

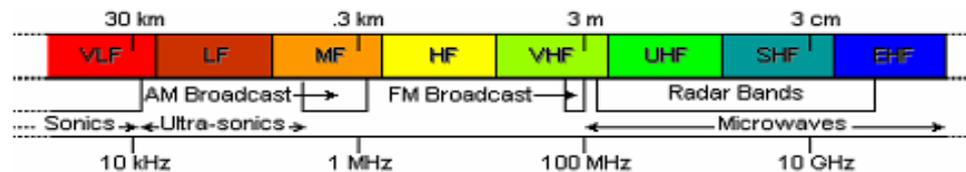


Federal Spectrum Management System

1

International Symposium on Advanced Radio Technologies (ISART)

July 25, 2012





FSMS Purpose

2

FSMS enables more efficient spectrum use.

The United States & Possessions are running out of identifiable, interference-free spectrum:

- New technologies leverage previously unused resource;
- Bands become more congested due to increased demand; and,
- Antiquated, stove-piped systems hinder identification of available spectrum.

FSMS implements improved data capture and analysis capabilities to:

- Support the Federal Spectrum Management needs of the US Government by identifying and managing spectrum for Federal use; and,
- Identify and release spectrum for non-Federal use.

83% of IRAC agencies reported that they will face some or great difficulty in the future meeting their critical mission needs because of insufficient spectrum.

GAO-11-352 Management of Federally Assigned Spectrum April 2011



FSMS System Products

3

Spectrum XXI Online (SXXIO)

- **Process:** Federal Frequency Assignment Management
- **Produces:** Federal Frequency Assignments
- **Stakeholders:** Frequency Assignment Branch, Systems Engineering & Analysis Branch, IRAC Frequency Assignment Subcommittee, Agency staff and field users

Equipment Characteristics Repository

- **Process:** Validate Equipment Characteristics
- **Produces:** Validated Equipment Characteristics Records
- **Stakeholders:** Frequency Assignment Branch, Systems Review Branch, IRAC Frequency Assignment Subcommittee, IRAC Systems Planning Subcommittee

Equipment Location and Certification Information Database Online (EL-CIDO)

- **Process:** Certification of Spectrum Support for Federal Systems
- **Produces:** Certifications of Spectrum Support for Federal Systems
- **Stakeholders:** OSM Systems Review Branch, IRAC Systems Planning Subcommittee

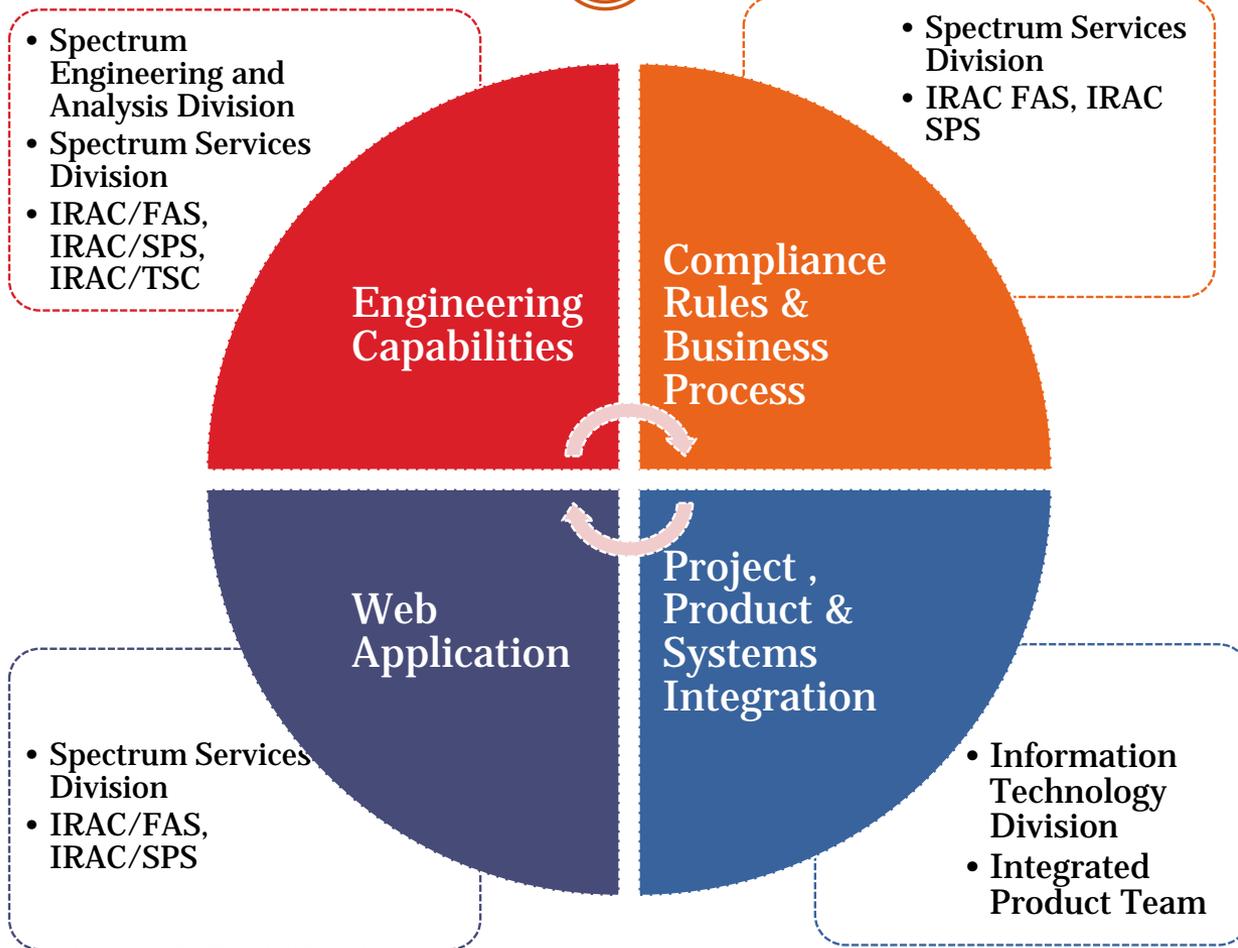
Shared Capabilities

Compliance Rules, Engineering Algorithms, Web Interface, Data Standard



Integration Business and Technical Environment

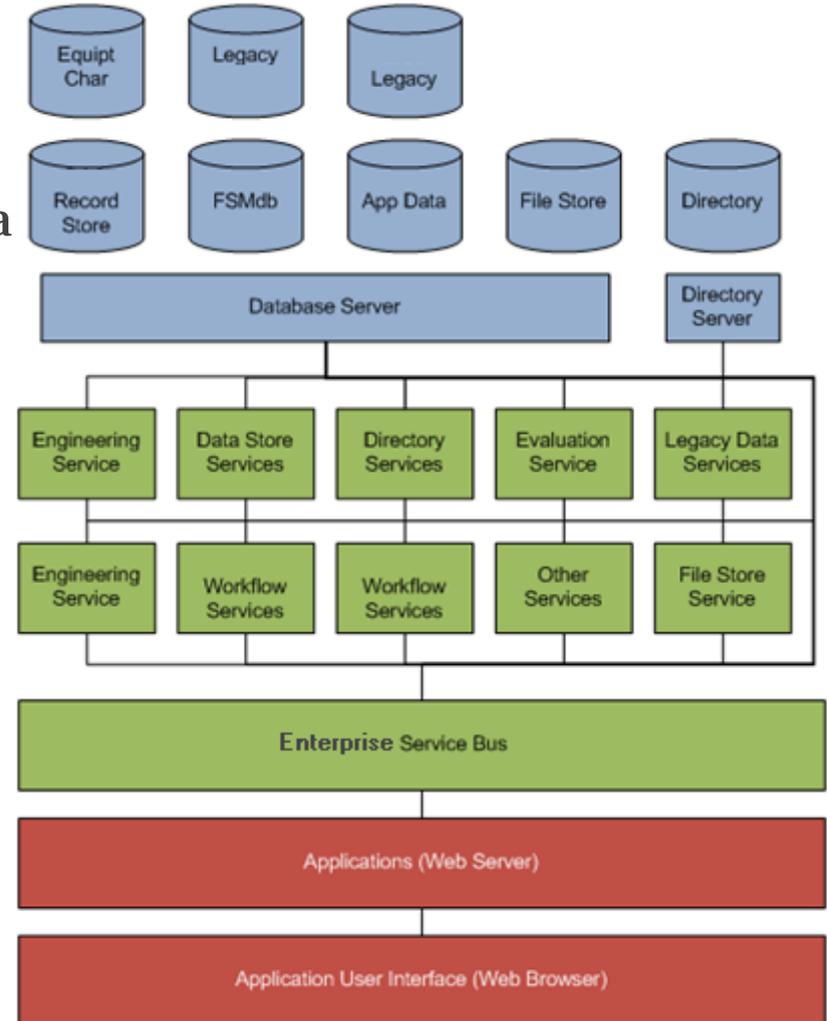
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System Overview

5

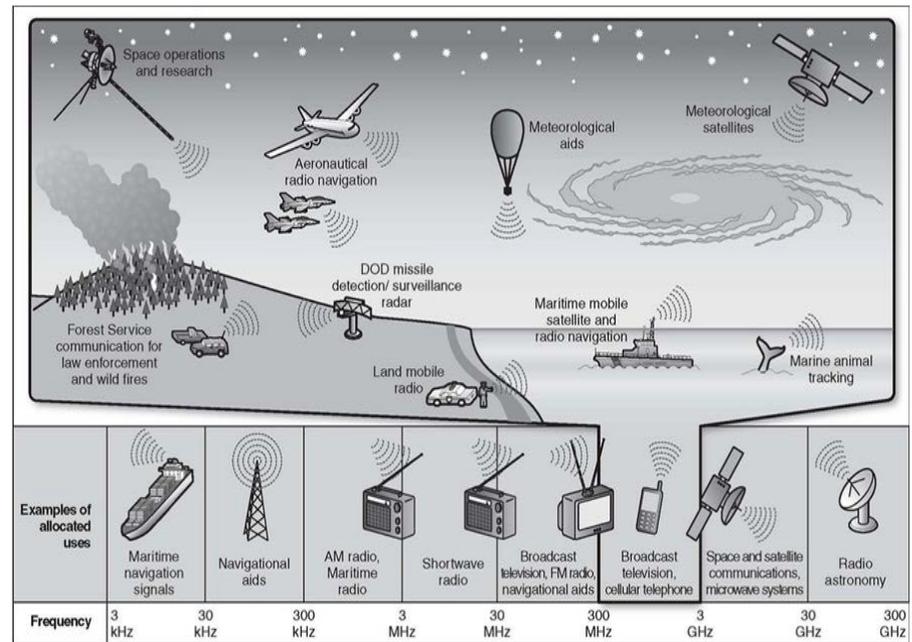
- **Multi-Tier System**
- **Data Tier**
 - SQL database supporting XML data
 - LDAP directory
 - COTS Reporting Engine
- **Business Logic Tier**
 - Web Services orchestrated through a Service Bus
- **Presentation Tier**
 - Rich Internet Application (RIA) User Interface running in the Web Browser
 - Application Logic executed on a Web Server



Capability improvements that support future spectrum sharing

6

- Improved engineering that leverages detailed equipment characteristics and antenna gain patterns vs. simplistic representation of transmitted signal
- Improved default values for missing data vs. ignoring records with missing data
- Statistical analysis of mobile systems vs. worst case (closest approach)
- Sophisticated algorithm for selecting new frequencies to fit systems closer together in the spectrum vs. selection model that used widest separation between systems to minimize potential for interference (due to less precise engineering)
- Map system to support visualization of spectrum usage.
- Spectrum Occupancy Chart provides awareness of spectrum congestion in a given area and frequency band.
- Integrated Table of Allocation data supports frequency planning and selection.
- Integrated equipment database will improve the availability of detailed equipment behavior data so that fewer records will rely on estimates of equipment behavior.
- Reporting system will support analysis of current use of spectrum.



Note: There are improvements in FSMS that are not related to engineering, but are enablers that make using the improved engineering more accessible to federal users.



FSMS Development Roadmap

7

FSMS Phase 1: 2010 - 2012 Prepare & Submit Frequency Proposals

Unclassified FSMS	SXXIO Common Capabilities	Prep & Submit Freq Proposals	Compliance Checks	Database and Engineering Algorithm Improvements	Legacy System Interface	Phase 2 Functional Specs
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SXXIO front-end assignment process available to NTIA & federal agencies (users).

Increase stakeholder familiarity with the new user interface, data standards, and engineering algorithms in SXXIO.



FSMS Phase 2: 2011-2012 Authorize Frequency Proposals, Data Exchange Standard, Equipment Characteristics Repository

Classified & Unclassified FSMS	Receive & Process Freq Proposals	Data Exchange Standard & New Database	Equipment Characteristics Repository	TSB-88 & 10F Engineering Algorithms	New Compliance Checks & TOA Authoring	Parallel New Back-Office Services & Legacy Systems	Phase 3 Functional Specs
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SXXIO assignment authorization process available to users.

Enable transition of federal agencies and NTIA to SXXIO from the legacy SXXI system.



FSMS Phase 3: 2013 - 2014 Certify Requests for Spectrum Support

Classified & Unclassified FSMS, COOP	Enhanced Phase 2 Capabilities	New Back-Office Services Replace Legacy Components	Retirement of DCFS, SXXI & GMF Card Format.	Certify Spectrum Support Request	Doc & Case Mgmt Integration Support	Phase 4 Functional Specifications
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Replace legacy FMRS systems. Retire card format data standard. Spectrum Support Certification process available to users.

Enable full transition of federal agencies and NTIA to SXXIO for Frequency Assignment process, and back-end Certification process.



FSMS Phase 4: 2014 - 2016 Prepare & Submit Requests for Certification of Spectrum Support

Classified & Unclassified FSMS, COOP	Enhanced Phase 3 Capabilities	Frequency Assignment Review Process	Prepare & Submit Certification Requests	Legacy Data Migration	Steady State Planning
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Replace legacy ELCID system and data standard. ELCID Online available to users.

Enable full transition of federal agencies and NTIA to FSMS front-end Certification process. Transition to Steady State.



To Steady State