



**Program Executive Office
Command, Control, Communications,
Computers and Intelligence (PEO C4I)**

Communications Program Office (PMW/A 170)

HF in the US Navy Update

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Agenda



- Introduction
- Capability
- Concept of Operations
- Basic Configuration
- System Capabilities
- Accomplishments & Goals
- Stretch Goals for BFTN



Introduction



- Netcentric Warfare supports task-organized material forces at sea with the capability to project combat power ashore by vertical and surface assaults from beyond the visual and radar horizons of the enemy shore
 - The Battle Force Tactical Network (BFTN) Gateway system is a platform communication element within the Netcentric architecture
 - Operating in support of disadvantaged platforms that cannot directly interoperate due to lack of SATCOM, depreciated SATCOM or SATCOM-denied connectivity
 - BFTN operates small dual network management equipment sets adapted to operate within each platform's Radio Frequency (RF) communications space to provide transport of SPIRNET⁽¹⁾ via ADNS and CENTRIXS-M⁽²⁾ Internet Protocol (IP)-data communication

(1) Secret Internet Protocol Router Network

(2) Combined Enterprise Regional Information Exchange System–Maritime



Capability Discussion



- BFTN gives the Surface Warfare, and Air Defense Commanders a powerful communication resource in a lack of SATCOM, depreciated SATCOM or SATCOM denied environment for Coalition or US-Only IP-data transport
 - Support mutually exclusive platform mission profiles, yet mutually inclusive objectives with extended-range terrestrial tactical networking communications pathways
- Range of Military Operations
 - Maritime Domain Awareness (MDA)
 - Maritime Interdiction Operations (MIO)
 - Anti-Submarine Warfare (ASW)
 - Expeditionary Warfare Operations (EWO)



Concept of Operations



- Tactical data can be distributed across the at-sea AOR without dependencies on NOC intercession
 - Concurrently providing immediate bridging of tactical data into any platform's SATCOM circuits to shore
 - The BFTN operational contribution is best demonstrated in the operational needs vignette that follows (next three slides)

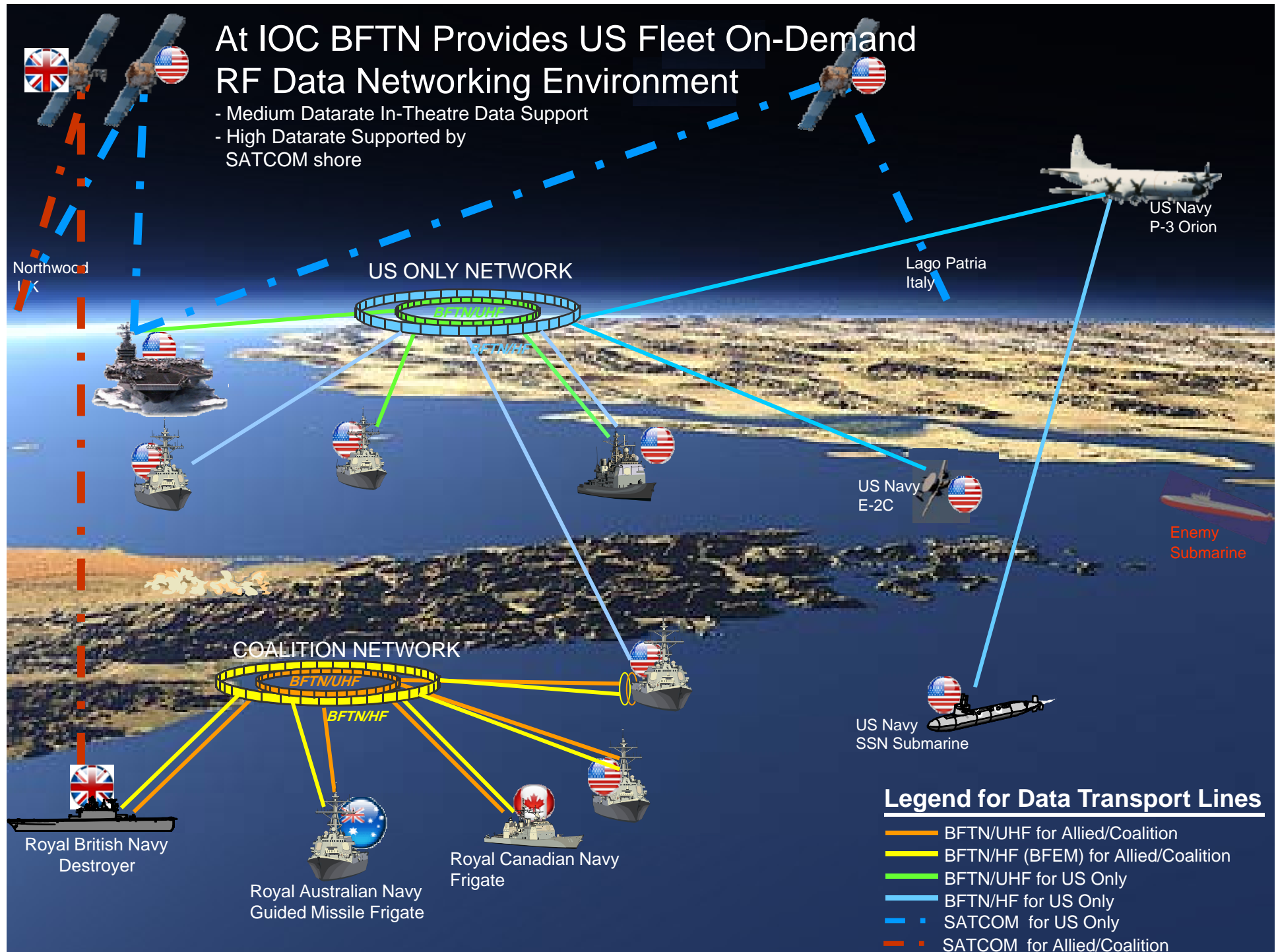
The Legacy US Fleet On-Demand RF Data Networking Environment

- Voice Comms Fills Gap for In-Theatre Info. Sharing
- All other Info Gaps Supported by SATCOM shore



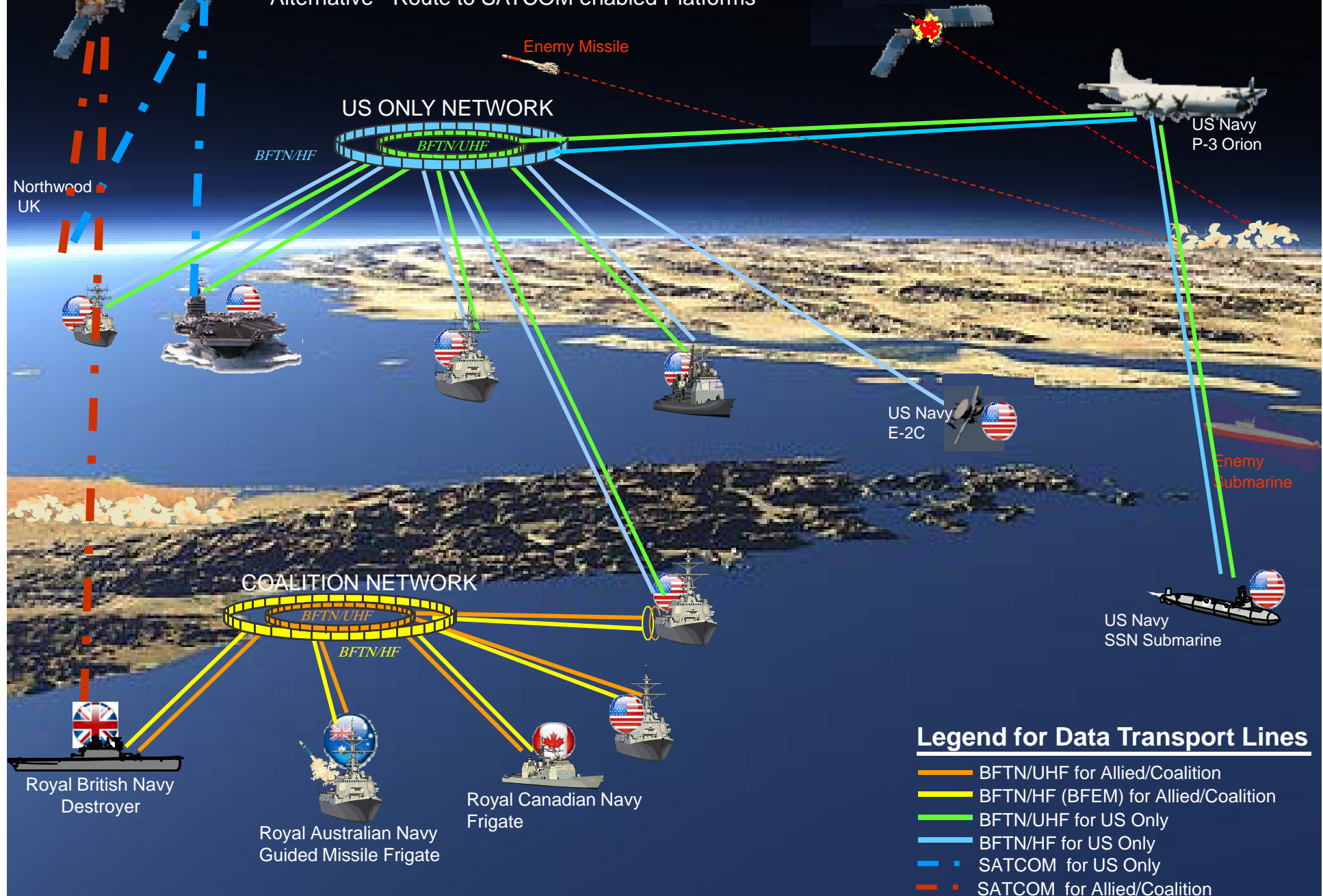
At IOC BFTN Provides US Fleet On-Demand RF Data Networking Environment

- Medium Datarate In-Theatre Data Support
- High Datarate Supported by SATCOM shore



At FOC BFTN Supports a SATCOM-Denied Environment

-RF Data Networking provides continuous Medium Datarate In-Theatre Information Transport Support
Alternative - Route to SATCOM enabled Platforms





Basic Configuration



- **BFTN utilizes presently installed radio equipment and interfaces to CENTRIXS and ADNS routers to extend IP-data connectivity across RF pathways**
 - **Uses Token Ring & TDMA Layer 2 protocols to sustain RF gateways in persistent contact**
 - **Self-forming, self-healing master-less network conduct**





System Capabilities (U)



Key Performance Parameter	Production Threshold	Production Objective	Rationale/Analytic Linkage
On air data rates (Surface and Air (HF only) Platforms)	BFTN/HF: 4.8 Kbps (SSB)/9.6 Kbps (ISB) (Received signal-to-noise-ratio of at least 22dB) BFTN/UHF: 38.4 Kbps (Received signal-to-noise-ratio of at least 22dB)	BFTN/HF: 56 Kbps (Received signal-to-noise-ratio of at least 22dB) BFTN/UHF: 256 Kbps (Received signal-to-noise-ratio of at least 22dB)	Minimum/necessary data-rate thresholds to sustain network transport IP-based user data across 200NM 6-12 node circuit
Operational Availability (Ao)	.90	.98	Ao necessary to sustain route reporting to ADNS and CENTRIXS routers to facilitate routing policy decisions in an automated and efficient manner. When acting as an alternative path to SATCOM for tactical communications
Materiel Availability (A _M)	.70	.90	A _M necessary to ensure that the systems design and logistics organization behind it adequately supports the warfighter with operational capability
Net Ready KPP	BFTN is separate from, yet connected to, other entities through the NCE via CENTRIXS-M and ADNS	In the net-centric view, the BFTN operates in the Net-Centric Environment (NCE) by supporting the sharing of information and services between Navy entities.	BFTN Operational View (OV-1) of NCE aligns with precepts and standards of the Global Information Grid's NCE.
Operate with SSN/SSGN Submarines	BFTN/HF: 1.2 Kbps (SSB) (at BCA operating speeds and depth)/6.4 Kbps(SSB) with mast antenna)/ 2.4/9.6 Kbps (ISB) (Received signal-to-noise-ratio of at least 22dB) BFTN/UHF: 38.4 Kbps (Received signal-to-noise-ratio of at least 22dB)	BFTN/HF: 56 Kbps (Received signal-to-noise-ratio of at least 22dB) BFTN/UHF: 256 Kbps (Received signal-to-noise-ratio of at least 22dB)	The system must function with all SSNs and SSGNs in multiple antenna configurations to support the communications requirements of the submarine service



Accomplishments & Goals



- **Accomplishments:**

- Independent Assessment (COMOPTEVFOR) completed Jul 2009
- 10% Field Deployment approved Nov 2009
- CONOPS completed Dec 2009
- EQT completed (aircraft, ships & subs) Apr 2010
- Capability Document (CPD) approved Sept 2010
- ILS completed Nov 2010
- Demonstrated Higher datarates in TW'10

- **Goals:**

- Asymmetric connectivity of BFTN to all CENTRIXS-M configurations
- Allied/Coalition interoperation in Mediterranean Sea AOR



BFTN Stretch Goals



- U.S. Navy's Fiscal Resources meter BFTN Stretch Goals
 - Near Term:
 - Complete fielding of 253 systems towards meeting inventory objectives of 340+ platforms
 - Add aHFIP BFTN utility into airborne platforms per Joint Staff authorizations for HFDS Program
 - Mid-Term
 - Increase datarates through modernized modem CODECs, broadened HF & UHF channel widths, and automated (hands-off) modem/radio control operation
 - Long Term
 - Align waveform and channel performance improvements with JTRS objectives assure transitional interoperability in out-years



Summary



- BFTN RF Networking (IP Based) use for Allied/Coalition naval interoperability is a recognized need
 - Also applied to separate US-Only circuit to mesh aircraft and submarines with Afloat vessels
- Load-balancing IP over HF and IP over UHF makes a lot of sense in creating RF networking capability
- Technology expansion to improve datarates is part of BFTN reach toward FOC
- Goals within the Navy's BFTN programs are compatible with JTRS implementation



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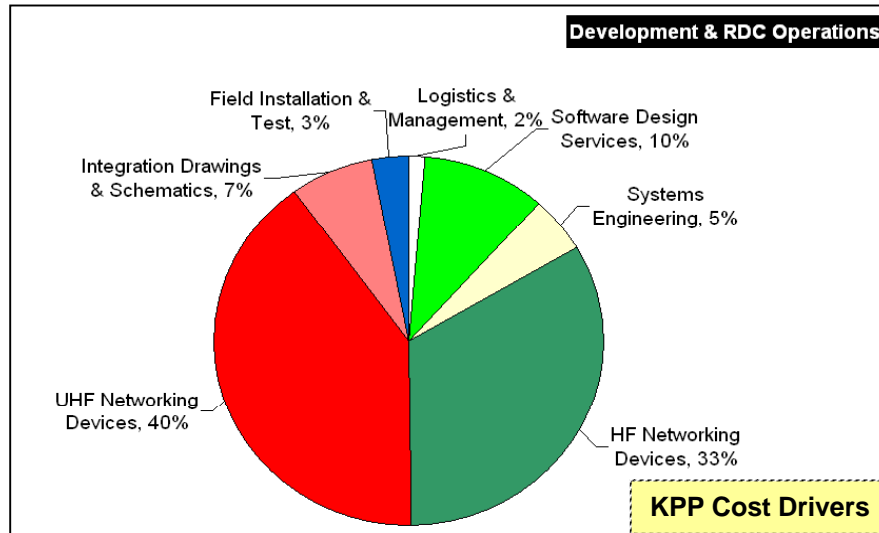
Backup



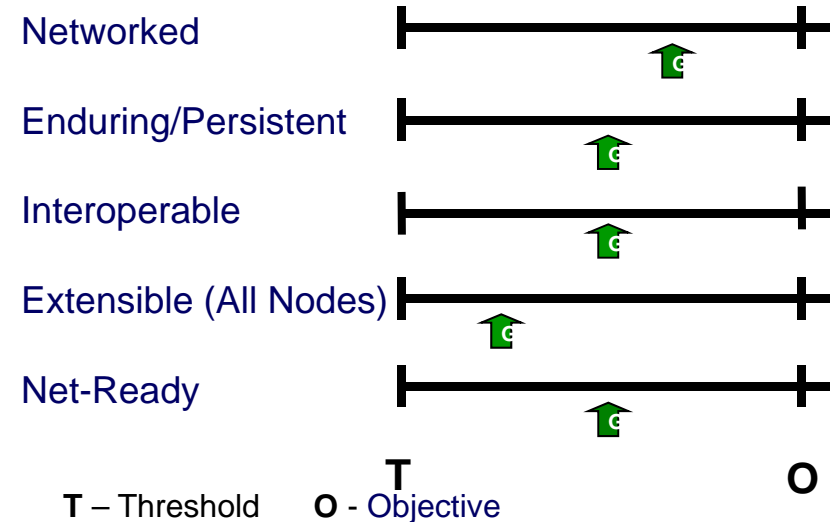
Metrics



Top Cost Drivers (% of program cost)



Performance (KPPs)

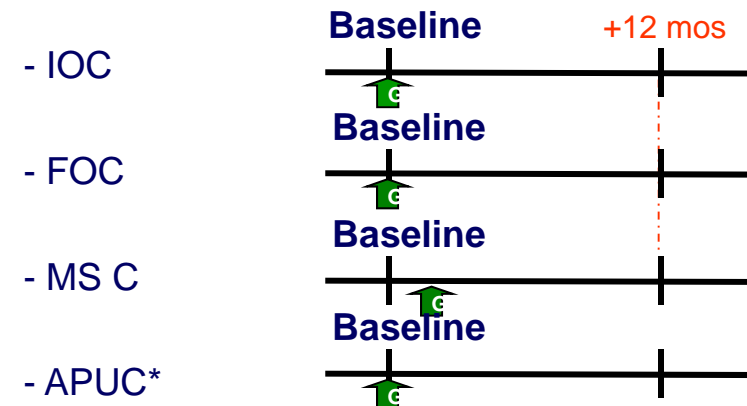


Technology Readiness Assessment*

Critical Technologies	Current Assessment	Est @ Next Milestone
RF Gateway connectivity & IP data transport	7	8
Higher datarates & automated multi-path selection	7	8
Complexity and Scale of the system	7	8

Acquisition Program Baseline (APB)

Schedule/Cost



*APUC: Avg. Procurement Unit Cost