

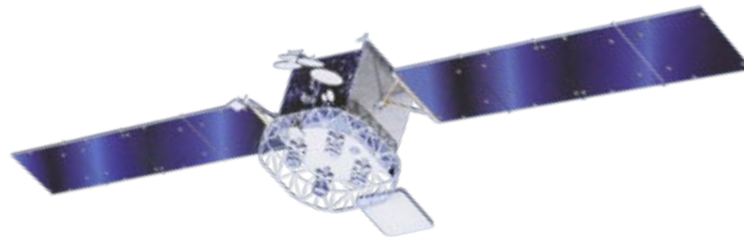


NTIA Spectrum Management of Space Services

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International Spectrum Policy Division
September 19, 2018

Outline

1. Satellite functions and services
2. Satellite orbits
3. ITU satellite network registration
4. NTIA and U.S. national process



Satellite Functions and Services

- Communications:
 - Fixed-Satellite Service (FSS)
 - Broadcast-Satellite Service (BSS)
 - Mobile-Satellite Service (MSS)
- Radiodetermination Satellite Service (RDSS)
 - Radionavigation Satellite Service (RNSS)
- Earth Remote Sensing: Earth Exploration Satellite Service (EESS)
 - Weather: Meteorological Satellite Service (MetSat)
- Scientific Research: Space Research Service (SRS)
- Others:
 - Space Operation Service (SOS)
 - Inter-Satellite Service (ISS)

Communications Satellites

- Of the over 1200 operating satellites, >50% are communications satellites
- Commonly known as “bent pipe” principle
- Transmit messages from one part of the world to another – wide area coverage of earth stations
- Messages can be audio, video, or data



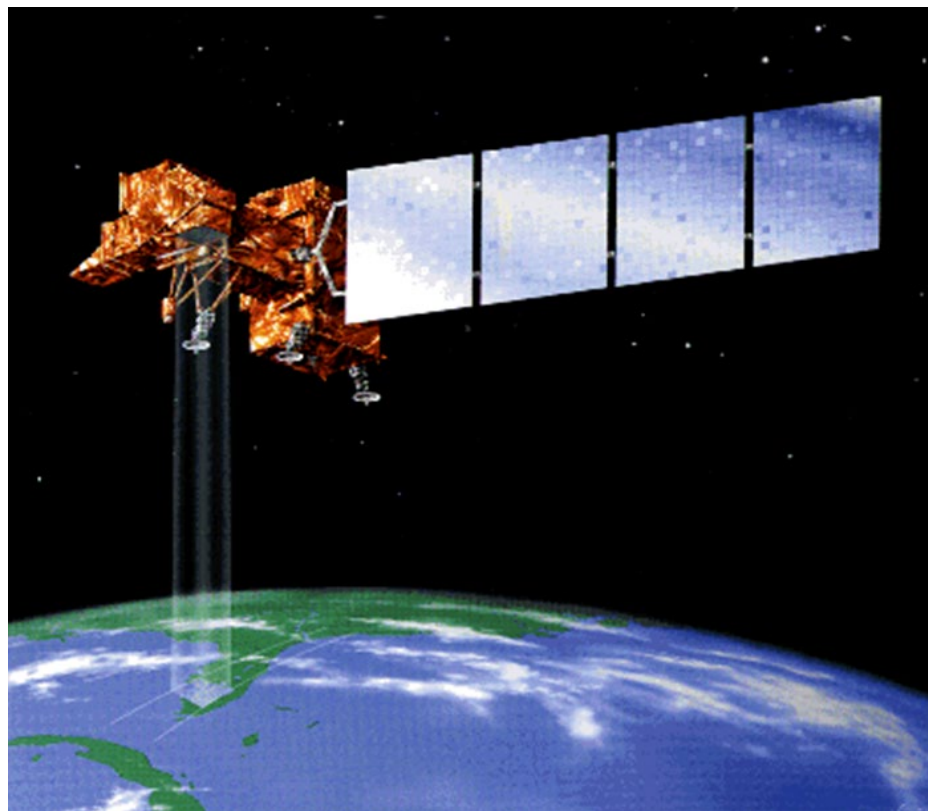
INTELSAT FSS satellite

Radionavigation-Satellite Service (RNSS)

- NAVSTAR GPS (U.S.)
- GLONASS (Russia)
- GALILEO (Europe)
- COMPASS/BeiDou (China)
- QZSS (Japan)
- IRNSS (India)

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

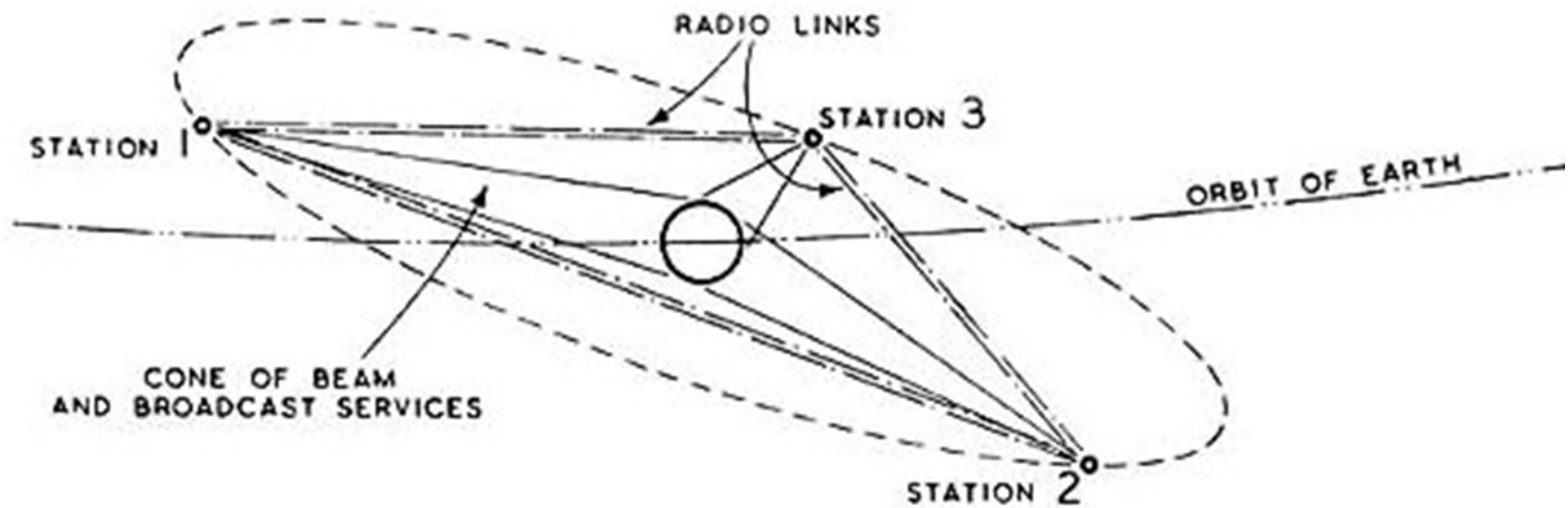


LANDSAT-7

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

GEOSTATIONARY ORBIT



**Original figure from Arthur C. Clarke's article
in the October 1945 edition of Wireless World**

Types of Orbits

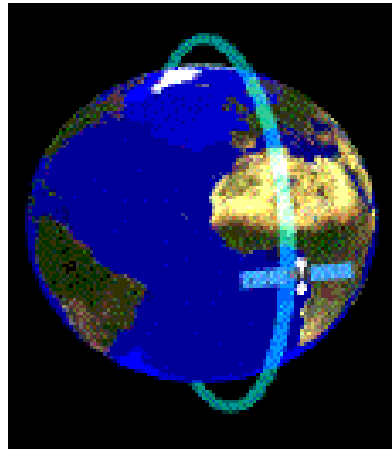
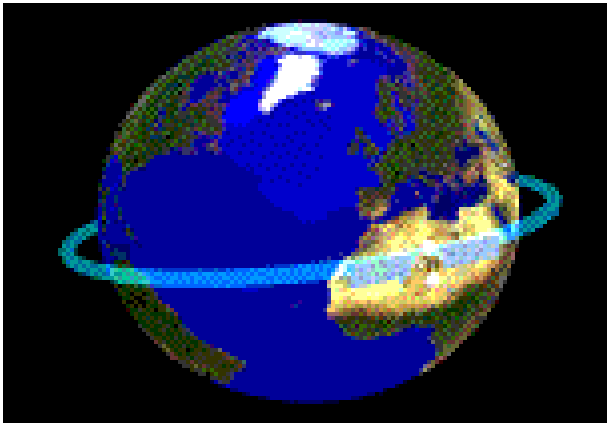
GSO



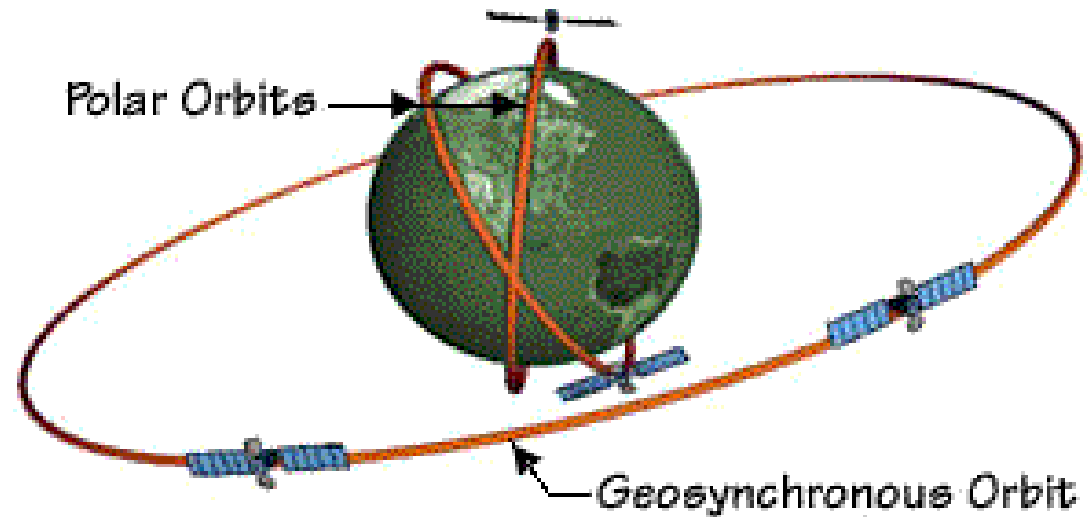
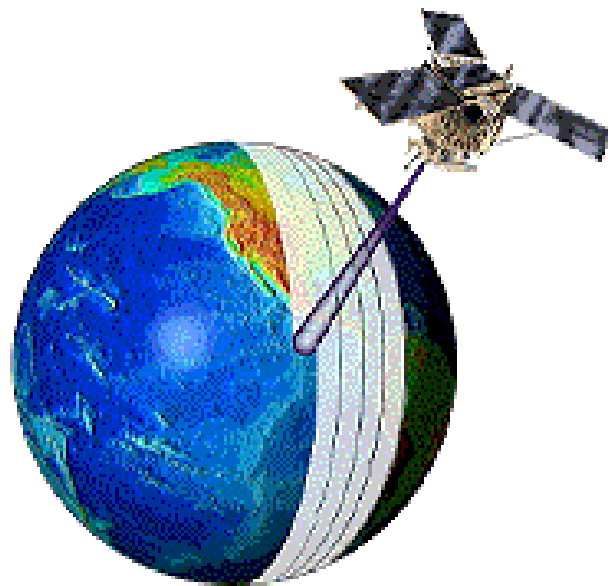
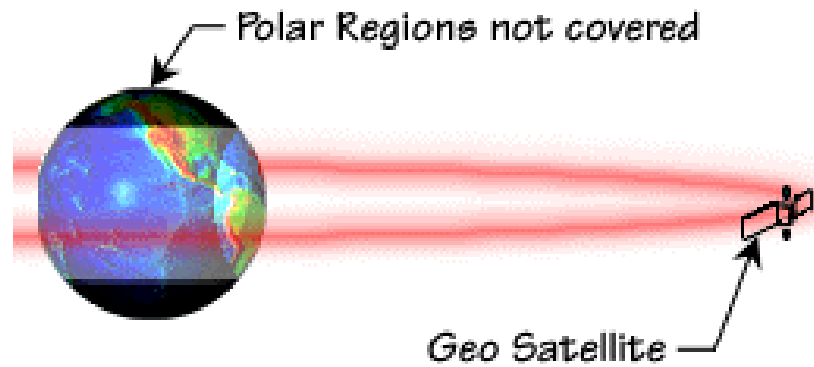
HEO



LEO



Polar



International Frequency Registration of Space Services

- Advance Publication of Information (API) (not subject to coordination)
- 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

BR IFIC 2783 International Frequency Information Circular (Space Services) 25.11.2014 ITU

BR IFIC Publications: Databases, As received (Res.55), Preface, Cost Recovery, BR Software, BR Circular Letters

Special Sections: -- ALL --, AP30-30A/E, AP30/E, AP30A/E, AP30B/A6A, API/A, API/B

Parts I-S, II-S, III-S: -- ALL --, PART I-S, PART II-S, PART III-S

Administrations: ARG, ARS, BUL, CHN, CZE, D, E

Res 609

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SPECIAL SECTION / PART	PLAN PART	RESPONSIBLE ADMINISTRATION		NAME OF THE SPACE STATION	ORB. POS.	NAME OF THE ASSOCIATED EARTH STATION	IDENTIFICATION NUMBER
		ADM.	INTERG. ORG.				
AP30/E/687	A	EGY		EGYNILE1-BSS	-7		114552009
AP30/E/688	A	EGY		EGYNILE2-BSS	-19		114552010
AP30/E/689	A	EGY		EGYNILE3-BSS	15		114552011
AP30/E/690	A	HOL		NSS-BSS 60E	60		114552012
AP30/E/691	A	F		F-SAT-E-BSS-143E	143		114552013
AP30-30A/E/430	B	G		USAT-S3 MOD-C	-86.5		106555007
AP30A/E/687	A	EGY		EGYNILE1-BSS	-7		114554009
AP30A/E/688	A	EGY		EGYNILE2-BSS	-19		114554010
AP30A/E/689	A	EGY		EGYNILE3-BSS	15		114554011
AP30A/E/690	A	HOL		NSS-BSS 60E	60		114554012
AP30A/E/691	A	F		F-SAT-E-BSS-143E	143		114554013
AP30B/A6A/345		F		LH-SAT FSS 151.5E	151.5		114559030

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Advanced Publication Information (API)

- API date of receipt starts the date of bringing into use (DBIU) clock
 - If assignment not BIU in 7 years, filing is canceled
 - Roughly 80% of APIs are cancelled.
 - Comments are for information only

API (cont'd)

- If network subject to coordination, only coordination request is submitted and API is automatically generated
- NGSOs not subject to coordination pay cost recovery fees for API (about 500 CHF)

Coordination

- Coordination request filing contains detailed info about satellite network
- ITU staff analyze coordination requests to check whether data submitted conforms with:
 - The Convention, Table of Frequency Allocations, other provisions of the Radio Regulations
- Certain frequency bands are not subject to coordination, including most space research allocations

Coordination (cont'd)

- ITU determines networks for which a specific filing requires coordination
- Once published in an IFIC, Administrations have 4 months to add their names and/or networks to the coordination process
- Coordination receipt date determines coordination priority to other satellite networks
- Coordination between Administrations takes place primarily by correspondence; more difficult cases addressed through bilateral coordination meetings

Notification

- Notification takes place prior to the end of the 7 year DBIU period and lists coordination status
- Favorable finding by Bureau allows network to be added to the MIFR (Master International Frequency Register)
- Frequencies registered in the MIFR have obtained international recognition
- Notifications that are returned receive an unfavorable finding and are also published in an IFIC

Bringing Into Use

- You must bring network into use within 7 years
- WRC-12 Adopted No. 11.44B on Bringing Into Use (BIU) assignments for GSO Networks
 - Requires a GSO satellite to be capable of transmitting/receiving the frequency assignment
 - Requires 90 day deployment at orbital position
 - Bureau must be notified 30 days from the 90 day period of the BIU date
- WRC-15 modified No. 11.44B to allow a BIU date more than 120 days prior to the date of receipt of the notification information shall also be considered as having been brought into use

Suspension

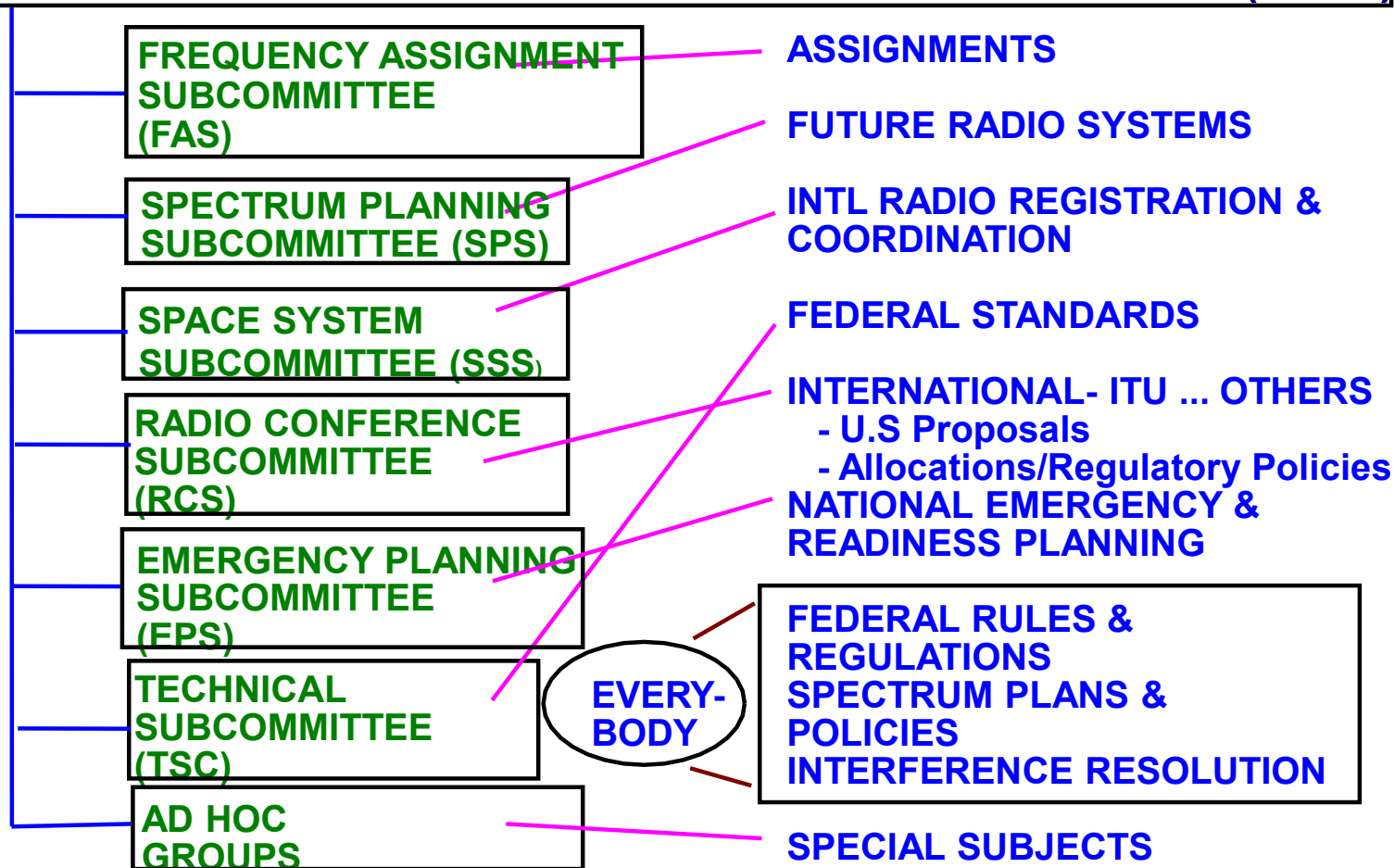
- WRC-12 revised provisions for suspending assignments
 - Administrations must suspend assignments within six months of satellite failure
 - Suspension cannot last longer than three years to resume use of an assignment
 - To bring back into use an assignment for a GSO network, you must deploy a GSO satellite for 90 days having the capability of transmitting/receiving the frequency assignment
- WRC-15 revised suspension rules to reduce the three-year time period. The amount by which the three-year period shall be reduced shall be equal to the amount of time that has elapsed between the end of the six-month period and the date that the Bureau is informed of the suspension.

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 Deputy Administrator for Spectrum Management
- IRAC has been operating since 1922

INTERDEPARTMENT RADIO ADVISORY COMMITTEE (IRAC)



Space Systems Subcommittee 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.

SPACE SYSTEMS SUBCOMMITTEE

- 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

Questions?

