

FORTY YEARS OF AIR SUPREMACY F-15 EAGLE—THE BEGINNINGS

F-15 DEVELOPMENT & FLIGHT TEST



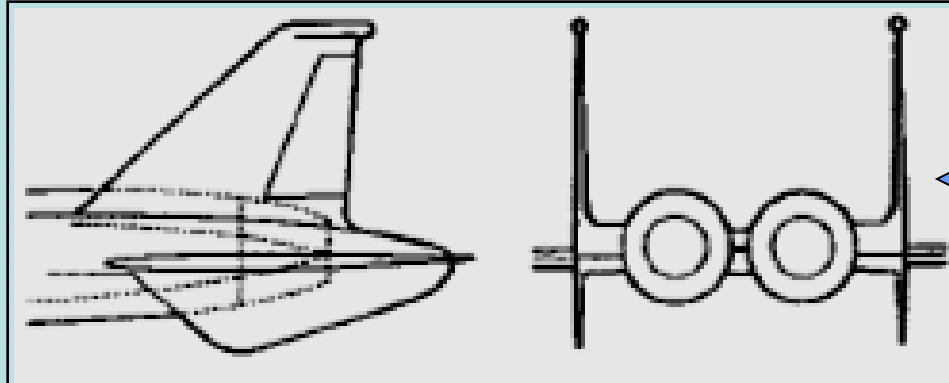
PROPOSAL CONFIGURATION—JULY 1969

JACK ABERCROMBIE

McDONNELL ENGINEER :

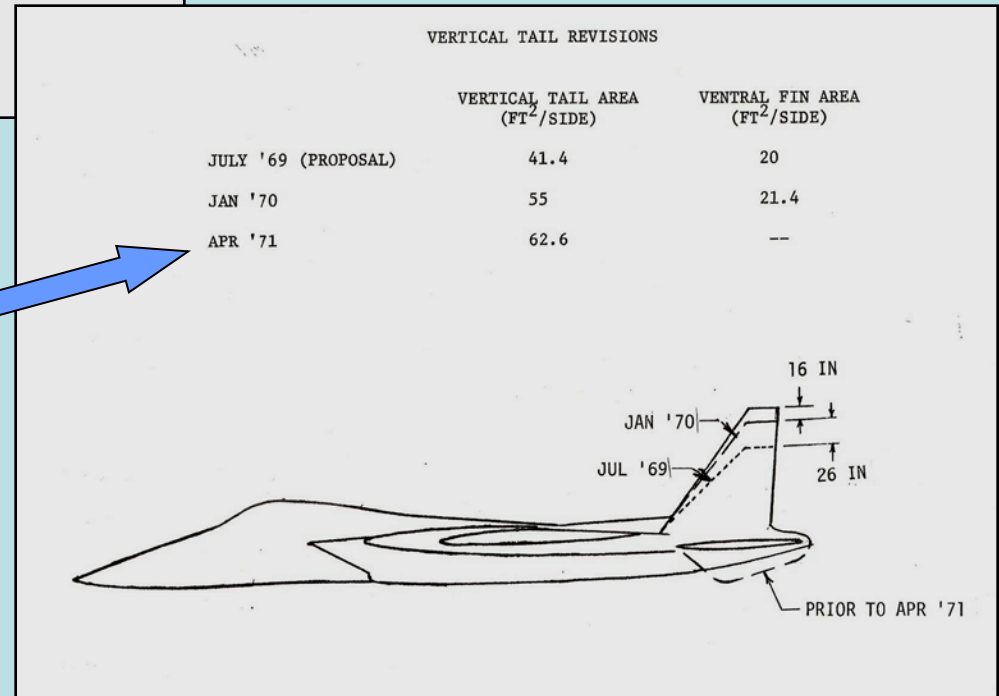
AERODYNAMICS / FLYING QUALITIES / TECHNOLOGY INTEGRATION

VERTICAL TAILS & VENTRALS EVOLUTION



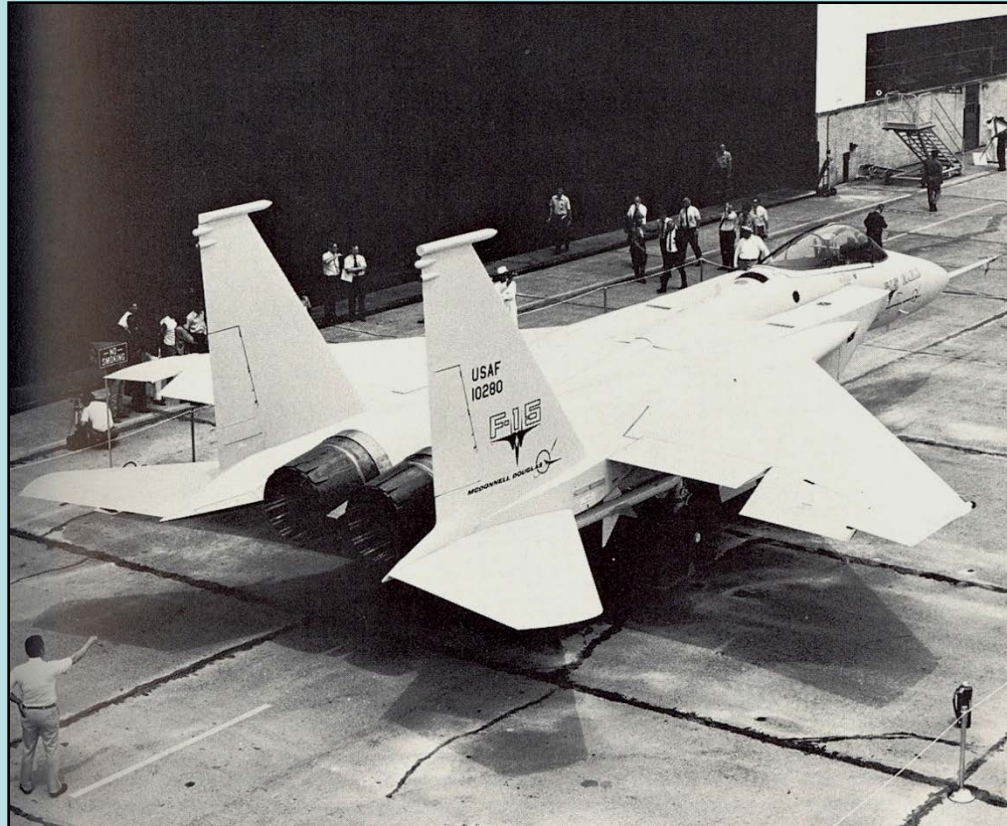
**DIRECTIONAL STABILITY
SHORTFALL FOUND IN
WIND TUNNEL TESTS**

PROPOSAL (JULY 1969)



FINAL CONFIGURATION

F-15 ROLLOUT CEREMONY JUNE 1972



**AFTER ROLLOUT, AIRCRAFT DISMANTLED &
TRANSPORTED TO EDWARDS IN C-5A**

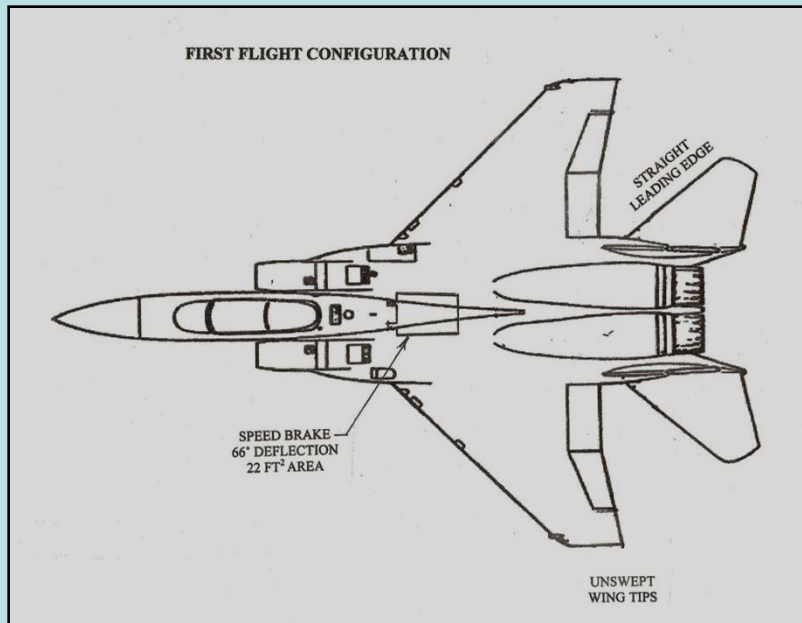
FIRST FLIGHT—27 JULY 1972—31 MTHS AFTER ATP

EARLY WORK START—0500—BEFORE HEAT OF DAY (115°)

ENGINE START--0755

BRAKE RELEASE FOR TAKEOFF--0820

TAKEOFF R/W 04 OVER LAKE BED—NEW ENGINE AS WELL AS NEW AIRPLANE



--PROBLEMS--

MAIN GEAR DOOR RIGGING

SPEEDBRAKE INDUCED BUFFET

FIRST FLIGHT CELEBRATION

DISTINGUISHED ATTENDEES

IRV BURROWS—TEST PILOT

DON MALVERN—PROGRAM DIRECTOR

GEN. BEN BELLIS—SPO DIRECTOR

C.E. "BUD" ANDERSON—WW2 ACE

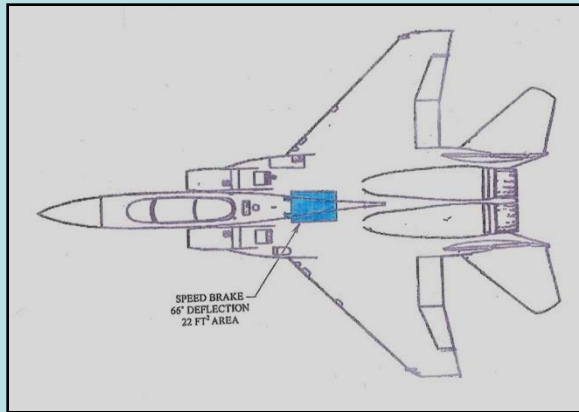
CHUCK YEAGER—ANDERSON'S WING MAN

FLORENCE "PANCHO" BARNES

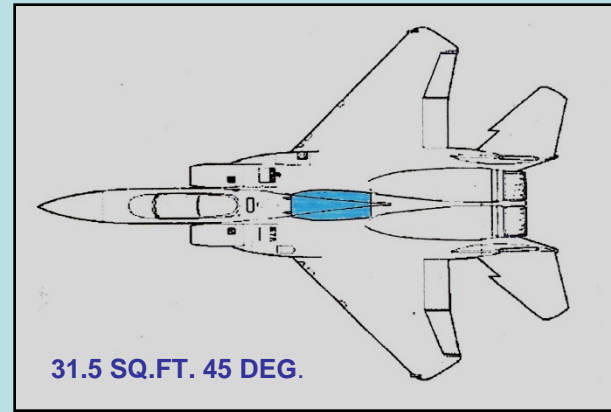


SPEEDBRAKE INDUCED BUFFET

WIND TUNNEL TESTS IN ST. LOUIS & FLIGHT TESTS OF 12 CONFIGURATIONS.



1st FLIGHT CONFIG (Buffet OK at 35 deg, not enough drag)



FINAL CONFIG at 45 deg



RAPID FLIGHT TEST PACE

**A/C # 1—60 FLIGHTS IN TWO MONTHS--
SOMETIMES 3 SORTIES PER DAY.**

A/C # 2—ARRIVED END OF SEPTEMBER.

13 TEST AIRCRAFT—EDWARDS & EGLIN.

PRIMARY TEST AIRCRAFT ASSIGNMENTS

F-1 Envelope Expansion, Flying Qualities, External Stores

F-2 Engine Development, Performance

F-3 Avionics, Airspeed System

F-4 Structural Loads

F-5 Armament, Tank Jettison

F-6 Avionics, Fire Control System

F-7 Armament

TF-1 Two-Seater Evaluation, Training, VIP Fam Flights

F-8 High AOA, Stalls, Spins

F-9 Aircraft and Engine Performance

F-10 Tactical Electronic Warfare System, Radar (at Eglin)

F-17 Time-to-Climb Record Setting

TF-2 Special Programs

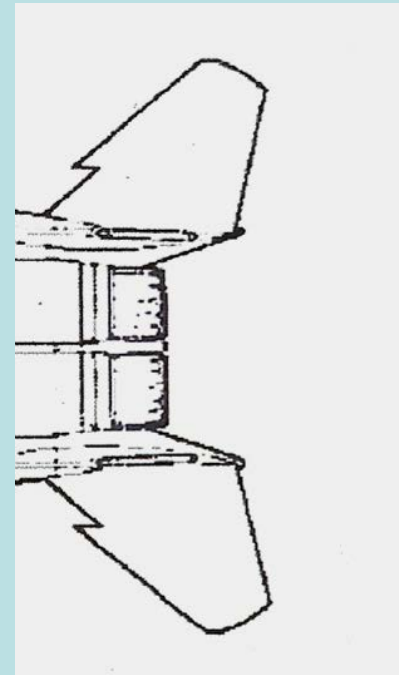
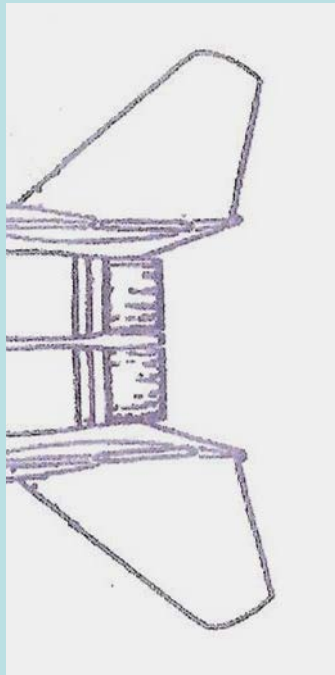
HISTORY & CURRENT STATUS OF TEST AIRCRAFT:

<http://airandspacemuseum.org/education.html>



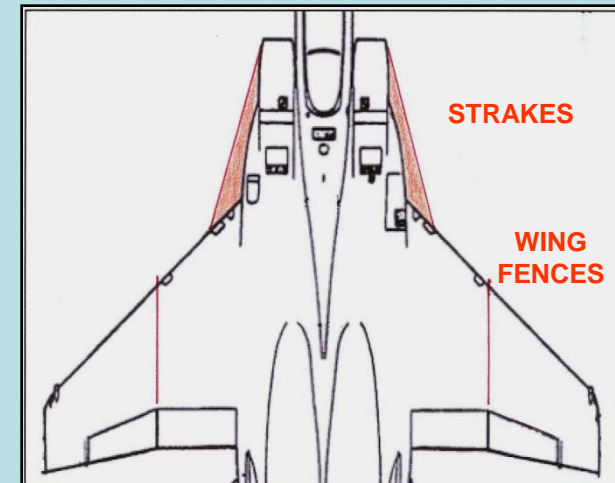
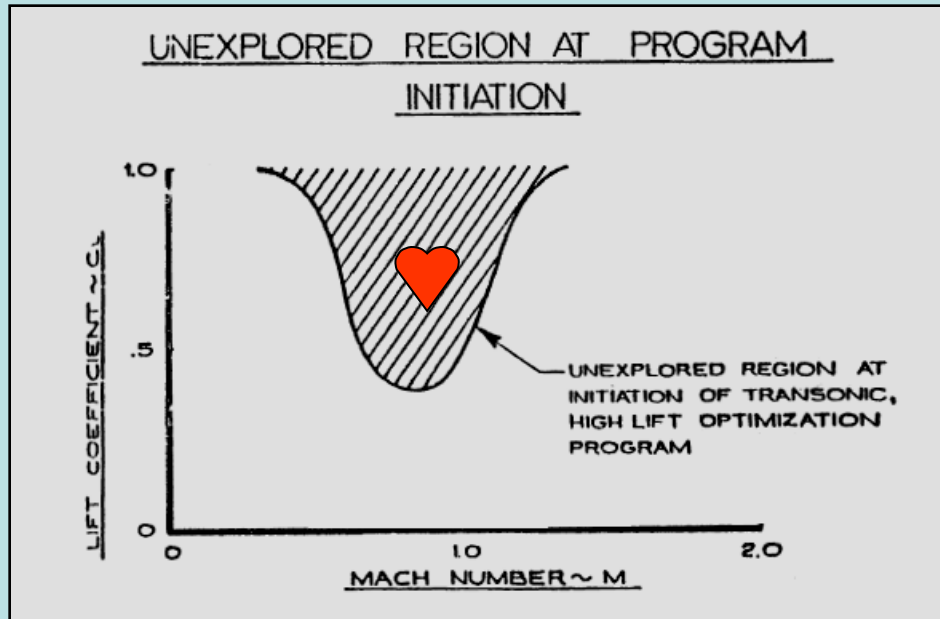
HORIZONTAL STABILATOR SNAG LEADING EDGE

POTENTIAL FOR FLUTTER FOUND IN WIND TUNNEL TESTS,
SUMMER 1972

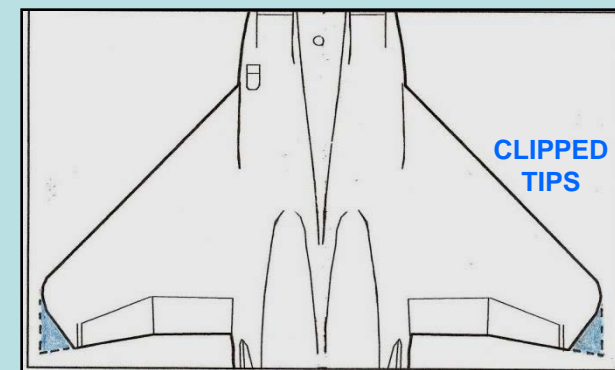


HEAVY AIRFRAME BUFFET IN HEART OF COMBAT MANUEVERING ENVELOPE

$M \approx 0.9$, $4 \frac{1}{2}$ -5 g, 30,000 FT



ST. LOUIS DEVELOPED SOLUTION



EDWARDS DEVELOPED SOLUTION

PROBLEM TRACED TO SHOCK INDUCED SEPARATION EXCITING 1ST FUSELAGE BENDING VIBRATION MODE—NOT POSSIBLE TO PREDICT.

CLIPPED TIP ALSO PRECLUDED EXCESSIVE WING LOADS AT $M=1.02$, 20K.

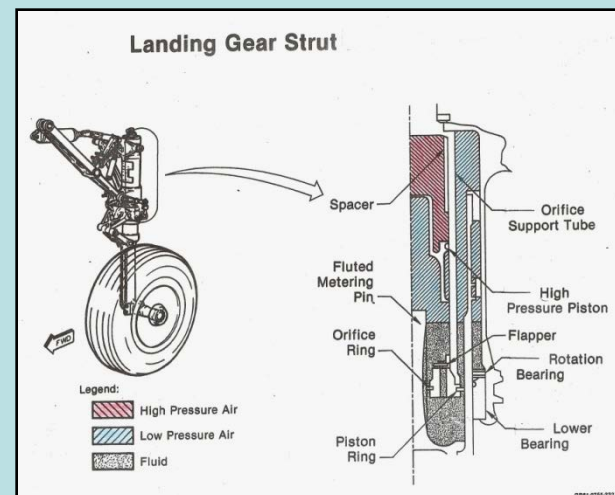
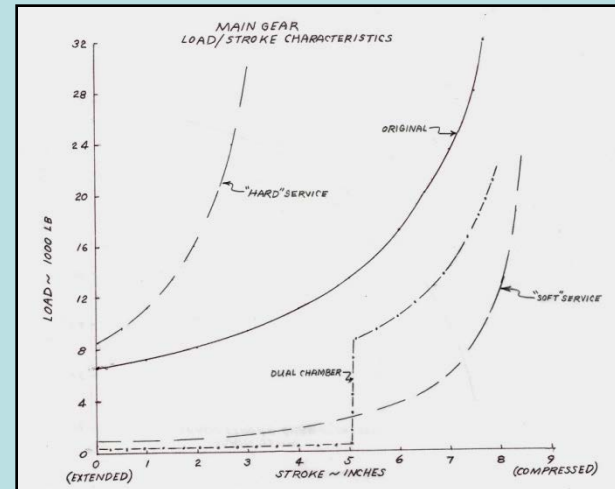
CROSS-WIND LANDINGS

PROBLEM: TRACKING CENTERLINE

REQUIREMENT: OPERATION
IN 30 KT CROSS-WIND

PROBLEM TRACED TO MAIN
GEAR ACTING AS “SKATE
BOARDS”

SOLUTION:
CHANGE TO DUAL-CHAMBER
STRUTS



HIGH ANGLE OF ATTACK, STALL, SPIN TESTS

AUSPICIOUS START—INADVERTENT SPIN WITH SHIP #1 DUE TO EXCESSIVE LEFT/RIGHT WING FUEL ASYMMETRY. NORMAL RECOVERY.

SHIP #8 SPIN TEST PROGRAM:

DELAYED--EMERGENCY POWER UNIT HYDRAZINE PROBLEMS. CHANGED TO BATTERY.

PILOTS—JACK KRINGS, DENNY BEHM, PETE WINTERS (USAF), DAVE PETERSON (USAF).

THREE UPRIGHT SPIN MODES—ENTRY WITH HIGH ENERGY “ARI DEFEAT.” ONE INVERTED “MODE.” ALL RECOVER NORMALLY.

115 SPINS ACCOMPLISHED (VARIOUS LOADS).

CAT I AND CAT II ENDED AUGUST 1975.

FIRST TIME EVER: NO LOSS OF TEST AIRCRAFT.



THE EVOLUTION CONTINUES

MORE 1ST FLIGHTS

TF-15 (F-15B)—7 July 1973.

F-15C—26 February 1979.

F-15D—19 June 1979.

F-15J (Japan)—4 June 1980.

F-15E—11 December 1986.

F-15S/MTD (Technology Demonstrator)—7 Sep 1988.

F-15S (Saudi Arabia)—19 June 1995.

F-15I (Israel)—12 September 1997.

F-15K (Korea)—3 March 2005.

F-15SG (Singapore)—16 September 2008.

