NASA CR-115703

Volume 2

This document is submitted in compliance with NAS9-12100

SD 72-SH-0003

B-70 AIRCRAFT STUDY

FINAL REPORT

Volume II

April 1972

L. J. Taube
L.J. Taube
Study Manager
B-70 Aircraft Study

[redacted]

Space Division
North American Rockwell

VOL : II

This document is submitted in compliance with NAS9-12100

SD 72-SH-0003

B-70 AIRCRAFT STUDY

FINAL REPORT

Volume II

April 1972

L.J. Taube
Study Manager
B-70 Aircraft Study

[redacted]

Space Division
North American Rockwell

PRECEDING PAGE BLANK NOT FILMED

TABLE OF CONTENTS

TABLE OF CONTENTS
VOLUME II

AIR VEHICLE WBS 1.0

GENERAL

The B-70 Program, at the onset, was a full weapon system capable of sustained Mach 3 flight for the major portion of its design missions. The weapon system was to enter the SAC inventory as an RS-70 with the first intercontinental reconnaissance/bomber wing scheduled to go operational in July, 1964. After several redirections, a two XB-70 air vehicle program emerged with its prime objective being to demonstrate the technical feasibility of sustained Mach 3 flight.

This section describes the original Weapon System 110A concepts, the evolution of the RS-70 design, and the XB-70 air vehicles which demonstrated the design, fabrication, and technical feasibility of long range Mach 3 flights at high altitude. The data presented shows that a very large step forward in the state-of-the-art of manned aircraft design was achieved during the B-70 development program and that advances were made and incorporated in every area, including design, materials application, and manufacturing techniques.

WEAPON SYSTEM 110A REQUIREMENTS

The operational mission of the full weapon system was the effective accomplishment of the USAF strategic bombardment high-altitude supersonic mission. Particular emphasis was on those portions to which the capabilities of the contemporary strategic missiles were not suited and for which the manned bomber had the only proven capabilities. The man-machine combination was to provide discretionary capabilities for target discrimination, malfunction correction or override, timely evasive maneuvers, judgment in selection and employment of penetration aids, heavy payload of mixed weapons, intelligence collection, damage assessment, best altitude and penetration routes, recallability and recoverability.

The design of the weapon system was to ensure ease of production, easy and rapid installation of subsystems and equipment, and ease of general maintenance with a minimum of elapsed time allowed for maintenance periods. Components and materials were to be selected to reduce the requirements for manpower, skill level, special tools, and ground equipment. The degree of accessibility of the equipment as installed in the air vehicle element was commensurate with the frequency of inspection, servicing, or repair of the item. The offensive subsystem (supported by the defensive subsystem to increase survival probability) was to provide accurate navigation to distant target areas and launch weapons with precision for total target destruction.

In conjunction with the above design requirements, three basic range missions were established as baseline design criteria for the weapon system. These basic range missions are schematically presented on the global picture of

Exhibit 1, page II-11. As shown, two of the missions penetrated the target area at high altitude with total ranges of 6447 nautical miles unrefueled and 7748 nautical miles refueled. The third mission, which was also inflight refueled, had a total range of 5312 nautical miles with an "on-the-deck" target area penetration at Mach 0.95 for 856 nautical miles.

B-70 DEVELOPMENT

In 1955 when the Weapon System 110A design studies were initiated and based on the existing state-of-the-art in aerodynamics, the air vehicle was visualized as being very large with tremendous fuel capacity. As presented by Exhibit 2, page II-12, this design included two floating wing tip auxiliary fuel tanks, each the size of a B-47 medium bomber which had to be jettisoned prior to supersonic flight. At the onset, it was estimated that the vehicle would gross at 650,000 lbs.; however, by mid 1956, the gross weight estimate had increased to 700,000 lbs. Due to the logistics of the expendable wing tip tanks (two for each mission) and the need for additional runway construction (each SAC base), it was evident that this configuration was unacceptable, whereby an extensive aerodynamic and high temperature development program was initiated.

The aerodynamic and high temperature development programs resulted in significant advancements in the state-of-the-art for the basic airframe and subsystems. A summary of the aerodynamic features and arrangements developed is presented by Exhibit 3, page II-13, while Exhibit 4, page II-14, summarizes the advancements made in high temperature development. The B-70 air vehicle, as depicted by Exhibit 3, page II-13, had an estimated gross weight of 550,000 lbs. which did not impact the existing SAC bases or present any unacceptable logistic problems. This arrangement or configuration became "baseline" for the RS-70 and subsequently the XB-70 air vehicles. The configuration is discussed in detail under each applicable subsystem as identified by the WBS.

RS-70 AND XB-70 CONFIGURATIONS

The RS-70 general arrangement is presented by Exhibit 5, page II-15, which evolved into that presented by Exhibit 6, page II-16, for the XB-70 air vehicles. As shown for the RS-70, the nose section contained the radar bomb-sighting antenna, inertial navigation platform, Doppler radar, and an air refueling receptacle. The cabin contained provisions for a crew of four in encapsulated seats and were identified as pilot, copilot, bombardier-navigator, and defense system operator. The electronic equipment compartment aft of the cabin contained the majority of electronic equipment in racks on either side of an aisleway. This compartment, which was pressurized and air conditioned, was accessible in flight. The environmental conditioning equipment was located aft of the electronic equipment bay immediately forward of the integral fuselage fuel tankage. The central portion of the fuselage contained engine air ducts, multiple-weapon bay, landing gear, and integral fuel tankage. The wings, including

the folding tips, provided additional integral fuel tankage and contained six elevons on each side of which the two outboard elevons locked "in-trail" when the tips folded. The aft fuselage supported twin verticals, a cluster of three drag chutes, and six General Electric J-93 engines.

The XB-70 air vehicles, as depicted by Exhibit 6, page II-16, retained the essential configuration, fundamental areas, and basic flight equipment of the RS-70. The XB-70 equipment provisions were different from the production versions in the following important aspects.

1. Radar bomb-sighting antenna, inertial platform, Doppler radar, and air refueling receptacle were omitted from the nose section.

2. The crew consisted of pilot and copilot.

3. The electronic equipment retained was installed in the cabin instead of the electronics equipment bay.

4. Weapon installation provisions were removed from the bomb bay.

5. Wing tip fuel tanks and bomb bay fuel provisions were eliminated.

6. The bombing/navigation/missile guidance (BN & MG) and defensive systems were eliminated.

7. The mission and traffic control system (M&TC) was replaced by available GFP communication, navigation, and identification equipment.

8. Ballast was incorporated in appropriate quantity and location to maintain air vehicle balance and aeroelastic properties that represented the production air vehicle.

FLIGHT TEST PROGRAMS

The RS-70 Flight Test Program was planned to be conducted in four phases identified as Category I, II, III and IV. Category I flight test program was to be the prime responsibility of the contractor and included test beds and all prime vehicle development up to and including the full weapon system demonstration. Category II was a 20-flight hour phase scheduled for air vehicle No. 1 early in the flight test program and was to be conducted by Air Force pilots to establish feasibility of the basic air vehicle. Category III was to be conducted by the Air Force using Air Force airborne crews but with maintenance and on-the-job training provided by the contractor. This phase of testing was to be on the full weapon system conducted by the Air Force Test Center to evaluate operational suitability. Category IV was to be a complete Air Force program where operational type air and ground crews evaluated the full weapon system under simulated operational conditions.

Exhibits 7, 8, 9, and 10, pages II-17, II-18, II-19, and II-20, present a detail breakdown of the planned Category I flight test hours scheduled for the RS-70. Exhibit 7, page II-17, shows the chargeable flight hours to each major task that was to be conducted on the prime air vehicles while Exhibit 8, page II-18, shows the scheduled test bed flight hours. Exhibit 9, page II-19, presents the total chargeable flight hours scheduled for the basic air vehicle development. The RS-70 flight test program was based on the test or time sharing concept which is the most timely and economical means of providing the maximum test experience. This concept requires a large capacity instrumentation system and detail planning starting with wind tunnel tests, ground tests and each air vehicle flight. As shown by Exhibit 10, page II-20, utilizing time sharing, test experience was increased for the basic vehicle from 1575 charge hours to 4280 equivalent test hours. This same percentage increase due to time sharing was used in planning the XB-70 flight test program and was essentially verified during the test program.

The detail breakdown of the XB-70 flight test program is presented by Exhibits 11, page II-21, and 12, page II-22. Exhibit 11, page II-21, shows the charged flight hours for the major subsystems, while Exhibit 12, page II-22, presents the equivalent flight test hours based on the percentage gain due to time sharing. The charged flight hours of Exhibit 11, page II-21, were those planned for the XB-70 program which were within a total tolerance band of less than 6.5 hours when compared to the actual charged hours. Based on this small error and to facilitate analysis, the planned charged hours were used as the basic flight hours charged during the XB-70 program as depicted by Exhibit 12, page II-22. Exhibit 13, page II-23, presents a percentage comparison of the XB-70 program flight hour exposure to that planned for the RS-70 program. The percentages shown are based strictly on flight hours exposure and do not reflect the fidelity of the subsystem tested. The weighing of the percentages shown based on subsystem fidelity and the flight envelope flown is presented in the analysis under each subsystem as identified by the WBS. Exhibit 14, page II-24, presents the flight envelopes of the RS-70 and the XB-70. The maximum allowable speed shown for the XB-70 was essentially 80 percent of the RS-70 maximum "Q" with a plateau at 30,000 ft. to reduce the impact of gust loading. The RS-70 was $\pm$ 2 "g" aircraft designed to also withstand gust loading of $\pm$ 2 "g's", while the XB-70 was limited to + 1.6 "g's" and + 0.4 "g's" in maneuvering flight. Except for total temperature, the XB-70 was essentially limited to 80 percent of the RS-70 maximum allowable loading.

SST FLIGHT RESEARCH

During the XB-70 flight test development program, special instrumentation was installed to obtain supersonic transport flight research data. The instrumentation was designed, manufactured, and installed (mainly on air vehicle no. 2) with data gathering, reduction, and analysis performed on a non-interference basis during the XB-70 development program. The SST flight research data was obtained in various areas as designated by the eight tasks shown below. All of the tasks indicated were sponsored by NASA except for acoustic loads which was sponsored by FAA.

TASKS	A/V #1	A/V #2
1. Aerodynamics (Panel Response)	X	X
2. Structures (Landing Loads)	X	
3. Structures (Gust Loads)		X
4. Structures (Acoustic Loads)		X
5. Aerodynamics (Skin Friction Drag)		X
6. Aerodynamics (Base Drag)		X
7. Thermal Environment (Cabin & Structures)		X
8. Thermal Environment (Fuel System)		X

The instrumentation installed in the XB-70's for the SST flight research program is summarized as follows: (See Exhibit 15, page II-25.)

Panel Response	-	A NASA tape recorder and two microphones in the cockpit area.
Landing Loads	-	Rate of sink trailing arms, landing gear cameras, and NASA VGH recorder.
Gust Loads	-	A gust probe boom, accelerometers, pressure transducers, and yaw and pitch angle instrumentation.
Acoustic Loads	-	Microphones and pressure tape to measure the properties of a turbulent boundary layer.
Skin Friction Drag	-	Wing pressure rakes, static pressure lines, thermo couple wires, and fuselage pressure rakes.
Base Drag	-	Boattail and pressure tapes around engines 4, 5, and 6.
Thermal Environment	-	Thermo couples on cabin windshield and structure, flight control components, landing gear, and fuel system.
Additional Data	-	The VGH recorder was also utilized to obtain fatigue data. The XB-70 development instrumentation, such as aerodynamic and stability and control transducers, were used for program correlation.

FOLLOW-ON RESEARCH ACTIVITY

Subsequent to the XB-70 flight test development program, two flight research programs were initiated on the remaining XB-70 No. 1. The first program was for Sonic Boom Measurements and was sponsored jointly by NASA and USAF. The first flight (No. 1-50) was initiated on 11-3-66 with the program completed on 1-31-67 (flight No. 1-60). The primary purpose of the test program was to determine the proper method of combining the theoretical sonic boom intensity due to lift and due to volume for the far field case. The pressure signatures of several aircraft, but principally the XB-70, were measured on the ground at various distances from the ground track of the air vehicle. The atmospheric effects on the sonic boom intensity were also investigated.

The second follow-on program was sponsored by NASA and was an investigation into the control of structural dynamics. The first flight (No. 1-61) was initiated on 4-25-67 with the program completed on 2-4-69 (flight No. 1-83)

when the No. 1 XB-70 was ferried to WPAF Base Air Museum. To conduct the structure dynamics investigation, the air vehicle was modified for the installation of an Exciter Vane System in the nose section and an elevon control system titled Identically Located Accelerometers and Forces (ILAF).

The Exciter Vane System consisted of two small vanes protruding from both sides of the nose section, tied together through the fuselage by a "sewer pipe," and hydraulically driven. The system was controllable from the cockpit for both frequency and amplitude which provided controlled dynamics to the air vehicle structure. The ILAF system tied into the XB-70 Flight Augmentation Control System which provided elevon control for structural dynamic dampening. The concept was based on locating the input accelerometers near the elevons (for system stability), mixing this input signal with CG signals which cancelled normal flight accelerations and provided a structural dynamics frequency spectrum.

AIR VEHICLES 1, 2 and 3 CONFIGURATION COMPARISON

At the time of program redirection to three XB-70 air vehicles (3-31-61), it was planned that AV's 1 and 2 would be identical in design to demonstrate the technical feasibility of B-70 type aircraft design and AV 3 would include provisions to demonstrate the functional operation of a prototype bombing-navigation system. Subsequent to this redirection, systems development and manufacturing considerations led to further significant differences between AV's 1 and 2, as follows:

1. AV 1 had zero degree wing dihedral versus 5 degree on AV 2.

   This change was issued to correct lateral dynamic stability problems at intermediate supersonic speed and became evident too late in the manufacturing process to be incorporated on AV 1 which utilized a bob weight to provide the capability for pilot compensation.

2. A manual air induction control system was utilized on AV 1 versus an automatic system on AV 2.

   An interim manual system with limited automatic features was flown on AV 1 due to development schedules associated with the automatic system. See WBS 1.5 for additional detail.

3. The wing-to-fuselage joint design differed between AV's 1 and 2.

   Due to wing-to-fuselage mismatch problems encountered on AV 1, the joining transition area was redesigned to facilitate assembly. See page II-26 for display of different design and WBS 3.0 for detail on problems encountered.

4. AV 2 had a 2800 gallon greater fuel capacity than AV 1.

   This fuel capacity difference was primarily attributable to Tank No. 5 being blocked off on AV 1 due to problems experienced in sealing. See WBS 3.0 for further detail.

It was planned that AV 3 would be similar in structure as AV 2 but that modification would be made to include provisions for the bombing-navigation system as follows:

1. Four-man crew on AV 3 versus two-man crew on AV's 1 and 2.

   An observer and system operator position were required in support of bombing-navigation missions and systems operations. See page II-27 for display of crew arrangement.

2. AV 3 required major modifications in the environmental control system.

   Double versus single air cooling loops were required to support the additional crewmen and electronic equipment on AV 3. In addition, a greater cooling capacity and added liquid cooling loops were required. See Exhibit 18, page II-28.

3. Equipment bay variances

   Major electronic equipment additions were required in support of the bombing-navigation system which resulted in rearrangement of the electronic and ECS equipment bays plus the blocking off of the No. 1 fuel tank for ECS water/ice tank.

4. Nose cavity additions

   The AV 3 bombing-navigation required the addition of an inertial navigation platform and radar antenna equipment with associated cooling loops in the nose section. See Exhibit 17, page II-27.

5. Secondary power system additions

   An additional generator on engine No. 5, line contactor, stepdown transformer, secondary bus and the associated controls were required in support of the added electronic equipment on AV 3.

MOCKUPS AND SIMULATORS

Shortly after contract go-ahead, effort was initiated on mockup design and fabrication in support of the Design Engineering Inspection (DEI). Emphasis was placed on the air vehicle mockup and displays, see Exhibit 19, page II-29 . Additional mockups such as the over-nose vision (see Exhibit 20 page II-30), cabin lighting, and the Wright Air Development Center unit were being fabricated during this same period (See special chart, page II-31, for display of mockup milestones). Earlier program mockup requirements included those items associated with the weapons systems and mission; that is,

alert pod, bomb displacing gear, rocket package, serial refueling, etc. As of July 1959, 21 individual major mockups and simulators had been identified. At the time of redirection to a 3 air vehicle program (March 1961) this number had increased to 24 and was as follows:

Flight Control	Engine Compartment Fire Tolerance
Elect. Integration	Escape Capsule Test Sled
Rain Erosion Test Sled	Escape Capsule Test Units
Doppler Radome Mockup	Electronic Systems Checkout
ECM Radomes and Antennas	Main Landing Gear
Impedance Model	Nose Landing Gear
Full Scale Vert. Stabilizer	Hydraulic Pumping
Antenna Range Models	Antenna Test Mockup
Radar Back Scatter Models	Bomb/Navigation Radome Mockup
Radar Reflectivity	Engine-Inlet Compatibility
Environmental	Fuel System
Propulsion Test Stand	Fuel Tank Purge and Vent System

Due to the budget limitations and reduced program requirements associated with the 3 XB-70 air vehicle program, the aforementioned 24 items were reduced to the following 11:

Flight Control	Propulsion Test Stand
Doppler Radome Mockup	Escape Capsule Test Units
Impedance Model	Electronic Systems Checkout
.57 Scale Engine-Inlet Compat.	Bomb/Navigation Radome
Antenna Range Models	Fuel System
Environmental	

The above units were completed in support of the XB-70 programs and further detail, if historically significant, appears under the individual subsystem in Volumes III and IV of this study.

COST DEFINITION

Cost data accumulated in this level 4 WBS item includes all the identifiable expenditures incurred in the design, development, ground testing, fabrication, assembly, system installation, vehicle checkout and preflight activities. In all cases, with the exception of system installation vehicle checkout and preflight, the costs are identified to a vehicle subsystem. Total costs of $695,313,561 are segregated amoung the level 5 subsystems in the following manner:

WBS		Total Cost	Detail
1.1	Airframe Structure	$406,036,084	Vol. III page III-65
1.2	Environmental Control Subsystem	24,906,411	Vol. III page III-404
1.3	Propulsion Subsystem	35,843,291	Vol. III page III-546
1.4	Secondary Power Subsystem	54,383,954	Vol. III page III-697
1.5	Air Induction Subsystem	19,060,408	Vol. IV page IV-65
1.6	Flight Control Subsystem	24,435,028	Vol. IV page IV-180

WBS CODE: 1.0

WBS		Total Cost	Detail
1.7	Personnel Accom. & Escape Subsystem	$ 12,557,555	Vol. IV Page IV-229
1.8	Alighting and Arresting Subsys.	17,259,216	Vol. IV Page IV-426
1.9	Mission and Traffic Control Subsystem	3,770,766	Vol. IV Page IV-480
1.10	Flight Indication Subsystem	3,292,562	Vol. IV Page IV-574
1.11	Test Instrumentation Subsystem	8,937,176	Vol. IV Page IV-618
1.12	Subsystem Installation, Checkout and Preflight	61,338,601	Vol. IV Page IV-648
1.0	Air Vehicle *	23,492,509	
	Total 1.0 Air Vehicle	$695,313,561	

All cost data for WBS items 1.1 through 1.12 can be located in volume III or IV beginning on the pages indicated above. The remainder of this section will limit itself to the definition of the cost data associated at level 1.0 ($23,492,509).

Detail of the recorded costs associated with this item is provided by Element of Cost (EOC) and Subdivision of Work (SDW). Section III of Volume I contains a definition of these items.

As an aid in the definition and evaluation of the in-house engineering costs associated with this WBS items, a matrix of the engineering hours expended by group has been developed. This matrix is as follows:

Group	Title	Hours
3	Electronical and Avionics Installation	63,051
11	Weight Control	259,843
12	Checking	6,829
13	Aerodynamics	57,726
14	Wind Tunnel Models	246,723
47	Human Factors and Cockpit Display	14,072
49	Avionics Integration and Control	73,692
51	Structural Dynamics	421,171
57	Engineering Specifications	40,819
64	Design Support	149,724
86	Electronic Integration	120,430
88	Electronic Equipment	58,619
94	Flight Simulation	7,291
95	Electrical System Design	9,286
97	Laboratory Services	36,764
109	Hydraulic Lab	10,296
110	Electrical Power Lab	95,149

* Costs associated to the air vehicle as an entity and not identifiable to a particular subsystem.

WBS CODE: 1.0

Group	Title	Hours
131	Aerodynamics Special Projects	5,078
132	Thermodynamics	17,873
133	Aerodynamics	54,456
146	Thermodynamics Lab	5,582
	Various	72,105
	Total Engineering Hours	1,826,579

1.0	Design Engineering SDW	1,745,000 hrs
1.0	Test/QC SDW	81,579 hrs
		1,826,579 hrs.

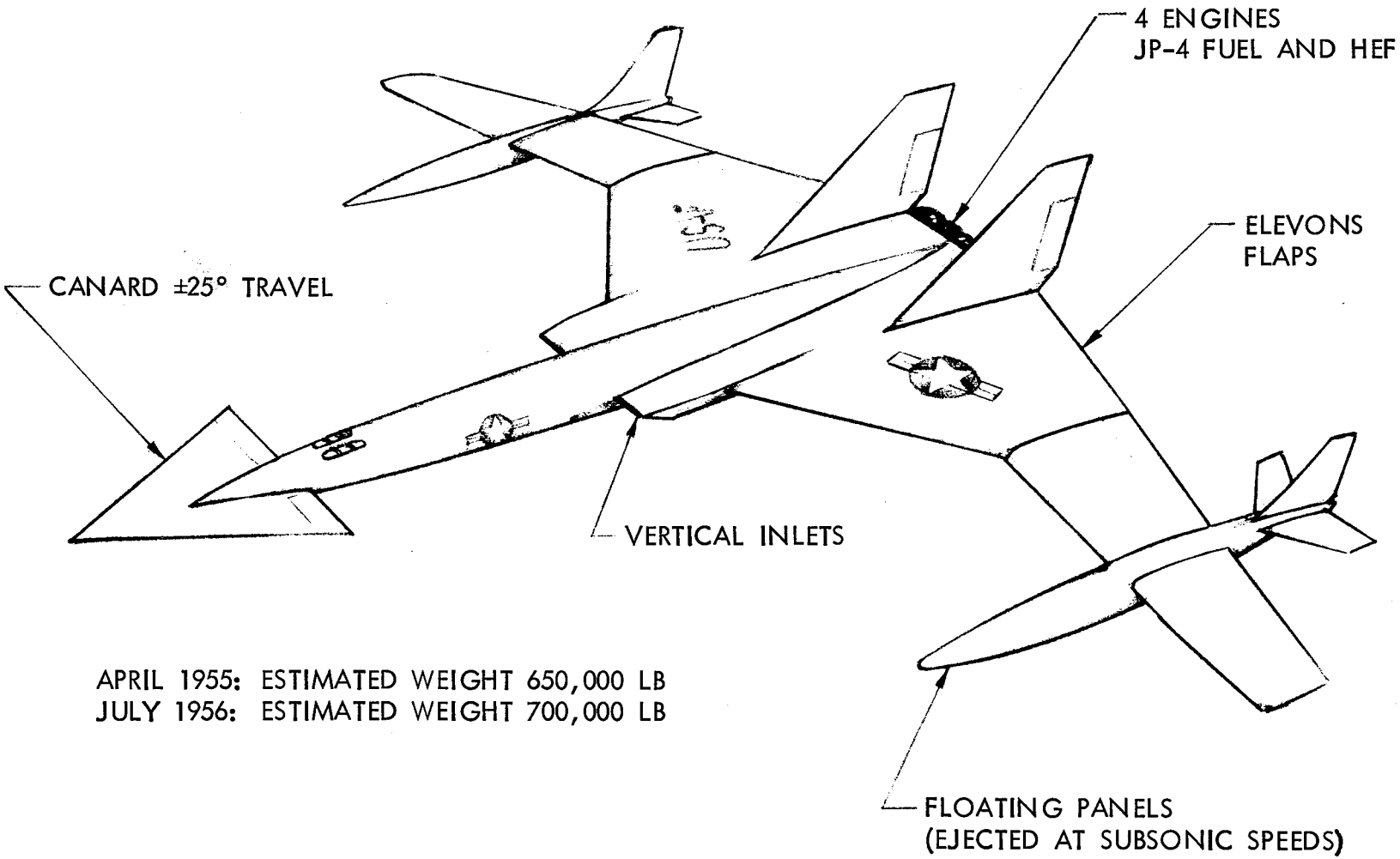
Ground testing activities identified to this item contain those test activities which could not be associated to a particular subsystem. These costs reflect the in-house testing activities only. Subcontractor testing, if identified, can be located in the Test/QC Subdivision of Work, Subcontracting Element of Cost, in each of the subsystems. The following is a summary of the major in-house test activities assigned to this WBS item.

Description	Recorded Cost
Air Vehicle Mock-up	$ 3,141,439
Model Shop-General Effort	351,942
Metallic Materials Lab Tests	133,585
Test Support	122,159
Electrical Equipment Lab Tests	104,114
Test Engineering Support	75,392
Model Design - Construction	58,582
General Test Shop Support	27,834
Various	967,015
Cost (less MPC & G&A)	$ 4,982,062
Material Procurement Cost	100,125
General and Administrative	42,888
Total Cost WBS 1.0 Test/QC SDW	$ 5,125,075

RS-70 MISSION PROFILES

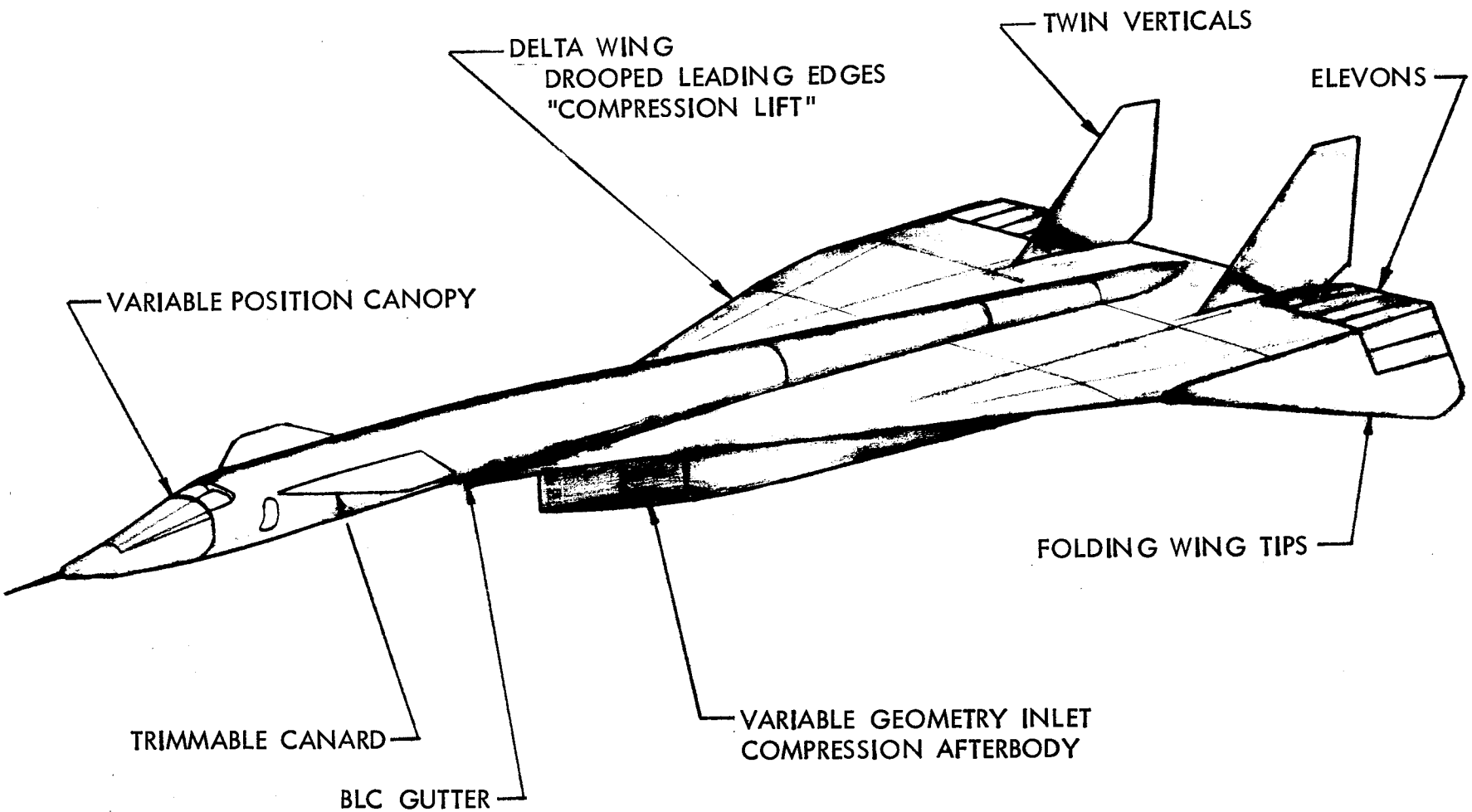
EXHIBIT 1

SAC BOMBER ~ AT THE ONSET
CONVENTIONAL CONSTRUCTION, MATERIALS, TECHNOLOGY



APRIL 1955: ESTIMATED WEIGHT 650,000 LB
JULY 1956: ESTIMATED WEIGHT 700,000 LB

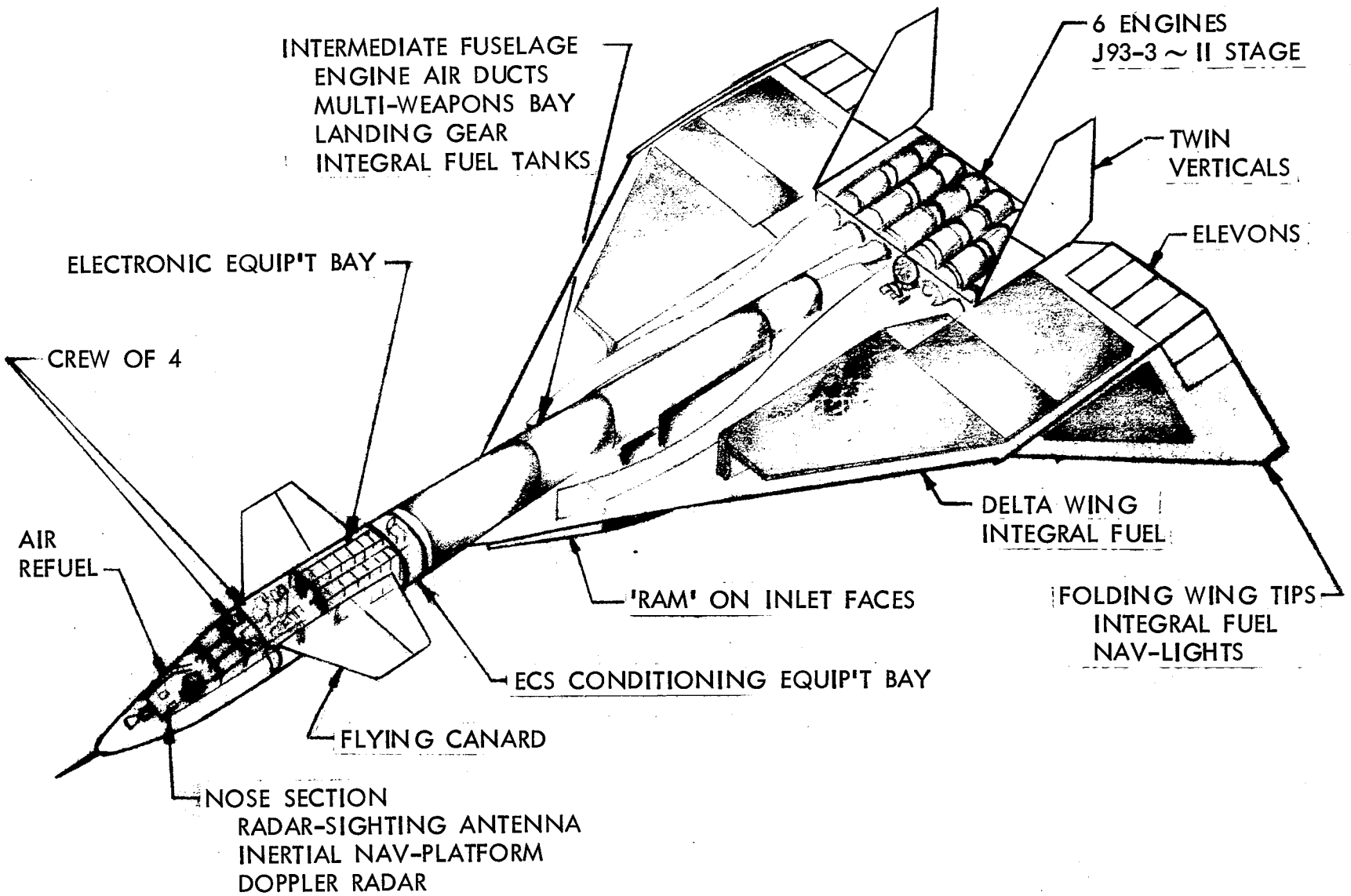
B-70 AERODYNAMIC FEATURES



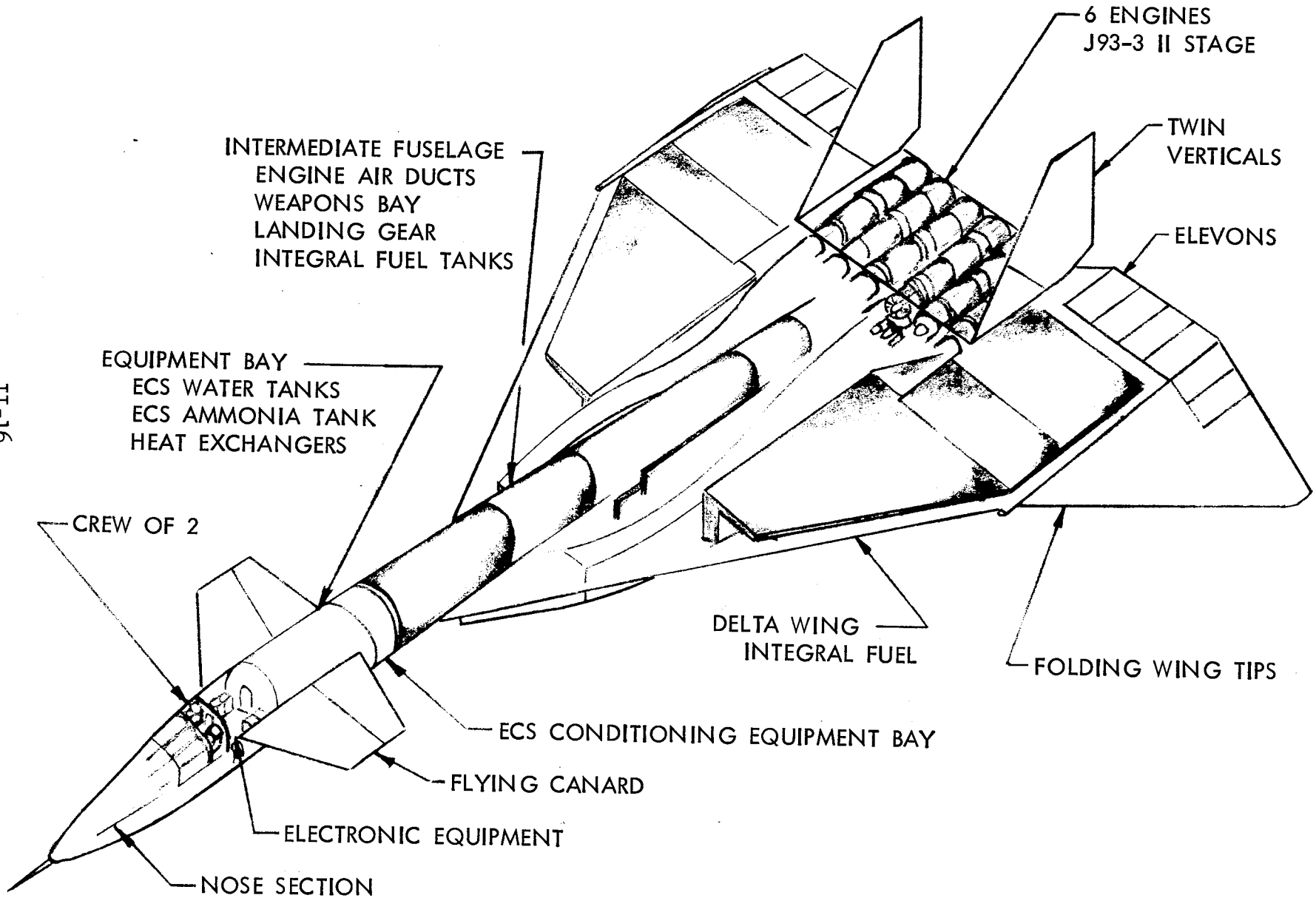
HIGH-TEMPERATURE DEVELOPMENT

	PRIOR TO B-70	B-70 DESIGN
STRUCTURES	240 F	450 TO 630 F
FUELS	JP-4 ~ 200 F	JP-6 ~ 300 F
OILS	300 TO 350 F	UP TO 450 F
ELECTRICAL SYSTEMS	250 F	550 F
HYDRAULIC SYSTEMS	-65 TO 350 F	-65 TO 450 F
BEARINGS	375 F	630 F
SEALS	275 F	500 TO 630 F
GREASES	375 F (25 HR)	450 F (100 HR)
TIRES	200 F (4 HR)	360 F (4 HR)
RADOMES AND WINDOWS	250 TO 300 F	500 TO 530 F

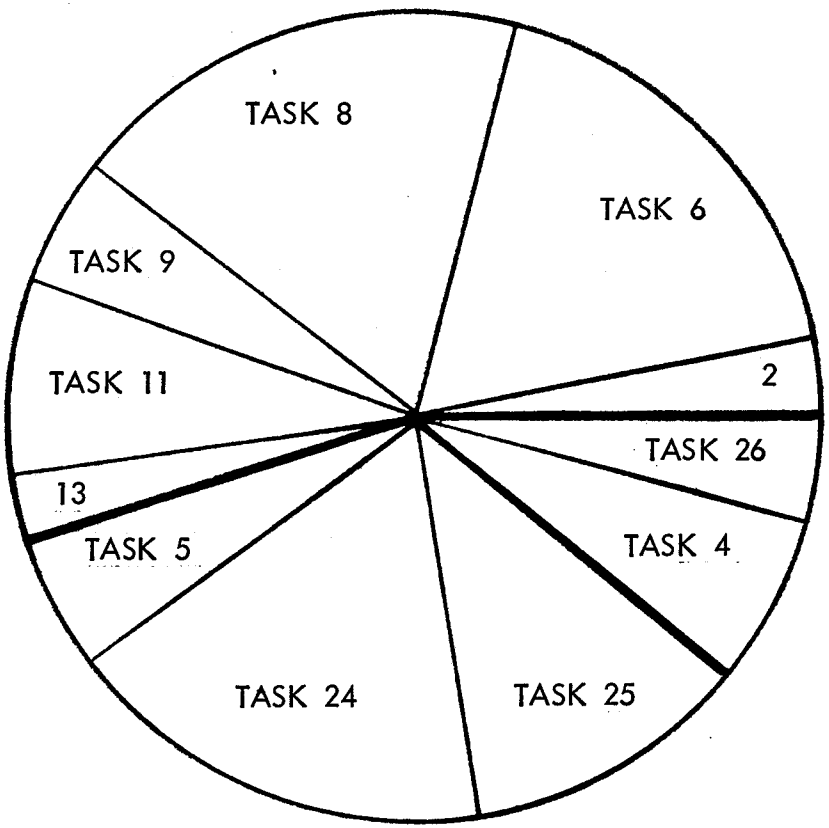
RS-70 GENERAL ARRANGEMENT



XB-70 GENERAL ARRANGEMENT

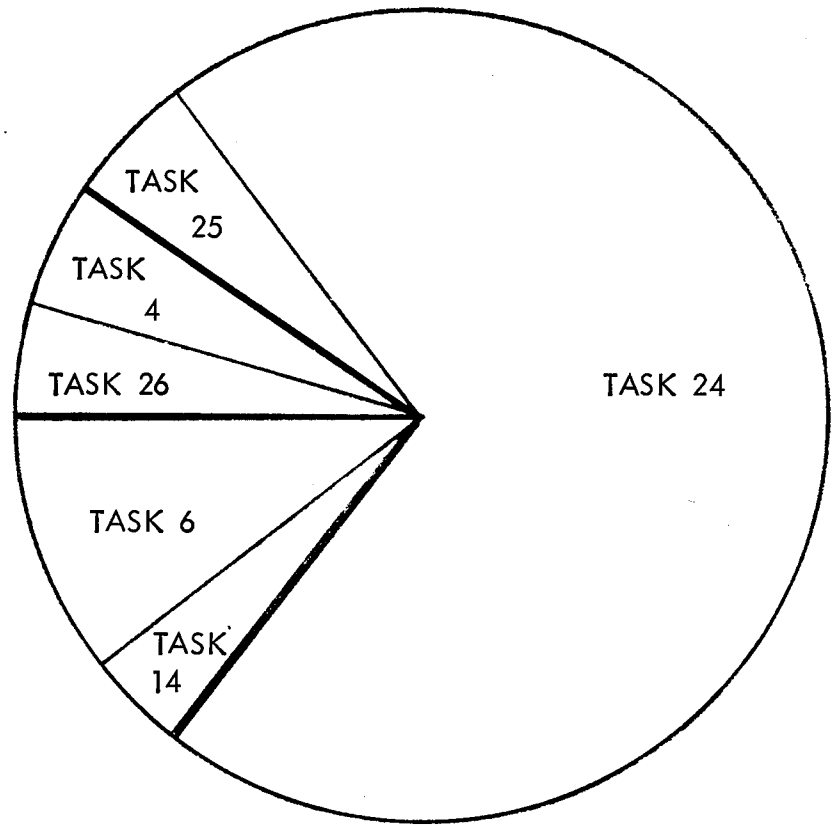


RS-70 CATEGORY I ~ FLIGHT HOUR SUMMARY
RS-70 TEST AIR VEHICLES



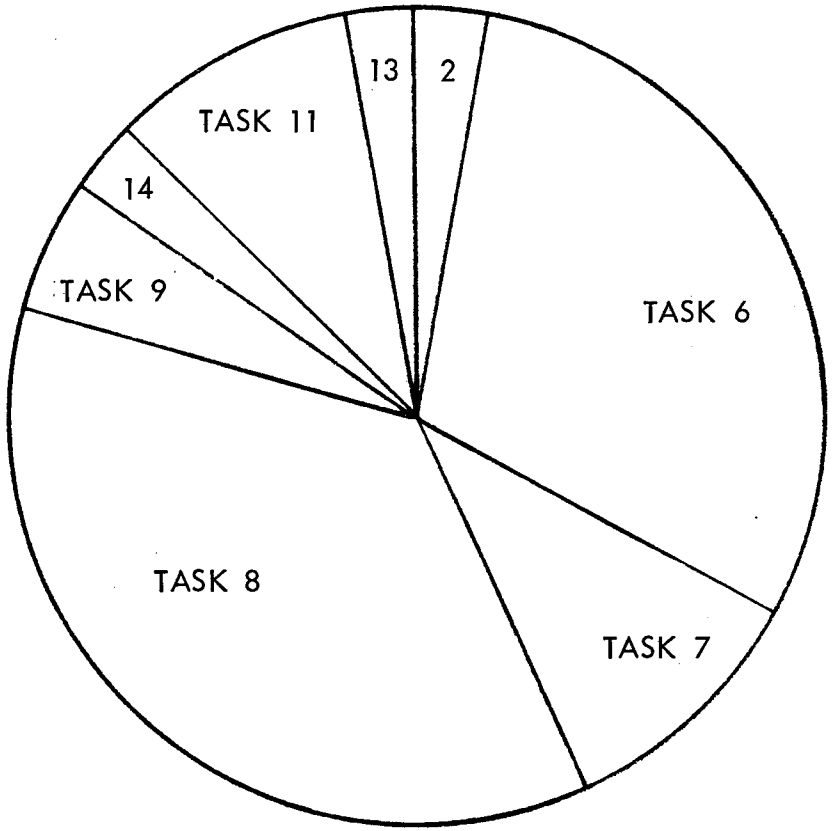
TASK	TITLE	FLIGHT HR
2	AIR VEHICLE	50
6	PROPULSION	315
8	AIR FRAME	575
9	ECS	100
11	FLIGHT CONTROLS	165
13	SECONDARY POWER	35
	PRIMARY A/V TESTS: TOTAL	1240
5	M&TC	115
24	OFFENSIVE	400
25	DEFENSIVE	250
	MILITARY SUBSYSTEMS: TOTAL	765
4	MISSILES	160
26	PENETRATION	110
	AIRBORNE COOPERATION: TOTAL	270
	RS-70's FLIGHT TEST HRS: TOTAL	2275

RS-70 CATEGORY I ~ FLIGHT HOUR SUMMARY
FLYING TEST BEDS



TASKS	TITLE	FLIGHT HR
6	PROPULSION	270
14	PERSONNEL ACCOM	65
	PRIMARY A/V TESTS: TOTAL	335
4	MISSILES	150
26	PENETRATION	100
	AIRBORNE COOPERATION: TOTAL	250
24	OFFENSIVE	1925
25	DEFENSIVE	150
	MILITARY SUBSYSTEMS: TOTAL	2075
	FLYING TEST BEDS FLIGHT HR: TOTAL	2660

RS-70 CATEGORY I ~ FLIGHT HOUR SUMMARY
CHARGEABLE FLIGHT HOURS



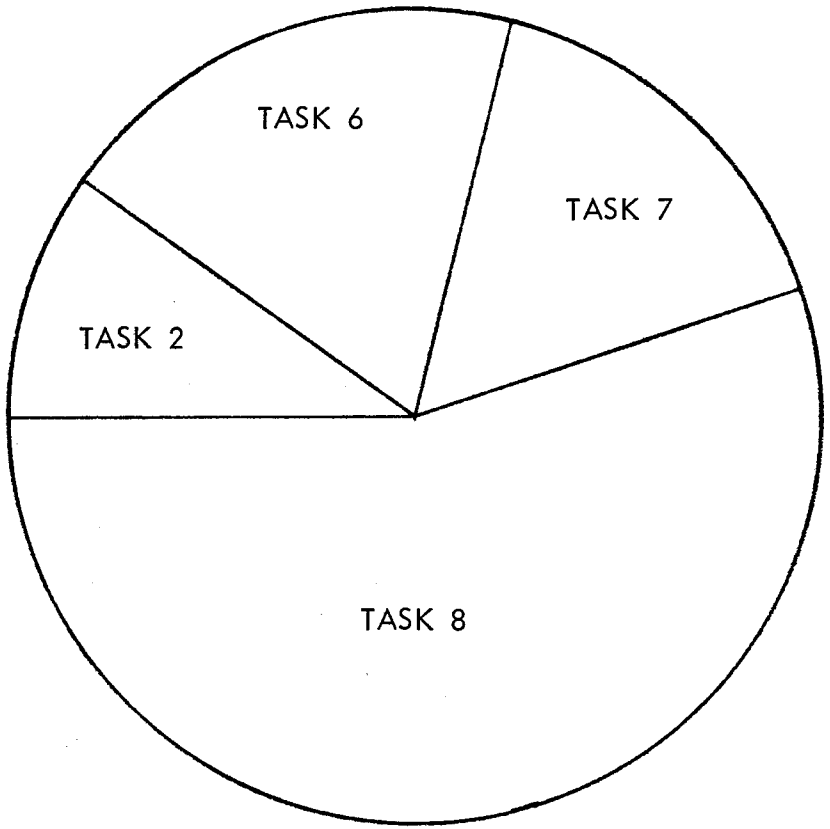
TASKS	TITLE		FLIGHT HR
2	AIR VEHICLE		50
6	PROPULSION		435
7	AIR INDUCTION SYS		150
8	AIRFRAME		575
	STABILIZE AND CONTROL	250	
	PERFORMANCE	140	
	STRUCTURES	85	
	A/V DEMO	100	
	ALIGHT AND ARREST	0	
9	ECS		100
11	FLIGHT CONTROL		165
12	FLIGHT INDICATION		0
13	SECONDARY POWER		35
14	PERSONNEL ACCOMMODATIONS		65
	CHARGEABLE FLIGHT HR.: TOTAL		1575

RS-70 CATEGORY I ~ FLIGHT HOUR SUMMARY
PRIMARY AIR VEHICLE EQUIVALENT FLIGHT TEST HOURS

PRIMARY AIR VEHICLE SYSTEMS	BASIC FLIGHT HOURS CHARGED PER SYSTEM	PERCENT FLIGHT HOURS ADDITIVE DUE TO TIME-SHARING												NET TIME SHARING (HOURS)	TOTAL EQUIVALENT FLIGHT TEST HOURS
		AIR VEHICLE	PROPULSION	AIR INDUCTION	STABILITY & CONT.	PERFORMANCE	STRUCTURES	A/V DEMO	ECS	FLIGHT CONT.	FLIGHT INDICATION	SECONDARY PWR	PERSONNEL ACCOM		
AIR VEHICLE	50	-	-	-	-	-	-	-	-	-	-	-	-	-	50
PROPULSION	435	-	-	50	10	50	-	10	10	-	-	100	-	225	660
AIR INDUCTION	150	-	60	-	10	50	-	10	10	20	-	-	-	245	395
STABILITY AND CONTROL	250	-	10	10	-	25	50	10	-	60	-	-	-	220	470
PERFORMANCE	140	-	50	50	25	-	-	10	10	-	-	-	-	235	375
STRUCTURES	85	-	20	20	50	25	-	50	25	60	-	-	-	400	485
A/V DEMO	100	-	-	-	-	-	-	-	-	-	-	-	-	-	100
ALIGHT AND ARREST	0	-	20	20	20	20	20	20	-	-	-	-	-	180	180
ECS	100	-	10	10	10	10	50	20	-	10	-	-	-	180	280
FLIGHT CONTROL	165	-	10	10	75	10	25	10	-	-	-	-	-	260	425
FLIGHT INDICATION	0	-	10	10	50	25	25	10	10	50	-	-	-	310	310
SECONDARY POWER	35	-	100	20	10	10	10	10	10	10	-	-	-	295	330
PERSONNEL ACCOM.	65	-	.10	10	10	10	10	10	50	10	-	-	-	155	220
													TOTAL		4280

II-20

XB-70 PROGRAM ~ FLIGHT HOUR SUMMARY
CHARGED FLIGHT HOURS"



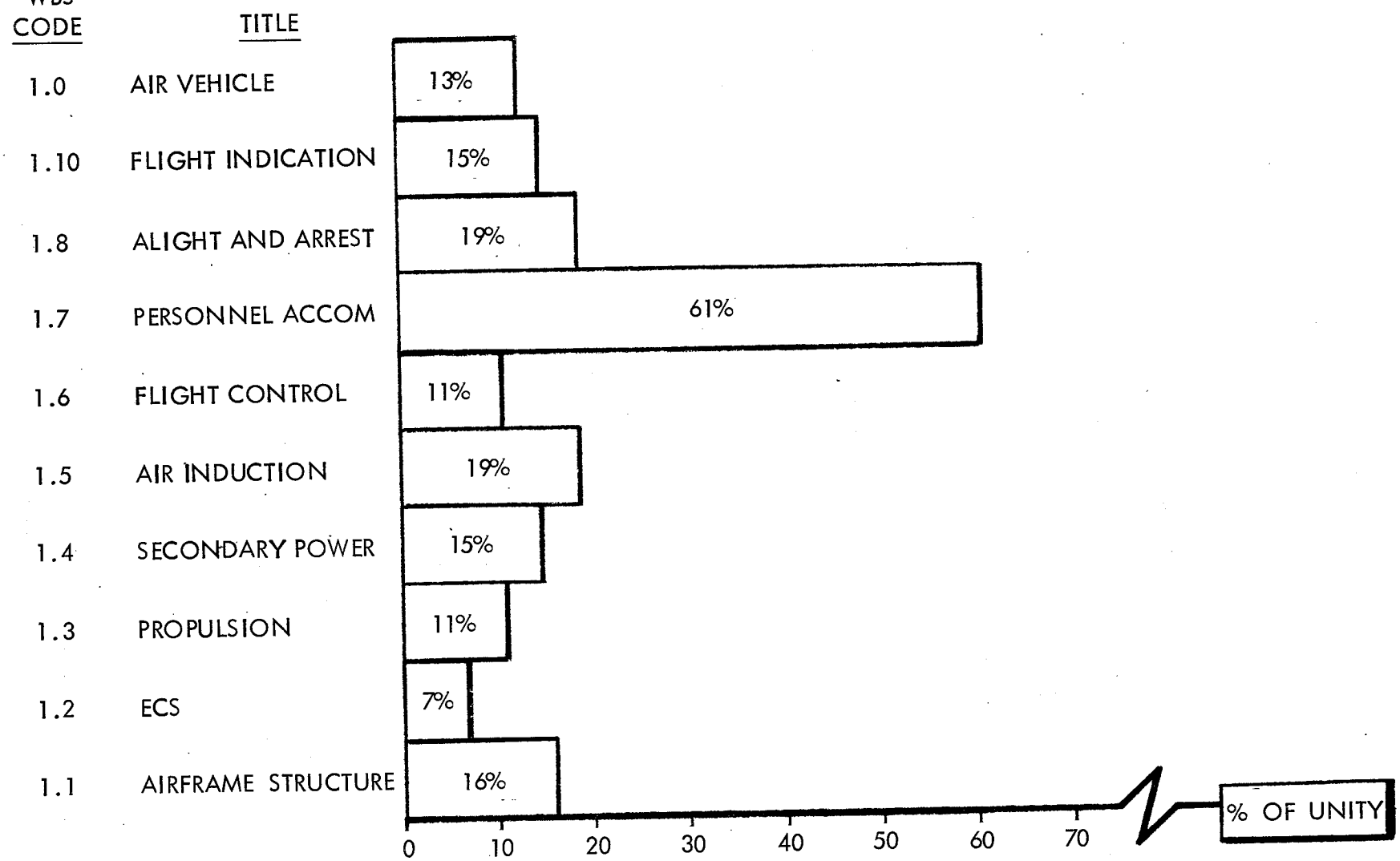
TASKS	TITLE		FLIGHT HR.
2	AIR VEHICLE		20
6	PROPULSION		35
7	AIR INDUCTION		30
8	AIRFRAME		100
	STABILIZE AND CONTROL	50	
	PERFORMANCE	40	
	STRUCTURES	10	
9	ECS		0
11	FLIGHT CONTROL		0
12	FLIGHT INDICATION		0
13	SECONDARY POWER		0
14	PERSONNEL ACCOM		0*

*ESCAPE SYSTEM TEST BEDS = 120 HR.
COMPARED TO 65 HR. PLANNED.

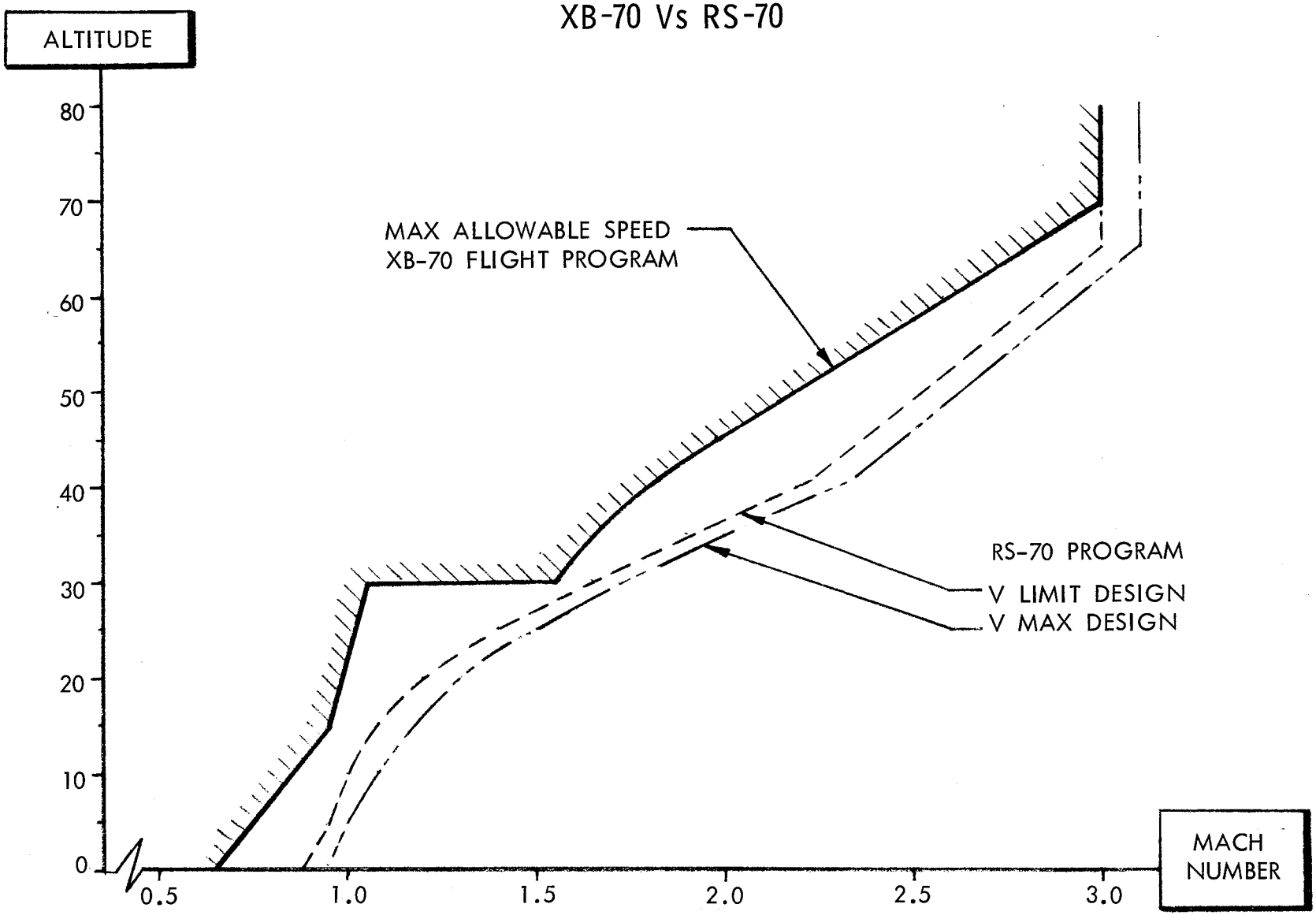
XB-70 PROGRAM ~ FLIGHT HOUR SUMMARY
PRIMARY AIR BEHICLE EQUIVALENT FLIGHT TEST HOURS

PRIMARY AIR VEHICLE SYSTEMS	BASIC FLIGHT HOURS CHARGED PER SYSTEM	PERCENT FLIGHT HOURS ADDITIVE DUE TO TIME-SHARING												NET TIME SHARING (HOURS)	TOTAL EQUIVALENT FLIGHT TEST HOURS
		AIR VEHICLE	PROPULSION	AIR INDUCTION	STABILITY & CONT.	PERFORMANCE	STRUCTURES	ALIGHT & ARREST	ECS	FLIGHT CONT.	FLIGHT INDICATION	SECONDARY PWR	PERSONNEL ACCOM		
AIR VEHICLE	20	-	-	-	-	-	-	-	-	-	-	-	-	-	20
PROPULSION	35	-	-	50	10	50	-	-	-	-	-	-	-	40	75
AIR INDUCTION	30	-	60	-	10	50	-	-	-	-	-	-	-	45	75
STABILITY AND CONTROL	50	-	10	10	-	25	50	-	-	-	-	-	-	20	70
PERFORMANCE	40	-	50	50	25	-	-	-	-	-	-	-	-	45	85
STRUCTURES	10	-	20	20	50	25	-	-	-	-	-	-	-	50	60
ALIGHT AND ARREST	0	-	20	20	20	20	20	-	-	-	-	-	-	35	35
ECS	0	-	10	10	10	10	50	-	-	-	-	-	-	20	20
FLIGHT CONTROL	0	-	10	10	75	10	25	-	-	-	-	-	-	50	50
FLIGHT INDICATION	0	-	10	10	50	25	25	-	-	-	-	-	-	45	45
SECONDARY POWER	0	-	100	20	10	10	10	-	-	-	-	-	-	50	50
PERSONNEL ACCOM	120	-	10	10	10	10	10	-	-	-	-	-	-	15	135
													TOTAL		720

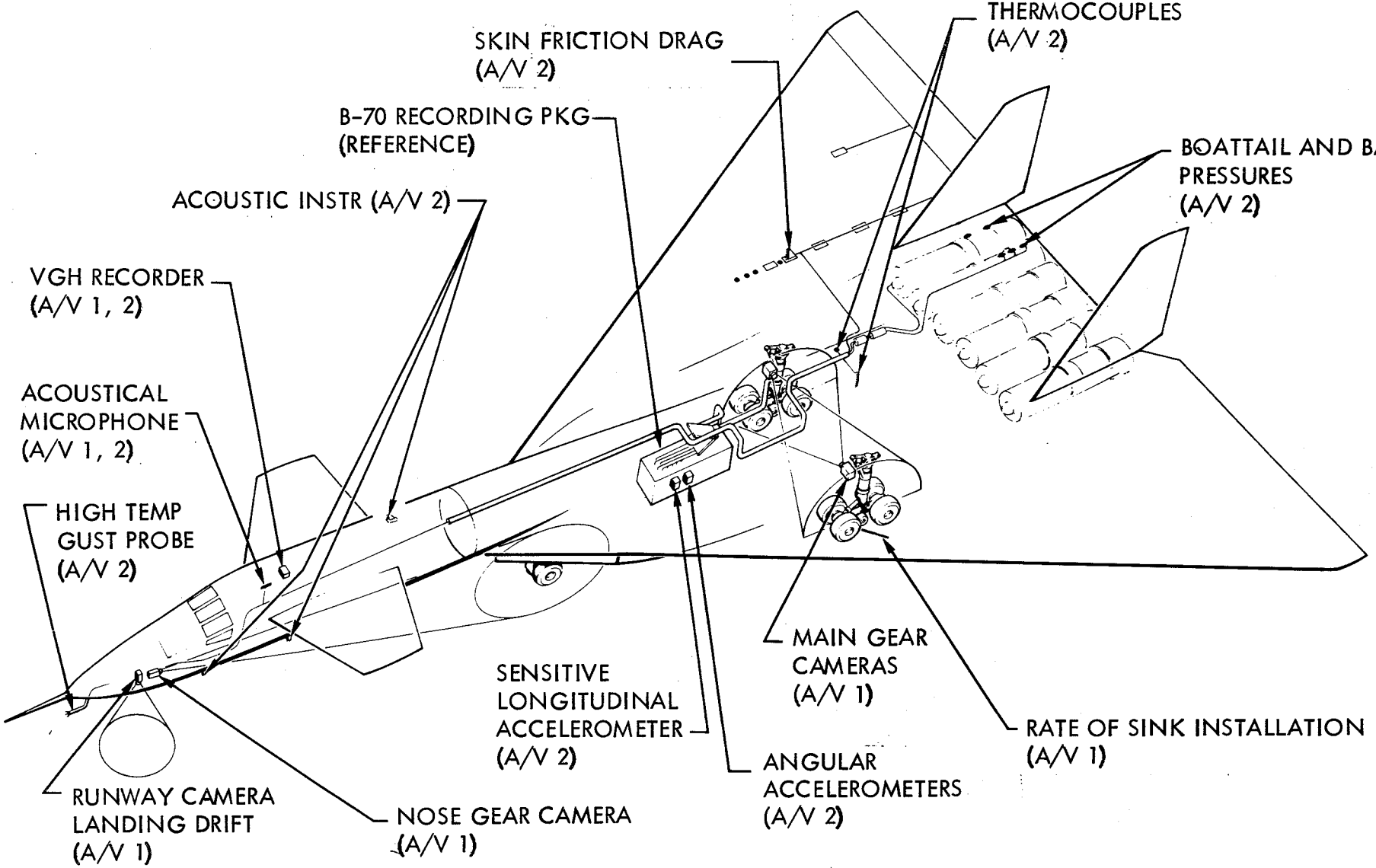
XB-70 PROGRAM ~ FLIGHT HOUR EXPOSURE BASED ON RS-70 PROGRAM TO BE UNITY



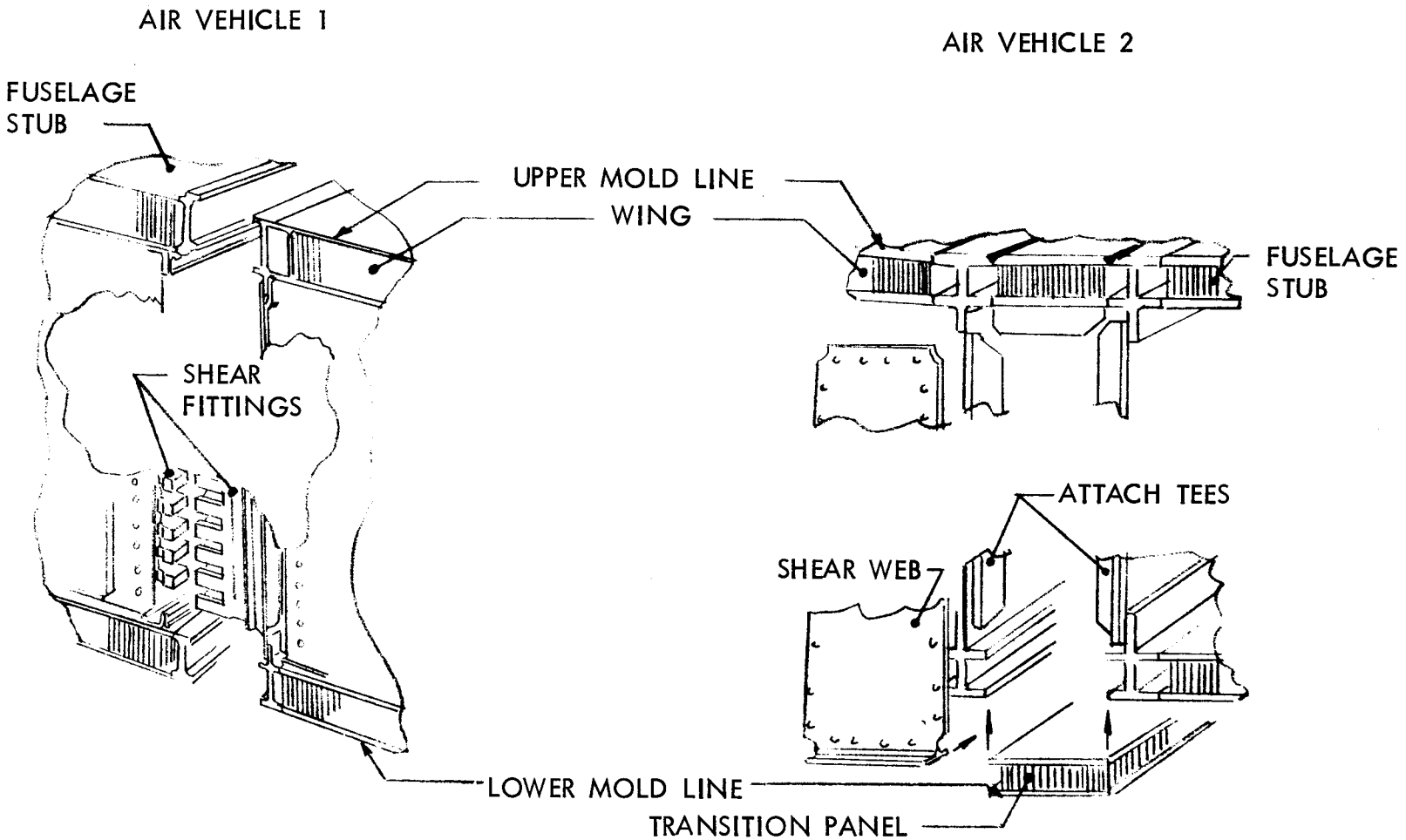
FLIGHT ENVELOPE
XB-70 Vs RS-70



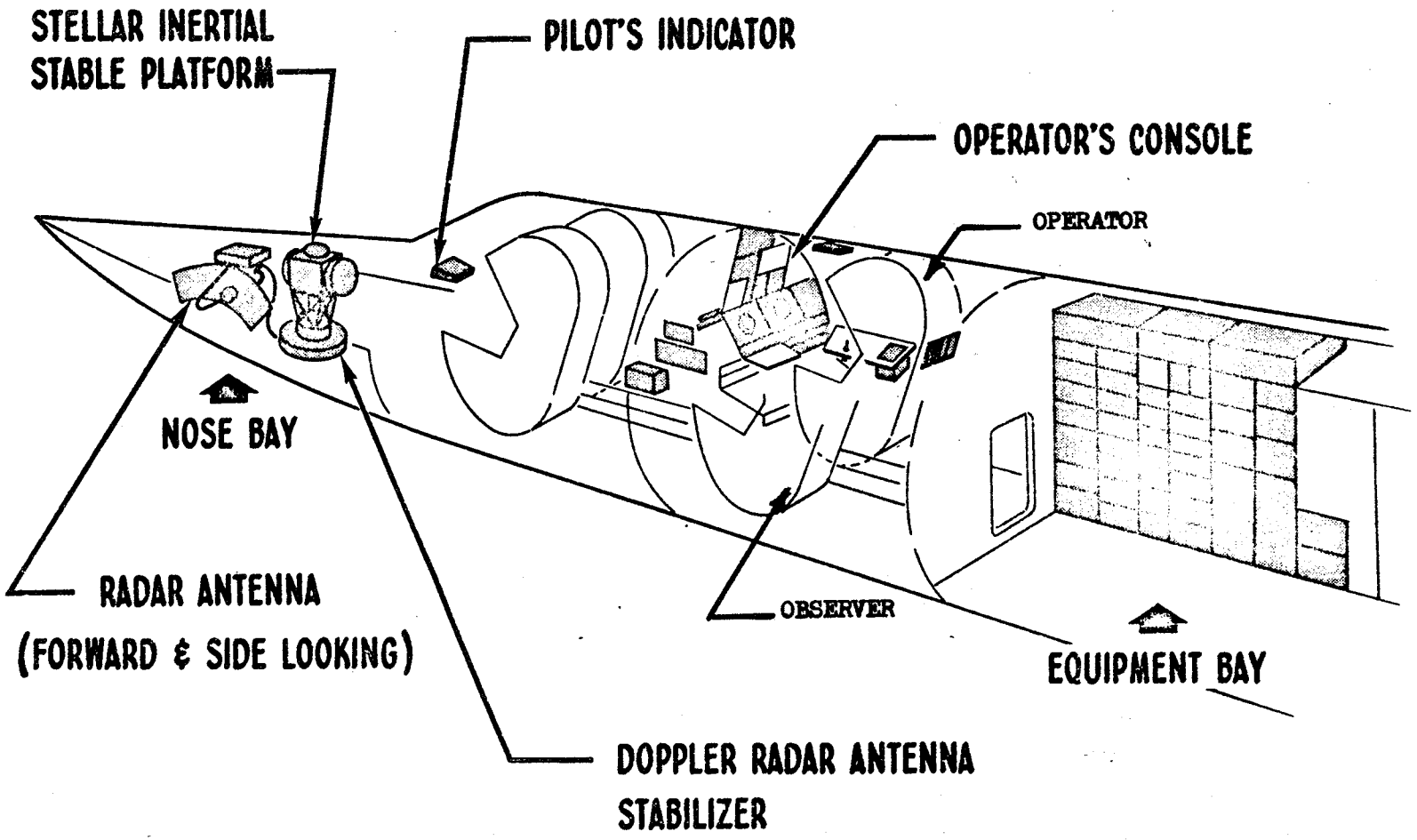
SST INSTRUMENTATION



WING TO FUSELAGE JOINING



BN&MG SUBSYSTEM INSTALLATION
AIR VEHICLE NO 3

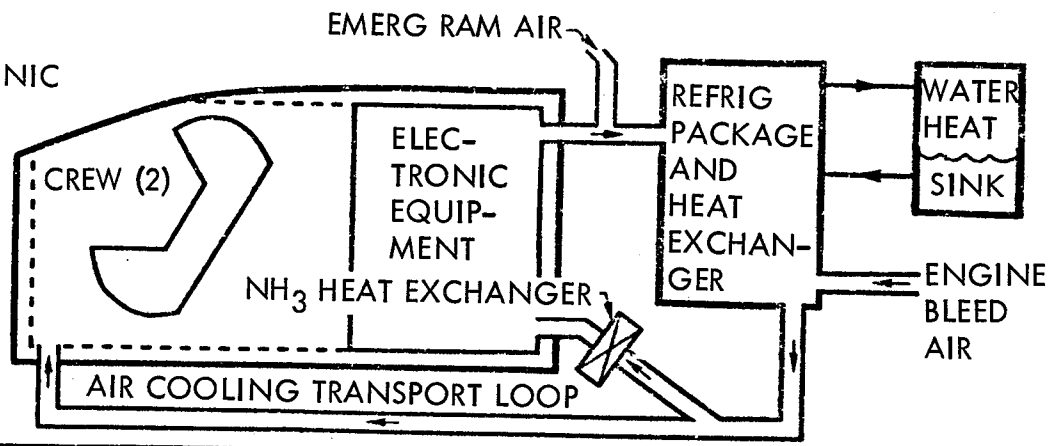


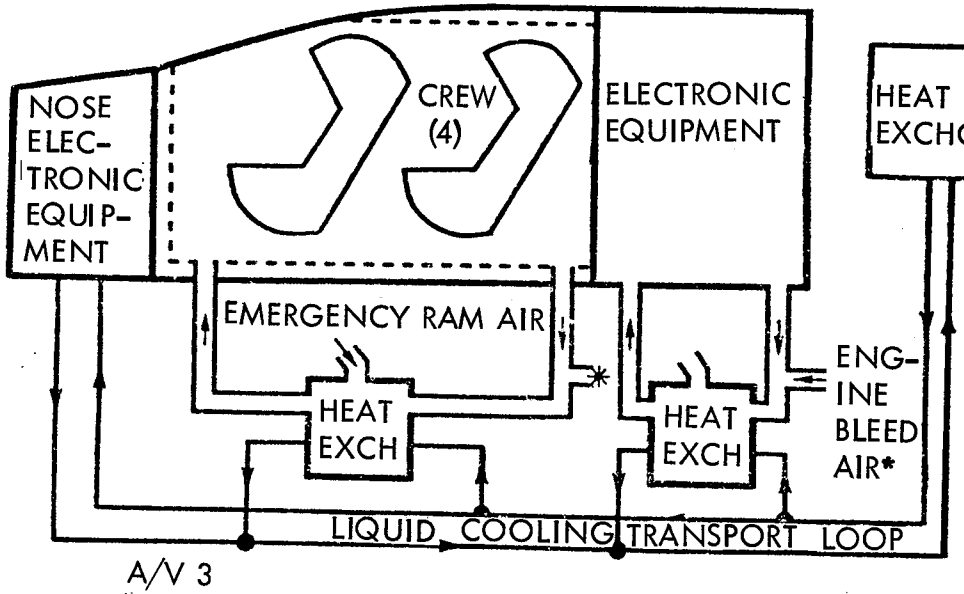
ENVIRONMENTAL CONTROL SUBSYSTEM

BASIC

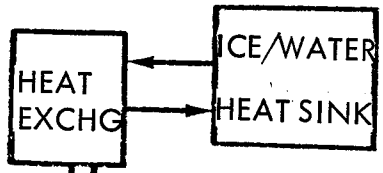
- SINGLE AIR LOOP-CREW AND ELECTRONIC EQUIPMENT
- PNEUMATIC DRIVE (ENGINE BLEED) -FREON COMPRESSOR
- PRIMARY COOLING-AIR LOOP

A/V 1&2





A/V 3

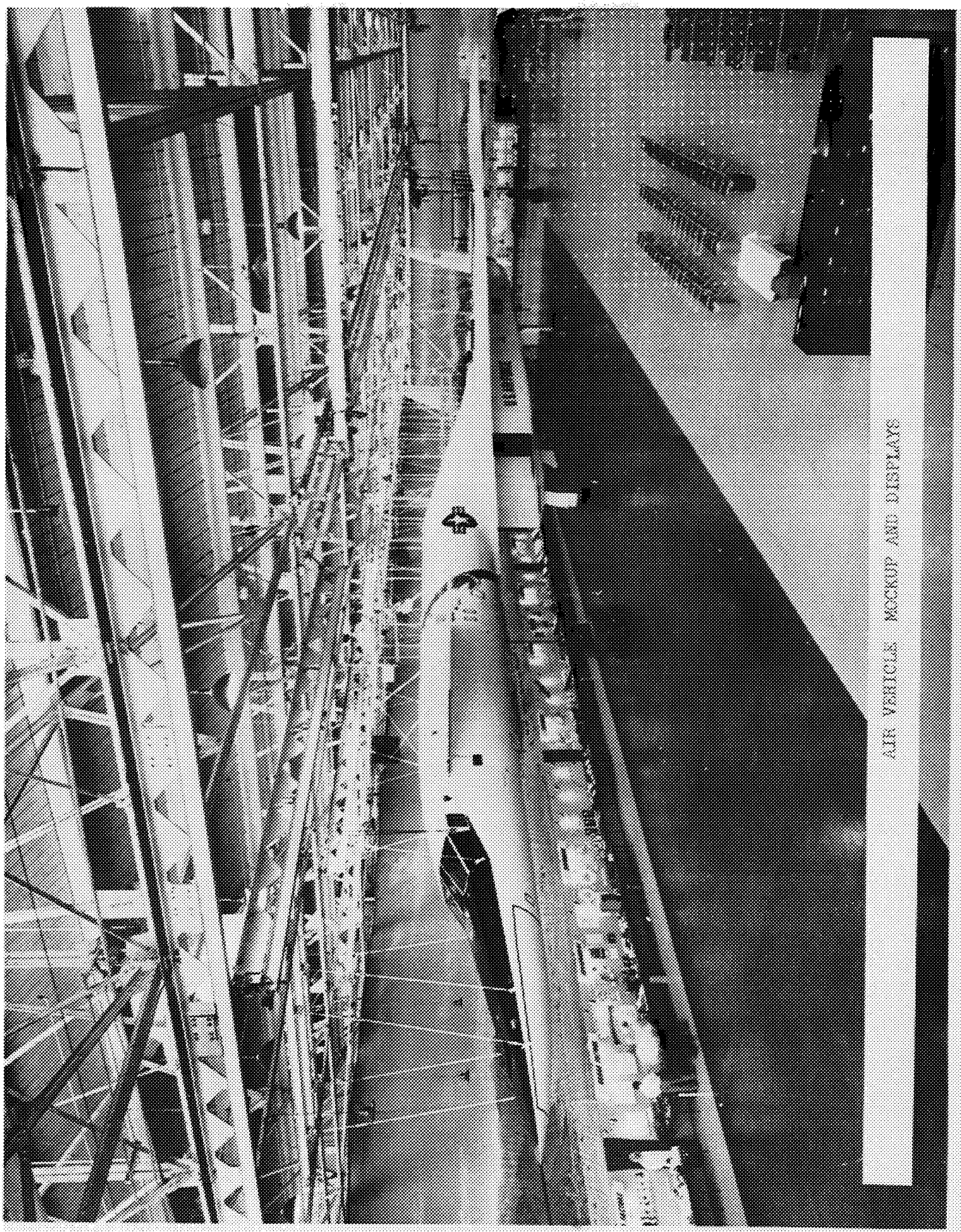


MODIFIED FOR BOMB-NAV SYSTEM

- SEPERATE AIR LOOPS-CREW AND ELECTRONIC EQUIPMENT.
- ICE/WATER HEAT SINK
- INCREASED PRIMARY AIR COOLING CAPACITY AND LIQUID LOOPS

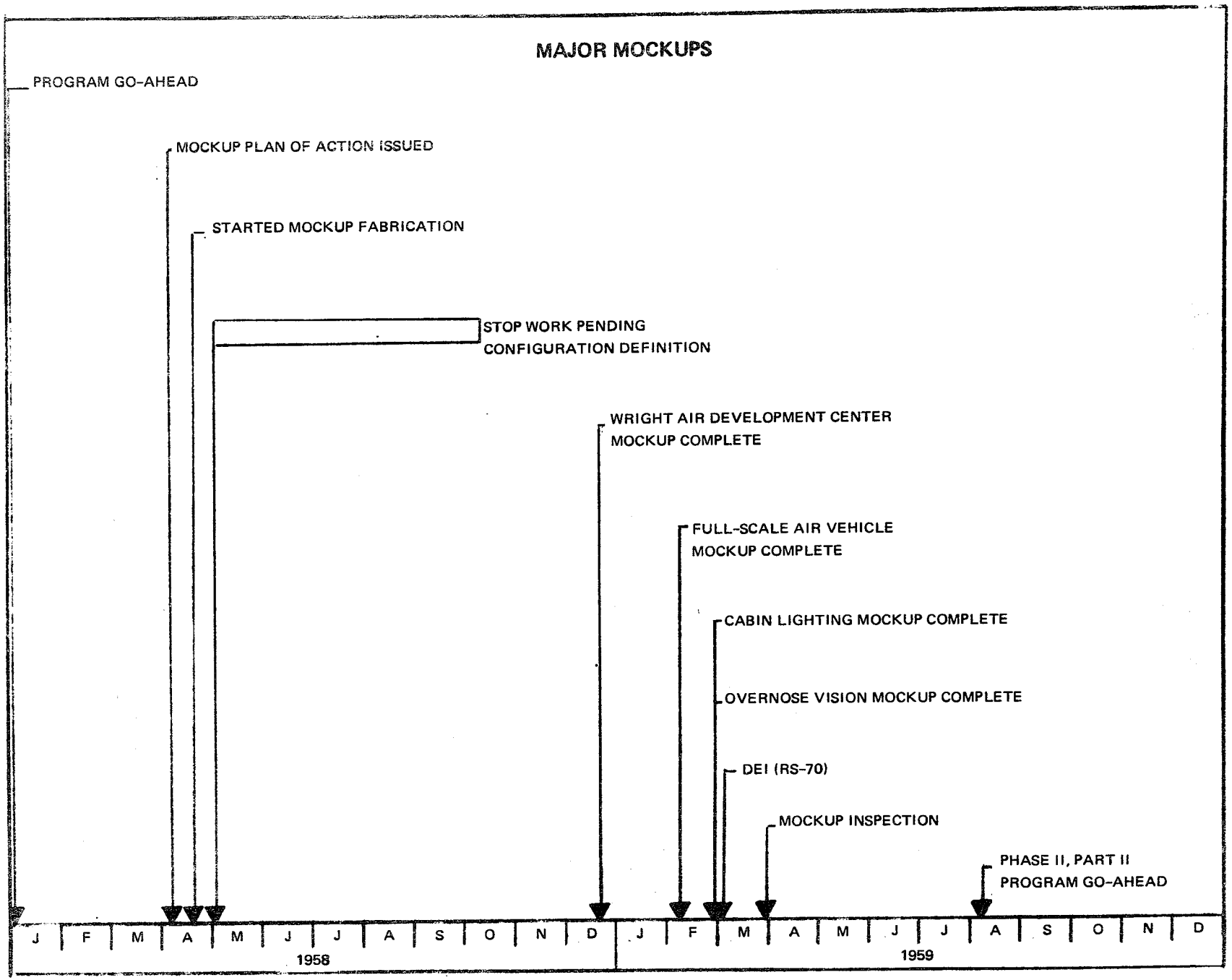
SD72-SH-0003

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH



OVER-NOSE VISION MOCKUP

EXHIBIT 20


MAJOR MOCKUPS
PROGRAM GO-AHEAD
MOCKUP PLAN OF ACTION ISSUED
STARTED MOCKUP FABRICATION
STOP WORK PENDING
CONFIGURATION DEFINITION
WRIGHT AIR DEVELOPMENT CENTER
MOCKUP COMPLETE
FULL-SCALE AIR VEHICLE
MOCKUP COMPLETE
CABIN LIGHTING MOCKUP COMPLETE
OVERNOSE VISION MOCKUP COMPLETE
DEI (RS-70)
MOCKUP INSPECTION
PHASE II, PART II
PROGRAM GO-AHEAD
J F M A M J J A S O N D
1958
J F M A M J J A S O N D
1959

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

			5-SUBSYS 0	5-SUBSYS 01	5-SUBSYS 02	5-SUBSYS 03
			HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS
DESIGN/ENGINEERING			1826579	8302581	985802	1761024
LABOR AT $	4.921		8505232	40769287	4912462	8489644
ENGR BURDEN AT $	4.463		7919655	36746727	4335751	7185430
PRODUCTION				11904709		
LABOR AT $	3.222			38337731		
SHOP SUPPORT			508479	4386037	111236	442874
LABOR AT $	3.036		1488671	13183710	320730	1393646
PLANNING				716532		
LABOR AT $	3.417			2442730		
TEST/QC			5411	1950765	8931	27838
LABOR AT $	3.531		17456	6871767	27132	87911
MFG BURDEN AT $	3.918		1966438	74073403	418209	1717820
ENGR MATERIAL			916866	11693669	167696	815446
MFG MATERIAL				27227491		
SUBCONTRACT				103499447	13552727	11598442
MPC			106624	8205547	582839	608353
WIND TUNNEL				2760920		
OTHER COST			2267739	12295983	197805	3383427
SUB-TOTAL			23188681	378108412	24515351	35280119
GEN & ADMIN			303828	6595097	391060	563172
IDWA				21332575		
TOTAL COST			23492509	406036084	24906411	35843291

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-36 III-73 III-438 III-590

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM '1
AIR VEHICLE

			5-SUBSYS 04	5-SUBSYS 05	5-SUBSYS 06	5-SUBSYS 07
			HOURS	HOURS	HOURS	HOURS
			DOLLARS	DOLLARS	DOLLARS	DOLLARS
DESIGN/ENGINEERING			1950276	630695	1130155	526124
LABOR AT $	4.921		9832880	3110162	5567013	2580264
ENGR BURDEN AT $		4.463	9231077	2700615	5118121	2375291
PRODUCTION						
LABOR AT $	3.222					
SHOP SUPPORT			339739	151065	573357	510049
LABOR AT $	3.036		1041422	470196	1712747	1610946
PLANNING						
LABOR AT $	3.417					
TEST/QC			19595	10036	34093	21266
LABOR AT $	3.531		63051	31264	110134	65983
MFG BURDEN AT $		3.918	1354238	629614	2232702	1932869
ENGR MATERIAL			805279	546226	1173454	966093
MFG MATERIAL						
SUBCONTRACT			29005372	9301831	7425036	1153331
MPC			1369796	412883	427124	146407
WIND TUNNEL				1243178		
OTHER COST			330209	326113	257964	69926
SUB-TOTAL			53033324	18772082	24024295	10901110
GEN & ADMIN			921444	288326	410733	200741
IDWA			429186			1455704
TOTAL COST			54383954	19060408	24435028	12557555

SUBDIVISION OF WORK COST DETAIL - SEE PAGE	III-734	IV-94	IV-216	IV-336

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

			5-SUBSYS 08	5-SUBSYS 09	5-SUBSYS 10	5-SUBSYS 11
			HOURS	HOURS	HOURS	HOURS
			DOLLARS	DOLLARS	DOLLARS	DOLLARS
DESIGN/ENGINEERING			199309	213308		530886
LABOR AT $	4.921		998488	995250		2686991
ENGR BURDEN	AT $	4.463	874375	908594		2647685
PRODUCTION						137320
LABOR AT $	3.222					449311
SHOP SUPPORT			2650	16223		174639
LABOR AT $	3.036		9280	47473		591227
PLANNING						
LABOR AT $	3.417					
TEST/QC			301	771		19251
LABOR AT $	3.531		1273	2617		66972
MFG BURDEN	AT $	3.918	11602	62860		1435666
ENGR MATERIAL			8199	98457		747683
MFG MATERIAL						
SUBCONTRACT			14352749	1505370	3097830	
MPC			704276	85538	136403	104605
WIND TUNNEL						
OTHER COST			61	9157		48942
SUB-TOTAL			16960303	3715316	3234233	8779082
GEN & ADMIN			298913	55450	58329	158094
IDWA						
TOTAL COST			17259216	3770766	3292562	8937176

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE IV-447 IV-511 IV-577 IV-620

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

		5-SUBSYS 12 HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		316502	18373241
LABOR AT $ 4.921		1967649	90415322
ENGR BURDEN	AT $ 4.463	1952457	81995778
PRODUCTION		4590814	16632843
LABOR AT $ 3.222		14796835	53583877
SHOP SUPPORT		65703	7282051
LABOR AT $ 3.036		236401	22106449
PLANNING		280324	996856
LABOR AT $ 3.417		963821	3406551
TEST/QC		587203	2685461
LABOR AT $ 3.531		2135631	9481191
MFG BURDEN	AT $ 3.918	22277981	108113402
ENGR MATERIAL			17939068
MFG MATERIAL		9848132	37075623
SUBCONTRACT			194492135
MPC		1318030	14208425
WIND TUNNEL			4004098
OTHER COST			19187326
SUB-TOTAL		55496937	656009245
GEN & ADMIN		1155919	11401106
IDWA		4685745	27903210
TOTAL COST		61338601	695313561

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE IV-663 II-60

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

			DESIGN /ENGR HOURS DOLLARS	TEST /QC HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			1745000	81579	1826579
LABOR AT $	4.656		8158719	346513	8505232
ENGR BURDEN AT $		4.336	7550198	369457	7919655
SHOP SUPPORT			14412	494067	508479
LABOR AT $	2.928		44856	1443815	1488671
TEST/QC			462	4949	5411
LABOR AT $	3.226		1668	15788	17456
MFG BURDEN AT $		3.827	62908	1903530	1966438
ENGR MATERIAL			31391	885475	916866
MPC			6499	100125	106624
OTHER COST			2250255	17484	2267739
SUB-TOTAL			18106494	5082187	23188681
GEN & ADMIN			260940	42888	303828
TOTAL COST			18367434	5125075	23492509

TIME-PHASED COST
DETAIL - SEE PAGE II-37 II-47 II-52

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	162.0	27270	4.574	124733	124080	248813
Q-2 58						
Q-3 58	707.5	118922	4.289	510012	463263	973275
Q-4 58						
Q-1 59	826.0	140995	4.169	587867	481887	1069754
Q-2 59						
Q-3 59	1083.0	190654	4.258	811889	698724	1510613
Q-4 59						
Q-1 60	1002.0	173710	4.561	792331	649651	1441982
Q-2 60						
Q-3 60	877.0	147300	4.800	707037	543459	1250496
Q-4 60						
Q-1 61	1303.0	222341	4.675	1039462	758136	1797598
Q-2 61						
Q-3 61	842.5	152750	4.918	751208	694903	1446111
Q-4 61						
Q-1 62	603.0	102930	4.967	511216	473422	984638
Q-2 62						
Q-3 62	435.5	73144	4.861	355588	371280	726868
Q-4 62						
Q-1 63	549.0	93733	5.027	471209	507067	978276
Q-2 63						
Q-3 63	607.0	101986	5.001	510006	581447	1091453
Q-4 63						
Q-1 64	948.0	161790	4.786	774294	966461	1740755
Q-2 64						
Q-3 64	40.0	7060	6.493	45842	48088	93930
Q-4 64						
Q-1 65	148.0	25598	5.537	141729	163863	305592
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
5-SUBSYSTEM 0 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	14.5	2472	5.479	13544	9008	22552
Q-4 65						
Q-1 66	13.5	2345	4.585	10752	15459	26211
TOTAL	10161.5	1745000		8158719	7550198	15708917

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	10.5	1712	2.992	5123	4928	10051
Q-2 58						
Q-3 58		-77	1.351	-104	-193	-297
Q-4 58						
Q-1 59	1.5	260	3.546	922	962	1884
Q-2 59						
Q-3 59	24.0	4314	2.887	12455	17410	29865
Q-4 59						
Q-1 60	-16.5	-2881	2.885	-8313	-7854	-16167
Q-2 60						
Q-3 60		98	2.653	260	216	476
Q-4 60						
Q-1 61		69	2.928	202	236	438
Q-2 61						
Q-3 61	3.0	636	2.943	1872	2260	4132
Q-4 61						
Q-1 62	12.0	1925	3.068	5905	7538	13443
Q-2 62						
Q-3 62	10.5	1847	3.001	5543	7339	12882
Q-4 62						
Q-1 63	13.5	2259	3.205	7240	9312	16552
Q-2 63						
Q-3 63	12.0	1930	3.307	6383	9473	15856
Q-4 63						
Q-1 64	10.5	1788	3.147	5627	8747	14374
Q-2 64						
Q-3 64	3.0	515	3.266	1682	2411	4093
Q-4 64						
Q-1 65		17	3.471	59	111	170
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 1
5-SUBSYSTEM 0 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65					12	12
TOTAL	84.0	14412		44856	62908	107764

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		49	3.061	150		150
Q-2 58						
Q-3 58		76	3.039	231		231
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59		115	4.626	532		532
Q-4 59						
Q-1 60	1.5	149	3.322	495		495
Q-2 60						
Q-3 60		13	2.846	37		37
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		6	4.667	28		28
Q-4 62						
Q-1 63		35	3.029	106		106
Q-2 63						
Q-3 63						
Q-4 63						
Q-1 64						
Q-2 64						
Q-3 64		9	5.111	46		46
Q-4 64						
Q-1 65		6	4.833	29		29
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65		4	3.500	14		14
TOTAL	1.5	462		1668		1668

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	172.5	29031	4.478	130006	129008	259014	580
Q-2 58							
Q-3 58	707.5	118921	4.290	510139	463070	973209	-174
Q-4 58							
Q-1 59	827.5	141255	4.168	588789	482849	1071638	6
Q-2 59							
Q-3 59	1107.0	195083	4.228	824876	716134	1541010	2391
Q-4 59							
Q-1 60	987.0	170978	4.588	784513	641797	1426310	-386
Q-2 60							
Q-3 60	877.0	147411	4.798	707334	543675	1251009	119
Q-4 60							
Q-1 61	1303.0	222410	4.675	1039664	758372	1798036	97
Q-2 61							
Q-3 61	845.5	153386	4.910	753080	697163	1450243	200
Q-4 61							
Q-1 62	615.0	104855	4.932	517121	480960	998081	2999
Q-2 62							
Q-3 62	446.0	74997	4.816	361159	378619	739778	2726
Q-4 62							
Q-1 63	562.5	96027	4.984	478555	516379	994934	473
Q-2 63							
Q-3 63	619.0	103916	4.969	516389	590920	1107309	550
Q-4 63							
Q-1 64	958.5	163578	4.768	779921	975208	1755129	1210
Q-2 64							
Q-3 64	43.0	7584	6.272	47570	50499	98069	1053
Q-4 64							
Q-1 65	148.0	25621	5.535	141817	163974	305791	14477
Q-2 65							
Q-3 65	14.5	2476	5.476	13558	9020	22578	4120
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	13.5	2345	4.585	10752	15459	26211	-1
Q-2 66							
Q-3 66							951
TOTAL	10247.0	1759874		8205243	7613106	15818349	31391

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
5-SUBSYSTEM 0
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58	31		259625		259625
Q-2 58					
Q-3 58	-9		973026		973026
Q-4 58					
Q-1 59	1	34402	1106047		1106047
Q-2 59					
Q-3 59	202	92803	1636406		1636406
Q-4 59					
Q-1 60	50	124088	1550062	29533	1579595
Q-2 60					
Q-3 60	15	188561	1439704	27431	1467135
Q-4 60					
Q-1 61	8	332312	2130453	39590	2170043
Q-2 61					
Q-3 61	16	200337	1650796	30677	1681473
Q-4 61					
Q-1 62	236	381992	1383308	23219	1406527
Q-2 62					
Q-3 62	214	303001	1045719	17552	1063271
Q-4 62					
Q-1 63	46	166291	1161744	19424	1181168
Q-2 63					
Q-3 63	54	-89817	1018096	17023	1035119
Q-4 63					
Q-1 64	128	154695	1911162	40666	1951828
Q-2 64					
Q-3 64	383	153568	253073	5385	258458
Q-4 64					
Q-1 65	4330	145615	470213	7209	477422
Q-2 65					
Q-3 65	735	58246	85679	2286	87965
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66	1	4161	30372	915	31287
Q-2 66					
Q-3 66	58		1009	30	1039
TOTAL	6499	2250255	18106494	260940	18367434

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
5-SUBSYSTEM 0
SUBD OF WORK TEST/QC

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60	40.5	6752	4.720	31872	25055	56927
Q-4 60						
Q-1 61	37.5	6426	3.914	25153	21891	47044
Q-2 61						
Q-3 61	145.5	26415	3.914	103398	106238	209636
Q-4 61						
Q-1 62	135.0	23098	3.964	91550	105335	196885
Q-2 62						
Q-3 62	30.0	4953	4.663	23098	29173	52271
Q-4 62						
Q-1 63	15.0	2654	4.340	11519	13331	24850
Q-2 63						
Q-3 63	33.0	5466	5.368	29344	30972	60316
Q-4 63						
Q-1 64	34.5	5815	5.259	30579	34726	65305
Q-2 64						
Q-3 64					2736	2736
TOTAL	471.0	81579		346513	369457	715970

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 1
5-SUBSYSTEM 0 **AIR VEHICLE**
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	3.0	625	2.765	1728	1893	3621
Q-4 58						
Q-1 59	1647.0	281018	2.927	822640	1008290	1830930
Q-2 59						
Q-3 59	516.0	90943	2.810	255535	404368	659903
Q-4 59						
Q-1 60	420.0	72852	2.871	209123	279654	488777
Q-2 60						
Q-3 60	7.5	1328	3.541	4703	-9136	-4433
Q-4 60						
Q-1 61	52.5	9066	3.144	28502	31115	59617
Q-2 61						
Q-3 61	16.5	2881	3.420	9854	11986	21840
Q-4 61						
Q-1 62	6.0	1020	3.438	3507	5041	8548
Q-2 62						
Q-3 62	1.5	132	3.364	444	646	1090
Q-4 62						
Q-1 63	1.5	274	3.620	992	1115	2107
Q-2 63						
Q-3 63	76.5	12901	3.030	39086	58009	97095
Q-4 63						
Q-1 64	123.0	21027	3.220	67701	111529	179230
Q-2 64						
Q-3 64					-980	-980
TOTAL	2871.0	494067		1443815	1903530	3347345

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 1
5-SUBSYSTEM 0 **AIR VEHICLE**
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		5	3.000	15		15
Q-4 58						
Q-1 59	7.5	1362	3.148	4287		4287
Q-2 59						
Q-3 59	3.0	474	2.987	1416		1416
Q-4 59						
Q-1 60	1.5	201	3.189	641		641
Q-2 60						
Q-3 60	1.5	151	4.576	691		691
Q-4 60						
Q-1 61		52	2.404	125		125
Q-2 61						
Q-3 61		37	4.811	178		178
Q-4 61						
Q-1 62		9	2.889	26		26
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	4.5	746	2.964	2211		2211
Q-4 63						
Q-1 64	10.5	1912	3.242	6198		6198
Q-2 64						
Q-3 64						
TOTAL	28.5	4949		15788		15788

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0 **AIR VEHICLE**
SUBD OF WORK TEST/QC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58	3.0	630	2.767	1743	1893	3636	4207
Q-4 58							
Q-1 59	1654.5	282380	2.928	826927	1008290	1835217	212172
Q-2 59							
Q-3 59	519.0	91417	2.811	256951	404368	661319	37647
Q-4 59							
Q-1 60	421.5	73053	2.871	209764	279654	489418	31574
Q-2 60							
Q-3 60	49.5	8231	4.528	37266	15919	53185	2230
Q-4 60							
Q-1 61	90.0	15544	3.460	53780	53006	106786	17296
Q-2 61							
Q-3 61	162.0	29333	3.867	113430	118224	231654	5821
Q-4 61							
Q-1 62	141.0	24127	3.941	95083	110376	205459	91483
Q-2 62							
Q-3 62	31.5	5085	4.630	23542	29819	53361	173178
Q-4 62							
Q-1 63	16.5	2928	4.273	12511	14446	26957	27529
Q-2 63							
Q-3 63	114.0	19113	3.696	70641	88981	159622	55987
Q-4 63							
Q-1 64	168.0	28754	3.634	104478	146255	250733	151924
Q-2 64							
Q-3 64					1756	1756	74427
TOTAL	3370.5	580595		1806116	2272987	4079103	885475

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0 **AIR VEHICLE**
SUBD OF WORK TEST/QC

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 58	230		8073		8073
Q-4 58					
Q-1 59	17965	4967	2070321		2070321
Q-2 59					
Q-3 59	3187	3571	705724		705724
Q-4 59					
Q-1 60	4153		525145	10006	535151
Q-2 60					
Q-3 60	293	2292	58000	1105	59105
Q-4 60					
Q-1 61	1460	3328	128870	2395	131265
Q-2 61					
Q-3 61	491	2591	240557	4470	245027
Q-4 61					
Q-1 62	7205	737	304884	5117	310001
Q-2 62					
Q-3 62	13639	10289	250467	4204	254671
Q-4 62					
Q-1 63	2712	19093	76291	1276	77567
Q-2 63					
Q-3 63	5516	-29384	191741	3206	194947
Q-4 63					
Q-1 64	16194		418851	8912	427763
Q-2 64					
Q-3 64	27080		103263	2197	105460
TOTAL	100125	17484	5082187	42888	5125075

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	162.0	27270	4.574	124733	124080	248813
Q-2 58						
Q-3 58	707.5	118922	4.289	510012	463263	973275
Q-4 58						
Q-1 59	826.0	140995	4.169	587867	481887	1069754
Q-2 59						
Q-3 59	1083.0	190654	4.258	811889	698724	1510613
Q-4 59						
Q-1 60	1002.0	173710	4.561	792331	649651	1441982
Q-2 60						
Q-3 60	917.5	154052	4.796	738909	568514	1307423
Q-4 60						
Q-1 61	1340.5	228767	4.654	1064615	780027	1844642
Q-2 61						
Q-3 61	988.0	179165	4.770	854606	801141	1655747
Q-4 61						
Q-1 62	739.0	126028	4.783	602766	578757	1181523
Q-2 62						
Q-3 62	464.5	78097	4.849	378686	400453	779139
Q-4 62						
Q-1 63	565.0	96387	5.008	482728	520398	1003126
Q-2 63						
Q-3 63	640.0	107452	5.019	539350	612419	1151769
Q-4 63						
Q-1 64	982.0	167605	4.802	804873	1001187	1806060
Q-2 64						
Q-3 64	40.0	7060	6.493	45842	50824	96666
Q-4 64						
Q-1 65	148.0	25598	5.537	141729	163863	305592
Q-2 65						
Q-3 65	14.5	2472	5.479	13544	9008	22552

C-2

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
5-SUBSYSTEM 0 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	13.5	2345	4.585	10752	15459	26211
TOTAL	10633.0	1826579		8505232	7919655	16424887

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	10.5	1712	2.992	5123	4928	10051
Q-2 58						
Q-3 58	3.0	548	2.964	1624	1700	3324
Q-4 58						
Q-1 59	1648.5	281278	2.928	823562	1009252	1832814
Q-2 59						
Q-3 59	541.5	95257	2.813	267990	421778	689768
Q-4 59						
Q-1 60	403.5	69971	2.870	200810	271800	472610
Q-2 60						
Q-3 60	9.0	1426	3.480	4963	-8920	-3957
Q-4 60						
Q-1 61	54.0	9135	3.142	28704	31351	60055
Q-2 61						
Q-3 61	19.5	3517	3.334	11726	14246	25972
Q-4 61						
Q-1 62	17.5	2945	3.196	9412	12579	21991
Q-2 62						
Q-3 62	12.0	1979	3.025	5987	7985	13972
Q-4 62						
Q-1 63	15.0	2533	3.250	8232	10427	18659
Q-2 63						
Q-3 63	88.5	14831	3.066	45469	67482	112951
Q-4 63						
Q-1 64	133.5	22815	3.214	73328	120276	193604
Q-2 64						
Q-3 64	3.0	515	3.266	1682	1431	3113
Q-4 64						
Q-1 65		17	3.471	59	111	170
Q-2 65						
Q-3 65					12	12
TOTAL	2959.0	508479		1488671	1966438	3455109

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		49	3.061	150		150
Q-2 58						
Q-3 58		81	3.037	246		246
Q-4 58						
Q-1 59	7.5	1362	3.148	4287		4287
Q-2 59						
Q-3 59	3.0	589	3.307	1948		1948
Q-4 59						
Q-1 60	1.5	350	3.246	1136		1136
Q-2 60						
Q-3 60	1.5	164	4.439	728		728
Q-4 60						
Q-1 61		52	2.404	125		125
Q-2 61						
Q-3 61		37	4.811	178		178
Q-4 61						
Q-1 62		9	2.889	26		26
Q-2 62						
Q-3 62		6	4.667	28		28
Q-4 62						
Q-1 63		35	3.029	106		106
Q-2 63						
Q-3 63	4.5	746	2.964	2211		2211
Q-4 63						
Q-1 64	10.5	1912	3.242	6198		6198
Q-2 64						
Q-3 64		9	5.111	46		46
Q-4 64						
Q-1 65		6	4.833	29		29
Q-2 65						
Q-3 65		4	3.500	14		14
TOTAL	28.5	5411		17456		17456

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	172.5	29031	4.478	130006	129008	259014	580
Q-2 58							
Q-3 58	710.5	119551	4.282	511882	464963	976845	4033
Q-4 58							
Q-1 59	2482.0	423635	3.342	1415716	1491139	2906855	212178
Q-2 59							
Q-3 59	1627.5	286500	3.776	1081827	1120502	2202329	40038
Q-4 59							
Q-1 60	1407.0	244031	4.074	994277	921451	1915728	31188
Q-2 60							
Q-3 60	928.0	155642	4.784	744600	559594	1304194	2349
Q-4 60							
Q-1 61	1394.5	237954	4.595	1093444	811378	1904822	17393
Q-2 61							
Q-3 61	1007.5	182719	4.742	866510	815387	1681897	6021
Q-4 61							
Q-1 62	756.5	128982	4.746	612204	591336	1203540	94482
Q-2 62							
Q-3 62	476.5	80082	4.804	384701	408438	793139	175904
Q-4 62							
Q-1 63	580.0	98955	4.963	491066	530825	1021891	28002
Q-2 63							
Q-3 63	733.0	123029	4.771	587030	679901	1266931	56537
Q-4 63							
Q-1 64	1126.0	192332	4.598	884399	1121463	2005862	153134
Q-2 64							
Q-3 64	43.0	7584	6.272	47570	52255	99825	75480
Q-4 64							
Q-1 65	148.0	25621	5.535	141817	163974	305791	14477
Q-2 65							
Q-3 65	14.5	2476	5.476	13558	9020	22578	4120
Q-4 65							
Q-1 66	13.5	2345	4.585	10752	15459	26211	-1

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66							951
TOTAL	13620.5	2340469		10011359	9886093	19897452	916866

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58	31		259625		259625
Q-2 58					
Q-3 58	221		981099		981099
Q-4 58					
Q-1 59	17966	39369	3176368		3176368
Q-2 59					
Q-3 59	3389	96374	234213C		2342130
Q-4 59					
Q-1 60	4203	124088	2075207	39539	2114746
Q-2 60					
Q-3 60	308	190853	1497704	28536	1526240
Q-4 60					
Q-1 61	1468	335640	2259323	41985	2301308
Q-2 61					
Q-3 61	507	202928	1891353	35147	1926500
Q-4 61					
Q-1 62	7441	382729	1688192	28336	1716528
Q-2 62					
Q-3 62	13853	313290	1296186	21756	1317942
Q-4 62					
Q-1 63	2758	185384	1238035	20700	1258735
Q-2 63					
Q-3 63	5570	-119201	1209837	20229	1230066
Q-4 63					
Q-1 64	16322	154695	2330013	49578	2379591
Q-2 64					
Q-3 64	27463	153568	356336	7582	363918
Q-4 64					
Q-1 65	4330	145615	470213	7209	477422
Q-2 65					
Q-3 65	735	58246	85679	2286	87965
Q-4 65					
Q-1 66	1	4161	30372	915	31287

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
5-SUBSYSTEM 0

AIR VEHICLE

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66					
Q-3 66	58		1009	30	1039
TOTAL	106624	2267739	23188681	303828	23492509

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

		DESIGN /ENGR HOURS / DOLLARS	PROD HOURS / DOLLARS	TOOLING AND STE HOURS / DOLLARS	TEST /QC HOURS / DOLLARS
DESIGN/ENGINEERING		15970542	389215		2013484
LABOR AT $ 4.921		79719272	2277162		8418888
ENGR BURDEN AT $ 4.463		71224682	2380271		8390825
PRODUCTION			16632843		
LABOR AT $ 3.222			53583877		
SHOP SUPPORT		254520	65703		6961828
LABOR AT $ 3.036		801624	236401		21068424
PLANNING			966407		30449
LABOR AT $ 3.417			3286350		120201
TEST/QC		17505	2058958		608998
LABOR AT $ 3.531		59199	7472494		1949498
MFG BURDEN AT $ 3.918		1101336	79814249		27197817
ENGR MATERIAL		443981			17495087
MFG MATERIAL			37075623		
SUBCONTRACT		61625796	104415066	27555083	896190
MPC		2582197	8627463	1054134	1944631
WIND TUNNEL					4004098
OTHER COST		17320018	657262		1210046
SUB-TOTAL		234878105	299826218	28609217	92695705
GEN & ADMIN		3451754	5852908	506150	1590294
IDWA			23992560		3910650
TOTAL COST		238329859	329671686	29115367	98196649

TIME-PHASED COST DETAIL - SEE PAGE II-62 II-74 II-86 II-88

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

			TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			18373241
LABOR AT $	4.921		90415322
ENGR BURDEN	AT $	4.463	81995778
PRODUCTION			16632843
LABOR AT $	3.222		53583877
SHOP SUPPORT			7282051
LABOR AT $	3.036		22106449
PLANNING			996856
LABOR AT $	3.417		3406551
TEST/QC			2685461
LABOR AT $	3.531		9481191
MFG BURDEN	AT $	3.918	108113402
ENGR MATERIAL			17939068
MFG MATERIAL			37075623
SUBCONTRACT			194492135
MPC			14208425
WIND TUNNEL			4004098
OTHER COST			19187326
SUB-TOTAL			656009245
GEN & ADMIN			11401106
IDWA			27903210
TOTAL COST			695313561

TIME-PHASED COST
DETAIL - SEE PAGE II-101

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	732.5	122995	4.618	568005	559607	1127612
Q-2 58						
Q-3 58	3787.0	636217	4.437	2822990	2486700	5309690
Q-4 58						
Q-1 59	5026.5	857878	4.368	3746877	2945404	6692281
Q-2 59						
Q-3 59	8041.5	1415295	4.257	6025412	5084039	11109451
Q-4 59						
Q-1 60	8908.5	1544068	4.581	7073430	5825267	12898697
Q-2 60						
Q-3 60	8930.0	1500180	4.711	7066939	5547812	12614751
Q-4 60						
Q-1 61	12096.5	2064492	4.786	9880577	7164180	17044757
Q-2 61						
Q-3 61	7986.0	1448090	4.954	7174198	6667669	13841867
Q-4 61						
Q-1 62	7161.0	1222235	5.271	6442288	5619830	12062118
Q-2 62						
Q-3 62	6741.5	1132606	5.269	5967409	5808982	11776391
Q-4 62						
Q-1 63	6195.0	1057254	5.913	6251770	5998781	12250551
Q-2 63						
Q-3 63	6776.5	1138562	5.298	6032522	5835936	11868458
Q-4 63						
Q-1 64	5837.5	996233	5.640	5618539	6191884	11810423
Q-2 64						
Q-3 64	3325.5	585352	5.863	3432171	3871847	7304018
Q-4 64						
Q-1 65	1037.0	179686	6.498	1167512	1177616	2345128
Q-2 65						
Q-3 65	365.0	61352	6.682	409939	397016	806955

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	46.5	8007	4.808	38494	41856	80350
Q-2 66						
Q-3 66		40	5.000	200	256	456
TOTAL	92994.0	15970542		79719272	71224682	150943954

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58	57.0	9531	3.051	29082	25774	54856
Q-3 58						
Q-4 58	25.5	4198	3.147	13213	12684	25897
Q-1 59		-71	4.295	305	1226	1531
Q-2 59						
Q-3 59	246.0	43243	2.926	126508	171670	298178
Q-4 59						
Q-1 60	-120.0	-20814	2.869	-59720	-43877	-103597
Q-2 60						
Q-3 60	171.0	28830	2.886	83199	108807	192006
Q-4 60						
Q-1 61	181.5	30909	2.834	87595	109988	197583
Q-2 61						
Q-3 61	46.5	8410	2.852	23986	40033	64019
Q-4 61						
Q-1 62	30.0	5025	3.199	16077	21786	37863
Q-2 62						
Q-3 62	325.5	54737	3.257	178259	220942	399201
Q-4 62						
Q-1 63	351.0	59861	3.412	204272	259107	463379
Q-2 63						
Q-3 63	90.0	15199	3.209	48772	99953	148725
Q-4 63						
Q-1 64	45.0	7652	3.330	25483	34555	60038
Q-2 64						
Q-3 64	15.0	2651	3.201	8485	14023	22508
Q-4 64						
Q-1 65	15.0	2524	3.014	7608	12094	19702
Q-2 65						
Q-3 65	10.5	1884	3.221	6069	9265	15334

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	4.5	749	3.239	2426	3370	5796
Q-2 66						
Q-3 66		2	2.500	5	-64	-59
TOTAL	1494.0	254520		801624	1101336	1902960

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	314	3.029	951		951
Q-2 58						
Q-3 58	1.5	158	2.804	443		443
Q-4 58						
Q-1 59		-28	2.107	-59		-59
Q-2 59						
Q-3 59	13.5	2270	3.163	7181		7181
Q-4 59						
Q-1 60	13.5	2363	3.566	8427		8427
Q-2 60						
Q-3 60	12.0	2078	3.436	7139		7139
Q-4 60						
Q-1 61	9.0	1569	3.040	4769		4769
Q-2 61						
Q-3 61	3.0	469	3.290	1543		1543
Q-4 61						
Q-1 62	1.5	231	4.541	1049		1049
Q-2 62						
Q-3 62	7.5	1373	3.137	4307		4307
Q-4 62						
Q-1 63	24.0	4009	3.478	13943		13943
Q-2 63						
Q-3 63	12.0	1962	3.363	6599		6599
Q-4 63						
Q-1 64	1.5	203	4.030	818		818
Q-2 64						
Q-3 64	1.5	316	4.209	1330		1330
Q-4 64						
Q-1 65		40	3.475	139		139
Q-2 65						
Q-3 65	1.5	131	3.481	456		456

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66		46	3.500	161		161
Q-2 66						
Q-3 66		1	3.000	3		3
TOTAL	103.5	17505		59199		59199

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	791.0	132840	4.502	598038	585381	1183419	2315
Q-2 58							
Q-3 58	3814.0	640573	4.428	2836646	2499384	5336030	6095
Q-4 58							
Q-1 59	5026.5	857779	4.368	3747123	2946630	6693753	7548
Q-2 59							
Q-3 59	8301.0	1460808	4.216	6159101	5255709	11414810	24599
Q-4 59							
Q-1 60	8802.0	1525617	4.603	7022137	5781390	12803527	-585
Q-2 60							
Q-3 60	9113.0	1531088	4.675	7157277	5656619	12813896	20020
Q-4 60							
Q-1 61	12287.0	2096970	4.756	9972941	7274168	17247109	11049
Q-2 61							
Q-3 61	8035.5	1456969	4.942	7199727	6707702	13907429	25443
Q-4 61							
Q-1 62	7192.5	1227491	5.262	6459414	5641616	12101030	2830
Q-2 62							
Q-3 62	7074.5	1188716	5.174	6149975	6029924	12179899	26544
Q-4 62							
Q-1 63	6570.0	1121124	5.771	6469985	6257888	12727873	18347
Q-2 63							
Q-3 63	6878.5	1155723	5.268	6087893	5935889	12023782	45401
Q-4 63							
Q-1 64	5884.0	1004088	5.622	5644840	6226439	11871279	50781
Q-2 64							
Q-3 64	3342.0	588319	5.851	3441986	3885870	7327856	116576
Q-4 64							
Q-1 65	1052.0	182250	6.449	1175259	1189710	2364969	52183
Q-2 65							
Q-3 65	377.0	63367	6.572	416464	406281	822745	13132
Q-4 65							
Q-1 66	51.0	8802	4.667	41081	45226	86307	17994

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66		43	4.837	208	192	400	3709
TOTAL	94591.5	16242567		80580095	72326018	152906113	443981

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	IDWA
Q-1 58		2315	125	4005	1189864		
Q-2 58							
Q-3 58	89125	95220	1124	104599	5536973		
Q-4 58							
Q-1 59	2933925	2941473	78392	475835	10189453		
Q-2 59							
Q-3 59	14910848	14935447	409770	939928	27699955		
Q-4 59							
Q-1 60	11966051	11965466	709960	2086415	27565368	452518	
Q-2 60							
Q-3 60	7253091	7273111	432970	1535678	22055655	420225	
Q-4 60							
Q-1 61	5716349	5727398	164708	2345026	25484241	473574	
Q-2 61							
Q-3 61	5646678	5672121	163922	1795223	21538695	400251	
Q-4 61							
Q-1 62	4642746	4645576	147802	2247999	19142407	321304	
Q-2 62							
Q-3 62	4471422	4497966	144081	1941045	18762991	314934	
Q-4 62							
Q-1 63	2535040	2553387	109449	1551769	16942478	283278	
Q-2 63							
Q-3 63	561146	606547	22499	-455647	12197181	203937	
Q-4 63							
Q-1 64	877395	928176	125908	969866	13895229	293746	
Q-2 64							
Q-3 64	12390	128966	46452	893710	8396984	178671	
Q-4 64							
Q-1 65	9590	61773	18732	619196	3064670	76427	
Q-2 65							
Q-3 65		13132	2343	247679	1085899	28972	
Q-4 65							
Q-1 66		17994	3733	17692	125726	3787	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK DESIGN/ENGINEERING

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	IDWA
Q-2 66							
Q-3 66		3709	227		4336	130	
TOTAL	61625796	62069777	2582197	17320018	234878105	3451754	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

	TOTAL COST
Q-1 58	1189864
Q-2 58	
Q-3 58	5536973
Q-4 58	
Q-1 59	10189453
Q-2 59	
Q-3 59	27699955
Q-4 59	
Q-1 60	28017886
Q-2 60	
Q-3 60	22475880
Q-4 60	
Q-1 61	25957815
Q-2 61	
Q-3 61	21938946
Q-4 61	
Q-1 62	19463711
Q-2 62	
Q-3 62	19077925
Q-4 62	
Q-1 63	17225756
Q-2 63	
Q-3 63	12401118
Q-4 63	
Q-1 64	14188975
Q-2 64	
Q-3 64	8575655
Q-4 64	
Q-1 65	3141097
Q-2 65	
Q-3 65	1114871
Q-4 65	
Q-1 66	129513

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK DESIGN/ENGINEERING

	TOTAL COST
Q-2 66	
Q-3 66	4466
TOTAL	238329859

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
SUBD OF WORK PRODUCTION **AIR VEHICLE**

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		8	4.625	37	36	73
Q-2 58						
Q-3 58	81.0	13518	5.414	73189	9721	82910
Q-4 58						
Q-1 59	97.5	16629	5.456	90721	14539	105260
Q-2 59						
Q-3 59	174.0	30569	5.273	161199	34800	195999
Q-4 59						
Q-1 60	67.5	11814	5.500	64976	16616	81592
Q-2 60						
Q-3 60	1.5	234	4.060	950	-759	191
Q-4 60						
Q-1 61	3.0	608	4.942	3005	3088	6093
Q-2 61						
Q-3 61	4.5	725	3.607	2615	960	3575
Q-4 61						
Q-1 62	12.0	2131	4.363	9298	11224	20522
Q-2 62						
Q-3 62	51.0	8606	4.356	37487	42668	80155
Q-4 62						
Q-1 63	55.5	9578	4.729	45296	50922	96218
Q-2 63						
Q-3 63	-363.0	-61028	5.495	-335329	-13868	-349197
Q-4 63						
Q-1 64	97.5	16694	4.694	78359	100357	178716
Q-2 64						
Q-3 64	1345.5	236793	5.239	1240661	1481893	2722554
Q-4 64						
Q-1 65	337.5	58425	5.136	300096	376259	676355
Q-2 65						
Q-3 65	261.0	43812	11.510	504257	251470	755727

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING

4-SYSTEM 1
SUBD OF WORK PRODUCTION AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66		99	3.485	345	345	690
Q-2 66						
Q-3 66						
TOTAL	2226.0	389215		2277162	2380271	4657433

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION
SUBD OF WORK 1 PRODUCTION

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	45.0	7756	4.702	36469	15299	51768
Q-2 60						
Q-3 60	76.5	12911	2.650	34218	23865	58083
Q-4 60						
Q-1 61	3259.5	556180	3.143	1747956	2094250	3842206
Q-2 61						
Q-3 61	10192.5	1848287	3.152	5825301	7400880	13226181
Q-4 61						
Q-1 62	15639.0	2669161	3.075	8207356	11012512	19219868
Q-2 62						
Q-3 62	13857.0	2328074	3.202	7455133	10492911	17948044
Q-4 62						
Q-1 63	12666.0	2161579	3.286	7103831	9745299	16849130
Q-2 63						
Q-3 63	14742.0	2476741	2.826	6998049	11455827	18453876
Q-4 63						
Q-1 64	14718.0	2511784	3.580	8992441	14789108	23781549
Q-2 64						
Q-3 64	6741.0	1186480	3.365	3992935	6429221	10422156
Q-4 64						
Q-1 65	4222.5	731845	3.509	2568369	3860465	6428834
Q-2 65						
Q-3 65	846.0	142045	4.378	621819	837069	1458888
Q-4 65						
Q-1 66					10096	10096
Q-2 66						
Q-3 66					7	7
TOTAL	97005.0	16632843		53583877	78166809	131750686

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT
SUBD OF WORK 1 PRODUCTION

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	261.0	45842	3.628	166336	233354	399690
Q-4 64						
Q-1 65	114.0	19861	3.528	70065	95548	165613
Q-2 65						
Q-3 65					-819	-819
TOTAL	375.0	65703		236401	328083	564484

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 1
SUBD OF WORK PRODUCTION

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	12.0	1905	2.998	5711		5711
Q-4 58						
Q-1 59	55.5	9569	2.960	28324		28324
Q-2 59						
Q-3 59	133.5	23401	2.989	69940		69940
Q-4 59						
Q-1 60	270.0	46837	3.160	147990	483	148473
Q-2 60						
Q-3 60	544.5	91472	3.050	278949		278949
Q-4 60						
Q-1 61	969.0	165424	3.022	499849	74882	574731
Q-2 61						
Q-3 61	876.0	158836	2.917	463256	78426	541682
Q-4 61						
Q-1 62	828.0	141246	2.980	420899	79970	500869
Q-2 62						
Q-3 62	751.5	126222	2.977	375747	86277	462024
Q-4 62						
Q-1 63		45	3.800	171	207	378
Q-2 63						
Q-3 63	519.0	87095	7.303	636031	438506	1074537
Q-4 63						
Q-1 64	472.5	80585	3.096	249479	394254	643733
Q-2 64						
Q-3 64	126.0	22279	3.325	74073	111685	185758
Q-4 64						
Q-1 65	51.0	8912	3.120	27804	42183	69987
Q-2 65						
Q-3 65	15.0	2586	3.120	8069	12468	20537
Q-4 65						
Q-1 66		-7	8.285	58	16	74
TOTAL	5623.5	966407		3286350	1319357	4605707

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 AIR VEHICLE
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	6.0	931	4.908	4569		4569
Q-4 58						
Q-1 59	6.0	898	4.257	3823		3823
Q-2 59						
Q-3 59	25.5	4471	4.665	20855		20855
Q-4 59						
Q-1 60	51.0	8936	5.052	45145		45145
Q-2 60						
Q-3 60	9.0	1591	3.901	6207		6207
Q-4 60						
Q-1 61	232.5	39568	3.133	123963		123963
Q-2 61						
Q-3 61	739.5	133975	3.147	421666		421666
Q-4 61						
Q-1 62	1521.0	259621	3.230	838640		838640
Q-2 62						
Q-3 62	1746.0	293411	3.424	1004639		1004639
Q-4 62						
Q-1 63	1623.0	276938	3.625	1003816		1003816
Q-2 63						
Q-3 63	1996.5	335427	4.273	1433282		1433282
Q-4 63						
Q-1 64	2269.5	387399	3.589	1390543		1390543
Q-2 64						
Q-3 64	1134.0	199504	3.598	717802		717802
Q-4 64						
Q-1 65	543.0	94048	3.850	362050		362050
Q-2 65						
Q-3 65	132.0	22240	4.294	95494		95494
TOTAL	12034.5	2058958		7472494		7472494

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
SUBD OF WORK PRODUCTION

AIR VEHICLE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58		8	4.625	37	36	73	
Q-2 58							
Q-3 58	99.0	16354	5.104	83469	9721	93190	
Q-4 58							
Q-1 59	159.0	27096	4.535	122868	14539	137407	
Q-2 59							
Q-3 59	333.0	58441	4.312	251994	34800	286794	
Q-4 59							
Q-1 60	433.5	75343	3.910	294580	32398	326978	
Q-2 60							
Q-3 60	631.5	106208	3.016	320324	23106	343430	
Q-4 60							
Q-1 61	4464.0	761780	3.117	2374773	2172220	4546993	
Q-2 61							
Q-3 61	11812.5	2141323	3.134	6712838	7480266	14193104	
Q-4 61							
Q-1 62	18000.0	3072159	3.085	9476193	11103706	20579899	
Q-2 62							
Q-3 62	16405.5	2756313	3.219	8873006	10621856	19494862	
Q-4 62							
Q-1 63	14344.5	2448140	3.330	8153114	9796428	17949542	
Q-2 63							
Q-3 63	16894.5	2838235	3.077	8732033	11880465	20612498	
Q-4 63							
Q-1 64	17557.5	2996462	3.574	10710822	15283719	25994541	
Q-2 64							
Q-3 64	9607.5	1690898	3.662	6191807	8256153	14447960	
Q-4 64							
Q-1 65	5268.0	913091	3.645	3328384	4374455	7702839	
Q-2 65							
Q-3 65	1254.0	210683	5.836	1229639	1100188	2329827	
Q-4 65							
Q-1 66		92	4.380	403	10457	10860	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK PRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66					7	7	
TOTAL	117264.0	20113126		66856284	82194520	149050804	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK PRODUCTION

	MFG MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A
Q-1 58					5641	5714	
Q-2 58							
Q-3 58		29946	29946	265	112960	236361	
Q-4 58							
Q-1 59		555137	555137	14717	190600	897861	
Q-2 59							
Q-3 59		6449252	6449252	176221	269832	7182099	
Q-4 59							
Q-1 60	400	7579016	7579416	449708	5714	8361816	159640
Q-2 60							
Q-3 60	15609	7951934	7967543	473857	19886	8804716	181734
Q-4 60							
Q-1 61	1001899	12070287	13072186	430143	26283	18075605	394142
Q-2 61							
Q-3 61	4707321	15525866	20233187	842176	12977	35281444	734029
Q-4 61							
Q-1 62	4903221	18404312	23307533	971161		44858593	800299
Q-2 62							
Q-3 62	5119756	13066692	18186448	818198		38499508	675884
Q-4 62							
Q-1 63	5800375	10822277	16622652	1030995		35603189	643803
Q-2 63							
Q-3 63	6559067	5678913	12237980	828725	2424	33681627	610325
Q-4 63							
Q-1 64	5706444	6069327	11775771	1441856	9882	39222050	923323
Q-2 64							
Q-3 64	2336960	170650	2507610	905921	1063	17862554	413240
Q-4 64							
Q-1 65	508486	41457	549943	165626		8418408	237946
Q-2 65							
Q-3 65	440881		440881	78656		2849364	78986
Q-4 65							
Q-1 66	5227		5227	1084		17171	517

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK PRODUCTION

	MFG MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A
Q-2 66							
Q-3 66	-30023		-30023	-1846		-31862	-960
TOTAL	37075623	104415066	141490689	8627463	657262	299826218	5852908

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK PRODUCTION

	IDWA	TOTAL COST
Q-1 58		5714
Q-2 58		
Q-3 58		236361
Q-4 58		
Q-1 59	11147	909008
Q-2 59		
Q-3 59	4243	7186342
Q-4 59		
Q-1 60	6400	8527856
Q-2 60		
Q-3 60	59151	9045601
Q-4 60		
Q-1 61	2512358	20982105
Q-2 61		
Q-3 61	3923564	39939037
Q-4 61		
Q-1 62	2924005	48582897
Q-2 62		
Q-3 62	2610066	41785458
Q-4 62		
Q-1 63	2496459	38743451
Q-2 63		
Q-3 63	3068199	37360151
Q-4 63		
Q-1 64	4803875	44949248
Q-2 64		
Q-3 64	1561617	19837411
Q-4 64		
Q-1 65	4727	8661081
Q-2 65		
Q-3 65	6749	2935099
Q-4 65		
Q-1 66		17688

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK PRODUCTION

	IDWA	TOTAL COST
Q-2 66		
Q-3 66		-32822
TOTAL	23992560	329671686

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TOOLING AND STE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	SUBC
Q-1 59							
Q-2 59							42156
Q-3 59							708192
Q-4 59							2645053
Q-1 60							2438699
Q-2 60							4959380
Q-3 60							8019599
Q-4 60							2889461
Q-1 61							3760321
Q-2 61							1008179
Q-3 61							557934
Q-4 61							441443
Q-1 62							67059
Q-2 62							17607
Q-3 62							
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63							
Q-4 63							
Q-1 64							
Q-2 64							
Q-3 64							
Q-4 64							
Q-1 65							
TOTAL							27555083

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 **AIR VEHICLE**
SUBD OF WORK TOOLING AND STE

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-1 59	1117	43273		43273
Q-2 59				
Q-3 59	19349	727541		727541
Q-4 59				
Q-1 60	156926	2801979	60236	2862215
Q-2 60				
Q-3 60	144690	2583389	89969	2673358
Q-4 60				
Q-1 61	142085	5101465	97866	5199331
Q-2 61				
Q-3 61	229763	8249362	130732	8380094
Q-4 61				
Q-1 62	91829	2981290	40329	3021619
Q-2 62				
Q-3 62	119397	3879718	47418	3927136
Q-4 62				
Q-1 63	42806	1050985	17362	1068347
Q-2 63				
Q-3 63	17924	575858	9140	584998
Q-4 63				
Q-1 64	60623	502066	10583	512649
Q-2 64				
Q-3 64	21881	88940	1892	90832
Q-4 64				
Q-1 65	5744	23351	623	23974
TOTAL	1054134	28609217	506150	29115367

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
SUBD OF WORK TEST/QC AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	48.0	8007	4.442	35570	36430	72000
Q-2 58						
Q-3 58	190.5	32064	4.157	133284	125443	258727
Q-4 58						
Q-1 59	286.5	48836	4.175	203866	167509	371375
Q-2 59						
Q-3 59	213.0	37359	4.110	153546	134425	287971
Q-4 59						
Q-1 60	456.0	78933	4.496	354871	276037	630908
Q-2 60						
Q-3 60	1480.5	248723	4.057	1009154	924883	1934037
Q-4 60						
Q-1 61	1807.5	308500	3.707	1143641	984397	2128038
Q-2 61						
Q-3 61	1563.0	283438	4.311	1221925	1280733	2502658
Q-4 61						
Q-1 62	2009.5	343015	4.266	1463370	1479238	2942608
Q-2 62						
Q-3 62	1760.5	295797	4.332	1281486	1308685	2590171
Q-4 62						
Q-1 63	592.0	100967	4.802	484823	563253	1048076
Q-2 63						
Q-3 63	475.0	79859	4.690	374574	401289	775863
Q-4 63						
Q-1 64	341.5	58294	4.785	278963	353627	632590
Q-2 64						
Q-3 64	176.5	31037	4.350	135019	183541	318560
Q-4 64						
Q-1 65	238.5	41322	2.278	94136	107269	201405
Q-2 65						
Q-3 65	112.5	18933	2.995	56703	68681	125384

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 1
SUBD OF WORK TEST/QC AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	-7.5	-1278	3.847	-4916	-3488	-8404
Q-2 66						
Q-3 66	-1.5	-322	3.500	-1127	-1127	-2254
TOTAL	11742.0	2013484		8418888	8390825	16809713

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT
SUBD OF WORK 1 TEST/QC

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		21	2.476	52	73	125
Q-2 58						
Q-3 58	393.0	65963	2.959	195215	223717	418932
Q-4 58						
Q-1 59	2580.0	440392	2.959	1303166	1570961	2874127
Q-2 59						
Q-3 59	2632.5	463330	2.922	1353656	1812754	3166410
Q-4 59						
Q-1 60	3711.5	643285	2.963	1905775	2335373	4241148
Q-2 60						
Q-3 60	6366.0	1069448	3.036	3246734	3914402	7161136
Q-4 60						
Q-1 61	11555.5	1972145	3.063	6041034	7307719	13348753
Q-2 61						
Q-3 61	5615.5	1018267	3.042	3098001	4515108	7613109
Q-4 61						
Q-1 62	3593.5	613359	2.885	1769570	2199679	3969249
Q-2 62						
Q-3 62	1952.5	328056	3.091	1013895	1375198	2389093
Q-4 62						
Q-1 63	764.5	130411	3.201	417503	554026	971529
Q-2 63						
Q-3 63	746.0	125339	3.446	431945	890005	1321950
Q-4 63						
Q-1 64	511.5	87277	2.842	248065	384779	632844
Q-2 64						
Q-3 64	100.5	17699	.706	12500	40605	53105
Q-4 64						
Q-1 65	-72.5	-12525	.844	10586	25570	36156
Q-2 65						
Q-3 65		74	291.284	21555	37307	58862

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT
SUBD OF WORK 1 TEST/QC

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	-4.5	-705	1.128	-795	98	-697
Q-2 66						
Q-3 66		-8	4.125	-33	53	20
TOTAL	40445.5	6961828		21068424	27187427	48255851

C-2

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		-82	3.317	-272	-141	-413
Q-2 63						
Q-3 63	160.0	26848	3.970	106582	2586	109168
Q-4 63						
Q-1 64	8.5	1451	3.747	5437	3399	8836
Q-2 64						
Q-3 64	8.5	1449	3.738	5417	3410	8827
Q-4 64						
Q-1 65	3.0	548	3.880	2126	791	2917
Q-2 65						
Q-3 65	1.5	219	3.881	850	316	1166
Q-4 65						
Q-1 66		16	3.813	61	23	84
TOTAL	181.5	30449		120201	10384	130585

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 AIR VEHICLE
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58						
Q-3 58	9.0	1565	3.539	5538		5538
Q-4 58						
Q-1 59	45.0	7788	3.005	23404		23404
Q-2 59						
Q-3 59	114.0	20038	3.104	62191		62191
Q-4 59						
Q-1 60	242.5	42036	2.970	124840		124840
Q-2 60						
Q-3 60	661.5	111179	3.217	357703		357703
Q-4 60						
Q-1 61	1335.0	227917	3.248	740251		740251
Q-2 61						
Q-3 61	652.0	118171	3.140	371109		371109
Q-4 61						
Q-1 62	193.5	33089	3.229	106859		106859
Q-2 62						
Q-3 62	115.5	19411	3.091	59996		59996
Q-4 62						
Q-1 63	38.5	6518	3.459	22547		22547
Q-2 63						
Q-3 63	46.0	7651	3.377	25838		25838
Q-4 63						
Q-1 64	52.0	8866	3.712	32913		32913
Q-2 64						
Q-3 64	2.5	451	.545	246		246
Q-4 64						
Q-1 65	21.0	3649	3.782	13802		13802
Q-2 65						
Q-3 65	4.0	620	3.313	2054		2054

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66		38	4.237	161	-40	121
Q-2 66						
Q-3 66		11	4.182	46	46	92
TOTAL	3532.0	608998		1949498	6	1949504

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	48.0	8028	4.437	35622	36503	72125	32
Q-2 58							
Q-3 58	592.5	99592	3.354	334037	349160	683197	121438
Q-4 58							
Q-1 59	2911.5	497016	3.079	1530436	1738470	3268906	371316
Q-2 59							
Q-3 59	2959.5	520727	3.014	1569393	1947179	3516572	282932
Q-4 59							
Q-1 60	4410.0	764254	3.121	2385486	2611410	4996896	1461316
Q-2 60							
Q-3 60	8508.0	1429350	3.228	4613591	4839285	9452876	1048535
Q-4 60							
Q-1 61	14698.0	2508562	3.159	7924926	8292116	16217042	2746905
Q-2 61							
Q-3 61	7830.5	1419876	3.304	4691035	5795841	10486876	3144887
Q-4 61							
Q-1 62	5796.5	989463	3.375	3339799	3678917	7018716	1119329
Q-2 62							
Q-3 62	3828.5	643264	3.662	2355377	2683883	5039260	1483235
Q-4 62							
Q-1 63	1395.0	237814	3.888	924601	1117138	2041739	1416426
Q-2 63							
Q-3 63	1427.0	239697	3.917	938939	1293880	2232819	2622128
Q-4 63							
Q-1 64	913.5	155888	3.627	565378	741805	1307183	456499
Q-2 64							
Q-3 64	288.0	50636	3.025	153182	227556	380738	379313
Q-4 64							
Q-1 65	190.0	32994	3.657	120650	133630	254280	564041
Q-2 65							
Q-3 65	118.0	19846	4.090	81162	106304	187466	213619
Q-4 65							
Q-1 66	-12.0	-1929	2.846	-5489	-3407	-8896	36894

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

AIR VEHICLE

4-SYSTEM 1
SUBD OF WORK TEST/QC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	-1.5	-319	3.492	-1114	-1028	-2142	26242
Q-4 66							
Q-1 67							
Q-2 67							
Q-3 67							
TOTAL	55901.0	9614759		31557011	35588642	67145653	17495087

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

	SUBC	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-1 58		32	2	170368	1293	171661	243820
Q-2 58							
Q-3 58		121438	6642	583528	-9669	573859	1385136
Q-4 58							
Q-1 59		371316	31440	610704	76663	687367	4359029
Q-2 59							
Q-3 59	9303	292235	24211	695957	58795	754752	4587770
Q-4 59							
Q-1 60	166202	1627518	202067	338115	77173	415288	7241769
Q-2 60							
Q-3 60	162050	1210585	147513	403089	62100	465189	11276163
Q-4 60							
Q-1 61	220498	2967403	238309	296523	12891	309414	19732168
Q-2 61							
Q-3 61	63814	3208701	267451	237221	58753	295974	14259002
Q-4 61							
Q-1 62	32400	1151729	89328	207559	74575	282134	8541907
Q-2 62							
Q-3 62	26054	1509289	118457	177914	359688	537602	7204608
Q-4 62							
Q-1 63	73413	1489839	142657	148254	169674	317928	3992163
Q-2 63							
Q-3 63	38968	2661096	259588	118797	311194	429991	5583494
Q-4 63							
Q-1 64	103488	559987	62872	1	-28401	-28400	1901642
Q-2 64							
Q-3 64		379313	138000	-1	-23441	-23442	874609
Q-4 64							
Q-1 65		564041	168717	1	6129	6130	993168
Q-2 65							
Q-3 65		213619	38114		2453	2453	441652
Q-4 65							
Q-1 66		36894	7651	11740	176	11916	47565

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4--SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

	SUBC	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-2 66							
Q-3 66		26242	1612	4328		4328	30040
Q-4 66							
Q-1 67							
Q-2 67							
Q-3 67							
TOTAL	896190	18391277	1944631	4004098	1210046	5214144	92695705

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

	G & A	IDWA	TOTAL COST
Q-1 58			243820
Q-2 58			
Q-3 58			1385136
Q-4 58			
Q-1 59		12067	4371096
Q-2 59			
Q-3 59		4605	4592375
Q-4 59			
Q-1 60	143158	6935	7391862
Q-2 60			
Q-3 60	220716	37147	11534026
Q-4 60			
Q-1 61	400975	1860333	21993476
Q-2 61			
Q-3 61	301557	1989563	16550122
Q-4 61			
Q-1 62	143261		8685168
Q-2 62			
Q-3 62	120837		7325445
Q-4 62			
Q-1 63	66749		4058912
Q-2 63			
Q-3 63	93355		5676849
Q-4 63			
Q-1 64	40462		1942104
Q-2 64			
Q-3 64	18609		893218
Q-4 64			
Q-1 65	26497		1019665
Q-2 65			
Q-3 65	11782		453434
Q-4 65			
Q-1 66	1431		48996

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 AIR VEHICLE
SUBD OF WORK TEST/QC

	G & A	IDWA	TOTAL COST
Q-2 66			
Q-3 66	905		30945
Q-4 66			
Q-1 67			
Q-2 67			
Q-3 67			
TOTAL	1590294	3910650	98196649

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1 DESIGN/ENGINEERING

AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	780.0	131010	4.607	603612	596073	1199685
Q-2 58						
Q-3 58	4058.0	681799	4.443	3029463	2621864	5651327
Q-4 58						
Q-1 59	5410.5	923343	4.377	4041464	3127452	7168916
Q-2 59						
Q-3 59	8427.5	1483223	4.275	6340157	5253264	11593421
Q-4 59						
Q-1 60	9432.0	1634815	4.584	7493277	6117920	13611197
Q-2 60						
Q-3 60	10411.5	1749137	4.618	8077043	6471936	14548979
Q-4 60						
Q-1 61	13908.0	2373600	4.646	11027223	8151665	19178888
Q-2 61						
Q-3 61	9553.0	1732253	4.848	8398738	7949362	16348100
Q-4 61						
Q-1 62	9183.5	1567381	5.050	7914956	7110292	15025248
Q-2 62						
Q-3 62	8553.5	1437009	5.071	7286382	7160335	14446717
Q-4 62						
Q-1 63	6842.5	1167799	5.807	6781889	6612956	13394845
Q-2 63						
Q-3 63	6889.0	1157393	5.246	6071767	6223357	12295124
Q-4 63						
Q-1 64	6277.0	1071221	5.579	5975861	6645868	12621729
Q-2 64						
Q-3 64	4847.5	853182	5.635	4807851	5537281	10345132
Q-4 64						
Q-1 65	1612.5	279433	5.589	1561744	1661144	3222888
Q-2 65						
Q-3 65	738.5	124097	7.824	970899	717167	1688066
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM DESIGN/ENGINEERING
1
AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66	39.0	6828	4.968	33923	38713	72636
Q-2 66						
Q-3 66	-1.5	-282	3.287	-927	-871	-1798
TOTAL	106962.0	18373241		90415322	81995778	172411100

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	45.0	7756	4.702	36469	15299	51768
Q-2 60						
Q-3 60	76.5	12911	2.650	34218	23865	58083
Q-4 60						
Q-1 61	3259.5	556180	3.143	1747956	2094250	3842206
Q-2 61						
Q-3 61	10192.5	1848287	3.152	5825301	7400880	13226181
Q-4 61						
Q-1 62	15639.0	2669161	3.075	8207356	11012512	19219868
Q-2 62						
Q-3 62	13857.0	2328074	3.202	7455133	10492911	17948044
Q-4 62						
Q-1 63	12666.0	2161579	3.286	7103831	9745299	16849130
Q-2 63						
Q-3 63	14742.0	2476741	2.826	6998049	11455827	18453876
Q-4 63						
Q-1 64	14718.0	2511784	3.580	8992441	14789108	23781549
Q-2 64						
Q-3 64	6741.0	1186480	3.365	3992935	6429221	10422156
Q-4 64						
Q-1 65	4222.5	731845	3.509	2568369	3860465	6428834
Q-2 65						
Q-3 65	846.0	142045	4.378	621819	837069	1458888
Q-4 65						
Q-1 66					10096	10096
Q-2 66						
Q-3 66					7	7
TOTAL	97005.0	16632843		53583877	78166809	131750686

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58	57.0	9552	3.050	29134	25847	54981
Q-3 58						
Q-4 58	417.0	70161	2.971	208428	236401	444829
Q-1 59						
Q-2 59	2580.0	440321	2.960	1303471	1572187	2875658
Q-3 59						
Q-4 59	2878.0	506573	2.922	1480164	1984424	3464588
Q-1 60						
Q-2 60	3591.5	622471	2.966	1846055	2291496	4137551
Q-3 60						
Q-4 60	6537.0	1098278	3.032	3329933	4023209	7353142
Q-1 61						
Q-2 61	11737.0	2003054	3.060	6128629	7417707	13546336
Q-3 61						
Q-4 61	5662.0	1026677	3.041	3121987	4555141	7677128
Q-1 62						
Q-2 62	3623.5	618384	2.888	1785647	2221465	4007112
Q-3 62						
Q-4 62	2278.0	382793	3.114	1192154	1596140	2788294
Q-1 63						
Q-2 63	1115.5	190272	3.268	621775	813133	1434908
Q-3 63						
Q-4 63	836.5	140538	3.421	480717	989958	1470675
Q-1 64						
Q-2 64	556.0	94929	2.882	273548	419334	692882
Q-3 64						
Q-4 64	376.0	66192	2.830	187321	287982	475303
Q-1 65						
Q-2 65	57.0	9860	8.951	88259	133212	221471
Q-3 65						
Q-4 65	12.0	1958	14.108	27624	45753	73377

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66		44	37.068	1631	3468	5099
Q-2 66						
Q-3 66		-6	4.667	-28	-11	-39
TOTAL	42314.0	7282051		22106449	28616846	50723295

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	12.0	1905	2.998	5711		5711
Q-4 58						
Q-1 59	55.5	9569	2.960	28324		28324
Q-2 59						
Q-3 59	133.5	23401	2.989	69940		69940
Q-4 59						
Q-1 60	270.0	46837	3.160	147990	483	148473
Q-2 60						
Q-3 60	544.5	91472	3.050	278949		278949
Q-4 60						
Q-1 61	969.0	165424	3.022	499849	74882	574731
Q-2 61						
Q-3 61	876.0	158836	2.917	463256	78426	541682
Q-4 61						
Q-1 62	828.0	141246	2.980	420899	79970	500869
Q-2 62						
Q-3 62	751.5	126222	2.977	375747	86277	462024
Q-4 62						
Q-1 63		-37	2.730	-101	66	-35
Q-2 63						
Q-3 63	678.0	113943	6.517	742613	441092	1183705
Q-4 63						
Q-1 64	481.0	82036	3.107	254916	397653	652569
Q-2 64						
Q-3 64	135.0	23728	3.350	79490	115095	194585
Q-4 64						
Q-1 65	55.0	9460	3.164	29930	42974	72904
Q-2 65						
Q-3 65	16.5	2805	3.180	8919	12784	21703
Q-4 65						
Q-1 66		9	13.222	119	39	158
TOTAL	5805.5	996856		3406551	1329741	4736292

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	314	3.029	951		951
Q-2 58						
Q-3 58	16.5	2654	3.975	10550		10550
Q-4 58						
Q-1 59	51.0	8658	3.138	27168		27168
Q-2 59						
Q-3 59	151.5	26779	3.369	90227		90227
Q-4 59						
Q-1 60	308.0	53335	3.345	178412		178412
Q-2 60						
Q-3 60	683.5	114848	3.231	371049		371049
Q-4 60						
Q-1 61	1576.5	269054	3.230	868983		868983
Q-2 61						
Q-3 61	1393.0	252615	3.144	794318		794318
Q-4 61						
Q-1 62	1716.0	292941	3.231	946548		946548
Q-2 62						
Q-3 62	1870.5	314195	3.402	1068942		1068942
Q-4 62						
Q-1 63	1684.5	287465	3.619	1040306		1040306
Q-2 63						
Q-3 63	2054.0	345040	4.248	1465719		1465719
Q-4 63						
Q-1 64	2323.0	396468	3.592	1424274		1424274
Q-2 64						
Q-3 64	1138.0	200271	3.592	719378		719378
Q-4 64						
Q-1 65	564.0	97737	3.847	375991		375991
Q-2 65						
Q-3 65	136.5	22991	4.263	98004		98004
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 1 AIR VEHICLE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66		84	3.833	322	-40	282
Q-2 66						
Q-3 66		12	4.083	49	46	95
TOTAL	15668.0	2685461		9481191	6	9481197

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	838.5	140876	4.498	633697	621920	1255617	2347
Q-2 58							
Q-3 58	4503.5	756519	4.301	3254152	2858265	6112417	127533
Q-4 58							
Q-1 59	8097.0	1381891	3.908	5400427	4699639	10100066	378864
Q-2 59							
Q-3 59	11590.5	2039976	3.912	7980488	7237688	15218176	307531
Q-4 59							
Q-1 60	13646.5	2365214	4.102	9702203	8425198	18127401	1460731
Q-2 60							
Q-3 60	18253.0	3066646	3.943	12091192	10519010	22610202	1068555
Q-4 60							
Q-1 61	31450.0	5367312	3.777	20272640	17738504	38011144	2757954
Q-2 61							
Q-3 61	27676.5	5018668	3.707	18603600	19983809	38587409	3170330
Q-4 61							
Q-1 62	30990.0	5289113	3.644	19275406	20424239	39699645	1122159
Q-2 62							
Q-3 62	27310.5	4588293	3.788	17378358	19335663	36714021	1509779
Q-4 62							
Q-1 63	22308.5	3807078	4.084	15547700	17171454	32719154	1434773
Q-2 63							
Q-3 63	25199.5	4233655	3.722	15758865	19110234	34869099	2667529
Q-4 63							
Q-1 64	24355.0	4156438	4.071	16921040	22251963	39173003	507280
Q-2 64							
Q-3 64	13237.5	2329853	4.201	9786975	12369579	22156554	495889
Q-4 64							
Q-1 65	6511.0	1128335	4.098	4624293	5697795	10322088	616224
Q-2 65							
Q-3 65	1749.5	293896	5.877	1727265	1612773	3340038	226751
Q-4 65							
Q-1 66	39.0	6965	5.168	35995	52276	88271	54888

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	-1.5	-276	3.283	-906	-829	-1735	29951
Q-4 66							
Q-1 67							
Q-2 67							
Q-3 67							
TOTAL	267754.5	45970452		178993390	190109180	369102570	17939068

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	MFG MATL	SUBC	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $
Q-1 58			2347	127	170368	10939	181307
Q-2 58							
Q-3 58		119071	246604	8031	583528	207890	791418
Q-4 58							
Q-1 59		3531218	3910082	125666	610704	743098	1353802
Q-2 59							
Q-3 59		22077595	22385126	629551	695957	1268555	1964512
Q-4 59							
Q-1 60	400	22356322	23817453	1518661	338115	2169302	2507417
Q-2 60							
Q-3 60	15609	17905774	18889938	1199030	403089	1617664	2020753
Q-4 60							
Q-1 61	1001899	22966514	26726367	975245	296523	2384200	2680723
Q-2 61							
Q-3 61	4707321	29255957	37133608	1503312	237221	1866953	2104174
Q-4 61							
Q-1 62	4903221	25968919	31994299	1300120	207559	2322574	2530133
Q-2 62							
Q-3 62	5119756	21324489	27954024	1200133	177914	2300733	2478647
Q-4 62							
Q-1 63	5800375	14438909	21674057	1325907	148254	1721443	1869697
Q-2 63							
Q-3 63	6559067	6836961	16063557	1128736	118797	-142029	-23232
Q-4 63							
Q-1 64	5706444	7491653	13705377	1691259	1	951347	951348
Q-2 64							
Q-3 64	2336960	250099	3082948	1112254	-1	871332	871331
Q-4 64							
Q-1 65	508486	68654	1193364	358819	1	625325	625326
Q-2 65							
Q-3 65	440881		667632	119113		250132	250132
Q-4 65							
Q-1 66	5227		60115	12468	11740	17868	29608

C-3

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	MFG MATL	SUBC	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $
Q-2 66							
Q-3 66	-30023		-72	-7	4328		4328
Q-4 66							
Q-1 67							
Q-2 67							
Q-3 67							
TOTAL	37075623	194492135	249506826	14208425	4004098	19187326	23191424

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	SUB TOTAL	G & A	IDWA	TOTAL COST
Q-1 58	1439398			1439398
Q-2 58				
Q-3 58	7158470			7158470
Q-4 58				
Q-1 59	15489616		23214	15512830
Q-2 59				
Q-3 59	40197365		8848	40206213
Q-4 59				
Q-1 60	45970932	815552	13335	46799819
Q-2 60				
Q-3 60	44719923	912644	96298	45728865
Q-4 60				
Q-1 61	68393479	1366557	4372691	74132727
Q-2 61				
Q-3 61	79328503	1566569	5913127	86808199
Q-4 61				
Q-1 62	75524197	1305193	2924005	79753395
Q-2 62				
Q-3 62	68346825	1159073	2610066	72115964
Q-4 62				
Q-1 63	57588815	1011192	2496459	61096466
Q-2 63				
Q-3 63	52038160	916757	3068199	56023116
Q-4 63				
Q-1 64	55520987	1268114	4803875	61592976
Q-2 64				
Q-3 64	27223037	612412	1561617	29397116
Q-4 64				
Q-1 65	12499597	341493	4727	12845817
Q-2 65				
Q-3 65	4376915	119740	6749	4503404
Q-4 65				
Q-1 66	190462	5735		196197

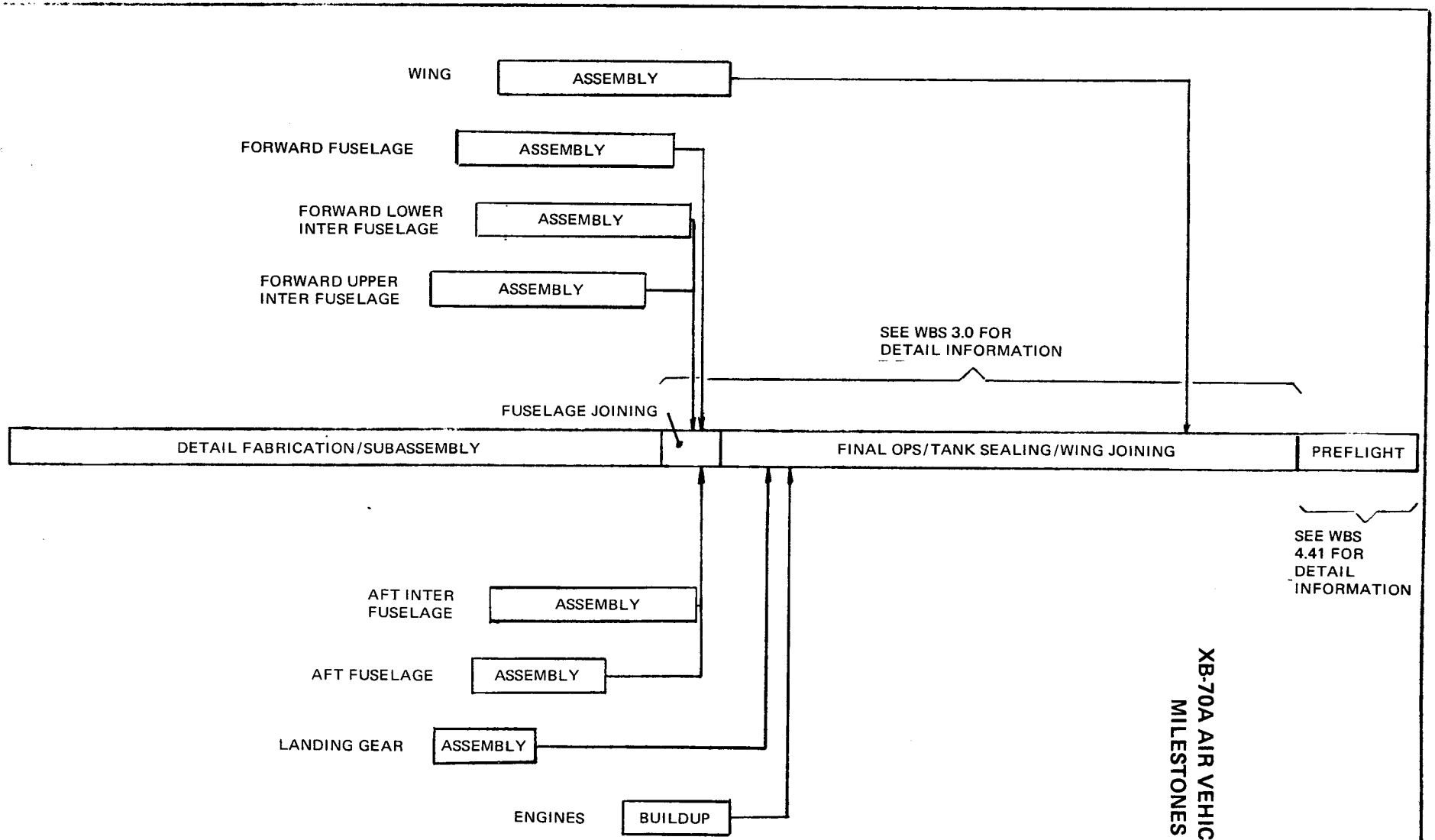
NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 1
AIR VEHICLE

	SUB TOTAL	G & A	IDWA	TOTAL COST
Q-2 66				
Q-3 66	2514	75		2589
Q-4 66				
Q-1 67				
Q-2 67				
Q-3 67				
TOTAL	656009245	11401106	27903210	695313561

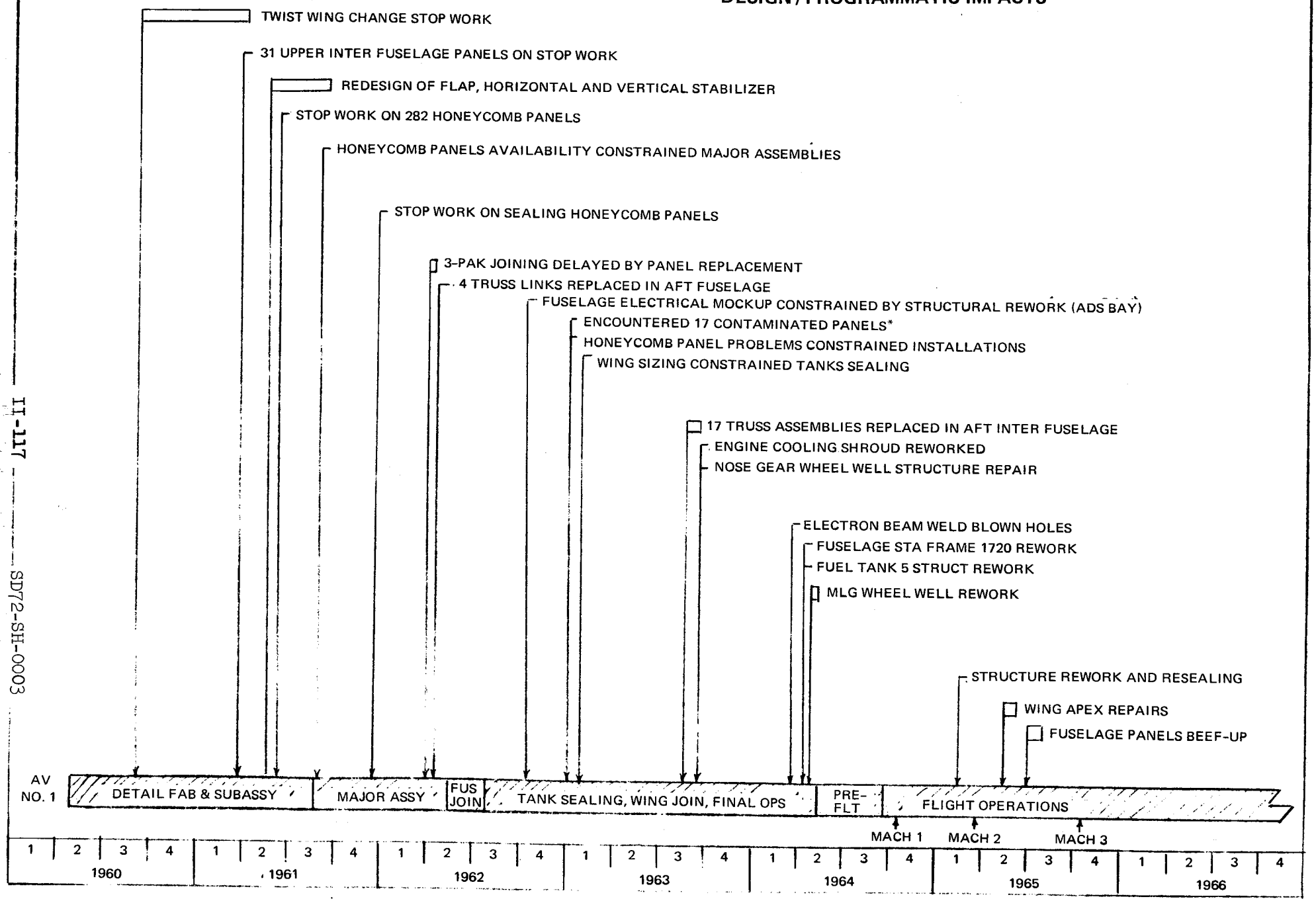

WING
ASSEMBLY
FORWARD FUSELAGE
ASSEMBLY
FORWARD LOWER INTER FUSELAGE
ASSEMBLY
FORWARD UPPER INTER FUSELAGE
ASSEMBLY
SEE WBS 3.0 FOR DETAIL INFORMATION
FUSELAGE JOINING
DETAIL FABRICATION/SUBASSEMBLY
FINAL OPS/TANK SEALING/WING JOINING
PREFLIGHT
SEE WBS 4.41 FOR DETAIL INFORMATION
AFT INTER FUSELAGE
ASSEMBLY
AFT FUSELAGE
ASSEMBLY
LANDING GEAR
ASSEMBLY
ENGINES
BUILDUP
XB-70A AIR VEHICLE 1
MILESTONES
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
1960
1961
1962
1963
1964

WBS 1.0

TABULATION OF DATES
AIR VEHICLE NO. 1

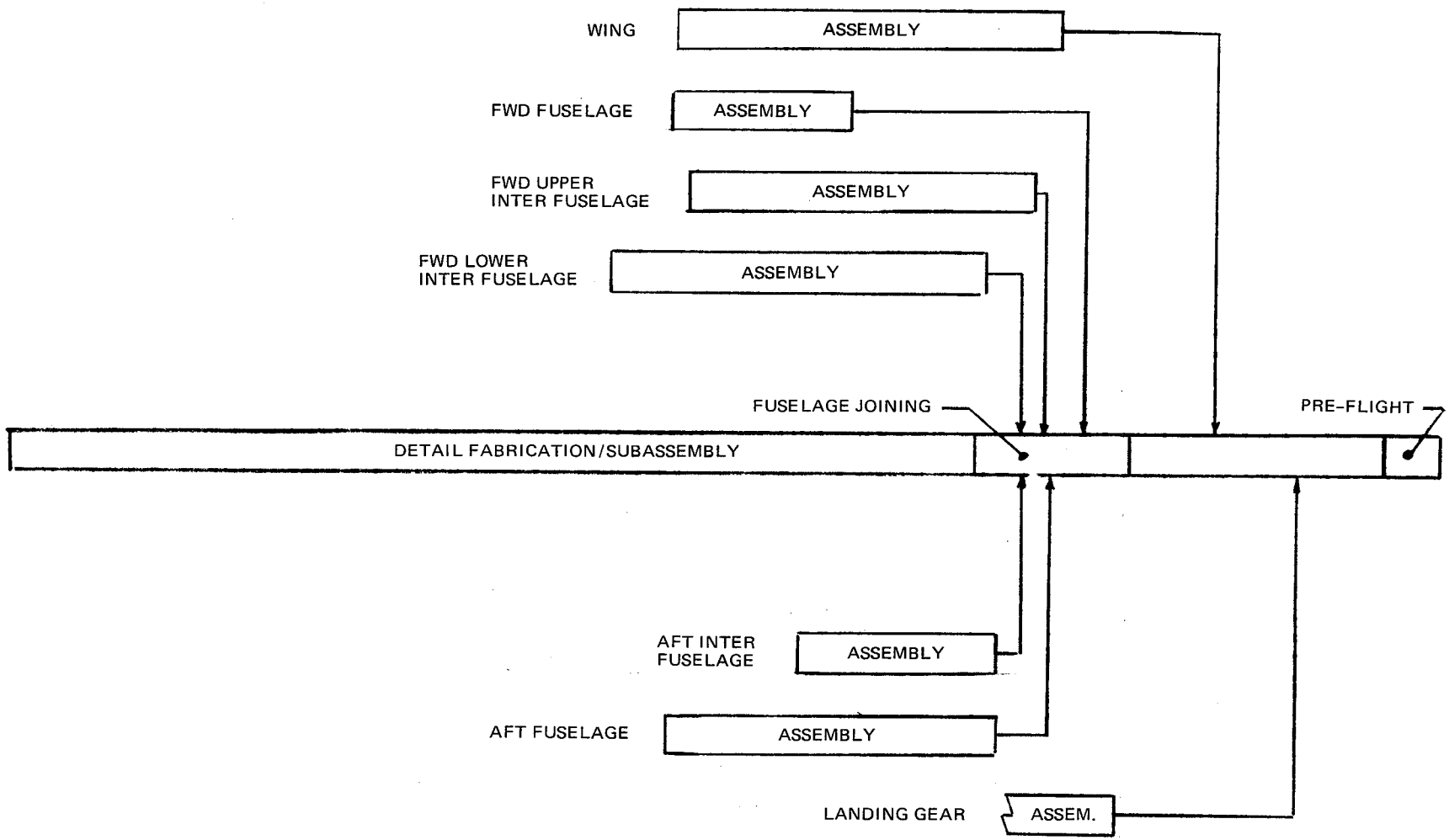
ACTIVITY	START	COMPLETE
DETAIL FABRICATION	5-1-60	-
INITIAL SUBASSEMBLY	8-5-60	-
ASSEM FWD UPP INTER FUS	8-25-61	4-27-62
ASSEM LANDING GEAR	9-1-61	12-20-61
ASSEM FWD FUSELAGE	9-22-61	6-1-62
ASSEM AFT FUSELAGE	10-6-61	3-16-62
ASSEM LWR FWD INTER FUS	10-6-61	6-15-62
ASSEM AFT INTER FUS	11-3-61	6-22-62
ASSEM WINGS	11-7-61	7-26-62
FUSELAGE JOINING	5-18-62	7-21-62
WING JOINT SIZING	1-16-63	12-7-63
ENGINE INSTALLATIONS	4-6-62	10-12-62 (INITIAL CONFIG)
FINAL OPERATIONS	9-14-62	6-17-64
WING JOIN INNER WELD	1-7-64	2-18-64
WING JOIN OUTER WELD	1-20-64	4-25-64
ROLLOUT	-	5-11-64
GROUND VIBRATION TESTS	6-17-64	6-28-64
PROP & INTEG SYS TESTS	7-8-64	8-3-64
TAXI TESTS	8-9-64	9-14-64
1ST FLIGHT	-	9-21-64
1ST MACH 1 FLIGHT	-	10-12-64
1ST MACH 2 FLIGHT	-	3-24-65
1ST MACH 3 FLIGHT	-	10-14-65

XB-70A AIR VEHICLE 1
DESIGN / PROGRAMMATIC IMPACTS



XB-70A AIR VEHICLE NO. 2 MILESTONES

WBS 1.0



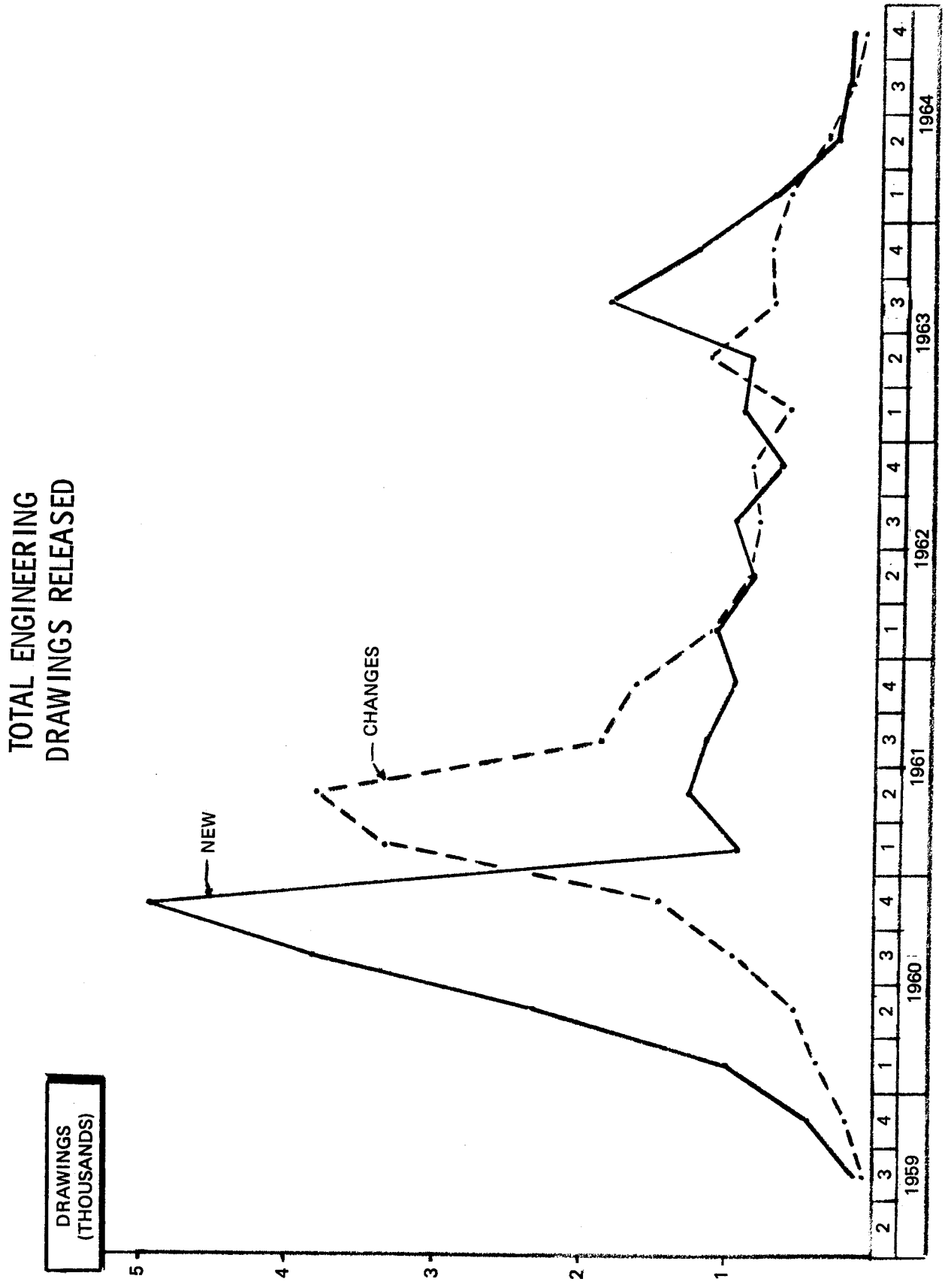
F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
1961 1962 1963 1964 1965

WBS 1.0

TABULATION OF DATES
AIR VEHICLE NO. 2

ACTIVITY	START	COMPLETE
DETAIL FABRICATION	8-25-61	-
INITIAL SUBASSEMBLY	11-10-61	-
ASSEM FWD UPP INTER FUS	7-1-63	6-8-64
ASSEM LANDING GEAR	-	9-1-64
ASSEM FWD FUSELAGE	6-10-63	12-6-63
ASSEM AFT FUSELAGE	6-10-63	5-5-64
ASSEM LWR FWD INTER FUS	4-15-63	4-25-64
ASSEM AFT INTER FUS	10-18-63	5-2-64
ASSEM WINGS	6-14-63	7-3-64
FUSELAGE JOINING	4-12-64	9-14-64
WING JOINT SIZING	11-12-64	12-7-64
WING TO FUS JOINING	12-8-64	2-21-65
FINAL OPERATIONS	3-31-65	7-6-65
ENGINE INSTALLATIONS	3-25-65	4-22-65
ROLLOUT	-	5-29-65
GROUND VIBRATION TESTS	(NOT APPLICABLE)	
PROP & INTEG SYS TESTS	6-23-65	6-29-65
TAXI TESTS	7-10-65	7-10-65
1ST FLIGHT	-	7-17-65
1ST MACH 1 FLIGHT	-	7-17-65
1ST MACH 2 FLIGHT	-	9-29-65
1ST MACH 3 FLIGHT	-	1-3-66

PRECEDING PAGE BLANK NOT FILMED



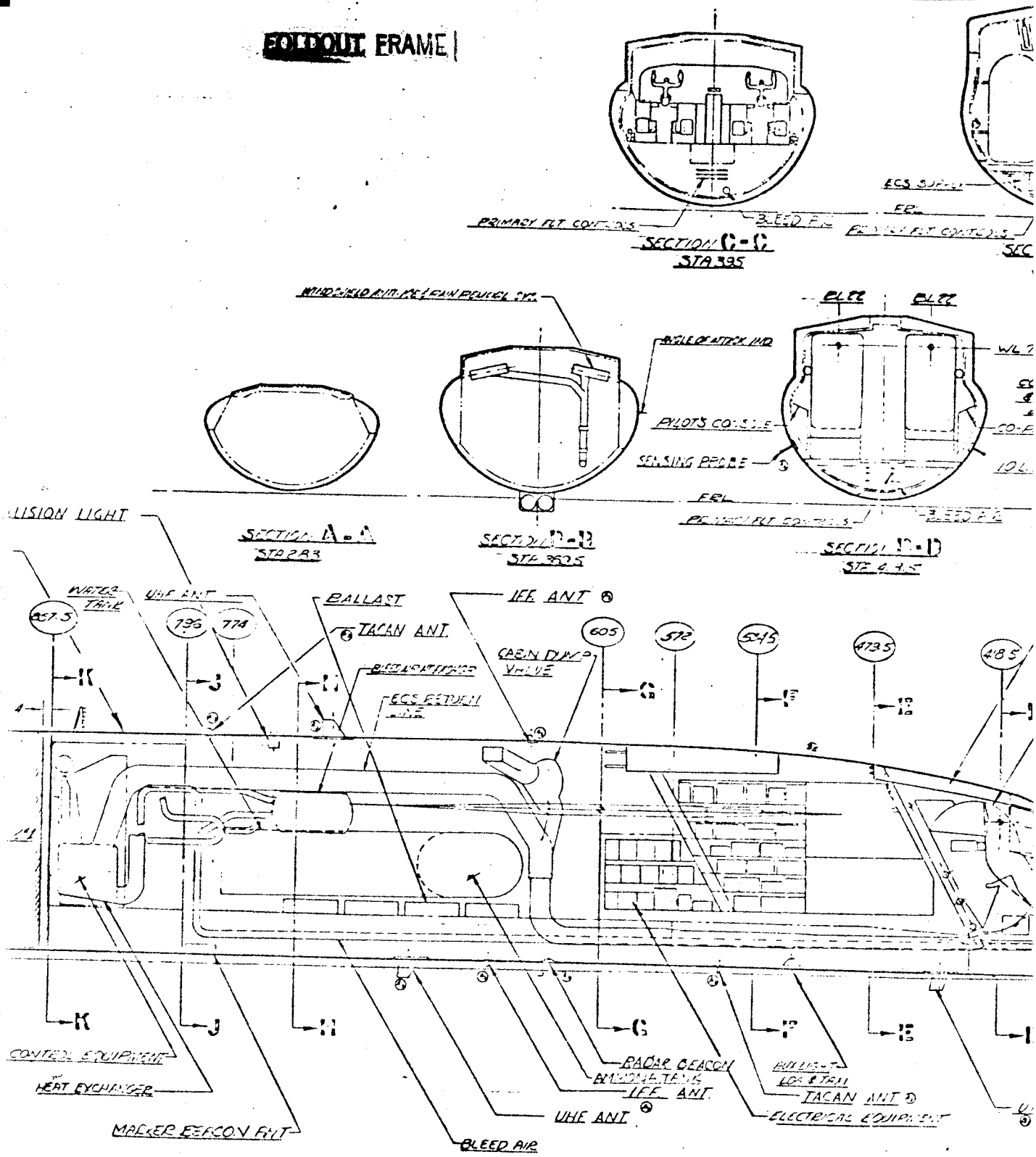
ANTI

ENVISION
ACCESS RD.

FUEL

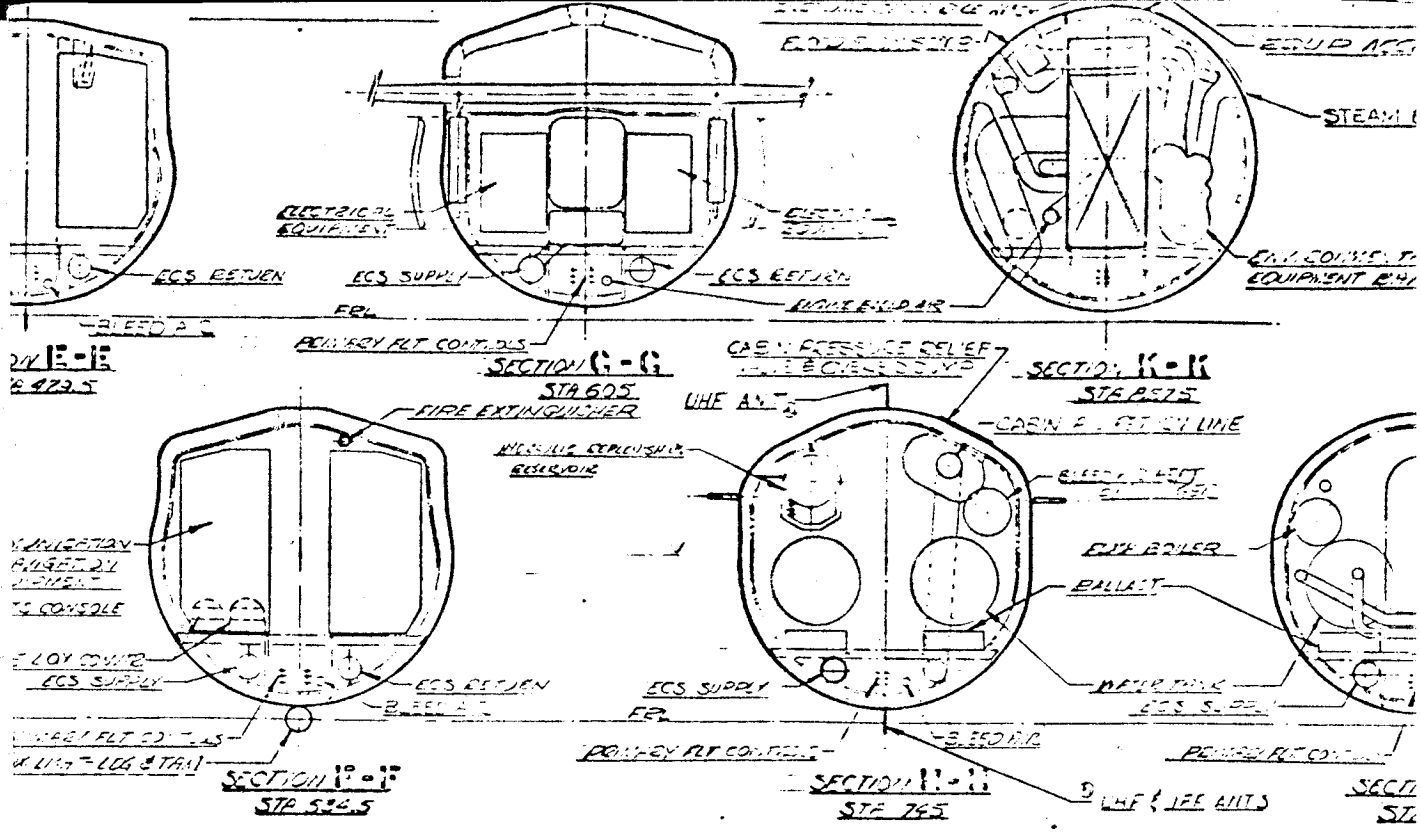
ENVISION

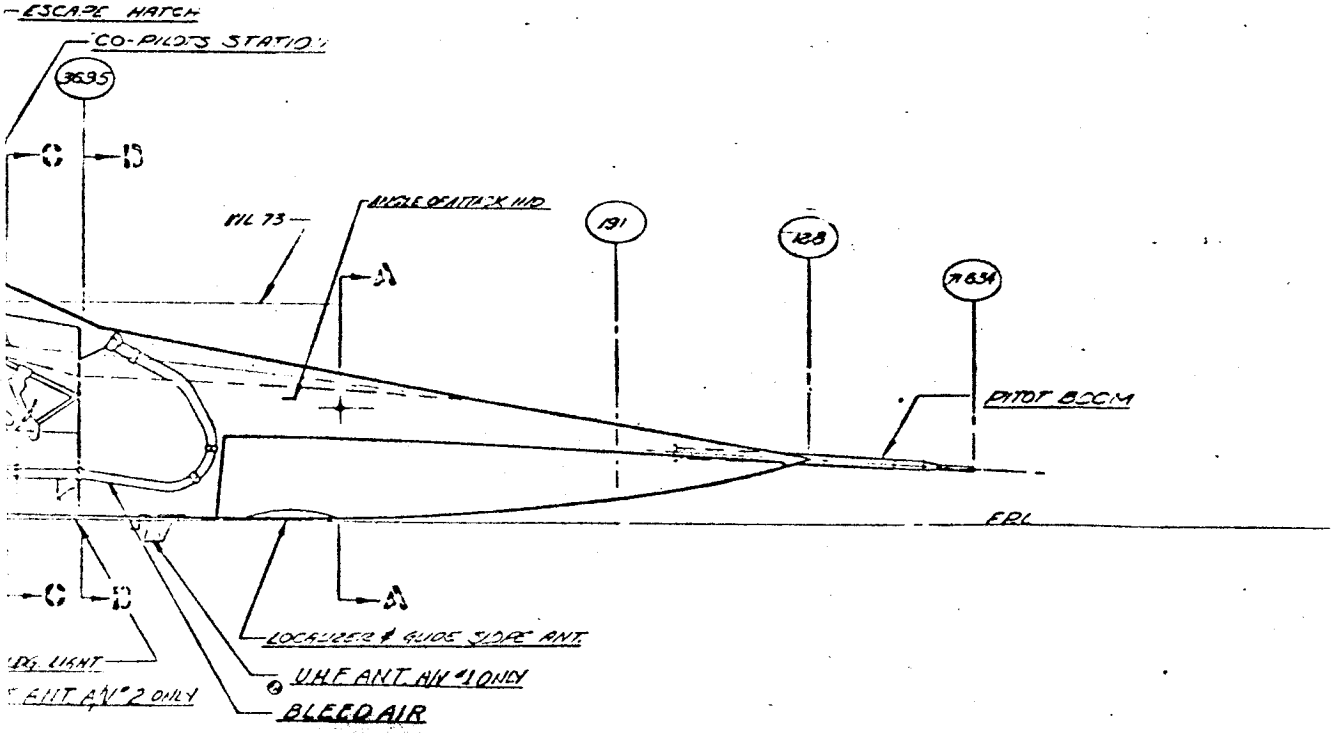
FOLDOUT FRAME



R.H. SIDE VIEW LOOKING INBOARD

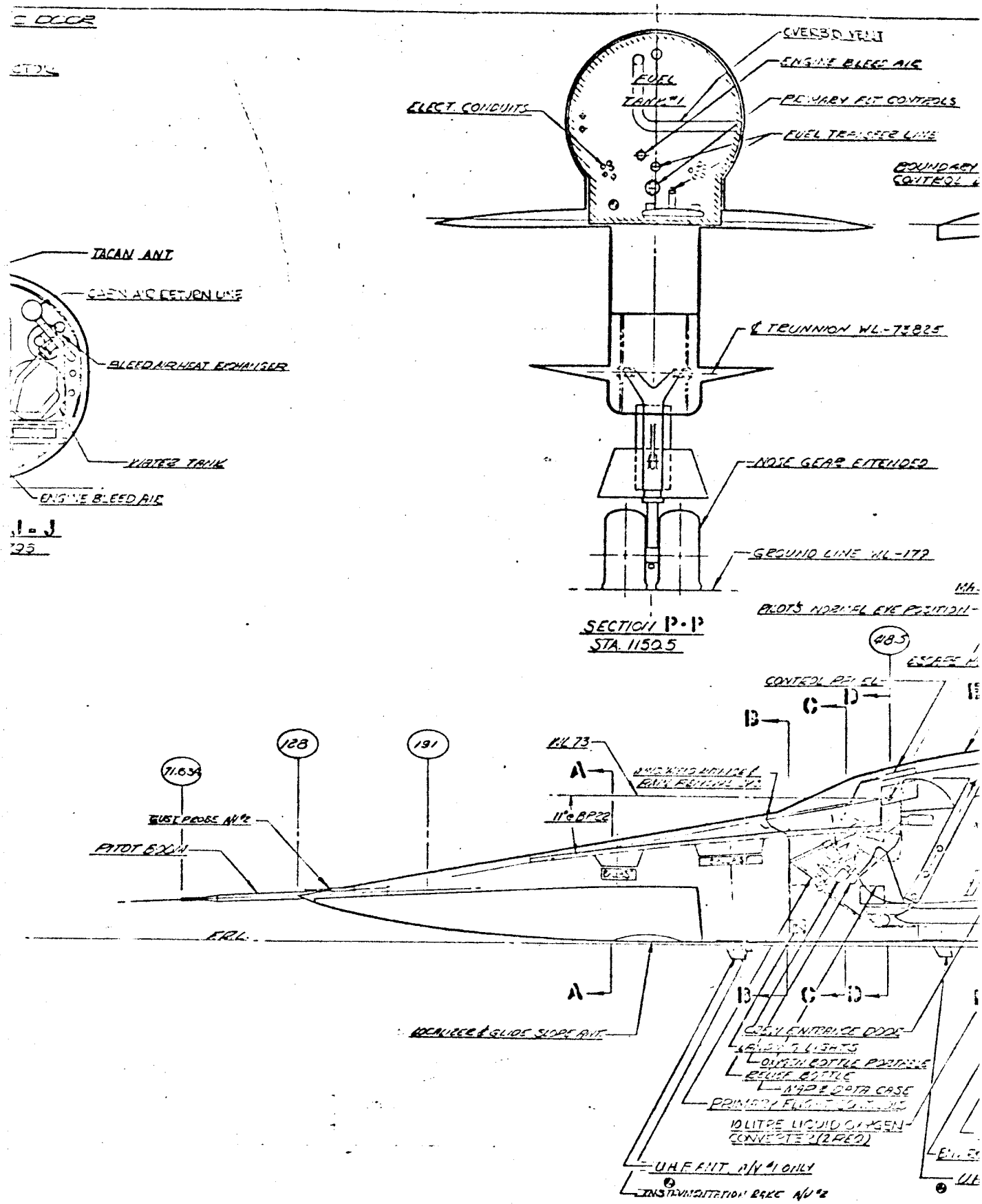
ORIGINAL PAGE IS
OF POOR QUALITY

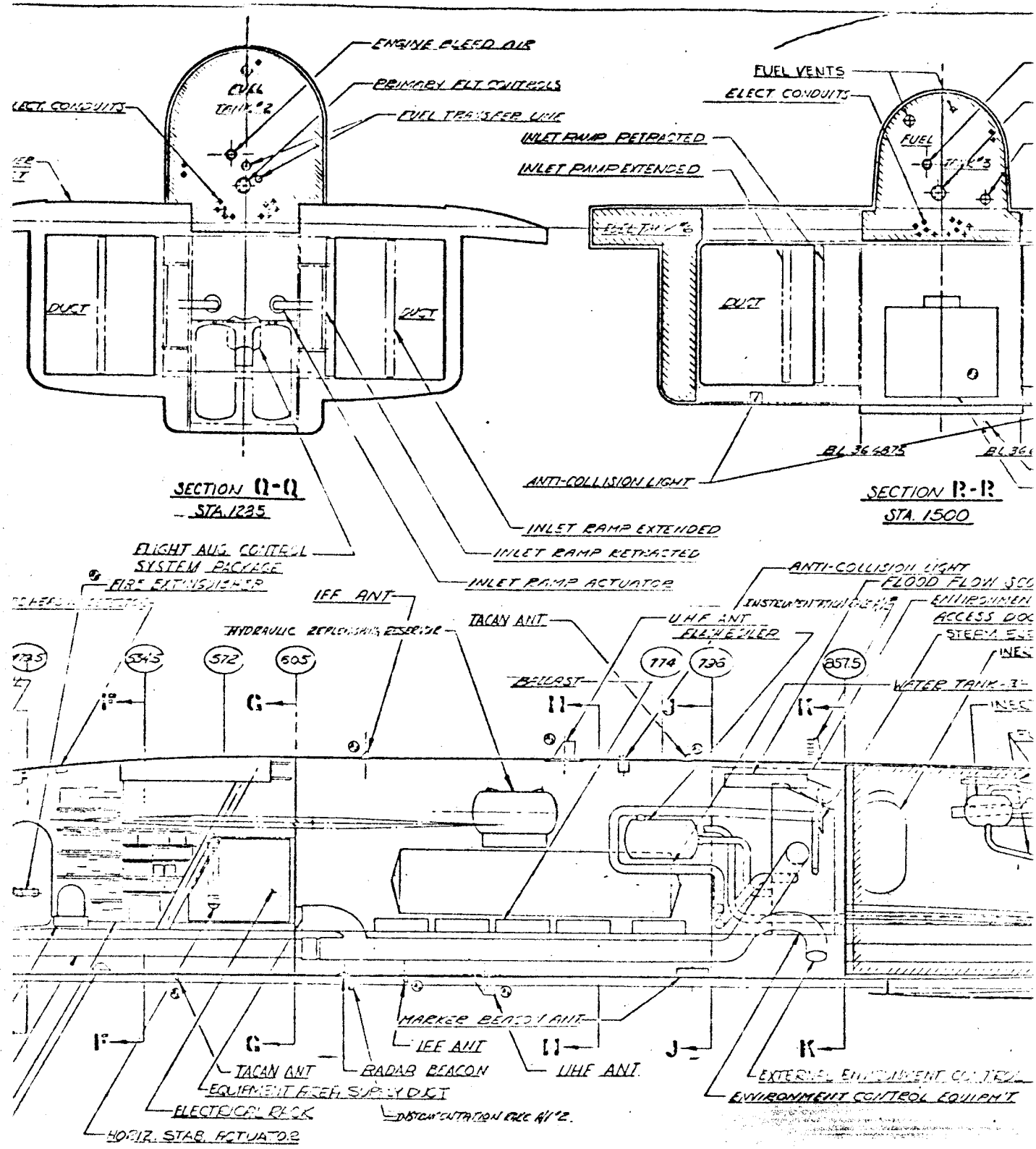


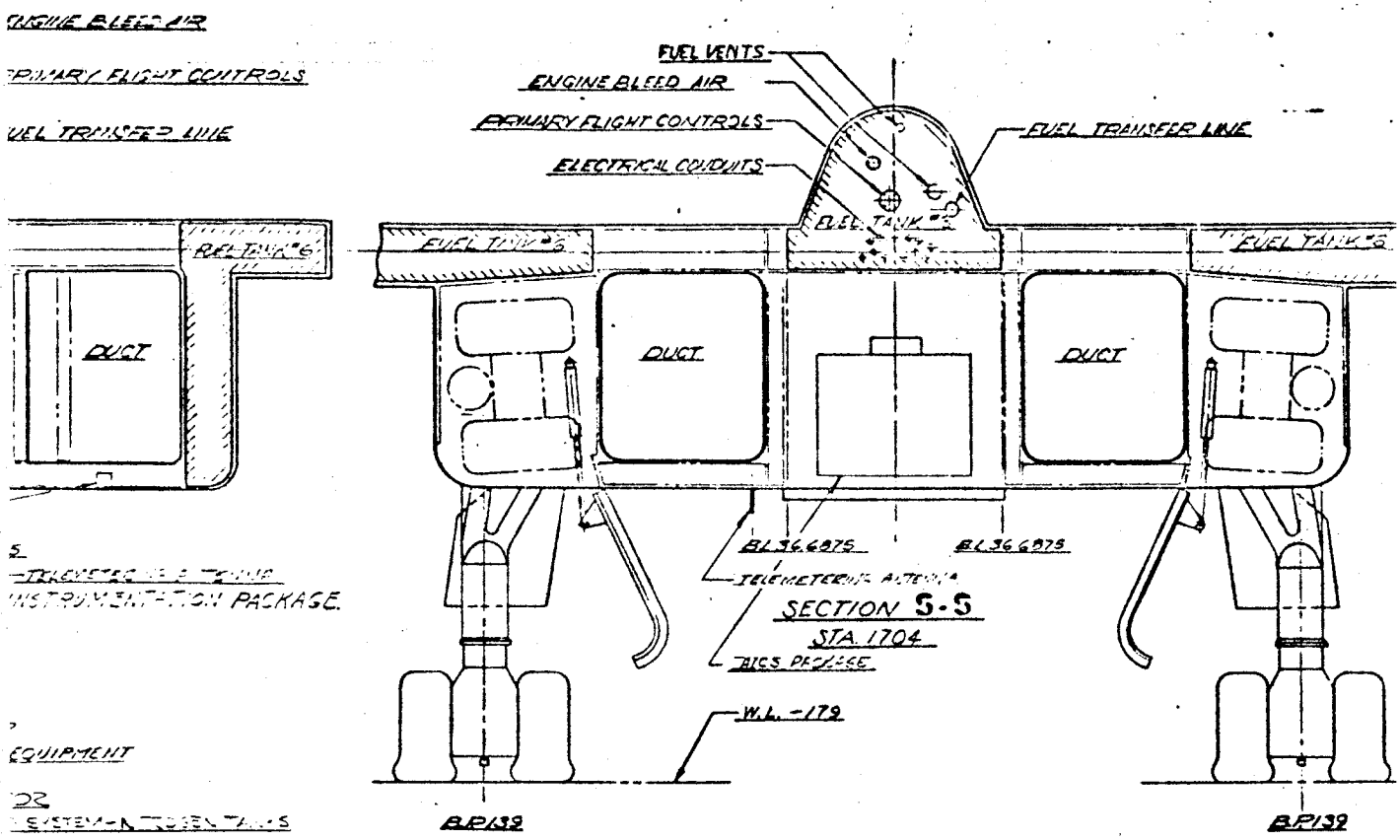


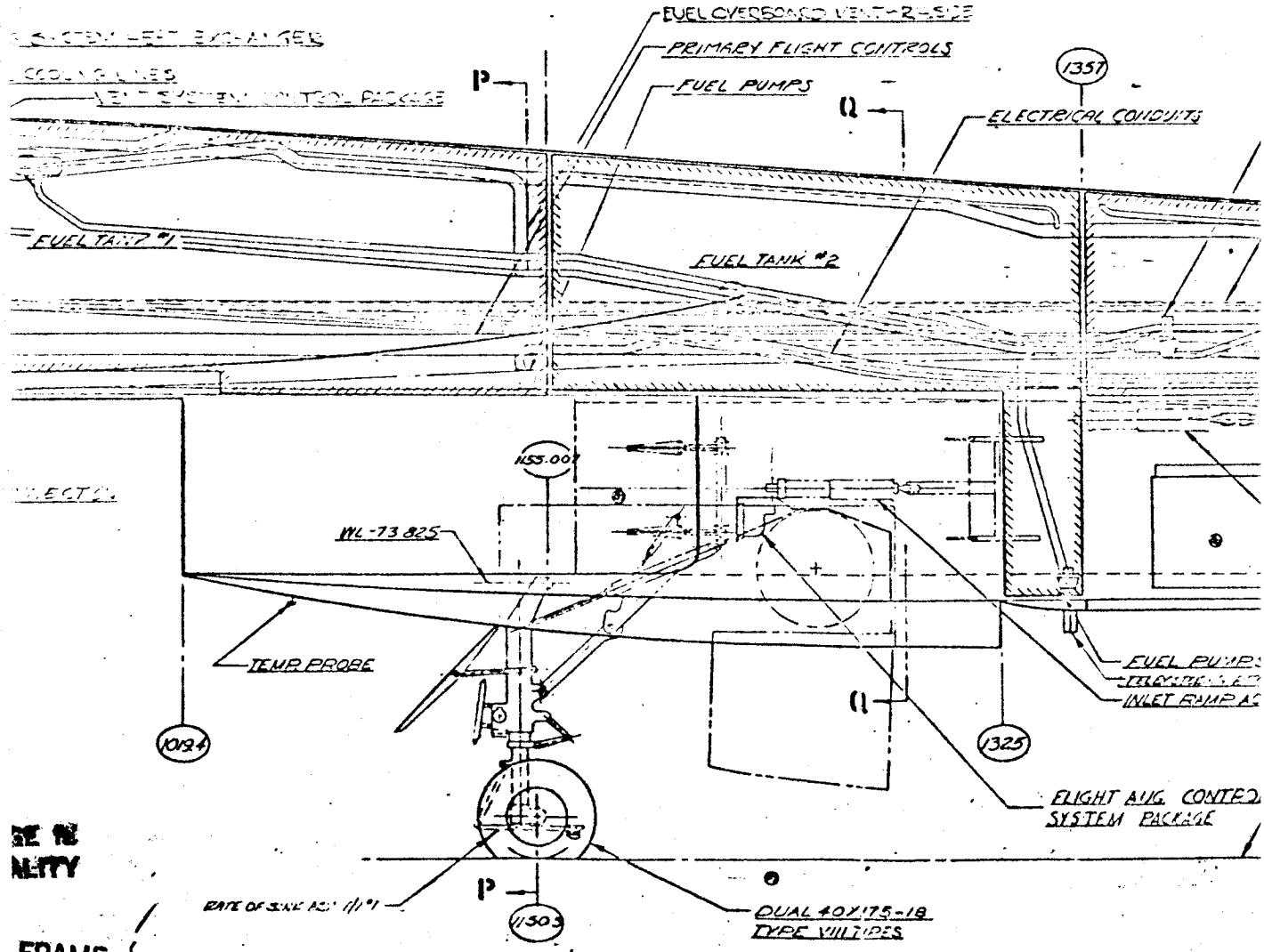
FOLDOUT FRAME 7

ORIGINAL PAGE IS OF POOR QUALITY

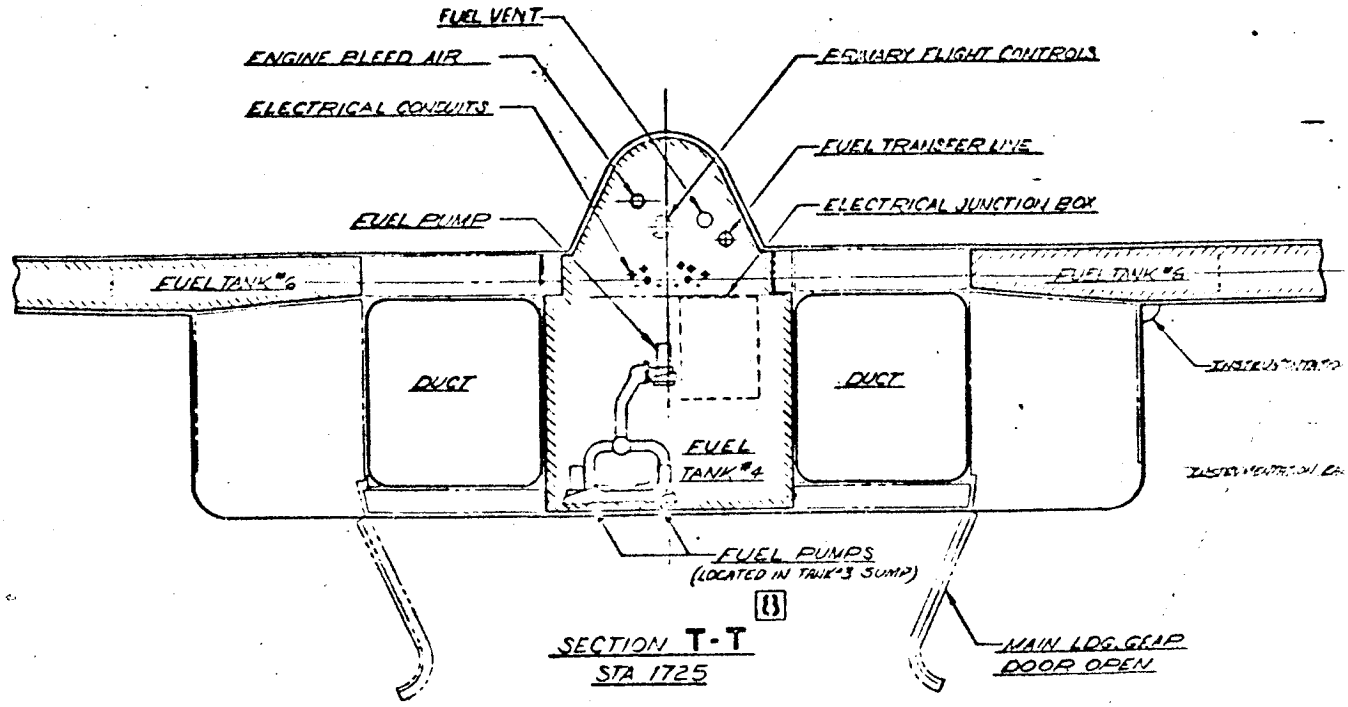




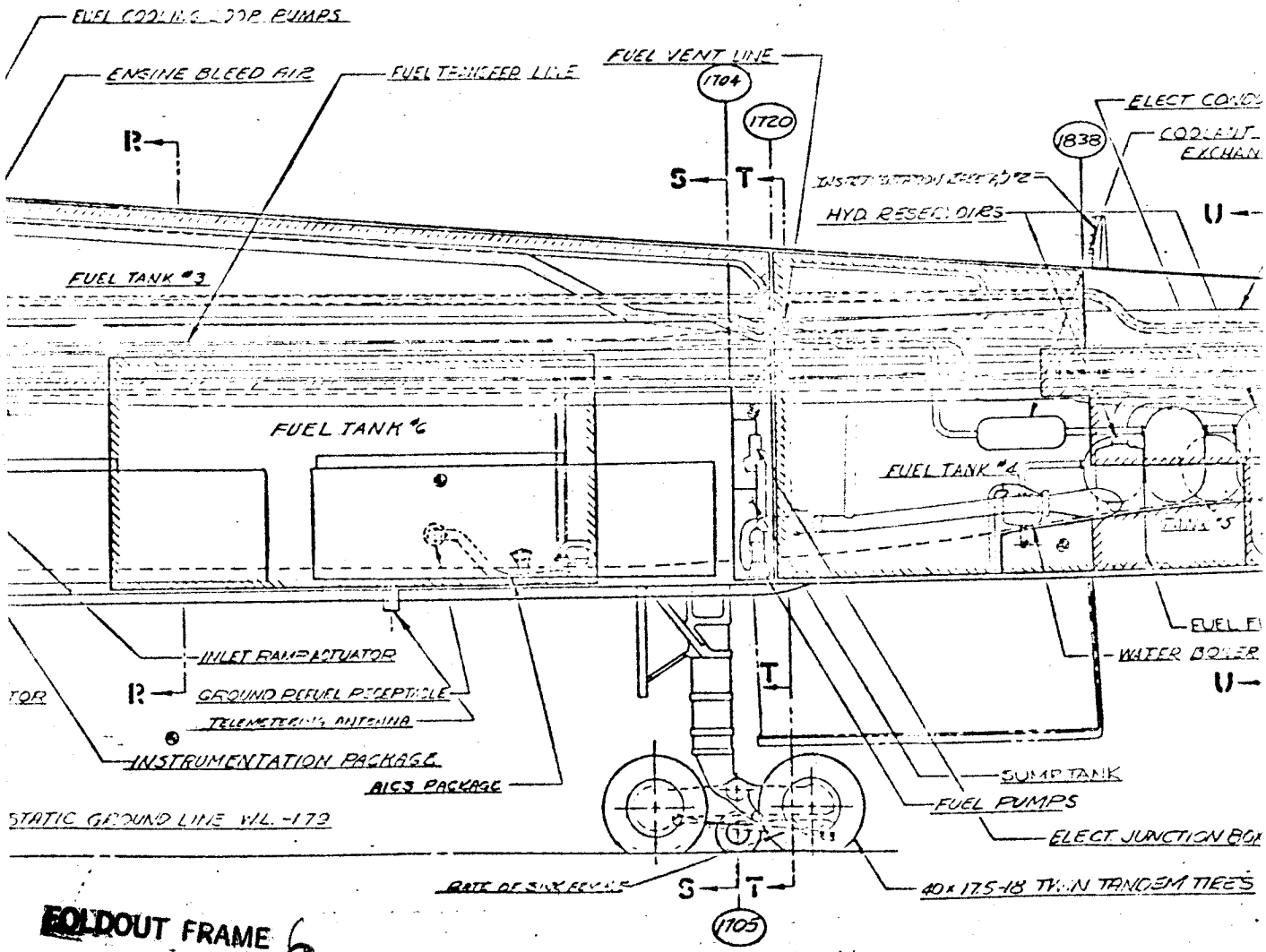

ENGINE BLEED AIR
PRIMARY FLIGHT CONTROLS
UEL TRANSFER LINE
FUEL VENTS
ENGINE BLEED AIR
PRIMARY FLIGHT CONTROLS
ELECTRICAL CONDUITS
FUEL TRANSFER LINE
FUEL TANK "6"
FUEL TANK "5"
FUEL TANK "3"
DUCT
DUCT
DUCT
BL 36.6875
BL 36.6875
TELEMETERING ANTENNA
SECTION S-S
STA 1704
TICS PACKAGE
W.L. -179
BP 139
BP 139
5
INSTRUMENTATION PACKAGE
EQUIPMENT
23
SYSTEM-NITROGEN TANKS


SYSTEM HEAT EXCHANGER
COOLING LINES
FUEL OVERBOARD VENT-R.-SIDE
PRIMARY FLIGHT CONTROLS
FUEL PUMPS
ELECTRICAL CONDUITS
1357
P
Q
FUEL TANK "1"
FUEL TANK "2"
1155.00
W.L. -73.825
TEMP PROBE
1092
1325
FUEL PUMP
INLET PUMP AS
FLIGHT AUG. CONTROL
SYSTEM PACKAGE
P
1503
DUAL 40X.175-18
TYPE VIII TIRES

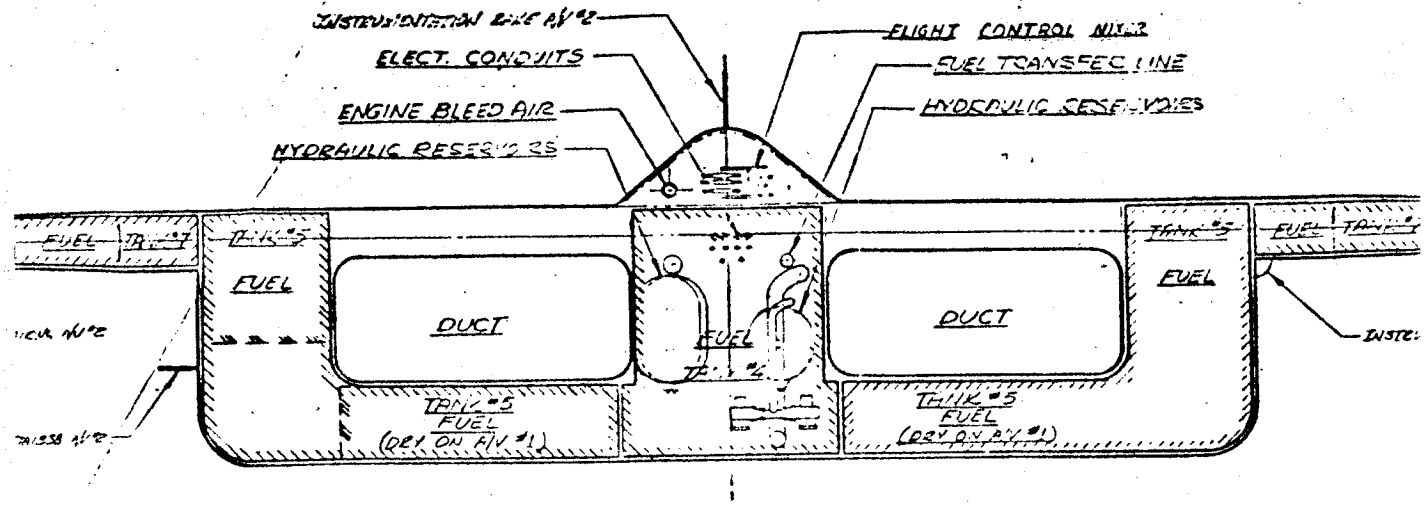
FRAME 5



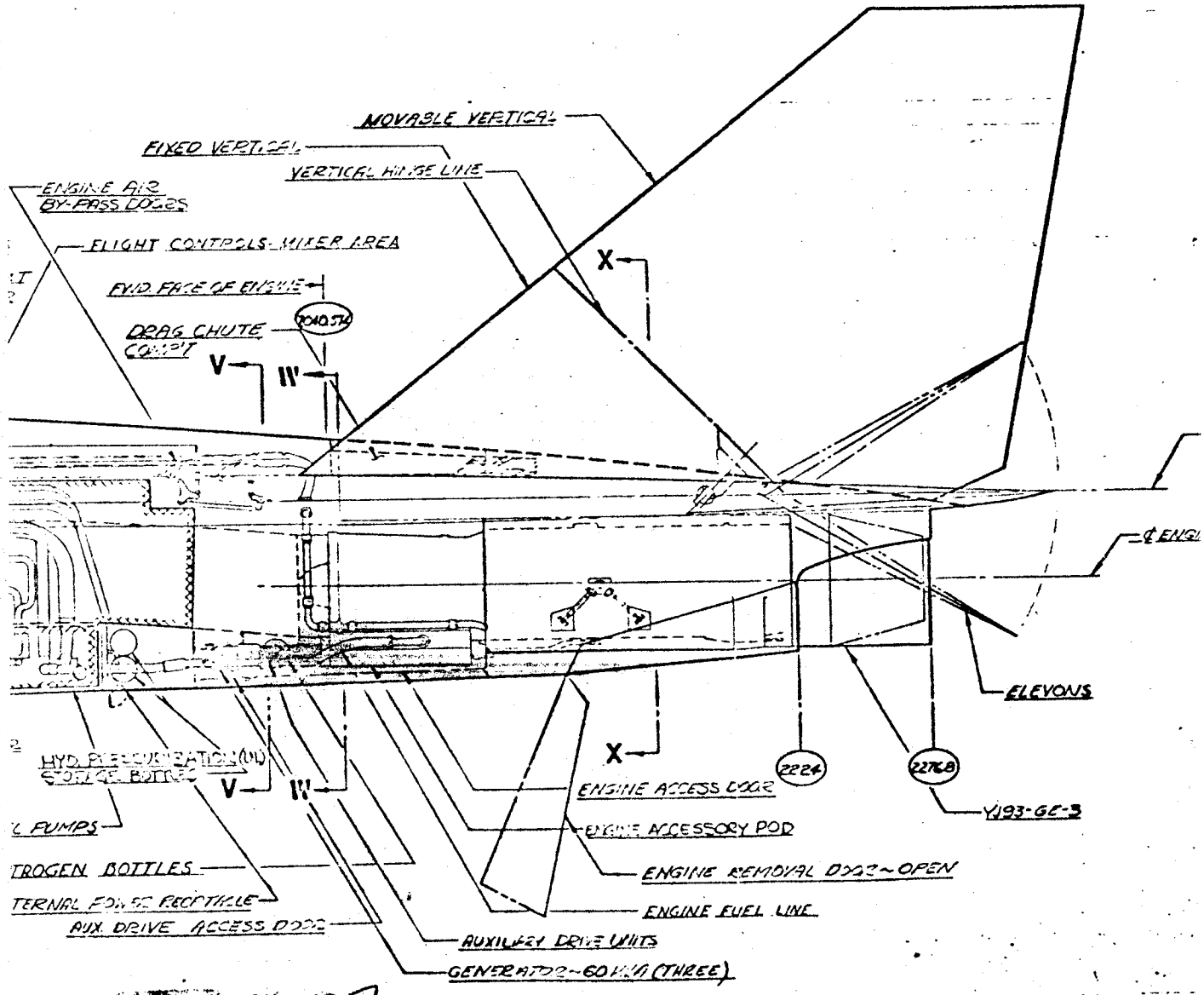
SECTION T-T
STA 1725



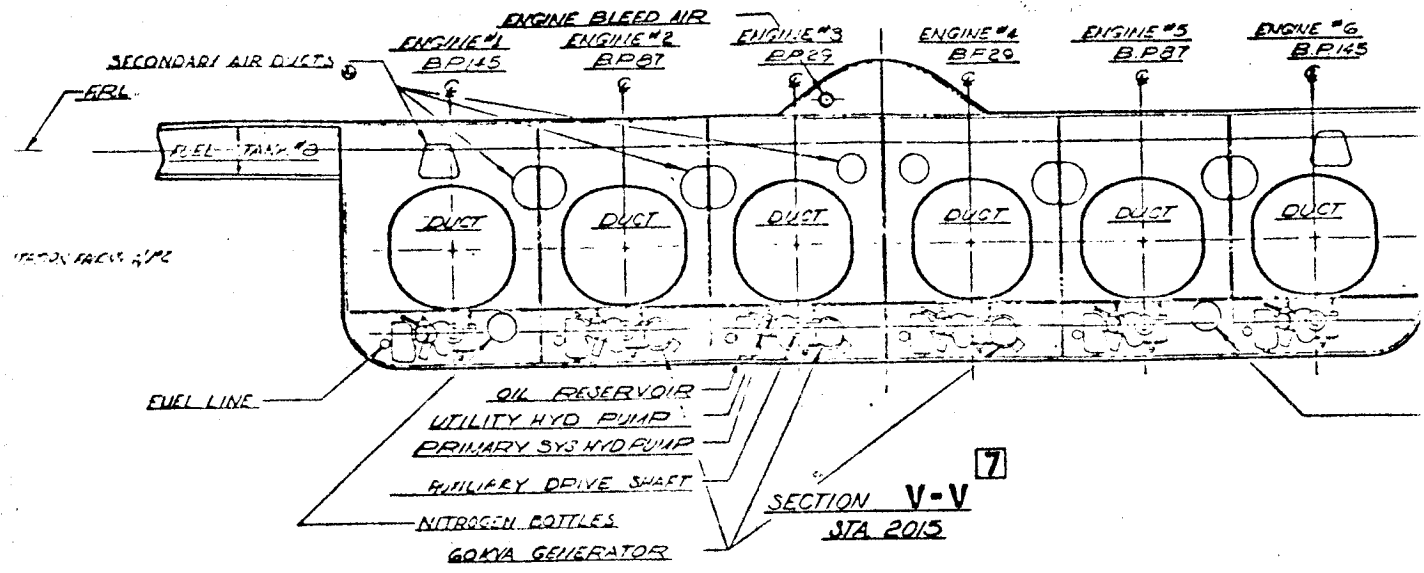
FOLDOUT FRAME 6



SECTION U-U 7
STA 1324.5

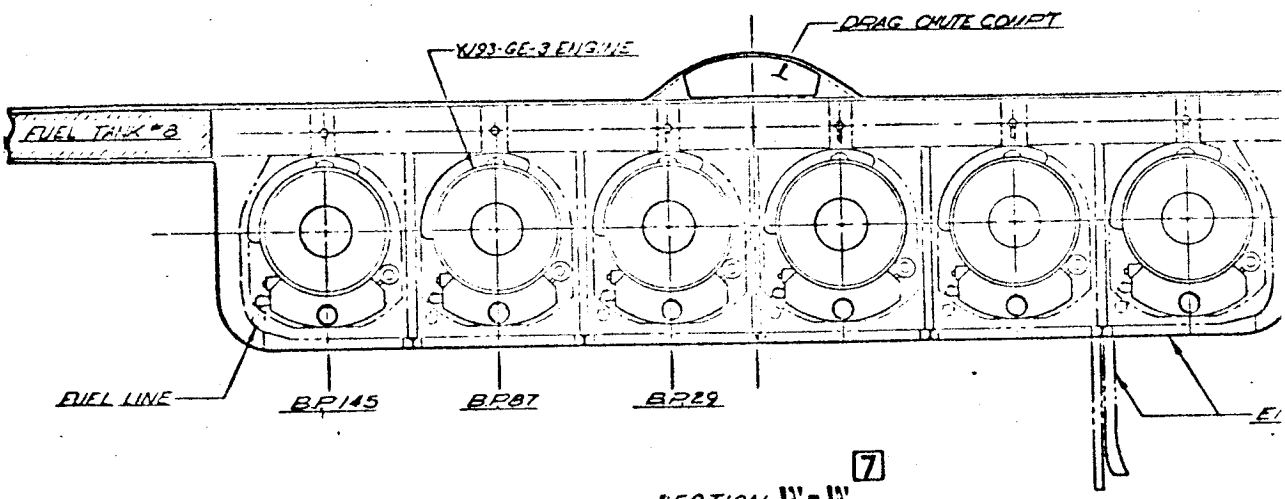


FOLDOUT FRAME 7



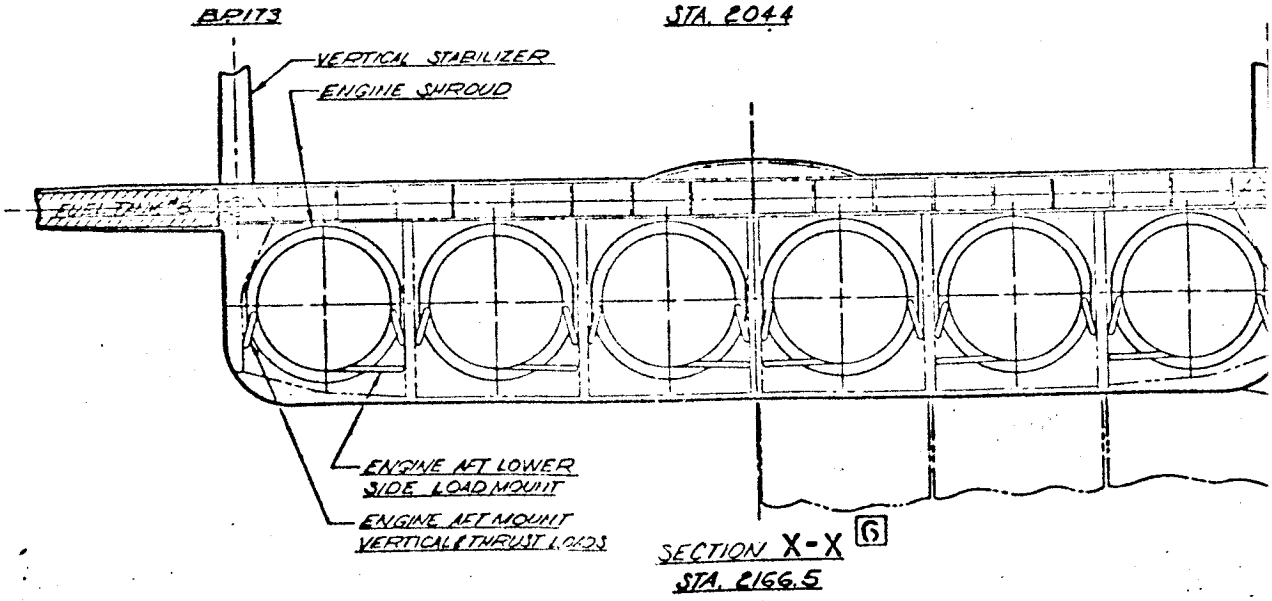
SECTION V-V
STA. 2015

7



SECTION W-W
STA. 2044

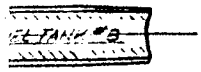
7



SECTION X-X
STA. 2166.5

6

FOLDOUT FRAME 8

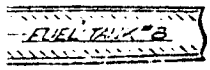


W.L.-33.54

INSTRUMENTATION FAIRING A/V #2

W.L.-60.94

NITROGEN BOTTLE



W.L.-33.54

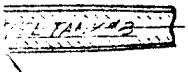
INSTRUMENTATION FAIRING A/V #2

VE ACCESS DOOR

MAX. USABLE FUEL CAPACITY A/V #1

TANK #1	JP-6	7526
#2	JP-6	1889
#3	JP-6	5413
#4	JP-6	6119
#5	JP-6	DRY
#6	JP-6	11,857
#7	JP-6	3290
#8	JP-6	4077

TOTAL USABLE FUEL A/V #1 43,171 GALLONS



VERTICAL STABILIZER ACTUATOR

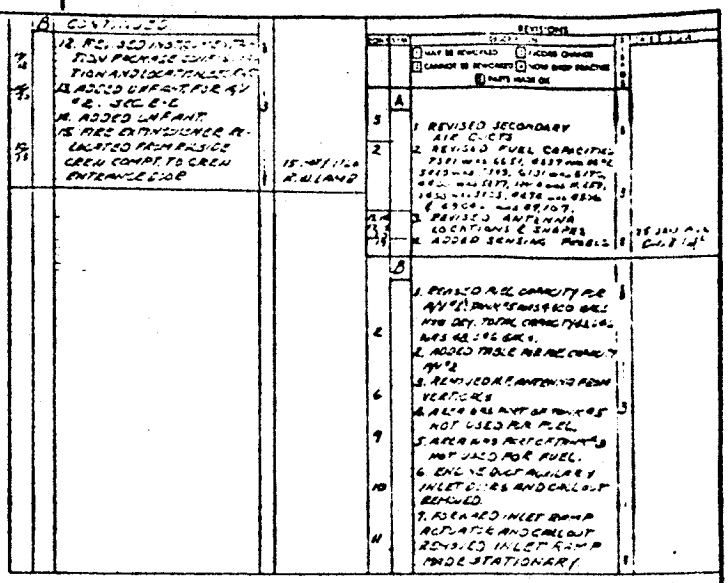
INSTRUMENTATION FAIRING A/V #2

MAX. USABLE FUEL CAPACITY A/V #2

TANK #1	JP-6	7422
#2	JP-6	4900
#3	JP-6	5485
#4	JP-6	5906
#5	JP-6	4641
#6	JP-6	10,787
#7	JP-6	3148
#8	JP-6	3684

TOTAL USABLE FUEL A/V #2 45,971 GALLONS

FOLDOUT FRAME 9

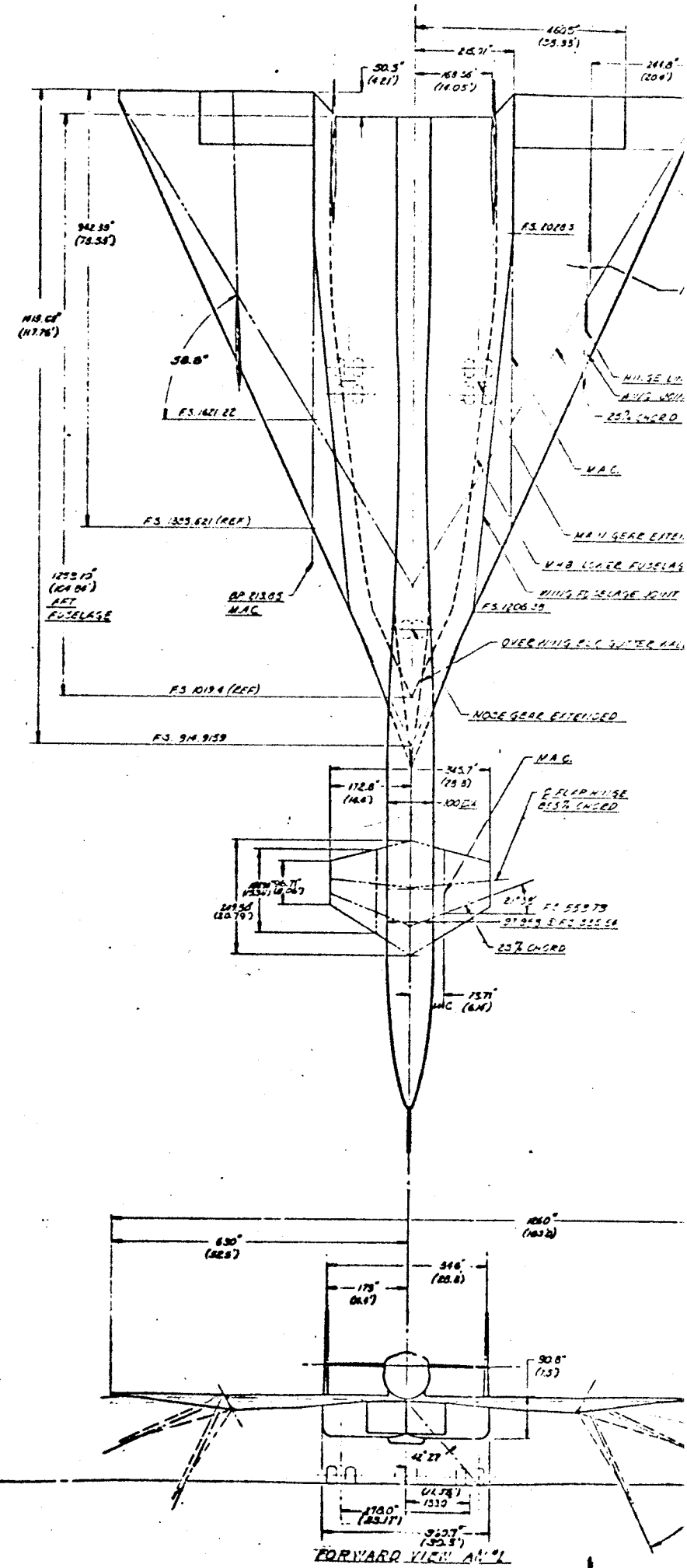


FINAL PAGE IS POOR QUALITY

T FRAME 10

PRECEDING PAGE BLANK NOT FILMED

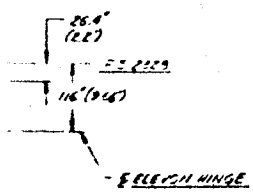
FOLDOUT FRAME 1



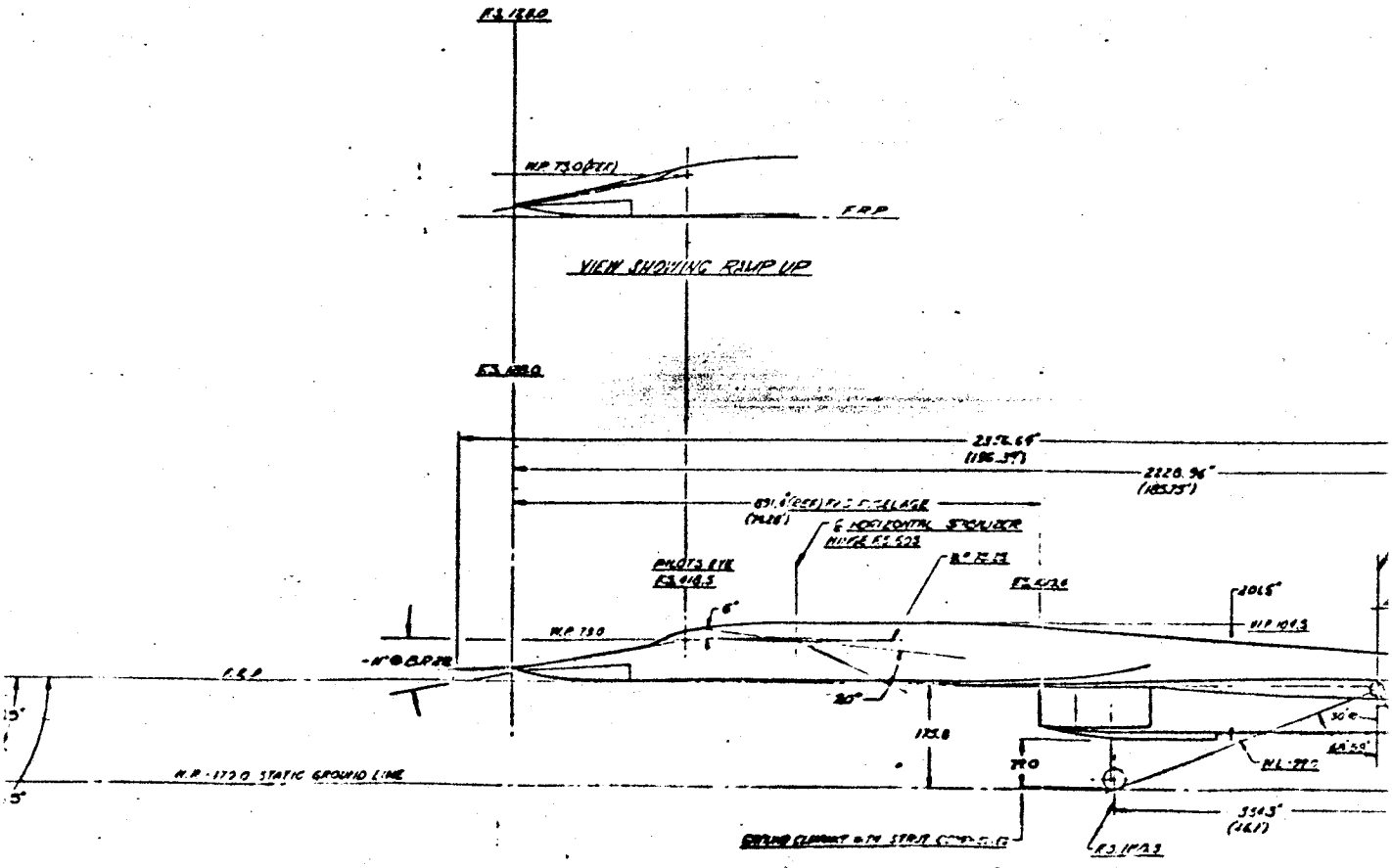
ORIGINAL PAGE IS
OF POOR QUALITY

FOLDOUT FRAME 2

ORIGINAL PAGE IS OF POOR QUALITY



ING FOLD
AIRING



FOLDOUT FRAME 3

WING

AREA	6297.8
ASPECT RATIO	
TAPER RATIO	
SWEEP BACK (25% ELEMENT)	
AIRFOIL STRAIGHT TAPER LEADING	
EDGE TO 25% CONSTANT THICKNESS	
TO 70% (MODIFIED) STEP FAIRED	
70% (MODIFIED) TO TRAILING EDGE	
LEADING EDGE DROOP STRAIGHT OF W.L.	
FOLDED OUTBOARD OF FOLD	
INCIDENCE	0° INBOARD, -3° AT FOLD
DIHEDRAL	0° AT ELEV
ROOT CHORD	
TIP CHORD	
M.A.C. LENGTH	
% = .020 @ BP 2.5 TO .025 @ BP 69.2	
30-70 MACH MODIFIER	

ELEVON

TOTAL ELEVON AREA-NET OF [illegible]	395
ELEVON AREA (PER SIDE)	197
ELEVON DEFLECTION	30° UP 3

HORIZONTAL STABILIZER

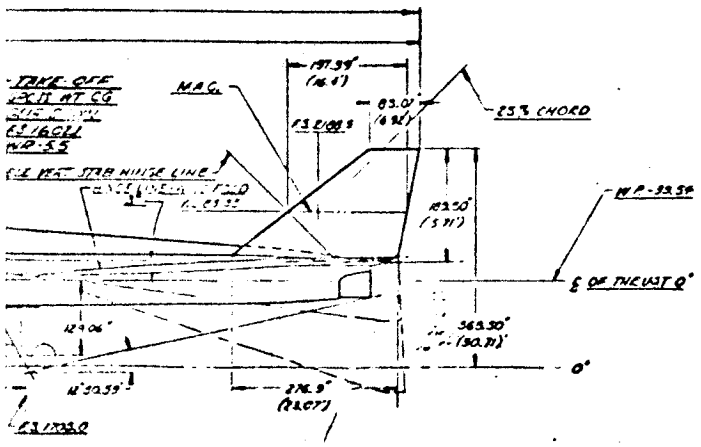
AREA (TOTAL)	459
ASPECT RATIO (TOTAL)	
TAPER RATIO (TOTAL)	
ROOT CHORD (TOTAL)	
TIP CHORD	
SWEEP BACK (25% ELEMENT)	
AIRFOIL	30-70 MOD
FLAP AREA (TOTAL	
FLAP DEFLECTION	
% = .025 @ BP 2.5 TO .025 @ TIP 30-70 MOD M	
M.A.C. LENGTH (TOTAL)	
DEFLECTION	

VERTICAL STABILIZER

TOTAL VERTICAL AREA	467.9
SINGLE VERTICAL AREA	233.9
ASPECT RATIO	
TAPER RATIO	
SWEEP BACK (25% ELEMENT)	
ROOT CHORD	
TIP CHORD	
AIRFOIL	30-70 MOD
% = .0375 @ ROOT & .025 @ TIP	
M.A.C. LENGTH	
RUDDER AREA (TOTAL	
RUDDER DEFLECTION (GEAR DOWN)	
RUDDER DEFLECTION (GEAR UP)	

FOLDING TIP

AREA (EACH)	521.34
ASPECT RATIO	
TAPER RATIO	
DEFLECTION	25° A



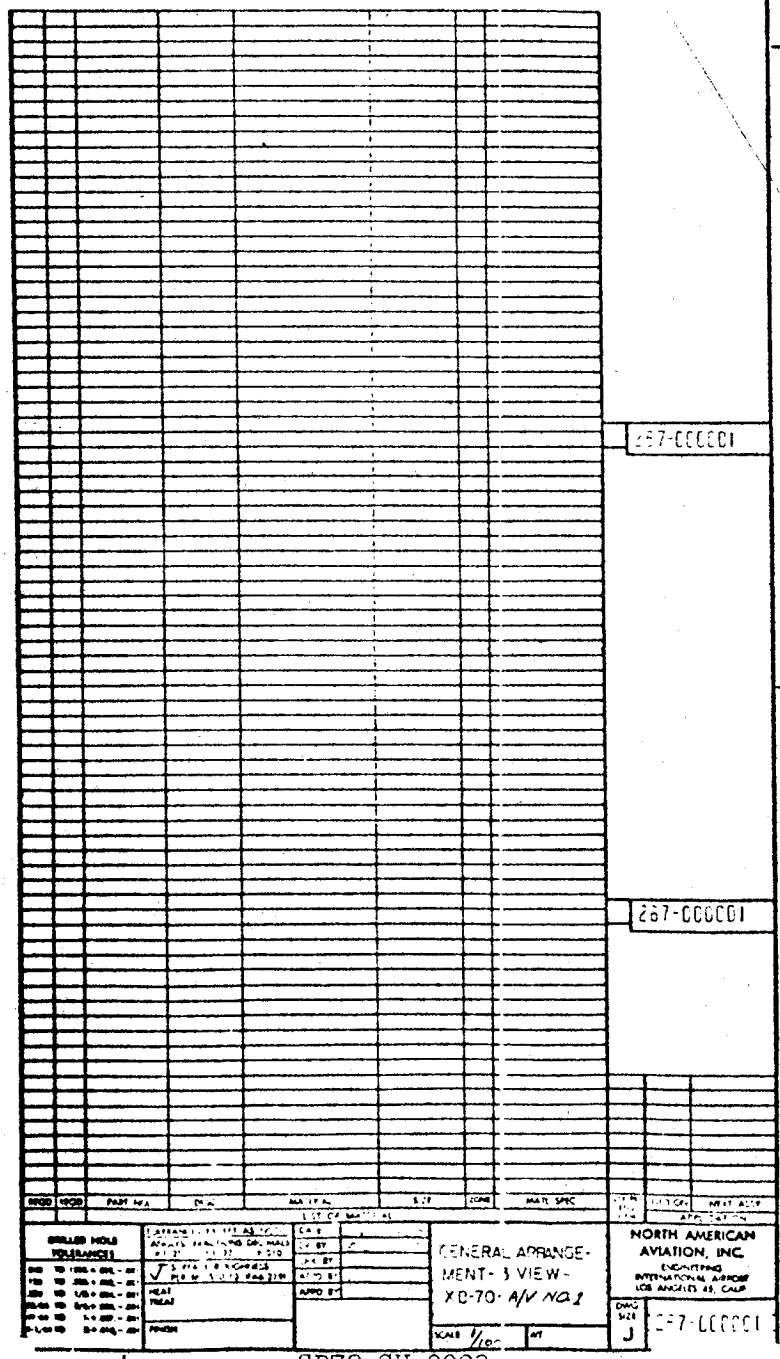
FOLDOUT FRAME 4

LANDING GEAR
MAIN GEAR - TANDEM DUAL
40x17.5-19 END TYPE VIII
NOSE GEAR - DUAL
40x17.5-19 END TYPE VIII
DEFLECTION

MAIN GEAR TOTAL STROKE	13 5/8 IN.
STATIC TO COMPRESSED	2 5/8 IN.
NOSE GEAR TOTAL STROKE	14 1/4 IN.
STATIC TO COMPRESSED	3 IN.

ENGINES
SIX(6) V393-GE-3 ENGINES

FOLDOUT FRAME 5



WORK BREAKDOWN STRUCTURE

PROGRAM TECHNICAL SUPPORT WBS CODE: 2.0

WBS LEVELS
4 5 6 7 8

2.0 PROGRAM TECHNICAL SUPPORT

2.20 DESIGN SUPPORT

2.20.1 Structural Dynamics

2.20.2 Loads

2.20.3 Stress

2.20.4 Weight Control

2.20.5 Structural Sciences

2.20.6 Lines and Dimensions

2.20.7 Materials and Processes

2.20.8 Non Metallics

2.20.9 External Aero

2.20.10 Internal Aero

2.20.11 Flight Sciences

2.20.12 Thermal Dynamics

2.20.13 Systems and Tactics

2.20.14 Design Support

2.20.15 Specifications

2.20.16 Design Producibility

2.20.17 Life Sciences

2.21 OTHER R&D TESTING

2.21.1 Tests

2.21.1.1 Structural R&D

WORK BREAKDOWN STRUCTURE

PROGRAM TECHNICAL SUPPORT WBS CODE: 2.0

WBS LEVELS
4 5 6 7 8

2.21.1.2 Thermal Labs

2.21.1.3 Material and Process Lab

2.21.1.4 Lab Services

2.21.1.5 Structural Dynamic Lab

2.21.1.6 Wind Tunnels

2.21.1.7 Hydraulic Lab

2.21.1.8 Electrical Power Lab

2.21.1.9 Flight Simulator

2.21.2 Model Shop

2.22 PROGRAM MANAGEMENT

2.22.1 Projects/Administration

2.22.2 Advance System Aeroprojects

2.22.3 Planning

2.22.4 Component Controls

2.22.5 Data Control

2.22.6 Presentations

2.23 LOGISTICS SUPPORT

2.23.1 Field Service

2.23.2 Maintenance Analysis

2.23.3 Maintenance Schedules

2.23.4 Packaging Studies

WORK BREAKDOWN STRUCTURE

PROGRAM TECHNICAL SUPPORT

WBS CODE: 2.0

WBS LEVELS				
4	5	6	7	8

2.24 WEAPON SYSTEM

2.24.1 Weapon System Analysis

2.24.2 Combat Effectiveness

2.24.3 Operational Analysis

2.24.4 Preliminary Analysis

2.24.5 Program Analysis

2.24.6 Preliminary Design

2.24.7 Advance Design

PROGRAM TECHNICAL SUPPORT WBS 2.0

DESCRIPTION

This WBS item has been established to collect those elements of the B-70 program which are closely related to the technical effort but are not identified to a particular vehicle subsystem. This item also contains all in-house and subcontractor costs associated with the design, development, fabrication and testing of the weapon system. The WBS level 5 elements comprising Program Technical Support 2.0 are:

2.20	Design Support	$	0	Page II-166
2.21	Other R&D Testing	$	0	Page II-168
2.22	Program Management	$	12,110,286	Page II-174
2.23	Logistics Support	$	2,717,771	Page II-184
2.24	Weapon System	$	136,524,947	Page II-193
Total Cost		$	151,353,004	Page II-131

It should be noted that Design Support 2.20 and other R&D Testing 2.21 contain no cost dollars. These items are used to provide a recap, for information purposes only, of the hours expended by each of the engineering groups defined by the WBS items 2.20 and 2.21. The North American Accounting system provides the ability to assign these groups to a particular subsystem, therefore, the actual costs are included in the subsystems (1.1 through 1.11.)

Explanation and definition of the costs associated with all the WBS level 5 items in Program Technical Support can be located on the pages indicated above.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

			5-SUBSYS 22	5-SUBSYS 23	5-SUBSYS 24	TOTAL
			HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS
DESIGN/ENGINEERING			1270491	257696	760698	2288885
LABOR AT $	4.762		6216096	1173517	3510080	10899693
ENGR BURDEN	AT $	4.248	5223627	1302642	3195969	9722238
PRODUCTION					220672	220672
LABOR AT $	3.646				804564	804564
SHOP SUPPORT			16626	18407	14410	49443
LABOR AT $	4.742		106311	84244	43901	234456
PLANNING					101	101
LABOR AT $	4.495				454	454
TEST/QC					1503	1503
LABOR AT $	3.627				5452	5452
MFG BURDEN	AT $	1.960	23954	99385	409156	532495
ENGR MATERIAL			3911	6808	50351	61070
MFG MATERIAL					5575	5575
SUBCONTRACT					122190126	122190126
MPC			476	578	4608407	4609461
OTHER COST			367673	3274	287993	658940
SUB-TOTAL			11942048	2670448	135112028	149724524
GEN & ADMIN			168238	47323	1412919	1628480
TOTAL COST			12110286	2717771	136524947	151353004

SUBDIVISION OF WORK COST DETAIL - SEE PAGE	II-176	II-185	II-198	II-132

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

			DESIGN /ENGR HOURS / DOLLARS	PROD HOURS / DOLLARS	TOOLING AND STE HOURS / DOLLARS	TEST /QC HOURS / DOLLARS
DESIGN/ENGINEERING			2265365			23520
LABOR AT $	4.762		10800714			98979
ENGR BURDEN AT $		4.248	9622103			100135
PRODUCTION				220672		
LABOR AT $	3.646			804564		
SHOP SUPPORT			36439			13004
LABOR AT $	4.742		195048			39408
PLANNING				48		53
LABOR AT $	4.495			163		291
TEST/QC			131	1084		288
LABOR AT $	3.627		423	4216		813
MFG BURDEN AT $		1.960	129119	42262		361114
ENGR MATERIAL			11894			49176
MFG MATERIAL				5575		
SUBCONTRACT			36323328	85854040	12758	
MPC			1060028	3544765	589	4079
OTHER COST			658827			113
SUB-TOTAL			58801484	90255585	13347	654108
GEN & ADMIN			485162	1131495	174	11649
TOTAL COST			59286646	91387080	13521	665757

TIME-PHASED COST DETAIL - SEE PAGE II-134 II-142 II-147 II-148

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

		TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		2288885
LABOR AT $ 4.762		10899693
ENGR BURDEN AT $ 4.248		9722238
PRODUCTION		220672
LABOR AT $ 3.646		804564
SHOP SUPPORT		49443
LABOR AT $ 4.742		234456
PLANNING		101
LABOR AT $ 4.495		454
TEST/QC		1503
LABOR AT $ 3.627		5452
MFG BURDEN AT $ 1.960		532495
ENGR MATERIAL		61070
MFG MATERIAL		5575
SUBCONTRACT		122190126
MPC		4609461
OTHER COST		658940
SUB-TOTAL		149724524
GEN & ADMIN		1628480
TOTAL COST		151353004

TIME-PHASED COST
DETAIL - SEE PAGE II-154

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	457.5	76930	4.509	346867	350029	696896
Q-2 58						
Q-3 58	1049.0	176270	4.280	754512	691272	1445784
Q-4 58						
Q-1 59	1351.5	230678	4.239	977832	812548	1790380
Q-2 59						
Q-3 59	1486.0	261490	4.143	1083470	943378	2026848
Q-4 59						
Q-1 60	1163.5	201636	4.325	872097	761642	1633739
Q-2 60						
Q-3 60	802.5	134884	4.600	620470	488341	1108811
Q-4 60						
Q-1 61	1721.5	293773	4.554	1337956	873647	2211603
Q-2 61						
Q-3 61	939.0	170302	4.899	834320	753174	1587494
Q-4 61						
Q-1 62	672.0	114748	5.196	596250	519012	1115262
Q-2 62						
Q-3 62	664.0	111513	5.023	560117	562404	1122521
Q-4 62						
Q-1 63	660.0	112657	5.475	616802	611202	1228004
Q-2 63						
Q-3 63	812.0	136411	5.721	780448	741026	1521474
Q-4 63		6			8	8
Q-1 64	724.5	123768	5.611	694432	720093	1414525
Q-2 64						
Q-3 64	360.0	63348	5.918	374917	404470	779387
Q-4 64						
Q-1 65	175.5	30434	6.266	190703	206557	397260
Q-2 65						
Q-3 65	90.0	15139	6.113	92545	99030	191575

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	40.5	6966	5.778	40253	51953	92206
Q-2 66						
Q-3 66	26.5	4412	6.057	26723	32317	59040
TOTAL	13195.5	2265365		10800714	9622103	20422817

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	290	3.631	1053	981	2034
Q-2 58						
Q-3 58		-64	2.078	-133	-140	-273
Q-4 58						
Q-1 59		77	2.688	207	251	458
Q-2 59						
Q-3 59	6.0	1013	2.962	3000	4141	7141
Q-4 59						
Q-1 60	-4.5	-690	2.984	-2059	-1866	-3925
Q-2 60						
Q-3 60					-59	-59
Q-4 60						
Q-1 61	4.5	804	3.041	2445	2384	4829
Q-2 61						
Q-3 61					240	240
Q-4 61						
Q-1 62	19.5	3233	5.893	19053	6184	25237
Q-2 62						
Q-3 62	28.5	4839	7.108	34396	4765	39161
Q-4 62						
Q-1 63	114.0	19341	4.972	96154	86910	183064
Q-2 63						
Q-3 63	45.0	7596	5.389	40932	25328	66260
TOTAL	214.5	36439		195048	129119	324167

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59						
Q-2 59						
Q-3 59		35	2.829	99		99
Q-4 59						
Q-1 60		3	5.667	17		17
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61		92	3.304	304		304
Q-2 61						
Q-3 61		1	3.000	3		3
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		5	7.200	36		36
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		-5	7.200	-36		-36
TOTAL		131		423		423

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	459.0	77220	4.506	347920	351010	698930	458
Q-2 58							
Q-3 58	1049.0	176206	4.281	754379	691132	1445511	-33
Q-4 58							
Q-1 59	1351.5	230755	4.238	978039	812799	1790838	-77
Q-2 59							
Q-3 59	1492.0	262538	4.139	1086569	947519	2034088	1952
Q-4 59							
Q-1 60	1159.0	200949	4.330	870055	759776	1629831	-1562
Q-2 60							
Q-3 60	802.5	134884	4.600	620470	488282	1108752	-167
Q-4 60							
Q-1 61	1726.0	294669	4.550	1340705	876031	2216736	7251
Q-2 61							
Q-3 61	939.0	170303	4.899	834323	753414	1587737	3106
Q-4 61							
Q-1 62	691.5	117981	5.215	615303	525196	1140499	129
Q-2 62							
Q-3 62	692.5	116357	5.110	594549	567169	1161718	107
Q-4 62							
Q-1 63	774.0	131998	5.401	712956	698112	1411068	
Q-2 63							
Q-3 63	857.0	144002	5.704	821344	766354	1587698	
Q-4 63		6			8	8	
Q-1 64	724.5	123768	5.611	694432	720093	1414525	
Q-2 64							
Q-3 64	360.0	63348	5.918	374917	404470	779387	642
Q-4 64							
Q-1 65	175.5	30434	6.266	190703	206557	397260	88
Q-2 65							
Q-3 65	90.0	15139	6.113	92545	99030	191575	
Q-4 65							
Q-1 66	40.5	6966	5.778	40253	51953	92206	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	26.5	4412	6.057	26723	32317	59040	
TOTAL	13410.0	2301935		10996185	9751222	20747407	11894

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58		458	25	1322	700735		700735
Q-2 58							
Q-3 58	7667900	7667867	67998	17498	9198874		9198874
Q-4 58							
Q-1 59	15373379	15373302	407634	124559	17696333		17696333
Q-2 59							
Q-3 59	2813500	2815452	77043	65035	4991618		4991618
Q-4 59							
Q-1 60	1000807	999245	59172	76573	2764821	52679	2817500
Q-2 60							
Q-3 60	1289784	1289617	76504	53870	2528743	48180	2576923
Q-4 60							
Q-1 61	1005368	1012619	29499	87526	3346380	62187	3408567
Q-2 61							
Q-3 61	1140320	1143426	32936	46603	2810702	52232	2862934
Q-4 61							
Q-1 62	1347123	1347252	42824	19133	2549708	42797	2592505
Q-2 62							
Q-3 62	1347122	1347229	42784	69282	2621013	43993	2665006
Q-4 62							
Q-1 63	2080310	2080310	88388	56143	3635909	60792	3696701
Q-2 63							
Q-3 63	359054	359054	11539	13486	1971777	32968	2004745
Q-4 63					8		8
Q-1 64	898661	898661	123422	21542	2458150	52304	2510454
Q-2 64							
Q-3 64		642	234	1826	782089	16642	798731
Q-4 64							
Q-1 65		88	26	2468	399842	10667	410509
Q-2 65							
Q-3 65				1498	193073	5152	198225
Q-4 65							
Q-1 66				71	92277	2779	95056

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66							
Q-3 66				392	59432	1790	61222
TOTAL	36323328	36335222	1060028	658827	58801484	485162	59286646

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59	576.0	101470	3.689	374296		374296
Q-4 59						
Q-1 60	625.5	108474	3.643	395211		395211
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	63.0	10648	3.239	34484	39347	73831
Q-2 61						
Q-3 61		80	7.163	573	2847	3420
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	1264.5	220672		804564	42194	846758

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING
SUBD OF WORK 2 PRODUCTION **PROGRAM TECHNICAL SUPPORT**

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61		48	3.396	163	68	231
TOTAL		48		163	68	231

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		112	7.241	811		811
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	6.0	972	3.503	3405		3405
TOTAL	6.0	1084		4216		4216

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
SUBD OF WORK PRODUCTION

PROGRAM TECHNICAL SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 59	576.0	101470	3.689	374296		374296	
Q-4 59							
Q-1 60	625.5	108586	3.647	396022		396022	
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61	69.0	11668	3.261	38052	39415	77467	4780
Q-2 61							
Q-3 61		80	7.163	573	2847	3420	795
Q-4 61							
Q-1 62							
Q-2 62							
Q-3 62							
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63							
TOTAL	1270.5	221804		808943	42262	851205	5575

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
8-70 AIRCRAFT STUDY

4-SYSTEM 2
SUBD OF WORK PRODUCTION

PROGRAM TECHNICAL SUPPORT

	SUBC	TOTAL MATERIAL	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58 Q-4 58	403574	403574	3581	407155		407155
Q-1 59 Q-2 59	3050417	3050417	80884	3131301		3131301
Q-3 59 Q-4 59	24671259	24671259	673913	25719468		25719468
Q-1 60 Q-2 60	18527001	18527001	1099276	20022299	381485	20403784
Q-3 60 Q-4 60	8625848	8625848	511770	9137618	174099	9311717
Q-1 61 Q-2 61	8648685	8653465	248197	8979129	166859	9145988
Q-3 61 Q-4 61	8536107	8536902	244778	8785100	163254	8948354
Q-1 62 Q-2 62	2991441	2991441	95073	3086514	51807	3138321
Q-3 62 Q-4 62	2991433	2991433	94986	3086419	51805	3138224
Q-1 63 Q-2 63	4795488	4795488	203635	4999123	83585	5082708
Q-3 63 Q-4 63	666689	666689	21463	688152	11506	699658
Q-1 64	1946098	1946098	267209	2213307	47095	2260402
TOTAL	85854040	85859615	3544765	90255585	1131495	91387080

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK TOOLING AND STE

	SUBC	TOTAL MATERIAL	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 59 Q-4 59	4035	4035	110	4145		4145
Q-1 60 Q-2 60	4278	4278	253	4531	86	4617
Q-3 60 Q-4 60	3286	3286	194	3480	66	3546
Q-1 61 Q-2 61	1142	1142	32	1174	22	1196
Q-3 61	17	17		17		17
TOTAL	12758	12758	589	13347	174	13521

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
SUBD OF WORK TEST/QC PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60						
Q-2 60						
Q-3 60		1	3.000	3		3
Q-4 60						
Q-1 61	76.5	13034	4.400	57352	44305	101657
Q-2 61						
Q-3 61	5.5	951	3.843	3655	10417	14072
Q-4 61						
Q-1 62	28.5	4949	3.978	19687	21224	40911
Q-2 62						
Q-3 62	16.5	2888	3.604	10409	13638	24047
Q-4 62						
Q-1 63	11.5	1919	4.498	8632	10422	19054
Q-2 63						
Q-3 63	-1.5	-223	3.399	-758	128	-630
Q-4 63						
Q-1 64		1	.999	-1	1	
TOTAL	137.0	23520		98979	100135	199114

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2
SUBD OF WORK TEST/QC

PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	4.5	669	2.709	1812	2588	4400
Q-4 58						
Q-1 59	4.5	886	2.837	2514	3359	5873
Q-2 59						
Q-3 59	6.0	993	2.763	2744	4122	6866
Q-4 59						
Q-1 60	10.5	1759	2.895	5093	12203	17296
Q-2 60						
Q-3 60	6.0	914	2.745	2509	187088	189597
Q-4 60						
Q-1 61	35.0	5998	3.167	18996	99759	118755
Q-2 61						
Q-3 61	2.5	411	3.416	1404	46572	47976
Q-4 61						
Q-1 62		122	2.533	309	443	752
Q-2 62						
Q-3 62	4.5	677	3.065	2075	2685	4760
Q-4 62						
Q-1 63	1.5	176	3.295	580	715	1295
Q-2 63						
Q-3 63	3.0	401	3.426	1374	1581	2955
Q-4 63						
Q-1 64		-2	1.000	-2	-1	-3
TOTAL	78.0	13004		39408	361114	400522

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 2 PROGRAM TECHNICAL SUPPORT
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		28	3.357	94	111	205
Q-2 63						
Q-3 63		25	7.880	197	-111	86
TOTAL		53		291		291

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC
SUBD OF WORK 2 TEST/QC

PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		44	2.659	117		117
Q-4 58						
Q-1 59		24	3.333	80		80
Q-2 59						
Q-3 59		29	2.966	86		86
Q-4 59						
Q-1 60		4	2.750	11		11
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	1.0	135	2.741	370		370
Q-2 61						
Q-3 61		16	2.500	40		40
Q-4 61						
Q-1 62		-3	2.000	-6		-6
Q-2 62						
Q-3 62		28	2.786	78		78
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		9	3.889	35		35
Q-4 63						
Q-1 64		2	1.000	2		2
TOTAL	1.0	288		813		813

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
SUBD OF WORK TEST/QC

PROGRAM TECHNICAL SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58 Q-4 58	4.5	713	2.705	1929	2588	4517	2199
Q-1 59 Q-2 59	4.5	910	2.851	2594	3359	5953	590
Q-3 59 Q-4 59	6.0	1022	2.769	2830	4122	6952	239
Q-1 60 Q-2 60	10.5	1763	2.895	5104	12203	17307	-900
Q-3 60 Q-4 60	6.0	915	2.745	2512	187088	189600	146
Q-1 61 Q-2 61	112.5	19167	4.003	76718	144064	220782	12864
Q-3 61 Q-4 61	8.0	1378	3.700	5099	56989	62088	8835
Q-1 62 Q-2 62	28.5	5068	3.944	19990	21667	41657	20574
Q-3 62 Q-4 62	21.0	3593	3.496	12562	16323	28885	-1191
Q-1 63 Q-2 63	13.0	2123	4.383	9306	11248	20554	6109
Q-3 63 Q-4 63	1.5	212	4.000	848	1598	2446	-281
Q-1 64		1	.999	-1		-1	-8
TOTAL	216.0	36865		139491	461249	600740	49176

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
SUBD OF WORK TEST/QC

PROGRAM TECHNICAL SUPPORT

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 58 Q-4 58	120		6836		6836
Q-1 59 Q-2 59	50		6593		6593
Q-3 59 Q-4 59	20		7211		7211
Q-1 60 Q-2 60	-118		16289	310	16599
Q-3 60 Q-4 60	19		189765	3616	193381
Q-1 61 Q-2 61	1087		234733	4362	239095
Q-3 61 Q-4 61	746	113	71782	1334	73116
Q-1 62 Q-2 62	1621	3	63855	1072	64927
Q-3 62 Q-4 62	-93	19	27620	464	28084
Q-1 63 Q-2 63	601		27264	455	27719
Q-3 63 Q-4 63	27	-22	2170	36	2206
Q-1 64	-1		-10		-10
TOTAL	4079	113	654108	11649	665757

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM DESIGN/ENGINEERING
2 PROGRAM TECHNICAL SUPPORT
ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	457.5	76930	4.509	346867	350029	696896
Q-2 58						
Q-3 58	1049.0	176270	4.280	754512	691272	1445784
Q-4 58						
Q-1 59	1351.5	230678	4.239	977832	812548	1790380
Q-2 59						
Q-3 59	1486.0	261490	4.143	1083470	943378	2026848
Q-4 59						
Q-1 60	1163.5	201636	4.325	872097	761642	1633739
Q-2 60						
Q-3 60	802.5	134885	4.600	620473	488341	1108814
Q-4 60						
Q-1 61	1798.0	306807	4.548	1395308	917952	2313260
Q-2 61						
Q-3 61	945.0	171253	4.893	837975	763591	1601566
Q-4 61						
Q-1 62	701.5	119697	5.146	615937	540236	1156173
Q-2 62						
Q-3 62	681.0	114401	4.987	570526	576042	1146568
Q-4 62						
Q-1 63	671.5	114576	5.459	625434	621624	1247058
Q-2 63						
Q-3 63	811.0	136194	5.725	779690	741162	1520852
Q-4 63						
Q-1 64	724.5	123769	5.611	694431	720094	1414525
Q-2 64						
Q-3 64	360.0	63348	5.918	374917	404470	779387
Q-4 64						
Q-1 65	175.5	30434	6.266	190703	206557	397260
Q-2 65						
Q-3 65	90.0	15139	6.113	92545	99030	191575
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM DESIGN/ENGINEERING
2
PROGRAM TECHNICAL SUPPORT
ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66						
Q-2 66	40.5	6966	5.778	40253	51953	92206
Q-3 66	26.5	4412	6.057	26723	32317	59040
TOTAL	13335.0	2288885		10899693	9722238	20621931

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION 2 PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59	576.0	101470	3.689	374296		374296
Q-4 59						
Q-1 60	625.5	108474	3.643	395211		395211
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	63.0	10648	3.239	34484	39347	73831
Q-2 61						
Q-3 61		80	7.163	573	2847	3420
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	1264.5	220672		804564	42194	846758

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT
2 PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58 Q-2 58	1.5	290	3.631	1053	981	2034
Q-3 58 Q-4 58	3.0	605	2.775	1679	2448	4127
Q-1 59 Q-2 59	6.0	963	2.826	2721	3610	6331
Q-3 59 Q-4 59	11.5	2006	2.863	5744	8263	14007
Q-1 60 Q-2 60	6.0	1069	2.838	3034	10337	13371
Q-3 60 Q-4 60	6.0	914	2.745	2509	187029	189538
Q-1 61 Q-2 61	40.0	6802	3.152	21441	102143	123584
Q-3 61 Q-4 61	2.5	411	3.416	1404	46812	48216
Q-1 62 Q-2 62	19.5	3355	5.771	19362	6627	25989
Q-3 62 Q-4 62	33.0	5516	6.612	36471	7450	43921
Q-1 63 Q-2 63	114.0	19517	4.956	96734	87625	184359
Q-3 63 Q-4 63	48.0	7997	5.290	42306	26909	69215
Q-1 64		-2	1.000	-2	-1	-3
TOTAL	291.0	49443		234456	490233	724689

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING 2 PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61		48	3.396	163	68	231
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63		28	3.357	94	111	205
Q-2 63						
Q-3 63		25	7.880	197	-111	86
TOTAL		101		454	68	522

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 2 PROGRAM TECHNICAL SUPPORT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		44	2.659	117		117
Q-4 58						
Q-1 59		24	3.333	80		80
Q-2 59						
Q-3 59		64	2.891	185		185
Q-4 59						
Q-1 60	1.0	119	7.050	839		839
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	7.5	1199	3.402	4079		4079
Q-2 61						
Q-3 61		17	2.529	43		43
Q-4 61						
Q-1 62		-3	2.000	-6		-6
Q-2 62						
Q-3 62		33	3.455	114		114
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		4	.249	-1		-1
Q-4 63						
Q-1 64		2	1.000	2		2
TOTAL	8.5	1503		5452		5452

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	459.0	77220	4.506	347920	351010	698930	458
Q-2 58							
Q-3 58	1052.0	176919	4.275	756308	693720	1450028	2166
Q-4 58							
Q-1 59	1357.5	231665	4.233	980633	816158	1796791	513
Q-2 59							
Q-3 59	2073.5	365030	4.010	1463695	951641	2415336	2191
Q-4 59							
Q-1 60	1796.0	311298	4.083	1271181	771979	2043160	-2462
Q-2 60							
Q-3 60	808.5	135799	4.588	622982	675370	1298352	-21
Q-4 60							
Q-1 61	1908.5	325504	4.471	1455475	1059510	2514985	20115
Q-2 61							
Q-3 61	947.5	171761	4.890	839995	813250	1653245	11941
Q-4 61							
Q-1 62	721.0	123049	5.163	635293	546863	1182156	20703
Q-2 62							
Q-3 62	714.0	119950	5.061	607111	583492	1190603	-1084
Q-4 62							
Q-1 63	785.5	134121	5.385	722262	709360	1431622	6109
Q-2 63							
Q-3 63	859.0	144220	5.701	822192	767960	1590152	-281
Q-4 63							
Q-1 64	724.5	123769	5.611	694431	720093	1414524	-8
Q-2 64							
Q-3 64	360.0	63348	5.918	374917	404470	779387	642
Q-4 64							
Q-1 65	175.5	30434	6.266	190703	206557	397260	88
Q-2 65							
Q-3 65	90.0	15139	6.113	92545	99030	191575	
Q-4 65							
Q-1 66	40.5	6966	5.778	40253	51953	92206	

C-4

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	26.5	4412	6.057	26723	32317	59040	
TOTAL	14899.0	2560604		11944619	10254733	22199352	61070

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-1 58				458	25	1322	700735
Q-2 58							
Q-3 58			8071474	8073640	71699	17498	9612865
Q-4 58							
Q-1 59			18423796	18424309	488568	124559	20834227
Q-2 59							
Q-3 59			27488794	27490985	751086	65035	30722442
Q-4 59							
Q-1 60			19532086	19529624	1158583	76573	22807940
Q-2 60							
Q-3 60			9918918	9918897	588487	53870	11859606
Q-4 60							
Q-1 61	4780		9655195	9680090	278815	87526	12561416
Q-2 61							
Q-3 61	795		9676444	9689180	278460	46716	11667601
Q-4 61							
Q-1 62			4338564	4359267	139518	19136	5700077
Q-2 62							
Q-3 62			4338555	4337471	137677	69301	5735052
Q-4 62							
Q-1 63			6875798	6881907	292624	56143	8662296
Q-2 63							
Q-3 63			1025743	1025462	33029	13464	2662107
Q-4 63							
Q-1 64			2844759	2844751	390630	21542	4671447
Q-2 64							
Q-3 64				642	234	1826	782089
Q-4 64							
Q-1 65				88	26	2468	399842
Q-2 65							
Q-3 65						1498	193073
Q-4 65							
Q-1 66						71	92277

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-2 66							
Q-3 66						392	59432
TOTAL	5575		122190126	122256771	4609461	658940	149724524

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	G & A	TOTAL COST
Q-1 58		700735
Q-2 58		
Q-3 58		9612865
Q-4 58		
Q-1 59		20834227
Q-2 59		
Q-3 59		30722442
Q-4 59		
Q-1 60	434560	23242500
Q-2 60		
Q-3 60	225961	12085567
Q-4 60		
Q-1 61	233430	12794846
Q-2 61		
Q-3 61	216820	11884421
Q-4 61		
Q-1 62	95676	5795753
Q-2 62		
Q-3 62	96262	5831314
Q-4 62		
Q-1 63	144832	8807128
Q-2 63		
Q-3 63	44510	2706617
Q-4 63		
Q-1 64	99399	4770846
Q-2 64		
Q-3 64	16642	798731
Q-4 64		
Q-1 65	10667	410509
Q-2 65		
Q-3 65	5152	198225
Q-4 65		
Q-1 66	2779	95056

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
PROGRAM TECHNICAL SUPPORT

	G & A	TOTAL COST
Q-2 66		
Q-3 66	1790	61222
TOTAL	1628480	151353004

COST DEFINITION WBS 2.20

DESIGN SUPPORT

This WBS item is utilized to display, as information only, a matrix of the engineering groups and disciplines which normally support the development and design of the complete aircraft rather than an individual subsystem. No costs are contained in this item as the North American cost accounting system provides the ability to assign these groups to a vehicle subsystem. The assignment of the design support groups to the subsystems utilizing the cost accounting system detail was a joint discussion made by NR and NASA at the conclusion of Phase I of this study.

To provide the analysts with the ability to isolate and remove, if desired, one or all of these design support groups from the subsystems, the following matrix was developed. Each group associated with this WBS item has been identified and a recap of the hours charged to individual subsystems has been prepared. No cost data has been assigned to this item. The hours data is presented as information only.

WBS 2.20 DESIGN SUPPORT-ENGINEERING GROUP MATRIX

WBS CODE	GROUP	GROUP TITLE	WBS 1.0	WBS 1.1	WBS 1.2	WBS 1.3	WBS 1.4	WBS 1.5	WBS 1.6	WBS 1.7	WBS 1.9	SUBSYSTEM TOTAL
2.20.1	51	Structural Dynamics	421171									421171
2.20.2	73	Structural Loads		306050								306050
2.20.3	10	Structural Analysis		1019126		5662			8204			1032992
2.20.4	11	Weight Control	259843	32796		7559				1925		302123
2.20.5	33	Advanced Structures		256050								256050
	34	Structural Projects		242904	6515				35779	2132		287330
2.20.6	30	Numerical Design		215538		5816						221354
2.20.7	50	Metallurgy		22872	86029	86717						195618
	54	Material & Process		409495		19053	39063					467611
2.20.8	75	Non-Metallics		131066			24500		11816		3068	170450
2.20.9	13	Aerodynamics	28863	62385								91248
	131	Aero Special Projects	5078	70307		6658						82043
	133	Aerodynamics	27248	98876		64407						190531
2.20.10	13	Aerodynamics	28863	62385								91248
	133	Aerodynamics	27248	98877		64407						190532
2.20.11	130	Flight Sciences				13344						13344
2.20.12	132	Thermodynamics	17873	32130	221086			36131				307220
2.20.13	55	Flt Controls Analysis		3608				23448	231404			258460
2.20.14	64	Design Support	149724	2035					7576	1579		160914
2.20.15	57	Engineering Specs	40819	23228	18350	32202	58434		34440	11611	17726	236810
2.20.16	12	Checking		146505	11297	12431	12895		16410	8084		207622
	53	Design Productibility		241403		8582	33252					283237
2.20.17	150	Life Sciences								13406		13406
		WBS 2.20 TOTAL	1006730	3477636	343277	326838	168144	59579	345629	38737	20794	5787364

COST DEFINITION WBS 2.21

OTHER R&D TESTING

This WBS item is utilized to display, as information only, a matrix of the engineering lab groups, which normally support the development and design of the complete aircraft rather than an individual subsystem. No costs are contained in this item as the North American cost accounting system provides the ability to assign these groups to a vehicle subsystem. The assignment of the design support groups to the subsystems utilizing the cost accounting system detail was a joint decision made by NR and NASA at the conclusion of Phase I of this study.

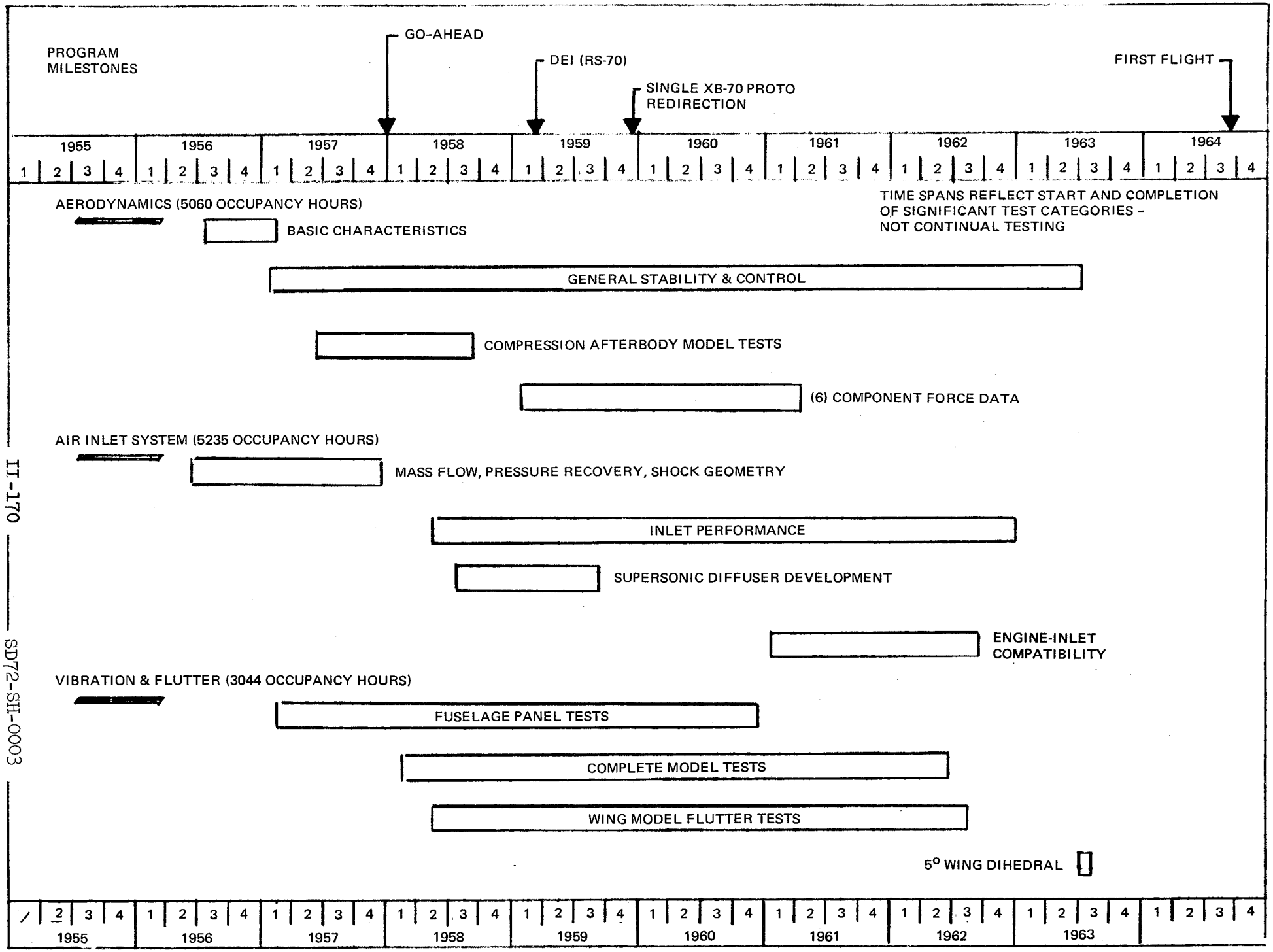
To provide the analysts with the ability to isolate and remove, if desired, one or all of these design support groups from the subsystem, the following matrix was developed. Each group associated with this WBS item has been identified and a recap of the hours charged to individual subsystems has been prepared. No cost data has been assigned to this item. The hours data is presented as information only.

WBS 2.21 OTHER R&D TESTING-ENGINEERING GROUP MATRIX

WBS CODE	GROUP	GROUP TITLE	WBS 1.0	WBS 1.1	WBS 1.2	WBS 1.3	WBS 1.4	WBS 1.5	WBS 1.6	WBS 1.7	WBS 1.9	SUBSYSTEM TOTAL
2.21.1.1	67	Structural Test Lab		387804			4854			4118		396776
2.21.1.2	92	Thermodynamics			30465	22691						53156
	146	Thermodynamics	5582		18587	19595				5657		49421
2.21.1.3	66	Metallic Materials Lab		336180		17776	17704					371660
2.21.1.4	97	Laboratory Services	36764	126386	8977	34023	57963		39404	6334	5078	314929
2.21.1.6	96	Wind Tunnel Projects		138560				24696				163256
	134	Wind Tunnel Projects		75897				24499				100396
2.21.1.7	109	Hydraulic Lab	10296	40465		78321	167950		60007			357039
2.21.1.8	110	Electrical Power Lab	95149	5532	7980		36026			14310	38493	197490
2.21.1.9	94	Flight Simulation	7291	71659		32172	4803		178540	3810		298275
		SUB-TOTAL	155082	1182483	66009	204578	289300	49195	277951	34229	43571	2302398
2.21.2	14	Wind Tunnel Models	246723	125534				261674				633931
		TOTAL	401805	1308017	66009	204578	289300	310869	277951	34229	43571	2936329

WIND TUNNEL TESTS

WBS 2.21.1.6

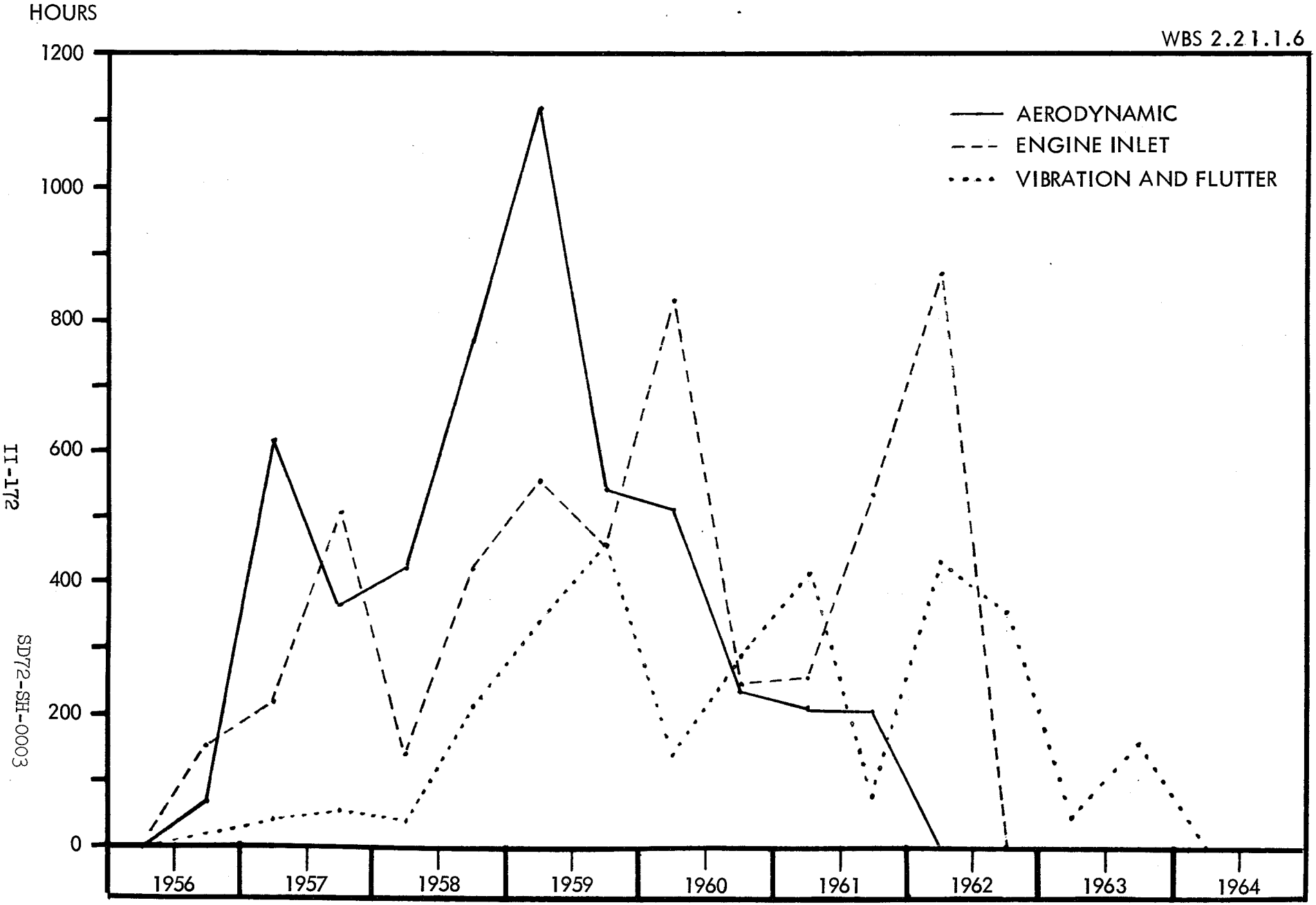


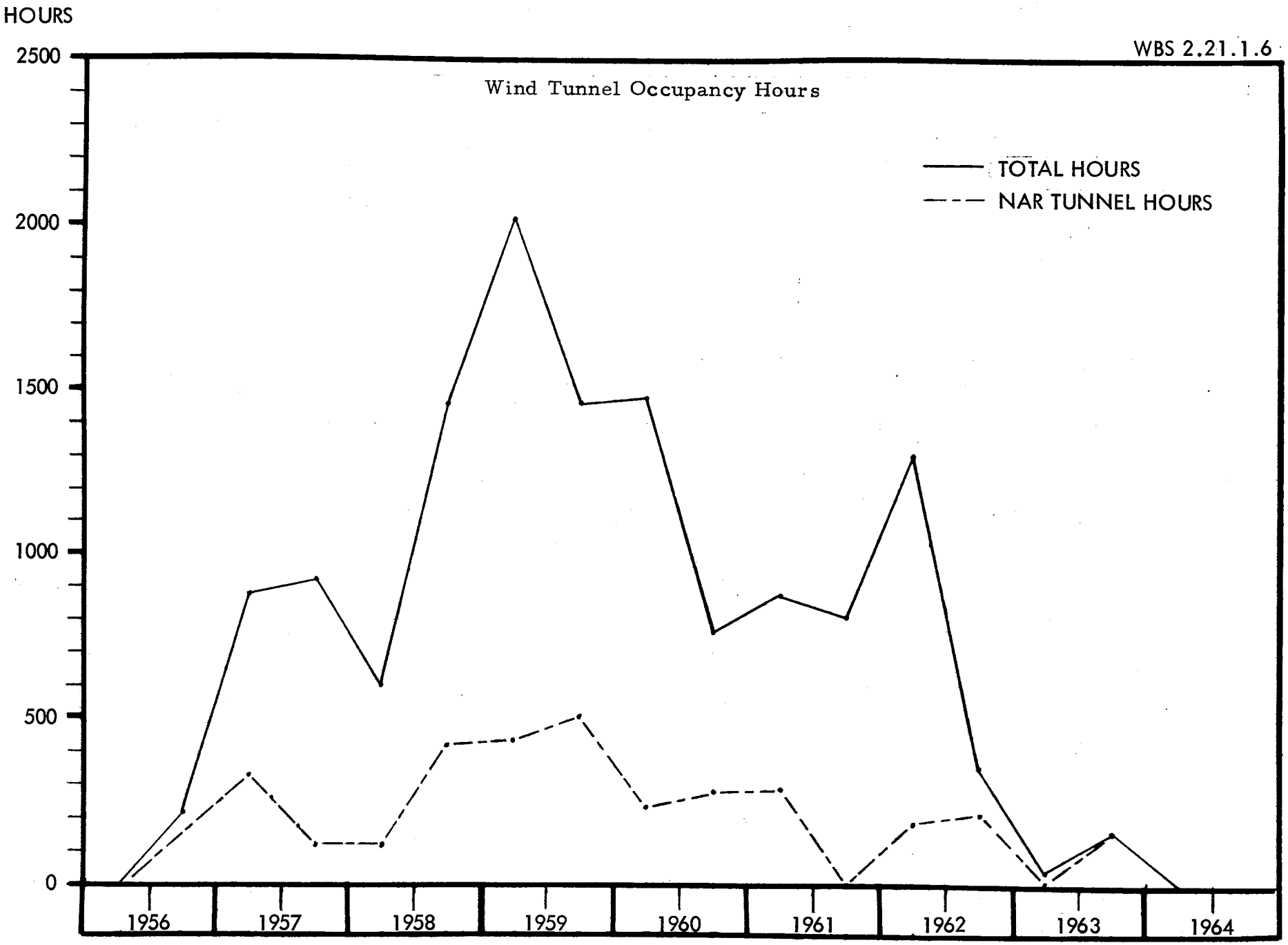
WIND TUNNEL MODEL SUMMARY

WBS 2.21.1.6

AERODYNAMIC TESTS		AIR INLET TESTS		VIBRATION & FLUTTER TESTS	
MODEL	SCALE	MODEL	SCALE	MODEL	SCALE
SMALL AERO FORCE	.008	PRELIM INLET DUCT RESEARCH	.04	FLOATING PANEL	NONE
SMALL AERO FORCE (-154 LINES)	.008	PRELIM INLET DUCT RESEARCH	.05	FLUTTER	.06
BLUFF STORE	.035	INFINITELY VARIABLE DUCT	NONE	CENTER LINE VERTICAL	.10
BLUFF STORE	.06	BASE PRESSURE	.04	COMPLETE MODEL	.03
BLUFF STORE	.008	BASE PRESSURE	.045	COMPLETE MODEL	.04
BLC TEST SPECIMEN	NONE	POROUS MATERIAL RESEARCH	NONE	COMPLETE MODEL	.06
COMPRESSION AFTERBODY	NONE	SUPERSONIC DIFFUSER	.04	VERTICAL STABILIZER	.06
PRELIMINARY TRISONIC FORCE	.03	INLET CONTROL	.10	FLUTTER WING	.04
WING & WEDGE	NONE	INLET CONTROL	.25	FLUTTER WING	.10
FORCE MODEL I	.03	INLET CONTROL (HSD)	.04	VERTICAL TAIL	.15
FORCE MODEL II	.03	INLET-ENGINE CONTROL	.577	CANARD	.13
FORCE MODEL III	.03	INLET FORCE	.04	CANARD	.20
FORCE MODEL III	.008	INLET DUCT - I	.05	SUSPENSION SYSTEM	.06
FORCE MODEL IV	.03	INLET DUCT - III	.05	q REDUCER	FULL
FORCE MODEL IV	.008	INLET DUCT - IIIR	.05	COMPLETE TRAN	.04
FORCE MODEL V	.03			FUSELAGE FLUTTER PANELS	.89
CANOPY DRAG	.06			FUSELAGE FLUTTER PANELS	FULL
CANOPY DRAG	.0618			FORCE MODEL - IV	.04
ENCAPSULATED SEAT	.08			INLET FLUTTER RAMPS	.10
ENCAPSULATED SEAT	.025				
2 DIMENSIONAL WING	NONE				
SURFACE ROUGHNESS	NONE				
WING PRESSURE	.024				
PRESSURE PROBE	1.00				

Wind Tunnel Occupancy Hours




HOURS
WBS 2.21.1.6
Wind Tunnel Occupancy Hours
TOTAL HOURS
NAR TUNNEL HOURS
2500
2000
1500
1000
500
0
1956
1957
1958
1959
1960
1961
1962
1963
1964

COST DEFINITION WBS 2.22

PROGRAM MANAGEMENT

Cost data assigned to this WBS item include the activities associated with the following functions:

a) control of program costs and technical accomplishments
b) phasing
c) operational, maintenance and functional configuration analysis
d) labor costs of personnel supporting engineering representation at associate contractors and subcontractors
e) final preparation of reports and data for presentation to the customer
f) program planning
g) data control

The engineering groups providing support to these tasks are:

Group No.	Engineering Group Title	Hours Expended
2	Propulsion Design and Development	2,389
11	Weight Control	17,174
13	Aerodynamics	3,285
15	Data Control	17,204
19	Propulsion System Development	4,831
20	Operation Planning	44,726
27	Proposal and Procurement Planning	11,985
28	Field Service Publications	4,680
42	AGE Electrical Equipment	4,251
45	Design Illustrations	245,292
46	Mechanical and Propulsion Adm.	5,225
55	Flight Control Analysis	3,802
57	Engineering Specifications	75,671
59	X-Ray Photo Template Lab	17,561
61	Operations Administration	59,140
64	Design Support	2,792
65	Photo-Instrumentation	24,314
69	B-70 Planning	9,042
71	Support Equipment AGE	8,175
72	Engineering Computing	34,351
76	Flight Test Project Engineering	19,579
77	Reliability and Maintainability	17,097
79	Packaging	10,113
80	Flight Operations	16,494
84	Weapon System Analysis	57,459
90	Electronic System Administration	7,811
94	Flight Simulation	21,060
98	Field Service Publications	3,745
103	Flight Test Engineering Adm.	16,778
107	Flight Test Maintenance Support	12,605
116	Advanced Aerospace Systems	7,429
117	Preliminary Analysis	4,169
119	Preliminary Design	13,429

Group No.	Engineering Group Title	Hours Expended
120	R&D Programming	8,574
121	Advanced Projects	15,839
123	Preliminary Design	4,150
125	Electrical System Equipment	7,233
127	B-70 Project Group	276,757
128	Operations Research	39,784
129	Operations and Military Systems Analysis	58,555
169	B-70 Project Planning	18,736
Various		37,205
	Total Engineering Hours	1,270,491

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 22
PROGRAM MANAGEMENT

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		1270491		1270491
LABOR AT $ 4.893		6216096		6216096
ENGR BURDEN AT $ 4.112		5223627		5223627
SHOP SUPPORT		16626		16626
LABOR AT $ 6.394		106311		106311
MFG BURDEN AT $ 1.441		23954		23954
ENGR MATERIAL		3911		3911
MPC		476		476
OTHER COST		367673		367673
SUB-TOTAL		11942048		11942048
GEN & ADMIN		168238		168238
TOTAL COST		12110286		12110286

TIME-PHASED COST
DETAIL - SEE PAGE II-177

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 22 PROGRAM MANAGEMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	157.5	26391	4.406	116273	120078	236351
Q-2 58						
Q-3 58	465.0	78079	4.320	337295	304342	641637
Q-4 58						
Q-1 59	790.5	134993	4.336	585301	478868	1064169
Q-2 59						
Q-3 59	691.5	121694	4.285	521503	430500	952003
Q-4 59						
Q-1 60	717.0	124172	4.362	541599	465137	1006736
Q-2 60						
Q-3 60	610.5	102575	4.533	464979	366251	831230
Q-4 60						
Q-1 61	886.5	151182	4.602	695800	354864	1050664
Q-2 61						
Q-3 61	705.0	127904	4.895	626110	517854	1143964
Q-4 61						
Q-1 62	409.5	69838	5.153	359847	313609	673456
Q-2 62						
Q-3 62	396.0	66569	5.163	343663	335604	679267
Q-4 62						
Q-1 63	379.5	64663	5.696	368338	351325	719663
Q-2 63						
Q-3 63	418.5	70243	6.241	438378	358111	796489
Q-4 63						
Q-1 64	357.0	60845	6.010	365666	365952	731618
Q-2 64						
Q-3 64	270.0	47435	6.129	290740	298583	589323
Q-4 64						
Q-1 65	102.0	17734	6.720	119172	121848	241020
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 22 PROGRAM MANAGEMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	34.5	5852	6.602	38635	38579	77214
Q-4 65						
Q-1 66	1.5	322	8.686	2797	2122	4919
TOTAL	7392.0	1270491		6216096	5223627	11439723

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2
5-SUBSYSTEM 22 PROGRAM MANAGEMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	144	4.701	677	497	1174
Q-2 58						
Q-3 58	-1.5	-144	4.701	-677	-453	-1130
Q-4 58						
Q-1 59		24	2.500	60	66	126
Q-2 59						
Q-3 59		-22	.227	-5	-19	-24
Q-4 59						
Q-1 60		-14	7.857	-110	-33	-143
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62	18.0	3189	5.934	18922	5984	24906
Q-2 62						
Q-3 62	28.5	4880	7.074	34519	4933	39452
Q-4 62						
Q-1 63	27.0	4713	5.989	28227	7481	35708
Q-2 63						
Q-3 63	22.5	3856	6.405	24698	5498	30196
TOTAL	96.0	16626		106311	23954	130265

C-3.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 22 **PROGRAM MANAGEMENT**
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	159.0	26535	4.407	116950	120575	237525	
Q-2 58							
Q-3 58	463.5	77935	4.319	336618	303889	640507	
Q-4 58							
Q-1 59	790.5	135017	4.335	585361	478934	1064295	
Q-2 59							
Q-3 59	691.5	121672	4.286	521498	430481	951979	878
Q-4 59							
Q-1 60	717.0	124158	4.361	541489	465104	1006593	-908
Q-2 60							
Q-3 60	610.5	102575	4.533	464979	366251	831230	-205
Q-4 60							
Q-1 61	886.5	151182	4.602	695800	354864	1050664	151
Q-2 61							
Q-3 61	705.0	127904	4.895	626110	517854	1143964	3151
Q-4 61							
Q-1 62	427.5	73027	5.187	378769	319593	698362	
Q-2 62							
Q-3 62	424.5	71449	5.293	378182	340537	718719	114
Q-4 62							
Q-1 63	406.5	69376	5.716	396565	358806	755371	
Q-2 63							
Q-3 63	441.0	74099	6.249	463076	363609	826685	
Q-4 63							
Q-1 64	357.0	60845	6.010	365666	365952	731618	
Q-2 64							
Q-3 64	270.0	47435	6.129	290740	298583	589323	643
Q-4 64							
Q-1 65	102.0	17734	6.720	119172	121848	241020	87
Q-2 65							
Q-3 65	34.5	5852	6.602	38635	38579	77214	
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 22 **PROGRAM MANAGEMENT**
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	1.5	322	8.686	2797	2122	4919	
TOTAL	7488.0	1287117		6322407	5247581	11569988	3911

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 PROGRAM MANAGEMENT
5-SUBSYSTEM 22
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58		1275	238800		238800
Q-2 58					
Q-3 58		11637	652144		652144
Q-4 58					
Q-1 59		23752	1088047		1088047
Q-2 59					
Q-3 59	74	35817	988748		988748
Q-4 59					
Q-1 60	-119	62913	1068479	20358	1088837
Q-2 60					
Q-3 60	-27	42649	873647	16646	890293
Q-4 60					
Q-1 61	13	56612	1107440	20580	1128020
Q-2 61					
Q-3 61	266	31793	1179174	21913	1201087
Q-4 61					
Q-1 62		29894	728256	12224	740480
Q-2 62					
Q-3 62	9	36074	754916	12671	767587
Q-4 62					
Q-1 63		22874	778245	13012	791257
Q-2 63					
Q-3 63		7784	834469	13952	848421
Q-4 63					
Q-1 64		726	732344	15582	747926
Q-2 64					
Q-3 64	234	727	590927	12574	603501
Q-4 64					
Q-1 65	26	2202	243335	6492	249827
Q-2 65					
Q-3 65		881	78095	2084	80179
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 22 PROGRAM MANAGEMENT
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66		63	4982	150	5132
TOTAL	476	367673	11942048	168238	12110286

COST DEFINITION

LOGISTICS SUPPORT

WBS CODE: 2.23

Total costs of $2,717,771 contained in this WBS item reflect all identifiable in-house costs incurred in providing field service, performing maintenance analysis, producting maintenance schedules and conducting packaging studies. Included are such tasks as:

a) Design and development of a maintenance concept

b) Support operation analysis

c) Development of a product performance reporting system

d) Analysis of product performance data collected from test operations.

e) Analysis, determination and delineation of individual tasks, expressed in terms of methods, equipment, facilities and personnel required to sustain the end product.

Detail of the recorded costs associated with this WBS item is provided by Element of Cost (EOC) and Subdivision of Work (SDW). Section III of Volume I provides a detail definition of these items.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 23
LOGISTICS SUPPORT

			DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			257696	257696
LABOR AT $	4.554		1173517	1173517
ENGR BURDEN AT $	5.055		1302642	1302642
SHOP SUPPORT			18407	18407
LABOR AT $	4.577		84244	84244
MFG BURDEN AT $	5.399		99385	99385
ENGR MATERIAL			6808	6808
MPC			578	578
OTHER COST			3274	3274
SUB-TOTAL			2670448	2670448
GEN & ADMIN			47323	47323
TOTAL COST			2717771	2717771

TIME-PHASED COST
DETAIL - SEE PAGE II-186

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2 LOGISTICS SUPPORT
5-SUBSYSTEM 23
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	271	4.236	1148	1235	2383
Q-2 58						
Q-3 58	4.5	688	3.865	2659	2637	5296
Q-4 58						
Q-1 59	57.0	9837	3.507	34497	37191	71688
Q-2 59						
Q-3 59	172.5	30452	3.958	120539	120123	240662
Q-4 59						
Q-1 60	84.0	14619	4.083	59695	63441	123136
Q-2 60						
Q-3 60	46.5	7883	4.619	36411	32625	69036
Q-4 60						
Q-1 61	384.0	65507	4.195	274812	260807	535619
Q-2 61						
Q-3 61	72.0	12951	4.636	60043	86406	146449
Q-4 61						
Q-1 62	60.0	10181	4.846	49336	45911	95247
Q-2 62						
Q-3 62	61.5	10208	4.710	48080	51260	99340
Q-4 62						
Q-1 63	66.0	11377	4.169	47431	61776	109207
Q-2 63						
Q-3 63	112.5	18998	4.877	92650	110720	203370
Q-4 63						
Q-1 64	118.5	20249	4.862	98457	122510	220967
Q-2 64						
Q-3 64	66.0	11659	5.089	59332	80191	139523
Q-4 64						
Q-1 65	72.0	12541	5.637	70696	83659	154355
Q-2 65						

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 23 LOGISTICS SUPPORT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	55.5	9224	5.808	53576	60032	113608
Q-4 65						
Q-1 66	39.0	6639	5.638	37432	49801	87233
Q-2 66						
Q-3 66	26.5	4412	6.057	26723	32317	59040
TOTAL	1499.5	257696		1173517	1302642	2476159

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2 LOGISTICS SUPPORT
5-SUBSYSTEM 23
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		40	2.150	86	111	197
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63	85.5	14628	4.644	67927	79429	147356
Q-2 63						
Q-3 63	22.5	3739	4.341	16231	19845	36076
TOTAL	108.0	18407		84244	99385	183629

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 23
LOGISTICS SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	1.5	271	4.236	1148	1235	2383	
Q-2 58							
Q-3 58	4.5	688	3.865	2659	2637	5296	
Q-4 58							
Q-1 59	57.0	9837	3.507	34497	37191	71688	
Q-2 59							
Q-3 59	172.5	30492	3.956	120625	120234	240859	285
Q-4 59							
Q-1 60	84.0	14619	4.083	59695	63441	123136	
Q-2 60							
Q-3 60	46.5	7883	4.619	36411	32625	69036	
Q-4 60							
Q-1 61	384.0	65507	4.195	274812	260807	535619	6540
Q-2 61							
Q-3 61	72.0	12951	4.636	60043	86406	146449	-17
Q-4 61							
Q-1 62	60.0	10181	4.846	49336	45911	95247	
Q-2 62							
Q-3 62	61.5	10208	4.710	48080	51260	99340	
Q-4 62							
Q-1 63	151.5	26005	4.436	115358	141205	256563	
Q-2 63							
Q-3 63	135.0	22737	4.789	108881	130565	239446	
Q-4 63							
Q-1 64	118.5	20249	4.862	98457	122510	220967	
Q-2 64							
Q-3 64	66.0	11659	5.089	59332	80191	139523	
Q-4 64							
Q-1 65	72.0	12541	5.637	70696	83659	154355	
Q-2 65							
Q-3 65	55.5	9224	5.808	53576	60032	113608	
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 23
LOGISTICS SUPPORT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	39.0	6639	5.638	37432	49801	87233	
Q-2 66							
Q-3 66	26.5	4412	6.057	26723	32317	59040	
TOTAL	1607.5	276103		1257761	1402027	2659788	6808

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 23
LOGISTICS SUPPORT

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			2383		2383
Q-2 58					
Q-3 58			5296		5296
Q-4 58					
Q-1 59			71688		71688
Q-2 59					
Q-3 59	24		241168		241168
Q-4 59					
Q-1 60		2085	125221	2386	127607
Q-2 60					
Q-3 60			69036	1315	70351
Q-4 60					
Q-1 61	553	19	542731	10086	552817
Q-2 61					
Q-3 61	1		146433	2721	149154
Q-4 61					
Q-1 62			95247	1599	96846
Q-2 62					
Q-3 62			99340	1667	101007
Q-4 62					
Q-1 63			256563	4290	260853
Q-2 63					
Q-3 63		267	239713	4008	243721
Q-4 63					
Q-1 64			220967	4702	225669
Q-2 64					
Q-3 64			139523	2969	142492
Q-4 64					
Q-1 65			154355	4118	158473
Q-2 65					
Q-3 65		511	114119	3045	117164
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 23
LOGISTICS SUPPORT

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66			87233	2627	89860
Q-2 66					
Q-3 66		392	59432	1790	61222
TOTAL	578	3274	2670448	47323	2717771

COST DEFINITION

WEAPON SYSTEM

WBS CODE: 2.24

Recorded cost of $136,524,947 includes all identifiable costs incurred against the offensive and defensive weapon system. The weapon system excludes the Airborne Cooperational and the Ground Cooperational system. The original RS-70 program included both an offensive and a defensive system, however, when the program was redirected in late 1959, the requirement for the weapon system was deleted. With the addition of AV No. 3 to the B-70 program, the weapon system was reinstated.

A summary of the subcontractor recorded cost data is presented on page II-195 The vast majority of the costs accumulated in this WBS item are associated with IBM's development activities on the Bomb/Navigation System. A thorough discussion of the contractual arrangements, program redirections, delivery dates and other pertinent supplier data is provided. Cost data includes the supplier expenditures for engineering production, tooling and testing (where identified) performed at the supplier's facility. Refer to the Subcontracting Element of Cost definition (Volume I, page I-26) for additional explanation.

As an aid in the definition and evaluation of the in-house engineering costs associated with the weapon system, a matrix of engineering hours has been developed. This matrix recaps the hours charged by the engineering groups in support of the weapon system development. The matrix is as follows:

Group	Title	Hours Expended
3	Electrical and Avionics Installation	2,067
11	Weight Control	3,622
13	Aerodynamics	2,577
14	Wind Tunnel Models	1,678
32	Armament	14,163
35	Fuselage	2,437
45	Design Illustrations	3,875
48	Communication and Indicating System	35,654
49	Avionics Integration and Control	157,789
50	Metallurgy	5,696
55	Flight Controls Analysis	3,765
57	Engineering Specifications	17,678
61	Operations Administration	3,728
63	Flight Test Maintenance	8,768
72	Engineering Computing	2,955
75	Non-Metallics	6,587
76	Flight Test Project Engineering	8,877

WBS CODE: 2.24

Group	Title	Hours Expended
77	Reliability and Maintainability	5,183
84	Weapon System Analysis	182,913
85	Communication and Indicating System	72,750
86	Electronic Integration	20,157
94	Flight Simulation	9,397
95	Electrical System Design	13,104
96	Wind Tunnel Projects	10,015
97	Laboratory Services	8,645
110	Electrical Power Lab	35,802
119	Preliminary Design	61,611
120	R&D Programming	13,819
125	Electrical System Equipment	6,992
127	B-70 Project Group	31,831
	Various	6,563
	Total Engineering Hours	760,698

2.24	Engineering SDW	737,178
2.24	Test/QC SDW	23,520
	Total Hours	760,698

SUBCONTRACTOR MATRIX

Subsystem: Weapon Subsystem WBS Code: 2.24.1

SUBCONTRACTOR	ENGINEERING	PROD	TOOLING	TEST	TOTAL
IBM	33,252,681	81,183,752	-	-	114,436,433
Beech	1,661,291	862,245	12,758	-	2,536,294
Westinghouse	946,753	2,710,735	-	-	3,657,488
Others	462,603	1,097,308	-	-	1,559,911
TOTAL	36,323,328	85,854,040	12,758	-	122,190,126

IBM was selected to produce the AN/ASQ028(V) Bombing Navigation and Missile Guidance Subsystem for the B-70 Weapon System.

The two letter contracts awarded to IBM for this effort, along with their award and completion dates are as follows:

L861-GX-600013	May 1, 1958 - December 2, 1959
L1E1-YJ-600221	October 15, 1960 - March 6, 1964

The Statement of Work for the two contracts required IBM to provide engineering, management, fabrication and other necessary services leading to the design, development and support of the AN/ASQ-28(V) Bombing Navigation and Missile Guidance Subsystem for the B-70. In addition, Letter Contract 600221 called for IBM to deliver one prototype model and nine flight test models. On April 3, 1961, all but the prototype model were cancelled.

Work on the Bombing Navigation and Missile Subsystem was initiated by the Air Force under Prime Contract AF33(600)-31315 to IBM. When NR was selected as the B-70 Weapon System prime contractor, the IBM prime contract was terminated and replaced by NR Purchase Order L861-GX-600013.

The AN/ASQ(V) Bombing Navigation and Missile Guidance Subsystem required the highest degree of engineering technology to develop, fabricate, and test the highly accurate system. It represented over five years of navigation utilizing digital computation with stellar-monitored, Doppler-damped inertial guidance. This, combined with high resolution, side-looking and squint capabilities as provided through the Doppler data processor, made up the most effective bombing navigation, missile guidance system ever developed for the Air Force.

On December 2, 1959, Contract 600013 was terminated for the convenience of the Government. At termination, IBM had basically completed the experimental model Bombing Navigation and Missile Guidance Subsystem program. Complete design release for fabrication was scheduled to be complete in May 1960. At the time of termination the program was well into the hardware stage as evidenced by the vast amount of inventory that had been acquired and which had to be inventoried and placed in warehouse storage for disposition. At termination, Contract 600013 was approximately 89% completed.

WBS CODE: 2.24.1

On March 3, 1960 NR directed IBM to suspend all activity relative to screening of excess B-70 inventory and the Air Force issued Prime Contract AF33(600)-41253 to IBM to continue a portion of the BNMGS Program, known as the C-121 Program.

When the B-70 program was initiated in October 1960, IBM's prime contract was again terminated and NR issued Letter Contract 600221 to IBM to continue the C-121 prototype program concurrently with design, development and delivery of 12 flight test models. On April 3, 1961, effort on the flight test models was terminated but effort was continued on the prototype BNMGS, which was to be used on Air Vehicle 3. On March 6, 1964 the program was completely terminated for the convenience of the Government. IBM and its subcontractors disposed of all residual inventory in accordance with direction from the Air Force. Approximately 30,000 line items of inventory had been counted and categorized as defined by ASPR; part number, description, quantity, condition code, unit measure and cost determined and listed on worksheets. These worksheets were then verified by IBM Property Administration and Quality Control. The inventory was moved to warehouse staging area, worksheets verified against physical property and location annotated. The proceeds obtained from the disposition of the property was credited to Purchase Order 600221.

BEECH was selected to produce the Alert Pod Subsystem for the B-70 in accordance with Specification NA5-3093.

The two letter contracts awarded to Beech for this effort, along with their award and completion dates are as follows:

L961-GX-600124	April 6, 1959 - December 3, 1959
L001-YZ-600227	November 11, 1960 - March 31, 1961

The Statement of Work called for the subcontractor to perform engineering, management, and manufacturing services, including but not limited to, analytical and design studies directed toward the design, development, testing and mockup of the Alert Pod Subsystem.

Beech was in the early stages of design and development on Contract 600124 and had completed 9.7% of the effort, when it was terminated on December 3, 1961.

Letter Contract 600227 was awarded to Beech on November 11, 1960 as a continuation of the effort initiated by Purchase Order 600124. Beech was again in the early stages of design and development when the contract was terminated on March 31, 1961 for the convenience of the Government, having completed 4.5% of the effort.

WESTINGHOUSE was selected to provide the Defensive Subsystem Group for the B-70 Air Vehicles. Two Letter Contracts were awarded to Westinghouse for this effort:

L961-GX-600127	June 3, 1959 - December 2, 1959
L1E1-YZ-600320	October 29, 1960 - March 31, 1961

The Statement of Work for the two contracts called for the subcontractor to furnish analytical, design, test, and other necessary studies and programs as

required by NR's governing specification, leading to the definition and optimization of the Defensive Subsystem Group.

Westinghouse was in the early stages of design and development when Contract 600127 was terminated on December 2, 1959, for the convenience of the Government.

Letter Contract 600320 was awarded to Westinghouse on October 29, 1960 as a continuation of the effort initiated by Purchase Order 600127. Under the terms of the new purchase order all terminated inventory generated against Letter Contract 600127 and not disposed of previously was to be reviewed for usability and transferred to Contract 600320 at no cost. In addition, the subcontractor was required to conduct a complete investigation and evaluation of the AN/ALQ-27 Defensive Subsystem Program which was being developed under an Air Force Prime Contract placed with Sperry Gyroscope Company. The study objectives were:

1. AN/ALQ-27 program areas which were applicable to a YB-70 Defensive Subsystem.

2. AN/ALQ-27 program areas which were not applicable to a YB-70 Defensive Subsystem and reasons.

3. Specific recommendations for modification or expansion of the AN/ALQ-27 Flight Test Program which were necessary to orient or to assist in the design of a YB-70 Defensive Subsystem.

4. Technical assistance and study effort as may be necessary to define a YB-70 Defensive Subsystem.

The AN/ALQ-27 study effort was completed on January 16, 1961 and the design and development effort called for under Contract 600320 was in the early stages of design on March 31, 1961, the date the contract was terminated.

Three companies submitted proposals in competition for the B-70 Defensive Subsystem. Westinghouse Air Arm Division, Baltimore, Maryland, was selected as Defensive Subsystem subcontractor in April of 1959, primarily on the basis of their advanced engineering concept. This concept was considered a prime factor, since utilization of the Defensive Subsystem for the B-70 required a combination of techniques beyond the capability of any single company. It was North American Rockwell's and Westinghouse's intention to utilize the countermeasures industry to the fullest extent on this program.

The various tier subcontractors were to be selected from those industry members whose technical capability was proven. To implement this approach, a detailed technical development survey was completed on November 1959. This was to aid in the selection of lower tier contractors in December 1959. However, prior to this the Defensive Subsystem contract with Westinghouse was terminated. All inventory and tooling related to the above contracts were disposed of in accordance with Air Force direction and the cost credited to the appropriate contract.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

			DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOOLING AND STE HOURS DOLLARS	TEST /QC HOURS DOLLARS
DESIGN/ENGINEERING			737178			23520
LABOR AT $	4.614		3411101			98979
ENGR BURDEN AT $	4.201		3095834			100135
PRODUCTION				220672		
LABOR AT $	3.646			804564		
SHOP SUPPORT			1406			13004
LABOR AT $	3.047		4493			39408
PLANNING				48		53
LABOR AT $	4.495			163		291
TEST/QC			131	1084		288
LABOR AT $	3.627		423	4216		813
MFG BURDEN AT $		1.729	5780	42262		361114
ENGR MATERIAL			1175			49176
MFG MATERIAL				5575		
SUBCONTRACT			36323328	85854040	12758	
MPC			1058974	3544765	589	4079
OTHER COST			287880			113
SUB-TOTAL			44188988	90255585	13347	654108
GEN & ADMIN			269601	1131495	174	11649
TOTAL COST			44458589	91387080	13521	665757

TIME-PHASED COST DETAIL - SEE PAGE II-200 II-208 II-213 II-214

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

			TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			760698
LABOR	AT $ 4.614		3510080
ENGR BURDEN	AT $ 4.201		3195969
PRODUCTION			220672
LABOR	AT $ 3.646		804564
SHOP SUPPORT			14410
LABOR	AT $ 3.047		43901
PLANNING			101
LABOR	AT $ 4.495		454
TEST/QC			1503
LABOR	AT $ 3.627		5452
MFG BURDEN	AT $ 1.729		409156
ENGR MATERIAL			50351
MFG MATERIAL			5575
SUBCONTRACT			122190126
MPC			4608407
OTHER COST			287993
SUB-TOTAL			135112028
GEN & ADMIN			1412919
TOTAL COST			136524947

TIME-PHASED COST
DETAIL - SEE PAGE II-220

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	299.0	50268	4.564	229446	228716	458162
Q-2 58						
Q-3 58	580.5	97503	4.252	414558	384293	798851
Q-4 58						
Q-1 59	502.5	85848	4.171	358034	296489	654523
Q-2 59						
Q-3 59	621.0	109344	4.037	441428	392755	834183
Q-4 59						
Q-1 60	363.0	62845	4.309	270803	233064	503867
Q-2 60						
Q-3 60	145.5	24426	4.875	119080	89465	208545
Q-4 60						
Q-1 61	451.5	77084	4.766	367344	257976	625320
Q-2 61						
Q-3 61	162.0	29447	5.032	148167	148914	297081
Q-4 61						
Q-1 62	204.0	34729	5.386	187067	159492	346559
Q-2 62						
Q-3 62	207.0	34736	4.847	168374	175540	343914
Q-4 62						
Q-1 63	214.5	36617	5.490	201033	198101	399134
Q-2 63						
Q-3 63	280.5	47176	5.287	249420	272203	521623
Q-4 63						
Q-1 64	250.5	42674	5.397	230309	231631	461940
Q-2 64						
Q-3 64	24.0	4254	5.840	24845	25696	50541
Q-4 64						
Q-1 65	1.5	159	5.252	835	1050	1885
Q-2 65						

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65		63	5.302	334	419	753
Q-4 65						
Q-1 66		5	4.800	24	30	54
TOTAL	4307.0	737178		3411101	3095834	6506935

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2 WEAPON SYSTEM
5-SUBSYSTEM 24
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	146	2.575	376	484	860
Q-2 58						
Q-3 58		80	6.800	544	313	857
Q-4 58						
Q-1 59		53	2.774	147	185	332
Q-2 59						
Q-3 59	6.0	995	2.934	2919	4049	6968
Q-4 59						
Q-1 60	-4.5	-676	2.883	-1949	-1833	-3782
Q-2 60						
Q-3 60					-59	-59
Q-4 60						
Q-1 61	4.5	804	3.041	2445	2384	4829
Q-2 61						
Q-3 61					240	240
Q-4 61						
Q-1 62		44	2.977	131	200	331
Q-2 62						
Q-3 62		-41	3.000	-123	-168	-291
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		1	3.000	3	-15	-12
TOTAL	7.5	1406		4493	5780	10273

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 2 WEAPON SYSTEM
5-SUBSYSTEM 24
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		35	2.829	99		99
Q-4 59						
Q-1 60		3	5.667	17		17
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61		92	3.304	304		304
Q-2 61						
Q-3 61		1	3.000	3		3
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		5	7.200	36		36
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		-5	7.200	-36		-36
TOTAL		131		423		423

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	300.5	50414	4.559	229822	229200	459022	458
Q-2 58							
Q-3 58	580.5	97583	4.254	415102	384606	799708	-33
Q-4 58							
Q-1 59	502.5	85901	4.170	358181	296674	654855	-77
Q-2 59							
Q-3 59	627.0	110374	4.027	444446	396804	841250	789
Q-4 59							
Q-1 60	358.5	62172	4.325	268871	231231	500102	-654
Q-2 60							
Q-3 60	145.5	24426	4.875	119080	89406	208486	38
Q-4 60							
Q-1 61	456.0	77980	4.746	370093	260360	630453	560
Q-2 61							
Q-3 61	162.0	29448	5.032	148170	149154	297324	-28
Q-4 61							
Q-1 62	204.0	34773	5.383	187198	159692	346890	129
Q-2 62							
Q-3 62	207.0	34700	4.850	168287	175372	343659	-7
Q-4 62							
Q-1 63	214.5	36617	5.490	201033	198101	399134	
Q-2 63							
Q-3 63	280.5	47172	5.287	249387	272188	521575	
Q-4 63							
Q-1 64	250.5	42674	5.397	230309	231631	461940	
Q-2 64							
Q-3 64	24.0	4254	5.840	24845	25696	50541	-1
Q-4 64							
Q-1 65	1.5	159	5.252	835	1050	1885	1
Q-2 65							
Q-3 65		63	5.302	334	419	753	
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 WEAPON SYSTEM
5-SUBSYSTEM 24
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66		5	4.800	24	30	54	
TOTAL	4314.5	738715		3416017	3101614	6517631	1175

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK DESIGN/ENGINEERING

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58		458	25	47	459552		459552
Q-2 58							
Q-3 58	7667900	7667867	67998	5861	8541434		8541434
Q-4 58							
Q-1 59	15373379	15373302	407634	100807	16536598		16536598
Q-2 59							
Q-3 59	2813500	2814289	76945	29218	3761702		3761702
Q-4 59							
Q-1 60	1000807	1000153	59291	11575	1571121	29935	1601056
Q-2 60							
Q-3 60	1289784	1289822	76531	11221	1586060	30219	1616279
Q-4 60							
Q-1 61	1005368	1005928	28933	30895	1696209	31521	1727730
Q-2 61							
Q-3 61	1140320	1140292	32669	14810	1485095	27598	1512693
Q-4 61							
Q-1 62	1347123	1347252	42824	-10761	1726205	28974	1755179
Q-2 62							
Q-3 62	1347122	1347115	42775	33208	1766757	29655	1796412
Q-4 62							
Q-1 63	2080310	2080310	88388	33269	2601101	43490	2644591
Q-2 63							
Q-3 63	359054	359054	11539	5435	897603	15008	912611
Q-4 63							
Q-1 64	898661	898661	123422	20816	1504839	32020	1536859
Q-2 64							
Q-3 64		-1		1099	51639	1099	52738
Q-4 64							
Q-1 65		1		266	2152	57	2209
Q-2 65							
Q-3 65				106	859	23	882
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2 WEAPON SYSTEM
5-SUBSYSTEM 24
SUBD OF WORK DESIGN/ENGINEERING

		SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1	66				8	62	2	64
TOTAL		36323328	36324503	1058974	287880	44188988	269601	44458589

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 2
5-SUB SYSTEM 24 WEAPON SYSTEM
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59	576.0	101470	3.689	374296		374296
Q-4 59						
Q-1 60	625.5	108474	3.643	395211		395211
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	63.0	10648	3.239	34484	39347	73831
Q-2 61						
Q-3 61		80	7.163	573	2847	3420
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	1264.5	220672		804564	42194	846758

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 2
5-SUBSYSTEM 24
SUBD OF WORK PRODUCTION

WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61		48	3.396	163	68	231
TOTAL		48		163	68	231

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 2
5-SUBSYSTEM 24
SUBD OF WORK PRODUCTION

WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		112	7.241	811		811
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	6.0	972	3.503	3405		3405
TOTAL	6.0	1084		4216		4216

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
SUBD OF WORK PRODUCTION

WEAPON SYSTEM

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 59	576.0	101470	3.689	374296		374296	
Q-4 59							
Q-1 60	625.5	108586	3.647	396022		396022	
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61	69.0	11668	3.261	38052	39415	77467	4780
Q-2 61							
Q-3 61		80	7.163	573	2847	3420	795
Q-4 61							
Q-1 62							
Q-2 62							
Q-3 62							
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63							
TOTAL	1270.5	221804		808943	42262	851205	5575

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK PRODUCTION

	SUBC	TOTAL MATERIAL	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58	403574	403574	3581	407155		407155
Q-4 58						
Q-1 59	3050417	3050417	80884	3131301		3131301
Q-2 59						
Q-3 59	24671259	24671259	673913	25719468		25719468
Q-4 59						
Q-1 60	18527001	18527001	1099276	20022299	381485	20403784
Q-2 60						
Q-3 60	8625848	8625848	511770	9137618	174099	9311717
Q-4 60						
Q-1 61	8648685	8653465	248197	8979129	166859	9145988
Q-2 61						
Q-3 61	8536107	8536902	244778	8785100	163254	8948354
Q-4 61						
Q-1 62	2991441	2991441	95073	3086514	51807	3138321
Q-2 62						
Q-3 62	2991433	2991433	94986	3086419	51805	3138224
Q-4 62						
Q-1 63	4795488	4795488	203635	4999123	83585	5082708
Q-2 63						
Q-3 63	666689	666689	21463	688152	11506	699658
Q-4 63						
Q-1 64	1946098	1946098	267209	2213307	47095	2260402
TOTAL	85854040	85859615	3544765	90255585	1131495	91387080

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
SUBD OF WORK TOOLING AND STE

WEAPON SYSTEM

	SUBC	TOTAL MATERIAL	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 59	4035	4035	110	4145		4145
Q-4 59						
Q-1 60	4278	4278	253	4531	86	4617
Q-2 60						
Q-3 60	3286	3286	194	3480	66	3546
Q-4 60						
Q-1 61	1142	1142	32	1174	22	1196
Q-2 61						
Q-3 61	17	17		17		17
TOTAL	12758	12758	589	13347	174	13521

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60						
Q-2 60						
Q-3 60		1	3.000	3		3
Q-4 60						
Q-1 61	76.5	13034	4.400	57352	44305	101657
Q-2 61						
Q-3 61	5.5	951	3.843	3655	10417	14072
Q-4 61						
Q-1 62	28.5	4949	3.978	19687	21224	40911
Q-2 62						
Q-3 62	16.5	2888	3.604	10409	13638	24047
Q-4 62						
Q-1 63	11.5	1919	4.498	8632	10422	19054
Q-2 63						
Q-3 63	-1.5	-223	3.399	-758	128	-630
Q-4 63						
Q-1 64		1	.999	-1	1	
TOTAL	137.0	23520		98979	100135	199114

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	4.5	669	2.709	1812	2588	4400
Q-4 58						
Q-1 59	4.5	886	2.837	2514	3359	5873
Q-2 59						
Q-3 59	6.0	993	2.763	2744	4122	6866
Q-4 59						
Q-1 60	10.5	1759	2.895	5093	12203	17296
Q-2 60						
Q-3 60	6.0	914	2.745	2509	187088	189597
Q-4 60						
Q-1 61	35.0	5998	3.167	18996	99759	118755
Q-2 61						
Q-3 61	2.5	411	3.416	1404	46572	47976
Q-4 61						
Q-1 62		122	2.533	309	443	752
Q-2 62						
Q-3 62	4.5	677	3.065	2075	2685	4760
Q-4 62						
Q-1 63	1.5	176	3.295	580	715	1295
Q-2 63						
Q-3 63	3.0	401	3.426	1374	1581	2955
Q-4 63						
Q-1 64		-2	1.000	-2	-1	-3
TOTAL	78.0	13004		39408	361114	400522

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 2
5-SUB SYSTEM 24
SUBD OF WORK TEST/QC

WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		28	3.357	94	111	205
Q-2 63						
Q-3 63		25	7.880	197	-111	86
TOTAL		53		291		291

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		44	2.659	117		117
Q-4 58						
Q-1 59		24	3.333	80		80
Q-2 59						
Q-3 59		29	2.966	86		86
Q-4 59						
Q-1 60		4	2.750	11		11
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	1.0	135	2.741	370		370
Q-2 61						
Q-3 61		16	2.500	40		40
Q-4 61						
Q-1 62		-3	2.000	-6		-6
Q-2 62						
Q-3 62		28	2.786	78		78
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		9	3.889	35		35
Q-4 63						
Q-1 64		2	1.000	2		2
TOTAL	1.0	288		813		813

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
SUBD OF WORK TEST/QC

WEAPON SYSTEM

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58	4.5	713	2.705	1929	2588	4517	2199
Q-4 58							
Q-1 59	4.5	910	2.851	2594	3359	5953	590
Q-2 59							
Q-3 59	6.0	1022	2.769	2830	4122	6952	239
Q-4 59							
Q-1 60	10.5	1763	2.895	5104	12203	17307	-900
Q-2 60							
Q-3 60	6.0	915	2.745	2512	187088	189600	146
Q-4 60							
Q-1 61	112.5	19167	4.003	76718	144064	220782	12864
Q-2 61							
Q-3 61	8.0	1378	3.700	5099	56989	62088	8835
Q-4 61							
Q-1 62	28.5	5068	3.944	19990	21667	41657	20574
Q-2 62							
Q-3 62	21.0	3593	3.496	12562	16323	28885	-1191
Q-4 62							
Q-1 63	13.0	2123	4.383	9306	11248	20554	6109
Q-2 63							
Q-3 63	1.5	212	4.000	848	1598	2446	-281
Q-4 63							
Q-1 64		1	.999	-1		-1	-8
TOTAL	216.0	36865		139491	461249	600740	49176

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24 WEAPON SYSTEM
SUBD OF WORK TEST/QC

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 58	120		6836		6836
Q-4 58					
Q-1 59	50		6593		6593
Q-2 59					
Q-3 59	20		7211		7211
Q-4 59					
Q-1 60	-118		16289.	310	16599
Q-2 60					
Q-3 60	19		189765	3616	193381
Q-4 60					
Q-1 61	1087		234733	4362	239095
Q-2 61					
Q-3 61	746	113	71782	1334	73116
Q-4 61					
Q-1 62	1621	3	63855	1072	64927
Q-2 62					
Q-3 62	-93	19	27620	464	28084
Q-4 62					
Q-1 63	601		27264	455	27719
Q-2 63					
Q-3 63	27	-22	2170	36	2206
Q-4 63					
Q-1 64	-1		-10		-10
TOTAL	4079	113	654108	11649	665757

C-5

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	299.0	50268	4.564	229446	228716	458162
Q-2 58						
Q-3 58	580.5	97503	4.252	414558	384293	798851
Q-4 58						
Q-1 59	502.5	85848	4.171	358034	296489	654523
Q-2 59						
Q-3 59	621.0	109344	4.037	441428	392755	834183
Q-4 59						
Q-1 60	363.0	62845	4.309	270803	233064	503867
Q-2 60						
Q-3 60	145.5	24427	4.875	119083	89465	208548
Q-4 60						
Q-1 61	528.0	90118	4.713	424696	302281	726977
Q-2 61						
Q-3 61	168.0	30398	4.994	151822	159331	311153
Q-4 61						
Q-1 62	232.5	39678	5.211	206754	180716	387470
Q-2 62						
Q-3 62	223.5	37624	4.752	178783	189178	367961
Q-4 62						
Q-1 63	226.5	38536	5.441	209665	208523	418188
Q-2 63						
Q-3 63	279.0	46953	5.296	248662	272331	520993
Q-4 63						
Q-1 64	250.5	42675	5.397	230308	231632	461940
Q-2 64						
Q-3 64	24.0	4254	5.840	24845	25696	50541
Q-4 64						
Q-1 65	1.5	159	5.252	835	1050	1885
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65		63	5.302	334	419	753
Q-4 65						
Q-1 66		5	4.800	24	30	54
TOTAL	4445.0	760698		3510080	3195969	6706049

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59	576.0	101470	3.689	374296		374296
Q-4 59						
Q-1 60	625.5	108474	3.643	395211		395211
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	63.0	10648	3.239	34484	39347	73831
Q-2 61						
Q-3 61		80	7.163	573	2847	3420
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	1264.5	220672		804564	42194	846758

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	146	2.575	376	484	860
Q-2 58						
Q-3 58	4.5	749	3.146	2356	2901	5257
Q-4 58						
Q-1 59	6.0	939	2.834	2661	3544	6205
Q-2 59						
Q-3 59	11.5	1988	2.849	5663	8171	13834
Q-4 59						
Q-1 60	6.0	1083	2.903	3144	10370	13514
Q-2 60						
Q-3 60	6.0	914	2.745	2509	187029	189538
Q-4 60						
Q-1 61	40.0	6802	3.152	21441	102143	123584
Q-2 61						
Q-3 61	2.5	411	3.416	1404	46812	48216
Q-4 61						
Q-1 62	1.5	166	2.651	440	643	1083
Q-2 62						
Q-3 62	4.0	636	3.069	1952	2517	4469
Q-4 62						
Q-1 63	1.5	176	3.295	580	715	1295
Q-2 63						
Q-3 63	3.0	402	3.425	1377	1566	2943
Q-4 63						
Q-1 64		-2	1.000	-2	-1	-3
TOTAL	88.0	14410		43901	366894	410795

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61		48	3.396	163	68	231
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63		28	3.357	94	111	205
Q-2 63						
Q-3 63		25	7.880	197	-111	86
TOTAL		101		454	68	522

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		44	2.659	117		117
Q-4 58						
Q-1 59		24	3.333	80		80
Q-2 59						
Q-3 59		64	2.891	185		185
Q-4 59						
Q-1 60		119	7.050	839		839
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61	7.5	1199	3.402	4079		4079
Q-2 61						
Q-3 61		17	2.529	43		43
Q-4 61						
Q-1 62		-3	2.000	-6		-6
Q-2 62						
Q-3 62		33	3.455	114		114
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		4	.249	-1		-1
Q-4 63						
Q-1 64		2	1.000	2		2
TOTAL	7.5	1503		5452		5452

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	300.5	50414	4.559	229822	229200	459022	458
Q-2 58							
Q-3 58	585.0	98296	4.243	417031	387194	804225	2166
Q-4 58							
Q-1 59	508.5	86811	4.156	360775	300033	660808	513
Q-2 59							
Q-3 59	1208.5	212866	3.860	821572	400926	1222498	1028
Q-4 59							
Q-1 60	994.5	172521	3.884	669997	243434	913431	-1554
Q-2 60							
Q-3 60	151.5	25341	4.798	121592	276494	398086	184
Q-4 60							
Q-1 61	638.5	108815	4.456	484863	443839	928702	13424
Q-2 61							
Q-3 61	170.5	30906	4.978	153842	208990	362832	8807
Q-4 61							
Q-1 62	234.0	39841	5.200	207188	181359	388547	20703
Q-2 62							
Q-3 62	227.5	38293	4.723	180849	191695	372544	-1198
Q-4 62							
Q-1 63	228.0	38740	5.430	210339	209349	419688	6109
Q-2 63							
Q-3 63	282.0	47384	5.281	250235	273786	524021	-281
Q-4 63							
Q-1 64	250.5	42675	5.397	230308	231631	461939	-8
Q-2 64							
Q-3 64	24.0	4254	5.840	24845	25696	50541	-1
Q-4 64							
Q-1 65	1.5	159	5.252	835	1050	1885	1
Q-2 65							
Q-3 65		63	5.302	334	419	753	
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66		5	4.800	24	30	54	
TOTAL	5805.0	997384		4364451	3605125	7969576	50351

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-1 58				458	25	47	459552
Q-2 58							
Q-3 58			8071474	8073640	71699	5861	8955425
Q-4 58							
Q-1 59			18423796	18424309	488568	100807	19674492
Q-2 59							
Q-3 59			27488794	27489822	750988	29218	29492526
Q-4 59							
Q-1 60			19532086	19530532	1158702	11575	21614240
Q-2 60							
Q-3 60			9918918	9919102	588514	11221	10916923
Q-4 60							
Q-1 61	4780		9655195	9673399	278249	30895	10911245
Q-2 61							
Q-3 61	795		9676444	9686046	278193	14923	10341994
Q-4 61							
Q-1 62			4338564	4359267	139518	-10758	4876574
Q-2 62							
Q-3 62			4338555	4337357	137668	33227	4880796
Q-4 62							
Q-1 63			6875798	6881907	292624	33269	7627488
Q-2 63							
Q-3 63			1025743	1025462	33029	5413	1587925
Q-4 63							
Q-1 64			2844759	2844751	390630	20816	3718136
Q-2 64							
Q-3 64				-1		1099	51639
Q-4 64							
Q-1 65				1		266	2152
Q-2 65							
Q-3 65						106	859
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-1 66						8	62
TOTAL	5575		122190126	122246052	4608407	287993	135112028

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

	G & A	TOTAL COST
Q-1 58		459552
Q-2 58		
Q-3 58		8955425
Q-4 58		
Q-1 59		19674492
Q-2 59		
Q-3 59		29492526
Q-4 59		
Q-1 60	411816	22026056
Q-2 60		
Q-3 60	208000	11124923
Q-4 60		
Q-1 61	202764	11114009
Q-2 61		
Q-3 61	192186	10534180
Q-4 61		
Q-1 62	81853	4958427
Q-2 62		
Q-3 62	81924	4962720
Q-4 62		
Q-1 63	127530	7755018
Q-2 63		
Q-3 63	26550	1614475
Q-4 63		
Q-1 64	79115	3797251
Q-2 64		
Q-3 64	1099	52738
Q-4 64		
Q-1 65	57	2209
Q-2 65		
Q-3 65	23	882
Q-4 65		

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 2
5-SUBSYSTEM 24
WEAPON SYSTEM

		G & A	TOTAL COST
Q-1	66	2	64
TOTAL		1412919	136524947

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

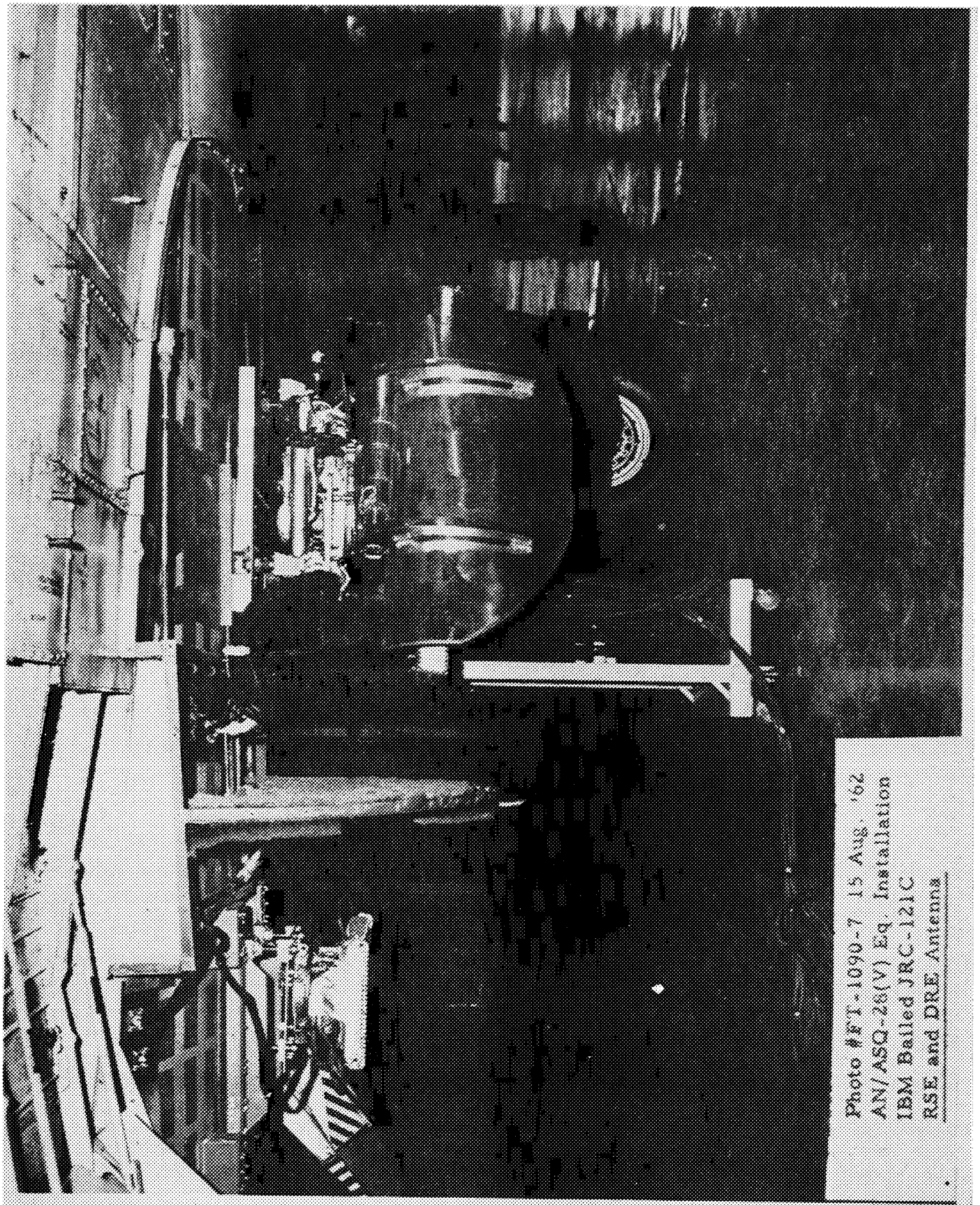


Photo #FT-1090-7 15 Aug. '62
AN/ASQ-28(V) Eq. Installation
IBM Balled JRC-121C
RSE and DRE Antenna

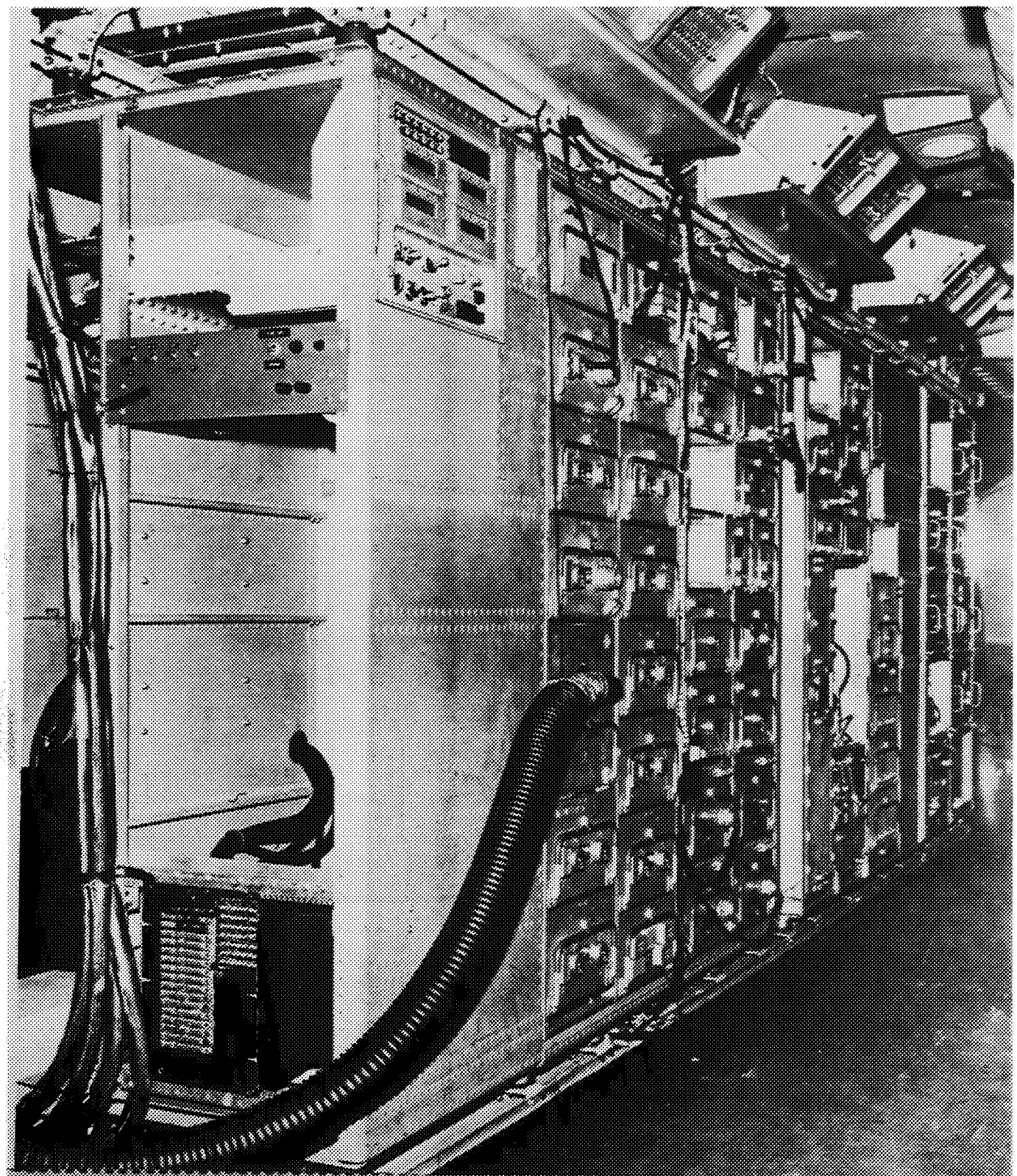
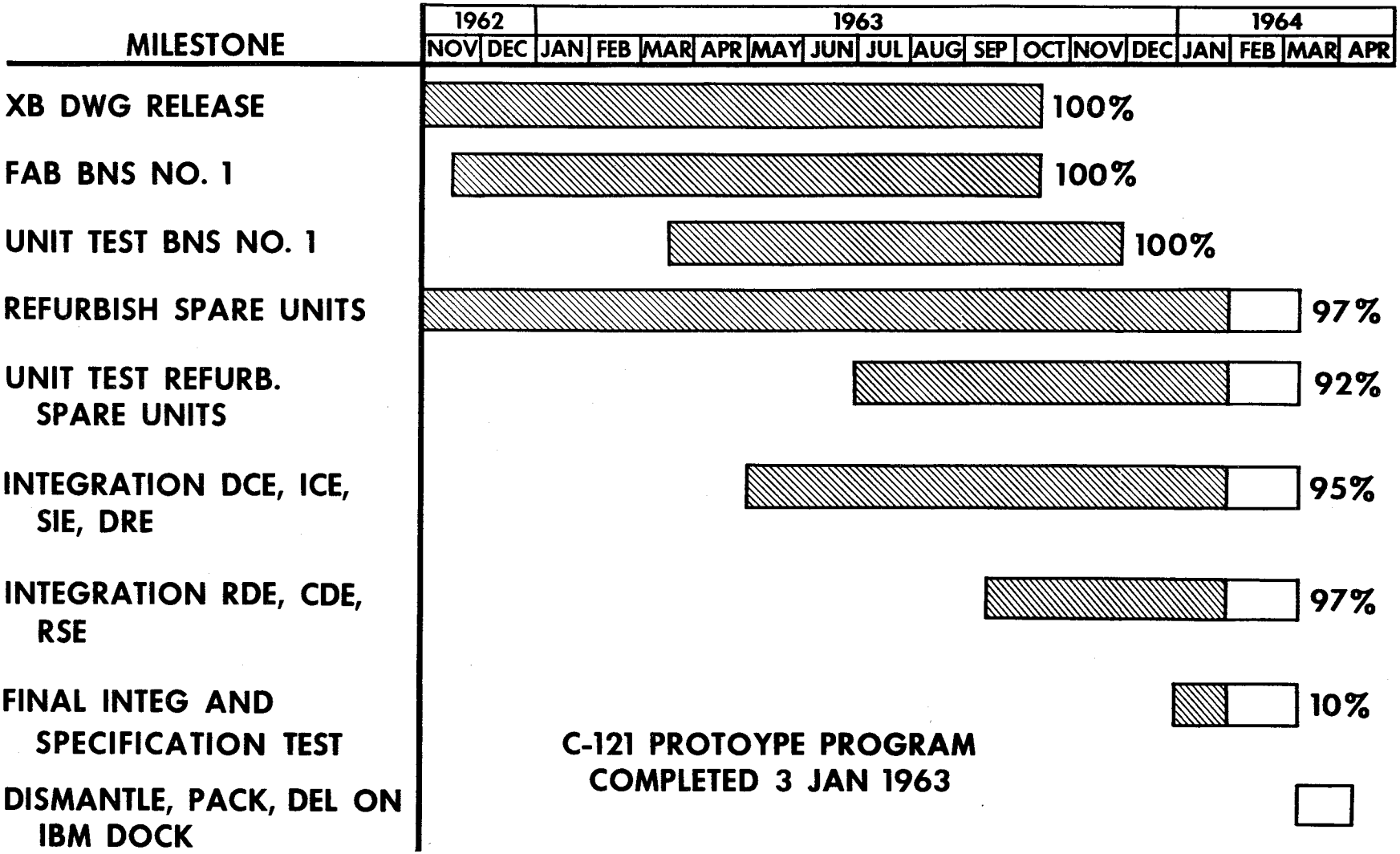
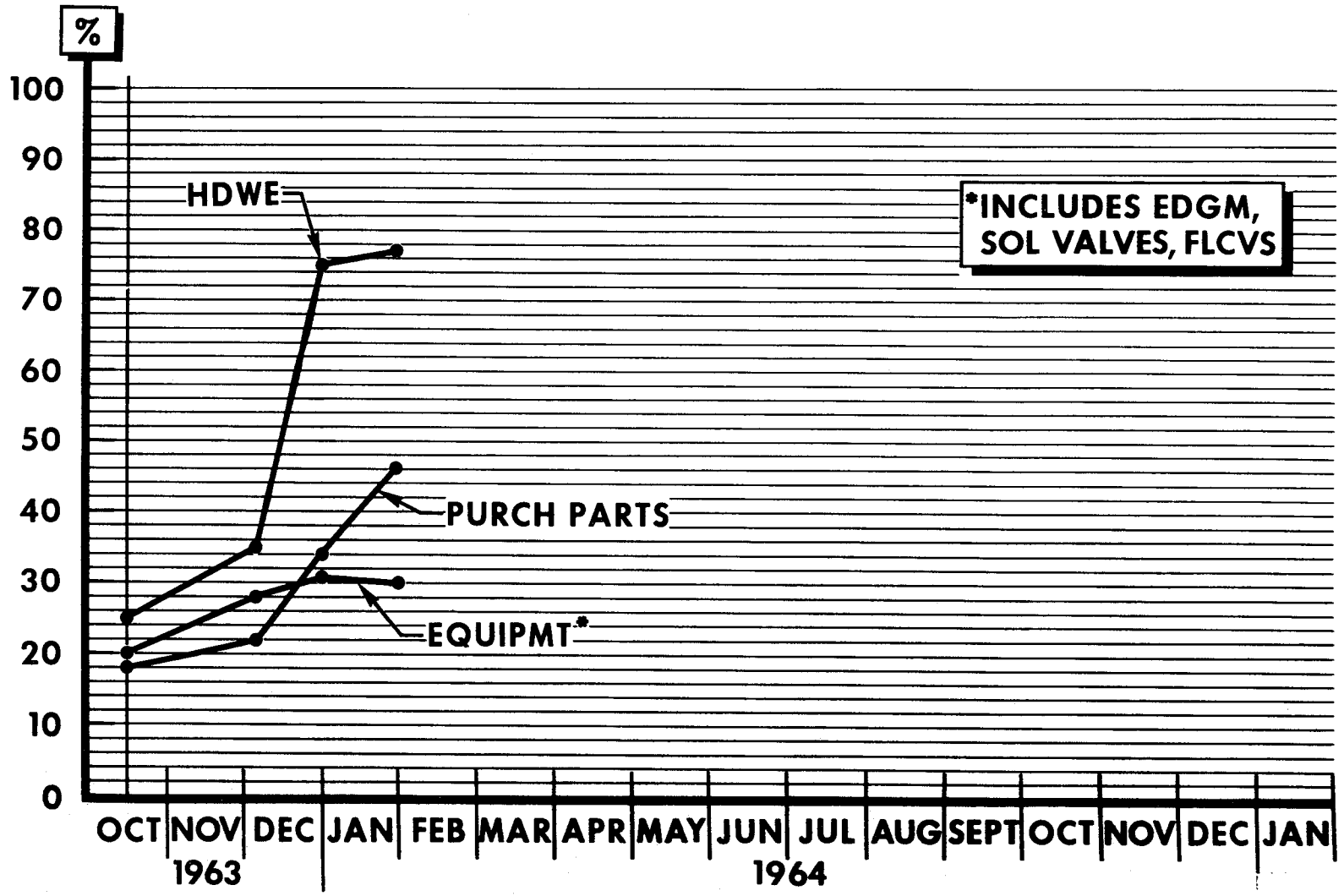


Photo #FT-1090-9 15 Aug. '62 AN/ASQ-28(V) Eq. Installation IBM Balled JRC-121C - View Looking Aft BNS Racks 2, 4, 6, and 8 and Simulator Rack (foreground to aft respectively).

A/V NO. 3 BOMBING/NAVIGATION SYSTEM
XB-70B PROTOTYPE



A/V NO. 3 STATUS
EQUIPMENT-PURCHASED PARTS-HARDWARE
(% REPRESENTS ITEMS ISSUED OR AVAILABLE OF A/V REQ)



MAJOR AIRFRAME MATING WBS 3.0

GENERAL

This WBS item has been established to collect the technical, schedule and cost data relative to the joining of the major airframe. This activity presented peculiar problems on the B-70 program, primarily, Air Vehicle No. 1. A discussion of the activities and problems related to Air Vehicle No. 1 major airframe mating is contained below.

Major airframe mating commenced with the joining operation of the fuselage aft and forward center sections on May 18, 1962 and progressed to a completion of fuselage joining on July 18, 1962. (See Exhibit 1 page II-240 for pictorial display of assembly sequence.) Subsequently, major problems in structure repair, wing to fuselage mismatch and fuel tank sealing were encountered. These problems delayed completion of wing joining until April 24, 1964.

The following discussion reviews the individual problem areas which delayed the completion of mating operations on Air Vehicle 1.

Fuel Tank Sealing and Structural Repairs

Sealing of the fuel tanks to essentially a zero leakage level was required not only to prevent fuel leaks but primarily to prevent dissipation of the gaseous nitrogen which was used as an inerting agent in the fuel tanks. The basic fuel tank sealing was accomplished by a metal-to-metal seal provided by welding or brazing in the process of joining individual panels. The criterion for sealing required that a tank hold air at a pressure of 10 pounds per square inch with "zero leakage." Since the accuracy of the measurement of leakage was not absolutely precise, an indicated leakage of less than 10 cubic inches per minute was considered acceptable. This is equivalent to allowing one hole the diameter of a human hair in a 3,000 square foot surface.

To locate leaks, the tanks were either vacuum or pressure checked utilizing various methods of leak detection. Detecting leaks was a repetitive operation, with lesser leaks showing up as larger leaks were eliminated. Leaks which were approximately .050 to .060 inches in diameter were located by application of a soap solution over the suspect area with incoming air creating bubbles at the point of leakage. Another method utilized for detecting sizable leaks was to locate the point by an ultrasonic device which detected the passage of air through an orifice. A staining dye activated by ammonia drawn through the holes was used to outline smaller or pinpoint holes, while almost invisible holes were located by means of a helium gas sniffer.

Prior to the end of 1962 a seal brazing technique was used on the aforementioned pinhole leaks or if a doubler type repair was required. This

technique utilized a braze alloy that melts at a temperature of about 1,160°F, applied by a hand-held torch. This process was very critical and time consuming, since no sealing was accomplished if the temperature was too low and secondary damage to the thin homeycomb panel face sheets occurred if the temperature was too high. Damage of this nature to various fuel tank sections caused a heavy workload at the end of 1962. Approximately 3000 of these areas had to be inspected and repaired where damage was found.

Another process which contributed to delay of timely completions was the portable nickel plating utilized in structural repairs. As this process was used, it was found that if a small fissure of defect existed in the panel, the plating solution could seep through into the panel and cause core corrosion. Repairing this damage necessitated the removal and replacement of complete steel honeycomb panels which in turn further delayed tank completions and sealing.

A new method sealing small pinhole leaks was developed in the early months of 1963. This process consisted of plasma-spraying aluminum over a leaking area and then applying six coats of Viton cured at 375°F. This sealing method did result in some secondary heat damage to structure but considerably less than that experienced with earlier processes. Viton sealing was constrained at times during the mating operations due to the flammability potential when welding in adjacent areas.

Wing Mate

Originally, a series of tools were programmed to assure the close tolerances required to mate the wing to the wing stubs. However, to conserve funds, most of the wing joining tools were eliminated in the program redirection of April 1961 and only contour support tools were provided. This necessitated matching the wing joint by optical methods, involving the fit of four contoured surfaces along an 80 foot distance to an accuracy of .008 inches or less. When this was initially attempted in late 1962, it was found that the support surfaces along the length of the wing would move and that ambient temperature differentials would also move the two surfaces of the wing and wing stub apart. After several attempts, matching by this technique was abandoned and a fitting was designed to attach to the wing stub to compensate for the inaccuracies in the joint alignment permitted by the simplified tooling. These match operations were constrained by the fuel tank sealing required in the wing root stub tanks. Fusion and electron beam welding were employed in wing joining; fusion on the inner weld and electron beam on the outer. Subsequent to inner weld completion and prior to starting the outer weld, the wing joint was x-ray inspected and the tanks were pressurized for leak detection. Extensive preparations were required in support of the external electron beam welding. These preparations consisted of cleaning the weld joint, applying RTV 77 sealant, and then placing a smooth plate over the sealant to hold the vacuum box and electron beam gun. During the early stages of wing to fuselage welding, considerable

time was spent in repairing weld areas, but this decreased as techniques improved and personnel became more experienced.

In summary, the major factors that caused delay in completing the airframe mating on the first air vehicle were as follows:

1. The necessity of changing the sealing process from use of a polymide sealant to application of plasma spray and Viton, a rubber based sealing compound. Fuel tank sealing, consequently installations and wing joining, were extensively delayed by this change of sealing process which required further developmental testing before air vehicle application.

2. Reinspection and subsequent repair of damaged areas found under the seals in brazed sections.

3. Replacement of sections of honeycomb panels damaged by nickel plating contamination and by gross voids that increased in size prior to completion of repairs.

4. Repeated pressurizing cycles necessary to detect minute air leaks.

5. Necessary changes to the auxiliary drive subsystem bay, involving the manufacture of an additional 6,000 individual parts.

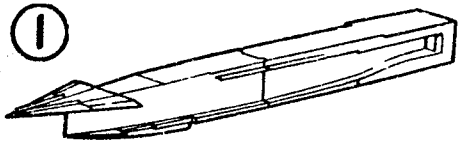
6. Restrictions upon parallel effort in the air vehicle due to the inflammability of uncured Viton.

NOTE: For further technical data dealing with fuel tank sealing and major assembly joining see pages III-35 through III-37, WBS 1.1.

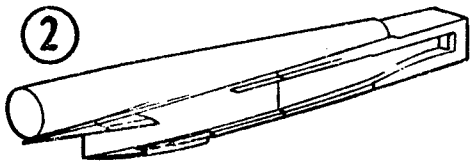
COST DEFINITIONS

Total costs of $8,488,042 represent all identifiable expenditures connected with mating the major sections of the structures for Air Vehicle No. 1, 2 and a portion of 3. Installation of subsystem equipment and checkout activities are excluded. Flight test technicians and manufacturing personnel were involved in this activity and are segregated by Element of Cost (EOC). The Design/Engineering EOC contains the flight test technicians and the Production EOC reflects the manufacturing personnel.

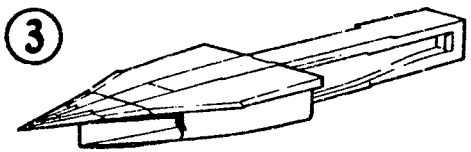
XB-70 A/V NO.1 ASSEMBLY SEQUENCE



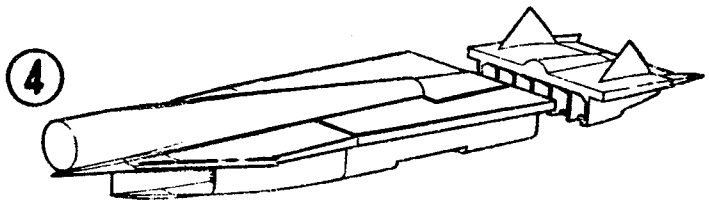
- WELD CENTER SECTIONS



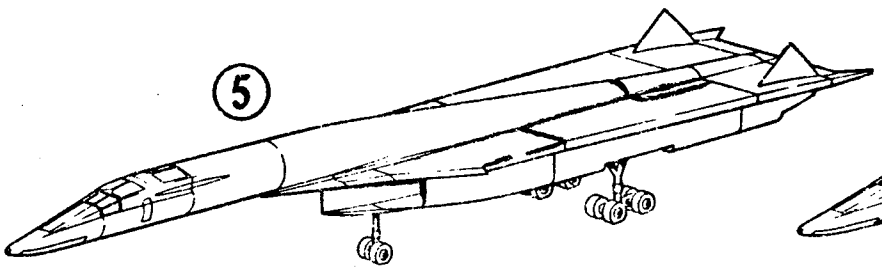
- PREMATE CHECK UPPER INTERMED FUS

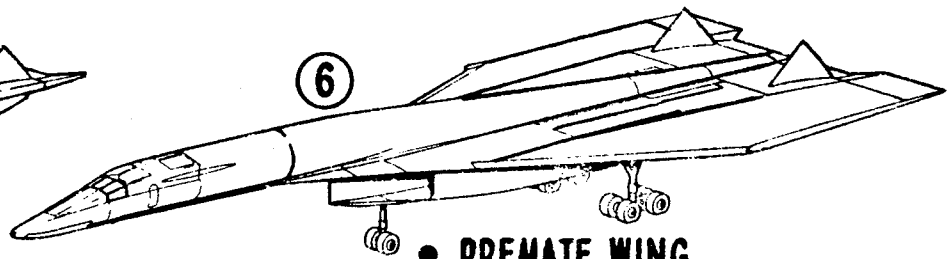


- WELD FWD OUTBD SECTIONS



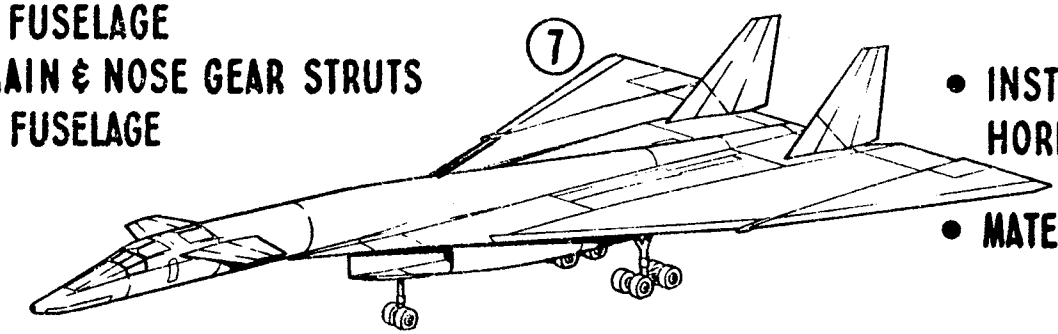
- WELD AFT OUTBD SECTION-LH-RH
- MATE UPPER INTER FUSELAGE
- PREMATE AFT FUSELAGE





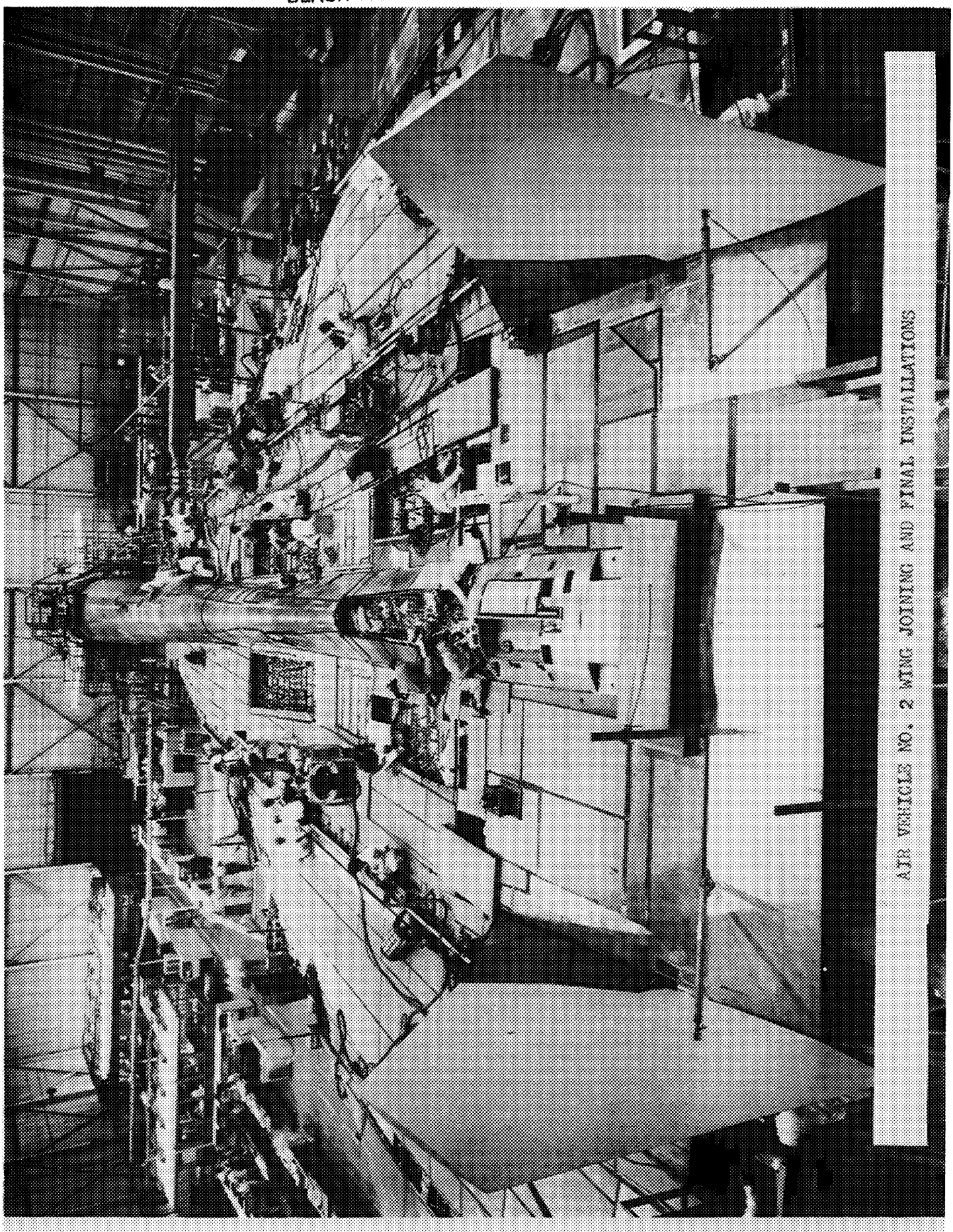
- PREMATE WING

- MATE AFT FUSELAGE
- INSTALL MAIN & NOSE GEAR STRUTS
- MATE FWD FUSELAGE



- INSTALL VERTICAL & HORIZONTAL STAB.
- MATE WING

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH



AFR VEHICLE NO. 2 WING JOINING AND FINAL INSTALLATIONS

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 3
MAJOR AIRFRAME MATING

		5-SUBSYS 0	TOTAL
		HOURS	HOURS
		DOLLARS	DOLLARS
DESIGN/ENGINEERING		240192	240192
LABOR AT $ 5.105		1226299	1226299
ENGR BURDEN AT $	5.379	1292101	1292101
PRODUCTION		690140	690140
LABOR AT $ 3.225		2225908	2225908
TEST/QC		91027	91027
LABOR AT $ 3.644		331711	331711
MFG BURDEN AT $	4.168	3255981	3255981
SUB-TOTAL		8332000	8332000
GEN & ADMIN		156042	156042
TOTAL COST		8488042	8488042

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-243

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 3
5-SUBSYSTEM 0

		PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		240192	240192
LABOR AT $ 5.105		1226299	1226299
ENGR BURDEN AT $ 5.379		1292101	1292101
PRODUCTION		690140	690140
LABOR AT $ 3.225		2225908	2225908
TEST/QC		91027	91027
LABOR AT $ 3.644		331711	331711
MFG BURDEN AT $ 4.168		3255981	3255981
SUB-TOTAL		8332000	8332000
GEN & ADMIN		156042	156042
TOTAL COST		8488042	8488042

TIME-PHASED COST
DETAIL - SEE PAGE II-244

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 3
5-SUBSYSTEM 0 MAJOR AIRFRAME MATING
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	166.5	28359	5.143	145837	138622	284459
Q-2 62						
Q-3 62	426.0	71687	4.998	358285	362174	720459
Q-4 62						
Q-1 63	337.5	57643	5.196	299501	310912	610413
Q-2 63						
Q-3 63	312.0	52345	5.157	269969	297643	567612
Q-4 63						
Q-1 64	177.0	30158	5.064	152707	182750	335457
TOTAL	1419.0	240192		1226299	1292101	2518400

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 197

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 3
5-SUBSYSTEM 0 MAJOR AIRFRAME MATING
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	183.0	31318	3.111	97418	126368	223786
Q-2 62						
Q-3 62	496.5	83515	3.150	263089	353989	617078
Q-4 62						
Q-1 63	856.5	146150	3.199	467488	630517	1098005
Q-2 63						
Q-3 63	870.0	146150	2.980	435583	468191	903774
Q-4 63						
Q-1 64	489.0	83515	3.622	302491	423044	725535
Q-2 64						
Q-3 64	742.5	130659	3.234	422486	561962	984448
Q-4 64						
Q-1 65	246.0	42574	3.425	145822	193358	339180
Q-2 65						
Q-3 65	156.0	26259	3.486	91531	116038	207569
TOTAL	4039.5	690140		2225908	2873467	5099375

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 3
5-SUBSYSTEM 0 MAJOR AIRFRAME MATING
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	24.0	4130	3.292	13598		13598
Q-2 62						
Q-3 62	66.0	11016	3.331	36691		36691
Q-4 62						
Q-1 63	112.5	19278	3.468	66854		66854
Q-2 63						
Q-3 63	115.0	19277	4.009	77282	211683	288965
Q-4 63						
Q-1 64	64.5	11015	3.678	40511	53338	93849
Q-2 64						
Q-3 64	97.5	17234	3.610	62216	77076	139292
Q-4 64						
Q-1 65	33.0	5616	3.793	21300	25418	46718
Q-2 65						
Q-3 65	21.0	3461	3.831	13259	14999	28258
TOTAL	533.5	91027		331711	382514	714225

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 3
5-SUBSYSTEM 0
SUBD OF WORK PRODUCTION

MAJOR AIRFRAME MATING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-1 62	373.5	63807	4.025	256853	264990	521843	8789
Q-2 62							
Q-3 62	988.5	166218	3.959	658065	716163	1374228	23066
Q-4 62							
Q-1 63	1306.5	223071	3.738	833843	941429	1775272	29683
Q-2 63							
Q-3 63	1297.0	217772	3.595	782834	977517	1760351	29433
Q-4 63							
Q-1 64	730.5	124688	3.976	495709	659132	1154841	24572
Q-2 64							
Q-3 64	840.0	147893	3.277	484702	639038	1123740	23911
Q-4 64							
Q-1 65	279.0	48190	3.468	167122	218776	385898	10296
Q-2 65							
Q-3 65	177.0	29720	3.526	104790	131037	235827	6292
TOTAL	5992.0	1021359		3783918	4548082	8332000	156042

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

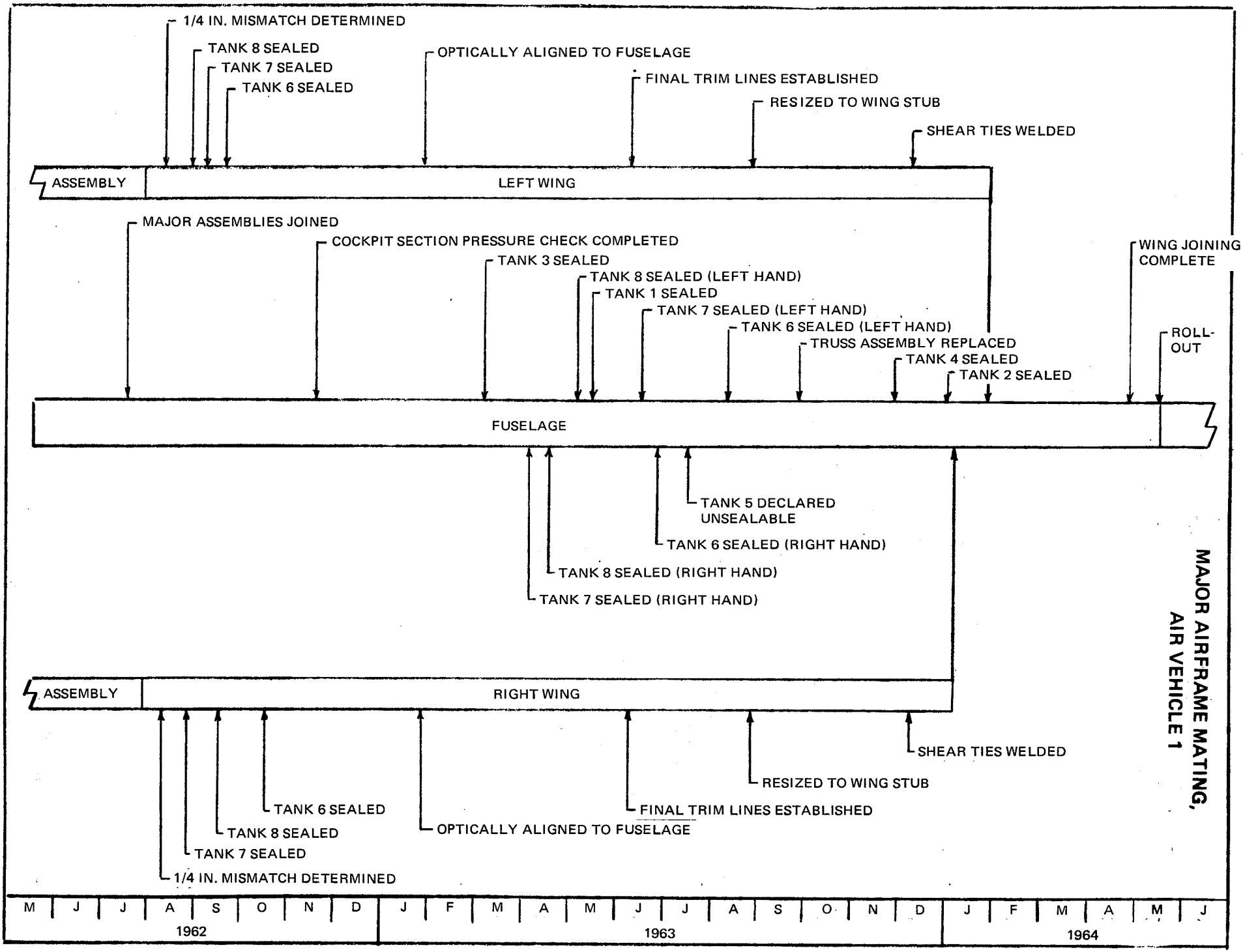
APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 3
5-SUBSYSTEM 0
SUBD OF WORK PRODUCTION

MAJOR AIRFRAME MATING

	TOTAL COST
Q-1 62	530632
Q-2 62	
Q-3 62	1397294
Q-4 62	
Q-1 63	1804955
Q-2 63	
Q-3 63	1789784
Q-4 63	
Q-1 64	1179413
Q-2 64	
Q-3 64	1147651
Q-4 64	
Q-1 65	396194
Q-2 65	
Q-3 65	242119
TOTAL	8488042


1/4 IN. MISMATCH DETERMINED
TANK 8 SEALED
TANK 7 SEALED
TANK 6 SEALED
OPTICALLY ALIGNED TO FUSELAGE
FINAL TRIM LINES ESTABLISHED
RESIZED TO WING STUB
SHEAR TIES WELDED
ASSEMBLY
LEFT WING
MAJOR ASSEMBLIES JOINED
COCKPIT SECTION PRESSURE CHECK COMPLETED
TANK 3 SEALED
TANK 8 SEALED (LEFT HAND)
TANK 1 SEALED
TANK 7 SEALED (LEFT HAND)
TANK 6 SEALED (LEFT HAND)
TRUSS ASSEMBLY REPLACED
TANK 4 SEALED
TANK 2 SEALED
WING JOINING COMPLETE
ROLL-OUT
FUSELAGE
TANK 5 DECLARED UNSEALABLE
TANK 6 SEALED (RIGHT HAND)
TANK 8 SEALED (RIGHT HAND)
TANK 7 SEALED (RIGHT HAND)
ASSEMBLY
RIGHT WING
SHEAR TIES WELDED
RESIZED TO WING STUB
FINAL TRIM LINES ESTABLISHED
OPTICALLY ALIGNED TO FUSELAGE
TANK 6 SEALED
TANK 8 SEALED
TANK 7 SEALED
1/4 IN. MISMATCH DETERMINED
M J J A S O N D J F M A M J J A S O N D J F M A M J
1962
1963
1964
MAJOR AIRFRAME MATING, AIR VEHICLE 1

WBS 4.0: FLIGHT TEST

GENERAL:

The flight test program was conducted on two XB-70 air vehicles and was a flight research program which demonstrated the design, fabrication, and technical feasibility of long range Mach 3 flights at high altitude. It was the final phase in a very large step forward in the state-of-the-art of manned aircraft design achieved during the B-70 development program. The advanced aerodynamic and high temperature design concepts incorporated in the XB-70 air vehicles were all essentially verified during the flight test program. These state-of-the-art achievements as well as the XB-70 configuration, are defined in the air vehicle subsystems technical descriptions presented in Volumes III and IV of this report.

The flight test program was conducted to accomplish the established detail objectives as presented by Exhibit 1, page II-253. The air vehicle configuration, allowable configuration changes, and all flight test support requirements were based on that deemed necessary to safely accomplish the test objectives. All effort, including that involved with manufacturing checkout, preflight, and the flight test program, was scheduled to achieve the desired goals by the most timely and economical means. In this same framework, the flight test program management was streamlined to provide closer control and to reduce reaction time. Exhibit 2, page II-254, presents the management matrix employed, and as shown, operations control was based on the Joint Test Force (JTF) concept while contractual coverage was provided by the Development Research Vehicle (DRV) Division of Wright Patterson Air Force Base.

This section presents a technical description of the effort expended during final operations, preflight, and the flight test program. The support items during this program phase, such as, Flight Test Ground Support Equipment (FTGSE), Special Test Equipment, and Tooling are discussed under WBS Sections 5.0, 7.0, and 8.0, respectively. The comparison between the flight test program planned for the RS-70 and that conducted on the XB-70 air vehicles is presented under Air Vehicle Summary Data; WBS: 1.0. The Air Vehicle Summary Data section also presents the XB-70 operational flight limits and flight testing hours expended per air vehicle major subsystem.

COST DEFINITION

The recorded costs displayed in this WBS item are accumulated at levels 5 and 6 in the following manner:

WBS CODE: 4.0

WBS 4.40	Final Operations and Preflight	$ -0-	Page II-259
WBS 4.41	Flight Test	$ 2,781,972	Page II-310
WBS 4.41.1	Flight Operations	$29,594,412	Page II-310
WBS 4.41.2	Air Vehicle Maintenance	$ 5,216,014	Page II-310
WBS 4.41.3	Instrumentation	$ 1,164,316	Page II-311
WBS 4.41.4	Post Flight Evaluation	$ -0-	Page II-311
WBS 4.41.5	Major Air Vehicle Repair	$ 496,336	Page II-311
	Total WBS 4.0 Flight Test	$39,253,050	

Definition and explanation of the cost data can be found on the pages indicated above.

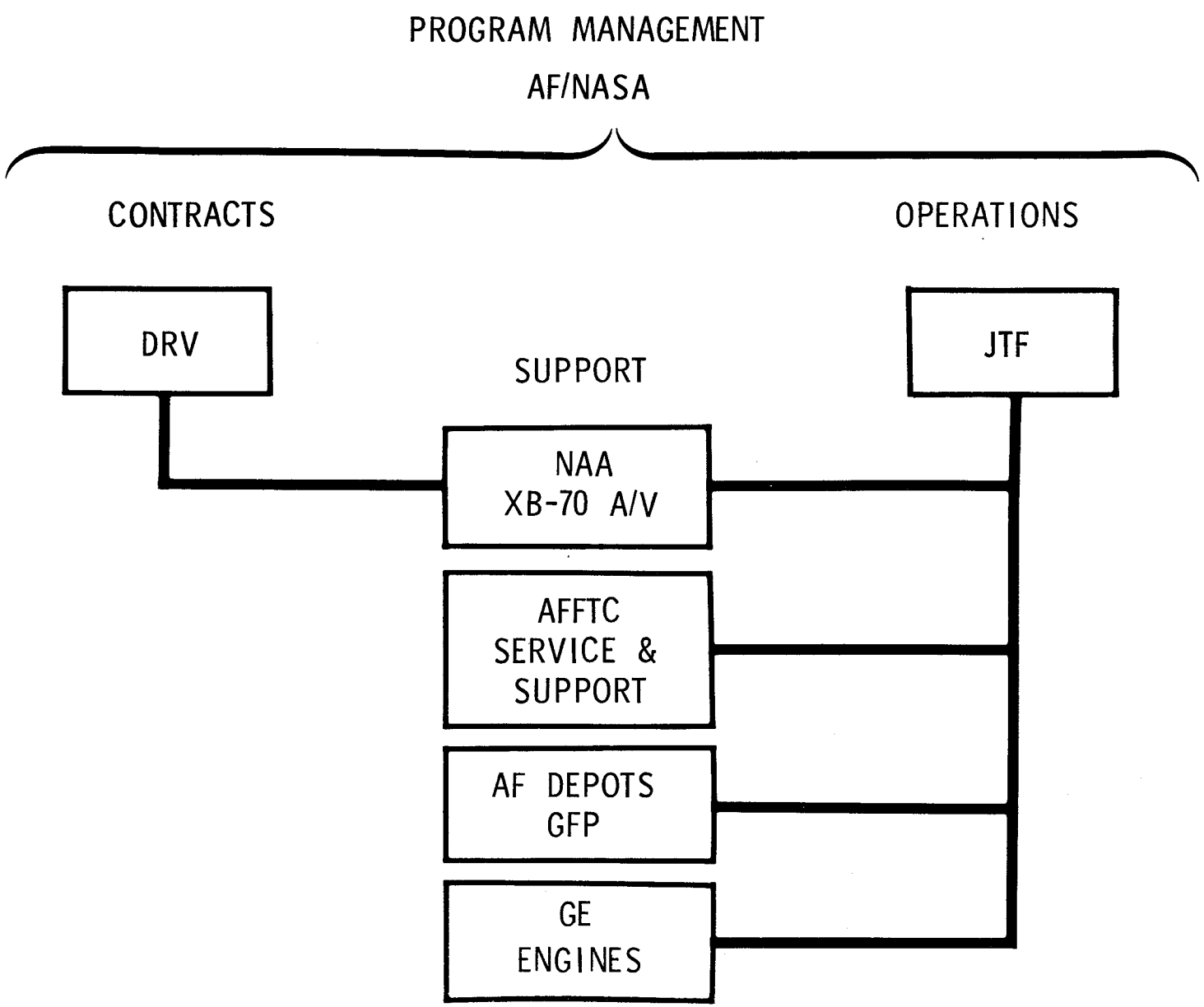
APPROVED PROGRAM OBJECTIVES

- DEMONSTRATE TECHNICAL FEASIBILITY OF ACHIEVING THE PERFORMANCE GOALS OF A M3.0 AIR VEHICLE
- DEMONSTRATE FLYING QUALITIES OF THE XB-70 UNDER FAIR WEATHER CONDITIONS
- DEFINE MAJOR PROBLEMS
- ESTABLISH AIRWORTHINESS & ACQUIRE DATA ON 15 SUBSYSTEMS
- QUANTITATIVELY EVALUATE WITH DATA:

  STABILITY & CONTROL
  PERFORMANCE
  VIBRATION / FLUTTER / ACOUSTICS
  STRUCTURAL INTEGRITY
  TEMPERATURE EFFECTS

- ACHIEVE M1 THE FIRST FLIGHT
- ACHIEVE 30 MIN SUSTAINED M3 DURING PROGRAM
- OBTAIN 180 HOURS OF FLIGHT IN 22-1/2 AOM'S
- PRESENT ANALYSIS TO GOVT IN MONTHLY PROGRESS REPORTS

XB-70 FLIGHT TEST PROGRAM



WBS 4.0 FLIGHT TEST

FINAL OPERATIONS AND PREFLIGHT WBS CODE: 4.40

GENERAL:

In a production type program, final operations and preflight are performed during two separate phases with final operations and checkout being the last phase of manufacturing and preflight the initial phase of Engineering Flight Test. However, during the XB-70 program, to achieve the most efficient programming of resources available and to reduce calendar time, final operations and preflight were performed concurrently on both Air Vehicle No. 1 and Air Vehicle No. 2.

The No. 1 air vehicle went into the concurrent phase of final operations and preflight on May 12, 1964. During the next three months certain manufacturing items were completed, systems operational evaluations, Phase I proof loads, and flutter and vibration tests were conducted with NR and AF inspections completed on August 7, 1964. Taxi tests No. 1, No. 2 and No. 3 were conducted on August 9th, 16th, and 24th, respectively. These taxi tests were unsatisfactory due mainly to hydraulic line failures. Taxi test No. 4 was conducted on August 25th and taxi tests No. 5 and No. 6 were conducted on September 14th with the first flight on the No. 1 air vehicle occurring on September 21, 1964. Subsequent to the fourth flight on October 12, 1964, the No. 1 air vehicle went into the second phase of final operations and preflight in preparation for high supersonic flight. During this time period, the two major items were the completion of the Air Induction System and Phase II proof loads; flight No. 5 occurred on February 16, 1965.

The final operations and preflight on air vehicle No. 2 were initated on May 29, 1965 with taxi tests conducted on July 10, 1965. The first flight on Air Vehicle No. 2 occurred on July 16, 1965.

DISCUSSION:

On Air Vehicle No. 1 only, final operations and preflight were performed in two phases with the first phase consisting of that testing necessary to assure safe flight up to Mach 1.4 while during the second phase the air vehicle was prepared for high supersonic flight. The systems ground checkout, evaluation, and calibrations were scheduled in this manner to be compatible with the Air Induction Control System (AICS) schedule (see WBS 1.5) and to provide an advance overall "look" at the B-70 in flight for possible basic problem areas. The final operation and preflight requirements were essentially the same for both air vehicles except for structural loading and dynamic tests which were conducted on Air Vehicle No. 1 only.

The No. 1 air vehicle was "rolled-out" from Manufacturing on May 11, 1964 and was transferred officially to Engineering Flight Test on May 12, 1964, which was the official start date for final operations and preflight. The initial period was devoted to subsystems operations which consisted primarily of final operations on the hydraulic systems, landing gear, and first phase of operations on the flight controls. Installation of J-93

engine modifications for the afterburner fuel pumps and throttle linkage were also accomplished during this period together with final fuel tank installations and pressure tests. After the initial period, engineering ground tests required during the first phase of preflight were conducted. These tests consisted essentially of subsystem evaluations and calibrations including instrumentation checkout and calibrations.

The initial engineering evaluations were for Phase I proof loads and dynamic tests on the airframe structure. The proof load tests consisted of applying simulated air loads to the main gear, nose gear, and all alighting and arresting subsystem doors during subsystem operations. The structural dynamics tests consisted of vibration tests of the air vehicle to investigate the flutter modes and to verify calculated data as required to assure safe flight operation. Exhibits 3, 4, 5, and 6, on pages II-260, II-261, II-262, and II-263, respectively, present the test setup for the vibration and flutter ground tests. Following the structural dynamics tests, engineering type tests were conducted to verify subsystem operation and subsystem interface functions to ensure safety of flight. During these preflight tests, engineering data were obtained by the airborne instrumentation system for utilization during the flight testing.

During the initial preflight phase, the air vehicle was weighed (before expendables were added) to establish the empty gross weight and center of gravity of the air vehicle, see Exhibit 7, page II-264. Landing gear tests were initiated and partially completed; however several components were short which delayed completion of tests until after taxi tests. Exhibit 8, page II-265, presents a view of the main gear in the intial phase of retraction. Fuel system calibrations were accomplished to verify quantity and operation of the gaging system, fuel supply, fuel management, cooling fuel flow loop, transfer system, and to establish the unavailable fuel of individual tanks and total fuel system. The emergency environmental system, which used ammonia and required the air vehicle to be outside the hangar with special GSE, was evaluated to assure correct operation, verify servicing techniques/equipment, and to establish zero leakage.

In addition to the engineering tests described above, specific subsystem tests conducted required various combinations of engine operations. These engineering tests were identified as propulsion and integrated systems tests which confirmed operation of the propulsion subsystem, secondary power subsystems, and the ECS. These single-engine and multi-engine ground operations also provided vibration data of the engine, structure, and secondary power subsystems. During the engine runs and with special instrumentation located at various points, both near and far field noise level data were obtained as part of the NASA Noise and Sonic Boom Program.

The No. 1 air vehicle was removed from flight status after Flight No. 4 and the second phase of final operations and preflight was performed. This phase of ground tests was in preparation for high supersonic flight with the major effort directed toward the satisfactory completion of the Phase II proof load tests and the installation, checkout, and preflight of the

AICS. In addition to this effort, deficiencies disclosed during the initial flights, which would interfere with flight objectives, were corrected and the flight augmentation control system (FACS) was preflighted (this system was not activated during first flights).

The Phase II proof loading tests were conducted to demonstrate that major surfaces would adequately perform, both statically and dynamically, under the high loads of high speed flight; Exhibit 9, page II-266, presents the areas tested. As shown, the areas loaded were the folding wing tips, elevons, canard surfaces and flaps, vertical stabilizers, AIS ramps and bypass doors, flight control system, and the emergency rain air scoop. Exhibits 10, through 14, pages II-267 through II-271, present actual test setups typical of those employed during the proof testing. As shown as by the exhibits, the surfaces were loaded by hydraulic actuators which transmitted the load through vacuum pads attached to the surfaces: the exception to this was the loading of the AIS ramps where the inlet was pressurized. During the tests, structural stiffness and deflection data were obtained and noninterference loaded surface operation verified. The maximum proof loads applied were 80% of design limit except for specific areas, such as the control column, cables, elevons, where 100% design limit load was applied.

The Phase II proof tests of the AIS was initiated on the left-hand inlet; however, due to a failure, the proof testing of the AIS was completed on the right-hand inlet which required repositioning of the special test set-up. The failure experienced was at the forward hinge of the first movable ramp at approximately 90% load. The failure also caused secondary damage to local structure behind the ramp in the nose wheel well area. The beef-up of the ramps and the repair of structural damage slipped Flight No. 5 schedule by approximately one month.

The following table presents the load level applied during the Phase II tests:

Item	Load Level
Static Loading:	
Control System	Limit pilot loads
Horizontal Stabilizer	80% limit
Wing Folding Tips	80% limit inboard wing 64% limit movable wing
Elevons	80% limit
AIS Duct and Ramps	100% limit
AIS Bypass Doors	100% limit

WBS CODE: 4.40

Item	Load Level
Operational Tests Under Load:	
Horizontal Stabilizer	72% limit
Vertical Stabilizer	80% limit
Wing Folding Tips	100% limit operational load
Elevons	80% limit
AIS Ramps (one side)	100% limit operational load
AIS Bypass Doors	100% limit
Emergency Rain Scoop	100% limit

Taxi Tests: The first taxi test occurred on August 9, 1964 where problems with nose wheel steering, brake chatter, loss of Primary No. 1 hydraulic system, and ammonia fumes in the cockpit caused the tests to be aborted. The nose wheel steering problem was two fold: one was an apparent drift and the other was an apparent lack of authority. The control valve of the steering unit was replaced which fixed the drift, in addition, an indicator was installed in the cockpit to provide the pilot nose wheel position to aid primarily in engagement of steering. The authority of the nose wheel steering was squawked throughout the flight test program; however, the condition was minimized to some extent by pilot technique.

The brake chatter was believed to be caused by the brake linings not being "burned-in" (seating the discs). However, a switch was installed so that fore and aft brakes of each bogie could be selected so that "burn-in" could be accomplished during the next taxi. The Primary No. 1 hydraulics was lost due to a line break at a coupling in ADS Bay No. 1. (for a summary of hydraulic line failure technical analyses, see Technical Driver: Hydraulic Pumps, WBS 1.4.) The ammonia fumes in the cockpit were caused by contaminated make-up air from the engines which had ingested the overboard exhausted ammonia fumes. The condition could only happen during taxi and ground operations where there was insufficient wind to clear the area forward of the inlets of fumes. To correct the unacceptable condition, a ground lockout relay was installed which closed the make-up air valve during ground operations.

The second taxi test was made on August 16th with the first pass to 35 KIAS satisfactorily completed. However, the second pass was aborted due to a hydraulic leak caused by a ruptured line at a manifold fitting in ADS Bay No. 1. During the taxi tests at low speed, the brakes still chattered which caused the landing gear doors to open and the No. 3 engine nozzle to go full open. The "burning-in" of the brake linings was scheduled to continue during the next taxi tests.

WBS CODE: 4.40

The third taxi tests were conducted on August 24th with two passes up to 65 KIAS satisfactorily completed. However, after the second pass a hydraulic leak was found in ADS Bay No. 6 which was caused by a primary pump valve manifold seal failure. It was subsequently found that the left-hand brake actuator was also leaking which resulted in a rework of installing a new viton seal in all brake actuators. On August the 25th the fourth taxi tests were satisfactorily completed with no problems encountered. Two passes were made; the first up to 86 KIAS (75 knots ground speed) and the second up to 122 KIAS (100 K ground speed). During the second pass, the drag chute was satisfactorily deployed at 122 KIAS and jettisoned at 80 KIAS with subsequent deceleration accomplished by moderate to heavy braking.

The fifth and sixth taxi tests were satisfactorily completed on September 14, 1964. The fifth taxi test consisted of one pass at 87 KIAS while the sixth consisted of one pass at 97 KIAS. After the sixth taxi test, all eight main gear tires were replaced (due to wear) and the landing gear cycled 20 times in preparation for first flight. In addition, several binding hydraulic valves were replaced and the No. 4 and No. 6 engines had to be replaced due to foreign object damage (FOD).

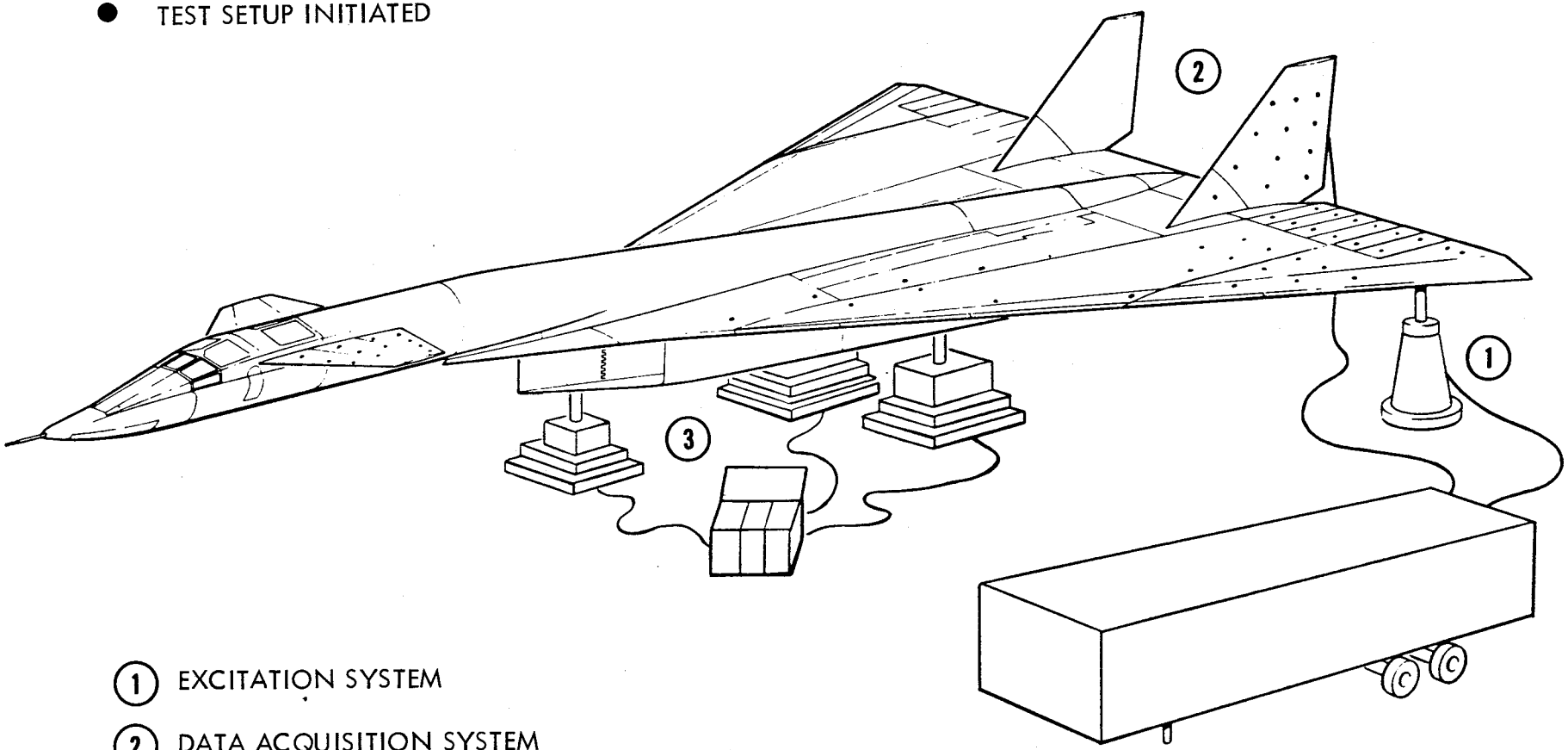
The extensive prior-to-first flight taxi tests were conducted to provide the pilot (and engineering data) the capability of evaluating the low and high speed characteristics of the new air vehicle. This included radius of turn, steering, braking, intermediate speed directional control, high speed directional control and nose wheel "lift-off" or longitudinal control power. It also allowed the pilot to evaluate visibility and "get-the-feel" of the air vehicle, such as establishing reference points, during these critical phases of flight. Since these conditions were evaluated on Air Vehicle No. 1, the No. 2 air vehicle taxi tests were completed in one day; July 10, 1965. For taxi schedules and taxi area plots, see Exhibits 14A and 14B, on pages II-272 and II-273.

COST DEFINITION:

Cost of the final operations and preflight activities performed on A/V's 1 and 2 are contained in WBS 1.12 (Volume IV, page IV-647). Flight test personnel performing final operations and preflight activities cannot be segregated from the manufacturing personnel performing systems installation and checkout on the two air vehicles. This condition exists because of the uniqueness of the program. If the B-70 had been a production program instead of a two-vehicle research and development program, manufacturing and flight test activities would have been two separate, independent operations. However, because of budgetary and schedule constraints, maximum utilization of personnel was essential. Therefore subsystem installation, checkout, final operations and preflight activities were performed by both manufacturing and flight test personnel concurrently. No segregation of activities in this area is available because the same accounting procedures were utilized by all personnel.

STRUCTURAL DYNAMICS GROUND VIBRATION TESTS

- TEST EQUIPMENT AVAILABLE AND ON SITE
- TEST SETUP INITIATED



(1) EXCITATION SYSTEM

(2) DATA ACQUISITION SYSTEM

(3) AIR SUSPENSION SYSTEM

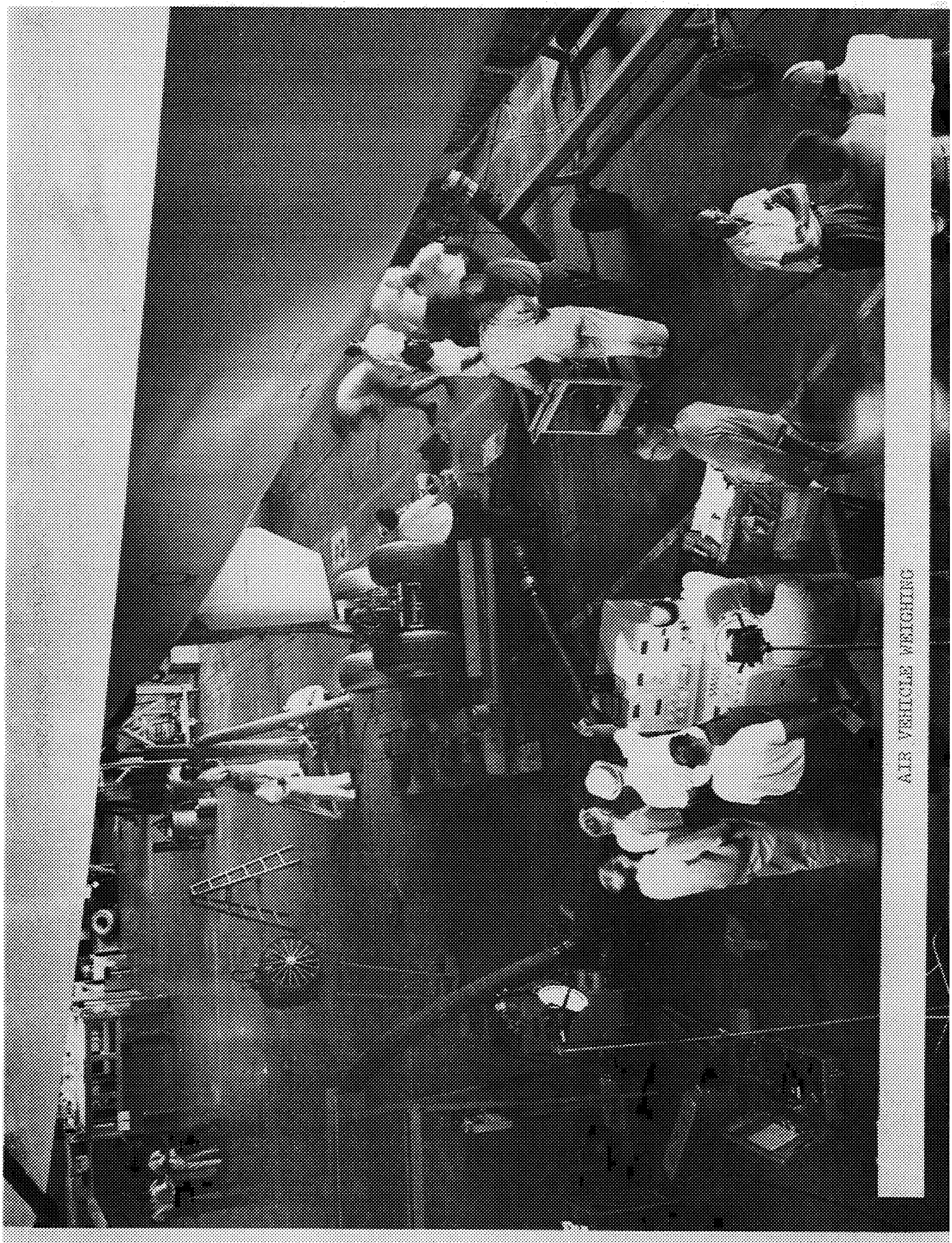
INSTRUMENTATION VAN

STRUCTURAL DYNAMICS TESTS

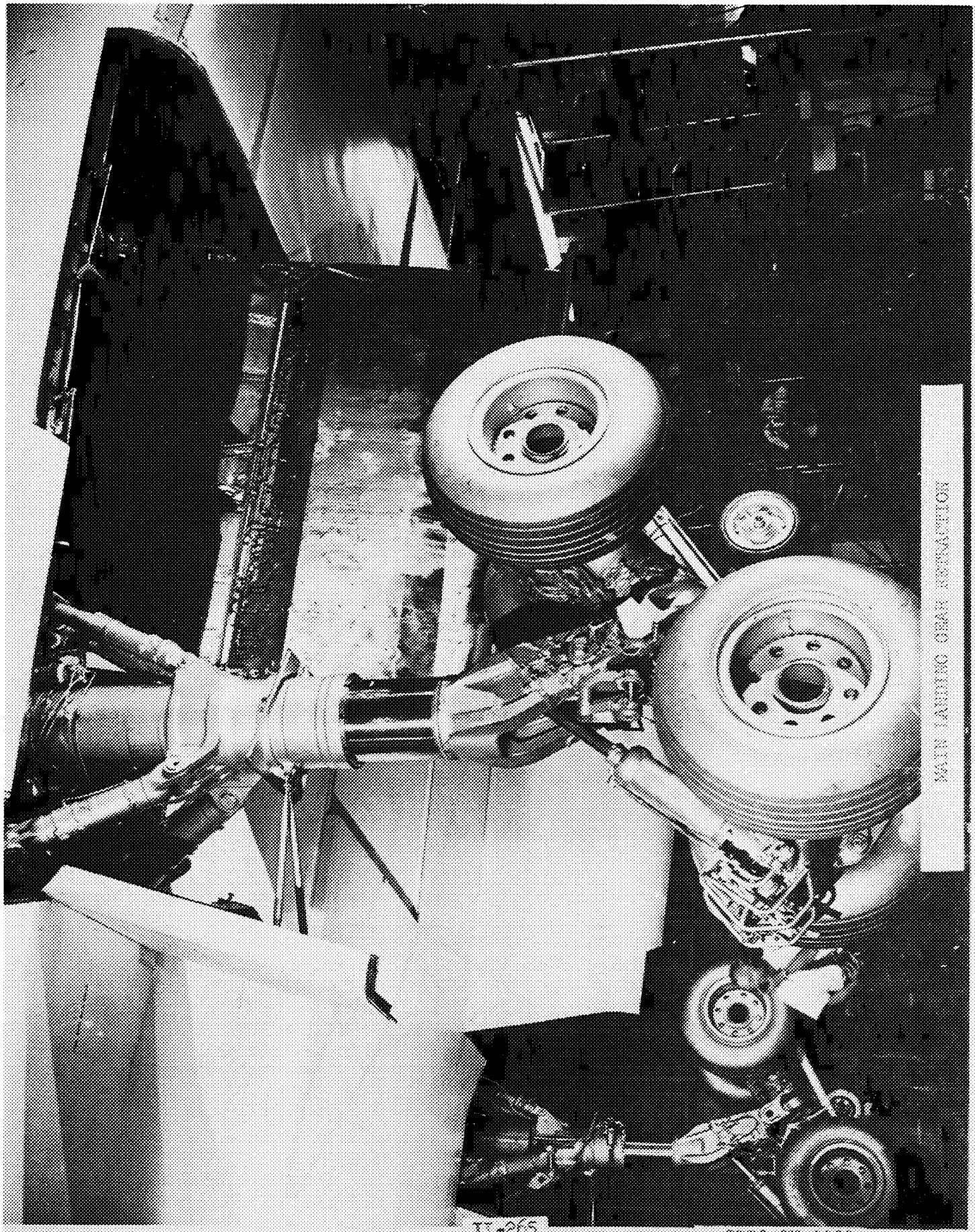
STRUCTURAL DYNAMICS TESTS

STRUCTURAL DYNAMICS TESTS

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

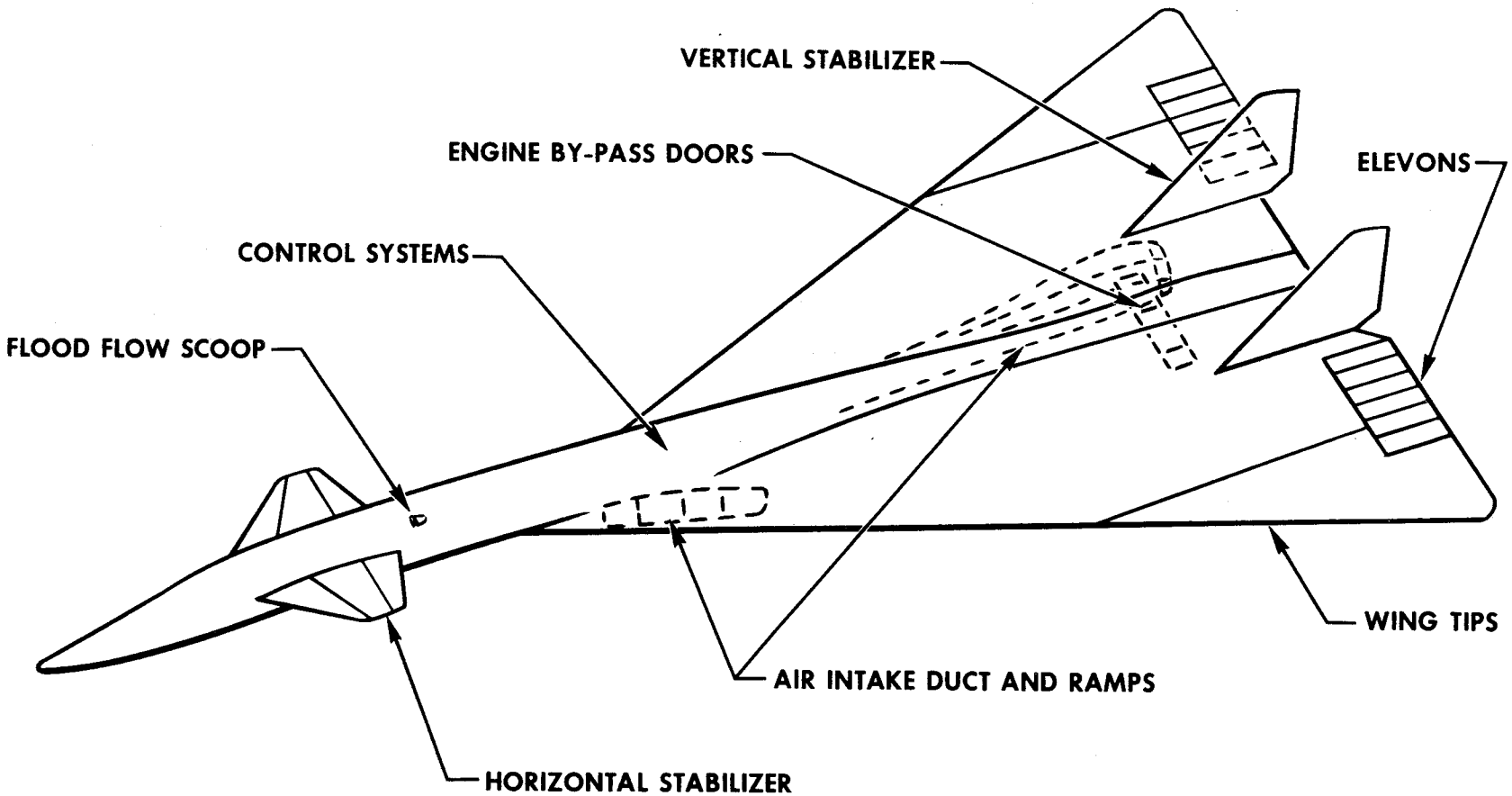


AIR VEHICLE WELDING



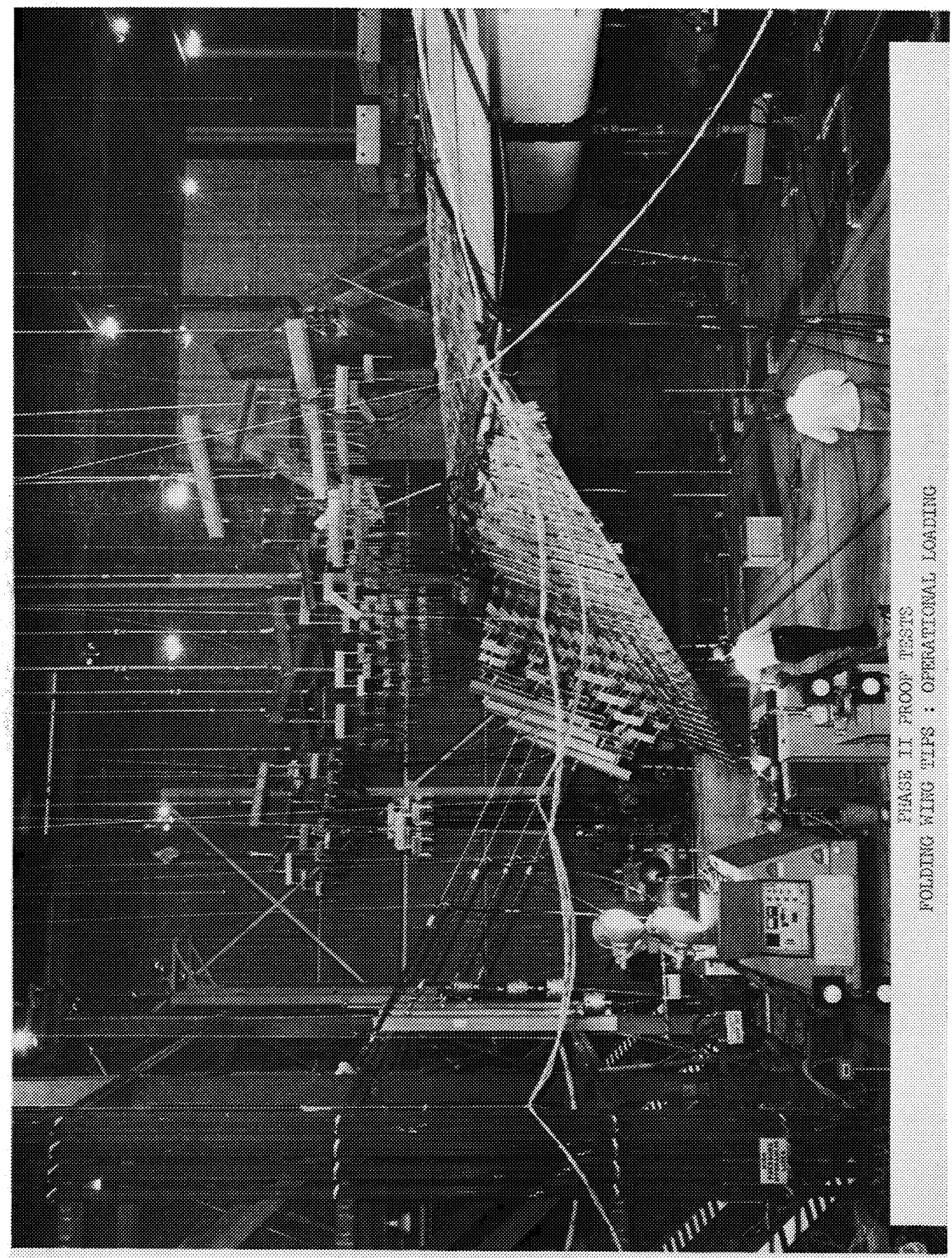
MAIN LANDING GEAR ASSEMBLY

PHASE II PROOF TESTS
PROOF AND OPERATIONAL TESTS UNDER LOAD



PHASE II PROOF TESTS
AIR RAMP-STATIC LOADING

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH



FOLDING SAIL GRID : OPERATIONAL LOADING
PAGE 11 PROP PASS

SATURN S-IVB STAGE, SANTA SUSANA FIELD LABS
FWSB 11 FOOT TESTS
SANTA SUSANA, CALIFORNIA

CT-Hyf-12-8

ELEVON LOADING : STATIC
PHASE II PROOF TESTS

EXHIBIT 13
SD72-SH-0003

OUTLOT CLEWS ; SITE GRAB SAMPLE
SEEN FROM 11 NEWS

FINAL OPERATIONS AND PREFLIGHT TAXI TESTS, AIR VEHICLE 1

WBS 4.40

TEST	MAX. SPEED KNOTS (IAS)	MILES
1	20	1.7
2	35	2.3
3	40 65	4.7
4	86 122	9.4
5	97	5.2
6	87	3.2

1 TEST ABORTED DUE TO BREAK IN ADS BAY 1 HYDRAULIC LINE, STEERING PROBLEMS, BRAKE CHATTER, AND NH3 FLUMES IN COCKPIT

2 FIRST RUN: EXPERIENCED BRAKE CHATTER, LANDING GEAR DOOR MALFUNCTION, AND UNPLANNED OPENING OF NO. 3 ENGINE NOZZLE.
SECOND RUN: CANCELLED DUE TO HYDRAULIC LEAK.

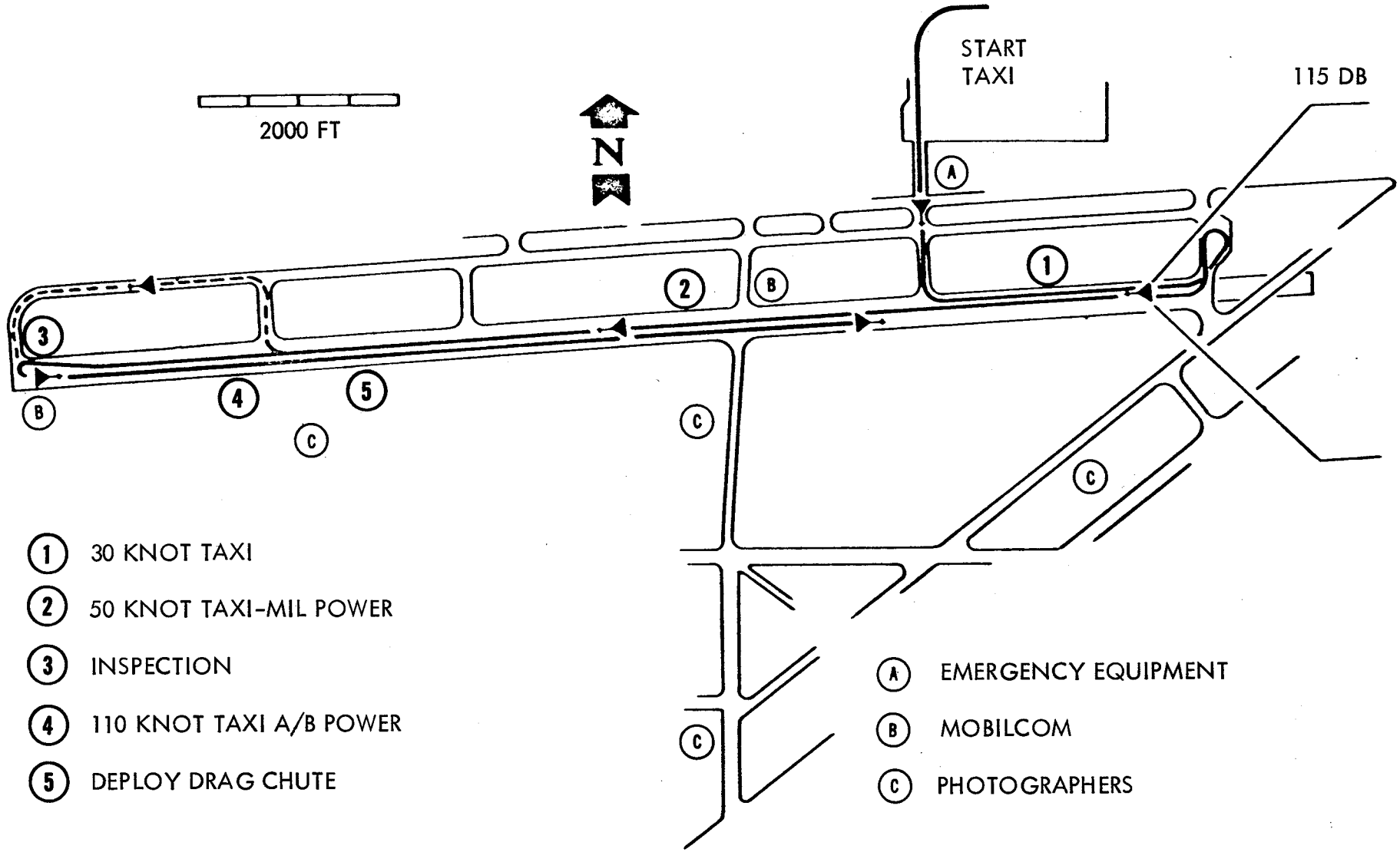
3 POST-RUNS INSPECTION REVEALED HYDRAULIC LEAK IN ADS BAY 6 AND LEFT-HAND BRAKE ACTUATOR SEALS REQUIRED REPLACEMENT.

4 FIRST RUN: NOSE WHEEL STEERING EVALUATION COMPLETED.
SECOND RUN: DRAG CHUTE JETTISONED SATISFACTORILY AT 80 KIAS AFTER BEING DEPLOYED AT 122 KIAS. BRAKES OPERATED SATISFACTORILY AND NO HYDRAULIC LEAKAGES WERE ENCOUNTERED.

5 6 SUCCESSFUL TESTS

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 AUG 1964 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 SEP

TAXI TEST PROCEDURES



PREFLIGHT & FINAL OPERATIONS
(AV NO. 1)

WBS 4.40

Prior to conducting the air vehicle rollout on 5-11-64, it had been resolved that the following manufacturing operations would be deferred for later completions:

Hydraulic servicing and power-on

Primary and utility cross systems leak check

Landing gear operations

By-pass door system

Flight Control, AICS, brake control, steering, wing fold, preliminary and complete fuel system functional operations

Fire Protection

Thrust control and speed reset

Engine ignition ground and air start

Engine and ADS oil indicating

Engine windmill brake

Emergency generator

Drag chute

Windshield ramp

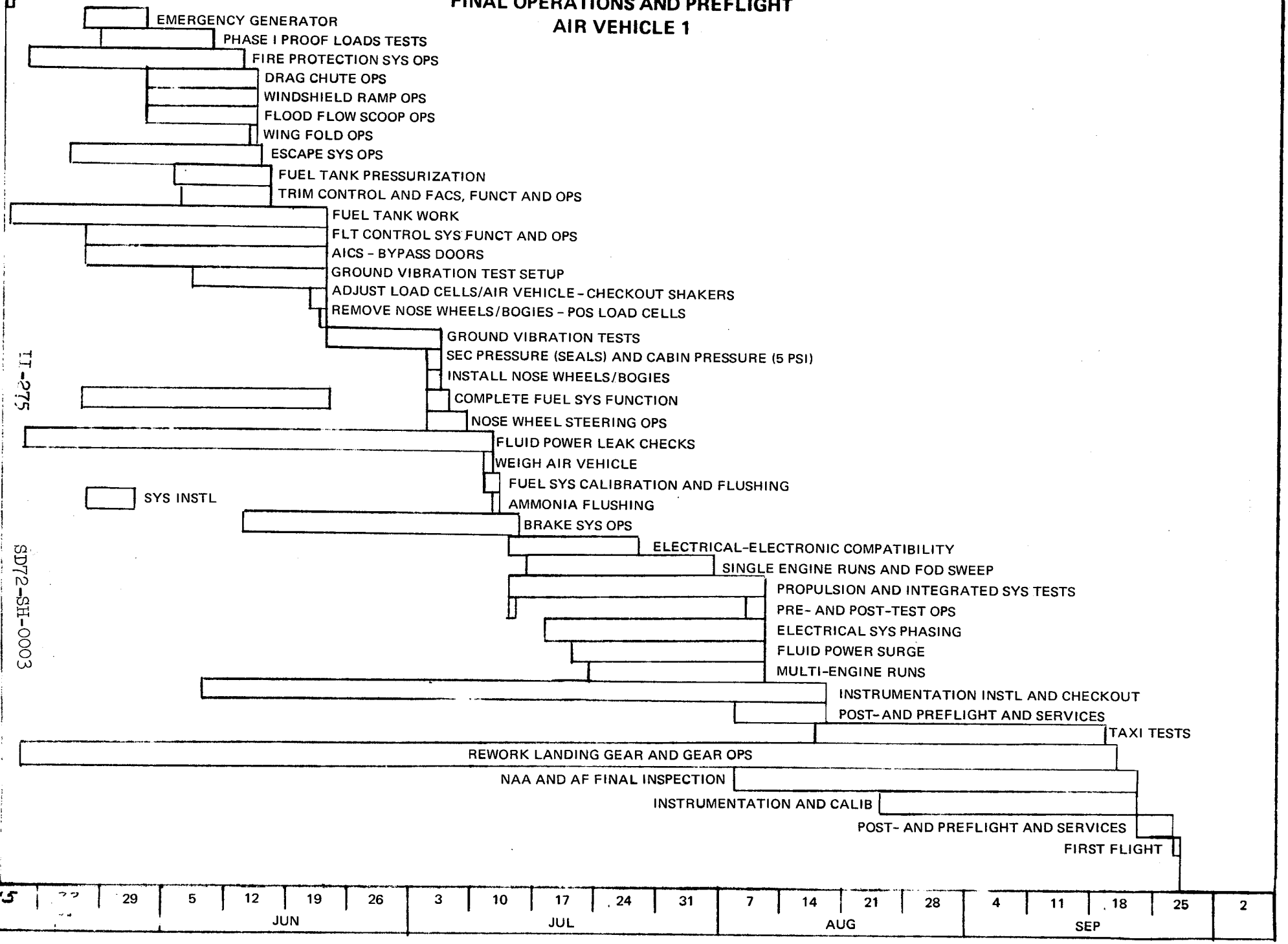
Flood flow scoop

Auxiliary cooling

Escape system

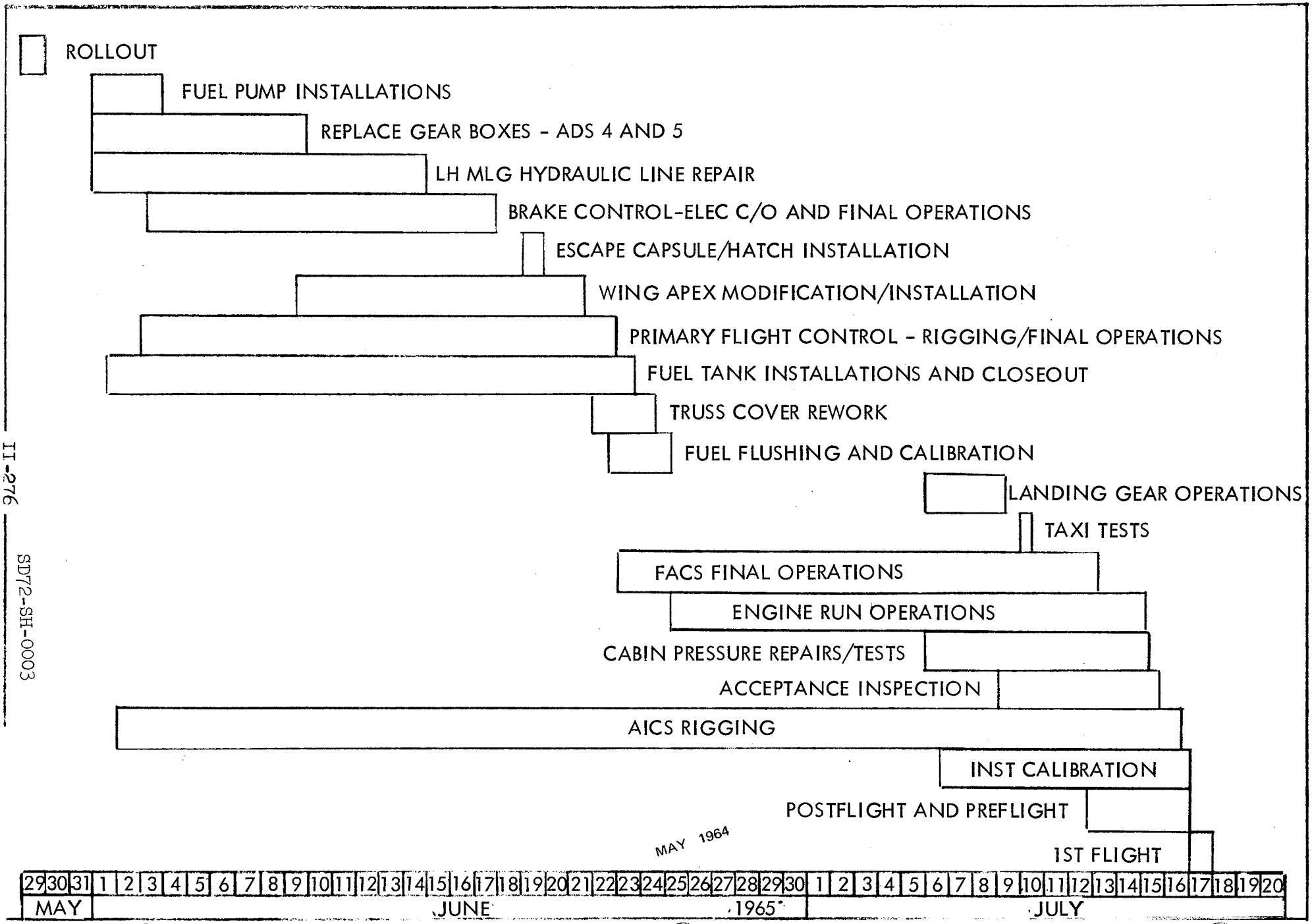
Secondary pressure and cabin pressure leakage test at 5 psi

FINAL OPERATIONS AND PREFLIGHT
AIR VEHICLE 1



Final Operations and Preflight
Air Vehicle 2

WBS 4.40



SD72-SH-0003

FLIGHT TESTING WBS CODE: 4.41

The flight testing development and research phase of the B-70 Flight Test Program was initiated on September 21, 1964 with the first flight on Air Vehicle No. 1. The flight test development program was concluded with Flight No. 49 on Air Vehicle No. 1 on May 9, 1966 and Flight No. 46 on Air Vehicle No. 2 on June 8, 1966. The No. 2 air vehicle was lost on Flight No. 46 as a result of a midair collision between an F-104 chase plane and the B-70. The NASA/Air Force joint contracted research phase continued on Air Vehicle No. 1 as described under Air Vehicle Summary Data; WBS 1.0 in Volume II of this report. On Flight No. 83 on February 4, 1969, the No. 1 air vehicle was ferried to Wright Patterson Air Force Base and turned over to the Air Museum.

The flight test development program performance was based on Aircraft Operational Months (AOM) which is discussed under Air Vehicle Maintenance; WBS 4.41.2. The development program consisted of 22-1/2 AOM's or 35 total aircraft calendar months over a time span of approximately 23 calendar months. Exhibits 15 and 16, on pages II-285 and II-286, present the flight rate and flight hour performance showing the comparison between scheduled and actual. As depicted, the total number of flights was 95 and the total hours was 186:23 (scheduled 180 hours). Exhibits 17 and 18, pages II-287 and II-288, present the turnaround performance showing the program goal versus actuals for unscheduled and scheduled maintenance based on AOM's. (Scheduled and unscheduled maintenance are also discussed under WBS 4.41.2).

Exhibit 19, page II-289, presents the XB-70 flight envelope showing, by solid line, that area explored by Air Vehicle No. 1 and, by a dash line, that explored by Air Vehicle No. 2. During these explorations, data were obtained on the Air Vehicle and its subsystems as depicted by Exhibit 12, page II-22, under Air Vehicle Summary Data; WBS: 1.0. A general summary of the data parameters is presented in Exhibit 20, page II-290. As shown, during the test program there were 249 parameters deleted and 378 parameters added resulting in a growth from 837 at onset to a total of 966 parameters. (It should be noted that the exhibit presents a general summation of a most variant condition that existed on both air vehicles).

In subsequent subsections, as identified by the WBS, narrative discussions are presented on Flight Operations, Air Vehicle Maintenance, Instrumentation, Post Flight Evaluation, and Major Repairs. In addition, the following paragraphs present the Pilot's Summary which was extracted in total from "XB-70A Pilot's Summary Report" written by Mr. A. S. White, Chief Test Pilot, Engineering Flight Test, North American Rockwell. In conjunction with the pilot's summary, the following exhibits are presented: Exhibit 21, page II-291, XB-70 at lift off; Exhibit 22, page II-292, March 3 radar ground plot; and Exhibit 23, page II-293, XB-70 during the landing phase.

WBS CODE: 4.41

Pilot's Summary Report:

Summary:

The XB-70 has proven itself to be a very remarkable airplane. It has accomplished every milestone that was set down for it. No aerodynamic changes were required in order to achieve the objectives; but in spite of its tremendous performance, the XB-70 is an unfinished airplane. It was operated in a completely new speed and altitude range, but with off-the-shelf navigation equipment and flight instrumentation that were obsolete for this type of flight operation. This pilot believes that with normal development, including some aerodynamic refinement, some system changes, and better instruments and navigational equipment, this would be a truly outstanding airplane.

General:

In reading this pilot's summary report, consideration should be given to the fact that the combination of this airplane's size, weight, and speed ranges compares to no other airplane in existence; and that the program was primarily a research program with ground rules that allowed only those changes which were necessary to safely accomplish the test objectives. In the normal sequence of development to an operational airplane, many of the opinions and recommendations expressed herein would have been made after the initial airworthiness flights. They are presented now, for the record, and for consideration if improvements can be made for follow-on programs.

In general terms, the XB-70A was an interesting airplane to fly. It had some peculiarities due to size, weight, and configuration that were different from most other airplanes. The movable wing tips introduced some new characteristics in the airplane that had not been experienced before, such as the wide variation in directional stability, roll power, and dihedral effect.

The airplane had a tremendous performance capability and was a thrill to fly from that standpoint, but this capability combined with the fact that the airplane was climbed and cruised very near the boundary of the allowable flight envelope quicker and easier than any other airplane this pilot has flown. The duct pressure limits and the low allowable "g" aggravated the recovery. All this adds to the pressure on the pilot by requiring greater concentration on his part. This was acceptable in a research program of this nature, but would certainly not be acceptable in an operational vehicle. The potential for a great airplane is here, but some refinements are required. More specifically, the pilot's opinions and recommendations are as follows:

Ground Handling Qualities:

Taxiing the airplane was not a difficult operation. Turns from one narrow taxiway to another narrow taxiway was made with acceptable accuracy. However, parking the airplane in a precise location was difficult because of

the restricted visibility, configuration of the airplane, and lack of repeatability of the nosewheel steering system, i.e., the nosewheel steering rate varied with the load on the nose gear so that full rudder pedal application did not consistently give the same turning rate. Ground observers were required for parking, but their inputs were sometimes valueless due to the steering system's inability to follow their directions. Cooper Rating of 3.5. See Exhibit 24, page II-294, for clarification.

Originally the braking system was unsatisfactory at very low speeds, but with development, the system became marginally satisfactory. The airplane could be stopped without brake chatter as long as the pilot anticipated far enough in advance to be able to apply very light braking to make the stop. If an abrupt stop was required at low speeds, heavy brake chatter occurred. Cooper Rating 4.5.

In-Flight Handling Qualities:

Low Speed: The pitch control in low speed flight regime was very good. Some lack in airplane response could be detected during abrupt pitch maneuvers; however, the response was satisfactory in all of the normal maneuvers used in flying the airplane. The long period of the short-period oscillation was different from most other airplanes, but did not cause difficulty in controlling the airplane. The damping in pitch was good in the subsonic flight regime. Cooper Rating of 2.5.

The main difficulty in flying the XB-70 was caused by a combination of characteristics in the lateral-directional sense. These characteristics were: First, that the period of the short-period oscillation was very long as compared to most other airplanes, secondly, the side force per degree of sideslip was low in this airplane. This combination made it difficult for the pilot to sense inadvertent sideslips. In addition to those characteristics, the airplane had a marked positive dihedral effect (particularly #2 A/V) and it had excessive adverse yaw due to ailerons. Considering these four characteristics together, if an inadvertent sideslip occurred without the pilot's knowledge (busy with other system operation), the airplane rolled due to the dihedral effect. Instinctive reaction of the pilot was to counteract the roll with aileron; however, the aileron input increased the sideslip because of the high adverse yaw due to aileron. This increased sideslip caused more roll away from the aileron input and aggravated the situation. The solution was that the pilot had to fly the sideslip or yaw indicator religiously throughout the flight regime. This general characteristic of the XB-70 was most predominant with the wing tips up. Cooper Rating of 4.5.

Placing the wingtips in the one-half position reduced the tendency for the situation explained in the previous paragraph, because lowering the wingtips reduced the roll power by approximately 50%, therefore reducing yaw due to aileron. In addition, the tips down configuration reduced the positive dihedral effect. Cooper Rating of 4.0.

Visibility with the windshield in the up position was unsatisfactory. The pilot cannot see the horizon ahead and must make the flight almost entirely with reference to the pitch attitude indicating system. The poor quality of the heading information, precise heading, climb schedule made altitude flying extremely difficult. In addition, images of light-colored ground such as snow and sandy desert areas reflected badly in the windshield during turns, at times causing vertigo. Cooper Rating of 5.0.

Unstarts: The inadvertent inlet unstarts encountered in the flight test program varied in intensity from mild to severe. They were breath-taking to say the least. In the case of a severe unstart, it jarred the airplane rather violently and was followed by heavy buffeting, intense aerodynamic noise, and minor trim changes. At Mach 3, the primary trim change was in roll, but usually did not persist since the other inlet would normally unstart within a few seconds. If the inlet system did not effect an immediate restart, the inlet would go into buzz. The buzz cycle was immediately recognizable to the pilot since it was almost purely a lateral oscillation at about the natural frequency of the fuselage. If it was not corrected, it built up in intensity to a very disturbing, if not destructive, magnitude. In spite of the severity of the transients caused by inlet unstarts, airplane control was considered good.

Landing: The XB-70 was not a difficult airplane to land. Some care had to be used due to the distance between the pilot and the main gear and due to the crew station height above the main gear at touchdown. Because of these dimensions, it was easy to undershoot the runway. After some practice, all pilots were able to make satisfactory landings without external assistance from chase aircraft.

The wing of the XB-70 experienced a strong ground effect in the proximity of the runway which helped considerably in making relatively smooth landings. The secret to a good landing, like in most airplanes, was a good stabilized approach using a rather low rate of descent (2 to 3 degrees glide scope).

Crosswind landings in the XB-70 were not as difficult as was predicted. The relatively shallow bank angle per degree of sideslip made the wing-down technique rather easy to use with the XB-70.

Landing in turbulent air required additional pilot concentration, primarily due to previously mentioned relationship between inadvertent sideslip, dihedral effect, and yaw due to ailerons. The pilot was required to watch the yaw indicator very closely in making an approach so as not to get into this inadvertent sideslip condition close to the ground. Landing Cooper Rating was 3.5.

Cockpit: Controls and Layout:

Capsule: The pressure seals in the capsule doors were torn loose many

times when the pilots entered the capsules. Entering the capsule, particularly when wearing the pressure suit, was very difficult due to the lack of space. The seals should be guarded so that they are not damaged in this way.

The original installation of the capsule handgrip seat pins included a lanyard and a take up reel which were installed behind the pilots shoulder. A large percentage of the time the take-up reel did not operate; and when it did operate, the pin was extremely hard to reach to reinstall after flight. A temporary fix was made by cutting the lanyard, thereby eliminating the take-up reel. This worked satisfactorily, except for the minor inconvenience of not having a place to stow the pin.

The emergency parachute and riser cutter handles and the hinge split handle were difficult to see when encapsuled. When the pilot raised his head to see the handles with his helmet on, he had to raise his helmet with his hand in order to see past the bow of the helmet. This was particularly true when the pilot was wearing a pressure suit and was aggravated under the dynamic conditions encountered after ejection.

The pressurization and capsule oxygen gages were particularly hard to see once in the capsule. The safety belt was almost impossible to adjust after it has been fastened. The seal deflate button was very difficult to actuate due to its location when the pilot was wearing a pressure suit.

The hot mike interphone capability during encapsulation was operable only after the capsule doors were closed. It appears wise, after the experience of the recent ejection, that the hot mike be actuated in another way in addition to the door closure. It should be connected to the handgrips so that when encapsulation is made, the hot mike interphone is available even if the doors are not closed.

The manual impact attenuator inflation device was extremely difficult to get to while encapsulated. It was recommended that some thought be given to relocating this device between the pilot's knees for easier access.

The Secondary Nozzle Rheostat: This rheostat is in a poor location considering the number of times it was used during flight. It would be desirable to move it forward in the area near the oxygen and visor heater switches.

Hydraulic Pump Status Indicators: The hydraulic pump status indicators became almost useless in view of the number of times the pump status indicators showed yellow with the pumps operating properly.

Nosewheel Steering System: The nosewheel steering engage button ideally should be mounted on the control wheel. Originally this was not done because of lack of space on the wheel. The pilots believed that the augmentation disengage switch should have the priority location on the wheel. The experience gained in the flight test program indicates that it would be satisfactory to move the augmentation disengage switch to the same area as

the augmentation engage button on the console and put the nosewheel steering engage switch on the control wheel.

TACAN: The TACAN instrumentation on the XB-70 was only marginally satisfactory. Early in the program the pilots were requested to list the minimum equipment with which they could accomplish the mission, and one TACAN was suggested for navigation. Experience has now shown that without radar tracking and the occasional assistance of the FAA centers, some of the missions would have been extremely difficult to complete satisfactorily due to the quality of this equipment and installation.

Attitude and Heading Information: The attitude and heading information was marginally satisfactory. This added to the pilot's difficulty in navigating the airplane. In view of the above two conditions, it was highly desirable to have a more reliable navigation system. An inertial platform was highly recommended.

AICS Controls: The AICS controls were satisfactory for the development stages, although the controls in A/V #1 were minimum satisfactory. It was highly recommended that this system be reviewed for future use.

Flaps: The flap system was marginally satisfactory. Because of a design problem, the flaps were to be raised for the taxi and lowered just prior to takeoff in order to ensure that they would retract in flight. Occasionally they would not extend for landing, and occasionally they would not retract after landing. The result was that the pilots lost confidence in the flap system. It was recommended that a design change be made to eliminate the necessity of the intricate procedure that was required to operate the flap system.

Map Case: The map case was almost inaccessible to the pilots. In most cases the pilot had to get out of his seat to get the equipment from the map case. Although the map case was of little use to the pilots, it was the only place in the cockpit that extra material could be stored. Check lists and pilot's data cards had to be strapped to the pilot's legs to be of any use. Some consideration should be given to a more convenient stowage space for let-down charts, handbook, and additional maps, particularly if this airplane is to be used for cross-country work in the future.

Wingtip Selector Switch: If the flaps are lowered for landing prior to raising the wingtips to the up position, it would be possible to lose control of the airplane. It was recommended that a safety device be installed to prevent lowering the flaps when the tips were not in the up position.

The airplane had moderate buffet at low speeds with the gear and flaps down. There was a minor change in the buffet level as the gear and flaps were raised. Some buffet persisted and a high aerodynamic noise level existed until the airplane accelerated to .87 Mn or above, at which time the buffet completely disappeared and the noise was reduced to at least half of the low-speed level.

High Speed: Pitch control during the transonic acceleration and low supersonic speed ranges was very good. Above Mach 2 it became evident that there was some deterioration in the effectiveness of the pitch control. At speeds above 2.5 Mn, the force level required to maneuver the airplane was excessive due to this deterioration and due to the action of the "g" bellows. Cooper Rating of 3.5.

The directional control was adequate to take care of three engines out on one side, but was much less effective in producing yaw than were the ailerons. Considering the capability of the rudders alone, they were considered adequate. Cooper Rate of 3.0. However, the powerful capability of the ailerons in producing yaw was considered the most objectionable characteristic in the airplane. Cooper Rating of 4.5.

The roll response of the airplane in the supersonic flight regime was good. The roll response did not seem to deteriorate at the same rate as pitch response, and therefore there was less compatibility in the response of the airplane between Mach 2 and 2.7 than in other areas. As the airplane approached Mach 3, the roll response deteriorated and the yaw due to aileron input was reduced; therefore the handling qualities of the airplane in roll were better at Mach 3 than at any other supersonic speed. Cooper Rating for the roll control system was 3.5.

Although there were minor differences in the flight characteristics between 1.4 and Mach 3 with all augmentation off, the general characteristics were the same. The short-period oscillations in pitch and yaw were four to six seconds in length and the damping in pitch and yaw was relatively poor. The airplane could be flown at all speeds with the augmentation off, except that extreme care had to used in the use of ailerons because of the strong tendency to excite lateral-directional oscillations with the ailerons. This was due to a high roll rate in the unaugmented case and because of the excessive level of yaw due to ailerons. When the pilots left the ailerons alone, the yawing oscillations would damp. Unaugmented supersonic flight: Cooper Rating of 5.0.

Visibility: The visibility with the windshield down was satisfactory. Although some forward visibility was lost after the rotation at takeoff and during the initial part of the climbout, the remainder of the subsonic flight was satisfactory.

The visibility for landing was considered good. At no time was the pilot aware of any loss of the runway visibility during approach, flare, and touchdown: Cooper Rating of 3.0.

The longitudinal trim system was very good. Cooper Rating of 2.0.

The lateral trim system was also very good, except that the primary lateral trim control was difficult to operate with a high degree of accuracy when the pilot was wearing heavy gloves. Cooper Rating of 3.0.

The directional trim system was very good after the gear had been retracted. It was too sensitive with the gear down, which caused the pilot to over-control when attempting to trim out directionally. Occasionally some difficulty was encountered when engaging the nosewheel steering system due to the inability of finding the neutral directional trim position.

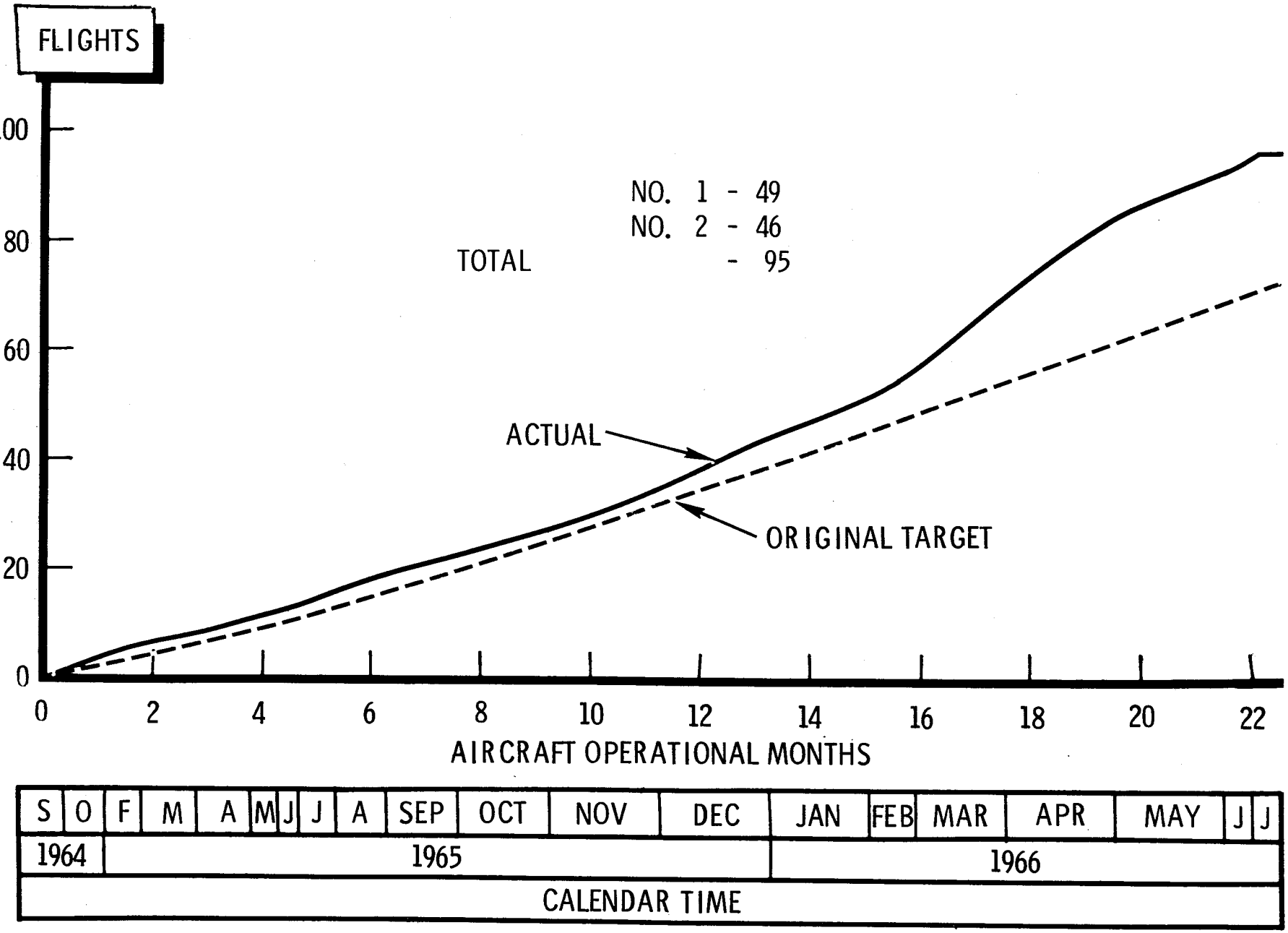
For instance, the pilot would trim out directionally prior to putting the gear down; however, the trim system would not be exactly centered at this time. When the gear was lowered, this minor out-of-trim condition was amplified by a ratio of four to one. Due to turbulence and low speed flight characteristics, this out-of-trim condition would go undetected until after landing when the rudders were released and the nosewheel steering engaged which resulted in an abrupt transient in the steering system. It was recommended that consideration be given to reducing the directional trim rate and incorporating a rudder position indicator. Cooper Rating of 3.0.

The compatibility of the roll and pitch force gradients was satisfactory; however, due to the large differences in the moments of inertia, the airplane responded much quicker in roll than in pitch or yaw. This was not considered to be a discrepancy against the airplane, but a characteristic of a very long and narrow configuration. It required some getting use to by the pilots in order not to overcontrol in roll, particularly with the tips up. A change should not be made in the response characteristics, but something should be done to reduce the adverse yaw due to ailerons. This would eliminate the primary objectionable characteristics in the airplane. If the pilots were not concerned about generating yaw with aileron inputs, the fighter-like roll response would not be objectionable. Control force compatibility: Cooper Rating of 3.0.

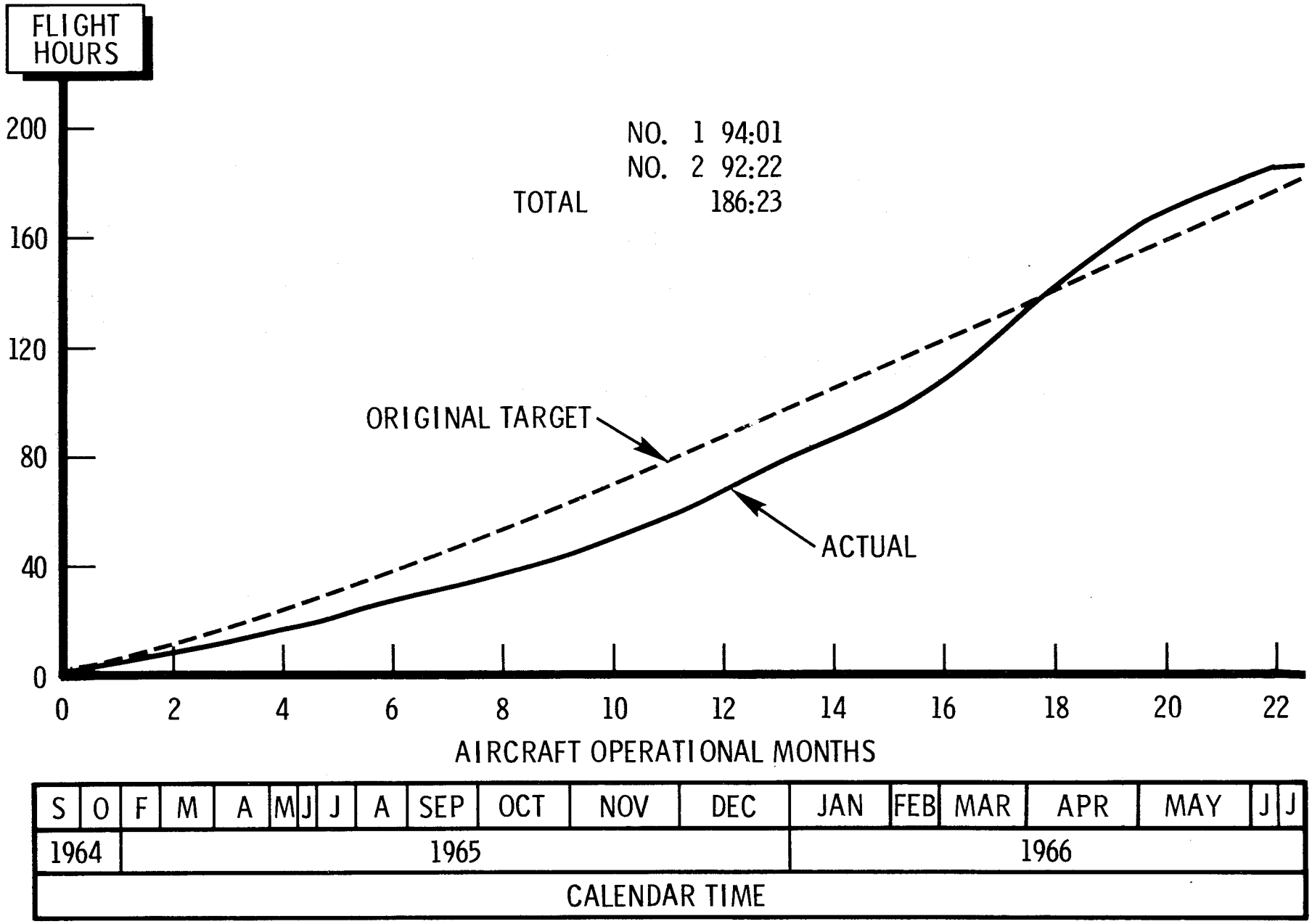
The trim change while operating the landing gear was negligible. The trim change while operating the wing tips was small and occurred at such a slow rate that it was hardly noticeable to the pilot since he took care of it in the normal trimming of the airplane. The trim change due to operation of the flaps was large, but easily manageable with the trim system. Although the trim system did take care of the trim change, when the flaps were lowered the control column moved very near the forward end of its travel leaving very little usable down elevon for maneuvering, go-around, or flying in turbulent air. This could be extremely hazardous in the instance where the center of gravity was farther aft than normal.

It was recommended that a design change be made whereby more down elevon control would be available with flaps down.

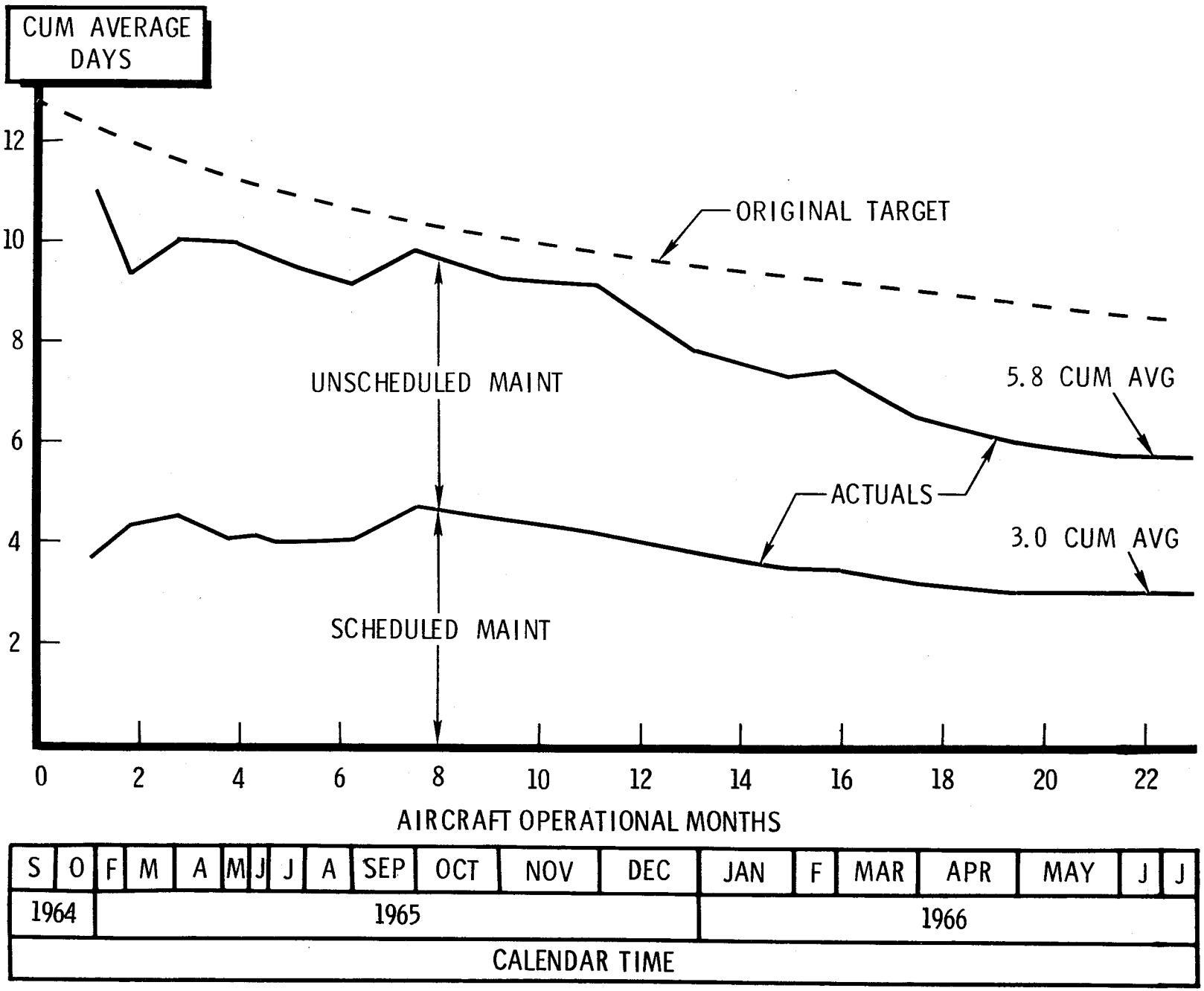
FLIGHT RATE PERFORMANCE



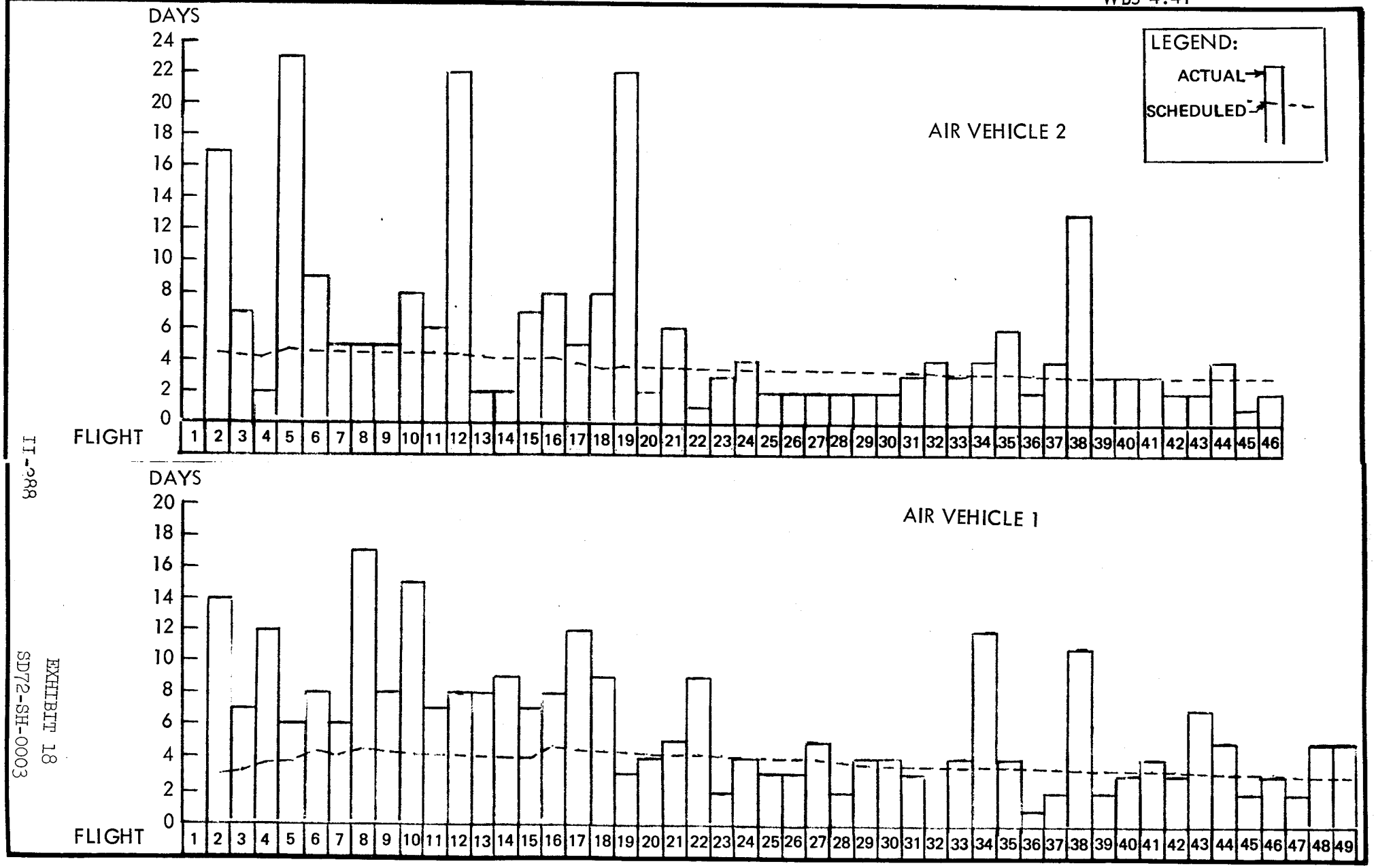
FLIGHT HOUR PERFORMANCE

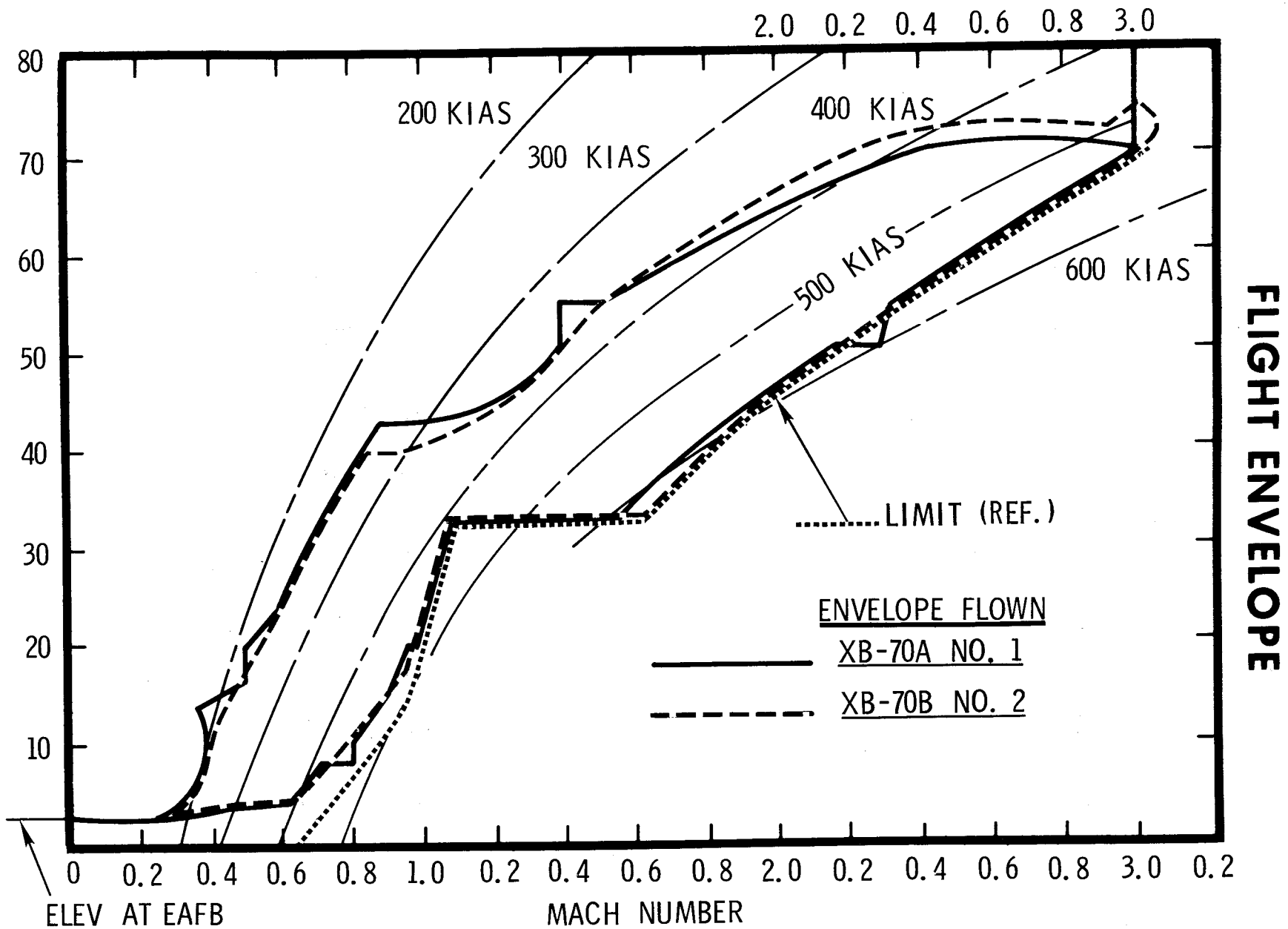


TURN AROUND PERFORMANCE



WBS 4.41

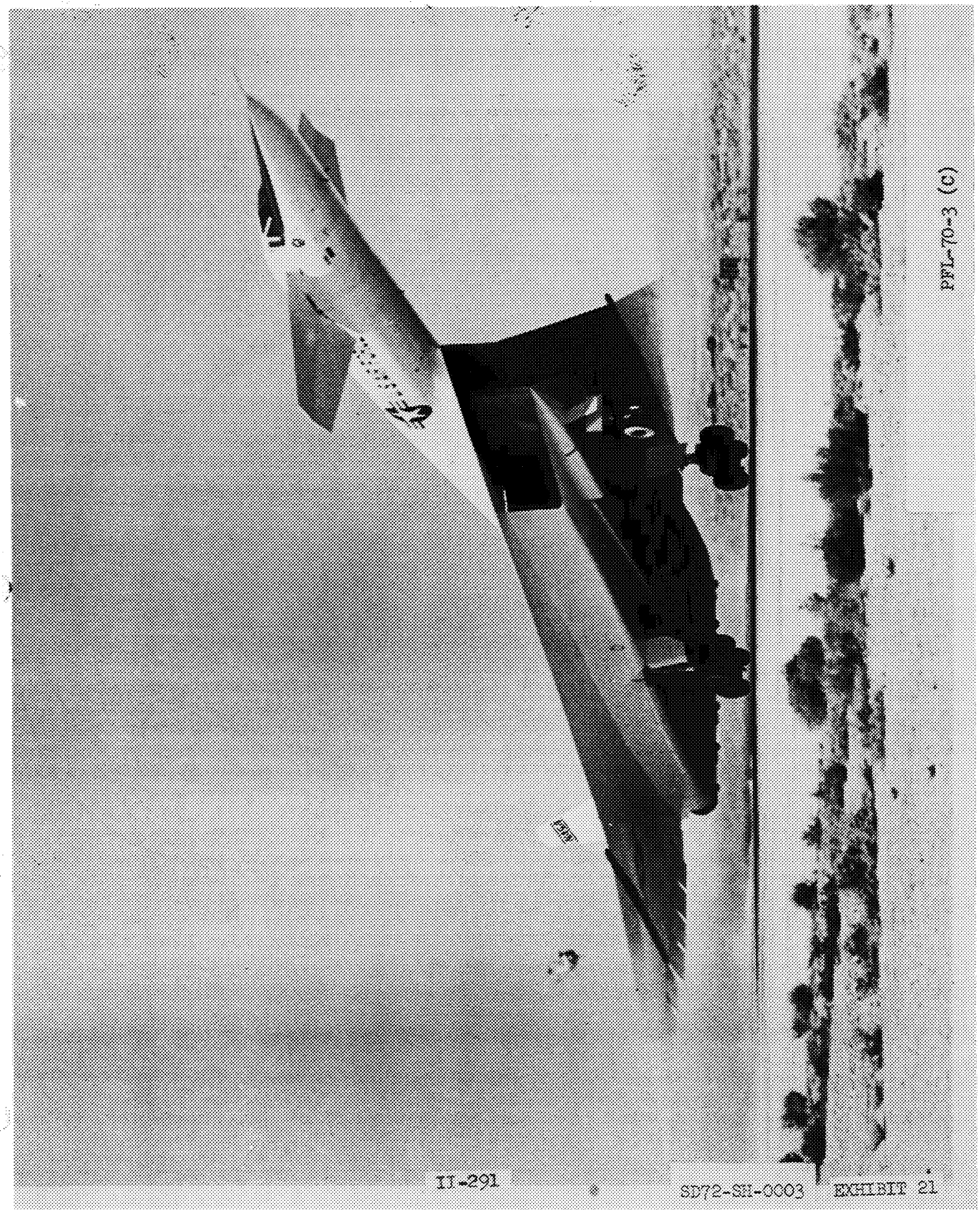

DAYS
LEGEND:
ACTUAL
SCHEDULED
AIR VEHICLE 2
FLIGHT
AIR VEHICLE 1
DAYS
FLIGHT

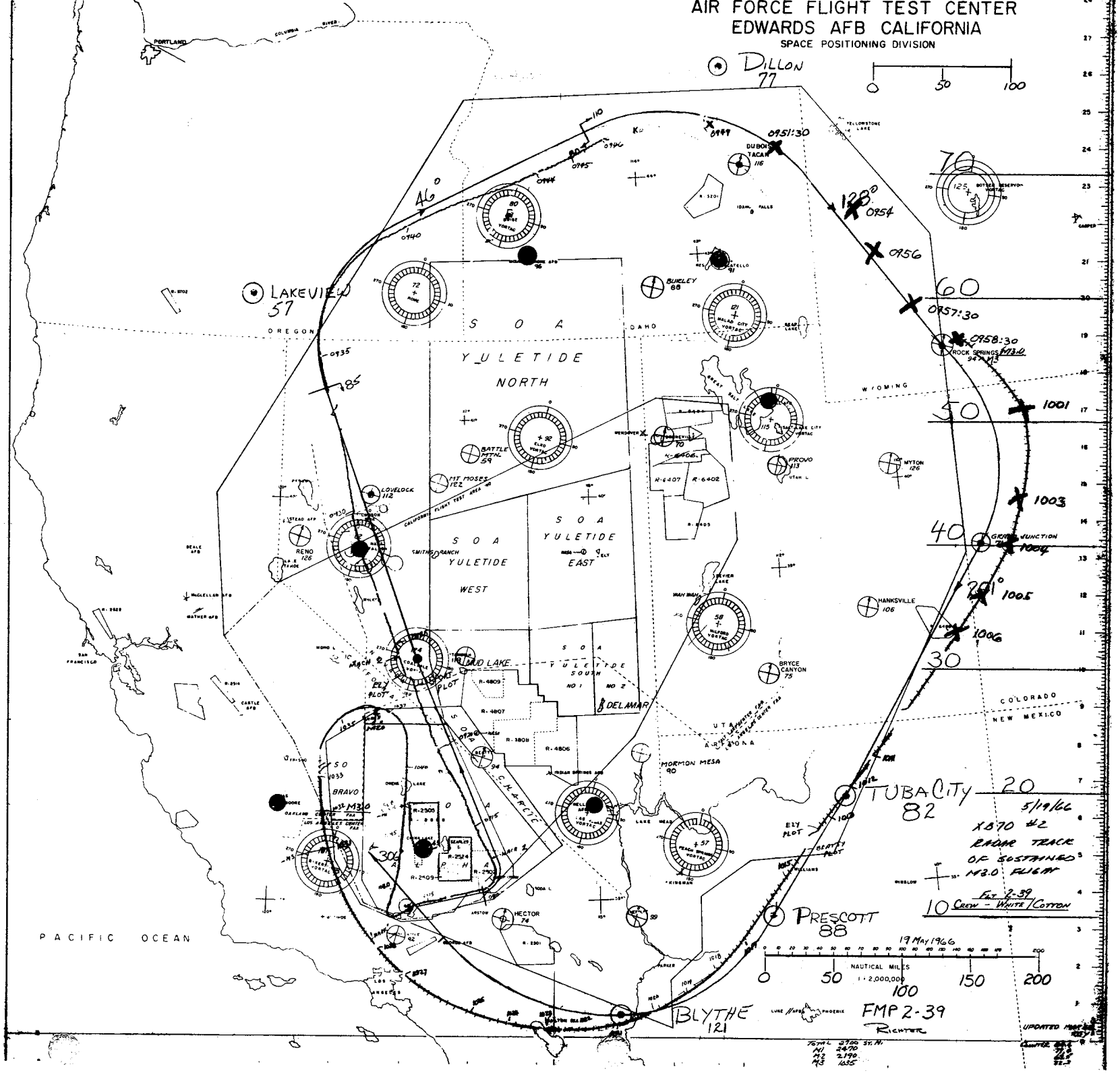

FLIGHT ENVELOPE
ALTITUDE - 1000 FT
80
70
60
50
40
30
20
10
200 KIAS
300 KIAS
400 KIAS
500 KIAS
600 KIAS
LIMIT (REF.)
ENVELOPE FLOWN
XB-70A NO. 1
XB-70B NO. 2
2.0 0.2 0.4 0.6 0.8 3.0
0 0.2 0.4 0.6 0.8 1.0 0.2 0.4 0.6 0.8 2.0 0.2 0.4 0.6 0.8 3.0 0.2
ELEV AT EAFB
MACH NUMBER

DATA PARAMETER SUMMARY

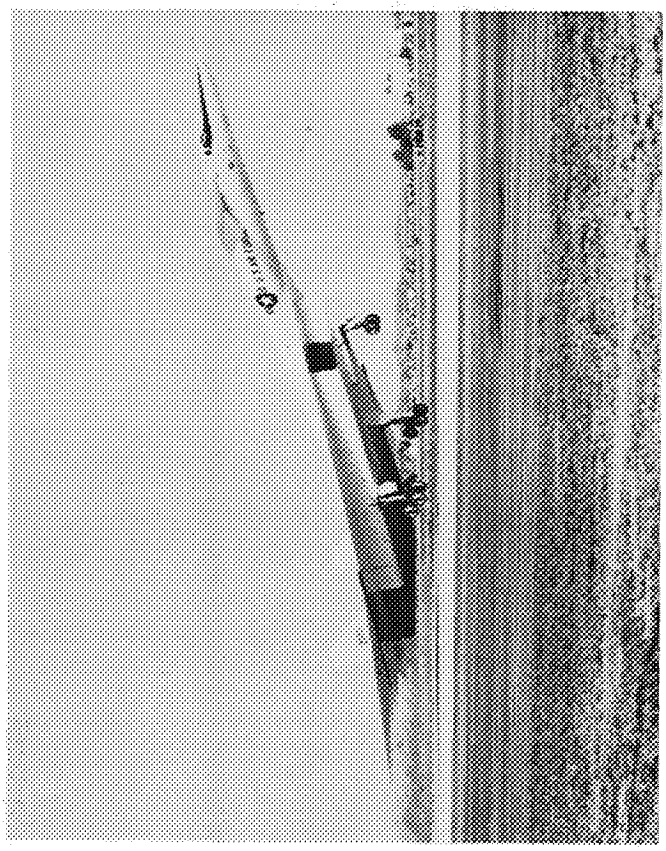
TOTAL PARAMETER LIST	837
PARAMETERS DELETED	-249
PARAMETERS ADDED	+378
TOTAL PARAMETER LIST	966
PARAMETER DISTRIBUTION	
MISCELLANEOUS	138
ACCELEROMETERS	67
POSITIONS	104
TEMPERATURES	142
STRAIN GAGES	118
PRESSURES	397

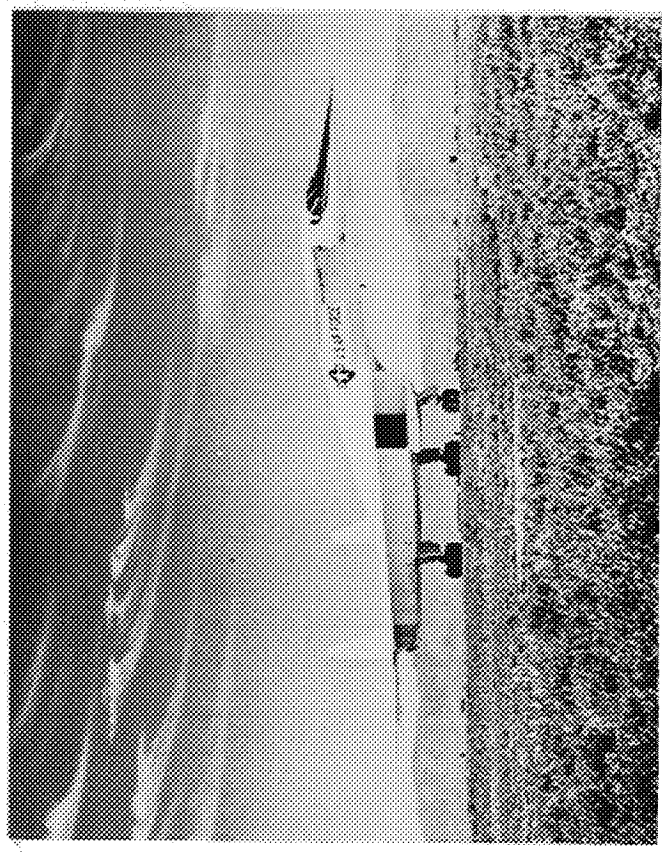
ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

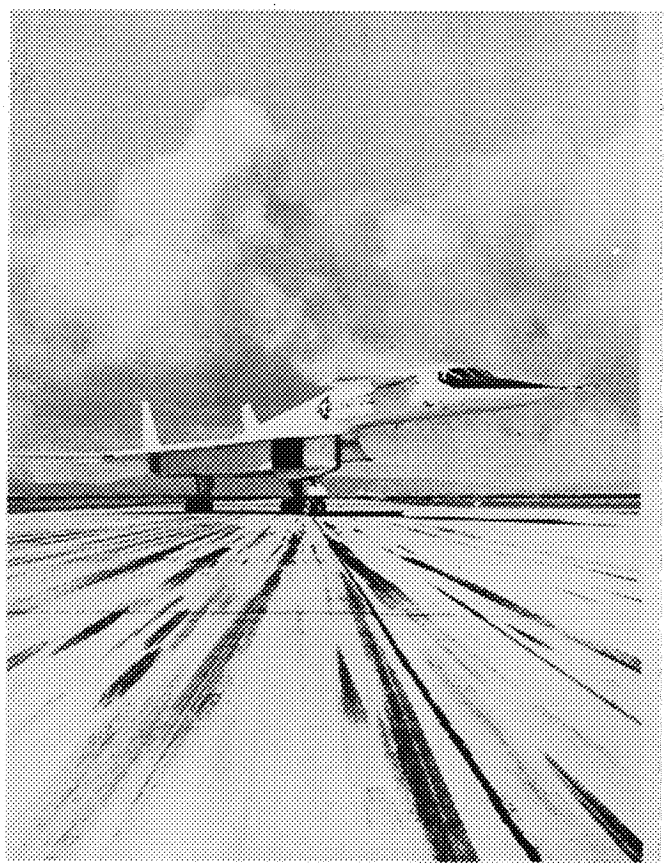


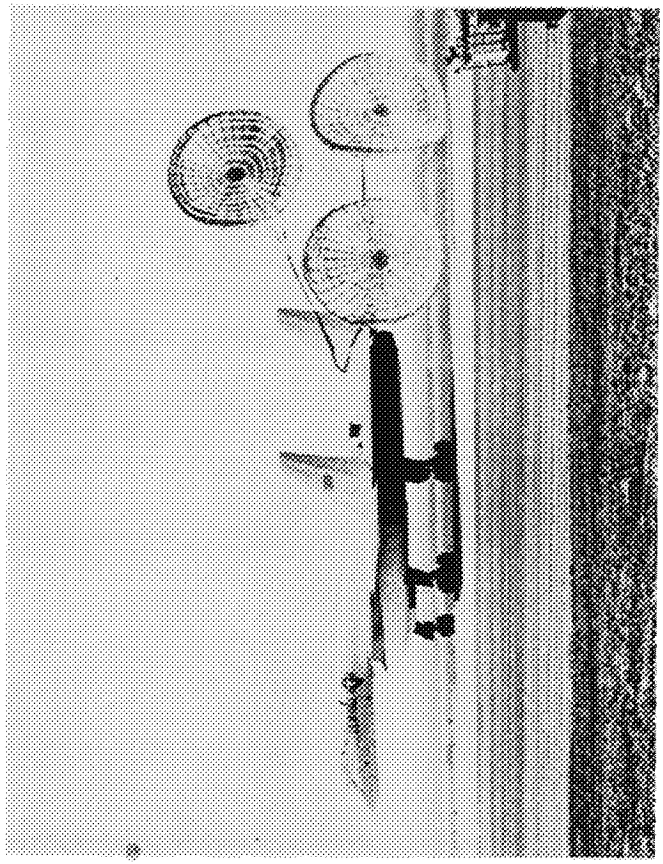

AIR FORCE FLIGHT TEST CENTER
EDWARDS AFB CALIFORNIA
SPACE POSITIONING DIVISION
DILLON 77
LAKEVIEW 57
BURLEY 88
PRESCOTT 88
BLYTHE 121
TUBA CITY 82
S O A
Y U L E T I D E
NORTH
S O A
YULETIDE
WEST
S O A
YULETIDE
EAST
S O A
YULETIDE
SOUTH
NO 1
NO 2
BRAVO
CHARLIE
DELAMAR
MUD LAKE
MORMON MESA
PACIFIC OCEAN
OREGON
IDAHO
WYOMING
COLORADO
NEW MEXICO
UTAH
ARIZONA
0951:30
0954
0956
0957:30
0958:30
1001
1003
1004
1005
1006
5/19/66
XB70 #2
BASIC TRACK
OF SUSTAINED
M3.0 FLIGHT
FLT 2-39
CREW - WHITE/COTTON
19 MAY 1966
NAUTICAL MILES
1:2,000,000
FMP 2-39
RICHTER

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH









COOPER PILOT OPINION RATING SYSTEM

Adjective rating	Numerical rating	Description	Primary mission accomplished	Can be landed
Satisfactory	1	Excellent, includes optimum	Yes	Yes
	2	Good, pleasant to fly	Yes	Yes
	3	Satisfactory, but with some mildly unpleasant characteristics	Yes	Yes
Unsatisfactory	4	Acceptable, but with unpleasant characteristics	Yes	Yes
	5	Unacceptable for normal operation	Doubtful	Yes
	6	Acceptable for emergency condition only: Failure of stability augmenter	Doubtful	Yes
Unacceptable	7	Unacceptable even for emergency condition: Failure of stability augmenter	No	Doubtful
	8	Unacceptable—dangerous	No	No
	9	Unacceptable—uncontrollable	No	No
Catastrophic	10	Motions possibly violent enough to prevent pilot escape	No	No

PILOT'S FLIGHT REPORT

AIR VEHICLE XB-70A #2 (207) PILOT A. S. White

FLIGHT NO. 2-39 COPILOT Col. J. Cotton

DATE OF TEST 19 May 1966 FLIGHT TIME 1:59

CHASE AIRCRAFT AND PILOTS

Chase 1 - T-38 #598 - Capt. Hoag/DeLong(NAA Photo)
Chase 2 - F-104 #817 - Capt. Livingston
Chase 3 - T-38 #598 - Capt. Hoag/DeLong(NAA Photo)
Support - B-58 #662 - Lt. Col. Fulton/Prahl
Rescue - C-130 #132 - Sq. Ldr. Cretney/Maj.Doryland

PURPOSE OF FLIGHT

Mach 3 for 30 minutes!

1.0 PREFLIGHT AND TAXI

The preflight and engine start phases were completed by 0814. It was necessary to make a soft start on the #1 engine. Although this was not written up as a discrepancy, soft starts have been necessary for the last three engine starts.

An oil leak was detected from the engine 4 pod vent. No. 4 engine was accelerated to 90 per cent rpm for a short time and on reducing power to idle, the leak had stopped. No further action was taken.

Data was taken for the power advances required during the taxi phase. No brake chatter was encountered at any time on this flight.

2.0 TAKEOFF, CLIMB, AND CRUISE

Brakes were released for takeoff at 0900 and MAX A/B was immediately selected. OVERSPEED was not used for this takeoff. The runway temperature was reported to be 69° at brake release. The acceleration check was made using the sensitive airspeed indicator on the pilot's side. According to the handbook, the airplane should have accelerated from 70 to 148 knots in 20 seconds. It actually accelerated from 70 knots to 150 knots in 20 seconds. Rotation started at 195 knots, and the airplane flew off the ground at 210 knots on the pilot's tape airspeed indicator.

The gear and flaps were raised. The #2 utility augmentation channel disengaged during the gear cycle and was immediately re-engaged after the gear was up and locked. The tips were lowered to one-half at 300 knots during the climb. At .9 Mn the AICS was reset and switched

to the AUTO mode. The first turn was made at 32,000 ft. fifty miles east of the Edwards TACAN. The airplane did not accelerate during the turn; consequently, it did not go supersonic until the turn was completed. The windshield was raised for the acceleration and the airplane was accelerated at 32,000 ft. to 575 knots where the climb was continued. During the initial part of the climb, the speed was allowed to build up to 595 knots and then slowly bled off to 575 by 40,000 ft.

The inlets started between 2.13 and 2.16 Mn just prior to reaching 50,000 ft. in the climb. After accelerating to 2.6 Mn, light buffeting was observed in the airplane of the type encountered on previous flights when the bleed air holes were partially plugged. However, this buffeting all but disappeared by 2.7 Mn and was not noted again during the flight.

Both the pilot and copilot had trouble in the climb phase of this flight with the face plate fogging over. The pilot normally runs the heater rheostat at the mid position, but had it on full hot and was still getting some fogging. The copilot reduced the airflow through the eyeball outlets to a minimum, and then turned the cabin heat up one notch in an attempt to help this situation. Later in the flight when the temperature was up, neither pilot had trouble with the face plate fogging. Whatever the cause, it appears that the face plate heating units are not adequate to take care of the moisture expelled in the helmet.

The turn north of Lovelock, Nevada, was made at approximately 2.6 Mn, and up until that time the TACAN indications were very good. The DME function of the TACAN broke lock just before the turn, so the ground station advised the pilot of the turning point. After rolling out of the turn, the TACAN locked on Lake View TACAN station and appeared to be functioning satisfactorily, but the heading information drifted and fooled the pilot into thinking that he was left of course when actually the radar track showed him to be right of course. The TACAN worked very well for the remainder of the flight. Any errors in navigation were caused by the drifting and the sluggishness of the heading information.

The inlet system was switched to HIGH PERFORMANCE at 2.7 Mn. The turn northeast of Boise, Idaho, was made at 2.8 Mn using a 15- to 17-degree bank angle. The airplane did not accelerate in this turn.

During the run between a point north of DuBois to Rock Springs, the airplane was slowly accelerating, but the throat Mns were on the lower limit. At 2.9 Mn the deviation control was set to 000 for the right inlet. At 2.92 the setting was changed to 995. At 2.97 the left inlet deviation control was set to 000. Mach 3 indicated was achieved at 0959 at a point in a turn just southeast of Rock Springs, Wyoming. Total fuel remaining at that time was 81,000 pounds. The throat Mns indicated 3.06 on the left and 3.02 on the right. Consequently, the

right deviation was changed to 990. During the next two minutes, the Mach number built up to 3.025, and then bled off to 3.01 as the airplane climbed above 71,000 ft. Throat Mns were 3.05 on the left and 3.04 on the right. The deviation settings were then changed to 995 on the left and 985 on the right and remained that way for the rest of the Mach 3 portion of the flight. The Mach number varied between 3.02 and 3.06 with several constant periods at 3.03. Altitude variations ranged between 70,500 and 72,500 ft. It is the pilot's opinion that the altitude variations were caused by very minor errors in pitch attitude, rather than any abrupt pressure changes in the atmosphere. The altitude changes were not sudden; however, the rate-of-climb instrument showed some rather large excursions occasionally during the flight.

A right turn was started at Prescott, Arizona, and the airplane was held in a 15-degree bank. The flight path at the beginning of the turn was approximately ten miles west of the planned flight path, and the airplane overshot the planned flight path by approximately fifty miles on arriving in the Edwards area. No problem was encountered in maintaining speed in the turn, although altitude control required intense pilot concentration.

The throttle settings during the Mach 3 run varied between a 92-degree throttle angle and MAX A/B. During the early part of the run, the average throttle setting was approximately ninety-eight degrees. During the final ten minutes, the average throttle setting was 95 degrees or less.

The pilot was aware of the minor trim changes caused by fuel burning out of tank 8 and tank 1. In other words, the pilot could sense the point where tank 8 stopped feeding and tank 1 began feeding due to the shift in the CG. This has a minor effect on the precise altitude control, since only minor pitch trim changes will cause rather large changes in the rate of climb.

A marker was placed on the data at C/N 5688 with a call-out for correlation with the ground stations at Edwards during the last five minutes of the run. After at least 32 minutes at Mach 3, the inlets were switched to normal and the deviation controls set at 005. Before the pilot could reduce the throttle to Military Power, the left inlet unstarted. It restarted immediately and the copilot reset the duct. At approximately this time the right inlet unstarted and went into several cycles of buzz. The copilot selected LOW PERFORMANCE; but even though the airplane was buffeting moderately due to the inlet settings, the buzz lights went out and the side-to-side oscillation associated with buzz ceased. The VIBRATION HIGH light came on with no indication of high vibration on any of the twelve pickups. Military Power was selected and the deceleration commenced. As the airplane decelerated through 2.6 Mn, the left-hand #1 buzz light came on with no airplane transient. This occurred several times during the descent to Mach 2.

At approximately 2.2 Mn, in a right turn near Bishop, the windshield was lowered. Total fuel at this time was 26,500 pounds. At a speed just below Mach 2, the #6 engine EGT suddenly increased to 1000 degrees. The throttle was reduced to IDLE, eliminating the over-temperature condition. At .7 Mn it was noted that the utility pump status lights were on for utility pumps 1, 3, 4, and 5. At approximately 1.2 Mn, the #1 engine nozzle position indicator became inoperative and began to spin counterclockwise. Just after going subsonic with engines #1, #3, #4, and #6 at IDLE, the #3 engine compressor vibration pickup was indicating 60 per cent. The throttle was increased to 80 per cent rpm, which reduced the vibration to 40 per cent. The #2 engine was then reduced to IDLE for the descent.

3.0 APPROACH AND LANDING

The normal descent was made to a straight-in final approach. While turning on final approach after having lowered the gear satisfactorily, the flaps were lowered. The flaps came down and then slowly started back up again with the flap switch in the DOWN position. Flaps were raised on the approach and a no-flap landing was made. Touchdown occurred at approximately 174 knots on the pilot's VSI. Two chutes inflated and braking was satisfactory. After turning off the runway, during the Military Power runs, it was noted that the #4 nozzle had failed open. The #4 engine EGT indicated only 500 degrees at Military Power throttle setting, and the nozzle position was 70 per cent.

4.0 SUMMARY

This flight should have removed all doubt about the XB-70A's capability of accomplishing its objectives. Although some difficulty was encountered in accelerating at the northern end of the course, once Mach 3 was achieved it was no problem maintaining the speed, even in the turns.

It was apparent from this flight that the automatic inlet system has not been fully developed. Evidently more data at Mach 3 is required to optimize this system so that the copilot isn't required to manually adjust the automatic schedule so many times in order to satisfactorily complete a mission. Since this is one of the most important, if not the most important, new system in the airplane, it would be very beneficial to schedule sufficient flying at Mach 3 to overcome this deficiency; in fact, this is strongly recommended.

5.0 DISCREPANCIES

1. Yaw augmentation #2 disengaged several times during flight.
2. Pilot and copilot face plate heat inadequate.
3. #6 engine went overtemp. at Mil. Power during descent.
4. #1 engine nozzle indicator spinning during last portion of flight.

5. Flaps went down and then slowly bled up on final approach.
6. #4 engine nozzle stuck open on Mil. Power run after landing.
7. VIBRATION HIGH light on after unstart. Individual readouts were O.K.

A. S. White
Aircraft Commander

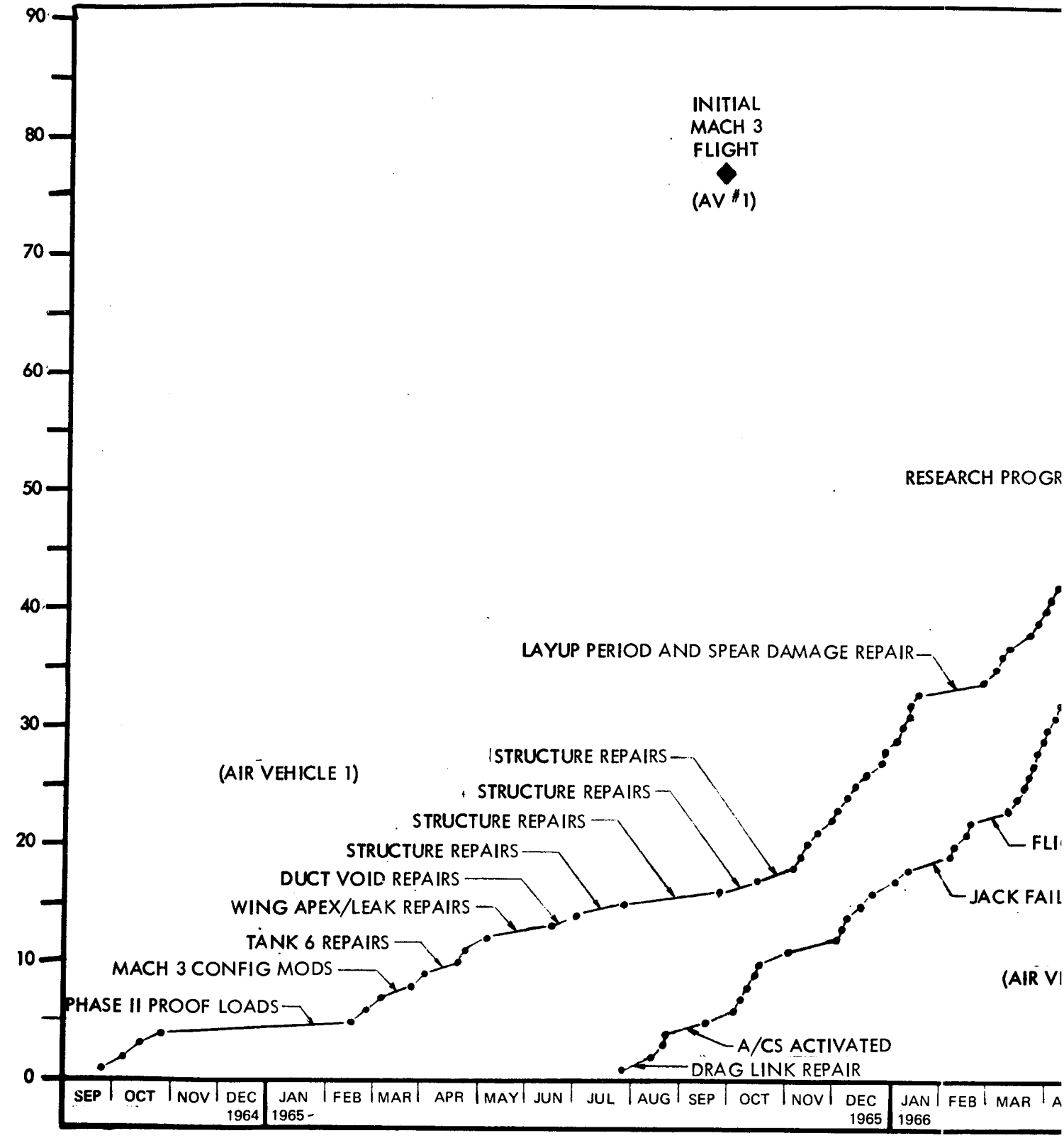
HANDLING QUALITIES QUESTIONNAIRE

FLIGHT 2-39 PILOT A. White CONFIGURATION Tips - Down; Gear and Flaps - Up

LONGITUDINAL	MACH/ALT.	RATING		COMMENTS
TRIMMABILITY - Ability to hold: Airspeed, Altitude, Attitude	3.0; 70K	FACS ON	4	Attitude control, and consequently altitude control, require more than normal pilot concentration.
		FACS OFF		
MANEUVERABILITY - Ability to change: Airspeed, Altitude, Load Factor		FACS ON	4	
		FACS OFF		
RESPONSE TO TURBULENCE			3	
RESPONSE TO CONFIGURATION CHANGES				
OVERALL LONGITUDINAL RATING			4	

HANDLING QUALITIES QUESTIONNAIRE

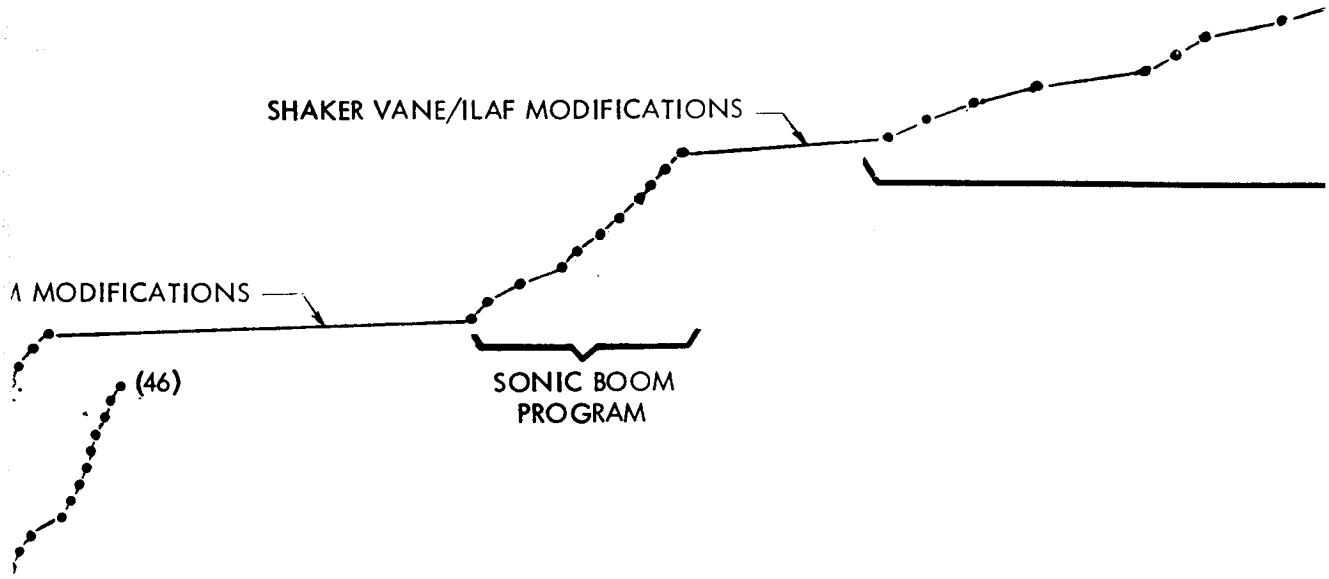
LATERAL-DIRECTIONAL	MACH/ALT.	RATING		COMMENTS
TRIMMABILITY - Ability to hold: Heading Bank Angle		FACS ON	3	Holding a heading is not difficult, but selecting a new heading is difficult due to the lag or drift in the heading information. The maneuverability rating could be raised if better instrument presentation was available.
		FACS OFF		
MANEUVERABILITY - Ability to change: Heading Bank Angle		FACS ON	4	
		FACS OFF		
RESPONSE TO TURBULENCE			3	
OVERALL LATERAL-DIRECTIONAL RATING			3.5	
CONTROL HARMONY			3	



FOLDOUT FRAME 2

XB-70A Flight History Summary

SUSTAINED
MACH 3
FLIGHT
◆
(AV #2)



IT DAMAGE REPAIR

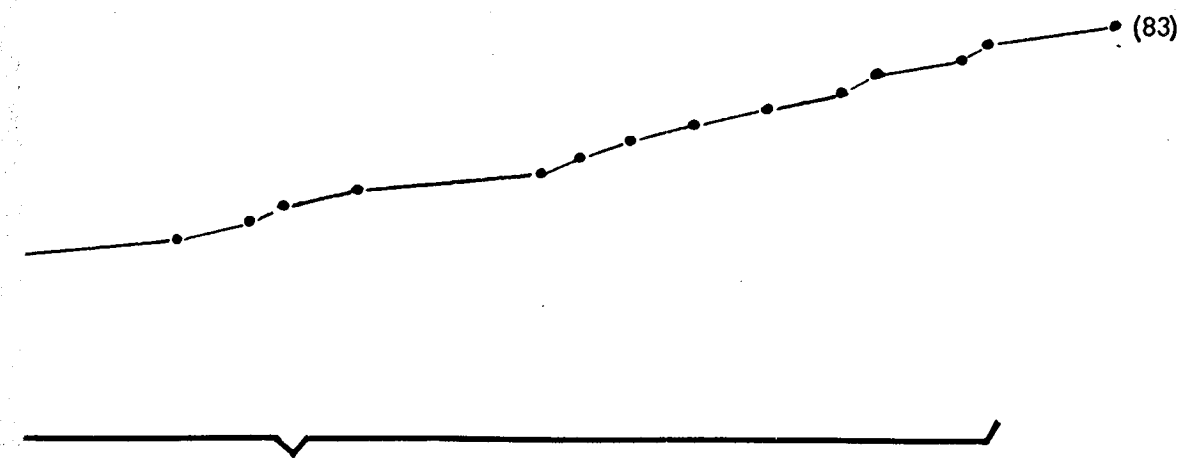
E

CLE 2)

MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
							1966	1967									

FOLDOUT FRAME 3

WBS 4.41



STRUCTURAL DYNAMICS
RESEARCH PROGRAM

)V	DEC 1967	JAN 1968	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC 1968	JAN 1969	FEB

Air Vehicle 1 Flight Statistics

WBS 4.41

Flight No.	Date	Time		Altitude (ft)	Temperature (°F)	Speed Mach No.	Supersonic		Over Mach 2		Mach 3	
		Flight	Cum				Flight	Cum	Flight	Cum	Flight	Cum
1	9-21-64	1:07	1:07	16,000	-	0.50	-	-	-	-	-	-
2	10-5-64	:55	2:02	28,000	-	0.85	-	-	-	-	-	-
3	10-12-64	1:35	3:37	35,400	-	1.11	:15	:15	-	-	-	-
4	10-24-64	1:25	5:02	46,300	81	1.42	:40	:55	-	-	-	-
5	2-16-65	1:10	6:12	45,000	118	1.60	:40	1:35	-	-	-	-
6	2-25-65	:53	7:05	35,000	-	.97	-	1:35	-	-	-	-
7	3-4-65	1:37	8:42	50,200	167	1.85	1:00	2:35	-	-	-	-
8	3-24-65	1:40	10:22	56,100	236	2.14	1:14	3:49	:40	:40	-	-
9	4-2-65	:54	11:16	34,500	-	0.95	-	3:49	-	:40	-	-
10	4-20-65	1:42	12:58	58,500	314	2.30	1:14	5:03	:50	1:30	-	-
11	4-28-65	1:43	14:41	64,300	348	2.45	1:16	6:19	:57	2:27	-	-
12	5-7-65	1:25	16:06	65,000	425	2.60	:58	7:17	:33	3:00	-	-
13	6-16-65	1:37	17:43	65,000	429	2.60	1:15	8:32	:50	3:50	-	-
14	7-1-65	1:44	19:27	68,000	508	2.85	1:19	9:51	:50	4:40	-	-
15	7-27-65	1:43	21:10	66,000	514	2.82	1:05	10:56	:43	5:23	-	-
16	9-22-65	1:57	23:07	67,000	511	2.83	1:17	12:13	:56	6:19	-	-
17	10-14-65	1:47	24:54	70,000	586	3+	1:10	13:23	:46	7:05	:02	:02
18	11-4-65	2:04	26:58	46,000	170	1.86	1:17	14:40	-	7:05	-	:02
19	11-8-65	2:23	29:21	45,500	170	1.89	:46	15:26	-	7:05	-	:02
20	11-12-65	2:25	31:46	46,000	150	1.84	:36	16:02	-	7:05	-	:02
21	11-18-65	2:02	33:48	47,000	185	1.88	:50	16:52	-	7:05	-	:02
22	11-30-65	1:59	35:47	56,000	320	2.34	1:12	18:04	:53	7:58	-	:02
23	12-2-65	1:51	37:38	60,000	328	2.46	1:22	19:26	:34	8:32	-	:02
24	12-7-65	2:26	40:04	62,000	-	2.45	:40	20:06	:22	8:54	-	:02
25	12-10-65	2:18	42:22	50,700	-	1.82	:55	21:01	-	8:54	-	:02
26	12-14-65	2:10	44:32	20,000	-	0.95	-	21:01	-	8:54	-	:02
27	12-20-65	1:58	46:30	42,000	-	1.78	1:11	22:12	-	8:54	-	:02

Flight No.	Date	Time		Altitude (ft)	Temperature (°F)	Speed Mach No.	Supersonic		Over Mach 2		Mach 3	
		Flight	Cum				Flight	Cum	Flight	Cum	Flight	Cum
28	12-22-65	2:35	49:05	34,000	-	1.42	:14	22:26	-	8:54	-	:02
29	1-3-66	2:41	51:46	26,000	-	0.94	-	22:26	-	8:54	-	:02
30	1-6-66	3:40	55:26	33,000	-	0.94	-	22:26	-	8:54	-	:02
31	1-11-66	1:35	57:01	46,000	-	1.85	:46	23:12	-	8:54	-	:02
32	1-11-66	:58	57:59	27,000	-	0.95	-	23:12	-	8:54	-	:02
33	1-15-66	1:27	59:26	47,000	-	1.85	:50	24:02	-	8:54	-	:02
34	2-26-66	2:22	61:48	20,000	-	0.92	-	24:02	-	8:54	-	:02
35	3-3-66	2:42	64:30	15,000	-	0.55	-	24:02	-	8:54	-	:02
36	3-4-66	2:27	66:57	56,000	225	2.02	:48	24:50	:12	9:06	-	:02
37	3-7-66	2:19	69:16	67,000	290	2.22	1:02	25:52	:16	9:22	-	:02
38	3-22-66	2:11	71:27	32,000	-	0.97	-	25.52	-	9:22	-	:02
39	3-24-66	2:00	73:27	60,000	360	2.42	1:06	27:58	:21	9:43	-	:02
40	3-28-66	1:41	75:08	65,000	365	2.43	1:21	28:19	:32	10:15	-	:02
41	4-1-66	2:09	77:17	58,800	365	2.45	1:15	29:34	:20	10:35	-	:02
42	4-5-66	2:01	79:18	61,000	365	2.43	1:12	30:46	:48	11:23	-	:02
43	4-13-66	2:03	81:21	62,500	418	2.60	1:05	31:51	:47	12:10	-	:02
44	4-19-66	2:12	83:33	17,000	-	0.58	-	31:51	-	12:10	-	:02
45	4-21-66	2:02	85:35	61,000	360	2.42	1:20	33:11	:59	13:09	-	:02
46	4-25-66	2:07	87:42	63,000	415	2.55	1:12	34:23	:52	14:01	-	:02
47	4-27-66	2:41	90:23	31,000	-	1.50	:08	34:31	-	14:01	-	:02
48	5-3-66	1:22	91:45	23,000	-	0.55	-	34:31	-	14:01	-	:02
49	5-9-66	2:16	94:01	15,000	-	0.50	-	34:31	-	14:01	-	:02
50	11-3-66	2:00	96:01	61,000	235	2.10	:35	35:06	:12	14:13	-	:02
51	11-10-66	1:39	97:40	60,000	385	2.50	1:12	36:18	:32	14:45	-	:02
52	11-23-66	1:38	99:18	61,000	395	2.51	1:06	37:24	:22	15:07	-	:02
53	12-12-66	1:57	101:15	60,000	357	2.52	1:01	38:25	:32	15:39	-	:02
54	12-16-66	1:54	103:09	60,300	370	2.55	1:01	39:26	:27	16:06	-	:02

Air Vehicle 1 Flight Statistics (Cont)

WBS 4.41

Flight No.	Date	Time		Attitude (ft)	Temperature (°F)	Speed Mach No.	Supersonic		Over Mach 2		Mach 3	
		Flight	Cum				Flight	Cum	Flight	Cum	Flight	Cum
55	12-20-66	1:45	104:54	60,800	380	2.53	1:00	40:26	:32	16:38	-	:02
56	1-4-67	1:44	106:38	60,400	385	2.53	:57	41:23	:35	17:13	-	:02
57	1-13-67	1:46	108:24	61,000	392	2.57	1:00	42:23	:38	17:51	-	:02
58	1-17-67	1:44	110:08	60,200	403	2.54	1:01	43:24	:38	18:29	-	:02
59	1-25-67	1:32	111:40	35,000	-	1.41	:51	44:15	-	18:29	-	:02
60	1-31-67	1:32	113:12	37,000	-	1.40	:49	45:04	-	18:29	-	:02
61	4-25-67	1:07	114:19	17,000	-	-	-	45:04	-	18:29	-	:02
62	5-12-67	2:18	116:37	16,500	-	-	-	45:04	-	18:29	-	:02
63	6-2-67	2:23	119:00	42,000	-	1.43	:42	45:46	-	18:29	-	:02
64	6-22-67	1:54	120:54	54,000	179	1.83	:57	46:43	-	18:29	-	:02
65	8-10-67	2:29	123:23	15,500	-	0.92	-	46:43	-	18:29	-	:02
66	8-24-67	1:52	125:17	58,000	-	2.27	:56	47:39	:23	18:52	-	:02
67	9-8-67	1:55	127:10	59,700	-	2.30	1:15	48:54	:51	19:43	-	:02
68	10-11-67	1:39	128:49	58,000	-	2.43	1:11	50:05	:47	20:30	-	:02
69	11-2-67	1:56	130:45	64,000	403	2.55	1:14	51:19	:47	21:17	-	:02
70	1-12-68	1:54	132:39	67,000	-	2.55	1:01	52:20	:42	21:59	-	:02
71	2-13-68	2:43	135:22	41,000	-	1.18	:16	52:36	-	21:59	-	:02
72	2-28-68	1:51	137:13	18,500	-	-	-	52:36	-	21:59	-	:02
73	3-21-68	2:32	139:45	15,500	-	-	-	52:36	-	21:59	-	:02
74	6-11-68	1:11	140:56	9,500	-	-	-	52:36	-	21:59	-	:02
75	6-28-68	2:39	143:35	39,400	-	1.23	:18	52:54	-	21:59	-	:02
76	7-19-68	1:55	145:30	42,000	-	1.62	:48	53:42	-	21:59	-	:02
77	8-16-68	1:55	147:25	63,000	-	2.47	:55	54:37	:34	22:33	-	:02
78	9-10-68	1:48	149:13	63,000	-	2.54	1:04	55:41	:35	23:08	-	:02
79	10-18-68	1:56	151:09	52,000	-	2.18	:54	56:35	:13	23:21	-	:02
80	11-1-68	2:08	153:17	41,000	-	1.62	:48	57:23	-	23:21	-	:02
81	12-3-68	1:58	155:15	39,400	-	1.64	:56	58:19	-	23:21	-	:02
82	12-17-68	1:45	157:00	63,500	-	2.53	1:12	59:31	:55	24:16	-	:02
83	2-4-69	3:16	160:16	29,000	-	0.92	-	59:31	-	24:16	-	:02

Air Vehicle 2 Flight Statistics

WBS 4.41

Flight No.	Date	Time		Altitude (ft)	Temperature (°F)	Speed Mach No.	Supersonic		Over Mach 2		Mach 3	
		Flight	Cum				Flight	Cum	Flight	Cum	Flight	Cum
1	7-17-65	1:13	1:13	42,000	80	1.41	:21	:21	-	-	-	-
2	8-10-65	1:27	2:40	41,000	81	1.45	:31	:52	-	-	-	-
3	8-18-65	1:58	4:38	46,000	80	1.45	:44	1:36	-	-	-	-
4	8-20-65	2:04	6:42	42,000	81	1.44	:41	2:17	-	-	-	-
5	9-17-65	1:55	8:37	50,500	165	1.83	1:00	3:17	-	-	-	-
6	9-29-65	1:44	10:21	54,000	295	2.23	:32	3:49	:05	:05	-	-
7	10-5-65	1:40	12:01	55,000	290	2.30	:31	4:20	:09	:14	-	-
8	10-11-65	1:55	13:56	57,500	305	2.34	1:18	5:38	:53	1:07	-	-
9	10-16-65	1:43	15:39	59,500	360	2.43	1:12	6:50	:47	1:54	-	-
10	10-20-65	2:07	17:45	59,000	326	2.46	1:11	8:01	:43	2:37	-	-
11	11-2-65	1:54	19:40	59,000	330	2.45	1:20	9:21	:46	3:23	-	-
12	11-29-65	2:19	21:59	15,200	-	.53	-	9:21	-	3:23	-	-
13	12-1-65	2:02	24:01	64,000	435	2.67	1:24	10:45	:59	4:22	-	-
14	12-3-65	1:55	25:56	69,000	510	2.87	1:14	11:59	:51	5:13	-	-
15	12-11-65	2:03	27:59	70,600	556	2.94	1:16	13:15	:53	6:06	-	-
16	12-21-65	1:49	29:48	72,000	535	2.95	1:20	14:35	1:02	7:08	-	-
17	1-3-66	1:52	31:40	72,000	601	3.05	1:22	15:57	1:06	8:14	:03	:03
18	1-12-66	1:46	33:28	72,000	605	3.06	1:24	17:21	1:03	9:17	:04	:07
19	2-7-66	2:11	35:39	42,000	-	1.44	1:03	18:24	-	9:17	-	:07
20	2-9-66	1:49	37:28	70,800	606	3.04	1:09	19:33	:48	10:05	:05	:12
21	2-16-66	3:06	40:34	32,000	-	1.10	:02	19:35	-	10:05	-	:12
22	2-17-66	1:47	42:21	73,000	608	3.04	1:23	20:58	1:05	11:10	:15	:27
23	3-10-66	1:56	44:17	67,000	445	2.76	1:25	22:23	:54	12:04	-	:27
24	3-15-66	1:59	46:16	69,500	508	2.85	1:33	23:56	1:11	13:15	-	:27
25	3-17-66	1:52	48:08	70,350	508	2.85	1:27	25:23	1:09	14:24	-	:27
26	3-19-66	1:57	50:05	74,000	550	2.93	1:30	26:53	1:10	15:34	-	:27

Air Vehicle 2 Flight Statistics (Cont)

WBS 4.41

Flight No.	Date	Time		Altitude (ft)	Temperature (°F)	Speed Mach No.	Supersonic		Over Mach 2		Mach 3	
		Flight	Cum				Flight	Cum	Flight	Cum	Flight	Cum
27	3-24-66	1:32	51.37	64,000	440	2.71	:47	27:40	:29	16:03	-	:27
28	3-26-66	3:09	54:46	36,000	-	.94	-	27:40	-	16:03	-	:27
29	3-29-66	1:51	56:37	48,000	120	1.65	1:25	29:05	-	16:03	-	:27
30	3-31-66	2:10	58:47	72,000	550	2.95	1:20	30:25	1:02	17:05	-	:27
31	4-4-66	1:57	60:44	73,000	550	2.95	1:30	31:55	1:09	18:14	-	:27
32	4-8-66	2:05	62:49	73,000	610	3.07	1:09	33:04	:50	19:04	:16	:43
33	4-12-66	1:49	64:38	72,800	624	3.08	1:17	34:21	:53	19:57	:20	1:03
34	4-16-66	2:01	66:39	71,000	568	3.03	1:03	35:24	:43	20:40	:01	1:04
35	4-23-66	2:01	68:40	66,000	473	2.73	1:22	36:46	1:01	21:41	-	1:04
36	4-26-66	2:05	70:45	65,500	423	2.65	1:17	38:03	:50	22:31	-	1:04
37	4-30-66	2:16	73:01	16,000	-	.55	-	38:03	-	22:31	-	1:04
38	5-16-66	2:09	75:10	65,000	470	2.73	1:11	39:14	:46	23:17	-	1:04
39	5-19-66	1:59	77:09	72,500	620	3.06	1:31	40:45	1:13	24:30	:33	1:37
40	5-22-66	2:22	79:31	36,500	110	1.51	:25	41:10	-	24:30	-	1:37
41	5-25-66	2:23	81:54	42,000	115	1.63	:49	41:59	-	24:30	-	1:37
42	5-27-66	2:08	84:02	62,000	401	2.53	1:17	42:16	:39	25:09	-	1:37
43	5-31-66	2:02	86:04	57,000	290	2.25	1:12	43:28	:22	25:31	-	1:37
44	6-4-66	2:05	88:09	70,000	555	2.93	1:20	44:48	:54	26:25	-	1:37
45	6-6-66	2:00	90:00	72,000	620	3.05	1:15	-	:53	27:18	:09	1:46
46	6-8-66	2:13	92:22	32,000	85	1.41	:14	47:17	-	27:18	-	1.46

WBS CODE: 4.41

COST DEFINITION:

The cost data presented for this WBS level 5 item (WBS 4.41 Flight Test) is a summation of the level 6 blocks as indicated below:

			Cost Data
WBS 4.41	Flight Test	$ 2,781,972	Page II-315
WBS 4.41.1	Flight Operations	$29,594,412	Page II-385
WBS 4.41.2	Air Vehicle Maintenance	$ 5,216,014	Page II-432
WBS 4.41.3	Instrumentation	$ 1,164,316	Page II-448
WBS 4.41.4	Post Flight Evaluation	$ -0-	
WBS 4.41.5	Major Air Vehicle Repair	$ 496,336	Page II-470
		$39,253,050	Page II-341

Detail cost data can be found on the pages indicated above.

WBS 4.41 Flight Test $ 2,781,972

Cost data accumulated in this WBS item are those expenditures appearing in the Cost Accumulation Statements that can not be associated with a Flight Test level 6 item. The costs include engineering, flight line production support, and test technicians.

WBS 4.41.1 Flight Operations $29,594,412

Cost accumulated in this level 6 item contain all identifiable expenditures associated with the planning, ground operations and flight operations that existed during the XB-70 Flight Test Development Program. The technical discussion on page II-379 provides a detail discussion of the activities associated with this WBS item.

WBS 4.41.2 Air Vehicle Maintenance $ 5,216,014

This WBS item contains those costs associated with the scheduled and unscheduled maintenance of the two aircraft during the flight test portion of the XB-70 program. Major repairs as the result of accidents or malfunctions **are not** included in these costs. Flight Test Ground Support Equipment maintenance is likewise not included (see WBS 5.51). The technical discussion beginning on page II-410 provides a detail discussion of the maintenance concept and activities associated with the flight test program.

WBS CODE: 4.41

WBS 4.41.3 Instrumentation $ 1,164,316

Expenditures associated with the calibration, maintenance, data acquisition, and reliability of the flight test instrumentation are collected in this WBS item. Costs associated with the development and installation of the test instrumentation is contained in WBS 1.11 Test Instrumentation Subsystem. The technical discussion **on page II-**438 provides a detail discussion of the flight test instrumentation.

WBS 4.41.4 Post Flight Evaluation $ -0-

No cost data has been assigned to this item as the recorded cost records did not provide detail in this area. The evaluation of the flight test data is contained within the subsystem engineering effort as the design and support groups provided personnel to perform this function.

WBS 4.41.5 Major Air Vehicle Repair $ 496,336

Flight Test personnel supporting the repair of ship #1 after flights 1, 12 and 14 and ship #2 after flight 1 **are contained in this item. Support** from manufacturing for these repairs are included in WBS 1.12 as they can not be identified. Normal maintenance and major rework not the result of accidents are included in WBS 4.41.2 Air Vehicle Maintenance.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
FLIGHT TEST

			5-SUBSYS 41 HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			2279153	2279153
LABOR AT $	5.601		12765763	12765763
ENGR BURDEN AT $		6.677	15219035	15219035
PRODUCTION			11030	11030
LABOR AT $	3.225		35575	35575
SHOP SUPPORT			301586	301586
LABOR AT $	4.042		1219027	1219027
PLANNING			77	77
LABOR AT $	3.883		299	299
TEST/QC			374099	374099
LABOR AT $	4.665		1745335	1745335
MFG BURDEN AT $		5.899	4051204	4051204
ENGR MATERIAL			1577071	1577071
MFG MATERIAL			144913	144913
MPC			276599	276599
OTHER COST			1202278	1202278
SUB-TOTAL			38237099	38237099
GEN & ADMIN			1015951	1015951
TOTAL COST			39253050	39253050

COST DETAIL FOR
4.41 TOTALS ON PAGE II-341

COST DETAIL FOR
WBS LEVEL 6 ITEMS
INCLUDED IN 4.41
SEE PAGE II-313

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

			6-M ASSY 0	6-M ASSY 01	6-M ASSY 02	6-M ASSY 03
			HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS
DESIGN/ENGINEERING			7882	1958503	219064	84141
LABOR AT $	5.601		31041	11308624	953328	420445
ENGR BURDEN	AT $	6.677	35715	13498804	1167125	459205
PRODUCTION			11030			
LABOR AT $	3.225		35575			
SHOP SUPPORT			28298	81949	148211	9628
LABOR AT $	4.042		96006	304273	658064	33160
PLANNING			77			
LABOR AT $	3.883		299			
TEST/QC			179735	122675	64799	578
LABOR AT $	4.665		828056	587413	299264	2217
MFG BURDEN	AT $	5.899	1367107	1223461	1224034	47207
ENGR MATERIAL			277387	430206	698057	149948
MFG MATERIAL				144913		
MPC			43566	99768	102548	24624
OTHER COST				1191690	10528	
SUB-TOTAL			2714752	28789152	5112948	1136806
GEN & ADMIN			67220	805260	103066	27510
TOTAL COST			2781972	29594412	5216014	1164316

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-315 II-385 II-432 II-448

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

			6-M ASSY 05 HOURS / DOLLARS	TOTAL HOURS / DOLLARS
DESIGN/ENGINEERING			9563	2279153 /
LABOR AT $	5.601		52325	12765763
ENGR BURDEN AT $	6.677		58186	15219035
PRODUCTION				11030
LABOR AT $	3.225			35575
SHOP SUPPORT			33500	301586
LABOR AT $	4.042		127524	1219027
PLANNING				77
LABOR AT $	3.883			299
TEST/QC			6312	374099
LABOR AT $	4.665		28385	1745335
MFG BURDEN AT $		5.899	189395	4051204
ENGR MATERIAL			21473	1577071
MFG MATERIAL				144913
MPC			6093	276599
OTHER COST			60	1202278
SUB-TOTAL			483441	38237099
GEN & ADMIN			12895	1015951
TOTAL COST			496336	39253050

COST DETAIL
SEE PAGE II-470 II-341

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

		PROD HOURS / DOLLARS	TEST /QC HOURS / DOLLARS	TOTAL HOURS / DOLLARS
DESIGN/ENGINEERING			7882	7882
LABOR AT $ 3.938			31041	31041
ENGR BURDEN AT $ 4.531			35715	35715
PRODUCTION		11030		11030
LABOR AT $ 3.225		35575		35575
SHOP SUPPORT			28298	28298
LABOR AT $ 3.393			96006	96006
PLANNING			77	77
LABOR AT $ 3.883			299	299
TEST/QC		173005	6730	179735
LABOR AT $ 4.607		803054	25002	828056
MFG BURDEN AT $ 6.239		1211502	155605	1367107
ENGR MATERIAL			277387	277387
MPC			43566	43566
SUB-TOTAL		2050131	664621	2714752
GEN & ADMIN		53828	13392	67220
TOTAL COST		2103959	678013	2781972

TIME-PHASED COST DETAIL - SEE PAGE II-316 II-320 II-330

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63					52259	52259
Q-4 63						
Q-1 64					40112	40112
Q-2 64						
Q-3 64	19.5	3486	3.201	11157	243330	254487
Q-4 64						
Q-1 65	31.5	5515	3.224	17781	211916	229697
Q-2 65						
Q-3 65	12.0	2029	3.271	6637	220272	226909
Q-4 65						
Q-1 66					271514	271514
Q-2 66						
Q-3 66					172099	172099
TOTAL	63.0	11030		35575	1211502	1247077

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63	60.0	10129	3.481	35264		35264
Q-4 63						
Q-1 64	39.0	6630	3.903	25878		25878
Q-2 64						
Q-3 64	204.0	35787	4.275	153001		153001
Q-4 64						
Q-1 65	162.0	28136	4.521	127199		127199
Q-2 65						
Q-3 65	193.5	32492	4.946	160709		160709
Q-4 65						
Q-1 66	208.5	36204	5.013	181473		181473
Q-2 66						
Q-3 66	141.0	23627	5.059	119530		119530
TOTAL	1008.0	173005		803054		803054

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK PRODUCTION

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-3 63	60.0	10129	3.481	35264	52259	87523	1463
Q-4 63							
Q-1 64	39.0	6630	3.903	25878	40112	65990	1404
Q-2 64							
Q-3 64	223.5	39273	4.180	164158	243330	407488	8671
Q-4 64							
Q-1 65	193.5	33651	4.308	144980	211916	356896	9522
Q-2 65							
Q-3 65	205.5	34521	4.848	167346	220272	387618	10342
Q-4 65							
Q-1 66	208.5	36204	5.013	181473	271514	452987	13643
Q-2 66							
Q-3 66	141.0	23627	5.059	119530	172099	291629	8783
TOTAL	1071.0	184035		838629	1211502	2050131	53828

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK PRODUCTION

FLIGHT TEST

	TOTAL COST
Q-3 63	88986
Q-4 63	
Q-1 64	67394
Q-2 64	
Q-3 64	416159
Q-4 64	
Q-1 65	366418
Q-2 65	
Q-3 65	397960
Q-4 65	
Q-1 66	466630
Q-2 66	
Q-3 66	300412
TOTAL	2103959

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58						
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61	1.5	302	3.460	1045	1182	2227
Q-4 61						
Q-1 62	4.5	784	4.061	3184	3623	6807
Q-2 62						
Q-3 62	4.5	729	4.255	3102	3748	6850
Q-4 62						
Q-1 63	7.5	1234	4.219	5206	6506	11712
Q-2 63						
Q-3 63		52	6.904	359	92	451
Q-4 63						
Q-1 64	3.0	549	3.776	2073	2870	4943
Q-2 64						
Q-3 64	3.0	582	4.784	2784	3718	6502
Q-4 64						
Q-1 65	1.5	337	3.985	1343	1939	3282

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-2 65						
Q-3 65	3.0	426	4.345	1851	1943	3794
Q-4 65						
Q-1 66	15.0	2545	3.495	8896	8897	17793
Q-2 66						
Q-3 66	1.5	342	3.503	1198	1197	2395
TOTAL	45.0	7882		31041	35715	66756

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		2	2.500	5	7	12
Q-4 61						
Q-1 62	9.0	1596	3.073	4905	6048	10953
Q-2 62						
Q-3 62	16.5	2797	2.883	8065	11573	19638
Q-4 62						
Q-1 63	18.0	3120	2.952	9209	16490	25699
Q-2 63						
Q-3 63	24.0	3969	3.353	13307	25623	38930
Q-4 63						
Q-1 64	30.0	5026	3.513	17655	25156	42811
Q-2 64						
Q-3 64	31.5	5500	3.888	21382	36232	57614
Q-4 64						
Q-1 65	16.5	2912	3.205	9333	13936	23269
Q-2 65						
Q-3 65	19.5	3160	3.612	11415	19450	30865
Q-4 65						
Q-1 66	1.5	210	3.343	702	1086	1788

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-2 66						
Q-3 66		6	4.667	28	4	32
TOTAL	166.5	28298		96006	155605	251611

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		3	2.333	7	10	17
Q-2 63						
Q-3 63		74	3.946	292	-10	282
TOTAL		77		299		299

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		70	2.929	205		205
Q-2 62						
Q-3 62		101	3.119	315		315
Q-4 62						
Q-1 63	6.0	943	3.131	2953		2953
Q-2 63						
Q-3 63	13.5	2164	3.413	7386		7386
Q-4 63						
Q-1 64		120	3.808	457		457
Q-2 64						
Q-3 64	12.0	2210	4.108	9079		9079
Q-4 64						
Q-1 65		43	4.744	204		204
Q-2 65						
Q-3 65	6.0	1033	4.103	4238		4238
Q-4 65						
Q-1 66		45	3.711	167		167
Q-2 66						
Q-3 66		1	1.999	-2		-2
TOTAL	37.5	6730		25002		25002

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58							
Q-2 58							
Q-3 58							
Q-4 58							
Q-1 59							
Q-2 59							
Q-3 59							
Q-4 59							
Q-1 60							
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61							
Q-2 61							
Q-3 61	1.5	304	3.454	1050	1189	2239	56
Q-4 61							
Q-1 62	13.5	2450	3.385	8294	9671	17965	6191
Q-2 62							
Q-3 62	21.0	3627	3.166	11482	15321	26803	48918
Q-4 62							
Q-1 63	31.5	5300	3.278	17375	23006	40381	55915
Q-2 63							
Q-3 63	37.5	6259	3.410	21344	25705	47049	44862
Q-4 63							
Q-1 64	33.0	5695	3.544	20185	28026	48211	55071
Q-2 64							
Q-3 64	46.5	8292	4.009	33245	39950	73195	54756
Q-4 64							
Q-1 65	18.0	3292	3.305	10880	15875	26755	11832
Q-2 65							
Q-3 65	28.5	4619	3.790	17504	21393	38897	-214

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-4 65							
Q-1 66	16.5	2800	3.488	9765	9983	19748	
Q-2 66							
Q-3 66	1.5	349	3.507	1224	1201	2425	
TOTAL	249.0	42987		152348	191320	343668	277387

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58					
Q-2 58					
Q-3 58					
Q-4 58					
Q-1 59					
Q-2 59					
Q-3 59					
Q-4 59					
Q-1 60					
Q-2 60					
Q-3 60					
Q-4 60					
Q-1 61					
Q-2 61					
Q-3 61	5		2300	38	2338
Q-4 61					
Q-1 62	488	34	24678	414	25092
Q-2 62					
Q-3 62	3855	15	79591	1336	80927
Q-4 62					
Q-1 63	5507		101803	1702	103505
Q-2 63					
Q-3 63	4419	-49	96281	1610	97891
Q-4 63					
Q-1 64	5871		109153	2323	111476
Q-2 64					
Q-3 64	19920		147871	3146	151017
Q-4 64					
Q-1 65	3539		42126	1124	43250
Q-2 65					
Q-3 65	-38		38645	1031	39676

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0
SUBD OF WORK TEST/QC

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-4 65					
Q-1 66			19748	595	20343
Q-2 66					
Q-3 66			2425	73	2498
TOTAL	43566		664621	13392	678013

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58						
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61	1.5	302	3.460	1045	1182	2227
Q-4 61						
Q-1 62	4.5	784	4.061	3184	3623	6807
Q-2 62						
Q-3 62	4.5	729	4.255	3102	3748	6850
Q-4 62						
Q-1 63	7.5	1234	4.219	5206	6506	11712
Q-2 63						
Q-3 63		52	6.904	359	92	451
Q-4 63						
Q-1 64	3.0	549	3.776	2073	2870	4943
Q-2 64						
Q-3 64	3.0	582	4.784	2784	3718	6502
Q-4 64						
Q-1 65	1.5	337	3.985	1343	1939	3282
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING

4-SYSTEM	4
5-SUBSYSTEM	41
6-MAJ ASSY	0

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	3.0	426	4.345	1851	1943	3794
Q-4 65						
Q-1 66	15.0	2545	3.495	8896	8897	17793
Q-2 66						
Q-3 66	1.5	342	3.503	1198	1197	2395
TOTAL	45.0	7882		31041	35715	66756

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63					52259	52259
Q-4 63						
Q-1 64					40112	40112
Q-2 64						
Q-3 64	19.5	3486	3.201	11157	243330	254487
Q-4 64						
Q-1 65	31.5	5515	3.224	17781	211916	229697
Q-2 65						
Q-3 65	12.0	2029	3.271	6637	220272	226909
Q-4 65						
Q-1 66					271514	271514
Q-2 66						
Q-3 66					172099	172099
TOTAL	63.0	11030		35575	1211502	1247077

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
6-MAJ ASSY 0

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		2	2.500	5	7	12
Q-4 61						
Q-1 62	9.0	1596	3.073	4905	6048	10953
Q-2 62						
Q-3 62	16.5	2797	2.883	8065	11573	19638
Q-4 62						
Q-1 63	18.0	3120	2.952	9209	16490	25699
Q-2 63						
Q-3 63	24.0	3969	3.353	13307	25623	38930
Q-4 63						
Q-1 64	30.0	5026	3.513	17655	25156	42811
Q-2 64						
Q-3 64	31.5	5500	3.888	21382	36232	57614
Q-4 64						
Q-1 65	16.5	2912	3.205	9333	13936	23269
Q-2 65						
Q-3 65	19.5	3160	3.612	11415	19450	30865
Q-4 65						
Q-1 66	1.5	210	3.343	702	1086	1788
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT TEST**
6-MAJ ASSY 0

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 66		6	4.667	28	4	32
TOTAL	166.5	28298		96006	155605	251611

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		3	2.333	7	10	17
Q-2 63						
Q-3 63		74	3.946	292	-10	282
TOTAL		77		299		299

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

	TEST/QC
4-SYSTEM	4
5-SUBSYSTEM	41
6-MAJ ASSY	0

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		70	2.929	205		205
Q-2 62						
Q-3 62		101	3.119	315		315
Q-4 62						
Q-1 63	6.0	943	3.131	2953		2953
Q-2 63						
Q-3 63	73.5	12293	3.469	42650		42650
Q-4 63						
Q-1 64	39.0	6750	3.901	26335		26335
Q-2 64						
Q-3 64	216.0	37997	4.266	162080		162080
Q-4 64						
Q-1 65	162.0	28179	4.521	127403		127403
Q-2 65						
Q-3 65	199.5	33525	4.920	164947		164947
Q-4 65						
Q-1 66	208.5	36249	5.011	181640		181640
Q-2 66						
Q-3 66	141.0	23628	5.059	119528		119528
TOTAL	1045.5	179735		828056		828056

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENG MAT
Q-1 58							
Q-2 58							
Q-3 58							
Q-4 58							
Q-1 59							
Q-2 59							
Q-3 59							
Q-4 59							
Q-1 60							
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61							
Q-2 61							
Q-3 61	1.5	304	3.454	1050	1189	2239	5
Q-4 61							
Q-1 62	13.5	2450	3.385	8294	9671	17965	619
Q-2 62							
Q-3 62	21.0	3627	3.166	11482	15321	26803	4891
Q-4 62							
Q-1 63	31.5	5300	3.278	17375	23006	40381	5591
Q-2 63							
Q-3 63	97.5	16388	3.454	56608	77964	134572	4486
Q-4 63							
Q-1 64	72.0	12325	3.737	46063	68138	114201	5507
Q-2 64							
Q-3 64	270.0	47565	4.150	197403	283280	480683	5475
Q-4 64							
Q-1 65	211.5	36943	4.219	155860	227791	383651	1183
Q-2 65							
Q-3 65	234.0	39140	4.723	184850	241665	426515	-21
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	225.0	39004	4.903	191238	281497	472735	
Q-2 66							
Q-3 66	142.5	23976	5.036	120754	173300	294054	
TOTAL	1320.0	227022		990977	1402822	2393799	277387

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58					
Q-2 58					
Q-3 58					
Q-4 58					
Q-1 59					
Q-2 59					
Q-3 59					
Q-4 59					
Q-1 60					
Q-2 60					
Q-3 60					
Q-4 60					
Q-1 61					
Q-2 61					
Q-3 61	5		2300	38	2338
Q-4 61					
Q-1 62	488	34	24678	414	25092
Q-2 62					
Q-3 62	3855	15	79591	1336	80927
Q-4 62					
Q-1 63	5507		101803	1702	103505
Q-2 63					
Q-3 63	4419	-49	183804	3073	186877
Q-4 63					
Q-1 64	5871		175143	3727	178870
Q-2 64					
Q-3 64	19920		555359	11817	567176
Q-4 64					
Q-1 65	3539		399022	10646	409668
Q-2 65					
Q-3 65	-38		426263	11373	437636
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 0

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66			472735	14238	486973
Q-2 66					
Q-3 66			294054	8856	302910
TOTAL	43566		2714752	67220	2781972

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TEST /QC HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		2271271		7882	2279153
LABOR AT $ 5.601		12734722		31041	12765763
ENGR BURDEN AT $	6.677	15183320		35715	15219035
PRODUCTION			11030		11030
LABOR AT $ 3.225			35575		35575
SHOP SUPPORT		273288		28298	301586
LABOR AT $ 4.042		1123021		96006	1219027
PLANNING				77	77
LABOR AT $ 3.883				299	299
TEST/QC		85457	281912	6730	374099
LABOR AT $ 4.665		387151	1333182	25002	1745335
MFG BURDEN AT $	5.899	1917005	1978594	155605	4051204
ENGR MATERIAL		1299684		277387	1577071
MFG MATERIAL			144913		144913
MPC		208712	24321	43566	276599
OTHER COST		1200382	1896		1202278
SUB-TOTAL		34053997	3518481	664621	38237099
GEN & ADMIN		906766	95793	13392	1015951
TOTAL COST		34960763	3614274	678013	39253050

TIME-PHASED COST
DETAIL - SEE PAGE II-343 II-352 II-356 II-366

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	7.5	1359	4.574	6216	6184	12400
Q-2 58						
Q-3 58	36.0	6104	4.270	26065	23802	49867
Q-4 58						
Q-1 59	39.0	6549	4.213	27589	22421	50010
Q-2 59						
Q-3 59	34.5	6025	4.188	25231	21935	47166
Q-4 59						
Q-1 60	27.0	4788	4.556	21815	17784	39599
Q-2 60						
Q-3 60	9.0	1479	4.766	7049	5409	12458
Q-4 60						
Q-1 61	34.5	5837	4.853	28327	19500	47827
Q-2 61						
Q-3 61	42.0	7497	4.919	36881	34125	71006
Q-4 61						
Q-1 62	103.5	17782	5.034	89507	81739	171246
Q-2 62						
Q-3 62	153.0	25589	5.038	128926	128717	257643
Q-4 62						
Q-1 63	186.0	31720	5.184	164440	171628	336068
Q-2 63						
Q-3 63	97.5	16277	5.195	84555	91958	176513
Q-4 63						
Q-1 64	82.5	14015	5.436	76190	85717	161907
Q-2 64						
Q-3 64	285.0	50089	5.246	262782	324091	586873
Q-4 64						
Q-1 65	2364.0	409832	5.555	2276787	2724247	5001034
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	2977.5	500264	5.708	2855708	3185635	6041343
Q-4 65						
Q-1 66	3690.0	639503	5.759	3682749	4665523	8348272
Q-2 66						
Q-3 66	3135.0	526562	5.572	2933905	3572905	6506810
TOTAL	13303.5	2271271		12734722	15183320	27918042

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	4.5	816	4.602	3755	5974	9729
Q-4 64						
Q-1 65	537.0	93192	3.708	345523	524329	869852
Q-2 65						
Q-3 65	258.0	43233	3.668	158582	285658	444240
Q-4 65						
Q-1 66	391.5	67966	3.599	244622	507271	751893
Q-2 66						
Q-3 66	405.0	68081	5.443	370539	593773	964312
TOTAL	1596.0	273288		1123021	1917005	3040026

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	3.0	428	3.652	1563		1563
Q-4 64						
Q-1 65	108.0	18819	4.319	81272		81272
Q-2 65						
Q-3 65	109.5	18472	4.412	81502		81502
Q-4 65						
Q-1 66	153.0	26416	4.758	125689		125689
Q-2 66						
Q-3 66	127.5	21322	4.555	97125		97125
TOTAL	501.0	85457		387151		387151

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK DESIGN/ENGINEERING

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	7.5	1359	4.574	6216	6184	12400	
Q-2 58							
Q-3 58	36.0	6104	4.270	26065	23802	49867	
Q-4 58							
Q-1 59	39.0	6549	4.213	27589	22421	50010	
Q-2 59							
Q-3 59	34.5	6025	4.188	25231	21935	47166	
Q-4 59							
Q-1 60	27.0	4788	4.556	21815	17784	39599	
Q-2 60							
Q-3 60	9.0	1479	4.766	7049	5409	12458	
Q-4 60							
Q-1 61	34.5	5837	4.853	28327	19500	47827	
Q-2 61							
Q-3 61	42.0	7497	4.919	36881	34125	71006	
Q-4 61							
Q-1 62	103.5	17782	5.034	89507	81739	171246	
Q-2 62							
Q-3 62	153.0	25589	5.038	128926	128717	257643	
Q-4 62							
Q-1 63	186.0	31720	5.184	164440	171628	336068	
Q-2 63							
Q-3 63	97.5	16277	5.195	84555	91958	176513	
Q-4 63							
Q-1 64	82.5	14015	5.436	76190	85717	161907	
Q-2 64							
Q-3 64	292.5	51333	5.223	268100	330065	598165	6105
Q-4 64							
Q-1 65	3009.0	521843	5.181	2703582	3248576	5952158	180299
Q-2 65							
Q-3 65	3345.0	561969	5.509	3095792	3471293	6567085	322489
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENG MAT
Q-1 66	4234.5	733885	5.523	4053060	5172794	9225854	31803
Q-2 66							
Q-3 66	3667.5	615965	5.522	3401569	4166678	7568247	47275
TOTAL	15400.5	2630016		14244894	17100325	31345219	129968

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK DESIGN/ENGINEERING

FLIGHT TEST

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-1 58							12400
Q-2 58							
Q-3 58							49867
Q-4 58							
Q-1 59							50010
Q-2 59							
Q-3 59							47166
Q-4 59							
Q-1 60							39599
Q-2 60							
Q-3 60							12458
Q-4 60							
Q-1 61							47827
Q-2 61							
Q-3 61							71006
Q-4 61							
Q-1 62							171246
Q-2 62							
Q-3 62							257643
Q-4 62							
Q-1 63							336068
Q-2 63							
Q-3 63							176513
Q-4 63							
Q-1 64							161907
Q-2 64							
Q-3 64		6105	2221		54346	54346	660837
Q-4 64							
Q-1 65		180299	53927		167388	167388	6353772
Q-2 65							
Q-3 65		322489	57530		289587	289587	7236691
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK DESIGN/ENGINEERING

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUI TOTAI
Q-1 66		318035	65960		475620	475620	1008546
Q-2 66							
Q-3 66		472756	29074		213441	213441	828351
TOTAL		1299684	208712		1200382	1200382	3405399

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK DESIGN/ENGINEERING

	G & A	TOTAL COST
Q-1 58		12400
Q-2 58		
Q-3 58		49867
Q-4 58		
Q-1 59		50010
Q-2 59		
Q-3 59		47166
Q-4 59		
Q-1 60	755	40354
Q-2 60		
Q-3 60	237	12695
Q-4 60		
Q-1 61	847	48674
Q-2 61		
Q-3 61	1320	72326
Q-4 61		
Q-1 62	2874	174120
Q-2 62		
Q-3 62	4324	261967
Q-4 62		
Q-1 63	5618	341686
Q-2 63		
Q-3 63	2951	179464
Q-4 63		
Q-1 64	3445	165352
Q-2 64		
Q-3 64	14061	674898
Q-4 64		
Q-1 65	169518	6523290
Q-2 65		
Q-3 65	193074	7429765
Q-4 65		

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK DESIGN/ENGINEERING

	G & A	TOTAL COST
Q-1 66	258268	10343737
Q-2 66		
Q-3 66	249474	8532992
TOTAL	906766	34960763

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63					52259	52259
Q-4 63						
Q-1 64					40112	40112
Q-2 64						
Q-3 64	19.5	3486	3.201	11157	256350	267507
Q-4 64						
Q-1 65	31.5	5515	3.224	17781	344305	362086
Q-2 65						
Q-3 65	12.0	2029	3.271	6637	398445	405082
Q-4 65						
Q-1 66					542664	542664
Q-2 66						
Q-3 66					344459	344459
TOTAL	63.0	11030		35575	1978594	2014169

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63	60.0	10129	3.481	35264		35264
Q-4 63						
Q-1 64	39.0	6630	3.903	25878		25878
Q-2 64						
Q-3 64	214.5	37766	4.275	161462		161462
Q-4 64						
Q-1 65	276.0	47962	4.557	218586		218586
Q-2 65						
Q-3 65	355.5	59778	4.869	291081		291081
Q-4 65						
Q-1 66	417.0	72398	4.998	361871		361871
Q-2 66						
Q-3 66	281.5	47249	5.059	239040		239040
TOTAL	1643.5	281912		1333182		1333182

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK PRODUCTION

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 63	60.0	10129	3.481	35264	52259	87523	
Q-4 63							
Q-1 64	39.0	6630	3.903	25878	40112	65990	
Q-2 64							
Q-3 64	234.0	41252	4.185	172619	256350	428969	-45
Q-4 64							
Q-1 65	307.5	53477	4.420	236367	344305	580672	26302
Q-2 65							
Q-3 65	367.5	61807	4.817	297718	398445	696163	81546
Q-4 65							
Q-1 66	417.0	72398	4.998	361871	542664	904535	-2458
Q-2 66							
Q-3 66	281.5	47249	5.059	239040	344459	583499	39568
TOTAL	1706.5	292942		1368757	1978594	3347351	144913

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK PRODUCTION

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 63			87523	1463	88986
Q-4 63					
Q-1 64			65990	1404	67394
Q-2 64					
Q-3 64	-16		428908	9127	438035
Q-4 64					
Q-1 65	7867	39	614880	16405	631285
Q-2 65					
Q-3 65	14547	826	793082	21373	814455
Q-4 65					
Q-1 66	-510	1023	902590	27183	929773
Q-2 66					
Q-3 66	2433	8	625508	18838	644346
TOTAL	24321	1896	3518481	95793	3614274

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58						
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61	1.5	302	3.460	1045	1182	2227
Q-4 61						
Q-1 62	4.5	784	4.061	3184	3623	6807
Q-2 62						
Q-3 62	4.5	729	4.255	3102	3748	6850
Q-4 62						
Q-1 63	7.5	1234	4.219	5206	6506	11712
Q-2 63						
Q-3 63		52	6.904	359	92	451
Q-4 63						
Q-1 64	3.0	549	3.776	2073	2870	4943
Q-2 64						
Q-3 64	3.0	582	4.784	2784	3718	6502
Q-4 64						
Q-1 65	1.5	337	3.985	1343	1939	3282
Q-2 65						

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	3.0	426	4.345	1851	1943	3794
Q-4 65						
Q-1 66	15.0	2545	3.495	8896	8897	17793
Q-2 66						
Q-3 66	1.5	342	3.503	1198	1197	2395
TOTAL	45.0	7882		31041	35715	66756

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		2	2.500	5	7	12
Q-4 61						
Q-1 62	9.0	1596	3.073	4905	6048	10953
Q-2 62						
Q-3 62	16.5	2797	2.883	8065	11573	19638
Q-4 62						
Q-1 63	18.0	3120	2.952	9209	16490	25699
Q-2 63						
Q-3 63	24.0	3969	3.353	13307	25623	38930
Q-4 63						
Q-1 64	30.0	5026	3.513	17655	25156	42811
Q-2 64						
Q-3 64	31.5	5500	3.888	21382	36232	57614
Q-4 64						
Q-1 65	16.5	2912	3.205	9333	13936	23269
Q-2 65						
Q-3 65	19.5	3160	3.612	11415	19450	30865
Q-4 65						
Q-1 66	1.5	210	3.343	702	1086	1788
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 66		6	4.667	28	4	32
TOTAL	166.5	28298		96006	155605	251611

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT TEST
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		3	2.333	7	10	17
Q-2 63						
Q-3 63		74	3.946	292	-10	282
TOTAL		77		299		299

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4 FLIGHT TEST
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		70	2.929	205		205
Q-2 62						
Q-3 62		101	3.119	315		315
Q-4 62						
Q-1 63	6.0	943	3.131	2953		2953
Q-2 63						
Q-3 63	13.5	2164	3.413	7386		7386
Q-4 63						
Q-1 64		120	3.808	457		457
Q-2 64						
Q-3 64	12.0	2210	4.108	9079		9079
Q-4 64						
Q-1 65		43	4.744	204		204
Q-2 65						
Q-3 65	6.0	1033	4.103	4238		4238
Q-4 65						
Q-1 66		45	3.711	167		167
Q-2 66						
Q-3 66		1	1.999	-2		-2
TOTAL	37.5	6730		25002		25002

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58							
Q-2 58							
Q-3 58							
Q-4 58							
Q-1 59							
Q-2 59							
Q-3 59							
Q-4 59							
Q-1 60							
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61							
Q-2 61							
Q-3 61	1.5	304	3.454	1050	1189	2239	56
Q-4 61							
Q-1 62	13.5	2450	3.385	8294	9671	17965	6191
Q-2 62							
Q-3 62	21.0	3627	3.166	11482	15321	26803	48918
Q-4 62							
Q-1 63	31.5	5300	3.278	17375	23006	40381	55915
Q-2 63							
Q-3 63	37.5	6259	3.410	21344	25705	47049	44862
Q-4 63							
Q-1 64	33.0	5695	3.544	20185	28026	48211	55071
Q-2 64							
Q-3 64	46.5	8292	4.009	33245	39950	73195	54756
Q-4 64							
Q-1 65	18.0	3292	3.305	10880	15875	26755	11832
Q-2 65							
Q-3 65	28.5	4619	3.790	17504	21393	38897	-214
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	16.5	2800	3.488	9765	9983	19748	
Q-2 66							
Q-3 66	1.5	349	3.507	1224	1201	2425	
TOTAL	249.0	42987		152348	191320	343668	277387

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58					
Q-2 58					
Q-3 58					
Q-4 58					
Q-1 59					
Q-2 59					
Q-3 59					
Q-4 59					
Q-1 60					
Q-2 60					
Q-3 60					
Q-4 60					
Q-1 61					
Q-2 61					
Q-3 61	5		2300	38	2338
Q-4 61					
Q-1 62	488	34	24678	414	25092
Q-2 62					
Q-3 62	3855	15	79591	1336	80927
Q-4 62					
Q-1 63	5507		101803	1702	103505
Q-2 63					
Q-3 63	4419	-49	96281	1610	97891
Q-4 63					
Q-1 64	5871		109153	2323	111476
Q-2 64					
Q-3 64	19920		147871	3146	151017
Q-4 64					
Q-1 65	3539		42126	1124	43250
Q-2 65					
Q-3 65	-38		38645	1031	39676
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
SUBD OF WORK TEST/QC

FLIGHT TEST

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66			19748	595	20343
Q-2 66					
Q-3 66			2425	73	2498
TOTAL	43566		664621	13392	678013

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	7.5	1359	4.574	6216	6184	12400
Q-2 58						
Q-3 58	36.0	6104	4.270	26065	23802	49867
Q-4 58						
Q-1 59	39.0	6549	4.213	27589	22421	50010
Q-2 59						
Q-3 59	34.5	6025	4.188	25231	21935	47166
Q-4 59						
Q-1 60	27.0	4788	4.556	21815	17784	39599
Q-2 60						
Q-3 60	9.0	1479	4.766	7049	5409	12458
Q-4 60						
Q-1 61	34.5	5837	4.853	28327	19500	47827
Q-2 61						
Q-3 61	43.5	7799	4.863	37926	35307	73233
Q-4 61						
Q-1 62	109.5	18566	4.993	92691	85362	178053
Q-2 62						
Q-3 62	156.0	26318	5.017	132028	132465	264493
Q-4 62						
Q-1 63	193.5	32954	5.148	169646	178134	347780
Q-2 63						
Q-3 63	97.5	16329	5.200	84914	92050	176964
Q-4 63						
Q-1 64	85.5	14564	5.374	78263	88587	166850
Q-2 64						
Q-3 64	288.0	50671	5.241	265566	327809	593375
Q-4 64						
Q-1 65	2367.0	410169	5.554	2278130	2726186	5004316
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	2980.5	500690	5.707	2857559	3187578	6045137
Q-4 65						
Q-1 66	3703.5	642048	5.750	3691645	4674420	8366065
Q-2 66						
Q-3 66	3136.5	526904	5.570	2935103	3574102	6509205
TOTAL	13348.5	2279153		12765763	15219035	27984798

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63					52259	52259
Q-4 63						
Q-1 64					40112	40112
Q-2 64						
Q-3 64	19.5	3486	3.201	11157	256350	267507
Q-4 64						
Q-1 65	31.5	5515	3.224	17781	344305	362086
Q-2 65						
Q-3 65	12.0	2029	3.271	6637	398445	405082
Q-4 65						
Q-1 66					542664	542664
Q-2 66						
Q-3 66					344459	344459
TOTAL	63.0	11030		35575	1978594	2014169

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		2	2.500	5	7	12
Q-4 61						
Q-1 62	9.0	1596	3.073	4905	6048	10953
Q-2 62						
Q-3 62	16.5	2797	2.883	8065	11573	19638
Q-4 62						
Q-1 63	18.0	3120	2.952	9209	16490	25699
Q-2 63						
Q-3 63	24.0	3969	3.353	13307	25623	38930
Q-4 63						
Q-1 64	30.0	5026	3.513	17655	25156	42811
Q-2 64						
Q-3 64	36.0	6316	3.980	25137	42206	67343
Q-4 64						
Q-1 65	555.0	96104	3.692	354856	538265	893121
Q-2 65						
Q-3 65	276.0	46393	3.664	169997	305108	475105
Q-4 65						
Q-1 66	393.0	68176	3.598	245324	508357	753681
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 66	405.0	68087	5.443	370567	593777	964344
TOTAL	1762.5	301586		1219027	2072610	3291637

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 63		3	2.333	7	10	17
Q-2 63						
Q-3 63		74	3.946	292	-10	282
Q-4 63						
Q-1 64						
Q-2 64						
Q-3 64						
Q-4 64						
Q-1 65						
Q-2 65						
Q-3 65						
Q-4 65						
Q-1 66						
Q-2 66						
Q-3 66						
TOTAL		77		299		299

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		70	2.929	205		205
Q-2 62						
Q-3 62		101	3.119	315		315
Q-4 62						
Q-1 63	6.0	943	3.131	2953		2953
Q-2 63						
Q-3 63	73.5	12293	3.469	42650		42650
Q-4 63						
Q-1 64	39.0	6750	3.901	26335		26335
Q-2 64						
Q-3 64	229.5	40404	4.260	172104		172104
Q-4 64						
Q-1 65	385.5	66824	4.490	300062		300062
Q-2 65						
Q-3 65	472.5	79283	4.753	376821		376821
Q-4 65						
Q-1 66	570.0	98859	4.934	487727		487727
Q-2 66						
Q-3 66	408.0	68572	4.902	336163		336163
TOTAL	2184.0	374099		1745335		1745335

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	7.5	1359	4.574	6216	6184	12400	
Q-2 58							
Q-3 58	36.0	6104	4.270	26065	23802	49867	
Q-4 58							
Q-1 59	39.0	6549	4.213	27589	22421	50010	
Q-2 59							
Q-3 59	34.5	6025	4.188	25231	21935	47166	
Q-4 59							
Q-1 60	27.0	4788	4.556	21815	17784	39599	
Q-2 60							
Q-3 60	9.0	1479	4.766	7049	5409	12458	
Q-4 60							
Q-1 61	34.5	5837	4.853	28327	19500	47827	
Q-2 61							
Q-3 61	43.5	7801	4.862	37931	35314	73245	56
Q-4 61							
Q-1 62	118.5	20232	4.834	97801	91410	189211	6191
Q-2 62							
Q-3 62	172.5	29216	4.806	140408	144038	284446	48918
Q-4 62							
Q-1 63	217.5	37020	4.911	181815	194634	376449	55915
Q-2 63							
Q-3 63	195.0	32665	4.322	141163	169922	311085	44862
Q-4 63							
Q-1 64	154.5	26340	4.641	122253	153855	276108	55071
Q-2 64							
Q-3 64	573.0	100877	4.698	473964	626365	1100329	60861
Q-4 64							
Q-1 65	3339.0	578612	5.100	2950829	3608756	6559585	192131
Q-2 65							
Q-3 65	3741.0	628395	5.428	3411014	3891131	7302145	322275
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	4666.5	809083	5.469	4424696	5725441	10150137	318035
Q-2 66							
Q-3 66	3949.5	663563	5.488	3641833	4512338	8154171	472756
TOTAL	17358.0	2965945		15765999	19270239	35036238	1577071

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-1 58							12400
Q-2 58							
Q-3 58							49867
Q-4 58							
Q-1 59							50010
Q-2 59							
Q-3 59							47166
Q-4 59							
Q-1 60							39599
Q-2 60							
Q-3 60							12458
Q-4 60							
Q-1 61							47827
Q-2 61							
Q-3 61		56	5				73306
Q-4 61							
Q-1 62		6191	488		34	34	195924
Q-2 62							
Q-3 62		48918	3855		15	15	337234
Q-4 62							
Q-1 63		55915	5507				437871
Q-2 63							
Q-3 63		44862	4419		-49	-49	360317
Q-4 63							
Q-1 64		55071	5871				337050
Q-2 64							
Q-3 64	-45	60816	22125		54346	54346	1237616
Q-4 64							
Q-1 65	26302	218433	65333		167427	167427	7010778
Q-2 65							
Q-3 65	81546	403821	72039		290413	290413	8068418
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-1 66	-2458	315577	65450		476643	476643	11007807
Q-2 66							
Q-3 66	39568	512324	31507		213449	213449	8911451
TOTAL	144913	1721984	276599		1202278	1202278	38237099

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	G & A	TOTAL COST
Q-1 58		12400
Q-2 58		
Q-3 58		49867
Q-4 58		
Q-1 59		50010
Q-2 59		
Q-3 59		47166
Q-4 59		
Q-1 60	755	40354
Q-2 60		
Q-3 60	237	12695
Q-4 60		
Q-1 61	847	48674
Q-2 61		
Q-3 61	1358	74664
Q-4 61		
Q-1 62	3288	199212
Q-2 62		
Q-3 62	5660	342894
Q-4 62		
Q-1 63	7320	445191
Q-2 63		
Q-3 63	6024	366341
Q-4 63		
Q-1 64	7172	344222
Q-2 64		
Q-3 64	26334	1263950
Q-4 64		
Q-1 65	187047	7197825
Q-2 65		
Q-3 65	215478	8283896
Q-4 65		

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
FLIGHT TEST

	G & A	TOTAL COST
Q-1 66	286046	11293853
Q-2 66		
Q-3 66	268385	9179836
TOTAL	1015951	39253050

WBS 4.0 FLIGHT TEST

Flight Operations WBS CODE: 4.41.1

This section presents an operations engineering summary covering the many facets of Planning, Ground Operations, and Flight Operations that existed during the XB-70 Flight Test Development Program.

Planning:

Operations Engineering planning for the support of the two air vehicle program consisted of two Flight Mission Planners in addition to three teams of engineers. Two of these teams were used in direct support of the air vehicles, the third in direct support of the ground support equipment (FTGSE) utilized by the air vehicles. Each air vehicle team consisted of a team leader and five air vehicle system-oriented engineers. The third team consisted of a team leader and four engineers, two assigned responsibility for electrical FTGSE and two assigned responsibility for mechanical FTGSE.

Detailed assignments of the members of each air vehicle team were as follows:

Team Leader: Assigned overall responsibility for the technical direction of all flight and ground test activities, control of all flight and ground operations, coordination and scheduling of support activities for flight and ground tests, and the technical support of systems configurations.

System Engineer No. 1 - Operational support of Landing Gear, Hydraulics, and Accessory Drive Systems.

System Engineer No. 2 - Operational support of Propulsion and Fuel Systems.

System Engineer No. 3 - Operational support of Environmental Control, Escape, and Personnel Accommodations Systems.

System Engineer No. 4 - Operational support of Flight Controls, Flight Augmentation Control, and Air Induction Control Systems.

System Engineer No. 5 - Operational support of Electrical Power Distribution, Communication, Navigation, Cockpit Display, and miscellaneous electronics systems.

Flight Mission Planner - Responsible to plan each mission in its entirety, including ground track, flight profile, fuel consumption, test points to be obtained, and support required, i.e. safety chase air vehicles, communication frequency assignments, restricted area clearance, etc.

WBS CODE: 4.41.1

Operational Procedures formulated as operational control documents and utilized throughout the flight test program were as follows:

Flight Test Procedure Letters - Procedure Letters were originated to define standard methods of operation pertaining to the XB-70 Project.

Operational Test Plans - Prior-to-flight ground operations for this air vehicle were extensive due to its size and the complexity of its systems. An integrated schedule was developed, and detailed Operational Test Plans (OTP's) were compiled in order to assure timely completion of these operations in a safe manner. In order that these OTP's be uniform and complete, a Flight Test Procedure Letter was generated to define format and content.

Flight Test Technical Guides - Technical Guides, applicable to specific air vehicles or equipment, were prepared as tools to enable operations and maintenance groups to accomplish repetitive shop testing or post- and preflight activities safely, sequentially, and completely. Material contained in these Technical Guides was based on Engineering Process Specifications, released drawings, Engineering Orders, etc., but was presented in a manner that enabled the user to economically and expeditiously accomplish his assigned task. A Flight Test Procedure Letter was prepared to define format and content of the Technical Guide.

Planning for ground operations included the compilation of all requirements from Process Specifications, Test Authorizations, Engineering Orders, etc., and the integration of these requirements into a smooth flowing plan scheduled to preclude delays or lost motion of any kind. The OTP's were prepared to provide for accumulation of parts, test equipment, ground support equipment, personnel, and information at the proper time to integrate the activity. The systems operations engineers were required to coordinate and conduct their assigned activities as prescribed in the OTP's which they had prepared with attention to safe, sequential, and complete accomplishment of their tasks. Planning for flexibility of operations was carried out to provide for delays due to malfunctions. Due to the size of the air vehicle, the noise level in the surrounding area, and the number of personnel involved in the operations, a central communications station was designed, constructed, and employed during the ground test program.

This ground communication station was housed in a 29-passenger bus to give it the mobility required for the program. It contained two-way radio communications, a five-channel ground inter-communication system capable of being tied in to the air vehicle inter-communication system as well as to that used by ground support equipment personnel. Completely self-contained electrical power generation was provided so that it could operate at remote sites and could maintain radio communications while in motion. It provided seating for driver and ten people and equipment maintenance technician. This Mobile Communication Station proved invaluable

during the course of ground and flight operations.

Planning for flight operations revolved around the Operations team. Specifications were drawn for a Flight Control Communications room, designed to provide for the entire team to be seated at a telemetry and radar console where specific air vehicle flight safety parameters would be displayed. These provided intelligence concerning air vehicle position (ground track and altitude), velocity, attitude, surface controls position, structural stresses, fluid systems pressures, and specific systems health information.

In addition, seats were provided for specific support functions such as Safety Chase Air Vehicle Controller, FAA airspace coordinator, range communications controller, Flight Mission Planner and a member of management to act as final authority for important decisions. In support of this group a second room was specified to display, on analog recorders, the same telemetered intelligence to a group of design engineers. This provided for expert analysis of data, on-the-spot, to support the operations team in decisions pertaining to in-flight malfunctions.

The Flight Communications Control room was connected by a microwave network to the Edwards Flight Test Range (EFTR) communications and tracking stations. The EFTR provided a test mission environment in a highly instrumented flight test corridor extending from Wendover, Utah, to Edwards AFB, California. By properly planning the ground track and flight profile, this communication and telemetry network, together with its tracking radar stations, could be used to maintain constant surveillance of the air vehicle.

Each Flight Test Operations Engineer was required to study all information available pertaining to his systems in order to gain the detailed knowledge of their design and operating characteristics. Each engineer attended such briefings as were available; contacted design personnel cognizant of his systems; studied drawings, technical manuals and reports; and engaged in the operation of simulators and other system testing available. Each was periodically required to brief the entire group on the status of his systems and their operational characteristics. This provided a degree of cross-training as well as the systems interface information necessary to the welding of the individual engineers into an operating team.

As manufacturing of the air vehicle approached completion, the team was employed in the final operations checkout and assisted in problem analysis and resolution. This application of their knowledge enhanced their training and led directly into the Ground Test Operations required to proof test each system prior to flight. Additional training was acquired by reviewing Safety Analyses and conducting additional analysis wherever indicated.

Since the method to be used for flight monitoring was somewhat advanced in respect to previous methods, a simulated flight mission was conducted from the Flight Communications Control room, using a TB-58 as the flight vehicle. This exercise served a two-fold purpose: It gave the team an opportunity to acquire first-hand experience in the use of the Control Room while conducting a mission with pre-planned XB-70 malfunction events, and at the same time exercised the functional operation of the Control Room and its equipment.

Ground Operations:

Complete ground testing of the air vehicle and all of its subsystems was accomplished upon completion of its manufacture and prior to its flight operations. The Operational Test Plans, as noted above, were integrated by schedule and accomplished to ensure satisfactory operation of each system, individually, and interfaced with all associated systems. They were conducted by the Flight Test Operations Teams, assigned to cover two twelve-hour shifts in order to expedite the operation. Malfunctions and other problems were repaired and otherwise resolved on-the-spot by the team whenever possible. When on-the-spot resolution was not possible, coordination with the cognizant group of Engineering or Procurement personnel was initiated and follow-up maintained until the solution was obtained. This method of operation proved very satisfactory from a point of view of expeditious completion of the ground activities in that it allowed for continuous surveillance of air vehicle activity by knowledgeable systems operation personnel with excellent shift-to-shift coordination. Culmination of this occurred with the taxi tests where all systems were functionally operated together to assure proper operation for flight.

Special tests were conducted periodically throughout the program in order to determine specific characteristics of the air vehicle. For example, after four flights the No. 1 Air Vehicle was returned to Palmdale from Edwards AFB and set up in special fixtures to proof-load test the control surfaces and the inlet duct. These tests were conducted by the Structures Test Lab personnel under the surveillance of Flight Test personnel. The fuel system calibration was another example of such a special test. It was conducted by Flight Test Operations personnel in the Edwards AFB Weight and Balance Facility in accordance with a pre-planned OTP.

A set of post- and preflight requirements was compiled and formalized on prepared forms by the Flight Test Maintenance group with the assistance of the Operations Engineers. These were tailored to integrate air vehicle system checkout and servicing into coordinated operation in order to safely and expeditiously prepare the air vehicle for flight, using the maintenance and operations teams in coordinated effort. These forms were updated periodically during the course of the program as experience was gained and system changes were made.

During ground operations, FTGSE was treated the same as any air vehicle system. Assigned engineers and maintenance personnel maintained constant

surveillance of air vehicle system changes and up-dated the FTGSE to match all changes made. A program for improving operation and use was constantly progressing throughout the air vehicle test program. The Instrumentation Subsystem (WBS: 1.11), in addition to recording flight parameters for the test program, was used throughout the period to gather information in support of malfunction analysis. It proved an invaluable assistant to Operations and Design engineers in analyzing causes of malfunctions and proving operational suitability of corrections made.

Flight Operations:

The Flight Mission Planners custom-tailored the air vehicle flight mission parameters to meet test requirements. They developed the mission profile and ground track to fit the capabilities of the EFTR instrumentation and sequenced the test points to fit the pattern. It was their task to assure proper fuel management, air vehicle weight and balance, mission support activities, and be constantly acquainted with air vehicle system status. Once the mission plan was finalized, they participated in the mission briefing for the pilots and furnished detailed information on conduct of the mission.

During flight, the mission planner was required to monitor all elements of air vehicle situation in order to advise on energy management for return of the air vehicle to Edward AFB. He provided alternate test points that could be accomplished in the event a malfunction or environmental change required a change of mission.

The mission support to flight operations was as follows:

EFTR Facilities: Communications, telemetry, and radar tracking facilities are provided in real-time by the EFTR. For the XB-70 program, two channels of UHF, 36 parameters of telemetered information, and a constant-surveillance radar-tracked ground plot were provided.

Telemetry and radar ground track equipment operation were considered very good. These displays were consistently available and generally accurate. They were occasionally disrupted while flight was in progress, principally at extremes of acquisition capability when the air vehicle was in a turn.

Radio communications were only fair if considered on an overall basis. Frequent loss of communications occurred, principally as a result of low power output equipment at the uprange stations. Adding to this difficulty were the many connections and patch panels in the system associated with the ground station at the Flight Communications Control Room. Backup communications capabilities were provided in three ways. First, a phone patch system was installed to enable the Flight Controller to use transceivers installed at the NAA facility. This system was used with success several times. Second, a relay message system was employed, using a telephone conference call system to the FAA facilities at Salt Lake City, Denver, and Oakland. This

necessarily limited the degree of communication, but proved helpful several times in determining air vehicle status. Third, the NASA High Range Communication System was "piped" into the Control Room. This is associated with, but uses different equipment than, the EFTR. This method was used several times with success. Without these alternate methods of communications, many test missions would have had to be aborted.

Chase Air Vehicles: Safety chase air vehicles were mandatory for every mission. They provided the pilot with "external eyes" from which to view his vehicle.

General practice was to provide a constant surveillance during the flight regime where chase capability matched that of the XB-70. In flight regimes where no chase was available to match the XB-70 capability, a proximity chase was provided to be immediately available should the XB-70 experience a serious problem. The TB-58 was the most versatile of all chase aircraft provided. It had the greatest velocity-range capability and proved invaluable to the program.

Emergency Search and Rescue Procedures: Emergency search and rescue procedures were prepared by Flight Test Operations Engineering, coordinated with Industrial Security (NR) and with the Air Force, and presented in a Flight Test Procedure Letter.

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		1958503		1958503
LABOR AT $ 5.774		11308624		11308624
ENGR BURDEN AT $ 6.892		13498804		13498804
SHOP SUPPORT		81949		81949
LABOR AT $ 3.713		304273		304273
TEST/QC		15083	107592	122675
LABOR AT $ 4.788		63784	523629	587413
MFG BURDEN AT $ 5.979		465052	758409	1223461
ENGR MATERIAL		430206		430206
MFG MATERIAL			144913	144913
MPC		75447	24321	99768
OTHER COST		1189794	1896	1191690
SUB-TOTAL		27335984	1453168	28789152
GEN & ADMIN		763700	41560	805260
TOTAL COST		28099684	1494728	29594412

TIME-PHASED COST
DETAIL - SEE PAGE II-386 II-394 II-399

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	7.5	1359	4.574	6216	6184	12400
Q-2 58						
Q-3 58	36.0	5974	4.270	25507	23296	48803
Q-4 58						
Q-1 59	36.0	6234	4.213	26262	21344	47606
Q-2 59						
Q-3 59	33.0	5749	4.185	24062	20929	44991
Q-4 59						
Q-1 60	22.5	3871	4.555	17634	14363	31997
Q-2 60						
Q-3 60	9.0	1439	4.769	6863	5260	12123
Q-4 60						
Q-1 61	34.5	5813	4.680	27204	19420	46624
Q-2 61						
Q-3 61	33.0	6074	4.903	29780	27638	57418
Q-4 61						
Q-1 62	72.0	12170	5.007	60941	55962	116903
Q-2 62						
Q-3 62	118.5	19969	4.998	99807	100253	200060
Q-4 62						
Q-1 63	142.5	24422	5.163	126084	132084	258168
Q-2 63						
Q-3 63	61.5	10394	5.235	54410	59288	113698
Q-4 63						
Q-1 64	46.5	7917	5.607	44393	48527	92920
Q-2 64						
Q-3 64	246.0	43240	5.200	224850	278433	503283
Q-4 64						
Q-1 65	2069.5	358671	5.576	1999910	2392344	4392254

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-2 65						
Q-3 65	2629.5	441758	5.838	2578772	2862277	5441049
Q-4 65						
Q-1 66	3297.0	571606	5.924	3386330	4276741	7663071
Q-2 66						
Q-3 66	2571.0	431843	5.950	2569599	3154461	5724060
TOTAL	11465.5	1958503		11308624	13498804	24807428

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT OPERATIONS**
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	3.0	582	4.881	2841	4362	7203
Q-4 64						
Q-1 65	249.0	43188	3.728	161018	226929	387947
Q-2 65						
Q-3 65	75.0	12587	3.457	43518	70702	114220
Q-4 65						
Q-1 66	28.5	5027	3.914	19675	40117	59792
Q-2 66						
Q-3 66	123.0	20565	3.755	77221	122942	200163
TOTAL	478.5	81949		304273	465052	769325

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	1.5	322	3.798	1223		1223
Q-4 64						
Q-1 65	34.5	6046	4.236	25613		25613
Q-2 65						
Q-3 65	19.5	3234	4.049	13096		13096
Q-4 65						
Q-1 66	16.5	2785	4.419	12307		12307
Q-2 66						
Q-3 66	16.5	2696	4.282	11545		11545
TOTAL	88.5	15083		63784		63784

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT OPERATIONS**
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	7.5	1359	4.574	6216	6184	12400	
Q-2 58							
Q-3 58	36.0	5974	4.270	25507	23296	48803	
Q-4 58							
Q-1 59	36.0	6234	4.213	26262	21344	47606	
Q-2 59							
Q-3 59	33.0	5749	4.185	24062	20929	44991	
Q-4 59							
Q-1 60	22.5	3871	4.555	17634	14363	31997	
Q-2 60							
Q-3 60	9.0	1439	4.769	6863	5260	12123	
Q-4 60							
Q-1 61	34.5	5813	4.680	27204	19420	46624	
Q-2 61							
Q-3 61	33.0	6074	4.903	29780	27638	57418	
Q-4 61							
Q-1 62	72.0	12170	5.007	60941	55962	116903	
Q-2 62							
Q-3 62	118.5	19969	4.998	99807	100253	200060	
Q-4 62							
Q-1 63	142.5	24422	5.163	126084	132084	258168	
Q-2 63							
Q-3 63	61.5	10394	5.235	54410	59288	113698	
Q-4 63							
Q-1 64	46.5	7917	5.607	44393	48527	92920	
Q-2 64							
Q-3 64	250.5	44144	5.186	228914	282795	511709	5924
Q-4 64							
Q-1 65	2353.0	407905	5.360	2186541	2619273	4805814	110670
Q-2 65							
Q-3 65	2724.0	457579	5.759	2635386	2932979	5568365	98273

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-4 65							
Q-1 66	3342.0	579418	5.900	3418312	4316858	7735170	64548
Q-2 66							
Q-3 66	2710.5	455104	5.841	2658365	3277403	5935768	150791
TOTAL	12032.5	2055535		11676681	13963856	25640537	430206

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL	G & A	TOTAL COST
Q-1 58					12400		12400
Q-2 58							
Q-3 58					48803		48803
Q-4 58							
Q-1 59					47606		47606
Q-2 59							
Q-3 59					44991		44991
Q-4 59							
Q-1 60					31997	610	32607
Q-2 60							
Q-3 60					12123	231	12354
Q-4 60							
Q-1 61					46624	825	47449
Q-2 61							
Q-3 61					57418	1067	58485
Q-4 61							
Q-1 62					116903	1962	118865
Q-2 62							
Q-3 62					200060	3358	203418
Q-4 62							
Q-1 63					258168	4316	262484
Q-2 63							
Q-3 63					113698	1901	115599
Q-4 63							
Q-1 64					92920	1977	94897
Q-2 64							
Q-3 64	2155		54346	54346	574134	12216	586350
Q-4 64							
Q-1 65	33101		166018	166018	5115603	136484	5252087
Q-2 65							
Q-3 65	17531		288587	288587	5972756	159353	6132109

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK DESIGN/ENGINEERING

	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL	G & A	TOTAL COST
Q-4 65							
Q-1 66	13387		473588	473588	8286693	249570	8536263
Q-2 66							
Q-3 66	9273		207255	207255	6303087	189830	6492917
TOTAL	75447		1189794	1189794	27335984	763700	28099684

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64					13020	13020
Q-4 64						
Q-1 65					131578	131578
Q-2 65						
Q-3 65					170522	170522
Q-4 65						
Q-1 66					271151	271151
Q-2 66						
Q-3 66					172138	172138
TOTAL					758409	758409

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 4
5-SUBSYSTEM 41 FLIGHT OPERATIONS
6-MAJ ASSY 01
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64						
Q-4 64						
Q-1 65						
Q-2 65						
Q-3 65						
Q-4 65						
Q-1 66						
Q-2 66						
Q-3 66						
TOTAL						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUB SYSTEM 41 **FLIGHT OPERATIONS**
6-MAJ ASSY 01
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	11.5	1979	4.275	8461		8461
Q-4 64						
Q-1 65	114.0	19705	4.614	90916		90916
Q-2 65						
Q-3 65	156.0	26126	4.764	124473		124473
Q-4 65						
Q-1 66	208.5	36194	4.984	180396		180396
Q-2 66						
Q-3 66	141.0	23588	5.061	119383		119383
TOTAL	631.0	107592		523629		523629

C-8

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
SUBD OF WORK PRODUCTION

FLIGHT OPERATIONS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 64 Q-4 64	11.5	1979	4.275	8461	13020	21481	-45
Q-1 65 Q-2 65	114.0	19705	4.614	90916	131578	222494	26302
Q-3 65 Q-4 65	156.0	26126	4.764	124473	170522	294995	81546
Q-1 66 Q-2 66	208.5	36194	4.984	180396	271151	451547	-2458
Q-3 66	141.0	23588	5.061	119383	172138	291521	39568
TOTAL	631.0	107592		523629	758409	1282038	144913

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 **FLIGHT OPERATIONS**
6-MAJ ASSY 01
SUBD OF WORK PRODUCTION

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 64	-16		21420	456	21876
Q-4 64					
Q-1 65	7867	39	256702	6849	263551
Q-2 65					
Q-3 65	14547	826	391914	10670	402584
Q-4 65					
Q-1 66	-510	1023	449602	13540	463142
Q-2 66					
Q-3 66	2433	8	333530	10045	343575
TOTAL	24321	1896	1453168	41560	1494728

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	7.5	1359	4.574	6216	6184	12400
Q-2 58						
Q-3 58	36.0	5974	4.270	25507	23296	48803
Q-4 58						
Q-1 59	36.0	6234	4.213	26262	21344	47606
Q-2 59						
Q-3 59	33.0	5749	4.185	24062	20929	44991
Q-4 59						
Q-1 60	22.5	3871	4.555	17634	14363	31997
Q-2 60						
Q-3 60	9.0	1439	4.769	6863	5260	12123
Q-4 60						
Q-1 61	34.5	5813	4.680	27204	19420	46624
Q-2 61						
Q-3 61	33.0	6074	4.903	29780	27638	57418
Q-4 61						
Q-1 62	72.0	12170	5.007	60941	55962	116903
Q-2 62						
Q-3 62	118.5	19969	4.998	99807	100253	200060
Q-4 62						
Q-1 63	142.5	24422	5.163	126084	132084	258168
Q-2 63						
Q-3 63	61.5	10394	5.235	54410	59288	113698
Q-4 63						
Q-1 64	46.5	7917	5.607	44393	48527	92920
Q-2 64						
Q-3 64	246.0	43240	5.200	224850	278433	503283
Q-4 64						
Q-1 65	2069.5	358671	5.576	1999910	2392344	4392254

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-2 65						
Q-3 65	2629.5	441758	5.838	2578772	2862277	5441049
Q-4 65						
Q-1 66	3297.0	571606	5.924	3386330	4276741	7663071
Q-2 66						
Q-3 66	2571.0	431843	5.950	2569599	3154461	5724060
TOTAL	11465.5	1958503		11308624	13498804	24807428

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64					13020	13020
Q-4 64						
Q-1 65					131578	131578
Q-2 65						
Q-3 65					170522	170522
Q-4 65						
Q-1 66					271151	271151
Q-2 66						
Q-3 66					172138	172138
TOTAL					758409	758409

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	3.0	582	4.881	2841	4362	7203
Q-4 64						
Q-1 65	249.0	43188	3.728	161018	226929	387947
Q-2 65						
Q-3 65	75.0	12587	3.457	43518	70702	114220
Q-4 65						
Q-1 66	28.5	5027	3.914	19675	40117	59792
Q-2 66						
Q-3 66	123.0	20565	3.755	77221	122942	200163
TOTAL	478.5	81949		304273	465052	769325

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	13.5	2301	4.209	9684		9684
Q-4 64						
Q-1 65	148.5	25751	4.525	116529		116529
Q-2 65						
Q-3 65	175.5	29360	4.686	137569		137569
Q-4 65						
Q-1 66	225.0	38979	4.944	192703		192703
Q-2 66						
Q-3 66	156.0	26284	4.981	130928		130928
TOTAL	718.5	122675		587413		587413

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	7.5	1359	4.574	6216	6184	12400	
Q-2 58							
Q-3 58	36.0	5974	4.270	25507	23296	48803	
Q-4 58							
Q-1 59	36.0	6234	4.213	26262	21344	47606	
Q-2 59							
Q-3 59	33.0	5749	4.185	24062	20929	44991	
Q-4 59							
Q-1 60	22.5	3871	4.555	17634	14363	31997	
Q-2 60							
Q-3 60	9.0	1439	4.769	6863	5260	12123	
Q-4 60							
Q-1 61	34.5	5813	4.680	27204	19420	46624	
Q-2 61							
Q-3 61	33.0	6074	4.903	29780	27638	57418	
Q-4 61							
Q-1 62	72.0	12170	5.007	60941	55962	116903	
Q-2 62							
Q-3 62	118.5	19969	4.998	99807	100253	200060	
Q-4 62							
Q-1 63	142.5	24422	5.163	126084	132084	258168	
Q-2 63							
Q-3 63	61.5	10394	5.235	54410	59288	113698	
Q-4 63							
Q-1 64	46.5	7917	5.607	44393	48527	92920	
Q-2 64							
Q-3 64	262.5	46123	5.147	237375	295815	533190	5924
Q-4 64							
Q-1 65	2467.0	427610	5.326	2277457	2750851	5028308	110670
Q-2 65							
Q-3 65	2880.0	483705	5.706	2759859	3103501	5863360	98273

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-4 65							
Q-1 66	3550.5	615612	5.846	3598708	4588009	8186717	64548
Q-2 66							
Q-3 66	2850.0	478692	5.803	2777748	3449541	6227289	150791
TOTAL	12662.5	2163127		1220031C	14722265	26922575	430206

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-1 58							12400
Q-2 58							
Q-3 58							48803
Q-4 58							
Q-1 59							47606
Q-2 59							
Q-3 59							44991
Q-4 59							
Q-1 60							31997
Q-2 60							
Q-3 60							12123
Q-4 60							
Q-1 61							46624
Q-2 61							
Q-3 61							57418
Q-4 61							
Q-1 62							116903
Q-2 62							
Q-3 62							200060
Q-4 62							
Q-1 63							258168
Q-2 63							
Q-3 63							113698
Q-4 63							
Q-1 64							92920
Q-2 64							
Q-3 64	-45	5879	2139		54346	54346	595554
Q-4 64							
Q-1 65	26302	136972	40968		166057	166057	5372305
Q-2 65							
Q-3 65	81546	179819	32078		289413	289413	6364670

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	MFG MATL	TOTAL MATERIAL	MPC	WIND TUNNEL	OTHER COST	TOTAL O/C $	SUB TOTAL
Q-4 65							
Q-1 66	-2458	62090	12877		474611	474611	8736295
Q-2 66							
Q-3 66	39568	190359	11706		207263	207263	6636617
TOTAL	144913	575119	99768		1191690	1191690	28789152

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	G & A	TOTAL COST
Q-1 58		12400
Q-2 58		
Q-3 58		48803
Q-4 58		
Q-1 59		47606
Q-2 59		
Q-3 59		44991
Q-4 59		
Q-1 60	610	32607
Q-2 60		
Q-3 60	231	12354
Q-4 60		
Q-1 61	825	47449
Q-2 61		
Q-3 61	1067	58485
Q-4 61		
Q-1 62	1962	118865
Q-2 62		
Q-3 62	3358	203418
Q-4 62		
Q-1 63	4316	262484
Q-2 63		
Q-3 63	1901	115599
Q-4 63		
Q-1 64	1977	94897
Q-2 64		
Q-3 64	12672	608226
Q-4 64		
Q-1 65	143333	5515638
Q-2 65		
Q-3 65	170023	6534693

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 01
FLIGHT OPERATIONS

	G & A	TOTAL COST
Q-4 65		
Q-1 66	263110	8999405
Q-2 66		
Q-3 66	199875	6836492
TOTAL	805260	29594412

WBS 4.0 FLIGHT TEST

Air Vehicle Maintenance WBS CODE: 4.41.2

General:

The air vehicle maintenance concept, which was established to provide the most timely and economical scheduling and the maximum utilization of resources, was as follows:

> "...Flight Test to receive the air vehicles from Manufacturing and perform prior-to-flight tests at Palmdale. To accomplish this,Flight Test will use operational test procedure Technical Guides and the assistance of Manufacturing. To maintain and update the air vehicles using the guidance of NR process specifications, blueprints, Engineering Orders and Air Force Technical Orders utilizing NR assigned facilities at EAFB and AFFTC shops. To develop a series of workbooks, forms and procedures to be utilized through all maintenance cycles. To maintain all Flight Test Ground Support Equipment (FTGSE) with the assistance of NR supporting departments and the AFFTC...."

Basically the original concept was followed. The air vehicle was received and prior-to-flight tests made utilizing some Manufacturing support. A number of planned prior-to-flight operations were delayed, however, since some systems were not required for first flight. After the first few operations it was evident that changes in preliminary procedures and forms were required. Some methods of operation even dictated changes in the process specifications. Sign-off forms were constantly revised to eliminate excessive sign-offs, servicing, etc., throughout the program.

The plans to utilize the AFFTC support shops to the maximum as directed by the Services & Support Agreement proved impractical in most areas and shop work ended up being performed in-house by expanding NR capabilities.

During the XB-70 Flight Test Program, specific maintenance operations were performed at specific periods and within certain constraints. These maintenance operations are defined in the following definitions:

Flight Test Ground Support Equipment

Flight Test Ground Support Equipment (FTGSE) was defined as any or all implements or devices as approved on the FTGSE Nomenclature List required at the test site to inspect, test, service, adjust,calibrate, gage, measure, repair, assemble, disassemble, transport, safeguard actuate, and/or otherwise maintain the XB-70A Air Vehicle during the planned flight test program.

Inspections

Inspections were maintenance requirements accomplished on the air vehicle or on equipment in order to determine its operating capability. These requirements included the operations necessary to adequately verify these

conditions. These requirements consisted, in part, of removing, replacing, gaining access to, testing, operating, checking, servicing, or in any manner conducting an investigation to determine the status of the equipment being inspected. Repairing, reconditioning, and unscheduled replacement were not functions of inspection, but were the results.

Preflight Inspection

The preflight inspection was accomplished prior to flight to verify air vehicle and subsystem condition and flight readiness. The preflight inspection was divided into a hangar preflight and flight line preflight inspection. The hangar preflight inspection and the hangar postflight inspection generally overlapped when no unusual amount of unscheduled maintenance occurred between flights. The hangar preflight consisted of a minimum visual inspection, close-out of some compartments, servicing of those expendables permissible in the hangar area, and initiation of subsystem operational verification checks. The flight line preflight consisted of complete expendables servicing, specific subsystem checks associated with serviced for flight systems, final inspection and close-out of compartments left open for preflight, and final subsystem operational checks from the cockpit of the flight-ready air vehicle.

Preflight Inspection (Instrumentation)

The instrumentation preflight consisted of rechecking the instrumentation recording equipment to ascertain that no failure had occurred, and to realign and balance out the system just prior to flight.

"Turnaround" Preflight Inspection

The "Turnaround" preflight inspection was accomplished between flights when more than one flight was scheduled on the same day. This inspection was essentially the same as the standard pre-flight inspection with the addition of some specific elements of the postflight inspection.

Postflight Inspection

The postflight inspection was accomplished after flight to determine the condition of the air vehicle, subsystems, engines, components and accessories. It consisted of visual inspection of exterior surfaces, compartments, subsystem installations and components, subsystem operational checks, and subsystem adjustments and calibrations required as a result of the inspection. The elements of component replacement and structural repair were unscheduled maintenance and were not included as part of the postflight inspection. The postflight inspection was divided into a flight line postflight and hangar postflight inspection. The flight line postflight inspection consisted of evaluation of in-flight discrepancies and immediately apparent problems such as leaks, structural damage, etc. This inspection was primarily geared to establishing flight line activity such as engine runs, draining of fuel, etc., that had to be accomplished prior to

moving the air vehicle to the hangar. The hangar postflight inspection consisted of the complete visual inspection, subsystem operational checks, calibrations, adjustments, and final close-out of those compartments not required open for the preflight inspection.

Periodic Inspection

The periodic inspection was a thorough and searching inspection of the entire air vehicle including replacement of components as specified by the NR documents. Units were disassembled, if necessary, to ascertain the stage of wear or deterioration of parts or subassemblies. Preflight-postflight inspection, plus performance of an operational and requalifying check of all functional air vehicle systems, and accomplishment of all periodic lubrication requirements (including wheel bearing lubrications), were also performed.

Special Inspections

Special inspections were scheduled inspections based on subsystem requirements that cannot, due to system peculiarities, be accomplished during postflight, periodic inspections, or inspections whose frequency of inspection differs from the normal postflight and periodic frequency.

Maintainability

This was the quality of the combined features and characteristics of equipment design which permitted or enhanced the accomplishment of maintenance by personnel of average skills under the natural environmental conditions in which it operated.

Maintenance

This was the effort required to retain material in or restore it to a serviceable condition, modifying or improving equipment in use or in storage, to meet programmed operational requirements; installation-engineering and installation of fixed communication-electronics equipment and facilities. Maintenance also included the functions of servicing, trouble-shooting, repairing, inspecting, testing, and reclaiming.

Organizational Maintenance

This was the maintenance performed by NR flight line personnel using flight line equipment in the performance of:

a. Preflight, servicing, postflight and periodic aircraft inspection.

b. Calibration of systems and removal and replacement of components.

c. Servicing, inspection and preventative maintenance of Flight Test ground support equipment (FTGSE).

WBS CODE: 4.41.2

Field Maintenance

The maintenance performed by Flight Test personnel using shop facilities provided at the Test Site by Edwards AFB and NR for detailed inspection, testing, adjusting, calibration and repair of unserviceable parts, assemblies, sub-assemblies and components in support of organizational maintenance.

Depot Maintenance

The maintenance performed on assemblies, sub-assemblies and components which required industrial facilities and capabilities for complete disassembly, replacement or repair of parts, rebuilding or reassembly, and adjustment and testing which restored such items to a serviceable condition. Depot maintenance was in support of organizational and field maintenance activities.

Scheduled Maintenance

This maintenance was defined as the planned maintenance cycles that occurs as a result of air vehicle flight time, total operating time, or calendar time. The following inspections constituted the scheduled maintenance requirements for the XB-70A air vehicles: preflight, postflight, periodic, and special inspections.

Unscheduled Maintenance

Maintenance which resulted from discrepancies generated by malfunctions or deficiencies found to exist during flight, or as a result of scheduled inspection, that necessitated immediate corrective action before the air vehicle could be returned to an "in-commission" status was termed "Unscheduled Maintenance". This did not include the unpredictable maintenance generated and accomplished during a periodic inspection, but did include those configuration changes made to instrumentation installations.

Operating Time:

Operating time was the total operating time that a unit, component, subsystem or the air vehicle was operated.

Flight Time

Flight time began when the aircraft started to move forward on a take-off run and terminated when the aircraft landed. A landing was considered to have taken place when the aircraft came to a stop on the active runway or when the aircraft had turned off the active - if no stop was made. The flight time as recorded by the Tower prevailed.

WBS CODE: 4.41.2

Ground Time

Ground time was the total operating time that a unit, component, subsystem, or the air vehicle was operated while on the ground. This operating time did not have to be recorded in every instance.

Out of Commission (Status)

Air vehicles that were out of commission were out of commission for the following reasons:

Scheduled maintenance
Unscheduled maintenance
Modification or configuration change
Aircraft out of commission - parts (AOCP)
Engine out of commission - parts (EOCP)
Aircraft not fully equipped (ANFE)

Maintenance Tasks:

The maintenance tasks were the requirements that were necessary to retain in or restore to a serviceable condition the air vehicle or equipment. These tasks were associated with all phases of the maintenance cycle and included such functions as servicing, troubleshooting, repairing, inspection, testing, and reclaiming. The tasks were itemized in general in a Maintenance & Support Plan. Some of the tasks outlined were combined, added to, compressed or eliminated. Thrust runs were never made on this contract and it was found that sound suppression devices were unnecessary. Servicing procedures were revised as learning progressed through the program.

Ground Handling, Towing

Towing proved to be generally easier than anticipated. A six man team was found necessary for a "bend over" inspection, walking ahead of the main and nose gear to pick up debris which would cause tire damage.

Towing from the main gear with heavy duty tugs and steering from the nose with a smaller unit proved possible, but impractical for long tows such as from the run pad to hangar.

The GSE external braking units were attached to the A/V only when the A/V was heavy with fuel. At these times, when near maximum towing weight, two heavy duty tugs were used in tandem, on the nose gear, while pulling up the grade from taxiway to hangar.

Since the hangar floor was marginal for a heavy weight vehicle it became standard practice to deflate the A/V tires prior to entering the hangar with a heavy weight A/V. This was done just outside the doors prior to entering. The tires were inflated again when the A/V was first removed from the hangar prior to towing any distance.

When the air vehicle was in the hangar a tow bar was left attached and a prime mover stationed just outside the door adjacent to the nose. There was a bridle made to tie the AICS package dolly to the main gear. In addition, the instrumentation package dolly was tied to the AICS package dolly. This provided the capability of towing the air vehicle out of the hangar in case of emergency with the packages down.

Ground Handling, Taxi

It was found necessary to install the tire cages immediately after taxi. These were not used for a period of time but after several occurrences they were found necessary and beneficial.

Ground Handling, Jacking

Jacking proved to be no major problem under normal conditions, although one failure occurred in the internal structure of A/V #2 which caused the nose jack to penetrate the foreward fuselage. Subsequently a saddle arrangement was made for A/V #1 that fit the nose jack and in case of jack pad failure, would support the aircraft and distribute the load on the fuselage structure.

The original Process Specification on jacking was followed throughout. The only change required was upping the maximum jacking weight limit.

Ground Operations :

After acceptance of the A/V from Manufacturing at Palmdale, a series of planned operations took place in preparation for first flight. These operations were conducted by use of Operations Test Procedures which were prepared by Flight Test Operations System Engineers for use during this phase of the program. In addition to the OTP's, the Maintenance Group prepared and utilized Flight Test Technical Guides.

Due to the urgency of getting the first flight, some system checks were delayed. Only those systems that were required for the first flight were completely checked out. As the program progressed and the learning period extended, changes were made in the methods used for ground operations. These changes included short cuts to expedite the operations. In some cases, however, additional work was added which was found necessary due to experience and the OTP's and technical guides were updated accordingly.

Under normal circumstances, most operations required for postflight and/or preflight were performed in the hangar. There were exceptions to this, especially during quick turn-arounds when it was necessary to leave the A/V on the run pad. In addition, the fuel management and boost pump checks were made on the ramp or run pad after partial fuel servicing. It was found on occasion that if the A/V restraining bars were installed prior to fuel servicing that extreme difficulty could be experienced in disconnecting them. Exhibit 25, page II-429, present the XB-70 on the "run pad" in preparation for refueling.

The quick disconnects for the hydraulic systems caused many problems during the early portion of program until reworked connectors were provided. The length of time required to disconnect was particularly obvious due to the requirement of disconnecting just prior to taxi out.

For operations away from the main facility, it was found that portable print and raw stock carts were a must. These were used for supporting Hydraulic, Electrical, Engine, Instrumentation, etc., operations.

When all engines were shut down, ground personnel could not contact the A/V crew on intercom because there was no A/V battery. To correct this situation, an AIC 17 battery box was inserted in the system between the ground crew and the A/V. It was necessary to modify the A/V to do this. The pilot selected intercom ground power and communications could be established. This modification was made only on A/V #1.

The original inert tank entry procedures were, for the most part, found to be satisfactory for inspections, minor repairs and most component replacements. When major maintenance was required in the fuel cells, it was found necessary to flush the tank or tanks with trichloroethylene and air wash them due to the time restrictions and physical restrictions of personnel suited up for inert tank entry. The only major modifications to tank entry equipment were an improved intercom system and the addition of a second emergency air supply. Fuel cell washing with trichloroethylene required revised methods to be developed from that planned. The spray bar sprinkler system of introducing trichloroethylene to the tanks for flushing worked very well for all tanks except 6, 7, and 8 which required a fill and drain procedure.

In the beginning of operations at EAFB, no facilities were provided at the Run Pad. This proved to be completely unsatisfactory. To correct this, a portable building 24 X 20 feet was brought from Palmdale by NR and installed adjacent to the Pad. This building was equipped as a field office for Maintenance and Inspection operations. The building was equipped with radio transceiver for controlling ground vehicle movement and with interphone and flight monitoring capabilities via telephone patch.

Ground cooling of the A/V was a problem due to environmental conditions at the test site. This was compounded by the hangar configuration which required long duct runs to reach the A/V. The long runs were due to placing the ground cooling carts outside the building to reduce the noise level. In addition, a sound barrier wall was necessary around the units (3 or 4 manifolded together) to cut down noise in adjacent offices.

All FTGSE equipment was serviced and maintained by the Flight Test GSE Maintenance and Control Group with assistance as required from the AFFTC and Plant Maintenance. This included fuel, oil, NH3, LN2, LOX, GN2, and dispensing equipment. Assistance was also given to the air vehicle crew for proper operation of the equipment when required. Originally the GSE group performed air vehicle ammonia servicing and assisted in other operations, e.g., refrigeration package pre-installation checkout, etc. As

time progressed and personnel became limited, all servicing was performed by air vehicle crew members.

The engine run pad and flight station were set up with all required equipment, in preparation for engine runs and flight, by the GSE group prior to moving the air vehicle to the location. This equipment was also returned to the hangar by this group after completion of these operations. Equipment located at the air vehicle was given a daily inspection by GSE Group to assure that equipment was adequately serviced and operated properly.

Since initiating the Flight Test program it was found that Flight Test needed the capability for supporting the XB-70 with GSE at sites other than EAFB. Such a requirement could be from either scheduled or unscheduled landings. To react with the necessary speed to minimize the expenditure of manhours, a fly-away kit was prepared consisting of general type equipment required for preparing the air vehicle for flight including servicing, pre and post-flight inspection and replacing tires. An alternate method was also devised for deaerating the fuel during the fueling operation. The alternate method was required due to the size and/or availability of GN2 equipment. Transporting and servicing the equipment were both problems which should be considered for this type equipment in the future.

For the most part A/V servicing was performed as outlined by the Maintenance Plan. Defueling operations required the major revision. This revision was to provide a closed loop system for all defueling and/or draining operations.

Servicing was normally performed on the Run Pad, but on occasion all expendables, except JP-6 fuel and NH3, was accomplished in the hangar. However, when this was done, generally some top-off was necessary on the pad. Exhibit 26, page II-474, present the XB-70 with FTGSE positioned during preflight in preparation for a mission. Exhibit 27, page II-431, presents the XB-70 after a mission showing the required FTGSE.

The wet ice contour molds for FACS sensor cooling had to be installed within four hours of takeoff which made it a definite pad servicing. It had also been forecasted that in-flight temperatures above 1.7 Mn would require dry ice cooling for the fire extinguisher system. This proved to be unnecessary and none was ever used. It was later estimated that anything below Mn 3 for two hours would be satisfactory without any ice cooling.

To expedite engine servicing both the hydraulic and engine oil service units were combined on one F2 trailer. This proved especially beneficial during off-base operations for handling and transportability. Engine servicing originally required the hydraulic system to be drained completely and refilled with a known amount of fluid since no quantity gage was installed. This was a time consuming operation. Later on, a fluid level checker was acquired which was a Piston Position Indicator (PPI). With this unit it was possible to locate the GN2 actuated pistons position in the reservoir thus obtaining a fluid quantity indication.

WBS CODE: 4.41.2

Maintenance Scheduling:

A procedure was established on the XB-70 program for holding a daily schedule meeting. This meeting was held approximately 1 hour after the start of the first shift. The Design Engineering Supervisor (with Systems Specialists, as required), Maintenance Supervisors from each A/V, Planner and Scheduling ECC, F. T. Operations Engineer, Inst. Engineers, Material & LSS Supervision, Inspection personnel and Air Force were always represented. In addition, the Chief Engineer and other Management personnel would attend when on site. Work required was scheduled and placed by shift on the scheduling board for each A/V. This information was copied, duplicated and distributed to all concerned by the ECC Scheduler after the meeting.

Shift turn-over notes were kept by Maintenance supervision and the status of each scheduled item noted at the end of each shift. In addition, there was a day-night Maintenance turn-over meeting which was held at the end of the first shift each day. These meetings and the notes from each shift along with the remainder of the crews' personal coordination provided adequate Maintenance continuity.

For the XB-70 program, a new group was established for configuration and accounting control and time records. One of the functions of this group was to monitor all incoming EO's, record in the Certification Verification Record (CVR) book each EO listed on the EO transmittal form, list applicable EO's in the aircraft work book and maintain active and completed records of all EO's. The IBM computer system proved very efficient since initiated for configuration and accounting control.

Time Recorders were established and required to have an accurate listing of installed controlled components at all times from Air Vehicle acceptance. To accomplish this the Time Recorder had to be in close coordination with Manufacturing and Inspection to obtain final serialization and configuration data and verify previous recorded data. This information could only be obtained and maintained with all required records which were not available from any single source. Each final installation and/or change thereafter required the incorporation of this information into the Master Card File and IBM Tab Report. In addition, each monthly revision of the Controlled Parts List Mandatory Removal and Inspection Report had to be reviewed and additional items and/or changes be incorporated into the above operation.

All spare ballistic charges and propellant actuated devices, used in the Air Vehicle crew escape system were listed on records and IBM tab in order to maintain a closer control of these units as to load date and storage life.

To minimize extended Air Vehicle lay-up's due to periodic inspections and/or replacement of controlled components, a Controlled Progressive Maintenance (CPM) program was established. The air vehicles periodic inspections and reports were divided into eight (8) CPM cycles with a lead and lag time for each cycle. Each cycle was governed by flight time and relative engineering requirements.

WBS CODE: 4.41.2

A complete historical file was maintained for each XJ-93 GE engine to record operating time both ground and flight. This determined time of required engine inspection and overhaul and compliance with required engine specification and EO's. This file also provided information as to engine availability and configuration. A status board was maintained in the scheduling room to provide ready, up-to-date information as to installed and spare engine status and critical air vehicle components.

Maintenance Shops:

The Maintenance Shops at EAFB were established to perform organizational, Field level and Limited C&E (Component and Equipment) maintenance. This was done in accordance with the Maintenance Plans. In most cases, the shops were called upon to perform more functions than had originally been scheduled.

The tubing shop, electrical shops, and filter cleaning shop had to be relocated intact from Palmdale to EAFB. This was necessary for support after Palmdale phased out. The Filter Cleaning shop was located in the M & M Hangar at EAFB instead of the NR-assigned building. Even though in another area, NR maintained Management control of the area and equipment. More and more effort was expended near the end of the program for AF support and an AF man worked in the area most of the time.

Maintenance Engines:

Engine maintenance was performed as a joint effort between NR shops, GE shops and with the support of the Air Force Flight Test Center (AFFTC) Propulsion Branch. All leak check, etc., runs were made in the GE test cell at EAFB prior to installation. These runs were monitored by NR Inspection in the initial stages of the program, but this was later discontinued and operations certified by GE were accepted by NR.

The working agreements between GE and NR were in accordance with the Engine Maintenance Plan. According to this agreement, NR Engine Shop performed periodic inspections, build-ups, instrumentation and removals and installations.

Maintenance Support:

The Flight Test Center/NR agreement was used very little in actual air vehicle maintenance. The AFFTC shops were utilized only a few times for emergency work, but primarily all work was done in NR on-site or PMD/LAX backup shops. The tire and parachute shops were probably the most extensively used support along with fire standby, supply and fueling. There were a few problems encountered in the fuel servicing but generally excellent support was given. Support in these areas was enhanced by using AF personnel assigned to the JTF for coordination.

Manufacturing and Maintenance departments in Palmdale were planned to be used as backup support for EAFB operations. These departments were utilized through the completion and first flight of A/V #2. After this time, shops that had been

anticipated to remain in Palmdale were closed down. This closing necessitated the acquisition of equipment and skills by Flight Test and the relocation of complete shops to EAFB. This was accomplished by what was termed the FLIGHTS Committee (Flight Test Support EAFB), which was made up of Manufacturing, Industrial Engineering and Flight Test personnel.

The complete tubing shop, filter cleaning and electrical maintenance shops were relocated to EAFB when Site #3 phased out at Palmdale. The electronics lab functions were taken over by Flight Test and the electronics shop expended and equipped to perform the work that had been handled previously in Palmdale.

Shop support, material follow-up and Logistics supply functions in Los Angeles were utilized on the program. The systems functioned as planned and procedures appeared to be adequate in this area.

General Electric provided engine support with ample representation at Palmdale, Santa Susana, LA, AEDC, and EAFB. The GE shops at Edwards and Evendale were utilized in support of this program. A working agreement was negotiated to define the areas of responsibility between GE and NR.

Maintenance Inspection:

Air Force Quality Assurance representatives had coverage on all shifts during the entire program. The A/V's were accepted by the AF by a 262 inspection prior to first flight.

Flight Test Maintenance personnel prepared the various inspection forms which were then approved by Quality Control. These forms were continually revised during the program as experience was gained. The forms initially were compiled into six books for each A/V. These consisted of the following:

Book #1 Carried the Work Items
Book #2 Parts Replacement Records
Book #3 Post Flight
Book #4 Preflight
Book #5 Instrumentation
Book #6 Flight Records

As time progressed and a number of fuel leaks occurred, a Book #7 was added to maintain records of these leaks. In addition, a Book #8 was added for Mandatory Inspections.

An on-site fluid test lab was established to provide analysis of fuel, hydraulic oils, and other expendables. Both Air Force and Company inspectors were assigned to cover shipping and receiving of parts and components at the site. In addition, inspection coverage was provided for all Facilities and FTGSE equipment maintenance and repair.

WBS CODE: 4.41.2

Communications:

The ground communications network for the XB-70 Flight Test Program was broken down into the following categories: Data Control, Voicecom Center, Flight Shack, Mobilcom Bus, radio equipped vehicles, portable radios, and ground maintenance intercom. Each category is analyzed as to its original purpose, problems involved in meeting initial requirements, actual use during various phases of the program, capabilities added and requirements deleted.

Data Control

Edwards Data Control, at Building 3940, was designed as a flight control center for the NR Flight Test engineers during flight. Telemetry parameters were displayed on plotting boards or oscillographs as required. Closed circuit television was available for observing aircraft up to a distance of one hundred and fifty miles. An extensive communications network was maintained to permit contact with the air vehicle, the ground maintenance crew, and the engineering staff.

Two UHF frequencies were available for maintaining contact with the air vehicle and its chase aircraft. The two radios used were selected from a bank of four locally operated GRC-27's, or from a bank of remotely controlled GRC-27's located at Building 2580, or from "High Range" radio stations remotely controlled by land lines or micro wave. Initially all radios used at EAFB were remotely controlled from Bldg. 2580. Due to the unreliability of this system, the four GRC-27's were installed in Building 3940. This arrangement proved to be satisfactory. The "High Range" network was initially subject to numerous equipment malfunctions; however, as the program progressed, communications became more reliable. Many of the malfunctions later consisted of loss of reception by the XB-70. During these periods excellent reception of XB-70 transmissions at Data Control usually prevailed. Use of chase aircraft for relay stations was used extensively when the chase aircraft were properly positioned.

Three Gonset 150 radios were initially installed at Edwards Data Control. One unit was tuned to 123.15 MC for cummunications with the ground maintenance vehicles. Another was tuned to 123.35 MC for cummunications with Flight Test Operations vehicles. The third unit was tuned to 123.5 MC which was the transport aircraft dispatch frequency. Due to the lack of use, the 123.35 MC radio was removed from operation. The 123.15 MC and 123.5 MC radios were not used extensively but when needed both proved to be indispensable. Any time aircraft carrying only VHF equipment were involved in XB-70 tests, 123.15 MC was used as the primary VHF frequency to avoid cluttering up 123.5 MC which was used by other aircraft companies. The 3940 Data Control equipment and the P.A. system was maintained by AFFTC personnel. NR employees maintained the Contractor-furnished Gonset radios used in Data Control as well as other ground communications utilized in the local areas. This maintenance was performed in Building 1820 Electronics Shop.

WBS CODE: 4.41.2

At the beginning of the XB-70 program an elaborate thirteen channel intercom system was used. The malfunction rate was high and it was eventually replaced by a GTA-6 telephone system. The GTA-6 was less versatile and the intercom capabilities were not used extensively. Due to the close proximity of all personnel concerned in Data Control, direct verbal communication proved to be more satisfactory than using the intercom system.

Two hours prior to flight, a one-way intercom phone patch was set up from the Mobilcom Bus at the engine Run Pad to Data Control. This patch was used to keep the engineering personnel informed as to the status of the air vehicle.

Two telephone lines were present between Building 1820 and 3940 to distribute the local and "High Range" UHF audio to key points throughout Building 1820. This audio also went to the PBX room and could, by use of telephone lines, be routed to the Flight Shack, Security Shack and Los Angeles. The primary UHF frequency was normally sent on one of the lines from Building 3940 and secondary chase frequency was transmitted on the second line. Several telephones were required to maintain contact with necessary personnel during flight. One NR line, three base lines, a hot line to the Control Tower, and a hot line to RAPCON were available and were used constantly during flight.

Building 1820

The communications network at the XB-70 Flight Test Facility, Building 1820, was built-up around the Voicecom Center. The Voicecom Center was equipped with three UHF radios, two VHF radios, one HF SSB radio, an intercom to the electronic shop, a radio phone patch, two telephones, and two tape recorders. The Voicecom Center was originally designed to coordinate all mobile vehicle movements and as a backup communications center in case of radio failure at Data Control. Due to the cutback of the XB-70 Program at the time A/V #3 was cancelled, the Voicecom Center never was used to the extent of its design. It was used during flight program as a reception point for messages to occupants of the building from mobile vehicles operating remotely, and recording flight data. Because of its high antennas it proved itself invaluable as a relay station for vehicles out of range of each other.

Three GRC-27 UHF transceivers located in the electronics shop were remotely controlled from the Voicecom Center. These radios were used to check out the entire UHF communications network prior to each flight. During flight they were used to monitor the flight and would have been used to control the mission if necessary.

Two Gonset 150 VHF transceivers were available for communicating with NR transport aircraft (123.5 MC) and maintenance personnel (123.15MC). During emergencies these radios played a key role in dispatching GSE to required areas and relaying messages from the Mobilcom Bus and other mobile vehicles to the necessary personnel in Building 1820. A public address system was at the disposal of the Voicecom operator allowing him to page any one, or any combination of twelve areas around Building 1820.

WBS CODE: 4.41.2

A Collins, HF SSB, KWM-2 transceiver was located in the electronics shop and was remotely controlled from the Voicecom Center. This unit had a power output of 100 watts PEP and was designed for long range communications. The two frequencies which had been assigned to NR by the FCC were 3376KC and 6770KC. These frequencies were shared with other contractors on base. The intended purpose for this unit was for long range communications in case the XB-70 landed in some remote area. A second KWM-2 was located in the Mobilcom Bus. Experience has shown that remote control of a unit such as the KWM-2 was impractical because of the frequent tuning requirements. The KWM-2 was never used as designed and during tests was operated locally from the electronics shop.

An electronic audio indicating system was used in the Voicecom Center to give the operator visual indication of the source of his audio signal. This indicating system eliminated much confusion.

Two voice operated Ampex tape recorders were located in the Voicecom Center to record the XB-70 flights. The signal recorded originated at Building 3940 and included the "High Range" audio. The recorders were originally located in the engineering office, but were removed because of the distraction caused during playback and the requirement for constant monitoring during flight. VOX operation was utilized to conserve tape and caused a certain loss of audio at the beginning of each series of transmissions. With a good signal this loss was usually negligible.

Two telephones were used in the Voicecom Center. Originally there was also a hot line to Edwards Control Tower. This line was later disconnected because of lack of use. The importance of an adequate telephone system in an operations center of this type cannot be over emphasized.

A five-channel radio telephone patch was in operation in the Voicecom Center to permit radio communications from any UHF, VHF, or HF station within range of the Voicecom Center to any telephone capable of reaching the NR operator. Since the system was voice operated the success of the patch was dependent upon a good signal to noise ratio on the phone line. This was always obtained on local NR lines but seldom on incoming calls from outside lines. (A more reliable arrangement would be a manually operated system.) The phone patch was used extensively as a one-way patch (no talking capabilities) out of Building 1820. (In the past the X-15 flights were monitored in Los Angeles using this method.) In addition to the five two-way radio telephone patches available from the NR telephone operator, there was also a one-way radio phone patch which carried the XB-70 local and "High Range" audio. This was the same audio line which was connected to the tape recorders. It originated at Edwards Data Control.

Flight monitor speakers were located in the Flight Debriefing Room, Flight Monitor Room #3 and #4, Project Engineer's Office, Electronics Shop and Voicecom Center. During a flight these speakers carried the local and "High Range" audio from Edwards Data Control. Two hours prior to each flight, the XB-70 interphone audio was connected into the Flight Monitor Rooms #3 and #4 via a conference call phone patch from the Mobilcom.

At the beginning of the program, interphone stations were located in Flight Monitor Rooms #3 and #4. These two stations were a part of the interphone system from Data Control. When the GTA-6 system was installed the two stations were eliminated due to lack of use.

Flight Shack

The NR Flight Shack was located at the XB-70 engine Run Up pad. It was utilized by the XB-70 ground crew as a supervision and inspection office during the times the XB-70 was located on the Pad. A Gonset 150 transceiver, tuned to 123.15 MC was present for communications with the Mobilcom and other mobile vehicles during flight. With the help of this radio, air vehicle GSE could be dispatched to the runway or any other place required in a minimum of time. A 60-watt PA system was utilized for paging purposes during operations in the area. During flight the local and "High Range" audio was piped into the flight shack from the NR PBX office and presented over intercom and PA system. This kept the ground crew informed as to the progress of the flight.

Provisions were available at the Run Pad for the one-way AIC-17, intercom phone patch to Security, Flight Monitor Rooms #3 and #4, Edwards Data Control and Los Angeles. This patch was set up from the Mobilcom and was used to keep all areas up to date on prior to flight operations.

The AIC-17 interphone power supply, three AIC-17 interphone stations and an intercom monitor speaker were available in the Flight Shack for use by inspection and the XB-70 ground crew during operations.

Mobilcom

The Mobilcom Bus was the operations center for the XB-70 at all times the air vehicle was on the ground but not in the hangar. It was able to operate from a fixed location or in a mobile configuration. During preflight operations at the engine Run Pad the ground crew utilized the Mobilcom as a control center for coordinating air vehicle maintenance. During engine starts prior to flight, operations engineers used the Mobilcom as a control center for checking operation of the air vehicle systems. While taxiing, the ground crew escorted the air vehicle with the Mobilcom advising it of any problems and assisting the pilots as necessary. During ground emergencies (such as blown tires on the runway) the Mobilcom was utilized as a communications center. Messages were relayed to and from Data Control, Voicecom, and the Flight Shack concerning GSE requirements and other information pertinent to the situation. If any part of the runway or taxiway was blocked, contact was established with Edwards Ground Control giving them frequent progress reports.

The Mobilcom was equipped with two ARC-27 UHF transceivers; one Gonset 3139 VHF transceiver, one Gonset 3156 receiver, a five-channel intercom, a 75-watt PA system, a tape recorder, and had instruments to indicate wind temperature and altimeter information.

WBS CODE: 4.41.2

The ARC-27's were used for UHF communications with the XB-70 Data Control, Voicecom, or the tower. The ARC-27's could be tuned to any frequency between 225.0 and 339.9 MC and had a power output of 15 watts.

The Gonset 3139 was used for VHF communications with Data Control, Voicecom, Flight Shack or other mobile vehicles. The transmitter was crystal controlled and could be tuned to any one of six frequencies, with a power output of 6 watts. It was normally tuned to 123.15 MC during flight. The other crystals were for 123.35 and 123.5 MC.

A Gonset 3156 receiver was available for listening to any station in the frequency range of 108-135 MC. It was seldom used.

The tape recorder in the Mobilcom was operated continuously or in a VOX mode. It was capable of recording any one of the radios or intercom channels. The recorder was operated at all times that any operation was in progress. Only the tapes concerned with flights or special tests were retained.

Two telephones were available in the Mobilcom. One was a base line and the other an NR line. These were attached by means of phone jacks mounted on the bus. A one-way phone patch was available in the Mobilcom. Two hours prior to each flight it was utilized to send the AIC-17 intercom audio to Data Control, Security, Flight Monitor Rooms #3 and #4, and Los Angeles.

Metro Bus

The Metro Bus was originally built up for the X-15 Program. It provided many of the capabilities that are found in the Mobilcom; however, it lacked the room and was used as a backup vehicle. The Metro Bus contained provisions for one operator only. Five or six persons in addition to the operator could be seated in the Metro, but they were without desk space. Moving from one place to another in the Metro was virtually impossible and no air conditioning was available. The Metro Bus was used quite frequently as an operations center when both aircrafts were out of the hangar simultaneously. On occasion it was utilized when the Mobilcom was out of commission.

The Metro contained two ARC-27 transceivers, one Gonset 3139, VHF transceivers, one Gonset 3139, VHF transceiver, provisions for a KWM-2 transceiver (the unit which could be placed in the Metro was in the Mobilcom), a PA system, a tape recorder and two telephones. When the Metro Bus was utilized for flight, the two ARD-27's were used for UHF communications with the XB-70, Data Control, Voicecom, or the Tower and they could be tuned to any frequency between 225.0 and 399.9 MC with 15 watts power output.

The Gonset 3139 was used for VHF communications with Data Control, Voicecom, Flight Shack, or other mobile vehicles. The transmitter was crystal controlled and could be tuned to any one of six frequencies, provided all six crystals positions were utilized, with 6 watts of RF power output. Normally this unit was tuned to 123.15 MC.

The KWM-2, when utilized, was operated on either of the two Company frequencies of 3376 IC and 6770 KC.

A public address system was available for paging purposes and for broadcasting the UHF audio.

The tape recorder in the Metro could tape only the UHF audio and VOX operation was not available. Wind, temperature and altimeter indicators were also available.

Miscellaneous

Two jeeps were used during the program. One jeep carried an ARC-27 UHF transceiver and a Gonset 150 single-channel transceiver tuned to 123.15 MC. The ARC-27 used a 24V aircraft battery for power. The battery was normally charged with a trickle charger. A 24VDC gas driven generator was mounted in the jeep but was too noisy for continuous operation. A more satisfactory arrangement would be a 24V alternator running off the jeep engine. A fully charged battery was capable of delivering adequate power for about one hour. The UHF was used primarily for maintaining contact with Ground Control while the XB-70 was being towed to and from the engine run area. It was also used to maintain contact with the tower during operations on the lake bed or other areas requiring Ground Control coordination.

The VHF was used primarily during emergencies for maintaining contact with the voicecom of the Flight Shack while the jeep was used to coordinate movement of GSE items.

The other jeep had a single-channel Gonset 150 transceiver, tuned to 123.15 MC. The vehicle was used for general transportation and/or support. The radio was primarily used during aircraft emergencies to dispatch GSE.

The personnel carrier contained a single-channel Gonset 150 transceiver tuned to 123.15 MC. It was used to transport the maintenance crew during emergencies.

The Dodge Power Wagon contained a single-channel Gonset 150 tuned to 123.15 MC. This unit was used to deliver GSE during the XB-70 operations away from the hangar. The radio was used primarily during emergencies for coordinating GSE movements. The original task for this vehicle was to retrieve the deceleration chute after A/V landing. The AFFTC performed this task.

The Air Vehicle Tow Tractors both had provisions for a Gonset 150 VHF transceiver tuned to 123.15 MC. One radio was available and was swapped back and forth as necessary. The Tow Tractors were used to tow the XB-70 where required. The radios were used to keep in touch with the jeep which was in turn to contact with the tower on UHF.

Two station wagons were equipped with radios. One with provisions for a Gonset 3139 transceiver. The radio was removed from the vehicle due to lack of use. The other station wagon was equipped with a Gonset 150 VHF transceiver tuned to 123.15 MC. The radio was often used while towing the XB-70 to keep in touch with the jeep and the tow tractor.

Four portable battery operated Skycrafter transceivers were used on various occasions during the XB-70 Program. They were single-channel units with an output of one-half watt of power. The units were very reliable for distances under a quarter of a mile. At greater distances antenna placement was quite critical and untrained people experienced a great deal of difficulty with them. Reliable air to ground communications was consistantly obtained up to three miles.

The AIC-17 intercom system was used by the ground crew for communications between the air vehicle, the ground crew, the Flight Shack and the Mobilcom. Any number of stations could be added to the system without loading or other adverse effects. A malfunction at one station would not affect the rest of the network. Instead of using the PP1618/AIC-17 battery packs, a separate 24V power supply was manufactured. This power supply eliminated failures due to dead batteries. Interconnected junction boxes were placed at strategic points around the air vehicle so the ground crew could plug into the necessary box with extension cords.

Long Line

Long Line communications are ground-to-ground communications such as TWX, telephone, etc. The AFFTC facility was provided an in-plant dial system and a manual PBX board by the AFFTC. The board was manned by NR operators for two shifts. The telephone system was equipped with a master intercom connecting the major offices. In addition to the master, each system had a local intercom from the secretary or clerk to each instrument. Each functional group had a three or four number rotary which made up their system. Under the initial Joint Test Force operation the systems were layed out to integrate the AF personnel with the contractor counterparts. This proved unsatisfactory and had to be reworked to provide the functional group systems.

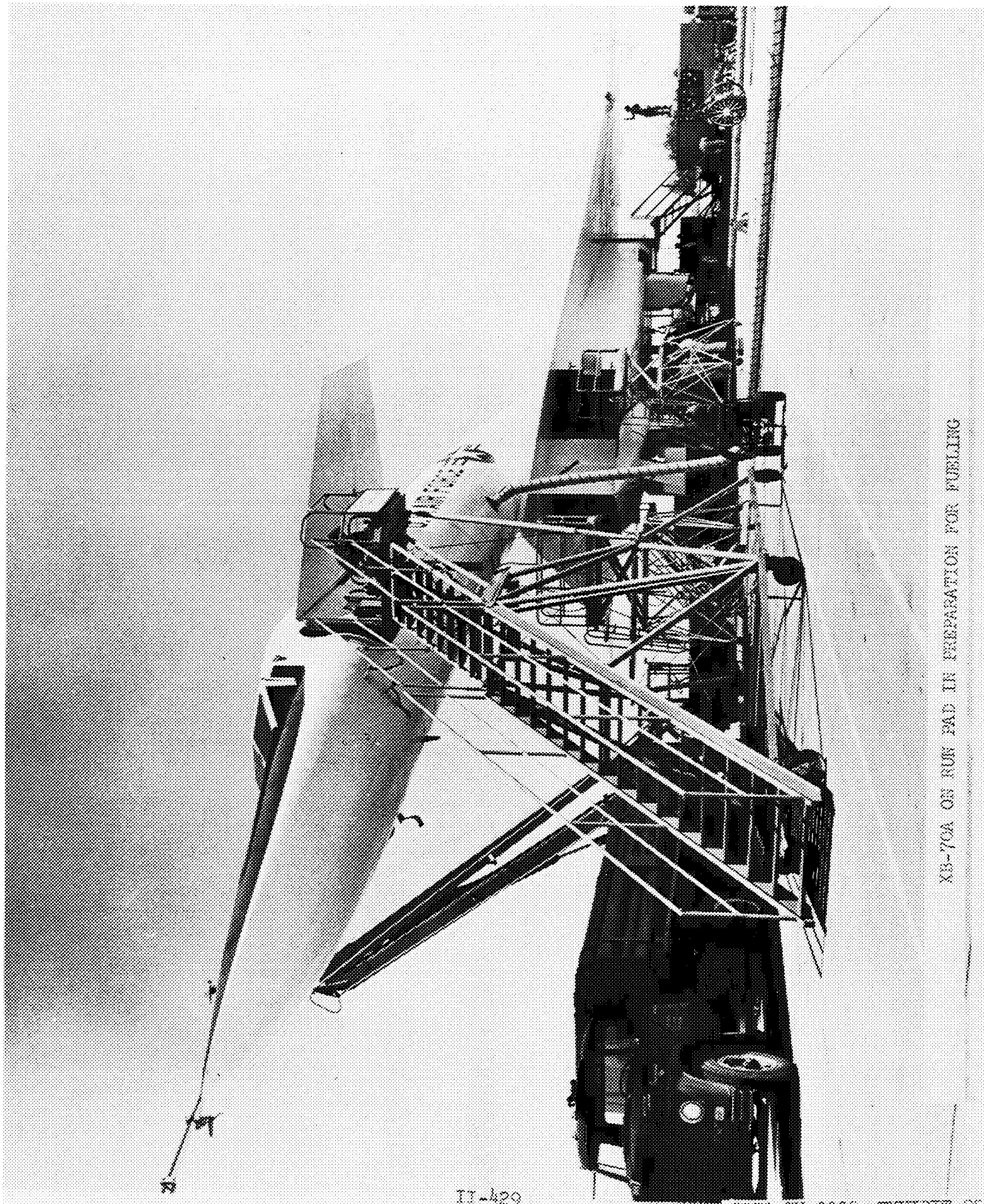
The NR EAFB telephone system was connected to the Palmdale and LA boards by lease lines. The NR board at EAFB was linked to the AFFTC main switchboard with local trunks and in addition some of the lease lines to LA and Palmdale were terminated on the AFFTC board. This termination provided flexibility for on-base calls and coverage during off hours. For emergency call-ins and night lines, both Palmdale and Lancaster FEX trunk lines were terminated on the NR/EAFB board. There was also a radio telephone "patch system" installed which provided listening capabilities for flight operations at selected speaker phone locations.

An Engineering and Logistics supply TWX system was installed linking the EAFB Facility with the corresponding offices in LA and Palmdale. One machine was located in the Engineering area at EAFB and one in the Material Control Office. One additional TWX circuit was installed and this provided pilot weather information and was located in the Dispatch Office.

A complete PA system was installed which included links to all the major Base facilities utilized, such as Run Pad, taxiway 5, thrust stand, etc. These links could be selected on an individual basis from Voicecom or all positions simultaneously. Building 3940 Control Room or Security had an

all-position override in case of emergency. In addition, selected areas had individual paging capabilities such as the warehouse area. This network was never utilized as originally planned.

North American Rockwell funded for all TWX circuits, lease lines and FEX trunks. All other services and the equipment installations were supplied by the AFFTC on a no-charge-for-use basis.



XB-70A ON RUN PAD IN PREPARATION FOR FUELING

FTGSE - MISSION START

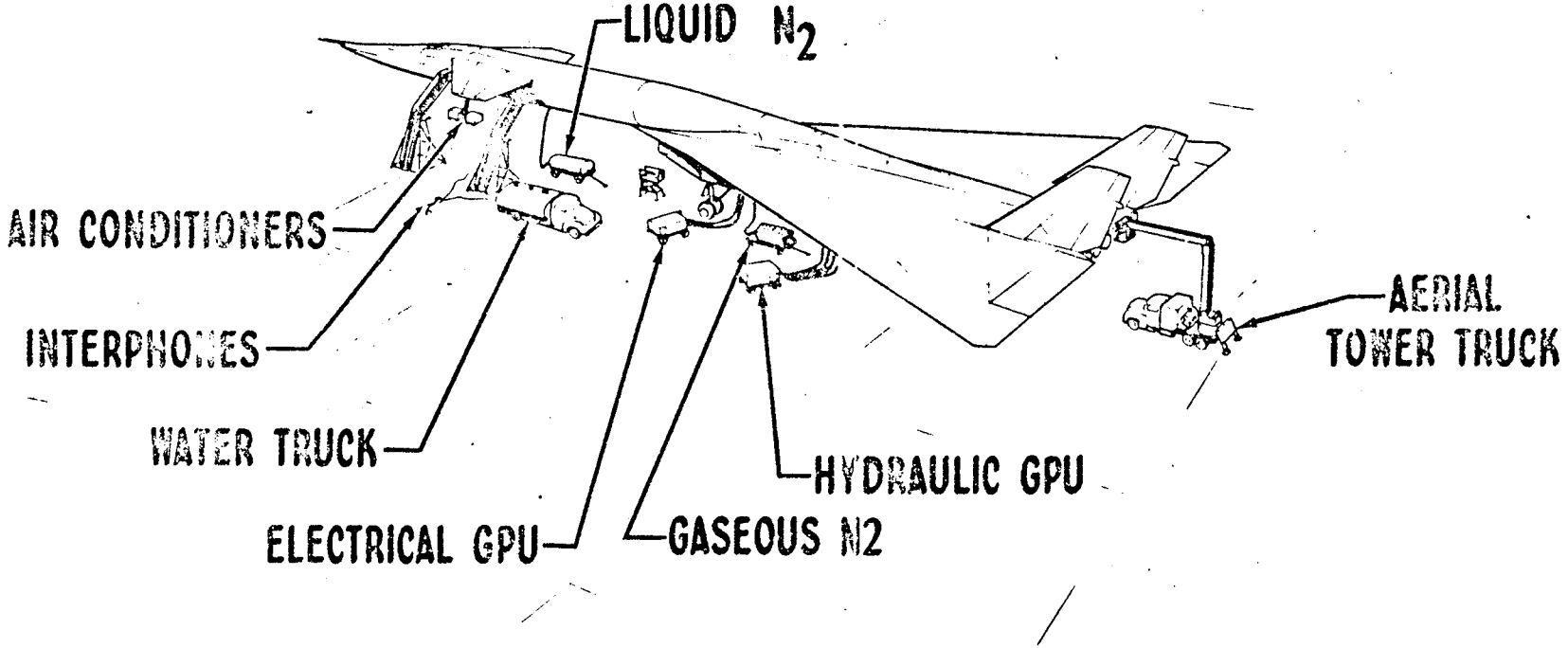
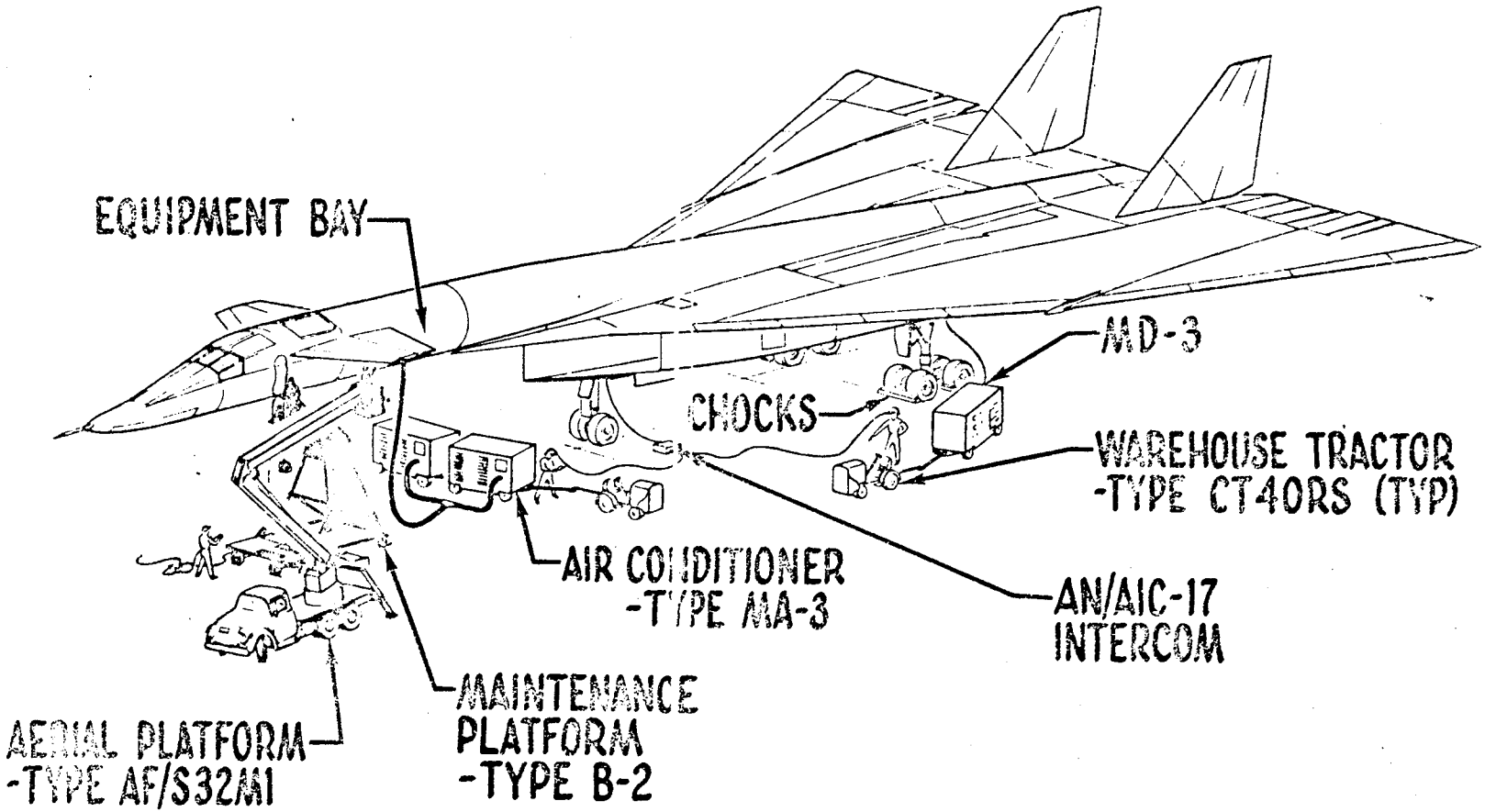


EXHIBIT 26
SD72-SH-0003

FTGSE - MISSION COMPLETION



COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 02
AIR VEHICLE MAINTENANCE

		DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		219064	219064
LABOR AT $ 4.352		953328	953328
ENGR BURDEN AT $	5.328	1167125	1167125
SHOP SUPPORT		148211	148211
LABOR AT $ 4.440		658064	658064
TEST/QC		64799	64799
LABOR AT $ 4.618		299264	299264
MFG BURDEN AT $	5.746	1224034	1224034
ENGR MATERIAL		698057	698057
MPC		102548	102548
OTHER COST		10528	10528
SUB-TOTAL		5112948	5112948
GEN & ADMIN		103066	103066
TOTAL COST		5216014	5216014

TIME PHASED COST
DETAIL - SEE PAGE II-433

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 AIR VEHICLE MAINTENANCE
6-MAJ ASSY 02
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	163.5	28260	5.237	148001	180024	328025
Q-2 65						
Q-3 65	249.0	41808	4.698	196432	236690	433122
Q-4 65						
Q-1 66	358.5	62159	4.403	273703	365756	639459
Q-2 66						
Q-3 66	517.5	86837	3.860	335192	384655	719847
TOTAL	1288.5	219064		953328	1167125	2120453

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 **AIR VEHICLE MAINTENANCE**
6-MAJ ASSY 02
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64	1.5	206	3.981	820	1223	2043
Q-4 64						
Q-1 65	85.5	14878	3.638	54130	109616	163746
Q-2 65						
Q-3 65	150.0	25224	3.701	93344	186554	279898
Q-4 65						
Q-1 66	355.5	61535	3.579	220236	457359	677595
Q-2 66						
Q-3 66	276.0	46368	6.244	289534	469282	758816
TOTAL	868.5	148211		658064	1224034	1882098

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 AIR VEHICLE MAINTENANCE
6-MAJ ASSY 02
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64		53	3.208	170		170
Q-4 64						
Q-1 65	48.0	8435	4.365	36818		36818
Q-2 65						
Q-3 65	84.0	14103	4.502	63491		63491
Q-4 65						
Q-1 66	135.0	23516	4.801	112892		112892
Q-2 66						
Q-3 66	111.0	18692	4.595	85893		85893
TOTAL	378.0	64799		299264		299264

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 **AIR VEHICLE MAINTENANCE**
6-MAJ ASSY 02
AIR VEHICLE MAINTENANCE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 64	1.5	259	3.822	990	1223	2213	127
Q-4 64							
Q-1 65	297.0	51573	4.633	238949	289640	528589	26934
Q-2 65							
Q-3 65	483.0	81135	4.354	353267	423244	776511	199767
Q-4 65							
Q-1 66	849.0	147210	4.122	606831	823115	1429946	204436
Q-2 66							
Q-3 66	904.5	151897	4.678	710619	853937	1564556	266793
TOTAL	2535.0	432074		1910656	2391159	4301815	698057

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 AIR VEHICLE MAINTENANCE
6-MAJ ASSY 02
AIR VEHICLE MAINTENANCE

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 64		127	46		2386	51	2437
Q-4 64							
Q-1 65		26934	8056	1349	564928	15072	580000
Q-2 65							
Q-3 65		199767	35638	981	1012897	27024	1039921
Q-4 65							
Q-1 66		204436	42400	2012	1678794	5084	1683878
Q-2 66							
Q-3 66		266793	16408	6186	1853943	55835	1909778
TOTAL		698057	102548	10528	5112948	103066	5216014

WBS 4.0 FLIGHT TEST

INSTRUMENTATION WBS CODE: 4.41.3

This section presents a summary of the flight test instrumentation operations. For description of the Instrumentation Subsystem and associated exhibits see WBS 1.11 in Volume IV of this report. This summary discusses the flight test instrumentation operations under six major functions: Pre- and Post-Flight Procedures, Calibrations, Maintenance and Improvements, Data Acquisitioning, Data Accuracy, and Reliability.

Pre- and Post-Flight Procedures:

The Instrumentation Pre-Flight Procedure was divided into three phases and were referred to as T-24, T-9, and T-3. Each of these phases were defined in detail in Flight Test Technical Guide Reports (FTTG) as listed below:

(a) T-24: Instrumentation System & Sensor Operational Status Checks.

(b) T-9: Instrumentation Pre-Flight Data Acquisition.

(c) T-3: Instrumentation Flight Configuration and Clearance Procedure

The above listed procedures were reviewed and revised at various times to reflect any new or improved methods that would improve data accuracy, reliability, and maintenance.

T-24 Procedure

The T-24 Instrumentation Procedure was initiated as early as possible before flight to insure that all systems and sensors were operating properly prior to taking formal pre-flight data records. An outline of this procedure follows:

Instrumentation Operational Status Checks:

(1) Package Configuration
(2) Instrumentation Control Switch Configuration
(3) Circuit Breaker Configuration
(4) Decommutator Selector
(5) Package Cooling
(6) Application of Package Electrical Power
(7) Digital Data System Checkout
(8) Digital Parameter Checkout
(9) Analog Data System Checkout
(10) Telemetry Transmitting Equipment
(11) Digital Recorder Checkout
(12) Analog and Telemetered Parameter Checkout
(13) Environmental System Checkout
(14) Cockpit and Cabin Equipment Checks
(15) Flutter Recording System

(16) Landing Gear Camera Checks
(17) SST Recording System Checkout
(18) Strain Gauge Power Supply Resistance Check
(19) CCC Pressure Transducer Power Supply Frequency and Voltage Check
(20) Analog System Oscillator Frequency Check

T-9 Procedure

The T-9 Instrumentation Procedure was initiated after completion of the T-24 Procedure, and as close to flight time as was possible. This procedure, when followed in its entirety, assured data reduction accurate pre-flight reference and sensitivity levels for all sensors. Upon completion of the pre-flight data records, the data tapes and all necessary information, including a copy of the T-9 Data Log Sheets were shipped to L.A. Data Reduction by the fastest possible transportation. An outline of this procedure follows:

Analog and Digital Record #1

(1)	A/V Circuit Breaker Configuration
(2)	A/V and Package Power Requirements
(3)	Instrumentation Package Circuit Breaker Configuration
(4)	Tape I.D. Switch Configuration
(5)	Time Interval Record Switch Configuration
(6)	Instrumentation Package Control Switch Configuration
(7 & 8)	External Equipment Requirements
(9)	Cabin P.D.U. Circuit Breaker Configuration
(10)	Cockpit Control Switch Configuration
(11 & 12)	A/V External Jig Requirements
(13 thru 20)	General Information **Prior to Taking First Digital Data Record**
(21 thru 23)	Digital Data Record #1
(24 thru 25)	General Information Prior to Taking First Analog Data Record
(26)	Analog Data Record #1

Analog and Digital Record #2

(1)	A/V Power Requirement
(2)	A/V Circuit Breaker Requirement
(3 thru 7)	General Information Prior to Taking Digital Record #2
(8)	Digital Data Record #2
(9 thru 10)	Analog Data Record #2
(11 and 12)	Removal of A/V Jigs and Equipment

Analog and Digital Record #3

(1)	Cockpit Instrumentation Control Switch configuration
(2)	Instrumentation Package Control Switch configuration
(3)	Digital Data Record #3

WBS CODE: 4.41.3

Digital Data Record #4

(1 thru 3) Preparation for Digital Record #4
(4) Digital Data Record #4

Pilots Vertical Accelerometer Check and Instrumentation Package Power Shut Down

Log Sheets for Data Record #1 (4 Sheets)

Log Sheets for Data Record #2 (2 Sheets)

T-3 Procedure

After completion of the formal pre-flight data records, the instrumentation package and instrumentation section of the AICS package were inspected and readied for flight. The T-3 Procedure became a permanent record and sign-off sheet to verify that the package's modules, control panels, circuit breaker panel, tape recorders, and so forth, were in the proper configuration for flight. This procedure, when completed, was the final step in the instrumentation system for pre-flight. An outline of this procedure follows:

(1) Camera Close-Out
(2) Pilots Instrumentation Control Panel
(3) Co-Pilots Instrumentation Control Panel
(4) Pilot and Co-Pilots Correlation Panel
(5) Pilot and Co-Pilot Instrument Panel (Instrumentation)
(6) E.E. Bay Circuit Breaker Configuration
(7) Cabin Area, Instrumentation and SST Shelf
(8) Data Recording System
(9) Instrumentation Package Circuit Breaker Panel
(10) Instrumentation Package Control Panel
(11) AICS Package (Instrumentation Sections)
(12) Instrumentation Power Shut Down
(13) Instrumentation Package Closeout
(14) Package Installation in A/V
(15) Final Instrumentation System Checkout
(16) Final Package L/N_2 Top Off
(17) Enclosure: Instrumentation Flight Clearance Sign Off Record

Post Flight Procedure

In addition to the pre-flight instrumentation procedures listed above, a short informal post flight procedure was followed to insure that all data taken during a flight was properly removed, identified and shipped to L.A. Data Reduction with a minimum of time. This post flight procedure also covered the final shut down of instrumentation power.

WBS CODE: 4.41.3

Instrumentation Calibrations:

To insure the validity of flight test recorded data, periodic calibrations were performed on all data sensors and associated recording systems. The overall method and interval of these calibrations for airborne data sensors were established by an NR Engineering Flight Test Procedure Letter which included a special calibration interval for each type of data sensor used in the XB-70A Air Vehicle. The recording systems calibrations were normally a function of maintenance procedures covered elsewhere in this section, principally in the T-24 pre-flight status checks. A description of each category of airborne data sensor calibration with sample procedures and forms follow. The calibrations were generally groups as those performed in the air vehicle with the data system, and those performed with the airborne sensors removed in outside laboratory facilities. In either case, it was this calibration which determined the value of the factors, in engineering units, used to process flight data.

Calibrations Performed On The Air Vehicle (Using The Airborne Data System)

Position transmitters and many miscellaneous parameters were calibrated by providing controlled inputs from A/V components. For example, elevons were deflected in known (measured) increments of full travel or the Central Air Data System (CADS) was provided simulated, precise pressure and temperature inputs while instrumentation pick offs were monitored at these known system data levels. These data were plotted to verify a linear output of the data sensors, and to determine the factor for data reduction. A calibration procedure used for elevon positions and a sample blank "universal" data sheet used for most calibrations of this type are included (Encl. 2 and 3). Calibration procedures of most all types of instrumentation used on the XB-70A are on file with the Data Acquisition Engineering Office.

Simulated inputs from portable laboratory equipment were used to verify the calibration of the signal conditioning and data systems for such parameters as thermocouples, liquid volumetric flow rate and RPM. With the data sensor disconnected, an appropriate millivolt supply source or signal generator was substituted to provide precise incremental voltage or frequency inputs to the signal conditioning and data systems. The output was then recorded at these known levels or visually observed on digital or analog readout equipment. Then tabulated data was plotted, or recorded data reduced through normal data reduction procedures, to verify the required calibration.

Calibrations Performed Under Laboratory Conditions

Instrumentation data sensors were calibrated in the laboratory, at least initially, at several different temperature environments simulating those to be encountered in their application. Subsequent calibration of position transmitters usually consisted of those described above which were intended primarily to verify that the mechanical linkages and signal conditioning still produced a linear output at the desired level of signal. Other types of transducers, however, received a complete periodic laboratory calibration since the physical aspect of their installation was not a primary factor in the overall data sensing system accuracy, i.e., pressure transducers,

accelerometers, gyros, etc. Also, the necessary conditions for their calibration were more easily controlled in the laboratory.

The Litton pressure transducer calibrations were verified by the Los Angeles Metrology Laboratory, normally every 30 days. When calibrated units were reinstalled, only a pressure check of the system in which they were installed was performed to insure an absence of leaks. Leakage rates were observed by monitoring the digital readout count, with respect to time, while the system involved was pressurized and disconnected from the pressure source. The high degree of accuracy of the Litton transducers, and the fact that they were used to measure basic reference parameters was justification for their frequent and precise calibration.

Other transducers which sense either pressure, or acceleration forces were usually returned to the Flight Test Laboratory for calibration at no more than 6 month intervals. However, due to their inaccessability and the large number involved, verification of previous calibrations of some pressure transducers in the air vehicle was allowed through the data system when scheduling considerations justified this action. This was accomplished by accurately pressurizing the reference systems individually, to which most were connected, at various levels and recording the outputs of a large number of transducers simultaneously.

Flow transmitters used in both the fuel and hydraulic systems were sent to the A. F. Fuel Laboratory at Edwards Air Force Base for calibrations at intervals deemed necessary. Data provided by this laboratory were then plotted to arrive at the factors needed to interpret the flight data.

The calibration of all vibration, flutter pick-ups, and boundary layer or noise level microphones was accomplished by the NR Structural Dynamics Laboratory at intervals dictated by the flight program and installation considerations. For instance, all engine vibration pick-ups were replaced with recently calibrated units at the time of every engine change. Other pick-ups were replaced with newly calibrated units as often as each flight, dependent on future flight objectives or past flight data evaluation. All pick-ups were removed for calibration during any extended layup of the air vehicle.

Rate and attitude gyros with some of the associated signal conditioning circuitry were normally sent to the Flight Test Laboratory, where rate and tilt tables were available, for periodic calibration. However, the attitude gyros were calibrated using the air vehicle data system by use of extension cables on the gyro module, and reading the output at various angles of inclination as measured with a calibrated inclinometer.

There were some special recorders installed in the XB-70 such as the NASA Airspeed Recorder, VGH Recorder and Angular Accelerometers. These were self contained sensing and recording systems which were maintained and furnished by NASA. Any calibrations required were performed by NASA during regular maintenance procedures initiated by them.

WBS CODE: 4.41.3

Instrumentation System Maintenance and Improvements:

The size and scope of the data acquisition system required a continuous effort towards system maintenance and improvement in order to insure that all systems were in perfect working order and that all acquired data was reliable and accurate. Most of the electronic equipment was of solid state design, with very few exceptions, and for that reason alone was highly reliable and relatively trouble free. Many components were interchangeable and therefore presented a very desirable and efficient means of trouble-shooting the system, in the event of a malfunction, by means of substitution and interchanging of components. Exhibit 28, page II-447, presents a view of the instrumentation package during an "up-grading".

Maintenance

One of the primary means of maintenance of the entire data acquisition system was the accomplishment of the Instrumentation Pre-Flight Procedure (FTTG), prior to each flight. The procedure outlined many maintenance procedures, and system and parameter checkout procedures, and when followed to completion, did insure that all systems and data parameters were operating at their most efficient, accurate, and trouble free manner.

Another phase of system maintenance was the re-calibration of all data parameters. The recalibration period of data parameters varied from a period of one month to six months, depending on the type of transducer used. This period of recalibration was determined through past performance and reliability of various types of pickups and transducers. The "Instrumentation Calibration Procedure" part of this report defines the re-calibration period. In certain cases, when necessary due to a checkout desired to verify the proper operation of a parameter, a parameter was re-calibrated within the minimum re-calibration period. During all calibrations, and after a final analysis of the calibration data, if any discrepancies were noted that would show a variation from a past calibration, that parameter or system was carefully analyzed to determine the cause, and all necessary action was taken to correct and prevent the re-occurrence of that discrepancy.

The Data Processing Group was another very valuable source of information regarding the condition or degradation of accuracy or reliability of the data system or parameters. The Data Processing Group constantly monitored all data and informed the Data Acquisition Group of the discrepancies detected. Upon receipt of a data squawk, the instrumentation engineer analyzed the squawk to determine the possible cause and necessary action to correct and prevent further squawks of that type. In many cases the engineer determined, from records of past histories of similar squawks or from his own past experience, exactly what action was required. A written record was made and filed of all system or parameter discrepancies and the action taken to correct and prevent any re-occurrence.

Trouble shooting to determine an answer to a malfunction or discrepancy to the data system or a data parameter was greatly simplified, and a minimum of time was required due to the interchangeability of many of the components of the data system. In addition, the data system was divided into major areas to assist in determining an answer to the malfunction or discrepancy.

The following shows the many varied and useful means that were used to find a solution to a problem.

Parameter Patch Panel

By removing patch panel the data system was divided into the following two major areas:

a. The basic data recording system including data filters, data switches, data amplifiers, subcarriers, etc.

b. The data input transducer including wiring, plugs, etc.

Interchangeable Components

a. All 5 to 1 data switches

b. All 4 to 1 data switches (in many cases a and b were interchanged).

c. All signal conditioning cards of a given type

d. All 12V power supplies

e. All 5V power supplies

f. All CCC pressure transducer power supplies

g. All CCC transducer modules

h. All 100 to 1 switch modules

i. All 20 to 1 switch modules

j. All 10 to 1 switch modules

k. All 4 to 1 switch modules

l. All thermocouple switch modules

m. All filter modules of a given type (when necessary all 1 cps, 4 cps, or 8 cps filter modules were interchanged to assist in determining a solution).

n. All digital data amplifiers (5 total)

o. All analog subcarrier oscillator modules (this included all individual oscillators).

p. All telemetry transmitter modules

q. All tape recorders

The items listed above are by no means a complete list, nor was it intended to present a complete list of troubleshooting methods in this report; rather, it was included to show the many ways the instrumentation engineer had at his disposal to locate and correct a malfunction or discrepancy to the data system or parameter.

Inspection

Periodic inspection and periodic maintenance were accomplished on many components of the data system in order to further assure that the system would perform in an accurate and trouble-free manner. The periodic inspection and maintenance of various components were governed by either manufacturers recommendations, or by past performance and history or by a design requirement.

Improvements

Improvements in the data acquisition system were a continuous program. All phases of the data system were constantly analyzed to determine if any component or system could be improved to produce a more reliable, accurate, or trouble-free system. The following are examples of improvements that were made to the data system.

a. Printed circuit card connectors were changed to a more reliable and trouble-free type.

b. All type transports were modified to permit use of very thin base data tape resulting in greater record time available for in flight data acquisition.

c. All "CCC" type pressure transducer signal conditioning modules and power supplies were wired for individual fused circuits, to provide protection for each parameter.

d. Analog data system electronics and tape transport were changed to Ampex type of equipment to provide for greater reliability and interchange of existing equipment used on the digital data system.

e. A design change was made to the analog to digital converter to improve the digital data accuracy.

Flight Test Data Acquisition:

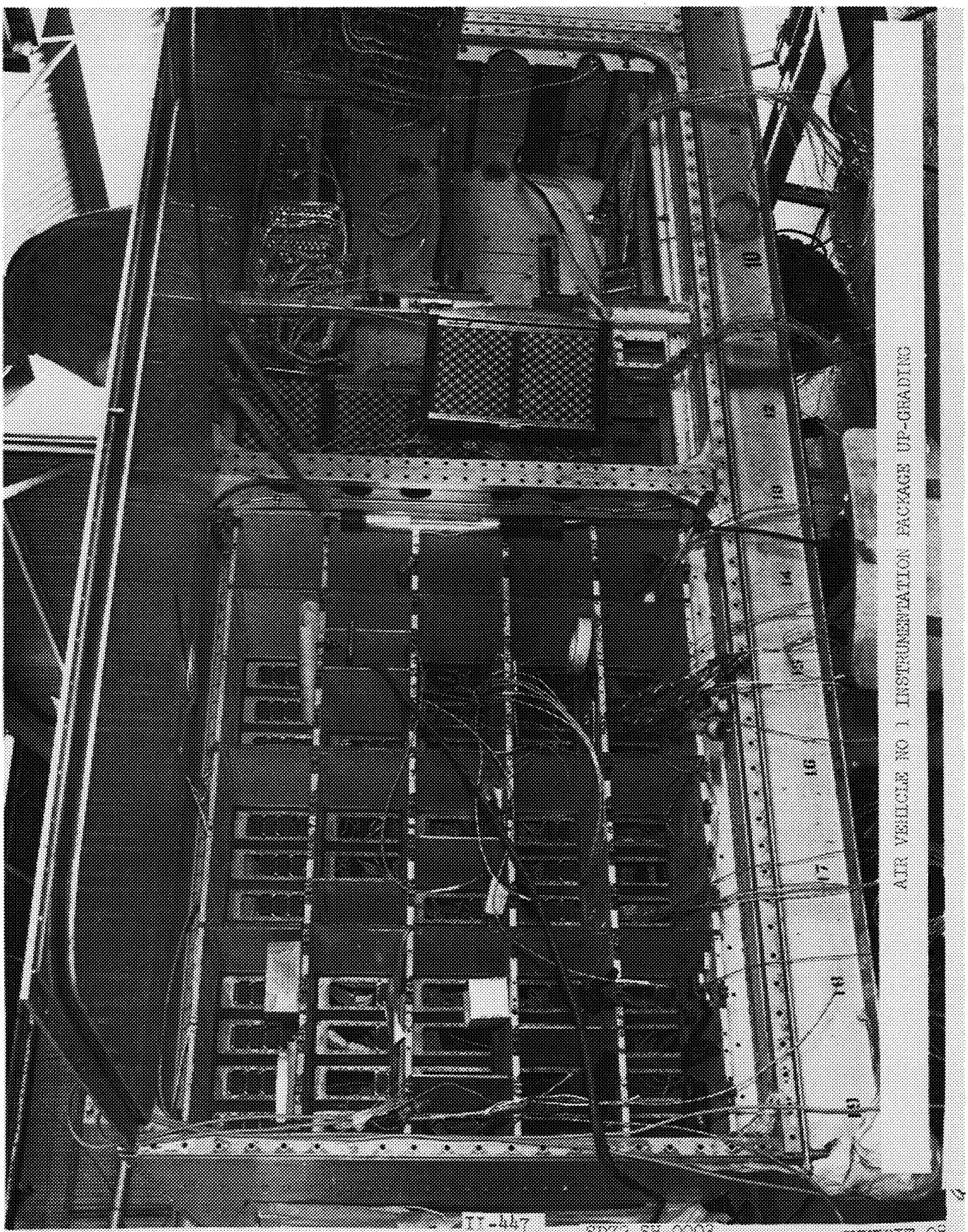
The amount of data acquired in the flight test program proved the desirability of using a high speed system. The entire system recorded an average of 82.5 million data points per flight while an average 22.6 million data points were reduced per flight. Percentage yield of acceptable data averaged 96%. With the aid of these results, aerodynamic, performance, and handling characteristics of the air vehicle were established to high altitude and high Mach numbers. A large amount of information was also obtained on structural integrity, inlet duct and engine performance, and other subsystem operation.

Data Accuracy:

The accuracy of data gathered during the flight test program must be divided into several parts. The digital recording system, excluding sensors, had an input accuracy of ±0.05% full scale. The recording accuracy of the analog system, excluding sensors, was ±3% full scale. The sensors had accuracies ranging from 0.001% for the Litton pressure transducers to CCC medium pressure range transducers which were accurate to within 3%. All other data sensors were between these limits.

System Reliability:

The entire data acquisition system proved to be very reliable. There was only one instance of system malfunction when the recording tape folded over on one of the digital recorders. Data from this tape were recovered by other than standard data reduction methods. There were records of other malfunctions but, in all cases, the cause was something other than the basic system. In fact, at least two flight plans were changed due to the fail-safe and warning lights built into the system. Incorrect procedures and also failure to follow procedures accounted for the rest of the malfunctions. No flight was completely lost due to a data system malfunction.



AFT VEHICLE TO ENGINE INSTRUMENTATION BACKUP-GROUND

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		84141		84141
LABOR AT $ 4.997		420445		420445
ENGR BURDEN AT $ 5.458		459205		459205
SHOP SUPPORT		9628		9628
LABOR AT $ 3.444		33160		33160
TEST/QC		417	161	578
LABOR AT $ 3.836		1567	650	2217
MFG BURDEN AT $ 4.625		46144	1063	47207
ENGR MATERIAL		149948		149948
MPC		24624		24624
SUB-TOTAL		1135093	1713	1136806
GEN & ADMIN		27464	46	27510
TOTAL COST		1162557	1759	1164316

TIME-PHASED COST
DETAIL - SEE PAGE II-449 II-457 II-461

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	1.5	130	4.292	558	506	1064
Q-4 58						
Q-1 59	1.5	315	4.213	1327	1077	2404
Q-2 59						
Q-3 59	1.5	276	4.236	1169	1006	2175
Q-4 59						
Q-1 60	6.0	917	4.559	4181	3421	7602
Q-2 60						
Q-3 60		40	4.650	186	149	335
Q-4 60						
Q-1 61		24	46.792	1123	80	1203
Q-2 61						
Q-3 61	7.5	1423	4.990	7101	6487	13588
Q-4 61						
Q-1 62	33.0	5612	5.090	28566	25777	54343
Q-2 62						
Q-3 62	33.0	5620	5.181	29119	28464	57583
Q-4 62						
Q-1 63	43.5	7298	5.256	38356	39544	77900
Q-2 63						
Q-3 63	34.5	5883	5.124	30145	32670	62815
Q-4 63						
Q-1 64	36.0	6098	5.214	31797	37190	68987
Q-2 64						
Q-3 64	39.0	6849	5.538	37932	45658	83590
Q-4 64						
Q-1 65	88.5	15302	5.534	84678	100959	185637
Q-2 65						
Q-3 65	88.5	14821	4.907	72721	79773	152494

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	33.0	5737	3.960	22717	23025	45742
Q-2 66						
Q-3 66	46.5	7796	3.690	28769	33419	62188
TOTAL	493.5	84141		420445	459205	879650

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64		28	3.357	94	389	483
Q-4 64						
Q-1 65	37.5	6533	3.494	22828	31661	54489
Q-2 65						
Q-3 65	3.0	543	3.363	1826	2341	4167
Q-4 65						
Q-1 66	7.5	1380	3.357	4633	9658	14291
Q-2 66						
Q-3 66	7.5	1144	3.303	3779	2095	5874
TOTAL	55.5	9628		33160	46144	79304

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64		53	3.208	170		170
Q-4 64						
Q-1 65	1.5	175	3.560	623		623
Q-2 65						
Q-3 65		27	4.519	122		122
Q-4 65						
Q-1 66		108	4.324	467		467
Q-2 66						
Q-3 66		54	3.426	185		185
TOTAL	1.5	417		1567		1567

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 **INSTRUMENTATION**
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58	1.5	130	4.292	558	506	1064	
Q-4 58							
Q-1 59	1.5	315	4.213	1327	1077	2404	
Q-2 59							
Q-3 59	1.5	276	4.236	1169	1006	2175	
Q-4 59							
Q-1 60	6.0	917	4.559	4181	3421	7602	
Q-2 60							
Q-3 60		40	4.650	186	149	335	
Q-4 60							
Q-1 61		24	46.792	1123	80	1203	
Q-2 61							
Q-3 61	7.5	1423	4.990	7101	6487	13588	
Q-4 61							
Q-1 62	33.0	5612	5.090	28566	25777	54343	
Q-2 62							
Q-3 62	33.0	5620	5.181	29119	28464	57583	
Q-4 62							
Q-1 63	43.5	7298	5.256	38356	39544	77900	
Q-2 63							
Q-3 63	34.5	5883	5.124	30145	32670	62815	
Q-4 63							
Q-1 64	36.0	6098	5.214	31797	37190	68987	
Q-2 64							
Q-3 64	39.0	6930	5.512	38196	46047	84243	54
Q-4 64							
Q-1 65	127.5	22010	4.913	108129	132620	240749	25029
Q-2 65							
Q-3 65	91.5	15391	4.851	74669	82114	156783	20080
Q-4 65							
Q-1 66	40.5	7225	3.850	27817	32683	60500	48608

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	54.0	8994	3.639	32733	35514	68247	56177
TOTAL	550.5	94186		455172	505349	960521	149948

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58		1064		1064
Q-4 58				
Q-1 59		2404		2404
Q-2 59				
Q-3 59		2175		2175
Q-4 59				
Q-1 60		7602	145	7747
Q-2 60				
Q-3 60		335	6	341
Q-4 60				
Q-1 61		1203	22	1225
Q-2 61				
Q-3 61		13588	253	13841
Q-4 61				
Q-1 62		54343	912	55255
Q-2 62				
Q-3 62		57583	966	58549
Q-4 62				
Q-1 63		77900	1302	79202
Q-2 63				
Q-3 63		62815	1050	63865
Q-4 63				
Q-1 64		68987	1468	70455
Q-2 64				
Q-3 64	20	84317	1794	86111
Q-4 64				
Q-1 65	7486	273264	7291	280555
Q-2 65				
Q-3 65	3582	180445	4814	185259
Q-4 65				
Q-1 66	10081	119189	3590	122779

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK DESIGN/ENGINEERING

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-2 66				
Q-3 66	3455	127879	3851	131730
TOTAL	24624	1135093	27464	1162557

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUB SYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65					811	811
Q-2 65						
Q-3 65					29	29
Q-4 65						
Q-1 66						
Q-2 66						
Q-3 66					223	223
TOTAL					1063	1063

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 INSTRUMENTATION
6-MAJ ASSY 03
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65		121	3.893	471		471
Q-2 65						
Q-3 65		6	8.833	53		53
Q-4 65						
Q-1 66				1		1
Q-2 66						
Q-3 66		34	3.676	125		125
TOTAL		161		650		650

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 **INSTRUMENTATION**
6-MAJ ASSY 03
SUBD OF WORK PRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-1 65		121	3.893	471	811	1282	34
Q-2 65							
Q-3 65		6	8.833	53	29	82	2
Q-4 65							
Q-1 66				1		1	
Q-2 66							
Q-3 66		34	3.676	125	223	348	10
TOTAL		161		650	1063	1713	46

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
SUBD OF WORK PRODUCTION

INSTRUMENTATION

	TOTAL COST
Q-1 65	1316
Q-2 65	
Q-3 65	84
Q-4 65	
Q-1 66	1
Q-2 66	
Q-3 66	358
TOTAL	1759

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	1.5	130	4.292	558	506	1064
Q-4 58						
Q-1 59	1.5	315	4.213	1327	1077	2404
Q-2 59						
Q-3 59	1.5	276	4.236	1169	1006	2175
Q-4 59						
Q-1 60	6.0	917	4.559	4181	3421	7602
Q-2 60						
Q-3 60		40	4.650	186	149	335
Q-4 60						
Q-1 61		24	46.792	1123	80	1203
Q-2 61						
Q-3 61	7.5	1423	4.990	7101	6487	13588
Q-4 61						
Q-1 62	33.0	5612	5.090	28566	25777	54343
Q-2 62						
Q-3 62	33.0	5620	5.181	29119	28464	57583
Q-4 62						
Q-1 63	43.5	7298	5.256	38356	39544	77900
Q-2 63						
Q-3 63	34.5	5883	5.124	30145	32670	62815
Q-4 63						
Q-1 64	36.0	6098	5.214	31797	37190	68987
Q-2 64						
Q-3 64	39.0	6849	5.538	37932	45658	83590
Q-4 64						
Q-1 65	88.5	15302	5.534	84678	100959	185637
Q-2 65						
Q-3 65	88.5	14821	4.907	72721	79773	152494

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	33.0	5737	3.960	22717	23025	45742
Q-2 66						
Q-3 66	46.5	7796	3.690	28769	33419	62188
TOTAL	493.5	84141		420445	459205	879650

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65					811	811
Q-2 65						
Q-3 65					29	29
Q-4 65						
Q-1 66						
Q-2 66						
Q-3 66					223	223
TOTAL					1063	1063

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64		28	3.357	94	389	483
Q-4 64						
Q-1 65	37.5	6533	3.494	22828	31661	54489
Q-2 65						
Q-3 65	3.0	543	3.363	1826	2341	4167
Q-4 65						
Q-1 66	7.5	1380	3.357	4633	9658	14291
Q-2 66						
Q-3 66	7.5	1144	3.303	3779	2095	5874
TOTAL	55.5	9628		33160	46144	79304

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 64		53	3.208	170		170
Q-4 64						
Q-1 65	1.5	296	3.696	1094		1094
Q-2 65						
Q-3 65		33	5.303	175		175
Q-4 65						
Q-1 66		108	4.333	468		468
Q-2 66						
Q-3 66		88	3.523	310		310
TOTAL	1.5	578		2217		2217

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58	1.5	130	4.292	558	506	1064	
Q-4 58							
Q-1 59	1.5	315	4.213	1327	1077	2404	
Q-2 59							
Q-3 59	1.5	276	4.236	1169	1006	2175	
Q-4 59							
Q-1 60	6.0	917	4.559	4181	3421	7602	
Q-2 60							
Q-3 60		40	4.650	186	149	335	
Q-4 60							
Q-1 61		24	46.792	1123	80	1203	
Q-2 61							
Q-3 61	7.5	1423	4.990	7101	6487	13588	
Q-4 61							
Q-1 62	33.0	5612	5.090	28566	25777	54343	
Q-2 62							
Q-3 62	33.0	5620	5.181	29119	28464	57583	
Q-4 62							
Q-1 63	43.5	7298	5.256	38356	39544	77900	
Q-2 63							
Q-3 63	34.5	5883	5.124	30145	32670	62815	
Q-4 63							
Q-1 64	36.0	6098	5.214	31797	37190	68987	
Q-2 64							
Q-3 64	39.0	6930	5.512	38196	46047	84243	54
Q-4 64							
Q-1 65	127.5	22131	4.907	108600	133431	242031	25029
Q-2 65							
Q-3 65	91.5	15397	4.853	74722	82143	156865	20080
Q-4 65							
Q-1 66	40.5	7225	3.850	27818	32683	60501	48608

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGI MATI
Q-2 66							
Q-3 66	54.0	9028	3.640	32858	35737	68595	5617
TOTAL	550.5	94347		455822	506412	962234	14994

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58		1064		1064
Q-4 58				
Q-1 59		2404		2404
Q-2 59				
Q-3 59		2175		2175
Q-4 59				
Q-1 60		7602	145	7747
Q-2 60				
Q-3 60		335	6	341
Q-4 60				
Q-1 61		1203	22	1225
Q-2 61				
Q-3 61		13588	253	13841
Q-4 61				
Q-1 62		54343	912	55255
Q-2 62				
Q-3 62		57583	966	58549
Q-4 62				
Q-1 63		77900	1302	79202
Q-2 63				
Q-3 63		62815	1050	63865
Q-4 63				
Q-1 64		68987	1468	70455
Q-2 64				
Q-3 64	20	84317	1794	86111
Q-4 64				
Q-1 65	7486	274546	7325	281871
Q-2 65				
Q-3 65	3582	180527	4816	185343
Q-4 65				
Q-1 66	10081	119190	3590	122780

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 03
INSTRUMENTATION

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-2 66				
Q-3 66	3455	128227	3861	132088
TOTAL	24624	1136806	27510	1164316

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

	DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	9563		9563
LABOR AT $ 5.472	52325		52325
ENGR BURDEN AT $ 6.084	58186		58186
SHOP SUPPORT	33500		33500
LABOR AT $ 3.807	127524		127524
TEST/QC	5158	1154	6312
LABOR AT $ 4.497	22536	5849.	28385
MFG BURDEN AT $ 4.757	181775	7620	189395
ENGR MATERIAL	21473		21473
MPC	6093		6093
OTHER COST	60		60
SUB-TOTAL	469972	13469	483441
GEN & ADMIN	12536	359	12895
TOTAL COST	482508	13828	496336

TIME-PHASED COST
DETAIL - SEE PAGE II-471 II-476 II-480

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05 MAJOR AIR VEHICLE REPAIR
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	43.5	7599	5.816	44198	50920	95118
Q-2 65						
Q-3 65	10.5	1877	4.147	7783	6895	14678
Q-4 65						
Q-1 66		1	.999	-1	1	
Q-2 66						
Q-3 66		86	4.012	345	370	715
TOTAL	54.0	9563		52325	58186	110511

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	165.0	28593	3.761	107547	156123	263670
Q-2 65						
Q-3 65	28.5	4879	4.077	19894	26061	45955
Q-4 65						
Q-1 66		24	3.250	78	137	215
Q-2 66						
Q-3 66		4	1.250	5	-546	-541
TOTAL	193.5	33500		127524	181775	309299

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	24.0	4163	4.376	18218		18218
Q-2 65						
Q-3 65	6.0	1108	4.326	4793		4793
Q-4 65						
Q-1 66		7	3.286	23		23
Q-2 66						
Q-3 66	-.5	-120	4.150	-498		-498
TOTAL	29.5	5158		22536		22536

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 65	232.5	40355	4.212	169963	207043	377006	17666
Q-2 65							
Q-3 65	45.0	7864	4.129	32470	32956	65426	4369
Q-4 65							
Q-1 66		32	3.125	100	138	238	443
Q-2 66							
Q-3 66	-.5	-30	4.933	-148	-176	-324	-1005
TOTAL	277.0	48221		202385	239961	442346	21473

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 65	5284	21	399977	10671	410648
Q-2 65					
Q-3 65	779	19	70593	1883	72476
Q-4 65					
Q-1 66	92	20	793	24	817
Q-2 66					
Q-3 66	-62		-1391	-42	-1433
TOTAL	6093	60	469972	12536	482508

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION

4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65					7622	7622
Q-4 65						
Q-1 66					-1	-1
Q-2 66						
Q-3 66					-1	-1
TOTAL					7620	7620

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	7.5	1154	5.066	5846		5846
Q-4 65						
Q-1 66				1		1
Q-2 66						
Q-3 66				2		2
TOTAL	7.5	1154		5849		5849

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41 MAJOR AIR VEHICLE REPAIR
6-MAJ ASSY 05
SUBD OF WORK PRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-3 65	7.5	1154	5.066	5846	7622	13468	359
Q-4 65							
Q-1 66				1	-1		
Q-2 66							
Q-3 66				2	-1	1	
TOTAL	7.5	1154		5849	7620	13469	359

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
SUBD OF WORK PRODUCTION

MAJOR AIR VEHICLE REPAIR

	TOTAL COST
Q-3 65	13827
Q-4 65	
Q-1 66	
Q-2 66	
Q-3 66	1
TOTAL	13828

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	43.5	7599	5.816	44198	50920	95118
Q-2 65						
Q-3 65	10.5	1877	4.147	7783	6895	14678
Q-4 65						
Q-1 66		1	.999	-1	1	
Q-2 66						
Q-3 66		86	4.012	345	370	715
TOTAL	54.0	9563		52325	58186	110511

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65					7622	7622
Q-4 65						
Q-1 66					-1	-1
Q-2 66						
Q-3 66					-1	-1
TOTAL					7620	7620

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	165.0	28593	3.761	107547	156123	263670
Q-2 65						
Q-3 65	28.5	4879	4.077	19894	26061	45955
Q-4 65						
Q-1 66		24	3.250	78	137	215
Q-2 66						
Q-3 66		4	1.250	5	-546	-541
TOTAL	193.5	33500		127524	181775	309299

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 65	24.0	4163	4.376	18218		18218
Q-2 65						
Q-3 65	13.5	2262	4.703	10639		10639
Q-4 65						
Q-1 66		7	3.429	24		24
Q-2 66						
Q-3 66	-.5	-120	4.133	-496		-496
TOTAL	37.0	6312		28385		28385

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 65	232.5	40355	4.212	169963	207043	377006	17666
Q-2 65							
Q-3 65	52.5	9018	4.249	38316	40578	78894	4369
Q-4 65							
Q-1 66		32	3.156	101	137	238	443
Q-2 66							
Q-3 66	-.5	-30	4.867	-146	-177	-323	-1005
TOTAL	284.5	49375		208234	247581	455815	21473

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 4
5-SUBSYSTEM 41
6-MAJ ASSY 05
MAJOR AIR VEHICLE REPAIR

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 65	5284	21	399977	10671	410648
Q-2 65					
Q-3 65	779	19	84061	2242	86303
Q-4 65					
Q-1 66	92	20	793	24	817
Q-2 66					
Q-3 66	-62		-1390	-42	-1432
TOTAL	6093	60	483441	12895	496336

WBS 5.0: FLIGHT TEST GROUND SUPPORT EQUIPMENT

OBJECTIVES AND SCOPE:

Flight Test Ground Support Equipment (FTGSE) included all test equipment items provisioned for the support of the XB-70 air vehicles during the flight test development program. The FTGSE was provisioned based on the following objectives:

(1) To provide FTGSE for support of the air vehicle and installed subsystems during the flight test program.

(2) To provide FTGSE for maintenance of the components determined to be maintainable within the NR, Los Angeles Division complex.

The ground rules which were applied in developing equipment to meet the objectives were that all FTGSE necessary to support on-site maintenance operations would be provisioned; however, to accomplish this objective within the severe funding restrictions, maximum use was to be made of GFP, NR technician skills, and the sharing of manufacturing tools (TSC) between Manufacturing and Engineering Flight Test. The approach was to confine all risks involved to possible flight schedule impacts with no compromise to maintenance of the air vehicle as related to flight safety.

The XB-70 FTGSE program evolved when in December, 1959, the B-70 Program was redirected from a production status to a flight test development status which automatically deleted all requirements for manufacturing type Ground Support Equipment (GSE). With the redirection, funding for the XB-70 program was critical which dictated that the capability be provided for maximum utilization (interdepartment transfer or sharing) of manufacturing tooling and special test equipment. In addition, to further reduce cost, if analysis showed it more economical to originally configure a special test equipment item for flight test use, it was provisioned as FTGSE and then utilized by Manufacturing for system installation and/or checkout.

The procurement or provisioning of FTGSE, as directed by the XB-70 contract, was based on "lead-time-away" from the required date of the individual end item. Under this ground rule, the objective of the procurement program for the testing equipment was to have each item of FTGSE on site 30 days prior to first use during either final checkout and preflight or flight test operations. (The 30 days prior delivery was utilized for checkout, calibration, and Air Force Inspection approval). The procurement of FTGSE was categorized by the major subsystems which they supported, such as, air vehicle handling, alighting and arresting, flight control, central air data, propulsion, secondary power, environmental control, air induction control, mission and traffic control, and personnel protection. The FTGSE provisioned was of two types: that which directly supported the air vehicle installed subsystems, and that for subsystem component repair. The following table shows the FTGSE breakdown as related to CFE and GFP items at the time period of air vehicle No. 1 preflight.

Source	End Items
CFE Air Vehicle FTGSE	652
CFE Component Repair FTGSE	145
GFP FTGSE	299
TOTAL	1096

The 1096 end items provisioned at this "out-the-door" point in time increased to a total of 1600 end items during the course of the flight test program. The increase was essentially due to: (1), knowledge gained in subsystem operation showing additional requirements; and (2), the closing out of subcontractors and assuming "in-house" responsibility for the component repair. Of the total 1600 end items of FTGSE, approximately 1000 would be classified as 'special' while the other 600 end items would be classified as conventional type GSE.

The equipment required for test, checkout, and servicing of the air vehicle is summarized in the following paragraphs.

Air Vehicle Handling Equipment: This equipment included FTGSE such as that required for air vehicle towing, weighing, leveling, mooring, and jacking, as well as that necessary for gaining access to the various equipment service connections and for protective covering.

Personnel Protection: Equipment in this category included that necessary for servicing the pressurization, gaseous oxygen, and liquid oxygen systems, accomplishing capsule pressurization system checkout and electrical systems checkout.

Alighting and Arresting: FTGSE in this category included all equipment necessary for servicing and checkout of all systems associated with the landing gear including nose wheel steering, braking system, hot-tire sensing system, struts, and tire servicing. It also included that equipment required for drag chute installation and for drag chute deployment.

Secondary Power: There were several categories of equipment required for service and checkout of the secondary power system as well as for continuous support of the air vehicle during maintenance of the other subsystems in the hangar and at remote sites. The FTGSE included equipment for constant speed drive loading, hydraulic system leakage and functional checks, hydraulic pump test set, hydraulic fluid servicing, filter cart, and gaseous nitrogen servicing trailers. Electrical system checkout included ground power unit, phase rotation tester, electrical power test set, and power analyzer and test set. In addition, several types of equipment were required for air vehicle wiring and power distribution checkout and/or de-bugging.

Propulsion: The FTGSE required for propulsion subsystem servicing, checkout, and test included engine lubrication and hydraulic servicing carts, sound supressors, FOD screens, fuel deaeration, gaseous nitrogen servicing, fuel

sampling, ullage gas analyzing, liquid nitrogen servicing, low pressure tester, fuel filtration, various flow meters and the GE "suitcase".

Flight Control: The flight control test sets included equipment for checking such items as surface travel, rate, force and deflection as well as functional testing of the FACS, ancillary controls, and the trim systems.

Mission and Traffic Control: The equipment was essentially all GFP and was required for pre-flighting the Intercom, UHF, ILS, TACAN, and IFF systems.

Central Air Data: The equipment required for the CADS was for testing the pressure sensors, total temperature probe, computer, indicators, and amplifiers.

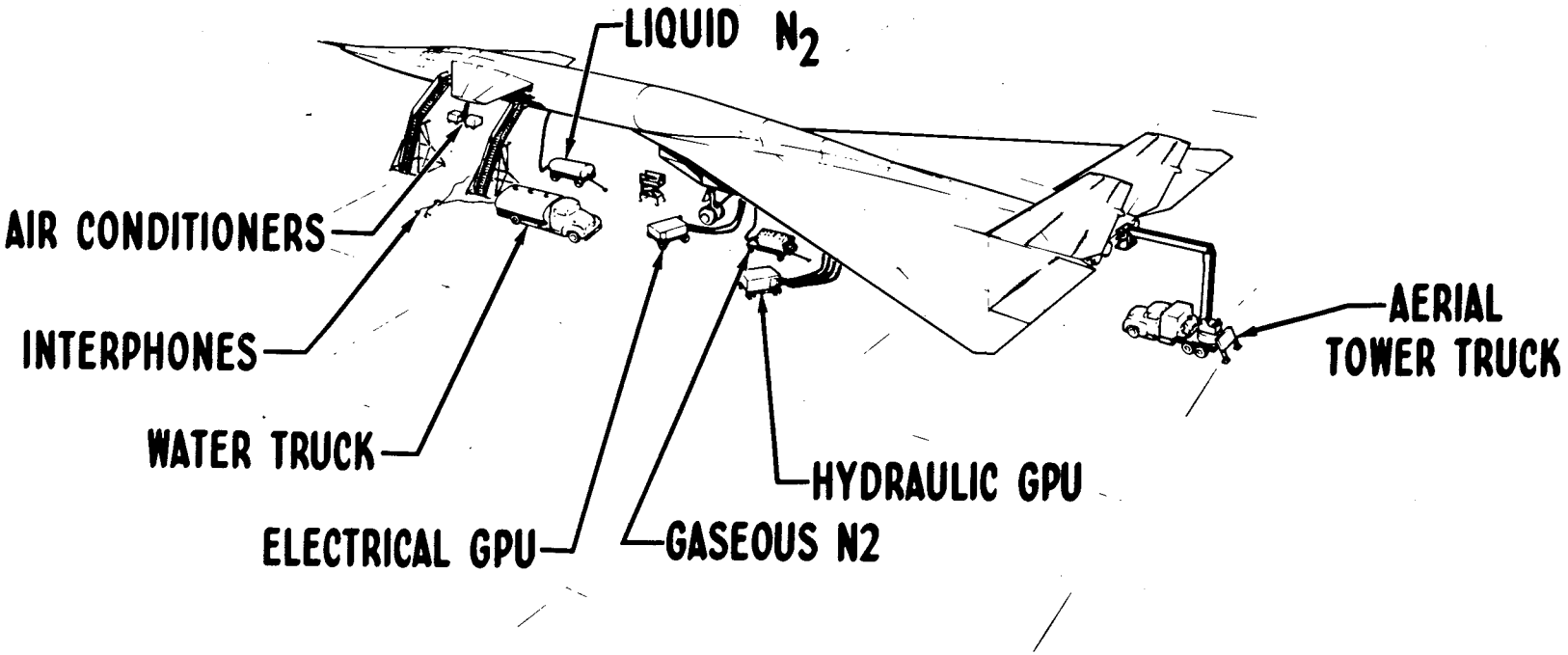
Air Induction System: FTGSE for the AIS included that equipment required to checkout, test, and calibrate the AICS sensors, probes, surface travels and rates for both the automatic control, standby and emergency systems.

Environmental Control: The diverse requirements for ECS FTGSE fell into two categories: that required for system checkout on the air vehicle and that required for engineering evaluation. This equipment included such items as low pressure testers for leakage, air flow calibraters, cooling effect detectors testers, air flow distribution analyzer, laminar flow meters, motor-generator set, ammonia and heated water servicing, gas turbine and hose sets, freon system tester and several adapters.

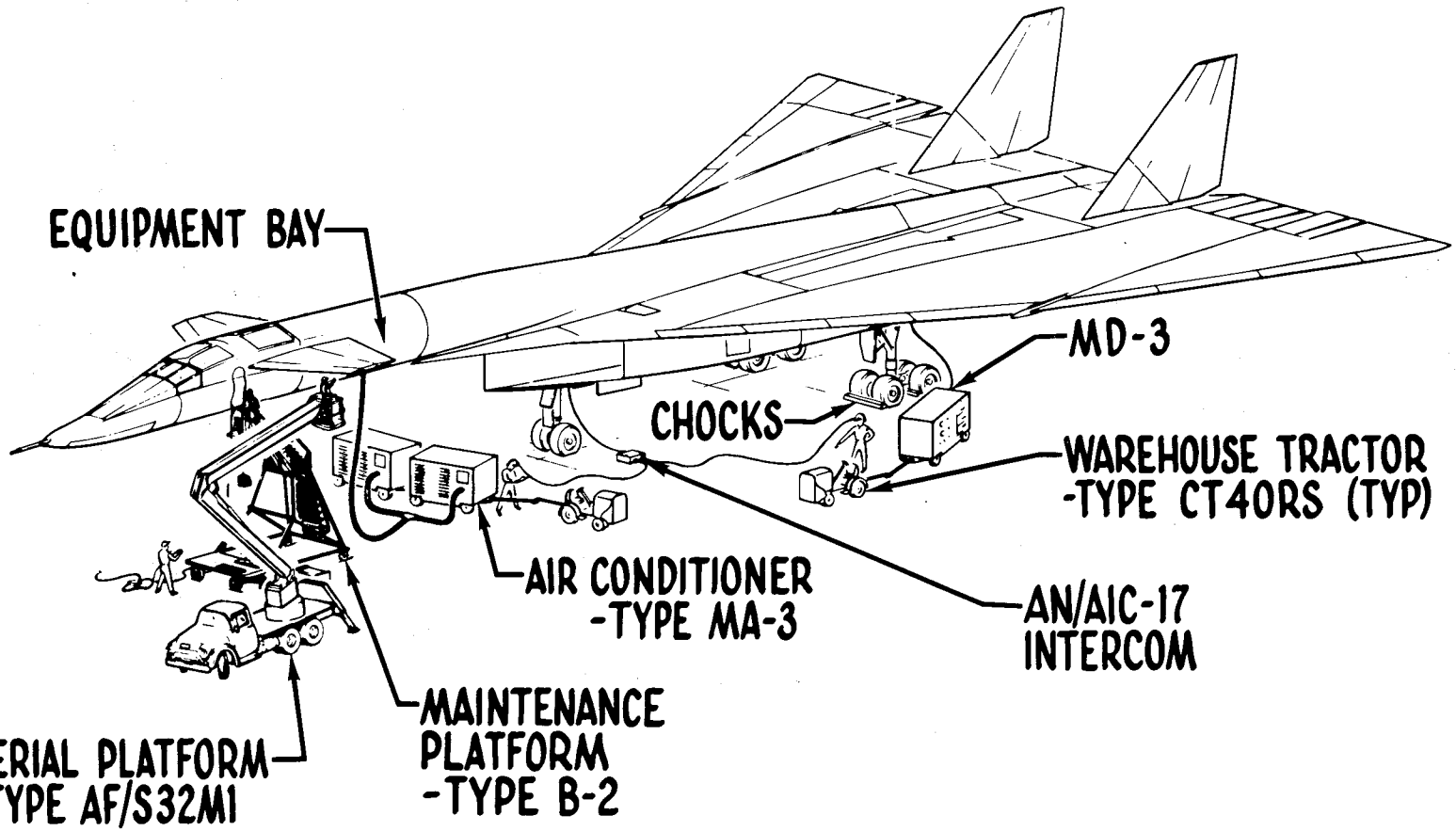
The FTGSE for electrical and mechanical component repair was comprised of those end items for: (1), isolation and removal of the faulty component; (2), repair of the component by replacement of either assemblies or bits and pieces; (3), component reverification to confirm repair; and (4), air vehicle installation and subsystem performance verification.

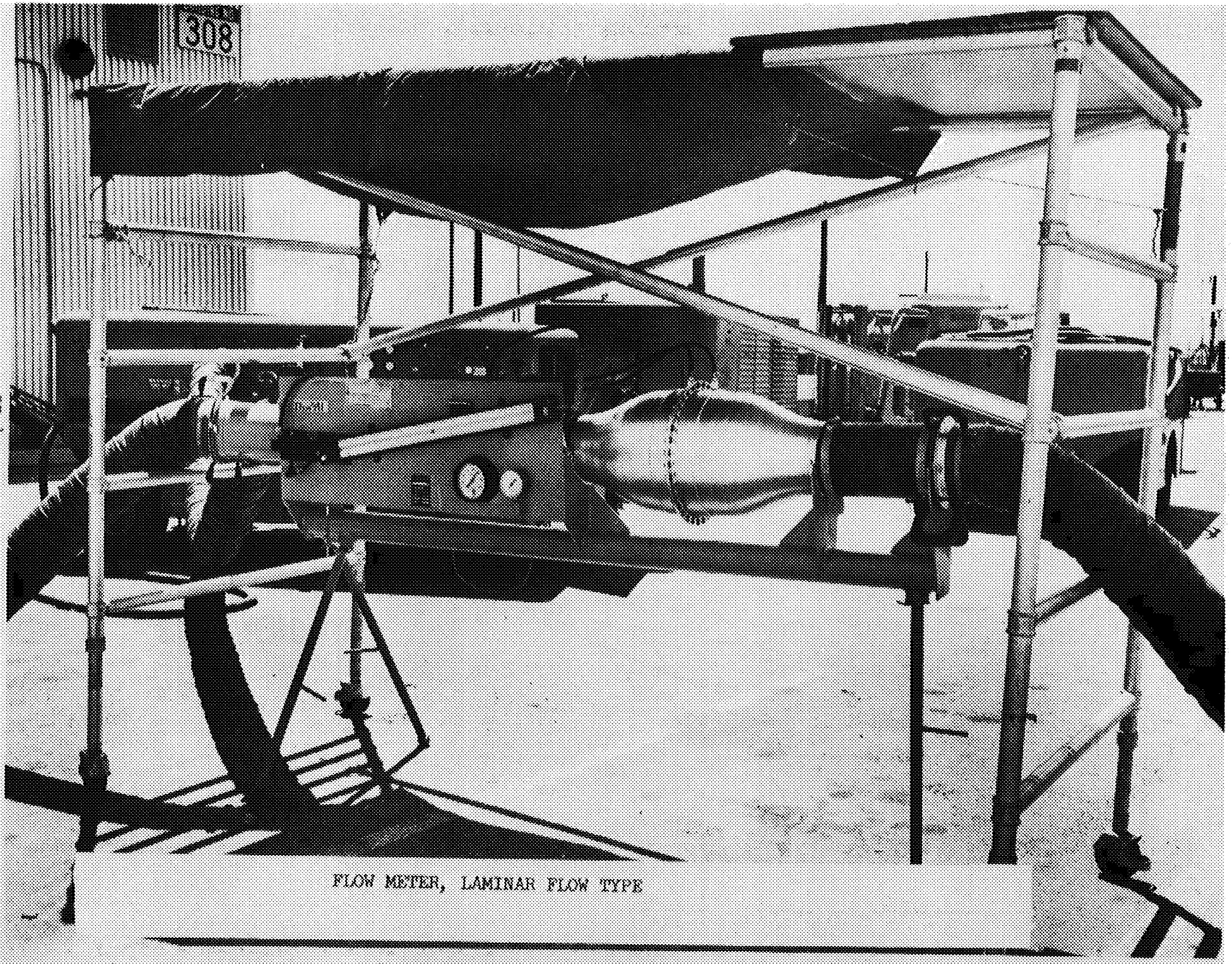
Exhibits 1 and 2, pages II-490 and II-491, respectively present typical FTGSE arrangements for mission start and mission completion. Exhibits 3 through 12 present pictures of some typical FTGSE.

FTGSE - MISSION START



FTGSE - MISSION COMPLETION

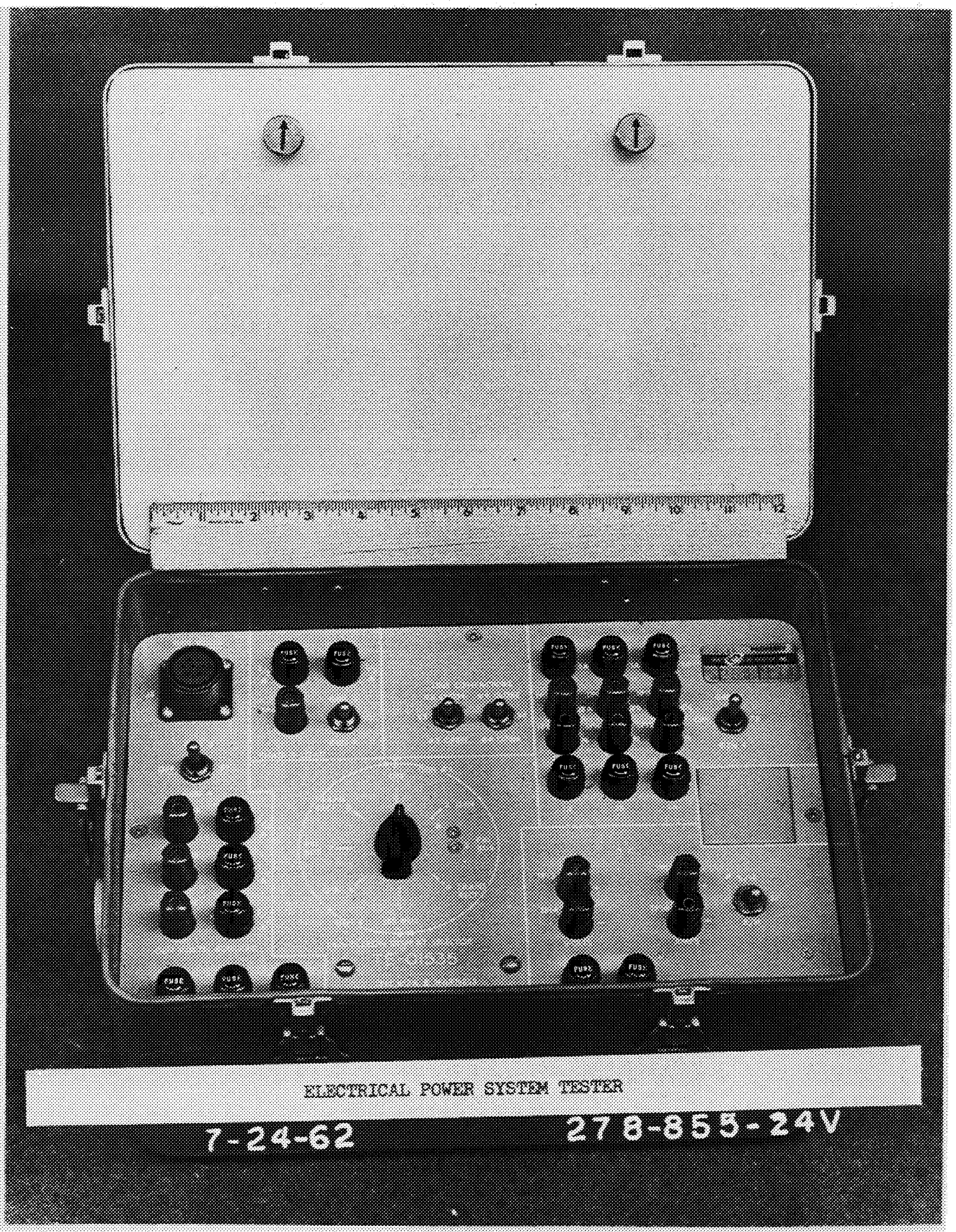




FLOW METER, LAMINAR FLOW TYPE

EXHIBIT 3
SS72-631-0003
FT-492

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH



278-855-24V

NITROGEN SERVICING UNIT

278-855-17C

EXHIBIT 6

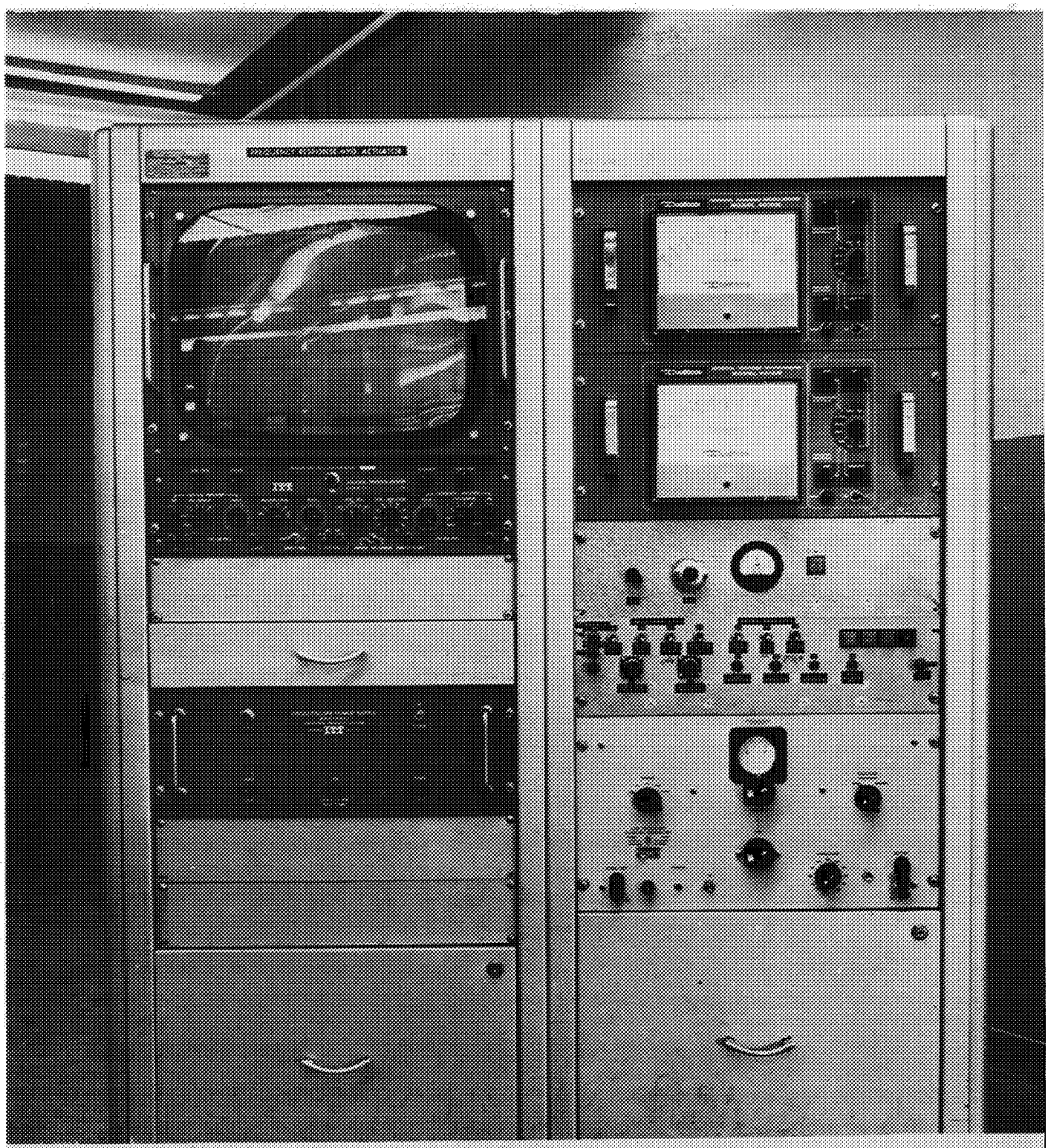
REMOTE GROUND POWER UNIT

SD72-SH-0003

Exhibit I

*

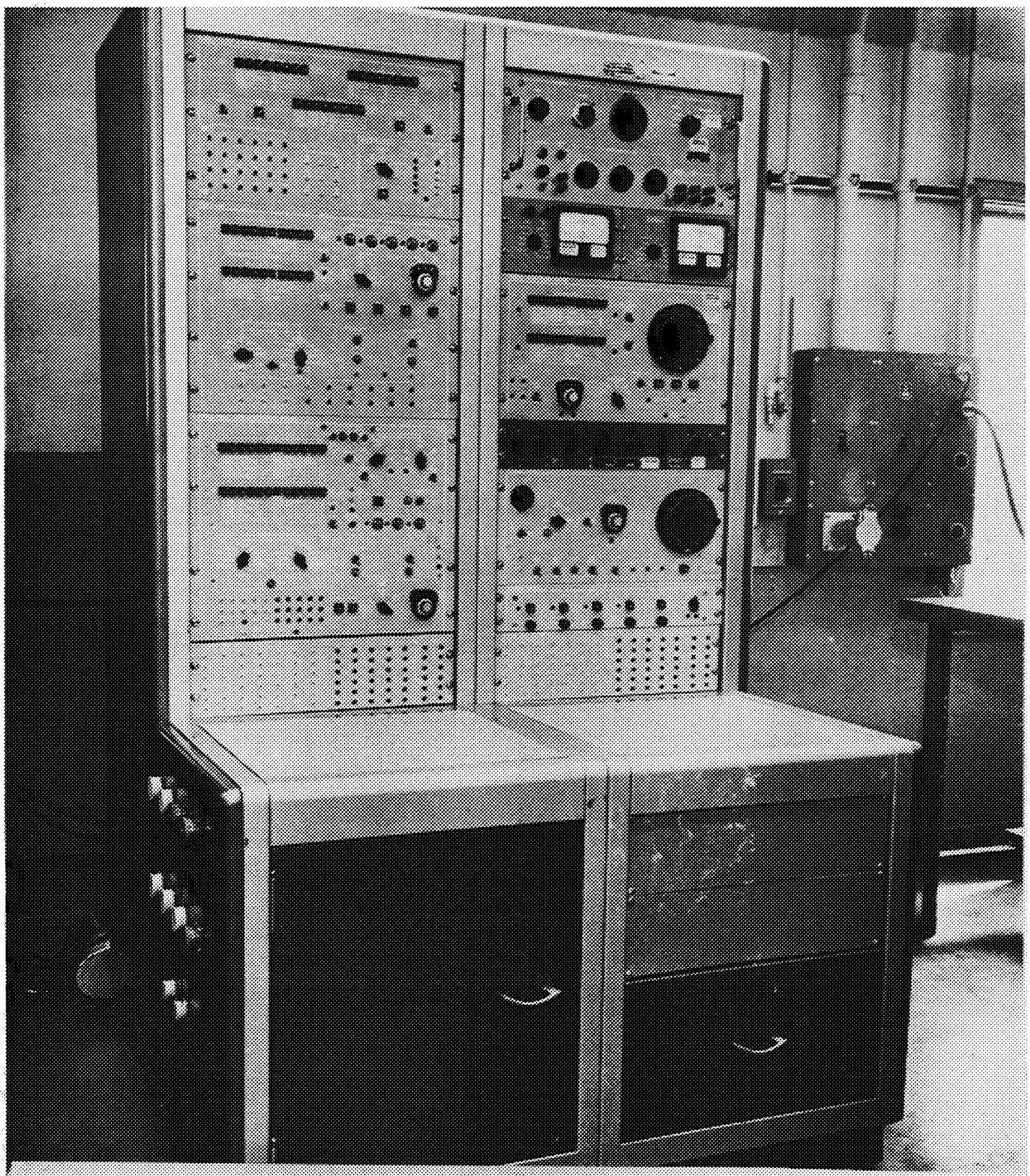
11-196



TESTER, FREQUENCY RESPONSE HYDRAULIC ACTUATOR CONSOLE

11-15-62

278-855-57 B

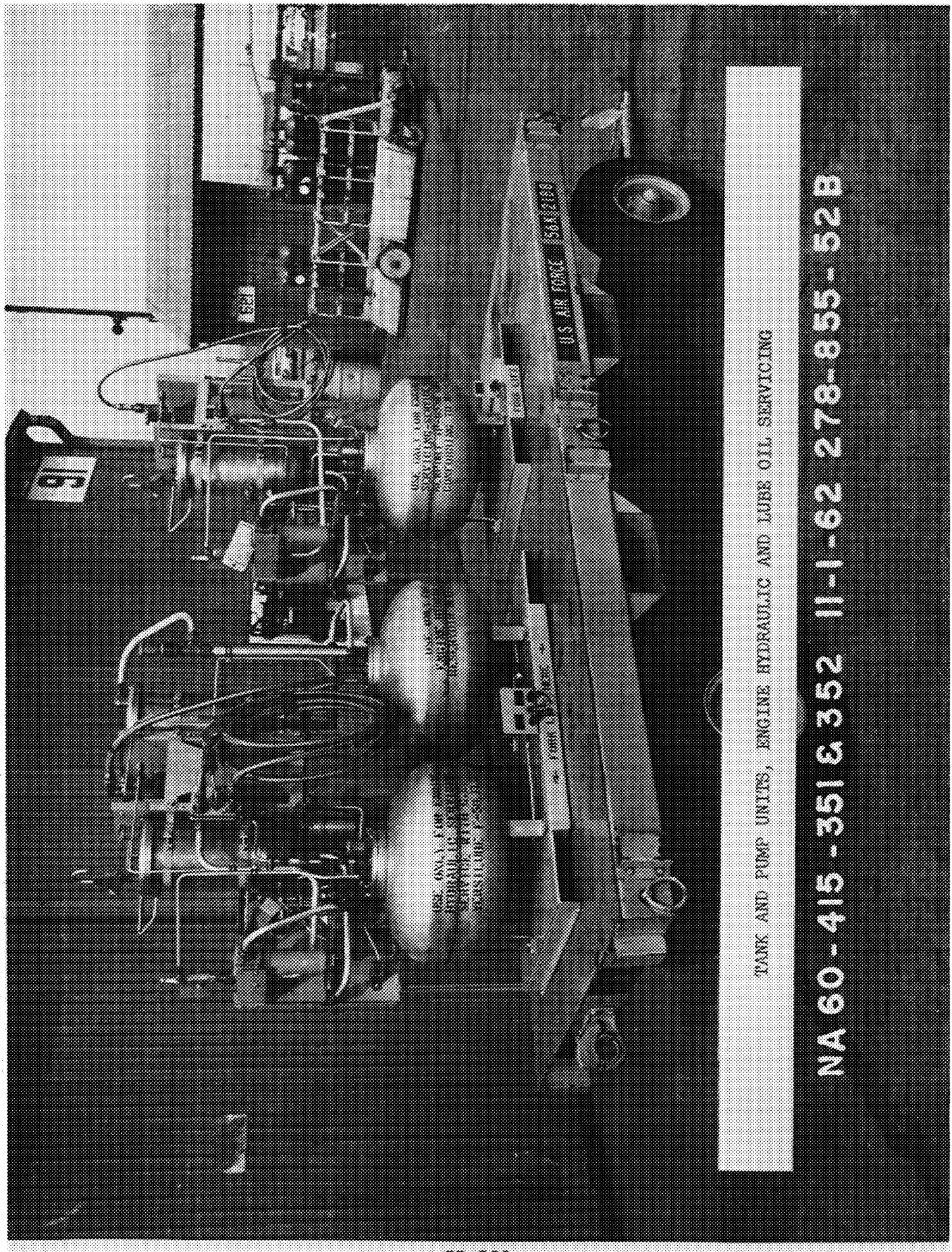


FLIGHT AUGMENTATION CONTROL SYSTEM TEST SET, COMPUTER UNIT

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

RECIPROCATING POWER DRIVEN COMPRESSOR

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH



BRAKE CONTROL SYSTEM SIMULATOR
1-63 278-855-780

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

			5-SUBSYS 50	5-SUBSYS 51	TOTAL
			HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS
DESIGN/ENGINEERING			1580700	83812	1664512
LABOR AT $	4.407		6894024	440678	7334702
ENGR BURDEN AT $		4.852	7561259	515432	8076691
PRODUCTION			224559		224559
LABOR AT $	3.326		746798		746798
SHOP SUPPORT			272322	21443	293765
LABOR AT $	4.706		1287067	95429	1382496
PLANNING			7858		7858
LABOR AT $	3.633		28551		28551
TEST/QC			14866	4891	19757
LABOR AT $	3.572		52560	18007	70567
MFG BURDEN AT $		4.471	2313564	127366	2440930
ENGR MATERIAL			216590	7532	224122
MFG MATERIAL			1578449		1578449
MPC			233560	1866	235426
OTHER COST			60604		60604
SUB-TOTAL			20973026	1206310	22179336
GEN & ADMIN			397683	26637	424320
TOTAL COST			21370709	1232947	22603656

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-503 II-537 II-547

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TEST /QC HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		1576734	3854	112	1580700
LABOR AT $ 4.361		6876930	16586	458	6894024
ENGR BURDEN AT $ 4.783		7540100	20734	425	7561259
PRODUCTION			224559		224559
LABOR AT $ 3.326			746798		746798
SHOP SUPPORT		271960		362	272322
LABOR AT $ 4.726		1286027		1040	1287067
PLANNING			7858		7858
LABOR AT $ 3.633			28551		28551
TEST/QC		714	14138	14	14866
LABOR AT $ 3.536		2710	49785	65	52560
MFG BURDEN AT $ 4.453		1344265	967922	1377	2313564
ENGR MATERIAL		214558		2032	216590
MFG MATERIAL			1578449		1578449
MPC		28502	204948	110	233560
OTHER COST		60550	54		60604
SUB-TOTAL		17353692	3613827	5507	20973026
GEN & ADMIN		327086	70575	22	397683
TOTAL COST		17680778	3684402	5529	21370709

TIME-PHASED COST
DETAIL-SEE PAGE II-504 II-514 II-520 II-525

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1962

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50 GSE BASIC
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	37.5	6362	4.366	27779	28944	56723
Q-2 58						
Q-3 58	268.5	45069	4.153	187177	178709	365886
Q-4 58						
Q-1 59	480.0	81982	4.041	331270	281781	613051
Q-2 59						
Q-3 59	766.0	134772	3.990	537695	482324	1020019
Q-4 59						
Q-1 60	439.5	76161	4.500	342727	285751	628478
Q-2 60						
Q-3 60	261.0	43754	5.127	224326	162162	386488
Q-4 60						
Q-1 61	711.0	121378	4.612	559767	410982	970749
Q-2 61						
Q-3 61	465.0	84321	4.946	417049	394373	811422
Q-4 61						
Q-1 62	568.5	97112	4.889	474778	445240	920018
Q-2 62						
Q-3 62	82.5	13826	3.700	51159	82978	134137
Q-4 62						
Q-1 63	126.0	21483	3.967	85223	109934	195157
Q-2 63						
Q-3 63	349.5	58740	4.955	291075	350905	641980
Q-4 63						
Q-1 64	478.5	81608	5.312	433476	488455	921931
Q-2 64						
Q-3 64	304.5	53502	5.738	306982	354976	661958
Q-4 64						
Q-1 65	3498.0	606198	3.928	2381016	3145245	5526261
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1967

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50 GSE BASIC
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	214.5	36042	5.004	180337	257438	437775
Q-4 65						
Q-1 66	61.5	10578	2.797	29583	44265	73848
Q-2 66						
Q-3 66	22.5	3846	4.046	15561	35638	51199
TOTAL	9134.5	1576734		6876980	7540100	14417080

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5 **GSE BASIC**
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		4	2.000	8	14	22
Q-2 58						
Q-3 58		36	3.278	118	146	264
Q-4 58						
Q-1 59	130.5	22157	2.725	60370	81977	142347
Q-2 59						
Q-3 59	82.5	14425	2.748	39643	61617	101260
Q-4 59						
Q-1 60	9.0	1650	2.855	4710	6545	11255
Q-2 60						
Q-3 60					-386	-386
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		11	2.455	27	42	69
Q-4 61						
Q-1 62	42.0	7117	5.006	35625	32881	68506
Q-2 62						
Q-3 62	546.0	91772	4.996	458493	447996	906489
Q-4 62						
Q-1 63	501.0	85585	5.237	448246	460787	909033
Q-2 63						
Q-3 63	241.5	40571	5.167	209630	208564	418194
Q-4 63						
Q-1 64	9.0	1444	3.111	4492	7235	11727
Q-2 64						
Q-3 64	4.5	689	3.376	2326	3375	5701
Q-4 64						
Q-1 65	21.0	3699	3.431	12691	18918	31609
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5
5-SUBSYSTEM 50 **GSE BASIC**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	9.0	1425	3.286	4683	6909	11592
Q-4 65						
Q-1 66	1.5	277	4.170	1155	1649	2804
Q-2 66						
Q-3 66	6.0	1098	3.470	3810	5996	9806
TOTAL	1603.5	271960		1286027	1344265	2630292

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5 GSE BASIC
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		4	2.250	9		9
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59		26	2.846	74		74
Q-4 59						
Q-1 60		9	3.889	35		35
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63		47	4.681	220		220
Q-2 63						
Q-3 63		26	5.462	142		142
Q-4 63						
Q-1 64		70	3.243	227		227
Q-2 64						
Q-3 64		31	3.194	99		99
Q-4 64						
Q-1 65	1.5	311	3.833	1192		1192
Q-2 65						
Q-3 65		92	3.435	316		316
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5 GSE BASIC
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66		29	4.345	126		126
Q-2 66						
Q-3 66		69	3.913	270		270
TOTAL	1.5	714		2710		2710

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

GSE BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	37.5	6366	4.365	27787	28958	56745	
Q-2 58							
Q-3 58	268.5	45109	4.152	187304	178855	366159	
Q-4 58							
Q-1 59	610.5	104139	3.761	391640	363758	755398	14981
Q-2 59							
Q-3 59	848.5	149223	3.869	577412	543941	1121353	5254
Q-4 59							
Q-1 60	448.5	77820	4.465	347472	292296	639768	1144
Q-2 60							
Q-3 60	261.0	43754	5.127	224326	161776	386102	-1
Q-4 60							
Q-1 61	711.0	121378	4.612	559767	410982	970749	-12
Q-2 61							
Q-3 61	465.0	84332	4.946	417076	394415	811491	441
Q-4 61							
Q-1 62	610.5	104229	4.897	510403	478121	988524	-4
Q-2 62							
Q-3 62	628.5	105598	4.826	509652	530974	1040626	975
Q-4 62							
Q-1 63	627.0	107115	4.982	533689	570721	1104410	53198
Q-2 63							
Q-3 63	591.0	99337	5.042	500847	559469	1060316	42977
Q-4 63							
Q-1 64	487.5	83122	5.272	438195	495690	933885	29476
Q-2 64							
Q-3 64	309.0	54222	5.706	309407	358351	667758	7130
Q-4 64							
Q-1 65	3520.5	610208	3.925	2394899	3164163	5559062	9121
Q-2 65							
Q-3 65	223.5	37559	4.935	185336	264347	449683	45797
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 **GSE BASIC**
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	63.0	10884	2.836	30864	45914	76778	1150
Q-2 66							
Q-3 66	28.5	5013	3.918	19641	41634	61275	2931
TOTAL	10739.5	1849408		8165717	8884365	17050082	214558

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 GSE BASIC
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			56745		56745
Q-2 58					
Q-3 58			366159		366159
Q-4 58					
Q-1 59	1269		771648		771648
Q-2 59					
Q-3 59	445	4629	1131681		1131681
Q-4 59					
Q-1 60	150	9366	650428	12393	662821
Q-2 60					
Q-3 60		3025	389126	7414	396540
Q-4 60					
Q-1 61	-1	7379	978115	18176	996291
Q-2 61					
Q-3 61	37	4277	816246	15168	831414
Q-4 61					
Q-1 62		2608	991128	16636	1007764
Q-2 62					
Q-3 62	76	7757	1049434	17615	1067049
Q-4 62					
Q-1 63	5240	5638	1168486	19520	1188006
Q-2 63					
Q-3 63	4233	7851	1115377	18649	1134026
Q-4 63					
Q-1 64	3142	4616	971119	20663	991782
Q-2 64					
Q-3 64	2594	3108	680590	14482	695072
Q-4 64					
Q-1 65	2728	17	5570928	148632	5719560
Q-2 65					
Q-3 65	8170	157	503807	13442	517249
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK DESIGN/ENGINEERING

GSE BASIC

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66	239	43	78210	2355	80565
Q-2 66					
Q-3 66	180	79	64465	1941	66406
TOTAL	28502	60550	17353692	327086	17680778

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50 **GSE BASIC**
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		8	3.000	24	34	58
Q-2 62						
Q-3 62	1.5	138	3.145	434	584	1018
Q-4 62						
Q-1 63		-36	3.333	-120	-21	-141
Q-2 63						
Q-3 63	9.0	1526	4.290	6547	7108	13655
Q-4 63						
Q-1 64	6.0	1138	4.651	5293	6730	12023
Q-2 64						
Q-3 64	3.0	401	3.736	1498	2257	3755
Q-4 64						
Q-1 65	1.5	275	4.382	1205	1830	3035
Q-2 65						
Q-3 65	1.5	168	4.899	823	1085	1908
Q-4 65						
Q-1 66		113	3.920	443	644	1087
Q-2 66						
Q-3 66		123	3.569	439	483	922
TOTAL	22.5	3854		16586	20734	37320

C-10

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK PRODUCTION

GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	240	7.238	1737	295	2032
Q-4 61						
Q-1 62	40.0	6783	3.052	20699	24301	45000
Q-2 62						
Q-3 62	309.0	52028	3.027	157511	204229	361740
Q-4 62						
Q-1 63	342.0	58394	3.134	183018	231964	414982
Q-2 63						
Q-3 63	188.5	31620	3.315	104820	140106	244926
Q-4 63						
Q-1 64	189.0	32299	3.573	115404	139808	255212
Q-2 64						
Q-3 64	124.5	21951	3.717	81602	94090	175692
Q-4 64						
Q-1 65	36.0	6363	4.182	26613	27484	54097
Q-2 65						
Q-3 65	39.0	6604	3.421	22590	34661	57251
Q-4 65						
Q-1 66	31.5	5502	4.199	23102	32705	55807
Q-2 66						
Q-3 66	16.5	2775	3.496	9702	14054	23756
TOTAL	1317.5	224559		746798	943697	1690495

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 5
5-SUBSYSTEM 50 GSE BASIC
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	4.5	751	3.688	2770	330	3100
Q-2 62						
Q-3 62	7.5	1272	3.106	3951	1073	5024
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	15.0	2616	4.043	10576	7391	17967
Q-4 63						
Q-1 64	7.5	1156	3.548	4102	5478	9580
Q-2 64						
Q-3 64	3.0	528	3.371	1780	2432	4212
Q-4 64						
Q-1 65	1.5	386	3.443	1329	1821	3150
Q-2 65						
Q-3 65	3.0	470	3.311	1556	2174	3730
Q-4 65						
Q-1 66	3.0	449	3.666	1646	2427	4073
Q-2 66						
Q-3 66	1.5	230	3.657	841	1099	1940
TOTAL	46.5	7858		28551	24225	52776

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK PRODUCTION

GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	1.5	273	3.209	876		876
Q-2 62						
Q-3 62	12.0	1976	3.121	6167		6167
Q-4 62						
Q-1 63	12.0	2108	3.759	7923		7923
Q-2 63						
Q-3 63	7.5	1318	2.666	3514		3514
Q-4 63						
Q-1 64	18.0	2995	3.475	10409		10409
Q-2 64						
Q-3 64	12.0	2147	3.499	7513		7513
Q-4 64						
Q-1 65	4.5	795	3.523	2801		2801
Q-2 65						
Q-3 65	6.0	979	3.769	3690		3690
Q-4 65						
Q-1 66	4.5	878	4.257	3738		3738
Q-2 66						
Q-3 66	4.5	669	4.714	3154		3154
TOTAL	82.5	14138		49785		49785

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK PRODUCTION

GSE BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 61	1.5	240	7.238	1737	295	2032	
Q-4 61							
Q-1 62	46.0	7815	3.118	24369	24665	49034	10523
Q-2 62							
Q-3 62	330.0	55414	3.033	168063	205886	373949	166760
Q-4 62							
Q-1 63	354.0	60466	3.156	190821	231943	422764	328048
Q-2 63							
Q-3 63	220.0	37080	3.383	125457	154605	280062	446157
Q-4 63							
Q-1 64	220.5	37588	3.597	135208	152016	287224	275255
Q-2 64							
Q-3 64	142.5	25027	3.692	92393	98779	191172	110990
Q-4 64							
Q-1 65	43.5	7819	4.086	31948	31135	63083	74758
Q-2 65							
Q-3 65	49.5	8221	3.486	28659	37920	66579	49653
Q-4 65							
Q-1 66	39.0	6942	4.167	28929	35776	64705	45444
Q-2 66							
Q-3 66	22.5	3797	3.723	14136	15636	29772	70861
TOTAL	1469.0	250409		841720	988656	1830376	1578449

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK PRODUCTION

GSE BASIC

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 61			2032	38	2070
Q-4 61					
Q-1 62	829	455	60841	1021	61862
Q-2 62					
Q-3 62	13140	-70	553779	9295	563074
Q-4 62					
Q-1 63	32312	779	783903	13107	797010
Q-2 63					
Q-3 63	43946	-1136	769029	12858	781887
Q-4 63					
Q-1 64	29342	16	591837	12593	604430
Q-2 64					
Q-3 64	40378	6	342546	7289	349835
Q-4 64					
Q-1 65	22360	4	160205	4274	164479
Q-2 65					
Q-3 65	8858		125090	3337	128427
Q-4 65					
Q-1 66	9425		119574	3601	123175
Q-2 66					
Q-3 66	4358		104991	3162	108153
TOTAL	204948	54	3613827	70575	3684402

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50 **GSE BASIC**
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		75	4.547	341	280	621
Q-4 60						
Q-1 61		37	3.162	117	145	262
TOTAL		112		458	425	883

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5
5-SUBSYSTEM 50 **GSE BASIC**
SUBD OF WORK TEST/QC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		24	2.208	53	88	141
Q-4 58						
Q-1 59	1.5	188	3.037	571	695	1266
Q-2 59						
Q-3 59		105	2.438	256	501	757
Q-4 59						
Q-1 60		37	3.622	134	66	200
Q-2 60						
Q-3 60					-3	-3
Q-4 60						
Q-1 61		8	3.250	26	30	56
TOTAL	1.5	362		1040	1377	2417

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK TEST/QC

GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		14	4.643	65		65
TOTAL		14		65		65

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK TEST/QC

GSE BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58		24	2.208	53	88	141	5
Q-4 58							
Q-1 59	1.5	188	3.037	571	695	1266	2016
Q-2 59							
Q-3 59		119	2.697	321	501	822	-1
Q-4 59							
Q-1 60		37	3.622	134	66	200	6
Q-2 60							
Q-3 60		75	4.547	341	277	618	6
Q-4 60							
Q-1 61		45	3.178	143	175	318	
TOTAL	1.5	488		1563	1802	3365	2032

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
SUBD OF WORK TEST/QC

GSE BASIC

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58		146		146
Q-4 58				
Q-1 59	110	3392		3392
Q-2 59				
Q-3 59		821		821
Q-4 59				
Q-1 60		206	4	210
Q-2 60				
Q-3 60		624	12	636
Q-4 60				
Q-1 61		318	6	324
TOTAL	110	5507	22	5529

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	37.5	6362	4.366	27779	28944	56723
Q-2 58						
Q-3 58	268.5	45069	4.153	187177	178709	365886
Q-4 58						
Q-1 59	480.0	81982	4.041	331270	281781	613051
Q-2 59						
Q-3 59	766.0	134772	3.990	537695	482324	1020019
Q-4 59						
Q-1 60	439.5	76161	4.500	342727	285751	628478
Q-2 60						
Q-3 60	261.0	43829	5.126	224667	162442	387109
Q-4 60						
Q-1 61	711.0	121415	4.611	559884	411127	971011
Q-2 61						
Q-3 61	465.0	84321	4.946	417049	394373	811422
Q-4 61						
Q-1 62	568.5	97120	4.889	474802	445274	920076
Q-2 62						
Q-3 62	82.5	13964	3.695	51593	83562	135155
Q-4 62						
Q-1 63	126.0	21447	3.968	85103	109913	195016
Q-2 63						
Q-3 63	358.5	60266	4.938	297622	358013	655635
Q-4 63						
Q-1 64	484.5	82746	5.303	438769	495185	933954
Q-2 64						
Q-3 64	306.0	53903	5.723	308480	357233	665713
Q-4 64						
Q-1 65	3499.5	606473	3.928	2382221	3147075	5529296
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	216.0	36210	5.003	181160	258523	439683
Q-4 65						
Q-1 66	61.5	10691	2.809	30026	44909	74935
Q-2 66						
Q-3 66	24.0	3969	4.031	16000	36121	52121
TOTAL	9155.5	1580700		6894024	7561259	14455283

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	240	7.238	1737	295	2032
Q-4 61						
Q-1 62	40.0	6783	3.052	20699	24301	45000
Q-2 62						
Q-3 62	309.0	52028	3.027	157511	204229	361740
Q-4 62						
Q-1 63	342.0	58394	3.134	183018	231964	414982
Q-2 63						
Q-3 63	188.5	31620	3.315	104820	140106	244926
Q-4 63						
Q-1 64	189.0	32299	3.573	115404	139808	255212
Q-2 64						
Q-3 64	124.5	21951	3.717	81602	94090	175692
Q-4 64						
Q-1 65	36.0	6363	4.182	26613	27484	54097
Q-2 65						
Q-3 65	39.0	6604	3.421	22590	34661	57251
Q-4 65						
Q-1 66	31.5	5502	4.199	23102	32705	55807
Q-2 66						
Q-3 66	16.5	2775	3.496	9702	14054	23756
TOTAL	1317.5	224559		746798	943697	1690495

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		4	2.000	8	14	22
Q-2 58						
Q-3 58		60	2.850	171	234	405
Q-4 58						
Q-1 59	130.5	22345	2.727	60941	82672	143613
Q-2 59						
Q-3 59	82.5	14530	2.746	39899	62118	102017
Q-4 59						
Q-1 60	10.0	1687	2.871	4844	6611	11455
Q-2 60						
Q-3 60					-389	-389
Q-4 60						
Q-1 61		8	3.250	26	30	56
Q-2 61						
Q-3 61		11	2.455	27	42	69
Q-4 61						
Q-1 62	42.0	7117	5.006	35625	32881	68506
Q-2 62						
Q-3 62	546.0	91772	4.996	458493	447996	906489
Q-4 62						
Q-1 63	501.0	85585	5.237	448246	460787	909033
Q-2 63						
Q-3 63	241.5	40571	5.167	209630	208564	418194
Q-4 63						
Q-1 64	9.0	1444	3.111	4492	7235	11727
Q-2 64						
Q-3 64	4.5	689	3.376	2326	3375	5701
Q-4 64						
Q-1 65	21.0	3699	3.431	12691	18918	31609
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	9.0	1425	3.286	4683	6909	11592
Q-4 65						
Q-1 66	1.5	277	4.170	1155	1649	2804
Q-2 66						
Q-3 66	6.0	1098	3.470	3810	5996	9806
TOTAL	1604.5	272322		1287067	1345642	2632709

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	4.5	751	3.688	2770	330	3100
Q-2 62						
Q-3 62	7.5	1272	3.106	3951	1073	5024
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	15.0	2616	4.043	10576	7391	17967
Q-4 63						
Q-1 64	7.5	1156	3.548	4102	5478	9580
Q-2 64						
Q-3 64	3.0	528	3.371	1780	2432	4212
Q-4 64						
Q-1 65	1.5	386	3.443	1329	1821	3150
Q-2 65						
Q-3 65	3.0	470	3.311	1556	2174	3730
Q-4 65						
Q-1 66	3.0	449	3.666	1646	2427	4073
Q-2 66						
Q-3 66	1.5	230	3.657	841	1099	1940
TOTAL	46.5	7858		28551	24225	52776

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		4	2.250	9		9
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59		40	3.475	139		139
Q-4 59						
Q-1 60		9	3.889	35		35
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62	1.5	273	3.209	876		876
Q-2 62						
Q-3 62	12.0	1976	3.121	6167		6167
Q-4 62						
Q-1 63	12.0	2155	3.779	8143		8143
Q-2 63						
Q-3 63	7.5	1344	2.720	3656		3656
Q-4 63						
Q-1 64	18.0	3065	3.470	10636		10636
Q-2 64						
Q-3 64	12.0	2178	3.495	7612		7612
Q-4 64						
Q-1 65	6.0	1106	3.610	3993		3993
Q-2 65						
Q-3 65	6.0	1071	3.740	4006		4006
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66	4.5	907	4.260	3864		3864
Q-2 66						
Q-3 66	4.5	738	4.640	3424		3424
TOTAL	84.0	14866		52560		52560

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	37.5	6366	4.365	27787	28958	56745	
Q-2 58							
Q-3 58	268.5	45133	4.151	187357	178943	366300	5
Q-4 58							
Q-1 59	610.5	104327	3.759	392211	364453	756664	16997
Q-2 59							
Q-3 59	848.5	149342	3.869	577733	544442	1122175	5253
Q-4 59							
Q-1 60	449.5	77857	4.465	347606	292362	639968	1150
Q-2 60							
Q-3 60	261.0	43829	5.126	224667	162053	386720	5
Q-4 60							
Q-1 61	711.0	121423	4.611	559910	411157	971067	-12
Q-2 61							
Q-3 61	466.5	84572	4.952	418813	394710	813523	441
Q-4 61							
Q-1 62	656.5	112044	4.773	534772	502786	1037558	-4
Q-2 62							
Q-3 62	957.0	161012	4.209	677715	736860	1414575	975
Q-4 62							
Q-1 63	981.0	167581	4.323	724510	802664	1527174	53198
Q-2 63							
Q-3 63	811.0	136417	4.591	626304	714074	1340378	42977
Q-4 63							
Q-1 64	708.0	120710	4.750	573403	647706	1221109	29476
Q-2 64							
Q-3 64	450.0	79249	5.070	401800	457130	858930	7130
Q-4 64							
Q-1 65	3564.0	618027	3.927	2426847	3195298	5622145	9121
Q-2 65							
Q-3 65	273.0	45780	4.674	213995	302267	516262	45797
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	102.0	17826	3.354	59793	81690	141483	1150
Q-2 66							
Q-3 66	52.5	8810	3.834	33777	57270	91047	2931
TOTAL	12208.0	2100305		9009000	9874823	18883823	216590

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58					56745		56745
Q-2 58							
Q-3 58		5			366305		366305
Q-4 58							
Q-1 59		16997	1379		775040		775040
Q-2 59							
Q-3 59		5253	445	4629	1132502		1132502
Q-4 59							
Q-1 60		1150	150	9366	650634	12397	663031
Q-2 60							
Q-3 60		5		3025	389750	7426	397176
Q-4 60							
Q-1 61		-12	-1	7379	978433	18182	996615
Q-2 61							
Q-3 61		441	37	4277	818278	15206	833484
Q-4 61							
Q-1 62	10523	10519	829	3063	1051969	17657	1069626
Q-2 62							
Q-3 62	166760	167735	13216	7687	1603213	26910	1630123
Q-4 62							
Q-1 63	328048	381246	37552	6417	1952389	32627	1985016
Q-2 63							
Q-3 63	446157	489134	48179	6715	1884406	31507	1915913
Q-4 63							
Q-1 64	275255	304731	32484	4632	1562956	33256	1596212
Q-2 64							
Q-3 64	110990	118120	42972	3114	1023136	21771	1044907
Q-4 64							
Q-1 65	74758	83879	25088	21	5731133	152906	5884039
Q-2 65							
Q-3 65	49653	95450	17028	157	628897	16779	645676
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 50
GSE BASIC

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66	45444	46594	9664	43	197784	5956	203740
Q-2 66							
Q-3 66	70861	73792	4538	79	169456	5103	174559
TOTAL	1578449	1795039	233560	60604	20973026	397683	21370709

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 51
GSE MAINTENANCE

		DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		83812	83812
LABOR AT $ 5.258		440678	440678
ENGR BURDEN AT $ 6.150		515432	515432
SHOP SUPPORT		21443	21443
LABOR AT $ 4.450		95429	95429
TEST/QC		4891	4891
LABOR AT $ 3.682		18007	18007
MFG BURDEN AT $ 4.837		127366	127366
ENGR MATERIAL		7532	7532
MPC		1865	1866
SUB-TOTAL		1206310	1206310
GEN & ADMIN		26637	26637
TOTAL COST		1232947	1232947

TIME-PHASED COST
DETAIL-SEE PAGE II-538

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 51 GSE MAINTENANCE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	6.0	1074	4.397	4722	4882	9604
Q-2 58						
Q-3 58	27.0	4542	4.325	19643	17790	37433
Q-4 58						
Q-1 59	36.0	6189	4.276	26462	21375	47837
Q-2 59						
Q-3 59	24.0	4322	4.313	18640	15799	34439
Q-4 59						
Q-1 60		38	6.395	243	142	385
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	39.0	6669	4.837	32257	29208	61465
Q-4 63						
Q-1 64	56.0	9598	3.427	32890	69206	102096
Q-2 64						
Q-3 64	66.0	11735	4.142	48612	73874	122486
Q-4 64						
Q-1 65	87.0	15092	5.662	85458	100019	185477
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
5-SUBSYSTEM 51 GSE MAINTENANCE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	190.5	32030	5.006	160349	209981	370330
Q-4 65						
Q-1 66	-100.5	-17414	3.231	-56264	-130859	-187123
Q-2 66						
Q-3 66	58.5	9937	6.809	67666	104015	171681
TOTAL	489.5	83812		440678	515432	956110

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5 GSE MAINTENANCE
5-SUBSYSTEM 51
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58						
Q-2 58						
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60						
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	4.5	711	3.069	2182	2960	5142
Q-4 63						
Q-1 64	4.5	859	3.217	2763	12599	15362
Q-2 64						
Q-3 64	21.0	3734	3.554	13272	31776	45048
Q-4 64						
Q-1 65	19.5	3315	4.111	13627	16274	29901
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 SHOP SUPPORT
5-SUBSYSTEM 51 GSE MAINTENANCE
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	33.0	5594	4.769	26676	26149	52825
Q-4 65						
Q-1 66	27.0	4725	5.156	24363	25566	49929
Q-2 66						
Q-3 66	15.0	2505	5.008	12546	12042	24588
TOTAL	124.5	21443		95429	127366	222795

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5 GSE MAINTENANCE
5-SUBSYSTEM 51
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 63		10	3.100	31		31
Q-4 63						
Q-1 64	10.5	1788	3.629	6489		6489
Q-2 64						
Q-3 64	16.5	2910	3.713	10804		10804
Q-4 64						
Q-1 65	1.5	139	3.705	515		515
Q-2 65						
Q-3 65		33	3.909	129		129
Q-4 65						
Q-1 66		6	3.667	22		22
Q-2 66						
Q-3 66		5	3.400	17		17
TOTAL	28.5	4891		18007		18007

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 51
GSE MAINTENANCE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	6.0	1074	4.397	4722	4882	9604	
Q-2 58							
Q-3 58	27.0	4542	4.325	19643	17790	37433	
Q-4 58							
Q-1 59	36.0	6189	4.276	26462	21375	47837	
Q-2 59							
Q-3 59	24.0	4322	4.313	18640	15799	34439	
Q-4 59							
Q-1 60		38	6.395	243	142	385	
Q-2 60							
Q-3 60							
Q-4 60							
Q-1 61							
Q-2 61							
Q-3 61							
Q-4 61							
Q-1 62							
Q-2 62							
Q-3 62							
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63	43.5	7390	4.664	34470	32168	66638	262
Q-4 63							
Q-1 64	71.0	12245	3.442	42142	81805	123947	458
Q-2 64							
Q-3 64	103.5	18379	3.955	72688	105650	178338	751
Q-4 64							
Q-1 65	108.0	18546	5.370	99600	116293	215893	2381
Q-2 65							
Q-3 65	223.5	37657	4.970	187154	236130	423284	1357
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 51
GSE MAINTENANCE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	-73.5	-12683	2.514	-31879	-105293	-137172	1343
Q-2 66							
Q-3 66	73.5	12447	6.446	80229	116057	196286	980
TOTAL	642.5	110146		554114	642798	1196912	7532

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 51
GSE MAINTENANCE

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-1 58		9604		9604
Q-2 58				
Q-3 58		37433		37433
Q-4 58				
Q-1 59		47837		47837
Q-2 59				
Q-3 59		34439		34439
Q-4 59				
Q-1 60		385	7	392
Q-2 60				
Q-3 60				
Q-4 60				
Q-1 61				
Q-2 61				
Q-3 61				
Q-4 61				
Q-1 62				
Q-2 62				
Q-3 62				
Q-4 62				
Q-1 63				
Q-2 63				
Q-3 63	26	66926	1119	68045
Q-4 63				
Q-1 64	45	124450	2648	127098
Q-2 64				
Q-3 64	80	179169	3812	182981
Q-4 64				
Q-1 65	866	219140	5847	224987
Q-2 65				
Q-3 65	406	425047	11340	436387
Q-4 65				

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
5-SUBSYSTEM 51
GSE MAINTENANCE

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-1 66	240	-135589	-4083	-139672
Q-2 66				
Q-3 66	203	197469	5947	203416
TOTAL	1866	1206310	26637	1232947

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TEST /QC HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		1660546	3854	112	1664512
LABOR AT $ 4.407		7317658	16586	458	7334702
ENGR BURDEN AT $ 4.852		8055532	20734	425	8076691
PRODUCTION			224559		224559
LABOR AT $ 3.326			746798		746798
SHOP SUPPORT		293403		362	293765
LABOR AT $ 4.706		1381456		1040	1382496
PLANNING			7858		7858
LABOR AT $ 3.633			28551		28551
TEST/QC		5605	14138	14	19757
LABOR AT $ 3.572		20717	49785	65	70567
MFG BURDEN AT $ 4.471		1471631	967922	1377	2440930
ENGR MATERIAL		222090		2032	224122
MFG MATERIAL			1578449		1578449
MPC		30368	204948	110	235426
OTHER COST		60550	54		60604
SUB-TOTAL		18560002	3613827	5507	22179336
GEN & ADMIN		353723	70575	22	424320
TOTAL COST		18913725	3684402	5529	22603656

TIME-PHASED COST DETAIL - SEE PAGE II-548 II-558 II-564 II-569

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	45.0	7436	4.371	32501	33826	66327
Q-2 58						
Q-3 58	295.5	49611	4.169	206820	196499	403319
Q-4 58						
Q-1 59	516.0	88171	4.057	357732	303156	660888
Q-2 59						
Q-3 59	790.5	139094	4.000	556335	498123	1054458
Q-4 59						
Q-1 60	439.5	76199	4.501	342970	285893	628863
Q-2 60						
Q-3 60	261.0	43754	5.127	224326	162162	386488
Q-4 60						
Q-1 61	711.0	121378	4.612	559767	410982	970749
Q-2 61						
Q-3 61	465.0	84321	4.946	417049	394373	811422
Q-4 61						
Q-1 62	568.5	97112	4.889	474778	445240	920018
Q-2 62						
Q-3 62	82.5	13826	3.700	51159	82978	134137
Q-4 62						
Q-1 63	126.0	21483	3.967	85223	109934	195157
Q-2 63						
Q-3 63	389.5	65409	4.943	323332	380113	703445
Q-4 63						
Q-1 64	534.0	91206	5.113	466366	557661	1024027
Q-2 64						
Q-3 64	370.5	65237	5.451	355594	428850	784444
Q-4 64						
Q-1 65	3585.0	621290	3.970	2466474	3245264	5711738
Q-2 65						
Q-3 65	405.0	68072	5.005	340686	467419	808105

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	-39.0	-6836	3.903	-26681	-86594	-113275
Q-2 66						
Q-3 66	82.5	13783	6.038	83227	139653	222880
TOTAL	9628.0	1660546		7317658	8055532	15373190

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		4	2.000	8	14	22
Q-2 58						
Q-3 58		36	3.278	118	146	264
Q-4 58						
Q-1 59	130.5	22157	2.725	60370	81977	142347
Q-2 59						
Q-3 59	82.5	14425	2.748	39643	61617	101260
Q-4 59						
Q-1 60	9.0	1650	2.855	4710	6545	11255
Q-2 60						
Q-3 60					-386	-386
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61		11	2.455	27	42	69
Q-4 61						
Q-1 62	42.0	7117	5.006	35625	32881	68506
Q-2 62						
Q-3 62	546.0	91772	4.996	458493	447996	906489
Q-4 62						
Q-1 63	501.0	85585	5.237	448246	460787	909033
Q-2 63						
Q-3 63	246.0	41282	5.131	211812	211524	423336
Q-4 63						
Q-1 64	13.5	2303	3.150	7255	19834	27089
Q-2 64						
Q-3 64	25.5	4423	3.527	15598	35151	50749
Q-4 64						
Q-1 65	40.5	7014	3.752	26318	35192	61510
Q-2 65						
Q-3 65	42.0	7019	4.468	31359	33058	64417

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 SHOP SUPPORT GROUND SUPPORT EQUIPMENT
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	28.5	5002	5.102	25518	27215	52733
Q-2 66						
Q-3 66	21.0	3603	4.540	16356	18038	34394
TOTAL	1728.0	293403		1381456	1471631	2853087

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC GROUND SUPPORT EQUIPMENT
4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		4	2.250	9		9
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59		26	2.846	74		74
Q-4 59						
Q-1 60		9	3.889	35		35
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63		47	4.681	220		220
Q-2 63						
Q-3 63		36	4.806	173		173
Q-4 63						
Q-1 64	10.5	1858	3.615	6716		6716
Q-2 64						
Q-3 64	16.5	2941	3.707	10903		10903
Q-4 64						
Q-1 65	3.0	450	3.793	1707		1707
Q-2 65						
Q-3 65	1.0	125	3.560	445		445
Q-4 65						
Q-1 66		35	4.229	148		148

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC GROUND SUPPORT EQUIPMENT
4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-2 66						
Q-3 66		74	3.878	287		287
TOTAL	31.0	5605		20717		20717

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

GROUND SUPPORT EQUIPMENT

4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	45.0	7440	4.369	32509	33840	66349	
Q-2 58							
Q-3 58	295.5	49651	4.168	206947	196645	403592	
Q-4 58							
Q-1 59	646.5	110328	3.790	418102	385133	803235	14981
Q-2 59							
Q-3 59	873.0	153545	3.882	596052	559740	1155792	5254
Q-4 59							
Q-1 60	448.5	77858	4.466	347715	292438	640153	1144
Q-2 60							
Q-3 60	261.0	43754	5.127	224326	161776	386102	-1
Q-4 60							
Q-1 61	711.0	121378	4.612	559767	410982	970749	-12
Q-2 61							
Q-3 61	465.0	84332	4.946	417076	394415	811491	441
Q-4 61							
Q-1 62	610.5	104229	4.897	510403	478121	988524	-4
Q-2 62							
Q-3 62	628.5	105598	4.826	509652	530974	1040626	975
Q-4 62							
Q-1 63	627.0	107115	4.982	533689	570721	1104410	53198
Q-2 63							
Q-3 63	635.5	106727	5.016	535317	591637	1126954	43239
Q-4 63							
Q-1 64	558.0	95367	5.037	480337	577495	1057832	29934
Q-2 64							
Q-3 64	412.5	72601	5.263	382095	464001	846096	7881
Q-4 64							
Q-1 65	3628.5	628754	3.967	2494499	3280456	5774955	11502
Q-2 65							
Q-3 65	448.0	75216	4.952	372490	500477	872967	47154
Q-4 65							
Q-1 66	-10.5	-1799	.564	-1015	-59379	-60394	2493

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

GROUND SUPPORT EQUIPMENT

4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	103.5	17460	5.720	99870	157691	257561	3911
TOTAL	11387.0	1959554		8719831	9527163	18246994	222090

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

GROUND SUPPORT EQUIPMENT

4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			66349		66349
Q-2 58					
Q-3 58			403592		403592
Q-4 58					
Q-1 59	1269		819485		819485
Q-2 59					
Q-3 59	445	4629	1166120		1166120
Q-4 59					
Q-1 60	150	9366	650813	12400	663213
Q-2 60					
Q-3 60		3025	389126	7414	396540
Q-4 60					
Q-1 61	-1	7379	978115	18176	996291
Q-2 61					
Q-3 61	37	4277	816246	15168	831414
Q-4 61					
Q-1 62		2608	991128	16636	1007764
Q-2 62					
Q-3 62	76	7757	1049434	17615	1067049
Q-4 62					
Q-1 63	5240	5638	1168486	19520	1188006
Q-2 63					
Q-3 63	4259	7851	1182303	19768	1202071
Q-4 63					
Q-1 64	3187	4616	1095569	23311	1118880
Q-2 64					
Q-3 64	2674	3108	859759	18294	878053
Q-4 64					
Q-1 65	3594	17	5790068	154479	5944547
Q-2 65					
Q-3 65	8576	157	928854	24782	953636
Q-4 65					
Q-1 66	479	43	-57379	-1728	-59107

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

GROUND SUPPORT EQUIPMENT

4-SYSTEM 5
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66					
Q-3 66	383	79	261934	7888	269822
TOTAL	30368	60550	18560002	353723	18913725

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		8	3.000	24	34	58
Q-2 62						
Q-3 62	1.5	138	3.145	434	584	1018
Q-4 62						
Q-1 63		-36	3.333	-120	-21	-141
Q-2 63						
Q-3 63	9.0	1526	4.290	6547	7108	13655
Q-4 63						
Q-1 64	6.0	1138	4.651	5293	6730	12023
Q-2 64						
Q-3 64	3.0	401	3.736	1498	2257	3755
Q-4 64						
Q-1 65	1.5	275	4.382	1205	1830	3035
Q-2 65						
Q-3 65	1.5	168	4.899	823	1085	1908
Q-4 65						
Q-1 66		113	3.920	443	644	1087
Q-2 66						
Q-3 66		123	3.569	439	483	922
TOTAL	22.5	3854		16586	20734	37320

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	240	7.238	1737	295	2032
Q-4 61						
Q-1 62	40.0	6783	3.052	20699	24301	45000
Q-2 62						
Q-3 62	309.0	52028	3.027	157511	204229	361740
Q-4 62						
Q-1 63	342.0	58394	3.134	183018	231964	414982
Q-2 63						
Q-3 63	188.5	31620	3.315	104820	140106	244926
Q-4 63						
Q-1 64	189.0	32299	3.573	115404	139808	255212
Q-2 64						
Q-3 64	124.5	21951	3.717	81602	94090	175692
Q-4 64						
Q-1 65	36.0	6363	4.182	26613	27484	54097
Q-2 65						
Q-3 65	39.0	6604	3.421	22590	34661	57251
Q-4 65						
Q-1 66	31.5	5502	4.199	23102	32705	55807
Q-2 66						
Q-3 66	16.5	2775	3.496	9702	14054	23756
TOTAL	1317.5	224559		746798	943697	1690495

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	4.5	751	3.688	2770	330	3100
Q-2 62						
Q-3 62	7.5	1272	3.106	3951	1073	5024
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	15.0	2616	4.043	10576	7391	17967
Q-4 63						
Q-1 64	7.5	1156	3.548	4102	5478	9580
Q-2 64						
Q-3 64	3.0	528	3.371	1780	2432	4212
Q-4 64						
Q-1 65	1.5	386	3.443	1329	1821	3150
Q-2 65						
Q-3 65	3.0	470	3.311	1556	2174	3730
Q-4 65						
Q-1 66	3.0	449	3.666	1646	2427	4073
Q-2 66						
Q-3 66	1.5	230	3.657	841	1099	1940
TOTAL	46.5	7858		28551	24225	52776

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	1.5	273	3.209	876		876
Q-2 62						
Q-3 62	12.0	1976	3.121	6167		6167
Q-4 62						
Q-1 63	12.0	2108	3.759	7923		7923
Q-2 63						
Q-3 63	7.5	1318	2.666	3514		3514
Q-4 63						
Q-1 64	18.0	2995	3.475	10409		10409
Q-2 64						
Q-3 64	12.0	2147	3.499	7513		7513
Q-4 64						
Q-1 65	4.5	795	3.523	2801		2801
Q-2 65						
Q-3 65	6.0	979	3.769	3690		3690
Q-4 65						
Q-1 66	4.5	878	4.257	3738		3738
Q-2 66						
Q-3 66	4.5	669	4.714	3154		3154
TOTAL	82.5	14138		49785		49785

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 61	1.5	240	7.238	1737	295	2032	
Q-4 61							
Q-1 62	46.0	7815	3.118	24369	24665	49034	10523
Q-2 62							
Q-3 62	330.0	55414	3.033	168063	205886	373949	166760
Q-4 62							
Q-1 63	354.0	60466	3.156	190821	231943	422764	328048
Q-2 63							
Q-3 63	220.0	37080	3.383	125457	154605	280062	446157
Q-4 63							
Q-1 64	220.5	37588	3.597	135208	152016	287224	275255
Q-2 64							
Q-3 64	142.5	25027	3.692	92393	98779	191172	110990
Q-4 64							
Q-1 65	43.5	7819	4.086	31948	31135	63083	74758
Q-2 65							
Q-3 65	49.5	8221	3.486	28659	37920	66579	49653
Q-4 65							
Q-1 66	39.0	6942	4.167	28929	35776	64705	45444
Q-2 66							
Q-3 66	22.5	3797	3.723	14136	15636	29772	70861
TOTAL	1469.0	250409		841720	988656	1830376	1578449

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK PRODUCTION

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 61			2032	38	2070
Q-4 61					
Q-1 62	829	455	60841	1021	61862
Q-2 62					
Q-3 62	13140	-70	553779	9295	563074
Q-4 62					
Q-1 63	32312	779	783903	13107	797010
Q-2 63					
Q-3 63	43946	-1136	769029	12858	781887
Q-4 63					
Q-1 64	29342	16	591837	12593	604430
Q-2 64					
Q-3 64	40378	6	342546	7289	349835
Q-4 64					
Q-1 65	22360	4	160205	4274	164479
Q-2 65					
Q-3 65	8858		125090	3337	128427
Q-4 65					
Q-1 66	9425		119574	3601	123175
Q-2 66					
Q-3 66	4358		104991	3162	108153
TOTAL	204948	54	3613827	70575	3684402

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5
SUBD OF WORK TEST/QC GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		75	4.547	341	280	621
Q-4 60						
Q-1 61		37	3.162	117	145	262
TOTAL		112		458	425	883

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 5
SUBD OF WORK TEST/QC GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		24	2.208	53	88	141
Q-4 58						
Q-1 59	1.5	188	3.037	571	695	1266
Q-2 59						
Q-3 59		105	2.438	256	501	757
Q-4 59						
Q-1 60		37	3.622	134	66	200
Q-2 60						
Q-3 60					-3	-3
Q-4 60						
Q-1 61		8	3.250	26	30	56
TOTAL	1.5	362		1040	1377	2417

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC
SUBD OF WORK 5 TEST/QC

GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		14	4.643	65		65
TOTAL		14		65		65

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK TEST/QC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 58		24	2.208	53	88	141	5
Q-4 58							
Q-1 59	1.5	188	3.037	571	695	1266	2016
Q-2 59							
Q-3 59		119	2.697	321	501	822	-1
Q-4 59							
Q-1 60		37	3.622	134	66	200	6
Q-2 60							
Q-3 60		75	4.547	341	277	618	6
Q-4 60							
Q-1 61		45	3.178	143	175	318	
TOTAL	1.5	488		1563	1802	3365	2032

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 GROUND SUPPORT EQUIPMENT
SUBD OF WORK TEST/QC

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 58		146		146
Q-4 58				
Q-1 59	110	3392		3392
Q-2 59				
Q-3 59		821		821
Q-4 59				
Q-1 60		206	4	210
Q-2 60				
Q-3 60		624	12	636
Q-4 60				
Q-1 61		318	6	324
TOTAL	110	5507	22	5529

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	45.0	7436	4.371	32501	33826	66327
Q-2 58						
Q-3 58	295.5	49611	4.169	206820	196499	403319
Q-4 58						
Q-1 59	516.0	88171	4.057	357732	303156	660888
Q-2 59						
Q-3 59	790.5	139094	4.000	556335	498123	1054458
Q-4 59						
Q-1 60	439.5	76199	4.501	342970	285893	628863
Q-2 60						
Q-3 60	261.0	43829	5.126	224667	162442	387109
Q-4 60						
Q-1 61	711.0	121415	4.611	559884	411127	971011
Q-2 61						
Q-3 61	465.0	84321	4.946	417049	394373	811422
Q-4 61						
Q-1 62	568.5	97120	4.889	474802	445274	920076
Q-2 62						
Q-3 62	82.5	13964	3.695	51593	83562	135155
Q-4 62						
Q-1 63	126.0	21447	3.968	85103	109913	195016
Q-2 63						
Q-3 63	398.5	66935	4.928	329879	387221	717100
Q-4 63						
Q-1 64	541.5	92344	5.108	471659	564391	1036050
Q-2 64						
Q-3 64	373.5	65638	5.440	357092	431107	788199
Q-4 64						
Q-1 65	3586.5	621565	3.970	2467679	3247094	5714773
Q-2 65						
Q-3 65	406.5	68240	5.005	341509	468504	810013
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING

4-SYSTEM 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66	-39.0	-6723	3.903	-26238	-85950	-112188
Q-2 66						
Q-3 66	82.5	13906	6.017	83666	140136	223802
TOTAL	9650.5	1664512		7334702	8076691	15411393

C-7.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	240	7.238	1737	295	2032
Q-4 61						
Q-1 62	40.0	6783	3.052	20699	24301	45000
Q-2 62						
Q-3 62	309.0	52028	3.027	157511	204229	361740
Q-4 62						
Q-1 63	342.0	58394	3.134	183018	231964	414982
Q-2 63						
Q-3 63	188.5	31620	3.315	104820	140106	244926
Q-4 63						
Q-1 64	189.0	32299	3.573	115404	139808	255212
Q-2 64						
Q-3 64	124.5	21951	3.717	81602	94090	175692
Q-4 64						
Q-1 65	36.0	6363	4.182	26613	27484	54097
Q-2 65						
Q-3 65	39.0	6604	3.421	22590	34661	57251
Q-4 65						
Q-1 66	31.5	5502	4.199	23102	32705	55807
Q-2 66						
Q-3 66	16.5	2775	3.496	9702	14054	23756
TOTAL	1317.5	224559		746798	943697	1690495

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5 SHOP SUPPORT GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		4	2.000	8	14	22
Q-2 58						
Q-3 58		60	2.850	171	234	405
Q-4 58						
Q-1 59	130.5	22345	2.727	60941	82672	143613
Q-2 59						
Q-3 59	82.5	14530	2.746	39899	62118	102017
Q-4 59						
Q-1 60	10.0	1687	2.871	4844	6611	11455
Q-2 60						
Q-3 60					-389	-389
Q-4 60						
Q-1 61		8	3.250	26	30	56
Q-2 61						
Q-3 61		11	2.455	27	42	69
Q-4 61						
Q-1 62	42.0	7117	5.006	35625	32881	68506
Q-2 62						
Q-3 62	546.0	91772	4.996	458493	447996	906489
Q-4 62						
Q-1 63	501.0	85585	5.237	448246	460787	909033
Q-2 63						
Q-3 63	246.0	41282	5.131	211812	211524	423336
Q-4 63						
Q-1 64	13.5	2303	3.150	7255	19834	27089
Q-2 64						
Q-3 64	25.5	4423	3.527	15598	35151	50749
Q-4 64						
Q-1 65	40.5	7014	3.752	26318	35192	61510
Q-2 65						
Q-3 65	42.0	7019	4.468	31359	33058	64417
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66	28.5	5002	5.102	25518	27215	52733
Q-2 66						
Q-3 66	21.0	3603	4.540	16356	18038	34394
TOTAL	1729.0	293765		1382496	1473008	2855504

C-11

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	4.5	751	3.688	2770	330	3100
Q-2 62						
Q-3 62	7.5	1272	3.106	3951	1073	5024
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	15.0	2616	4.043	10576	7391	17967
Q-4 63						
Q-1 64	7.5	1156	3.548	4102	5478	9580
Q-2 64						
Q-3 64	3.0	528	3.371	1780	2432	4212
Q-4 64						
Q-1 65	1.5	386	3.443	1329	1821	3150
Q-2 65						
Q-3 65	3.0	470	3.311	1556	2174	3730
Q-4 65						
Q-1 66	3.0	449	3.666	1646	2427	4073
Q-2 66						
Q-3 66	1.5	230	3.657	841	1099	1940
TOTAL	46.5	7858		28551	24225	52776

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58		4	2.250	9		9
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59		40	3.475	139		139
Q-4 59						
Q-1 60		9	3.889	35		35
Q-2 60						
Q-3 60						
Q-4 60						
Q-1 61						
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62	1.5	273	3.209	876		876
Q-2 62						
Q-3 62	12.0	1976	3.121	6167		6167
Q-4 62						
Q-1 63	12.0	2155	3.779	8143		8143
Q-2 63						
Q-3 63	7.5	1354	2.723	3687		3687
Q-4 63						
Q-1 64	28.5	4853	3.529	17125		17125
Q-2 64						
Q-3 64	28.5	5088	3.619	18416		18416
Q-4 64						
Q-1 65	7.5	1245	3.621	4508		4508
Q-2 65						
Q-3 65	6.0	1104	3.745	4135		4135
Q-4 65						
Q-1 66	6.0	913	4.256	3886		3886
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 5 GROUND SUPPORT EQUIPMENT

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 66	4.5	743	4.631	3441		3441
TOTAL	114.0	19757		70567		70567

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	45.0	7440	4.369	32509	33840	66349	
Q-2 58							
Q-3 58	295.5	49675	4.167	207000	196733	403733	5
Q-4 58							
Q-1 59	646.5	110516	3.788	418673	385828	804501	16997
Q-2 59							
Q-3 59	873.0	153664	3.881	596373	560241	1156614	5253
Q-4 59							
Q-1 60	449.5	77895	4.466	347849	292504	640353	1150
Q-2 60							
Q-3 60	261.0	43829	5.126	224667	162053	386720	5
Q-4 60							
Q-1 61	711.0	121423	4.611	559910	411157	971067	-12
Q-2 61							
Q-3 61	466.5	84572	4.952	418813	394710	813523	441
Q-4 61							
Q-1 62	656.5	112044	4.773	534772	502786	1037558	-4
Q-2 62							
Q-3 62	957.0	161012	4.209	677715	736860	1414575	975
Q-4 62							
Q-1 63	981.0	167581	4.323	724510	802664	1527174	53198
Q-2 63							
Q-3 63	855.5	143807	4.595	660774	746242	1407016	43239
Q-4 63							
Q-1 64	780.0	132955	4.630	615545	729511	1345056	29934
Q-2 64							
Q-3 64	555.0	97628	4.860	474488	562780	1037268	7881
Q-4 64							
Q-1 65	3672.0	636573	3.969	2526447	3311591	5838038	11502
Q-2 65							
Q-3 65	496.5	83437	4.808	401149	538397	939546	47154
Q-4 65							
Q-1 66	30.0	5143	5.428	27914	-23603	4311	2493

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	126.0	21257	5.363	114006	173327	287333	3911
TOTAL	12857.5	2210451		9563114	10517621	20080735	224122

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58					66349		66349
Q-2 58							
Q-3 58		5			403738		403738
Q-4 58							
Q-1 59		16997	1379		822877		822877
Q-2 59							
Q-3 59		5253	445	4629	1166941		1166941
Q-4 59							
Q-1 60		1150	150	9366	651019	12404	663423
Q-2 60							
Q-3 60		5		3025	389750	7426	397176
Q-4 60							
Q-1 61		-12	-1	7379	978433	18182	996615
Q-2 61							
Q-3 61		441	37	4277	818278	15206	833484
Q-4 61							
Q-1 62	10523	10519	829	3063	1051969	17657	1069626
Q-2 62							
Q-3 62	166760	167735	13216	7687	1603213	26910	1630123
Q-4 62							
Q-1 63	328048	381246	37552	6417	1952389	32627	1985016
Q-2 63							
Q-3 63	446157	489396	48205	6715	1951332	32626	1983958
Q-4 63							
Q-1 64	275255	305189	32529	4632	1687406	35904	1723310
Q-2 64							
Q-3 64	110990	118871	43052	3114	1202305	25583	1227888
Q-4 64							
Q-1 65	74758	86260	25954	21	5950273	158753	6109026
Q-2 65							
Q-3 65	49653	96807	17434	157	1053944	28119	1082063
Q-4 65							
Q-1 66	45444	47937	9904	43	62195	1873	64068

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 5
GROUND SUPPORT EQUIPMENT

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66							
Q-3 66	70861	74772	4741	79	366925	11050	377975
TOTAL	1578449	1802571	235426	60604	22179336	424320	22603656

SPARES WBS 6.0

Background

In conjunction with the approval of the master schedule revision W27R in late 1960, the authority to establish and begin procuring spare parts to support the XB-70 program was obtained. Limited activity had occurred prior to this time. This effort was restricted primarily to the study of spares requirements for the Weapon System 110A (RS-70) concept.

As a result of the program redirection the spares concept was drastically revised. Release of spares hardware requirements was not instigated until late 1960 - early 1961. During the intervening period between program redirection and early 1961, back-up or additional test units were being procured to support the engineering test activities. These units were not identified as spares.

In May 1964, at the time of Air Vehicle No. 1 roll-out, 13,743 air vehicle spare parts and 1,630 flight test ground support equipment spares had been identified.

Severe program funding limitations dictated that the XB-70 spares program be based on a "high risk" philosophy. This concept eliminated the procurement of "insurance type" items and emphasized the minimum procurement of high cost repairables while assuring maximum utilization of the available assets and production line support. Program emphasis was placed on expediting overhaul of repairables in contrast to procurement of additional units. In support of this concept, Air Vehicle No. 3 provided much of the spare parts utilized during the flight test portion of the program.

Cost Definition

Total recorded cost of $18,010,222 includes all in-house costs associated with the definition, identification and fabrication of air vehicle and ground support equipment spare parts. The costs do not reflect any charges accumulated against Air Vehicle No. 3 which was utilized in the spares program after the vehicle was cancelled in early 1964.

Excluded from this WBS item are the costs identified by the subsystem contractors as "Spares." These costs are included in the subsystems. The following table provides a recap of the spares costs by subsystem.

WBS 6.0

WBS	Title	Spares Cost*
1.1	Airframe Structures	$ 16,445
1.2	Environmental Control System	88,898
1.3	Propulsion System	344,210
1.4	Secondary Power System	2,025,156
1.5	Air Induction System	221,383
1.6	Flight Control System	70,430
1.8	Alighting and Arresting System	99,406
	Total	$2,865,928

Refer to the individual WBS items for identification of the specific supplier providing the cost detail.

* Cost reported do not include Material Procurement Cost or General and Administrative Burdens

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 6
SPARES

		5-SUBSYS 60	TOTAL
		HOURS	HOURS
		DOLLARS	DOLLARS
DESIGN/ENGINEERING		478239	478239
LABOR AT $ 3.516		1681648	1681648
ENGR BURDEN AT $ 5.172		2473632	2473632
PRODUCTION		735485	735485
LABOR AT $ 3.132		2303896	2303896
PLANNING		24444	24444
LABOR AT $ 3.071		75067	75067
TEST/QC		49983	49983
LABOR AT $ 3.287		164304	164304
MFG BURDEN AT $ 4.137		3350652	3350652
ENGR MATERIAL		12960	12960
MFG MATERIAL		6357812	6357812
MPC		862366	862366
OTHER COST		348211	348211
SUB-TOTAL		17630548	17630548
GEN & ADMIN		379674	379674
TOTAL COST		18010222	18010222

SUBDIVISION OF WORK
COST DETAIL -SEE PAGE II-584

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

			DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING			462245	15994	478239
LABOR AT $	3.516		1623848	57800	1681648
ENGR BURDEN AT $	5.172		2410694	62938	2473632
PRODUCTION				735485	735485
LABOR AT $	3.132			2303896	2303896
PLANNING				24444	24444
LABOR AT $	3.071			75067	75067
TEST/QC				49983	49983
LABOR AT $	3.287			164304	164304
MFG BURDEN AT $	4.137			3350652	3350652
ENGR MATERIAL			12960		12960
MFG MATERIAL				6357812	6357812
MPC			1538	860828	862366
OTHER COST			340115	8096	348211
SUB-TOTAL			4389155	13241393	17630548
GEN & ADMIN			90499	289175	379674
TOTAL COST			4479654	13530568	18010222

TIME-PHASED COST DETAIL-SEE PAGE II-585 II-589 II-595

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 6
5-SUBSYSTEM 60 SPARES BASIC
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59	21.0	3517	3.442	12105	13538	25643
Q-2 59						
Q-3 59	168.0	29646	3.381	100239	118019	218258
Q-4 59						
Q-1 60	115.5	19919	3.941	78501	86395	164896
Q-2 60						
Q-3 60	34.5	5679	4.459	25322	22893	48215
Q-4 60						
Q-1 61	204.0	34719	4.275	148427	138845	287272
Q-2 61						
Q-3 61	129.0	23461	3.659	85843	119167	205010
Q-4 61						
Q-1 62	136.5	23271	3.322	77299	98669	175968
Q-2 62						
Q-3 62	204.0	34219	3.103	106188	142157	248345
Q-4 62						
Q-1 63	261.0	44509	3.089	137487	204304	341791
Q-2 63						
Q-3 63	272.5	45741	3.155	144319	229120	373439
Q-4 63						
Q-1 64	267.0	45653	3.266	149104	240163	389267
Q-2 64						
Q-3 64	210.0	36888	3.479	128324	207198	335522
Q-4 64						
Q-1 65	205.5	35739	3.669	131117	229207	360324
Q-2 65						
Q-3 65	175.5	29518	3.693	109015	191353	300368
Q-4 65						
Q-1 66	169.5	29341	3.780	110911	227536	338447
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 6
5-SUBSYSTEM 60 SPARES BASIC
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 66	121.5	20425	3.899	79647	142130	221777
TOTAL	2695.0	462245		1623848	2410694	4034542

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6 SPARES BASIC
5-SUBSYSTEM 60
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 59	21.0	3517	3.442	12105	13538	25643	
Q-2 59							
Q-3 59	168.0	29646	3.381	100239	118019	218258	
Q-4 59							
Q-1 60	115.5	19919	3.941	78501	86395	164896	
Q-2 60							
Q-3 60	34.5	5679	4.459	25322	22893	48215	
Q-4 60							
Q-1 61	204.0	34719	4.275	148427	138845	287272	
Q-2 61							
Q-3 61	129.0	23461	3.659	85843	119167	205010	372
Q-4 61							
Q-1 62	136.5	23271	3.322	77299	98669	175968	253
Q-2 62							
Q-3 62	204.0	34219	3.103	106188	142157	248345	7021
Q-4 62							
Q-1 63	261.0	44509	3.089	137487	204304	341791	2304
Q-2 63							
Q-3 63	272.5	45741	3.155	144319	229120	373439	162
Q-4 63							
Q-1 64	267.0	45653	3.266	149104	240163	389267	557
Q-2 64							
Q-3 64	210.0	36888	3.479	128324	207198	335522	79
Q-4 64							
Q-1 65	205.5	35739	3.669	131117	229207	360324	1676
Q-2 65							
Q-3 65	175.5	29518	3.693	109015	191353	300368	259
Q-4 65							
Q-1 66	169.5	29341	3.780	110911	227536	338447	277
Q-2 66							
Q-3 66	121.5	20425	3.899	79647	142130	221777	
TOTAL	2695.0	462245		1623848	2410694	4034542	12960

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6 SPARES BASIC
5-SUBSYSTEM 60
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 59			25643		25643
Q-2 59					
Q-3 59			218258		218258
Q-4 59					
Q-1 60		1814	166710	3176	169886
Q-2 60					
Q-3 60		377	48592	926	49518
Q-4 60					
Q-1 61		3247	290519	5399	295918
Q-2 61					
Q-3 61	31	924	206337	3834	210171
Q-4 61					
Q-1 62	20	3234	179475	3012	182487
Q-2 62					
Q-3 62	553	19377	275296	4620	279916
Q-4 62					
Q-1 63	227	41263	385585	6447	392032
Q-2 63					
Q-3 63	16	36073	409690	6850	416540
Q-4 63					
Q-1 64	59	29996	419879	8934	428813
Q-2 64					
Q-3 64	28	34572	370201	7877	378078
Q-4 64					
Q-1 65	501	34352	396853	10588	407441
Q-2 65					
Q-3 65	46	37875	338548	9032	347580
Q-4 65					
Q-1 66	57	55258	394039	11867	405906
Q-2 66					
Q-3 66		41753	263530	7937	271467
TOTAL	1538	340115	4389155	90499	4479654

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 6
5-SUBSYSTEM 60 SPARES BASIC
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 62		64	4.016	257	313	570
Q-4 62						
Q-1 63		102	3.588	366	589	955
Q-2 63						
Q-3 63	1.5	302	4.063	1227	1709	2936
Q-4 63						
Q-1 64	3.0	537	3.724	2000	2878	4878
Q-2 64						
Q-3 64	3.0	600	3.880	2328	3823	6151
Q-4 64						
Q-1 65	3.0	432	3.694	1596	2030	3626
Q-2 65						
Q-3 65	18.0	2938	3.563	10469	11121	21590
Q-4 65						
Q-1 66	28.5	5027	3.523	17710	18180	35890
Q-2 66						
Q-3 66	36.0	5992	3.646	21847	22295	44142
TOTAL	93.0	15994		57800	62938	120738

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 6
5-SUBSYSTEM 60
SUBD OF WORK PRODUCTION

SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	295.5	50531	2.960	149563	196879	346442
Q-2 62						
Q-3 62	1521.0	255447	3.046	778023	1032722	1810745
Q-4 62						
Q-1 63	793.5	135421	3.074	416283	569572	985855
Q-2 63						
Q-3 63	378.0	63592	3.524	224097	299878	523975
Q-4 63						
Q-1 64	243.0	41397	3.289	136171	203517	339688
Q-2 64						
Q-3 64	177.0	31145	3.484	108506	140943	249449
Q-4 64						
Q-1 65	327.0	56566	3.510	198552	256773	455325
Q-2 65						
Q-3 65	177.0	29613	3.363	99598	149807	249405
Q-4 65						
Q-1 66	169.5	29336	1.645	48246	211038	259284
Q-2 66						
Q-3 66	252.0	42437	3.413	144857	219101	363958
TOTAL	4333.5	735485		2303896	3280230	5584126

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 6 SPARES BASIC
5-SUBSYSTEM 60
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	294	2.707	796		796
Q-4 61						
Q-1 62	21.0	3693	2.706	9994		9994
Q-2 62						
Q-3 62	31.5	5285	2.608	13785		13785
Q-4 62						
Q-1 63		11	3.727	41		41
Q-2 63						
Q-3 63	40.5	6837	3.651	24965	30063	55028
Q-4 63						
Q-1 64	9.0	1536	3.068	4713	7512	12225
Q-2 64						
Q-3 64	9.0	1505	2.950	4440	7227	11667
Q-4 64						
Q-1 65	12.0	2140	3.043	6512	10100	16612
Q-2 65						
Q-3 65	7.5	1314	3.012	3958	6045	10003
Q-4 65						
Q-1 66	6.0	1018	3.128	3184	5483	8667
Q-2 66						
Q-3 66	4.5	811	3.303	2679	3992	6671
TOTAL	142.5	24444		75067	70422	145489

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 6 **SPARES BASIC**
5-SUBSYSTEM 60
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	9.0	1423	2.984	4246		4246
Q-2 62						
Q-3 62	69.0	11474	3.040	34883		34883
Q-4 62						
Q-1 63	51.0	8741	3.058	26733		26733
Q-2 63						
Q-3 63	33.0	5444	3.048	16593		16593
Q-4 63						
Q-1 64	22.5	3779	3.326	12570		12570
Q-2 64						
Q-3 64	15.0	2630	3.589	9439		9439
Q-4 64						
Q-1 65	30.0	5076	3.493	17732		17732
Q-2 65						
Q-3 65	27.0	4483	3.408	15279		15279
Q-4 65						
Q-1 66	18.0	3144	3.840	12073		12073
Q-2 66						
Q-3 66	22.5	3789	3.894	14756		14756
Q-4 66						
TOTAL	297.0	49983		164304		164304

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6
5-SUBSYSTEM 60
SUBD OF WORK PRODUCTION

SPARES BASIC

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-3 61	1.5	294	2.707	796		796	
Q-4 61							
Q-1 62	325.5	55647	2.944	163803	196879	360682	70552
Q-2 62							
Q-3 62	1621.5	272270	3.037	826948	1033035	1859983	288871
Q-4 62							
Q-1 63	844.5	144275	3.073	443423	570161	1013584	1597741
Q-2 63							
Q-3 63	453.0	76175	3.504	266882	331650	598532	715023
Q-4 63							
Q-1 64	277.5	47249	3.290	155454	213907	369361	422870
Q-2 64							
Q-3 64	204.0	35880	3.476	124713	151993	276706	265679
Q-4 64							
Q-1 65	372.0	64214	3.494	224392	268903	493295	261256
Q-2 65							
Q-3 65	229.5	38348	3.372	129304	166973	296277	548220
Q-4 65							
Q-1 66	222.0	38525	2.108	81213	234701	315914	1045141
Q-2 66							
Q-3 66	315.0	53029	3.472	184139	245388	429527	1142459
Q-4 66							
TOTAL	4866.0	825906		2601067	3413590	6014657	6357812

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6
5-SUBSYSTEM 60
SUBD OF WORK PRODUCTION

SPARES BASIC

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 61		445	1241	23	1264
Q-4 61					
Q-1 62	5559	3192	439985	7385	447370
Q-2 62					
Q-3 62	22763	6381	2177998	36558	2214556
Q-4 62					
Q-1 63	157377	-2035	2766667	46258	2812925
Q-2 63					
Q-3 63	70430	-5441	1378544	23049	1401593
Q-4 63					
Q-1 64	45078	339	837648	17823	855471
Q-2 64					
Q-3 64	96654	1813	640852	13636	654488
Q-4 64					
Q-1 65	78142	-1634	831059	22173	853232
Q-2 65					
Q-3 65	97802	282	942581	25148	967729
Q-4 65					
Q-1 66	216762	-1468	1576349	47475	1623824
Q-2 66					
Q-3 66	70261	6222	1648469	49647	1698116
Q-4 66					
TOTAL	860928	8096	13241393	289175	13530568

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59	21.0	3517	3.442	12105	13538	25643
Q-2 59						
Q-3 59	168.0	29646	3.381	100239	118019	218258
Q-4 59						
Q-1 60	115.5	19919	3.941	78501	86395	164896
Q-2 60						
Q-3 60	34.5	5679	4.459	25322	22893	48215
Q-4 60						
Q-1 61	204.0	34719	4.275	148427	138845	287272
Q-2 61						
Q-3 61	129.0	23461	3.659	85843	119167	205010
Q-4 61						
Q-1 62	136.5	23271	3.322	77299	98669	175968
Q-2 62						
Q-3 62	204.0	34283	3.105	106445	142470	248915
Q-4 62						
Q-1 63	261.0	44611	3.090	137853	204893	342746
Q-2 63						
Q-3 63	274.5	46043	3.161	145546	230829	376375
Q-4 63						
Q-1 64	270.0	46190	3.271	151104	243041	394145
Q-2 64						
Q-3 64	213.0	37488	3.485	130652	211021	341673
Q-4 64						
Q-1 65	208.5	36171	3.669	132713	231237	363950
Q-2 65						
Q-3 65	193.5	32456	3.681	119484	202474	321958
Q-4 65						
Q-1 66	198.0	34368	3.742	128621	245716	374337
Q-2 66						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
0-3 66	157.5	26417	3.842	101494	164425	265919
TOTAL	2788.5	478239		1681648	2473632	4155280

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	295.5	50531	2.960	149563	196879	346442
Q-2 62						
Q-3 62	1521.0	255447	3.046	778023	1032722	1810745
Q-4 62						
Q-1 63	793.5	135421	3.074	416283	569572	985855
Q-2 63						
Q-3 63	378.0	63592	3.524	224097	299878	523975
Q-4 63						
Q-1 64	243.0	41397	3.289	136171	203517	339688
Q-2 64						
Q-3 64	177.0	31145	3.484	108506	140943	249449
Q-4 64						
Q-1 65	327.0	56566	3.510	198552	256773	455325
Q-2 65						
Q-3 65	177.0	29613	3.363	99598	149807	249405
Q-4 65						
Q-1 66	169.5	29336	1.645	48246	211038	259284
Q-2 66						
Q-3 66	252.0	42437	3.413	144857	219101	363958
TOTAL	4333.5	735485		2303896	3280230	5584126

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	1.5	294	2.707	796		796
Q-4 61						
Q-1 62	21.0	3693	2.706	9994		9994
Q-2 62						
Q-3 62	31.5	5285	2.608	13785		13785
Q-4 62						
Q-1 63		11	3.727	41		41
Q-2 63						
Q-3 63	40.5	6837	3.651	24965	30063	55028
Q-4 63						
Q-1 64	9.0	1536	3.068	4713	7512	12225
Q-2 64						
Q-3 64	9.0	1505	2.950	4440	7227	11667
Q-4 64						
Q-1 65	12.0	2140	3.043	6512	10100	16612
Q-2 65						
Q-3 65	7.5	1314	3.012	3958	6045	10003
Q-4 65						
Q-1 66	6.0	1018	3.128	3184	5483	8667
Q-2 66						
Q-3 66	4.5	811	3.303	2679	3992	6671
TOTAL	142.5	24444		75067	70422	145489

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 6
5-SUBSYSTEM 60
SPARES BASIC

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	9.0	1423	2.984	4246		4246
Q-2 62						
Q-3 62	69.0	11474	3.040	34883		34883
Q-4 62						
Q-1 63	51.0	8741	3.058	26733		26733
Q-2 63						
Q-3 63	33.0	5444	3.048	16593		16593
Q-4 63						
Q-1 64	22.5	3779	3.326	12570		12570
Q-2 64						
Q-3 64	15.0	2630	3.589	9439		9439
Q-4 64						
Q-1 65	30.0	5076	3.493	17732		17732
Q-2 65						
Q-3 65	27.0	4483	3.408	15279		15279
Q-4 65						
Q-1 66	18.0	3144	3.840	12073		12073
Q-2 66						
Q-3 66	22.5	3789	3.894	14756		14756
Q-4 66						
TOTAL	297.0	49983		164304		164304

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6
SPARES

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 59	21.0	3517	3.442	12105	13538	25643	
Q-2 59							
Q-3 59	168.0	29646	3.381	100239	118019	218258	
Q-4 59							
Q-1 60	115.5	19919	3.941	78501	86395	164896	
Q-2 60							
Q-3 60	34.5	5679	4.459	25322	22893	48215	
Q-4 60							
Q-1 61	204.0	34719	4.275	148427	138845	287272	
Q-2 61							
Q-3 61	130.5	23755	3.647	86639	119167	205806	372
Q-4 61							
Q-1 62	462.0	78918	3.055	241102	295548	536650	253
Q-2 62							
Q-3 62	1825.5	306489	3.045	933136	1175192	2108328	7021
Q-4 62							
Q-1 63	1105.5	188784	3.077	580910	774465	1355375	2304
Q-2 63							
Q-3 63	726.0	121916	3.373	411201	560770	971971	162
Q-4 63							
Q-1 64	544.5	92902	3.278	304558	454070	758628	557
Q-2 64							
Q-3 64	414.0	72768	3.477	253037	359191	612228	79
Q-4 64							
Q-1 65	577.5	99953	3.557	355509	498110	853619	1676
Q-2 65							
Q-3 65	405.0	67866	3.512	238319	358326	596645	259
Q-4 65							
Q-1 66	391.5	67866	2.831	192124	462237	654361	277
Q-2 66							
Q-3 66	436.5	73454	3.591	263786	387518	651304	
Q-4 66							
TOTAL	7561.5	1288151		4224915	5324284	10049199	12960

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 6
SPARES

	MFG MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 59					25643		25643
Q-2 59							
Q-3 59					218258		218258
Q-4 59							
Q-1 60				1814	166710	3176	169886
Q-2 60							
Q-3 60				377	48592	926	49518
Q-4 60							
Q-1 61				3247	290519	5399	295918
Q-2 61							
Q-3 61		372	31	1369	207578	3857	211435
Q-4 61							
Q-1 62	70552	70805	5579	6426	619460	10397	629857
Q-2 62							
Q-3 62	288871	295892	23316	25758	2453294	41178	2494472
Q-4 62							
Q-1 63	1597741	1600045	157604	39228	3152252	52705	3204957
Q-2 63							
Q-3 63	715023	715185	70446	30632	1788234	29899	1818133
Q-4 63							
Q-1 64	422870	423427	45137	30335	1257527	26757	1284284
Q-2 64							
Q-3 64	265679	265758	96682	36385	1011053	21513	1032566
Q-4 64							
Q-1 65	261256	262932	78643	32718	1227912	32761	1260673
Q-2 65							
Q-3 65	548220	548479	97848	38157	1281129	34180	1315309
Q-4 65							
Q-1 66	1045141	1045418	216919	53790	1970388	59342	2029730
Q-2 66							
Q-3 66	1142459	1142459	70261	47975	1911999	57584	1969583
Q-4 66							
TOTAL	6357812	6370772	862366	348211	17630548	379674	18010222

SPECIAL TEST EQUIPMENT WBS 7.0

Cost Definition

B-70 special test equipment is defined as that equipment which did not become an end product or part of an end product but was designed, fabricated and/or procured for use by the Manufacturing and Quality Control departments in the fabrication, testing, inspection and certification of the XB-70 systems or components during and after the manufacturing process. Examples of the types of equipment included in this WBS item are:

a) continuity checkers

b) analyzers

c) electronic consoles

d) hydraulic test units

e) pressure test units

f) leak testers

g) other portable equipment

Cost data includes the identifiable expenditures to design, fabricate, test or procure the items listed above in support of the B-70 program. Some of the special test equipment was procured as capital investments and as such they are not included in the costs figures, Additional items were diverted from other in-house airframe programs and costs for this equipment is, likewise, absent from this WBS item. No costs for special test equipment developed or procured by the supplier for his internal use is included in the costs. See WBS 8.0, Tooling, for additional data.

Engineering special test equipment cannot be segregated from other in-house engineering costs. The costs for this engineering equipment are included in in the subsystem data.

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 7
SPECIAL TEST EQUIPMENT

	5-SUBSYS 0 HOURS / DOLLARS	TOTAL HOURS / DOLLARS
DESIGN/ENGINEERING	2348	2348
LABOR AT $ 4.201	9865	9865
ENGR BURDEN AT $ 5.032	11814	11814
TOOLING AND STE	215320	215320
LABOR AT $ 3.598	774818	774818
TEST/QC	801	801
LABOR AT $ 3.532	2829	2829
MFG BURDEN AT $ 4.207	909243	909243
TOOLING/STE MATL	596617	596617
MPC	61915	61915
SUB-TOTAL	2367101	2367101
GEN & ADMIN	44456	44456
TOTAL COST	2411557	2411557

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-605

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 7
5-SUBSYSTEM 0

SPECIAL TEST EQUIPMENT

	TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	2348	2348
LABOR AT $ 4.201	9865	9865
ENGR BURDEN AT $ 5.032	11814	11814
TOOLING AND STE	215320	215320
LABOR AT $ 3.598	774818	774818
TEST/QC	801	801
LABOR AT $ 3.532	2829	2829
MFG BURDEN AT $ 4.207	909243	909243
TOOLING/STE MATL	596617	596617
MPC	61915	61915
SUB-TOTAL	2367101	2367101
GEN & ADMIN	44456	44456
TOTAL COST	2411557	2411557

TIME-PHASED COST
DETAIL-SEE PAGE II-606

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 7
5-SUBSYSTEM 0 **SPECIAL TEST EQUIPMENT**
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61		46	3.565	164	156	320
Q-2 61						
Q-3 61		6	3.833	23	48	71
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		24	5.375	129	174	303
Q-4 62						
Q-1 63	1.5	378	5.595	2115	1995	4110
Q-2 63						
Q-3 63	6.0	955	3.074	2936	3831	6767
Q-4 63						
Q-1 64	3.0	420	5.455	2291	2591	4882
Q-2 64						
Q-3 64	1.5	170	4.894	832	883	1715
Q-4 64						
Q-1 65	1.5	180	4.406	793	1191	1984
Q-2 65						
Q-3 65	1.5	135	3.356	453	693	1146
Q-4 65						
Q-1 66						
Q-2 66						
Q-3 66		34	3.794	129	252	381
TOTAL	15.0	2348		9865	11814	21679

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 7 SPECIAL TEST EQUIPMENT
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60	1.5	149	2.953	440	567	1007
Q-4 60						
Q-1 61	7.5	1298	3.499	4542	4645	9187
Q-2 61						
Q-3 61	28.5	5229	4.039	21119	20092	41211
Q-4 61						
Q-1 62	28.5	4743	3.371	15988	17524	33512
Q-2 62						
Q-3 62	69.0	11615	3.080	35772	44575	80347
Q-4 62						
Q-1 63	39.0	6577	3.190	20981	24230	45211
Q-2 63						
Q-3 63	699.0	117475	3.514	412789	368082	780871
Q-4 63						
Q-1 64	55.5	9413	4.926	46364	43121	89485
Q-2 64						
Q-3 64	219.0	38514	3.345	128825	290653	419478
Q-4 64						
Q-1 65	117.0	20204	3.757	75900	81813	157713
Q-2 65						
Q-3 65		103	117.456	12098	13941	26039
TOTAL	1264.5	215320		774818	909243	1684061

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 7 **SPECIAL TEST EQUIPMENT**
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62	1.5	217	3.424	743		743
Q-2 62						
Q-3 62	1.5	320	3.425	1096		1096
Q-4 62						
Q-1 63		89	4.135	368		368
Q-2 63						
Q-3 63		71	3.141	223		223
Q-4 63						
Q-1 64		61	3.852	235		235
Q-2 64						
Q-3 64		23	4.000	92		92
Q-4 64						
Q-1 65		15	3.533	53		53
Q-2 65						
Q-3 65		5	3.800	19		19
TOTAL	3.0	801		2829		2829

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 7
SPECIAL TEST EQUIPMENT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-3 60	1.5	149	2.953	440	567	1007	1486
Q-4 60							
Q-1 61	7.5	1344	3.501	4706	4801	9507	21
Q-2 61							
Q-3 61	28.5	5235	4.039	21142	20140	41282	5420
Q-4 61							
Q-1 62	30.0	4960	3.373	16731	17524	34255	57699
Q-2 62							
Q-3 62	70.5	11959	3.094	36997	44749	81746	3717
Q-4 62							
Q-1 63	40.5	7044	3.331	23464	26225	49689	18632
Q-2 63							
Q-3 63	705.0	118501	3.510	415948	371913	787861	436382
Q-4 63							
Q-1 64	58.5	9894	4.941	48890	45712	94602	50451
Q-2 64							
Q-3 64	220.5	38707	3.352	129749	291536	421285	942
Q-4 64							
Q-1 65	118.5	20399	3.762	76746	83004	159750	16400
Q-2 65							
Q-3 65	1.5	243	51.728	12570	14634	27204	5467
Q-4 65							
Q-1 66							
Q-2 66							
Q-3 66		34	3.794	129	252	381	
TOTAL	1282.5	218469		787512	921057	1708569	596617

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 7
SPECIAL TEST EQUIPMENT

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 60	195	2688	51	2739
Q-4 60				
Q-1 61	2	9530	177	9707
Q-2 61				
Q-3 61	458	47160	876	48036
Q-4 61				
Q-1 62	4547	96501	1620	98121
Q-2 62				
Q-3 62	293	85756	1439	87195
Q-4 62				
Q-1 63	1835	70156	1173	71329
Q-2 63				
Q-3 63	42984	1267227	21188	1288415
Q-4 63				
Q-1 64	5378	150431	3201	153632
Q-2 64				
Q-3 64	343	422570	8991	431561
Q-4 64				
Q-1 65	4905	181055	4831	185886
Q-2 65				
Q-3 65	975	33646	898	34544
Q-4 65				
Q-1 66				
Q-2 66				
Q-3 66		381	11	392
TOTAL	61915	2367101	44456	2411557

TOOLING WBS 8.0

This WBS item is segregated into three major categories of tooling. They are: dimensional tooling, contract supplemental tooling and handling equipment. Each category is discussed below.

Dimensional Tooling WBS Code 8.80

This WBS item contains all the in-house costs for the design, fabrication, assembly, inspection, installation, modification and maintenance of the jigs, dies, fixtures, molds, patterns, taps, gages and other equipment of a specialized nature defined as tooling articles to be used in the manufacturing of the B-70 parts and assemblies. Subcontractor identified costs for tooling are included in the subsystem cost data under the "Tooling and STE" Subdivisions of Work and do not appear in this item. In-house costs cannot be associated to a particular subsystem, therefore they are collected and displayed in this WBS block. Subcontractor identified tooling costs included in the subsystems are as shown below:

WBS	Title	Recorded Costs*
1.1	Airframe Structures	$24,510,375
1.2	Environmental Control Subsystem	249,833
1.3	Propulsion Subsystem	179,269
1.4	Secondary Power Subsystem	206,408
1.5	Air Induction Subsystem	31,404
1.6	Flight Control Subsystem	467,552
1.7	Personnel Accommodations and Escape Subsystem	58,354
1.8	Alighting and Arresting Subsystem	1,851,888
	Total Cost	$27,555,083

Refer to the individual subsystems for identification of the particular suppliers included in the totals.

As the result of redirection to three air vehicles and the severe funding limitations placed upon the program, a minimal tooling concept for limited rate usage was developed. Under this concept the primary cirteria for tool design were:

* Excludes Material Procurement Costs and General and Administrative burdens

a) transportability

b) demountability or capability of being repositioned without undue expense

c) subject to partial dismantling for removal of parts assembled

d) expandability to permit rework for possible rate changes.

No requirements for interchangeability or replaceability were imposed, however consideration was given to the replaceability problems for such items as elevons, tips, doors, etc.

A tooling concept team was established to identify the major assembly tooling breakdown and master model requirements. Additional responsibilities included the review and approval of all tool planning submitted by the subcontractors. Within the five major categories of tooling the following policies prevailed.

a) Major Assembly Tooling -
This included all floor type major assembly tools which were restricted to minimal fixturing within the tool. See Exhibit 2 page II-616 for a typical tool in this category.

b) Master Tooling -
Master tools were provided in those areas required to coordinate the major assembly breakdown tools and master models for mold line control media. Masters fell in four categories: coordinate hole patterns and/or surfaces in more than one plane, coordinate hole patterns in contoured surfaces, coordinate hole patterns and/or surfaces for major cleavage points such as wing to fuselage shown on Exhibit 5 page II-619, and coordinate hole patterns in one plane due to engineering call-outs of matching holes requirements. North American supplied master tools to the subcontractors to control mating surfaces and attach patterns.

c) Braze Tooling -
Braze Fixtures (BRF), Prefit Assembly Jigs (PFAJ), Pre-Braze Apply Fixtures (PBAF) were provided for contoured panels as displayed by Exhibit 1, page II-615.

d) Trim/Fusion Weld/X-Ray Equipment -
Special fixed and portable tooling was provided to support the skate and skate track method of trimming, fusion welding and inspecting honeycomb panel joints. See Exhibit 4 page II-618, for a general arrangement of this type of equipment and Exhibit 3, page II-617 for further clarity of portable tools utilized on the skates and portable beams.

e) Detail Tooling -
Detail tooling was provided only in those areas where standard equipment or hand fabrication methods could not be employed or economically feasible. Sheet metal blanks or nibbler jigs (NJ) were ordered for blanks of .063 gauge and over and only in those cases where standard notching or nibbling was considered unsafe. Multiple type dies were provided to shape the various metals and to satisfy different forming requirements such as hot sizing and shrinkage considerations. Heat Treat Check Fixtures (HTCF) were provided for checking power hammered skins. Trim and drill tooling normally used after forming was not provided as these operations were performed on assembly. Machine parts were made by layout and setup wherever possible with tooling provided only in those cases where dimensional accuracy could not otherwise be achieved.

Contract Supplemental Tooling WBS 8.81

Total costs of $3,108,415 reflect all identifiable in-house costs to design, fabricate, assemble, procure, inspect, install, and maintain those items designated as contract supplemental tooling. These items are defined as those special or single purpose machines and devices such as erector set machines (excluding general purpose heads), jet engine starters and related gear boxes, sound abatement devices and other items as designated by the contract.

Handling Equipment WBS 8.82

Total costs of $1,571,840 include all identifiable in-house costs incurred in the design and fabrication of special handling equipment. Supplier handling equipment is not included in this item. It is included in the vendor costs associated with the Tooling and STE subdivision of work assigned to the subsystem. Supplier handling equipment cannot be identified as a separate item. Handling equipment is grouped into the following categories for identification only. Costs are not available for these individual groups.

a) Special Holding, Supporting and Material Handling Fixtures -
This equipment was peculiar to and necessary for support of XB-70 parts during such operations as process cleaning and/or hot and cold sizing.

b) Special Sheet and Skin Handling Equipment -
These units facilitated the handling and transfer of light gauge honeycomb panel facing sheets in and out of stretch-leveling operations.

c) Special Dollies, Racks and Containers -
This equipment was used primarily to store honeycomb panels, large coil and sheet metal, jigs, hot sizing tools, and to hold dies (up to 24 feet) during the cooling cycle from 1800°

downward prior to storage. In addition, special containers were utilized to store various parts between the sequential manufacturing operations. See Exhibit

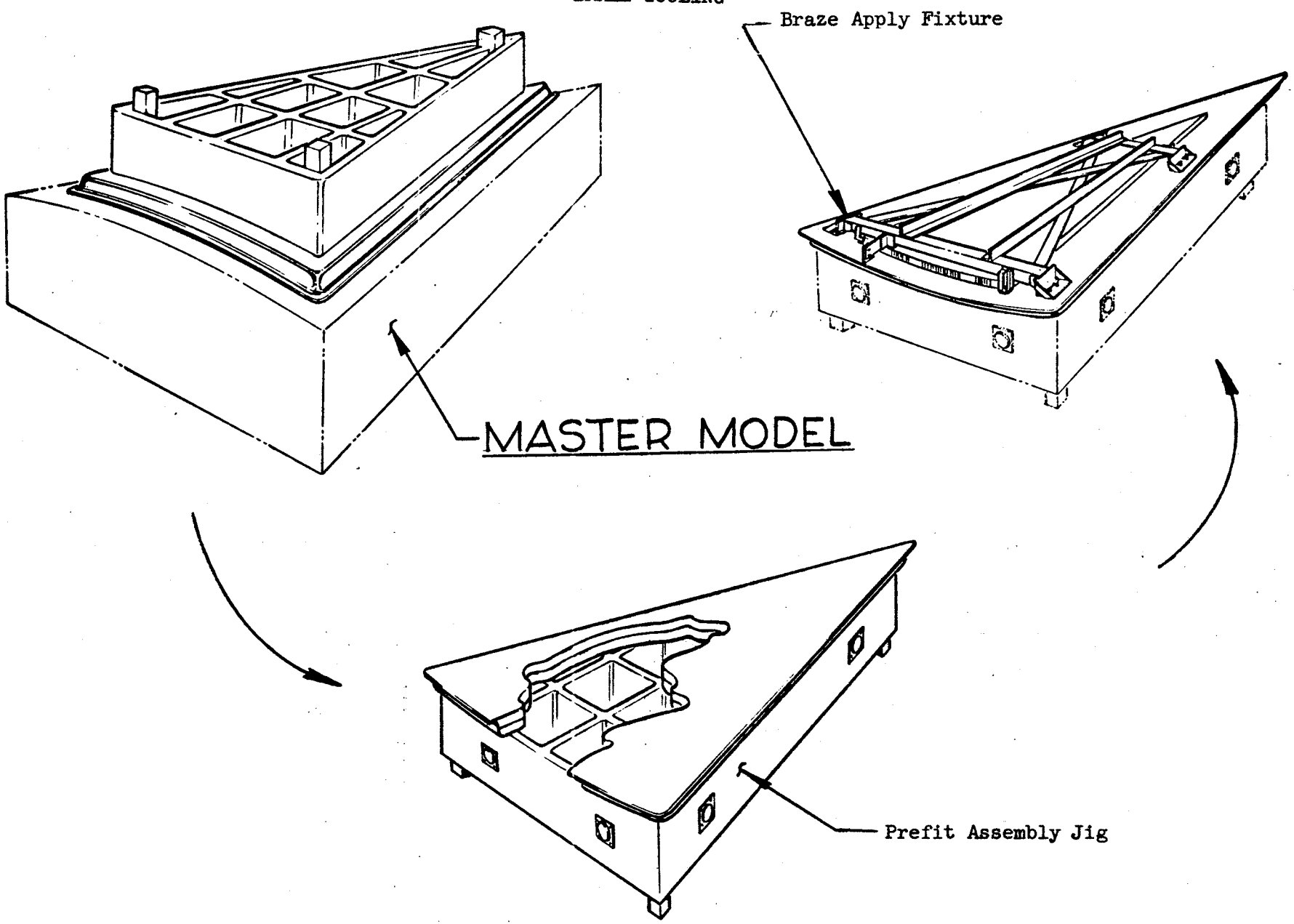
d) Special Slings and Adaptors
Special slings were utilized in handling honeycomb core material on and off various machines, air vehicle components or assemblies (see Exhibit 7, page II-621 for a typical special sling), electrical blanket brazing fixtures, and apply fixtures. Special slings and/or adaptors were used on such items as the crew escape capsules, engines and their containers, fuselage panes, flaps, bulkheads, windshields and doors. See Exhibit 9, page II-623 which displays the lifting frame used in installing the accessory drive system.

e) Special Skin Handling Trucks and Racks -
Special trucks and racks with protective devices were used in the handling of large thin gauge stainless steel skins. (Exhibit 8, pg II-622)

f) Special Floor Tracks
Subject tracks were required in moving tooling in the heat treating/ plating operations plus on the assembly line to maintain alignment during mating operations.

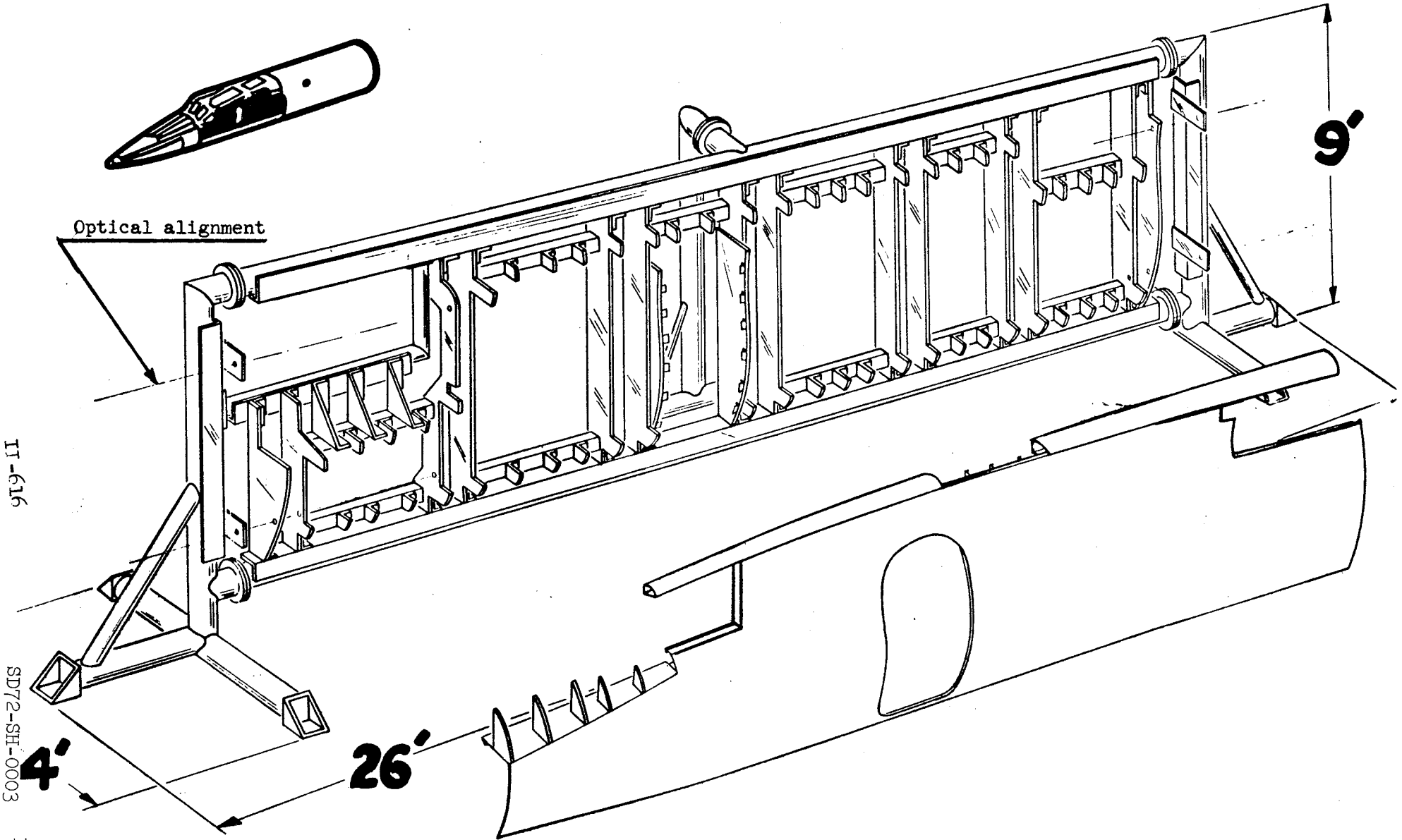
g) Special Work Platforms -
Special platforms, fixed and moveable, were utilized in conjunction with the various assembly jigs, pick-up jigs, installation and checkout operations. See Exhibit 6, page II-620 displaying typical moveable maintenance platform.

BRAZE TOOLING

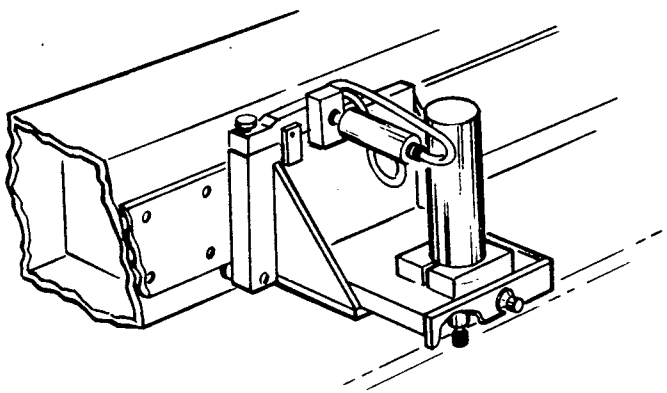


MAJOR ASSEMBLY TOOLING

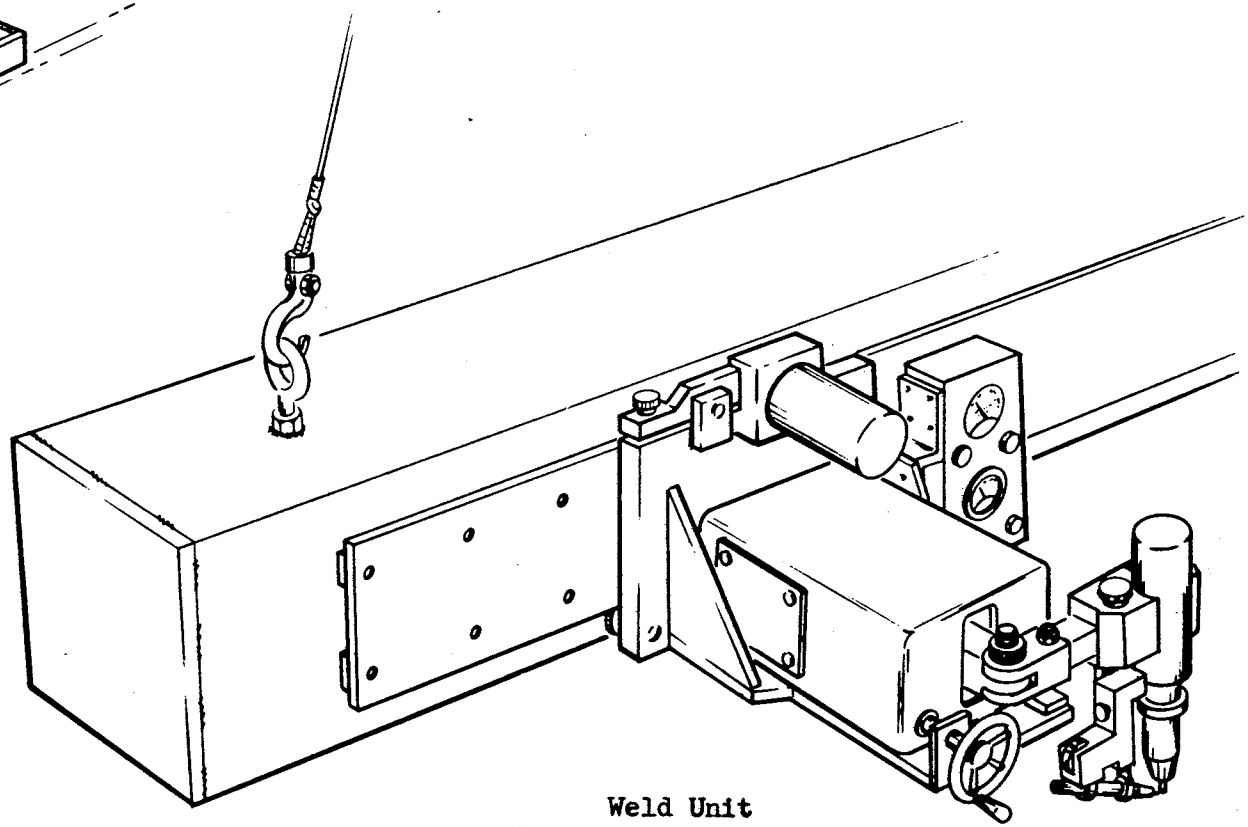
(Crew Compartment Side Panel Assembly Jig)



PORTABLE BEAMS



Machine Unit



Weld Unit

TRIM / FUSION WELD / X-RAY EQUIPMENT

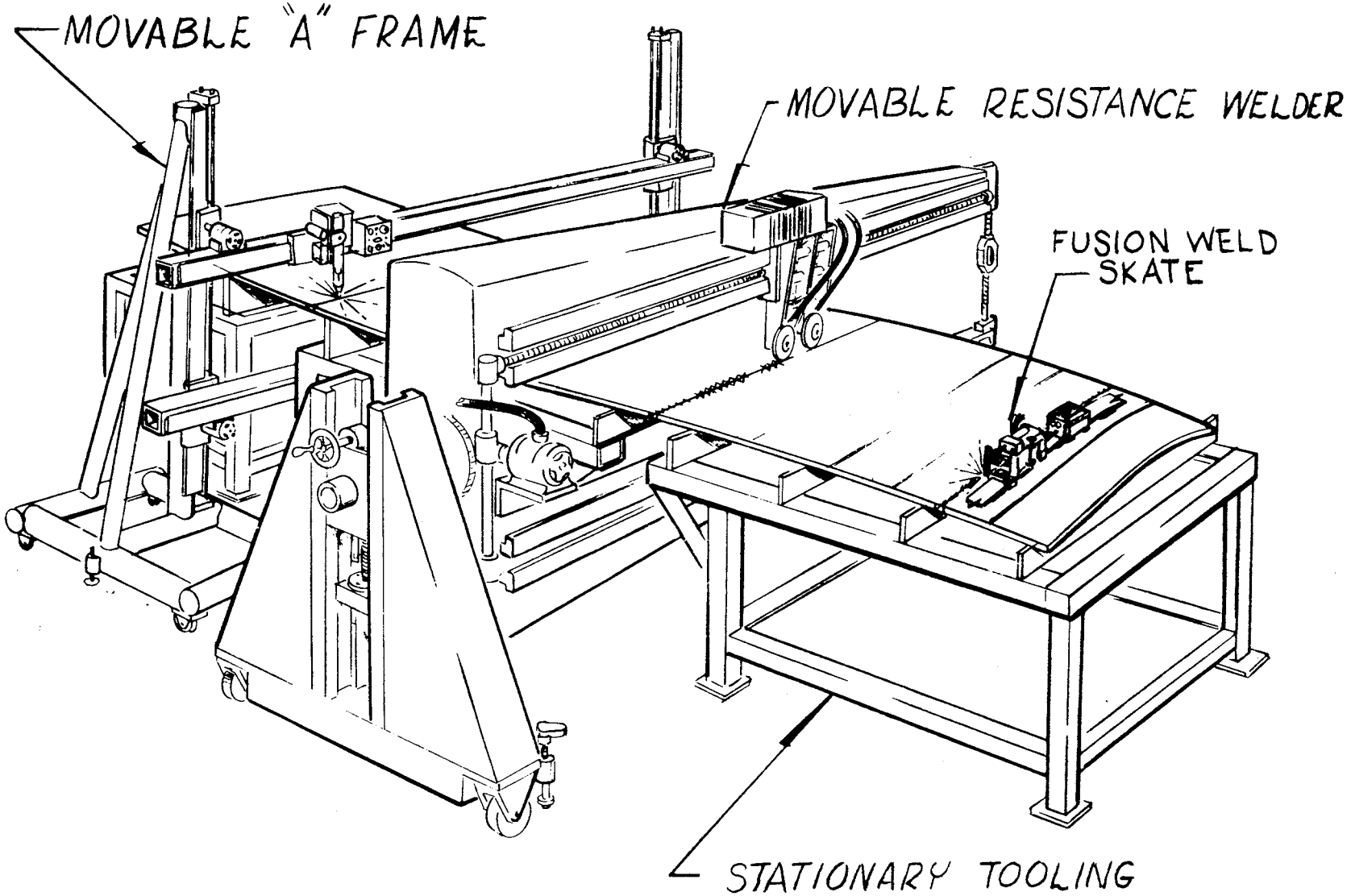
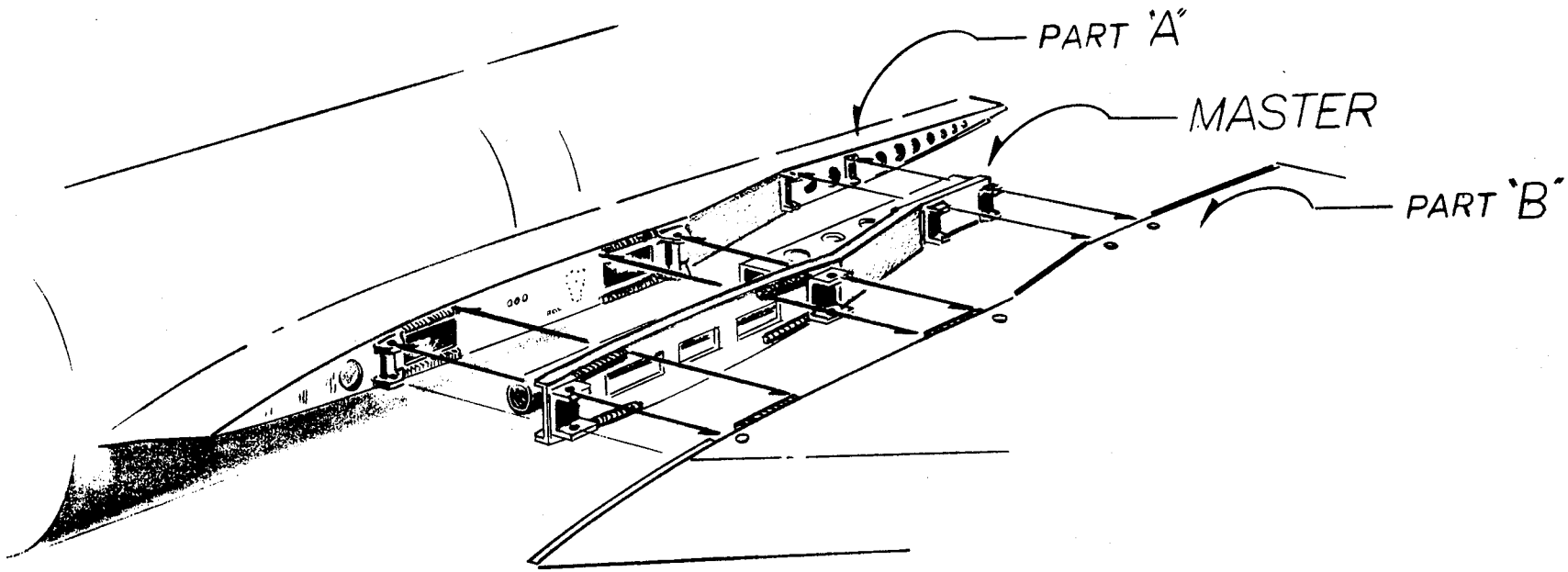


EXHIBIT 4
SD72-SH-0003

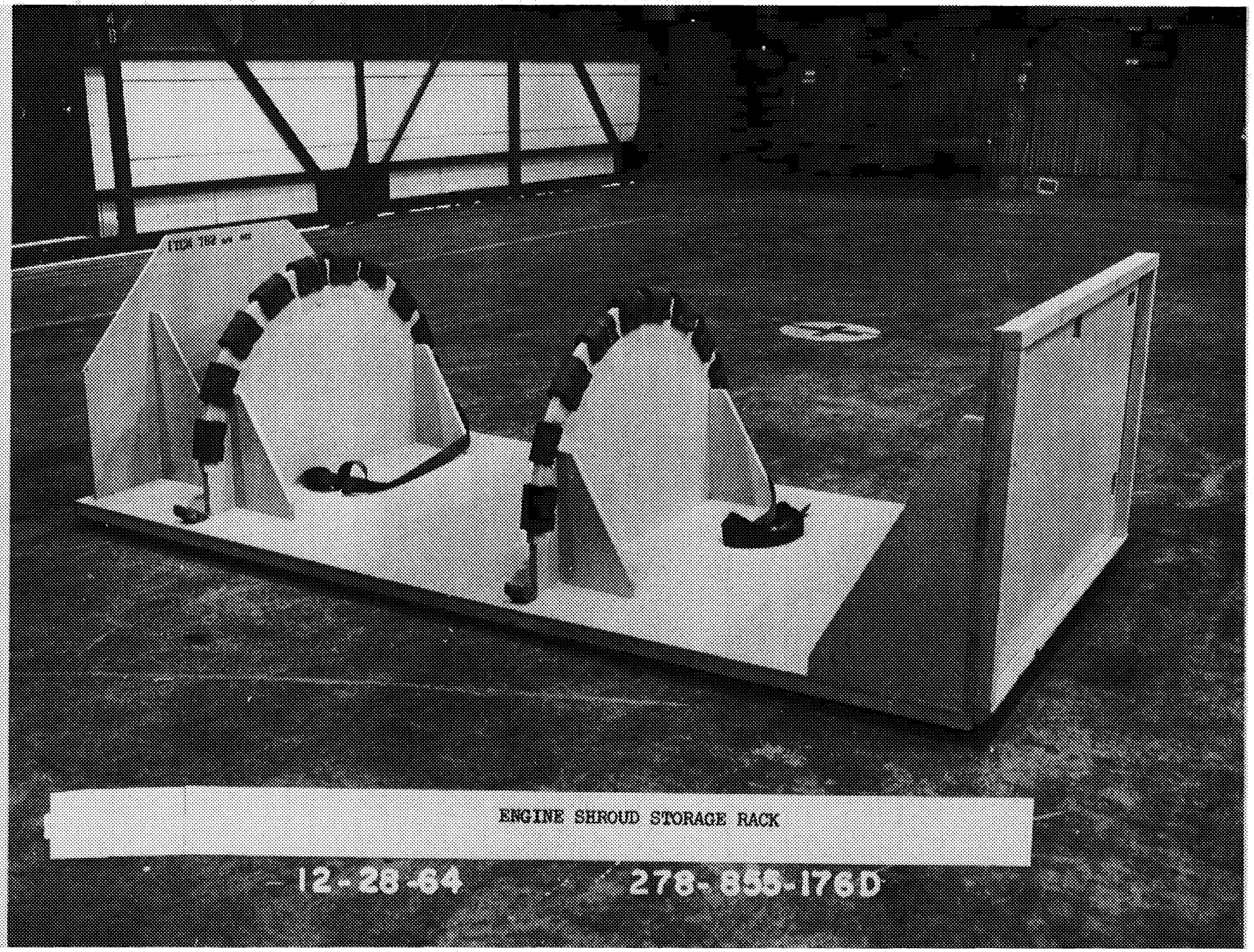
MASTER TOOLING
(Wing to Fuselage Joining)



MAINTENANCE PLATFORM

278-855-182G

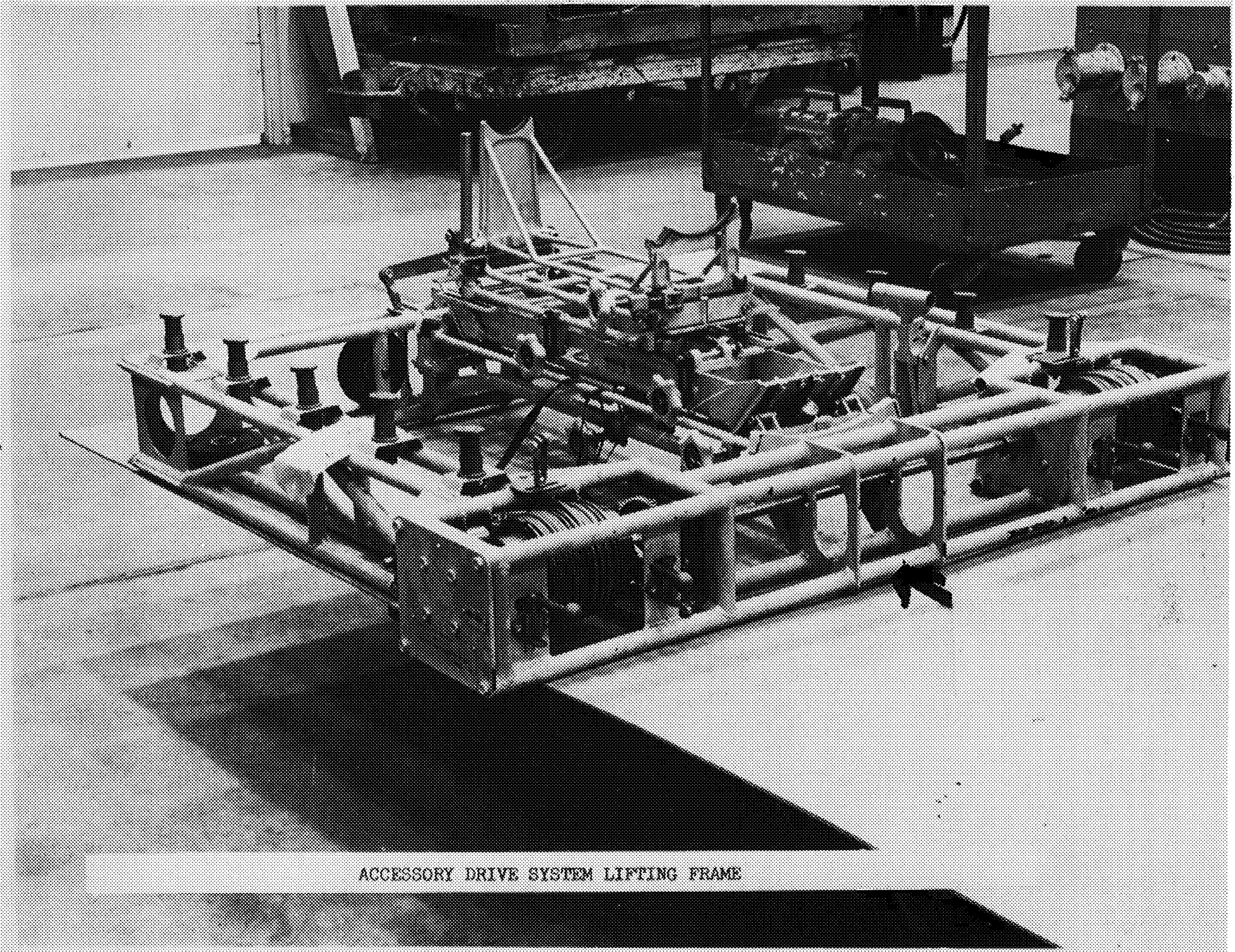
ENGINE SHROUD SLING
4-8-64
278-855-202 J



ENGINE SHROUD STORAGE RACK

12-28-64 278-835-176D

WBS 6.8.2



ACCESSORY DRIVE SYSTEM LIFTING FRAME

EXHIBIT C

SD72-SH-0025

IL-623

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

		5-SUBSYS 0	5-SUBSYS 80	5-SUBSYS 81	5-SUBSYS 82
		HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS	HOURS DOLLARS
DESIGN/ENGINEERING		1887	70589	622	12502
LABOR AT $ 3.436		6601	230082	2666	54755
ENGR BURDEN AT $ 4.539		8358	317488	3279	59444
TOOLING AND STE		682470	6347169	234893	145072
LABOR AT $ 3.412		2266425	21725638	798065	493442
PLANNING		571106	1590		
LABOR AT $ 3.504		2002107	4716		
TEST/QC		20487	274195	4593	2135
LABOR AT $ 3.422		70716	938690	14964	7163
MFG BURDEN AT $ 3.044		2568949	21250021	839884	553355
TOOLING/STE MATL		844371	22268688	1275734	342074
MPC		99362	1940267	117271	33624
OTHER COST		85	260953		
SUB-TOTAL		7866974	68936543	3051863	1543857
GEN & ADMIN		143367	1243123	56552	27983
TOTAL COST		8010341	70179666	3108415	1571840

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-626 II-635 II-647 II-653

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

		TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		85600
LABOR AT $ 3.436		294104
ENGR BURDEN AT $ 4.539		388569
TOOLING AND STE		7409604
LABOR AT $ 3.412		25283570
PLANNING		572696
LABOR AT $ 3.504		2006823
TEST/QC		301410
LABOR AT $ 3.422		1031533
MFG BURDEN AT $ 3.044		25212209
TOOLING/STE MATL		24730867
MPC		2190524
OTHER COST		261038
SUB-TOTAL		81399237
GEN & ADMIN		1471025
TOTAL COST		82870262

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-659

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 0

TOOLING

		TOOLING AND STE HOURS / DOLLARS	TOTAL HOURS / DOLLARS
DESIGN/ENGINEERING		1887	1887
LABOR AT $ 3.498		6601	6601
ENGR BURDEN AT $ 4.429		8358	8358
TOOLING AND STE		682470	682470
LABOR AT $ 3.321		2266425	2266425
PLANNING		571106	571106
LABOR AT $ 3.506		2002107	2002107
TEST/QC		20487	20487
LABOR AT $ 3.452		70716	70716
MFG BURDEN AT $ 2.016		2568949	2568949
TOOLING/STE MATL		844371	844371
MPC		99362	99362
OTHER COST		85	85
SUB-TOTAL		7866974	7866974
GEN & ADMIN		143367	143367
TOTAL COST		8010341	8010341

TIME-PHASED COST
DETAIL-SEE PAGE II-627

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

TOOLING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	340	5.676	1930	1278	3208
Q-2 60						
Q-3 60	3.0	558	3.344	1866	2038	3904
Q-4 60						
Q-1 61		15	2.267	34	147	181
Q-2 61						
Q-3 61	1.5	198	2.071	410	837	1247
Q-4 61						
Q-1 62	1.5	277	2.960	820	1277	2097
Q-2 62						
Q-3 62	1.5	135	2.919	394	744	1138
Q-4 62						
Q-1 63		110	2.955	325	595	920
Q-2 63						
Q-3 63	1.5	162	2.846	461	875	1336
Q-4 63						
Q-1 64		51	2.510	128	360	488
Q-2 64						
Q-3 64		21	5.762	121	59	180
Q-4 64						
Q-1 65		15	3.333	50	77	127
Q-2 65						
Q-3 65		5	12.400	62	71	133
TOTAL	10.5	1887		6601	8358	14959

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

TOOLING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	21.0	3633	2.847	10344	11324	21668
Q-2 60						
Q-3 60	78.0	12996	2.857	37125	39952	77077
Q-4 60						
Q-1 61	163.5	27867	2.918	81326	-20088	61238
Q-2 61						
Q-3 61	769.5	139538	3.626	505949	488793	994742
Q-4 61						
Q-1 62	984.0	167958	3.248	545444	591396	1136840
Q-2 62						
Q-3 62	399.0	66926	3.083	206359	262091	468450
Q-4 62						
Q-1 63	127.5	21671	4.781	103619	110225	213844
Q-2 63						
Q-3 63	553.5	92954	2.923	271729	233567	505296
Q-4 63						
Q-1 64	378.0	64396	6.389	411399	538388	949787
Q-2 64						
Q-3 64	438.0	77207	.967	74673	91863	166536
Q-4 64						
Q-1 65	30.0	5324	2.255	12003	26635	38638
Q-2 65						
Q-3 65	12.0	2000	3.228	6455	9250	15705
TOTAL	3954.0	682470		2266425	2383396	4649821

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 8
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

TOOLING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61	713.5	121729	3.174	386402	48895	435297
Q-2 61						
Q-3 61	343.5	62211	3.069	190899	26357	217256
Q-4 61						
Q-1 62		7	.142	-1		-1
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	2229.0	374566	3.682	1379106	64642	1443748
Q-4 63						
Q-1 64	36.0	6021	2.550	15354	16464	31818
Q-2 64						
Q-3 64	10.5	1963	7.200	14134	13451	27585
Q-4 64						
Q-1 65	19.5	3351	3.297	11047	9138	20185
Q-2 65						
Q-3 65	6.0	1123	4.185	4700	6016	10716
Q-4 65						
Q-1 66		3				
Q-2 66						
Q-3 66	1.5	132	3.530	466	590	1056
TOTAL	3359.5	571106		2002107	185553	2187660

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8 **TOOLING**
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		4	3.000	12		12
Q-2 60						
Q-3 60	1.5	219	3.306	724		724
Q-4 60						
Q-1 61	3.0	458	3.264	1495		1495
Q-2 61						
Q-3 61	15.0	2813	3.194	8984		8984
Q-4 61						
Q-1 62	31.5	5376	3.319	17842		17842
Q-2 62						
Q-3 62	15.0	2486	3.424	8512		8512
Q-4 62						
Q-1 63	7.5	1356	3.406	4619		4619
Q-2 63						
Q-3 63	18.0	3061	3.517	10766		10766
Q-4 63						
Q-1 64	18.0	2955	3.727	11013		11013
Q-2 64						
Q-3 64	7.5	1319	3.854	5084		5084
Q-4 64						
Q-1 65	3.0	440	3.784	1665		1665
TOTAL	120.0	20487		70716		70716

C-12

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-1 60	22.5	3977	3.089	12286	12602	24888	1448
Q-2 60							
Q-3 60	82.5	13773	2.884	39715	41990	81705	5145
Q-4 60							
Q-1 61	880.0	150069	3.127	469257	28954	498211	11324
Q-2 61							
Q-3 61	1129.5	204760	3.449	706242	515987	1222229	133786
Q-4 61							
Q-1 62	1017.0	173618	3.249	564105	592673	1156778	159401
Q-2 62							
Q-3 62	415.5	69547	3.095	215265	262835	478100	139404
Q-4 62							
Q-1 63	135.0	23137	4.692	108563	110820	219383	64397
Q-2 63							
Q-3 63	2802.0	470743	3.531	1662062	299084	1961146	59319
Q-4 63							
Q-1 64	432.0	73423	5.964	437894	555212	993106	172072
Q-2 64							
Q-3 64	456.0	80510	1.168	94012	105373	199385	75170
Q-4 64							
Q-1 65	52.5	9130	2.712	24765	35850	60615	15110
Q-2 65							
Q-3 65	18.0	3128	3.586	11217	15337	26554	7320
Q-4 65							
Q-1 66		3					475
Q-2 66							
Q-3 66	1.5	132	3.530	466	590	1056	
TOTAL	7444.0	1275950		4345849	2577307	6923156	844371

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 0
SUBD OF WORK TOOLING AND STE

TOOLING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60	190	85	26611	507	27118
Q-2 60					
Q-3 60	677		87527	1668	89195
Q-4 60					
Q-1 61	957		510492	9486	519978
Q-2 61					
Q-3 61	11305		1367320	25408	1392728
Q-4 61					
Q-1 62	12561		1328740	22302	1351042
Q-2 62					
Q-3 62	10985		628489	10549	639038
Q-4 62					
Q-1 63	5764		289544	4841	294385
Q-2 63					
Q-3 63	5309		2025774	33871	2059645
Q-4 63					
Q-1 64	18343		1183521	25182	1208703
Q-2 64					
Q-3 64	27347		301902	6424	308326
Q-4 64					
Q-1 65	4519		80244	2141	82385
Q-2 65					
Q-3 65	1306		35180	939	36119
Q-4 65					
Q-1 66	99		574	17	591
Q-2 66					
Q-3 66			1056	32	1088
TOTAL	99362	85	7866974	143367	8010341

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 0

TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGI MATI
Q-1 60	22.5	3977	3.089	12286	12602	24888	
Q-2 60							
Q-3 60	82.5	13773	2.884	39715	41990	81705	
Q-4 60							
Q-1 61	880.0	150069	3.127	469257	28954	498211	
Q-2 61							
Q-3 61	1129.5	204760	3.449	706242	515987	1222229	
Q-4 61							
Q-1 62	1017.0	173618	3.249	564105	592673	1156778	
Q-2 62							
Q-3 62	415.5	69547	3.095	215265	262835	478100	
Q-4 62							
Q-1 63	135.0	23137	4.692	108563	110820	219383	
Q-2 63							
Q-3 63	2802.0	470743	3.531	1662062	299084	1961146	
Q-4 63							
Q-1 64	432.0	73423	5.964	437894	555212	993106	
Q-2 64							
Q-3 64	456.0	80510	1.168	94012	105373	199385	
Q-4 64							
Q-1 65	52.5	9130	2.712	24765	35850	60615	
Q-2 65							
Q-3 65	18.0	3128	3.586	11217	15337	26554	
Q-4 65							
Q-1 66		3					
Q-2 66							
Q-3 66	1.5	132	3.530	466	590	1056	
TOTAL	7444.0	1275950		4345849	2577307	6923156	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 0

TOOLING

	TOOL/STE MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60	1448	1448	190	85	26611	507	27118
Q-2 60							
Q-3 60	5145	5145	677		87527	1668	89195
Q-4 60							
Q-1 61	11324	11324	957		510492	9486	519978
Q-2 61							
Q-3 61	133786	133786	11305		1367320	25408	1392728
Q-4 61							
Q-1 62	159401	159401	12561		1328740	22302	1351042
Q-2 62							
Q-3 62	139404	139404	10985		628489	10549	639038
Q-4 62							
Q-1 63	64397	64397	5764		289544	4841	294385
Q-2 63							
Q-3 63	59319	59319	5309		2025774	33871	2059645
Q-4 63							
Q-1 64	172072	172072	18343		1183521	25182	1208703
Q-2 64							
Q-3 64	75170	75170	27347		301902	6424	308326
Q-4 64							
Q-1 65	15110	15110	4519		80244	2141	82385
Q-2 65							
Q-3 65	7320	7320	1306		35180	939	36119
Q-4 65							
Q-1 66	475	475	99		574	17	591
Q-2 66							
Q-3 66					1056	32	1088
TOTAL	844371	844371	99362	85	7866974	143367	8010341

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 80
DIMENSIONAL TOOLING

	TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	70589	70589
LABOR AT $ 3.259	230082	230082
ENGR BURDEN AT $ 4.498	317488	317488
TOOLING AND STE	6347169	6347169
LABOR AT $ 3.423	21725638	21725638
PLANNING	1590	1590
LABOR AT $ 2.966	4716	4716
TEST/QC	274195	274195
LABOR AT $ 3.423	938690	938690
MFG BURDEN AT $ 3.209	21250021	21250021
TOOLING/STE MATL	22268688	22268688
MPC	1940267	1940267
OTHER COST	260953	260953
SUB-TOTAL	68936543	68936543
GEN & ADMIN	1243123	1243123
TOTAL COST	70179666	70179666

TIME-PHASED COST
DETAIL-SEE PAGE II-636

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8
5-SUBSYSTEM 80 DIMENSIONAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	152	4.704	715	690	1405
Q-2 58						
Q-3 58	1.5	308	3.078	948	1168	2116
Q-4 58						
Q-1 59		3	5.333	16	13	29
Q-2 59						
Q-3 59	10.5	1898	3.065	5818	6683	12501
Q-4 59						
Q-1 60	16.5	2877	2.506	7211	10837	18048
Q-2 60						
Q-3 60	24.0	4011	2.851	11437	15289	26726
Q-4 60						
Q-1 61	81.0	13916	2.794	38888	51822	90710
Q-2 61						
Q-3 61	93.0	16784	3.070	51535	70609	122144
Q-4 61						
Q-1 62	46.5	8059	3.399	27396	37108	64504
Q-2 62						
Q-3 62	54.0	8988	3.358	30179	46123	76302
Q-4 62						
Q-1 63	27.0	4727	4.112	19436	24676	44112
Q-2 63						
Q-3 63	28.5	4670	4.393	20516	25436	45952
Q-4 63						
Q-1 64	19.5	3309	3.873	12816	22474	35290
Q-2 64						
Q-3 64	4.5	750	3.140	2355	3425	5780
Q-4 64						
Q-1 65		109	5.651	616	851	1467
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8
5-SUBSYSTEM 80 DIMENSIONAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65		28	7.143	200	284	484
TOTAL	408.0	70589		230082	317488	547570

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8
5-SUBSYSTEM 80 DIMENSIONAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	58.5	9756	3.818	37248	25807	63055
Q-2 58						
Q-3 58	31.5	5241	6.150	32232	9793	42025
Q-4 58						
Q-1 59	121.5	20749	4.487	93095	58510	151605
Q-2 59						
Q-3 59	451.5	79372	3.728	295909	237465	533374
Q-4 59						
Q-1 60	2073.0	359234	3.446	1237896	1071343	2309239
Q-2 60						
Q-3 60	2413.5	405544	3.402	1379689	1175131	2554820
Q-4 60						
Q-1 61	8557.5	1460483	3.561	5201231	4331437	9532668
Q-2 61						
Q-3 61	13525.5	2452558	3.299	8090511	8089157	16179668
Q-4 61						
Q-1 62	4243.5	724250	3.355	2429801	2640330	5070131
Q-2 62						
Q-3 62	1636.5	275009	3.373	927508	1195452	2122960
Q-4 62						
Q-1 63	1493.5	254854	3.287	837663	955152	1792815
Q-2 63						
Q-3 63	-3.0	-425	132.215	56192	369804	425996
Q-4 63						
Q-1 64	1619.5	276354	3.402	940207	879221	1819428
Q-2 64						
Q-3 64	81.0	14371	7.681	110385	167202	277587
Q-4 64						
Q-1 65	42.0	7345	7.049	51777	42057	93834
Q-2 65						

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8
5-SUBSYSTEM 80 DIMENSIONAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	15.0	2422	1.612	3905	1918	5823
Q-4 65						
Q-1 66		4	.750	3	20	23
Q-2 66						
Q-3 66		48	8.042	386		386
TOTAL	36360.5	6347169		21725638	21249799	42975437

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 8
5-SUBSYSTEM 80 **DIMENSIONAL TOOLING**
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61	3.0	455	3.048	1387	208	1595
Q-2 61						
Q-3 61		3	2.667	8	14	22
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	6.5	1132	2.934	3321		3321
TOTAL	9.5	1590		4716	222	4938

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8 DIMENSIONAL TOOLING
5-SUBSYSTEM 80
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		1	2.000	2		2
Q-2 58						
Q-3 58		49	5.469	268		268
Q-4 58						
Q-1 59		80	3.038	243		243
Q-2 59						
Q-3 59	9.0	1526	3.080	4700		4700
Q-4 59						
Q-1 60	45.0	7821	3.259	25487		25487
Q-2 60						
Q-3 60	81.0	13528	3.423	46312		46312
Q-4 60						
Q-1 61	222.0	37776	3.326	125636		125636
Q-2 61						
Q-3 61	492.0	89347	3.592	320939		320939
Q-4 61						
Q-1 62	190.5	32476	3.089	100305		100305
Q-2 62						
Q-3 62	91.5	15303	3.180	48668		48668
Q-4 62						
Q-1 63	60.0	10314	3.351	34561		34561
Q-2 63						
Q-3 63	262.5	44017	3.510	154491		154491
Q-4 63						
Q-1 64	76.5	12963	3.679	47694		47694
Q-2 64						
Q-3 64	42.0	7367	3.360	24753		24753
Q-4 64						
Q-1 65	7.5	1305	3.597	4694		4694
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8
5-SUBSYSTEM 80 DIMENSIONAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65		39	.231	9		9
Q-4 65						
Q-1 66	1.5	283	.253	-72		-72
TOTAL	1581.0	274195		938690		938690

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 80
DIMENSIONAL TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-1 58	60.0	9909	3.831	37965	26497	64462	458
Q-2 58							
Q-3 58	33.0	5598	5.975	33448	10961	44409	-438
Q-4 58							
Q-1 59	121.5	20832	4.481	93354	58523	151877	-20
Q-2 59							
Q-3 59	471.0	82796	3.701	306427	244148	550575	89694
Q-4 59							
Q-1 60	2134.5	369932	3.435	1270594	1082180	2352774	592048
Q-2 60							
Q-3 60	2518.5	423083	3.398	1437438	1190420	2627858	672059
Q-4 60							
Q-1 61	8863.5	1512630	3.548	5367142	4383467	9750609	3043434
Q-2 61							
Q-3 61	14110.5	2558692	3.308	8462993	8159780	16622773	10266054
Q-4 61							
Q-1 62	4480.5	764785	3.344	2557502	2677438	5234940	4463780
Q-2 62							
Q-3 62	1782.0	299300	3.362	1006355	1241575	2247930	1878678
Q-4 62							
Q-1 63	1580.5	269895	3.304	891660	979828	1871488	588332
Q-2 63							
Q-3 63	294.5	49394	4.748	234520	395240	629760	380525
Q-4 63							
Q-1 64	1715.5	292626	3.420	1000717	901695	1902412	186454
Q-2 64							
Q-3 64	127.5	22488	6.114	137493	170627	308120	22374
Q-4 64							
Q-1 65	49.5	8759	6.518	57087	42908	99995	61343
Q-2 65							
Q-3 65	15.0	2489	1.653	4114	2202	6316	-14927
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 80
DIMENSIONAL TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-1 66	1.5	287	.239	-69	20	-49	3316
Q-2 66							
Q-3 66		48	8.042	386		386	35524
TOTAL	38359.0	6693543		22899126	21567509	44466635	22268688

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 80
DIMENSIONAL TOOLING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58	25		64945		64945
Q-2 58					
Q-3 58	-24		43947		43947
Q-4 58					
Q-1 59	-1		151856		151856
Q-2 59					
Q-3 59	7597	6411	654277		654277
Q-4 59					
Q-1 60	77854	17488	3040164	57924	3098088
Q-2 60					
Q-3 60	88376	5785	3394078	64667	3458745
Q-4 60					
Q-1 61	257170	43741	13094954	243344	13338298
Q-2 61					
Q-3 61	867481	159465	27915773	518759	28434532
Q-4 61					
Q-1 62	351745	48035	10098500	169503	10268003
Q-2 62					
Q-3 62	148039	-24940	4249707	71331	4321038
Q-4 62					
Q-1 63	57951	625	2518396	42108	2560504
Q-2 63					
Q-3 63	37482	-5776	1041991	17422	1059413
Q-4 63					
Q-1 64	19876	3702	2112444	44949	2157393
Q-2 64					
Q-3 64	8140	3603	342237	7282	349519
Q-4 64					
Q-1 65	18347	2110	181795	4850	186645
Q-2 65					
Q-3 65	-2663	704	-10570	-282	-10852
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 80
DIMENSIONAL TOOLING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66	687		3954	119	4073
Q-2 66					
Q-3 66	2185		38095	1147	39242
TOTAL	1940267	260953	68936543	1243123	70179666

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 81
CONTRACT SUPPLEMENTAL TOOLING

		TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		622	622
LABOR AT $ 4.286		2666	2666
ENGR BURDEN AT $ 5.272		3279	3279
TOOLING AND STE		234893	234893
LABOR AT $ 3.398		798065	798065
TEST/QC		4593	4593
LABOR AT $ 3.258		14964	14964
MFG BURDEN AT $ 3.507		839884	839884
TOOLING/STE MATL		1275734	1275734
MPC		117271	117271
SUB-TOTAL		3051863	3051863
GEN & ADMIN		56552	56552
TOTAL COST		3108415	3108415

TIME-PHASED COST
DETAIL-SEE PAGE II-648

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8
5-SUBSYSTEM 81 CONTRACT SUPPLEMENTAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 62		40	5.150	206	182	388
Q-2 62						
Q-3 62	1.5	346	1.705	590	838	1428
Q-4 62						
Q-1 63		-1	683.999	684	966	1650
Q-2 63						
Q-3 63		31	4.613	143	221	364
Q-4 63						
Q-1 64		22	7.091	156	150	306
Q-2 64						
Q-3 64		7	11.286	79	47	126
Q-4 64						
Q-1 65	1.5	132	4.591	606	565	1171
Q-2 65						
Q-3 65		45	4.489	202	310	512
TOTAL	3.0	622		2666	3279	5945

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8
5-SUBSYSTEM 81 CONTRACT SUPPLEMENTAL TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60						
Q-2 60	40.5	6919	3.399	23519	20664	44183
Q-3 60						
Q-4 60	208.5	35139	3.229	113475	109955	223430
Q-1 61						
Q-2 61	358.5	61190	3.464	211981	185895	397876
Q-3 61						
Q-4 61	120.0	21722	3.287	71401	67161	138562
Q-1 62						
Q-2 62	190.5	32458	3.250	105474	146349	251823
Q-3 62						
Q-4 62	153.0	25817	3.237	83577	84406	167983
Q-1 63						
Q-2 63	60.0	10146	2.738	27779	39323	67102
Q-3 63						
Q-4 63	46.5	7813	4.709	36795	34100	70895
Q-1 64						
Q-2 64	51.0	8662	3.327	28817	73344	102161
Q-3 64						
Q-4 64	114.0	20044	3.496	70083	56343	126426
Q-1 65						
Q-2 65	21.0	3737	5.050	18873	16751	35624
Q-3 65	7.5	1246	5.049	6291	5593	11884
TOTAL	1371.0	234893		798065	839884	1637949

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8 CONTRACT SUPPLEMENTAL TOOLING
5-SUBSYSTEM 81
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	250	3.292	823		823
Q-2 60						
Q-3 60	9.0	1466	3.173	4652		4652
Q-4 60						
Q-1 61	6.0	905	2.987	2703		2703
Q-2 61						
Q-3 61	1.5	283	3.830	1084		1084
Q-4 61						
Q-1 62	3.0	447	3.349	1497		1497
Q-2 62						
Q-3 62	3.0	427	3.372	1440		1440
Q-4 62						
Q-1 63		105	3.419	359		359
Q-2 63						
Q-3 63	1.5	321	3.436	1103		1103
Q-4 63						
Q-1 64	1.5	293	3.444	1009		1009
Q-2 64						
Q-3 64		70	2.857	200		200
Q-4 64						
Q-1 65		19	3.421	65		65
Q-2 65						
Q-3 65		7	4.143	29		29
TOTAL	27.0	4593		14964		14964

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 81
CONTRACT SUPPLEMENTAL TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-1 60	42.0	7169	3.395	24342	20664	45006	7017
Q-2 60							
Q-3 60	217.5	36605	3.227	118127	109955	228082	170992
Q-4 60							
Q-1 61	364.5	62095	3.457	214684	185895	400579	407442
Q-2 61							
Q-3 61	121.5	22005	3.294	72485	67161	139646	433036
Q-4 61							
Q-1 62	193.5	32945	3.253	107177	146531	253708	121493
Q-2 62							
Q-3 62	157.5	26590	3.220	85607	85244	170851	117569
Q-4 62							
Q-1 63	60.0	10250	2.812	28822	40289	69111	23664
Q-2 63							
Q-3 63	48.0	8165	4.659	38041	34321	72362	-28844
Q-4 63							
Q-1 64	52.5	8977	3.340	29982	73494	103476	15439
Q-2 64							
Q-3 64	114.0	20121	3.497	70362	56390	126752	7746
Q-4 64							
Q-1 65	22.5	3888	5.027	19544	17316	36860	148
Q-2 65							
Q-3 65	7.5	1298	5.025	6522	5903	12425	32
TOTAL	1401.0	240108		815695	843163	1658858	1275734

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 81
CONTRACT SUPPLEMENTAL TOOLING

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-1 60	923	52946	1009	53955
Q-2 60				
Q-3 60	22485	421559	8032	429591
Q-4 60				
Q-1 61	34429	842450	15655	858105
Q-2 61				
Q-3 61	36592	609274	11322	620596
Q-4 61				
Q-1 62	9574	384775	6458	391233
Q-2 62				
Q-3 62	9264	297684	4997	302681
Q-4 62				
Q-1 63	2331	95106	1590	96696
Q-2 63				
Q-3 63	-2841	40677	680	41357
Q-4 63				
Q-1 64	1646	120561	2565	123126
Q-2 64				
Q-3 64	2818	137316	2922	140238
Q-4 64				
Q-1 65	44	37052	989	38041
Q-2 65				
Q-3 65	6	12463	333	12796
TOTAL	117271	3051863	56552	3108415

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 82
HANDLING EQUIPMENT

		TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		12502	12502
LABOR AT $ 4.380		54755	54755
ENGR BURDEN AT $ 4.755		59444	59444
TOOLING AND STE		145072	145072
LABOR AT $ 3.401		493442	493442
TEST/QC		2135	2135
LABOR AT $ 3.355		7163	7163
MFG BURDEN AT $ 3.759		553355	553355
TOOLING/STE MATL		342074	342074
MPC		33624	33624
SUB-TOTAL		1543857	1543857
GEN & ADMIN		27983	27983
TOTAL COST		1571840	1571840

TIME-PHASED COST
DETAIL-SEE PAGE II-654

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8
5-SUBSYSTEM 82 HANDLING EQUIPMENT
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61	9.0	1546	4.235	6547	6050	12597
Q-4 61						
Q-1 62	55.5	9563	4.368	41769	44182	85951
Q-2 62						
Q-3 62	3.0	457	3.810	1741	4603	6344
Q-4 62						
Q-1 63		57	6.368	363	309	672
Q-2 63						
Q-3 63	4.5	879	4.932	4335	4300	8635
TOTAL	72.0	12502		54755	59444	114199

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8
5-SUBSYSTEM 82 HANDLING EQUIPMENT
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		16	4.313	69	63	132
Q-4 59						
Q-1 60	10.5	1770	3.419	6052	6338	12390
Q-2 60						
Q-3 60	28.5	4795	3.549	17016	15679	32695
Q-4 60						
Q-1 61	60.0	10151	3.515	35676	34053	69729
Q-2 61						
Q-3 61	126.0	22857	3.728	85204	80262	165466
Q-4 61						
Q-1 62	190.5	32535	3.193	103888	107573	211461
Q-2 62						
Q-3 62	192.0	32275	3.254	105009	127088	232097
Q-4 62						
Q-1 63	58.5	10060	3.257	32769	28450	61219
Q-2 63						
Q-3 63	55.5	9419	3.068	28901	53257	82158
Q-4 63						
Q-1 64	55.5	9462	3.271	30949	36445	67394
Q-2 64						
Q-3 64	54.0	9375	3.570	33472	47015	80487
Q-4 64						
Q-1 65	10.5	1764	7.272	12827	14817	27644
Q-2 65						
Q-3 65	3.0	593	2.715	1610	2293	3903
Q-4 65						
Q-1 66					22	22
TOTAL	844.5	145072		493442	553355	1046797

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8 **HANDLING EQUIPMENT**
5-SUBSYSTEM 82
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		6	3.000	18		18
Q-2 60						
Q-3 60		18	3.167	57		57
Q-4 60						
Q-1 61		37	3.135	116		116
Q-2 61						
Q-3 61		53	3.736	198		198
Q-4 61						
Q-1 62	4.5	674	3.736	2518		2518
Q-2 62						
Q-3 62	4.5	764	2.933	2241		2241
Q-4 62						
Q-1 63		-5	3.200	-16		-16
Q-2 63						
Q-3 63	1.5	208	3.423	712		712
Q-4 63						
Q-1 64	1.5	321	3.361	1079		1079
Q-2 64						
Q-3 64		29	3.793	110		110
Q-4 64						
Q-1 65		7	3.286	23		23
Q-2 65						
Q-3 65		3	4.333	13		13
Q-4 65						
Q-1 66		20	4.700	94		94
TOTAL	12.0	2135		7163		7163

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 82
HANDLING EQUIPMENT

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-3 59		16	4.313	69	63	132	
Q-4 59							
Q-1 60	10.5	1776	3.418	6070	6338	12408	3089
Q-2 60							
Q-3 60	28.5	4813	3.547	17073	15679	32752	13225
Q-4 60							
Q-1 61	60.0	10188	3.513	35792	34053	69845	25124
Q-2 61							
Q-3 61	135.0	24456	3.760	91949	86312	178261	94533
Q-4 61							
Q-1 62	250.5	42772	3.464	148175	151755	299930	56970
Q-2 62							
Q-3 62	199.5	33496	3.254	108991	131691	240682	117392
Q-4 62							
Q-1 63	58.5	10112	3.275	33116	28759	61875	-3994
Q-2 63							
Q-3 63	61.5	10506	3.231	33948	57557	91505	-4292
Q-4 63							
Q-1 64	57.0	9783	3.274	32028	36445	68473	21269
Q-2 64							
Q-3 64	54.0	9404	3.571	33582	47015	80597	10656
Q-4 64							
Q-1 65	10.5	1771	7.256	12850	14817	27667	7077
Q-2 65							
Q-3 65	3.0	596	2.723	1623	2293	3916	1025
Q-4 65							
Q-1 66		20	4.700	94	22	116	
TOTAL	928.5	159709		555360	612799	1168159	342074

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
5-SUBSYSTEM 82
HANDLING EQUIPMENT

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 59		132		132
Q-4 59				
Q-1 60	406	15903	303	16206
Q-2 60				
Q-3 60	1739	47716	909	48625
Q-4 60				
Q-1 61	2123	97092	1804	98896
Q-2 61				
Q-3 61	7988	280762	5218	286000
Q-4 61				
Q-1 62	4489	361389	6066	367455
Q-2 62				
Q-3 62	9250	367324	6166	373490
Q-4 62				
Q-1 63	-393	57488	961	58449
Q-2 63				
Q-3 63	-422	86791	1451	88242
Q-4 63				
Q-1 64	2267	92009	1958	93967
Q-2 64				
Q-3 64	3877	95130	2024	97154
Q-4 64				
Q-1 65	2117	36861	983	37844
Q-2 65				
Q-3 65	183	5124	137	5261
Q-4 65				
Q-1 66		116	3	119
TOTAL	33624	1543857	27983	1571840

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

		TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		85600	85600
LABOR AT $ 3.436		294104	294104
ENGR BURDEN AT $ 4.539		388569	388569
TOOLING AND STE		7409604	7409604
LABOR AT $ 3.412		25283570	25283570
PLANNING		572696	572696
LABOR AT $ 3.504		2006823	2006823
TEST/QC		301410	301410
LABOR AT $ 3.422		1031533	1031533
MFG BURDEN AT $ 3.044		25212209	25212209
TOOLING/STE MATL		24730867	24730867
MPC		2190524	2190524
OTHER COST		261038	261038
SUB-TOTAL		81399237	81399237
GEN & ADMIN		1471025	1471025
TOTAL COST		82870262	82870262

TIME-PHASED COST
DETAIL - SEE PAGE II-660

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 8 **TOOLING**
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	1.5	152	4.704	715	690	1405
Q-2 58						
Q-3 58	1.5	308	3.078	948	1168	2116
Q-4 58						
Q-1 59		3	5.333	16	13	29
Q-2 59						
Q-3 59	10.5	1898	3.065	5818	6683	12501
Q-4 59						
Q-1 60	18.0	3217	2.841	9141	12115	21256
Q-2 60						
Q-3 60	27.0	4569	2.912	13303	17327	30630
Q-4 60						
Q-1 61	81.0	13931	2.794	38922	51969	90891
Q-2 61						
Q-3 61	102.0	18528	3.157	58492	77496	135988
Q-4 61						
Q-1 62	105.0	17939	3.913	70191	82749	152940
Q-2 62						
Q-3 62	58.5	9926	3.315	32904	52308	85212
Q-4 62						
Q-1 63	28.5	4893	4.253	20808	26546	47354
Q-2 63						
Q-3 63	34.5	5742	4.433	25455	30832	56287
Q-4 63						
Q-1 64	19.5	3382	3.873	13100	22984	36084
Q-2 64						
Q-3 64	4.5	778	3.284	2555	3531	6086
Q-4 64						
Q-1 65	1.5	256	4.969	1272	1493	2765
Q-2 65						
Q-3 65		78	5.949	464	665	1129
TOTAL	493.5	85600		294104	388569	682673

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8 TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	58.5	9756	3.818	37248	25807	63055
Q-2 58						
Q-3 58	31.5	5241	6.150	32232	9793	42025
Q-4 58						
Q-1 59	121.5	20749	4.487	93095	58510	151605
Q-2 59						
Q-3 59	451.5	79388	3.728	295978	237528	533506
Q-4 59						
Q-1 60	2143.5	371556	3.439	1277811	1109669	2387480
Q-2 60						
Q-3 60	2728.5	458474	3.375	1547305	1340717	2888022
Q-4 60						
Q-1 61	9139.5	1559691	3.546	5530214	4531297	10061511
Q-2 61						
Q-3 61	14541.0	2636675	3.320	8753065	8725373	17478438
Q-4 61						
Q-1 62	5608.5	957201	3.327	3184607	3485648	6670255
Q-2 62						
Q-3 62	2380.5	400027	3.306	1322453	1669037	2991490
Q-4 62						
Q-1 63	1738.5	296731	3.376	1001830	1133150	2134980
Q-2 63						
Q-3 63	653.5	109761	3.586	393617	690728	1084345
Q-4 63						
Q-1 64	2103.0	358874	3.933	1411372	1527398	2938770
Q-2 64						
Q-3 64	687.0	120997	2.385	288613	362423	651036
Q-4 64						
Q-1 65	105.0	18170	5.255	95480	100260	195740
Q-2 65						
Q-3 65	37.5	6261	2.917	18261	19054	37315

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 8 TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66		4	.750	3	42	45
Q-2 66						
Q-3 66		48	8.042	386		386
TOTAL	42529.0	7409604		2528357C	25026434	50310004

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 8 TOOLING
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 61	715.5	122184	3.174	387789	49103	436892
Q-2 61						
Q-3 61	343.5	62214	3.069	190907	26371	217278
Q-4 61						
Q-1 62		7	.142	-1		-1
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	2236.5	375698	3.680	1382427	64642	1447069
Q-4 63						
Q-1 64	36.0	6021	2.550	15354	16464	31818
Q-2 64						
Q-3 64	10.5	1963	7.200	14134	13451	27585
Q-4 64						
Q-1 65	19.5	3351	3.297	11047	9138	20185
Q-2 65						
Q-3 65	6.0	1123	4.185	4700	6016	10716
Q-4 65						
Q-1 66		3				
Q-2 66						
Q-3 66	1.5	132	3.530	466	590	1056
TOTAL	3369.0	572696		2006823	185775	2192598

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8 **TOOLING**
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		1	2.000	2		2
Q-2 58						
Q-3 58		49	5.469	268		268
Q-4 58						
Q-1 59		80	3.038	243		243
Q-2 59						
Q-3 59	9.0	1526	3.080	4700		4700
Q-4 59						
Q-1 60	46.5	8031	3.259	26340		26340
Q-2 60						
Q-3 60	90.0	15231	3.397	51745		51745
Q-4 60						
Q-1 61	229.5	39176	3.317	129950		129950
Q-2 61						
Q-3 61	510.0	92496	3.581	331205		331205
Q-4 61						
Q-1 62	228.0	38973	3.135	122162		122162
Q-2 62						
Q-3 62	112.5	18980	3.207	60861		60861
Q-4 62						
Q-1 63	69.0	11770	3.358	39523		39523
Q-2 63						
Q-3 63	283.5	47607	3.509	167072		167072
Q-4 63						
Q-1 64	97.5	16532	3.677	60795		60795
Q-2 64						
Q-3 64	49.5	8785	3.432	30147		30147
Q-4 64						
Q-1 65	10.5	1771	3.640	6447		6447
Q-2 65						
Q-3 65		49	1.041	51		51

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 8
SUBD OF WORK TOOLING AND STE

TOOLING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	1.5	303	.73	22		22
TOTAL	1737.0	301410		1031533		1031533

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8 TOOLING
SUBD OF WORK TOOLING AND STE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-1 58	60.0	9909	3.831	37965	26497	64462	458
Q-2 58							
Q-3 58	33.0	5598	5.975	33448	10961	44409	-438
Q-4 58							
Q-1 59	121.5	20832	4.481	93354	58523	151877	-20
Q-2 59							
Q-3 59	471.0	82812	3.701	306496	244211	550707	89694
Q-4 59							
Q-1 60	2208.0	382854	3.430	1313292	1121784	2435076	603602
Q-2 60							
Q-3 60	2845.5	478274	3.371	1612353	1358044	2970397	861421
Q-4 60							
Q-1 61	10165.5	1734982	3.508	6086875	4632369	10719244	3487324
Q-2 61							
Q-3 61	15496.5	2809913	3.322	9333669	8829240	18162909	10927409
Q-4 61							
Q-1 62	5941.5	1014120	3.330	3376959	3568397	6945356	4801644
Q-2 62							
Q-3 62	2551.5	428933	3.302	1416218	1721345	3137563	2253043
Q-4 62							
Q-1 63	1836.0	313394	3.389	1062161	1159696	2221857	672399
Q-2 63							
Q-3 63	3208.0	538808	3.654	1968571	786202	2754773	406708
Q-4 63							
Q-1 64	2256.0	384809	3.900	1500621	1566846	3067467	395234
Q-2 64							
Q-3 64	751.5	132523	2.531	335449	379405	714854	115946
Q-4 64							
Q-1 65	136.5	23548	4.852	114246	110891	225137	83678
Q-2 65							
Q-3 65	43.5	7511	3.126	23476	25735	49211	-6550
Q-4 65							
Q-1 66	1.5	310	.81	25	42	67	3791

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8 **TOOLING**
SUBD OF WORK TOOLING AND STE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-2 66							
Q-3 66	1.5	180	4.733	852	590	1442	35524
TOTAL	48128.5	8369310		28616030	25600778	54216808	24730867

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING

4-SYSTEM 8
SUBD OF WORK TOOLING AND STE

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58	25		64945		64945
Q-2 58					
Q-3 58	-24		43947		43947
Q-4 58					
Q-1 59	-1		151856		151856
Q-2 59					
Q-3 59	7597	6411	654409		654409
Q-4 59					
Q-1 60	79373	17573	3135624	59743	3195367
Q-2 60					
Q-3 60	113277	5785	3950880	75276	4026156
Q-4 60					
Q-1 61	294679	43741	14544988	270289	14815277
Q-2 61					
Q-3 61	923366	159465	30173149	560707	30733856
Q-4 61					
Q-1 62	378369	48035	12173404	204329	12377733
Q-2 62					
Q-3 62	177538	-24940	5543204	93043	5636247
Q-4 62					
Q-1 63	65653	625	2960534	49500	3010034
Q-2 63					
Q-3 63	39528	-5776	3195233	53424	3248657
Q-4 63					
Q-1 64	42132	3702	3508535	74654	3583189
Q-2 64					
Q-3 64	42182	3603	876585	18652	895237
Q-4 64					
Q-1 65	25027	2110	335952	8963	344915
Q-2 65					
Q-3 65	-1168	704	42197	1127	43324
Q-4 65					
Q-1 66	786		4644	139	4783

C-8.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8 TOOLING
SUBD OF WORK TOOLING AND STE

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66					
Q-3 66	2185		39151	1179	40330
TOTAL	2190524	261038	81399237	1471025	82870262

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	60.0	9909	3.831	37965	26497	64462	
Q-2 58							
Q-3 58	33.0	5598	5.975	33448	10961	44409	
Q-4 58							
Q-1 59	121.5	20832	4.481	93354	58523	151877	
Q-2 59							
Q-3 59	471.0	82812	3.701	306496	244211	550707	
Q-4 59							
Q-1 60	2208.0	382854	3.430	1313292	1121784	2435076	
Q-2 60							
Q-3 60	2845.5	478274	3.371	1612353	1358044	2970397	
Q-4 60							
Q-1 61	10165.5	1734982	3.508	6086875	4632369	10719244	
Q-2 61							
Q-3 61	15496.5	2809913	3.322	9333669	8829240	18162909	
Q-4 61							
Q-1 62	5941.5	1014120	3.330	3376959	3568397	6945356	
Q-2 62							
Q-3 62	2551.5	428933	3.302	1416218	1721345	3137563	
Q-4 62							
Q-1 63	1836.0	313394	3.389	1062161	1159696	2221857	
Q-2 63							
Q-3 63	3208.0	538808	3.654	1968571	786202	2754773	
Q-4 63							
Q-1 64	2256.0	384809	3.900	1500621	1566846	3067467	
Q-2 64							
Q-3 64	751.5	132523	2.531	335449	379405	714854	
Q-4 64							
Q-1 65	136.5	23548	4.852	114246	110891	225137	
Q-2 65							
Q-3 65	43.5	7511	3.126	23476	25735	49211	
Q-4 65							
Q-1 66	1.5	310	.81	25	42	67	

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENG MAT
Q-2 66							
Q-3 66	1.5	180	4.733	852	590	1442	
TOTAL	48128.5	8369310		28616030	25600778	54216808	

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

	TOOL/STE MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58	458	458	25		64945		64945
Q-2 58							
Q-3 58	-438	-438	-24		43947		43947
Q-4 58							
Q-1 59	-20	-20	-1		151856		151856
Q-2 59							
Q-3 59	89694	89694	7597	6411	654409		654409
Q-4 59							
Q-1 60	603602	603602	79373	17573	3135624	59743	3195367
Q-2 60							
Q-3 60	861421	861421	113277	5785	3950880	75276	4026156
Q-4 60							
Q-1 61	3487324	3487324	294679	43741	14544988	270289	14815277
Q-2 61							
Q-3 61	10927409	10927409	923366	159465	30173149	560707	30733856
Q-4 61							
Q-1 62	4801644	4801644	378369	48035	12173404	204329	12377733
Q-2 62							
Q-3 62	2253043	2253043	177538	-24940	5543204	93043	5636247
Q-4 62							
Q-1 63	672399	672399	65653	625	2960534	49500	3010034
Q-2 63							
Q-3 63	406708	406708	39528	-5776	3195233	53424	3248657
Q-4 63							
Q-1 64	395234	395234	42132	3702	3508535	74654	3583189
Q-2 64							
Q-3 64	115946	115946	42182	3603	876585	18652	895237
Q-4 64							
Q-1 65	83678	83678	25027	2110	335952	8963	344915
Q-2 65							
Q-3 65	-6550	-6550	-1168	704	42197	1127	43324
Q-4 65							
Q-1 66	3791	3791	786		4644	139	4783

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 8
TOOLING

	TOOL/STE MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66							
Q-3 66	35524	35524	2185		39151	1179	40330
TOTAL	24730867	24730867	2190524	261038	81399237	1471025	82870262

OTHER PROGRAM ELEMENTS WBS 9.0

This item has been established to collect those costs which can not be associated with any other element of the Work Breakdown Structure. The level 5 items and their definitions contained in Other Program Elements are:

			Cost Data	
9.90	Preproduction	$ 1,815,287	pg.	II-680
9.91	Training	$ 868,720	pg.	II-707
9.92	Publications	$ 2,310,296	pg.	II-713
9.93	Photographic Photo Lab	$ 442,260	pg.	II-720
9.94	Reliability	$ 825,886	pg.	II-724
9.95	Producibility	$ 0		
9.96	Computing	$ 1,948,323	pg.	II-728
9.97	Photo-Template Lab	$ 255,698	pg.	II-735
9.98	Termination Costs	$ 7,574,353	pg.	II-739
	Total WBS 9.0	$ 16,040,823	pg.	II-746

9.90 Preproduction — $ 1,815,287

Costs contained in this item represent the labor and purchased services associated with the design of initial layout, set-up and rearrangement of the production department including the assembly and test areas for the B-70 program. These costs include installation of assembly jigs and fixtures, utilities where required for operation of contract tools, material handling equipment, storage equipment, and work benches. Also included is the effort to determine the types of special tools and special test equipment required to support assembly operations. Excluded from this item is the cost incurred in connection with the design, acquisition and installation of contract instrumentation and test equipment and the installation of simulators and related equipment.

9.91 Training — $ 868,720

This item contains all identifiable engineering labor, burden and material costs associated with the personnel training program and the supplying of technical services to the customer.

9.92 Publications — $ 2,310,296

Costs reported in this item represent all identiable Engineering and Logistics labor, burden and material charges required to prepare and deliver publications, charts, slides, films etc. as required by the contract. Included are the publication costs associated with the preparation and delivery of:

a) Flight Manuals
b) Maintenance Instructions Manuals
c) Structural Repair Manuals
d) Illustrated Parts Breakdown Manual
e) Parts Application Data List

f) Numerical Drawing List
g) Modification Instruction Manual
h) Technical Training Transparencies and Slides
i) Motion Pictures

Costs to research, analysis and prepare the technical data included in these items is not contained in this WBS item.

9.93 Photographic Photo Lab $ 442,260

Costs identified to this WBS item included the expenditures for developing, processing, and analyzing photographic data generated by test instrumentation.

9.94 Reliability $ 825,886

Contained in this WBS item are the identifiable costs for the establishment and implementation of an organized reliability and crew safety program. This program assured retention of reliability through design, development, testing, manufacturing and flight testing.

9.95 Producibility $ 0

No costs were assigned to this item as the data could not be identified from the subsystems.

9.96 Computing $ 1,948,323

This WBS item contains the technical programming effort related to the problems solving and data analysis functions identified specifically as being B-70 unique. Machine costs and general programming effort not related specifically to the B-70 program are not included in this item but are contained in the "Other Cost Dollars" Element of Cost.

9.97 Photo-Template Lab $ 255,698

This WBS item contains all identifiable costs associated with the fabrication of instrument panels utilizing the photo-template processes.

9.98 Termination Costs $ 7,574,353

Data contained in this WBS item includes the identifiable in-house and subcontractor costs paid as the result of the termination of a contract for the convenience of the government. These costs are associated primarily with the termination of Air Vehicle No. 3 and the program redirection from 11 YB-70's to 3XB-70's. Termination costs associated with the initial program redirection from the RS-70 program to the XB-70 program can not be identified. They are included in the in-house and supplier costs displayed in the subsystems. Included are such items as severance pay, settlement of suppliers' claims, preparation of redirection documents, disposal of redirected materials, processing of redirected employees, etc.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

		5-SUBSYS 90	5-SUBSYS 91	5-SUBSYS 92	5-SUBSYS 93
		HOURS / DOLLARS	HOURS / DOLLARS	HOURS / DOLLARS	HOURS / DOLLARS
DESIGN/ENGINEERING		8922	104274	210947	46644
LABOR AT $ 4.814		38128	462569	968036	230590
ENGR BURDEN AT $ 4.682		39181	401368	1105284	204502
PRODUCTION		64772			
LABOR AT $ 3.110		201412			
SHOP SUPPORT		7386			
LABOR AT $ 3.022		22321			
TOOLING AND STE		100268			
LABOR AT $ 3.508		351743			
PLANNING		960			
LABOR AT $ 3.203		3075			
TEST/QC		12562			
LABOR AT $ 3.475		43657			
MFG BURDEN AT $ 3.650		678796			
ENGR MATERIAL		11413	1434	129711	
MFG MATERIAL		65232			
TOOLING/STE MATL		289149			
MPC		37169	136	21244	
OTHER COST		454	903	39254	
SUB-TOTAL		1781730	866410	2263529	435092
GEN & ADMIN		33557	2310	46767	7168
TOTAL COST		1815287	868720	2310296	442260

SUBDIVISION OF WORK COST DETAIL - SEE PAGE II-680 II-707 II-713 II-720

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	5-SUBSYS 94	5-SUBSYS 96	5-SUBSYS 97	5-SUBSYS 98
	HOURS / DOLLARS	HOURS / DOLLARS	HOURS / DOLLARS	HOURS / DOLLARS
DESIGN/ENGINEERING	83785	194434	28164	
LABOR AT $ 4.814	418454	1005464	136957	
ENGR BURDEN AT $ 4.682	393933	911337	115198	
PRODUCTION				
LABOR AT $ 3.110				
SHOP SUPPORT				
LABOR AT $ 3.022				
TOOLING AND STE				
LABOR AT $ 3.508				
PLANNING				
LABOR AT $ 3.203				
TEST/QC				
LABOR AT $ 3.475				
MFG BURDEN AT $ 3.650				
ENGR MATERIAL				
MFG MATERIAL				
TOOLING/STE MATL				
MPC				
OTHER COST				7414547
SUB-TOTAL	812387	1916801	252155	7414547
GEN & ADMIN	13499	31522	3543	159806
TOTAL COST	825886	1948323	255698	7574353
SUBDIVISION OF WORK COST DETAIL - SEE PAGE	II-724	II-728	II-735	II-739

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	677170
LABOR AT $ 4.814	3260198
ENGR BURDEN AT $ 4.682	3170803
PRODUCTION	64772
LABOR AT $ 3.110	201412
SHOP SUPPORT	7386
LABOR AT $ 3.022	22321
TOOLING AND STE	100268
LABOR AT $ 3.508	351743
PLANNING	960
LABOR AT $ 3.203	3075
TEST/QC	12562
LABOR AT $ 3.475	43657
MFG BURDEN AT $ 3.650	678796
ENGR MATERIAL	142558
MFG MATERIAL	65232
TOOLING/STE MATL	289149
MPC	58549
OTHER COST	7455158
SUB-TOTAL	15742651
GEN & ADMIN	298172
TOTAL COST	16040823

SUBDIVISION OF WORK
COST DETAIL - SEE PAGE II-746

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

		DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOOLING AND STE HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		3900	4431	591	8922
LABOR AT $ 4.273		18816	16668	2644	38128
ENGR BURDEN AT $	4.392	14745	21142	3294	39181
PRODUCTION			64772		64772
LABOR AT $ 3.110			201412		201412
SHOP SUPPORT		7386			7386
LABOR AT $ 3.022		22321			22321
TOOLING AND STE				100268	100268
LABOR AT $ 3.508				351743	351743
PLANNING			562	398	960
LABOR AT $ 3.203			1826	1249	3075
TEST/QC		653	10639	1270	12562
LABOR AT $ 3.475		2005	37275	4377	43657
MFG BURDEN AT $	3.650	25902	286833	366061	678796
ENGR MATERIAL		11413			11413
MFG MATERIAL			65232		65232
TOOLING/STE MATL				289149	289149
MPC		1438	6781	28950	37169
OTHER COST		163	291		454
SUB-TOTAL		96803	637460	1047467	1781730
GEN & ADMIN		1837	11951	19769	33557
TOTAL COST		98640	649411	1067236	1815287

TIME-PHASED COST DETAIL-SEE PAGE II-681 II-686 II-692 II-698

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 90 PREPRODUCTION
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	7.5	1303	5.232	6817	4899	11716
Q-2 60						
Q-3 60	10.5	1862	4.523	8422	6948	15370
Q-4 60						
Q-1 61	3.0	525	5.105	2680	1781	4461
Q-2 61						
Q-3 61	1.5	185	4.081	755	995	1750
Q-4 61						
Q-1 62		25	5.680	142	115	257
Q-2 62						
Q-3 62					7	7
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	22.5	3900		18816	14745	33561

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 9
5-SUBSYSTEM 90 PREPRODUCTION
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	12.0	2124	2.803	5953	8679	14632
Q-2 60						
Q-3 60	22.5	3793	3.079	11680	12042	23722
Q-4 60						
Q-1 61	9.0	1435	3.203	4596	4777	9373
Q-2 61						
Q-3 61		34	2.706	92	404	496
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	43.5	7386		22321	25902	48223

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK DESIGN/ENGINEERING

PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	249	3.446	858		858
Q-2 60						
Q-3 60	1.5	275	2.964	815		815
Q-4 60						
Q-1 61		110	2.545	280		280
Q-2 61						
Q-3 61		19	2.737	52		52
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	3.0	653		2005		2005

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK DESIGN/ENGINEERING

PREPRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 60	21.0	3676	3.707	13628	13578	27206	2596
Q-2 60							
Q-3 60	34.5	5930	3.527	20917	18990	39907	7497
Q-4 60							
Q-1 61	12.0	2070	3.650	7556	6558	14114	1295
Q-2 61							
Q-3 61	1.5	238	3.777	899	1399	2298	8
Q-4 61							
Q-1 62		25	5.680	142	115	257	17
Q-2 62							
Q-3 62					7	7	
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63							
TOTAL	69.0	11939		43142	40647	83789	11413

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK DESIGN/ENGINEERING

PREPRODUCTION

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60	341		30143	574	30717
Q-2 60					
Q-3 60	986	453	48843	931	49774
Q-4 60					
Q-1 61	109	29	15547	289	15836
Q-2 61					
Q-3 61	1	5	2312	43	2355
Q-4 61					
Q-1 62	1		275	5	280
Q-2 62					
Q-3 62			7		7
Q-4 62					
Q-1 63		-485	-485	-8	-493
Q-2 63					
Q-3 63		161	161	3	164
TOTAL	1438	163	96803	1837	98640

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 90 PREPRODUCTION
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		8	2.625	21	28	49
Q-2 60						
Q-3 60	4.5	751	3.073	2308	2810	5118
Q-4 60						
Q-1 61	12.0	2019	3.340	6743	7835	14578
Q-2 61						
Q-3 61	1.5	254	3.839	975	1906	2881
Q-4 61						
Q-1 62	1.5	161	3.472	559	744	1303
Q-2 62						
Q-3 62					40	40
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		72	8.347	601	404	1005
Q-4 63						
Q-1 64	7.5	1165	4.688	5461	7031	12492
Q-2 64						
Q-3 64		1			344	344
TOTAL	27.0	4431		16668	21142	37810

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK PRODUCTION

PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	15.0	2535	3.409	8641	11495	20136
Q-2 60						
Q-3 60	147.0	24680	3.075	75894	100779	176673
Q-4 60						
Q-1 61	129.0	21979	3.123	68643	89110	157753
Q-2 61						
Q-3 61	46.5	8500	2.963	25188	47942	73130
Q-4 61						
Q-1 62	18.0	3062	2.910	8911	17899	26810
Q-2 62						
Q-3 62					594	594
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	9.0	1587	4.100	6506	6180	12686
Q-4 63						
Q-1 64	15.0	2502	3.133	7839	13077	20916
Q-2 64						
Q-3 64		-73	2.877	-210	-415	-625
TOTAL	379.5	64772		201412	286661	488073

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING
5-SUBSYSTEM 9 0
SUBD OF WORK PRODUCTION

PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61		40	2.875	115	18	133
Q-4 61						
Q-1 62		9	3.556	32	6	38
Q-2 62						
Q-3 62					1	1
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	3.0	483	3.255	1572		1572
Q-4 63						
Q-1 64		30	3.500	105	145	250
Q-2 64						
Q-3 64				2	2	4
TOTAL	3.0	562		1826	172	1998

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9 PREPRODUCTION
5-SUBSYSTEM 90
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	378	2.915	1102		1102
Q-2 60						
Q-3 60	13.5	2300	3.499	8048		8048
Q-4 60						
Q-1 61	19.5	3450	3.171	10939		10939
Q-2 61						
Q-3 61	13.5	2579	3.399	8767		8767
Q-4 61						
Q-1 62	9.0	1626	4.188	6809		6809
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		13	7.462	97		97
Q-4 63						
Q-1 64	1.5	284	5.229	1485		1485
Q-2 64						
Q-3 64		9	3.111	28		28
TOTAL	58.5	10639		37275		37275

C-13

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK PRODUCTION

PREPRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-1 60	16.5	2921	3.343	9764	11523	21287	585
Q-2 60							
Q-3 60	165.0	27731	3.110	86250	103589	189839	23519
Q-4 60							
Q-1 61	160.5	27448	3.145	86325	96945	183270	22200
Q-2 61							
Q-3 61	61.5	11373	3.081	35045	49866	84911	5808
Q-4 61							
Q-1 62	28.5	4858	3.358	16311	18649	34960	1933
Q-2 62							
Q-3 62					635	635	1516
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63	12.0	2155	4.072	8776	6584	15360	6871
Q-4 63							
Q-1 64	24.0	3981	3.740	14890	20253	35143	2778
Q-2 64							
Q-3 64		-63	2.857	-180	-69	-249	22
TOTAL	468.0	80404		257181	307975	565156	65232

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK PRODUCTION

PREPRODUCTION

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60	77		21949	418	22367
Q-2 60					
Q-3 60	3093		216451	4124	220575
Q-4 60					
Q-1 61	1876		207346	3853	211199
Q-2 61					
Q-3 61	491		91210	1695	92905
Q-4 61					
Q-1 62	152		37045	622	37667
Q-2 62					
Q-3 62	119		2270	38	2308
Q-4 62					
Q-1 63					
Q-2 63					
Q-3 63	677	291	23199	388	23587
Q-4 63					
Q-1 64	296		38217	813	39030
Q-2 64					
Q-3 64			-227		-227
TOTAL	6781	291	637460	11951	649411

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 90 PREPRODUCTION
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		19	4.105	78	71	149
Q-4 60						
Q-1 61		5	3.200	16	17	33
Q-2 61						
Q-3 61	1.5	195	3.621	706	865	1571
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		30	3.400	102	166	268
Q-4 63						
Q-1 64	1.5	175	4.543	795	1062	1857
Q-2 64						
Q-3 64	1.5	167	5.671	947	1113	2060
TOTAL	4.5	591		2644	3294	5938

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK TOOLING AND STE

PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		5	2.200	11	13	24
Q-4 59						
Q-1 60	9.0	1610	3.376	5436	4612	10048
Q-2 60						
Q-3 60	145.5	24383	3.309	80687	79804	160491
Q-4 60						
Q-1 61	94.5	16098	3.262	52518	53803	106321
Q-2 61						
Q-3 61	70.5	12904	3.860	49810	48540	98350
Q-4 61						
Q-1 62	39.0	6652	3.411	22691	25061	47752
Q-2 62						
Q-3 62	9.0	1464	2.794	4091	7060	11151
Q-4 62						
Q-1 63	18.0	3083	3.299	10171	11746	21917
Q-2 63						
Q-3 63	66.0	11007	3.607	39698	40325	80023
Q-4 63						
Q-1 64	96.0	16320	3.968	64757	67892	132649
Q-2 64						
Q-3 64	31.5	5422	3.186	17272	20190	37462
Q-4 64						
Q-1 65	7.5	1260	3.439	4333	6509	10842
Q-2 65						
Q-3 65		60	4.467	268	297	565
TOTAL	586.5	100268		351743	365852	717595

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 9 PREPRODUCTION
5-SUBSYSTEM 90
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		8	2.625	21		21
Q-4 60						
Q-1 61		98	2.888	283		283
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	1.5	262	3.179	833	97	930
Q-4 63						
Q-1 64		26	3.615	94	94	188
Q-2 64						
Q-3 64		4	4.500	18	18	36
TOTAL	1.5	398		1249	209	1458

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK TOOLING AND STE

PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		19	3.105	59		59
Q-2 60						
Q-3 60	1.5	296	3.247	961		961
Q-4 60						
Q-1 61	3.0	476	3.431	1633		1633
Q-2 61						
Q-3 61		37	2.919	108		108
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		4	3.250	13		13
Q-4 62						
Q-1 63		5	4.000	20		20
Q-2 63						
Q-3 63	1.5	227	3.573	811		811
Q-4 63						
Q-1 64		59	3.898	230		230
Q-2 64						
Q-3 64		41	3.805	156		156
Q-4 64						
Q-1 65		106	3.642	386		386
TOTAL	6.0	1270		4377		4377

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
SUBD OF WORK TOOLING AND STE

PREPRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-3 59		5	2.200	11	13	24	
Q-4 59							
Q-1 60	9.0	1629	3.373	5495	4612	10107	405
Q-2 60							
Q-3 60	147.0	24706	3.309	81747	79875	161622	42374
Q-4 60							
Q-1 61	97.5	16677	3.265	54450	53820	108270	35983
Q-2 61							
Q-3 61	72.0	13136	3.854	50624	49405	100029	72363
Q-4 61							
Q-1 62	39.0	6652	3.411	22691	25061	47752	56015
Q-2 62							
Q-3 62	9.0	1468	2.796	4104	7060	11164	41095
Q-4 62							
Q-1 63	18.0	3088	3.300	10191	11746	21937	
Q-2 63							
Q-3 63	69.0	11526	3.596	41444	40588	82032	1548
Q-4 63							
Q-1 64	97.5	16580	3.973	65876	69048	134924	30866
Q-2 64							
Q-3 64	33.0	5634	3.265	18393	21321	39714	8210
Q-4 64							
Q-1 65	7.5	1366	3.455	4719	6509	11228	290
Q-2 65							
Q-3 65		60	4.467	268	297	565	
TOTAL	598.5	102527		360013	369355	729368	289149

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90 **PREPRODUCTION**
SUBD OF WORK TOOLING AND STE

	MPC	SUB TOTAL	G & A	TOTAL COST
Q-3 59		24		24
Q-4 59				
Q-1 60	53	10565	201	10766
Q-2 60				
Q-3 60	5572	209568	3993	213561
Q-4 60				
Q-1 61	3041	147294	2737	150031
Q-2 61				
Q-3 61	6115	178507	3317	181824
Q-4 61				
Q-1 62	4414	108181	1816	109997
Q-2 62				
Q-3 62	3238	55497	932	56429
Q-4 62				
Q-1 63		21937	367	22304
Q-2 63				
Q-3 63	152	83732	1400	85132
Q-4 63				
Q-1 64	3290	169080	3598	172678
Q-2 64				
Q-3 64	2987	50911	1083	51994
Q-4 64				
Q-1 65	88	11606	310	11916
Q-2 65				
Q-3 65		565	15	580
TOTAL	28950	1047467	19769	1067236

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	7.5	1311	5.216	6838	4927	11765
Q-2 60						
Q-3 60	15.0	2632	4.106	10808	9829	20637
Q-4 60						
Q-1 61	15.0	2549	3.703	9439	9633	19072
Q-2 61						
Q-3 61	3.0	634	3.842	2436	3766	6202
Q-4 61						
Q-1 62	1.5	186	3.769	701	859	1560
Q-2 62						
Q-3 62					47	47
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		102	6.892	703	570	1273
Q-4 63						
Q-1 64	7.5	1340	4.669	6256	8093	14349
Q-2 64						
Q-3 64	1.5	168	5.637	947	1457	2404
TOTAL	51.0	8922		38128	39181	77309

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PRODUCTION
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	15.0	2535	3.409	8641	11495	20136
Q-2 60						
Q-3 60	147.0	24680	3.075	75894	100779	176673
Q-4 60						
Q-1 61	129.0	21979	3.123	68643	89110	157753
Q-2 61						
Q-3 61	46.5	8500	2.963	25188	47942	73130
Q-4 61						
Q-1 62	18.0	3062	2.910	8911	17899	26810
Q-2 62						
Q-3 62					594	594
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	9.0	1587	4.100	6506	6180	12686
Q-4 63						
Q-1 64	15.0	2502	3.133	7839	13077	20916
Q-2 64						
Q-3 64		-73	2.877	-210	-415	-625
TOTAL	379.5	64772		201412	286661	488073

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	12.0	2124	2.803	5953	8679	14632
Q-2 60						
Q-3 60	22.5	3793	3.079	11680	12042	23722
Q-4 60						
Q-1 61	9.0	1435	3.203	4596	4777	9373
Q-2 61						
Q-3 61		34	2.706	92	404	496
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
TOTAL	43.5	7386		22321	25902	48223

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		5	2.200	11	13	24
Q-4 59						
Q-1 60	9.0	1610	3.376	5436	4612	10048
Q-2 60						
Q-3 60	145.5	24383	3.309	80687	79804	160491
Q-4 60						
Q-1 61	94.5	16098	3.262	52518	53803	106321
Q-2 61						
Q-3 61	70.5	12904	3.860	49810	48540	98350
Q-4 61						
Q-1 62	39.0	6652	3.411	22691	25061	47752
Q-2 62						
Q-3 62	9.0	1464	2.794	4091	7060	11151
Q-4 62						
Q-1 63	18.0	3083	3.299	10171	11746	21917
Q-2 63						
Q-3 63	66.0	11007	3.607	39698	40325	80023
Q-4 63						
Q-1 64	96.0	16320	3.968	64757	67892	132649
Q-2 64						
Q-3 64	31.5	5422	3.186	17272	20190	37462
Q-4 64						
Q-1 65	7.5	1260	3.439	4333	6509	10842
Q-2 65						
Q-3 65		60	4.467	268	297	565
TOTAL	586.5	100268		351743	365852	717595

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		8	2.625	21		21
Q-4 60						
Q-1 61		98	2.888	283		283
Q-2 61						
Q-3 61		40	2.875	115	18	133
Q-4 61						
Q-1 62		9	3.556	32	6	38
Q-2 62						
Q-3 62					1	1
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	4.5	745	3.228	2405	97	2502
Q-4 63						
Q-1 64		56	3.554	199	239	438
Q-2 64						
Q-3 64		4	5.000	20	20	40
TOTAL	4.5	960		3075	381	3456

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	4.0	646	3.125	2019		2019
Q-2 60						
Q-3 60	16.5	2871	3.422	9824		9824
Q-4 60						
Q-1 61	24.0	4036	3.184	12852		12852
Q-2 61						
Q-3 61	15.0	2635	3.388	8927		8927
Q-4 61						
Q-1 62	9.0	1626	4.188	6809		6809
Q-2 62						
Q-3 62		4	3.250	13		13
Q-4 62						
Q-1 63		5	4.000	20		20
Q-2 63						
Q-3 63	1.5	240	3.783	908		908
Q-4 63						
Q-1 64	1.5	343	5.000	1715		1715
Q-2 64						
Q-3 64		50	3.680	184		184
Q-4 64						
Q-1 65		106	3.642	386		386
TOTAL	71.5	12562		43657		43657

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-3 59		5	2.200	11	13	24	
Q-4 59							
Q-1 60	47.5	8226	3.512	28887	29713	58600	2596
Q-2 60							
Q-3 60	346.5	58367	3.237	188914	202454	391368	7497
Q-4 60							
Q-1 61	271.5	46195	3.211	148331	157323	305654	1295
Q-2 61							
Q-3 61	135.0	24747	3.498	86568	100670	187238	8
Q-4 61							
Q-1 62	67.5	11535	3.393	39144	43825	82969	17
Q-2 62							
Q-3 62	9.0	1468	2.796	4104	7702	11806	
Q-4 62							
Q-1 63	18.0	3088	3.300	10191	11746	21937	
Q-2 63							
Q-3 63	81.0	13681	3.671	50220	47172	97392	
Q-4 63							
Q-1 64	120.0	20561	3.928	80766	89301	170067	
Q-2 64							
Q-3 64	33.0	5571	3.269	18213	21252	39465	
Q-4 64							
Q-1 65	7.5	1366	3.455	4719	6509	11228	
Q-2 65							
Q-3 65		60	4.467	268	297	565	
TOTAL	1136.5	194870		660336	717977	1378313	11413

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

	MFG MATL	TOOL/STE MATL	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A
Q-3 59						24	
Q-4 59							
Q-1 60	585	405	3586	471		62657	1193
Q-2 60							
Q-3 60	23519	42374	73390	9651	453	474862	9048
Q-4 60							
Q-1 61	22200	35983	59478	5026	29	370187	6879
Q-2 61							
Q-3 61	5808	72363	78179	6607	5	272029	5055
Q-4 61							
Q-1 62	1933	56015	57965	4567		145501	2443
Q-2 62							
Q-3 62	1516	41095	42611	3357		57774	970
Q-4 62							
Q-1 63					-485	21452	359
Q-2 63							
Q-3 63	6871	1548	8419	829	452	107092	1791
Q-4 63							
Q-1 64	2778	30866	33644	3586		207297	4411
Q-2 64							
Q-3 64	22	8210	8232	2987		50684	1083
Q-4 64							
Q-1 65		290	290	88		11606	310
Q-2 65							
Q-3 65						565	15
TOTAL	65232	289149	365794	37169	454	1781730	33557

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 90
PREPRODUCTION

	TOTAL COST
Q-3 59	24
Q-4 59	
Q-1 60	63850
Q-2 60	
Q-3 60	483910
Q-4 60	
Q-1 61	377066
Q-2 61	
Q-3 61	277084
Q-4 61	
Q-1 62	147944
Q-2 62	
Q-3 62	58744
Q-4 62	
Q-1 63	21811
Q-2 63	
Q-3 63	108883
Q-4 63	
Q-1 64	211708
Q-2 64	
Q-3 64	51767
Q-4 64	
Q-1 65	11916
Q-2 65	
Q-3 65	580
TOTAL	1815287

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 91
TRAINING

	DESIGN /ENGR HOURS DOLLARS	PROD HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	104274		104274
LABOR AT $ 4.436	462569		462569
ENGR BURDEN AT $ 3.849	401368		401368
ENGR MATERIAL	1434		1434
MPC	136		136
OTHER COST	903		903
SUB-TOTAL	866410		866410
GEN & ADMIN	2310		2310
TOTAL COST	868720		868720

TIME-PHASED COST
DETAIL-SEE PAGE II-708

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 91 TRAINING
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	27.0	4510	4.273	19271	20519	39790
Q-2 58						
Q-3 58	234.0	39429	4.250	167576	156883	324459
Q-4 58						
Q-1 59	184.5	31522	4.285	135062	115229	250291
Q-2 59						
Q-3 59	87.0	15291	4.686	71647	57227	128874
Q-4 59						
Q-1 60	42.0	7279	4.905	35700	26827	62527
Q-2 60						
Q-3 60		46	6.217	286	55	341
Q-4 60						
Q-1 61	34.5	5850	5.433	31784	19836	51620
Q-2 61						
Q-3 61		75	4.107	308	3275	3583
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63	1.5	272	3.438	935	1477	2412
Q-2 63						
Q-3 63					40	40
TOTAL	610.5	104274		462569	401368	863937

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 91 **TRAINING**
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENG MAT
Q-1 58	27.0	4510	4.273	19271	20519	39790	
Q-2 58							
Q-3 58	234.0	39429	4.250	167576	156883	324459	
Q-4 58							
Q-1 59	184.5	31522	4.285	135062	115229	250291	
Q-2 59							
Q-3 59	87.0	15291	4.686	71647	57227	128874	
Q-4 59							
Q-1 60	42.0	7279	4.905	35700	26827	62527	
Q-2 60							
Q-3 60		46	6.217	286	55	341	
Q-4 60							
Q-1 61	34.5	5850	5.433	31784	19836	51620	
Q-2 61							
Q-3 61		75	4.107	308	3275	3583	
Q-4 61							
Q-1 62							
Q-2 62							
Q-3 62							27
Q-4 62							
Q-1 63	1.5	272	3.438	935	1477	2412	154
Q-2 63							
Q-3 63					40	40	-38
TOTAL	610.5	104274		462569	401368	863937	143

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 91 TRAINING
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			39790		39790
Q-2 58					
Q-3 58			324459		324459
Q-4 58					
Q-1 59			250291		250291
Q-2 59					
Q-3 59			128874		128874
Q-4 59					
Q-1 60		815	63342	1207	64549
Q-2 60					
Q-3 60			341	6	347
Q-4 60					
Q-1 61		88	51708	961	52669
Q-2 61					
Q-3 61		506	4089	76	4165
Q-4 61					
Q-1 62		-506	-506	-8	-514
Q-2 62					
Q-3 62	22	11	308	5	313
Q-4 62					
Q-1 63	152		4112	69	4181
Q-2 63					
Q-3 63	-38	-11	-398	-6	-404
TOTAL	136	903	866410	2310	868720

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 91
TRAINING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	27.0	4510	4.273	19271	20519	39790	
Q-2 58							
Q-3 58	234.0	39429	4.250	167576	156883	324459	
Q-4 58							
Q-1 59	184.5	31522	4.285	135062	115229	250291	
Q-2 59							
Q-3 59	87.0	15291	4.686	71647	57227	128874	
Q-4 59							
Q-1 60	42.0	7279	4.905	35700	26827	62527	
Q-2 60							
Q-3 60		46	6.217	286	55	341	
Q-4 60							
Q-1 61	34.5	5850	5.433	31784	19836	51620	
Q-2 61							
Q-3 61		75	4.107	308	3275	3583	
Q-4 61							
Q-1 62							
Q-2 62							
Q-3 62							275
Q-4 62							
Q-1 63	1.5	272	3.438	935	1477	2412	1548
Q-2 63							
Q-3 63					40	40	-389
TOTAL	610.5	104274		462569	401368	863937	1434

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 91
TRAINING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			39790		39790
Q-2 58					
Q-3 58			324459		324459
Q-4 58					
Q-1 59			250291		250291
Q-2 59					
Q-3 59			128874		128874
Q-4 59					
Q-1 60		815	63342	1207	64549
Q-2 60					
Q-3 60			341	6	347
Q-4 60					
Q-1 61		88	51708	961	52669
Q-2 61					
Q-3 61		506	4089	76	4165
Q-4 61					
Q-1 62		-506	-506	-8	-514
Q-2 62					
Q-3 62	22	11	308	5	313
Q-4 62					
Q-1 63	152		4112	69	4181
Q-2 63					
Q-3 63	-38	-11	-398	-6	-404
TOTAL	136	903	866410	2310	868720

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 92
PUBLICATIONS

	DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	210947	210947
LABOR AT $ 4.589	968036	968036
ENGR BURDEN AT $ 5.240	1105284	1105284
ENGR MATERIAL	129711	129711
MPC	21244	21244
OTHER COST	39254	39254
SUB-TOTAL	2263529	2263529
GEN & ADMIN	46767	46767
TOTAL COST	2310296	2310296

TIME-PHASED COST
DETAIL-SEE PAGE II-714

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 92 PUBLICATIONS
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	3.0	443	3.898	1727	2012	3739
Q-2 58						
Q-3 58	1.5	169	3.740	632	457	1089
Q-4 58						
Q-1 59	4.5	771	3.949	3045	2739	5784
Q-2 59						
Q-3 59	22.5	4069	3.969	16149	16127	32276
Q-4 59						
Q-1 60	16.5	2816	4.452	12536	12197	24733
Q-2 60						
Q-3 60	18.0	2951	4.456	13151	12403	25554
Q-4 60						
Q-1 61	27.0	4626	4.473	20692	18280	38972
Q-2 61						
Q-3 61	30.0	5403	4.738	25598	24805	50403
Q-4 61						
Q-1 62	58.5	9899	4.719	46718	43354	90072
Q-2 62						
Q-3 62	178.5	30012	4.189	125719	130973	256692
Q-4 62						
Q-1 63	201.0	34204	4.333	148202	159773	307975
Q-2 63						
Q-3 63	168.0	28165	4.479	126154	143718	269872
Q-4 63						
Q-1 64	145.5	24784	4.556	112912	130425	243337
Q-2 64						
Q-3 64	111.0	19476	5.386	104892	120510	225402
Q-4 64						
Q-1 65	58.5	10064	3.825	38491	47321	85812
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 92 **PUBLICATIONS**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	36.0	6013	5.445	32743	39002	71745
Q-4 65						
Q-1 66	66.0	11494	5.196	59719	86110	145829
Q-2 66						
Q-3 66	93.0	15588	5.065	78956	115078	194034
TOTAL	1239.0	210947		968036	1105284	2073320

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 92
PUBLICATIONS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	3.0	443	3.898	1727	2012	3739	
Q-2 58							
Q-3 58	1.5	169	3.740	632	457	1089	
Q-4 58							
Q-1 59	4.5	771	3.949	3045	2739	5784	
Q-2 59							
Q-3 59	22.5	4069	3.969	16149	16127	32276	
Q-4 59							
Q-1 60	16.5	2816	4.452	12536	12197	24733	327
Q-2 60							
Q-3 60	18.0	2951	4.456	13151	12403	25554	213
Q-4 60							
Q-1 61	27.0	4626	4.473	20692	18280	38972	734
Q-2 61							
Q-3 61	30.0	5403	4.738	25598	24805	50403	4486
Q-4 61							
Q-1 62	58.5	9899	4.719	46718	43354	90072	3940
Q-2 62							
Q-3 62	178.5	30012	4.189	125719	130973	256692	17939
Q-4 62							
Q-1 63	201.0	34204	4.333	148202	159773	307975	6657
Q-2 63							
Q-3 63	168.0	28165	4.479	126154	143718	269872	24085
Q-4 63							
Q-1 64	145.5	24784	4.556	112912	130425	243337	5549
Q-2 64							
Q-3 64	111.0	19476	5.386	104892	120510	225402	13898
Q-4 64							
Q-1 65	58.5	10064	3.825	38491	47321	85812	14626
Q-2 65							
Q-3 65	36.0	6013	5.445	32743	39002	71745	14142
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 92
PUBLICATIONS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66	66.0	11494	5.196	59719	86110	145829	13797
Q-2 66							
Q-3 66	93.0	15588	5.065	78956	115078	194034	9318
TOTAL	1239.0	210947		968036	1105284	2073320	129711

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 92
PUBLICATIONS

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			3739		3739
Q-2 58					
Q-3 58			1089		1089
Q-4 58					
Q-1 59			5784		5784
Q-2 59					
Q-3 59			32276		32276
Q-4 59					
Q-1 60	43	172	25275	482	25757
Q-2 60					
Q-3 60	28		25795	491	26286
Q-4 60					
Q-1 61	62	495	40263	748	41011
Q-2 61					
Q-3 61	379		55268	1027	56295
Q-4 61					
Q-1 62	310	1638	95960	1611	97571
Q-2 62					
Q-3 62	1414	3834	279879	4698	284577
Q-4 62					
Q-1 63	656	4334	319622	5344	324966
Q-2 63					
Q-3 63	2372	4039	300368	5022	305390
Q-4 63					
Q-1 64	592	4064	253542	5395	258937
Q-2 64					
Q-3 64	5056	5247	249603	5311	254914
Q-4 64					
Q-1 65	4375	2208	107021	2855	109876
Q-2 65					
Q-3 65	2523	2602	91012	2428	93440
Q-4 65					

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 92
PUBLICATIONS

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 66	2861	5472	167959	5058	173017
Q-2 66					
Q-3 66	573	5149	209074	6297	215371
TOTAL	21244	39254	2263529	46767	2310296

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 93
PHOTOGRAPHIC LAB

	DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	46644	46644
LABOR AT $ 4.944	230590	230590
ENGR BURDEN AT $ 4.384	204502	204502
SUB-TOTAL	435092	435092
GEN & ADMIN	7168	7168
TOTAL COST	442260	442260

TIME-PHASED COST
DETAIL-SEE PAGE II-721

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 93 PHOTOGRAPHIC LAB
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 59	6.0	923	4.514	4166	3174	7340
Q-2 59						
Q-3 59	21.0	3663	4.144	15179	13144	28323
Q-4 59						
Q-1 60	33.0	5771	4.508	26017	21243	47260
Q-2 60						
Q-3 60	37.5	6224	4.756	29604	22765	52369
Q-4 60						
Q-1 61	46.5	7960	4.777	38024	35064	73088
Q-2 61						
Q-3 61	27.0	4994	5.050	25219	23897	49116
Q-4 61						
Q-1 62	45.0	7696	5.358	41234	35423	76657
Q-2 62						
Q-3 62	37.5	6338	5.290	33526	32484	66010
Q-4 62						
Q-1 63	6.0	1040	5.663	5889	5569	11458
Q-2 63						
Q-3 63	10.5	1678	5.740	9631	9484	19115
Q-4 63						
Q-1 64	1.5	354	5.884	2083	2236	4319
Q-2 64						
Q-3 64		3	6.000	18	19	37
TOTAL	271.5	46644		230590	204502	435092

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 93
PHOTOGRAPHIC LAB

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-1 59	6.0	923	4.514	4166	3174	7340	
Q-2 59							
Q-3 59	21.0	3663	4.144	15179	13144	28323	
Q-4 59							
Q-1 60	33.0	5771	4.508	26017	21243	47260	900
Q-2 60							
Q-3 60	37.5	6224	4.756	29604	22765	52369	998
Q-4 60							
Q-1 61	46.5	7960	4.777	38024	35064	73088	1358
Q-2 61							
Q-3 61	27.0	4994	5.050	25219	23897	49116	913
Q-4 61							
Q-1 62	45.0	7696	5.358	41234	35423	76657	1287
Q-2 62							
Q-3 62	37.5	6338	5.290	33526	32484	66010	1108
Q-4 62							
Q-1 63	6.0	1040	5.663	5889	5569	11458	192
Q-2 63							
Q-3 63	10.5	1678	5.740	9631	9484	19115	320
Q-4 63							
Q-1 64	1.5	354	5.884	2083	2236	4319	92
Q-2 64							
Q-3 64		3	6.000	18	19	37	
TOTAL	271.5	46644		230590	204502	435092	7168

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 93
PHOTOGRAPHIC LAB

	TOTAL COST
Q-1 59	7340
Q-2 59	
Q-3 59	28323
Q-4 59	
Q-1 60	48160
Q-2 60	
Q-3 60	53367
Q-4 60	
Q-1 61	74446
Q-2 61	
Q-3 61	50029
Q-4 61	
Q-1 62	77944
Q-2 62	
Q-3 62	67118
Q-4 62	
Q-1 63	11650
Q-2 63	
Q-3 63	19435
Q-4 63	
Q-1 64	4411
Q-2 64	
Q-3 64	37
TOTAL	442260

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 94
RELIABILITY

		DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		83785	83785
LABOR AT $ 4.994		418454	418454
ENGR BURDEN AT $ 4.702		393933	393933
SUB-TOTAL		812387	812387
GEN & ADMIN		13499	13499
TOTAL COST		825986	825886

TIME-PHASED COST
DETAIL-SEE PAGE II-725

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 94 **RELIABILITY**
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58	3.0	474	4.430	2100	1865	3965
Q-4 58						
Q-1 59	22.5	3857	5.955	22967	13256	36223
Q-2 59						
Q-3 59	34.5	5955	4.193	24971	21462	46433
Q-4 59						
Q-1 60	39.0	6641	4.565	30319	24822	55141
Q-2 60						
Q-3 60	49.5	8216	4.773	39217	30245	69462
Q-4 60						
Q-1 61	52.5	8920	4.723	42126	29956	72082
Q-2 61						
Q-3 61	27.0	4863	5.016	24394	22241	46635
Q-4 61						
Q-1 62	34.5	5977	5.218	31188	27443	58631
Q-2 62						
Q-3 62	44.5	7432	5.104	37933	37136	75069
Q-4 62						
Q-1 63	51.0	8707	5.178	45083	47010	92093
Q-2 63						
Q-3 63	57.0	9499	5.188	49278	54258	103536
Q-4 63						
Q-1 64	40.5	6843	4.967	33987	41265	75252
Q-2 64						
Q-3 64	24.0	4160	5.395	22445	28231	50676
Q-4 64						
Q-1 65	7.5	1305	5.534	7222	8575	15797
Q-2 65						
Q-3 65	6.0	936	5.581	5224	6168	11392
TOTAL	493.0	83785		418454	393933	812387

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 94
RELIABILITY

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-3 58	3.0	474	4.430	2100	1865	3965	
Q-4 58							
Q-1 59	22.5	3857	5.955	22967	13256	36223	
Q-2 59							
Q-3 59	34.5	5955	4.193	24971	21462	46433	
Q-4 59							
Q-1 60	39.0	6641	4.565	30319	24822	55141	1051
Q-2 60							
Q-3 60	49.5	8216	4.773	39217	30245	69462	1323
Q-4 60							
Q-1 61	52.5	8920	4.723	42126	29956	72082	1339
Q-2 61							
Q-3 61	27.0	4863	5.016	24394	22241	46635	867
Q-4 61							
Q-1 62	34.5	5977	5.218	31188	27443	58631	984
Q-2 62							
Q-3 62	44.5	7432	5.104	37933	37136	75069	1260
Q-4 62							
Q-1 63	51.0	8707	5.178	45083	47010	92093	1540
Q-2 63							
Q-3 63	57.0	9499	5.188	49278	54258	103536	1731
Q-4 63							
Q-1 64	40.5	6843	4.967	33987	41265	75252	1601
Q-2 64							
Q-3 64	24.0	4160	5.395	22445	28231	50676	1078
Q-4 64							
Q-1 65	7.5	1305	5.534	7222	8575	15797	421
Q-2 65							
Q-3 65	6.0	936	5.581	5224	6168	11392	304
TOTAL	493.0	83785		418454	393933	812387	13499

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 94
RELIABILITY

	TOTAL COST
Q-3 58	3965
Q-4 58	
Q-1 59	36223
Q-2 59	
Q-3 59	46433
Q-4 59	
Q-1 60	56192
Q-2 60	
Q-3 60	70785
Q-4 60	
Q-1 61	73421
Q-2 61	
Q-3 61	47502
Q-4 61	
Q-1 62	59615
Q-2 62	
Q-3 62	76329
Q-4 62	
Q-1 63	93633
Q-2 63	
Q-3 63	105267
Q-4 63	
Q-1 64	76853
Q-2 64	
Q-3 64	51754
Q-4 64	
Q-1 65	16218
Q-2 65	
Q-3 65	11696
TOTAL	825886

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 96
COMPUTING

		DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		194434	194434
LABOR AT $ 5.171		1005464	1005464
ENGR BURDEN AT $ 4.687		911337	911337
SUB-TOTAL		1916801	1916801
GEN & ADMIN		31522	31522
TOTAL COST		1948323	1948323

TIME-PHASED COST
DETAIL-SEE PAGE II-729

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 96 COMPUTING
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	13.5	2168	4.558	9882	9864	19746
Q-2 58						
Q-3 58	42.0	7078	4.351	30795	27671	58466
Q-4 58						
Q-1 59	51.0	8623	4.336	37386	29568	66954
Q-2 59						
Q-3 59	57.0	9986	4.245	42386	36105	78491
Q-4 59						
Q-1 60	58.5	10263	4.563	46830	38265	85095
Q-2 60						
Q-3 60	99.0	16522	4.733	78194	60775	138969
Q-4 60						
Q-1 61	141.0	24091	4.744	114278	81158	195436
Q-2 61						
Q-3 61	81.0	14819	4.999	74082	67923	142005
Q-4 61						
Q-1 62	127.5	21701	5.279	114566	99810	214376
Q-2 62						
Q-3 62	159.0	26643	5.351	142555	107096	249651
Q-4 62						
Q-1 63	112.5	19231	6.228	119778	123590	243368
Q-2 63						
Q-3 63	60.0	10133	5.390	54616	61776	116392
Q-4 63						
Q-1 64	51.0	8602	5.747	49437	54842	104279
Q-2 64						
Q-3 64	40.5	7167	5.837	41835	46220	88055
Q-4 64						
Q-1 65	36.0	6342	6.579	41727	45839	87566
Q-2 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 96 COMPUTING
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 65	6.0	1065	6.683	7117	19751	26868
Q-4 65						
Q-1 66					1084	1084
TOTAL	1135.5	194434		1005464	911337	1916801

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 96
COMPUTING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	13.5	2168	4.558	9882	9864	19746	
Q-2 58							
Q-3 58	42.0	7078	4.351	30795	27671	58466	
Q-4 58							
Q-1 59	51.0	8623	4.336	37386	29568	66954	
Q-2 59							
Q-3 59	57.0	9986	4.245	42386	36105	78491	
Q-4 59							
Q-1 60	58.5	10263	4.563	46830	38265	85095	
Q-2 60							
Q-3 60	99.0	16522	4.733	78194	60775	138969	
Q-4 60							
Q-1 61	141.0	24091	4.744	114278	81158	195436	
Q-2 61							
Q-3 61	81.0	14819	4.999	74082	67923	142005	
Q-4 61							
Q-1 62	127.5	21701	5.279	114566	99810	214376	
Q-2 62							
Q-3 62	159.0	26643	5.351	142555	107096	249651	
Q-4 62							
Q-1 63	112.5	19231	6.228	119778	123590	243368	
Q-2 63							
Q-3 63	60.0	10133	5.390	54616	61776	116392	
Q-4 63							
Q-1 64	51.0	8602	5.747	49437	54842	104279	
Q-2 64							
Q-3 64	40.5	7167	5.837	41835	46220	88055	
Q-4 64							
Q-1 65	36.0	6342	6.579	41727	45839	87566	
Q-2 65							
Q-3 65	6.0	1065	6.683	7117	19751	26868	
Q-4 65							

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 96
COMPUTING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 66					1084	1084	
TOTAL	1135.5	194434		1005464	911337	1916801	

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 96
COMPUTING

	SUB TOTAL	G & A	TOTAL COST
Q-1 58	19746		19746
Q-2 58			
Q-3 58	58466		58466
Q-4 58			
Q-1 59	66954		66954
Q-2 59			
Q-3 59	78491		78491
Q-4 59			
Q-1 60	85095	1621	86716
Q-2 60			
Q-3 60	138969	2648	141617
Q-4 60			
Q-1 61	195436	3632	199068
Q-2 61			
Q-3 61	142005	2639	144644
Q-4 61			
Q-1 62	214376	3598	217974
Q-2 62			
Q-3 62	249651	4190	253841
Q-4 62			
Q-1 63	243368	4069	247437
Q-2 63			
Q-3 63	116392	1946	118338
Q-4 63			
Q-1 64	104279	2219	106498
Q-2 64			
Q-3 64	88055	1874	89929
Q-4 64			
Q-1 65	87566	2336	89902
Q-2 65			
Q-3 65	26868	717	27585
Q-4 65			

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 96
COMPUTING

	SUB TOTAL	G & A	TOTAL COST
Q-1 66	1084	33	1117
TOTAL	1916801	31522	1948323

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 97
PHOTO-TEMPLATE LAB

	DESIGN /ENGR HOURS DOLLARS	TOTAL HOURS DOLLARS
DESIGN/ENGINEERING	28164	28164
LABOR AT $ 4.863	136957	136957
ENGR BURDEN AT $ 4.090	115198	115198
SUB-TOTAL	252155	252155
GEN & ADMIN	3543	3543
TOTAL COST	255698	255698

TIME PHASED COST
DETAIL-SEE PAGE II-736

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9
5-SUBSYSTEM 97 PHOTO-TEMPLATE LAB
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58		94	4.670	439	428	867
Q-2 58						
Q-3 58	7.5	1234	4.625	5707	4832	10539
Q-4 58						
Q-1 59	16.5	2878	4.513	12989	9895	22884
Q-2 59						
Q-3 59	16.5	2964	4.320	12805	10633	23438
Q-4 59						
Q-1 60	16.5	2745	4.451	12217	10471	22688
Q-2 60						
Q-3 60	27.0	4446	4.656	20700	16557	37257
Q-4 60						
Q-1 61	25.5	4454	4.826	21496	15397	36893
Q-2 61						
Q-3 61	10.5	1889	4.852	9165	8635	17800
Q-4 61						
Q-1 62	21.0	3459	5.328	18430	15963	34393
Q-2 62						
Q-3 62	10.5	1870	5.382	10065	9627	19692
Q-4 62						
Q-1 63	4.5	843	6.609	5571	5147	10718
Q-2 63						
Q-3 63	3.0	477	5.300	2528	2475	5003
Q-4 63						
Q-1 64	3.0	536	5.979	3205	3367	6572
Q-2 64						
Q-3 64	1.5	275	5.964	1640	1771	3411
TOTAL	163.5	28164		136957	115198	252155

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 97
PHOTO-TEMPLATE LAB

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	G & A
Q-1 58		94	4.670	439	428	867	
Q-2 58							
Q-3 58	7.5	1234	4.625	5707	4832	10539	
Q-4 58							
Q-1 59	16.5	2878	4.513	12989	9895	22884	
Q-2 59							
Q-3 59	16.5	2964	4.320	12805	10633	23438	
Q-4 59							
Q-1 60	16.5	2745	4.451	12217	10471	22688	432
Q-2 60							
Q-3 60	27.0	4446	4.656	20700	16557	37257	710
Q-4 60							
Q-1 61	25.5	4454	4.826	21496	15397	36893	686
Q-2 61							
Q-3 61	10.5	1889	4.852	9165	8635	17800	331
Q-4 61							
Q-1 62	21.0	3459	5.328	18430	15963	34393	577
Q-2 62							
Q-3 62	10.5	1870	5.382	10065	9627	19692	331
Q-4 62							
Q-1 63	4.5	843	6.609	5571	5147	10718	179
Q-2 63							
Q-3 63	3.0	477	5.300	2528	2475	5003	84
Q-4 63							
Q-1 64	3.0	536	5.979	3205	3367	6572	140
Q-2 64							
Q-3 64	1.5	275	5.964	1640	1771	3411	73
TOTAL	163.5	28164		136957	115198	252155	3543

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 97
PHOTO-TEMPLATE LAB

	TOTAL COST
Q-1 58	867
Q-2 58	
Q-3 58	10539
Q-4 58	
Q-1 59	22884
Q-2 59	
Q-3 59	23438
Q-4 59	
Q-1 60	23120
Q-2 60	
Q-3 60	37967
Q-4 60	
Q-1 61	37579
Q-2 61	
Q-3 61	18131
Q-4 61	
Q-1 62	34970
Q-2 62	
Q-3 62	20023
Q-4 62	
Q-1 63	10897
Q-2 63	
Q-3 63	5087
Q-4 63	
Q-1 64	6712
Q-2 64	
Q-3 64	3484
TOTAL	255698

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98

TERMINATION COSTS

	DESIGN /ENGR HOURS	DESIGN /ENGR DOLLARS	PROD HOURS	PROD DOLLARS	TOOLING AND STE HOURS	TOOLING AND STE DOLLARS	OTHER COST HOURS	OTHER COST DOLLARS
OTHER COST		1989913		291299		14383		5118952
SUB-TOTAL		1989913		291299		14383		5118952
GEN & ADMIN		43715		6074		322		109695
TOTAL COST		2033628		297373		14705		5228647
TIME-PHASED COST DETAIL-SEE PAGE		II-741		II-742		II-743		II-744

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98

TERMINATION COSTS

	TOTAL HOURS DOLLARS
OTHER COST	7414547
SUB-TOTAL	7414547
GEN & ADMIN	159806
TOTAL COST	7574353

TIME-PHASED COST
DETAIL-SEE PAGE II-745

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98
SUBD OF WORK DESIGN/ENGINEERING

TERMINATION COSTS

	ENGR MATL	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60		592	592	11	603
Q-2 60					
Q-3 60		15767	15767	300	16067
Q-4 60					
Q-1 61		35483	35483	659	36142
Q-2 61					
Q-3 61		500290	500290	9297	509587
Q-4 61					
Q-1 62		367130	367130	6162	373292
Q-2 62					
Q-3 62		333497	333497	5598	339095
Q-4 62					
Q-1 63		99882	99882	1670	101552
Q-2 63					
Q-3 63		-309305	-309305	-5171	-314476
Q-4 63					
Q-1 64		3690	3690	79	3769
Q-2 64					
Q-3 64		13275	13275	282	13557
Q-4 64					
Q-1 65		4324	4324	115	4439
Q-2 65					
Q-3 65		917453	917453	24477	941930
Q-4 65					
Q-1 66		7103	7103	214	7317
Q-2 66					
Q-3 66		732	732	22	754
TOTAL		1989913	1989913	43715	2033628

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98
SUBD OF WORK PRODUCTION

TERMINATION COSTS

	SUBC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60		12198	12198	232	12430
Q-2 60					
Q-3 60		3642	3642	69	3711
Q-4 60					
Q-1 61		1862	1862	35	1897
Q-2 61					
Q-3 61		10008	10008	186	10194
Q-4 61					
Q-1 62		2478	2478	42	2520
Q-2 62					
Q-3 62		1809	1809	30	1839
Q-4 62					
Q-1 63		1179	1179	20	1199
Q-2 63					
Q-3 63		70755	70755	1183	71938
Q-4 63					
Q-1 64		78103	78103	1662	79765
Q-2 64					
Q-3 64		65291	65291	1389	66680
Q-4 64					
Q-1 65		21735	21735	580	22315
Q-2 65					
Q-3 65		7157	7157	191	7348
Q-4 65					
Q-1 66		7261	7261	219	7480
Q-2 66					
Q-3 66		7821	7821	236	8057
TOTAL		291299	291299	6074	297373

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98
SUBD OF WORK TOOLING AND STE

TERMINATION COSTS

	OTHER COST	G & A	TOTAL COST
Q-1 60	2224	42	2266
Q-2 60			
Q-3 60	46	1	47
Q-4 60			
Q-1 61			
Q-2 61			
Q-3 61	1162	22	1184
Q-4 61			
Q-1 62			
Q-2 62			
Q-3 62			
Q-4 62			
Q-1 63			
Q-2 63			
Q-3 63			
Q-4 63			
Q-1 64	3279	70	3349
Q-2 64			
Q-3 64	4987	106	5093
Q-4 64			
Q-1 65			
Q-2 65			
Q-3 65			
Q-4 65			
Q-1 66	1070	32	1102
Q-2 66			
Q-3 66	1615	49	1664
TOTAL	14383	322	14705

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98
SUBD OF WORK OTHER COST

TERMINATION COSTS

	SUBC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60		18116	18116	345	18461
Q-2 60					
Q-3 60		112353	112353	2141	114494
Q-4 60					
Q-1 61		66498	66498	1236	67734
Q-2 61					
Q-3 61		318024	318024	5910	323934
Q-4 61					
Q-1 62		35864	35864	602	36466
Q-2 62					
Q-3 62		11976	11976	201	12177
Q-4 62					
Q-1 63		5697	5697	95	5792
Q-2 63					
Q-3 63		1598681	1598681	26730	1625411
Q-4 63					
Q-1 64		256870	256870	5466	262336
Q-2 64					
Q-3 64		869076	869076	18492	887568
Q-4 64					
Q-1 65		163492	163492	4362	167854
Q-2 65					
Q-3 65		1730851	1730851	46179	1777030
Q-4 65					
Q-1 66		-168921	-168921	-5087	-174008
Q-2 66					
Q-3 66		100375	100375	3023	103398
TOTAL		5118952	5118952	109695	5228647

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
5-SUBSYSTEM 98

TERMINATION COSTS

	ENGR MATL	SUBC	TOTAL MATERIAL	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60				33130	33130	630	33760
Q-2 60							
Q-3 60				131808	131808	2511	134319
Q-4 60							
Q-1 61				103843	103843	1930	105773
Q-2 61							
Q-3 61				829484	829484	15415	844899
Q-4 61							
Q-1 62				405472	405472	6806	412278
Q-2 62							
Q-3 62				347282	347282	5829	353111
Q-4 62							
Q-1 63				106758	106758	1785	108543
Q-2 63							
Q-3 63				1360131	1360131	22742	1382873
Q-4 63							
Q-1 64				341942	341942	7277	349219
Q-2 64							
Q-3 64				952629	952629	20269	972898
Q-4 64							
Q-1 65				189551	189551	5057	194608
Q-2 65							
Q-3 65				2655461	2655461	70847	2726308
Q-4 65							
Q-1 66				-153487	-153487	-4622	-158109
Q-2 66							
Q-3 66				110543	110543	3330	113873
TOTAL				7414547	7414547	159806	7574353

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	DESIGN /ENGR HOURS / DOLLARS	PROD HOURS / DOLLARS	TOOLING AND STE HOURS / DOLLARS	OTHER COST HOURS / DOLLARS
DESIGN/ENGINEERING	672148	4431	591	
LABOR AT $ 4.814	3240886	16668	2644	
ENGR BURDEN AT $ 4.682	3146367	21142	3294	
PRODUCTION		64772		
LABOR AT $ 3.110		201412		
SHOP SUPPORT	7386			
LABOR AT $ 3.022	22321			
TOOLING AND STE			100268	
LABOR AT $ 3.508			351743	
PLANNING		562	398	
LABOR AT $ 3.203		1826	1249	
TEST/QC	653	10639	1270	
LABOR AT $ 3.475	2005	37275	4377	
MFG BURDEN AT $ 3.650	25902	286833	366061	
ENGR MATERIAL	142558			
MFG MATERIAL		65232		
TOOLING/STE MATL			289149	
MPC	22818	6781	28950	
OTHER COST	2030233	291590	14383	5118952
SUB-TOTAL	8633090	928759	1061850	5118952
GEN & ADMIN	150361	18025	20091	109695
TOTAL COST	8783451	946784	1081941	5228647

TIME-PHASED COST DETAIL-SEE PAGE II-748 II-756 II-762 II-768

COST BREAKDOWNS
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

		TOTAL HOURS DOLLARS
DESIGN/ENGINEERING		677170
LABOR AT $ 4.814		3260198
ENGR BURDEN	AT $ 4.682	3170803
PRODUCTION		64772
LABOR AT $ 3.110		201412
SHOP SUPPORT		7386
LABOR AT $ 3.022		22321
TOOLING AND STE		100268
LABOR AT $ 3.508		351743
PLANNING		960
LABOR AT $ 3.203		3075
TEST/QC		12562
LABOR AT $ 3.475		43657
MFG BURDEN	AT $ 3.650	678796
ENGR MATERIAL		142558
MFG MATERIAL		65232
TOOLING/STE MATL		289149
MPC		58549
OTHER COST		7455158
SUB-TOTAL		15742651
GEN & ADMIN		298172
TOTAL COST		16040823

TIME-PHASED COST
DETAIL - SEE PAGE II-769

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	43.5	7215	4.341	31319	32823	64142
Q-2 58						
Q-3 58	288.0	48384	4.274	206810	191708	398518
Q-4 58						
Q-1 59	285.0	48574	4.439	215615	173861	389476
Q-2 59						
Q-3 59	238.5	41928	4.368	183137	154698	337835
Q-4 59						
Q-1 60	213.0	36818	4.629	170436	138724	309160
Q-2 60						
Q-3 60	240.0	40267	4.708	189574	149748	339322
Q-4 60						
Q-1 61	330.0	56426	4.804	271080	201472	472552
Q-2 61						
Q-3 61	178.0	32228	4.950	159521	151771	311292
Q-4 61						
Q-1 62	285.0	48757	5.174	252278	222108	474386
Q-2 62						
Q-3 62	430.5	72295	4.838	349798	317323	667121
Q-4 62						
Q-1 63	376.5	64297	5.062	325458	342566	668024
Q-2 63						
Q-3 63	297.0	49952	4.849	242207	271751	513958
Q-4 63						
Q-1 64	241.5	41119	4.903	201624	232135	433759
Q-2 64						
Q-3 64	177.0	31081	5.496	170830	196751	367581
Q-4 64						
Q-1 65	102.0	17711	4.937	87440	101735	189175
Q-2 65						
Q-3 65	48.0	8014	5.626	45084	64921	110005

C-14

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-4 65						
Q-1 66	66.0	11494	5.196	59719	87194	146913
Q-2 66						
Q-3 66	93.0	15588	5.065	78956	115078	194034
TOTAL	3932.5	672148		3240886	3146367	6387253

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

SHOP SUPPORT
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60	12.0	2124	2.803	5953	8679	14632
Q-2 60						
Q-3 60	22.5	3793	3.079	11680	12042	23722
Q-4 60						
Q-1 61	9.0	1435	3.203	4596	4777	9373
Q-2 61						
Q-3 61		34	2.706	92	404	496
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
Q-4 63						
Q-1 64						
Q-2 64						
Q-3 64						
TOTAL	43.5	7386		22321	25902	48223

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	249	3.446	858		858
Q-2 60						
Q-3 60	1.5	275	2.964	815		815
Q-4 60						
Q-1 61		110	2.545	280		280
Q-2 61						
Q-3 61		19	2.737	52		52
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
Q-4 63						
Q-1 64						
Q-2 64						
Q-3 64						
TOTAL	3.0	653		2005		2005

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	43.5	7215	4.341	31319	32823	64142	
Q-2 58							
Q-3 58	288.0	48384	4.274	206810	191708	398518	
Q-4 58							
Q-1 59	285.0	48574	4.439	215615	173861	389476	
Q-2 59							
Q-3 59	238.5	41928	4.368	183137	154698	337835	
Q-4 59							
Q-1 60	226.5	39191	4.523	177247	147403	324650	2923
Q-2 60							
Q-3 60	264.0	44335	4.558	202069	161790	363859	7710
Q-4 60							
Q-1 61	339.0	57971	4.760	275956	206249	482205	2029
Q-2 61							
Q-3 61	178.0	32281	4.946	159665	152175	311840	4494
Q-4 61							
Q-1 62	285.0	48757	5.174	252278	222108	474386	3957
Q-2 62							
Q-3 62	430.5	72295	4.838	349798	317323	667121	18214
Q-4 62							
Q-1 63	376.5	64297	5.062	325458	342566	668024	8205
Q-2 63							
Q-3 63	297.0	49952	4.849	242207	271751	513958	23696
Q-4 63							
Q-1 64	241.5	41119	4.903	201624	232135	433759	5549
Q-2 64							
Q-3 64	177.0	31081	5.496	170830	196751	367581	13898
Q-4 64							
Q-1 65	102.0	17711	4.937	87440	101735	189175	14626
Q-2 65							
Q-3 65	48.0	8014	5.626	45084	64921	110005	14142
Q-4 65							
Q-1 66	66.0	11494	5.196	59719	87194	146913	13797

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK DESIGN/ENGINEERING

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	93.0	15588	5.065	78956	115078	194034	9318
TOTAL	3979.0	680187		3265212	3172269	6437481	142558

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

OTHER PROGRAM ELEMENTS

4-SYSTEM 9
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 58			64142		64142
Q-2 58					
Q-3 58			398518		398518
Q-4 58					
Q-1 59			389476		389476
Q-2 59					
Q-3 59			337835		337835
Q-4 59					
Q-1 60	384	1579	329536	6278	335814
Q-2 60					
Q-3 60	1014	16220	388803	7407	396210
Q-4 60					
Q-1 61	171	36095	520500	9672	530172
Q-2 61					
Q-3 61	380	500801	817515	15193	832708
Q-4 61					
Q-1 62	311	368262	846916	14216	861132
Q-2 62					
Q-3 62	1436	337342	1024113	17190	1041303
Q-4 62					
Q-1 63	808	103731	780768	13055	793823
Q-2 63					
Q-3 63	2334	-305116	234872	3929	238801
Q-4 63					
Q-1 64	592	7754	447654	9526	457180
Q-2 64					
Q-3 64	5056	18522	405057	8618	413675
Q-4 64					
Q-1 65	4375	6532	214708	5727	220435
Q-2 65					
Q-3 65	2523	920055	1046725	27926	1074651
Q-4 65					
Q-1 66	2861	12575	176146	5305	181451

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

OTHER PROGRAM ELEMENTS

4-SYSTEM 9
SUBD OF WORK DESIGN/ENGINEERING

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-2 66					
Q-3 66	573	5881	209806	6319	216125
TOTAL	22818	2030233	8633090	150361	8783451

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		8	2.625	21	28	49
Q-2 60						
Q-3 60	4.5	751	3.073	2308	2810	5118
Q-4 60						
Q-1 61	12.0	2019	3.340	6743	7835	14578
Q-2 61						
Q-3 61	1.5	254	3.839	975	1906	2881
Q-4 61						
Q-1 62	1.5	161	3.472	559	744	1303
Q-2 62						
Q-3 62					40	40
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		72	8.347	601	404	1005
Q-4 63						
Q-1 64	7.5	1165	4.688	5461	7031	12492
Q-2 64						
Q-3 64		1			344	344
TOTAL	27.0	4431		16668	21142	37810

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION
SUBD OF WORK 9 PRODUCTION

OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	15.0	2535	3.409	8641	11495	20136
Q-2 60						
Q-3 60	147.0	24680	3.075	75894	100779	176673
Q-4 60						
Q-1 61	129.0	21979	3.123	68643	89110	157753
Q-2 61						
Q-3 61	46.5	8500	2.963	25188	47942	73130
Q-4 61						
Q-1 62	18.0	3062	2.910	8911	17899	26810
Q-2 62						
Q-3 62					594	594
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	9.0	1587	4.100	6506	6180	12686
Q-4 63						
Q-1 64	15.0	2502	3.133	7839	13077	20916
Q-2 64						
Q-3 64		-73	2.877	-210	-415	-625
TOTAL	379.5	64772		201412	286661	488073

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 61		40	2.875	115	18	133
Q-4 61						
Q-1 62		9	3.556	32	6	38
Q-2 62						
Q-3 62					1	1
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	3.0	483	3.255	1572		1572
Q-4 63						
Q-1 64		30	3.500	105	145	250
Q-2 64						
Q-3 64				2	2	4
TOTAL	3.0	562		1826	172	1998

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TEST/QC
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK PRODUCTION

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	1.5	378	2.915	1102		1102
Q-2 60						
Q-3 60	13.5	2300	3.499	8048		8048
Q-4 60						
Q-1 61	19.5	3450	3.171	10939		10939
Q-2 61						
Q-3 61	13.5	2579	3.399	8767		8767
Q-4 61						
Q-1 62	9.0	1626	4.188	6809		6809
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		13	7.462	97		97
Q-4 63						
Q-1 64	1.5	284	5.229	1485		1485
Q-2 64						
Q-3 64		9	3.111	28		28
TOTAL	58.5	10639		37275		37275

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK PRODUCTION

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	MFG MATL
Q-1 60	16.5	2921	3.343	9764	11523	21287	585
Q-2 60							
Q-3 60	165.0	27731	3.110	86250	103589	189839	23519
Q-4 60							
Q-1 61	160.5	27448	3.145	86325	96945	183270	22200
Q-2 61							
Q-3 61	61.5	11373	3.081	35045	49866	84911	5808
Q-4 61							
Q-1 62	28.5	4858	3.358	16311	18649	34960	1933
Q-2 62							
Q-3 62					635	635	1516
Q-4 62							
Q-1 63							
Q-2 63							
Q-3 63	12.0	2155	4.072	8776	6584	15360	6871
Q-4 63							
Q-1 64	24.0	3981	3.740	14890	20253	35143	2778
Q-2 64							
Q-3 64		-63	2.857	-180	-69	-249	22
TOTAL	468.0	80404		257181	307975	565156	65232

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK PRODUCTION

	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60		585	77	12198	34147	650	34797
Q-2 60							
Q-3 60		23519	3093	3642	220093	4193	224286
Q-4 60							
Q-1 61		22200	1876	1862	209208	3888	213096
Q-2 61							
Q-3 61		5808	491	10008	101218	1881	103099
Q-4 61							
Q-1 62		1933	152	2478	39523	664	40187
Q-2 62							
Q-3 62		1516	119	1809	4079	68	4147
Q-4 62							
Q-1 63				1179	1179	20	1199
Q-2 63							
Q-3 63		6871	677	71046	93954	1571	95525
Q-4 63							
Q-1 64		2778	296	78103	116320	2475	118795
Q-2 64							
Q-3 64		22		65291	65064	1389	66453
Q-4 64							
Q-1 65				21735	21735	580	22315
Q-2 65							
Q-3 65				7157	7157	191	7348
Q-4 65							
Q-1 66				7261	7261	219	7480
Q-2 66							
Q-3 66				7821	7821	236	8057
TOTAL		65232	6781	291590	928759	18025	946784

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		19	4.105	78	71	149
Q-4 60						
Q-1 61		5	3.200	16	17	33
Q-2 61						
Q-3 61	1.5	195	3.621	706	865	1571
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63		30	3.400	102	166	268
Q-4 63						
Q-1 64	1.5	175	4.543	795	1062	1857
Q-2 64						
Q-3 64	1.5	167	5.671	947	1113	2060
TOTAL	4.5	591		2644	3294	5938

NORTH AMERICAN ROCKWELL CORP. APRIL 1972
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		5	2.200	11	13	24
Q-4 59						
Q-1 60	9.0	1610	3.376	5436	4612	10048
Q-2 60						
Q-3 60	145.5	24383	3.309	80687	79804	160491
Q-4 60						
Q-1 61	94.5	16098	3.262	52518	53803	106321
Q-2 61						
Q-3 61	70.5	12904	3.860	49810	48540	98350
Q-4 61						
Q-1 62	39.0	6652	3.411	22691	25061	47752
Q-2 62						
Q-3 62	9.0	1464	2.794	4091	7060	11151
Q-4 62						
Q-1 63	18.0	3083	3.299	10171	11746	21917
Q-2 63						
Q-3 63	66.0	11007	3.607	39698	40325	80023
Q-4 63						
Q-1 64	96.0	16320	3.968	64757	67892	132649
Q-2 64						
Q-3 64	31.5	5422	3.186	17272	20190	37462
Q-4 64						
Q-1 65	7.5	1260	3.439	4333	6509	10842
Q-2 65						
Q-3 65		60	4.467	268	297	565
TOTAL	586.5	100268		351743	365852	717595

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

PLANNING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		8	2.625	21		21
Q-4 60						
Q-1 61		98	2.888	283		283
Q-2 61						
Q-3 61						
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	1.5	262	3.179	833	97	930
Q-4 63						
Q-1 64		26	3.615	94	94	188
Q-2 64						
Q-3 64		4	4.500	18	18	36
TOTAL	1.5	398		1249	209	1458

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60		19	3.105	59		59
Q-2 60						
Q-3 60	1.5	296	3.247	961		961
Q-4 60						
Q-1 61	3.0	476	3.431	1633		1633
Q-2 61						
Q-3 61		37	2.919	108		108
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62		4	3.250	13		13
Q-4 62						
Q-1 63		5	4.000	20		20
Q-2 63						
Q-3 63	1.5	227	3.573	811		811
Q-4 63						
Q-1 64		59	3.898	230		230
Q-2 64						
Q-3 64		41	3.805	156		156
Q-4 64						
Q-1 65		106	3.642	386		386
TOTAL	6.0	1270		4377		4377

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	TOOL/STE MATL
Q-3 59		5	2.200	11	13	24	
Q-4 59							
Q-1 60	9.0	1629	3.373	5495	4612	10107	405
Q-2 60							
Q-3 60	147.0	24706	3.309	81747	79875	161622	42374
Q-4 60							
Q-1 61	97.5	16677	3.265	54450	53820	108270	35983
Q-2 61							
Q-3 61	72.0	13136	3.854	50624	49405	100029	72363
Q-4 61							
Q-1 62	39.0	6652	3.411	22691	25061	47752	56015
Q-2 62							
Q-3 62	9.0	1468	2.796	4104	7060	11164	41095
Q-4 62							
Q-1 63	18.0	3088	3.300	10191	11746	21937	
Q-2 63							
Q-3 63	69.0	11526	3.596	41444	40588	82032	1548
Q-4 63							
Q-1 64	97.5	16580	3.973	65876	69048	134924	30866
Q-2 64							
Q-3 64	33.0	5634	3.265	18393	21321	39714	8210
Q-4 64							
Q-1 65	7.5	1366	3.455	4719	6509	11228	290
Q-2 65							
Q-3 65		60	4.467	268	297	565	
TOTAL	598.5	102527		360013	369355	729368	289149

C-9.

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK TOOLING AND STE

	MPC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-3 59			24		24
Q-4 59					
Q-1 60	53	2224	12789	243	13032
Q-2 60					
Q-3 60	5572	46	209614	3994	213608
Q-4 60					
Q-1 61	3041		147294	2737	150031
Q-2 61					
Q-3 61	6115	1162	179669	3339	183008
Q-4 61					
Q-1 62	4414		108181	1816	109997
Q-2 62					
Q-3 62	3238		55497	932	56429
Q-4 62					
Q-1 63			21937	367	22304
Q-2 63					
Q-3 63	152		83732	1400	85132
Q-4 63					
Q-1 64	3290	3279	172359	3668	176027
Q-2 64					
Q-3 64	2987	4987	55898	1189	57087
Q-4 64					
Q-1 65	88		11606	310	11916
Q-2 65					
Q-3 65			565	15	580
Q-4 65					
Q-1 66		1070	1070	32	1102
Q-2 66					
Q-3 66		1615	1615	49	1664
TOTAL	28950	14383	1061850	20091	1081941

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 OTHER PROGRAM ELEMENTS
SUBD OF WORK OTHER COST

	SUBC	OTHER COST	SUB TOTAL	G & A	TOTAL COST
Q-1 60		18116	18116	345	18461
Q-2 60					
Q-3 60		112353	112353	2141	114494
Q-4 60					
Q-1 61		66498	66498	1236	67734
Q-2 61					
Q-3 61		318024	318024	5910	323934
Q-4 61					
Q-1 62		35864	35864	602	36466
Q-2 62					
Q-3 62		11976	11976	201	12177
Q-4 62					
Q-1 63		5697	5697	95	5792
Q-2 63					
Q-3 63		1598681	1598681	26730	1625411
Q-4 63					
Q-1 64		256870	256870	5466	262336
Q-2 64					
Q-3 64		869076	869076	18492	887568
Q-4 64					
Q-1 65		163492	163492	4362	167854
Q-2 65					
Q-3 65		1730851	1730851	46179	1777030
Q-4 65					
Q-1 66		-168921	-168921	-5087	-174008
Q-2 66					
Q-3 66		100375	100375	3023	103398
TOTAL		5118952	5118952	109695	5228647

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9 DESIGN/ENGINEERING
OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 58	43.5	7215	4.341	31319	32823	64142
Q-2 58						
Q-3 58	288.0	48384	4.274	206810	191708	398518
Q-4 58						
Q-1 59	285.0	48574	4.439	215615	173861	389476
Q-2 59						
Q-3 59	238.5	41928	4.368	183137	154698	337835
Q-4 59						
Q-1 60	213.0	36826	4.629	170457	138752	309209
Q-2 60						
Q-3 60	244.5	41037	4.678	191960	152629	344589
Q-4 60						
Q-1 61	342.0	58450	4.753	277839	209324	487163
Q-2 61						
Q-3 61	180.0	32677	4.933	161202	154542	315744
Q-4 61						
Q-1 62	286.5	48918	5.169	252837	222852	475689
Q-2 62						
Q-3 62	430.5	72295	4.838	349798	317363	667161
Q-4 62						
Q-1 63	376.5	64297	5.062	325458	342566	668024
Q-2 63						
Q-3 63	298.0	50054	4.853	242910	272321	515231
Q-4 63						
Q-1 64	249.0	42459	4.896	207880	240228	448108
Q-2 64						
Q-3 64	177.0	31249	5.497	171777	198208	369985
Q-4 64						
Q-1 65	102.0	17711	4.937	87440	101735	189175
Q-2 65						
Q-3 65	48.0	8014	5.626	45084	64921	110005
Q-4 65						

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

DESIGN/ENGINEERING
4-SYSTEM 9 OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 66	66.0	11494	5.196	59719	87194	146913
Q-2 66						
Q-3 66	93.0	15588	5.065	78956	115078	194034
TOTAL	3961.0	677170		3260198	3170803	6431001

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PRODUCTION 9 OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	15.0	2535	3.409	8641	11495	20136
Q-2 60						
Q-3 60	147.0	24680	3.075	75894	100779	176673
Q-4 60						
Q-1 61	129.0	21979	3.123	68643	89110	157753
Q-2 61						
Q-3 61	46.5	8500	2.963	25188	47942	73130
Q-4 61						
Q-1 62	18.0	3062	2.910	8911	17899	26810
Q-2 62						
Q-3 62					594	594
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	9.0	1587	4.100	6506	6180	12686
Q-4 63						
Q-1 64	15.0	2502	3.133	7839	13077	20916
Q-2 64						
Q-3 64		-73	2.877	-210	-415	-625
TOTAL	379.5	64772		201412	286661	488073

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM SHOP SUPPORT
9 OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 58						
Q-4 58						
Q-1 59						
Q-2 59						
Q-3 59						
Q-4 59						
Q-1 60	12.0	2124	2.803	5953	8679	14632
Q-2 60						
Q-3 60	22.5	3793	3.079	11680	12042	23722
Q-4 60						
Q-1 61	9.0	1435	3.203	4596	4777	9373
Q-2 61						
Q-3 61		34	2.706	92	404	496
Q-4 61						
Q-1 62						
Q-2 62						
Q-3 62						
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63						
Q-4 63						
Q-1 64						
Q-2 64						
Q-3 64						
TOTAL	43.5	7386		22321	25902	48223

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

TOOLING AND STE
4-SYSTEM 9 OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 59		5	2.200	11	13	24
Q-4 59						
Q-1 60	9.0	1610	3.376	5436	4612	10048
Q-2 60						
Q-3 60	145.5	24383	3.309	80687	79804	160491
Q-4 60						
Q-1 61	94.5	16098	3.262	52518	53803	106321
Q-2 61						
Q-3 61	70.5	12904	3.860	49810	48540	98350
Q-4 61						
Q-1 62	39.0	6652	3.411	22691	25061	47752
Q-2 62						
Q-3 62	9.0	1464	2.794	4091	7060	11151
Q-4 62						
Q-1 63	18.0	3083	3.299	10171	11746	21917
Q-2 63						
Q-3 63	66.0	11007	3.607	39698	40325	80023
Q-4 63						
Q-1 64	96.0	16320	3.968	64757	67892	132649
Q-2 64						
Q-3 64	31.5	5422	3.186	17272	20190	37462
Q-4 64						
Q-1 65	7.5	1260	3.439	4333	6509	10842
Q-2 65						
Q-3 65		60	4.467	268	297	565
TOTAL	586.5	100268		351743	365852	717595

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM PLANNING 9

OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-3 60		8	2.625	21		21
Q-4 60						
Q-1 61		98	2.888	283		283
Q-2 61						
Q-3 61		40	2.875	115	18	133
Q-4 61						
Q-1 62		9	3.556	32	6	38
Q-2 62						
Q-3 62					1	1
Q-4 62						
Q-1 63						
Q-2 63						
Q-3 63	4.5	745	3.228	2405	97	2502
Q-4 63						
Q-1 64		56	3.554	199	239	438
Q-2 64						
Q-3 64		4	5.000	20	20	40
TOTAL	4.5	960		3075	381	3456

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM TEST/QC 9 OTHER PROGRAM ELEMENTS

ON-SITE LABOR

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $
Q-1 60	4.0	646	3.125	2019		2019
Q-2 60						
Q-3 60	16.5	2871	3.422	9824		9824
Q-4 60						
Q-1 61	24.0	4036	3.184	12852		12852
Q-2 61						
Q-3 61	15.0	2635	3.388	8927		8927
Q-4 61						
Q-1 62	9.0	1626	4.188	6809		6809
Q-2 62						
Q-3 62		4	3.250	13		13
Q-4 62						
Q-1 63		5	4.000	20		20
Q-2 63						
Q-3 63	1.5	240	3.783	908		908
Q-4 63						
Q-1 64	1.5	343	5.000	1715		1715
Q-2 64						
Q-3 64		50	3.680	184		184
Q-4 64						
Q-1 65		106	3.642	386		386
TOTAL	71.5	12562		43657		43657

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-1 58	43.5	7215	4.341	31319	32823	64142	
Q-2 58							
Q-3 58	288.0	48384	4.274	206810	191708	398518	
Q-4 58							
Q-1 59	285.0	48574	4.439	215615	173861	389476	
Q-2 59							
Q-3 59	238.5	41933	4.368	183148	154711	337859	
Q-4 59							
Q-1 60	253.0	43741	4.401	192506	163538	356044	2923
Q-2 60							
Q-3 60	576.0	96772	3.824	370066	345254	715320	7710
Q-4 60							
Q-1 61	598.5	102096	4.082	416731	357014	773745	2029
Q-2 61							
Q-3 61	312.0	56790	4.320	245334	251446	496780	4494
Q-4 61							
Q-1 62	352.5	60267	4.833	291280	265818	557098	3957
Q-2 62							
Q-3 62	439.5	73763	4.798	353902	325018	678920	18214
Q-4 62							
Q-1 63	394.5	67385	4.981	335649	354312	689961	8205
Q-2 63							
Q-3 63	379.0	63633	4.596	292427	318923	611350	23696
Q-4 63							
Q-1 64	361.5	61680	4.578	282390	321436	603826	5549
Q-2 64							
Q-3 64	208.5	36652	5.158	189043	218003	407046	13898
Q-4 64							
Q-1 65	109.5	19077	4.831	92159	108244	200403	14626
Q-2 65							
Q-3 65	48.0	8074	5.617	45352	65218	110570	14142
Q-4 65							
Q-1 66	66.0	11494	5.196	59719	87194	146913	13797

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	MAN-MONTHS	LABOR HOURS	LABOR RATE	LABOR DOLLARS	BURDEN DOLLARS	LABOR + BURDEN $	ENGR MATL
Q-2 66							
Q-3 66	93.0	15588	5.065	78956	115078	194034	9318
TOTAL	5046.5	863118		3882406	3849599	7732005	142558

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-1 58							64142
Q-2 58							
Q-3 58							398518
Q-4 58							
Q-1 59							389476
Q-2 59							
Q-3 59							337859
Q-4 59							
Q-1 60	585	405		3913	514	34117	394588
Q-2 60							
Q-3 60	23519	42374		73603	9679	132261	930863
Q-4 60							
Q-1 61	22200	35983		60212	5088	104455	943500
Q-2 61							
Q-3 61	5808	72363		82665	6986	829995	1416426
Q-4 61							
Q-1 62	1933	56015		61905	4877	406604	1030484
Q-2 62							
Q-3 62	1516	41095		60825	4793	351127	1095665
Q-4 62							
Q-1 63				8205	808	110607	809581
Q-2 63							
Q-3 63	6871	1548		32115	3163	1364611	2011239
Q-4 63							
Q-1 64	2778	30866		39193	4178	346006	993203
Q-2 64							
Q-3 64	22	8210		22130	8043	957876	1395095
Q-4 64							
Q-1 65		290		14916	4463	191759	411541
Q-2 65							
Q-3 65				14142	2523	2658063	2785298
Q-4 65							
Q-1 66				13797	2861	-148015	15556

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	MFG MATL	TOOL/STE MATL	SUBC	TOTAL MATERIAL	MPC	OTHER COST	SUB TOTAL
Q-2 66							
Q-3 66				9318	573	115692	319617
TOTAL	65232	289149		496939	58549	7455158	15742651

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	G & A	TOTAL COST
Q-1 58		64142
Q-2 58		
Q-3 58		392518
Q-4 58		
Q-1 59		389476
Q-2 59		
Q-3 59		337859
Q-4 59		
Q-1 60	7516	402104
Q-2 60		
Q-3 60	17735	948598
Q-4 60		
Q-1 61	17533	961033
Q-2 61		
Q-3 61	26323	1442749
Q-4 61		
Q-1 62	17298	1047782
Q-2 62		
Q-3 62	18391	1114056
Q-4 62		
Q-1 63	13537	823118
Q-2 63		
Q-3 63	33630	2044869
Q-4 63		
Q-1 64	21135	1014338
Q-2 64		
Q-3 64	29698	1424783
Q-4 64		
Q-1 65	10979	422520
Q-2 65		
Q-3 65	74311	2859609
Q-4 65		
Q-1 66	469	16025

NORTH AMERICAN ROCKWELL CORP.
SPACE DIVISION
DATA PREPARED UNDER
NASA CONTRACT NAS9-12100

APRIL 1972

TIME PHASED EXPEND.
B-70 AIRCRAFT STUDY

4-SYSTEM 9
OTHER PROGRAM ELEMENTS

	G & A	TOTAL COST
Q-2 66		
Q-3 66	9627	329244
TOTAL	298172	16040823