Why Share Spectrum ?

**Mike Williams
Technical Director
Defense Spectrum Organization
29 July 2010**

DISA

A Combat Support Agency

Disclaimer

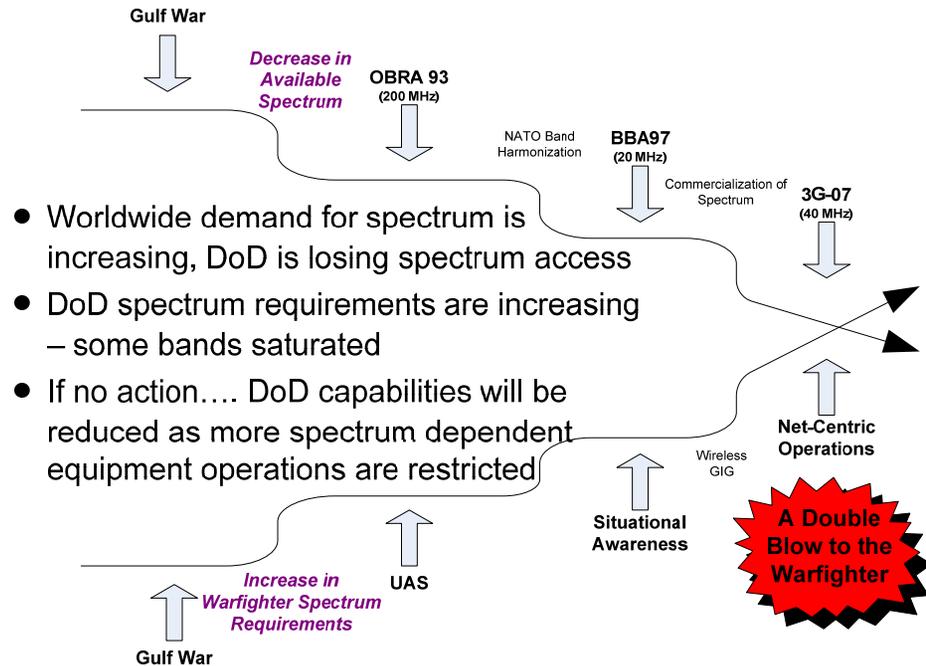**
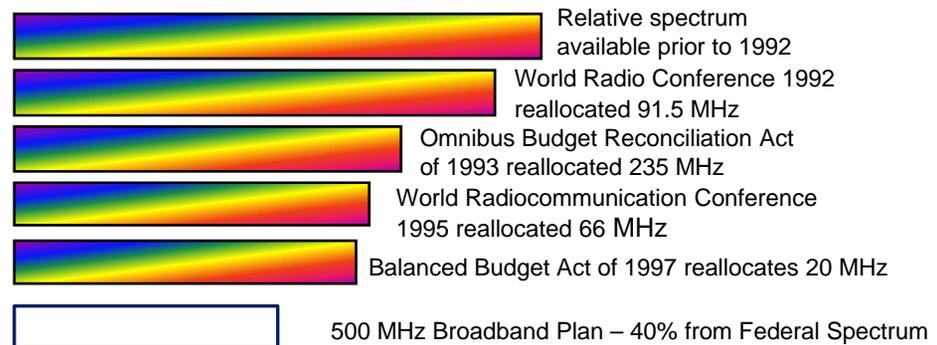
The information provided in this briefing is for general information purposes only. It does not constitute a commitment on behalf of the United States Government to provide any of the capabilities, systems or equipment presented and in no way obligates the United States Government to enter into any future agreements with regard to the same. The information may not be posted on a web site or disseminated without the express consent of the United States Government.

****

Spectrum Availability Trends

- **Houston, We Have a Problem !**

- **Spectrum is a key enabler for all DoD operations**
  - **Pressure to open more spectrum to commercial sector is increasing**
  - **Spectrum is inherently limited**
  - **Technology can improve efficiency and utilization of this resource**

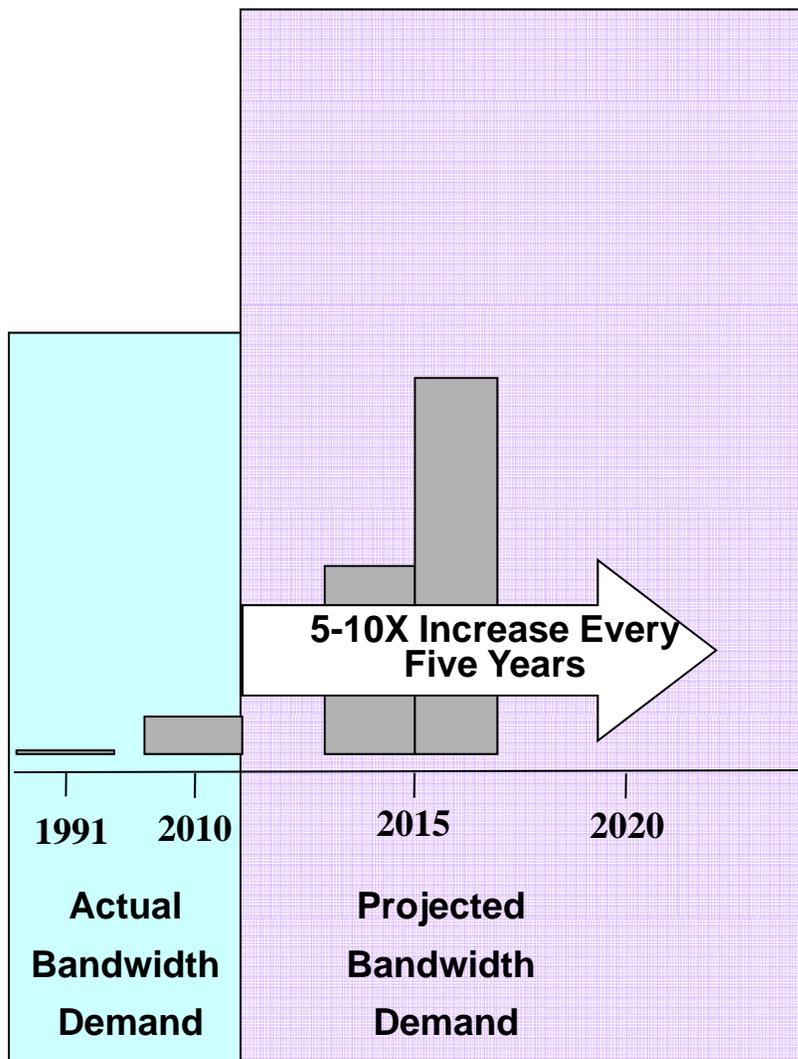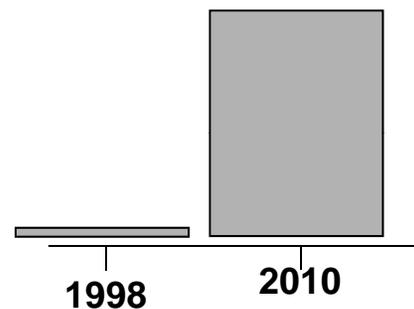- **Must find ways to support greater spectrum use density**

Gulf War

Decrease in Available Spectrum

OBRA 93 (200 MHz)

NATO Band Harmonization

BBA97 (20 MHz)

Commercialization of Spectrum

3G-07 (40 MHz)

- Worldwide demand for spectrum is increasing, DoD is losing spectrum access
- DoD spectrum requirements are increasing – some bands saturated
- If no action…. DoD capabilities will be reduced as more spectrum dependent equipment operations are restricted

Net-Centric Operations

Wireless GIG

Situational Awareness

A Double Blow to the Warfighter

Increase in Warfighter Spectrum Requirements

UAS

Gulf War

Cumulative Effect of Reallocation

Relative spectrum available prior to 1992

World Radio Conference 1992 reallocated 91.5 MHz

Omnibus Budget Reconciliation Act of 1993 reallocated 235 MHz

World Radiocommunication Conference 1995 reallocated 66 MHz

Balanced Budget Act of 1997 reallocates 20 MHz

500 MHz Broadband Plan – 40% from Federal Spectrum

Since 1992, spectrum relocations have reduced DoD spectrum access 412.5 MHz

UNCLASSIFIED

![DISA — A Combat Support Agency]

Growing DoD Spectrum Requirements

Representative Driver
Unmanned Aerial Vehicles (UAVs)

5-10X Increase Every Five Years

1991   2010   2015   2020

Actual Bandwidth Demand

Projected Bandwidth Demand

1998   2010

DoD Spectrum Management and Spectrum Access Transformation

DISA
A Combat Support Agency

SDS-Spectrum Dependent System

Spectrum Access Transformation (NOTIONAL)

Opportunistic Spectrum Access: Coexisting DSA SDSs

Autonomous, negotiated Spectrum Access; Shared Frequency Assignments between DSA SDS and non DSA SDS (beyond DoD)

Coordinated Spectrum Access; Shared Frequency Assignments between DSA SDS and non-DSA DoD SDSs

Cleared Pool of Frequency Assignments Shared by DSA SDSs

Static Frequency Assignments (no DSA SDS)

Target Architecture

Transition Architecture 3

Transition Architecture 2

Transition Architecture 1

Baseline Architecture

• Shared Spectrum Situational Awareness

• SM Web Services

• SM Web-based Applications

Cognitive Self-synching Spectrum Use

• Standardized Shared Data Environment

• Stove-piped Systems, Man in the Loop

Spectrum Management Transformation

Epoch 1	Epoch 2	Epoch 3	Epoch 4	Epoch 5
2007	2012	2016	2020	2025

UNCLASSIFIED

5

Current Status

- **DoD shares spectrum everyday**
  - **Among diverse systems both DoD and non-military systems**

- **But we need and can do it better**
  - **Higher fidelity engineering**
  - **Take advantage of processing power and predictive algorithms to identify and cancel interference**
  - **Make more use of the temporal aspect of spectrum use**

- **Implement flexible technologies such as Dynamic Spectrum Access**

These steps are necessary just to meet DoD's own growing demands

We Will Share

- ## Sharing spectrum is inevitable
  - ### There just isn't enough in the lower portions of the EM spectrum to meet everyone's needs through exclusive allocations
  - ### There is a tremendous variance in how Nations use spectrum

- ## We have (or will have) the technology
  - ### We can design systems with advanced signal processing capabilities to identify and mitigate interference
  - ### We can build systems with policy based controls to adjust their behavior based on location/EME knowledge/sensing
  - ### Geographic sharing arrangements *may* be feasible

BUT;

A Combat Support Agency

How Do We Move Forward ?

- **DoD needs access to spectrum to test and train with new capabilities to ensure we are prepared**
  - We should establish one or more locations where DoD can have relatively free access to the EM spectrum
  - If we pursue geographic sharing, we need to establish a priority structure to adjust access during emergency situations