



The U.S. System of Spectrum Management

USTTI Spectrum Management Course

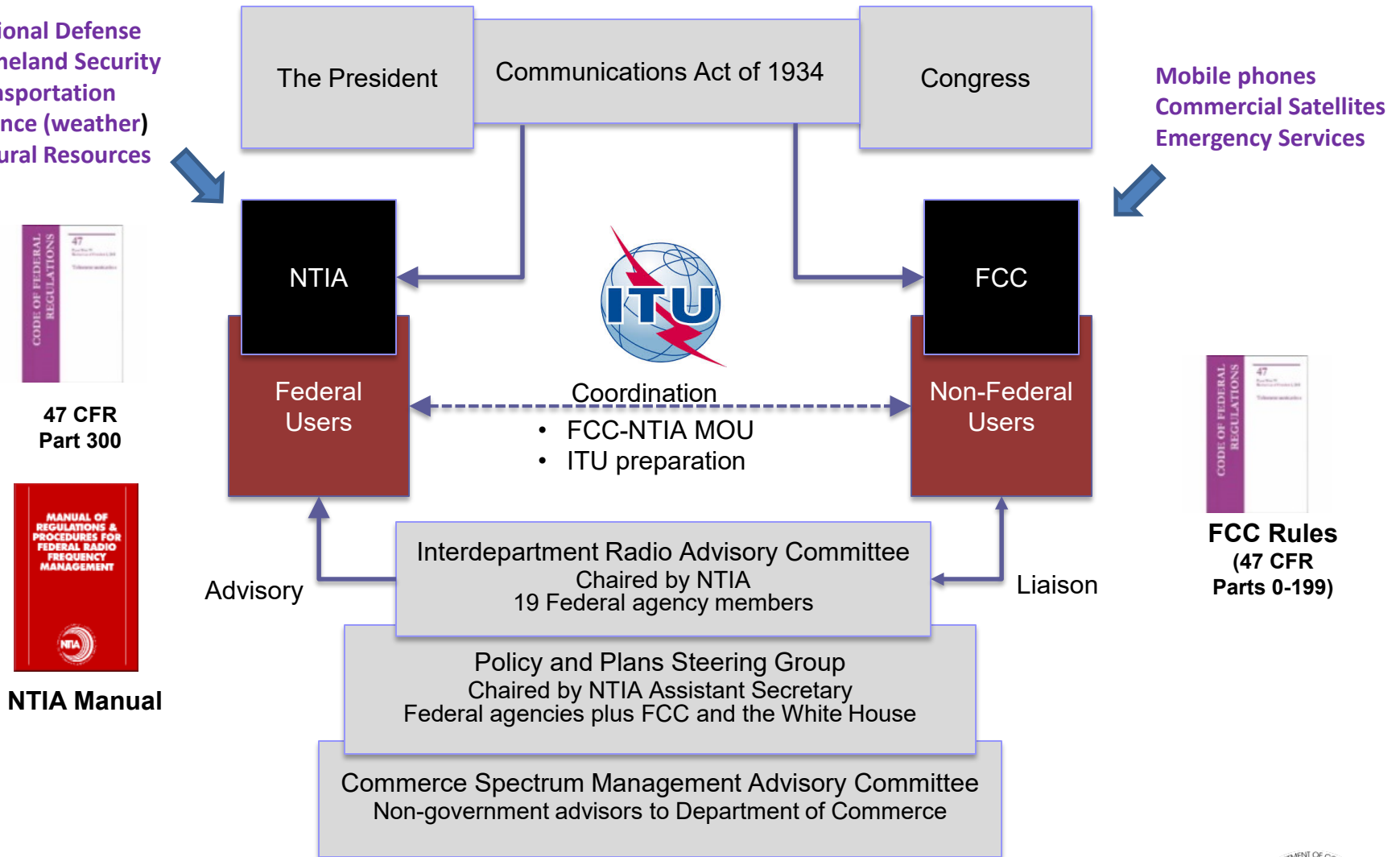
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John Alden
Spectrum Affairs and Information Division
NTIA Office of Spectrum Management

U.S. National Spectrum Management

- National Defense
- Homeland Security
- Transportation
- Science (weather)
- Natural Resources

Mobile phones
Commercial Satellites
Emergency Services



Federal Spectrum Management

- The Executive Branch of government retains jurisdiction over its own spectrum use.
- The Executive Office of the President (the White House) has delegated authority to the Commerce Department's National Telecommunications and Information Administration (NTIA).
- All federal departments and agencies have responsibility to use spectrum effectively and efficiently.

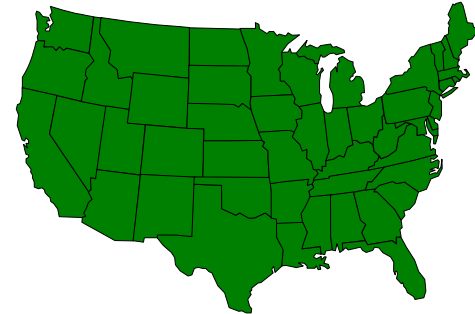


Managing Federal Spectrum Use

- System certification
- Frequency assignment
- Strategic planning
- Emergency planning
- Technical standards development and implementation
- Engineering and analysis to support spectrum policy-making
- International conference preparation
- Coordination with FCC



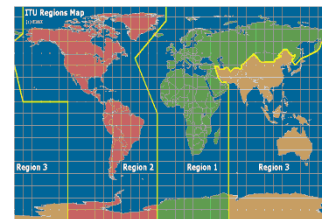
Planner



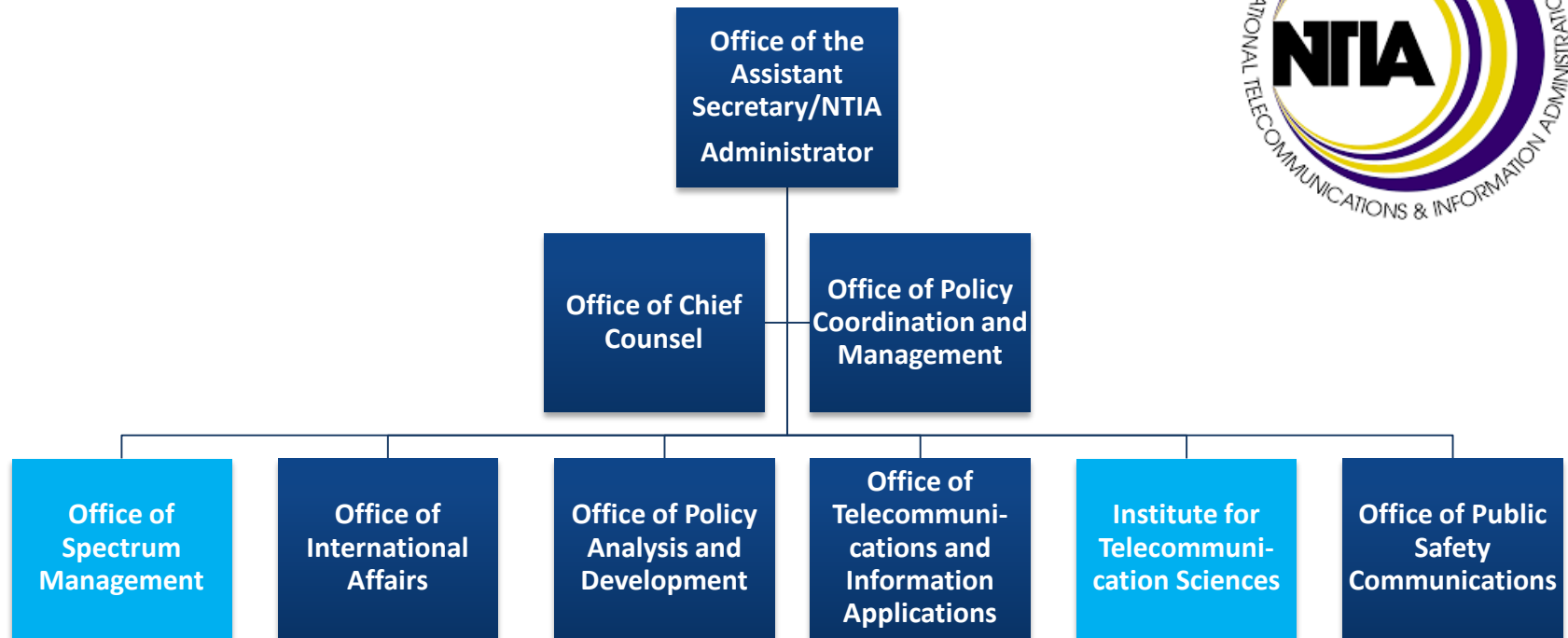
Engineer



Operations Officer



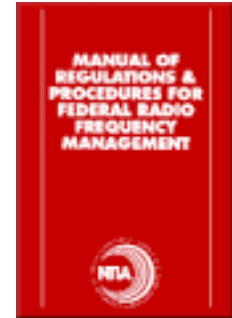
NTIA's Organization



- OSM carries out NTIA's mission and role as the chief Executive Branch agency for federal spectrum policy and management
- ITS (located in Boulder, CO) is NTIA's research office; it works to explore RF engineering theory and practical applications.

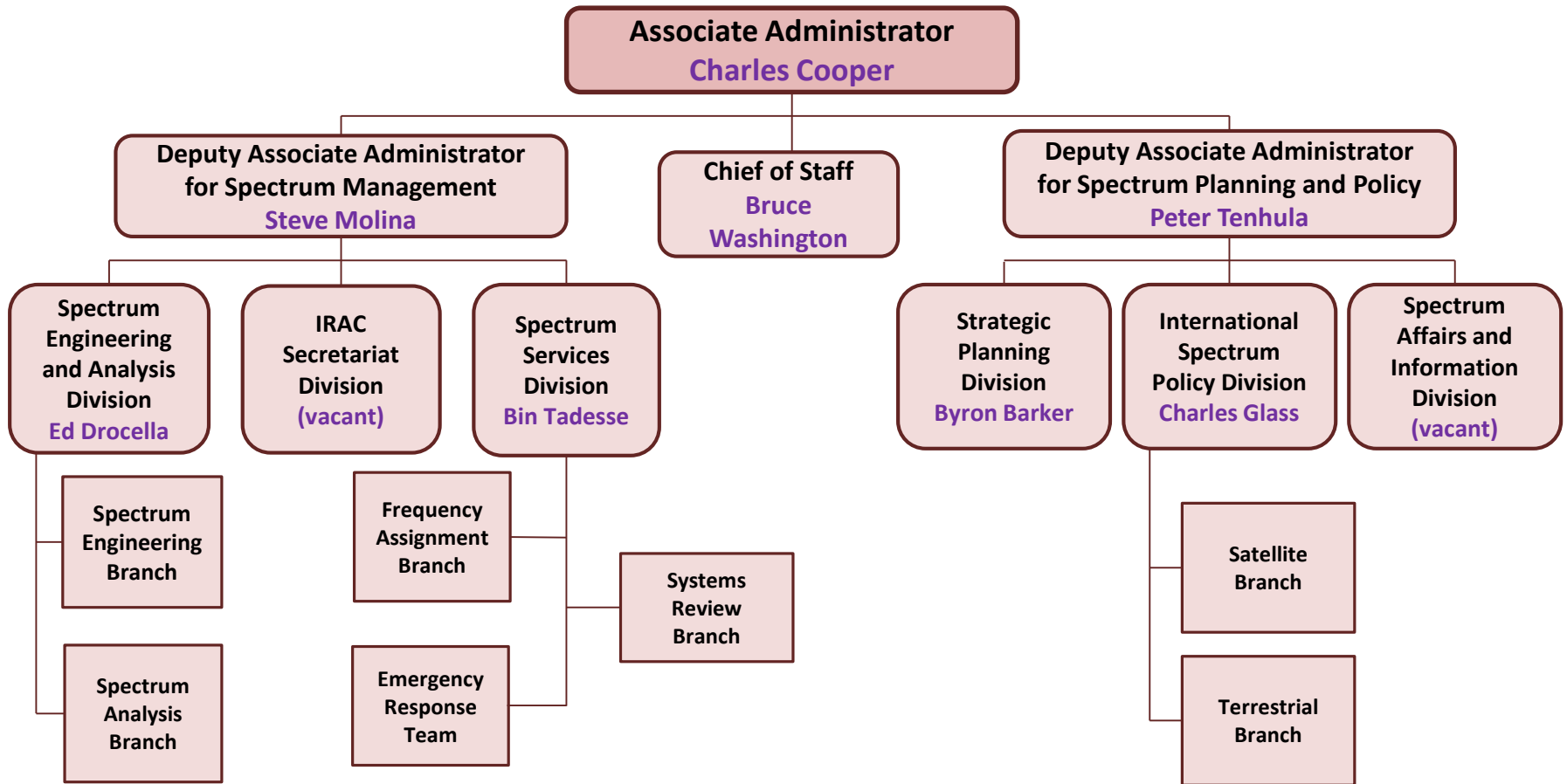
OSM's Mission and Role

- Manages all federal government use of spectrum
- Develops policy and regulations governing spectrum use by federal agencies and departments
- Supports national and international spectrum management policy initiatives and programs



OSM is meeting the increasing spectrum needs of the United States while balancing the national and economic security interests of our nation

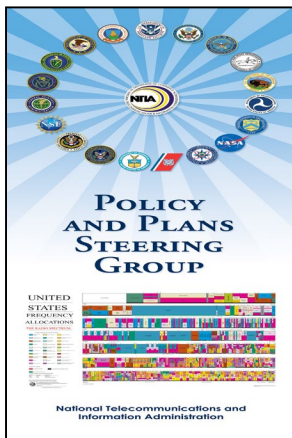
OSM's Organization



Advice to NTIA

Interdepartment Radio Advisory Committee (IRAC)

- Organized in 1922, the oldest standing advisory committee
- Government only members appointed by 19 federal agencies
- Six permanent subcommittees, six active ad hoc groups



Policy and Plans Steering Group (PPSG)

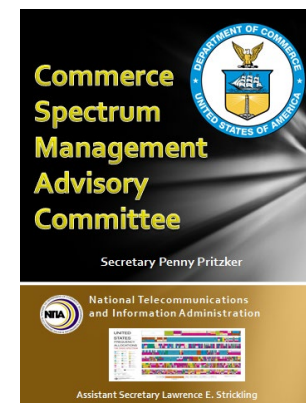
- Government-only interagency organization comprised of senior-level officials (includes White House offices - OSTP, OMB, NEC, and NSS)
- Advises NTIA on spectrum policy matters and strategic planning



Commerce Spectrum Management Advisory Committee (CSMAC)

- Members are spectrum policy experts from outside government
- Up to thirty members, appointed for two-year terms, meetings open to public

<http://www.ntia.doc.gov/category/csmac>



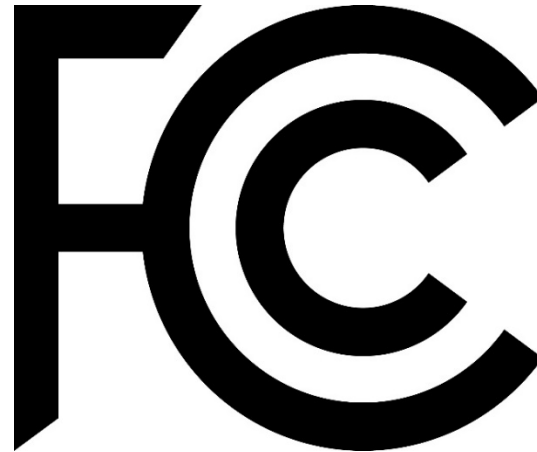
Non-Federal Spectrum Management

- “Non-Federal” means everything other than U.S. government operations
 - Commercial use of spectrum
 - State and local government use of spectrum
- The Communications Act of 1934 established the Federal Communications Commission to govern these uses.

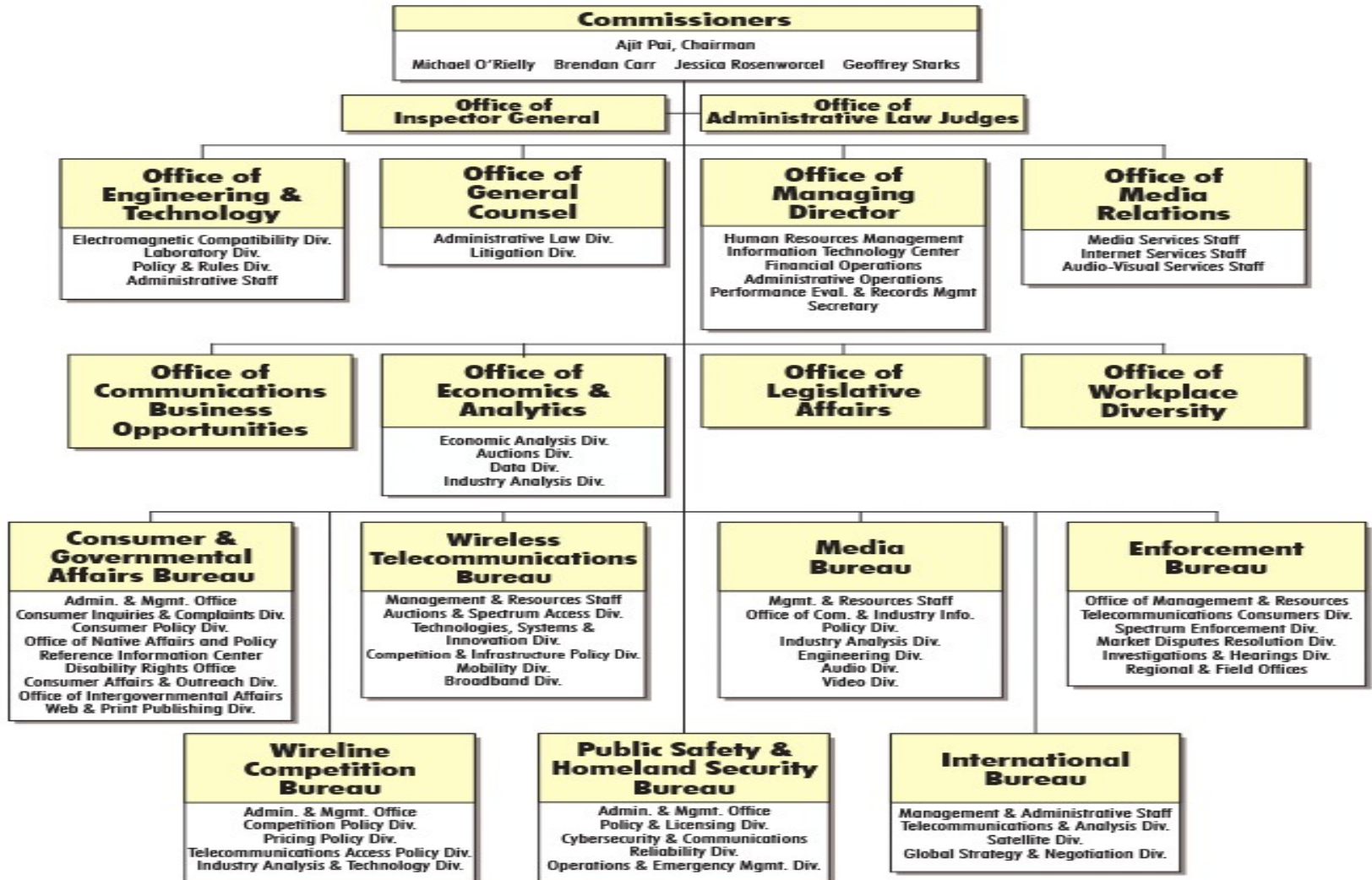


The Federal Communications Commission

- The FCC is an *independent regulatory agency*, directly responsible to Congress
 - The FCC is not subject to the Executive Branch's authority
 - Jurisdiction covers the 50 states & District of Columbia
- It consists of a Chairman and four Commissioners
 - Appointed by President
 - Majority (3 out of 5) is generally from President's political party, including chairman.
 - Confirmed by Senate
 - Staggered five-year terms



FCC Organization



The FCC's Spectrum Management Role

- The FCC is tasked with regulating interstate and international communications by radio, television, wire, satellite and cable
- Spectrum management promotes:
 - efficient use of the spectrum
 - interference protection among licensed stations
 - new technologies and services
 - harmonized spectrum use

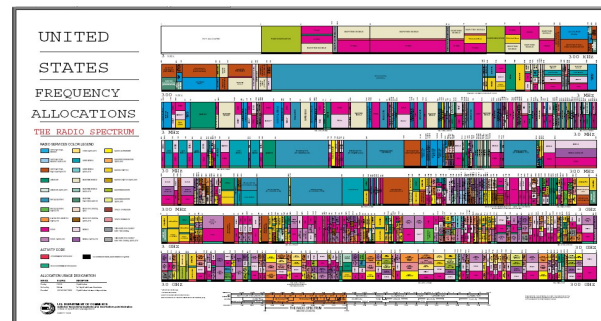


Title 47, U.S. Code of Federal Regulations

Communications Act, Section 301 - “...No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio...except under and in accordance with this Act and with a license in that behalf granted under the provision of this Act.”

FCC Spectrum Management Functions

- **Allocate Spectrum** to various radio services
- **Develop Service Rules** to provide administrative procedures, technical standards, and other operational requirements for shared intra- and inter-service use of the spectrum
- **Assign Frequencies** to individual systems or authorizes specific equipment use, assignments coordinated domestically and internationally
- **Enforce Rules** to ensure compliance of radio equipment



FCC Licensing Models

➤ **Dedicated Use Model (command-and-control)**

- Spectrum uses are limited and conform to detailed service rules (AM and FM Radio, TV broadcasting, public safety)

➤ **Exclusive Use Model**

- Flexible use rights for specified spectrum within defined geographic area (Cellular, PCS , AWS, BRS, UMFUS)
- Rights governed by technical rules

➤ **Opportunistic Use Model**

- Spectrum is shared with multiple licensed exempt users (eg. Wi-Fi, UNII, UWB)
- No right to interference protection

➤ **Managed Access Model**

- Database used to assign spectrum that is shared among multiple licensed and general authorized access users (eg. TV White Space Devices and Broadcast TV)
- General Authorized Access users have no protection from interference

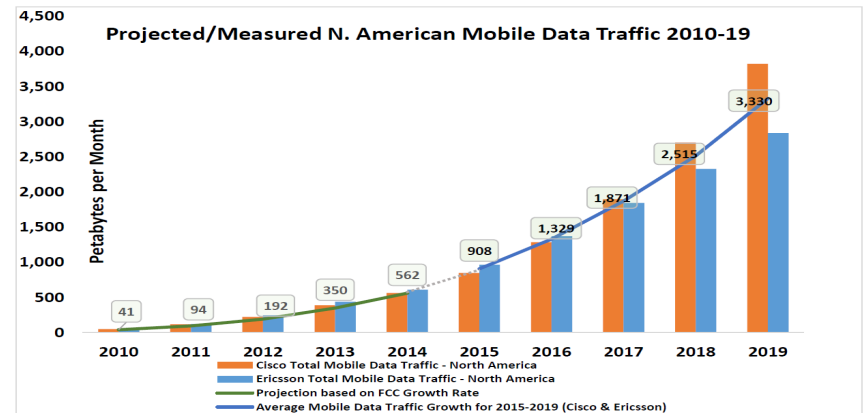
The FCC's Decision-Making Process

- Laws such as the Communications Act and Administrative Procedures Act (APA) govern FCC's interactions with the public and spectrum management
- Notice to Public
 - Public Notices (PN), Notice of Inquiry (NOI), Notice of Proposed Rulemaking (NPRM or Further NPRM), Federal Register Publication
- Decision based on Public Comment
 - Report and Order (R&O), Memorandum Opinion and Order (MO&O)
- Authorization Orders issued with operating conditions



Balancing Commercial and Federal Spectrum Requirements

- U.S. policy priority: Supporting wireless industry spectrum needs
- Space launch and commerce
- As the federal spectrum regulator, NTIA must strike a balance between commercial and federal needs
- NTIA is directed by legislation and presidential directives
- NTIA is influenced by technological change



Current Spectrum Policy Drivers

- Legislation: Spectrum Pipeline Act and MOBILE NOW Act
- Sharing and Enforcement Techniques, including dynamic spectrum sharing
- 3.5 GHz Radar and Commercial Sharing Framework
- 5G Technologies and implementation
- Incentives for Efficiency and Sharing
- Data Accuracy and Transparency

Federal & Non-Federal Collaboration

- NTIA & FCC collaborate to manage spectrum issues affecting both jurisdictions
 - E.g. sharing approaches, service rules
 - IRAC and PPSG serve as forums for discussion
 - A 2003 MOU between FCC and NTIA calls for coordination of spectrum management activities
- Both FCC and NTIA (with other federal agencies) have key roles in international activities representing the U.S.



NTIA's Role in the International Process

GOAL: International Radio Regulations support U.S. spectrum policy and enable federal uses of the spectrum

- Prepares for, participates in, and implements results of World Radiocommunication Conferences
- Represents/coordinates with the federal agencies to develop positions and proposals for Executive Branch (via the IRAC)
- Works with FCC and Department of State to ensure U.S. international spectrum needs are met
- Manages international registration of federal satellite systems (spectrum and orbits).



Domestic policy decisions need to consider international implications (and vice versa)

The FCC's Role in the International Process

- FCC also prepares for, participates in, and implements results of World Radiocommunication Conferences
 - The Executive Branch assembles delegations, which include FCC experts (and industry representatives)
- FCC seeks industry views on agenda items through its WRC Advisory Committee (WAC) and public comments
 - The WAC recommends proposals to the FCC
- FCC prepares non-federal proposals for de-confliction and consolidation with federal (NTIA process) proposals
- The U.S. Department of State ultimately decides final content of U.S. proposals to submit to CITELE and WRC.
 - State Department then assembles delegations for CITELE and ITU meetings, including WRCs.



John Alden
Office of Spectrum
Management

jalden@ntia.gov



Website: NTIA.GOV

Twitter: @NTIAgov

Facebook: Facebook.com/NTIAgov