</u>	_____

(about 94 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-5A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>11 LCH</u> QPA: <u>1</u> MTBM	WUC: <u>13 AQN</u> QPA: <u>3</u> MTBM	WUC: <u>13 BPS</u> QPA: <u>1</u> MTBM	WUC: <u>13 ECV</u> QPA: <u>1</u> MTBM	WUC: <u>13 FCH</u> QPA: <u>1</u> MTBM
JUL - DEC 81	<u>29,165</u>	<u>7292</u> 4	<u>12,500</u> 7	<u>29167</u> 1	<u>3241</u> 9	<u>14584</u> 2
JAN - JUN 81	<u>24,306</u>	<u>3473</u> 7	<u>10,413</u> 7	<u>6077</u> 0	<u>12154</u> 4	<u>12154</u> 2
JUL - DEC 80	<u>26,480</u>	<u>4413</u> 6	<u>8367</u> 9	<u>8827</u> 3	<u>1794</u> 14	<u>12551</u> 2
JAN - JUN 80	<u>25,102</u>	<u>12551</u> 2	<u>8367</u> 9	<u>8827</u> 3	<u>1794</u> 14	<u>12551</u> 2
TOTALS	<u>105,053</u>	<u>19</u>	<u>23</u>	<u>1</u>	<u>30</u>	<u>6</u>
TWO YEAR AVG. MTBMs		<u>5,529</u>	<u>13,702</u>	<u>105,053</u>	<u>3502</u>	<u>17,899</u>

(about 76 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-5A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45 LAH</u> QPA: <u>1</u> <u>HYD SYS</u> MTBM <u>NO 1</u> <u>FAIL.</u>	WUC: <u>45 LCH</u> QPA: <u>1</u> <u>HYD SYS</u> MTBM <u>NO 1</u> <u>FAIL.</u>	WUC: <u>45 LER</u> QPA: <u>1</u> <u>RMT</u> MTBM <u>EMER</u> <u>SYS</u> <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u> <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u> <u>FAIL.</u>
JUL - DEC 81	<u>29,165</u>	<u>29167</u> <u>1</u>	<u> </u> <u>0</u>	<u> </u> <u>0</u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>
JAN - JUN 81	<u>24,306</u>	<u>4862</u> <u>5</u>	<u>24306</u> <u>1</u>	<u>24308</u> <u>1</u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>
JUL - DEC 80	<u>26,980</u>	<u> </u> <u>0</u>	<u>13240</u> <u>2</u>	<u> </u> <u>0</u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>
JAN - JUN 80	<u>25,102</u>	<u>8367</u> <u>3</u>	<u>5020</u> <u>5</u>	<u>25102</u> <u>1</u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>
TOTALS	<u>105,053</u>	<u>9</u>	<u>8</u>	<u>2</u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>
TWO YEAR AVG. MTBMs	<u>11,672</u>	<u>13,131</u>	<u>52,527</u>	<u> </u>	<u> </u> <u> </u> <u> </u>	<u> </u> <u> </u> <u> </u>

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-141 ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>14ECK</u> QPA: <u>1</u> Elevator C-141	WUC: <u>24FAE</u> QPA: <u>1</u> Aux Power Plant	WUC: <u>45CDD</u> QPA: <u>1</u> HVO Sys A-3	WUC: _____ QPA: _____	WUC: _____ QPA: _____
		MTBM	MTBM	MTBM	MTBM	MTBM
		FAIL.	FAIL.	FAIL.	FAIL.	FAIL.
JUL - DEC 81	<u>146631</u>	<u>9</u>	<u>3</u>	<u>60</u>	_____	_____
JAN - JUN 81	<u>138775</u>	<u>12</u>	<u>5</u>	<u>42</u>	_____	_____
JUL - DEC 80	<u>143653</u>	<u>13</u>	<u>7</u>	<u>48</u>	_____	_____
JAN - JUN 80	<u>142728</u>	<u>6</u>	<u>17</u>	<u>48</u>	_____	_____
TOTALS	<u>571782</u>	<u>40</u>	<u>32</u>	<u>198</u>	_____	_____
TWO YEAR AVG. MTBMs		<u>14295</u>	<u>18095</u>	<u>2888</u>	_____	_____

(About 250 Acft)
As of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-130 ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>13720</u> QPA: <u>2</u> <u>Beak</u> MTBM FAIL.	WUC: <u>454 AA</u> QPA: <u>1</u> <u>Utility</u> MTBM FAIL.	WUC: <u>457 AB</u> QPA: <u>1</u> <u>Booster</u> MTBM FAIL.	WUC: <u>454 AC</u> QPA: <u>1</u> <u>Emergency</u> MTBM FAIL.	WUC: <u>457 AD</u> QPA: <u>1</u> <u>Run</u> MTBM FAIL.
JUL - DEC 81	<u>24683</u>	<u>3394</u> <u>14</u>	<u>3333</u> <u>7</u>	<u>3703</u> <u>7</u>	<u>11109</u> <u>2</u>	<u>0</u>
JAN - JUN 81	<u>25698</u>	<u>3534</u> <u>15</u>	<u>1446</u> <u>18</u>	<u>2313</u> <u>11</u>	<u>6939</u> <u>4</u>	<u>2</u>
JUL - DEC 80	<u>24629</u>	<u>2580</u> <u>19</u>	<u>1956</u> <u>13</u>	<u>4156</u> <u>6</u>	<u>4750</u> <u>5</u>	<u>0</u>
JAN - JUN 80	<u>24250</u>	<u>3557</u> <u>14</u>	<u>1819</u> <u>13</u>	<u>2186</u> <u>11</u>	<u>8184</u> <u>3</u>	<u>0</u>
TOTALS	<u>99260</u>	<u>62</u>	<u>51</u>	<u>35</u>	<u>14</u>	<u>—</u>
TWO YEAR AVG. MTBMs	<u>3202</u>	<u>1946</u>	<u>2836</u>	<u>7090</u>	<u>Very High</u>	<u>—</u>

(About 125 ACFT)
as of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-130 B ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342 D</u> QPA: <u>2 Brake</u> MTBM <u>489</u>	WUC: <u>454 AA</u> QPA: <u>1 Utility</u> MTBM <u>1643</u>	WUC: <u>454 AB</u> QPA: <u>1 Booster</u> MTBM <u>2301</u>	WUC: <u>454 AC</u> QPA: <u>1 Emer.</u> MTBM <u>4314</u>	WUC: <u>454 AD</u> QPA: <u>1 Aux</u> MTBM <u>2301</u>
JUL - DEC 81	<u>25563</u>	<u>104</u>	<u>16</u>	<u>11</u>	<u>6</u>	<u>11</u>
JAN - JUN 81	<u>23695</u>	<u>30</u>	<u>19</u>	<u>13</u>	<u>5</u>	<u>6</u>
JUL - DEC 80	<u>24987</u>	<u>17</u>	<u>15</u>	<u>9</u>	<u>5</u>	<u>8</u>
JAN - JUN 80	<u>25264</u>	<u>27</u>	<u>13</u>	<u>8</u>	<u>2</u>	<u>7</u>
TOTALS	<u>99509</u>	<u>178</u>	<u>63</u>	<u>41</u>	<u>18</u>	<u>32</u>
TWO YEAR AVG. MTBMs	<u>1112</u>	<u>1580</u>	<u>2427</u>	<u>5528</u>	<u>3109</u>	

About 110 Acft
As of 31 DEC 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-130 E ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342 D</u> QPA: <u>2</u> <u>Beats</u> MTBM <u>FAIL.</u>	WUC: <u>454 AA</u> QPA: <u>1</u> <u>UTILITY</u> MTBM <u>FAIL.</u>	WUC: <u>454 AB</u> QPA: <u>1</u> <u>Booster</u> MTBM <u>FAIL.</u>	WUC: <u>454 AC</u> QPA: <u>1</u> <u>Emergency</u> MTBM <u>FAIL.</u>	WUC: <u>454 AD</u> QPA: <u>1</u> <u>Run</u> MTBM <u>FAIL.</u>
JUL - DEC 81	<u>111,725</u>	<u>4280</u> <u>55</u>	<u>2352</u> <u>50</u>	<u>5628</u> <u>21</u>	<u>6851</u> <u>17</u>	<u>3940</u> <u>30</u>
JAN - JUN 81	<u>121,234</u>	<u>2447</u> <u>99</u>	<u>1589</u> <u>76</u>	<u>5644</u> <u>22</u>	<u>5845</u> <u>21</u>	<u>4546</u> <u>27</u>
JUL - DEC 80	<u>115,918</u>	<u>4554</u> <u>51</u>	<u>2371</u> <u>49</u>	<u>3912</u> <u>30</u>	<u>7113</u> <u>16</u>	<u>3557</u> <u>33</u>
JAN - JUN 80	<u>120,055</u>	<u>4890</u> <u>49</u>	<u>2282</u> <u>53</u>	<u>6233</u> <u>20</u>	<u>9003</u> <u>13</u>	<u>3769</u> <u>32</u>
TOTALS	<u>473,932</u>	<u>254</u>	<u>228</u>	<u>93</u>	<u>67</u>	<u>122</u>
TWO YEAR AVG. MTBMs		<u>3731</u>	<u>2079</u>	<u>5096</u>	<u>7074</u>	<u>3885</u>

(About 325 ACFT
As of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR C-130B ACCUMULATORS (Dense Retrieval System)

TIME PERIOD	TOTAL OPER HOURS	WUC: 17BOW QPA: <u>1</u> MTBM	WUC: 17HHM QPA: <u>1</u> MTBM	WUC: 17LAB QPA: <u>1</u> MTBM	WUC: <u> </u> QPA: <u> </u> MTBM
JUL - DEC 81	2143	<u>0</u>	1075 <u>2</u>	<u>0</u>	<u> </u>
JAN - JUN 81	2235	1127 <u>2</u>	564 <u>4</u>	282 <u>8</u>	<u> </u>
JUL - DEC 80	2149	537 <u>4</u>	1075 <u>2</u>	1075 <u>2</u>	<u> </u>
JAN - JUN 80	2166	<u>0</u>	271 <u>8</u>	<u>0</u>	<u> </u>
TOTALS	8693	<u>6</u>	<u>16</u>	<u>10</u>	<u> </u>
TWO YEAR AVG. MTBMs		1448	543	869	<u> </u>

(About 9 ACFT)
as of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-111A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45AAK</u>			WUC: <u>45AAL</u>			WUC: <u>45AAM</u>			WUC: _____		
		QPA: <u>2</u>	<u>BRAKE</u>	FAIL.	QPA: <u>2</u>	<u>DAMP</u>	FAIL.	QPA: <u>4</u>	<u>HOLIE</u>	FAIL.	QPA: _____	MTBM	FAIL.
		MTBM			MTBM			MTBM			MTBM		
JUL - DEC 81	<u>9172</u>	<u>9173</u>	<u>2</u>	<u>2</u>	<u>9173</u>	<u>2</u>	<u>2</u>	<u>2158</u>	<u>17</u>	<u>17</u>	_____	_____	_____
JAN - JUN 81	<u>9059</u>	<u>2589</u>	<u>8</u>	<u>8</u>	<u>1510</u>	<u>12</u>	<u>12</u>	<u>755</u>	<u>48</u>	<u>48</u>	_____	_____	_____
JUL - DEC 80	<u>9202</u>	<u>18,404</u>	<u>1</u>	<u>1</u>	<u>4601</u>	<u>4</u>	<u>4</u>	<u>3346</u>	<u>11</u>	<u>11</u>	_____	_____	_____
JAN - JUN 80	<u>9381</u>	<u>1,876</u>	<u>10</u>	<u>10</u>	<u>3127</u>	<u>6</u>	<u>6</u>	<u>1975</u>	<u>19</u>	<u>19</u>	_____	_____	_____
TOTALS	_____	_____	<u>21</u>	_____	_____	<u>24</u>	_____	_____	<u>95</u>	_____	_____	_____	_____
TWO YEAR AVG. MTBMs	_____	<u>3506</u>	_____	_____	<u>3068</u>	_____	_____	<u>1550</u>	_____	_____	_____	_____	_____

(about 85 aircraft
as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-111 D ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>4500K</u> QPA: <u>2</u> <u>DRIVE</u> MTBM <u>FAIL.</u>	WUC: <u>4500L</u> QPA: <u>2</u> <u>MAJOR</u> MTBM <u>FAIL.</u>	WUC: <u>4500M</u> QPA: <u>4</u> <u>MAJOR</u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u>FAIL.</u>
JUL - DEC 81	<u>8558</u>	<u>1903</u> <u>9</u>	<u>451</u> <u>38</u>	<u>951</u> <u>36</u>	<u> </u>	<u> </u>
JAN - JUN 81	<u>9155</u>	<u>6105</u> <u>3</u>	<u>555</u> <u>33</u>	<u>1145</u> <u>32</u>	<u> </u>	<u> </u>
JUL - DEC 80	<u>8092</u>	<u>4046</u> <u>4</u>	<u>1079</u> <u>15</u>	<u>1904</u> <u>17</u>	<u> </u>	<u> </u>
JAN - JUN 80	<u>8775</u>	<u>8775</u> <u>2</u>	<u>8775</u> <u>2</u>	<u>5850</u> <u>6</u>	<u> </u>	<u> </u>
TOTALS	<u>34580</u>	<u>18</u>	<u>88</u>	<u>91</u>	<u> </u>	<u> </u>
TWO YEAR AVG. MTBMs		<u>3842</u>	<u>786</u>	<u>1520</u>	<u> </u>	<u> </u>

(about 82 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTEM (TYPE 1) FOR F-111 E ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45 AAK</u> QPA: <u>2</u> MTEM FAIL.	WUC: <u>45 AAL</u> QPA: <u>2</u> MTEM FAIL.	WUC: <u>45 AAM</u> QPA: <u>4</u> MTEM FAIL.	WUC: _____ QPA: _____ MTEM FAIL.	WUC: _____ QPA: _____ MTEM FAIL.
JUL - DEC 81	<u>10,564</u>	<u>10,567</u> 2	<u>5283</u> 4	<u>4227</u> 10	_____	_____
JAN - JUN 81	<u>9,144</u>	_____ 0	<u>1663</u> 11	<u>1355</u> 27	_____	_____
5 JUL - DEC 80	<u>7,801</u>	<u>19602</u> 1	<u>1634</u> 12	<u>1782</u> 22	_____	_____
JAN - JUN 80	<u>9,132</u>	<u>18264</u> 1	_____ 0	<u>5218</u> 7	_____	_____
TOTALS	<u>38540</u>	<u>4</u>	<u>27</u>	<u>66</u>	_____	_____
TWO YEAR AVG. MTEMs	<u>19270</u>	<u>2855</u>	<u>2,336</u>	_____	_____	_____

(about 70 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-111 F ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	45 AAK				45 AAL				45 AAM				45 AAN			
		WUC:	QPA:	MTBM	FAIL.	WUC:	QPA:	MTBM	FAIL.	WUC:	QPA:	MTBM	FAIL.	WUC:	QPA:	MTBM	FAIL.
JUL - DEC 81	11,419	4,568	2	4,568	5	5,710	2	5,710	4	2,175	4	2,175	20	2,175	4	2,175	20
JAN - JUN 81	11,172	11,175	2	11,175	2	3,725	2	3,725	6	2,980	2	2,980	16	2,980	2	2,980	16
JUL - DEC 80	8,440	16,880	1	16,880	1	8,440	1	8,440	2	11,253	1	11,253	3	11,253	1	11,253	3
JAN - JUN 80	10,053	10,053	2	10,053	2	5,027	2	5,027	4	5,745	2	5,745	7	5,745	2	5,745	7
TOTALS	41,048				10				16				46				46
TWO YEAR AVG. MTBM _g		8,217				5,136				3,573				3,573			

(about 93 aircraft)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-111 (B)A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45 AAK</u>			WUC: <u>45 PAL</u>			WUC: <u>45 AAM</u>			WUC: _____		
		QPA: <u>2</u>	BRAKE	FAIL.	QPA: <u>2</u>	DATA FOR SERVO	FAIL.	QPA: <u>4</u>	INSTR.	FAIL.	QPA: _____	MTBM	FAIL.
JUL - DEC 81	<u>8,222</u>	<u>4,113</u>	<u>4</u>		<u>5,484</u>	<u>3</u>		<u>3,656</u>	<u>9</u>				
JAN - JUN 81	<u>8,714</u>	<u>17,435</u>	<u>1</u>		<u>14,53</u>	<u>12</u>		<u>918</u>	<u>38</u>				
JUL - DEC 80	<u>8,398</u>	<u>2399</u>	<u>7</u>		<u>2399</u>	<u>7</u>		<u>1200</u>	<u>28</u>				
JAN - JUN 80	<u>9,013</u>	<u>9013</u>	<u>2</u>		<u>1127</u>	<u>16</u>		<u>2,575</u>	<u>14</u>				
TOTALS	<u>34,347</u>		<u>14</u>			<u>38</u>			<u>89</u>				
TWO YEAR AVG. MTBMs		<u>4,907</u>			<u>1,808</u>			<u>1,544</u>					

(about 60 aircraft, as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-15 ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>12 C8P</u> QPA: <u>1</u> <u>Acc. Hyd.</u> <u>Campy</u>	WUC: <u>24 DAD</u> QPA: <u>2</u> <u>Acc. Hyd.</u> <u>Jet Fuel</u> <u>stent</u>	WUC: _____ QPA: _____ MTBM _____ FAIL. _____	WUC: _____ QPA: _____ MTBM _____ FAIL. _____	WUC: _____ QPA: _____ MTBM _____ FAIL. _____
JUL - DEC 81	<u>40839</u>	MTBM <u>3403</u> <u>12</u>	MTBM <u>2042</u> <u>40</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____
JAN - JUN 81	<u>43353</u>	MTBM <u>3097</u> <u>14</u>	MTBM <u>1008</u> <u>86</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____
57 JUL - DEC 80	<u>39899</u>	MTBM <u>2347</u> <u>17</u>	MTBM <u>1078</u> <u>74</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____
JAN - JUN 80	<u>43635</u>	MTBM <u>2297</u> <u>19</u>	MTBM <u>1455</u> <u>60</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____
TOTALS	<u>167,726</u>	MTBM <u>62</u>	MTBM <u>260</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____
TWO YEAR AVG. MTBMs		<u>2705</u>	<u>1290</u>	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____	MTBM _____ FAIL. _____

ebond
(380 Aircraft)
(as of DEC 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-4C ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342E</u> QPA: <u>1</u> <u>Beats</u>	WUC: <u>4511E</u> QPA: <u>1</u> <u>Acc Sy</u>	WUC: <u>4512C</u> QPA: <u>1</u> <u>Acc Sy</u>	WUC: <u>4513D</u> QPA: <u>1</u> <u>Utility</u>	WUC: _____ QPA: _____
		MTBM <u>7525</u>	MTBM _____	MTBM _____	MTBM _____	MTBM _____
		FAIL. <u>3</u>	FAIL. <u>0</u>	FAIL. <u>0</u>	FAIL. <u>0</u>	FAIL. _____
JUL - DEC 81	<u>22572</u>					
JAN - JUN 81	<u>23151</u>					
JUL - DEC 80	<u>23058</u>					
JAN - JUN 80	<u>23687</u>					
TOTALS	<u>92468</u>	<u>33</u>	<u>0</u>	<u>0</u>	<u>0</u>	_____
TWO YEAR AVG. MTBMs	<u>2802</u>	<u>7</u>	<u>2</u>	<u>2</u>	<u>2</u>	_____

(About 290 ACFT
as of Dec 81)

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-4D ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342E</u> QPA: <u>1</u> <u>Beams</u> MTBM <u>FAIL.</u>	WUC: <u>4511E</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>FAIL.</u>	WUC: <u>4512C</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>FAIL.</u>	WUC: <u>4513D</u> QPA: <u>1</u> <u>Utility</u> MTBM <u>FAIL.</u>	WUC: _____ QPA: _____ MTBM <u>FAIL.</u>
JUL - DEC 81	<u>42793</u>	<u>2140</u> <u>20</u>	<u>0</u>	<u>0</u>	<u>0</u>	_____
JAN - JUN 81	<u>44389</u>	<u>1233</u> <u>36</u>	<u>0</u>	<u>14797</u> <u>3</u>	<u>44391</u> <u>1</u>	_____
JUL - DEC 80	<u>46013</u>	<u>2556</u> <u>18</u>	<u>0</u>	<u>15338</u> <u>3</u>	<u>0</u>	_____
JAN - JUN 80	<u>45183</u>	<u>1369</u> <u>33</u>	<u>15061</u> <u>3</u>	<u>9037</u> <u>5</u>	<u>0</u>	_____
TOTALS	<u>178328</u>	<u>107</u>	<u>3</u>	<u>11</u>	<u>1</u>	_____
TWO YEAR AVG. MTBMs		<u>1667</u>	<u>59459</u>	<u>16216</u>	<u>178328</u>	_____

(About 430 AIRCRAFT)
as of 31 Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-4E ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342E</u> QPA: <u>1</u> <u>Dep.</u> MTBM <u>2240</u>	WUC: <u>4511E</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>19062</u>	WUC: <u>4522C</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>11437</u>	WUC: <u>4513D</u> QPA: <u>1</u> <u>Utility</u> MTBM <u>27971</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>
JUL - DEC 81	<u>56005</u>	<u>25</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u> </u>
JAN - JUN 81	<u>57185</u>	<u>37</u>	<u>3</u>	<u>5</u>	<u>0</u>	<u> </u>
5 JUL - DEC 80	<u>55941</u>	<u>35</u>	<u>0</u>	<u>3</u>	<u>2</u>	<u> </u>
JAN - JUN 80	<u>67407</u>	<u>46</u>	<u>1</u>	<u>8</u>	<u>3</u>	<u> </u>
TOTALS	<u>236538</u>	<u>143</u>	<u>4</u>	<u>16</u>	<u>5</u>	<u> </u>
TWO YEAR AVG. MTBMs	<u>1654</u>	<u>59135</u>	<u>14784</u>	<u>47308</u>	<u> </u>	<u> </u>

(About 510 ALF)
As of 31 Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR RF-4C ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>1342 E</u> QPA: <u>1</u> <u>BEAR</u> MTBM <u>FAIL.</u>	WUC: <u>4511 E</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>FAIL.</u>	WUC: <u>4512 C</u> QPA: <u>1</u> <u>Acc Sp</u> MTBM <u>FAIL.</u>	WUC: <u>4513 D</u> QPA: <u>1</u> <u>UTION</u> MTBM <u>FAIL.</u>	WUC: _____ QPA: _____ MTBM <u>FAIL.</u>
JUL - DEC 81	<u>41067</u>	<u>1580</u> <u>26</u>	<u>0</u>	<u>0</u>	<u>0</u>	_____
JAN - JUN 81	<u>39972</u>	<u>1428</u> <u>28</u>	<u>0</u>	<u>3</u>	<u>0</u>	_____
5 JUL - DEC 80	<u>38268</u>	<u>1664</u> <u>23</u>	<u>0</u>	<u>2</u>	<u>0</u>	_____
JAN - JUN 80	<u>39679</u>	<u>1167</u> <u>34</u>	<u>39679</u> <u>1</u>	<u>13226</u> <u>3</u>	<u>0</u>	_____
TOTALS	<u>158986</u>	<u>111</u>	<u>1</u>	<u>8</u>	<u>0</u>	_____
TWO YEAR AVG. MTBMs		<u>1432</u>	<u>158986</u>	<u>19873</u>	<u>Very HIGH</u>	_____

(About 330 ACFT)
As of 31 Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-16B ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45AAR</u> QPA: <u>2</u> MTBM <u>1375</u>	WUC: <u>45AAD</u> QPA: <u>2</u> MTBM <u>13754</u>	WUC: <u>45AAE</u> QPA: <u>2</u> MTBM <u>6877</u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>	WUC: <u> </u> QPA: <u> </u> MTBM <u> </u>
JUL - DEC 81	<u>6875</u>	<u>10</u>	<u>1</u>	<u>2</u>	<u> </u>	<u> </u>
JAN - JUN 81	<u>7944</u>	<u>11</u>	<u>1</u>	<u>3</u>	<u> </u>	<u> </u>
JUL - DEC 80	<u>5033</u>	<u>7</u>	<u>4</u>	<u>5</u>	<u> </u>	<u> </u>
JAN - JUN 80	<u>4004</u>	<u>7</u>	<u>2</u>	<u>2</u>	<u> </u>	<u> </u>
TOTALS	<u>23856</u>	<u>35</u>	<u>8</u>	<u>12</u>	<u> </u>	<u> </u>
TWO YEAR AVG. MTBMs		<u>1363</u>	<u>5964</u>	<u>3976</u>	<u> </u>	<u> </u>

(About 60 ACFT)
as of Dec 81

TWO YEAR AVERAGE MTBM (TYPE 1) FOR F-16A ACCUMULATORS

TIME PERIOD	TOTAL OPER HOURS	WUC: <u>45AAC</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>45AAD</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>45AAE</u> QPA: <u>2</u> MTBM FAIL.	WUC: <u>45AAF</u> QPA: <u>1</u> MTBM FAIL.	WUC: QPA: MTBM FAIL.
JUL - DEC 81	<u>23590</u>	<u>1966</u> 24	<u>11795</u> 4	<u>2359</u> 20	<u>0</u>	<u>0</u>
JAN - JUN 81	<u>23009</u>	<u>920</u> 50	<u>7670</u> 6	<u>1354</u> 34	<u>0</u>	<u>0</u>
2 JUL - DEC 80	<u>11122</u>	<u>927</u> 24	<u>5561</u> 4	<u>2224</u> 10	<u>0</u>	<u>0</u>
JAN - JUN 80	<u>6240</u>	<u>1248</u> 10	<u>2080</u> 6	<u>2080</u> 6	<u>0</u>	<u>0</u>
TOTALS	<u>63961</u>	<u>108</u>	<u>20</u>	<u>70</u>	<u>0</u>	<u>0</u>
TWO YEAR AVG. MTBMs		<u>1184</u>	<u>6396</u>	<u>1827</u>	<u>VERY HIGH</u>	<u>0</u>

(About 210 ACFT)
as of Dec 81

APPENDIX C
Q-D056B-B05 AND
B06 SUMMARIES

Published By:

PRAM
ASD/RA
Wright-Patterson AFB, OH 45433
AV 785-6632

PCN: Q-D056B-B06-RX-254

18 NOV 1966

RCS: LOG-LOE(AR)7170
(Report B06)

FOREWORD

TITLE: Maintenance Actions, Man-Hours, and Aborts by Work Unit Code.

SOURCE: AFM 66-1, TO 00-20-2 Series, "On" and "Off" equipment work reported on AFTO Form 349 and AFR 65-110 aircraft utilization data.

FREQUENCY: Monthly (or less frequently at the option of the System Manager Air Logistics Center - reference AFLCR 66-15).

CONTENTS: This report provides "On" and "Off" equipment historical information on the maintenance actions, man-hours, and aborts for the past six months, by month, on every work unit code (WUC) included in the master record. This report also provides a series of summary line entries for each system and subsystem in WUC sequence, and EAD and system summaries at the end of the report. Due to the method of assigning and reporting standard reporting designators (SRD) for registered support equipment, "Off" equipment data cannot be displayed for this equipment. All of the data columns displayed in this report, unless otherwise noted in the column header, relate to and result from "On" equipment maintenance actions.

USE: This report is used as a reference for historical information pertaining to each assigned WUC. It provides the capability to plot trending and performance data in the areas of failures, maintenance actions, manpower resource expenditures, and aborts. Monthly it can be used to monitor problem areas and to verify the effectiveness of modifications. Current and previous years' microfiche reports are available for special studies.

DESCRIPTION:

1. Responsible Air Logistics Management Organization and End Article Identification. In the upper left-hand corner of the report the System Manager-Air Logistics Center (ALC) is printed, along with the equipment type designator and end article designator (EAD). The EAD is structured by equipment type in accordance with AFLCR 66-15, Chapter 2, as follows:

a. For aircraft and related mobile training sets - Modified mission symbol (if assigned), basic mission and type symbol, design number and series (if a master record is established by series) - for example: F015, B052H, F111T, and T038T.

b. For air launched missiles (ALM) or ground launched missiles (GLM) - The launch environment symbol, mission and type symbol, design number and series (if a master record is established by series) - for example: AIM009E, GLM030B.

c. For ground communications-electronic (C-E), except L systems - The installation, equipment and purpose designation; the design number and series (if a master record is established by series) - for example: TPN019V, TRC197.

d. For ground communications L systems (C-E) - The system identifier "L" and the standard reporting designator - for example: 407L8K1.

e. For registered support equipment (SE) - The Federal Supply Class and NIIN designator portion of the registration number - for example: 6115AWA.

f. For support equipment (SE) which is identified by a standard reporting designator - The type model and the series (if a master record is established by series) - for example: GSM231.

g. For trainers and simulators (TRS) - The second and third characters of the standard reporting designator, the first two characters of the end item work unit code and three zeros - for example: RADF000.

h. For ground launched missile (Class 1) trainers (TRS) - The type, model, and series and "T" - for example: LGM030T.

i. For aircraft engines (ENG) - The basic engine type and model and the last two characters of the standard reporting designator of the aircraft in which the engine is installed - for example: TF033BP.

j. For munitions (WEP) - A "W," a blank, the first three characters of the end item work unit code and two zeros - for example: W RSV00.

2. Demand Report Control Number: When the report is produced by demand, this is the control number entered in columns 19-24 of the demand request card. See AFLCR 66-15, Chapter 6, for its purpose and structure.

3. Period Ending: This is the last day of the report month. The month indicates the most current effective period of the data in this report.

4. WUC: This is a listing of work unit codes which qualify for entry in this report as described in "CONTENTS" paragraph.

5. NOUN: This is the noun describing the work unit code.

6. Cat, QPA, ACT LMT or FAIL LMT and USE FACT. These entries, from the B4 Master Record, appear immediately below the WUC and Noun. Following is a description of each entry:

a. Cat Ind: This is a category indicator placed in the B4 Master Record by the system manager to identify the relationship of the WUC to the safety/mission accomplishment of the end article:

<u>Category Indicator</u>	<u>Description</u>
A	Safety of Flight/Operation. This identifies work unit codes, which upon failure or malfunction, would present a safety hazard to the end piece of equipment or operating personnel.
B	Mission Accomplishment. This identifies work unit codes which, upon failure or malfunction, would adversely affect mission accomplishment.
C	General Logistics. This identifies work unit codes, not assigned Category A or B, which will be evaluated from a hi-value, reliability, critical support and normal performance standpoint.

b. QPA - This is the quantity per application of the work unit code to the end piece of equipment.

c. ACT LMT - If this header appears, the entry is Action Limit. This value is a computed or manually assigned value based on accumulated experience, or estimated when an adequate experience base is not available. The criteria for establishing or adjusting this value is prescribed in AFLCR 66-15, Chapter 2, Section B. Action Limit applies only to aircraft, aircraft engines, and the AGM069A. If the work unit code experience reflects a low or erratic failure rate there probably will be no Action Limit assigned and the entry will be NO LMT.

d. **FAIL LMT** - If this header appears, the entry is Failure Limit. This value is manually assigned by the system/item manager ALC and represents an acceptable and expected count of reported failure conditions reported for one month. The criteria for establishing or adjusting this value is prescribed in AFLCR 66-15, Chapter 2, Section B. Failure Limit applies to all equipment not covered by Action Limit (paragraph c above). As in paragraph c above a NO LMT entry denotes a low or erratic failure rate and the equipment manager has not assigned a limit to this item.

7. **USE FACT.** This is Use Factor (K1), the ratio of work unit code item operation to the end item operation.

8. **Month** - This is a listing of the current month and each of the preceding five months on which maintenance actions have been reported, or for which a Mean Time Between Maintenance Type 1 (MTBM-1) has been computed. An asterisk (*) after the month indicates that the Action Limit or Failure Limit has been breached for the month. For equipment where Action Limit applies, this indicator will appear when the MTBM-1 has been calculated at less than the Action Limit. For equipment where Failure Limit applies, this indicator will appear when the failure count for one month equals or exceeds the Failure Limit. When any of the previous five months do not appear in this column, no maintenance actions or man-hours were processed for the WUC during those months.

9. **Inv** - This is the inventory of the End Article or WUC and it is furnished for information only. Inventory is entered under the following criteria:

a. **Computed Inventory** - This is the average possessed inventory - as computed from the Aerospace Vehicle Inventory, Status and Utilization Reporting System (AFR 65-110) - for aircraft, AQM, BQM, CQM, and PQM drones and the AGM069A missile. For aircraft engines, the average possessed inventory for the aircraft is multiplied by the number of engines on the aircraft.

b. **Special Inventory** - A manual special inventory as entered in the B4 Master Record will appear when the inventory of the WUC applies to only a part of the fleet or as stated in paragraph c below. Special inventory for airborne equipment is used to prorate operating time registered for the entire fleet (fleet inventory will be used if the special inventory is greater). Special inventory is identified by an "X" immediately to the right of this column.

c. Inventory for all equipment other than those categories indicated in paragraph 9a above is the inventory manually entered in the B4 Master Record by the equipment manager. The inventory for equipment other than aircraft and engines is used to compute the operating time which appears in the operating time column of this report.

10. Op Time - This column displays the total fleet time that the end article was operated for each month listed, or a computed figure, and a six month total line for each WUC.

a. For aircraft and the AGM069A monthly line entries on all numeric system WUCs, the operating time will be: flying time X inventory ratio.

NOTE: Inventory ratio is B4 special inventory (if a special inventory has been entered) divided by AFR 65-110 inventory.

b. For aircraft engine reports, the monthly line entries will be: aircraft flying time X the number of installed engines X inventory ratio.

c. For ground and air launched missiles, the monthly line entries will be: AFR 65-110 inventory (if available) X 30 days X inventory ratio; or B4 inventory X 30 days (if AFR 65-110 inventory is not available).

d. For all other equipment plus alpha system WUCs in missile master records, the monthly line entries will be: B4 inventory X 30 days.

e. For the six months total line entries, the operating time will conform to the following criteria:

(1) When six months of maintenance data is displayed for a WUC, the six month line entry is a total of the six months operating time.

(2) When less than six months of maintenance data is displayed for a WUC, but the WUC has reported actions which pre-date the current six month period, the six month line entry is a total of the six months operating time.

(3) When less than six months of maintenance data is available for the WUC, the six month line entry is the total operating time from the first month that the work unit code was added to the B4 Master Record.

11. Abo - This is the number of aborts (mission failures) reported for the work unit code for the months indicated. On equipment maintenance actions with a when discovered code/ equipment type combinations are counted as aborts. (Records with zero units and those with invalid or no defect low malfunction codes are excluded.)

a. For ACF, ALM and ENG (Aircraft/Mobile Training Sets, Air Launched Missiles and Aircraft Engines). When Discovered Codes "A" or "C" in combination with Action Taken Codes "F, G, K, L, P, R, or Z."

b. For GLM (Ground Launched Missiles). When Discovered Codes "A, C, H, or P" in combination with Action Taken Codes "F, G, K, L, P, R, or Z."

c. For SE, TRS, and C-E (Support Equipment, Trainers, Simulators, Missile Class 1 Trainers, Ground Communications-Electronic Equipment and L Systems). When Discovered Code "C" in combination with Action Taken Codes "F, G, K, L, P, R, or Z."

d. For WEP (Munitions). When Discovered Code "C" in combination with Action Taken Codes "F, G, K, L, P, R, or Z."

12. Maint Actions - This is the number of maintenance actions reported for the current month and each of the preceding five months against the listed work unit code. The accumulation is based on a count of units completed on maintenance actions with selected how mal and action taken combinations. These actions are determined and listed as follows:

a. Type-1 - This column displays failures. The computer definition of a failure at the two, three, and five position work unit code level is:

(1) Any Type 1 how malfunction code in combination with an action taken code of F, K, L, or Z.

(2) Any Type 1 how malfunction code in combination with an action taken code of P or R provided the removed item was not found serviceable ("B" action taken code) at the bench check station.

b. Type-2 - This column displays other malfunction actions which are defined as:

Type 2 how malfunction code and all action taken codes listed in paragraph 11b above.

c. Total - These are the total maintenance actions (units) reported under all valid how malfunction codes (Types 1, 2, and 6) and all action taken codes listed in paragraph 11b above, plus E, H, J, S, V, and X.

13. MTBM - This is the Mean Time Between Maintenance Type 1 or Mean Time Between Maintenance Total as indicated by the following two subheadings:

a. Type 1 - The Mean Time Between Maintenance Type 1 (MTBM-1) is computed each month for each work unit code unless no failures have been reported for any three consecutive months within time span covered by this report. For each monthly MTBM-1 computation, a three month accumulation of failures and operating time (flying hours or days) is used, i.e., current and previous two months. Following is the formula:

$$\text{MTBM-1} = \frac{\text{Operating Time} \times \text{Use Factor} \times \text{QPA}}{\text{Quantity of Failures}} \times \text{Inventory Ratio}$$

Where:

- | | |
|----------------------|--|
| Operating Time | = A three month (current and previous two months) accumulation of flying hours. Adjusted by inventory ratio, or inventory X days, as applicable. (See paragraph 10.) |
| Use Factor | = Ratio of item operating time to flying hours. (Normally 1.00) |
| QPA | = Number of identical items reportable under one work unit code. |
| Quantity of Failures | = A three month (current and previous two months) accumulation of failures. |
| Inventory Ratio | = B4 special inventory divided by AFR 65-110 inventory. |

b. Total - The Mean Time Between Maintenance total is computed each month for each work unit code using the same formula and criteria as for MTBM-1 with one exception, i.e., quantity of total maintenance actions is substituted for quantity of failures. See paragraph 12c.

14. Man-hours - This is the number of man-hours (whole labor hours) reported on the work unit code for the months listed. These man-hours are listed as follows:

a. Sched - These are the man-hours spent as schedule maintenance and reported by the following Type Maintenance Codes as listed in AFM 300-4, ADE MA-358.

(1) For aircraft (including installed engines), drones, and related mobile training sets and resident training equipment: "A, C, D, E, H, J, M, P, Q, R, T."

(2) For engine shop work: "A, C, D, H, K, Q, T."

(3) For Air Launched Missiles, related Support and Training Equipment: "A, C, D, E, J, P, R, T."

(4) For Ground Launched Missiles, related Support, Communications-Electronic and Training Equipment: "A, D, F, J, P, R, T."

(5) For Common Support Equipment: "A, D, J, P, Q, R, T."

(6) For Class 1 Trainers: "A, D, J, P, R, T."

(7) For Ground Communications-Electronic Equipment: "A, F, J, P, R, T."

(8) For Munitions: "A, J, R, T."

b. Unsch - These are the man-hours spent as unscheduled maintenance and reported by the following Type Maintenance Codes as listed in AFM 300-4, ADE MA-358. For all of the categories of equipment listed in paragraph 14a above, the following codes, as they apply, are considered to be unscheduled maintenance: "B, E, H, L, S, W, Y."

*NOTE - These codes can be scheduled maintenance - see preceding paragraphs (1), (2), and (3) for description by equipment type.

c. Shop - These are the man-hours expended by shop maintenance personnel in checking/repairing items removed from the end article which are charged to this Work Unit Code. These are "Off" equipment man-hours and include Programmed Depot Maintenance (PDM) but exclude depot component overhaul.

15. Shop Action Units - This is a unit count of "Off" equipment actions reported on the Work Unit Code. The following three categories of shop actions are identified:

a. Repr - This column is a unit count of "Off" equipment actions which have been assigned Action Taken Codes A, F, G, K, L, V, or Z.

b. Condm - This column is a unit count of "Off" equipment actions which have been assigned Action Taken Code 9.

c. NRTS - This column is a unit count of "Off" equipment actions which have been assigned Action Taken Codes 1 through 8.

NOTE: The above columns include Programmed Depot Maintenance (PDM) but exclude depot component overhaul.

16. Totals - Below the month entries for each WUC, totals are listed for each of headings (paragraphs 9-14). The mean time calculations are based on six month totals of units and operating time.

17. Subsystem Summary - After all WUCs for a subsystem are listed, data is summarized for the subsystem (the first three characters of the work unit code suffixed with "XX") for the current month, each of the preceding five months, and a subsystem total. This summary is not produced if only one WUC is reported for the system.

18. System Summary - After all WUCs and subsystems for a system are listed, data is summarized for the system (the first two characters of the work unit code suffixed with "XXX"), in the same format as the subsystem summary above.

19. EAD Summary - After the last system summary for each EAD, a new page will start with an EAD Summary. It summarizes all data included in system and subsystem summaries. Computations using B4 data fields will substitute 001 for QPA and 01.00 for Use Factor. Operating time will be "fleet," or will be computed from the first B4 inventory, as applicable.

20. System Summary - System summaries will be repeated in this section for easy reference.

21. The End Article Designator (EAD) in the upper left-hand corner of each page of this report may represent a single item of equipment or a group of similar end items, as determined by the System Manager ALC. For aircraft and missiles, all Mission Design Series (MDS) for which data may appear in the report are listed under heading - "Data for the Following Weapon Systems can be in this report:," at the end of the report.

COMMENTS: All comments regarding the contents, use, and distribution of this report should be submitted through command channels to HQ AFLC/LOEP, Wright-Patterson AFB, Ohio 45433.

ALC: DPALC TYP EGPI ACF EAC: C007A WUC: 12213

WUC	MOUN	MONTH	INV	TYPE	CP	PAINT ACTION		ITEM		PANHOUSES		SHOP		ACTION UNITS	
						FAIL	OTH/MAL	TOT	TYPE-1	TOTAL	SCHED	UNSCH	REPR	COND	NRYS
12313 SAFETY BELT CAT CPA ACT LMT USE FACT C 32 1.00		SEP	35	091					13052	12052					
		JUL	30	012					12061	12061					
		JUN	30	017				6	12092	12092					1
		MAY	30	717				6	27420	27420					1
		TOTALS		5120											
12314 ATTACHMENT PAIL CAT CPA ACT LMT USE FACT C 4 1.00		SEP	35	091				2		0460	3				
		AUG	29	915						5351					
		JUL	30	012						9709					
		JUN	30	017						5642					
		TOTALS		5120						6055					
12315 TPOCF SEATS CAT CPA ACT LMT USE FACT C 16 1.00		SEP	35	091				3	0735	1506	6				
		AUG	29	915				9	21403	1061	12				
		JUL	30	012				12	3012	1450	7				
		JUN	30	017				1	2143	1929					4
		TOTALS		5120						1504					12
12316 FLUCLAGE COMP GFR CAT CPA ACT LMT USE FACT C 1 1.00		SEP	35	091				4	0735	1506	6				
		AUG	29	915				9	21403	1061	12				
		JUL	30	012				12	3012	1450	7				
		JUN	30	017				1	2143	1929					4
		TOTALS		5120						1504					12
12317 LANCING GEAR CAT CPA ACT LMT USE FACT C 3 1.00		SEP	35	091				4	0735	1506	6				
		AUG	29	915				9	21403	1061	12				
		JUL	30	012				12	3012	1450	7				
		JUN	30	017				1	2143	1929					4
		TOTALS		5120						1504					12
12318 SLURSYSTEM SUMMARY CAT CPA ACT LMT USE FACT C 1 1.00		SEP	35	091				4	0735	1506	6				
		AUG	29	915				9	21403	1061	12				
		JUL	30	012				12	3012	1450	7				
		JUN	30	017				1	2143	1929					4
		TOTALS		5120						1504					12
12319 MATA GFAP ASSY CAT CPA ACT LMT USE FACT C 2 1.00		SEP	35	091				4	0735	1506	6				
		AUG	29	915				9	21403	1061	12				
		JUL	30	012				12	3012	1450	7				
		JUN	30	017				1	2143	1929					4
		TOTALS		5120						1504					12

PCN: Q-D056B-B05-RX-217 (Microfiche - Monthly)
Q-D056B-B05-WK-M17 (Paper - Weekly, AR)

18 NOV 1981

RCS: LOG-LOE(AR)7169
(Report B05)

FOREWORD

TITLE: Summarized Maintenance Actions for Selected Work Unit Codes.

SOURCE: TO 00-20-2 Series, "ON" and OFF" Equipment Work Reported on AFTO Form 349.

IDENTIFICATION: Consists of responsible ALC for logistics management, report control number (demand only), type equipment, End Article Designator (EAD), and Work Unit Code (WUC). Listed at the end of this report is the various mission, design, and series (MDS) of weapon systems included in this report.

FREQUENCY:

a. Monthly (or less frequently at the option of the System Manager of the Air Logistic Center (Ref AFLCR 66-15). This report is produced when one of the following conditions exist.

(1) When the number of failures equals or exceeds the established failure limit for a work unit code for the current month. Failure limit applies to all categories of equipment except aircraft, aircraft engines and the AGM069A.

(2) When the Mean Time Between Maintenance - Type 1 (MTBM-1) computation is less than the action limit (AL) established for two consecutive months. The monthly MTBM-1 computation is based on the current and two previous months accumulation of MTBM-1 actions divided into the corresponding three months operating time. Action limit applies only to WUCs for aircraft, aircraft engines, and numeric WUCs for the AGM069A.

b. On Demand (Special Request). This report can be produced when requested for an entire EAD, system (2 digit WUC), subsystem (3 digit WUC), or WUC (5 digit WUC). Reference AFLCR 66-15, Chapter 6, Section B for demand format.

c. Emergency Demand Request. This report can be produced within 24 hours to support accident/incident investigations.

CONTENTS: This report provides six months of summarized detail information on work unit codes which do not perform to the preset standards described above. When this report is produced as a result of a demand request, it will provide from one to twelve months of data at the option of the requester. Support General Data (units and man-hours) is reported by demand only. The three parts of the report are produced for each work unit code. Part I - "ON" equipment actions, Part II - Shop actions (except for SE), and Part III - Parts replaced (except for SE).

USE: This report is used to conduct detail analysis for special studies on work unit codes to:

- a. Determine the reasons for substandard performance and monitor problem areas.
- b. Assess the impact of changes to inspection requirements.
- c. Determine whether or not the maintenance actions are distributed evenly across the inventory or if they are concentrated at specific locations.
- d. Verify modifications effectiveness.
- e. Identify reasons for items causing a high rate of unscheduled maintenance.

f. *To facilitate the maintenance*
DESCRIPTION:

a. Part I. "ON" Equipment Actions.

(1) How Malfunction - Code, Noun and Type. This column displays the numeric how malfunction codes, and the nouns describing the codes, reported against the work unit code. Type how malfunction codes (1, 2, and 6) are described in AFLCR 66-15, Chapter 5, Section B.

(2) Curr MO Unit Count.

(a) Fail. This column displays the number of failures accumulated during the current month for each how malfunction code appearing in the report. (See failure definition in paragraph a(3)(a) below.)

(b) Oth Mal. This column displays the numbers of other malfunctions accumulated during the current month for each how malfunction code appearing in the report. (See Oth Mal definition in paragraph a(3)(b) below.)

(3) Six Month Unit Count. The following columns display the number of units completed accumulated for the most recent six month period when the report is produced as a result of performance not meeting the action limit or failure limit criteria. These columns will contain one to twelve months of data for demand requests, depending on the period of data requested. Column headings will reflect the requested number of months.

(a) Fail. This column displays the number of failures (units) for the WUC. The computer definition describing a failure at the five position work unit code level is:

1. Any Type 1 how malfunction code in combination with an action taken code of F, K, L, or Z.

2. Any Type 1 how malfunction code in combination with an action taken code of P or R, provided the removed item was not found serviceable ("B" action taken code) at the bench check station.

(b) Oth Mal. This column displays other malfunctions (units) which are defined as any Type 2 how mal code with action taken codes F, G, K, L, P, R, or Z or any Type 1 how mal code with action taken code "G."

(c) Six Month Unit Count by Action Taken. The following individual columns display the number of units completed accumulated for each action taken code (or group of action taken codes) listed in the column heading. Six months of data will be in these columns when the report is produced as a result of performance not meeting the action limit or failure limit criteria. For demand request, these columns will contain one to twelve months of data depending on the period of data requested.

(4) Six Month Units. This column displays the number of units accumulated for each how malfunction code listed for the most recent six month period when the report is produced as a result of performance not meeting the action limit or failure limit criteria. Demand requests will contain one to twelve months of data, depending on the period of data requested. Column heading will reflect the number of months.

(5) Six Month M/HRS. This column displays the number of man-hours accumulated for each how malfunction code listed for the most recent six month period when the report is produced as a result of performance not meeting the action limit or failure limit criteria. For demand request, refer to paragraph (4) above.

(6) Total. A total line is entered for each type how malfunction. This is indicated by a single asterisk (*).

(7) WUC Total. The WUC total line is the sum of total lines, described in paragraph (6) above.

(8) Six Month Units & Man-hours for Other Actions. This line print will appear as the last entry in this section of Part I. This entry displays six months units and man-hours on action taken codes other than those listed in paragraph (c) above, plus any unidentified action codes which have been reported. Action taken codes "Q," "T," "U," "Y," and INVL will appear on this entry. For demand request, refer to paragraph (4) above.

(9) The second section of Part I displays the same data as the first section except that the data is in command/base sequence instead of by how malfunction code.

b. Part II. Shop Actions. The heading for this part of the report is the same as Part I. The data within this part, however, is grouped by Federal Supply Class (FSC) and Part Number (P/N) of the item being repaired; along with the National Item Identification Number (NIIN), Materiel Management Code (MMC) if the part number can be successfully matched using the reported FSC/PN and the "OFF" equipment master record. In instances where reported FSC/PN combinations cannot be matched to a NIIN, the part numbers and associated data are grouped and displayed as the last entry in this part. Part II is a two-section display of data for each part number processed as a shop maintenance action and reported against the work unit code indicated. The first section displays data in how malfunction code sequence and the second section in base sequence, with a spread of action taken code groupings across the page of the report. The following headings apply:

(1) How Malfunction, Code, and Noun. (Reference AFM 300-4, Volume I).

(2) Repair, AFG. These columns display the number of units and man-hours reported against the how malfunction code using action taken codes "A," "F," and "G."

(3) Adjust, KL. These columns display the number of units and man-hours reported against the how malfunction code using action taken codes "K" and "L."

(4) CLN/TEST/CRSN, VXZ. These columns display the number of units and man-hours reported against the how malfunction code using action taken codes "V," "X," and "Z."

(5) SRVCBLE, BJ. These columns display the number of units and man-hours reported against the how malfunction code using action taken codes "B" and "J."

(6) NRTS & Condemned. These columns display the number of units processed through field maintenance repair shops, but not returned to a serviceable condition at base level. Also, a composite entry of man-hours to process these items is displayed.

(a) NRTS 1 - Repair not authorized.

(b) NRTS 2-6 - Item not repaired due to lack of equipment, tools, facilities, skills, parts, shop backlog or technical data.

(c) NRTS 7-8 - Item not repaired, excess to base requirements or directed return to depot.

(d) NRTS 9 - Item is condemned.

(7) Total. These columns display the total number of units and man-hours (paragraph b(1) through b(6)) reported against the how malfunction code.

(8) Delayed, CDMN. These columns display the number of units and man-hours reported against the how malfunction code using action taken codes "C," "D," "M," and "N."

(9) The same spread of data for the part number (described in paragraph b(2) through b(8) above) is displayed in base sequence.

(10) WUC Total. At the end of Part II for each WUC, the totals of columns of paragraph b(2) through b(6) for all part numbers are displayed.

c. Part III, Parts Replaced. The heading for this part of the report is the same as Part I. This part contains data identifying the actual parts replaced during repair. These parts replaced relate to the part numbered items repaired and identified in Part II for the work unit code indicated. Data is displayed by FSC/Part Number as follows:

(1) FSC, Part Number. These columns identify the parts replaced.

(2) How Malfunction, Code and Noun(s). These columns describe the reasons for the parts replacement.

(3) Ref Sym Noun. This column displays the reference symbol used on communication, armament, and electronics equipment. The symbol indicates the position within a circuit in which the replaced part was installed. For other parts replaced, a noun describing the part is listed. The entry is obtained from Block 29d of the AFTO Form 349.

(4) Base. This column contains the name of the base reporting the how malfunction and replacement action.

(5) Quantity, Curr and Five. These columns display the number of units (parts replaced) for the current month and the previous five months when the report is produced as a result of performance not meeting the action limit or failure limit criteria. For demand requests, the previous months column will contain one to eleven months of data depending on the number of months requested.

(6) Total. When more than one line is printed for a part number, a part number total line is printed.

(7) WUC Total. Where more than one line is printed in Part III, a WUC total line is printed.

d. The End Article Designator (EAD) in the upper left-hand corner of each page of this report may represent a single item of equipment or a group of similar end items, as determined by the ALC System Manager. For aircraft and missiles, all Mission Design Series (MDS) for which data may appear in the report are listed under the heading - "Data for the Following Weapon Systems may be in this report:."

COMMENTS: All comments regarding the contents, use, and distribution of this report should be submitted through command channels to HQ AFLC/LOEP, Wright-Patterson AFB, Ohio 45433.

SUMMARY OF MAINTENANCE ACTIONS FOR SELECTED WORK UNIT CODES
 ALG:CALC FCN: TYP ECF: ACF EAD: C122 PUC: 72117 PERIOD ENDING RISEF30 81/10/73 C-C0458-F0F-011-217 PAGE 49
 CNTL AMPLER AP291 CAT JAC C

PART 1 - ON EQUIPMENT ACTIONS

CODE	ACN	CLIFF PC	UNIT COUNT	SIX MONTH UNIT COUNT	SIX MONTH UNIT COUNT BY ACTICA TAKEN	SIX MONTH MONTH	SIX MONTH MONTH
TYPE 1							
027 FLUCTUATES	1	1	1	1	1	1	1.0
127 ACJUST IMPROF							2.7
135 STICK OF JAM							4
242 FAIL TO OPER							2.7
255 NO OUTPUT							9.1
383 LOCK ON MAL							15.9
472 FLSE PLODN							5
721 IMF EE ELF TPT							7.0
750 PIESTING							9
901 INTERMITTENT							1.1
TOTAL	1	3	3	21	2	36	37.2

TYPE 2							
100 ERPN SAFETY WP	1	1	1	1	1	1	3
TOTAL	1	1	1	1	1	1	3

TYPE 6							
755 NO DEFECT							0
TOTAL							0

TYPE 6							
MLC TOTAL	1	3	4	21	4	37	37.5
6 MONTHS UNITS & MAN-OURS	1	3	4	21	4	37	37.5
FOR OTHER ACTIONS							0

COMPANE BASE							
AFR ATTACKER AFR ON	10	10	10	10	10	10	22.7
AFR DISTANCE AFR PAS	14	14	14	14	14	14	34.8
TOTAL	32	32	32	32	32	32	37.5

COMPANE TOTAL**							
MLC TOTAL	32	32	32	32	32	32	37.5

ALCIBALIC SCAS TYP ECF: 0CF CANI C123 WUC172113
 PERIOD ENDING AISEPIC
 CNIL AMPLER AP251 CAT INF C
 PART II - SHOF ACTIONS

FSC 5841 F/N 01-003(1-1) - NIN/PPC 00531682

REPAIR AFE	ADJUST KL	CLM/TEST/CRSN VYZ	SPVABLE RJ	ARTS & CONCEPTS	UNITS	HOURS	DELAYED COMM
255 AC CLTRUT	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0
BASE ACUM	1	11.0	0.0	0.0	0.0	11.0	0.0
VAL -BALC WRS	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0

FSC 5841 F/N 02-003(1-1) - NIN/PPC 00265774

REPAIR AFE	ADJUST KL	CLM/TEST/CRSN VYZ	SPVABLE RJ	ARTS & CONCEPTS	UNITS	HOURS	DELAYED COMM
255 AC CLTRUT	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0
BASE ACUM	1	11.0	0.0	0.0	0.0	11.0	0.0
VAL -BALC WRS	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0

FSC 5841 F/N 02-003(1-1) - NIN/PPC 002127031

REPAIR AFE	ADJUST KL	CLM/TEST/CRSN VYZ	SPVABLE RJ	ARTS & CONCEPTS	UNITS	HOURS	DELAYED COMM
255 AC CLTRUT	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0
BASE ACUM	1	11.0	0.0	0.0	0.0	11.0	0.0
VAL -BALC WRS	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0

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REPAIR AFE	ADJUST KL	CLM/TEST/CRSN VYZ	SPVABLE RJ	ARTS & CONCEPTS	UNITS	HOURS	DELAYED COMM
255 AC CLTRUT	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0
BASE ACUM	1	11.0	0.0	0.0	0.0	11.0	0.0
VAL -BALC WRS	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0

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REPAIR AFE	ADJUST KL	CLM/TEST/CRSN VYZ	SPVABLE RJ	ARTS & CONCEPTS	UNITS	HOURS	DELAYED COMM
255 AC CLTRUT	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0
BASE ACUM	1	11.0	0.0	0.0	0.0	11.0	0.0
VAL -BALC WRS	1	11.0	0.0	0.0	0.0	11.0	0.0
TOTAL	1	11.0	0.0	0.0	0.0	11.0	0.0

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