REPORT NO. AP60-1046
VOLUME I

WS 107A-1

GROUND OPERATIONAL EQUIPMENT LIST

SERIES E AND F

WE ARE NOW
GENERAL DYNAMICS | ASTRONAUTICS

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

VOLUME I

REPORT NO. AP60-1046

GROUND OPERATIONAL EQUIPMENT LIST SERIES E AND F

THIS REPORT SUPERSEDES REPORTS:

AZM-27-229 AP60-0551

AZM-27-246 AP60-0553

AP60-0554

5 JANUARY 1961

CONTRACT NOS.

AF04(647)-370 AF04(647)-453

AF04(647)-346 AF04(647)-605

CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

Issued 5 January 1961
Revised 22 February 1961
Revised 22 March 1961
Revised 22 April 1961
No Revision 22 May 1961
No Revision 22 June 1961
No Revision 22 July 1961
No Revision 22 August 1961
No Revision 22 September 1961
No Revision 22 October 1961
No Revision 22 November 1961
Revised 22 December 1961

don't have

AP60-1046
22 March 1961

INTRODUCTION

INTRODUCTION TO USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

This Ground Operational Equipment List is prepared in accordance with WDT Exhibit 57-1 dated 16 September 1957, as revised 1 December 1959, as modified by CCN 52 to Contract No. AF 04(647)-346 and CCN 13 to Contract No. AF 04(647)-605, and as implemented by CCN 51 to Contract No. AF 04(647)-370 and CCN 26 to Contract No. AF 04(647)-453.

This list includes Figure-1's for ground operational equipment (GOE) recommended for Convair-Astronautics development, commercial, and government furnished equipment.

In accordance with AMC BMC letter LBTCP dated 17 December 1959, Weapon System Equipment Component List No. 252 (SM-65) should be referred to for information concerning common hand tools.

By Air Force direction in the applicable CCN's:

1) Part or specification number listed in column 3 of the Figure-1 is the number proposed for original provisioning and does not necessarily reflect the part number of the article actually delivered or the required configuration of that article.

2) Recommended quantities only are listed in column 7 of the Figure-1. Provisioned quantities are not published in this list.

3) Figure-1's will not be updated for any reason except change of function (new usage), deletion, or supersession.

4) Reference should be made to the current issue of AFBMD Exhibit 60-36 for configuration or part number changes, and for provisioning information.

Reference should be made to the latest revision of Convair-Astronautics Report No. AP60-0742 for current Federal nomenclatures and type numbers.

Entries under column 9 on the Figure-1 are only area-estimated prices which cannot be considered as firm.

By CCN direction, item numbers are assigned according to the following system:

1) One Figure-1 item identification number is assigned for all provisioning of a given item.

2) For items having the same basic part number, the item identification number is the same for both Figure-1 (GOE) and Figure-A (GSE) items.

3) Item identification numbers of all WS107A-1 Series E and Series F Figure-1's, when these items are common to Series D, are the same as the corresponding Series D item identification number.

4) Item identification numbers, of all items required for WS107A-1 Series E and/or Series F only, begin with the number 5000.

By Air Force Direction, the word "Commercial" is inserted in column 13 to designate "common and standard" items previously designated as CFE.

Maintenance and support equipment is listed on Figure-A in USAF Weapon System 107A-1 Ground Support Equipment List, Series E and F Report No. AP60-1045. Items having both a support and a launch function are listed in both Report No. AP60-1045 and AP60-1046.

Contract AF 04(647)-680 has superseded Contract No. AF 04(647)-370 for the OSTF No. 1 Program. Since revision of Figure-1 entries in this GOE List is restricted specifically to additions, deletions, and changes in function; page frames in the body of this report will continue to reflect OSTF No. 1 listings under Contract No. AF 04(647)-370.

TABLE OF CONTENTS

FIGURE-1 CROSS REFERENCE LIST, ITEM IDENTIFICATION NUMBER

SERIES D, E, AND F

Old Item No.	New Item No.	Old Item No.	New Item No.	Old Item No.	New Item No.
1101	5000	1122	5013	1212	5029
1102	30.2	1123	5014	1214	5030
1103	5001	1124	5015	1215	5031
1105	6.1	1125	5016	1219	5032
1106	5002	1126	5017	1221	5033
1107	26	1127	5018	1222	5098
1109	5003	1128	5019	1227	5034
1110	5004	1129	5020	1228	5035
1111	5005	1130	5021	1231	5100
1112	5006	1131	5022	1232	5036
1113	5007	1132	5023	1433	5001
1114	5008	1134	5025	1435	5099
1115	5009	1200	5026	1534	30.2
1116	5079	1201	5027	1535	5028
1117	5010	1207	5095	2000	5037
1120	5011	1210	5028	2379	5037
1121	5012				

LIST OF DELETED AND SUPERSEDED ITEMS

ITEM SEQUENCE	LAST PUBLISHED REVISION	PART OR SPECIFICATION NUMBER	NOMENCLATURE		REASON FOR (D) DELETION OR (S) SUPERSESSION
1100	B-Jan '60	27-49501-3	Service Line and Equipment Instl, Launcher	(D)	This item is incorporated with item 5000.
1104	C-Mar '60	27-24507-1	Secondary Shutdown Kit Instl, Booster Engine, MA-3	(S)	This item is superseded by item 5011.
1108	A-Sep '59	27-49550-1	Shock Mounts, Missile	(D)	This item is incorporated with items 5000 and 5002.
1118	A-May '60	27-99067-3	System Assy, Drive, Launcher Platform	(S)	This item is broken out into and superseded by items 5020, 5021, 5022 and 5023 per Provisioning Conference action 19 February 1960.
1119	A-May '60	27-99071-3	System Assy, Suspension, Crib	(S)	This item is broken out into and superseded by items 5018 and 5019 per Provisioning Conference action 19 February 1960.
1133	New-Jul '60	27-96150-1	Deflector, Turbine Exhaust	(D)	This item is deleted as an end item of GOE since the item was fabricated in place as a part of the "Installation and Checkout" task.
1202	A-Feb '60	27-06183-1	Relay Logic Unit No. 2	(S)	This item is incorporated with item 5027.
1203	A-Feb '60	27-06185-1	Signal Responder	(S)	This item is incorporated with item 5027.
1204	New-Sep '60	27-68645-3	Cable Kit, Umbilical	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of the "Installation and Checkout" task.
1205	New-Sep '60	27-06192-1	Cable Kit, Umbilical Telemetering, IRSS, and Impact Prediction	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of the "Installation and Checkout" task.
1206	A-Feb '60	27-06214-3	Junction Box, Umbilical, Left	(S)	This item is incorporated with item 5033.
1208	New-Sep '60	27-68644-1	Cable Kit, Interconnecting, IRSS	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.

LIST OF DELETED AND SUPERSEDED ITEMS (cont)

ITEM SEQUENCE	LAST PUBLISHED REVISION	PART OR SPECIFICATION NUMBER	NOMENCLATURE	REASON FOR (D) DELETION OR (S) SUPERSESSION
1209	New-Sep '60	27-68688-5	Cable Kit, Interconnecting, Launch and Service Building	(D) This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.
1211	A-Feb '60	27-06189-1	Distribution Set, AC Power	(S) This item is superseded by items 5032 and 5037.
1213	C-Aug '60	27-68913-803	Cable Kit, Interconnecting Launch and Service Building	(D) This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.
1216	New-Sep '60	ARMA 2-00026-800	Countdown Group	(D) Incorporation of Associate Contractor end items as a part of CV-A GOE list has been discontinued per AF letter LBWAPG/Mr. Simon/306 dated 29 November, 1960.
1217	New-Sep '60	ARMA 2-00026-802	Alignment Group, Sensing Platform	(D) Incorporation of Associate Contractor end items as a part of CV-A GOE list has been discontinued per AF letter LBWAPG/Mr. Simon/306 dated 29 November 1960.
1218	A-Apr '60	ARMA 2-00034-258	Amplifier Assy	(D) The requirement for missile checkout at the MAB no longer exists.
1220	New-Sep '60	27-68711-801	Cable Kit Miscellaneous	(D) This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.
1223	New-Sep '60	General Electric 00835	Monitoring Set, Prelaunch, Re-entry Vehicle	(D) Incorporation of Associate Contractor end items as a part of CV-A GOE list has been discontinued per AF letter LBWAPG/Mr. Simon/306 dated 29 November 1960.
1224	C-Sep '60	North American Aviation Inc. G1001	Control-Monitor Set	(D) Incorporation of Associate Contractor end items as a part of CV-A GOE list has been discontinued per AF letter LBWAPG/Mr. Simon/306 dated 29 November 1960.
1225	A-Jun '60	27-53800-1	Cable Kit, TLM Trailer, Launch and Service Building, OSTF-X	(D) This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.
1226	New-Sep '60	27-99066-3	System Assy, Launcher Platform to Crib Cable Loop	(D) This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of "Installation and Checkout" task.

LIST OF DELETED AND SUPERSEDED ITEMS (cont)

ITEM SEQUENCE	LAST PUBLISHED REVISION	PART OR SPECIFICATION NUMBER	NOMENCLATURE		REASON FOR (D) DELETION OR (S) SUPERSESSION
1229	New-Sep '60	ARMA 2-00042-751	Countdown Group	(D)	Incorporation of Associate Contractor end items as a part of CV-A GOE list has been discontinued per AF letter LBWAPG/Mr. Simon/306 dated 29 November 1960.
1230	New-Sep '60	27-68713-1	Cable Kit, Missile Umbilical and Launcher, Launch Control Series E Silo	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of the "Installation and Checkout" task.
1233	New-Sep '60	27-68779-1	Cable Kit, Launch Control Center Crib, Interconnecting Launch Control Series E Silo	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of the "Installation and Checkout" task.
1234	New-Sep '60	27-68714-1	Cable Kit, Crib Launch Control, Series E Silo	(D)	This item is deleted as an end item of GOE per AF direction at Provisioning Conference 24 October thru 4 November 1960. This item now is part of the "Installation and Checkout" task.
1235	None	27-68871-1	Auxiliary Logic and Control Group	(D)	No static firing requirement at OSTF No. 2. Deleted prior to publication.
5015	A-Feb '61	27-27729-1	Charge Unit, Liquid Oxygen	(D)	The requirement for this item no longer exists, due to revisions in launch sequence programming.
5025	A-Feb '61	Hahn & Clay Machine and Boiler Works 1065	Tank, High Pressure Gas, Slug Fill	(D)	The requirement for this item no longer exists, due to revisions in launch sequence programming.
5134	None	27-27009-1	Drain Control Unit, Liquid Oxygen Transfer Line	(S)	This item is superseded by item 5133.

LIST OF EFFECTIVE ITEMS

Item Sequence	Old Item Sequence	Date and/or Revision	Nomenclature	Fig. 1 Page Nos.
			PART I	
6.1	1105	New-Jan '61	Erection Mechanism, Boom	1
26	1107	New-Jan '61	Control Unit, Pressurization	1
30.2	1102	New-Jan '61	Pumping Unit, Hydraulic	1
			PART II	
5000	1101	New-Jan '61	Service Lines and Equipment Instl, Launcher	1
5001	1103	New-Jan '61	Control Unit, Nitrogen	1
5002	1106	New-Jan '61	Boom, Erector, Missile	1
5003	1109	New-Jan '61	Sight Tube Instl, Horizontal	1
5004	1110	New-Jan '61	Anti-Fire Installation	1
5005	1111	New-Jan '61	Pod Air Conditioning Unit, Silo	1
5006	1112	New-Jan '61	Charge Unit, Helium, Silo Lift	1
5007	1113	New-Jan '61	Distribution Unit, Pneumatic	1
5008	1114	New-Jan '61	Pumping Unit, Hydraulic	1
5009	1115	New-Jan '61	System Assembly, Hydraulic, Missile Lifting	1
5010	1117	New-Jan '61	System Assembly, Launcher Platform	1
5011	1120	New-Jan '61	Captive Firing Kit, Propulsion, Series E	1
5012	1121	New-Jan '61	Launcher and Utilities Assembly, Silo	1
5013	1122	New-Jan '61	System Assembly, Door Closure	1
5014	1123	New-Jan '61	System Assembly Locking, Launcher Platform	1
5015	1124	A-Feb '61 (Del)	Charge Unit, Liquid Oxygen	1
5016	1125	New-Jan '61	System Assembly, Collimator	1
5017	1126	New-Jan '61	System Assembly, Gaseous Oxygen Vent Mechamism	1
5018	1127	New-Jan '61	System Assembly, Suspension, Crib	1
5019	1128	New-Jan '61	System Assembly, Lock and Damper	1
5020	1129	New-Jan '61	System Assembly, Counterweight	1
5021	1130	New-Jan '61	System Assembly, Guide Rails, Counterweight	1
5022	1131	New-Jan '61	System Assembly, Drive, Launcher Platform	1
5023	1132	New-Jan '61	System Assembly, Cable and Guide, Launcher Platform	1
5025	1134	A-Feb '61 (Del)	Tank, High Pressure Gas, Slug Fill	1
5026	1200	New-Jan '61	Console, Launch Control, Unitary Concept	1
5027	1201	New-Jan '61	Assembly, Sequencer and Responder Group, EOC	1
5028	1210	New-Jan '61	Power Supply and Distribution Unit, Stationary, GSE	1
5029	1212	New-Jan '61	Battery, Emergency, Missile Ground Power, Stationary	1
5030	1214	New-Jan '61	Console, Assembly, Operational and Checkout, Missile Destruct System	1
5031	1215	New-Jan '61	Cabinet, Combustion Stability Monitor	1
5032	1219	New-Jan '61	Relay Box, AC Power Distribution, GSE	1
5033	1221	New-Jan '61	Junction Box Group, Launch and Test	1
5034	1227	New-Jan '61	Console, Launcher Control, Silo Concept	1
5035	1228	New-Jan '61	Control Monitor Group, Missile Launch	1

LIST OF EFFECTIVE ITEMS (cont)

Item Sequence	Old Item Sequence	Date and/or Revision	Nomenclature	Fig. 1 Page Nos.
			PART II (cont)	
5036	1232	New-Jan '61	System Assembly, Electrical Missile Lifting	1
5037	2000	New-Jan '61	Motor-Generator Skid Mounted, Type MD-2	1, -2
5079	1116	New-Jan '61	Control Unit Pressurization, Silo	1, -2
5095	1207	New-Jan '61	Junction Box, Umbilical, Right	1
5098	1222	New-Jan '61	Auxiliary Logic and Control Group/ Launch Control Equipment	1, -2
5099	1435	New-Jan '61	Strut Assembly, Re-Entry Vehicle	1
5100	1231	New-Jan '61	Junction Box, Umbilical, Launcher Platform	1
5133	None	New-Apr '61	Topping Control Unit, Liquid Oxygen, Silo	1, -2
5171	None	New-Dec'61	Cable, Autopilot and Actuator Checkout	1

PART I

SERIES E AND F ITEMS COMMON TO SERIES D

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AFDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
6.1			27-95002-1		ERECTION			Est											CONTRACT NO. AF 04(647)-370								
			Spec 27-09419-1		MECHANISM,			125,000																				
			Spec Cont Dwg 27-09418-1		BOOM																							
			EID-27-9111																								
															11 mo			OSTF No. 1	1							1	
																			CONTRACT NO. AF 04(647)-346								
																2/19/60	5/24/60	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																			CONTRACT NO. AF 04(647)-453								
																		OSTF No. 2									
																			CONTRACT NO. AF 04(647)-605								
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Erection Mechanism, Boom.

Basically, the rection mechanism consists of two traversing carriages and a pair of erection struts connected to the erection boom forward of the pivot point of the boom-launcher combination. Traversing of the electrically-powered, chain-driven carriages provides the forces, through the erection struts, required to pivot the boom-launcher combination, with or without a missile, through a 100-degree vertical arc between horizontal-ready position, missile-erected position, and launch position.

The mechanism is driven by a 440-volt ac motor of approximately 75 hp through a speed-reducing gear box. A "fail-safe" brake is provided on the shaft between the motor and the gear box. The motor, gear box, and brake are mounted near the centerline of the missile enclosure at approximately missile station 1700. A drive shaft extends outward from the gear box toward both sidewalls of the enclosure. A drive-chain sprocket is mounted on each outer end of the drive shaft approximately 11.5 feet from the missile centerline. Two idler sprockets, one attached to each sidewall, are located at approximately the same elevation, at missile station 1165, forward of the drive sprockets. A roller drive chain encircles each drive-and-idler-sprocket (one on each side of the enclosure) combination. The ends of the roller chains are attached to links near the ends of the traversing carriages, approximately 23 feet long, which span the enclosure.

The traversing carriages consist of a length of welded-tube trusswork with solid roller-type wheels mounted at each end. The wheels roll on rails attached to the walls of the enclosure. Action of the drive chains tow the carriages horizontally in either direction. Two connecting-rod-type erection struts are pivoted at one end of the tubes of the carriages just inboard of the drive-chain links. The other end of the erection struts which are approximately 12 feet long, pivot on the lower chord of the erection boom forward of the boom-launcher link. These erection struts are designed to carry either compressive or tensive loads. The drive chains are maintained in tension to ensure against sudden surge in the boom-missile-launcher combination when the loading on the erection strut shifts from tension to compression, or the reverse, as the center of gravity of the boom-missile-launcher combination passes over center.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 6.1

The erection mechanism may be controlled or actuated from either the launch control center or the launcher area.

The mechanism is de-energized during standby operating conditions except when necessary to energize the mechanism for occasional missile erection for crew training or checkout purposes. During countdown, the missile-boom-launcher combination is erected, the launcher is latched down, the boom-launcher-locks are released, the boom is disconnected from the missile and rotated approximately an additional 10 degrees to launch position. After launch the boom is again locked to the launcher and the boom-launcher combination is lowered to the horizontal.

(5) PROBLEM AREA: During standby, a missile is supported in horizontal readiness condition by an erection boom-launcher combination. The missile and erection boom have a combined weight of approximately 14 tons. During countdown, a missile must be erected within a period of 90 seconds maximum. It is required that the equipment used to erect the missile be capable of lowering an erected missile to the horizontal position. The equipment used in erecting or lowering a missile must also be capable of stopping at any point in the erection or lowering sequence, holding the missile at that point, and then resuming operation smoothly in either sequence as desired.

Equipment is required:

1) Which is capable of erecting or lowering the missile-boom-launcher combination in 90 seconds or less when controlled remotely.

2) Which will ensure smooth, rapid, shock-free erection or lowering of a missile.

3) Which will control positively the erection or lowering of a missile.

4) Which will move the erection boom clear of the missile during launching.

(18) REMARKS: This item is similar to Series D configuration. Item 6.1 in Report No. ZM-7-357.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
26					Minneapolis-Honeywell GM 43-E3 Spec 7-08432-9 EID-27-8001 CONTROL UNIT, PRESSURIZATION FSC NOMENCLATURE: CONTROL, PRESSURE SYSTEM			Est 120,000								8 mo			OSTF No. 1	1								1
																2/19/60	5/24/60	576-C	1								1
																		567	9								9
																		548	9								9
																		706									
																		549	9								9
																		OSTF No. 2									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

CONTRACT NO. AF 04(647)-370

CONTRACT NO. AF 04(647)-346

CONTRACT NO. AF 04(647)-453

CONTRACT NO. AF 04(647)-605

(4) NOMENCLATURE: (PNS) Control Unit, Pressurization.

This unit, which weighs approximately 2000 pounds, is skid mounted and enclosed in a rectangular housing approximately 9 feet long, 7 feet wide, and 7 feet high. At one end there is control panel for local manual operation. This unit is capable of handling missile tank pressurization during high-rate propellant loading.

The control unit contains the following sections:

1) Helium pressurization control (automatic).
2) Refrigerated helium.
3) Helium pressurization (emergency).

The unit is capable of operating between minus 65 deg F and plus 165 deg F. All tubing and fittings are of stainless steel with proof and burst pressures as follows:

Proof Pressure - 150 percent of operating pressure.
Burst Pressure - 250 percent of operating pressure.

The unit is capable of transferring helium from a ground source and delivering it to the missile propellant tanks at the desired flow rates in accordance with the four required pressure phases and at the required pressure differentials. The unit is self regulating, pneumatically, during each of its pressure phases. These pressure phases are sequenced electrically from a remote-control console located in the blockhouse. Each phase of tank pressure is transmitted to the regulators and relief valves by sensing lines. In addition, helium at 3000 psig is furnished to the missile helium bottles.

The control unit has automatic pressure relief valves and permits remote, electrical, emergency control of propellant tank pressures. During the liquid oxygen tanking phase, the unit vents the liquid oxygen pressurization line to the atmosphere.

The unit is capable of supplying emergency helium to the tanks. The unit is not used for static firing or launch. When the required pressure phases have been completed after propellant loading the control of tank pressurization is transferred to the missile system.

(5) PROBLEM AREA: The thin skin of the pure monocoque missile tank section must be kept under tension at all times. During the period from missile erection until firing, tank-skin tension is maintained by controlled pressure in the missile tanks. Helium gas, from a ground source at 1200 psig, is supplied for this purpose.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 26

A pressure differential must be maintained across the missile intermediate bulkhead to prevent collapse of this bulkhead. This pressure differential must be maintained with a minimum value of 2.5 psi and increased during high-rate propellant transfer. During this high-rate propellant transfer, helium must flow at rates of from zero to 6.0 pounds per minute through four pressurization phases as follows:

Phase	Condition	Fuel Minimum	Liquid Oxygen Minimum
1	"Stand-By" Pressure	9.5 psig	5.2 psig
2F	"Fuel Loading" Pressure	24.5 psig	1.8 psig
2L	"Liquid Oxygen Loading" Pressure	57.0 psig	1.8 psig
3	"Flight" Pressure	57.5 psig	24.7 psig

It is desirable that pressurization and propellant loading operations be remotely controlled for safety reasons. However, there are certain checks and tests (functional and leak tests are examples) which can be best done with local control of helium flow and pressures.

The helium required for tank pressurization during missile flight is stored in bottles at 3000 psig. Since these bottles which are attached to the missile are not of sufficient size to contain the required helium at ambient temperatures, the helium is chilled and contracted to increase the amount which can be stored in the bottles without increasing their weight. This is done by introducing liquid nitrogen into the shrouds surrounding the helium bottles.

Since the problem of maintaining missile pressurization is critical, particularly during high-rate propellant transfer, it is desirable that equipment be provided with emergency pressurization.

Equipment is required which can be used to:

1) Control, regulate and route, semiautomatically and/or manually the flight pressurization gases from the ground facilities into the fuel and liquid oxygen tanks of a missile.
2) Regulate pressures within individual tanks and differential pressure between these tanks from missile post-erection standby condition through high-rate propellant transfer to pressurization-complete condition.
3) Provide automatic pressure relief for the missile propellant tanks and provide monitor signals for remote indication and control of tank pressurization.
4) Control the transfer of helium from storage to missile storage bottles.
5) Backup systems to supplement the primary system in case of possible breakdown of the primary system.

(18) REMARKS: This item is functionally similar to item 26 in Report No. ZM-7-357.

This item is similar in function to GOE item 5079 used at Series F sites.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
																		CONTRACT NO. AF 04(647)-370									
30.2					Sprague Eng. 75725 Spec 27-08650-5 EID-27-8226			PUMPING UNIT, HYDRAULIC					CFE		9 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
								Est 40,000								2/19/60	5/3/60	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC	T-330 (1)								

(4) NOMENCLATURE: (PNS) Pumping Unit, Hydraulic.

This unit is skid mounted; measures approximately 12 feet long, 6 feet wide, 6 feet high; and weighs approximately 7,800 pounds.

The unit contains two independent hydraulic pumping systems housed in a common cabinet. The first-stage system is connected to the missile booster hydraulic system; the second-stage system to the missile sustainer/vernier hydraulic system.

Each hydraulic-fluid system comprises a low-pressure pump, high-pressure pump; electric motor, cooler-heater, fluid-supply tank, flowmeter (sight gage), and associated hand valves, relief valves, gages, and filters (cleanliness controlled by Convair Spec. No. 0-75014). The system also includes a remote control cable connection which controls the pump motors; a pressurized fluid reservoir (working pressure 100 psig); and an oil evacuation system which removes, under pressure, approximately 65 cubic inches of oil from the missile hydraulic system. The remote control cable connection also provides indications, in the launch operation building, of the operational readiness of the unit. Both the high-pressure and low-pressure pumps are operated by the electric motor which, in turn, operates on 440-volt, 3-phase, ac power.

Each low-pressure pump draws hydraulic fluid (MIL-O-5606) from the supply tank or missile return line and delivers this fluid to the high-pressure pumps at rates of approximately 23 gpm and 12 gpm with pressure ranges of approximately 10 psig to 150 psig. Each high-pressure pump, in turn, supplies this hydraulic fluid at 3000 psig to the missile booster hydraulic system at 23 gpm and to the missile sustainer/vernier hydraulic system at 12 gpm.

The power pumps are used to fill and bleed the two missile hydraulic systems independently. The flowmeters provide a check point which is used to verify that the unit hydraulic system is free of air. The unit fluid reservoirs are depressurized during this period.

After filling and bleeding is complete, the flowmeters are bypassed and the unit fluid reservoir is pressurized to approximately 100 psig. The unit is then ready to supply hydraulic power to either of the missile hydraulic systems or to both missile hydraulic systems simultaneously.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 30.2

The unit is designed to maintain the desired discharge pressures (2000 psig, and 3000 psig), temperatures, and flow rates automatically. Each unit fluid tank has a capacity of approximately 30 gallons. Each system has a cooler and heater which maintain the temperature of the hydraulic fluid between 35 degrees F and 100 degrees F throughout the complete range of environmental operating conditions.

A common hydraulic-fluid control panel is mounted on the front of the hydraulic pumping unit. This panel contains all of the valves, gages, sight glasses, indicators, and switches required for local manual operation of the system. Provisions for remote control of each system from the launch operations building are included where required.

A nitrogen gas control system is provided for unit-component pressurization (fluid reservoirs and oil evacuation chambers).

The following utilities are required for operation of this equipment:

1) 150 kva of 440-volt, 60-cycle, 3-phase ac power

2) 0.7 kw of 28-volt dc power

3) 50 gpm of fresh cooling water at 60 psig and temperatures between 40 degrees F and 70 degrees F

(5) PROBLEM AREA: When the missile arrives at the SMA from the factory, its hydraulic systems must be leak checked, filled, and bled to ensure that they are ready for checkout. Checkouts to assure the readiness of the hydraulic systems for use are required at the SMA and periodically, at the launcher. These checkouts require a supply of automatically regulated hydraulic power to the two systems at temperatures ranging from 35 degrees F to 100 degrees F and at the following flow rates:

Booster Hydraulic System - 2 gpm to 23 gpm at 3000 psi

Sustainer/Vernier Hydraulic System - 2 gpm to 12 gpm at 3000 psi

A separate supply of hydraulic power is required for each missile hydraulic system. This is required because, if the supply was manifolded, the actuation of one missile hydraulic system would result in depletion of hydraulic power in the supply lines of the inactive system. Such depletion could cause interaction between the thrust chambers and result in possible damage to these chambers.

The missile internal hydraulic power sources are inoperative until just before engine firing during countdown. However, the countdown procedure calls for activation of both hydraulic systems from an external source prior to this time. Normally, supply pressure during countdown is 2000 psig. Approximately one minute prior to launch, 65 cubic inches of fluid volume are removed from each missile hydraulic system. Safety demands that hydraulic power to the missile be controlled remotely during static firing or missile launching. Hydraulic power during most other checkouts requires local control.

Equipment is required which can be used for:

1) Filling and bleeding booster and sustainer/vernier hydraulic systems.

2) Supplying automatically regulated hydraulic power individually to each separate missile hydraulic system during checkout or countdown. Pressures required are 200 psig and 3000 psig with remote control of 2000 psig supply pressures.

3) Remote and local control of the hydraulic power supply and remote control as specified in (2) above.

4) Adequate fluid and contamination control including filtration per Convair Spec No. 0-75014.

(18) REMARKS: This item is similar to item 30.2 in Report No. ZM-7-357.

This item is the same as GSE item 30.2 in Report No. AP60-1045.

PART II

SERIES E AND F ITEMS

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	PARTS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5000		27-49501-805 EID-27-9034 (Operational Training) EID-27-9051 (OSTF)			SERVICE LINES AND EQUIPMENT INSTL, LAUNCHER FSC NOMENCLATURE: LAUNCHER, MISSILE			Est 250,000						CFE													
																		CONTRACT NO. AF 04(647)-370									
															12 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
															12 mo	7/10/59	5/24/59	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-603									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Service Lines and Equipment Installation, Launcher.

The launcher is a mechanical-structural subassembly which supports a missile during horizontal readiness and rotates with the missile to the vertical for missile tanking and launching. The launcher and the following utilities comprise the launcher and utilities assembly:

1) Service lines
2) Hydraulic and pneumatic systems
3) Electrical-umbilical support and release equipment
4) Propellant transfer lines and associated valves
5) Thrust chamber heating and pod air conditioning ducts

The service lines include rigid and flexible tubing; quick disconnect couplings; valves, swivel joints; and associated attaching hardware for liquid oxygen, fuel, hydraulic fluid, water, gaseous nitrogen, and liquid nitrogen lines between the facility supply lines and the missile.

The launcher subassembly measures approximately 13 feet long, 24 feet wide, 4-1/2 feet high, and weighs approximately 17 tons. This subassembly includes the following principal components:

1) The launcher structure which is a trapezoidal-shaped frame constructed of heavy welded steel pipe.
2) Four support pedestals constructed of concrete and steel. Each pedestal contains an alignment pin and a holddown hook. The holddown hook mates with one of the four missile longerons. To permit free launch, the holddown hooks are released immediately following propellant loading.
3) Four shock-mount assemblies. The launcher is mounted on these shock-mount assemblies while supporting a missile in standby horizontal position. The two lower shock-mount assemblies (pivot assembly shock mounts) are identical and are located near

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5000

the ends of the pivot assembly of the launcher at missile station 1288. The lower shock mount assemblies are mounted on the floor of the facility. The two upper shock-mount assemblies are identical and are mounted on the walls of the facility. The upper shock-mounts are detached from the launcher when a missile is rotated to vertical position. This assembly, in conjunction with the shock mounts for the erection boom, reduce the probability of damage to the missile, launcher, boom, and erection mechanism as a result of shock effects from nuclear blast.

The launcher is rotated to permit mating with a horizontal missile. At the time of mating, the Quadrant I and Quadrant II hooks are attached to the missile and remain attached until completion of the erection and loading cycles. Quadrant III and Quadrant IV hooks are attached when the missile reaches the vertical, and remain attached until completion of the loading cycle.

(5) PROBLEM AREA: A missile must be maintained in a condition of horizontal readiness at the launcher installation until missile erection by an overhead erection boom. Following erection, a missile must be supported in a vertical position during propellant loading operations and until the missile is ready for flight.

Equipment is required at the launcher installation which will:

1) Mate manually with and provide horizontal support for missile.

2) Rotate with a missile to the vertical position.

3) Provide a stable platform which will support and hold a missile erect during the missile loading operation. This must be accomplished without overloading the missile structure.

4) Release a missile and permit unobstructed, unrestricted vertical takeoff of the missile.

5) Support an erection-boom assembly in conjunction with the erection mechanism.

6) Re-engage the missile in the event a launch is not completed, restrain the missile during propellant unloading, and return the missile to horizontal storage position.

7) Provide control of the utilities for transmitting electrical power and various fluids from the facility connections in the launch pad area to the missile system.

8) Connect utilities to a missile during the mating operation and rotate with these utilities and the launcher subassembly during the erection operation.

9) Disconnect utilities and fluid lines from the missile, prior to or during launch, without hindering the launch.

10) Provide shock protection for a missile and launch site equipment during standby condition.

(18) REMARKS: This item is similar in function to GOE item 5012 used at Series F sites.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5001		Accessory Products 892700 Spec 27-08670-1 Spec Cont Dwg 27-08015-1 EID-27-8241			CONTROL UNIT, NITROGEN			Est 13,000						CFE														
															7 mo			OSTF No. 1	1							1	
																8/28/59	6/12/60	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
															7 mo			OSTF No. 2	1							1	
															7 mo	4/14/60		576-D	1							1	
																		576-E	1							1	
																1/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-330 (1), T-349 (1)								

CONTRACT NO. AF 04(647)-370

CONTRACT NO. AF 04(647)-346

CONTRACT NO. AF 04(647)-453

CONTRACT NO. AF 04(647)-605

(4) NOMENCLATURE: (PNS) Control Unit, Nitrogen.

This pneumatic unit, when supplied with high pressure nitrogen gas from the facility storage cylinders, regulates and distributes the gas to the missile and ground components and systems. All regulated gaseous nitrogen used at the launch site, with the exception of nitrogen gas used for the transfer of fuel, is supplied through this unit.

The unit weighs approximately 1500 pounds. It is enclosed in a steel housing which measures approximately 4 feet long, 3 feet wide, and 5 feet high. An illuminated control panel, inclined at a sufficient angle to facilitate convenient observation and operation of all controls, contains all of the gages, manual valves and regulator controls.

Primarily, the unit is manually operated. Gaseous nitrogen which is received at the unit; at inlet pressure range of 1200 to 4000 psig; is filtered, regulated and then distributed to the following outlets:

1) 1000 psig to engine service unit
2) 1000 psig to hydraulic supply unit
3) 1000 psig to propellant valve (ground fill and drain, liquid oxygen)
4) 0.1 psig to umbilical junction box

Four additional outlets are provided in the unit for distribution of nitrogen gas for various charging and purging requirements. Attached to each outlet is a 45 foot length of flexible hose. The hose is mounted on hose reels located in the lower compartment of the unit. The hoses are attached to the unit by a swivel joint which allows winding or unwinding without disconnecting the hose from the unit.

These four outlets supply nitrogen gas for the following functions:

Line 1) Zero to 40 psig for propulsion component leakage tests.
Line 2) 40 psig to 250 psig for hydraulic reservoir pressurization.
Line 3) 250 psig to 1500 psig for NAA and vernier accumulator charging and for ground operation of the vernier solo motor.
Line 4) 1500 psig to 4000 psig for booster and sustainer accumulator charging and vernier solo nitrogen sphere charging.

By Air Force direction.
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5001

(5) PROBLEM AREA: Gaseous nitrogen for use in the control, charging, testing, and purging of various components and systems located in the launcher area, is stored in facility storage cylinders.

A pneumatic unit is required which can receive, regulate, monitor, and distribute this gas to the various missile and ground components and systems as required.

(18) REMARKS: This unit performs the functions of both the nitrogen control unit and the nitrogen charge panel (Items 25.1 and 26.0.2 in Report No. ZM-7-357).

This item is the same as GSE item 5001 in Report No. AP60-1045.

USAF WEAPON SYSTEM 1074-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | DEV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	WHYS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																								
5002		27-95008-1 Spec 27-09008-1 Spec Cont Dwg 27-09007-1 EID-27-9108			BOOM, ERECTOR, MISSILE FSC NOMENCLATURE: BOOM, MISSILE ERECTION			Est 80,000						CFE															
																		CONTRACT NO. AF 04(647)-370									
															10 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																7/10/59	5/24/60	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Boom, Erector, Missile.

The erector boom is comprised of the following principal parts:

1) Boom structure
2) Nose clamp
3) Launcher-to-boom struts
4) Hydraulic power unit
5) Shock Mount Assemblies

The boom is a tapered truss-type structure of welded steel, and measures approximately 67 feet long. The structure tapers from approximately 12-1/2 feet wide at the launcher attach points to approximately 4 feet wide at the nose clamp attach bracket. The depth of the structure varies from approximately 6-1/2 feet at the launch attach points to 4 feet at the nose clamp attach bracket. The boom is connected to the launcher at two pivot points and is secured to these points by connecting pins. The boom erection struts (part of Item 1105) are attached to the boom by lifting arm pins located on each side of the boom structure at missile station 1106. Support for the forward end of the boom when the boom is horizontal is provided by stop pads which rest on launching pad shock mounts located at missile station 553.50. These stop pads are attached at each side of the bottom of the beam structure.

The nose clamp is an electrically and hydraulically actuated tong-type, self-locking clamp attached to the forward end of the boom structure. This clamp encircles the missile re-entry vehicle adapter section. The clamp provides the load point which supports the forward end of a missile while the missile is horizontal and during missile erection and lowering. The nose clamp which has a maximum width of 12 inches is normally centered on the re-entry vehicle adapter section at missile station 465.50. The clamp has a 4 inch vertical and lateral self-aligning feature and may be swung forward through an arc of approximately 70 degrees to prevent interference during missile transfer. The clamp is lined with a resilient material to protect the missile surface from damage.

The launcher-to-boom struts are hydraulic pistons containing a locking mechanism. The two struts extend from the launcher and attach to the boom at missile station 1106. The attach points are located on each side of the boom above the lifting arm pins.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5002

During erection, the struts are locked in retracted position from zero to 90 degrees of the erection cycle. When the boom and launcher reach 90 degrees, the launcher is locked in position; the struts are unlocked and extended approximately 24 inches which moves the boom an additional 10 degrees. The cycle is reversed when lowering the boom.

The hydraulic power unit operates the nose clamp, the launcher-to-boom struts, the boom pedestal shock mount assemblies, and the launcher support set. The unit includes an electric motor driven hydraulic pump and all the accessories required to supply a variable flow of hydraulic fluid up to 2 gpm at 3000 psig.

A missile stretch system consisting of two struts is stored on the boom. These struts are installed between the boom and the nose clamps in fittings which are provided. This stretch system is designed to provide 9000 pounds (plus or minus 1000 pounds) of stretch to a missile while it is on the launcher. These struts are equipped with a manually operated (hand pump) hydraulic system which is cross-connected to ensure that equal loads are applied to both struts.

Operation of the erector boom, except for the stretch system, is by remote control. All hydraulic components are equipped with solenoid operated valves and limit switches. The electric motor is powered by 440-volt, 60-cycle, 3-phase ac. All limit switches are powered by 110-volt, 60-cycle, 3-phase ac; all solenoids by 28-volt dc.

A platform of expanded metal grating is positioned on the boom on either side of the top vernier engine of a horizontal missile. Two lightweight portable ladders provide access to these platforms.

The boom pedestal shock mounts are right and left hand mirror image assemblies. Each of the two mounts consists of a triangularly framed strut, a shock absorber, and a hydraulic actuator. The struts are bolted to the missile enclosure wall in the launch and service building. These struts extend inboard from the wall approximately 6 feet toward each side of the missile erection boom. The sides of the struts converge to an apex which is fastened to the boom.

The shock absorber is bolted to the top of the boom end of the strut. This shock absorber consists of honeycomb rubber sandwiched between metal plates. The top plate is bent upward 90 degrees at the outboard edge to form a bracket. This bracket supports a hydraulic actuator. The actuator has an internal locking mechanism that locks the actuator piston, and contains limit switches to indicate remotely the piston position.

Hydraulic fluid under 3000 psi is provided from the erection boom hydraulic power unit. The hydraulic actuator is controlled remotely by solenoid operated valves.

With the erection boom in the horizontal position the forward boom support pads rest on the shock absorbers. The actuator pistons are extended and enter holes in the support pads. This action locks the boom to the shock absorbers.

The nose clamp shock mount is a pivoted boom attached on the missile enclosure wall at approximately missile station 465.50. The boom is electro-mechanically operated to engage the boom bracket on the nose clamp. The sandwich configuration of honeycomb rubber bonded between metal plates is again used to perform the actual shock absorption function by restraining the nose clamp from lateral motion.

With all shock mounts installed, the launcher erector boom and missile are protected from shock laterally by the nose clamp shock mounts and launcher sway mounts, and vertically by the launcher pedestal shock mounts, and fore and aft by the launcher pedestal shock mounts.

(5) PROBLEM AREA: The thin-skinned, pressurized missile tank section of pure monocoque construction can only be handled at structural attach points. These structural attach points, aft on the missile thrust section and forward on the re-entry vehicle adapter, are so located that handling stresses are uniformly transmitted to the tank skin. Aft support of the missile is provided by mating the missile with the launcher.

Equipment must be provided which will provide forward support for the missile. This equipment must act simultaneously with the launcher to provide two-point suspension of the missile during the erection period in countdown. In addition, the equipment must be capable of lowering the missile from the erected position and of supporting the missile during prolonged periods of storage. The equipment must be simple in construction and operation to minimize the time required for mating with the missile; remotely controlled to reduce manpower requirements and increase safety of operations; and be capable of being disengaged, clear of an erected missile, so that the missile may be launched.

Specifically, equipment is required which:

1) Will accommodate a Series E missile.
2) Will provide adequate safe support for a missile while the missile is horizontal and during the rapid missile erection sequence.
3) Can be remotely disengaged from a vertical missile and rotated clear of the missile so that the missile may be launched.
4) When controlled remotely, will re-engage a vertical missile and safely lower that missile to a horizontal position.
5) Without repositioning, will permit the missile to be backed into position for mating with the launcher and boom.

6) Will support the missile adequately during erection or lowering, and during storage in a horizontal position.

7) Will apply a 9,000-pound stretch load to a missile while the missile is in a horizontal position.

8) Will withstand shock effects and in conjunction with the launcher provide shock protection for the missile while in the standby horizontal position.

(18) REMARKS: This item is similar in function to item 10.3 in Report No. ZM-7-357.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AROC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5003		27-96005-1 EID-27-9047			SIGHT TUBE INSTL., HORIZONTAL FSC NOMENCLATURE: TUBE ASSY, SIGHT, INERTIAL GUIDANCE SYSTEM									CFE					CONTRACT NO. AF 04(647)-370									
															7 mo			OSTF No. 1	1								1	
																		CONTRACT NO. AF 04(647)-346										
																†12/2/59	6/15/60	576-C	1								1	
																		567	9								9	
																		548	9								9	
																		706										
																		549	9								9	
																		CONTRACT NO. AF 04(647)-453										
																		OSTF No. 2										
																		CONTRACT NO. AF 04(647)-605										
																		576-D										
																		576-E										
																		550										
																		551										
																		577										
																		578										
																		579										
																		556										
																		ATC										

(4) NOMENCLATURE: (PNS) Sight Tube Installation, Horizontal.

This item provides an optically unobstructed path for a beam of light between the missile inertial guidance system (IGS) and a collimator located beneath the floor of the launch and service building enclosure. The tube can be used with the missile in both the horizontal and vertical position. The tube remains attached to the missile until rise-off at which time it swings upward and outward to clear the missile. This installation comprises the following subassemblies:

1) Four tube assemblies. These tube assemblies provide a line of sight between the collimator and the missile pod.
2) One base assembly. This base assembly supports the tube assembly.
3) One lever assembly. This lever assembly contains counterweights and linkage to swing the tube assembly clear at missile rise-off.

The 12 inch diameter tube assemblies are constructed of black-paper-base phenolic tubing (Mil-P-79B type PBG) with a wall thickness of 0.188 inches. When extended the over-all length of the sight tube is approximately 40 feet. Baffles of 3/4-inch plywood are spaced at irregular intervals within the tube to provide an aperture of 9 inches. The baffles also minimize the effect of light ray dispersion and promote air turbulence to prevent formation of static layers of air which might cause a temperature differential of greater than 5 degree F within the length of the tube.

The tube assembly has two distinct configurations dependent upon missile position, i.e., horizontal or vertical. Two forward sections of the tube, one 100 inches long and the other 204 inches long, are hinged to allow the assembly to fold back on itself. This allows the rear portion of the tube to be in contact with one of two ports in the IGS pod and permit a light beam to fall on a porro prism of the sensing platform when the missile is horizontal. This position permits continuous course alignment of the guidance systems. While still in its folded position the forward tip of the tube is connected to the second of the two parts in the guidance pod. As the missile is erected the tube unfolds, disconnecting at the first pod opening and becomes fully extended when the missile reaches the vertical position. The light beam now travels the entire length of the tube to strike the prism for fine orientation of the sensing platform.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5003

The forward or missile end of the tube assembly is coupled to a 6-inch diameter aluminum tube which has a sponge rubber seal. A coil spring inserted between the two tubes permits fore and aft adjustment of 4 inches. A bracket on the aluminum tube engages a hook on the missile pod. This holds the tube in place. At missile rise-off the hook disengages permitting the tube to swing clear.

The base assembly is essentially a support stand consisting of welded steel channels in the form of a right triangle with the hypotenuse of the triangle forming the support for the base of the sight tube assembly. The base is positioned over the collimator opening in the floor of the enclosure and is held in position with three dowel pins. Three casters on the base provide mobility for the stand which has to be moved whenever the missile handling trailer is in the enclosure. The base assembly and the sight tube assembly are located 77.6 inches from and parallel with the missile center line. Brackets on the base assembly permit adjustment of the sight tube in elevation and azimuth.

The lever assembly consists of two 600-pound counterweights pivoted one on each side of the base assembly and attached to the tube assembly. These counterweights function to maintain contact between the missile pod and sight tube and on rise-off to swing the sight tube up and away from the missile. Ball-lock pins permit locking the counterweight to the base assembly when disassembling all or any part of the entire sight tube installation.

To maintain a low temperature differential between the inside and outside of the tube, and to eliminate temperature gradients within the tube, ambient air is forced through the tube at approximately 300 cfm. A facility blower takes air from inside the enclosure and forces it into the collimator room. From the collimator room the air exhausts through the tube.

(5) PROBLEM AREA: A structure is required to provide an unobstructed refraction-free line of sight between the Arma collimator and the missile IGS sensing platform porro prism. This equipment must:

1) Be adjacent to the IGS window during platform fine alignment
2) Be capable of clearing the missile at rise-off
3) Provide baffles or other devices to prevent light dispersion and provide an aperture of 9 inches inner diameter
4) Provide 4.5 inches clearance between the center line of sight and the inner circumference of any part of the baffle or structure
5) Maintain light beam alignment within a tolerance of plus-or-minus 2 seconds of arc
6) Maintain a temperature differential, in conjunction with a circulating air system, of plus-or-minus 5-degree F between any two points of the tube.

(18) REMARKS: † Technical Figure-A approval granted per Air Force TWX LBTCS-12-2-E dated 2 December 1959.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5004		27-96126-1 EID-27-9061			ANTI-FIRE INSTALLATION			Est 2,000					CFE														
																		CONTRACT NO. AF 04(647)-370									
															6 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																1/22/60	6/5/60	576-C	1							1	
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Anti-Fire Installation.

This installation consists of a four-inch supply main with three risers and a three-inch spray manifold with twenty-two spray nozzles. The spray manifold is routed around the entire inner edge of the flame structure opening. The nozzles provide a flat spray of water around the missile thrust chambers at a point approximately four to seven inches above the exhaust end of the thrust chambers.

The supply main, a four-inch diameter steel pipe, connects the facility supply at the launcher stub-up to the spray manifold. The spray manifold is three-inch diameter steel pipe with twenty-two spray nozzles. The spray nozzles are mounted 9 to 42 inches away from the thrust chambers. Two type of nozzles are used; eight type-A nozzles each provide approximately 28 gallons of water per minute and fourteen type-B nozzles each provide approximately 34 gallons of water per minute in a flat horizontal spray. The spray has a spread of approximately 30 degrees on either side of the center line of the nozzle. Each nozzle is adjustable within 40 degrees in any direction and each is positioned so that a sheet of water floods the outside of the thrust chambers from four to seven inches above the exhaust end of the thrust chambers. The spray pattern encircles the thrust chambers and cools and extinguishes any flame which might rise into the thrust section at engine cutoff.

The system supplies a total of approximately 720 gallons of water a minute at 125-psi static head. During static firing or an aborted launch, the system is automatically activated at engine cutoff to prevent blow back of heated gases and flame from the engines. Manual control permits the system to function as an auxiliary firex and cooling system.

(5) PROBLEM AREA: A water system is required which can be used to prevent blow back of heated gases from the rocket engines into the booster section of the missile. The system provided should be capable of automatic activation at engine cutoff during static firing, or in the case of an aborted launch.

(18) REMARKS: This item is similar in function to item 9.1.4 in Report No. ZM-7-357.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5004

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																						
5005		C. G. Hokanson Co. Inc. 514100 Spec 27-08085-1 Spec Cont Dwg 27-08018-1 EID-27-8087			POD AIR CONDITIONING UNIT, SILO FSC NOMENCLATURE: AIR CONDITIONER			Est 50,000					CFE														
																			CONTRACT NO. AF 04(647)-370								
																		OSTF No. 1								
																			CONTRACT NO. AF 04(647)-346								
																		576-C								
																		567								
																		548								
																		706								
																		549								
																			CONTRACT NO. AF 04(647)-453								
															8 mo			OSTF No. 2	1						1	
																			CONTRACT NO. AF 04(647)-605								
																4/14/60	2/21/61	576-D	1						1	
																		576-E	1						1	
																1/22/60		550	12						12	
																		551	12						12	
																		577	12						12	
																		578	12						12	
																		579	12						12	
																		556	12						12	
																		ATC	T-349 (1)							

(4) NOMENCLATURE: (PNS) Pod Air Conditioning Unit, Silo

This unit measures approximately 8 feet square, 10 feet high, and weighs approximately 6500 pounds.

The following major components make up the unit:

1) Dehumidifier
2) Refrigeration unit
3) Blower
4) Electric motors
5) Chilled water coils
6) Direct expansion coil
7) Pump and piping
8) Air filters
9) Ducts
10) Instrumentation and controls
11) Accounting

The unit delivers air at 1820 cfm at 35 degrees F (plus zero degrees F, or minus 5 degrees F) with a maximum moisture content of 18 grains per pound of dry air. Conditioned air is delivered against a static pressure of 32 column inches of water.

The air is dehumidified by an adsorption type chamber. Air cooling is by three water chilled cooling coils and a direct expansion coil. The expansion coil operates from a hermetically sealed refrigeration unit with an air cooled condenser. Chilled water flow in the cooling coils is controlled by a water regulating valve which is controlled by the refrigeration compressor head pressure.

The air flow control system is operated by positioning dampers on the inlet flange of the blower. Volume is adjustable from 1120 cfm to 1820 cfm at altitudes varying from sea level to 5,000 feet.

Dehumidification is controlled by regulating the rate of desiccant reactivation in the dehumidifying chamber. The unit is capable of operating within the following range of conditions on a psychrometric chart:

1) A 35 degree F dry bulb line at zero relative humidity to the saturation line
2) The saturation line from 35 to 57 degrees F
3) The constant moisture line at 70 grains per pound of air from 57 degrees F dewpoint on the saturation line to 77 degrees F dry bulb at approximately 50 percent relative humidity.
4) A line from the 77 degree dry bulb at the 70 grains per pound of air point to 77 degrees F dry bulb, zero relative humidity.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5005

Dust filtering in the unit is 5 micron filtration rating, equivalent to an efficiency rating of not less than 85 percent by the National Bureau of Standards discoloration test standard.

(5) PROBLEM AREA: With the missile in readiness for flight, the electronic equipment and circuitry must be maintained at a constant ambient temperature and humidity to prevent overheating and malfunction.

Equipment is required capable of furnishing a variable air flow of from 1120 cfm to 1820 cfm at 35 degrees F (plus zero degrees or minus 5 degrees F) from sea level to 5,000 feet. The equipment must also hold moisture to 18 grains per pound of air maximum; deliver a uniform flow of air against a static pressure of 32 inches water column gage; and filter the air to 5 micron size with 85 percent efficiency.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5006		Minneapolis-Honeywell GM-4-S1 Spec 27-08083-1 Spec Cont Dwg 27-08014-1 EID-27-8085			CHARGE UNIT, HELIUM, SILO LIFT FSC NOMENCLATURE: CONTROL-CHARGING UNIT, HELIUM			Est 185,000						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															9 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																1/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-349 (1)								

(4) NOMENCLATURE: (PNS) Charge Unit, Helium, Silo Lift.

This is a skid-mounted, cube-shaped unit measuring approximately 60 inches square and weighing approximately 500 pounds. The unit controls and routes, semiautomatically and/or manually, pressurized helium gases from the pneumatic distribution unit into the missile helium storage spheres on the silo lift when the lift is in the lowered position. After separation, when the silo lift is rising, these storage spheres have sufficient helium to continue pressurization of the missile helium storage spheres through the high pressure helium charge section. The charge unit consists of the following sections:

1) High pressure helium charge section
2) High pressure helium relief section
3) High pressure helium emergency section
4) Low pressure helium control section
5) Instrumentation section

Maximum inlet pressure of 6000 psig, received by this unit from the pneumatic distribution unit, is used as follows:

1) The high pressure helium charge section has a 6000 psig inlet pressure. This pressure is regulated to 1000 psig for pressurizing a 0.5 cubic foot helium storage sphere which operates the low pressure helium control section upon separation from silo lift ground pressurization. The 6000 psig inlet pressure also pressurizes a 3.0 cubic foot helium storage sphere to 6000 psig which is regulated to 3050 psig for pressurizing the missile helium storage spheres upon separation from silo lift ground pressurization.

2) The high pressure helium relief section relieves the high pressure helium in the missile spheres when the pressure reaches 3300 plus-or-minus 50 psig.

3) High pressure helium emergency section can pressurize the fuel tank by supplying gas from the helium storage spheres aboard the missile.

4) Low pressure helium control section operates at 35 psig regulated down from the 6000 psig inlet pressure, and is used to operate the unit controllers.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5006

5) Instrumentation section contains integral measuring elements for sensing variables in the controlled fluid. These instruments incorporate integral pneumatic feedback circuits with pilot relay valves having pressure amplification ratios of 3.5 to 1.

This charge unit is pneumatically self-regulating during each of its schedules which are electrically sequenced by remote signals. Sensing lines transmit tank pressure to the controllers. Regulators and relief valves remain stable in the system under both dynamic and static pressure conditions.

The unit performs satisfactorily at any air temperature between plus 30 degrees F and plus 80 degrees F (50 percent relative humidity). The unit is designed to operate within a pressure range from 20.58 to 30 inches of mercury, and is capable of withstanding pressures from 3.44 to 30 inches of mercury non-operating.

The unit is so constructed that all components in the helium gas section have an operating gas temperature range of plus 35 degrees F to plus 80 degrees F. Components are designed to a proof pressure of 150 percent of maximum operating pressure and a minimum burst pressure of 250 percent of operating pressure. Tubing is tested to a proof pressure of 200 percent of maximum operating pressure, and a burst pressure of 400 percent of maximum operating pressure.

(5) PROBLEM AREA: Equipment is required which will relay pneumatic pressure to the missile from the pneumatic distribution unit when the silo lift is in the lowered position, and to continue this pressurization to the missile after the silo lift has separated from the ground connection throughout the transition to launch position.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	WHYS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5007		Minneapolis-Honeywell DM-21-E1 Spec 27-08080-1 Spec Cont Dwg 27-08017-1 EID-27-8086			DISTRIBUTION UNIT, PNEUMATIC **FSC NOMENCLATURE:** MANIFOLD-REGULATOR, PNEUMATIC SYSTEM			Est 85,000						CFE														
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576 C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															10 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																1/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-349 (1)								

(4) NOMENCLATURE: (PNS) Distribution Unit, Pneumatic.

This is a skid mounted unit measuring approximately 96 inches long, 60 inches wide, 60 inches high, and weighing approximately 5,000 pounds.

The unit controls, remotely and semiautomatically, the flow of gases from storage vessels to other ground support equipment via the outlet ports of the unit. The unit provides stable regulated pressure, under both static and dynamic pressure conditions, with varying flow rates in the gaseous nitrogen pressurization system, or with constant flow rates in the helium supply systems.

The unit consists of the following systems:

1) Helium flow control and regulating system.
2) Helium emergency system.
3) Helium charge system.
4) Gaseous nitrogen pressurization system.
5) Emergency instrument air system.

Maximum inlet pressures for this unit are 6000 psig for helium and 4000 psig for nitrogen. With an initial inlet gas temperature of 70 degree F, the minimum inlet pressures and rates of flow for each system are as follows:

1) The helium flow control and regulation system has a minimum inlet pressure of 3900 psig with a flow of 25 pounds, plus-or-minus 1 pound per minute of helium via the helium heat exchanger to the booster helium storage bottles.

2) The helium emergency system has a minimum inlet pressure of 870 psig with a maximum flow of 9 pounds per minute of helium to the pressurization control unit.

3) The helium charge system has a minimum inlet pressure of 6000 psig with a minimum flow of 25 pounds per minute to the helium charge unit.

4) The gaseous nitrogen pressurization system has a minimum inlet pressure of 910 psig with a minimum flow of 48 pounds per minute to the liquid nitrogen vessel.

5) The emergency instrumentation air system has a minimum inlet pressure of 910 psig with a minimum flow of 14 pounds per minute of air to the instrument air system.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5007

The unit performs at any air temperature from 30 degrees F to plus 125 degrees F, and a pressure range from 20.58 to 30 inches of mercury. Components are designed to a proof pressure of 150 percent of maximum operating pressure, and a minimum burst pressure of 250 percent of operating pressure, with the exception of the pressure switches which are proof tested for 10 percent above working pressure of their respective system.

(5) PROBLEM AREA: Equipment is required which will control the flow of gases from storage vessels to the pressurization control unit, the helium charge unit for ground support of the missile, and the chilled helium fill system.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	[hatched]	UNIT PRICE	[hatched]	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AFDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5008		Royal Jet, Inc. 500170 Spec 27-08657-1 EID-27-8249			PUMPING UNIT, HYDRUALIC			Est 45,000					CFE															
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															9 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																11/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-349 (1)								

(4) NOMENCLATURE: (PNS) Preferred - Pumping Unit, Hydraulic

This unit, located on the launch platform, measures approximately 5 feet wide, 5 feet high, 6 feet long, and weighs approximately 2,500 pounds.

The unit contains two independent hydraulic pumping systems housed in a common cabinet. The first stage system is connected to the missile booster hydraulic system; the second stage system to the missile sustainer/vernier hydraulic system.

Each hydraulic-fluid system comprises a pump, pressure compensator control, oil cooler, oil evacuation chamber, sight tube, restricter, and associated electrically and hand operated valves, relief valves, gages, indicators, dampeners, and filters (cleanliness controlled by Convair Spec. No. 0-75014).

The first and second stage systems use a 20 gallon common reservoir, electrical oil cooler motor, and electrical pump drive motor. The system also includes a remote control cable connection which controls the pump motor and an oil evacuation system. The evacuation system removes approximately 65 cubic inches of oil from the missile hydraulic system, under pressure. The remote control cable connection also provides indications, in the launch control center, of the operational readiness of the unit.

Each pump is driven by a 30 hp, 440-volt, 3-phase ac motor. Each pump draws hydraulic fluid (MIL-H-5606A) from the reservoir or missile return line and supplies this hydraulic fluid to the missile at the required rate (8 gpm maximum) and pressure.

Each stage of the unit is used to fill and bleed the respective missile hydraulic system independently. The sight tubes provide a check point to see if the hydraulic system is free of air.

After the system is filled and bled the sight tubes are bypassed and the unit is then ready to supply hydraulic power to either of the missile hydraulic systems, or to both missile hydraulic systems simultaneously.

The unit maintains the desired discharge pressures (2000 psig, and 3000 psig), temperatures, and flow rates automatically. Each system has a fan cooled fin-and-tube type, oil cooler driven by a 3-hp electric motor. The oil cooler maintains the hydraulic fluid from silo ambient temperature of approximately 77 degrees F. to 140 degrees F. A common hydraulic-fluid control panel is mounted on the front of the

By Air Force direction:
1 Part or specification number listed in column 3 is the number proposed for original provisioning.
2 Recommended quantities only are listed in column 7.
3 This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5008

hydraulic pumping unit. This panel contains all of the meters, valves, indicators, gages, switches, and controls required for local manual operation of the system. The panel lights and various unit valves operate on 28 volt dc power. Provisions for remote control of each system from the launch control center are included where required. External outlets provide connection to the nitrogen control unit for pressurization of the oil evacuation chambers (working pressure 500 psig) and the unit reservoir (working pressure 100 psig).

This equipment requires 31 KVA of 440-volt, 60-cycle, 3-phase ac power; 0.3 kw of 28-volt dc power; and 1000 psig (minimum) dry nitrogen gas, from an external source.

(5) PROBLEM AREA: Periodically at the launch site, the two missile hydraulic systems must be functionally checked to ensure their operational readiness. Leak checks and fill and bleed operations must be performed following any maintenance on the hydraulic system. These checkouts require a supply of automatically regulated hydraulic fluid to the two systems from silo ambient temperature of approximately 77 degrees F to 140 degrees F and flow rates to 8 gallon per minute at 3000 psig.

A separate supply of hydraulic fluid is required for each missile hydraulic system. If this supply is manifolded, the actuation of one missile hydraulic system could result in depletion of hydraulic fluid in the supply lines of the inactive system. Such depletion could cause interaction between the thrust chambers and result in damage to the chambers.

The missile internal hydraulic power sources are inoperative until just before engine firing during countdown. However, the countdown procedure calls for activation of both hydraulic systems from an external source prior to this time. Normally, supply pressure during countdown is 2000 psig. Approximately one minute prior to launch 65 cubic inches of fluid volume is removed from each missile hydraulic system to allow for thermal expansion of the fluid during flight.

Equipment is required which can be used for:

1) Filling and bleeding booster and sustainer/vernier hydraulic systems
2) Supplying automatically regulated hydraulic power individually to each separate missile hydraulic system during checkout or countdown. Pressures required are 2000 psig and 3000 psig with remote control of the 2000 psig supply pressures.
3) Remote and local control of the hydraulic power supply and remote control as specified in (2) above.
4) Leak checking missileborne hydraulic plumbing
5) Adequate fluid and contamination control including filtration per Convair Spec. No. 0-75014.

(18) REMARKS GSE item 30.2 in Report No. AP 60-1045 performs a similar function at the SMA.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5009		27-87160-1 Spec 27-08680-1 EID-27-9271			SYSTEM ASSY, HYDRAULIC, MISSILE LIFTING FSC NOMENCLATURE: PUMPING UNIT, HYDRAULIC			Est 62,000					CFE															
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															11 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Hydraulic, Missile Lifting.

The hydraulic missile lifting system assembly provides 3,000 pounds per square inch hydraulic fluid used in the maintenance, firing cycle, and down-cycle of the missile lifting system. This hydraulic system is located on the second level of the crib structure and contains three principal assemblies:

1) Reservoir and Pump Assembly - This is the principal source of all hydraulic power for the remotely-mounted hydraulic actuators. This system contains two hydraulic pumps:

   a) Standby or Make-Up Pump - This pump is operated by a two horsepower electric motor and has a capacity of 4.9 gallons per minute at 200 pounds per square inch.

   b) Main Hydraulic Pump - The main hydraulic pump is of the axial piston, variable displacement type, driven by a 40 horsepower, electric motor.

Hydraulic fluid is supplied from a 275 gallon reservoir. The reservoir and pump assembly also consists of a frame assembly and a flow-control system with associated filters, relief valves, check valves, and necessary piping and tubing.

2) Accumulator Rack Assembly - This rack assembly provides facilities for storing hydraulic power required to operate all silo hydraulic systems during the firing or countdown phases of operation. The principal components within this assembly are:

   a) Accumulator Subassembly

   b) Nitrogen Vessel Subassembly

   c) Accumulator Rack - This rack includes the frame required to tie the accumulators, nitrogen vessels, and valves together

   d) Necessary tubing and piping connecting the assembly

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5009

3) Control Panel Assembly - This panel assembly includes the manifolding necessary to provide hydraulic power to each system. The assembly is composed of the following manifold subassemblies:

   a) Door Cylinders
   b) Crib Locks
   c) Work Platforms
   d) Miscellaneous

(5) PROBLEM AREA: A central source of hydraulic power is required in the crib area to insure the operation of the various items of GSE during launch, testing, and static firing of the missile. This system is also required to seal the interior of the silo from the elements and to protect it from blast damage.

Equipment is required for the performance of the following functions:

1) Open and close blast doors and lock blast doors in closed position

2) Lock crib to silo structure

3) Lock launcher platform to the crib structure, in raised and lowered positions

4) Stabilize launcher platform at ground level

5) Position and retract the missile maintenance platforms

6) Operate stretch sling used for placing missile in stretch

7) Actuate gaseous oxygen vent-retraction system

8) Operate launcher drive disengaging coupling and launcher elevator-brake system

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL.

CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
		STOCK NUMBER																									
ITEM SEQUENCE	GSE SPEC. PARA. NO.	CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER	NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
5010		27-99063-1 Spec 27-09576-1 EID-27-9256			SYSTEM ASSY, LAUNCHER PLATFORM FSC NOMENCLATURE: PLATFORM LAUNCHER SYSTEM, SILO, GUIDED MISSILE			Est 135,198						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															12 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Launcher Platform.

This structure is essentially an open cage-type elevator powered by electric hoists. The assembly is approximately 16 feet square, has an overall height of approximately 49 feet, and wieghs approximately 171,500 pounds. The elevator structure is divided into four unevenly spaced levels connected to each other by stair type ladders. The levels are supported by horizontal members framed between four vertical trusses.

From the top down, the four levels are:

1) Launcher deck
2) Second level deck
3) Grate deck
4) Grate deck

The launcher deck mounts the missile, holddown equipment, and associated equipment. This deck also contains the flame deflector. The deflector, an integral part of the platform structure, is designed to direct missile engine exhaust away from the silo opening and prevent flashback. The flame deflector is lined with gunite at OSTF-2, 576-D, and 576-E.

The second level deck mounts the hydraulic locking system which anchors the entire structure to the walls of the silo during launch. At OSTF-2 and 576-D and E a seal in the form of a plastic buffer around the perimeter of this deck weather-seals the silo and prevents engine exhaust gases from entering the silo during launch. There is no seal installed at operational sites. Additional equipment on this deck includes the APCHE relay, APCHE stub-up, cable box, junction boxes and landline junction box.

The third level grate deck contains hydraulic pumping equipment, nitrogen control unit, and helium supplies. This deck also contains supplementary items of required GSE.

The fourth level grate deck houses the liquid oxygen slug unit, disconnect units, cable ducts, landlines, interfacility box, and pod air conditioner.

An accessory platform is used on the elevator structure. This is the engine compartment access platform. This platform is of removable aluminum grating and L-beam construction and is installed over the flame pit opening when personnel are working on the missile engines. The platform includes a total of 10 grates which cover an area approximately 15 feet long by 9 feet 7 inches wide.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5010

(5) PROBLEM AREA: In the silo configuration, a missile must be supported above ground for firing and below ground for stowing.

An elevator type structure is required which will:

1) Support a fully loaded missile along with various items of GSE required for launch.

2) Provide personnel access for work on the missile engines and GSE.

3) Raise a missile to ground surface for launching.

4) Provide a means of preventing flames and missile exhaust gases from entering the silo during launch at complexes with refire capability.

5) Withstand missile loads, angular misalignment forces, launcher installation, propellant loading, launch, ground shock, stretch and equipment installation.

6) Withstand engine exhaust temperatures, and engine blast at complexes with refire capability.

(18) REMARKS: Only OSTF and training sites have refire capabilities.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	WHEN	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5011		27-24020-1 EID-27-2006			CAPTIVE FIRING KIT, PROPULSION, SERIES E									CFE													
															8 mo	7/10/60	8/18/60	OSTF No. 1	1							1	
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		OSTF No. 2									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

CONTRACT NO. AF 04(647)-370

CONTRACT NO. AF 04(647)-346

CONTRACT NO. AF 04(647)-453

CONTRACT NO. AF 04(647)-605

(4) NOMENCLATURE: (PNS) Captive Firing Kit, Propulsion, Series E.

This kit comprises the following subassemblies:

Nomenclature	Part No.	Qty.
Secondary shutdown kit assembly	27-24513	2
Engine overspeed cutoff kit installation	27-24310	2
Purge kit assembly and installation	27-24016	1

The secondary shutdown kit is attached to the pedestal longerons in Quadrants I and III of the booster section at approximately station 1218.0. The kit consists of a pneumatic reservoir which is filled through a manifold installed in a pressurizing port with a check valve and a pressure gage (zero to 3000 psig). Gaseous nitrogen is fed through the port and check valve prior to firing. The gaseous nitrogen creates a tank pressure of 800 psi (plus or minus 100 psig). A line connects the manifold to a solenoid operated three way valve. Operation of the solenoid releases the pneumatic pressure through a flex line to the booster engine main oxidizer valve control manifold. Closing the main oxidizer valve also closes the main fuel valve, causing the booster engine to shut off.

The engine overspeed cutoff kit consists of a spring loaded weight mounted on a spinning shaft. When the shaft speed exceeds the maximum speed for which the trip mechanism was set, the force exerted on the spring by the rotational acceleration of the weight overcomes the spring force and moves outward. In so doing, the weight cams a lever which releases a spring loaded rod. This rod in turn actuates a microswitch to energize the complete cutoff relay in the engine control circuit. The trip mechanism is mounted on the accessory drive pad of the turbopump.

The purge kit consists of a launcher mounted supply manifold, a missile mounted distribution manifold, and associated flex hoses and connections. A 1000 psig gaseous nitrogen source is fed through a filter to the supply manifold where, by the use of orifices and solenoid operated valves, pressures are supplied through flex hoses to the distribution manifold. The distribution manifold, mounted on the radiation shield of the booster section, consists of three supply inlets and seven outlets. Gaseous nitrogen is distributed through three of these outlets to the booster and sustainer oxidizer domes. A fourth outlet distributes gaseous nitrogen for purging the vernier engines. The three remaining outlets distribute gaseous nitrogen to the booster and sustainer igniter fuel lines. The only orificed outlets in the distribution manifold are the two leading to the booster igniter fuel lines.

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.

Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5011

(5) PROBLEM AREA: During captive firing of the MA-3 engine system, booster engines must be cut off in case of missile electrical power failure and all engines must be cut off in case of turbopump overspeed.

Equipment is required which can be used to cut off booster engines in the event of missile electrical power failure and cut off all engines in case of turbopump overspeed. The equipment supplied must be designed to remove residual hypergol and oxidizer before personnel enter the test area and thus eliminate any unsafe condition which may exist in thrust chambers and associated equipment.

(18) REMARKS: This item supersedes Item 1104.

OSTF No. 2 item deleted per BMC TWX LBTCR-4-67E dated 21 April 1960.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	NOTES	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5012		27-49910-1 EID-27-9059			LAUNCHER AND UTILITIES ASSY., SILO FSC NOMENCLATURE: LAUNCHER PLATFORM, SILO, GUIDED MISSILE			Est 325,000						CFE														
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															13 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) Launcher and Utilities Assembly, Silo.

This item comprises the following components:

1) Support Frame: This frame consists of two horizontal members supported by tripod tube assemblies which are attached to the top level of the launcher platform. The entire frame structure supports and holds a missile in proper position over the flame bucket so that exhaust gases will not impinge on the launcher or launcher platform.

   Four locating pins on the launcher platform are mated with openings in the missile to provide accurate positioning of the missile in the structure. The launcher is equipped with four manually operated holddown clamps which hold the missile in place after launcher mating and during fuel loading.

2) Supporting Towers: The towers comprise tube-type structures which support the air conditioning ducts and electrical umbilical lines. One tower is used on each launcher at operation of bases and two towers per launcher at OSTF 2, 576 D and 576 E.

3) Service Lines: The hydraulic and pneumatic connections servicing a missile from the launcher platform, are grouped in a disconnect panel which is mounted on the launcher.

(5) PROBLEM AREA: A missile must be maintained in vertical readiness at the launcher installation.

Equipment must be supplied which can be installed on the launcher platform and provide:

1) Missile support and stability during readiness and countdown through launch.

2) Quick disconnect at missile rise-off.

3) Hydraulic, pneumatic, propellant, and electrical lines necessary for servicing a missile prior to launch. This includes topping and supercooled transfer of liquid oxygen.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFSMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective P as guide for inserting Rev

ITEM NUMBER 5012

4) Missile holddown at stowed position, launch position, any level between stowed and launch positions.

5) Support for ducts and cables.

(18) REMARKS: This item is similar in function to GOE item 5000.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT L LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5013		27-99074-1 Spec 27-09587-1 EID-27-9275			SYSTEM ASSY., DOOR CLOSURE FSC NOMENCLATURE: DOOR ACTUATING MECHANISM SILO, GUIDED MISSILE			Est 45,850						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															13 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Door Closure.

This system comprises the following equipment:

1) Actuating Cylinders - These are two hydraulic cylinders one for each concrete silo door. The cylinders are hung by trunnion mounts in the silo cap. Actuation of the cylinder opens or closes the silo doors through action of the cylinder piston.

2) Door Cylinder Mounting Brackets - Two trunnion brackets mounted on the silo cap support the hydraulic cylinders. Bearings in the brackets allow free swing of the actuating cylinders.

3) Actuator Cylinder Door Bracket - The piston rod ends of the actuator cylinders are attached to brackets mounted on the underside of each silo door. Extension or retraction of the rod raises or lowers the door.

4) Breakaway Door Cylinders - Four breakaway door cylinders are mounted in the cap opening, two for each door. Each cylinder rod has a 5-inch stroke. The cylinders are capable of breaking the doors loose from the silo cap frame under conditions of icing and/or misalignment.

(5) PROBLEM AREA: Two doors of reinforced concrete with sealed edges are used to weather seal the silo and protect the interior from the effects of near miss thermonuclear explosions. Opening and closing the silo doors is part of the missile launch and checkout procedures.

Equipment is required which will open silo doors in 45 seconds against a surface weight of 30 pounds per square foot, complete icing of the system, and/or a wind force of 60 mph.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5013

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	MAINT.	UNIT PRICE	TOTAL UNIT PRICE	COGNIZANT LABORATORY, CENTER & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5014		27-99065-1 Spec 27-09578-1 EID-27-9273			SYSTEM ASSEMBLY LOCKING, LAUNCHER PLATFORM FSC NOMENCLATURE: LOCKING SYSTEM, LAUNCHER PLATFORM			Est 176,457						CFE														
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															12 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-603									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly Locking, Launcher Platform.

This system is designed to lock the launcher platform rigidly in the stowed or launch position as required. The device will lock the launcher platform to the silo cap within 5 seconds after the platform has reached launch position at the end of travel. Electrical circuitry indicates the status of the system. When locked in position, the launcher platform is aligned with the silo centerline.

The system is broken into five main components:

1) Lock Actuators. Lock actuators are attached to each of the four corner columns on the second level of the launcher platform. The locks are on the same plane and each lock is connected to a movable actuator rod attached to guide rollers.

2) Guide Rollers. The guide roller assembly comprises two shaft mounted guide rollers linked together vertically. The upper roller follows an arc which pulls the lower guide roller into rigid locking position at the silo cap within 5 seconds after the platform is in place. The assembly will develop a preload stress of up to 235,000 pounds. A hydraulic wedge on the back of the actuator rod, moving the lock actuators, acts as an interlock. This wedge will lock the actuator rod in position in one second. The guide rollers operate on a tapered platform alignment rail.

3) Platform Alignment Rail. This is a tapered rail section mounted on the silo cap. The guide rollers operate on this rail which serves to align the launcher platform with the opening in the silo cap.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5014

4) Up-Lock Strikers. In addition to the platform alignment rail, four lock strikers are mounted in the silo cap. Each striker acts as a cam for one of the four sets of guide rollers thus providing a launcher platform stop and a rigid locking position for the system.

5) Down-Lock Strikers. Four down-lock strikers are mounted on the crib structure for locking the launcher platform in down (stowed) position. These strikers form a rigid connection between the launcher platform and the crib structure.

(5) PROBLEM AREA: Launching and checkout of the missile requires that the launcher platform be locked rigidly to the supporting structure. Similarly the platform and missile load must be locked rigidly in place to the crib structure when in stowed position.

Equipment is required which will:

1) Provide a preloaded and rigid lock position at both the launcher and stowed positions of launcher platform and missile.

2) Support designated load.

3) Withstand heat and blast conditions at sites with refire capabilities.

4) Withstand ground shock

5) Align the launcher platform center with the silo center.

6) Prevent launcher platform movement in the stowed position

(18) REMARKS: Only OSTF and training sites have refire capability.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL.

CONTRACT NO. (See Column 7) | REV. A-Feb '61

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SAA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																								
5015		27-27729-1 Spec 27-02378-1 EID-27-2004			CHARGE UNIT, LIQUID OXYGEN			Est 150,000					CFE															
																		CONTRACT NO. AF 04(647)-370										
																		OSTF No. 1										
																		CONTRACT NO. AF 04(647)-346										
																		576-C										
																		567										
																		548										
																		706										
																		549										
																		CONTRACT NO. AF 04(647)-453										
															8 mo			OSTF No. 2	1							1		
																		CONTRACT NO. AF 04(647)-605										
																4/14/60	2/21/61	576-D	1								1	
																		576-E	1								1	
																2/24/60		550	12								12	
																		551	12								12	
																		577	12								12	
																		578	12								12	
																		579	12								12	
																		556	12								12	
																		ATC										

REASON FOR DELETION

The requirement for this item no longer exists, due to revisions in launch sequence programming.

DELETED

(4) NOMENCLATURE: Charge Unit, Liquid Oxygen.

The liquid oxygen charge unit comprises the following principal subassemblies:

1) Tank assembly
2) Fluid control pressurization installation
3) Electrical power and controls installation
4) Vacuum system installation

The tank assembly includes a liquid oxygen storage tank within a liquid oxygen shroud tank. A vacuum insulated tank surrounds the shroud. The fluid control and pressurization installation consists of valves, regulators, guages, a helium blanket subsystem, and a nitrogen purge subsystem. An ac electrical power system and a dc control system comprise the electrical power and controls installation. The vacuum system installation includes a vacuum pump, an oil separator, a shutoff valve, and a vacuum guage.

The liquid oxygen storage tank is filled with 450 gallons of liquid oxygen. By pressurizing the tank a maximum of 400 gallons of liquid oxygen is transferred to the missileborne equipment while the launcher platform is rising to launch position. The amount of liquid oxygen transferred is controlled by the missileborne equipment.

The tank assembly recommended at OSTF No. 2 is provided with instrumentation fittings. The tank assemblies recommended for operational bases are not provided with these fittings.

(5) PROBLEM AREA: A quantity of liquid oxygen is required in the missileborne propulsion system 60 seconds prior to engine start. This liquid oxygen is required to maintain a net positive suction head at the turbopumps. The transfer of liquid oxygen must be accomplished during launcher platform rise and in proper sequence during the countdown procedure.

Equipment is required which will supply this liquid oxygen.

(18) REMARKS: This item was formerly listed as the liquid oxygen subcooled slug unit (FSC Nomenclature: Subcooler, Liquid Oxygen, A/F 32R-2). The requirement for subcooling the liquid oxygen by liquid nitrogen has been deleted.

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.

Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity | Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5015

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRO DUCTION LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5016		27-99073-1 Spec 27-09586-1 EID-27-9357			SYSTEM ASSY, COLLIMATOR FSC NOMENCLATURE: ACCESSORY GROUP, COLLIMATOR, INERTIAL GUIDANCE SYSTEM			Est 6,120						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															10 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Collimator.

This item provides an optically unobstructed path for a beam of light between the missileborne inertial guidance system (IGS) stabilized platform porro prism and a collimator located in an enclosure in the silo wall. The sight tube remains attached to the missile until rise-off, at which time it swings upward to clear the missile and launcher platform structure.

The collimator system assembly comprises the following components:

1) Collimator enclosure
2) Access ladder
3) Collimator support platform
4) Bench mark supports
5) Collimator sight tube
6) Collimator sight tube retraction mechanism
7) Signal devices

The collimator enclosure is an insulated room which houses the collimator, collimator support platform, and bench mark supports. This room is fastened to the side of the silo between the sixth and seventh levels and houses the operational and maintenance personnel for the collimator system. The enclosure is provided with a positive-action, self-closing door and is caulked and insulated to maintain a constant internal temperature level. A handrail is provided around the collimator platform for personnel and equipment safety.

Since the enclosure is located approximately eight feet above the level of the crib structure, a ladder is provided to give personnel safe and unrestricted access to the enclosure.

The collimator support platform is a 3-foot 6-inch diameter plate which support the collimator rigidly. The supporting structure of the platform fastens to a steel plate mounted on the wall of the silo.

Two bench mark supports are housed in the collimator enclosure. The supporting structures fasten to facility-furnished steel plates mounted on the wall of the silo.

The collimator sight tube provides an optically unobstructed path for a beam of light to transmit data from the collimator to the missile. The tube is constructed of 10.75-inch diameter aluminum tubing coated on the inside to reduce light diffraction. Neoprene boots and sleeve

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.

Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5016

joints are installed at each end of the tube. These boots and joints preserve alignment at all times and provide flexible and adjustable connections to adjoining structures.

The tube is constructed in two sections; one section is fixed, the other is movable. The fixed section is fastened to the crib structure with two adjustable fittings. These fittings allow minor adjustments in alignment. One end of the fixed section is provided with an adjustable, flexible connection with the collimator enclosure. The other end of this section mates with the hinged end of the movable section of the tube.

The movable section is fastened to the structure by a hinge. A seal fitting on the lower end of the movable section mates with a similar fitting on the fixed section when the tube is in operating position. The upper end of the movable section is coupled to the missile through a sleeve coupling, neoprene boot, and another sleeve coupling. This upper sleeve has a 1/2-inch thick neoprene gasket that mates and provides a soft contact with the skin of the missile. The upper sleeve is also provided with a bar which acts as a window-hook fastener to keep the tube locked to the missile.

The collimator sight tube retraction mechanism consists of a 190-pound counterweight. Upward movement of the missile causes the window-hook fastener to release and the movable section of the tube to swing upward through an arc of approximately 64 degrees to stowed position. In stowed position there is a 2-inch minimum clearance between the sight tube and the launcher platform. A detent equipped with a neoprene bumper provides shock absorption and prevents tube rebound from the stowed position. This arrangement allows one-man manual extension of the collimator tube to operating position.

Signal devices consisting of 28-volt dc microswitches signal the position of the movable section of the collimator tube to the missile launcher lift control.

(5) PROBLEM AREA: An unobstructed refraction-free, line-of-sight between the ARMA collimator and the (AIG) missileborne stabilized platform porro prism must be provided.

Equipment is required which will:

1) Be adjacent to the AIG window during platform fine alignment.

2) Retract to a safe position just prior to missile rise-off.

3) Provide baffles or other devices in the tube structure to prevent light dispersion.

4) Provide a minimum 9 inches inside diameter aperture.

5) Have a minimum dimension of 4.5 inches from the centerline-of-sight to any inner circumference of the baffle or structure.

6) Maintain light beam alignment within a tolerance of plus-or-minus 2 seconds of arc.

7) Maintain a temperature gradient of not more than 5 degrees F between the collimator enclosure and the missile, in conjunction with a flow of conditioned air.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1) ITEM SEQUENCE	(2) GSE SPEC PARA NO	(3) STOCK NUMBER: CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER	(4) NOMENCLATURE	(5) DESCRIPTION OF PROBLEM AREA	(6) UNITS	(9) UNIT PRICE	(10) TOTAL PRICE	(11) COGNIZANT LABORATORY, CENTER, & SERVICE	(12) TYPE CLASSIFICATION	(13) PROPOSED SUPPLY SOURCE	(14) SOURCE CODE	(18) SECURITY CLASS & REMARKS	(16) EST PRODUCTIONS LEAD TIME	(17) DATE OF ARDC APPROVAL	(15) EST DATE FIRST ITEM AVAILABLE	LOCATION	(7) AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	(8) TOTAL ON ORDER
5017		27-99064-1 Spec 27-09577-1 EID-27-9270			SYSTEM ASSEMBLY, GASEOUS OXYGEN VENT MECHANISM FSC NOMENCLATURE: VENTILATION SYSTEM, GASEOUS OXYGEN			Est 9,000						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															10 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Gaseous Oxygen Vent Mechanism.

The gaseous oxygen vent system consists of the following components:

1) Outlet pipe and flexible bellows

2) Flexible duct from the fan inlet to the outlet of the hinged retractable pipe

3) Straight section of fan inlet pipe

4) Hinged and counterbalanced pivoting section of inlet pipe approximately 18 inches inside diameter and 12 feet long

The system is designed to carry a large volume of air-oxygen mixture as it pours from the missile liquid oxygen boil-off valve. The equipment provides rapid dilution and evacuation to prevent excessive concentration of oxygen and consequent safety hazard. During standby and liquid oxygen loading the pivoted inlet pipe is in a horizontal position. When in this position, the pipe removes the gaseous oxygen as it boils from the gaseous oxygen relief valve.

The pivoted inlet pipe is attached to a hydraulically actuated arm designed to swing the pipe 90 degrees to a vertical position to clear the missile just before the elevator starts its rise to launch position.

(5) PROBLEM AREA: The rapid boil-off of gaseous oxygen from the missile oxygen boil-off valve creates a serious safety problem in the silo.

Equipment is required which is capable of high velocity transfer of gaseous oxygen from the boil-off valve to the facility air changing chambers where this gaseous oxygen is exhausted from the silo and dispersed. To prevent missile damage, the equipment provided must be automatically retractable from the missile prior to lift to launch position.

By Air Force direction
1 Part or specification number listed in column 3 is the number proposed for original provisioning.
2 Recommended quantities only are listed in column 7.
3 This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5017

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNIT OF ISSUE	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AROC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5018			27-99061-1 EID-27-9274		SYSTEM ASSY, SUSPENSION, CRIB FSC NOMENCLATURE: SUSPENSION SYSTEM, SILO CRIB, GUIDED MISSILE			Est 29,500										CONTRACT NO. AF 04(647)-370										
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															7 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	7/23/60	576-D	1							1	
																		576-E	1							1	
																† 3/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) - System Assembly, Suspension, Crib.

This system consists of four wall brackets and eight crib suspension shock struts.

The four wall brackets are mounted 90 degrees apart on the wall of the silo. These brackets support the crib suspension shock struts, which in turn support the crib.

Eight shock struts, paired into four sets, are equally spaced around the periphery of the crib and attached to the wall bracket. Each strut is 60 feet long. Each strut consists of a central spring capsule with a 5-inch diameter centered strut rod at each end of the capsule. The end of one rod attaches to the silo wall bracket; the end of the other rod attaches to the crib. The spring capsule comprises six concentric pairs of springs and six spools, mounted to form a column. Seven spacer plates and three rods extending the length of the column, hold the springs in position.

Each strut provides 23 inches of vertical deflection from free height, and sustains the loads incurred by this deflection.

(5) PROBLEM AREA: The silo launching site must be capable of launching a missile after experiencing a near miss by a nuclear weapon.

Equipment is required to isolate the loaded crib structure from the ground shock created by a nuclear explosion. The equipment provided must be designed to withstand the loads imposed by the following conditions:

1) Missile installation
2) Raising and lowering of launcher platform
3) Stowed and launch positions of launcher platform
4) Propellant loading
5) Missile launch
6) Ground shock

(18) REMARKS: †Technical Figure-A approval of this item granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1119 in part per Provisioning Conference action 19 February 1960.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5018

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	15		7								8
ITEM SEQUENCE	GSE SPEC PARA NO	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT AMCHEP	AT LCCS	AT GUID STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG PART OR DWG. NUMBER																						
5019			27-99091-1 EID-27-9287		SYSTEM ASSY, LOCK AND DAMPER FSC NOMENCLATURE: DAMPER AND LOCK SYSTEM SILO CRIB, GUIDED MISSILE			Est 114,400						CFE													
																		CONTRACT NO AF 04(647)-370								
																		OSTF No 1	—						—	
																		CONTRACT NO AF 04(647)-346								
																		576 C	—						—	
																		567	—						—	
																		548	—						—	
																		706	—						—	
																		549	—						—	
																		CONTRACT NO AF 04(647)-453								
															9 mo			OSTF No 2	1						1	
																		CONTRACT NO AF 04(647)-605								
																4/14/60		576 D	1						1	
																		576 E	1						1	
																3/22/60	8/9/60	550	12						12	
																		551	12						12	
																		577	12						12	
																		578	12						12	
																		579	12						12	
																		556	12						12	
																		ATC								

(4) NOMENCLATURE: (PNS) - System Assembly, Lock and Damper.

This system comprises the following locks and dampers:

1) Vertical spring capsule locks. Four vertical spring capsule locks, one on each set of suspension struts, lock the struts into single units and level the crib prior to launch. Each locking device consists of a hydraulic cylinder and locking fork. The fork locks the strut to within 1.16-inch of nominal length from a maximum initial error of plus-or-minus 3 inches.

2) Horizontal crib-to-silo locks. Three horizontal locks consisting of a hydraulic cylinder on the crib which exerts force against a striker plate in the silo wall, are located 120 degrees apart in the upper area of the silo. These locks position the crib centerline to within plus-or-minus 0.06-inch of the silo centerline.

3) Vertical shock strut dampers. There are four dampers, one for each set of shock struts. Each damper consists of spring loaded friction blocks which bear against the center rod of the crib suspension shock strut. Each damper exerts a force of 950 pounds.

4) Horizontal crib-to-silo dampers. Four horizontal dampers are equally spaced around the periphery of the crib. Each damper consists of a telescoping rod attached to a set of spring loaded friction blocks which bear against the damper rod. Each damper exerts a force of 200 pounds and is capable of plus-or-minus 8 inches of vertical motion and plus-or-minus 4 inches of unilateral motion.

(5) PROBLEM AREA: The silo launching site must be capable of launching a missile after experiencing a near miss by a nuclear weapon.

Equipment is required to dampen ground shock vibrations, lock the crib to the silo to provide a stable structure for launch, and position the crib centerline to the silo centerline under all load condition. The system provided must be designed to withstand the loads imposed by the following conditions:

By Air Force direction
1 Part or specification number listed in column 3 is the number proposed for original provisioning.
2 Recommended quantities only are listed in column 7.
3 This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages

ITEM NUMBER 5019

1) Missile installation
2) Raising and lowering of launcher platform
3) Stowed and launch positions of launcher platform
4) Propellant loading
5) Launch
6) Ground shock

(18) REMARKS. †Technical Figure-A approval granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1119 in part per Provisioning Conference action 19 February 1960.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL.

CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA		UNIT PRICE		COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5020			27-99096-1 EID-27-9288		SYSTEM ASSY., COUNTERWEIGHT FSC NOMENCLATURE: COUNTERWEIGHT, LAUNCH PLATFORM, MISSILE LIFTING			Est 88,700						CFE														
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															8 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60		576-D	1							1	
																		576-E	1							1	
																† 3/22/60	6/25/60	550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Counterweight.

This assembly consists of iron and steel slabs and two sheave subassemblies.

The slab unit comprises approximately 26 cast iron and 3 steel slabs bolted together to form a 541,000-pound counter-weight at operational sites. Approximately 19,000 pounds of additional weight is required at OSTF and training sites to compensate for special equipment installed on the launcher platform. The unit measures approximately 19 feet wide, 3-1/2 feet deep, and 24 feet high. A V-shaped groove in each vertical end of the counterweight accomodates a guide rail. Guide shoes are mounted on the two faces of each groove to provide bearing surfaces for the guide rail.

Two sheave assemblies, each weighing approximately 4,650 pounds, are bolted to the counterweight assembly, one on each side. Each sheave is provided with five grooves to accomodate the drive system wire ropes.

(5) PROBLEM AREA: The launcher platform, together with a fully loaded missile and all GSE on the platform, must be raised to ground level prior to launching the missile. Various other operations involving checkout and test also require missile surfacing. Equipment is required to minimize the power required to raise and lower the loaded missile launcher platform.

(18) REMARKS: †Technical Figure-A approval granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1118 in part per Provisioning Conference action 19 February 1960.

*By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex end/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages

ITEM NUMBER 5020

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRO DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
																		CONTRACT NO. AF 04(647)-370									
5021		27-99077-1			SYSTEM ASSY,			Est					CFE					OSTF No. 1									
		EID-27-9290			GUIDE RAILS,			8,700																			
					COUNTERWEIGHT																						
					FSC NOMENCLATURE:																						
					GUIDE RAIL, COUNTERWEIGHT MISSILE LIFTING, LAUNCH PLATFORM																							
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															8 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60		576-D	1							1	
																		576-E	1							1	
																† 3/22/60	10/12/60	550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Guide Rails, Counterweight.

This assembly comprises the following components:

1) Counterweight guide rails
2) Brackets

The guide rails are mounted vertically in the launcher platform counterweight shaft to restrain lateral movement of the counterweight. The rails are fabricated of 8-inch by 8-inch by 1-inch thick steel angles. Each rail is welded to a 1-inch thick backup plate approximately 12 inches wide. The backup plate is reinforced by a 1-inch thick, 4-inch wide welded steel rib. For ease of handling and to facilitate assembly, the rails are fabricated in sections and fitted end-to-end forming an over-all length of approximately 136 feet 9-1/2 inches.

The brackets are short steel bars used to secure the guide rails to the crib structure. One side of each bracket is welded to the back of the guide rails. The other side is bolted to a casting which in turn is mounted on a channel beam attached to the crib structure. The castings are shimmed to insure that camber in the guide rails is less than 3/8-inch in 40 feet. Above 947 feet the guide rails are adjusted to allow 0.3-inch clearance between the counterweight shoes and the guide rail face. Below 947 feet the guide rails taper to a clearance of 0.6-inch.

(5) PROBLEM AREA: Missile launching from an underground crib structure requires raising the missile to ground surface prior to launch. Various other operations which involve checkout and tests also require missile surfacing.

Equipment is required to prevent lateral movement of the launcher platform counterweights under both static and dynamic conditions.

(18) REMARKS: †Technical Figure-A approval granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1118 in part per Provisioning Conference action 19 February 1960.

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5021

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3) STOCK NUMBER			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO	CLASS CODE	SERIAL NUMBER	MFG PART OR DWG. NUMBER	NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
5022			27-99094-1 EID-27-9269		SYSTEM ASSY, DRIVE, LAUNCHER PLATFORM FSC NOMENCLATURE: DRIVE ASSEMBLY, LAUNCH PLATFORM, GUIDED MISSILE			Est 194,800						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															11 mo			OSTF No 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60		576 D	1							1	
																		576-E	1							1	
																† 3/22/60	10/19/60	550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) - System Assembly, Drive, Launcher Platform.

This system, which raises and lowers the launcher platform, comprises the following subassemblies:

1) Motors: Two identical 125-hp, 480-volt, 60-cycle, 3-phase, open-drip-proof, crane-and-hoist-wound-rotor electric motors are provided. These motors have the following characteristics:

Synchronous speed - 1800 rpm
Temperature, ambient - 40 deg C
Temperature Rise - 70 deg C
Insulation - Class B
Minimum breakdown torque - 275 percent
Frame - NEMA 505

One motor is used for high-speed hoisting at a rate of 2.42 feet per second; the other motor is used for low-speed hoisting at a rate of 0.24 to 0.26 feet per second. Each motor drives a tachometer generator, rated 230-volt dc, at 2300 rpm. Tachometer generator speed is 2300 rpm when the motor speed is 1800 rpm.

2) Main Reduction Gear: The high-speed motor is connected directly to the main reduction gear which has a reduction ratio of 12.077:1. This reduction gear drives two traction sheaves, through flexible couplings, shafts, and drive gears.

3) Auxiliary Reduction Gear: The low-speed motor is connected to an auxiliary reduction gear through a shaft and flexible connection. This auxiliary reduction gear has a gear ratio of 11.3:1. Output of this reduction gear is transmitted to the main reduction gear for further reduction, through a shaft and clutch assembly.

4) Clutch Assembly: The auxiliary reduction gear is disconnected from the main reduction gear during high-speed operation, by means of a clutch coupling. The clutch coupling is located between the auxiliary and main reduction gears, and is disconnected by a hydraulic cylinder that actuates a lever connected to the gear coupling.

5) Brake Assembly: A 28-1/4-inch diameter disk is attached to the shaft of the high-speed

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity | Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5022

motor. A U-shaped yoke mounted around the disk holds four hydraulically actuated brake shoes. These shoes, of fail-safe design, exert breaking pressure on both sides of the disk simultaneously.

6) Traction Sheaves: Two traction sheaves, driven from the main reduction gear, along with the wire rope subassemblies, provide the means of raising and lowering the launcher platform.

7) Motor Controls: Both motors are controlled from a common saturable-reactor type control network. Speed and direction commands are presented in the form of several preset command voltages from a reference voltage supply. These command voltages are automatically switched into the reference voltage selection circuitry by outputs from the control monitor group (Item 5035). Motor speed is controlled by tachometer feedback control. The control circuitry, amplifiers, and power transformer are housed in control cabinet No. 1, which weighs approximately 600 pounds. The saturable and secondary reactors, and the secondary resistors are housed in control cabinet No. 2 which weighs approximately 3000 pounds.

8) Base Structure Subassembly: This subassembly is constructed of I-beams, steel plates, and grids. The subassembly is installed on the first level of the silo. This subassembly supports the electric motors, transmission subassembly, counterweights, and approximately 50 percent of the launcher platform weight.

(5) PROBLEM AREA: Missile launching from an underground crib structure requires raising the missile to ground surface prior to launch. Various other operations which involve checkout and tests also require missile surfacing.

Equipment capable of raising the platform together with a fully loaded missile and all GOE/GSE on the platform, from the stowed to launching position, is required. The equipment provided must be designed to make controlled stops at any point of travel under any load conditions, and must raise the missile into launch position within prescribed time limits. Local and remote controls are required for operation of this equipment.

(18) REMARKS: † Technical Figure-A approval granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1118 in part per Provisioning Conference action 19 February 1960.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5023			27-99092-1 EID-27-9289		SYSTEM ASSY., CABLE AND GUIDE, LAUNCHER PLATFORM FSC NOMENCLATURE: GUIDE ASSY -WIRE ROPE SET, LAUNCH PLATFORM, MISSILE LIFTING			Est 146,000						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															8 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	11/23/60	576-D	1							1	
																		576-E	1							1	
																† 3/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Cable and Guide, Launcher Platform.

This assembly comprises the following components:

1) Wire rope subassembly
2) Tension equalizer subassembly
3) Idler sheaves
4) Guide rails
5) Guide rail brackets
6) Guide roller subassemblies

The wire rope subassembly consists of two wire rope sets, five wire ropes to a set. The sets are connected to the under side of the first level below the drive mechanism in Quadrants I and IV in the counterweight shaft. Each set loops down and through the counterweight sheaves, up and over the drive sheaves, down the launcher platform shaft, under the launcher platform, and then up the launcher platform shaft to elevation 991 feet where the ropes are secured in Quadrants II and III. Each wire rope is approximately 1-1/2 inches in diameter with a 6 by 25-1-6-6-12 strand with a minimum breaking strength of 228,000 pounds.

The ropes terminate in a tension equalizer in Quadrants II and III. This tension equalizer evens the tension between the two sets of wire rope through a crossbar which transfers a portion of the excess tension in one set of wire ropes to the other set until the tension in both sets is equalized.

Four idler sheaves are mounted on the underside of the launcher platform, one sheave at each corner. These sheaves rest on the wire ropes and support the launcher platform. Shortening or lengthening the wire ropes in the launcher platform shaft raises or lowers the launcher platform.

Three vertical guide rails are attached to the inner sides of the launcher platform shaft structure. These rails minimize lateral movement or tilting of the launcher platform and provide a smooth vertical track for the launcher platform guide rollers throughout the full range of launcher platform travel. The rails are of I-beam construction with the flanges machined to provide a smooth bearing surface. One I-beam rail, 17 inches deep is located in Quadrant III; two I-beam rails, one 17 inches deep and the other 10 inches deep, are located in Quadrant IV. The larger

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5023

rails extend from elevation 851 feet 9 inches to elevation 991 feet 3 inches. The small rail terminates at elevation 977 feet 3 inches. Camber in the rails does not exceed 0.075-inch in 30 feet. Small angle brackets are welded along the back of the guide rails at intervals. These brackets are bolted to fittings fastened to the crib structure. The use of shims and slotted bolt holes permits accurate vertical alignment of the guide rails.

Three guide roller subassemblies are attached to the bottom level of the launcher platform and mate with the three guide rails. Two large roller subassemblies are attached to the launcher platform at the next higher level and mate with the two large guide rails. Each subassembly consists of two rollers mounted on a large casting. The guide rail passes between the rollers.

(5) PROBLEM AREA: Missile launching from an underground crib structure requires raising the missile to ground surface prior to launch. Various other operations which involve checkout and tests also require missile surfacing.

Equipment is required which will align the launcher platform vertically in the shaft; support, raise, and lower the launcher platform between stowed and launch positions; and minimize horizontal shifting or twisting of the launcher platform under both static and dynamic conditions.

(18) REMARKS: †Technical Figure-A approval granted by AFBMD TWX R2201002 dated 22 March 1960.

This item supersedes item 1118 in part per Provisioning Conference action 19 February 1960.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV. A-Feb '61

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5025		Hahn & Clay Machine And Boiler Works 1065 Spec Cont Dwg 27-02454-1 EID-27-2007			TANK, HIGH PRESSURE GAS, SLUG FILL FSC NOMENCLATURE: TANK, PRESSURE			Est 5,000						CFE				CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															7 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-349 (1)								

(4) NOMENCLATURE: (PNS) Tank, High Pressure Gas, Slug Fill.

The tank is a slightly elongated cylindrical high pressure tank approximately 44 inches in diameter mounted with the major axis vertical. The tank contains gaseous nitrogen at 4000 psi operating pressure used to pressurize the liquid oxygen slug unit for transferring liquid oxygen to the missile. The tank is located on the fourth level of the launcher platform and has a maximum weight of 8000 pounds.

(5) PROBLEM AREA: To improve starting characteristics liquid oxygen must be forced to a point directly upstream of the rocket engine propellant pumps during the last 60 seconds prior to engine start.

A device is required to perform this operation.

DELETED

REASON FOR DELETION

The requirements for this item no longer exists, due to revisions in launch sequence programming.

By Air Force direction.

1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.

Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area

Use Current List of Effective Pages as guide for inserting Revision Pages

ITEM NUMBER 5025

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF APDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5026		Spec 27-06181-3 EID-27-6156 RCA 1023692-502			CONSOLE, LAUNCH CONTROL, UNITARY CONCEPT FSC NOMENCLATURE: CONSOLE, LAUNCH CONTROL			Est 20, 000					CFE															
																			CONTRACT NO. AF 04(647)-370								
															15 mo			OSTF No. 1		1						1	
																			CONTRACT NO. AF 04(647)-346								
																7/10/59	5/24/60	576-C		1						1	
																		567		9						9	
																		548		9						9	
																		706									
																		549		9						9	
																			CONTRACT NO. AF 04(647)-453								
																		OSTF No. 2									
																			CONTRACT NO. AF 04(647)-605								
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC	T-306 (1)								

(4) NOMENCLATURE: (PNS) Console, Launch Control, Unitary Concept.

This item consists of a table-type console which measures overall approximately 72 inches wide, 40 inches deep. 42 inches high. The console weighs approximately 500 pounds.

The console comprises left hand and right hand legs with communication panels, and a center panel. The center panel contains the status indicators and controls necessary to permit one operator to launch a missile. This panel includes a countdown clock, target and burst selection, fuel and liquid oxygen load meters, missile fuel and liquid oxygen pressure meters, systems operation and fault indicators in bar-graph form, and commit sequence indications.

(5) PROBLEM AREA: The unitary concept requires that one operator (launch control officer) accomplishes missile launching. This concept further requires that standby status be incorporated as an integral part of launch equipment and provide sufficient indications to establish the state of readiness for launch.

Equipment is required which will satisfy the foregoing parameters. The equipment supplied must hold fault indications to a minimum and provide a summary of the individual responses displayed on the chassis panels of the relay logic units.

(18) REMARKS: Function of this item includes functions of items 79.7, 79.8, and 79.8.2 in Report No. ZM-7-357.

This item is used with item 5027. During operational checkout the combination of items 5026 and 5027 functions as a single unit. This item is similiar in function to GOE item 5034 used at Series F sites.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5026

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																						
5027		27-68910-1 Spec 27-06182-1 EID-27-6201			ASSY, SEQUENCER AND RESPONDER GROUP, EOC FSC NOMENCLATURE: CONTROL - MONITOR GROUP			Est 240,000						CFE													
																			CONTRACT NO. AF 04(647)-370								
															15 mo			OSTF No. 1	1						1	
																			CONTRACT NO. AF 04(647)-346								
																8/28/59	5/24/60	576-C	1						1	
																		567	9						9	
																		548	9						9	
																		706								
																		549	9						9	
																			CONTRACT NO. AF 04(647)-453								
																		OSTF No. 2								
																			CONTRACT NO. AF 04(647)-605								
																		576-D								
																		576-E								
																		550								
																		551								
																		577								
																		578								
																		579								
																		556								
																		ATC	T-306 (1)							

(4) NOMENCLATURE: (PNS) Assembly, Sequencer and Responder Group, Series E Operational Capability (EOC).

This unit consists of relay logic units No. 1 and No. 2, and launch signal responder units No. 1 and No. 2.

Each relay logic unit is contained in a palletized rack-type structure measuring approximately 8 feet wide, 3 feet deep, and 6 feet high.

The relay logic unit contains the relays, comparators, delay devices, and wiring necessary to perform the various operations, in proper sequence, required to launch a missile successfully. Each chassis of the unit is equipped with AN-type connectors which are brought out on the back side of the unit. Allowance for future modification is provided by approximately 30 percent spares in the terminals of the wiring harness at the AN connectors.

All chassis pull out from the front for replacement. The chassis panels display indicators which permit static monitoring of individual system responses.

Relay logic unit No. 1 contains the subsystem logic for the following:

1) Erection control
2) Facility control
3) Propellant level control
4) Pressurization control
5) Liquid nitrogen/helium tanking control
6) Fuel tanking control
7) Liquid oxygen tanking control

Relay logic unit No. 2 contains the subsystem logic for these subsystems:

1) Guidance ground control
2) Re-entry vehicle ground control
3) Autopilot control
4) Missile ground power control
5) Engine ground control
6) Hydraulic control
7) Countdown control

Responder Unit: Each responder unit is contained in a palletized rack-type structure measuring approximately 8 feet wide, 3 feet deep, and 7 feet high.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5027

This unit contains the necessary relays, simulators, delay devices, and wiring to simulate the functional circuitry of the missile and associated GSE.

The responder, through switching connections, responds to all control signals originating at the launch control console (Item 5026) or relay logic units. For a given input signal the responder unit provides suitable replies to permit the full operation of the launch control system. The responder unit includes fault insertion to test the ability of the system to detect faults.

The launch signal responder unit No. 1 contains the responder logic for the following subsystems:

1) Missile ground power control
2) Liquid oxygen tanking control
3) Liquid nitrogen/helium tanking control
4) Fuel tanking control
5) Facility control
6) Erection control
7) Propellant level control
8) Engine ground control

Launch signal responder unit No. 2 contains the responder logic for the following subsystems:

1) Re-entry vehicle control
2) Autopilot
3) Hydraulic control
4) Pressure transducer
5) Guidance ground control
6) Countdown control
7) Pressurization control

Each of the logic and responder units weighs approximately 4000 pounds. The units are portable and can be handled with standard equipment.

(5) PROBLEM AREA: The unitary concept requires that one operator (launch control officer) accomplish missile launching. A relay logic system, time sequenced to effect a launch within the prescribed time, is necessary to achieve this degree of automation.

A periodic checkout of the launch control system is also required to verify the system operational readiness for a tactical launch.

Equipment is required which will satisfy the foregoing parameters. Fault location indicators in this equipment must be held to a minimum. However, those indicators which are required to ascertain the existence of a malfunction which will inhibit countdown or state-of-readiness must be supplied. Where necessary, these logic unit fault indicators must be summarized on the launch control console (Item 5026).

Equipment is also required to check out the launch control system by responding to control signals originating at the launch control console or relay logic units. This equipment must provide suitable replies to permit the full operation of the launch control system. This will provide a means of determining if the relay logic units are functioning properly.

The equipment chosen must also include fault insertion to test the ability of the system to detect faults and to provide the unit proficiency system capabilities.

(18) REMARKS: Functions of this item include functions of Items 64.5, 80.7, 80.8, 82.4, 82.5, 83.2, 85.4, 89.3, 89.8, 94, and 95 in Report No. ZM-7-357.

This item is used with item 5026. During operational checkout the combination of items 5026 and 5027 functions as a single unit.

This item is similar in function to GOE item 5035 used at Series F sites.

Superseded items 1202 and 1203 are incorporated with this item.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5028		Solar Aircraft Co. † 26127 Kurz and Root 5301021 Spec 27-06191-1 EID-27-6171			POWER SUPPLY AND DISTRIBUTION UNIT, STATIONARY, GSE FSC NOMENCLATURE: POWER SUPPLY-DISTRIBUTION SET			Est 4,000																				
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1	†1							1	
																		CONTRACT NO. AF 04(647)-346									
																		576-C	†1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																		576-D	1							1	
																		576-E	1							1	
																		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC	T-306(1), T-330(1), T349(1)								

(4) NOMENCLATURE: (PNS) Power Supply and Distribution Unit, Stationary, Ground Support Equipment.

This stationary power supply and distribution unit which measures approximately 51 inches wide, 36 inches deep, and 60 inches high is located in the launch and service building. The unit comprises the following principal components:

1) 28-volt dc power supply
2) Power distribution panel
3) Base

28-Volt Power Supply. This component comprises a transformer rectifier assembly designed to convert 440-volt ac to nominal 28-volt dc. The assembly includes a static-type voltage control unit for output voltage regulation and a control panel on which the following meters are mounted:

1) Ammeter - This meter indicates the current level of the voltage source.

2) Voltmeter - This meter indicates the output voltage level of the source.

3) Ampere-hour - This meter measures time-discharge of the battery assembly.

This power supply has the following characteristics:

1) Input rating - 440-volt (± 10 percent), 60-cps (± 5 percent), 3-phase ac.

2) Output voltage - 28-volt dc nominal.

3) Output current - 600 amperes continuous.

4) Voltage regulation - Plus-or-minus 0.5 percent of set value at any combination of load, input voltage, and frequency within the ratings.

5) Output voltage ripple - Ripple in the output voltage shall not exceed 0.15 volt rms (0.43 volt peak-to-peak) at any combination of load, input voltage, and frequency within the ratings.

By Air Force direction.
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5028

6) Recovery time - Recovery time from a transient voltage resulting from sudden application or removal of rated load shall be 0.1 second or less to reduce the transient voltage by 60 percent of its maximum value. Output voltage shall recover and remain within plus-or-minus 0.5 percent of its set value within 0.5 second after sudden application or removal of rated load.

Power Distribution Panel. This panel contains the relays and terminals necessary to switch and distribute rectified 28-volt dc and/or battery dc to the ground support equipment. The unit includes a blocking rectifier to prevent current feedback into the power supply.

Base. This base consists of the skids and frame work required to support the power supply and power distribution panel. The base is designed to be bolted to the floor.

(5) PROBLEM AREA: Ground control systems and missile subsystems require 600 amperes of 28-volt dc power.

Equipment which will supply 600 amperes of 28-volt dc is required in the launch and service building. The equipment provided must have the capability for monitoring, switching, and distributing power from the primary 28-volt dc power source and the 28-volt dc backup battery assembly.

(18) REMARKS: This item is similar in function to item 87 in Report No. ZM-7-357.

This item is the same as GSE item 5028 in Report No. AP60-1045.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNUSED	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF AROC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5029		Nicad Division, Gould-National Battery Co. CL-4476-BEMGP Spec 27-06226-1 EID-27-6198			BATTERY, EMERGENCY, MISSILE GROUND POWER, STATIONARY FSC NOMENCLATURE: BATTERY, STORAGE			Est 1,600				CFE																
																		CONTRACT NO. AF 04(647)-370									
															7 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																8/28/59	6/5/60	576-C	1							1	
																		567	10							10	
																		548	10							10	
																		706									
																		549	10							10	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-603									
																4/14/60		576-D	2							2	
																		576-E	1							1	
																1/22/60		550	13							13	
																		551	13							13	
																		577	13							13	
																		578	13							13	
																		579	13							13	
																		556	13							13	
																		ATC									

(4) NOMENCLATURE: (PNS) Battery, Emergency, Missile Ground Power, Stationary.

This unit, located at the Launch and Service Building (L&SB), provides a source of (emergency) 28-volt dc control power. It consists of the following major components:

1) Cells
2) Test panel
3) Enclosure

The battery consists of twenty-one (21) nickel cadmium alkaline type cells. The cells are mounted in wooden trays which are suitable for housing four cells. The trays are mounted on two shelves in the enclosure. Each cell has an ampere-hour rating of 240 ampere-hours at the 8-hour rate to a cell voltage of 1.14 volts.

Each cell has the following characteristics:

1) Charging voltage: 1.40 volts to 1.85 volts
2) Cells floated: 1.40 volts to 1.45 volts
3) Specific gravity: 1.160 to 1.200 (electrolyte temperature is not to exceed 145 degrees F or 60 degrees C)
4) Separators: Polystyrene
5) Case: Stainless steel or nickel-plated steel
6) Plates: Black nickel hydroxide and cadmium oxide set in perforated, flat steel pockets with graphite added
7) Electrolyte: Solution of KOH

The test panel contains a voltmeter, cell selector switch, and a press-to-read switch. This panel enables one to check voltage of the individual cells.

The voltmeter scale is zero to two volts dc with a sensitivity of 1000 ohms per volt and an accuracy of two percent of full scale deflection.

The enclosure is a steel cabinet measuring 3 feet wide, 3 feet deep, and 6 feet high. The enclosure is mounted on a skid-type base that has provisions for fork lifting. The enclosure contains two shelves with guides to accept wooden, cell trays.

By Air Force direction.
1: Part or specification number listed in column 3 is the number proposed for original provisioning.
2: Recommended quantities only are listed in column 7.
3: This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5029

The charge in the battery at the launch and service building is maintained by a trickle charge from the main rectifier power supply. The battery assembly is recycled to the SMA every 6 months for discharge (Item 78), recharge (Item 76), and cell replacement as required.

(5) PROBLEM AREA: During countdown missile-borne and ground systems are controlled remotely by 28-volt dc control power. In the event of a hazardous condition arising from loss of 60-cps ac or input dc power, the missile and peculiar GSE must be capable of being returned to a safe condition.

Equipment is required which will supplement the 28 volt dc transformer rectifier during countdown and provide an emergency source of 28 volt dc power in the event of a transformer-rectifier malfunction or an input voltage failure.

Conventional hydrometer measurements will not indicate a NICAD battery's state of charge. The NICAD battery's state of charge is verified by a controlled discharge using the electrical dummy load (Item 78). After discharging, the NICAD battery is charged with the rectifier power supply (Item 76).

Equipment is required at the SMA which will permit routine maintenance, controlled discharging and charging to be performed on the battery assembly replacement units at the launch operations building without reducing the operational capabilities of the squadron.

(18) REMARKS: The function of this item is similar to Item 77.1 in Report No. ZM-7-357.

The 10th battery shown allocated to each of the squadrons 567, 548, and 549, the second battery shown allocated to Complex 576-D, and the thirteenth battery allocated to each of the squadrons 550 and on, is an extra unit provided for rotational maintenance.

This item is the same as GSE item 5029 in Report No. AP60-1045.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO (See Column 7) | REV.:

(1) ITEM SEQUENCE	(2) GSE SPEC PARA. NO.	(3) STOCK NUMBER CLASS CODE	(3) STOCK NUMBER SERIAL NUMBER	(3) STOCK NUMBER MFG. PART OR DWG. NUMBER	(4) NOMENCLATURE	(5) DESCRIPTION OF PROBLEM AREA	(6) UNITS	(9) UNIT PRICE	(10) TOOL FIXT	(11) COGNIZANT LABORATORY, CENTER, & SERVICE	(12) TYPE CLASSIFICATION	(13) PROPOSED SUPPLY SOURCE	(14) SOURCE CODE	(15) SECURITY CLASS & REMARKS	(16) EST PRODUCTION LEAD TIME	(17) DATE OF AROC APPROVAL	(18) EST DATE FIRST ITEM AVAILABLE	LOCATION	(7) AT LAUNCHERS	(7) AT LCC'S	(7) AT GUID STAS	(7) AT SMA	(7) GENERAL	(7) DEPOT	(7)	(7)	(7) SUB TOTAL	(8) TOTAL ON ORDER
5030		Aerojet General F-14001-1F Spec Cont Dwg 27-05216-3 EID-27-6138			CONSOLE ASSEMBLY, OPERATIONAL AND CHECKOUT, MISSILE DESTRUCT SYSTEM			Est 23,200					CFE †GFP															
															7 mo			OSTF No 1		1							1	
																		CONTRACT NO AF 04(647)-370										
																11/13/59	9/26/60	576-C		1							1	
																		567										
																		548										
																		706										
																		549										
																		CONTRACT NO AF 04(647)-453										
																		OSTF No 2		†1							1	
																		CONTRACT NO AF 04(647)-605										
																		576-D		†1							1	
																10/28/60		576-E		1							1	
																		550										
																		551										
																		577										
																		578										
																		579										
																		556										
																		ATC										

(4) NOMENCLATURE: (PNS) Console, Assembly, Operational and Checkout, Missile Destruct System.

This unit measures approximately 2 feet wide, 2 feet deep, 5 feet high, and is equipped with a 12 inch shelf located approximately 40 inches above the floor. The unit weighs approximately 500 pounds. Electrical input is 115-volt 60-cycle ac power.

This unit contains the control switches, indicating lights, and communication equipment required to operate and check out the telemetry and range safety (command destruct) systems. The unit also provides a station which can be used for communicating with the necessary elements of the instrumentation and range safety systems.

(5) PROBLEM AREA: The telemetry and range safety (command destruct) systems are part of the base installation. Proper functioning of these systems is vital in attaining the objectives of the launch program.

The telemetry system includes a telemeter package, a signal conditioner and power control package, transducers, mounting bracketry, interconnecting cables, and a battery which also provides the power for one range safety receiver. The telemetry and range safety antennas are combined.

The telemeter package, Government-furnished property (AFS), is a small, ruggedly constructed missileborne system. The system is capable of accepting data inputs from a variety of transducers; translating these data quantities into a signal form compatible with the FM/FM telemetry section of the Interrange Instrumentation Group (IRIG) document No. 103-56, Telemetry Standards, dated 9 October 1956; and providing the facility necessary for transmission of these signals. Certain operational frequencies are the sole exceptions to the document above.

Seven voltage-controlled, subcarrier oscillators are used. Provisions are made for time division multiplexing (PAM/FM/FM) two of these channels. The equipment is capable of meeting all performance requirements with a signal level of zero to 5-volt dc at a maximum source impedance of 100 kilohms.

Approximately 46 telemetry measurements are used to provide maximum information with minimum complication of operation and installation. Twenty-two potentiometer type transducers and their associated hardware are installed to monitor key points in the propulsion and autopilot systems. Six amplifier-demodulator units are required to condition the signals created by measurements originating in the autopilot system. In general, signals from the remaining measurements are occurrence indications of certain specific events within the missile systems.

By Air Force direction
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages

ITEM NUMBER 5030

The missileborne range safety (command destruct) system consists of:

1) Two AFS modified ARW-62 Command receivers
2) Two antennas (also used by the telemetry system)
3) One ring coupler
4) Coaxial cables connecting the receivers and antennas
5) Two on-off switching units
6) Safety and arming devices
7) One 28-volt dc battery which powers one AFS ARW-62 receiver. (This battery also furnishes power to other systems.)
8) One AFS battery which powers the AFS telemeter, one AFS ARW-62 receiver, and provides one-half ampere for telemetry transducer excitation and signal conditioning
9) One destruct package
10) Interconnecting cables and wiring harnesses
11) Mounting bracketry

The range safety system receives the destruct signal from the ground based transmitter.

A ground station uses the carrier wave of the telemetry system to determine the location of the missile. The ground station then processes this location information in the impact predictor system which computes the progressive impact points which would result if all propulsion were cut off at corresponding progressive instants during powered flight. If the course of the missile is unsatisfactory, the range safety officer can elect to destroy the missile through the range safety system.

The antenna system, coaxial cable, interconnecting cable harnesses, switching provisions, transducers, signal conditioning circuitry, and all mounting bracketry are contractor furnished.

The AFS battery has sufficient capacity to power the AFS telemeter, one AFS range safety receiver and its associated functions, and to provide one-half ampere of 28-volt (±2 volts) dc for transducer excitation and signal conditioning. The battery is of the instant-activated type and is activated and controlled from mobile equipment located inside the launch operation building and alongside the launch control consoles.

Equipment is required which can be used to operate and checkout the IRSS. This equipment must also provide a station which can be used for communication with the necessary elements of the instrumentation and range safety.

(18) REMARKS: This unit performs the same function as Item 54 in Report No. ZM-7-357.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5031		27-68693-1 EID-27-6202			CABINET COMBUSTION STABILITY MONITOR									CFE														
															7 mo		3/25/60	OSTF No. 1	2							2	
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		OSTF No 2									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

CONTRACT NO. AF 04(647)-370

CONTRACT NO. AF 04(647)-346

CONTRACT NO. AF 04(647)-453

CONTRACT NO. AF 04(647)-605

(4) NOMENCLATURE: Cabinet, Combustion Stability Monitor.

The combustion stability monitor is used to monitor the individual combustion characteristics of each booster engine thrust chamber during captive hot firing tests. This unit detects the frequency and amplitude of rough combustion. If rough combustion exceeds certain fixed limits, the unit, acting through a delay network, actuates the engine cutoff circuit.

The combustion stability monitor equipment is housed in two cabinets. One configuration contains the control and monitoring equipment, and is located between the relay logic unit and the responder unit in the launch and service building. The other configuration contains that electronic equipment which must be located near the missile, adjacent to the umbilical junction box, in order that the piezoelectric transducer (accelerometer) dynamic output may be monitored accurately. The two units will carry different dash numbers of the same basic part number.

The first combustion stability monitor unit is mounted in a hammertone steel cabinet measuring approximately 17 inches wide, 24 inches deep, and 48 inches high. The cabinet contains the following principal components in addition to interconnecting harnesses, a cooling unit, and panel mounted receptacles.

1) Three line voltage stabilizers.
2) Three combustion cutoff units.

Line Voltage Stabilizer.

The line voltage stabilizer is a static magnetic voltage regulator. This unit maintains a constant voltage input to the combustion cutoff unit thus preventing sensitivity changes due to line voltage fluctuations.

Combustion Cutoff Unit.

The combustion cutoff unit contains the electronic circuitry for detecting frequency and amplitude of rough combustion. A relay in the combustion cutoff unit automatically closes when the control monitor set detects approximately 20 milliseconds of rough combustion. This relay completes the cutoff circuit of the rocket engine and terminates the hot firing, if the standby-ready switch is in the ready position.

The second combustion stability monitor unit is mounted in a hammertone steel cabinet which measures 17 inches wide, 24 inches deep and 65

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5031

inches high. This unit contains three accelerometer amplifier units with associated interconnecting harnesses, cooling unit. and panel mounted receptacles.

The accelerometer amplifier is a fixed gain amplifier with a cathode follower input. The amplifier accepts the signal generated by the accelerometer mounted on the injector dome of the booster thrust chamber. By means of a cathode follower input, the unit converts the small high impedance signal to a lower impedance. The low impedance signal is then amplified in a fixed gain amplifier, the output of which is connected by coaxial cable to the combustion cutoff unit.

The line voltage stabilizers, combustion cutoff chassis', and accelerometer amplifiers are Government Furnished Parts.

(5) PROBLEM AREA: Large rocket engines are subject to two types of combustion instability; chugging and rough combustion. Chugging is a low frequency pheonomenon which results from an improper ratio of injector pressure to chamber pressure. Damage to a thrust chamber caused by chugging is small compared with the damage caused by an equal amplitude of rough combustion.

Rough combustion results in increased heat and tangential and radial pressure waves within the combustion chamber. These waves, combined with violent fluctuations in pressure, can cause damage to the entire missile and facility.

Cabinet mounted equipment is required which will monitor the combustion of the booster engine thrust chambers during captive firings, to detect the presence of combustion instability and to shut down the booster engine if excessive instability exists.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																						
5032		CV-FW-27SE3005-1 Spec 27-06243-1 EID-27-6214			RELAY BOX, AC POWER DISTRIBUTION, GSE FSC NOMENCLATURE: DISTRIBUTION BOX			Est 2,000					CFE														
																		CONTRACT NO. AF 04(647)-370								
															7 mo			OSTF No. 1	1						1	
																		CONTRACT NO. AF 04(647)-346								
																11/13/59	5/25/60	576-C	1						1	
																		567	9						9	
																		548	9						9	
																		706								
																		549	9						9	
																		CONTRACT NO. AF 04(647)-453								
																		OSTF No. 2	1						1	
																		CONTRACT NO. AF 04(647)-605								
																4/14/60		576-D	1						1	
																		576-E	1						1	
																2/24/60		550	12						12	
																		551	12						12	
																		577	12						12	
																		578	12						12	
																		579	12						12	
																		556	12						12	
																		ATC					T-306 T-330		1 1	

(4) NOMENCLATURE: (PNS) Relay Box, AC Power Distribution, GSE.

The ac power distribution relay box measures 24 inches wide, 24 inches high, and 8 inches deep. This box, located at the launcher, houses equipment required to distribute 400 cycle ac power to the following units:

†1) Pressurization control logic unit No. 1
2) Checkout missile power control unit (Item 5066)
3) Countdown group (ARMA)
4) Signal responder
5) Countdown control logic unit No. 2

This relay box also contains receptacles, controls, indicating lights, and terminals required to monitor and control the distribution of 120-volt, 60-cycle, 3-phase ac power to the missileborne heaters.

The relay box receives 28-volt dc power from the power supply - distribution set (Item 5028) for control and monitoring of missileborne heater power.

(5) PROBLEM AREA: During checkout procedures and countdown operations the missileborne subsystems and GSE require 400-cycle power, 60-cycle power, and 28-volt dc power.

Equipment is required which will receive 400-cycle power from the motor generator set (Item 5037) and distribute this power to the various GSE circuits which require 400-cycle power.

During standby and countdown, heaters are used on certain rocket engine components and batteries to provide protection against cold.

Equipment is required which will control, monitor, and distribute 120-volt, 60-cycle ac to the missileborne heater circuits during standby and countdown.

(18) This item supersedes item 1211.

† Part of missile launch control monitor group (Item 5027 at horizontal sites, Item 5035 at silo sites).

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5032

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	[illegible]	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT L AUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																								
5033		27-68737-801 Spec 27-06626-1 Spec Cont Dwg 27-06213-1 EID-27-6179			JUNCTION BOX GROUP, LAUNCH AND TEST FSC NOMENCLATURE: INTERCONNECTING BOX GROUP, LAUNCH AND TEST			Est 25,000						CFE														
																		CONTRACT NO. AF 04(647)-370									
															9 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																3/29/60	6/12/60	576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Junction Box Group, Launch and Test.

The junction box group consists of the left umbilical junction box and the launcher checkout junction box. The description of these junction boxes is as follows:

1) Junction Box, Umbilical Left (27-06214)

This unit consists of a junction box with terminals and connectors. The box is located in the launch and service building, is mounted in the mechanical and electrical room, and extends into the missile storage area. This umbilical junction box provides points for the termination and distribution of harnesses distributing power, control signals, and monitoring signals between ground support equipment and the missile. This box also houses the Arma amplifier assembly. This assembly requires provisions for cooling.

The following cables terminate in this unit:

a) Guidance system umbilical
b) Guidance power and control umbilical
c) Autopilot umbilical
d) Missile power and propellant utilization umbilical
e) Propellant utilization and propulsion umbilical
f) Propulsion - Booster umbilical

Plug-in type cable connections for rapid replacement at the junction box are provided for cables connected to the missile.

2) Junction Box, Checkout, Launcher (27-06213)

This unit consists of a junction box with terminals and connectors. The box is located in the checkout cubicle in the launch and service building.

This junction box is fitted with umbilical-type connectors and is designed to transmit the listed functions of the following mobile ground support equipment between that equipment and the fixed ground support equipment:

a) Semitrailer mounted missile electrical system checkout station (Item 5062):

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5033

(1) Checkout signals and responses
(2) 28-volt dc
(3) 115/200-volt, 400-cps ac

b) Pneumatic checkout vehicle:

(1) 28-volt dc
(2) 440-volt, three-phase, 60-cps ac

(5) PROBLEM AREA: Ground power control and monitoring circuits are routed from ground support equipment through umbilical cables to the missile. These umbilical cables provide a removable interconnection between the missile and ground support equipment.

Equipment is required at each launcher which will provide a point for termination and distribution of these ground power control and monitoring circuits. The equipment supplied must provide plug-in type connection for the umbilical cables.

Equipment is required in the checkout cubicle in the launch and service building to provide a point which can be used to interconnect electrically trailerized checkout equipment and the ground support equipment located within the launch and service building. The equipment supplied must contain provisions for interconnecting the launch and service building interconnecting cable kit with umbilical-type connectors to the trailerized checkout equipment.

(18) REMARKS: The difference between Complex 576-C and the operational base configuration is as follows:

Part of the umbilical junction box protrudes through the wall between the M&E room and the missile storage area. The wall thickness for operational sites is 30 inches and the wall thickness at 576-C is 24 inches. The length of the protrusion on the junction box at operational sites is 6 inches greater than the protrusion at 576-C. Also, the box at 576-C has provisions for mounting an additional ARMA amplifier.

Superseded items 1206 and 1508 are incorporated with this item.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AFDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																						
5034		Hallamore Division of Siegler Corp 106205 Spec 27-06413-3 EID-27-6235			CONSOLE, LAUNCHER CONTROL, SILO CONCEPT FSC NOMENCLATURE: CONSOLE, LAUNCH CONTROL									CFE													
																		CONTRACT NO. AF 04(647)-370								
																		OSTF No. 1								
																		CONTRACT NO. AF 04(647)-246								
																		576-C								
																		567								
																		548								
																		706								
																		549								
																		CONTRACT NO. AF 04(647)-453								
															12 mo			OSTF No. 2	1						1	
																		CONTRACT NO. AF 04(647)-605								
																4/14/60	2/21/61	576-D	1						1	
																		576-E	1						1	
																2/24/60		550	12						12	
																		551	12						12	
																		577	12						12	
																		578	12						12	
																		579	12						12	
																		556	12						12	
																		ATC								

(4) NOMENCLATURE: (PNS) Console, Launcher Control, Silo Concept.

This item consists of a table-type console which measures approximately 72 inches wide, 40 inches deep, and 42 inches high. The console weighs approximately 500 pounds.

The center panel contains the status indicators and controls necessary to permit one operator to launch a missile. This panel includes a countdown clock, target and burst selection, missile fuel and liquid oxygen pressure meters, systems operation and fault indicators in bar-graph form, and commit sequence indications.

(5) PROBLEM AREA: The unitary concept requires that one operator, launch control officer, accomplishes missile launching. This concept further requires that standby status be incorporated as an integral part of launch equipment and provide sufficient indications to establish the state of readiness for launch. Equipment is required which will satisfy the foregoing parameters. The equipment supplied must hold fault indications to a minimum and provide a summary of the individual responses displayed on the chassis panels of the relay logic units.

(18) REMARKS: Function of this item includes functions of Items 79.7 and 79.8.2 in Report No. ZM-7-357.

This item is similar in function to GOE item 5026 used at Series E sites.

This item is used with item 5035. During operational checkout the combination of items 5034 and 5035 functions as a single unit.

By Air Force direction:
1. Part or specification number listed in column 3 is the number proposed for original provisioning.
2. Recommended quantities only are listed in column 7.
3. This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5034

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL.

CONTRACT NO (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST PRODUCTION LEAD TIME	DATE OF ARDC APPROVAL	EST DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5035		27-68746-1 EID-27-6234			CONTROL MONITOR GROUP, MISSILE LAUNCH FSC NOMENCLATURE: CONTROL-MONITOR GROUP			Est 240,000						CFE															
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576 C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															12 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576 D	1							1	
																		576 E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) Control Monitor Group, Missile Launch.

This item consists of four palletized rack-type structures which measure approximately 8 feet wide, 3 feet deep, and 7 feet high. The units weigh approximately 2500 pounds each. The units are portable and may be handled easily with standard handling equipment. Two of these units are signal responders and two are relay logic units.

The relay logic units contain the relays, comparators, delay devices, and wiring necessary to perform the various operations, in proper sequence, required to launch a missile successfully. Each chassis of the unit is equipped with connectors which are brought out on the back side of the unit. Allowance for future modification is provided by approximately 30 percent spares in the pins of the wiring harness at the connectors.

The signal responders contain relays, interrupter-type switches, stepping relays, push-button switches, and time delay relays. The equipment is designed to substitute simulated signals for the equipment, thereby conserving the missileborne equipment for actual operations or required checkout.

Fault insertion capabilities are incorporated to determine if the logic of the fault indicating circuitry of the respective launch control equipment is working properly.

All chassis pull out from the front for replacement. The chassis panels display indicators which permit static monitoring of individual system responses.

Relay logic unit No. 1 contains chassis circuitry for the following systems:

1) Propellant level
2) Fuel tanking
3) Pneumatics
4) LO_2 tanking
5) LN-He tanking
6) Facility
7) Missile lifting platform

Relay logic unit No. 2 contains chassis circuitry for the following systems:

1) Re-entry vehicle
2) Missile ground power
3) Guidance
4) Autopilot

By Air Force direction.

1: Part or specification number listed in column 3 is the number proposed for original provisioning.

2 Recommended quantities only are listed in column 7.

3 This page will not be updated to show provisioning action, configuration, or part number changes.

Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5035

5) Hydraulics
6) Engine
7) Countdown

Signal Responder No. 1 contains chassis circuitry for the following systems:

1) Prop level responder
2) Pneumatics responder
3) LN-He tanking responder
4) LO_2 tanking responder
5) Facility responder
6) Missile lifting platform

Signal Responder No. 2 contains chassis circuitry for the following systems:

1) Guidance
2) Missile ground power
3) Autopilot
4) Hydraulics
5) Engine
6) Countdown
7) Re-entry vehicle

(5) PROBLEM AREA: The unitary concept requires that one operator, launch control officer, accomplishes missile launching. A relay logic system, time sequenced to effect a launch within the prescribed time, is necessary to achieve this degree of automation.

Equipment is required which will satisfy the foregoing parameters. Fault location indicators in this equipment must be held to a minimum. However, those indicators which are required to ascertain the existence of a malfunction which will inhibit countdown or state-of-readiness must be supplied. Where necessary, these logic unit fault indicators must be summarized on the launch control console (Item 5034).

Checkout of launch control equipment is required as well as checkout of missileborne equipment. In order that the control consoles, etc., of the various systems may be checked out, units are required which will simulate the signals that would normally be present during launching operations and thereby avoid the actual loss of fluids and gases which would occur during electrical checkout.

(18) REMARKS: Functions of this item include functions of Items 64.5, 80.7, 80.8, 82.4, 82.5, 83.2, 85.4, 89.3, 89.8, 94, and 95 in Report No. ZM-7-357.

This item is used with item 5034. During operational checkout the combination of items 5034 and 5035 functions as a single unit.

This item is similar in function to GOE item 5027 used at Series E sites.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961

LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5036		27-99974-1 Spec 27-09750-1 EID-27-9064			SYSTEM ASSY, ELECTRICAL, MISSILE LIFTING FSC NOMENCLATURE: CONTROL SYSTEM, ELECTRICAL, MISSILE LIFTING			Est 129,000					CFE						CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																			CONTRACT NO. AF 04(647)-346								
																		576-C									
																		567									
																		548									
																		706									
																		549									
																			CONTRACT NO. AF 04(647)-453								
																		OSTF No. 2	1							1	
																			CONTRACT NO. AF 04(647)-605								
																5/24/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) System Assembly, Electrical, Missile Lifting.

This equipment comprises all the relays, comparators, delay devices, and circuitry to control and sequence the launch platform locks, launch platform rise, and silo door operation, prior to launching.

The system controls the launch platform from the working level or from the launch control center. Safety devices prevent movement of the launch platform when the locks and silo doors are not in proper position.

The following items comprise this system:

1) Four logic racks.
2) Motor control center assembly (power supply).
3) Operating level control assembly.
4) Local controls, launcher mechanism systems.
5) Horn post assembly.
6) Junction boxes.
7) Interconnecting cable kit.

(5) PROBLEM AREA: An integral part of launching operations include locking and unlocking the launcher platform-to-crib locks, raising the launch platform, opening the silo doors, and locking and unlocking the silo-cap-to-launch-platform locks.

Equipment is required to sequence these operations during count down, and to provide local control of these operations during checkout procedures.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5036

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	[hatched]	UNIT PRICE	[hatched]	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	AT GENERAL DEPOT	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5037		6125-724-8947 Kurz & Root Kurz MD2 Spec Cont Dwg 27-06416-1			MOTOR-GENERATOR SKID MOUNTED, TYPE MD-2																							† CFE/ AFS
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1	† 1							1	
																		CONTRACT NO. AF 04(647)-346									
																		576-C	† 1				1			2	
																		567	† 9				3			12	
																		548	† 9				3			12	
																		706									
																		549	9				3			12	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2	† 1								
																		CONTRACT NO. AF 04(647)-605									
																		576-D	1							1	
																		576-E	1							1	
																		550	12				4			16	
																		551	12				4			16	
																		577	12				4			16	
																		578	12				4			16	
																		579	12				4			16	
																		556	12				4			16	
																		ATC									

(4) NOMENCLATURE: (CS) Preferred - Motor Generator, Skid Mounted, Type MD-2.

This is a synchronous motor driven 120/208-volt, 400-cycle, 3-phase, ac, 10 kw alternator, built per MIL-M-4818B. The unit is approximately 43 inches long, 30 inches wide, 30 inches high, and weighs approximately 1800 pounds. The unit contains the following principal components:

1) Driving motor
2) Generator
3) Control panel
4) Skid mounting

The set has the following electrical characteristics:

1) AC input: 200/440 volts (plus-or-minus 10 percent), 60-cycle, 3-phase.

2) Voltage adjustment: The regulated output voltage is manually adjustable over a range of plus-or-minus 10 percent of the rated output voltage in increments of not more than 0.5-volt.

3) Voltage regulation: Voltage regulation is accomplished by use of a magnetic amplifier regulator with sensing on the average of the phase voltages. Constant voltage within plus or minus 1.6 percent of the adjusted no load voltage is supplied over the entire load range.

4) Frequency: The frequency is 400-cycle when the input frequency to the motor is 60-cycle.

5) Transient voltage recovery: The output voltage will vary less than 35 percent when a transient load is applied, from no load to full load or vice versa, and will recover to steady state voltage (plus-or-minus 2 volts) within 0.2 seconds or less after load change.

(5) PROBLEM AREA: Missile main 400-cps power is supplied by a missileborne inverter which obtains 28-volt dc power input from the missileborne main battery package. Use of this inverter during countdown, checkout and standby will deplete the missileborne battery and exceed the life expectancy of the inverter.

Equipment is required which will supply 115/200-volt, 400-cps, 3-phase ac ground power to the missile and to various ground support equipment. The equipment provided must supply continuous 400-cps power to the missileborne AIG system during standby condition. In addition, approximately 3 kw of 400-cps power is required to support the missileborne and ground systems. The equipment must be designed to meet the following parameters per Electrical Power Coordination Specification, ZM-7-442.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5037

1) Frequency shall be 394 to 406 cps under all load conditions.

2) The steady state line to neutral voltage shall be a nominal value between 113 and 117 volts rms, regulated to plus-or-minus 1-3/4 percent.

(18) REMARKS: §The quantities shown in the general column are for rotational maintenance. The one unit allocated to complex 576-C supports rotational maintenance at complexes 576-C, D, and E.

This item is the same as GSE item 5037 in Report No. AP60-1045.

This item supersedes item 1211.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AROC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5079		Minneapolis-Honeywell GM-43-E6 Spec 27-08081-1 Spec Cont Dwg 27-08016-1 EID-27-8084			CONTROL UNIT PRESSURIZATION, SILO FSC NOMENCLATURE: CONTROL PRESSURE SYSTEM			Est 61,000						CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															9 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
															9 mo	4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																1/22/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) Control Unit, Pressurization Silo.

This unit, weighing approximately 5500 pounds, measures approximately 9 feet long, 4 feet wide, and 6 feet high. The unit controls missile tank pressurization during high-rate propellant loading. The control panel, located on the front of the unit, is in two sections. A manual control section is located on the upper left side below the direct reading gages; a semi-automatic control panel is located on the upper right side of the front panel. The semiautomatic panel has a cover plate to seal the controllers after validation.

The control unit contains the following sections:

1) Helium pressurization control section (automatic)
2) Helium pressurization control section (emergency)

The unit operates at any air temperature from zero degree F (minimum exposure of 8 hours without benefit of solar radiation) to plus 110 degrees F. All tubing and fittings are of stainless steel with a proof pressure of 150 percent of operating pressure, and a burst pressure of 250 percent of operating pressure.

The unit transfers helium from a ground source and delivers it to the missile propellant tanks at the desired flow rates (6 pounds per minute maximum) in accordance with the three pressure phases and at the required pressure differentials. The unit is pneumatically self-regulating during each of its pressure phases. These pressure phases are sequenced electrically from a remote control console in the launch operation building. Each phase of tank pressure is transmitted to the pneumatic controller by sensing lines. The pneumatic controllers operate the regulators and relief valves to maintain tank pressures of the selected pressure phase.

The control unit has automatic pressure relief valves, and permits semiautomatic and emergency control of propellant tank pressures. During the liquid oxygen tanking phase, the unit vents the liquid oxygen pressurization line to the atmosphere, to maintain liquid oxygen tank pressure 2.5 psig.

The unit also supplies emergency helium to the tanks. A source of nitrogen gas or dry air is supplied to operate the various unit control system components. The unit is not used for static firing. When the pressure phases have been completed after propellant loading, tank pressurization control is transferred to the missile system.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5079

(5) PROBLEM AREA: The thin skin of the pure monocoque missile tank section must be kept under tension at all times. During the period from missile erection until firing, tank tension is maintained by controlled pressure in the missile tanks. Helium gas, from a ground source at 1200 psi, is supplied for this purpose.

A pressure differential must be maintained across the missile intermediate bulkhead to prevent collapse of this bulkhead. This pressure differential must be maintained with a minimum value of 2.5 psi and increased during high rate propellant transfer. During this high rate propellant transfer, helium must flow at rates of 0.0 pounds to 6.0 pounds per minute through three pressurization phases (see Table I).

For safety reasons, pressurization and propellant loading operations must be remotely controlled. However, there are certain checks and tests (functional and leak tests are examples) which can best be done with local control of helium flow and pressures. Since the problem of maintaining missile pressurization is critical, particularly during high-rate propellant transfer, equipment must be provided for both emergency and manual pressurization.

Equipment is required to:

1) Control, regulate, and route, semiautomatically and/or manually the flight pressurization gases from the ground facilities into the fuel and liquid oxygen tanks of a missile.

2) Regulate pressures within individual tanks and differential pressure between these tanks from missile post-erection standby condition, through high-rate propellant transfer, to pressurization complete condition.

3) Provide automatic pressure relief for the missile propellant tanks and provide monitor signals for remote indication and control of tank pressurization.

4) Serve as a backup system to supplement the primary system in case of primary system breakdown.

TABLE I

Phase	Condition	Fuel Tank Pressure	Liquid Oxygen Tank Pressure
1	Standby Pressures	11.5 psig	2.5 psig
2L	Liquid Oxygen Loading Pressure	60 psig	2.5 psig
3	Flight Pressure	60 psig	26.0 psig

(18) REMARKS: This item is similar in function to GOE item 26 used at Series E sites.

† Vendor part number will be changed from GM-43-E6 to GS-46-S1 by ECP action. New part numbers assigned by Minneapolis-Honeywell in accordance with AF direction during configuration control conference October 24 to 29, 1960.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	[illegible]	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5095		CV-FW 27SE3003-1 Spec Cont Dwg 27-06215-1 EID-27-6182			JUNCTION BOX, UMBILICAL, RIGHT FSC NOMENCLATURE: INTERCONNECTING BOX			Est 15,000						CFE														
																		CONTRACT NO. AF 04(647)-370									
															13 mo			OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																8/28/59	6/12/60	576-C	1							1	
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE: (PNS) Junction Box, Umbilical, Right.

This unit consists of a junction box with terminals and connectors. The box is mounted on the wall of the missile storage area in the launch and service building. This umbilical junction box provides a point for termination and distribution of ground telemetering (TLM), instrumentation and range safety system (IRSS), and impact predictor (IP) circuits which must support the missileborne subsystems during confidence flights and training.

The umbilical junction box is connected to the missile by the TLM, IRSS, and IP cable.

Plug-in type cable connections for rapid replacement at the junction box are provided for umbilical cables.

(5) PROBLEM AREA: Ground power control and monitoring circuits peculiar to training exercises and confidence flights are routed through an umbilical cable from ground support equipment to the missile. The umbilical cables provide a removable interconnection between the missile and launch control ground support equipment.

Equipment is required at each launcher which will provide a point for termination and distribution of these ground power control and monitoring circuits. The equipment supplied must provide plug-in type connections for the umbilical cables.

(18) REMARKS: **This item is similar in function to item 82.2.1 in Report No. ZM-7-357.**

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity ☐

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5095

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5098		27-61406-1 EID-27-6225			AUXILIARY LOGIC AND CONTROL GROUP/LAUNCH CONTROL EQUIPMENT FSC NOMENCLATURE: CONTROL-MONITOR GROUP, AUXILIARY			Est 20,000																					
															5 mo			OSTF No. 1	1							1	
																1/22/60	6/6/60	576-C	1							1	
																		567									
																		548									
																		706									
																		549									
																		OSTF No. 2									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

CONTRACT NO. AF 04(647)-370

CONTRACT NO. AF 04(647)-346

CONTRACT NO. AF 04(647)-453

CONTRACT NO. AF 04(647)-605

(4) NOMENCLATURE: (PNS) Auxiliary Logic and Control Group/Launch Control Equipment.

This group consists of an auxiliary logic unit and an auxiliary launch console.

The auxiliary logic unit occupies a standard equipment cabinet (approximately 2 feet wide, 2 feet deep, and 6 feet high) and is located adjacent to the electrical pit in the launcher electronic area. This unit contains the relay logic circuitry required to sequence those functions peculiar to launchers with a static firing and refire capability. The following chassis with their associated interconnecting harnesses and terminal boards are located in this unit:

1) Facility Chassis: This unit closes the collimator gate and missile pod cooling duct openings prior to lift off or a static firing. Hot gasses generated during engine ignition, and foreign matter, are thereby prevented from entering the collimator pit and the pod cooling duct.

2) Engine Control Chassis: This unit contains the relay logic required to shut down the missile engines and associated GSE during a static firing.

3) Erection Chassis: This unit contains the circuitry required to prevent release of the holddown devices during a static firing.

4) Water System Chassis: This unit contains the relay logic circuitry required to sequence the launch pad coolant and missile antifire systems on and off as required. The launch pad coolant system is sequenced on at commit start and continues until 60 seconds after missile rise-off or engine cut-off. The missile antifire system is sequenced on at engine cut-off or missile rise-off and continues for 60 seconds. The missile antifire system directs a horizontal spray of water onto the exterior of the engine thrust chambers approximately 5 inches above the exhaust ends. The blanket of water prevents blow back of hot gases and flames during launch, or in the event of an abort.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5098

The auxiliary logic unit requires 28-volt dc power from the power supply and distribution group (Item 5028) for relay operation and distribution to the missile launch control monitor (Item 5027).

The auxiliary launch console is a control and monitor unit located between the left arm and the main panel of the unitary concept launch control console (Item 5026), in the launch control center. This unit operates in conjunction with the auxiliary logic unit and other GSE to provide the following manual controls associated with static firings.

1) Emergency engines stop.
2) Mode switch (static or flight).
3) Water system manual override.

The auxiliary launch console also contains lamp test buttons to verify indicator lamp operation.

(5) PROBLEM AREA: Due to the refire capability and facility configuration peculiar to complex 576C and OSTF-1, and static firing capability at OSTF-1, additional equipmeny must be added to these sites to protect certain facility items and GSE from fire and damaging heat during static firing or a training launching. 576-C does not have static firing capabilities.

Equipment is required which will function with existing GSE to:

1) Operate the collimator gate and the missile pod cooling duct valve to prevent hot gasses and foreign matter from entering the collimator pit and the pod cooling duct.

2) Sequence the missile pad coolant and missile antifire systems on and off.

3) Shut down the missile engines and associated GSE during static firing.

4) Prevent the release of holddown devices during static firing.

5) Provide an emergency engine stop switch, a selector switch for static firing or flight, and a water system manual override.

(18) REMARKS: The function of superseded item 1414 has been included in this item.

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE: 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)								(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	NOTES	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT		SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																						
5099		27-93363-1 EID-27-9368			STRUT ASSEMBLY, RE-ENTRY VEHICLE									CFE													
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1	1							1	
																		CONTRACT NO. AF 04(647)-346									
																		576-C	1							1	
																		567	9							9	
																		548	9							9	
																		706									
																		549	9							9	
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2									
																		CONTRACT NO. AF 04(647)-605									
																		576-D									
																		576-E									
																		550									
																		551									
																		577									
																		578									
																		579									
																		556									
																		ATC									

(4) NOMENCLATURE (PNS) - Strut Assembly, Re-entry Vehicle.

This item measures approximately 44 inches long, 44 inches wide, and 88 inches high. The item consists of a cradle assembly mounted on a screw and cylinder assembly. The screw and cylinder assembly is mounted on a base assembly which is caster mounted. The base assembly is constructed of two channels in the form of a symmetrical cross. A caster is located near the end of each leg of the base assembly. Outboard of each caster is a manually operated mechanical jack. These jacks extend sufficiently to lift the strut assembly off the casters.

The strut assembly is maintained in a true vertical position by two adjustable spring assemblies, each attached at the lower end to adjacent legs of the base assembly. The upper end of each adjustable spring assembly is attached to the cylinder assembly. A spirit level on the cylinder assembly indicates necessary spring adjustment for vertical alignment.

The cradle can be raised or lowered manually by an acme screw. This enables placement for support of the re-entry vehicle or removal of the strut assembly from contact with the re-entry vehicle.

The load exerted by the re-entry vehicle on the strut is absorbed by a helical spring which is mounted within the cylinder assembly. A guage which is attached to the helical spring of the cylinder assembly indicates the waterline measurement at the longitudinal center line of the missile. When the strut is positioned so that the gauge reads the same as the actual waterline of the missile centerline, the spring is compressed to the the point where it provides the correct amount of support for the re-entry vehicle.

The strut cradles engages the re-entry vehicle at missile station 373.

(5) PROBLEM AREA: Should a loss of missile pressure or ground shock from a nuclear blast occur when the re-entry vehicle is installed on a horizontal missile crumpling of the missile tank would result from the weight of the re-entry vehicle.

Equipment is required to prevent the re-entry vehicle from causing damage to a missile due to inadvertent movement. The equipment chosen must be able to support the re-entry vehicle when it is attached to a missile in the horizontal position.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5099

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F

DATE 5 January 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	XXXX	UNIT PRICE	XXXX PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5100					Interstate Engineering Corp. 18200002 Spec Cont Dwg 27-04477-815 27-68713 EID-27-6208			JUNCTION BOX, UMBILICAL, LAUNCHER PLATFORM, FSC NOMENCLATURE: INTERCONNECTING BOX							Est 16,000				CFE										
																		CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1									
																		CONTRACT NO. AF 04(647)-346									
																		576-C									
																		567									
																		548									
																		706									
																		549									
																		CONTRACT NO. AF 04(647)-453									
															9 mo			OSTF No. 2	1							1	
																		CONTRACT NO. AF 04(647)-605									
																4/14/60	2/21/61	576-D	1							1	
																		576-E	1							1	
																2/24/60		550	12							12	
																		551	12							12	
																		577	12							12	
																		578	12							12	
																		579	12							12	
																		556	12							12	
																		ATC									

(4) NOMENCLATURE: (PNS) Junction Box, Umbilical, Launcher Platform.

The junction box is approximately 66 inches wide, 24 inches deep, 80 inches high, and is mounted on the launcher platform. The umbilical junction box provides a termination and distribution point for cables distributing power, control signals, and monitoring signals between GOE/GSE and the missile.

This unit also houses an ARMA amplifier which requires provisions for cooling.

The following cable kits terminate in this unit:

Part Number	Nomenclature
27-68713-	Cable Kit, Missile Umbilical & Launcher Silo (30 cables)
27-68715-	Cable Kit, Launcher Platform Umbilical Loop Silo (60 cables)
27-68751-	Cable Kit, Launcher Platform Launch Control Silo (20 cables)

Junction boxes at OSTF and training sites include telemetering, IRSS and impact prediction circuits.

Cable connections at the junction box, for cables connecting to the missile, are plug-in type for rapid replacement.

(5) PROBLEM AREA: A junction point is required for distribution of power and signals from the various GOE/GSE units to the corresponding units on the missile. Control and monitor signals between the missile and GOE/GSE must be routed both ways. The umbilical cables provide a removable interconnection between the missile and GOE/GSE.

Equipment is required at each launcher which will provide a termination and distribution point for those ground power, control, and monitoring circuits, which are routed from GOE/GSE through the umbilical cables to the missile. This equipment must also provide connections for rapid removal and replacement of the umbilical cables.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5100

USAF WEAPON SYSTEM 107A-1 GROUND OPERATIONAL EQUIPMENT LIST, SERIES E AND F | DATE: 22 April 1961 | LIST NUMBER: AP60-1046

SM-65 | CONVAIR-ASTRONAUTICS | CONVAIR IS A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)									(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	UNITS	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER & SERVICE	TYPE CLASSIFICATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRODUCTIONS LEAD TIME	DATE OF AROC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT ICC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5133			27-27003-1 EID 27-2010		TOPPING CONTROL UNIT, LIQUID OXYGEN, SILO			Est 25,500										CFE										
																			CONTRACT NO. AF 04(647)-370									
																		OSTF No. 1										
																			CONTRACT NO. AF 04(647)-346									
																		576-C										
																		567										
																		548										
																		706										
																		549										
																			CONTRACT NO. AF 04(647)-453									
															10 mo	3/2/61	6/16/61	OSTF No. 2	1							1		
																			CONTRACT NO. AF 04(647)-605									
																		576-D				1				1		
																		576-E				1				1		
																		550				12				12		
																		551				12				12		
																		577				12				12		
																		578				12				12		
																		579				12				12		
																		556				12				12		
																		ATC										

(4) NOMENCLATURE: Preferred - Topping Control Unit, Liquid Oxygen, Silo.

This unit is designed to control precooling, draining and topping operations during countdown. The unit measures approximately 3 feet wide, 4 feet deep, and 2 feet high, and is located on the eighth level of the crib. An attached pressure gage and a calibration fitting facilitate maintenance and servicing of the unit.

Topping operations are controlled by two pneumatically-operated valves, a topping chilldown valve and a rapid topping valve. The topping chilldown valve controls the transfer of liquid oxygen for chilldown of missile ducting to the engine turbopump inlets at the start of the countdown sequence and for maintenance of the load level in the missile liquid oxygen tank during the "hold" phase of the sequence. The rapid topping valve controls the transfer of liquid oxygen to the missile liquid oxygen tank during the final phase of the countdown sequence. The valves are of the "ball valve" type and utilize 1000 psi of gaseous nitrogen. The valves are operated by solenoid-controlled valves and contain double-acting cylinders which are spring-loaded to the "closed" position.

A 3-inch topping line branches into the following three lines:

1) a 3/4-inch line on which the topping chilldown valve is mounted.

2) a 3-inch (main) line on which the rapid topping valve is mounted.

3) a 1/2-inch line containing a bleed orifice which maintains topping line components in a chilled condition.

The three lines rejoin to form a single 3-inch line which then passes through a filter, and on to a missile.

Draining operations are controlled by two pneumatically-operated valves mounted as follows:

1) one valve is mounted on a 2-inch line which attaches to the 10-inch liquid oxygen quick disconnect. This valve, when opened, utilizes ullage pressure from the liquid oxygen storage tank to pressurize the liquid oxygen fill-and-drain line.

2) the other valve is mounted on the vent line. This valve controls the venting of boil-off gas from the 2-inch line and a 10-inch fill-and-drain line into the atmosphere.

These valves are controlled by electrically-operated solenoid valves mounted on the manifold described below. A third manually-controlled valve mounted on a short line between the manifold and the 2-inch line controls the purging of the 10-inch fill-and-drain line.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity / Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER 5133

Gaseous nitrogen at 4000 psi passes from the pressurization prefab into a 1000-psi regulator and manifold mounted in the topping control unit. The 1000-psi nitorgen then passes from the manifold to the electrically-operated solenoid valves. The solenoid valves which are "normally closed" (NC) are in turn controlled by a programed sequence in the control-monitor group (Item 5035).

(5) PROBLEM AREA: During countdown, liquid oxygen must be transferred to the missile from the liquid oxygen storage and topping tanks.

Equipment is required which will control the following transfer operations:

1) transfer of liquid oxygen from the topping tank, for cooling the missile ducting to the engine turbopump inlets, at the start of the countdown sequence.

2) transfer of liquid oxygen from the topping tank, for filling the missile liquid oxygen tank to the 100-percent level, during the final phase of the countdown sequence.

3) shutoff of liquid oxygen flow from the storage tank when the missile has reached 99 percent of capacity.

4) venting of the storage tank and pressurization, draining, and venting of the liquid oxygen fill-and-drain line prior to raising the silo launcher platform.

USAF WEAPON SYSTEM 107A-1 OPERATIONAL GROUND EQUIPMENT LIST, SERIES E AND F

DATE: 22 December 1961 | LIST NUMBER: AP60-1046

SM-65 | ASTRONAUTICS | A DIVISION OF GENERAL DYNAMICS CORPORATION | SAN DIEGO, CAL. | CONTRACT NO. (See Column 7) | REV.:

(1)	(2)	(3)			(4)	(5)	(6)	(9)	(10)	(11)	(12)	(13)	(14)	(18)	(16)	(17)	(15)		(7)							(8)
ITEM SEQUENCE	GSE SPEC. PARA. NO.	STOCK NUMBER			NOMENCLATURE	DESCRIPTION OF PROBLEM AREA	SMAC	UNIT PRICE	TOTAL PRICE	COGNIZANT LABORATORY, CENTER, & SERVICE	TYPE CLASSIFI-CATION	PROPOSED SUPPLY SOURCE	SOURCE CODE	SECURITY CLASS. & REMARKS	EST. PRO-DUCTIONS LEAD TIME	DATE OF ARDC APPROVAL	EST. DATE FIRST ITEM AVAILABLE	LOCATION	AT LAUNCHERS	AT LCC'S	AT GUID. STAS	AT SMA	GENERAL	DEPOT			SUB TOTAL	TOTAL ON ORDER
		CLASS CODE	SERIAL NUMBER	MFG. PART OR DWG. NUMBER																							
5171		27-03079-1 EID 27-5191			CABLE, AUTOPILOT AND ACTUATOR CHECKOUT			Est 200						CFE													
																		CONTRACT NO. AF 04(647)-680									
																		OSTF No. 1				‡					
																		CONTRACT NO. AF 04(647)-694									
															6 mo	8/10/61	10/3/61	576-C				1				1	
																		567				1				1	
																		548				1				1	
																		706				1				1	
																		549									
																		CONTRACT NO. AF 04(647)-453									
																		OSTF No. 2				‡					
																		CONTRACT NO. AF 04(647)-605									
																		576-D				‡					
																		576-E				‡					
																		550				1				1	
																		551				1				1	
																		577				1				1	
																		578				1				1	
																		579				1				1	
																		556				1				1	
																		ATC									

(4) NOMENCLATURE: Cable, Autopilot and Actuator Checkout.

This item consists of a length of 48-conductor rubber covered cable approximately 12 inches long fitted with a 48-pin male connector at one end and a 48-pin female connector at the other end. This connector is designed to mate with the connectors installed on the autopilot canister and on the actuators. The pitch and yaw connector pins are cross-connected to apply pitch output stimulus from the canister to the yaw actuator, and yaw response to the pitch portion of the canister.

In operation this test cable is inserted between the autopilot canister and the existing cable to the actuators and is removed upon completion of APCHE checkout of the autopilot system.

(5) PROBLEM AREA: Present test procedures check the continuity of the loop but do not isolate any faults located in either the autopilot canister or the actuator circuitry.

Equipment is required that will isolate faults in either the canister or the actuator circuitry.

(18) REMARKS: ‡ The item provisioned for complex 576-C will also support complexes 576-D and E and OSTF No. 1, and No. 2.

By Air Force direction:
1) Part or specification number listed in column 3 is the number proposed for original provisioning.
2) Recommended quantities only are listed in column 7.
3) This page will not be updated to show provisioning action, configuration, or part number changes.
Refer to current issue of AFBMD Exhibit 60-36 for configuration and provisioning information.

Recommended Quantity ☐ Approved Quantity

Asterisk indicates common usage with adjacent complex and/or area.

Use Current List of Effective Pages as guide for inserting Revision Pages.

ITEM NUMBER: 5171

AP60-1046
22 December 1961

ALPHABETICAL INDEX

ALPHABETICAL INDEX (Continued)