T46A SECOND FLIGHT
16 Oct 85

file 4 OPS
DJM

0. DUAL- MAJ HANSEN (CO PILOT)

1. RIDLEY - MANDATORY (FLUTTER)

2. TAKEOFF - SLOWER (1.1 VS 1.2 OR 7 KNOTS)

3. 15,000 FT 130 KIAS GEAR ↑↓↑

   150 KIAS

   175 KIAS

   DECEL 113 KIAS

   ACCEL 200 KIAS

   225 KIAS

   250 KIAS

5. 15,000 FT 200 WUT 3G

6. DESCEND TO 7,500 FT @ 200 KIAS

7. 7500 FT

   DECEL 112 KIAS

   ACCEL 250 KIAS

8. BINGO 300 LBS

9. 200 KT INITIAL - OVERHEAD PATTERN & LANDING

MOE
FILE = OPS-1

T-46A FLIGHT #3
*(PARENS) - Indicate New Points

Mission Objectives

1. Demonstrate engine airstart capability
2. Demonstrate auxilary gear extension
3. Demonstrate flap blowback
4. Expand the flight envelope:
   15,000 ft to 25,000 ft
   10 deg B to 12 deg B
   2 G's to 3 G's

1. Dual Martinez/Hansen
2. Ridley Control
3. Rwy 04 if possible (rwy 22 if necessary)
4. Takeoff $1.0V_s$/94 KIAS (10 knots slower)
5. Mil power climb, clean to 15,000 ft
6. 15,000 ft
   Lateral trim check @ 150, 175, 200, 225 KIAS
   Simulated single engine
   (Engine shut down/airstart 200 KIAS RT/150 KIAS LT)
   (Aux gear extension 150 KIAS)
7. (25,000 ft)
   130 KIAS
      Pace
      Engine accel decel
      Handling qualities
   175 KIAS
      Pace
      Handling qualities
8. Descent 25,000 to 15,000 ft (175, 150, 200 KIAS)
9. (15,000 ft)
   (WUT to 3 G's 200 KIAS)
   (Flap blowback accel 150 to 200 KIAS)
10. RTB Bingo 300 lbs
11. (Touch & go landing)

file OPS-1
DRC

T-46A
FLIGHT 4 MISSION CARD
SUMMARY

MISSION OBJECTIVES

1. Determine 1G stall characteristics, speed and alpha

2. Demonstrate flap blow back

3. Expand the flight envelope:
   15,000 to 20,000 ft for engine airstart
   2.0 G's to 3 GS
   12° alpha to stall alpha
   12° beta to 14° beta

MISSION PROFILE

1. Control room - At the CTF

2. Crew - Maj Hansen (Pilot) Mr Martinez (Co-pilot)

3. ~~Take Off~~ ROTATE at .95 V_S/89 KIAS (5 knots slower)

4. Climb to 15,000 ft @ 170 KIAS

5. 15,000 Ft
   Roll trim check 150, 175, 200, 225 KIAS
   Engine accel Decel 130 KIAS

6. 20,000 Ft
   Pace 200 KIAS
   Engine airstart 200 KIAS

7. 25,000 FT
   175 KIAS, pace, HQ block maneuvers
   130 KIAS, pace , HQ block maneuvers
   170 KIAS, engine accel/decel
   1 G stalls
      Clean
      SB's out
      Gear down flaps 20°
      Gear down Falps 20° SB's out

8. Descent to 7,500 ft 130, 150, 175 KIAS

9. 15,000 to 10,000 Ft Flab blow back check

10. 7,500 ft
    225 KIAS pace, HQ block maneuvers
    175 LIAS pace, HQ block maneuvers
    130 KIAS pace, HQ block maneuvers

11. RTB 300 #BS bingo

12. 1LS, touch and go landing, full stop

file 4 OPS-1
DM

T-46A
Flight 5 Mission Card
Summary

MISSION OBJECTIVES

1. Pitot-Static Calibration

MISSION PROFILE

1. Control Room - At the CTF

2. Crew - Maj Hansen (pilot) Mr Shawler (co-pilot)

3. ~~Takeoff~~ ROTATE at .9 V_S/85 KIAS (5 knots slower)

4. Tower Fly bys

	Speed	Configuration
1.	200	Clean
2.	225	"
3.	250	"
4.	180	"
5.	160	"
6.	140	"
7.	120	"
8.	110/1.1 V_S	"
9.	120	Power Approach
10.	110	"
11.	100/1.1 V_S	"
12.	160	Gear Only
13.	140	"
14.	120	"
15.	110/1.1 V_S	"
16.	120	Clean
17.	110/1.1 V_S	"
18.	160	"
19.	250	"
20.	140	Power Approach
21.	160	"
22.	165	"
23.	100/ 1.1 V_S	Clean

5. Bingo 200 lbs

6. Closed to full stop.

File 4-OPS-80 Dm

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 21 Oct 1985	e. CONFIGURATION Clean ,108 # ballast	i. FUEL LOAD 1140
b. PILOT Martinez, J.	f. INSTRUMENTATION Standard test tm.	j. SURFACE WIND 240/16
c. OBSERVER Hansen	g. START UP GR WT 8626	k. WEATHER 40 16 190
d. SORTIE TIME/TO TIME 1.5 (1428Z)	h. START UP C G 19.08	l. GROUND BLOCK 08:57

4. TESTS PERFORMED

Lateral trim checks, engine shut downs and relights at 15000' hp., aux gear extension, engine handling characteristics at FL 250.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

J. Martinez, FRC
Single engine control characteristics - 4 deg bank into good eng. to hold heading with no rudder input. Very minimal asymmetric engine thrust characteristics on engine cut from full power (simulated aux gear drop) - side speed brake extension produces nose up. Pitching moment requiring 4 to 5 lbs of forward stick force to check. Opening of top speed brake produces nose down pitching moment.

6. REMARKS *(Continue on reverse side if needed)*

J. Martinez, FRC
Test was terminated at point 18 on flight card due to loss of T-M reception by control at Ridley bldg.
Maj Eric Hansen,USAF
93 kias rotation achieved by Mr. Martinez with abrupt aft stick movement (approx 25 deg/30 lbs) resulting in smooth 8deg/sec rotation to 10 deg with no overshoot Best climb rate seems to be near 175 KIAS,with 1900 FPM @ 12,000 FT. Lateral trim is ineffective on this flight the aircraft wanted to roll left requiring full right roll trim at all speeds. Single engine 130 KIAS requires 4 deg bank into good engine or full yaw trim + 2 deg bank. Single engine go-arounds show very benign yawing characteristics. Engines shutdown and relight very well with bleed air on. Windmilling fan at 150 KIAS is 8%,core 0%. At 200 KIAS fan is 18%,core 0%. Aux landing gear extension at 150 KIAS puts main gear down as fast as using hydraulics with no yaw required, Nose gear took 15 seconds before showing down. Side speed brakes caused chatter,5 lbs nose up pitching moment. Top speed brake caused 5 lbs nosedown pitch,1000FPM descent at full power, and contributed no noticeable increase in buffet. Max rate of climb to 25,000 ft attained at 175 KIAS. Pressurization/ECS working fine with 12,500 ft cabin altitude at 25,000 ft. Pace check at 130 KIAS showed 4 knots higher on production airspeed vs. noseboom,altimeters within 10 ft. Pace data not reduced yet for comparison. Straight in appch on 3 deg VASI's showed 120 kias is trim speed for full nose up trim in PA configuration. 110 kias on final required 3-4 lbs back pressure.

1. Tightening up sagging gear doors worked. Right doors pull out very slightly at 250 kias,left doors are flush. Aircraft now has a tendency to roll left at all speeds whereas previous flight had slight right roll.
2. Roll trim is inadequate for current rigging, and may be inadequate even for good rigging,needs further looking at.
3. Unlike suspected,it seems the side speed brakes produce the harsh chatter when deployed,possibly disturbed air striking the horizontal/vertical stabilizers. The top speed brake creates a strong ,undesirable pitch down,"a lot of drag",but no noticeable delta in buffet.
4. Left ECU went to manual during right engine shutdown/relight, and again when left engine was shutdown. Reset ok each time.
5. Yaw damper tripped off each time with initiation of start sequence. Was a nuisance, and I'd like to see it less sensitive to voltage transients.
6. The landing gear handle torque rod connection is not rigid enough. Lowering the right gear handle resulted in no gear movement. The left gear handle lowered the gear ok.
7. Gear warning indicators lost on final approach - circuit breaker popped. Chase confirmed gear down and landed uneventfully.
8. Need much more aft trim. 120 KIAS trim speed at full aft trim in PA configuration is not enough.
9. Landed in 15G20 headwind. Stick grip was 2 inches forward of my groin and I was striking the inside of my thighs for roll corrections in the gusts. Stick position for landing is too far aft for comfortable control.
10. After landing and stopping for gear pins,both engines accelerated to 74% core. Going to manual mode brought core back to normal 62% core speed,but going back to auto ,the core went back up to 74%. Shut down the left engine to reduce taxi thrust. While taxiing in,the right engine began varying between 55% and 74% core erratically. Anomalies stopped with fuel control in manual.
11. Taxi characteristics in crosswinds excellent. Rudder is sufficient for straight line taxiing in a 15 kt crosswind at 15+ taxi speeds.
12. Landing technique was to pull power at 10 ft,roundout gradually to touchdown at 95 kts. Landing pitch attitude was held until full aft stick control effectiveness was lost and the nose began dropping at 85 KIAS. Rate of nose drop was slow during first half, a little faster during 2nd half decellerating through 80 KIAS. Nose contact rate was the same as previous flights despite lower speeds.

FILE OPS-1 MDK

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 23 Oct 85	e. CONFIGURATION Clean	i. FUEL LOAD 1140 Lbs
b. PILOT Hansen	f. INSTRUMENTATION Per TIS	j. SURFACE WIND Calm
c. OBSERVER Martinez	g. START UP GR WT 8626	k. WEATHER Clear, 40 deg. F
d. SORTIE TIME/TO TIME 1.7/1621 Z	h. START UP C G 19.08%	l. GROUND BLOCK Per flight card

4. TESTS PERFORMED

$0.95V_s$ rotation for takeoff (89KIAS), 170 KIAS check climb, longitudinal trim extremes, roll trim checks, engine operations checks, 20,000 ft shutdown/restart, 25,000 pace points, 175 KIAS and 130 KIAS handling qualities, 1 g stall investigations, descent checks, ILS, touch and goes.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

See next page

6. REMARKS *(Continue on reverse side if needed)*

J. Martinez, FRC
The stall characteristics of the T-46A in the clean configuration (480 lbs fuel remaining) were evaluated. The aircraft stalled at 94 KIAS (18 AOA). The aircraft was slowly decelerated from its trim speed of 125 KIAS, to stall while evaluating all axes of control effectiveness. Imminent stall was recognized by extremely light stick vibrations (AOA 17.5) followed by the stall which produced a nose down pitching moment. This writer feels that the natural stall warning is insufficient to warn the student pilot of impending stall. (Also) During the stall, the aircraft had a tendency to roll right, which could be countered by ailerons if the correction was attempted early in the roll. Stalls performed with the speed brakes deployed had a tendency to mask what little stall warning that the aircraft exhibited. Stall recovery was easily effected by a slight relaxation of the back stick pressure. Followed by immediate recovery to I G flight.
Major Hansen,
1. Brakes held ok at max power.
2. With T-1, there are no apparent over-rotation tendencies, but stick deflection and force required to rotate are excessive. The 2nd touch and go indicates the airplane might be very nice andling if the 3 point ground attitude could be increased about 5 degrees.
3. Stick force per g is very light. I'd prefer a 50% increase.
4. Landing gear extension at 180 KIAS was very pleasant - no pitching or ballooning tendencies.
5. Speed brake extension at 240 KIAS is very uncomfortable. Immediate chatter, buffet, nose hunting 2-3 deg., and slight pitch up followed by strong pitch down as speed brakes reach full extension.
6. Natural stall warning is inadequate in clean configuration, and non-existent due to buffet masking in any other configuration.
7. Pitch trim rate is very slow.

(continued)

RESULTS OF TESTS

Major Hansen,
Rotation required nearly full aft stick and as much force as I could hold, and was not able to begin rotation until going through 90 KIAS. Attaining and tracking takeoff pitch attitude required no undue pilot skill. Flyoff was at about 95 KIAS//At 170 KIAS/8000 ft, full nose down trim requires about 5-7 lbs and full nose up trim requires about 15 lbs Fs//Aircraft tended to roll right-more with increasing airspeed - above 150 KIAS. Was able to trim laterally up to 200 KIAS. Gear doors were flush this flight//Engines worked fine, no anomalies. Shutdown and relight at at 200 KIAS/20 K no problems (bleed air was on)//25,000' pace points show pitot statics to be very good//Handling qualities revealed:
Slow frequency and heavily damped short period both stick fixed and free//Lightly damped dutch roll, PHI/BETA $<$ 1; roll doublets - totally damped; sideslips - able to achieve only 9 deg. beta at full rudder at 225 KIAS/had some rudder left at 130 KIAS at 14 deg. beta; aileron rolls 60-60 deg. generated no more than 5 deg. beta with full stick/8 deg. beta full stick at 130 KIAS. Some roll rate reduction noted with 1/4 stick/130 KIAS passing through wings level, then picked up again; windup turns revealed fairly light Fs/g. One g stalls clean revealed very slight vibration in the stick beginning 3-4 KIAS above the stall. Stall occured at 94 KIAS with a sharp g-break and slight roll off to the right at 18 deg. alpha indicated (16 deg. true). No stick force lightening noted, even after g-break. Control in all three axes was very good in all configurations right up to the stall, and aileron was still effective for picking up the wing in the stall. Recoveries were immediate with slight forward stick to reduce AOA. Speed brake out stalls are the same, except that buffeting due to speed brakes totally masks stall warning. Gear and flaps 20 deg. also create buffet that totally masks stall warning. Flaps 20 deg. reduces stall speed to 84 KIAS,same characteristics. P.A. configuration feels very solid, very heavily damped, but good control all 3 axes down to stall//Flaps showed no indication at all of blowup between 150 and 200 KIAS//ILS signal and presentation were good from 8 miles out through to landing//Touch and go was made configured for 2nd takeoff (T.O. trim, flaps up, nosewheel on ground, 80 KIAS) with same comments as initial takeoff: can't get the nose off the ground at less than 94 KIAS. Second touch and go made without resetting flaps and trim, holding 95 KIAS touchdown attitude. Stick forces were light and pitch was easily controllable down to 90 KIAS when power was added. Flyoff was smooth and configuration cleanup produced no significant pitching moments. Excellent handling through the touch and go.

REMARKS (cont'd)

8. Engines and ECS were excellent this flight.
9. I would feel comfortable flying this aircraft at 25,000 ft without the yaw damper.

MDR file OPS-1 DR

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 Oct 85	e. CONFIGURATION Clean/Gear/P.A.	i. FUEL LOAD 1280 lbs.
b. PILOT Hansen	f. INSTRUMENTATION Per TIS	j. SURFACE WIND Calm
c. OBSERVER 2nd Pilot - Shawler	g. START UP GR WT 8730 lbs.	k. WEATHER Clear
d. SORTIE TIME/TO TIME 1.9/1517 z	h. START UP C G 19.03%	l. GROUND BLOCK On test cards

4. TESTS PERFORMED

T.O. rotate 0.9 V_S, tower fly-by pitot-statics data, touch and go landings, taxi eval. of revised nose gear steering.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Major Hansen,
Aircraft will not rotate even at full AFT stick until 95 KIAS. Full AFT stick rotation is exactly like the simulator, with slight strut extension and nose bobbing beginning 80-85 KIAS, then rapid rotation at 95. Rotation was checked at 12 degrees and returned to 10 degrees with no difficulty. Flyoff was normal and smooth. Tower fly-by data points were all stable and should be good for data reduction.
(continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

Major Hansen,
1. Spool up time for adequate thrust in low airspeed/altitude situations does not seem to be any problem, mainly because full power is never needed to stabilize the flight condition.
2. Over the wing refueling provided a 1280 lb. fuel load. Flew a 1.9 hr. mission in the traffic pattern with a heavy airplane.
3. Lowered gear for one pass at 195 KIAS. Very slight pitch up during transit, but only lasted 1/2 second. Very nice behavior.
4. Very easy to set power to hold a stable speed point.
5. During taxi in, right brake was dragging the airplane slightly right. Reached down and pulled the pilot's right pedal back and then the aircraft tracked straight.
Wendy Shawler, FRC,
1. Aircraft very solid in all three axis.
2. Visibility from cockpit - excellent.
3. ECS system excellent.
4. Speed brakes cause too much buffet at high speeds.
5. Nose wheel lift off requires too much elevator to get lift off at V_{stall} and too much force. Rotation control is not a problem. The same was true on a touch and go landing at 7700 pounds with full AFT stick and rotation at approximately 91 knots.
6. The nose wheel steering is very acceptable as is, but still needs to be adjusted to track straight.

RESULTS OF TESTS (cont'd)

Could not get P.A. configuration points above 140 KIAS due to power limitations.
Nose gearing steering is better, but masked by right brake dragging.
Wendy Shawler, FRC,
Excellent results on the tower fly-bys. Required full AFT stick to rotate on take-off at approximately 93 knots.

FILE OBS-1 MDE

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 25 Oct 85	e. CONFIGURATION Clean	i. FUEL LOAD 1280
b. PILOT Shawler	f. INSTRUMENTATION Per TIS	j. SURFACE WIND Calm
c. OBSERVER Hansen (2nd Pilot)	g. START UP GR WT 8800	k. WEATHER Clear
d. SORTIE TIME/TO TIME 1.7/2024Z	h. START UP C G 19.2%	l. GROUND BLOCK Per Test Card

4. TESTS PERFORMED

25 deg stick T/O rotation,accelerated stall investigations,150 kias @25,000 ft clean & gear + flaps 20 deg,climb to 35,000 ft,pace checks @150 & 175 KIAS, engine ops check,handling qualities at 150,175 KIAS,speed/power point @ 15,000 ft,touch and go 20 deg flaps takeoff.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Maj Hansen,USAF
Holding 25 deg of aft stick resulted in benign rotation rate beginning at 102 KIAS (1.1 Vs) with liftoff at 108 KIAS (1.15 Vs). Accelerated stalls at 150 KIAS both clean and with gear and flaps 20 deg were characterized by slight airframe and stick buffet at 13 deg with g break and sharp roll to the right at 14 deg. The roll to the right was not affected by rudder,but aileron was effective in checking the roll. The climb to 35,000 ft was completed. (cont pg2)

6. REMARKS *(Continue on reverse side if needed)*

Maj Hansen,USAF
1. Left engine went manual during start,shutdown,checked, & subsequently got a good start in auto. Just prior to takeoff, the left engine went into manual and was cleared by going to manual & back to auto. At 35,000 ft while setting up for 130 KIAS handling qualities maneuvers,an audible thumping was heard from the left side and was followed by left engine power cycling with fan varying abruptly between 60 and 83%. Going to manual mode,the engine functioned fine. Descending through 15,000 ft,auto was reselected and seemed ok. Garret is planning to change the ECU for that engine.
2. Accelerated stall warning only 1 deg of alpha before stall is inadequate, and the misrigging causing the right rolls during both 1g and accelerated stalls must be corrected.
3. Speed brake extension at 250 KIAS in the traffic pattern creates excessive chattering airframe buffet.
4. So far,flaps,trim,and 1000 lbs weight difference have no effect on ability to rotate the aircraft reasonably early (0.9 Vmin AVS requirement). 25 deg of elevator only produces delayed rotation at 1.1 Vmin.
5. The airplane handling qualities at 35,000 ft are much better than expected. Handling with yaw damper off is safe.
6. Engineers wanted to see 1g 360 deg aileron rolls to observe beta buildup, but they were not done awaiting SPO concurrence that such a maneuver is <u>not</u> interpreted as momentary "inverted flight",which is restricted.

Maj Hansen's Results (continued)
A lightly damped but not objectionable dutch roll,very strong roll damping, relatively linear rudder vs. sideslip,and low sideslip generation in 60-60 deg bank to bank rolls. A wind up turn produced a mild airframe buffet and a very slight wing rocking tendency at 12 deg alpha,where the test point was stopped. Pace points at 35K showed production and noseboom within 1/2 knot and 10 ft,and within 2 knots of pace aircraft. Speed power point at 15K revealed Vmax = 250 KIAS. Rotation with flaps 20 deg on a touch and go revealed same difficulty in achieving rotation as with flaps up.

Wendy Shawler, FRC
1. Smooth T.O. was made with 25 deg. of elevation, but lifted off above 105k.
2. Accelerated stalls at 25,000 gave the same general stall characteristics as the 1 "g" stalls. The stall warning is not adequate at only approximately 1 1/2 degrees of alpha warning. The "g" break and roll right are very good stall characteristics and recovery is immediate with a slight forward stick. The roll right can be controlled by slight left aileron. The rudder is not effective in controlling the roll off. The stalls were the same for clean and with gear and flaps.
3. The engines performed very well during the engine block.
4. The handling qualities at 35,000 feet at 150 knots and 170 knots were very good in all three axis. The T-46 is very easy to trim and fly at that altitude. The bank to bank rolls provide very little sideslip, but good roll rate.
5. A touch and go landing was made leaving the flaps down and full AFT trim. It was almost identical with my previous one which was no flaps and neutral trim.
6. The right engine swiched to manual during start and had to be shutdown to prevent over temp. The 2nd start was normal.
7. The left engine switched to manual in the last chance area, but reset normally. At 35,00 feet 145 knots the left engine stated oscillating. Switching to manual corrected the problem. Successful switch back to auto was made at 17,000 feet.

FILE mjr IFTR. 9 revised

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 4 NOV 85	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280 #
b. PILOT MAJOR HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 220/08
c. OBSERVER LTC CLINCH	g. START UP GR WT 8800	k. WEATHER 200 BKN 20+
d. SORTIE TIME/TO TIME 1.8/1313	h. START UP C G 19.2 %	l. GROUND BLOCK PER CARDS

4. TESTS PERFORMED

IOT&E first look - takeoffs, landings, climbs, lazy 8, traffic pattern stalls. DT&E: takeoff rotation evaluation, roll trim effectiveness, 7500 ft handling qualities at 150 and 250 KIAS, speed stability at 150 and 200 KIAS, speed/power points with gear/flaps 20 degrees at 140, 125, and 110 KIAS.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Major Hansen, USAF

DT&E: Two rotations for takeoff by Major Hansen using flaps 0 and 20 degrees, rotating at 1.0 V_{stall}, resulted in Cooper/Harper rating of 4 for difficulty in getting the aircraft to rotate at that speed, and **3** for the ability to stop at and track the 10 degree takeoff altitude. Roll trim is weak, slow and ineffective at full deflection in countering a right rolling tendency above 200 KIAS. 7500 handling qualities showed no surprises.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

Major Hansen, USAF

1. Light turbulence at 7500 ft, early afternoon caused some difficulty in obtaining stable data.
2. Mission was cut short due to loss of sideslip parameter.
3. IOT&E power off stalls at 15,000 ft produced g-break at 20-22 degrees indicated AOA vs. the 16 degrees seen at 25,000 ft with power for level flight. Airspeeds for stall were the same,but I'm at a loss to explain the AOA difference. Pre and post flight AOA instrumentation calibrations were good.
4. The longitudinal stick friction band masks doing a good speed stability point. At 200 KIAS, the initial trim point was steady hands off for 15 seconds, but after going + and - 15% speed and returning to 200 KIAS, stick release resulted in a phugoid converging on about 210 KIAS.
5. Had a repeat of the engines cycling (small step power increases from idle) while taxiing in after turning downwind (10 knots) on the taxiway. Quit when in manual mode.
6. Had a repeat of brakes dragging, particularly the right one, while taxiing in. It was relieved by pulling back on the pilot's pedals. We're awaiting FCD clearance to put in a bigger return spring.

LTC Clinch, AFOTEC

1. Aircraft feels very stable in all axes, should be an exceptional instrument platform.
2. Cockpit environment is excellent, visibility outstanding. Cockpit is quiet and comfortable, instrument panel layout is excellent.
3. Climb rates and accelerations were lower than I expected.
4. Roll forces were very high at high speed and it was difficult to maintain formation position as a result.
5. Aircraft is very responsive in the traffic pattern. Airspeeds are easy to control and easy to correct back to. Glide path is easy to correct back to from either too high or too low. Landing is not difficult. (continued on page 2)

RESULTS OF TESTS cont'd

Full pedal sideslip at 250 KIAS produced 5 degrees of sideslip. Full Stick deflection rolls at 250 KIAS produced less than 3 degrees of sideslip, about 8 degrees at 150 KIAS. Speed stability is positive, with obvious tendency toward a convergent phugoid. 25 knots off trim produced an estimated 3-4 lbs stick force change in the correct direction. Configured speed/power points were inconclusive due to insufficient time on each stabilized point and turbulence. IOT&E takeoffs were full aft stick, flaps up and normal technique, 1.0 V_{stall} flaps up. Cooper/Harper ratings were 4/2, 4/2 for rotation difficulty/10 degree tracking difficulty on each. LTC Clinch's full aft stick rotation resulted in a momentary overshoot to 15 degrees pitch.

LTC Clinch, AFOTEC

Aircraft feels very stable on ground, take-off was easy, rotation forces did not feel objectionably high, rotated further than I would have if a good visual reference had been available, was able to maintain a pitch attitude once obtained. Roll trim is inadequate with increasing speed. Aircraft needs roll trim almost constantly. Aircraft has inadequate stall warning in all configurations, 1 g or accelerated. Stall g break is very sharp with roll off on the right wing. High speed brake deployment is very dramatic - much buffet and noise, pitch, roll and yaw buffet. Roll forces are quite high at high speed and were especially noticable in formation. Difficult to maintain pecise position because of slow roll/high roll forces. Aircraft seemed to lack pitch trim authority on final below 120 KIAS. However, stick forces are very low and the biggest problem would probably be with flying a stable instrument approach. Landings are easy. The full aft stick take-off is a less dramatic maneuver than I had expected. Some overshoot on pitch attitude but easily correctable.

REMARKS cont'd

6. The aircraft take-off feels more like a T-38 than a T-37. One smooth pull to the takeoff and climbout attitude is used rather than running along on two wheels until takeoff speed like the T-37.

7. Ground handling feels very solid. Only problem was a dragging right brake. Nosewheel steering feels very responsive. Initial takeoff was made using rudder only from brake release.

T-46A MISSION SUMMARY
FLIGHT #10

OBJECTIVES:

1. Quick look OT&E evaluation.
2. Envelope expansion engine air starts at 20,000 and 25,000 ft.
3. Stall familiarization.
4. Speed stability.
5. Takeoff rotation evaluation.

PROFILE:

1. Mission Control at the CTF.
2. Crew: Mr. Shawler (Aircraft Commander), LTC. Clinch (AFOTEC).
3. (Clinch) Take off - 1.1 Vstall.
4. (Clinch) Climb constant A/S 170 KIAS.
5. 15000 ft.
   1 g stalls clean and PA.
   Speed stability 200 and 150 KIAS clean.
   130 KIAS clean HQ block maneuvers.
   Level accel. 150 to 250 KIAS.
6. (Clinch) Climb constant A/S 170 KIAS.
7. 35,000 ft.
   (Clinch) 1 g stalls clean.
   130 KIAS pace, HQ Block Maneuvers.
   150 KIAS speed stability, HQ Block Maneuvers.
   175 KIAS HQ Block Maneuvers.
8. (Clinch) descent.
9. 25,000 ft.
   (Clinch) Engine airstarts at Vmax and 150 KIAS.
10. (Clinch) descent.
11. 20,000 ft.
   (Clinch) Engine airstarts at Vmax and 150 KIAS.
12. (Clinch) Descent to pattern.
   (Clinch) Wing formation with T-33.
13. (Clinch) RTB overhead, touch and go landings.
14. Full stop landing (Clinch).

FILE MDE IFTR . 10 file OPS-1 DM

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 5 NOV 85	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER CLINCH	g. START UP GR WT 8800	k. WEATHER CLEAR/71 DEG. F
d. SORTIE TIME/TO TIME 2.0/1037	h. START UP C G	l. GROUND BLOCK

4. TESTS PERFORMED

Stalls at 15,000 feet and 35,000 feet.
H.Q. at 15,000 and 35,000.
7 take-offs for rotation control.
Airstarts at 25,000 feet.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Wendy Shawler, FRC
1. The stall characteristics are excellent, but inadequate stall warning.
2. The roll axis is over damped and/or the lateral control forces are too high even at low speeds.
3. The cockpit press fluctuated about 2,000 feet when temp. control was moved at 15,000 feet. Finally settled down and was o.k. for remainder of flight even at 35,000 feet. (Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Rotation stick forces for any configurations and rotation speed are relatively high but not excessive. Pitch attitude is easy to maintain once reached.
2. Aircraft is very stable in all axes when airborne.
3. Lateral stick forces are objectionable particularly at high speed.
4. Pitch trim is inadequate for final approach and pitch trim rate is too low at all times.
5. Lateral trim is objectionable - too much required, not enough available, amount changes with airspeed.
6. Cockpit is comfortable, visibility outstanding. Noise levels even at high speed (250 KIAS) very low.
7. Air conditioner spits ice particles (small amount) nearly continuously inflight. Air conditioner surges when temp. controller is moved, cabin pressure also surges.
8. Engines apparently cannot be safely started in the manual mode either on the ground or at altitude.

RESULTS OF TESTS cont'd

The canopy started to frost over at 35,000 feet, but the canopy defog worked very well.
5. Cockpit press was as advertised.
6. The rotation control on take-off is very easy, but the forces and stick movement required to get the nose gear off the runway are excessive. Increased airspeed minimizes these objections. The simulated inst. take-off was extremely easy to control and establish 10 degrees on the attitude indicators.
7. Good airstarts were obtained at 25,000 feet in auto mode at approximately 150 knots. The one manual mode was unsuccessful at 25,000 feet.
8. The roll trim is inadequate and too slow.
9. The longitudinal trim is inadequate and too slow.

LTC Clinch, AFOTEC
Second IOT&E Quick Look Sortie.
Initial take-off was 1.0 V_s (95 KIAS) rotation with 20 degree flaps. Flaps seemed to make no appreciable difference in the rotation. Aircraft is very stable in the climb, easy to hold airspeed, easy to level off. Saw approximately 2000 fpm through 10,000 ft. and 170 KIAS. Stalls at 35,000 feet showed no new characteristics - only one or two knots of mild warning in the stick then a sharp g break and right wing roll off. Descent rate out of 35000 feet at 110 KIAS is extremely low - 6-700 fpm. Descent rate at 150 KTS approx. 1000 fpm. Aircraft yawed about 1/4 ball with engine shutdown and good engine at max. Easily correctable with small rudder input. Easy to turn into dead engine, harder to turn away. Attempted manual mode restart unsuccessful with T 4.5 going overtemp. AUTO mode restart O.K. Core shows zero r.p.m. during inflight shutdown. Descent to traffic pattern at 250 KIAS results in high roll forces. Aircraft very stable on final, configured to land. Airspeed easy to capture and correct to; glide path easy to capture and to correct back to. Landings are easy. Full aft stick take-off with 20 degree flaps was unremarkable. Climb pitch easy to capture. Performed "instrument" take-off using ADI to achieve 10 degree climb rate - very positive maneuver. Encountered small amount of wake turbulence during flare to land, felt fairly sharp roll as a result. Correctable with ailerons.

FILE OPS-1
DR

T-46A MISSION SUMMARY

FLIGHT 11F

OBJECTIVES:

1. Engine Airstarts Manual Mode
2. Speed Brake Effects, 2Vs 3 brakes.
3. Takeoff Rotation Pilot Evaluation

PROFILE:

1. Mission Control at Ridley (Back-up CTF)
2. Crew: J. Martinez/Maj. J. Bush
3. T.O. & Climbout to 15000 ft. 170 KIAS
   - o Engine Airstarts 150 KIAS, Vmax
   - o Single Engine Handling Qualities 140, 125, 110 KIAS
   - o Lat & Long Trim Data 250, 150 130 KIAS
   - o Aux Landing Gear Extension 110 KIAS
   - o Speed Brake Buffet Investigation 225, 200, 175, 150,130 KIAS
   - o Handling Qualities Block Maneuvers 250 KIAS, 150 KIAS
4. Climb to 25,000' to 170 KIAS
   - o Handling Qualities Checks 200, 150 KIAS
   - o Level Flight Accel. 150 KIAS to Vmax
   - o Speed Stability 200 I 30 KIAS
5. Bingo 500 lbs. Descend to traffic pattern for 10 landings, Takeoff Evaluations

MDL FILE 035 1/12

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 6 NOV 85	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280 #
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER BUSH	g. START UP GR WT 8800	k. WEATHER -x 7H 60 DEG 2060 PA
d. SORTIE TIME/TO TIME 0.8/1030 L	h. START UP C G 19.2 %	l. GROUND BLOCK 30.17/2320'

4. TESTS PERFORMED

1. Ground handling.
2. 170 Kt climb 15 K.
3. S.E. speed power.
4. Auto & manual restarts.
5. 225 Kt SI
6. ILS full stop.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Major Bush, USAF
(3) A/C would not stabilize in level flight at 15'K S.E. w/gear down at any airspeed. Did drift down at 140, 125, 110 kts both gear only and gear & flaps.
(4) Two unsuccessful starts on left engine one manual, one auto. No rotation on either. Third attempt, an auto start, successful. Right engine overtemp on manual airstart 14K,130 Kts max temp 805 degrees for 1 sec.
J. Martinez, FRC (continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

Major Bush, USAF
1. Nose gear steering o.k. Didn't like using rudder to taxi. Brakes also effective for directional control.
2. Poor control harmony: light longitudinal/heavy lateral forces.
   Poor trimability: very slow rates both longitudinal & lateral.
   Rudder trim light but o.k.
   Couldn't trim left wing down above 170 kts.
3. Trim for zero beta w/2 or 3 degrees of bank and 5-10 lbs rudder.
4. Right Itt gauge sticking: jumped from 660 degrees to 740 degrees on airstart and kept going up.
5. Poor but better control harmony: longitudinal forces slightly higher, lateral still heavy.
6. --Slight nose up pitch w/gear and also flaps.
   --Speed brake buffet feels just like stall warning buffet from T-33/T-38 very bad.
   --Would not trim at 110 kts on final.
   --Lack of longitudinal trim caused heavier forces and therefore better control harmony.
   --Medium to heavy forces required for flare.
   --Poor deceleration after touchdown at idle.
   --Easy to control nose drop to runway at 85 kts.

J. Martinez, FRC
During the take off roll, rotation was commenced at 95 KIAS with a rather aggressive aft stick motion. Nose pitch up was easily stopped at the desired pitch attitude, (Cooper/Harper rating of 4 for rotation, 2 for control) and aircraft lifted off at approximately 102 KIAS.
Manual mode airstart on right engine @ 15000' Hp 130 KIAS resulted in an overtemperature situation requiring mission termination and return to base.
(continued on page 2)

RESULTS OF TESTS cont'd

1. Results of manual mode start attempts indicate we have no capability to start engines in manual mode.

REMARKS cont'd

A sticking engine temperature gauge (at 630 deg C) delayed pilot reaction sufficiently to cause late shutdown.

MOE FILE

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 8 NOV 85	e. CONFIGURATION CLEAN	i. FUEL LOAD 400 LBS
b. PILOT MAJOR HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 220/08
c. OBSERVER --------	g. START UP GR WT 7281	k. WEATHER 200 BKN 30+
d. SORTIE TIME/TO TIME 0.5/1425 Z	h. START UP C G 19.3 %	l. GROUND BLOCK PER CARD

4. TESTS PERFORMED

Light weight takeoff rotation evaluation, landing configuration evaluation.

Takeoffs:
1) 1.0 V_{stall} flaps 0 normal technique
2) 1.0 V_{stall} flaps 20 normal technique
3) Full aft stick flaps 0
4) Full aft stick flaps 20
5) Instrument takeoff flaps 0

Landings:
1) Flaps 20 SB out
2) Flaps 0 SB out
3) Flaps 20 SB in
4) Flaps 20 SB out
5) Flaps 20 SB out

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

TAKEOFF #	COOPER/HARPER RATING ROTATION	PITCH	TRACKING	COMMENTS
1	3		2	Reached T/O pitch att. at 93 KTS.
2	4		2	Heavier stick force-req'd more compensation to check pitch rate.
3	3		2	Strut extension at 75, nose off at 78, fly off at 85 (1.0V_s). (continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. The aircraft exhibited a definitely different and better feel for rotation at lighter weight. All takeoff attempts were characterized by first a definite nose strut extension to its stop, which could be felt, followed 3-5 knots later by nose rise at an onset rate requiring definite but generally minimal pilot compensation to reduce and stop at 10 deg. takeoff pitch attitude.
2. Flaps 20 deg. takeoffs seemed to need more aft stick force at the early part of rotation, making the pilot work a little harder at observing and reducing the rate to stop at 10 deg. takeoff pitch.
3. On takeoff #3, I could feel for about 2 seconds the aircraft was in the takeoff attitude rolling on the mains prior to liftoff. The nose wheel left the runway at about 78 KTS, reached takeoff attitude about 81 KTS, and flew off at about 85 KTS.
4. There was much more noticeable difference in ease of rotation in the weight change from 7800 lbs. (previous landing weights) to this 7200 lbs. configuration than between 8800 lbs. and 7800 lbs. The trend looks good for production weights, but the stick force and 0.9 Vmin spec requirements may still only be close. I'd like to try a longer nose strut.
5. All takeoff pitch attitude tracking was rated Cooper/Harper 2. Pitch damping is excellent and stick inputs for attaining and tracking are very comfortable and predictable - better than a T-37.
6. Taxiing at lighter weights required merely releasing the brakes for breakaway, and frequently using the brakes to slow down, particularly with a tailwind. Nosewheel steering feels more sensitive at lighter weight, which makes sense because of less mass to change direction. The first 5-10 degrees of deflection are satisfactory in feel and predictability for tracking, but greater deflections require greater force, and its difficult for the pilot to make smooth turns when trying to modulate small changes in force and deflection while holding heavier forces (moderate pilot compensation is required).

(continued on page 2)

RESULTS OF TESTS cont'd

TAKEOFF #	COOPER/HARPER RATING ROTATION	PITCH TRACKING	COMMENTS
4	3	2	Slightly faster rotation rate, otherwise same as #3.
5	3	2	O.K. on the gauges. No overcontrolling tendencies.

REMARKS cont'd

7. The landing gear control circuit breaker popped during the initial gear retraction leaving the nose gear down and mains up. Electrical control of gear extension was lost, and with the gear handle down, the aux gear extension was used and worked as advertised. Six patterns were flown with the gear down the entire flight with an average of 40 lbs. fuel per pattern.
8. Landings with flaps up required a slightly higher pitch attitude on final approach and slightly less power. Runway visibility over the nose was still very good. Although the same speeds were used, float in the flare about doubled over the 20 deg. flap configuration.
9. Landings with flaps 20 deg. and no speed brakes required idle power from the last third of the final turn (from 1000 AGL to a one mile final) until about the last quarter mile when about a knob width and a half of power was added to hold the 3 deg. glideslope at 110 KIAS. An 8 knot headwind certainly helped.

FILE OPS-1
BAK

FLIGHT 14 SUMMARY

1. MISSION OBJECTIVES

   FUNCTION CHECK OF FLUTTER EXCITATION SYSTEM
   MANUAL (NO HYDRAULICS) RUDDER CHARACTERISTICS
   FLUTTER ENVELOPE EXPANSION
   LATERAL TRIM EVALUATION

2. CREW: T-46 SHAWLER/EDMONDSON
   T-33 MARTINEZ/PHOTO

3. FLIGHT PROFILE

   A. CLIMB TO 15,000 FT AT 150 KIAS

   B. 15,000 FT 130 KIAS

      STICK RAPS
      SPEED BRAKES
      FREQ. BURST WING & TAIL
      FREQ. SWEEP WING & TAIL

   C. 15,000 FT 150 KIAS

      STICK RAPS
      SPEED BRAKES
      FREQ. BURST WING & TAIL
      FREQ. SWEEP WING & TAIL
      HANDLING QUALITIES (MANUAL RUDDER)

   D. CLIMB TO 30,000 FT AT 160 KIAS

   E. 30,000 FT FLUTTER

160 KIAS	STICK RAPS
181 KIAS	FREQ. SWEEP
201 KIAS	FREQ. BURST AS REQ.
222 KIAS	WING & TAIL
245 KIAS	SAS ON, OFF & MANUAL

   F. 15,000 FT LAT TRIM DATA
      (ALTERNATE)

   G. BINGO FUEL 200 LBS

   H. LANDING

File more file 4 OPS-1 OK

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 26 NOV 85	e. CONFIGURATION FLUTTER VANES WING & TAIL	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION FLUTTER	j. SURFACE WIND LIGHT
c. OBSERVER EDMONDSON	g. START UP GR WT 8758	k. WEATHER CLEAR/CALM
d. SORTIE TIME/TO TIME 1.7/1746 Z	h. START UP C G 19.55	l. GROUND BLOCK YES

4. TESTS PERFORMED

A. TAKEOFF
B. CLIMB 150 KIAS TO 15,000 FT
C. FLUTTER EXCITATION 15,000 FT 130 KIAS
STICK RAPS
SPEED BRAKE DEFLECTION
WING/TAIL VANE BURSTS AT 5 & 10 HZ AND AUTO FREQUENCY SWEEPS
D. LANDINGS - 4
HANDLING QUALITIES WITH AND WITHOUT RUDDER HYDRAULIC BOOST

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

LTC EDMONDSON, USAF
VERY UNPRODUCTIVE SORTIE DUE TO FLUTTER VANE SYSTEM NOT HOLDING A SELECTED FREQUENCY CONSTANT IN THE MANUAL MODE. ALSO THE MAXIMUM FREQUENCY IN THE AUTOMATIC MODE WAS LESS THAN THE MAXIMUM EXPECTED OF 60 HZ (53 MAX).

6. REMARKS *(Continue on reverse side if needed)*

THERE WERE SEVERAL TM DROP OUTS OF THE CONTROL SURFACE POSITION DUE TO A 5 VOLT POWER SOURCE DROP OUT. THE MASTER POWER INSTRUMENTATION SWITCH COULD BE CYCLED OFF/ON TO REGAIN THE 5 VOLT POWER SOURCE TO SI. THE RMCC HAD A SYSTEM OUTAGE DUE TO A COMPETING TM FREQUENCY WHICH TERMINATED THE FLUTTER TESTING PORTION OF THE MISSION. THE TM HOT MIKE VOICE CHANNEL FAILED IN FLIGHT. HANDLING QUALITIES WERE CHECKED AT 130 KIAS AND INCLUDED YAW DOUBLETS AND SIDESLIPS BOTH DAMPER ON AND IN MANUAL RUDDER. SIDESLIPS,BOOST ON,GAVE APPROXIMATELY 14 DEGREES RIGHT AND 18 DEGREES LEFT SIDESLIP AT MAXIMUM PEDAL DEFLECTION. WITH BOOST OFF, THE RUDER PEDAL FORCES WERE CONSIDERABLY HIGHER AND MAXIMUM ACHIEVABLE SIDESLIP SLIGHTLY LESS THAN WITH BOOST ON. DYNAMICS WITH BOOST OFF APPEARED THE SAME AS BOOST ON IN BOTH FREQUENCY AND NUMBER OF OVERSHOOTS.
DURING FLUTTER TESTING, THE MANUAL MODE DRIFTED FROM THE SELECTED MODE CONSIDERABLY I.E. AT A SELECTED 5 HZ THE INDICATED FREQUENCY VARIED FROM 6 TO 12 HZ.. DURING THE WING AUTO SWEEP THE FREQUENCY INDICATOR STOPPED AT APPROXIMATELY 34 HZ AND REMAINED THERE FOR SEVERAL SECONDS (AT 12 HZ THE MAXIMUM COCKPIT AMPLITUDE WAS FELT).
BEFORE THE NEXT FLUTTER FLIGHT,THE WING VANE MANUAL MODE MUST BE ALTERED TO HOLD A MANUAL FREQUENCY MORE CONSTANT, AND THE AUTO SWEEP MUST BE ADJUSTED TO GIVE A MAXIMUM OF 60 HZ.
THE FLIGHT TEST ENGINEERS REPORTED THIS MISSION TO BE VERY PRODUCTIVE BECAUSE FLUTTER DAMPINGS APPEARED TO MATCH THE GVT RESULTS.
BOTH ENGINE GROUND STARTS WERE MADE WITH BLEED ON AND ECS IN AUTO. LEFT ENGINE REACHED 715 DEGREES ITT AND TOOK 28 SECONDS TO STABILIZE AT IDLE. THE RIGHT ENGINE PEAKED AT 645 DEGREES AND TOOK 23 SECONDS.
WENDY SHAWLER, FRC
1. THE NOSEWHEEL STEERING WORKED VERY WELL DUE TO CHANGE.
2. THE BRAKES ALSO WORKED WELL AFTER THE HELPING SPRINGS WERE INSTALLED.
3. THE SPRING CHANGE IN THE RUDDER SYSTEM DID NOT PROVIDE ADDITIONAL RUDDER AT 130 K.

4. THE AIRCRAFT HAS A STRONG ROLL OFF TO THE LEFT AT ALL SPEEDS FLOWN (HP TO 150 K) GREATER THAN BEFORE.

FILE MDR IFTR 1B file 4-OP-1

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 3 DEC 85	e. CONFIGURATION	i. FUEL LOAD 1100
b. PILOT EDMONDSON	f. INSTRUMENTATION	j. SURFACE WIND NORTH AT 5K
c. OBSERVER SHAWLER	g. START UP GR WT 8747	k. WEATHER CLEAR AT 6
d. SORTIE TIME/TO TIME 1.4/0921	h. START UP C G 17.38	l. GROUND BLOCK YES

4. TESTS PERFORMED

DEMONSTRATION MISSION.
INITIATED ROTATION AT 95K T.O. AT 110K.
CLIMB TO 15,000 FEET AT 170K.
CHANDELLE'S; LAZY EIGHTS; 1 G AND ACCELERATED STALLS; AILERON ROLLS AT 160, 200 AND 250K; FORMATION AT 200K; ILS APPROACH AND 4 LANDINGS.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

WENDY SHAWLER, FRC
1. YAW DAMPER INOP
2. AIRCRAFT STILL ROLLS OFF TO THE LEFT AT ALL SPEEDS UP TO 250K.
3. VIDEO WAS TAKEN OF THE TUFTS AT 170K, 200K, 250K, 130K CLEAN AND PA; 120K CLEAN AND PA; AND DURING 1 G STALLS.
4. THE ACCELERATED STALLS AT 3 "G"'s WERE ACCOMPLISHED AT 160K.
5. THE AILERON ROLLS WERE ALL PERFORMED WITH THE YAW DAMPER OFF. (CONT'D REMKS)

6. REMARKS *(Continue on reverse side if needed)*

THE 360 DEGREE ROLLS TOOK 5 SEC AT 160K, 4 SEC AT 200K AND 4 SEC AT 250K ALL TO THE LEFT. THE ONE RIGHT ROLL WAS AT 250K AND TOOK 3.5 SEC. IN ALL CASES THE SIDESLIP WAS APPROXIMATELY 2 DEGREES.
6. AN OPS CHECK OF THE MANUAL FUEL CONTROL WAS MADE AT 15,000 FT 220K. THE LEFT ENGINE FAN WAS 92.5 PERCENT IN AUTO AND 85 PERCENT IN MANUAL. THE RIGHT ENGINE WAS 92.5 PERCENT IN AUTO AND 85.5 PERCENT IN MANUAL (ALL MAX POWER). THE ITT WAS STABLE AT 690 DEGREES.
7. THE C.G. WAS 17.38 PERCENT AT TAKEOFF AND 15.1 PERCENT AT LANDING. THE CHARACTERISTICS OF BOTH APPEARED TO BE THE SAME AS PREVIOUS FLIGHTS.

file 4-OP-1
IFTR 16 BHC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 3 DEC 85	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT SKANTZE	f. INSTRUMENTATION YES	j. SURFACE WIND LIGHT
c. OBSERVER EDMONDSON	g. START UP GR WT 8744	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 0.9/1540	h. START UP C G 17.38	l. GROUND BLOCK YES

4. TESTS PERFORMED

Takeoff - rotation at 95 KIAS.
Climb 170 KIAS to 15,000 ft.
Chandelle.
Lazy eight.
3 g turns.
1 g stalls clean and PA.
Accelerated stalls.
Aileron rolls 360 degrees.
Formation wing work.
Three touch and go landings.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

This mission was flown with tufts on right side of fuselage and both wing upper surfaces. Very little productive in flight photography was accomplished due to competition with the primary mission of demonstrating the aircraft to General Skantze.

6. REMARKS *(Continue on reverse side if needed)*

Lt Col Edmondson, USAF
The entire mission from engine start to shut down was flown by General Skantze. Each takeoff and landing was well executed with absolutely no control problem or negative comment by General Skantze. He made general comments on the lack of stall warning and specifically objected the right roll characteristic at stall. He disliked the speed brake buffet characteristics when deployed at high speed. He commented that overall the aircraft handled well and felt very solid.

FILE 4-OPS-1 DK

FLIGHT REPORT

A/C: T-46/492
DATE: 5 Dec 85
CREW: Staten/Edmondson
FLIGHT TIME: 1.5 hours

1. Aircraft General, Crew Station, and Procedures. All preflight, before start, start, taxi, takeoff, inflight, landing, and shutdown procedures are simple, logical, straightforward, and intuitive. In general the cockpit is well arranged and conforms to AF standard methodology. The out of cockpit visibility is excellent. I am 72 inches in height and weigh 200 pounds. Seat and rudder adjustments exceeded my needs in both directions. The throttle placement, total throttle movement, and ratio of throttle angular movement to engine response were comfortable and satisfactory. The ECS performs very well--constant temperature, no pressure surges and quiet. Following are specific deficiencies:

a. I had head room to the canopy and would like to have positioned the seat slightly higher to fully utilize the over-the-nose visibility but was restricted in vertical movement in order to keep the canopy and seat warning lights in view under the glare shield.

b. The speed brake switch must be redesigned to make it protrude more from side of throttle. Necessary for positive location and use of the switch. Additionally, the current switch on pilot's side has three positions. The aft is for open. The middle and forward retract the speedbrakes. I recommend that switch include a center off position to permit partial speedbrake operation.

c. The neutral stick position is satisfactory. However, it appears to have more aft than forward movement. I reached the aft region three times--on takeoff rotation, at stall, and immediately after touch down on landing. On these occasions I thought the aft position was slightly awkward. The aileron control (both on ground and in flight) has a distinct step when the tab spring is fully compressed. I could not achieve full left aileron on ground or in the air due to interference of my leg and clipboard. I recommend the total fore-aft throw be adjusted forward and that total left-right throw be reduced.

2. Nose Gear Steering. Positive. Gain seems satisfactory. When I attempted a very accurate taxi task, I got into a slight pilot induced oscillation. I slowed my inputs and it disappeared. On my limited exposure, I would not recommend any changes. Cooper-Harper rating: 3.

3. Wheel Brakes. First one third of total toe throw seems to not have any associated braking. So, I have to push a "lot" to even start braking. On engine runup for takeoff there is considerable pressure required and the foot is rotated well forward to hold the aircraft at full power. Cooper-Harper rating: 4.

4. Takeoff. The engine fan speed takes considerable time to stabilize for the takeoff thrust check (at least 10 seconds after core has reached maximum RPM). Directional control during roll is satisfactory. I attempted to rotate at 95 KIAS and takeoff at 110 KIAS. I started the stick back to gain control

of pitch attitude at 85 KIAS. I had no control until I had considerable aft stick position and force. The nose then raised quickly and the airplane was airborne before I wanted it to be (105 KIAS). Although the nose rose quickly, I was not concerned about over rotation. Because of the rotation, Cooper-Harper rating: 4.

5. Flying Qualities.

a. At airspeeds I flew, the short period and dutch roll (yaw damper ON) are essentially dead beat and have a medium frequency. The dutch roll is quite flat (mostly yaw). Flew through some turbulence and did not notice any unusual excitement of the dynamic modes. I found the overall control harmony to be satisfactory. I flew some mildly maneuvering formation but did not attempt any tight closed loop tracking tasks. For above factors Cooper-Harper rating: 2.

b. Ailerons. The aircraft required right aileron control pressure for level flight (about 3 pounds at 150 KIAS and 8 pounds at 250 KIAS). Aileron trim has negligible impact in either direction. Maximum roll rates while not extreme are adequate. Unable to get full left aileron due to stick interference with my leg. Aileron trim must be more effective. No noticeable yaw buildup on 360 degree rolls. Because of trim deficiencies, Cooper-Harper rating: 7.

c. Elevator. Pitch response is adequate and enough elevator power is available to achieve aerodynamic stall clean and in power approach configuration. Trim authority is inadequate. Minimum trim airspeed clean is about 113 KIAS and in power approach configuration is about 112 KIAS. I recommend that trim be modified to trim down to at least 10 knots below normal final approach speeds. Trim rate is too slow. On go around from low approach, I held continuous forward trim but could not keep up with trim requirement due to airspeed increase and configuration changes. Except for trim, Cooper-Harper rating: 2. Trim Cooper-Harper rating: 8.

d. Power Response. Typical of a fan engine, the thrust increases and decreases are slow. The most objectionable on this flight was the slow thrust decrease while flying formation. However, this was a limited look and the engines were running at the lower end of the thrust range.

e. Stalls. 1 g (clear and power approach) and 3 g (clean) stalls flown. There is a very light vibration in the stick (from the ailerons I think) starting about 10 knots above stall. This is not pronounced enough to be stall warning. Airframe buffet is apparent only 1 to 3 knots above stall. At stall there is a sharp g break with a pitch change of about 10 degrees. The airplane rolls to the right (perhaps associated with the aileron trim problem). Recovery is easy and positive. Some form of stall warning must be developed.

6. Landing. Winds were about 20 knots and gusting with about 15 knot crosswind component. On final control response, throttle response, glide path control, and airspeed control were satisfactory. I used the wing down method to compensate for the crosswind. The rudder is powerful and easily handled the crosswind. I held moderate rudder force and displacement and moderate aileron force (10-15 pounds). Drift was easily countered with small bank angle (about 5 degrees). Flare and landing were straightforward and directional control was good. Immediately after touchdown the nose lowered to runway even though I applied considerable aft stick. Cooper-Harper rating: 2.

7. From a qualitative view, I would like to have more excess thrust. That translates into fast climb rates, better acceleration, and high maximum airspeed in level flight.

8. Summary. The T-46 has many very good features and, I believe, it is fundamentally a well designed aircraft for the primary pilot training mission. We must and, most importantly, can correct the identified deficiencies during the early development phase.

KENNETH E. STATEN, Colonel, USAF
Commander, 6510th Test Wing

MDE IFTR.17 file 4 OP-1 PRE

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 5 DEC 85	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT STATEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND STRONG WNDS
c. OBSERVER EDMONDSON	g. START UP GR WT 8742	k. WEATHER VFR
d. SORTIE TIME/TO TIME 1.5/22:33Z	h. START UP C G 17.3%	l. GROUND BLOCK GRND BLCK

4. TESTS PERFORMED

Takeoff: Rotation at 95 KIAS, liftoff at 110 KIAS.
Climb: 170 KIAS up to 15,000 feet MSL gentle maneuvering during climb.
Airwork: 15,000 feet MSL
Chandelle - entry, max power, 250 KIAS
Lazy eight - entry, PLF, 200 KIAS
3 "g" turns -200 KIAS, PLF (continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

Col Staten, USAF
Aircraft General, Crew Station, and Procedures. All preflight, before start, start, taxi, takeoff, inflight, landing, and shutdown procedures are simple, logical, straightforward, and intuitive. In general the cockpit is well arranged and conforms to AF standard methology. The out of cockpit visibility is excellent. I am 72 inches in height and weigh 200 pounds. Seat and rudder adjustments exceeded my needs in both directions. The throttle placement, total throttle movement, and ratio of throttle angular movement to engine response were comfortable and satisfactory. The ECS performs very well--constant temperature, no pressure surges and quiet. Following are specific deficiencies:

a. I had head room to the canopy and would like to have positioned the seat slightly higher to fully utilize the over-the-nose visibility but was restricted in vertical movement in order to keep the canopy and seat warning lights in view under the glare shield.

b. The speed brake switch must be redesigned to make it protrude more from side of throttle. Necessary for positive location and use of the switch. Additionally, the current switch on pilot's side has three positions. The aft is for open. The middle and forward retract the speedbrakes. I recommend that switch include a center off position to permit partial speedbrake operation.

c. The neutral stick position is satisfactory. However, it appears to have more aft than forward movement. I reached the aft region three times--on takeoff rotation, at stall, and immediately after touch down on landing. On these occasions I thought the aft position was slightly awkward. The aileron control (both on ground and in flight) has a distinct step when the tab spring is fully compressed. I could not achieve full left aileron on ground or in the air due to interference of my leg and clipboard. I recommend the total fore-aft throw be adjusted and that total left-right throw be reduced.

2. Nose Gear Steering. Positive. Gain seems satisfactory. When I attempted a very accurate taxi task, I got into a slight pilot induced oscillation. (c. p. 2)

(cont'd from tests performed)
1 "g" stalls - clean and PA, 120 KIAS PLF
Accelerated stalls - up to 3 "g's", 175 KIAS, PLF
Aileron rolls - 150 KIAS to 250 KIAS
Formation wing work - 110 KIAS to 250 KIAS
Traffic patterns:
Visual straight in - low approach and go around
Closed
Full stop

(cont'd from remarks)
I slowed my inputs and it disappeared. On my limited exposure, I would not recommend any changes. Cooper-Harper rating: 3.
3. Wheel brakes. First one third of total toe throw seems to not have any associated braking. So, I have to push a "lot" to even start braking. On engine runup for takeoff there is a considerable pressure required and the foot is rotated well forward to hold the aircraft at full power. Cooper-Harper rating: 4.
4. Takeoff. The engine fan speed takes considerable time to stabilize for the takeoff thrust check (at least 10 seconds after core has reached maximum RPM). Directional control during roll is satisfactory. I attempted to rotate at 95 KIAS and takeoff at 110 KIAS. I started the stick back to gain control of pitch attitude at 85 KIAS. I had no control until I had considerable aft stick position and force. The nose then raised quickly and the airplane was airborne before I wanted it to be (105 KIAS). Although the nose rose quickly, I was not concerned about over rotation. Because of the rotation, Cooper-Harper rating: 4.
5. Flying qualities:

a. At airspeeds I flew, the short period and dutch roll (yaw damper ON) are essentially dead beat and have a medium frequency. The dutch roll is quite flat (mostly yaw). Flew through some turbulence and did not notice any unusual excitement of the dynamic modes. I found the overall control harmony to be satisfactory. I flew some mildly maneuvering formation but did not attempt any tight closed loop tracking tasks. For above factors Cooper-Harper rating: 2.

b. Ailerons. The aircraft required right aileron control pressure for level flight (about 3 pounds at 150 KIAS and 8 pounds at 250 KIAS). Aileron trim has negligible impact in either direction. Maximum roll rates while not extreme are adequate. Unable to get full left aileron due to stick interference with my leg. Aileron trim must be more effective. No noticeable yaw buildup on 360 degree rolls. Because of trim deficiencies, Cooper-Harper rating: 7.

c. Elevator. Pitch response is adequate and enough elevator power is available to achieve aerodynamic stall clean and in power approach configuration. Trim authority is inadequate. Minimum trim airspeed clean is about 113 KIAS and in power approach configuration is about 112 KIAS. I recommend that trim be modified to trim down to at least 10 knots below normal final approach speeds. Trim rate is too slow. On go around from low approach, I held continuous forward trim but could not keep up with trim requirement due to airspeed increase and configuration changes. Except for trim, Cooper-Harper rating: 2. Trim Cooper-Harper rating: 8.

d. Power response. Typical of a fan engine, the thrust increases and decreases are slow. The most objectionable in this flight was the slow thrust decrease while flying formation. However, this was a limited look and the engines were running at the lower end of the thrust range.

e. Stalls. 1 g (clear and power approach) and 3 g (clean) stalls flown. There is a very light vibration in the stick (from the ailerons I think) starting about 10 knots above stall. This is not pronounced enough to be stall warning.

Airframe buffet is apparent only 1 to 3 knots above stall. At stall there is a sharp g break with a pitch change of above 10 degrees. The airplane rolls to the right (perhaps associated with the aileron trim problem). Recovery is easy and positive. Some form of stall warning must be developed.

6. Landing. Winds were about 20 knots and gusting with about 15 knot crosswind component. On final control response, throttle response, glide path control, and airspeed control were satisfactory. I used the wing down method to compensate for the crosswind. I held moderate rudder force and displacement and moderate aileron force (10-15 pounds). Drift was easily countered with small bank angle (about 5 degrees). Flare and landing were straightforward and directional control was good. Immediately after touchdown the nose lowered to runway even though I applied considerable aft stick. Cooper-Harper rating: 2.

7. From a qualitative view, I would like to have more excess thrust. That translates into fast climb rates, better acceleration, and high maximum airspeed in level flight.

8. Summary. The T-46 has many very good features and, I believe, it is fundamentally a well designed aircraft for the preliminary pilot training mission. We must and, most importantly, can correct the identified deficiencies during the early development phase.

Lt Col Edmondson, USAF

Lateral trim - insufficient at all speeds. At 15,000 ft, 150 KIAS in clean configuration the aircraft rolls left at any lateral trim setting. With neutral lateral trim the aircraft rolled, from wings level to 30 degrees left in 13 seconds. With full right trim it rolled 30 degrees left in 22 seconds. With full right trim it rolled 30 degrees left in 11 seconds. At 200 KIAS with full right trim it also rolled left requiring 9 seconds to roll 30 degrees. With full left trim it rolled 30 degrees in 7 seconds. At 250 KIAS the results were nearly similar but a little faster 7 1/2 and 4 1/2 seconds respectively.

IFTR. 18 file 4 OPS

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 9 DEC 85	e. CONFIGURATION CLEAN, FLUTTER SYSTEM	i. FUEL LOAD 1280
b. PILOT MAJOR HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 330/05
c. OBSERVER J. MARTINEZ	g. START UP GR WT 8799	k. WEATHER CLEAR 50
d. SORTIE TIME/TO TIME 0.5/1915 Z	h. START UP C G 18.32%	l. GROUND BLOCK PER TIS CARD

4. TESTS PERFORMED

1. Roll trim check with fixed tabs installed.
2. 15,000/130 KIAS frequency sweep.
(Early return due to suspected hydraulic leak).

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Aircraft still rolls left - 25 degrees in 30 seconds with full right roll trim.
2. Flutter information unknown - only one point.

6. REMARKS *(Continue on reverse side if needed)*

1. Chase aircraft detected about 1" aileron upfloat on left aileron and no upfloat on right aileron at 150 KIAS.
2. Aircraft still rolls left about 1 deg/sec with full right trim with fixed tabs installed.
3. Wheel brakes chatter.
4. Chase detected hydraulic fluid streaming from belly drain about 1" wide going back to the tail. Terminated mission and returned for landing. Pressure remained good. Hydraulic fluid had pooled in panels after servicing.

5. Landed with about 90 KIAS touchdown speed, about 12 degrees pitch attitude.

FILE 4-OPS-1
BRC

T-46A MISSION SUMMARY
FLIGHT #21

1. CREW: T-46 HANSEN/SHAWLER
   T-33 BUSH/PHOTO

2. MISSION OBJECTIVES:

   A. FUNCTIONAL CHECK OF THE FLUTTER SYSTEM
   B. EVALUATE ROLL FORCES AND TRIM
   C. EVALUATE STALL WARNING
   D. TUFTING INVESTIGATION

3. MISSION PROFILE

   A. TAKEOFF 1.2 Vstall
   B. CLIMB 150 KIAS TO 15,000 FT
   C. 15,000 FT
      130 KIAS FLUTTER SYSTEM CHECK
               FULL LATERAL TRIM CHECK
               BANK TO BANK ROLLS
      150 KIAS FLUTTER SYSTEM CHECK
               FULL LATERAL TRIM CHECK
               BANK TO BANK ROLLS
   D. CLIMB 150 KIAS TO 20,000 FT
   E. 20,000 FT - 1 G STALL INVESTIGATION
               CLEAN AND POWER APPROACH
   F. DESCEND AT 150 KIAS AND RTB
   G. TOUCH AND GO LANDINGS/FULL STOP

file 4OPS-1
BH

SUMMARY OF CONFIGURATION

FLIGHT 21F

CHANGES TO FLUTTER SYSTEM

1. Replumbed MOOG control valve to provide increased stability in frequency output.

2. Added 6 foot flex hose on pressure side of excitation system to dampen resonance frequency of system.

3. Added check valves in hydraulic motor case and return to prevent pressure spikes from feeding back thru return and potentially damaging motor seals.

4. Replaced three way directional control valve with two seperate shut off valves, controlling wing and tail systems, to improve hydraulic motor control.

5. Installed a ten turn frequency dial to provide capability for finer frequency settings.

System, both wing and tail, have been calibrated and run on engines plus 45 minutes in hangar. System is operational and ready for flutter tests.

CHANGES TO AIRCRAFT

1. Added stall strips 3.75 inches long, inboard edge at sta 75.6, to each wing (were 2.50" long) to provide stall warning.

2. Removed fixed outboard wing tip tabs, and deflected left aileron fixed tab up 4 degrees to correct left rolloff.

3. Replaced -13 aileron spring tab springs with -11 weaker springs to lower lateral stick forces.

FIG MDE file 4-OAS-1 IFTR. 21

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 20 DEC 85	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER SHAWLER	g. START UP GR WT 8807 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.4/2129Z	h. START UP C G 20.0	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

- Roll off checks and bank to bank rolls at 130 and 150 KIAS.
- 1 g stalls at 20,000 ft clean and p.a. configuration.
- speed brake evaluation.
- touch and go landings.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

- The aircraft now rolls right at speeds up to the 150 KIAS allowed. The degree of roll off is similar to what we had before, except in the opposite direction. The degree of roll off is similar to what we had before, except in the opposite direction. The fixed wing tabs were removed and 4 degrees of trailing edge up was set on the left aileron fixed tab. In flight, the left aileron still floats up about 3/4 inch from flush at the outboard, and the right

(continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

- Flutter envelope expansion was not done on this flight because pre-takeoff system checks indicated a mandatory accelerometer was not functioning. After flight it was found that the problem was a paperwork labeling error.** Note - 23 Dec it was found that parameter 1309, long. acc. left vert fin tip, is not installed in the left vertical fin, it is installed in the left wing tip.

- The pitch trim is still inadequate with the VOR antenna removed, although about 5 knots lower trim speed is attainable. The trim speed with full nose up trim and speed brakes extended is greater than 150 KIAS. With gear and flaps extended, speed brakes retracted, full nose up trim is good for 110 KIAS. In the full P.A. configuration, (speed brakes extended), however, the trim speed is approximately 120 KIAS.

- Landings are still easy. One no flap, no speed brake overhead pattern was flown, and idle power and a little sideslip was necessary. This is not a desirable configuration. A simulated single engine go-around was made from the landing flare, leaving one throttle at idle and the other at max, retracting the speed brakes. About 1 inch of rudder pedal was needed for straight flight, and the aircraft accelerated and climbed out very nicely. The other throttle was advanced to max prior to retracting the gear and flaps, and the resulting spoolup and abrupt change from assymetric to symmetric thrust was fairly benign and easily controlled to within a couple degrees of yaw.

CONTINUED FROM PAGE 1, "Results of Tests"

aileron floats up almost 1/4 inch at the outboard - essentially no change in position from before. The stopped position of the wing flutter vane was about 10-15 degrees trailing edge up, which should have tended to help a left roll or reduce the right rolling tendency.

- The force required for bank to bank rolls was slightly less with the softest roll tab springs installed, according to instrumentation. Qualitatively, the pilots could not feel any difference, and the forces for roll are still too heavy, requiring two hands for more than 1/2 stick deflections at 150 KIAS.

- The 3.75 inch stall strip at wing stations 75.6 produced only 3/4 to 1 knot of stall warning with detectable amplitude in the form of longitudinal pulsing or "nibble" in the control stick. In the P.A. configuration, airframe buffet completely masked all warning. Stalls clean occured at 98 knots with a g break and a roll to the right. With a slow airspeed bleed off to the stall, the roll could be controlled with aileron and the wings held level through the g break. With more rapid bleed rates, however, the aircraft would snap over to about 30 degrees of right bank before it coild be stopped by breaking the stall and using some left aileron. P.A. configuration stalls occurred at 94 KIAS, with the same characteristics as the clean stall.

- Speed brake buffet at 130 KIAS with the cusps removed from the side speedbrakes was very acceptable. Not having flown the aircraft for a while, and not having grown accustomed to the speed brake buffet, the 150 KIAS buffet still feels objectionable.

file 4-OPS-1
BPL

T-46A MISSION SUMMARY
FLIGHT #22

1. CREW: T-46 SHAWLER/EDMONDSON
   T-33 BUSH/PHOTO

2. MISSION OBJECTIVES:

   A. FUNCTIONAL CHECK OF THE FLUTTER SYSTEM
   B. BEGIN PHASE I FLUTTER TESTING
   C. TUFTING INVESTIGATION

3. MISSION PROFILE

   A. TAKEOFF 1.2 Vstall
   B. CLIMB 150 KIAS TO 15,000 FT
   C. 15,000 FT
      130 KIAS FLUTTER SYSTEM CHECK
      150 KIAS FLUTTER SYSTEM CHECK
   D. CLIMB 150 KIAS TO 20,000 FT
   E. 20,000 FT - FLUTTER TEST POINTS
      159 KIAS (.36M)
      178 KIAS (.40M)
      199 KIAS (.44M)
      219 KIAS (.49M)
      240 KIAS (.53M)
   F. RTB (250 LBS)
   G. TOUCH AND GO/FULL STOP LANDING

WDE
FILE 4-OPS
BHK

INITIAL FLIGHT TEST REPORT T-46A SN492 DATE 2JAN
PILOT SHAWLER/EDMONDSON
SORTIE 22 HOURS FLOWN 2.2 TAKEOFF TIME 1336L
TESTS PERFORMED-FLUTTER INSTRUMENTATION CHECKOUT
RESULTS OF TESTS- THE OBJECTIVES OF THIS MISSION WERE:
A. FUNCTIONALLY CHECK THE FLUTTER EXCITATION AND RECORDING SYSTEM IN FLIGHT
B. EXECUTE FLUTTER ENCELOPE EXPANSION AT 20,000FT AT 159,178,199,219 AND 240 KIAS
C. VIDEO RECORD INFLIGHT TUFTS
REMARKS- THE EXCITATION SYSTEM WAS FUNCTIONALLY OPERATED AT 130 AND 150 KIAS AT 15,000FT. BOTH THE WING AND TAIL VANES OPERATED SATISFACTORY IN BOTH THE MANUAL BURST AND AUTO SWEEP MODES. NO ENVELOPE EXPANSION WAS ACCOMPLISHED BECAUSE THE FUNCTIONAL CHECKS CONSUMED THE ENTIRE MISSION. PROGRESS WAS EXTRMEMELY SLOW DUE TO A PROBLEM WITH THE AIR FORCE GROUND STATION'S CAPABILITY TO PROCESS REAL TIME DATA QUICKLY ENOUGH. THE EXCITATION SYSTEM APPEARED TO WORK CORRECTLY AS DID THE ACCELEROMETER/RECORDING SYSTEM. VIDEO COVERAGE OF THE EXTERNALLY MOUNTED TUFTS WAS ACCOMPLISHED.

mJE IFTR.22

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER file OPS-1 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 2 JAN 86	e. CONFIGURATION	i. FUEL LOAD
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND
c. OBSERVER EDMONDSON	g. START UP GR WT	k. WEATHER
d. SORTIE TIME/TO TIME SORT 22/HRS FLN 2.2	h. START UP C G	l. GROUND BLOCK

4. TESTS PERFORMED

Flutter instrumentation checkout.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

The objectives of the mission were:

A. Functionally check the flutter excitation and recording system in flight.

B. Execute flutter envelope expansion at 20,000 ft at 159, 178, 199, 219, and 240 KIAS.

C. Video record inflight tufts.

6. REMARKS *(Continue on reverse side if needed)*

The excitation system was functionally operated at 130 and 150 KIAS at 15,000 feet. Both the wing and tail vanes operated satisfactory in both the manual burst and auto sweep modes. No envelope expansion was accomplished because the functional checks consumed the entire mission. Progress was extremely slow due to a problem with the Air Force ground station's capability to process real time data quickly enough. The excitation system appeared to work correctly as did the accelerometer/recording system. Video coverage of the externally mounted tufts was accomplished.

file 40PS-1
DM
WENDY

1. T-46A 2. 84-0492 3. A. 3 JAN 86 B. MAJ HANSEN C. MR SHAWLER
D. 1.5HRS/2126Z E. CLEAN F. PER TIS G. 8750 LBS H. 19.0%
I. 1280 LBS J. CALM K. CLEAR L. PER TEST CARD.

4. 1. LATERAL TRIM CHECKS WITH FIXED AILERON TAB CHANGED FROM 4 TO 2 DEGREES TRAILING EDGE UP.
   2. STALL WARNING CHECKS, CLEAN AND P.A. CONFIGURATION WITH 2 1/2 INCH STALL STRIPS AT WING STATIONS 69.0 (SMALLER AND INBOARD FROM LAST TEST)

5. 1. AT 150 KIAS, 15,000 FT, CLEAN CONFIGURATION, WITH ROLL TRIM NEUTRAL, THE AIRCRAFT ROLLED RIGHT TO 30 DEGREES BANK IN 17 SECONDS. WITH FULL LEFT TRIM, THE AIRCRAFT ROLLED RIGHT TO 30 DEGREES BANK IN 18+ SECONDS. WITH FULL LEFT TRIM, THE AIRCRAFT ROLLED RIGHT TO 7 DEGREES IN 15 SECONDS. CHASE AIRCRAFT REPORTED THAT BOTH AILERONS WERE FLOATING UP, THE LEFT JUST SLIGHTLY MORE THAN THE RIGHT. STILL PHOTOS WERE TAKEN TO MORE CLOSELY OBSERVE ANGLES AND TAB POSITIONS.

   2. CLEAN STALLS AT 25,000 FT OCCURRED AT 98 KIAS WITH ONE TO TWO KNOTS OF BARELY PERCEPTIBLE WARNING IN THE FORM OF LONGITUDINAL STICK "NIBBLING." THE AMPLITUDE IS INADEQUATE AND ONLY DISCERNIBLE TO A PILOT CONCENTRATING ON DETECTING IT. P.A. CONFIGURATION AIRFRAME BUFFETING TOTALLY MASKS ANY WARNING WHATSOEVER, AND THE STALL OCCURRED CONSISTENTLY AT 94 KIAS. ALL STALLS WERE CHARACTERIZED BY A G-BREAK AND STRONG ROLLING TENDENCY TO THE RIGHT, AS IN ALL PREVIOUS TESTS.

6. 1. DESCENT FROM 25,000 FT WAS MADE WITH SPEED BRAKES EXTENDED. THE VIBRATION WAS CONSIDERED OBJECTIONABLE BY BOTH PILOTS. RETRIMMING AFTER SPEED BRAKE EXTENSION REQUIRED HOLDING NOSE UP TRIM FOR ABOUT A 5 SECOND CONTINUOUS BURST.

   2. ATTITUDE INDICATORS BOTH PRECESSED TO ABOUT 4 DEGREES LEFT BANK INDICATION EACH HALF HOUR, EVEN THOUGH THE FLIGHT WAS MOSTLY WINGS LEVEL WITH A FEW OCCASIONAL 20-30 BANK TURNS. THE FAST ERECT FUNCTION CORRECTED THEM TO LEVEL FLIGHT EACH TIME.

   3. THE YAW DAMPER TRIPPED OFF IN THE TRAFFIC PATTERN AND WOULD NOT RESET.

file 4 OPS-1
1 DRC

MISSION 23 SUMMARY

1. Objectives:

   a. Lateral Trim Evaluation

   b. Stall Warning Investigation

2. Crew: Hansen/Shawler

3. Mission Profile

   a. Takeoff at 1.2 Vstall

   b. Climb at 150 KIAS to 15,000 ft

   c. 15,000 ft, 150 KIAS, 130 KIAS
      Full lateral trim (left & right)

   d. Climb at 150 KIAS to 25,000 ft

   e. 25,000 ft
      1G Stall Clean
      1G Stall Power Approach

   f. RTB

   g. Touch and go/full stop landings

File MDE IFTR.23

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER file 40PS 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 3 JAN 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER SHAWLER	g. START UP GR WT 8750 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.5 HRS/2126Z	h. START UP C G 19.0%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

1. Lateral trim checks with fixed aileron tab changed from 4 to 2 degrees trailing edge up.
2. Stall warning checks, clean and PA configuration with 2 1/2 inch stall strips at wing stations 69.0 (smaller and inboard from last test).

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. At 150 KIAS, 15,000 ft, clean configuration, with roll trim neutral, the aircraft rolled right to 30 degrees bank in 17 seconds. With full left trim, the aircraft rolled right to 30 degrees bank in 18+ seconds. With full left trim, the aircraft rolled right to 7 degrees in 15 seconds. Chase aircraft reported that both ailerons were floating up, the left just slightly more than the right. Still photos were taken to more closely observe angles and tab positions.

(continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Descent from 25,000 ft was made with speed brakes extended. The vibration was considered objectionable by both pilots. Retrimming after speed brake extension required holding nose up trim for about a 5 second continuous burst.
2. Attitude indicators both precessed to about 4 degrees left bank indication each half hour, even though the flight was mostly wings level with a few occasional 20-30 bank turns. The fast erect function corrected them to level flight each time.
3. The yaw damper tripped off in the traffic pattern and would not reset.

(continued from page 1)

RESULTS OF TESTS

2. Clean stalls at 25,000 ft occurred at 98 KIAS with one to two knots of barely perceptible warning in the form of longitudinal stick "nibbling." The amplitude is inadequate and only discernible to a pilot concentrating on detecting it. PA configuration airframe buffeting totally masks any warning whatsoever, and the stall occurred consistently at 94 KIAS. All stalls were characterized by a g-break and strong rolling tendency to the right, as in all previous tests.

MDE
Fre & OPS-1
RHK

T-46A
MISSION SUMMARY

FLIGHT #24 6 JAN 86

1. Objectives
   A. Flutter envelope expansion
   B. Stall warning investigation
   C. Tuft documentation

2. Crew - ~~Bush/Shawl~~er
   MARTINEZ / BUSTA

3. Profile
   A. Takeoff 1.2 Vstall
   B. Climb at 150 KIAS to 20,000 ft
   C. 20,000 ft
      Flutter points 159, 178, 199, 219, 240 KIAS
      1 G stall warning investigation (clean and power approach)
   D. Descent
      Max speed defined by flutter clearance
   E. Touch and go/Full stop landings

4. Restrictions - Unpressured - remain below 25,000 ft PA

MDE
FILE 4-OPS-1
DAR

T-46A
MISSION SUMMARY

FLIGHT #25 7 JAN 86

1. Objectives
   A. Flutter envelope expansion
   B. Stall warning investigation
   C. Tuft documentation

2. Crew - T-46 - Edmondson/Shawler
   - T-33 - Bush/Photographer

3. Profile
   A. Takeoff 1.2 Vstall
   B. Climb at 150 KIAS to 20,000 ft
   C. 20,000 ft
      Flutter points 159, 179, 199, 219, 240 KIAS
      1 G stall warning investigation (clean and power approach)
   D. Descent
      Max speed defined by flutter clearance
   E. Touch and go/Full stop landings

4. Restrictions - Unpressured - remain below 25,000 ft PA

File 4-OPS DOC MDL IFTR 25

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 7 JAN 86	e. CONFIGURATION FLUTTER SYSTEM	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 080/10
c. OBSERVER SHAWLER	g. START UP GR WT 8759 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 2.1/1738Z	h. START UP C G 18.9%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

1. Continue flutter from flt 25: begin 159 KIAS with tail excitation.
2. Stall warning investigation with 5 inch stall strips with their inboard edges at wing stations 66.50.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A small portion of the 159 KIAS flutter point was worked: after a tail sweep, we had been investigating frequencies of interest for about 30 minutes when instrumentation failed to provide a frequency readout (either in the cockpit or on the ground) on the tail vane. The wing vane was checked, and it continued to provide frequency data. After a descent to 11,500 ft the tail vane was checked again and worked. A few more frequencies were investigated back up at 20,000 ft, then the frequency data was lost again, (continued in Block 6)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from Block 5)
and this time the mission was terminated. FRC engineers suspect temperature sensitivity of the magnetic pickup switch, and are looking for a way to keep it warm on future flights. Of the frequencies that were investigated, it appears that damping was good.
Stall warning is still negligible, with stalls occurring clean at about 99-100 KIAS, and in PA configuration at 96-97 KIAS. Interestingly, stalls this time were fairly symmetric, without the right rolling tendency at the G break. This might be attributed to the new stall strip location, causing a more symmetric inboard tripping of wing flow.

mDC FILE 4-OPS-1
JDR

T-46A
MISSION SUMMARY

FLIGHT #26 8 JAN 86

1. Objectives
   A. Flutter envelope expansion
   B. Stall warning investigation
   C. Tuft documentation

2. Crew - T-46 - Edmondson/Martinez
   - T-33 - Hansen/Photographer

3. Profile
   A. Takeoff 1.2 Vstall
   B. Climb at 150 KIAS to 20,000 ft
   C. 20,000 ft
      Flutter points 159, 179, 199, 219, 240 KIAS
      1 G stall warning investigation (clean and power approach)
   D. Descent
      Max speed defined by flutter clearance
   E. Touch and go/Full stop landings

4. Restrictions - Unpressured - remain below 25,000 ft PA

FILE MDC IFTR. 26 file 4-OPS-1 RDK

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 8 JAN 86	e. CONFIGURATION CLEAN W/FLUTT ATCH VANES	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8806	k. WEATHER CLR
d. SORTIE TIME/TO TIME 2.2/0906 L	h. START UP C G 18.3 GD/17.9 MSN	l. GROUND BLOCK

4. TESTS PERFORMED

Flutter @ 159 KIAS @ FL 200.
Stalls in both clean and PA configuration at FL 200

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Cleared 159 KT points and obtained some flutter data at 178 Kts prior to reaching bingo fuel state.
2. Stall warning inadequate in both clean and PA configuration.

6. REMARKS *(Continue on reverse side if needed)*

Stall strips located at wing station 65.10 had a width of 5 inches.

file 40PS-1
DHK

F-16A
MISSION SUMMARY
~~MAS~~ FLIGHT # 27 9 JAN 86

~~A.~~ 1. OBJECTIVE - BASELINE DRAG INVESTIGATION

2 CREW T46 BUSH / SHANCER
T-33 MARTINEZ / PHOTO

3. PROFILE

A. TAKEOFF 1.2 V_{STALL}
B CLIMB ~~172 KIAS~~ ~~150 170 KIAS~~ 172 KIAS TO 10,000 FT
C. CHECK CLIMB 172 KIAS 10 TO 18 M FT
~~D SPEED POWER~~
D. 15,000 FT SPEED POWER POINTS
246, 196, 146, 221, 172, 121, 110 KIAS
E. SAWTOOTH CLIMBS & DESCENTS 10 TO 18 M FT
[illegible] 196 KIAS
F 15,000 FT SPEED POWER POINTS
246, 196, 146, 221, 172, 121 110 KIAS
~~G STABILIZED TURNS~~
G 15,000 FT STABILIZED TURNS
172 AND 196 KIAS (1.5, 2.0 AND 2.5g)
H RTB 250 # FUEL
I. TOUCH AND GO / FULL STOP LANDING

IFTR. 27

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 9 JAN 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER SHAWLER	g. START UP GR WT 8820	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.9/1057	h. START UP C G MSN 19.0%	l. GROUND BLOCK YES

4. TESTS PERFORMED

Speed power points 15,000 ft climbs and descents 13,000 ft - 17,000 ft sustained turns at 15,000 ft.
All for drag investigation - complete.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

The following profile was flown with the specific points listed. A hydraulic leak developed late in the flight, but the pressure stayed up until shut down on the ramp.

6. REMARKS *(Continue on reverse side if needed)*

Flight profile:
1. Max power climb 10,000 - 18,000 172 KIAS.
2. Speed power points, 15,000 ft 246, 221, 196, 172, 146, 121, 110 KIAS.
3. Idle descent 172 K 18,000 - 13,000 ft.
4. Max power climb 196 K 11,000 - 18,000 ft. Idle descent 196 K 18,000 - 13,000 ft.
5. Constant "G" turns at 15,000 ft approximately 2.2 "G" at 172 KIAS and 196 KIAS.
6. Speed power 15,000 ft 196 KIAS.
7. Constant "G" max power turn at 15,000 ft 196 KIAS (2.8 "G"'s).
8. Speed power 15,000 ft 146, 110, 246 KIAS.

The 2 degree trailing edge up left fixed tab was reset to 0. Basically the aircraft could be trimmed at all speeds flown.

File IFTR.28

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE	2. SERIAL NUMBER
	T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 15 JAN 86	e. CONFIGURATION DRAG CLEAN UP	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION ATIS/FRC GND STN	j. SURFACE WIND 2206
c. OBSERVER SHAWLER	g. START UP GR WT 8856	k. WEATHER CLR
d. SORTIE TIME/TO TIME 2.1/0925	h. START UP C G 19.34	l. GROUND BLOCK 40 DEG F/PA 2170

4. TESTS PERFORMED

1) Max power climbs/idle descents @ 172, 196 KIAS, 15'K +/- 2'K.
2) Speed power @ 246, 221, 196, 172, 146, 121, 110 KIAS, 15'K.
3) 2 G turns @ 172, 196 KIAS 15'K.
4) 2.5 G turns @ 196 KIAS 15'K.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1) Repeated 196, 172, 146, 110, 246 KIAS, 15'K speed power.
2) Repeated 172 KIAS, 2 G turn, 15'K.
3) All data points noticeably better than baseline in terms of stability at test conditions.

6. REMARKS *(Continue on reverse side if needed)*

A. Qualitatively noted a slight improvement in performance at test day conditions.

1. Climbs were faster.
2. Descents were slower.
3. Took less power, 3-5% fan speed, for stabilized points.
4. Had enough gas left to add 172 KIAS speed power and 2 G turn repeat to card.

B. Roll off was slight but noticeable to left. Near neutral at 246 KIAS. Within the lateral friction band @ 196 KIAS. Only 2-3 lbs at lowest speed, 110 KIAS.

IFTR .30 file 1-OPS' PRC

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 21 JAN 86	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280 LBS
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER HANSEN	g. START UP GR WT 8820 LBS	k. WEATHER 20K BKN
d. SORTIE TIME/TO TIME 2.0/2041Z	h. START UP C G 18.7%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

Flutter, roll trim roll-off, bank-to-bank rolls at 20,000 ft, 178 KIAS (0.4m) and 199 KIAS (0.44m), stall strip warning investigation.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Got halfway through the flutter points at 199 KIAS before bingo fuel. Initial look at damping shows about 0.05 damping factor for the roughly 30 Hz mode at 178 KIAS. Bank-to-bank rolls show forces just about meeting spec maximums for required roll rates, but forces still feel high and not in harmony with pitch. At 150 KIAS, full right roll trim will almost trim the aircraft level, with 4 deg left bank attained in 30 sec. At 178 KIAS, however, both left and right full roll trim produce 30 deg left bank in about 28-30 seconds. (Cont'd on page 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Low drag configuration de-moded, flutter system reinstalled, 5 inch stall strips placed with inboard edge at wing station 54.75.
B. Flutter vane produces up to 7 g's excitation at 199 KIAS. Need to install smaller span vane before going to higher speeds to avoid exceeding 10 g limit.
C. At higher speeds on bursts, the flutter vanes continue moving through 2 to 3 cycles, giving uncertain data for flutter analysis, since the damping analyzed is for a slightly lower frequency than the initially set (and known) excitation frequency. FRC is now installing a vane brake to avoid this problem.

(Cont'd from p 2)
Stall warning is not improved, with about 1 Kt warning clean (stall 96 KIAS, slight left roll), and no warning in P.A. configuration (stall 93 KIAS, slight left roll).

file 4 OPS-1 PHC

T-46A MISSION SUMMARY

FLIGHT #31 23 JAN 86

1. MISSION OBJECTIVES:
   - A. FLUTTER ENVELOPE
   - B. LATERAL TRIM EVALUATION
2. CREW:
   - A. T-46 EDMONDSON/SHAWLER
   - B. T-33 MARTINEZ/G + 9
3. CONFIGURATION CHANGES:
   - A. VANE BRAKE ADDED
4. MISSION PROFILE:
   - A. TAKEOFF 1.2 V_{STALL}
   - B. CLIMB AT 160 KIAS TO 20,000 FT
   - C. 20,000 FT
     - 150 KIAS LATERAL TRIM CHECK
     - 199 KIAS (.44M) FLUTTER POINT, LATERAL TRIM CHECK
     - 219 KIAS (.49M) FLUTTER POINT, LATERAL TRIM CHECK
     - 240 KIAS (.53M) FLUTTER POINT, LATERAL TRIM CHECK
   - D. RTB (250 LBS FUEL)
   - E. TOUCH AND GO/FULL STOP LANDINGS
5. RESTRICTIONS:
   - A. UNPRESSURIZED COCKPIT - REMAIN BELOW 25,000 FT

file 4 OPS-
FTR.31

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 23 JAN 86	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280 #
b. PILOT EDMONDSON	f. INSTRUMENTATION YES	j. SURFACE WIND 270 10 G 20
c. OBSERVER SHAWLER	g. START UP GR WT 8861	k. WEATHER CLEAR/WINDY
d. SORTIE TIME/TO TIME 1643/0.6	h. START UP C G 19.6%	l. GROUND BLOCK

4. TESTS PERFORMED

Flutter at 20,000 ft 199 KIAS.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Flutter excitation system worked very well. However a very limited amount of data were obtained because of a late takeoff and only 30 minutes of daylight remaining to test in. At 199 KIAS and 20,000 ft, sweeps of frequencies were made from a minimum of 3 to 4 Hz up to approximately 59 Hz in a 60 sec time. Burst frequencies on the wing were made at 8.9, 13.5, 31.2, 32.0 and 33.0 Hz. One tail burst was accomplished at 7.4 Hz. The flutter excitation system was modified for this flight with a hydraulic (Continued in Remarks below)

6. REMARKS *(Continue on reverse side if needed)*

braking system to stop the vane coast down time. Initial indications from the ground station were the brake did stop the vane much better than before.

file 4-OPS-1 IFTR. 32

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 JAN 86	e. CONFIGURATION FLUTTER SYSTEM	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8860 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.8/2056Z	h. START UP C G 19.7%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

A. Flutter 199 KIAS (0.44M) and 219 KIAS (0.49M) at 20,000 ft P.A.
B. Lateral trim rolloff checks 150, 178, 199 KIAS.
C. Bank-to-bank and 360 degree rolls at 150, 178, 199 KIAS.
D. Clean 1 g stall for stall strip/stall warning check.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Flutter damping appears good. Completed all 199 KIAS points and nearly completed all 219 KIAS points. Manual rudder appears to have no effect on frequencies of interest or damping at any speed to date. (Recommend deleting manual rudder points from future flutter testing.)
B. Was able to trim out rolling tendencies at all airspeeds today, but 219 KIAS required full right roll trim tab.
C. Rolls left and right are qualitatively unaffected in symmetry, (Cont'd p 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Flutter brake system installed. The hydraulic line to the wing is routed on underside of the wing just forward of the aileron/flap hinge line, and faired in with aluminum tape. Looks terrible, but had no apparent effect on flight characteristics. Brake system works, significantly reducing vane overshoots, but one or two overshoots are still seen at higher vane frequencies (30-60 Hz).
B. G loads seen at 219 KIAS indicate we ought to be able to remain within 10 g's with the present size wing flutter vane and for the 240 KIAS (0.53M) points. Also, 240 KIAS looks like about the fastest points we'll be able to do without diving through the target altitude.
C. Aileron fixed tabs were set at 6 degrees TEU left, and 4 degrees TEU right from previous 0 degrees.
D. Stall strips were 5 inch long inverted L aluminum angle made from .040 aluminum sheet. The protruding leg was one half inch, and was placed with the inboard edge at wing station 75.0, and positioned vertically at the leading edge of the chord line.

however, because of difference in direction for arm strength, at 199 KIAS, full stick deflection rolls to the left were possible one handed, but two hands are needed to get full right deflection. A 360 degree roll at 199 KIAS took a little more than 3 seconds (see video tape forwarded to ASD/AFG on 24 Jan). Slight roll rate variation was discernible at 150 and 178 KIAS due to sideslip excursions (feet on the floor rolls).

D. Stall warning is still non-existent. G-break straight ahead occurred at 94 KIAS.

IFTR. 33

file 4-OPS-1
DPC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 27 JAN 86	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8863	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1525 1.4	h. START UP C G 19.58	l. GROUND BLOCK YES

4. TESTS PERFORMED

Flutter at 220 Kt, 20,000 ft. Bank to bank rolls at 200 Kt, 20,000 ft. Speed brake evaluation at 150 Kt and 200 Kt. Roll off checks at 200 Kt, 20,000 ft.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Flutter points completed at 219 KIAS SAS on and manual rudder.
B. 1. Roll off with neutral lateral trim was 8 degrees right in 15 sec.
   2. Roll off with full left trim was 6 degrees left in 15 sec.
   3. Roll off with full right trim was 27 degrees right in 15 sec.
C. 1. Bank to bank rolls completed using 1/4, 1/2, and 3/4 stick.
   2. 360 degree roll completed with full stick.

(Continued in REMARKS, below)

6. REMARKS *(Continue on reverse side if needed)*

D. Speed brake evaluation showed still too much downward pitching moment and too much buffet above 150 Kt.
No configuration changes made except to the speed brakes. Upper speed brake max deflection was changed from 55 degrees to 50 degrees. Blow back schedule changed so that upper speed brake starts in about 250 Kt and sides about 225 Kt. This was not checked on this flight.
Stall strips both removed before this flight and no stall warning investigation was performed.

file 4-OPS-1

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46	2. SERIAL NUMBER 482

3. CONDITIONS RELATIVE TO TEST

a. DATE 1/27/86	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8863	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1525 1-4	h. START UP C G 19.58	l. GROUND BLOCK YES

4. TESTS PERFORMED

FLUTTER AT 220K, 20,000 FT
BANK TO BANK ROLLS AT 200K, 20,000 FT
SPEED BRAKE EVAL AT 150K AND 200K
ROLL OFF CHECKS AT 200K, 20,000 FT

5. RESULTS OF TESTS (Continue on reverse side if needed)

A- FLUTTER POINTS COMPLETED AT 219 KIAS
SAS ON AND MANUAL RUDDER

B). ROLL OFF WITH NEUTRAL LATERAL
WAS 8° RIGHT IN 15 SEC.

6. REMARKS (Continue on reverse side if needed)

2. ROLL OFF WITH FULL LEFT TRIM
WAS 6° LEFT IN 15 SEC.

3. ROLL OFF WITH FULL RIGHT TRIM
WAS 27° RIGHT IN 15 SEC.

C). BANK TO BANK ROLLS COMPLETED
USING 1/4, 1/2 + 3/4 STICK

2. 360° ROLL COMPLETED WITH FULL
STICK

D- SPEED BRAKE EVALUATION SHOWED
STILL TOO MUCH DOWNWARD PITCHING
MOMENT AND TOO MUCH BUFFET
ABOVE 150K.

NO CONFIGURATION CHANGES MADE EXCEPT
TO THE SPEED BRAKES - UPPER SPEED

AFFTC FORM APR 74 365 REPLACES AFFTC FORM 365 ONETIME, MAR 74, WHICH IS OBSOLETE

BRAKE MAX DEFLECTION WAS CHANGED FROM 55° TO 50°. BLOW BACK SCHEDULE CHANGED SO THAT UPPER SPEED BRAKE STARTS IN ABOUT 150K AND SIDES ABOUT 175K. THIS WAS NOT CHECKED ON THIS FLIGHT

STALL STRIPS BOTH REMOVED BEFORE THIS FLIGHT AND NO STALL WARNING INVESTIGATION WAS PERFORMED

file 4-OPS-1
DHC

T-46A mission summary

Flt. # 34F, 28 Jan. 86

1. Mission objectives:

   a. Flutter envelope expansion
   b. Stall warning investigation
   c. Lateral trim investigation
   d. Roll response investigation
   e. Speed brake evaluation

2. Crew:

   a. T-46A, Hansen/Martinez
   b. T-33, Edmondson

3. Configuration change:

   a. Wing Leading Edge Stall Strip raised .32 inches at the same wing station.

4. Mission profile:

   a. T.O. 1.2 Vstall
   b. Climb at 170KIAS to 20,000 ft.
   c. 20,000 ft.
      1g stall warning investigation
      220 KIAS lateral trim check
      240 KIAS (0.53M) flutter point, lateral trim check
      252 KIAS (0.56M) flutter point, lateral trim check
      265 KIAS (0.59M) flutter point, lateral trim check
      TBD KIAS speed brake extension investigation
   d. RTB (250 lbs fuel)
   e Tch and Go/full stop landing

file 4-OPS-1
IFTR. 34 DM

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 28 JAN 86	e. CONFIGURATION FLUTTER SYSTEM	i. FUEL LOAD 1280 LBS
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER HANSEN	g. START UP GR WT 8858	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.5/1703 Z	h. START UP C G 19.7%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

A. Flutter tests, 20,000 ft 240 KIAS (0.53M) and 252 KIAS (0.56M).
B. Lateral trim rolloff checks 240 KIAS.
C. Aileron rolls 1/4, 1/2, 3/4 bank to bank, and full stick 360 deg at 240 KIAS.
D. Stall warning check, 1 G, 20,000 ft.
E. Speed brake buffet and pitching moment check at 240 KIAS, 20,000 ft.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Damping appears good, essentially all points completed.
B. Aircraft rolls left even with full right trim above 200 KIAS.
C. Stall warning with placement of stall strips in new location still inadequate (also stall speed increased to 106 KIAS.

6. REMARKS *(Continue on reverse side if needed)*

A. Stall strip installed at wing station 75, 1/2 inch up from leading edge of chord line.
B. Speed brake extension at 240 KIAS was evaluated with a different blowback schedule in that the upper brake will start in at 250 KTS and the side speed brakes at about 225 KIAS. The upper speed brake max deflection angle was decreased from 55 degrees to 50 degrees. The evaluation indicated that the downward pitching moment, and, especially the buffet, to remain highly objectionable.

file 4-OPS-1
FTR.35

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 29 JAN 86	e. CONFIGURATION FLUTTER	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION FLUTTER	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8863	k. WEATHER CLOUDY
d. SORTIE TIME/TO TIME 1.6, 1113	h. START UP C G 19.6	l. GROUND BLOCK YES

4. TESTS PERFORMED

Flutter points at 20,000 ft and 11,500 ft.
Stall strips removed.
No stalls or roll off checks.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Flutter points completed at 252 KT and 265 KT at 20,000 ft and 248 KT at 11,500 ft. 75% of 270 KT at 11,500 ft also completed.
B. Inner gear doors sagged down about 1 inch above 240 KT.
C. Best flutter mission to date and most productive. The next flight should finish up phase one of the flutter testing. Quick look at the real time data indicates damping is beginning to decrease at these higher speeds. The least structurally damped mode appears to be a 13.6 vertical fin mode. (Cont'd below)

6. REMARKS *(Continue on reverse side if needed)*

Preliminary results indicate a total damping of 4.0% at 270 KTs/11,500 ft.

file 4-OP3-1
DNC

T-46A MISSION SUMMARY

FLIGHT #35 29 JAN 86

1. MISSION OBJECTIVES:
   - A. FLUTTER ENVELOPE EXPANSION
2. CREW:
   - A. T-46A - SHAWLER/EDMONDSON
   - B. T-33 - HANSEN
3. CONFIGURATION CHANGE:
   - A. WING LEADING EDGE STALL STRIPS REMOVED
4. MISSION PROFILE:
   - A. TAKEOFF
   - B. CLIMB PER CLIMB SCHEDULE
   - C. 20,000 FT
     - 1 - 252 KIAS (.56M) FLUTTER POINT
     - 265 KIAS (.59M) FLUTTER POINTS
     - DESCEND TO 11,500 HP AT KIAS (PER FLUTTER ENGINEERS)
     - 248 KIAS (0.47M) FLUTTER POINTS
     - 270 KIAS (0.51M) FLUTTER POINTS
     - 279 KIAS (0.53M) FLUTTER POINTS
   - D. RTB (250 LBS FUEL)
   - E. TOUCH AND GO/FULL STOP LANDING

File mt

File 4 OPS-1 IFTR.38 PR

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 31 JAN 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1140#
b. PILOT MAJOR SCHULZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER MAJOR BUSH	g. START UP GR WT 8710	k. WEATHER 14,000 BKN
d. SORTIE TIME/TO TIME 1.3/0931	h. START UP C G 19.41	l. GROUND BLOCK PER CARDS

4. TESTS PERFORMED

IOT&E evaluation: takeoffs, landings, climbs/descents, steep turns, lazy 8, aileron roll, chandelle, power on stalls, traffic pattern stalls, slow flight, pitch/lateral trimmability, formation wing maneuvering and pre/post flight ground operations.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Taxied using normal speed and procedures. On takeoff, started stick back at approximately 94 KIAS and nose came up at approximately 100 KIAS. Pitch rate was rapid, but was controllable. Climbed to 10,000 MSL at 180 KIAS, leveled off and accelerated to 200 KIAS. Ran elevator trim through full travel and felt predictable stick forces. Full aileron trim made almost no change in stick forces. All instrument work including rate climbs and descents at 160 KIAS and 1000 fpm, and steep turns at 160 KIAS and 45° of bank were easy to fly. (Cont p2)

6. REMARKS *(Continue on reverse side if needed)*

1. The aircraft was stable and solid on the ground and in the air.
2. Stall recovery was easy.
3. Power response was excellent.
4. Rotation rate was too fast resulting in an initial overshoot of the desired pitch attitude for takeoff.
5. Buffet and pitching caused by the speed brake at high airspeeds is excessive and would be unsatisfactory, especially for instrument and formation work.
6. The speed brake switch is in an awkward position to reach on the throttle. It should be higher in a position to be activated with the hand still in a comfortable position to use the throttles.
7. Aileron trim is ineffective.
8. There is no noticeable stall warning.
9. Starter switches are positioned so that inadvertant airstarts might be a problem.

The aircraft was stable and solid. We flew 2 power on stalls (nose low straight ahead and nose high turning to the left) with 90% core set. There was no stall warning, but relaxing back pressure recovered the aircraft quickly. Traffic pattern stalls were similar in characteristics. Nose high turning to the left broke to the left (gear, flaps and speed brakes extended). Slow flight with gear only extendsed was easy to perform. Airspeed and altitude were easy to hold in level flight and turns. Speed brake was very effective with some buffet at 190 KIAS. Buffet was progressively lighter at 160 KIAS and 130 KIAS. I used the speed brake at 240 KIAS in the traffic pattern which resulted in severe buffet and pitch oscillations. Lazy eight and aileron rolls were easy to fly at 90% core and 200 KIAS. Response to aileron inputs was instantaneous, both initiating and stopping the roll. Roll rate was comfortable. The chandelle was easily performed at 95% core and 220 KIAS> Formation wing work, echelon turns, and crossunders were easy to fly. Flight control, power response and visibility were excellent, although I was probably flying further back on lead than some other pilots have (tail of tip tank on pilots' helmet on the T-33).

The first pattern was a no flap, no speed brake visual straight in flown at 110 KIAS. I flew slightly less than a 3° glide path (1 dot below ILS glide path). Floating did not seem excessive and the aircraft handled well. The touch and goes were easy due to excellent power response, good aircraft stability, and a relatively short time in the ground. All closed patterns were also easy to fly. The next pattern was flown with a normal configuration from a closed pull up to 1000' AGL. Visibility was excellent and the pattern was easy to fly. However, I was surprised at the effectiveness of the speed brake departing the perch and initially lost excessive altitude. I used 130 KIAS in final turns and 110 KIAS for final approach airspeeds on all overhead patterns. The next pattern was an overhead from 1000' AGL with only the gear extended. The aircraft handled well throughout the pattern. This pattern was followed by a reentry, using 240 KIAS, on initial. Except for my previous remarks about the speed brake, the aircraft handled well throughout the pattern (1500' AGL). We flew one more overhand from a closed pullup, followed by a full stop. The aircraft handled well on the full stop and was easy to control.

File mgt

file 4-OPS-1 IFTR.40

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 3 FEB 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION STD	j. SURFACE WIND 2308
c. OBSERVER MARTINEZ	g. START UP GR WT 8906	k. WEATHER 250 SCATT 50
d. SORTIE TIME/TO TIME 1.2/1220 L	h. START UP C G 19.0	l. GROUND BLOCK 30.03 T 58/PA 2200

4. TESTS PERFORMED

Flutter - 1) 270 KIAS 11,500 Hp tail bursts @ 7.2, 9.2, 12.4, 13.6 & 19.7 Hz
Random data
2) 279 KIAS 11,500 Hp stick raps, wing and tail sweeps
Wing bursts 8.2, 13.8 & 30.9 Hz
Tail bursts 7.2, 9.2, 12.4, 13.8 & 19.5 Hz
Random data (continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Major Bush, USAF
Phase I flutter complete.
Jim Martinez, FRC
Straight stick evaluation - an A-10 control stick handgrip was installed on the right control stick of the T-46A and was evaluated during 3 touch and go landings and also during climb and normal cruise flight evaluations.
(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

Major Bush, USAF
1) Main gear doors drooping at higher speed, approximately 1 to 2 inch gap at 279 KIAS.
2) Control harmony better at 180 KIAS than the last time I flew on 15 Jan 86. Still high roll forces at 250 KIAS.
3) Crosswind landings: (One with 6 KTs cross, last with 12 Kts cross.) Both were easily flown with wing low method. With mains on the ground during landing roll the ailerons are very effective for directional control. You can steer the aircraft with the ailerons.
4) Gusty winds in the parking area caused engine oscillations previously identified.
5) Flutter excitation was very unstable in frequency during both wing and tail bursts. Nine of the thirteen bursts had to be repeated, some two or three times. At the middle of the frequency range sampled on these bursts, deviations as much as plus and minus 1.5 Hz from target were experienced without any pilot inputs to the system. This resulted in an increase in time to complete these points by at least 100% to acquire adequate data. This is unacceptable to continue testing into Phase II flutter where exact frequency control at critical damping points is required.

(Continued from page 1, TESTS PERFORMED)
Straight stick T.O. evaluation - 95 KIAS rotation & full aft stick

(Continued from page 1, RESULTS OF TESTS)

Takeoff utilizing the straight stick resulted in a more comfortable apparent stick position at rotation. (Rotation speed 95 KIAS.) A 95 KT full AFT stick rotation was also performed and elicited the same comments, ie, although the forces are heavy, the arm position is not quite as awkward as with the original stick configuration. During climb and cruise the stick position was also quite comfortable. It is this writer's opinion that the full AFT position could be moved still further forward.

Feb 4-OPS-1 | FTR 42

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 7 FEB 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8855 LBS	k. WEATHER 130 BKN 50+
d. SORTIE TIME/TO TIME 1.6/1819 Z	h. START UP C G 19.6%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

Preliminary flying qualities: 15,000, 11,500, 7,500 ft, V_{stall} - 275 KIAS.
A. Roll trim effectiveness/rate evaluation.
B. Speed brake improvement.
C. Elevator trim tab effectiveness - clean and P.A. configuration/rate evaluation.
D. One G stall/stall strip evaluation. (Continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Roll trim seems no more effective than previously. It just took less time to reach the full stops.
B. Speed brakes were noticeably less effective in deceleration, but pitching moment was reduced to zero. Buffeting was reduced slightly, comfortable below 170 KIAS, tolerable 170-200 KIAS, and unacceptable above 200 KIAS.
C. Elevator trim rate was very compatible with speed changes and new trim
(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Roll tab enhanced by removing position potentiometer and bracket, and installing a fence at the outboard portion. Trim rate increased to 4 degrees/second.
B. Elevator tab rate increased to 4 degrees/second.
C. Speed brake deflection schedule modified from 55 degrees to 38 degrees on upper speed brake, and from 60 degrees to 44 degrees on side speed brakes.
D. 2 1/2 inch wide stall strips (1/2 inch triangular section) placed at wing stations 54.75, on leading edge chord line.
E. 40 degree flap selection ("full" position) enabled.
F. A full stop landing was made using speed brakes only. Near idle power was used for the final turn, and about 1/4 throttle was used on final. The landing pitch attitude could be held down to 73 KIAS.

(Continued from page 1 TESTS PERFORMED)

E. 40 degree flap evaluation - trim, traffic pattern, takeoff and landings.

(Continued from page 1 RESULTS OF TESTS)

points could be quickly attained with no overshooting attributable to trim rate. Available nose down trim runs out around 240-250 KIAS. In P.A. configuration, both 20 and 40 degree flap positions, nose up trim is now effective down to 110 KIAS with the removal of the nose down pitching moment contribution from the upper speed brake.
D. Still no warning in one G clean stalls (94 KIAS). A few stalls in the 40 degree flap P.A. configuration were characterized by a slight lightening of stick force and a hint of uncertainty in roll one or two knots before beginning a slight sink rate with about a 2 degree pitch bob, stalling and unstalling. Recovery was immediate with a slight reduction in back stick pressure. Stall speed was 93 KIAS.
E. 40 degrees of flaps and no speed brakes requires at or near idle power for all but the last 1/2 mile of final approach out of an overhead pattern. Landings were unremarkable - just slightly more time in the landing flare to bleed off airspeed. Rotations, however, from the 3-point atittude at about 95 KIAS were very easy, with the light stick forces, and very controllable rate. Patterns with 40 degrees flaps and speed brakes were very stable, very predictable, and with adequate thrust reserve. Landings could be easily judged for on spot and on airspeed. Trim was adequate to a little less than 105 KIAS, and touchdowns just above a stall required about 15-20 lbs stick force.

Revision (Page 1 only) of IFTR. 43 (other pages remain the same) Page 1 of 2 pgs

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 10 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND 240 10 G 15
c. OBSERVER EDMONDSON	g. START UP GR WT 8860	k. WEATHER WINDY/CLEAR
d. SORTIE TIME/TO TIME 1.7/1227 L	h. START UP C G 19.53	l. GROUND BLOCK YES

4. TESTS PERFORMED

A. Lateral trim check at 15,000 ft (130, 175, 200, 225, 250, 275 KIAS).
B. Roll authority at 15,000 ft.
C. Speed brake buffet and pitching evaluation at 275, 210, 170 KIAS.
D. Longitudinal trim evaluation at 130 and 110 KIAS.
E. One G stall investigation.

(Continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

A. The following table summarizes the lateral trim checks made at 15,000 ft clean configuration:

AIRSPEED (KIAS)	BANK ANGLE AFTER 15 SEC FULL LEFT TRIM	BANK ANGLE AFTER 15 SEC FULL RIGHT TRIM
150	18 deg L (20 sec)	12 deg R (20 sec)
130	8 deg L	22 deg R
175	0 deg	3 deg R
200	4 deg L	21 deg R
225	9 deg L	11 deg R
250	21 deg L	15 deg R

At 275 KIAS there was insufficent longitudinal trim to get a "hands off" condition, so the lateral trim checks at 275 KIAS were not possible. The lateral trim is clearly not adequate.

B. The time to roll 360 degrees with full lateral stick clean configuration are contained in the following table:

AIRSPEED (KIAS)	TIME (SEC)
130	5 1/2
175	4 1/2
200	3 1/2
225	3.0
250	4.0
275	3 1/2

(Continued on page 2)

IFTC 43

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 10 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION	j. SURFACE WIND 240 10 G 15
c. OBSERVER EDMONDSON	g. START UP GR WT 8860	k. WEATHER WINDY/CLEAR
d. SORTIE TIME/TO TIME 1.7/1227 L	h. START UP C G 19.53	l. GROUND BLOCK YES

4. TESTS PERFORMED

A. Lateral trim check at 15,000 ft (130, 175, 200, 225, 250, 275 KIAS).
B. Roll authority at 15,000 ft.
C. Speed brake buffet and pitching evaluation at 275, 210, 170 KIAS.
D. Longitudinal trim evaluation at 130 and 110 KIAS.
E. One G stall investigation.

(Continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

A. The following table summarizes the lateral trim checks made at 15,000 ft clean configuration:

AIRSPEED (KIAS)	BANK ANGLE AFTER 15 SEC FULL LEFT TRIM	BANK ANGLE AFTER 15 SEC FULL RIGHT TRIM
150	18 deg L (20 sec)	12 deg R (20 sec)
130	8 deg L	22 deg R
175	0 deg	3 deg R
200	4 deg ~~R~~ L	21 deg R
225	9 deg ~~R~~ L	11 deg R
250	21 deg ~~R~~ L	15 deg R

At 275 KIAS there was insufficent longitudinal trim to get a "hands off" condition, so the lateral trim checks at 275 KIAS were not possible.
The lateral trim is clearly not adequate.

B. The time to roll 360 degrees with full lateral stick clean configuration are contained in the following table:

AIRSPEED (KIAS)	TIME (SEC)
130	5 1/2
175	4 1/2
200	3 1/2
225	3.0
250	4.0
275	3 1/2

(Continued on page 2)

(Continued from page 1, TESTS PERFORMED)

F. Sideslips at 250 and 275 KIAS.
G. Landings and takeoffs with 40 degree flaps.

(Continued from page 1, REMARKS)

C. Speed brake evaluation:

AIRSPEED (KIAS)	BUFFET	PITCHING MOMENT
275	Still objectionable but improved.	Mild nose down improved.
210	Noticeable but not very objectionable.	Slight nose down.
170	Noticeable, not objectionable.	Slight nose down.

The present configuration of the speed brakes (upper 38 degree max/side 44 degree max) is much improved from the initial configuration in both having less buffet and less pitching moment.
D. The longitudinal trim is adequate at low speeds, but insufficient at 250 KTs and above. The prime reason for the low speed improvement is the decreased deflection of the upper speed brake.
E. The following is stall speeds indicated in the cockpit:

CONFIGURATION	STALL SPEED (KIAS)	FUEL (LBS)	AoA (DEG)
Clean	93.0/93.5	600	--
Power Approach (20 deg flaps)	88.0/87.5	590	--
Power Approach (40 deg flaps)	83.0/84.0	520	17 deg

With flaps at 40 degrees the stall had an abrupt and rapid roll to the right ie sixty degrees right in less than 2 seconds.
F. The following side slip information was recorded from the cockpit:

AIRSPEED (KIAS)	FULL RUDDER MAX BETA (DEG)	MAX BANK ANGLE (DEG)
250	5.5 deg L 4.0 deg R	10 deg
275	5.0 deg L 4.0 deg R	10 deg

G. Takeoff and landings with 40 degree flaps. The 40 degree flap setting seems to have some large effects on takeoff and landing.

TAKEOFF: With 40 degree flaps the aircraft is capable of initially raising the nose at 74 to 75 KIAS which is about 5 knots less than with 20 degree flaps. Also the longitudinal stick forces appear much less during takeoff rotations at 95 to 100 KIAS. The abrupt nose up pitch rate is about the same.

LANDING: With 40 degree flaps the landing is about the same as previously seen with 20 degree flaps except there is more drag. The 40 degree flap drag looks to be about the same delta drag as with 3 speed brakes. An approach and landing with 40 degree flaps and no speed brakes is easy to perform. At 130 KIAS, idle power the vertical velocity (gear down) was approximately the same (3000 fpm) for both the flaps 40 degrees and speed brakes out condition.

H. The straight stick is in both cockpits. We both liked this position, and do not desire any further forward stick position.

I. The longitudinal trim rate is now excellent, but further evaluation will be required after the span of the trim tab is increased.

file 4-OPS-1 IFTR.44

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 11 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 220/10
c. OBSERVER MARTINEZ	g. START UP GR WT 8867	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.4/0858	h. START UP C G 19.45	l. GROUND BLOCK COMPLETE

4. TESTS PERFORMED

A. Lateral trim check at 7,500' HP
B. Roll authority at 7,500' HP
C. Speed brake buffet and pitch change evaluation.
D. Speed stability investigation.
E. Landings and takeoffs with flaps set at 20 and 40 degrees with speed brakes and speed brakes only flaps up.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Lateral trim checks performed at 130, 175, 200, and 250 KIAS produced essentially the same results as those performed at 15,000 HP (See flight report of 10 Feb). Likewise the times to roll through 360° with full lateral stick application were identical to those obtained on the previous (Feb 10) flight. There was no discernable difference noted in left or right rolls.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Speed brake (upper) deflection was limited to 38° whereas the side brakes were limited to 35° deflection.

B. No stall strips installed.

(Continued from page 1 RESULTS OF TESTS)

B. Speed brakes were deployed at 275, 240, 210, and 170 KIAS and decelerations and the attendant buffeting noted. The consensus of opinion was that, with the current setting, the buffeting was in the "tolerable" range at speeds between 200 KIAS to 275 KIAS (highest tested) and quite comfortable below 200 KIAS.

C. Landings were accomplished with 20° flaps and speed brakes, 40° flaps with speed brakes, and 40° flaps, no speed brakes. The configuration utilizing 20° flaps and extended speed brakes produced a 2,500 feet per-minute vertical velocity at 130 KIAS (idle thrust) while the 40° flap speed brake retracted configuration resulted in approximately 2,900 feet per-minute vertical velocity. The final configuration of 40° flaps and speed brakes extended resulted in a 3,100 feet per minute descent which was less than anticipated.

File + OPS-1 PMC IFTR.45

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 12 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION PREL H.Q.	j. SURFACE WIND 230/10-20 KTS
c. OBSERVER CAMPANO	g. START UP GR WT 8742	k. WEATHER
d. SORTIE TIME/TO TIME 1.7/1043	h. START UP C G 17.6	l. GROUND BLOCK

4. TESTS PERFORMED

A. Roll off check and rolls 150, 130, 130 PA, 175, 200, 225, 250, 275.
B. Speed brake eval.
C. Stalls, 1 G, PA 20 degree flaps, PA 40 degree flaps.
D. Speed stability 250 KTs and 100 KTs.
E. Wind up turns 150, 200 and 250 KTs.
F. Landings with 20 degree and 40 degree flaps.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Changes since last flight. Upper S.B. increased from 38 degrees to 43 degrees. Both aileron fixed tabs were moved trailing edge up 3 degrees forward CG.

6. REMARKS *(Continue on reverse side if needed)*

A. Roll off checks showed very little change; can barely trim for wings level; still inadequate.
Rolls were faster with less force at least through 3/4 stick. Roll rate very reasonable.
B. Speed brakes still provide a little too much buffet, but near acceptability. The pitching moment is about the same at the 43 degree upper as the 38 degree. It is still a pitch down tendency and mildly objectionable.
C. The 1 "G" stalls were at 94-95 knots and a very slight left roll off.
The P.A. with 20 degree flaps was 87 knots and a slight left roll off.
The P.A. with 40 degree flap was 85 knots with one a slight roll off and one a large left roll off.
D. The speed stability is still light but positive with very little if any change with the forward C.G.
E. The wind up turns showed fairly high forces to get to stall at 150 KTs and an apparent non-linearity at 200 KTs and 250 KTs with increasing force with increasing "G".
F. Five landings were made using S.B. only, 40 degree flap only, S.B. and 20 degree flaps, and S.B. and 40 degree flaps. All configurations have adequate drag, but the S.B. and 40 degree flaps is the best. Rotation from touch-and-go with nose wheel lowered to runway was abrupt similar to static takeoff.
G. The straight stick is far enough forward per both pilots.

File IFTR.46 file 4 OPS-1 DHC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 13 FEB 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1140
b. PILOT COL HULLENDER	f. INSTRUMENTATION	j. SURFACE WIND STRONG/GUSTING
c. OBSERVER EDMONDSON	g. START UP GR WT 8650	k. WEATHER BKN/SCATT
d. SORTIE TIME/TO TIME 1.7/1040	h. START UP C G 19.54	l. GROUND BLOCK NA

4. TESTS PERFORMED

Demonstration profile

A. Takeoff
B. Climb to 15,000 ft
C. Formation wing work
D. Stalls 1 G - Clean and PA
E. Accelerated stalls at 3 G's
F. 3 G turns
G. Aileron rolls
H. Lazy eight
I. Pattern and landings

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Extremely successful mission. All objectives met and each maneuver completed.

6. REMARKS *(Continue on reverse side if needed)*

The following comments are first hand interpretations by Lt Col Edmondson of what Col Hullender said during and after the mission:

He liked the cockpit arrangement and outside visibility. He said the cockpit had plenty of room. He liked ground handling and commented the aircraft could be steered with virtually any control; NWS, rudder, wheel brakes, differential power or even lateral control at higher speed. He particularly liked the engine operation both on the ground and in the air. He noticed the deceleration time during a throttle chop was a little slow and this increased pilot workload some during formation flight. Overall, quite impressed with the quietness and low vibration level of the engines. During take off he commented the forces to rotate were not excessive but his first take off did have an abrupt pitch rate. Every takeoff after the first was not abrupt and he commented he "learned" the aircraft characteristics during the first rotation.

Formation was easier than the T-37, very stable and easy to fly. The aircraft is very stable in formation.

One G clean and power approach stalls using 20 degree and 40 degree flap settings were flown. He did not like the lack of stall warning and commented this must be corrected before student training. Stall characteristics were good.

Accelerated stalls at 3 G's. No warning as in 1 G stalls. This must be corrected. Actual stall was easy to recover. There was some right roll off. Commented that this will be a super acrobatic aircraft.

Patterns and landings - It is very easy to land.

Overall impressions were the aircraft performed better than he ever expected and is confident it will become an excellent trainer for the Air Force.

IFTR. 48 file 4-OPS-1 DHC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 14 FEB 86	e. CONFIGURATION IOT&E EVAL	i. FUEL LOAD 1140
b. PILOT BUSH	f. INSTRUMENTATION	j. SURFACE WIND 360/06
c. OBSERVER MANKE	g. START UP GR WT	k. WEATHER
d. SORTIE TIME/TO TIME 1.1/1200	h. START UP C G	l. GROUND BLOCK

4. TESTS PERFORMED

A. Takeoff and departure (100 KIAS rotation).
B. Stalls - clean and PA configuration, accelerated and 1 G.
C. Acrobatics - lazy 8, chandelle, aileron rolls.
D. Speed brake evaluation - (270 KIAS and below).
E. Formation wing work with T-33.
F. Instrument platform evaluation. G. Traffic patterns and landings.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Mission complete - all test points accomplished.
Configuration: Speed brakes - top 43 degrees/side 35 degrees.

6. REMARKS *(Continue on reverse side if needed)*

Capt Manke, USAF
Overall the aircraft displays excellent handling qualities and characteristics for a primary trainer. The highlights and findings of the mission are as follows:
A. Initial takeoff rotation pitch rate is rapid but controllable (not optimum for a primary trainer). Stick forces somewhat heavy but not objectionable. Departure - Climb to 10,000 ft at 170 KIAS. Adequate climb performance for primary trainer.
B. Stalls - Virtually no stall warning but docile and excellent recovery characteristics. Encountered some stall buffet just prior to accelerated stall (3 G, 150 KIAS, 70 degree bank).
C. Acrobatics - Very responsive/easy to handle during these mild acrobatic maneuvers.
Control harmony is adequate. Aircraft seemed to roll faster to the right.
D. Speed brake buffet and pitch down are tolerable up to 270 KIAS in this configuration. Speed brakes appear to be effective slowing the aircraft at the higher speeds (above 200 KIAS) but not at traffic pattern speeds.
E. Formation wing work - Excellent power response and closed loop handling qualities.
Questionable visibility during formation rejoins. Throttle friction too high even on the lowest setting.
F. Instrument platform evaluation - Stable instrument platform even in light to moderate turbulence. Excellent instrument displays.
G. Traffic patterns and landings - Aircraft handles well in the pattern. Configuration drag is somewhat low with 20% flaps and speedbrakes and therefore a low power setting is required to maintain approach speed. Aircraft characteristics on a 1000 ft pattern with 40% flaps and speedbrakes were excellent. (REMARKS cont'd on page 2)

REMARKS (Cont'd from page 1)

Inadequate elevator trim causes heavier than desired stick forces in flare.

Major Bush, USAF

1. Trim evaluation: Longitudinal trim rate still too slow by 1/2. Will not keep up with a max power acceleration from 170 to 270 KIAS or a normal deceleration and configuration change in the landing pattern. Lateral trim not evaluated.

2. Stalls: 1 G stalls both clean and PA all had slight roll off to the left. Accelerated stalls, 2.5 to 3 G to the right had slight roll off to the left and a definite G break. Accelerated stalls to the left did not exhibit a G break but sustained buffet at stall and a very slow roll off to the right.

3. Speed brake evaluation: Buffet acceptable at all speeds up to 270 KIAS. Slight pitch down moment required 2 to 3 pound pull force at 250 KIAS to compensate. Speed brakes not effective in traffic pattern with either 20 degree or 40 degree flaps. Both configurations required idle power to maintain 130 KIAS for final turn and excessive time at idle power on final in order to slow to 110 KIAS for final approach.

4. Aileron rolls: Stick forces too high for 3/4 and full stick rolls at all speeds from 170 to 270 KIAS. Roll rate noticeably higher for right rolls than for left rolls.

5. Control harmony: Acceptable at all speeds from 110 to 270 KIAS. However, longitudinal stick forces, about 1 G, are very light. At elevated G longitudianl forces are acceptable.

6. Configuration:

Side speed brakes - 35 degree max.
Top speed brake - 43 degree max.
Ailerons - floated down to near neutral position
by approximately 3 degrees up fixed tab.

1FTR.49

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 19 FEB 86	e. CONFIGURATION FWD C.G.	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION PREL. F.Q.	j. SURFACE WIND 210-240-20-27K
c. OBSERVER MANKE	g. START UP GR WT 8725	k. WEATHER LT TURB, BKN CLDS
d. SORTIE TIME/TO TIME 1.6/0930	h. START UP C G 17.33	l. GROUND BLOCK

4. TESTS PERFORMED

A. Speed brake eval.
B. Wind up turns (WUT)
C. Long. dynamic stability
D. Stalls
E. Asymmetric thrust
F. Landings

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Changes since last flight:
1. Upper speed brakes back to 55 degrees and side brakes fully locked closed.
2. Further FWD C.G. to 15% just prior to landing.

6. REMARKS *(Continue on reverse side if needed)*

Engine start made with ECS on using the battery. Left engine 39 sec and 725 degrees; right engine 34 sec and 600 degrees. Initial takeoff and takeoffs during touch and go's with the FWD C.G. were very close to previous ones.

A. The single upper speed brake was tested at 275, 240, 210 & 170 KTs clean and 150, 130, & 110 KTs PA. This configuration eliminates all of the objectionable buffet and wallowing. However, the pitch down moment was unacceptable above 170 KTs. The drag does appear to be adequate.

B. The wind up turns were completed to 4 G's at 275, 250 and 225 KTs. The forces were rather high at 4 G's, but Dave Manke felt O.K. WUT to stall in PA were flown at 130 KTs. The forces were very high and resulted in reasonable buffet, but no stall G break even with nearly full aft stick.

C. Long. dynamic stability points were flown at 250, 200 & 150 KTs clean and PA at 130 KTs both stick fixed and stick free.

D. Stalls were completed at 1 G clean, PA with 20 degrees of flaps, & PA with 40 degrees of flaps. Stall clean 92 KTs; 20 degrees 88 KTs; and 40 degrees 85 KTs. The stall characteristics were random, left, right or straight.

E. Asymmetric thrust points were flown at 275, 225, 175 and 145 KTs. In all cases very little rudder was required, and only 4 degrees of sideslip maximum. At the slower speed a maximum of 6 degrees of rudder was required with max pwr on one engine and idle on the other using wings level. (No bank angle.)

F. Both pilots made 3 landings:
1. Gear, S.B., 20 degree flaps
2. Gear, S.B., 40 degree flaps
3. Gear, S.B.

Configuration 2 provided adequate drag for normal approaches. Configuration 1 or 3 provided adequate drag for single engine. Dave Manke preferred 120 KTs turn to final versus 130 KTs, requiring less time to slow down to 110 KTs. The stick forces were high during the flare partially due to lack of trim. This minimized the feel during the flare. (Cont'd on page 2)

Also nearly full elevator was used during the flare (approximately 30').
G. The increased pitch down moment caused us to run out of longitudinal trim at higher speeds (approximately 125 KTs).

IFTR.51

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE	2. SERIAL NUMBER
	T-46A	84-0492

file 4 OPS-1 Ofc

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION PER TEST CARD	i. FUEL LOAD 1140
b. PILOT HANSEN	f. INSTRUMENTATION NOT REQ'D	j. SURFACE WIND CALM
c. OBSERVER GAMBLE	g. START UP GR WT 8694	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.0/1438Z	h. START UP C G 18.77	l. GROUND BLOCK NOT REQ'D

4. TESTS PERFORMED

Combined DT&E OT&E sortie: Fast taxi, 100 KIAS rotation, 170 KIAS departure to 17,000; trim evaluation during climb 220 KIAS barrel roll and 4 G turns. Speed brake evaluation @ 270 KIAS, TP stalls, formation wing work and rejoins. RTB for ILS and (3) 1000' AGL overhead patterns.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Rapid rotation at 100 KIAS with forward stick movement required to prevent pitch overshoot. Insufficient trim rate at all speeds. Insufficient trim authority at low and high speeds.
Roll rates are excellent. Four G turns easy to do and comfortable with G suit inflated. Easy to maintain precise G load.
Speed brake pitching moment unacceptable through entire speed range. Exceptionally bad at high speeds. (Cont'd on p 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Takeoff rotation remains abrupt.
2. Stick grip/position much better with straight stick.
3. Formation visibility cross cockpit is very bad.
4. Speed brake pitching moment unacceptable.
5. Control harmony much improved.
6. Position of flap handle makes it very difficult to get to flap handle with throttles in idle.
7. Lack of nose up trim and elevator authority in flare with speed brake extended is unacceptable.
8. Numerous improvements since last time I flew.

(Continued from page 1 RESULTS OF TESTS)

Still no stall warning during stalls.
Definite G break and easily recoverable during nose low stalls. Would be very startling to student pilot.
Formation flying easy to do but very limited cross cockpit visibility. Lack of SAS during flight wasn't noticeable in very calm air.
Simulated single engine evaluation at 7500' MSL. Unable to maintain level flight on one engine with 115 KIAS. Gear, flaps and S/B. Raised S/B then flaps and found minimal improvement in performance.
Very stable during instrument approach. Landings with speed brake extended are unacceptable because you run out of nose up elevator authority in flare (engineering data indicated elevator deflection was within 3 degrees of full trailing edge up).

file 4-OPS-1
IFTR.52 DMC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1140
b. PILOT SHAWLER	f. INSTRUMENTATION PER CARD	j. SURFACE WIND CALM
c. OBSERVER MINK	g. START UP GR WT 8694	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.0/0817	h. START UP C G 18.77%	l. GROUND BLOCK

4. TESTS PERFORMED

Taxi (using brakes and nosewheel steering), takeoff, climb, barrel roll, 4 G turns, speed brake evaluation, 1 G configured stall, basic instrument maneuvers, simulated single engine maneuvering, and patterns and landings.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Climb rate at 200 KIAS was about 1500 feet/min. Barrel roll flown at 90% core and 220 KIAS entry speed went well and control harmony was good. Stick force per G in the 4 G turn felt compatible with past experience in the T-37. At 270 KIAS, the pitch down when the speed brake was extended was very noticeable, and a very heavy stick force was required to keep the pitch from decreasing. The buffet was acceptable and there was no pitch oscillation.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

Major Mink, ATC

1. Stick forces for the rotation seemed heavy (105 KT rotation), but no overshoot of desired pitch was observed even though rotation rates were high.
2. Stick forces during barrel roll, aileron roll, and 4 G turn felt comfortable.
3. Pitch down and stick force to counter speedbrake were very pronounced at 270 KIAS and 220 KIAS. In the pattern the forces were acceptable.
4. The instrument platform was very stable.
5. Simulated single engine was very controllable at 7500 MSL with one engine at idle and one at max with very small rudder inputs required.
6. All configurations in the pattern were controllable. However, very low power settings were required to slow from final turn to final approach airspeed. The speed brake alone and the speed brake with 40 degree flaps were controllable on a 4 degree glidepath. The 40 degree flaps only configuration was the hardest to slow to final speed.
7. Stick forces required for the flare were too heavy.
8. Elevator trim effectiveness at low speeds with the speed brake extended was inadequate.

(Continued from page 1, RESULTS OF TESTS)
Instrument maneuvers were very controllable. Near idle power was required at 10,000 MSL to descend at 1000 ft/min and 160 KIAS.
With one engine at idle and one at max at 7500 MSL, approximately 220 KIAS was maintainable.
With both engines at idle the following descent rates were observed:

(1)	Gear and speed brake	1600 ft/min
(2)	Gear, speedbrake and 20 deg flap	1800 ft/min
(3)	Gear, speedbrake and 40 deg flap	2000 ft/min

The configured 1 G stall with gear, speed brakes and 40 degree flaps was characterized by no warning, a definite G break and an abrupt right roll.

file 4-UPS-1
1FTR.54 DM

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION SEE BELOW *	i. FUEL LOAD 1140
b. PILOT BUSH	f. INSTRUMENTATION TM ONLY	j. SURFACE WIND CALM
c. OBSERVER MANKE	g. START UP GR WT 8694	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.0/1227L	h. START UP C G 18.32	l. GROUND BLOCK

4. TESTS PERFORMED

IOT&E evaluation
1) Takeoff - 95 KIAS rotation.
2) Climb to 10,000' MSL.
3) Contact - barrel rolls, 4 "G" turns, traffic pattern stalls.
4) Formation - wingwork (SAS off), rejoin.
5) Patterns and landings - (5) various configurations.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

* Configuration - One upper speedbrake (55 degrees)
New lap belt webbing

6. REMARKS *(Continue on reverse side if needed)*

Capt Manke, USAF

1. Takeoff - Actually used two hands to get the nosewheel off by 95 KIAS. Rotation rate still somewhat abrupt.

2. Climb to 10,000' MSL - Excellent handling. I noticed the decreased climb performance due to increased OAT (75 degrees). Elevator trim rate just slightly slower than optimum.

3. Contact - Barrel roll - Appropriate control harmony.
4 "G" turns - Appropriate stick force per "G".
Speed brake evaluation - Buffet tolerable to 270 KIAS. Pitchdown unacceptable even at approach speeds.
Effectiveness - Lost 15 Kts in 5 seconds at 270 KIAS. However, less effective at slower speeds.
Traffic pattern stalls - Abrupt rolloff. Random right and left.

4. Formation - (SAS off) - Wingwork - No problem but SAS outage noticeable when aircraft is disturbed.
Rejoin - No problem. Adequate visibility from either cockpit.

5. Patterns and landings -
a) G, SB, 40 deg (1000') Best pattern for configuration drag. Most difficult landing due to heavy stick forces in flare.
b) G, SB (1000') Flyable pattern and landing.
c) G, 40 deg (1000') Easiest landing, lightest forces.

Major Bush, USAF

Same as above plus additional patterns:

1. 1500' AGL, gear, speed brakes, 20% flaps;
Started from a normal base position with calm winds at 130 KIAS, reduced power to

(Continued on page 2)

(Continued from page 1)
idle beginning final turn and accelerated to 140 KIAS in final turn. Left power at idle until short (1/4 NM) final before slowing to 110 KIAS for final approach.
Moderate aft stick forces required to flare for landing.
Not enough drag.
2. 1500' AGL, gear, speed brakes, 40% flaps;
Same as above except only accelerated to 135 KIAS at idle power in final turn. Slowed to 110 KIAS at 1/2 NM on final. Excessive aft stick force required to flare for landing.
Still not enough drag.
Both landings touched down at 95 KIAS without reaching full aft stick.

File 4-OPS-1
IFTR.53 DMC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION SIDE SB'S DEACT	i. FUEL LOAD 1140
b. PILOT EDMONDSON	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER SCHULZ	g. START UP GR WT 8694	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.0/0956	h. START UP C G 18.77	l. GROUND BLOCK

4. TESTS PERFORMED

Ground operations, takeoff, departure, contact, instrument confidence maneuvers, simulated single engine evaluation, overhead patterns.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

The aircraft was easy to taxi although I did not evaluate very slow taxi speeds extensively. Takeoff rotation rate at 110 KIAS was rapid, resulting in overshooting the initial target attitude but was controllable with pilot compensation. The departure was easy to fly at 200 KIAS, and took approximately 5 minutes to climb to 10,000 feet MSL. Elevator trim rate at 200 KIAS and 10,000' MSL was satisfactory, but a little on the slow side.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Rapid rotation rate on takeoff resulted in abrupt takeoff.
2. Aircraft required approximately 5 minutes to climb to 10,000' MSL.
3. Speed brake deployment at any airspeed resulted in an unsatisfactory pitching moment.
4. No stall warning.
5. During a slightly high flare I had to use a large elevator deflection and a great deal of back pressure just prior to touchdown.

The barrel roll was easy to perform at 220 KIAS. Aileron forces were acceptably light. Overall control harmony was good. Control harmony was good in 4 G turns at 220 KIAS, but aircraft could not maintain level flight and 220 KIAS.
Nose down pitching moment during speed brake deployment at any airspeed between 120 KIAS and 270 KIAS was unsatisfactory. There was no stall warning during traffic pattern stalls. The landing attitude stall using 40 degree flaps broke to the right at 87 1/2 KIAS. Recovery was normal. Unusual attitudes on instruments were easy to recover from unless the speed brake was deployed (nose low recovery). Speed brake deployment required excessive back pressure on the stick to complete the recovery. Vertical "S" was easily performed maintaining a constant heading and using 94% core in the climb and 75% core in the descent. Aileron roll and wingover were also easy to perform.
Simulated single engine in a clean configuration with the right engine at max power and the left at idle, 200 KIAS, 7500' MSL, required very little rudder pressure (approximately 2 pounds) to eliminate all side slip. The aircraft would not maintain level flight in the P.A. configuration with 20 degree flaps at 110 KIAS. In this configuration, rudder forces were only slightly higher than clean at 200 KIAS (maybe 3 or 4 pounds). With both engines at idle, maintaining 110 KIAS, the following VVI readings were obtained for the indicated configurations.

VVI = 1700 fpm	Speed brake, gear
VVI = 2100 fpm	Speed brake, gear, 40 deg flaps
VVI = 1900 fpm	Speed brake, gear, 20 deg flaps

On the first pattern we flew initial at 250 KIAS, used 40 degrees of flaps, speed brake, 120 KIAS in the final turn and 110 KIAS on final. Except for the initial pitching moment on speed brake deployment, the pattern was easy to fly. However, the landing flare was slightly high and I had to use a large elevator deflection and great deal of back pressure during the flare. The next pattern was flown from a closed pullup to 1000' AGL with the same configurations and airspeeds except the speed brake was not used. Airspeed control was more difficult due to the low power settings. The same was true on the next pattern using speed brake but no flaps.
Aircraft control on the ground during the full stop was excellent.

file 4-0151
1FTR.SS DAC

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE	2. SERIAL NUMBER
	T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION	i. FUEL LOAD
b. PILOT MARTINEZ	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER CLINCH	g. START UP GR WT	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.2/1411	h. START UP C G	l. GROUND BLOCK

4. TESTS PERFORMED

T.O. rotation at 100 KIAS
Climb to FL 240
Aileron roll
Barrel roll
4 G turns
Speed brake eval (single top S.B.)
Formation rejoins (wing and lead)
Crossunders
Wing work
Simulated single engine slow flight
Touch and go's

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Extension of the single upper speed brake results in a large downward pitching force. However, the deceleration associated with the extension does not feel very great.
2. Simulated single engine slow flight flown at 7500 MSL with gear and speed brake. With 20 degree flaps and full power could maintain airspeed, altitude and about +/- 20 degree bank. With 40 degree flaps could not maintain level flight. (Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Rotation forces are relatively high.
2. Climb to 24 ft MSL at 170 KIAS took approximately 15 minutes and the acceleration to 220 took another 3-4 minutes.
3. Aileron roll rates are adequate though not startingly fast. Roll forces are lower than when I last flew in November and the control harmony is better.
4. Stick forces felt during the high G turns seemed reasonable.
5. The pitch down with speed brake extension is clearly objectionable.
6. Simulated single engine slow flight was easy to coordinate with only small rudder inputs. Could not hold altitude and airspeed with 40 degree flaps, gear and speed brakes.
7. Patterns and landings

a. 40 degree flaps and speed brakes - 1500 ft pattern. Flew a one half to three quarter mile final. Drag was adequate to reach and hold airspeed on final through more drag would have made the task easier.

b. 40 degree flaps, no speed brakes - 1500 ft pattern. One half to three quarter mile final. Drag clearly inadequate. Started turn at 125 KIAS, kept idle power until touchdown 2000 ft down runway at 100 KTs.

c. Speedbrake only - 1500 ft pattern. One mile to one and one quarter mile final. Drag clearly inadequate. Had to add power on short final but that was probably due to the pattern size rather than increased drag.

The effect of the asymmetric thrust could be eliminated with only small rudder inputs.

file 4-UPS-1
IFTR.56 DHK

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE	2. SERIAL NUMBER
	T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 FEB 86	e. CONFIGURATION SIDE SPD BRKS DEACT	i. FUEL LOAD 1140
b. PILOT BUSH	f. INSTRUMENTATION	j. SURFACE WIND CALM
c. OBSERVER SCHULZ	g. START UP GR WT 8694	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.0/1605Z	h. START UP C G 18.77	l. GROUND BLOCK

4. TESTS PERFORMED

Taxi at various speeds, takeoff, drift down, departure, contact, formation, HI-VOR teardrop penetration/VOR final, overhead patterns (2).

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Taxi characteristics at all speeds were excellent. Rapid pitch rate on takeoff rotation resulted in overshooting the initial target attitude, but was controllable with pilot compensation. Rotation velocity was 95 KIAS. The aircraft was easy to handle on the climbout at 170 KIAS. Pitch trim rate was the same as my previous flight. Aileron rolls and barrel rolls were easy to perform using 90% core RPM and 220 KIAS. Stick forces on 4 G turn felt about right.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Rotation rate (95 KIAS) was rapid.
2. Speed brake deployment at any airspeed resulted in an unsatisfactory pitching moment.
3. No stall warning.
4. Maintaining 250 KIAS during the penetration with speed brake deployed and 80% RPM core on both engines requires too low a pitch attitude.
5. Drag in the pattern with gear, speed brake, and flaps 20 degrees requires lower than optimum power settings.

Speed brake deployment resulted in the previously reported pitch moment (all airspeeds). The power on stall with 80% core rpm occured with no warning, but the aircraft was easy to recover. There was no warning on the landing attitude traffic pattern stall (speed brake, gear, 20 degree flaps) and the aircraft rolled to the right. Lack of stall warning resulted in too much back pressure on the recovery which led to a secondary stall that also broke to the right. I flew formation wing work with SAS on and off, and didn't notice much difference between the two modes. The aircraft did not have enough power to keep up with lead during the echelon turn and we fell behind. The turning rejoin to the right at 190 KIAS was relatively easy to perform. I tended to over compensate during wingwork.

On the recovery, we flew the HI-VOR teardrop penetration to a VOR final. We approached the initial approach fix at 150 KIAS, and after station passage, set the power on both engines to 80% core rpm, dropped the nose to 10 degrees low, and after approximately a 3000' altitude loss picked up 250 KIAS. At this point I deployed the speed brake and had to lower the nose to 14 degrees to 15 degrees nose low to maintain 250 KIAS. At 1000' above the first altitude restriction I closed the speed brake and cut the pitch in half. The airplane handled well throughout the rest of the approach except for speed brake deployment. Following the subsequent touch and go followed by a closed pattern to 1000' AGL, I flew a pattern using 20 degree flaps, speed brake, 130 KIAS in the final turn, and 110 KIAS on final. I rolled out somewhat high on final and had to keep the power at idle for the entire final approach through touchdown. The next pattern was flown the same way except I used 120 KIAS in the final turn and flew a normal contact glide path. This time the power was at idle for most of the final approach. Major Bush flew the last pattern using speed brake and 40 degree flaps from 1000' AGL. Power control was better due to increased drag.

Drift down data with 2 engines at idle from 8500' MSL taken on departure follows:

VVI = 1700	Gear and speed brake
VVI = 1900	Gear, speed brake and 20 deg flaps
VVI = 1900	Gear, speed brake and 40 deg flaps

IFTR.57 Revised

file 4 OPS-1

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 27 FEB 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER HANSEN	g. START UP GR WT 8731	k. WEATHER CLR VSBY 60 MI
d. SORTIE TIME/TO TIME 1.7 1652Z	h. START UP C G 17.03/16.58 MSN	l. GROUND BLOCK PER CARDS

4. TESTS PERFORMED

1. Preliminary flying qualities: 15000', 7500'
2. Vertical velocity measurements with aircraft in 3 configurations.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Speed stability evaluation revealed a 15 KT wide friction band.
2. Phugoids - appeared moderately damped.
3. Pitch doublets - (stick free/stick fixed) - were well damped with 1 overshoot.
4. Wind up turns to 4 G's - stick force at 4 G's was lighter in this configuration by 8 to 10 lbs over the previous configuration.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

1. Speed brakes 43 degrees upper, 35 degrees side.
2. New elevator push rod and bell crank to reduce stick forces approximately 18% at aft extremity of travel.
3. Aircraft was flown at most forward CG (14.19% gear up) possible.

(Continued from page 1)

RESULTS OF TESTS:

1 G stalls were performed in clean, PA flaps 20 degree and PA flaps 40 degree configurations.
Stall speeds were 93 KIAS, 85 KIAS, and 83 respectively.
Stick forces at stall in all cases appeared somewhat lighter (slightly) than previously.
The vertical velocity of the T-46A was measured with the aircraft configured as follows: (1) gear down, speed brakes out, (2) gear down, flaps 20 degrees, speed brakes deployed and (3) gear down, flaps 40 degrees, and speed brakes deployed. The sink rates obtained were 2000 fpm, 1600 fpm and 1935 fpm respectively (engines idle, 110 KIAS).
Approaches and landings were accomplished in the three following configurations: (1) gear down, speed brakes only, (2) PA configuration, flaps 20 degrees and (3) PA with flaps 40 degrees.
In configuration 2 very low power settings were required in order to slow from final turn to approach airspeed, and although in configurations 1 & 3 the power setting was also moderately low, the drag was considered adequate.

FTR.58

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4085-1

3. CONDITIONS RELATIVE TO TEST

a. DATE 28 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION P. FL. Q.	j. SURFACE WIND CALM
c. OBSERVER GAMBLE	g. START UP GR WT 8923	k. WEATHER SUPER
d. SORTIE TIME/TO TIME 1.8/0857	h. START UP C G 22.41	l. GROUND BLOCK YES

4. TESTS PERFORMED

Changes - aft of mid C.G. 22.41 to 20.53

A. Takeoffs - Normal 0 degree and 20 degree flaps
- Full aft stick 0 and 20 degree flaps

B. Wind up turns 275, 250, 225 KTs clean, 130 KTs PA

C. Speed stability 250, 200, and 150 KTs

(Continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

A. The forces were much lighter during takeoff and very reasonable. The nose could be raised earlier and generate more pitch rate with full aft stick. Normal takeoffs were good. Flap deflection did not make any difference.

B. Wind up turns required less force and were very desirable. The PA WUT generated good buffet and no "G" break.

C. Forces were higher in push than pull at the 250 KT point.

D. Stalls were the same as previous, but required less force. The clean stall was 93 KTs, 21 degrees AOA with a slight left roll off. The PA (20 degree flaps) was 87 KTs, 22 degrees AOA with a straight ahead break. The PA (40 degree flaps) was 84 KTs, 23 degrees AOA with right roll off.

E. The turn coordination required no rudder and only a slight aileron force.

F. Idle power descents:

Gear, S.B., 0 flaps	1,800-1,900 (37 sec/1000')
Gear, S.B., 20 flaps	1,700-1,800 (39 sec/1000')
Gear, S.B., 40 flaps	2,000 (30 sec/1000')

G. The landings were made with S.B., S.B with 20 degree flaps, and S.B. with 40 degree flaps. The drag was marginally adequate for all configurations, with the 40 degree flaps slightly better. The forces were much lighter during the flare with more longitudinal sensitivity caused by the aft C.G. This combination increased the pilot workload during the flare making landings more difficult.

(Continued form page 1, TESTS PERFORMED)

D. Stalls, clean and PA
E. Turn coordination 250, 200, 150 KTs
F. Idle power descents
G. Landings

IFTR 59

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4OPS-1

3. CONDITIONS RELATIVE TO TEST

a. DATE 28 FEB 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION	j. SURFACE WIND
c. OBSERVER MARTINEZ	g. START UP GR WT 8955	k. WEATHER CLEAR/CALM
d. SORTIE TIME/TO TIME 1.7 HRS/1302L	h. START UP C G 22.16 @ T.O.	l. GROUND BLOCK

4. TESTS PERFORMED

Maneuvering flight
Short period excitation
1 G stalls
Longitudinal static stability
Saw tooth descent performance
Saw tooth climb performance
Landings and takeoffs

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Configuration

Aft of mid center of gravity 22%
Increased elevator effectiveness FCD #0288
Speed brakes max deflection: Sides - 35 degrees, upper - 43 degrees

The purpose of this test was to evaluate the near aft limit handling qualities of the aircraft before proceeding to full aft limits testing early next week (3 March 86). (Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

During engine start, the left engine sounded as if light off occured, but there was no ITT rise on the cockpit gauge. Seconds later the left throttle was moved a few degrees above idle and a second light off sound was heard but this time there was a T 4.5 indication. Garrett engineers feel there was possibly a double start.

Takeoffs:

Initial takeoff was performed by initiating rotation at 95 KIAS. The forces to unstick the nose gear may be slightly less than before (FCD #0288) according to the data tapes, but subjectively the initial rotation force felt almost the same as before, that is still too high. Let me explain why I feel the forces are "too high". A significant force is required to start the nose up or get the nose tire off the runway, but virtually no force is required once it becomes unstuck and starts up. In fact, on two takeoffs I actually released all aft pressure from the stick immediately after "unstick" and the aircraft made an excellent unassisted takeoff by continuing to increase its pitch angle to about 5 degrees (nose up) and flying off the runway with virtually no pilot inputs to longitudinal control. This difference of forces is the problem. The difference must be accomodated by the pilot very quickly or an "abrupt pitch rate" ensues.

Stick force per G was evaluated by flying the aircraft in a maneuver called a wind-up-turn (WUT) which keeps airspeed constant but slowly increases the G level by actually descending into an ever tightening spiral. Subjectively, the stick forces felt slightly less than before but no significant change. The engineers estimate the stick force per G gradient (Fs/g) to have decreased from a previous 8 or 9 to 6 or 7 in this configuration. The forces were subjectively satisfactory before, and now at the lower level remain satisfactory. The short period was excited before each WUT and found to still be well damped as before.

(Continued on page 2)

(Continued from page 1)

The second objective was to evaluate the modified (FCD #0288) stick to elevator gearing "improvements" with particular attention on reducing forces for takeoff rotation.

(Continued from page 1, REMARKS)

Longitudinal static stability was evaluated by increasing and decreasing speed from a trimmed condition by pushing (the stick) into a dive and pulling into a climb. Results indicate the aft pull gradient to still be very shallow and the push to be somewhat better than the pull. I still think the pull gradient is too shallow and gives insufficient cues of force during a slowing down situation. The push force change is o.k. because of the "upspring" in the control system. How about adding a "downspring" to improve the pull forces? A spring is cheap, doesn't weigh much and can be tailored to get the right answer. If it is too expensive, or too heavy, recommend we turn the "upspring" into a "downspring". This will also have a side benefit of reducing the amount of the present bob weight, so the total effect could be less weight. Several constant airspeed climbs and descents were made between 7,000 feet and 8,000 feet. The purpose was to quantify the differences in drag due to the speed brakes and flaps. The descents were flown gear down, and idle thrust at 110 KIAS with approximately 500 lbs of fuel remaining.

SAW TOOTH
CLIMBS AND DESCENTS 8 TO 7M'

POWER	LANDING GEAR POSITION	FLAP POSITION (DEG)	SPEEDBRAKES SIDES 35 DEG UPPER 43 DEG	INDICATED VERTICAL VELOCITY (FPM)	TIME (SEC)
IDLE	DOWN	0	OUT	1900	41
IDLE	DOWN	20	OUT	2000	33
IDLE	DOWN	40	OUT	2200	30
MAX	DOWN	0	IN	1500	42
MAX	DOWN	20	IN	1500	44

Landings:
Drag for landing with speed brakes extended (sides 35 degrees, upper 43 degrees) was minimum satisfactory with no flaps or with 20 degree flaps. With 40 degree flaps the drag was satisfactory. The speed brakes at these reduced angles do not provide enough drag to make on speed approaches without making very large power corrections, frequently all the way to idle power. Large power reductions to decelerate in the pattern mean greater compensation is required by the pilot and more judgement is needed. A little more drag is needed than presently available with the speed brakes at 35 degree sides, and 43 degree upper extension. The actual landing in this configuration was surprisingly more difficult than previously. The flare and touchdown were extremely sensitive to the slightest aft pressure causing a ballooning reaction of the aircraft. This tendency is probably due to the increased longitudinal control and only aggravated by the aft C.G. situation. But if you can imagine the takeoff attitude requiring no stick force, you should not find it difficult to appreciate how light and delicate it was to land. This would definitely be too sensitive for a novice student pilot.

One G stalls were flown at 10,000 feet with approximately 550# of fuel. No noticeable differences were seen except the longitudinal stick forces were much lighter at stall than previously. In fact they were so light that it felt as if there may have been some stick force lightening near stall. The following cockpit indications were recorded at stall.

1 G STALLS

GEAR	FLAPS	SPEED BRAKES	STALL SPEED	AOA
UP	UP	IN	93 KIAS	23 DEG
DOWN	20 DEG	OUT	86 KIAS	24 DEG
DOWN	40 DEG	OUT	83 KIAS	23 DEG

1FTR.60 file 4 OPS-1 pic

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 3 MAR 86	e. CONFIGURATION AFT CG	i. FUEL LOAD 1280#
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 9028 (9000 AT T.O.)	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.7/2258Z	h. START UP C G 24.7%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

A. Aft C.G. takeoffs
B. Aft C.G. landings
C. Long. stability, 130 KIAS, P.A.
D. Fs/g @ 130, 225, 250, 275 KIAS
E. Speed stability @ 150, 200, 250 KIAS
F. 1g clean & P.A. stall approaches
G. Speed brake buffet 240 KIAS clean and 130 KIAS P.A.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Very light initial rotation force, then from 3° to 10° pitch required push force.
B. Extremely light flare forces. Flare by sight picture - no useable force feedback.
C. Well damped short period in P.A. configuration.
D. Fs/g very light-on the order of 4-5 lbs/g.

(Continued on Page 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Flight # 60F, Preliminary Flying Qualities, aft c.g.
B. All P.A. configurations with 20° flaps, 43° upper speed brake, 35° side brakes.
C. Ran out of nose down trim at about 165 KIAS (clean).
D. On rotations for takeoff, force was required for little more than nose strut extension, then the aircraft continues rapid rotation on its own, requiring about 4 lbs forward force to stop and hold the takeoff attitude. With accelereration, increasing forward force was required, eventually running out of nose down trim around 165 KIAS.
E. Stick force per g, while very light compared to many other airplanes, feels good to an experienced pilot with recent fighter experience, but is much too light for a student pilot.
F. Although the C.G. was still forward of the neutral point and the maneuver point, I recommend limiting the aft c.g. for operational use much further forward to stay away from the undesirable takeoff and landing characteristics seen on this flight.
G. This speed brake configuration requires near idle power around a final turn from a 1000 ft pattern, then idle for about 1/2 the final approach to reduce speed from 130 to 110 KIAS, then about 1/4 throttle to stabilize on final. More drag is needed for normal patterns.

(Continued from page 1, Results of Tests)

E. Very light Fs/knot gradient, with friction band masking 15-20 knots at trim point.
F. Very sharp g break with slight roll to left at 92 KIAS clean. Recovery was also very abrupt, with little overall change in pitch. P.A. configuration stall was similar, stalling at 86 KIAS with a slight roll to the right.
G. At 240 KIAS, speed brakes produced a moderate pitch down and considerable buffet which was tolerable, but characterized by pitch and yaw erratic excursions of a few degrees. Deceleration was not as much as one would want to feel, at least qualitatively. At 130 KIAS P.A. configuration, buffet was not a problem, pitching moment acceptable.

IFTR-6 Ops-1 Dec 4

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 4 MAR 86	e. CONFIGURATION FWD C.G.	i. FUEL LOAD 1160
b. PILOT SHAWLER	f. INSTRUMENTATION P.F.Q.	j. SURFACE WIND CLAM
c. OBSERVER HANSEN	g. START UP GR WT 8617	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.5/0948E	h. START UP C G 17.57	l. GROUND BLOCK CLEAR

4. TESTS PERFORMED

A. Speed brakes eval - 60° sides; top 43°

B. Maneuver block "A"; pitch & yaw doublets; sideslips & wind up turns (7500', 122Kts and 8400', 170Kts)

C. Maneuver block "B", bank to bank rolls; rudder rolls and decelerating turns.

D. Stalls with new stall strip (2 1/2" at station 54.75)

(Continued on Reverse)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. The side S.B.'s at 60° and the top at 43° provide good deceleration and a very small pitch down moment at 150Kts and below. The buffet is still unacceptable at high speeds.

B. The maneuver block "A" provided data - no problems qualitatively.

C. The maneuver block "B" provided data. The roll rate with rudder alone was very good, and the aircraft could be controlled without ailerons.

(Continued on reverse)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from page 1, TESTS PERFORMED)

E. Rate of descents - gear, S.B., 0° flaps; gear, S.B., 20° flaps; gear, side S.B 60°; 0 flaps; gear, side S.B. 60°, 20° flaps.
F. Landings - gear, side S.B. 60°, 0 flaps; gear, S.B. + 20° flaps.

(Continued from page 1, RESULTS OF TESTS)

D. The new stall strip did not provide adequate stall warning. The stall speed was increased approximately 5 knots and <u>all stalls were symmetrical</u>. With speed brakes extended and flaps 0, the aircraft stalled in the landing flare in the instant before touchdown at 13 degrees indicated AOA and 100 knots. This was repeated by both pilots and seemed unusual, but handling qualities were normal with pitch and yaw steady and controlled through touchdown and rollout. The stalls at altitude were approximately 18 degrees alpha and 96Kts for 0° flaps.
E. The rate of descents at idle were:

Gear, S.B. 0° flaps - 1670 F/M
" " 20 " - 1820 "
Gear, S.B., (sides 60° only) 1540 F/M
" " " " " , 20° flaps - 1670 F/M

F. The gear and 60° side S.B.'s provide adequate drag for a hydraulic failure landing. This configuration plus 20° flaps, and 43° upper provide adequate drag for a normal landing.

IFTR.62

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 4 MARCH 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT MARTINEZ	f. INSTRUMENTATION P.F.Q.	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8774	k. WEATHER CLEAR VSBY 50 MI
d. SORTIE TIME/TO TIME 1.7	h. START UP C G 16.97 GEAR DN 16.53 MSN	l. GROUND BLOCK

4. TESTS PERFORMED

1. Maneuver block "A" pitch 4 yaw doublets, sideslips and wind up turns @ 11,000' HP and 245 KIAS and FL 250 & 122 KIAS.
2. Maneuver block "B" bank to bank rolls, rudder rolls and decelerating turns at 11,000' HP and 245 KIAS and also at FL 250 and 122 KIAS.
3. Speed brakes eval.
4. Landings, with side speed brakes 60 degrees only and also with 20 deg flaps.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Maneuver block "A" data acquired.
2. Maneuver block "B" data provided good data, rudder only roll rate very good.
3. Landings - a. The gear and 60 degree S.B's provide adequate drag for the hydraulic failure situation.
   b. The PA configuration with 43 degree top and 60 degree side speed brakes provide adequate drag for normal landings.

(Continued below in REMARKS section)

6. REMARKS *(Continue on reverse side if needed)*

4. At FL 250 during a 30 degree bank to bank (rudder only) roll at 122 KIAS, a full rudder input resulted in a roll acceleration (roll rate 110 deg/sec) which was easily terminated by unloading the controls. (Angle of attack was 13 deg maximum).

REMARKS:

1. Speed brakes configured as follows:
Side speed brakes 60 degree deflection and top speed brakes 43 degree deflection.

Idle power descents @ 110 KIAS:

1. Gear, S.B., 0 deg flaps	1714 ft/min
2. Gear, S.B., 20 deg flaps	1875 ft/min
3. Gear, S.B., (side S.B. only)	1538 ft/min
4. Gear, S.B., (side S.B. only)	1579 ft/min

IFTR. 63

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 5 MAR 86	e. CONFIGURATION AFT C.G.	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER SHAWLER	g. START UP GR WT 8996 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.7/1731Z	h. START UP C G 24.99%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

A. 170 KIAS/15,000 Ft Phugoid - stick fixed and free
B. 170 KIAS/15,000 ft speed stability
C. Roll trim effectiveness
D. 122 KIAS/7,500 ft pitch/yaw doublets, sideslips, wind up turn, bank to bank rolls coordinated and uncoordinated, decelerating 2g turn to stall.

(continued on page 2)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Phugoid strongly convergent fixed and free.
B. Light stick force per knot gradient with about a 15 knot friction band, only one point due to trim limitations at aft c.g.
C. Lateral trim obtainable only at 130 KIAS and below. Rolled right at all higher speeds.
D. Short period dead beat at both 122 and 170 KIAS, fixed and free.

(Continued on page 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Fixed tabs installed at outboard wing trailing edges.
B. Stall strips removed.
C. Speed brakes set for 43 deg. upper and 35 deg. side.
D. One landing was made with intentional long flare. An 89 KIAS touchdown/ 15 deg indicated AOA was obtained with near full aft stick with no indications of stall or impending stall as had occurred previously with the 2 1/2 inch stall strips at wing stations 54.75. Landing stick forces were very light.
E. Accelerated stalls from wind up turns were characterized by mild erratic wing rocking of 1-2 degrees and light airframe buffeting 1-2 knots (constant G deceleration) or less than 1/10 g (increased G, constant airspeed) prior to g break, then a moderate but controllable roll, usually to the left but once to the right at the g-break.
F. Takeoff rotation required 6-10 lbs aft stick force until about 3 deg pitch, then zero force going to a 2 lb push from 3 to 10 deg takeoff pitch attitude. Apparently c.g.'s in the roughly 21-25% range are not suitable for "normal" takeoff rotation characteristics, but are easily handled with plenty of control authority for test purposes.
G. With the aft c.g., full nose down trim at maximum power resulted in a maximum trim speed of 163 KIAS. With a reduced thrust vector (thrust for level flight) the maximum trim speed was 174 KIAS. In the P.A. configuration, 100-110 KIAS range, neutral trim (T.O. trim light illuminated) provided zero stick forces.
H. In order to use normal, accepted flight test techniques, and to continue proper flight testing with meaningful results, it is essential that the aircraft trim system be modified as soon as possible to be able to at least trim to hands off longitudinally and laterally at one g in all configurations throughout the c.g. range and throughout the airspeed envelope.

(Continued from page 1, TESTS PERFORMED)

E. 170 KIAS/8,400 ft pitch/yaw doublets, sideslips, 360 deg rolls coordinated and uncoordinated, wind up turn, bank to bank 2g rolls coordinated and uncoordinated, bank to bank rudder rolls with and without damper, decelerating 2g turn to stall.

F. Qualitative formation eval.

(Continued from page 1, RESULTS OF TESTS)

D. Two overshoots with damper on at both 122 and 170 KIAS, damper off, 10 overshoots at 122 KIAS, 8 at 170 KIAS, phi/beta less than one. Sideslips nominal and linear, well within beta-q limits at full pedal at both speeds. Wind up turns show stick force per g around 6 lbs/g both speeds. No force lightening noted up to stall. Bank to bank rolls show forces and rates within spec. Damper off with 3/4 and full deflection stick slightly excited the Dutch roll resulting in obvious roll rate oscillations, particularly at 122 KIAS.

E. Nothing unusual noted in 2g bank to bank rolls except that at 3/4 and full stick coordinated rolls, the roll is complete too quickly to properly coordinate (ditto for aileron rolls).

F. G onset predictable, damping and Fs/g are absolutely excellent for formation flying in the 150-250 KIAS, 5-10,000 ft range evaluated. No PIO tendencies whatsoever even with intentional gross abrupt mishandling.

IFTR.64

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

file 4 OPS-1 PMC

3. CONDITIONS RELATIVE TO TEST

a. DATE 6 MAR 86	e. CONFIGURATION MID CG/SB'S 35 DEG/43 DEG	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION PERFORMANCE	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8866	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.8	h. START UP C G 19.58%	l. GROUND BLOCK -----

4. TESTS PERFORMED

Speed power performance at 7,500 ft, 110, 125 and 150 KIAS. Configurations included; clean, gear down, flaps 20 degrees and gear down with flaps 20 degrees.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Twelve points flown before the on board tape ran out. Quality of TM signal was not sufficient to continue data acquisition, mission terminated 10 to 15 minutes early. Points flown were very stable with the exception of #2 which had a significant altitude change during the 4 minute test period.

6. REMARKS *(Continue on reverse side if needed)*

IFTR.65

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 6 MAR 86	e. CONFIGURATION SEE #6	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION ATIS	j. SURFACE WIND 2308
c. OBSERVER SHAWLER	g. START UP GR WT 8866	k. WEATHER 50 SCATT 200 BKN 50
d. SORTIE TIME/TO TIME 1.7/1401L	h. START UP C G 19.58	l. GROUND BLOCK 30.01 79T 2180 PA

4. TESTS PERFORMED

Speed power at 10,000' PA.
120 KIAS; clean, gear down, flaps 20 degrees, gear and flaps 20 degrees.
170 KIAS; clean, gear down, flaps 20 degrees, gear and flaps 20 degrees.
200 KIAS; clean, gear down.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Turbulent at 7,500' PA so moved up to 10,000' PA.
120 KIAS points were not very stable.
170 KIAS points were better but still some turbulence.
200 KIAS gear down took slight descent at max power.
Ran out of nose down trim at 170 KIAS w/gear & flaps 20 degrees.

6. REMARKS *(Continue on reverse side if needed)*

Speed brakes Side 35 degrees.
Top 43 degrees.

IFTR.67

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 20 Mar 86	e. CONFIGURATION Clean	i. FUEL LOAD 1280 lbs
b. PILOT Hansen	f. INSTRUMENTATION Per TIS	j. SURFACE WIND Calm
c. OBSERVER Martinez	g. START UP GR WT 8890 lbs	k. WEATHER Clear
d. SORTIE TIME/TO TIME 2.0 hrs/2151Z	h. START UP C G 20.41%	l. GROUND BLOCK AITS

4. TESTS PERFORMED

A. Elevator trim evaluation
B. Aft nacelle pressure survey
C. 30 degrees flap evaluation

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Trim was adequate in all configurations down to 100 KIAS, and adequate in clean configuration up to 275 KIAS (current cleared flutter limit). Full nose down trim at that speed required about a 10 lb pull force, and full nose up trim required about 50 lbs of push force. Trim rate was not changed from previous tab, and with the 50% added tab span, the effect was faster, but not so fast that a "click" could not refine a hands off trim setting.

(continued on Pg 2)

6. REMARKS *(Continue on reverse side if needed)*

A. Configuration: Aft nacelle pressure survey instrumentation installed. Flaps set for mid = 20 deg, full = 30 deg. Speed brakes remain set for 43 deg upper, 35 deg side.

B. Initial left engine battery start with a 5 - 10 knot wind up the tailpipe resulted in a rapid lightoff/blowout/lightoff/blowout and the throttle was cut off. The right engine was started and appeared to start normally. With the right generator on line, the left engine was started, and this time started normally. Garrett is investigating tailwind start sensitivity and the possible relationship to starting with bleed air extraction on.

C. The yaw damper tripped off and was re-engaged several times taxiing out for takeoff. It was off for takeoff and was re-engaged in the climb. It tripped off again after several seconds and was left off until coming back into the traffic pattern. It remained engaged for six patterns, until the final landing rollout, when it tripped again. This has been seen on other flights, but does not repeat for several flights. The situation has never repeated during maintenance checks of the system.

D. The longitudinal trim feels about right, both in rate and adequacy, for the mid-c.g. Trim above 275 KIAS and forward and aft c.g.'s remain to be evaluated.

(Results of Tests continued)

B. Data were obtained at several speeds and power settings, both straight and level and in climbs and descents for the aft nacelle pressure survey. Results await software to read and plot the recorded data.

C. The 30 degree flap setting affords about 100 ft/min better descent rate in idle, gear and speeds brakes extended, at 110 KIAS, than with 0 flaps or 20 degrees flaps. Glide path and airspeed control in the traffic pattern was noticeably easier. 1g stalls with 0 (92.5 KIAS stall) and 20 (89 KIAS stall) deg flaps were characterized by a straight ahead g-break with no warning. 30 deg flaps produced about a 30-40 Hz very light airframe buffet when extended, and 2 or 3 knots above the stall, a discernable lower frequency (5-15 Hz) airframe buffet could be felt in addition to the flap buffet. The amplitude increased slightly approaching the stall, which occurred at 84.5 KIAS with a g-break and abrupt roll to the left. The stall and left roll were about the same as seen previously with 40 deg flaps. A second 30 deg flap stall with speed brakes retracted showed identical characteristics, with the stall occuring at 85 KIAS. Gross weight during the stalls was about 8250 lbs.

Revised IFTR.68

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4OPS-1

3. CONDITIONS RELATIVE TO TEST

a. DATE 21 MAR 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1140
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8920	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.3	h. START UP C G 24.89 (T.O.) 24.46 MSN	l. GROUND BLOCK

4. TESTS PERFORMED

A. Elevator trim evaluation

B. Aft nacelle pressure survey

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Adequate trim in all configurations. In clean configuration trim was available to within 1 kt of stall and in PA configuration pilot was able to trim to stall. At 276 KIAS a full nose down trim setting produced an .8 to 1.0 lb pull force and full nose up trim required a 50 lb push force.

B. Pressure survey data obtained at .3M, .4M and .5M at F.L. 150 & F.L. 200.

6. REMARKS *(Continue on reverse side if needed)*

A. Configuration: Ballasted for full aft C.G.; flap positions 20° & 30° available speed brakes 43° upper and 35° side maximum extension.

IFTR.69

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492 file 4 OPS-1

3. CONDITIONS RELATIVE TO TEST

a. DATE 24 MAR 86	e. CONFIGURATION SEE ITEM 6	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION FLUTTER	j. SURFACE WIND 270/03
c. OBSERVER SHAWLER	g. START UP GR WT 8896	k. WEATHER CLR 30
d. SORTIE TIME/TO TIME 1.3/0959L	h. START UP C G 20.63	l. GROUND BLOCK 30.08 T 66 PA 2155

4. TESTS PERFORMED

1. Flutter functional check at 11,5000 feet MSL, 270 KIAS
2. Qualitative evaluation of longitudinal trim

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Flutter system frequency stability was improved. Desired frequencies were easier to set. Although frequency stability was better, drift off of set frequencies seemed to be random at different frequencies, i.e. some were stable (+/- .04 Hz) some drifted up (+1.5 Hz) some drifted down (-1.5 Hz). Preliminary engineering review indicates that the overall instability (is greater than .05 Hz and is not acceptable to proceed to Phase II flutter

(Continued on reverse)

6. REMARKS *(Continue on reverse side if needed)*

Configuration

A. Flutter System: No changes were made to the flutter excitation system prior to this flight.

B. Flutter procedures: Flutter system operation was modified in two ways; a) System was run at low frequency before and between test points to keep hydraulic fluid temperatures constant in an effort to enhance frequency stability. b) A manual adjustment to the frequency sweep mode was conducted in an effort to provide a longer time sweep through specific frequency ranges.

C. Speed brakes: Side 35°; Top 43°

D. Flaps: half 20°; full 30°

E. Longitudinal trim tab: 50% span increase

tests. Manual adjustments to the sweep mode appeared to increase the time span in desired frequency ranges. However these adjustments were very difficult for the pilot to accomplish accurately and did not always achieve desired results. The technical quality of the data obtained was unknown at the time of the debriefing.

B. Longitudinal trim was qualitatively evaluated in an airspeed range from 270 KIAS to 110 KIAS. Trim was effective in reducing forces to zero at all speeds in the range both in clean and PA configurations. Trim rate was adequate to keep up with all speed changes associated configuration changes.

ENGINEERING COMMENTS

Based on preliminary quick look data the flutter excitation system displayed an apparent increase in stability for those frequency bursts above 40 Hz. Frequency excursions of up to 0.6 Hz were evident in those frequency bursts below 40 Hz. These excursions are well outside the required CTF/EN tolerance of +/- 0.05 Hz for system stability. Near real time auto spectra plots indicate that the cockpit frequency meter was off the auto spectra center frequency by as much as 1 Hz. The frequency drift with respect to time is difficult to define quantitatively until a time correlation with frequency plot can be generated.

The right wing structural response problem was not addressed during this sortie because the new larger vane had not yet been installed.

The flutter vane cutoff point problem was not addressed because the new vane position indicator parameter was not available in the control room.

The manual override of the automatic sweep mode to effectively reduce the sweep rate between two arbitrary frequency units did not appear effective where it was most needed. That is, between 29 and 35 Hz. This is because the pilot had to start out with a slow sweep to avoid overshooting the target frequency band. However, further analysis is required to quantify the effectiveness of this technique.

IFTR-70

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4OPS-1 DK

3. CONDITIONS RELATIVE TO TEST

a. DATE 25 MAR 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1280
b. PILOT MARTINEZ	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER EDMONDSON	g. START UP GR WT 8822	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.6	h. START UP C G 17.38 GEAR DOWN 16.9 MSN	l. GROUND BLOCK CLEAR

4. TESTS PERFORMED

A. Lateral trim authority evaluation
B. Elevator trim tab effectiveness
C. Stick free doublets, with aircraft in; 1) Clean configuration; 2) With gear extended; 3) with gear and 20° flaps; 4) With gear and speed brakes extended and 5) In P.A. Configuration (20° flaps).

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Lateral trim data obtained (See table reverse side)
B. Elevator trim tab effectiveness data obtained. The aircraft could be trimmed to 115 KIAS in the clean configuration and 113 KIAS in the P.A. configuration
C. The stick free doublets performed in the five previously described configurations were heavily damped.
D. Touch and go landings were performed in P.A. and clean configurations at the

Continued on reverse

6. REMARKS *(Continue on reverse side if needed)*

A. Aircraft ballasted to forward C.G. configuration of 17.38 gear down; 16.9 mission and max forward of 14.6 with 150 lbs of fuel remaining.
B. Installed wing tip trim tabs; left 12.5° TED; Right 12.5° TEU
Reset right spring tab 1.7° TEU
Aileron fixed tab angles reset to 8.5° TEU.

forward C.G. condition. The nose wheel could be held off until the airspeed decayed below 85 Kts. In "take off" configuration pull forces of between 25 to 30 lbs were recorded.

LATERAL TRIM EVALUATION

SPEED	LEFT TRIM	RIGHT TRIM
110° KIAS	10 SEC to 30° angle of bank	25 SEC to 30° angle of bank (LEFT)
125	12 SEC to 30° angle of bank	15° in 15 seconds (LEFT)
150	14 " " " " " " " " "	10° in 15 SECONDS (LEFT)
170	15 " " " " " " " " "	9° in 15 SECONDS (LEFT)
200	10 " " " " " " " " "	12° in 15 SECONDS (LEFT)
225	6 " " " " " " " " "	20° in 15 SECONDS (LEFT)
250	4 " " " " " " " " "	30° in 13 SECONDS (LEFT)
275	3 " " " " " " " " "	30° in 7 SECONDS (LEFT)

NOTE: In all instances the airctaft rolled left regardless of trim setting.

IFTR 71 mgr

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492 file 4 OPS-7 DHC

3. CONDITIONS RELATIVE TO TEST

a. DATE 26 MAR 86	e. CONFIGURATION SEE #6	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION ATIS	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8936	k. WEATHER CIR LOT
d. SORTIE TIME/TO TIME 1.7/0631L	h. START UP C G 19.69	l. GROUND BLOCK 30.10 41T 2140PA

4. TESTS PERFORMED

Pitot static calibration by tower fly by
Speeds: 200, 225, 250, 275, 175, 150, 125, 110 KIAS, clean.
140, 120, 110 KIAS; PA
150, 125, 110 KIAS; gear down

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Air was calm 200 KIAS pt slight deceleration
250 KIAS pt slight acceleration
All other pts stable
All pts level no climb or dive
Repeated 275 KIAS pt at test controllers request

6. REMARKS *(Continue on reverse side if needed)*

Configuration
Production pitot tubes oriented -7° with body axis. Pitot heat was on. Speed brakes: Top 43°, sides 35°
Brakes: Slight left drag immediately after landing. Within 2 minutes it was back to normal w/no drag and tracking straight.
ILS: Course indicator was varying irratically up to 4° from centered w/ aircraft tracking straight down runway centerline on final. TWR confirmed good ILS monitor.
Lateral Trim: Level at 4300' MSL and 200 KIAS with full left trim, no force was required but when stick was released aircraft rolled right very slowly, less than 1° per second. Not normally noticeable with hands on the controls.
Lap Belt: The webbing adjustment mechanism on the left side of the lap belt, both seats, is in close proximity to the emergency restraint release handle and the survival kit attachment buckle. These three items are typically in contact when seated in a normal position with survival kit straps, harness, and lap belt adjusted normally. The webbing adjustment mechanism is positioned so as to interfere with the activation of the emergency restraint release handle should the need arise in an ejection seat malfunction situation.
Tower Fly-by Data: Data were acquired at the tower for each pass. Data should be useable for pitot-static calibrations. Data will probably not be useable for determination of the total air temperature probe recovery factors due to the rapid temperature rise observed at the tower during the flight.

File 4 OPS-1
IFTR. 72

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 27 MAR 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1140 LBS
b. PILOT LT GEN MCMULLEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND CALM
c. OBSERVER LTC EDMONDSON	g. START UP GR WT 8754 LBS	k. WEATHER CLEAR
d. SORTIE TIME/TO TIME 1.1 HRS/0013 Z	h. START UP C G 19.98	l. GROUND BLOCK YES

4. TESTS PERFORMED

Takeoff at 100 KIAS
Climb at 170 KIAS to 10M feet
Airwork

Formation	Accelerated stalls	Lazy eight
1 G stalls	3 G turns	Chandelle
Slow flight	Aileron rolls	Barrel roll (Cont'd in REMARKS)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

During the debriefing Gen McMullen commented favorably about the mission. The following are first hand interpretations of discussions immediately following the flights. (He flew both the T-46 and T-37 the same afternoon.)

A. Wheel brakes and nosewheel steering were good.
B. The takeoff was "different" (than most others he had flown) but it could be handled. (Compensation by the pilot is required.)
(Continued in REMARKS section)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from TESTS PERFORMED section)

Recovery
ILS straight in
Touch and go landings
Closed patterns
Full stop landing

(Continued from RESULTS OF TESTS)

C. Acceleration to climb speed was "straight forward."
D. Thrust performance (engine acceleration) was somewhat slow during formation but attributed this mostly to fan characteristics of this type engine.
E. Stall seemed super, had very little roll and self recovering but there was no stall warning and warning must be added.
F. Handled well in the wind-up turns (stick force per G was good).
G. Aileron forces were a little heavy.
H. Outside visibility was good.
I. Control harmony was fairly good but aileron forces a little heavy.
J. Aircraft seemed to stay where you put it (good stability).
K. Trim change with gear - noticeable, flaps - negligible, speed brakes - large.
L. Landings were easy.
M. Cockpit environment very good and flight instrument layout super.
N. Throttle friction much too heavy.

file 4-OPS-1
TF-TR.73

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 28 MAR 86	e. CONFIGURATION CLEAN	i. FUEL LOAD 1140 LBS
b. PILOT REP BEVERLY BYRON	f. INSTRUMENTATION PER TIS	j. SURFACE WIND GUSTY
c. OBSERVER LTC EDMONDSON	g. START UP GR WT 8694	k. WEATHER CLOUDY
d. SORTIE TIME/TO TIME 0.6 HRS/2135 Z	h. START UP C G 20.75	l. GROUND BLOCK YES

4. TESTS PERFORMED

VIP Demonstration profile.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

Mission was shortened due to limited time available. Mrs Byron appeared to enjoy her flight in the T-37 as well as the T-46. She said the difference between the two cockpits was incredible, the T-46 being so spacious with a lot less noise and it was cool. She commented the ACES II seat was much more comfortable and visibility was excellent. She stated there was obvious big improvements over the T-37 in all areas.

mE IFTR.74 file 4-OPS-1 AHR

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 31 MAR 86	e. CONFIGURATION	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION PREL. H.Q.	j. SURFACE WIND
c. OBSERVER HANSEN	g. START UP GR WT 9025	k. WEATHER
d. SORTIE TIME/TO TIME 1.7/1346	h. START UP C G 24.77	l. GROUND BLOCK

4. TESTS PERFORMED

A. Wind up turns; CR 275, 250, 225; PA 130
B. Speed stability; CR 250, 200, 150; gear/flaps 135
C. Trim to stall; CR and PA
D. Elevator trim tab effectiveness; CR 110, 125, 150, 200, 250, 275; PA 110, 130 & 150
E. Landings/touch and go's (Continued in REMARKS section)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. The stick force per G was acceptably light with no apparent change from a qualitative sense from the previous aft C.G. The P.A. configuration to stall was the same with large buffet just prior to stall.
B. The speed stability points showed no change qualitatively.
C. The trim is effective down to 1 knot above stall at CR and 2 knots above stall at PA. (Ideal condition).
(Continued in REMARKS section)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from TESTS PERFORMED)
Changes prior to flight:
Bobweight spring removed
Full aft C.G.
Speed brakes same: 43 deg upper, 35 deg sides
Flaps 20 degrees
No changes to lateral system
(Continued from RESULTS OF TESTS)
D. The trim is adequate throughout the speed range of 110-275 KTs, but the limit is reached at 275 KTs, with nothing left. This is the same condition as the previous aft C.G. flight. (No change with the bobweight spring removed).
E. Five landings were made with no difficulty at this aft C.G. The forces were rather light, but acceptable. Two takeoffs were made with neutral trim and two with trim for flare. All were acceptable with good forces to rotate and zero force after rotation. The neutral trim was the best.
F. The lateral trim is still not effective requiring full left trim at all speeds above 130 KTs and not enough at some speeds but close. Below 130 KTs it requires less than full left trim.
G. An instrumentation problem was found during the flight on longitudinal stick forces. This data was suspect and being investigated.

IFTR.75 Revised

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 4 APR 86	e. CONFIGURATION CLEAN, AFT C.G.	i. FUEL LOAD 1280 LBS
b. PILOT HANSEN	f. INSTRUMENTATION PER TIS	j. SURFACE WIND 230/06
c. OBSERVER MINK	g. START UP GR WT 9090 LBS	k. WEATHER CLEAR 20+
d. SORTIE TIME/TO TIME 1.7/2100Z	h. START UP C G 24.6%	l. GROUND BLOCK PER TEST CARD

4. TESTS PERFORMED

A. Pressure survey
B. Speed stability
C. Fs/g up to Nz or alpha limit
D. Trim evaluation

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

A. Inlet pressure survey taken: Data at 15,000, 20,000 ft.
B. Speed stability is positive but light, seems lighter slowing down from trim speed than when accelerating. Used stable point method.
C. Stick force per G is light at aft C.G. but acceptable. No force lightening noted until G break at stall.
D. Longitudinal trim was adequate down to 3 to 4 knots above the stall in clean and P.A. configurations at the aft C.G. (Continued in REMARKS section)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from RESULTS OF TESTS)
Full nose up trim at 275 KIAS requires about 50 lbs push to maintain straight and level. Full nose down trim at all speeds was no worse than a 10-15 lb pull. Lateral trim required full left trim beginning at 120 KIAS both clean and P.A. Above 120 KIAS, there was insufficient lateral trim to balance the aircraft. Below 120 KIAS, less than full left trim was required.

REMARKS:
A. Takeoff rotations required considerable aft stick force and position to attain rotation at 90 KIAS, then abruptly changed to a slight push when passing about 3 deg pitch attitude to control the rate up to the 10 deg takeoff attitude.
B. Pitch forces in landing are very light, with a slight ballooning tendency. On the full stop landing without flaps, the nose was held in the landing attitude with elevator down to 59 KIAS, when it dropped gradually and fairly gently.
C. There will be no more IFTR's from Major (Mr.) Hansen. It's been a pleasure. Good luck with the program: Strive for no less than an outstanding product. Call me at Boeing/Seattle.

MDE IFTR. 76

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	file 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 8 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1190
b. PILOT MARTINEZ	f. INSTRUMENTATION N/A	j. SURFACE WIND 2308/11
c. OBSERVER CAMPANO	g. START UP GR WT 9030	k. WEATHER 40 SCT 40
d. SORTIE TIME/TO TIME 1558/1.6	h. START UP C G 24.13	l. GROUND BLOCK YES

4. TESTS PERFORMED

1. Pressure survey
2. Speed stability
3. Stick force/G (wind up turns)
4. OT&E landings with full aft C.G.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

1. Inlet pressure survey data obtained at flight levels 150 and 200.
2. Speed stability is positive.
3. Stick force/G is light but acceptable.
4. Takeoffs & landings performed by Major Campano in wind conditions of 10 KTs gusting to 15 Kts with an 8 KT crosswind component, indicated a slightly higher degree of concentration required with the full aft C.G. configurtion.

(Continued in REMARKS section)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from RESULTS OF TESTS section)

Initial takeoff rotation with aft C.G. required quicker release of back stick pressure than normal takeoff. Pilot slightly overshot target climbout pitch attitude.

REMARKS

1. Aircraft could be trimmed laterally from 110 KIAS up to Vmax (275 KIAS).
2. Configuration: Full aft C.G., bob weight spring re-installed.

IFTR.77 mjE

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 9 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT BUSH	f. INSTRUMENTATION N/A	j. SURFACE WIND 050/03
c. OBSERVER CLINCH	g. START UP GR WT 8881	k. WEATHER CLR 35
d. SORTIE TIME/TO TIME 1.8/1135	h. START UP C G 16.68	l. GROUND BLOCK YES

4. TESTS PERFORMED

1. Wind up turn @ 15 K' 275, 250, 225 KIAS to 3.8 G; 130 KIAS PA to 2.5 G.
2. Pressure survey @ 15 K' 150, 200, 250 KIAS and split power at 175 KIAS.
3. Pressure survey @ 20 K' 135, 180, 225 KIAS and split power at 175 KIAS.
4. Speed stability @ 15 K' 250 (+25, -35) KIAS
   200 (+/-35) KIAS
   150 (+/-25) KIAS (Continued in REMARKS section)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

All test points complete.
Items 2 and 3 (TESTS PERFORMED), split power pressure survey points were at 5 power settings between idle and max on the left engine with the right engine used as required to maintain 175 KIAS.
Item 4, friction band was approximately +/- 12 KIAS at 250 KIAS, +/- 10 KIAS at 200 KIAS, +/- 7 KIAS at 150 KIAS, and +/- 5 KIAS at 125 KIAS (PA).
Item 5, min trim speed: Clean 122 KIAS, PA 117 KIAS. (Continued in REMARKS)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from TESTS PERFORMED section)
125 (+/-15) KIAS, PA.

5. Minumum trim speed clean and PA @ 15 K'.
6. Trim power @ 15 K' 110, 125, 150, 200, 250 KIAS.
   110, 130, 150 KIAS, PA.

(Continued from RESULTS OF TESTS)
Item 6, excessively heavy push forces with full nose up trim at 250 KIAS, approximately 30-40 pounds.

REMARKS
1. Very heavy stick forces for flare and takeoff on touch and go landing. Almost couldn't hold the nose in the landing attitude.

IFTR-78 MDE

INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

file 4 OPS-1 DK

3. CONDITIONS RELATIVE TO TEST

a. DATE 10 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION N/A	j. SURFACE WIND 250/01
c. OBSERVER MANKE	g. START UP GR WT 8835	k. WEATHER OVC/15
d. SORTIE TIME/TO TIME 1.7/0935	h. START UP C G 17.69 (FWD)	l. GROUND BLOCK YES

4. TESTS PERFORMED

A. WUT's at 275, 250 & 225 CR and 130 KTs PA.
B. Minumum airspeed trim check.
C. Elevator trim tab effectiveness: CR 110, 125, 150, 200, 250 & 268 KTS; PA 110, 130 & 150 KTs.
D. Speed stability: CR 250, 200 & 150 KTs; PA 125 KTs.
(Continued in REMARKS)

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Configuration change: Bob weight spring removed.
RESULTS:
A. WUT's - Good, reasonable forces. PA WUT resulted in heavy buffet prior to stall.
B. Minimum airspeed was approximately 120 KTs in CR with (PLF) power for level flight. Stall was 90 KTs straight ahead. For PA the speed was 112 KTs also PLF.
(Continued in REMARKS)

6. REMARKS *(Continue on reverse side if needed)*

(Continued from TESTS PERFORMED)
E. Landings with FWD C.G. (IOT&E).

(Continued from RESULTS OF TESTS)
C. Trim effectiveness data was acquired. Not enough trim at 110 KTs CR, but rest of the points were O.K.
D. Speed stability points were flown at 11,000 ft due to turbulence and clouds. Positive, but shallow slope in all cases.
E. Landings: 2 by Shawler.
Forces a little higher than desired but acceptable for both flare and for takeoff rotation. One landing was made with landing gear only requiring the complete pattern to be at idle.
CAPT MANKE:
Taxi: No veering tendencies while using nosewheel steering or brakes.
Takeoff: Desired pitch attitudes easily captured on 100-105 KT rotations. Rotations below 95 KTs required heavier stick inputs which caused a more rapid pitch change and a tendency to overshoot desired pitch attitude.
Landing: 4 by Manke (2 - SB, 20 deg flaps) (2 - SB only).
Stick forces in flare slightly higher than normal due to forward C.G. Using a shallower final and a later power reduction technique seems to improve landing characteristics.

IFTR 29/03E

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4 OPS-1 SHL

3. CONDITIONS RELATIVE TO TEST

a. DATE 11 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION N/A	j. SURFACE WIND CALM
c. OBSERVER MARTINEZ	g. START UP GR WT 8945	k. WEATHER 200 SCT/25
d. SORTIE TIME/TO TIME 0.4/0703 L	h. START UP C G 20.04	l. GROUND BLOCK YES

4. TESTS PERFORMED

MISSION AIR ABORTED DUE TO TEST INSTRUMENTATION FAILURE JUST AFTER LEVEL OFF.

NO TEST POINTS ACCOMPLISHED.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

MDE | FTR 80

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 11 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT EDMONDSON	f. INSTRUMENTATION N/A	j. SURFACE WIND 150/01 (CALM)
c. OBSERVER MARTINEZ	g. START UP GR WT 8945	k. WEATHER 200 BKN/25
d. SORTIE TIME/TO TIME 2.0/0950 L	h. START UP C G 20.04	l. GROUND BLOCK YES

4. TESTS PERFORMED

Speed power performance:
Two engine clean configuration 5,000 ft @ 110, 120, 150, 175 and 275 KIAS.
Single engine clean configuration 10,000 ft @ 150, 130, 120, 110, 170, 180, 200 and 225 KIAS.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

Mission was 100% successful. All planned test points were flown and quality data were obtained.

6. REMARKS *(Continue on reverse side if needed)*

The following cockpit instrument readings were recorded at each test point (9.0 two engine and 10.0 single engine).

TEST POINT	AIM AIR-SPEED	START AIR-SPEED	FINAL AIR-SPEED	START ALT	FINAL ALT
9.1	110	110.5	109	5,020	5,000
9.2	120	119	119	5,075	5,025
9.3	150	149	148.5	5,050	4,920
9.4	175	174	175	5,010	5,000
9.5	200	200	201	5,025	5,010
9.6	275	---	---	---	---
10.1	140	146	144	9,975	9,980
10.2	130	130	130	10,020	10,100
10.3	120	123	119	9,970	9,900
10.4	110	110	110	9,960	10,040
10.5	170	161	162.5	10,050	10,050
10.6	180	180	181	9,400	9,520
10.7	200	200	200	8,600	7,775
10.8	225	225	225	6,800	5,300

(CONTINUED ON PAGE 2)

TEST POINT	N1 SPEED LEFT	N1 SPEED RIGHT	N2 SPEED LEFT	N2 SPEED RIGHT	T 4.5 LEFT	T 4.5 RIGHT	FUEL
9.1	60	62	84	84	540	540	1180
9.2	57	60	83	83	545	530	1130
9.3	59	60	83.5	83.5	545	535	1090
9.4	64	65	86.5	86.0	560	560	1050
9.5	70	71	89	88.5	590	590	1000
9.6	--	--	--	--	---	---	----
10.1	81.5	14	94	0	675	100	800
10.2	82	12	94.5	0	680	100	720
10.3	79	12	93.5	0	660	100	750
10.4	82	12	94.5	0	680	100	680
10.5	86	14	96.5	0	715	140	860
10.6	90	--	98.5	--	752	---	620
10.7	90	--	98.5	--	752	---	465
10.8	89.5	--	98.5	--	750	---	500

After the single engine test points were completed, an airstart of the right engine was accomplished at 170 KIAS, 6500 ft. The airstart took 20 sec. and the peak T 4.5 temperature was 720 degrees C.

File 4-OPS-1
IFT 83

INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

a. DATE 15 APR 86	e. CONFIGURATION PER TIS	i. FUEL LOAD 1280
b. PILOT SHAWLER	f. INSTRUMENTATION N/A	j. SURFACE WIND 230/06
c. OBSERVER SCHULZ	g. START UP GR WT 8934	k. WEATHER 100 SCT/50
d. SORTIE TIME/TO TIME 1.9/1027	h. START UP C G 20.17	l. GROUND BLOCK YES

4. TESTS PERFORMED

A. Speed power PTS = S.B. - (43 deg/60 deg) 150K; S.B. & gear 150K; single eng, GR 150K; GR, 200K; single eng, GR; 110, 120, 130 & 150K; CR, 110K & 275K.
B. IOT&E Eval: Elevator trim 15,000'; 200K; speed brake eval 150, 200 & 250K; takeoffs and landings; and aux landing gear.
C. Airstarts
Configuration this flight: Speed brakes 43 deg/60 deg.

5. RESULTS OF TESTS *(Continue on reverse side if needed)*

6. REMARKS *(Continue on reverse side if needed)*

A. All speed power points completed. All 5,000 ft and 7,500 ft were changed to 10,000 ft due to turbulence. This completes the planned single engine drag tests.
B. The drag for normal landing was clearly adequate. (Shawler)
C. Two airstarts were made, one on each engine in auto mode at 150K 10,000 ft and 150K 12,000 ft. Both normal.

OT&E (Schulz)

On the takeoffs (3) I set a comfortable back pressure on the stick at approximately 95 KIAS and held a fixed stick position. The nose came up at approximately 110 KIAS. Rotation rate was rapid. I did not attempt to make any pitch corrections for the liftoff, which was slightly steep.

Single engine handling characteristics at 10,000' and clean were very good. Very little rudder pressure was required to maintain coordinated flight with the running engine at military power. Speed brake deployment at 15,000 feet, 250 KIAS and 200 KIAS (60 deg sides and 43 deg top) resulted in excessive buffet. Buffet at 150 KIAS was not too bad.

Aux gear extension seemed slow, but the configuration rate should not be a problem in an emergency if the pilot plans for it. There was a slight pitch down when the two side speed brakes were extended. On the straight in approach with side speed brakes, gear, and no flaps handling qualities were good. I turned off the SAS on a 1 mile final in light turbulence and didn't notice any difference in aircraft performance. I also flew a normal overhead pattern at 1500 feet AGL with SAS on as well as a normal overhead pattern at 1000 feet AGL with the SAS off and noticed no difference in performance.

During the flight, the gear handle warning light was difficult to see because of the translucent handle. The magnetic compass was also difficult to see. This problem should be remedied when the test instrumentation is removed if the panel between the glare shield and the magnetic compass lies flat.

Flt 84

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
G7044	84F	22 APR 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
MARTINEZ	1280	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
BUSH	8980/19.51	CLEAR
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1350/1.4	FLUTT SYST INST	WINDS 230 15 G 25
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
N83 TB (T-33)	EDMONDSON/PHOTO	1350/1.4

4. PURPOSE OF FLIGHT/TEST POINTS

1. Flutter system checkout flight.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

Flew total of 14 test points prior to hydraulic failure caused by massive leak. Aborted mission and returned to base.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM MAR 84 365 PREVIOUS EDITION IS OBSOLETE

1FTR85

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

File 4-OPS-1 DFE

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO PACE/G0601	B. FLIGHT NO/DATA POINTS 85/PER TIS	C. DATE 25 APR 86
D. FRONT COCKPIT *(Left Seat)* SHAWLER	E. FUEL LOAD 1280	F. JON 2591AO
G. REAR COCKPIT *(Right Seat)* EDMONDSON	H. START UP GR WT/CG 8937/20.05	I. WEATHER 100 SCT
J. TO TIME/SORTIE TIME 0932/1.6	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 250/09
M. CHASE ACFT/SERIAL NO T-33/83 TB	N. CHASE CREW MARTINEZ/BROWN	O. CHASE TO TIME/SORTIE TIME 0932/1.6

4. PURPOSE OF FLIGHT/TEST POINTS

	GROUND BLOCK TIME	LEFT	RIGHT	T-33
RAMP	0909	2230	2270	--
RUNWAY - TAKEOFF	0928	2230	2270	--

(Cont'd p. 2)

5. RESULTS OF TESTS *(Continue on reverse if needed)*

T-46

TEST POINT	ALTITUDE (RESET) LEFT	ALTITUDE (RESET) RIGHT	AIRSPEED LEFT	AIRSPEED RIGHT
9	15,010	15,125	199	205
10	15,005	15,125	220	229
11	15,000	15,140	241.5	245
12	12,010	12,160	253	260
14A	15,000	15,100	180	179
14B	14,920	14,800	180	179
14C	14,980	14,960	180	182
15	15,000	15,100	161	168
16A	15,000	15,080	142	149
16B	15,005	15,110	143	151
17A	15,010	15,110	123	130
17B	15,005	15,100	121.5	130
17C	14,980	14,980	125	128
17D	14,960	14,990	126.5	131
18A	14,960	15,060	110	118
18B	14,980	15,010	113.5	117
18C	14,960	15,020	113	117
20	15,025	15,120	110	118
21	14,985	15,075	120	129
22	15,000	15,090	129.5	136
25	15,015	15,105	150.5	157
26	15,015	15,080	130	138

(Continued on page 2)

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

(Cont'd from p. 1, block 4)

GROUND BLOCK

	TIME	LEFT	RIGHT	T-33
RUNWAY - LANDING	1105	2250	2280	--
RAMP	1111	2260	2300	2320

(Cont'd from p. 1, block 5)

T-46

TEST POINT	ALTITUDE (RESET) LEFT	ALTITUDE (RESET) RIGHT	AIRSPEED LEFT	AIRSPEED RIGHT
27	15,000	15,080	110	118
28A	20,015	20,110	200	208
28B	20,005	20,110	220	225
28C	20,030	20,150	250.5	252
13A	10,020	10,175	277	280
13B	10,020	10,160	277	280
13C	9,980	10,150	272	280

T-33

TEST POINT	ALTITUDE REAR	AIRSPEED FRONT	AIRSPEED REAR	REMARKS	TIME CODE
9	15,230	201	201.5		17:44:06
10	15,280	224	219.5		17:45:20
11	15,300	244	242		17:47:05
12	12,330	256	254.5		18:17:12
14A	15,205	181	183		17:48:45
14B	14,950	175	176	T46 RGT PEDAL	17:50:20
14C	15,000	174	176.5	T46 LFT PEDAL	--
15	15,180	161.5	161.5		17:53:20
16A	15,160	142	143	T33 CLEAN	17:55:40
16B	15,180	144	143	T33 20 DEG FLAPS	17:56:15
17A	15,160	123	121	T33 CLEAN	--
17B	15,150	122.5	121	T33 20 DEG FLAPS	--
17C	15,070	122.5	120.5	T46 RIGHT RUDDER T33 20 DEG FLAPS	--
17D	15,040	123	121	T46 LEFT RUDDER T33 20 DEG FLAPS	--
18A	15,110	110	109	ZERO BETA T33 20 DEG FLAPS	--
18B	15,090	112	110.5	RIGHT PEDAL T33 20 DEG FLAPS	--
18C	15,080	111	110.5	LEFT PEDAL T33 20 DEG FLAPS	--
20	15,170	110.5	110	T46 - PA T33 20 DEG FLAPS	18:04:30
21	15,170	120.5	119.5	T46 - PA T33 20 DEG FLAPS	18:05:30
22	15,130	129	129	T46 - PA	18:07:20

T-33

TEST POINT	ALTITUDE REAR	AIRSPEED FRONT	AIRSPEED REAR	REMARKS	TIME CODE
25	15,190	150.5	150.5	T46 GEAR DOWN	18:09:25
26	15,130	131	129.5	T46 GEAR DOWN	18:10:35
27	15,180	110	110	T46 GEAR DOWN T33 20 DEG FLAPS	18:12:02
28A	20,280	203.5	202.5		18:24:12
28B	20,330	224	219		18:25:33
28C	20,4XX	252	251.5	Vmax	18:29:45
13A	10,3XX	282	282	Vmax	18:36:41
13B	10,390	281	281	Vmax	--
13C	10,350	275.5	276	Vmax	--

IFTR 86

file 4-OPS-1 DNR

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO OT&E/G0608	B. FLIGHT NO/DATA POINTS 86/PER TIS	C. DATE 28 APR 86
D. FRONT COCKPIT *(Left Seat)* GAMBLE	E. FUEL LOAD 1280	F. JON 2591A0
G. REAR COCKPIT *(Right Seat)* BUSH	H. START UP GR WT/CG 8949/19.89	I. WEATHER CLR/85
J. TO TIME/SORTIE TIME 0929/1.8	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 280/08
M. CHASE ACFT/SERIAL NO T-33/83TB	N. CHASE CREW SHAWLER/CAMPANO	O. CHASE TO TIME/SORTIE TIME 0929/1.8

4. PURPOSE OF FLIGHT/TEST POINTS

Combined DT&E/OT&E sortie: Taxi using brakes for steering, heavyweight patterns, 170 KIAS climb to FL 250. Formation with T-33 (stability augmentation off), stalls (clean and configured), acrobatics (stability augmentation off), high altitude instrument penetration, patterns and landings.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Using brakes to steer while taxiing is acceptable but nosewheel steering makes the task much easier.
2. There didn't seem to be any performance difference between heavyweight and lightweight patterns and landings.
3. Wing formation flying above FL 200 with the T-33 as lead was significantly more difficult than wingwork at lower altitudes.
4. Lack of dampening with SAS off was very apparent at higher altitudes.
5. Acrobatics with 90% core and entry altitudes above FL 180 was an energy losing proposition.
6. Instrument penetration with idle, 5 degrees nose low, and 220 KIAS worked well.

REMARKS:

1. Rotation technique proposed by LTC Edmondson shows potential to improve initial takeoff flight characteristics.
2. Yaw dampening at FL 250 with SAS off is less than T-37.
3. Very high power settings are necessary for maintaining energy level during acrobatics above FL 180.
4. Landings at this CG are much easier than landings at aft CGs.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM MAR 84 365 PREVIOUS EDITION IS OBSOLETE

IFTR 87 file 4-OPS-1 Phr

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
VIP DEMO/G0609	87/PER TIS	29 APR 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
HARBOUR	1140	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
EDMONDSON	8788/19.91	CLR/50
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1048/1.0	PER TIS	230/10
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/83TB	SHAWLER/G+9	1048/1.0

4. PURPOSE OF FLIGHT/TEST POINTS

VIP demo profile:
Takeoff
Climbout to 10,000 ft
Formation
Stalls
Slow flight
Acrobatics
Landings

5. RESULTS OF TESTS *(Continue on reverse if needed)*

Gen Harbour's comments on the sortie were:

A. Starting procedures much less complex than T-37. Good ECU protection against overtemperature.

B. Got the nose high on rotation for initial takeoff. Was able to check it but was impressed by the rate.

C. Was able to feel slight warning just before stall. Magnitude was very light. Accelerated stall was very abrupt - Not startling, just quick. One "G" stalls were benign with virtually no warning.

D. Aileron roll - Didn't lose much altitude. No noticeable tendency to dish out.

E. Speedbrakes didn't seem to cause much buffet when deployed at 200 KTs.

F. Touch and go landings - Very different feel when the nosewheel is allowed to go all the way to the runway, almost a feeling of being pitched forward out of the seat.

G. Particularly impressed by the cockpit environment - Quietness, instrument layout, visibility. Does not give cramped feeling like T-37. Cross cockpit visibility for formation flying and traffic patterns is excellent.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM 365 PREVIOUS EDITION IS OBSOLETE

IFT288 Case 4-OPS-1 Phc

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	840492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO G0610	B. FLIGHT NO/DATA POINTS 88F	C. DATE 30 APR 86
D. FRONT COCKPIT *(Left Seat)* MARTINEZ	E. FUEL LOAD 1280	F. JON 2591A0
G. REAR COCKPIT *(Right Seat)* BUSH	H. START UP GR WT/CG 8980/19.51	I. WEATHER CLEAR
J. TO TIME/SORTIE TIME 1551/1.5	K. CONFIGURATION/LOADING FLUTT SYS INST	L. SURFACE CONDITIONS WINDS 230/12 G22
M. CHASE ACFT/SERIAL NO	N. CHASE CREW EDMONDSON/PHOTO	O. CHASE TO TIME/SORTIE TIME 1351/1.5

4. PURPOSE OF FLIGHT/TEST POINTS

Flutter system checkout flight, Phase I revisited.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

A total of 27 flutter test points were flown. Flutter frequency is erratic under 5 HZ.

AMENDMENT FROM ENGINEERING WILL FOLLOW.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM 365 PREVIOUS EDITION IS OBSOLETE

Amendment, Flight 88

Summary of T-46A Single Vane Excitation System Flt 88

1. Vane frequency stability was markedly improved for this flight excursions, based on autospectra data from the vane position parameter, was at most 0.5 HZ.

2. The flutter vane displayed erratic behavior below 8 HZ. Currently, there are no critical flutter modes predicted in this area and the phenomenon should not impact testing at this time.

3. The discrete frequency sweep capability displayed unacceptable lower frequency band start tolerance. There was, at times, 40 seconds between the time of sweep initiation until the desired lower end of the frequency band was reached. This severely limits the pilots time on condition.

4. The vane cutoff, at times, was 5 cycles to the freestream condition. This degrades any free response phenomenon.

5. The right side amplitude response was adequate. The right side modal response ability is still being analyzed by FRC and AF engineers.

1FTR91

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
PRELIM FLY QUAL/G0653	91/PER TIS	3 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
BUSH	1280	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
MARTINEZ	8992/19.61T	CLR/45
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1045/2.0	PER TIS	270/04E
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T33/83TB	EDMONDSON/GAMBACORTA	1045/2.0

4. PURPOSE OF FLIGHT/TEST POINTS

1. Max Performance check climb: 3,000 to 35,000 feet.
2. High altitude flying qualities: 35,000 feet, 122 KIAS.
3. Pressure Survey: 20,000 feet, 135 to 225 KIAS.
4. Lateral trim evaluation: 20,000 feet, 135 and 225 KIAS.
5. Longitudinal trim evaluation: 15,000 feet, 275 to 110 KIAS, Clean & PA.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Check climb took 34 minutes, 370 lbs fuel and 120 nautical miles from 3,000 to 33,500 feet. Climb breakdown starting from 3000 feet PA and 174 KIAS as follows:

ALT MSL	TIME	FUEL
10,000	4 min 22 sec	75 lb
20,000	12 min 19 sec	170 lb
30,000	25 min 36 sec	310 lb

2. Flying qualities at high altitude:

* NOTE: Fuel flow for level flight at 122 KIAS/217 KTAS was 390 lb/hr total. Temp was +6.5 °C hotter than standard day.

- Longitudinal - Slow short period well damped both stick fixed and free.
- Lateral/Directional - Well damped with yaw damper on, very low damping with damper off but not easily excited and not objectionable.
- Speed Stability - Light but adequate, (about 1 lb/10 knots) friction band +/- 10 KIAS.
- Maneuver Stability - Wind up turn to approx 2G's. Forces light (about 5 lb/g).

3. Pressure survey: SCANI valve pressure data for left inlet. All points stable for 30 seconds.

4. Lateral trim eval: At all airspeeds unable to trim lateral forces to zero. With full right trim aircraft still rolls left, about 1 degree/sec at all speeds. With full left trim roll rate to left increases to about 4 degrees/sec at 225 KIAS.

5. Longitudinal trim eval: Sufficient trim was available to trim longitudinal forces to zero at all airspeeds between 275 and 110 KIAS clean and 150 to 110 KIAS, PA. However, full nose down trim at 275 KIAS, clean produced no noticeable force change from an on trim condition and resulted in an only slightly perceptable nose down pitching moment. Full nose up trim at 110 KIAS, PA likewise produced no noticeable force change from an on trim condition and resulted in an only slightly nose up pitching moment. Longitudinal trim may be inadequate for higher or lower speeds than tested.

6. RECOMMENDATIONS

Climb and cruise performance on a slightly hotter than standard day were noticably degraded. Consideration should be given to the adequacy of existing performance data to safely execute the T-46A T-2 Ferry mission from Farmingdale, NY to Edwards AFB, CA.

COMPLETED BY	SIGNATURE	DATE

MDE IFTR92 File

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

file 4 OPS

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
PFQ/G0655	92/PER TIS	4 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
MARTINEZ	1280	2591AO
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
EDMONDSON	8970/19.82	250 SCT/45
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
0941/1.7	PER TIS	240/06
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/83TB	BUSH/CLINCH	0941/1.7

4. PURPOSE OF FLIGHT/TEST POINTS

1. Max performance climb, 3000' to FL 300.
2. High altitude flying qualities at FL 300 at 175 KIAS and 122 KIAS.
3. Pressure survey @ 15000' HP and at 150, 200, and 250 KIAS.
4. Lateral trim evaluation at 130, 200, and 275 KIAS.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Climb from 3000' HP to FL 240 required 16 min 26 sec. Fuel used in climb 210 lbs. The total elapsed time from 3000' HP to FL 300 was 24 min 55 seconds and required 285 lbs fuel.
2. Flying qualities at high altitude.
   A. Longitudinal - short period well damped, stick fixed and stick free.
   B. Lateral/directional - well damped with yaw damper engaged, lightly damped (6 overshoots) damper off.
   C. Pressure survey - SCANI valve pressure data obtained.
   D. Lateral trim evaluation - sufficient trim available at all speeds to trim aircraft "hands off". The aircraft was biased to the left in roll trim authority, however.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM 245 PREVIOUS EDITION IS OBSOLETE

ADE 1FTR93 OPS-1 DHC

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO PFQ/OT&E/G0657	B. FLIGHT NO/DATA POINTS 93/PER TIS	C. DATE 5 JUN 86
D. FRONT COCKPIT *(Left Seat)* BUSH	E. FUEL LOAD 1280	F. JON 2591AO
G. REAR COCKPIT *(Right Seat)* MINK	H. START UP GR WT/CG 8994/19.59	I. WEATHER CLR/20
J. TO TIME/SORTIE TIME 1039/1.7	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 230/10G16
M. CHASE ACFT/SERIAL NO T-33/83TB	N. CHASE CREW MARTINEZ/G+9	O. CHASE TO TIME/SORTIE TIME 1039/1.7

4. PURPOSE OF FLIGHT/TEST POINTS

1. Max performance climb: 3,000 - 25,000 feet.
2. Flying qualities: 24,500 feet, 205 KIAS.
3. Pressure survey: 20,000 feet, 110 KIAS, gear down.
4. Roll trim evaluation: 15,000 feet, 275, 200, 130 KIAS.
5. Pressure survey: 15,000 feet, 120 KIAS, gear down. (Cont'd p. 2)

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Max performance climb took 17 min 47 sec and 275 lbs of fuel. Temperature was +10 deg C above standard day.

ALT	TIME	FUEL
10000	3 min 55 sec	125 lb
15000	7 min 30 sec	170 lb
20000	11 min 30 sec	220 lb
25000	17 min 45 sec	275 lb

2. Flying qualities.
   - Pitch doublets both stick fixed and stick free were deadbeat.
   - Yaw doublet, damper on was deadbeat. Damper off yaw doublet had 13 overshoots before damping out. Very low damping.
   - Steady straight sideslip generated approximately 12 deg beta with 10 deg bank at full rudder deflection.
   - Bank to bank rolls with damper off had noticeable adverse yaw. No noticeable adverse yaw with damper on.
   - 360 deg roll was significantly faster rolling to the right, approximately 50% faster than to the left. Both done with full aileron.
   - Speed stability at 205 KIAS +/- 25 KIAS was light. (1 to 2 lbs per 10 knots.)
   - Wind up turn to approximately 3.5 G's resulted in increasing buffet and right roll off but no "G" break.
3. Pressure survey done at 20,000 feet, 110 KIAS, gear down, left engine stable at the following five power settings:
Max/90% fan, 84% fan, 77.5% fan, 60% fan, and idle/40% fan. Stable at each setting for a 30 second SCANI valve survey.
4. Roll trim was effective at all speeds but varied with speed.

(Cont'd on P. 2)

6. RECOMMENDATIONS

1. Investigate roll rate difference for full deflection rolls between right rolls and left rolls.
2. Develop test aircraft performance data to include hotter than standard day data prior to ferry of T-2 to Edwards AFB.

COMPLETED BY	SIGNATURE	DATE

(Continued from page 1, PURPOSE OF FLIGHT/TEST POINTS)

6. Hydraulic test: 15,000 feet, 140 KIAS.
   a. Rudder cycle b. Speed brake cycle c. Gear cycle d. Flap cycle
7. Hydraulic test: 15,000 feet, 250 KIAS.
   a. Rudder cycle.

(Continued from page 1, RESULTS OF TESTS)

	SPEED (KIAS)	TRIM SETTING	ROLL	RATE
	275	full left	left	9 deg/15 sec
	275	full right	right	30 deg/8 sec
	200	full left	left	9 deg/15 sec
	200	full right	right	19 deg/15 sec
	130	full left	left	30 deg/8 sec
	130	full right	left	2 deg/30 sec
repeat	130	full right	right	2 deg/30 sec

5. Pressure survey done at 15000 feet, 120 KIAS, gear down, left engine stable at the following five power settings:
Max/89% fan, 80% fan, 72.5% fan, 57% fan, idle/35% fan. Stable at each setting for a 30 second SCANI valve survey.
6. Hydraulic tests resulted in about 100 psi drop in pressure when gear or speed brakes were activated. No noticeable drop with rudder or flap cycles.

MDE IFTR94

file 4-OPS-1 Dk2

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
IOT&E/G8521	94	5 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
CLINCH	1140	2591AO
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
SHAWLER	8841/19.5	CLEAR
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1432/1.7	MID C.G.	21-27/10G22
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/N83TB	EDMONDSON/SCHULZ	1432/1.7

4. PURPOSE OF FLIGHT/TEST POINTS

IOT&E
Take-offs and landings
(Heavy weight, S.E., no flap)
Stalls
Formation
Rolls
Cruise
Airstart
Aux gear extension

5. RESULTS OF TESTS *(Continue on reverse if needed)*

W. SHAWLER, FRC:

1. Airstart performed at 10,000 ft 170 Kts to insure instrumentation was working during the transient. Worked fine with successful start in 27 seconds, max ITT 715 deg.
2. Cruise pt was made at 28,000 ft; .5 M; for 5 min. Used 50 lbs of fuel. Fuel flow indicated 270 lbs/eng/hr.
3. Stalls - all had a right roll off.
4. Lateral forces appear to be slightly higher than earlier flights. Also forces appear slightly higher to the left.
5. Aux landing gear operated as advertised.

LT COL CLINCH, AFOTEC:

1. Takeoff forces are very unusual - different than any aircraft I have flown. Moderate to heavy forces to rotate (regardless of fuel weight), then abruptly lighter forces to capture the climb attitude.
2. Very sluggish climb rate - approx 1800 FPM through 7000 ft MSL, 500-600 FPM through 24,000 ft MSL. Probably no better than the T-37.
3. Roll forces seem higher than before the aircraft was de-rigged. The roll system appears to be incapable of being restored accurately to an acceptable condition following any sort of maintenance action that requires re-rigging. The system is clearly going to be a serious problem in the field.
4. Performed cruise check at 28000 ft, .50 IMN, 190 KIAS - 600 PPH.
5. Performed single engine overhead pattern using the alternate gear extension (no flaps, side speed brakes 35 deg, no top speed brakes). Rolled in to base turn 100 ft AGL, 140 kts, .75 NM final, put both throttles in idle for entire turn and final approach. Very definitely inadequate drag in this configuration. Inappropriate for student training.
6. Single engine go-around from short final. Gear down, flaps up, speed brakes up, approximately 100 ft AGL, one engine at idle, other at max. Only able to climb very slowly - 100 FPM maximum. Raising gear had a very small effect. Climb rate increased to 150 FPM max.

6. RECOMMENDATIONS

1. Examine extended nose strut to improve takeoff characteristics.
2. Fix the roll control system.
3. Clean up the drag.

COMPLETED BY	SIGNATURE	DATE

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WDE IFTR 95

file 40PS-1 Phl

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
ENG AIRSTARTS/G0666	95/PER TIS	9 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
BUSH	1280	2591AO
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
MARTINEZ	8919/17.07	50/SCT
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1404/1.9	PER TIS	140/01
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/83TB	SHAWLER/BROWN	1404/1.9

4. PURPOSE OF FLIGHT/TEST POINTS

1. Airstarts: 10,000 feet PA, 15,000 feet PA, 20,000 feet PA, 25,000 feet PA.
2. Climb between altitudes with boost pump off.
3. Longitudinal trim evaluation: 15,000 feet PA, forward CG at 15% MAC.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. AIRSTARTS:

10,000 FEET PA

	KIAS	ENG #	MODE	BOOST PUMP	TIME/TEMP
1	170	1	AUTO	ON	26 SEC/720 DEG C
2	200	1	AUTO	ON	REVERTED TO MANUAL MODE AND SHUT DOWN NOTE 1.
2	200	1	AUTO	ON	26 SEC/705 DEG C
3	200	1	AUTO	OFF	26 SEC/705 DEG C
4	110	2	AUTO	ON	28 SEC/720 DEG C
5	110	2	AUTO	OFF	28 SEC/720 DEG C

15,000 FEET PA

6	170	1	AUTO	ON	27 SEC/715 DEG C
7	200	2	AUTO	ON	26 SEC/740 DEG C
8	110	1	AUTO	ON	33 SEC/715 DEG C
9	110	1	AUTO	OFF	33 SEC/715 DEG C

20,000 FEET PA

10	150	2	AUTO	ON	32 SEC/710 DEG C
11	110	2	AUTO	ON	35 SEC/705 DEG C
11	110	2	AUTO	ON	35 SEC/710 DEG C NOTE 2
12	110	2	AUTO	OFF	34 SEC/720 DEG C
13	175	1	AUTO	ON	31 SEC/720 DEG C
14	200	1	AUTO	ON	29 SEC/715 DEG C

6. RECOMMENDATIONS

Continue airstart eval per TIS.

COMPLETED BY	SIGNATURE	DATE

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1. AIRSTARTS (CONT'D):

25,000 FEET PA

KIAS	ENG #	MODE	BOOST PUMP	TIME/TEMP
150	2	AUTO	ON	37 SEC/710 DEG C
110	1	AUTO	ON	45 SEC/760 DEG C
110	1	AUTO	OFF	42 SEC/720 DEG C
200	2	AUTO	ON	29 SEC/725 DEG C

NOTE 1. Reverted to manual mode start due to a torque motor coil fault caused by power flux at shut down or start initiation. Engine shut down at 700 deg C and temp did not exceed 750 deg C.

NOTE 2. Re-accomplished due to core RPM not at zero when start was initiated.

All starts successful.

2. No engine anomalies noted during max power climbs with boost pump off.
3. Trim eval at 15,000 feet; 110 KIAS, clean and PA; 125 KIAS, clean; 130 KIAS, PA; 150 KIAS, clean and PA; and 275 KIAS, clean. Was able to trim for zero stick force at 110 KIAS both clean and PA. Had a slight amount of trim left in the nose up direction. Able to trim for zero force at 275 KIAS, clean with a slight amount of nose down trim left.

MDE IFTR96

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4 OPS-1 DMe

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
PFQ/G0668	96/PER TIS	10 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
BUSH	1280	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
CLINCH		CLR/45
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1047/1.8	PER TIS	180/08
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/83TB	SHAWLER/BROWN	1047/1.8

4. PURPOSE OF FLIGHT/TEST POINTS

1. Longitudinal trim eval: 15,000 feet, aft CG at 24% MAC.
2. Airstarts: 27,500 feet, 30,000 feet.
3. Auto relights: 5,000 feet, 15,000 feet, 25,000 feet.
4. Airstarts: 32,500 feet, 35,000 feet.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Longitudinal trim eval at 15,000 feet; 125 KIAS, clean and PA; 200 KIAS, 225 KIAS, 250 KIAS, 275 KIAS all clean. Sufficient trim to attain zero stick force at all points. Slight amount of nose down trim left at 275 KIAS.
2. AIRSTARTS:

27,500 FEET

KIAS	ENG #	MODE	BOOST PUMP	TIME/TEMP
125	2	AUTO	ON	43 SEC/740 DEG C
110	1	AUTO	ON	46 SEC/775 DEG C

30,000 FEET

125	1	AUTO	ON	51 SEC/781 DEG C NOTE 1

NOTE 1. Ground station observed 791 deg C and test director terminated airstart testing.
3. Auto relights not accomplished due to ground station malfunction. RTB for patterns.

6. RECOMMENDATIONS
Continue auto relights as per TIS.

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM MAR 84 365 PREVIOUS EDITION IS OBSOLETE

nide IFTR97 88

file 4-OPS-1 DRC

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
OT&E/G8522	97/PER TIS	10 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
CLINCH	1140	2591AO
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
SHAWLER	9015/24.26	CLR/45
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1444/1.5	PER TIS	110/01
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T-33/83TB	BUSH/G+9	1444/1.5

4. PURPOSE OF FLIGHT/TEST POINTS

OT&E sortie
Training/check ride for LtC Clinch
Aft CG eval
Cruise check

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Noticeably lighter forces for rotation. Could feel nose lighten at approximately 80 Kts. Stick moved forward at lift-off to reduce force input for climb attitude.
2. Climb to 20,000 ft very slow 1700-1800 fpm below 10,000 ft.
3. Cruise check at 24,000 ft - .50 IMN, 203.5 KIAS, 60 lbs fuel consumed in 5 minutes. (FF indicators showed 290 pph/engine).
4. Timed descent - Idle power, speed brakes, 19M to 16M, 250 KIAS - Time - 18 sec, descent angle - 20 deg (T-37: 23 sec, 16 deg nose low).
5. Idle power descent - 18,000 ft to 8,100 ft, 200 KIAS, idle power - 38 NM, 15 lbs fuel, 4 min 36 secs.
6. Traffic patterns and landings: Lightening of stick forces due to aft CG most apparent in flare, landing and rotation for takeoff phases. Pitch is sensitive when near the runway in ground effect. Airspeed bleeds very slowly so any excess elevator input results in a balloon. Will be a definite problem for students who typically have a difficult time holding recommended airspeed and tend to overcontrol in the flare and landing.
7. Touch and goes: The aft CG and the lightened stick forces actually resulted in more control of the pitch attitude during the takeoff roll. With careful application of forces the nose could be flown off the runway at about 90 Kts to set the takeoff attitude at about 100 Kts for a lift off at around 110 Kts. The takeoff then felt very smooth and controlled and not at all abrupt. It certainly felt like the change in stick forces was not nearly as abrupt or dramatic in size or rate as in the more forward CG condition.

6. RECOMMENDATIONS

1. Clean up the drag.
2. Try the longer nose strut. Being able to set the takeoff attitude prior to lift off reduced the difficulty of the takeoff task. A longer nose strut may allow us to do that under a wide range of CGs.

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM MAR 84 365 PREVIOUS EDITION IS OBSOLETE

MDE IFTR 98

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO ENG AIRSTARTS/G0669	B. FLIGHT NO/DATA POINTS 98/PER TIS	C. DATE 11 JUN 86
D. FRONT COCKPIT *(Left Seat)* BUSH	E. FUEL LOAD 1280	F. JON 2591AO
G. REAR COCKPIT *(Right Seat)* CAMPANO	H. START UP GR WT/CG 8958/20.39	I. WEATHER CLR/35
J. TO TIME/SORTIE TIME 1203/1.9	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS CALM
M. CHASE ACFT/SERIAL NO A-7/582	N. CHASE CREW DICKERSON	O. CHASE TO TIME/SORTIE TIME 1203/1.9

4. PURPOSE OF FLIGHT/TEST POINTS

1. Auto ignition test at 5,000, 15,000, and 25,000 feet.
2. Airstarts at 15,000, 25,000, and 27,500 feet.
3. Speed brake comparison with A-7 at 15,000 feet 250 KIAS.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. AUTO IGNITION TEST

5,000 FEET

	KIAS	ENG #	MODE	BOOST PUMP	RMK/TIME/TEMP
1	273	1	AUTO	ON	SUCCESSFUL
2	230	2	AUTO	ON	SUCCESSFUL
3	110	1	AUTO	ON	FAILED/RESTART: 31 SEC/715 DEG C
3	110	1	AUTO	ON	FAILED/RESTART: 33 SEC/715 DEG C

15,000 FEET

4	252	2	AUTO	ON	SUCCESSFUL
5	200	1	AUTO	ON	SUCCESSFUL
7	110	1	AUTO	ON	FAILED/RESTART: 38 SEC/725 DEG C
7	110	1	CONTINUOUS IGNITION	ON	SUCCESSFUL
7	110	2	AUTO	ON	FAILED/RESTART: 30 SEC/715 DEG C
7	110	2	CONTINUOUS IGNITION	ON	SUCCESSFUL

25,000 FEET

9	245	2	AUTO	ON	SUCCESSFUL
10	170	1	AUTO	ON	FAILED/RESTART: 41 SEC/755 DEG C
10	170	2	AUTO	ON	SUCCESSFUL

Auto ignition relights sometimes accompanied by an audible pop. No tendency to overtemp. Failure mode in all cases was flameout.

6. RECOMMENDATIONS

Determine cause of auto ignition failure, correct and retest.

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2. AIRSTARTS

15,000 FEET

	KIAS	ENG #	MODE	BOOST PUMP	TIME/TEMP	
6	150	2	AUTO	ON	29 SEC/715 DEG C	

25,000 FEET

8	245	2	AUTO	ON	30 SEC/730 DEG C	NOTE 1.
8	245	2	AUTO	ON	25 SEC/720 DEG C	
12	110	2	AUTO	ON	39 SEC/720 DEG C	
13	110	2	AUTO	OFF	39 SEC/720 DEG C	

27,500 FEET

14	125	2	AUTO	ON	42 SEC/735 DEG C
15	110	1	AUTO	ON	46 SEC/755 DEG C

NOTE 1. Descent rate greater than 6000 fpm to achieve this point. Descended through the altitude on first attempt. Second attempt on condition.

All airstarts successful.

3. At 15,000 feet 250 KIAS, power for level flight, deployed speed brake at the same time as A-7 chase. T-46A had a slightly greater deceleration than the A-7. Speed brake effective, buffet not objectionable.

MDE IFTR99 Rev A.

file 4 OPS-1

DAILY/INITIAL FLIGHT TEST REPORT

1. AIRCRAFT TYPE	2. SERIAL NUMBER
T-46A	84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO PFQ/G0683	B. FLIGHT NO/DATA POINTS 99/PER TIS	C. DATE 25 JUN 86
D. FRONT COCKPIT *(Left Seat)* MARTINEZ	E. FUEL LOAD 1280	F. JON 2591A0
G. REAR COCKPIT *(Right Seat)* SCHULZ	H. START UP GR WT/CG 9177/24.23	I. WEATHER 250/SCT 60
J. TO TIME/SORTIE TIME 1413/1.4	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 210/10G16
M. CHASE ACFT/SERIAL NO T38/943	N. CHASE CREW LUCZAK/SPRINKLE	O. CHASE TO TIME/SORTIE TIME 1413/1.4

4. PURPOSE OF FLIGHT/TEST POINTS

1. Inverted fuel system checkout
2. Aft C.G. flying qualities at F.L. 150
3. Pressure survey at F.L. 150
4. Landing characteristics with aft C.G.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Inverted flight was maintained for intervals of 5 seconds, 10 seconds and 20 seconds. Inverted flight at 5 seconds produced no noteworthy results. At 10 seconds the right fuel pressure light illuminated and the fuel flow decreased followed by illumination of both the left and right oil pressure lights. At 20 seconds the left and right oil pressure and fuel pressure lights were illuminated prior to recovery. Post-flight data analysis revealed a delta pressure spike in excess of 1000.
2. A series of bank to bank rolls, SAS on and off plus 360° roll maneuvers were performed at 250 KIAS @ FL 150.
3. Pressure survey data acquired at Mach nos. .24M, .3M, .4M and .5M.
4. 1 G stalls in both the clean and in P.A. configuration were accomplished. In clean configuration at stall the aircraft shuddered and the nose dropped. In the P.A. configuration the aircraft rolled sharply right.
5. Landings with aft C.G. were easily accomplished in gusty wind conditions with a slight increase in pitch sensitivity.

Maj Schulz

Takeoff: Stick forces at this aft C.G. lighter than I have previously experienced in the T-46, but the rotation characteristics were the same. I applied back pressure at 87 KIAS and attempted to maintain a constant back pressure. There was some delay before the nose came off the ground. Once rotation started the pitch charge was as rapid as on my previous flights, which resulted in one overshoot of takeoff attitude.

Patterns and Landings: Once again, stick forces were lighter than I have experienced on previous T-46 flights, but they were comfortable. Stick sensitivity in the flare was okay, but the airplane had more of a tendency to bounce than on my previous flights.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

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FLIGHT 99F FUEL SYSTEM ANOMALY

Inverted fuel system checkout test points were conducted at 15K' HP and 200 KIAS. Tests were conducted for inverted flight times of 5, 10 and 20 seconds. The test procedure provided for a 180 degree roll, maintain minus 1 G' for the specified time, then continue roll to upright. Parameters monitored on strip charts during these maneuvers were N_2 gas generator speed, $TT_{4.5}$ inter turbine temperature, fuel pump delta pressure, fuel flow rate, fuel pump inlet pressure and throttle position for each engine. Left rolls were used to obtain inverted flight.

The engine parameters were stabilized at the following conditions prior to the inverted flight maneuvers.

ENG	N_2 (rpm)	$TT_{4.5}$ (deg °C)	P (psid)	FF (lb/hr)	FPIP (psia)	Throttle (deg)
			5 sec			
LH	44K	720	40	360	15	47
RH	39K	600	-40	190	13	24
			10 sec			
LH	44K	700	40	360	14	47
RH	39K	600	-40	190	14	24
			20 sec			
LH	45K	750	40	380	14	51
RH	39K	580	-40	190	14	24

The five second inverted flight maneuver sustained negative G's for 3 seconds. The engine and fuel system responded to this inverted flight maneuver as follows:

RH eng - the fuel pressure immediately dropped from 13 to 7 psia, remained at 7 for 1.5 sec then returned to 13 psia. The pressure dropped slightly to 10 psia and recovered to 12 psia within a second during the roll out of inverted flight. All other parameters remained unchanged.

LH eng - the fuel pressure immediately dropped from 15 to 4 psia and then recovered to 15 psia in 1.5 seconds. During the roll out of inverted flight the fuel pressure dropped from 15 psia to 0 psia and returned to 15 psia within 1.5 seconds. In addition, the fuel pump delta pressure spiked to -970 psid during the initial fuel pressure drop from 15 to 4 psia. All other parameters remained unchanged.

The ten second inverted flight maneuver sustained negative G's for 12 seconds. The engine and fuel system responded to this inverted flight maneuver as follows:

RH Eng - The fuel pressure dropped from 14 to 4 psia and then recovered to 14 psia in 3.0 seconds. The pressure remained at 14 psio for 4.5 seconds then dropped to 0 within 1 second. The fuel pressure remained at 0 for 8 seconds and then returned to 15 psia, following recovery from inverted flight. All other parameters remained unchanged.

L/H ENG - The fuel pressure immediately dropped from 15 to 5 psia then returned to 15 psia within 1.5 seconds. The fuel pressure remained at 15 psia throughout the remaining inverted flight. On recovery the fuel pressure dropped to 0 and returned to 15 psia in 1 second. All other parameters remained unchanged.

The 20 second inverted flight maneuver sustained negative G's for 22 seconds. The engine and fuel system responded to this inverted flight maneuver as follows:

RH Eng -

Fuel pressure - dropped from 14 to 7 psia and recovered to 14 psia within 2 seconds. The fuel pressure remained at 14 psia for 4 seconds then dropped to 0 psia within 1.5 seconds and remained at 0 for a total of 15 seconds. The fuel pressure recovered from 0 to 14 psia within one second, during the recovery from inverted flight.

Fuel flow rate - dropped from 190 to 182 lb/hr 4.5 seconds after the fuel pressure dropped from 14 to 0 psia. The fuel flow rate climbed slightly and then dropped to 28 lb/hr, 10 seconds after the flow rate dropped to 182 lb/hr. This drop to 28 lb/hr occurred after the fuel pressure had been at 0 psia for 15 seconds and recovery from inverted flight initiated. During recovery the fuel flow rate peaked to 290 lb/hr and then recovered.

Fuel pump delta pressure - Remained at 40 psid then increased in response from -160 to +30 PSID after the fuel pressure had been at zero for four seconds. A pressure spike of -1000 psid occured during the recovery to a normal flight attitude of 1000 PSIA. The delta pressure returned to -40 psid 3 seconds after the spike occured.

ITT - The fuel pressure dropped from 14 to 0 psio. The temperature gradually decreased from 1080 to 1050 degree F in 16 seconds. During recovery from the maneuver, the temperature dropped to 950 degree F in 2 seconds. Eventually the temperature recovered to 1080 degree F.

N_2 - The RPMs dropped from 39K to 31K in 2 seconds. The drop occured the same time the ITT dropped from 1050 to 950 degree F. The RPMs immediately returned to 39K in 3 seconds along with recovery from the inverted flight condition.

L/H Eng - Fuel pressure dropped from 15 to 0 and recovered to 14 psia in less than 2 seconds. During recovery from inverted flight the fuel pump inlet pressure dropped to 0 psia and recovered to 15 psia within 1.5 seconds. All other parameters remained unchanged.

MDE File

FLIGHT 99F FUEL SYSTEM ANOMALY
REVISION A

This is a revision to the engineering addendum to the FTR for flight 99. This corrects the fuel pump inlet pressure readings to absolute pressure as shown. The original addendum showed incorrect absolute pressures as a result of data reduction using the FRC Ground Station, which has been corrected.

Inverted fuel system checkout test points were conducted at 15K' HP and 200 KIAS. Tests were conducted for inverted flight times of 5, 10 and 20 seconds. The test procedure provided for a 180 degree roll, maintain minus 1 G' for the specified time, then continue roll to upright. Parameters monitored on strip charts during these maneuvers were N_2 gas generator speed, inter turbine temperature (ITT) fuel pump delta pressure, fuel flow rate, fuel pump inlet pressure and throttle position for each engine. Left rolls were used to obtain inverted flight.

The engine parameters were stabilized at the following conditions prior to the inverted flight maneuvers.

*** 5 sec ***

ENG	N_2 (rpm)	ITT (deg C)	P (psid)	FF (lb/hr)	FPIP (psia)	Throttle (deg)
LH	44K	720	40	360	28	47
RH	39K	600	-40	190	28	24

*** 10 sec ***

LH	44K	700	40	360	28	47
RH	39K	600	-40	190	28	24

*** 20 sec ***

LH	45K	750	40	380	28	51
RH	39K	580	-40	190	28	24

The five second inverted flight maneuver sustained negative G's for 3 seconds. The engine and fuel system responded to this inverted flight maneuver as follows:

RH eng - the fuel pressure immediately dropped from 28 to 20 psia, remained at20 for 1.5 sec then returned to 28 psia. The pressure dropped slightly to 23 psia and recovered to 27 psia within a second during the roll out of inverted flight. All other parameters remained unchanged.

LH eng - the fuel pressure immediately dropped from 28 to 17 psia and then recovered to 28 psia in 1.5 seconds. During the roll out of inverted flight the fuel pressure dropped from 28 psia to 10 psia and returned to 28 psia within 1.5 seconds. In addition, the fuel pump delta pressure spiked to -970 psid during the initial fuel pressure drop from 28 to 17 psia. All other parameters remained unchanged.

The ten second inverted flight maneuver sustained negative G's for 12 seconds. The engine and fuel system responded to this inverted flight maneuver as follows:

RH Eng - The fuel pressure dropped from 28 to 17 psia and then recovered to 28 psia in 3.0 seconds. The pressure remained at 28 psio for 4.5 seconds then dropped to 8 within 1 second. The fuel pressure remained at 8 for 8 seconds and then returned to 28 psia, following recovery from inverted flight. All other parameters remained unchanged.

L/H ENG - The fuel pressure immediately dropped from 28 to 20 psia then returned to 28 psia within 1.5 seconds. The fuel pressure remained at 28 psia throughout the remaining inverted flight. On recovery the fuel pressure dropped to 8 and returned to 28 psia in 1 second. All other parameters remained unchanged.

The 20 second inverted flight maneuver sustained negative G's for 22 seconds. The engine and fuel system responded to this inverted flight maneuver as follows

RH Eng -

Fuel pressure - dropped from 28 to 20 psia and recovered to 28 psia within 2 seconds. The fuel pressure remained at 28 psia for 4 seconds then dropped to 8 psia within 1.5 seconds and remained at 8 for a total of 15 seconds. The fuel pressure recovered from 8 to 28 psia within one second, during the recovery from inverted flight.

Fuel flow rate - dropped from 190 to 182 lb/hr 4.5 seconds after the fuel pressure dropped from 28 to 8 psia. The fuel flow rate climbed slightly and then dropped to 28 lb/hr, 10 seconds after the flow rate dropped to 182 lb/hr. This drop to 28 lb/hr occurred after the fuel pressure had been at 8 psia for 15 seconds and recovery from inverted flight was initiated. During recovery the fuel flow rate peaked to 290 lb/hr and then recovered.

Fuel pump delta pressure - Remained at 40 psid then increased in response from -160 to +30 PSID after the fuel pressure had been at zero for four seconds. A pressure spike of -1000 psid occured during the recovery to a normal flight attitude of 1000 PSIA. The delta pressure returned to -40 psid 3 seconds after the spike occured.

ITT - After the fuel pressure dropped from 28 to 8 psia, the temperature gradually decreased from 1080 to 1050 degree F in 16 seconds. During recovery from the maneuver, the temperature dropped to 950 degree F in 2 seconds. Eventually the temperature recovered to 1080 degree F.

N_2 - The RPMs dropped from 39K to 31K in 2 seconds. The drop occured the same time the ITT dropped from 1050 to 950 degree F. The RPMs immediately returned to 39K in 3 seconds along with recovery from the inverted flight condition.

L/H Eng - Fuel pressure dropped from 28 to 24 and recovered to 28 psia in less than 2 seconds. During recovery from inverted flight the fuel pump inlet pressure dropped to 8 psia and recovered to 28 psia within 1.5 seconds. All other parameters remained unchanged.

IFTR100

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4 OPS-7

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
PFQ/G0684	100/PER TIS	26 JUN 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
BUSH	1280	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
SHAWLER	9172/24.3	250 BKN/50
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1122/1.8	PER TIS	210/12G16
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T33/83TB	MARTINEZ/GAMBACORTA	1122/1.8

4. PURPOSE OF FLIGHT/TEST POINTS

1. Pressure Survey 15,000 feet 120 KIAS clean & PA 150, 180, 225 KIAS Clean
2. Maneuver block A & B 25,000 feet 122 KIAS clean
3. Maneuver Block B 25,000 feet 122 KIAS speed brakes only
4. Maneuver block A & B 27,500 feet 170 KIAS clean

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. All tests complete as per card.
2. Only comment was for 360° coordinated rolls: passing approx 270° of roll angle of attack built up rapidly with no longitudinal stick input and the aircraft stalled. Happened both damper on and off at 170 KIAS 27,500 feet clean and speed brakes.
3. Landings were easy, stick forces were light but had no tendency to balloon or float. Takeoff had no tendency to over rotate or rotate abruptly.

SHAWLER

Takeoff was made by rotating the nose off the runway and continuing on the main gear. Good forces. Two landings were made without difficulty. The pitch response during the flare is more sensitive than the forward C.G., but not a problem.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

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IFTR 101

file 4 OPS-1

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO PFQ/G0685	B. FLIGHT NO/DATA POINTS 101/PER TIS	C. DATE 27 JUN 86
D. FRONT COCKPIT *(Left Seat)* MARTINEZ	E. FUEL LOAD 1280	F. JON 2591A0
G. REAR COCKPIT *(Right Seat)* EDMONDSON	H. START UP GR WT/CG 9163/24.67	I. WEATHER 150 SCT/50
J. TO TIME/SORTIE TIME 0948/1.7	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 210/04
M. CHASE ACFT/SERIAL NO T33/83TB	N. CHASE CREW SHAWLER/GAMBACORTA	O. CHASE TO TIME/SORTIE TIME 0948/1.7

4. PURPOSE OF FLIGHT/TEST POINTS

1. Preliminary Flying Qualities (Aft C.G.)
2. Pressure survey at F.L. 200
3. Landing characteristics

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. Pressure survey data obtained at F.L. 200 at airspeeds of .24M, .3M, .4M and .5M in the clean configuration and at .24M in P.A. configuration.
2. 2 stalls were performed at 7,500' Hp, one in the clean configuration and one in P.A. configuration fuel remaining was 1100#. The aircraft, in the clean configuration, stalled at 95 KIAS with a slight left roll. In the P.A. configuration the aircraft stalled at 91 KIAS which also resulted in a slight left roll at stall.
3. Block "B" maneuvers were performed at 27,500 Hp and 170 KIAS which consisted of a series of 60° bank to bank maneuvers with SAS on and off, bank to bank rudder only rolls, SAS on and off and a decelerating turn with a load factor of 2 G's.
4. A series of 3 touch and go landings followed by a full stop landing were accomplished at the end of the flight. Although gusty wind conditions prevailed, the landings were easily accomplished with no increase in pilot effort required at the aft CG configuration.

Lt Col Edmondson

The initial takeoff, at most aft CG limit, required a very light stick force to initiate the rotation followed by a no force requirement immediately after rotation. There was no attitude overshoot when capturing the takeoff attitude, but it definitely required a complete force relief to zero longitudinal force. Overall, the aft CG requires very light forces and it is easy to perform. Landings at aft CG were also easy to perform with no tendency to bounce or balloon. However, the forces are very light and could be over controlled if not familiar with the aircraft. I consider the aft CG takeoff and landing to be quite satisfactory.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

AFFTC FORM MAR 84 365 PREVIOUS EDITION IS OBSOLETE

IF-TR 102

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE T-46A	2. SERIAL NUMBER 84-0492

file 4 OPS

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO OT&E/G8524	B. FLIGHT NO/DATA POINTS 102/PER TIS	C. DATE 27 JUN 86
D. FRONT COCKPIT *(Left Seat)* BUSH	E. FUEL LOAD 1140	F. JON 2591A0
G. REAR COCKPIT *(Right Seat)* MANKE	H. START UP GR WT/CG 9018/24.55	I. WEATHER 150 SCT/45
J. TO TIME/SORTIE TIME 1333/1.5	K. CONFIGURATION/LOADING PER TIS	L. SURFACE CONDITIONS 200/12 G17
M. CHASE ACFT/SERIAL NO A-37/310	N. CHASE CREW MAUER	O. CHASE TO TIME/SORTIE TIME 1333/1.5

4. PURPOSE OF FLIGHT/TEST POINTS

Aft C.G. handling qualities (OT&E) takeoff, departure, stalls, slow flight, lateral trim eval, over-the-top acrobatics, patterns and landings.

5. RESULTS OF TESTS *(Continue on reverse if needed)*

a. Takeoff - Applied and held light stick force at 90 KIAS. Aircraft rotated at 103 KIAS to approximately 12° nose high (slightly higher than desired). Main gear lifted off at 108 KIAS. Task relatively simple if pilot is prepared for lighter forces than mid C.G. requires.

b. Departure and Climb - T-1 is underpowered in hot weather. During climb at 170 KIAS VVI only equals 1200 fpm at 10'M.

c. Stalls - Clean and PA - Random rolloffs right/left, not severe. No warning, but excellent initial stall and recovery characteristics.

d. Slow Flight - Gear and 20° flaps. Max power required to maintain level flight and 95 KIAS at 21,400' (No speedbrake).

e. Lateral Trim - Able to trim aircraft laterally hands off at most flying airspeeds, however lateral trim has almost no authority to compensate for contingencies (single engine, split flaps etc.)

f. Over-the-top Acrobatics - 10'M

Loop, Cuban 8 - The aircraft is capable of performing the maneuvers well. The tricky part right now is accomplishing the maneuvers within T-1's current airspeed and G limits. Once these limits are raised, even a novice will be able to perform these maneuvers (Entry: 260 KIAS, max power). Cloverleaf - same as above (Entry: 220 KIAS, 95% core).

g. Patterns and Landings - Simulate single engine straight in - (Gear, 20° flaps, Speedbrake). Unable to maintain 110 KIAS on 3° glidepath with max power on one engine and idle on the other. Had to retract speedbrake to reacquire glidepath and airspeed. (1060 # fuel) Normal Overhead - 1000' - ANgle of attack in final turn at 120 KIAS with turbulence can approach the current limits. On final with airspeed at 110 KIAS, insidious sink rates can develop on a hot day. Easily arrested with power. Landings - lighter forces required for aft C.G. landings than mid C.G. Task relatively simple of pilot is prepared for the lighter forces.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

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IFTR103

DAILY/INITIAL FLIGHT TEST REPORT	1. AIRCRAFT TYPE	2. SERIAL NUMBER
	T-46A	84-0492

file 4 OPS-1 DRC

3. CONDITIONS RELATIVE TO TEST

A. PROJECT/MISSION NO	B. FLIGHT NO/DATA POINTS	C. DATE
OT&E/G7052	103/Per TIS	30 Jun 86
D. FRONT COCKPIT *(Left Seat)*	E. FUEL LOAD	F. JON
MARTINEZ	1280	2591A0
G. REAR COCKPIT *(Right Seat)*	H. START UP GR WT/CG	I. WEATHER
GAMBLE	9170/24.34	200SCT/85
J. TO TIME/SORTIE TIME	K. CONFIGURATION/LOADING	L. SURFACE CONDITIONS
1107/1.7	Per TIS	200/04
M. CHASE ACFT/SERIAL NO	N. CHASE CREW	O. CHASE TO TIME/SORTIE TIME
T33/83TB	BUSH/GAMBACORTA	1107/1.7

4. PURPOSE OF FLIGHT/TEST POINTS

1. Preliminary Flying Qualities AFT CG
2. Pressure survey at FL. 200
3. Landing Characteristics

5. RESULTS OF TESTS *(Continue on reverse if needed)*

1. 1 G stalls in both P.A. and clean configurations were performed. In the clean configuration, the aircraft stalled at 95 KIAS. In the P.A. configuration, the stall occurred at 91 KIAS.
2. Landing survey data were acquired in 4 different configurations at speeds (commencing with a trim point of 120 KIAS) of 120, 115, 111, 107, 103, 99, and Vs +3. The 4 different configurations were as follows: (1) P.A. configuration, (2) side speed brakes extended, 20° flaps and gear down, (3) side speed brakes extended (4) gear extended and flaps 20°.
3. Pressure survey data obtained at FL 200 at 108 KIAS in clean and PA configuration, and also at .3M, .4M, and .5M in the clean configuration.
4. A speed stability point was obtained at FL 250 using a trim speed of 122 KIAS and varying airspeed from 103 KIAS to 140 KIAS.
5. A total of 5 touch and go landings were performed.

The 60° side speed brake and 43° top speed speed brakes configuration provides adequate drag for normal traffic pattern work.

Capt Gamble

Stick forces during flare and landing were very light at this CG.

6. RECOMMENDATIONS

COMPLETED BY	SIGNATURE	DATE

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