F-15B 836
Supersonic Research Testbed Capabilities

Brett Pauer, F-15B 836 Project Manager
NASA Armstrong Flight Research Center

January 14, 2016
F-15B 836 Overview

- F-15B (74-0141) – Obtained in 1993 from Hawaii ANG
  - Last flying B-model in the U.S.

- Two-Seat version

- Two F100-PW-220E engines – upgraded in 2014
  - 24,000 lb thrust class
  - Digital engine control

- Weights (1,500 lbs lighter than F-15D)
  - 42,000 lb – typical takeoff weight
  - 32,000 lb – typical landing weight
  - 12,000 lb – internal fuel (2,000 less than F-15D)

- Speed/Altitude
  - Mach 2+ / 60,000 feet (with pressure suit modification)
  - Mach 2 / 50,000 feet with test fixtures

- Dimensions
  - Length – 64 feet
  - Wingspan – 43 feet

5/12/2016
F-15B 836 Aircraft Systems/Limitations

- Two UHF Radios
- TACAN
- Air Refueling capable
- INS without GPS – up to 1 nm/hour drift
  - Supplemented with Garmin 496 Handheld
- Multi-Stage Improvement Program (MSIP) not accomplished
  - H009 Bus - no 1553 bus
- No Radar or TCAS – requires chase aircraft
- No ILS
- No visible moisture - Ground or Flight
- Armament/Defensive Systems Removed
F-15B 836 Instrumentation

- Research Nose Boom/Radome
  - Total/Static Pressure, Alpha/Beta

- Aircraft instrumentation system with S-Band telemetry and on board recording capability (Chapter 10)

- Video Recording and Downlink

- Video display in rear cockpit

- High speed camera for center station

- IR Camera for center station

- Research GPS (Ashtech Z-12)

- C-Band radar tracking beacon
F-15B Test Configurations

• Supports 3 current test fixtures with separate instrumentation systems and telemetry stream
  • Advanced Flight Test Fixture (AFTF)
  • Propulsion Flight Test Fixture (PFTF)
  • Centerline Instrumented Pylon (CLIP)

• Standard pylons are available

• Aircraft is capable of being modified
Advanced Flight Test Fixture (AFTF)

• Configurable fixture
• Dimensions: 107 x 32 x 8 in
• Weight: 500 lbs

• Configuration
  • PCM Data Encoder
  • 8 instrumentation bays
  • Reconfigurable leading edge
  • Removable NACA boom (Alpha, Beta, pressure)
  • Temp/pressure sensors, load cells and accelerometers

• Mach 2.0 / 50,000 feet / 3 G’s
Propulsion Flight Test Fixture (PFTF)

• Pylon, Adapter and experiment
• Adjustable Alpha (up to 8 degs)
• Dimensions: 107 x 19 x 10 in
  • Plus adapter/experiment
• Weight: 1100 lbs
  • + 500 lbs max adapter/experiment
• Configuration
  • PCM Data Encoder
  • 3 instrumentation bays
  • Force Balance – 3 axis load and moment sensors
  • Temp/pressure sensors, load cells and accelerometers
• Mach 2.0 / 50,000 feet / 3 G’s
Centerline Instrumented Pylon (CLIP)

- Modified F-15 Center Pylon
- Minimize flow disturbances
- Allows larger experiment
- Dimensions: 196 x 15 x 5 inches
  - 41 inch max adapter/experiment
- Weight: 580 lbs + experiment
- Configuration
  - PCM Data Encoder
  - 3 instrumentation bays
  - Force Balance – 3 axis load and moment sensors
  - Temp/pressure sensors, load cells and accelerometers
- Mach 2.0 / 50,000 feet / 5 G’s
Example Experiments

- Lifting Insulating Foam Trajectory (2005)
- Quiet Spike (2006-09)
- Supersonic Boundary Layer Transition (2010-14)
- Channeled Center-body Inlet Experiment (2011)

• F-15D Replacement for F-15B 836
• Same Baseline Capabilities as 836
• Added Aircraft Capabilities
  • EGI Navigation
  • Radar and ILS in chase configuration
  • TCAS/TAWS (Traffic and Terrain Avoidance Systems)
  • +2,000 lb Internal Fuel (above F-15B)
• Added Instrumentation
  • Improved telemetry data rate
  • HD Video Downlink
  • Cockpit Audio Recording and Hot Mic
  • Multi-station Camera
  • 1553 Bus Data
  • Ethernet data connection in cockpit
  • S or C-Band telemetry Streams
• Currently at Preliminary Design Review (PDR) stage