Spectrum Management of Space Services

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Outline

1. Overview of satellite functions and orbits
2. ITU satellite network registration
3. NTIA and U.S. national process
4. International regulatory issues for cubesats

Satellite Functions and Services

- **Communications**
- **Earth Remote Sensing: Earth Exploration Satellite Service (EESS)**
- **Weather: Meteorological Satellite Service (MetSat)**
- **Others**

Earth-Exploration Satellite Service

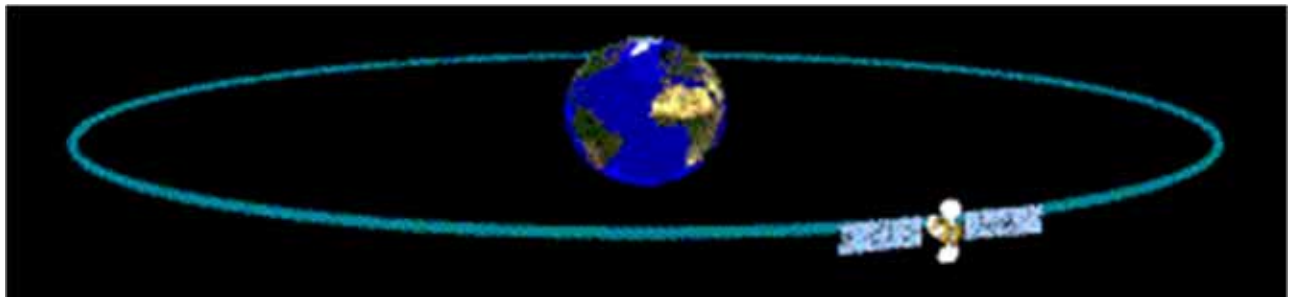
- **Better known as remote sensing satellite**
- **Study Earth's surface (eg., plant cover, chemical composition, surface water) and changes in the Earth's surface (e.g., deforestation, desertification)**
- **Important to farming, fishing, mining, and many other industries**
- **Active vs. passive EESS**

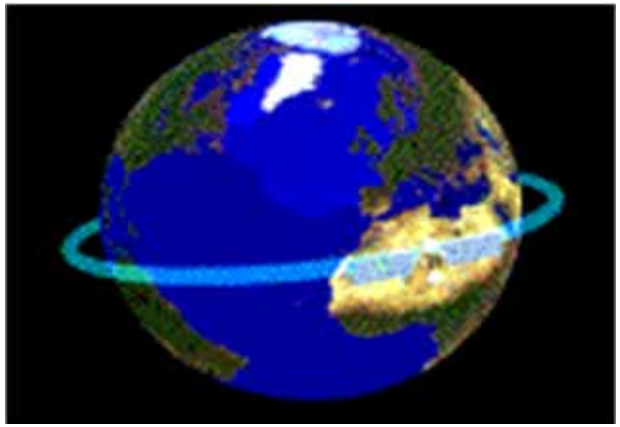
Satellite Orbits

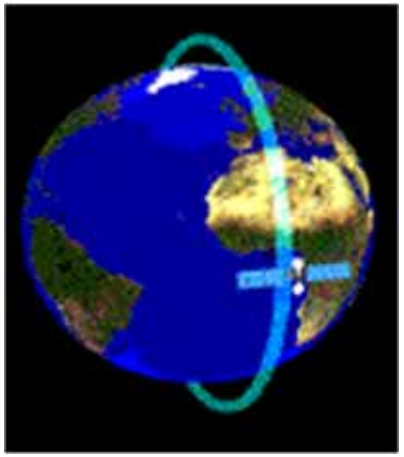
- **GSO: 35,786 km above the equator**
  - **Geosynchronous vs. geostationary**
- **NGSO**
  - **Low Earth orbit (LEO): 500 - 1000 Km**
  - **Medium Earth orbit (MEO): 1000 - 20,000 km**
  - **Highly Elliptical Orbits (HEO): up to about 40,000 km**
  - **Polar orbit & sun synchronous orbit**

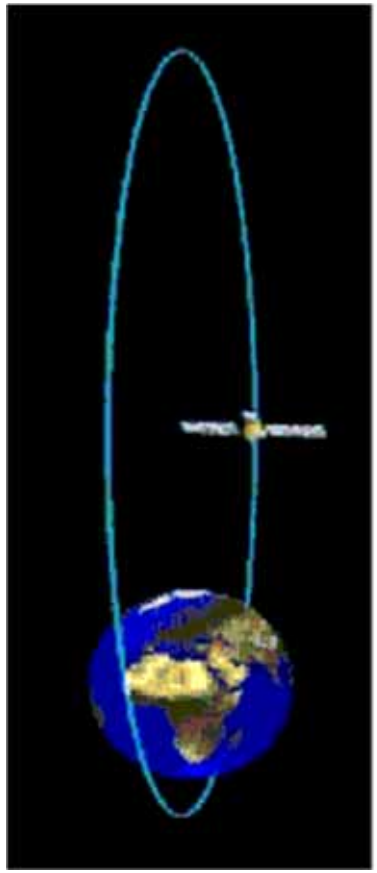
Selection of a satellite orbit depends on coverage and other requirements

Types of Orbits









International Frequency Registration of Space Services

- **Advance publication Information (API)**
- **Coordination**
- **Notification**

API, coordination and notification publication info is created with ITU SpaceCap software, and filed electronically

International Frequency Information Circular (IFIC)

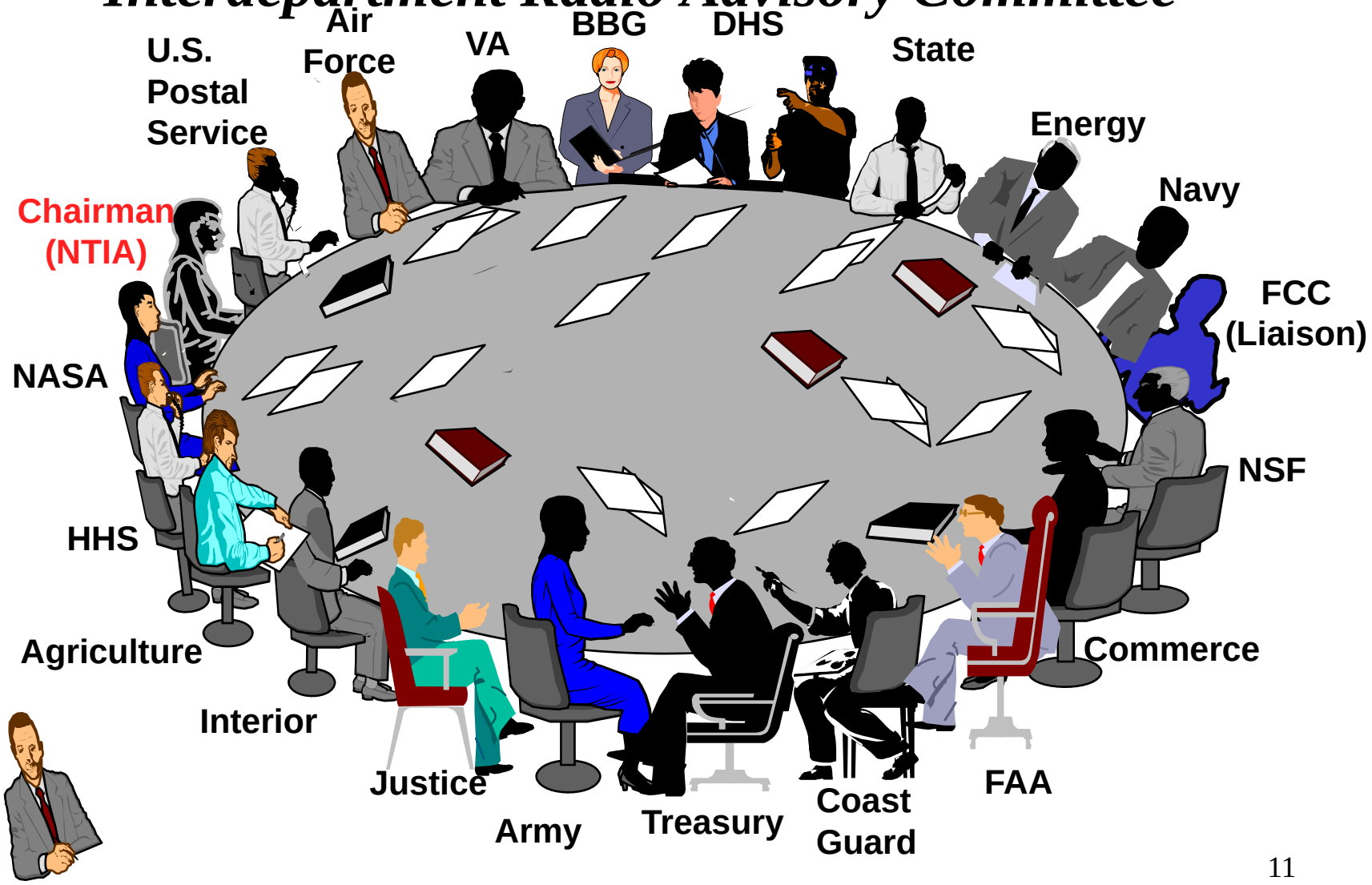
- **Published bi-weekly on CD-ROM for all ITU members**
  - API, coordination and notification requests are published in IFIC
  - Opportunity to verify if the intended new satellite network (or changes to existing ones) would create unacceptable interference to your network
  - 4 month time limit from date of publication to provide comments

NTIA & U.S. NATIONAL PROCESS

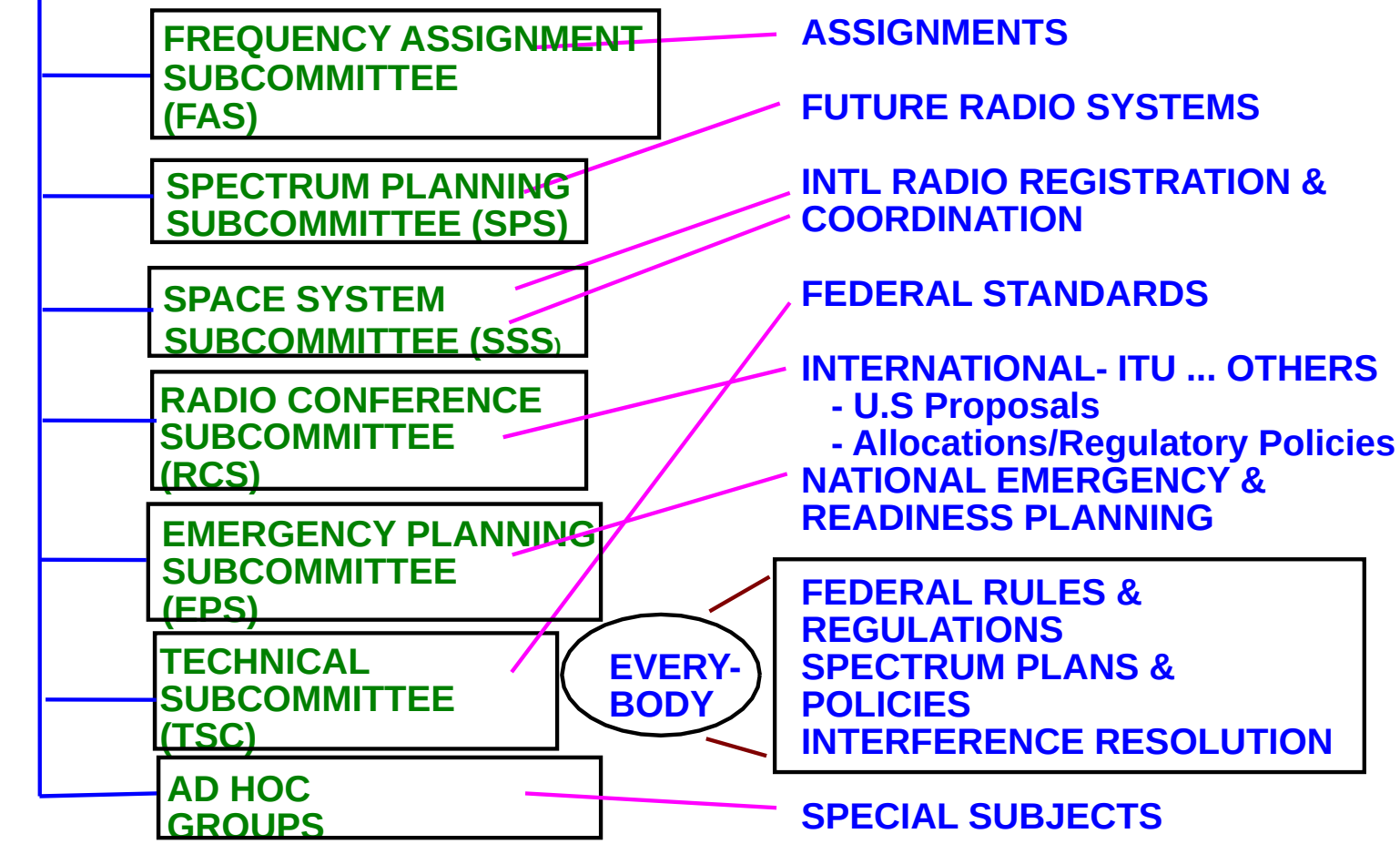
IRAC FUNCTIONS

- **The Interdepartment Radio Advisory Committee (IRAC) assists NTIA in assigning frequencies to U.S. Government uses and developing procedures, and technical criteria**
- **IRAC is the principal mechanism for NTIA to get Federal Agency advice on spectrum issues being considered by the FCC**
- **The IRAC includes 6 subcommittees and several Ad Hoc groups – it is chaired by OSM Administrator**
- **IRAC has been operating since 1922**

Interdepartment Radio Advisory Committee



INTERDEPARTMENT RADIO ADVISORY COMMITTEE (IRAC)



OMB A-11

- **OMB Circular A-11 requires us to do a certification of ALL satellite systems**

Spectrum Planning Subcommittee (SPS)

- **Subcommittee of the IRAC**
- **The SPS certifies systems for use in government-regulated frequency bands**
- **Unique and growing challenges from nanosatellites and picosatellites**

SPACE SYSTEMS SUBCOMMITTEE (SSS)

- **The SSS is responsible to the IRAC for international registration of U.S. Federal Government satellite systems with the ITU.**
- **All agencies operating satellite systems are entitled to participate**

SSS Mission

(a) review, modify, develop, and maintain the procedures for national implementation of the space related provisions of the ITU Radio Regulations;

(b) advance publish, coordinate, and notify government space systems under the applicable provisions of the ITU Radio Regulations;

(c) respond to the data furnished by other administrations and the BR regarding proposed space telecommunications systems in accordance with the applicable provisions of the ITU Radio Regulations;

(d) normally process all international actions through the FCC.

Excerpt from 3.3.2 Provision of NTIA Manual on Information Regarding Satellite Networks in Planned Satellite Systems:

As a matter of policy, advance publication information, coordination information (as necessary), and notices of frequency assignments relating to space systems shall be submitted to the BR. Exceptions to this policy will be made only by the NTIA on a case-by-case basis.

It is the practice of the United States not to submit space system information to the BR if: i) the intended use is for a short period of time (on the order of 12 months or less); ii) the intended use is not in accordance with the Table of Frequency Allocations of the ITU RR, or iii) national security is affected.

ITU-R Report SA.2348-0 (2015)

Provides an “overview of the particular challenges in coordination between different communication systems which may arise as a result of the operational and technical characteristics of nanosatellites and picosatellites”

WRC AI 9.1.8 – Regulatory aspects for nano- and picosatellites

- Invites WRC-18: to consider whether modifications to the regulatory procedures for notifying satellite networks are needed to facilitate the deployment and operation of nano- and picosatellites, and to take the appropriate actions.
- Invites ITU-R: to examine the procedures for notifying space networks and consider possible modifications to enable the deployment and operation of nano- and picosatellites, taking into account the short development time, short mission time and unique orbital characteristics.

WRC Positions on 9.1.8

- U.S. signatory to CITEL IAP:
  - No change to Articles 9 and 11 for WRC-15
  - Eliminate separate agenda item for nanosatellites/picosatellites for WRC-19
  - Suppress associated resolution
- Any issues can be addressed under standing satellite agenda item

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