FTTMP

HEADQUARTERS
AIR FORCE FLIGHT TEST CENTER
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS AIR FORCE BASE, CALIFORNIA 93523

AD INEXPLORATA

REPLY TO ATTN OF: FTTB

SUBJECT: XB-70 Joint Test Force Activity Report for June — 10 July 1964

TO: ASD (ASV)
Wright-Patterson AFB Ohio 45433

1070.

THRU: ~~FTT~~ T

1. PILOT TRAINING: (Colonel Joseph Cotton - 42951)

a. Flying Time:

	Charged to XB-70 Program			EAFB Provided - No Cost to XB-70			Total		
	B-58	B-52	B-47	B-58	B-52	B-47	B-58	B-52	B-47
Mr. White	2+00	None	3+00	None	None	None	2+00	None	3+00
Mr. Shepard	0+35	None	3+10	None	None	None	0+35	None	3+10
Lt Col Fulton	None	None	None	3+15	5+55	None	3+15	5+55	None
Colonel Cotton	2+35	None	6+10	3+15	None	2+40	5+50	None	8+50

TB-58-662: On 8 June, during the last flight before the aircraft was to go into phase inspection, the left wing upper wheel well fairing came off at 1.95 Mach. Although extensive damage resulted, local repair was made for a one time flight. The TB was delivered to Kelly on 19 June. A fair estimate for pickup is the first week of August.

B-52: One of the motherships is at Wichita and the other one has been busy on X-15 drops so no time was offered to our project. Lt Colonel Fulton obtained his time on four of the X-15's drop missions. Some B-52 time may be available in July.

B-47: Some flying was obtained during the first week of June before the aircraft departed for a month to support a TDY project.

FTT

b. Simulator: (Mr. D. O. Gobert - 7-227)

Simulator flying during June was as follows:

Test	Colonel Cotton	Lt Colonel Fulton
Practice First Flight Profile and Procedures	1 period - 1+00 Hrs	1 period - 1+00 Hrs

Simulator reliability was good. The gear and flaps were retracted at 10,000 feet. Practically no trim change was noted when the gear was retracted; however, retracting the flaps caused a rapid nose-down pitch change. The nose-down trim change is not easily anticipated or corrected. Approximately 2,000 feet altitude was lost and the rate of descent reached 6,000 feet per minute during one retraction. Roll instability was very noticeable near wings level flight with the Flight Augmentation Control System (FACS) "OFF". Based on the roll instability with smooth air, the XB-70A will wallow and roll constantly, regardless of the control technique used, in turbulent air.

2. XB-70A PRIORITY CHANGE: (Mr. D. O. Gobert - 7-227)

The XB-70A Air Force Systems Command (AFSC) priority has been decreased from 5B to 71F. This downgrading of priority is expected to delay the XB-70A Flight Test Program in the Ground Support Equipment, Maintenance Shops, Fuel Truck Scheduling and Range Scheduling areas since most of the other test programs (Helicopters, COIN, B-58, C-141, KC-135, F-4C, and X-15) on base have a higher priority. If this delay becomes serious an attempt will be made to increase the base priority and/or AFSC priority.

3. REQUISITION OF IFF CODES: (Mr. D. O. Gobert - 7-227)

The XB-70A Joint Test Force has requested authorization to use six unassigned Mode III Identification Friend or Foe (IFF) codes to supplement air-to-ground communication. These codes will be used throughout the XB-70A Test Program to indicate radio failure and emergency situations in the event the air vehicle should lose UHF voice communication. Flight Test Ground Control can be advised of the air vehicle status (landing at emergency site, landing on Rogers Dry Lake, landing on Edwards runway, etc) within two minutes.

4. FLIGHT MONITOR ROOM - BUILDING 3940: (Mr. D. O. Gobert - 7-227)

Flights have been made over the Air Force Flight Test Center (AFFTC) High Range using C-130 and a special test aircraft to evaluate telemetry (TM), UHF communications, radar tracking and automatic operation of the Data Acquisition Units. The TM, UHF and the Data Acquisition Units furnished good coverage using both aircraft. The radar skin track of the C-130 was poor in a number of areas because of ground clutter and the range profile exceeded the radar capability. An S-band beacon was installed in the special test aircraft to furnish better radar tracking capability. The reception using the S-band beacon was good using the Edwards and Beatty Stations. However, approximately 50 percent of the flight profile was lost due to the Ely Station being inoperative. Another flight will be scheduled using the S-band beacon prior to Mach 3.0 flights in the XB-70. The Flight Monitor Room in conjunction with Building 1820 is also being used for conducting exercises on communications and emergency procedures.

Joseph F. Cotton

JOSEPH F. COTTON
Colonel, USAF
XB-70A Test Director

FTMI File

HEADQUARTERS
AIR FORCE FLIGHT TEST CENTER
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS AIR FORCE BASE, CALIFORNIA 93523

1070

REPLY TO
ATTN OF: FTMI

SUBJECT: XB-70 Joint Test Force Activity Report for May — 12 June 1964

TO: ASD (ASJ)
Wright-Patterson AFB Ohio 45433

THRU: FTT

1. PILOT TRAINING: (Colonel Joseph Cotton - 42951)

a. Flying Time:

	Charged to XB-70 Program			EAFB Provided - No Cost to XB-70			Total		
	B-58	B-52	B-47	B-58	B-52	B-47	B-58	B-52	B-47
Mr. White	--	--	--	--	--	--	--	--	--
Mr. Shepard	--	--	--	--	--	--	--	--	--
Lt Col Fulton	4+50	--	5+00	4+40	6+05	--	9+30	6+05	5+50
Colonel Cotton	4+50	--	5+50	--	--	1+00	4+50	--	6+50

Messrs White and Shepard did not fly this month because they were not scheduled. B-47 time for Colonel Cotton and Lt Colonel Fulton was obtained flying an airshow and on the first trip to Kelly AFB to Functional Check Flight (FCF) (which was aborted) the TB-58. The B-58 time was obtained on two flights -- acceptance flight (FCF) after "Hustle-Up" and return from Kelly AFB and instrument check for Colonel Cotton. The other B-58 time for Lt Colonel Fulton was FCF and ferry of #888 to Chanute AFB. B-52 time for Lt Colonel Fulton was X-15 drops and Armed Forces Day airshow practice and flyby.

b. Simulator: (Mr. O. O. Johnson - 7-227)

No Air Force pilot flying in May. The simulator has been down for simplification of the landing simulation mechanization. The new mechanization will contain only the functions directly related to landings. It is hoped that a new camera lens will be installed by 1 July when landing simulation is due to resume.

Some Company pilot taping was accomplished to investigate flight control conditions encountered during manufacturing operations at Palmdale. Specifically, there were discrepancies in elevon positions for the combined full roll-full pitch input. The simulator and airplane characteristics were found similar.

The simulator will become active the week of 8 Jun 64 for first flight profile simulation.

2. PROPULSION: (Mr. R. E. Taylor - 7-229)

a. AEDC Pilot Briefing and Demonstration:

Colonel Cotton, Lt. Colonel Fulton and Mr. Taylor, Joint Test Force (JTF) visited Arnold Engineering Development Center (AEDC) Tullahoma, Tennessee on 26 and 27 May 64 to participate in YJ93 engine briefings and wind tunnel tests designed to familiarize the pilots with YJ93 operating characteristics at various altitudes and Mach number conditions. Major P. Dulais and Mr. Harold Williams, XB-70 Systems Project Office (SPO) were present for the sessions. The four pilots observed and participated in the demonstrations by alternating at the throttle controls over a wide range of wind tunnel conditions. Specific areas of demonstration were:

(1) Airstarts:

A total of 11 airstart attempts, 10 supersonic and one subsonic were unsuccessful. Subsequent General Electric (G. E.) investigation revealed a cracked igniter plug on the air start ignition (20 Joule) system which may have contributed to the airstart attempt failure.

(2) 520 cps Vibration:

Moderate 520 cps vibration (peaks to 6 mils) was induced by throttle burstin, to military power. Bode throttle maneuvers were performed by the pilots to demonstrate its effectiveness in obtaining positive reduction in vibration to a safe level. The throttle detent burst was performed by each pilot to demonstrate the technique to be used in the air vehicle to avoid inducing 520 cps vibration on rapid throttle advances.

(3) Minimum Afterburner Instability:

Minimum afterburner instability was induced to permit pilot observation of engine behaviour and execution of corrective throttle maneuvers (2-3° throttle advance).

(4) T_5 Reset Function:

The T_5 (EGT) cutback as inlet temperature was increased to over 300° F., was demonstrated at military power.

(5) Automatic Throttle:

Operation of the engine using the jog switch and throttle reset button to adjust power was accomplished by each pilot.

(6) Supersonic Operation:

Pilot operation of the engine at Mach 2+ conditions was accomplished with rpm alternately locked and unlocked.

Four topics were discussed in detail during the two day briefing sessions. The results and conclusions were:

(1) Reverse Airflow During Start:

Discussions indicated the possibility that high EGT will be experienced when starting the third (center) engine in each inlet. Successful starts are expected with five inches of water negative ΔP at the inlet face. G. E. stated that extrapolated data indicates hot starts requiring frequent hot section inspections are anticipated if negative ΔP's at or above 7.5 inches are experienced. During the discussions NAA indicated maximum negative ΔP's of 7.5 inches are a possibility. Later NAA restated the position to indicate that based on wind tunnel data the maximum anticipated negative ΔP is 4.5 to 5 inches. This lessens our anxiety over the problem, but we nevertheless feel positive backup measures should be readily available in the event these predictions are exceeded and hot start problems are experienced during preflight tests.

(2) Airstarts:

Our concern over lack of subsonic airstart envelope substantiation data dictated our request for prompt implementation of a program to define that portion of the envelope prior to extensive inflight throttle manipulations. Failure of engine S/N 170-570 to airstart during our visit intensified our concern. An additional request was made for a G. E. study of the feasibility of constant ignition during critical phases of flight. It is requested that results of this study be forwarded when available.

(3) 520 cps Vibration:

Pilot experience gained by actual operation of the engine adequately demonstrated the successful reduction of vibration by use of the bode maneuver. Although some of the pilots executed perfect bodes on the first attempt, continued success required practice. The throttle detent burst procedure (not the bode maneuver) being adopted for use in the air vehicle is concurred with and we feel that 520 cps vibration is a problem that can be lived with.

(4) Minimum Afterburner Instability:

The large amount of T_5 translation required to obtain instability at the lower inlet temperature conditions indicates the problem will probably be more apparent at high Mach conditions where T_5 reset adjusts calculated and indicated EGT into the low T_5 region where instability occurs. The problem was easily identified and corrected by a small amount of throttle advance. We feel the problem is minor and can be lived with.

b. G. E. - Edwards Test Cell Activity:

(1) Performance Data Repeatability:

Performance data acquisition on engine S/N 170-575 has been completed and the data is being processed into a report for Air Force review. One additional engine remains to be tested. It will be either engine S/N 170-580 or 170-581 and is to be the next installation following removal of -575.

(2) Axial Vibration Survey on S/N 170-575:

Engine S/N 170-575 remains in the test cell for investigation of the axial vibration phenomenon. Test data obtained to date indicates the phenomenon now defined at a 14 cps frequency, exists at low levels in military power and in more pronounced levels at minimum afterburner. Current G. E., activity is directed to investigating the effect of 14 cps test cell fuel system boost pressure oscillations. A G. E/Edwards report will be issued when investigations are complete.

c. Hi-Speed Spin Pit:

Excavation of the pit and laying of the foundation have been completed. Removal of the tank and protector rings from the pit at Norton AFB has been accomplished. Transfer of these items to Air Force Flight Test Center (AFFTC) is scheduled for this week. Completion of spin pit construction and vacuum check of the installation is scheduled for not later than 20 Jul 64.

3. T-38A Tests: (Mr. C. O. Johnson - 7-227)

Since our last report, the JTF and Messrs. Creech and Williams met with North American Aviation (NAA) to discuss our proposed tests. The Company opinion is that there is some advantage for the pilot to rotate the aircraft prior to first flight but there is a high risk involved. Further, the elevator forces approach 80 pounds at rotation, with trim for takeoff. We can reduce these forces by changing the trim.

The real concern is about the stopping distance. Based on handbook data, we calculated approximately 3,000 feet of runway remaining at stop using normal braking without drag chute (braking coefficient = 0.25).

NAA chooses to use $\mu = .15$, which shows no runway margin. Mr. Creech feels that 0.25, which results in 6 ft/sec^2 deceleration, is a realistic figure. It has been consistently exceeded on the dynamometer tests at Wright-Patterson AFB.

In an attempt to relieve some of NAA's apprehensions, we have discussed (among ourselves) off-loading gross weight 75,000 pounds from that for first flight which lowers the minimum rotation speed 14 knots.

Regardless of the outcome of the taxi test proposal, we continue to recommend a gear retraction between taxi tests and first flight.

We are contacting other contractors regarding their taxi program. We already have data from Boeing regarding the prototype 707 on which they conducted 8 or 10 runs at 80 knots on a 5,000 foot runway which ends in Lake Washington.

4. HYDRAULICS: (Captain Porta - 7-228)

a. Hydraulic Fluid Indicating Systems:

Reference B-70 SPO letters dated 26 May 64 and 3 Apr 64, B-70 JTF Activity Report of January 1964.

The cost quoted in your letter of 26 May 64 appears higher than anticipated for this type indicating system; however, we do not feel that NAA should stop all efforts in connection with the investigation of the proposed indicating system. To our knowledge, the tubing failures and system leakage problems stated in our January 1964 report have not been minimized. If these problems are not resolved we think that the indicating system is required. The presently installed system moved to the cockpit to provide monitoring of the fluid level by the flight crew should be the minimum consideration.

Joseph F. Catton

JOSEPH F. CATTON
Colonel, USAF
XB-70A Test Director

HEADQUARTERS
AIR FORCE FLIGHT TEST CENTER
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS AIR FORCE BASE, CALIFORNIA 93523

AD INEXPLORATA

REPLY TO ATTN OF: FTTB

SUBJECT: XB-70 Joint Test Force Activity Report for April 14 May 1964

TO: ASD (ASV)
Wright-Patterson AFB Ohio 45433

RF-MO

THRU: FTT GNT

1. PILOT TRAINING: (Colonel Joseph Cotton - 42951)

a. Flying Time:

	Charged to XB-70 Program			EAFB Provided - No Cost to XB-70			Total		
	B-58	B-52	B-47	B-58	B-52	B-47	B-58	B-52	B-47
Mr. White	--	2+20	3+00	--	--	--	--	2+20	3+00
Mr. Shepard	--	--	--	--	--	--	--	--	--
Lt Col Fulton	--	--	--	--	9+35	--	--	9+35	---
Colonel Cotton	--	2+20	3+00	--	5+20	--	--	7+40	3+00

TB-58 No. 662 in "Hustle Up" at San Antonio Air Materiel Area (SAAMA) all month. Extra B-52 flying by Colonel Cotton and Lt Colonel Fulton was in support of X-15 program.

b. Authority To Fly NAA Pilots: (Colonel Joseph Cotton - 42951)

United States Air Force (USAF) inspectors made a followup inspection of the Air Force Flight Test Center (AFFTC) and again they wanted to know by what authority we fly Mr. White and Mr. Shepard in the B-47, B-52 and B-58. We give them our reasons and Aeronautical Systems Division (ASD) letters but they want to see our approval or directive from Air Force Systems Command (AFSC) or USAF. The Center has no such document and I suggest we obtain command approval so this matter will be settled and satisfied once and for all. System Program Office (SPO) support will be greatly appreciated.

b. Simulator: (Mr. C. O. Johnson - 7-227)

Simulator flying during April was as follows:

Test	Colonel Cotton	Lt Colonel Fulton
AICS Emer. Procedures	1 period - 0+30 hrs	1 period - 1+20 hrs
Landing Practice & Control Force Evaluation	2 periods - 2+40 hrs	1 period - 1+00 hrs

Comments:

(1) Air Induction Control System Emergency Procedures:

Recent changes to Air Induction Control System (AICS) emergency procedures were evaluated by both pilots. Colonel Cotton satisfactorily accomplished accelerations, shutdowns and airstarts using the latest revised procedures. Lt Colonel Fulton evaluated accelerations, decelerations and unstarts with no problems. Elaboration on detailed results of this training and evaluation is contained in simulator reports given to Lt Colonel Gibson and Mr. Jim Williams.

(2) Landing Practice & Control Force Evaluation:

The visual display remained fuzzy making it easy to delay flare until abrupt control movement was required. The high longitudinal control forces resulted in overcontrolling and high touchdown sink rates. Harmony is poor between the lateral and longitudinal control systems and lag in longitudinal control response was experienced. The ballooning and subsequent pitch down characteristic during flare has been reduced on the simulator. Touchdown sink rates for a two degree glide slope averaged approximately eight feet per second. Reliability was good and several revisions have been made which have improved the landing simulation. However, it is still not possible to consistently make touchdowns of the 2 to 5 ft/sec variety.

2. PROPULSION: (Mr. R. E. Taylor - 7-229)

YJ93 engine test cell performance repeatability demonstration testing commenced 13 Apr 64 on Engine S/N 170-575. Test operations had to be terminated on 15 Apr 64 due to a progressive downward T5 reference shift which required replacement of the main fuel control. General Electric (GE) expects to resume testing on S/N 170-575 during the week of 11 May 64. In addition to the problem noted above, a longitudinal engine "shake" was observed. Magnitude of the "shake" was approximately 45-50 mils maximum at 16 CPS. GE will be exploring this "new" phenomenon when tests are resumed on engine S/N 170-575.

3. EMERGENCY PROCEDURES (SEC III - FLIGHT MANUAL): (Mr. D. O. Gobert - 7-226)

The majority of our time this month has been spent on reviewing and revising these procedures. We made our own detailed review and subsequently met with North American Aviation, Inc (NAA) handbook, design and flight test personnel to incorporate the agreed upon changes.

4. TAXI TESTS: (Mr. C. O. Johnson - 7-227)

Action on this item took place in May; however, we discuss it in this report for timely information.

The Joint Test Force (JTF) reviewed our previous recommendations with Messrs. D. Creech and J. Williams of the SPO, on 4 May. We jointly decided on the approach stated in Attachment 1 (Taxi Test Program Recommendations). Our recommendations call for essentially the basic program in OTP 62-9 (with taxi headings revised) plus a run to 135 knots, which is the predicted minimum nose wheel lift-off speed for the test gross weight.

After inspection of the runway overruns at Palmdale, we feel (contrary to previous recommendations) that the overrun is better to the east than to the west. The transition from concrete to dirt on the west end is abrupt; immediately there is an access road crossing perpendicular to the runway. The dip and rise to the east is more gradual than we had thought.

We have apprised NAA flight test of the recommendations; they weren't too pleased. Significant to mention is: Apparently they did not remember that the Pre-Flight Specification (NA-61-620-3) calls for acceleration to nose wheel lift-off speed.

We understand that the SPO will soon take action on this subject.

Joseph F. Cotton

JOSEPH F. COTTON
Colonel, USAF
XB-70A Test Director

1 Atch
Taxi Test Program Recommendations

TAXI TEST PROGRAM RECOMMENDATIONS

Taxi test requirements are called out in NAA Report NA 61-620-3, para. 3.1.4.3 as well as NA 61-620-2 and NA 61-620-2 TAB A.

The detailed procedures to accomplish the requirements of NA 61-620-3 are written up in OTP 62-9, rev. 2/13/64.

The B-70 SPO and the XB-70 Joint Test Force do not agree with the OTP 62-9.

We recommend the following changes be made to OTP 62-9 and the contractor instructed, by the B-70 SPO, to accomplish the taxi tests as outlined.

Item No. 1 - Introduction

Rewrite to agree with the new test procedures.

Item No. 2 - Para. A - Test Objectives

Subpara. 2 - Substitute the words "Handling Characteristics" in place of "Directional Control."

Add Para 2.4 - Elevon effectiveness (Pitch and roll)

Subpara. 3 - Eliminate Para. 3.1.

Item No. 3 - Rewrite "G" as follows:

G. TEST PROCEDURE

5. Taxi to Runway (Data continuous)

5.1 Call Tower on 361.4 mc.

5.2 Taxi south to Runway.

NOTE: Use mobilcom guidance.
If idle thrust results in excessive speed, shut down Engines 1 and 6.

5.3 Check tires, landing gear, hydraulic lines and brakes prior to taking runway.

6. Taxi Run No. 1 (Westbound - Runway 25, Data continuous)

6.1 10 Knots.

6.1.1 Nosewheel steering - Taxi position.
Evaluate auto and manual braking.

6.1.2 Nosewheel steering - OFF
Evaluate auto and manual braking.

6.2 10-30 Knots Steering Evaluation

6.2.1 Nosewheel steering - Take-off position.
Initiate and recover from "S" turns.

6.2.2 Nosewheel steering - Taxi position.
Initiate and recover from "S" turns.

6.2.3 Nosewheel steering - OFF
Steer with brakes only. Brakes auto.

6.3 180° Turn on runway (Steering-Taxi position).

6.3.1 Line up on Runway 07.

7. Tire, Brake, Landing Gear, Hydraulic Line Inspection.

7.1 Record tire temperatures.

8. Subsystem Static Checks - Brakes on Hold Mode.

8.1 Restart any engines which have been shut down.

8.2 Alert photo grid.

8.3 Dispatch helicopter with photographer and rescue team.

8.4 Advance power slowly from idle to MRP.

8.4.1 Flaps Up, cycle rudder and elevons at max rate.

8.4.2 Flaps down, cycle elevons at max rate.

9. Taxi Run No. 2 (Eastbound - Runway 07, Data continuous)

9.1 Configuration.

9.1.1 Flaps Down.

9.1.2 Trim for Take-off.

9.1.3 Brakes - automatic.

9.2 Brake release - Accelerate to 50 $\pm$ 10 Knots.

9.3 Power - Reduce to maintain approx. 50 Knots.

9.4 Steering Check - 50 Knots.

9.4.1 Nosewheel steering - Take-off position.

9.4.2 Nosewheel steering - OFF.

9.5 Decelerate - Steering OFF.

9.5.1 Power - Idle.

9.5.2 Brakes - Auto. Light to moderate braking.

9.5.3 Directional control with brakes.

9.6 Nose wheel steering - Taxi position at approx. 10 Knots.

9.7 Left Turn off runway to parking area.

10. Postrun Checks.

10.1 Shut down Engines 1, 2, 5, and 6.

10.2 Position tire cages.

10.3 Position shutdown and start GSE.

10.4 Measure tire temperatures.

10.5 Connect GSE.

10.6 Shutdown engines 3 and 4.

10.7 Service airplane.

10.7.1 Instrumentation LN_2.

10.7.2 NH_3.

10.7.3 GN_2.

10.7.4 Refuel to approx. 380,000 pounds.

11. Engine Start and Final Operations for Next Test.

11.1 Engine start per Flight Test normal procedures.

11.2 Ground checks per Flight Test normal procedures.

11.3 Measure tire temperatures.

11.4 Disconnect and move GSE to opposite end of runway.

11.5 Dispatch helicopter with photographer and rescue team.

11.6 Alert photo grid.

12. Taxi Run No. 3 (Westbound - Runway 25, Data continuous)

12.1 Configuration.

12.1.1 Flaps down.

12.1.2 Trim for Take-off.

12.1.3 Brakes - automatic.

12.1.4 Nosewheel steering - Take-off position.

12.2 Power - Advance slowly from Idle to Min A/B
Hold brakes.

12.3 Release brakes.

12.4 Power - Advance from Min A/B as required.

12.5 Accelerate to 100 $\pm$ 10 Knots.

12.6 Decelerate (Ground and aerial photos).

12.6.1 Power - Slowly reduce to Idle.

12.6.2 Evaluate ground handling.

12.6.3 Light to moderate braking.

12.7 Nosewheel steering - Taxi position at approx. 10 Knots.

12.8 180° Turn on West end of runway.

13. Postrun Checks.

Repeat steps 10.1 thru 10.8 as applicable.

14. Engine Start and Final Operations for Next Test.

Repeat steps 11.1 thru 11.6.

15. Taxi Run No. 4 (Eastbound - Runway 07, Data continuous).

15.1 Configuration.

15.1.1 Flaps Down.

15.1.2 Trim for Take-off.

15.1.3 Brakes - automatic.

15.1.4 Nosewheel steering - Take-off position.

15.2 Power - Advance slowly from Idle to Min A/B. Hold brakes.

15.3 Release brakes.

15.4 Power - Advance from Min to Max. A/B.

15.5 Accelerate to and maintain 135 Knots indicated speed.

15.6 Rotate to min. 5° and max 7° angle of attack.

15.6.1 Evaluate rudder control.

15.6.2 Evaluate roll control.

15.7 Lower nose gear to runway with longitudinal control.

15.8 Decelerate.

15.8.1 Reduce power to Idle.

15.8.2 Deploy drag chute - do not jettison.

15.8.3 Evaluate ground handling.

15.8.4 Normal braking.

15.8.5 Nosewheel steering - Taxi position at approx. 10 Knots.

15.8.6 Left turn to parking area.

16. Postrun Checks.

See Items 8.1 thru 8.10 of existing OTP.

Item No. 4 - Rewrite "H" as follows:

H. POST TEST OPERATIONS

1. Tow aircraft to engine run pad.

2. Remove oscillograph.

3. Crew debriefing.

4. A/V post and preflight and special inspections.

5. Gear retraction check.

Item No. 5 - Taxi Test Track:

Revise to agree with new test procedures.

FTT 1070

HEADQUARTERS
AIR FORCE FLIGHT TEST CENTER
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS AIR FORCE BASE, CALIFORNIA 93523

AD INEXPLORATA

REPLY TO ATTN OF: FTTB

SUBJECT: XB-70A Joint Test Force Activity Report for March — 10 April 1964

TO: ASD (ASV)
Wright-Patterson AFB Ohio 45433

THRU: FTT

1. PILOT TRAINING: (Colonel Joseph Cotton - 42951)

a. Flying Time:

	Charged to XB-70 Program			EAFB Provided - No Cost to XB-70			Total		
	B-58	B-52	B-47	B-58	B-52	B-47	B-58	B-52	B-47
Mr. White	8+10	---	2+00	---	---	---	8+10	---	2+00
Mr. Shepard	6+55	---	---	---	---	3+30	6+55	---	3+30
Lt Col Fulton	6+00	---	---	---	1+05	---	6+00	1+05	---
Colonel Cotton	12+05	---	2+00	---	---	---	12+05	---	2+00

The B-52 was busy with the X-15 and was not available for XB-70 pilot proficiency. TB-58 No. 662 was delivered to Kelly AFB for "Hustle-Up" on 30 March and will not return until mid May.

b. Simulator:

Air Force pilot simulator flight time is tabulated below:

Test	Colonel Cotton	Lt Colonel Fulton
AICS Emer & Norm. Proc.	2 periods - 3+30 hrs	2 periods - 5+00 hrs
Landing Practice & Control Force Evaluation	None	1 period - 1+40 hrs

Again, Lt Colonel Fulton was the only pilot to obtain simulator landing practice this month. The Air Induction Control System (AICS) function of the simulator has been operating satisfactorily; however, the same cannot be said for the flight control simulator.

FTT Copy

The following are major comments. We will continue to forward detail pilot reports to ASVT.

Air Induction Control System:

As reported last month, Colonel Cotton still experienced difficulty in tending to move the manual bypass wheels the wrong direction to effect an inlet start or unstart. However, he corrected the condition by making a determined effort to move the wheels correctly.

Lt Colonel Fulton stated that a danger exists in moving the manual throat wheels before reducing the manual bypass wheels when operating near maximum duct performance. In short, he feels that the copilot must divert the majority of his attention to control of the inlet, if in the manual mode. The abbreviated normal check list has been used in the simulator and it appears to be adequate but is being continually evaluated.

Landing Practice and Longitudinal Control Force Evaluation:

Lt Colonel Fulton accomplished 40 landings, only 19 of which resulted in acceptable sink rates. Satisfactory touchdowns continue to be very difficult to obtain consistently in the simulator. There is a lack of lateral/longitudinal control force harmony. Lateral forces evaluated were light, but acceptable; breakout forces are too low. Longitudinal forces are too high. There is also a lack of harmony between airplane response and control displacement in pitch and roll. The simulator exhibits a ballooning tendency during flare and a subsequent large pitch down.

The visual display is still inadequate to allow a good landing program to be conducted. The landing simulator will be down for the first part of April for rework.

2. PROPULSION: (Mr. R. E. Taylor - 7-228)

General Electric (GE), Western Contract Management Region (RWTT), and Joint Test Force (JTF) personnel met with North American Aviation, Inc (NAA) at the GE/Edwards Facility on 24 March to advise NAA of the GE-RWTT-JTF position on engine test stand correlation, hot gas reingestion and follow-on cell performance qualification testing. Prior to the meeting, NAA apparently thought that the original correlation program was satisfactory and did not realize the extent or impact of reingestion. Thus, they questioned the value and necessity of further testing. No significant developments resulted from the meeting. We remain uncertain of NAA's position.

3. FACILITIES: (Mr. C. O. Johnson - 7-227)

Rotor Spin Pit:

The lowest bid ($27,777) for the facility, from Santa Fe Engineering Company, exceeds the estimate of $23,500 given ASV in October 1963. Per our talk with Lt Colonel Allen on 24 Mar 64 the Center has requested (through ASD) the additional funds and an extension of the present Obligation Authority (OA) which expires 2 Apr 64. The Air Force Flight Test Center (AFFTC) proposes that a portion of the $6,153 surplus from the runup pad modification be transferred to this project.

4. INCIDENT AND CRASH RECORDER: (Mr. C. O. Johnson - 7-227)

Lockheed Aircraft Service Company has presented information to the Center on a recorder that was designed as a maintenance recording system, but which has a direct application as an incident or crash recorder, especially on flight test aircraft. A similar MIDAS recorder was installed on the BAC 111 which was destroyed in October 1963. Lockheed indicated that information was available from that recorder within 2½ hours after the crash. C-133 aircraft are being equipped, on a trial basis, with the Lockheed system in an attempt to determine the cause of C-133 accidents.

The unit can record approximately 270 parameters (using flight test transducers), plus voice. It can be ejected on impact or by other control signals. Indications are the unit itself will cost about $20,000 and would be available in three to four months. Engineering which must be accomplished to provide space and signal provisions will probably significantly increase the installation cost. NAA has indicated that the recorder is not compatible with the XB-70 instrumentation. It is too late and expensive for our program, but should be considered for future programs such as the TFX and SST.

5. FLIGHT MONITOR ROOM - BUILDING 3940: (Mr. Don Gobert - 7-227)

The flight monitor room is in commission. Modifications to the UHF radios have been completed. It was used on 30 Mar 64 to familiarize personnel with operating procedures and to evaluate emergency procedures. An annoying radio interference (cross-talk) problem exists which could require some rewiring or change of frequency. The room will be used in the near future to monitor flights for checkout of the radar tracking and communications capability on the AFFTC high range.

6. INTERIM FLIGHT MANUAL: (Mr. Don Gobert - 7-227)

The Interim Flight Manual was reviewed by NAA, SPO and the JTF at the NAA, Inglewood Facility during the week of 9 Mar 64.

The philosophy of the Flight Manual will be changed from an "operational" to a "flight test" concept. Therefore, the manual will be revised to include a description of flight test instrumentation and flight test equipment such as the vibration panel, sideslip indicator, etc.

The Emergency Procedures (Section III) were not included in the review since additional time was required to study the procedures with engineering and manufacturing personnel. A review of the Emergency Procedures will be conducted in April.

7. ESCAPE CAPSULE TEST VEHICLE: (Mr. Don Gobert - 7-227)

The B-58 pod which was modified for escape capsule tests will be stored in the Joint Test Force facility at Edwards. Pod Technical Orders will be deferred and will be performed only if the pod is needed for future tests.

8. TAXI TESTS: (Mr. C. O. Johnson - 7-227)

The Operational Test Plan (OTP) for taxi tests (OTP 62-9, dated 13 Feb 64) has been reviewed and discussed with NAA. We, of course, would like to see more tests to allow better evaluation of systems and structure. However, assuming the philosophy of three tests has been dictated by program funds, we forward the following comments for SPO consideration. A brief summary of the tests is included for clarity.

1. Test No. 1 - Low Speed (10-30 knots) Steering Evaluation:

   a. Taxi south from run-pad to runway.

   b. Turn east onto runway from taxiway and accelerate to test speed.

   c. Initiate and recover from "S" turns (steering with "taxi" position and steering with "takeoff" position).

   d. Steering with brakes only (steering off).

   e. Make full 180 degree turn with nose wheel steering on ("taxi" position).

   Comments:

   Taxi from the run-pad takes the airplane through a relatively confined area past a hangar, buildings and power islands. The pilots' attention should be devoted only to safely reaching the runway, not to steering and braking evaluations. The landing gear and wheel wells should be inspected prior to taking the runway.

We recommend that the airplane be turned west instead of east to provide more taxiing distance. Distance to the west end is approximately 9,000 vs 3,000 feet to the east. This triples the time available for evaluating low speed handling characteristics.

2. Test No. 2 - 50 Knot Taxi Run:

a. Accelerate at M.R.P. to 50 ± 10 knots steering on ("take-off" position). Reduce power to idle.

b. Steering check at 50 knots.

c. Decelerate using auto braking mode - light to moderate braking.

d. Directionally control with brakes.

e. Make 180 degree turn.

Comments:

The distance and time is adequate for this test; however, the airplane would taxi to the east instead of west if our recommendations are followed.

3. Test No. 3 - 110 Knot Taxi Run:

a. Abruptly advance power from idle to R.H.1.

b. Accelerate to 110 ± 10 knots - steering on ("takeoff" position).

c. Abruptly reduce power from R.H.1 to idle.

d. Check rudder effectiveness - steering off.

e. Apply light to moderate braking -- Brakes automatic.

f. Deploy chute 100 knots minimum.

g. Decelerate with light to moderate braking -- brake automatic.

h. Evaluate steering on and off.

i. Stop.

Comments:

(1) We recommend this run be performed to the west. The airplane would be headed into the prevailing wind and the west

overrun area presents fewer obstacles in case of a brake malfunction. The west overrun is open desert; the east overrun has a slight dip and rise to cross another runway which would probably cause large pitch oscillations should it be crossed.

(2) The power should be advanced to military and engine instruments checked prior to brake release, and subsequently advanced to maximum during the initial roll. Abrupt power advances are to be performed during static runs and should not be performed on these initial taxi tests.

(3) Disengaging nose wheel steering at 110 knots to evaluate rudder effectiveness introduces additional risks. If it is reengaged at 100 knots (per the plan) the pilot may not be able to adequately evaluate rudder effectiveness in this short elapsed time.

(4) We feel that additional tests are required to evaluate this condition, where the acceleration is more gradual and steering is off from brake release. A test of this type should be performed immediately after Test 2.

(5) We propose that the present Test 3 then be modified to delete the nose steering off evaluation and include acceleration to rotation speed and rotation.

Joseph F. Cotton

JOSEPH F. COTTON
Colonel, USAF
XB-70A Test Director

B-70

25 Sep 64

AFFTC Hist Squadron Rpt.

6. Real-Time TV Display: Real-time TV display of the initial XB-70 flight was provided in the B-70 Control Room and in Room 216, Bldg 3940, which was set up as a monitor room. In addition, video tape recording of the presentation was made. Coverage of the B-70 taxi-out and takeoff was provided by a TV camera set up at Site 2, atop a North American hangar at Palmdale. From this location the picture was transmitted by microwave to Bldg 5780. Camera #2 was set up at the LOTAS and this picture was also transmitted to Bldg 5780. Co-ax switching between the Palmdale camera and the LOTAS camera was performed at this point. A third camera was set up to cover the B-70 control room in general, but was primarily sited in on the Radar Plotting Board.

a. Complete coverage of the takeoff was provided by Palmdale camera after which it was airlifted to Edwards and set up on the roof of the Edwards Takeoff and Landing Tower to cover the taxi-in of the B-70 after landing, and also the egress of the flight crew. Good coverage of the first go-around and the final approach landing and roll-out were provided by the LOTAS camera. However, during the portions of the flight when the B-70 was at considerable distance from Edwards, coverage was lost due to very poor visibility. On several occasions after losing track, re-acquisition was accomplished by means of the Radar/LOTAS Acquisition System.

b. It was stated by the North American Test Director that the TV monitor presentation allowed them to keep the radio transmissions to a minimum as, in his words, "One picture is worth a thousand words." Additionally, the personnel in the Control Room were immediately apprised of the landing gear fire through the TV presentation. The video tape was taken to SSD on 23 September for showing and transcribing of a copy for them, for AFFTC, and for Lt Col O'Hara to forward to Hq AFSC.

FTY 25 Sep 64

c. Repaired access doors to Weight & Balance Hangar scales in preparation for the XB-70.

FTB 25 Sep 64

a. The XB-70 arrived from Palmdale on 21 Sep 64.

FTD 2 Oct 64

3. B-70 PROGRAM: FTDT provided pararescue support for the first B-70 flight. Colonel Cotton and Lt Col Knight have been contacted concerning documentation for medical support during B-70 flight operations. No date has been set for a meeting of the agencies concerned, but it is anticipated that such a meeting will be arranged shortly after the next B-70 flight, scheduled for 2 Oct 64. FTDT has verbally agreed to provide pararescue support for the next B-70 flight.

9 Oct 64

a. Support of 2d B-70 Flight: The second XB-70 flight was successfully covered on 5 October. Signal strength levels of sufficient levels were received at the Shoshone site to "lock up" receivers for data transmission when the vehicle was still in the local area at 12,500 feet indicated elevation. The hydraulic failure during flight was detected nearly simultaneously by the pilot and by the telemetry monitor engineer.

22. XB-70 Pressure Suit: An investigation into the XB-70 pressure suit/environmental control system incompatibilities was completed. Recommendations were made to North American through the XB-70 Test Force for conducting chamber testing to resolve the suit ventilation problems. Captain Weiner, a North American environmental engineer, completed this exercise as a two week active duty reservist.

FTF 21 Jun

Environmental section conducted test for NAA to determine performance of the ventilation diluter proposed by NAA.

FTO 24 May 63 - XB-70A Assignment: AFSC Aircraft Allocation established Project Number SYS3B-406 for allocation of three aircraft Serial Numbers 62-001, 62-207, and 62-208. Aircraft will be bailed to NAA, Assignment Code "EB". Program will include 250 flight hours for 62-001, 160 flight hours for 62-207, and 110 flight hours for 62-208.

FTO 18 Jan 63 - The justification document submitted to AFSC for five additional firefighters in support of XB-70 was disapproved on grounds that current authorizations were adequate based on criteria in AFM 26-1.

FTM 24 May 63 JP-6 fuel requirements from 1 June 63 thru 31 Dec 1963 were revised to 550,000 gallons at a meeting between the XB-70 Joint Test Force. The 550,000 gallons included fuel requirements for use at NAA at Santa Susana and Palmdale. Air Force Aerospace Fuels Field Office at Bell, California, was notified of the change from 1,414,000 gallons (not including NAA-Santa Susana & Palmdale).

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FTM 17 May 63 Edwards AFB has 300,000 gallons of JP-6 on hand with no use for several months. AF Aerospace Fuels Field Office in Bell made arrangements for NAA at Santa Susana to receive JP-6 shipments from Edwards so that Edwards old stock on hand could be used and replaced with fresh fuel.

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FTM 3 May North American for the XB-70 stated a requirement for an additional 100 lines in addition to the 100 they now have at Edwards. Communications-Electronics Implementation Plan Amendments (CEIPA's) requesting the 100 additional lines went to AFSC this week.

FTM 5 Apr Sgt Leier of FTMM and ~~xxxx~~ three men from FTE were at OCAM A conference at Wright-Patterson 4 - 5 April to finalize the work package on B-52B-008 and B-52C-399 (X-15 and X-20 motherships).

FTM 22 Mar JP-6 delivery time has been slow and undependable to Edwards from Toledo, Ohio, and Ashland, Kentucky, taking weeks for delivery. As of 1 April, Standard Oil of Southern California, obtained the contract to supply Edwards JP-6 which will expedite delivery.

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FTM 1 Mar On 10 July 1962 Edwards received for a limited field test two R-1 10,000 gallon refuelers intended utltimately for support of the XB-70 project. One of the refuelers was deadlined upon arrival becasue the power take-off was inoperative. The second ~~xxx~~ unit was placed in service 10 August 1962 but was ~~xxx~~ down for maintenance frequently to correct minor discrepancies. Then the differential broke on 4 October 1962 and has been down since. One is expected back in-commission in the next few days and the other is out indefinitely for complete engine overhaul by contractor in Bakersfield.

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FTF 5 Jul 63 - Data Systems Branch received two special B-70 test tapes (PCM) which were prepared by North American. These ~~tapes~~ magnetic tapes will be evaluated for use to insure equipment to be utilized in support of the XB-70 flight test program is functioning ~~ps~~ properly and to checkout airborne data acquisition sytems.

~~22xR~~

FTF 21 Feb The RC-121 aircraft flight test of the AN/ASQ28(V) Bomb Nav system for XB-70A vehicle #3 conducted by IBM at ~~Wwegoy~~ Owego NY from 29 May 1962 to 3 January 1963 was completed in 45 flights totalling 188:15 flying time. Demonstrated by IBM was the functional operation of equipment and integrated system and identification ~~fx~~ of fixes required for successful XB-70 operation.