

HF in the US Navy Update



HFIA
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HFDS relied on BFEM66 Today

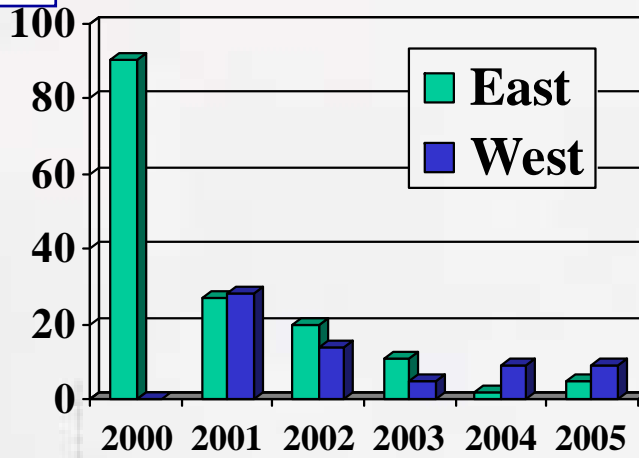
◆ *FY'04 – FY'06*

- Currently fielded 195 ships with point to point system BFEM66
 - Non-networked - stand alone
 - Still growing in number of Allies/Coalition partners who use BFEM66 for communication with US Navy afloat
- Technology obsolescence management is necessary objective in order to maintain the vast Allied/Coalition interoperability the US Navy afloat has today
 - Overlapped technology lifecycles across two (2) upgrade increments
 - Increment I: SMTP over HF (Battle Force E-Mail66)
 - Increment II: IPv6 over HF (S-5066) and VHF (non-S5066)



Performance: Service to the Fleet

Down Time Reports



Average Data Rates

| | Pre-Set Modem Speeds for Shipboard Systems | | | |
|--------------------|--|--------------|--------------|-------------|
| If Modem SNR = | <12 SNR* | 12-18 SNR* | 18-24 SNR* | >24 SNR* |
| With Function = | MIL110B | MIL110B | MIL110B-F | MIL110B-F |
| At Datarate = | 4.8 Kbps | 9.6Kbps | 12.8Kbps | 19.2Kbps |
| 253K Word document | 12.2 minutes | 10.9 Minutes | 7.0 Minutes | 3.0 minutes |
| 259K PDF File | 15.2 minutes | 13.7 minutes | 10.0 minutes | 7.1 minutes |

* SNR = Signal to Noise Rating on modem front panel

Interoperability Level:

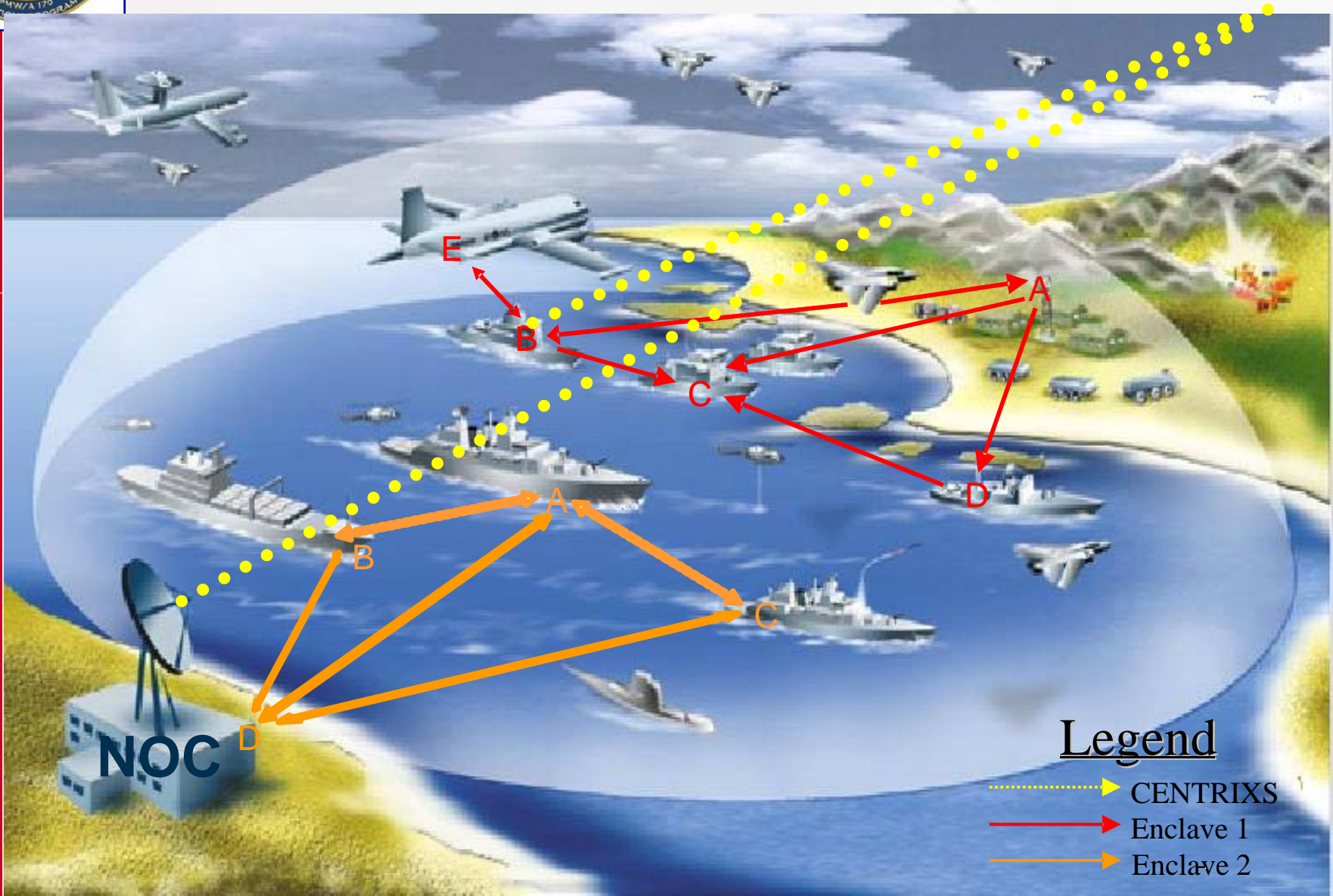
| Int'l Partner | NATO | Coalition | FMS/Direct | Verified |
|---------------|------|-----------|------------|--------------|
| Belg | 3 | | FMS | Yes |
| Can | 16 | | Direct | Yes |
| Fra | 77 | | Direct | |
| Ger | 24 | | FMS | Yes |
| Ital | 58 | | Direct | |
| Jap | | 22 | FMS | Yes |
| Neth | 6 | | Direct | Yes via NATO |
| Oman | | 15 | Direct | Yes via UK |
| Spn | 1 | | Direct | |
| UK | 60 | | Direct | Yes |
| US | 182 | | | |

Requirements

| Information Characteristics | Sending Node | Receiving Node | Format | Time lines |
|--|--|---|--|--|
| Operational and administrative traffic to include emails and attachments | Afloat platforms, shore sites both U.S. and Allied/Coalition. Joint aircraft/land based vehicles as appropriate. | Afloat platforms, shore sites both U.S. and Allied/Coalition. Joint aircraft/land based vehicles as appropriate | Data packets, formatted in accordance with STANAG 5066 in a modulated waveform complying with STANAG 4539/MIL-STD 188-110B | Variable. In two station net, 100KB message in less than 5 mins. |



The HF-IP Architecture Goal





Battle Force Email 66 Capabilities Growth Plan into HFDS

– FY'05 - FY'06

- **Integrate HF-IP Design and connect to secure LAN infrastructures**
 - **Advances HF pathway capability toward hands-free operation at a network appliance**
 - ✦ **E-Mail**
 - ✦ **Internet Relay Chat Environment (Demonstrated)**
 - ✦ **Secure FTP transfers**
 - ✦ **NetMeeting**
 - ✦ **Distributed Database Replication (Demonstrated)**
 - **Implement in air, ground and afloat environments**
 - ✦ **Diverse Token Ring connection topologies**
 - ✦ **Multicast link state**
- **Broaden scope of HFDS to include shore and aircraft**
 - **Successful demonstration in theatre and in more diverse architectures continues**
 - ✦ **Implementation with VHF for instance**



HFDS is listed as #2 Interoperability “Need” in US Navy

◆ FY’06 - FY’09

- Assessing the 32Kbps modems for use afloat**
 - Determine “good-put” expectations in operational environment**
- Assess business case offered by ALE in multi-cast/token ring environment over legacy SSB capability**
 - With ALE controller or new radio functions**
- Moving (as the rest of the US DoD is) toward IPv6**
 - Add HF-IP utility into airborne platforms**
 - Add HF-IP into shoreside platforms**
- Combining HFDS with non-HF systems to improve information transfer amidst ships in close proximity**

Move toward IP over HF in a Joint/Allied Interoperability environment will set the rate of authorized improvements in the U.S. Navy



HF Transition to JTRS

◆ **FY'07 - FY'10**

- Continue to measure and accomplish dove-tailing with JTRS requirements
 - JTRS will support all HF waveforms/protocols used in the US Navy today.
 - Mil-Std-188-110B appendix F
 - STANAGs 5066 and 4529
 - HF ALE Mil-Std-188-141B
 - ATC HF Data Links



Summary

- ☑ ***HF Data (IP Based) use for allied/coalition naval interoperability is proving reliable and efficient***
- ☑ ***US Navy continues to search for Higher speed modems for increasing HF medium operational utility***
- ☑ ***HFDS used with Military IT architectures is addressing the U.S. Navy's needs for data speed, hands-free utility and HF networking***
- ☑ ***Goals within the Navy's HF programs are compatible with JTRS implementation***



Questions ?



Backup Pages



Definitions

- ◆ **A Token Ring network is a local area network (LAN) in which all computers are connected in a ring, mesh or star topology and a bit- or token-passing scheme is used in order to prevent the collision of data between two computers that want to send messages at the same time**
 - Very briefly, here is how it works:
 - When a computer has a message to send, it inserts a token in an empty frame (this may consist of simply changing a 0 to a 1 in the token bit part of the frame) and inserts a message and a destination identifier in the frame.
 - The frame is then examined by each successive workstation. If the workstation sees that it is the destination for the message, it copies the message from the frame and changes the token back to 0.
 - When the frame gets back to the originator, it sees that the token has been changed to 0 and that the message has been copied and received. It removes the message from the frame.
 - The frame continues to circulate as an "empty" frame, ready to be taken by a workstation when it has a message to send.
 - The Token Ring protocol (IEEE 802.5) is the second most widely-used protocol on local area networks after [Ethernet](#).
- ◆ **The HF-IP Token scheme is used within a wireless “Bus” network topology and “Multi-cast” connection state.**
 - In the bus network topology, every HF-IP workstation is connected to a single frequency channel called “the bus”. Multicast⁽¹⁾ communication is systematically handed off between a single sender and multiple receivers on the HF-IP network.
 - Therefore, in effect, each workstation is directly connected to every other workstation in the network.

⁽¹⁾Together with anycast and unicast, multicast is one of the packet types in the Internet Protocol Version 6 (IPv6). Multicast is supported through wireless data networks technology.