# Flight Test Update - F/A-18E/F Super Hornet (Slides)

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**Abstract**

This presentation shows a background of the F/A-18 Super Hornet. Some background information includes: Program history, aircraft description, flight test program and the lessons noted.
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From: Team Leader, Technical Publishing Team, Naval Air Warfare Center Aircraft Division, 22541 Millstone Road, Patuxent River, MD 20670-5304

To: Commander, Naval Air Systems Command (AIR 7.5), 1421 Jefferson Davis Highway, Arlington, VA 22243

Subj: REQUEST FOR RELEASE OF TECHNICAL INFORMATION

Encl: (1) Flight Test Update - F/A-18E/F Super Hornet (Slides) (2 copies)
(2) F-18E1 Arrival at NAWCAD Patuxent River (Video Tape)

1. Enclosures (1) and (2) are forwarded for review and approval for public release.

2. Enclosures (1) and (2) will be presented at the Society of Experimental Test Pilots, San Diego, California on 15 March 1996. The authors of enclosure (1) are LCDR T. C. Gurney and Mr. Jim Sandberg. The proposed NAVAIR reviewer is Mr. Willie Smith (PMA265-F1). Request approval by ASAP or no later than 13 March 1996.

3. Please contact Dorothy Reppel at DSN 342-1709 or commercial (301) 342-1709 should you have any questions.

Karen L. Brown
KAREN L. BROWN
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THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.
• Program History
• Aircraft Description
• Flight Test Program
• Lessons Noted
Continues Hornet Evolution

Additional Improvements

- APG-73 Radar Upgrade
- Engine Upgrade
- Reconnaissance

F/A-18C/D
Night Strike

- Night/Adverse Weather Capability
- Deliveries Began October 1989

F/A-18C/D

- Advanced Weapons
- Improved Systems
- Fleet Deliveries September 1987

F/A-18A/B

- Replaced A-7 and F-4
- First Flight November 1978
Continues Hornet Evolution

Additional Improvements

F/A-18C/D
Night Strike

- APG-73 Radar Upgrade
- Engine Upgrade
- Reconnaissance

F/A-18C/D
Night/Adverse Weather Capability
Deliveries Began October 1989

F/A-18A/B
Advanced Weapons
Improved Systems
Fleet Deliveries September 1987

F/A-18E/F
- Longer Range
- Payload Flexibility
- Increased Payload Recovery
- Improved Survivability
- Growth Margin

Maintaining Outstanding Carrier Suitability and Growth Potential
## F/A-18E Characteristics

<table>
<thead>
<tr>
<th></th>
<th>F/A-18E</th>
<th>F/A-18E C260</th>
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<tbody>
<tr>
<td>Wing Area</td>
<td>500 sq ft</td>
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</tr>
<tr>
<td>Weight</td>
<td></td>
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<tr>
<td>Empty</td>
<td>30,564 lb</td>
<td>28,368 lb</td>
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<tr>
<td>Max TOGW</td>
<td>66,000 lb</td>
<td>51,000 lb</td>
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<tr>
<td>Takeoff (Fighter Escort)</td>
<td>47,874 lb</td>
<td>37,750 lb</td>
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<tr>
<td>Carrier Landing</td>
<td>42,900 lb</td>
<td>35,000 lb</td>
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<tr>
<td>Propulsion</td>
<td></td>
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<tr>
<td>(2) F404 Derivative Turbos</td>
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<tr>
<td>Engine</td>
<td></td>
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<tr>
<td>Total Thrust Class (SLSU)</td>
<td>44,000 lb</td>
<td>32,000 lb</td>
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<tr>
<td>Fuel (JP-5)</td>
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<tr>
<td>Internal</td>
<td>14,460 lb</td>
<td>10,860 lb</td>
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<tr>
<td>External</td>
<td></td>
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<tr>
<td>330 gal. Tanks</td>
<td>6,730 lb</td>
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<td>480 gal. Tanks</td>
<td>9,790 lb</td>
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<tr>
<td>Design Load Factor (USN)</td>
<td>7.5 g</td>
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*Diagram of F/A-18E aircraft*
F/A-18E/F Features

Additional 3,600(E)/3,385(F) lb Internal Fuel

Two Additional Wing Store Stations

Improved Inlet Design

Crew Station Upgrade

Aerial Refueling Store Compatibility

Survivability Enhancements

Dual Pressure Hydraulics

F414-GE-400 Engines

500 sq ft Wing

 Increased Composite Usage for Fuselage Skins
Alternate Speedbrake Mechanization

Primary Flight Controls Deflect
LEX Spoilers Deflect

Flaps Deflect

Mechanization Provides Roll and Yaw Command Priority Logic
E/F Flight Test Status (3/1/96)

- E–1 6 Flights 8.8 hr
- E–2 6 Flights 9.0 hr

- Both Aircraft @ Pax – Ready to Test
  - E–1 Air Data/Envelope Expansion
  - E–2 FQ/Propulsion/IFR
So, How Does It Fly?

- Handling Qualities
  - Up and Away
  - Landing
  - No Major FCS Design Issues

- Engine
  - Precise Control

- Performance
  - "Data On the Line or Above"
  - Longer Test Missions
Raw Uncorrected EOA Cruise Specific Range @ W/Delta = 206,238 (2) AIM-9 Configuration

![Graph showing V/WF vs Mach Number]

- **E2, Flight 2**
- **E2, Flight 3**
- **June 1994 Prediction:**
  - 38,000 ft
  - 42,023 lb
  - 25% Mac
  - Unaccelerated Flight
Raw Uncorrected EOA
Cruise Specific Range @
W/Delta = 61,107
(2) AIM-9 Configuration

Preliminary

V/WF
(NM/lb)

0.08
0.07
0.06
0.05
0.04
0.03

Mach Number

0.34 0.38 0.42 0.46 0.50 0.54 0.58 0.62 0.66 0.70 0.74

- E2, Flight 3

- June 1994 Prediction:
  10,000 ft
  42,023 lb
  25% Mac
  Unaccelerated Flight
Test Data Validates CFD

F/A-18E Sting and Distortion/Jet Effects Model

Mach 0.85, $\alpha = 3.5^\circ$
Comparisons

| Landing | 42,000 lb GW | 133 KIAS App SPD |
| Climb   | Mil Power Climb | Buffet Free |
| High Altitude Maneuvering | 85,000 lb GW | 146 KIAS App SPD |
|         | Afterburner Required | In Buffet |
# F/A-18E/F Aircraft Test Program Summary

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<tr>
<td>E1 (350)</td>
<td>ONDJ</td>
<td>FMAM</td>
<td>JASON</td>
<td>NDJF</td>
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<td>E2 (345)</td>
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<td>E3 (300)</td>
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<td>E4 (265)</td>
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<td>E5 (285)</td>
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<td>E6 (258)</td>
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<td>E7 (162)</td>
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F/A-18E/F Flight Test
Integrated Test Team Organization

C.D. Pilcher
CFTD

R.J. Miller
MDA
Manager
T-45/AV-8/
F/A-18C/D

CDR R.O. Wirt
GFTD

J.B. Dann
MDA
Safety

F.A. Madenwald
MDA
Flight
Operations

LCDR R. Niewoehner
USN

K.H. Morgan
MDA
Aircraft Test
and Data

R.J. Harney
USN

D. Macintosh
NGC

J.M. Smith
MDA
Technical
Support Team

B. Kneeland
USN

M.H. Ploch
MDA
QA

M. Franko
USN
Fleet
Compatibility

R.L. Renard
MDA
Business
Operations

D.E. Miller
MDA
H.R.

S.A. Kapinos
USN
Project/T&E
Coordinator

B.T. Franklin
MDA
Production
Operations

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