

Flight Test Safety Workshop

1-3 May, 2012
Seattle



**“I LEARNED ABOUT FLIGHT
TESTING FROM....”**

**“... JUST HANGING AROUND
LONG ENOUGH!”**

Jim Sandberg









**“I LEARNED ABOUT FLIGHT
TESTING FROM....”**

“Be sure you are right... then go ahead” - Davy Crockett

- YF-16 LATERAL PIO
- YF-22 LONGITUDINAL PIO
- F/A-18E/F VMCA

YF-16 "FIRST" FLIGHT



YF-16 "FIRST" FLIGHT



YF-22 LAST FLIGHT



YF-22 LAST FLIGHT



F/A-18E/F VMCA



“Good ideas are not adopted automatically. They must be driven into practice with courageous patience.”

- Admiral Hyman Rickover, USN

- Even if they affect safety
- Even if they affect efficiency
- Even if they affect design concepts

Even if they affect safety



B-2A crash 23 Feb 2008



Even if they affect efficiency

- F/A -18E/F FLUTTER TEST PROGRAM
- EGLIN's "LBA" WEAPONS TEST PROGRAMS

EVEN IF THEY AFFECT DESIGN CONCEPTS

YF-23 Integrated Auto Throttles



EVEN IF THEY AFFECT DESIGN CONCEPTS

**YF-23 Integrated Auto Throttles
(1988)**



**F/A-18E/F Integrated APC
(1994)**



F-35B LIGHTNING II (2004)



F-35B LIGHTNING II (2011)



“Sooner or later, programs need an excuse to do the right thing...”

F-18 HIGH AOA TESTING



“Sooner or later, programs need an excuse to do the right thing...”

F-18 HIGH AOA TESTING



F/A-18E/F SPIN TESTING



Upright Spin, 120 deg/sec, Left

3 Tank Interdiction Loading

Flight 266, Run 28, 10 July 98

Pilot: CDR Niewoehner

“If you can’t get the data... THAT’s the data!”
– Bob Wirt via Jerry Gallagher

- F/A-18E/F SPEED-POWER
VL DIVES
VMCA
- B-2 SPEED-POWER
- F-22 LOADS

Beware of short-cutting tried and true processes and procedures that WORK

- F/A-18E/F Iron Bird
- FADEC Regression Testing
- “Step One” Gear Check

“Step One” Gear Check

QF-86 (1986)



“Step One” Gear Check

QF-86 (1986)



YF-23 (1990)



LESSONS LEARNED

- “Be sure you’re right... then go ahead”
- “Good ideas are not adopted automatically. They must be driven into practice with courageous patience.”
- Sooner or later, programs need an excuse to do the right thing...
- “If you can’t get the data... THAT’s the data!”
- Beware of short-cutting tried and true processes and procedures that WORK

QUESTIONS?

COMMENTS?

Beware of “Quick Fixes” and project forward to identify unintended consequences.

- F-18 LEX SLOTS vs VERTICAL TAIL FATIGUE
- F-18 LEX DESIGN vs TURN PERFORMANCE
- F-18 WING SNAG vs WING DROP