Carrier Strike Aviation:
The Future of Naval Tactical Air and the Maritime Strategy

Precision Strike Winter Roundtable

RADM David L. Philman
(N88) Director, Air Warfare

Wednesday, March 3, 2010
Maritime Strategy

Use of the Sea as Maneuver Space

Stable Security Environment
Prevail in Conflict

Deterrence

Forward Presence

Humanitarian Assistance
Disaster Response

Maritime Security

Sea Control

Power Projection

Friends Partners Allies

USN
USMC
USCG

Ability to Prevail in Conflict Helps Create a Stable Security Environment
NAVAL AVIATION CAPABILITIES

Striking Power, Intelligence, Surveillance, Reconnaissance, and C2

Power Projection

Cutting Edge Training
CVN-78 Class: A Leap Ahead

Integrated Island
- Dual Band Radar
- Multi-Function Radar
- Volume Search Radar

Enhanced Flight Deck
- Advanced Arresting Gear
- Electromagnetic Aircraft Launch System

Improved Weapons & Material Handling
- Advanced Weapons Elevator
- Heavy UNREP

New Propulsion/Electric Plant
- All Electric Auxiliary Services
- Zonal Electrical Distribution System

Improved Survivability
- Underwater Protection

Improved Ship Self Defense
- Open Architecture
- ESSM

Key Performance Parameters

<table>
<thead>
<tr>
<th>KPP CVN 78</th>
<th>Threshold</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sortie Rate (sustained)</td>
<td>160</td>
<td>220</td>
</tr>
<tr>
<td>Sortie Rate (surge)</td>
<td>270</td>
<td>310</td>
</tr>
<tr>
<td>Service Life Allowance</td>
<td>5% Wt / 1.5 ft KG</td>
<td>7.5% Wt / 2.5 ft KG</td>
</tr>
<tr>
<td>Interoperability</td>
<td>Attain Critical IERs</td>
<td>Attain all IERs</td>
</tr>
<tr>
<td>Electrical Capacity</td>
<td>2.5X NIMITZ</td>
<td>3.0X NIMITZ</td>
</tr>
<tr>
<td>Manpower</td>
<td>500 reduction</td>
<td>900 reduction</td>
</tr>
</tbody>
</table>
Future Carrier Air Wing

NOTIONAL CVW OF THE FUTURE COMPRISED OF:

- 44 STRIKE FIGHTER (F/A-18, JSF) AIRCRAFT
- 5 EA-18G AIRBORNE ELECTRONIC ATTACK (AEA) AIRCRAFT
- 5 E-2D ADVANCED HAWKEYE AIRCRAFT
- 19 MH-60R/S HELOS (11 ON THE CARRIER/8 DISPERSED THROUGH THE CSG)
- 2 CARRIER ONBOARD DELIVERY (COD) AIRCRAFT AUGMENT THE ENTIRE CSG
Increasingly capable, \textit{Netted} Force

\textbf{F/A-18A-F}

\textbf{F/A-18 E/F & EA-18G}

\textbf{EA-6B}

\textbf{JSF}

\textbf{Capabilities}
- Precision Strike
- Stealth
- Anti-Air Warfare
- Electronic Attack
- Suppression & Destruction of Enemy Air Defenses
- Close Air Support
- ISR
- Air Refueling
- Reliability
- Supportability
- Maintainability

\textbf{F/A-18E/F & JSF More Capable:}
- Range, Payload, Bring-Back,
- State of the Art Sensors, Survivability
The F/A-18E/F aircraft is a multi-role fighter designed for aircraft carrier duty and is the first tactical aircraft initially designed to carry out both air-to-air and air-to-ground missions.

- Time Sensitive Strike
- Electronic Warfare
- Improved Stealth, Precision, Range, and Payload
- Combat Proven Capability, Forward Deployed and Ready to Meet the Nation’s Tasking
- Available Technology and Weapons Systems that Deter and Defeat the Threat
- Flexible, Affordable and Survivable
Super Hornet Block II

Providing time sensitive targeting solutions and high volume precision fires to ground forces and joint ground stations.
Future Capability

Image Correlation Targeting

- Onboard Geo-Registration for Precise Target coordinates through the WX

- Geo-Registration Targeting allows real-time reactive targeting at maximum weapon delivery range

- “JDAM Quality” target coordinates at long standoff ranges

- With open architecture, principle design will support growth to:
  - multiple moving targeting solutions using ATFLIR or AESA
  - Blue Force situational awareness
  - Combat ID

Note: Tested against over 12 different target sets, but truth data was only available for the ALAST target board shown here

Image Correlation Targeting Offers “JDAM Quality” Target Coordinates at Long Standoff Ranges

Long Standoff Range

SAR Spec with ANAV 420 ktas
ICT
AESA with ICT

Weapons TLE

ATFLIR
AESA

Designation Range NM

0 10 20 30 40 50

420 ktas
ICT
JSF F-35 Lightning II

- Meets the advanced threat (2010 & beyond) while improving lethality, survivability, and supportability
- Replaces aging USN and USMC tactical aircraft
- Tri-Service program
- Eight International Partners
- Stealth signature and advanced countermeasures
- Advanced avionics / data links
- Increased range with internal fuel and weapons
- Highly supportable, state of the art Prognostics and Health Management system

Affordable Next Generation “Family” of Strike Fighters
Integrated and Fused Mission Systems

- Full Spherical Coverage by Distributed Aperture System (DAS)
- Electro-Optical Targeting System (EOTS)
- 360° Coverage
- Emitter Locating Aft Band 2
- Fwd Band 3 / 4
- Fwd Band 2
- Radar Warning
- Link 16
- MADL

Active Electronically Scanned Array (AESA)

RADAR

Integrated and Fused Mission Systems

• Targeting
• FLIR
•IRST Functions

2010 2011 2012 2013 2014 2015

STOVL Delivery

CV Delivery

STOVL IOC

CV IOC

2016

CF-1 FF
Offensive Firepower

CV internal weapons bay
- 2k class weapon – each bay
- AMRAAM – each bay

STOVL internal weapons bay
- 1k class weapon – each bay
- AMRAAM – each bay

BF-3 undergoing ground vibration testing
F-35 Weapons

EXTERNAL WEAPONS

426-Gallon Wing Tank

Stormshadow (Not DoN POR)

AGM-158 JASSM (Not DoN POR)

MXU-648/CNU-88 Baggage Pod

AIM-120B and C AMRAAM

AIM-9X Sidewinder

BDU-57/58/60 Laser-Guided Training Round

Missionized Gun

INTERNAL AND EXTERNAL WEAPONS

GBU-32 JDAM 1,000-lb (MK-83/BLU-110 Warhead)

GBU-12 Paveway II 500-lb LGB (MK-82 Warhead)

GBU-31 JDAM 2,000-lb (MK-84 Warhead)

AGM-154A/C JSOW Glide Bomb

CBU-103/104/105 WCMD (Not DoN POR)

GBU-38 JDAM 500-lb (MK-82 Warhead)

GBU-31 JDAM 2,000-lb (BLU-109 Warhead)

AIM-120C AMRAAM

AIM-132 ASRAAM

EXTERNAL WEAPONS

GBU-10 Paveway II 2,000-lb LGB (MK-84 Warhead)

GBU-24A/B Paveway III 2,000-lb LGB (BLU-109 Warhead)

GBU-16 Paveway II 1,000-lb LGB (MK-83 Warhead)

MK-83 BLU-110 LDGP 1,000-lb LDGP

MK-83 BSU-85 HDGP

MK-84 2,000-lb LD/HDGP

MK-84 BSU-50 Ballute 2,000-lb HDGP

GBU-12 Paveway II 500-lb LGB (MK-82 Warhead)

MK-82 500-lb LD & HD

SDB

CU-09/100 Rockeye II Cluster Munition

Weapons Currently Under Development

UK 500# PGB
Air to Ground Weapons Roadmap

Rockets/MGA
- 2.75” Rockets
- 5” Rockets
- 20mm/25mm/50Cal

Direct Attack
- GP Bomb
- LGB/JDAM
- DMLGB
  - Hellfire (RW)
  - Maverick
  - GBU 24/J109

Stand-off Land Attack
- JSOW A/C
- SLAM-ER

Stand-off ASuW
- Harpoon 1-C
- SLAM-ER

Guided Rockets/MGA
- APKWS
- LOGIR*

Direct Attack
- DAMTC
- JAGM (RW)
- GBU 24/J109
- GP Bomb
- LGB/JDAM

Stand-off Land Attack
- JSOW C-1
- JAGM (FW)
- SDB II

Stand-off ASuW
- Harpoon III
- JSOW C-1

* Not Funded
** Not DoN POR

All Wx, Counter EA, Stand-off, Moving Target Capable

Air to Ground Weapons - Pacing the Threat
**UAS Roadmap**

**MISSIONS**

**SMALL TACTICAL**
Individual unit maneuver decisions, force protection, directed surveillance within 25 nmi

**TACTICAL**
LCS/SAG mission support; armed recce; MDA within 100 nmi

**PERSISTENT**
Land based, maritime multi-INT MDA in permissive environment within 2000 nmi

**PENETRATING**
CVN based, LO, IFR, multi-INT ISR/Persistent Strike or Next Generation Strike-Fighter

**SYSTEMS**

**STUAS POR**
Fire Scout

**sensor capabilities**

Organic detection, classification, and ID

Maritime tactical target detection, classification, ID, and designation. Mine detection.

Broad area maritime/littoral detection, classification, and ID

Littoral/overland detection, classification, ID, and targeting/geo-location

**SENSOR TYPES**

- **EO/IR** (Off-the-Shelf)
- **AIS**
- **EO/IR; Laser Designator/Range Finder (Brite Star II)**
- **Multi-spectral Imaging (COBRA)**
- **Multi-mode Magnetic Detection System**
- **Radar (funded in PB09)**
- **Radar**
- **EO/IR**
- **ESM**
- **AIS**
- **Radar**
- **EO/IR**
- **ESM**

**WHAT'S NEXT**

- **PB08 funding support**
- **Complete OT & IOC FY09**
- **Support LCS**
- **Complete MS B**
- **Award SDD contract (Both 4th QTR FY07)**
- **PB09 funding support**

**UAS Roadmap**

**BAMS UAS**
**Our Challenge:**

*Win the current wars while outpacing future threats*
LIFE…LIBERTY…AND THE PURSUIT OF ALL WHO THREATEN IT.