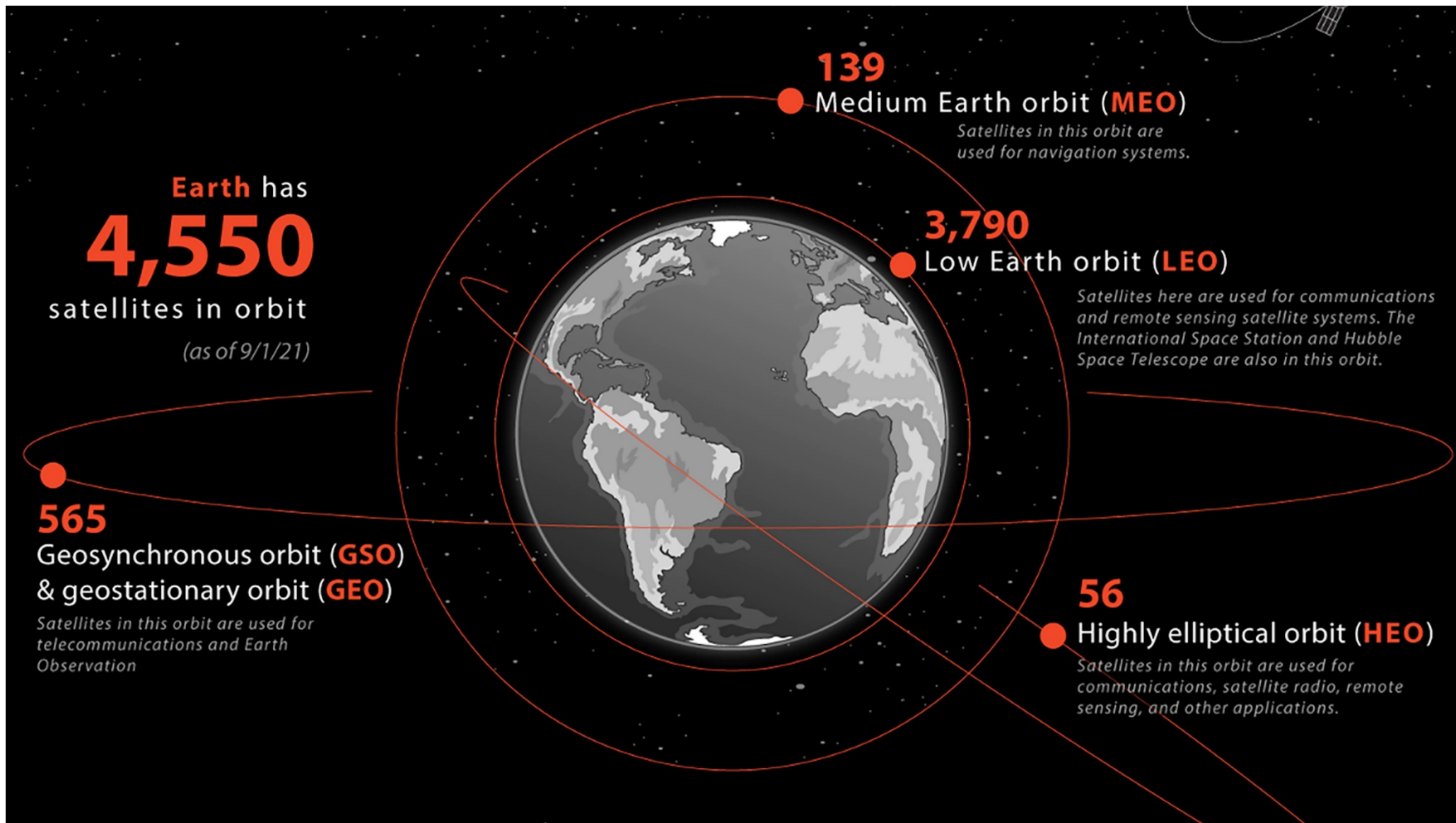
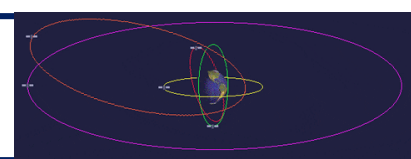


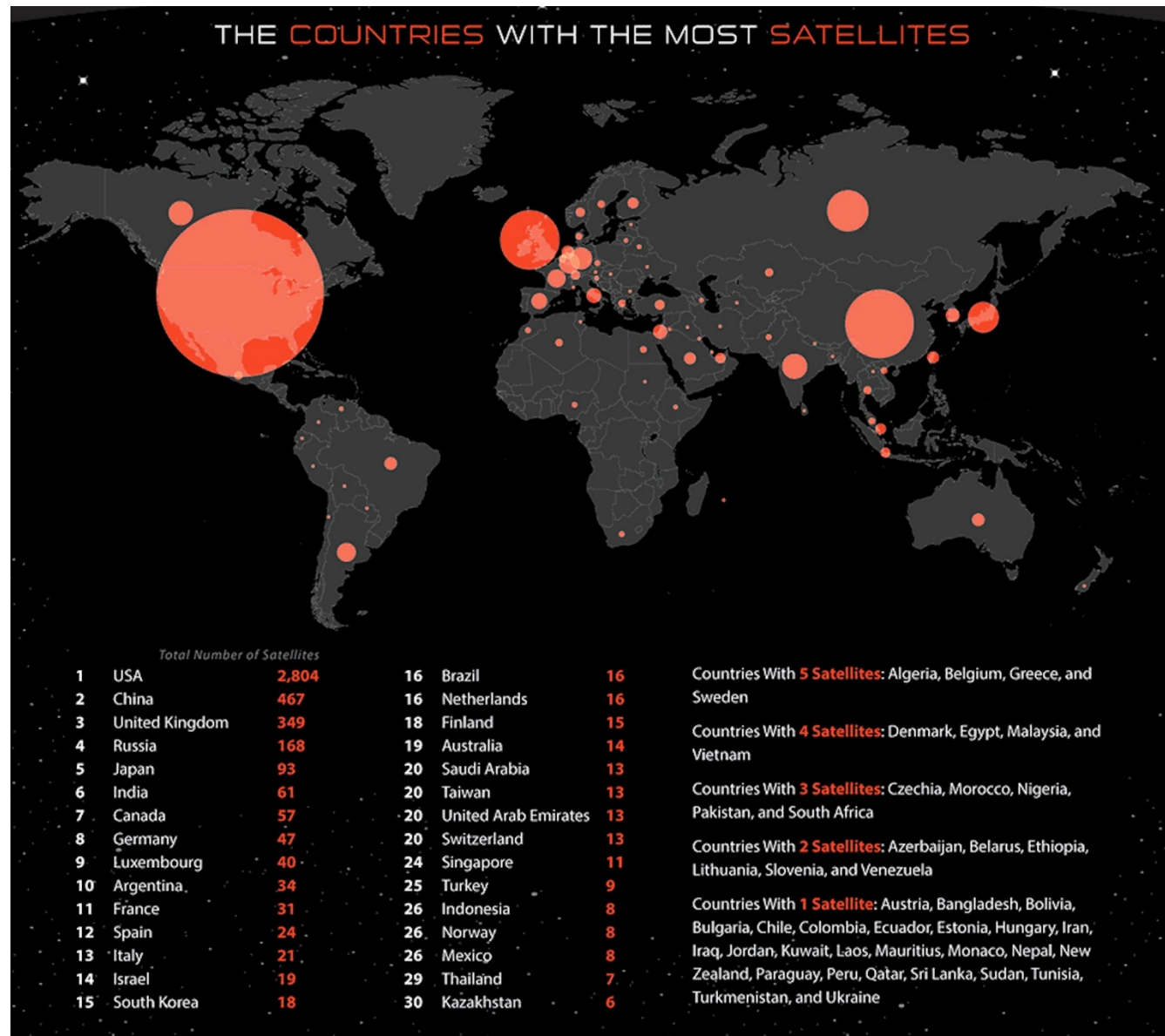
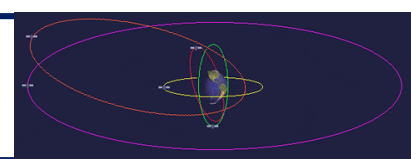
I SERVIZI SPAZIALI IN AMBITO ITU

8 GIUGNO 2023 - Mauro Di Crescenzo

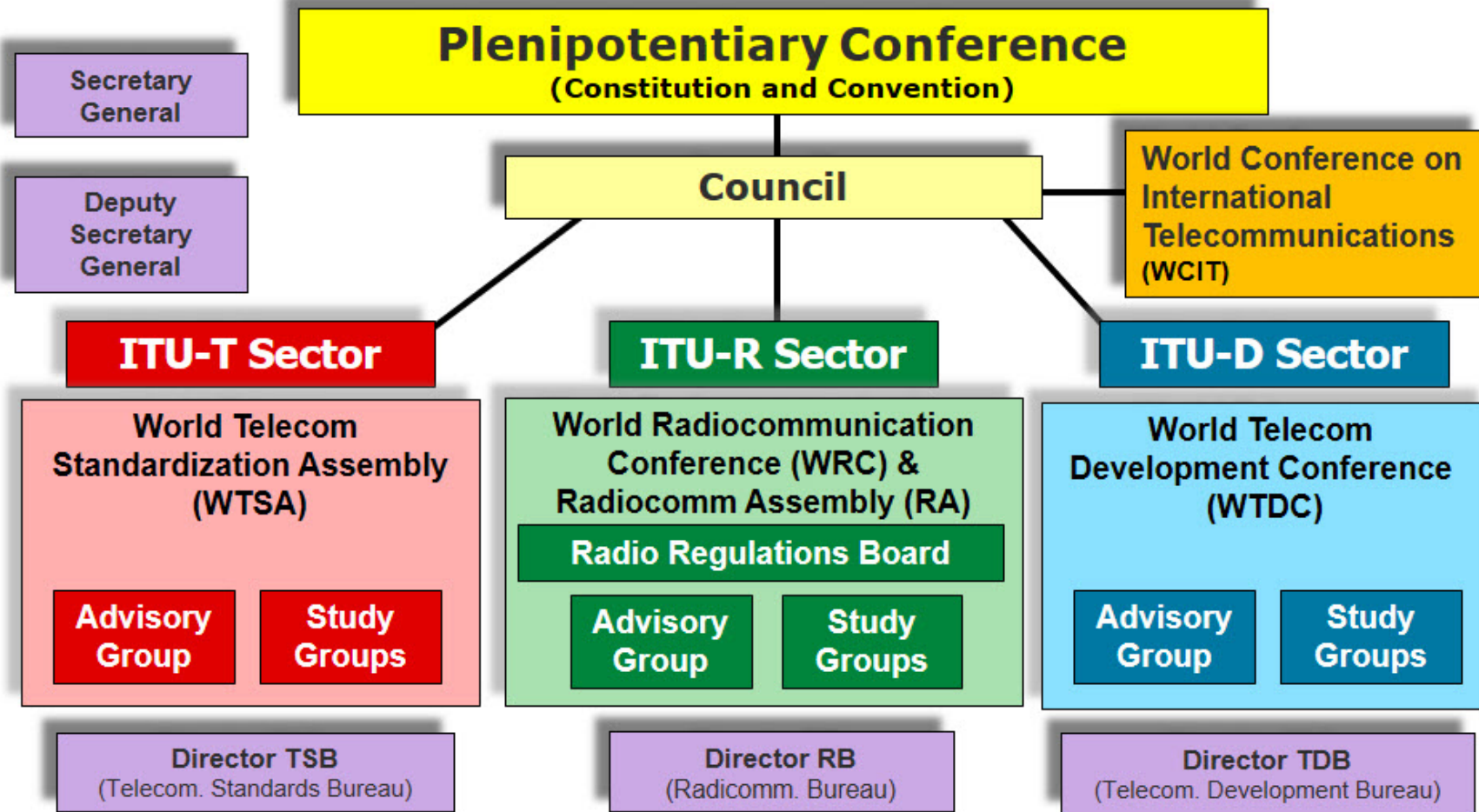
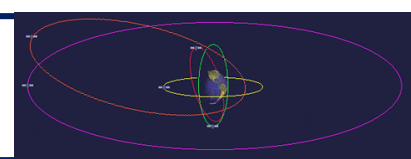
Satelliti operativi al 2021



Satelliti operativi per paese al 2021



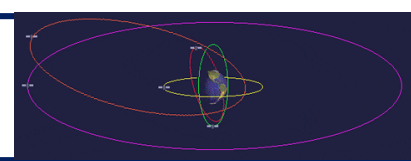
International Telecommunication Union (ITU)



- **ITU-T** develops **ICT & telecommunications standards**
- **ITU-R** manages **radio spectrum & satellite orbits**
- **ITU-D** assists developing countries
- **Secretariat** provides **overall management & coordination of the activities of the Union**

ISED's Involvement in the International Telecommunication Union: Evaluation report (June 2020)

Un impegno importante e molto vicino



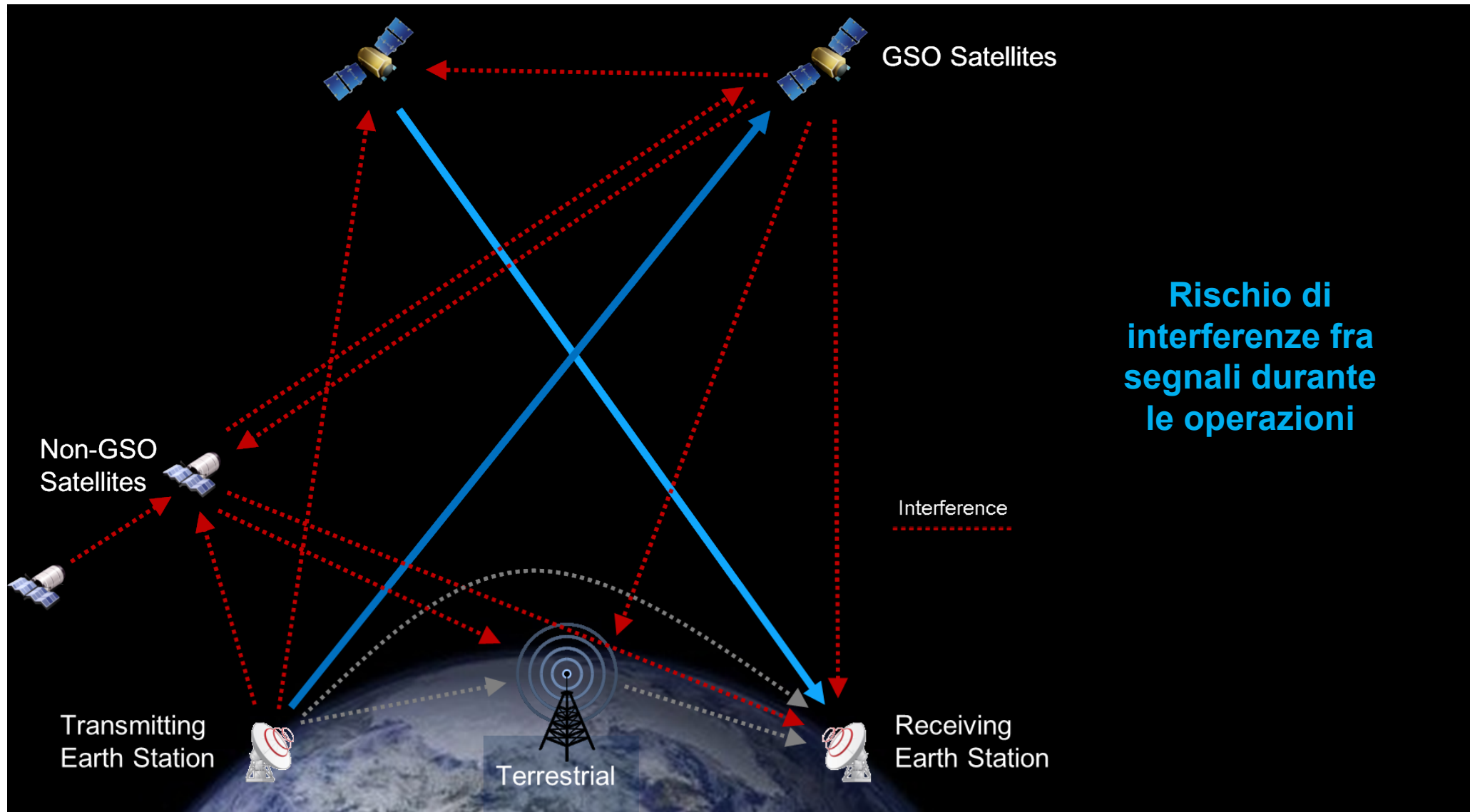
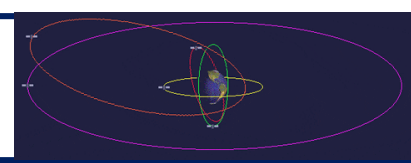
ITU World Radiocommunication Conference 2023 (WRC-23)

Dubai, United Arab Emirates, 20 November to 15 December 2023

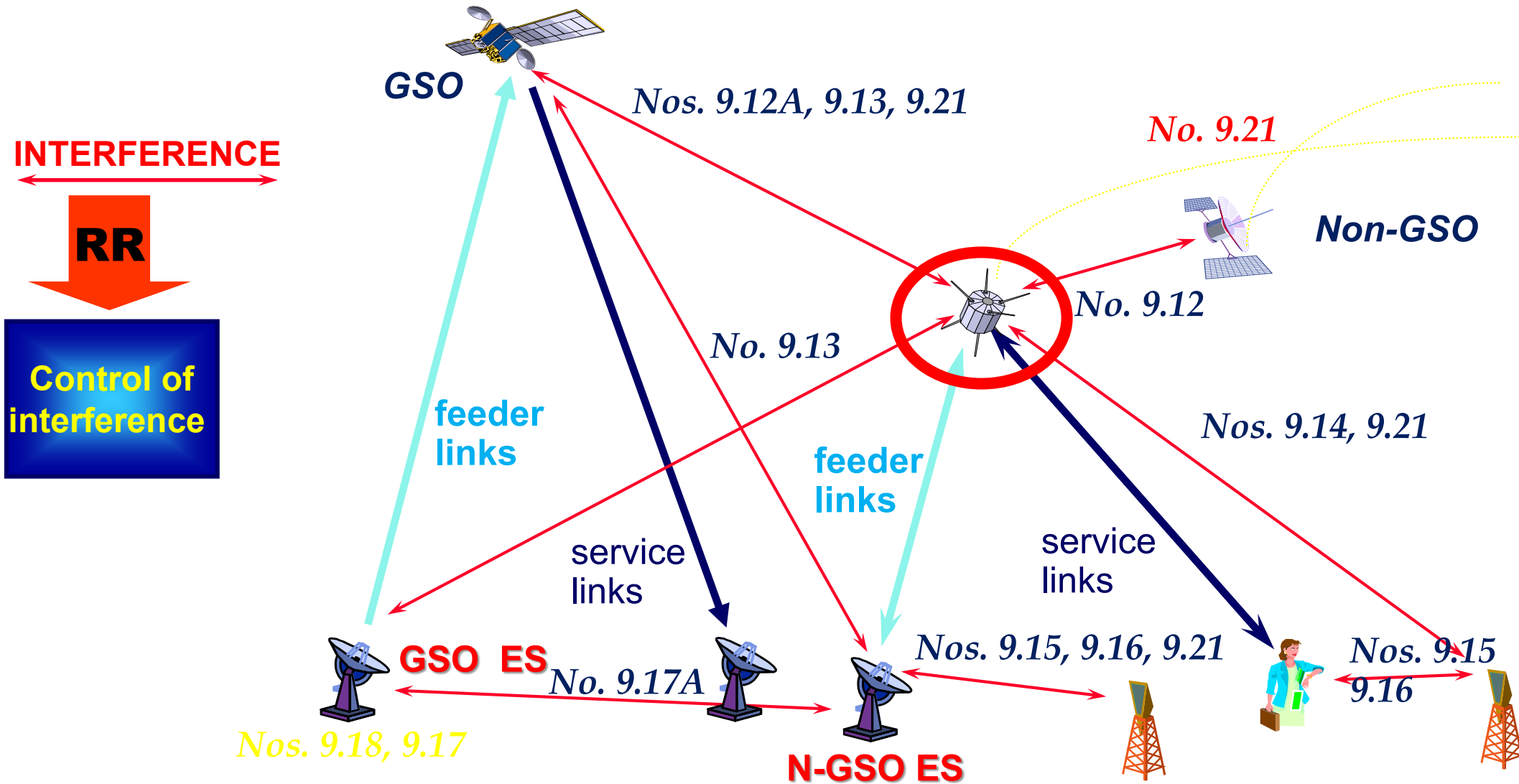
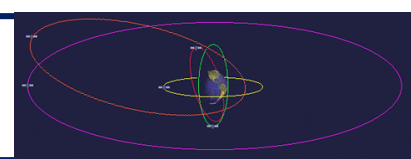
Le World Radiocommunication Conferences (WRC) si tengono ogni tre o quattro anni per rivedere e, se necessario, modificare i regolamenti radio ovvero il trattato internazionale che disciplina l'uso dello spettro delle radiofrequenze e delle orbite satellitari geostazionarie e non-geostazionarie. Le revisioni sono effettuate sulla base di un'agenda stabilita dal Consiglio dell'ITU, che tiene conto delle raccomandazioni formulate nelle precedenti conferenze mondiali delle radiocomunicazioni.

RADIOCOMMUNICATIONS - Il [Radiocommunication Sector \(ITU-R\)](#) dell'ITU coordina i servizi di radiocomunicazione e la gestione internazionale dello spettro delle radiofrequenze e delle orbite satellitari. A causa dell'enorme richiesta, queste risorse sono limitate e partecipare alle conferenze ITU-R e alle attività dei gruppi di studio - in cui vengono svolte attività tecniche e normative, sta diventando una priorità sempre più alta sia per i governi che per gli operatori del settore.

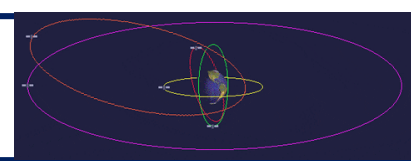
Interferenze fra reti satellitari e terrestri



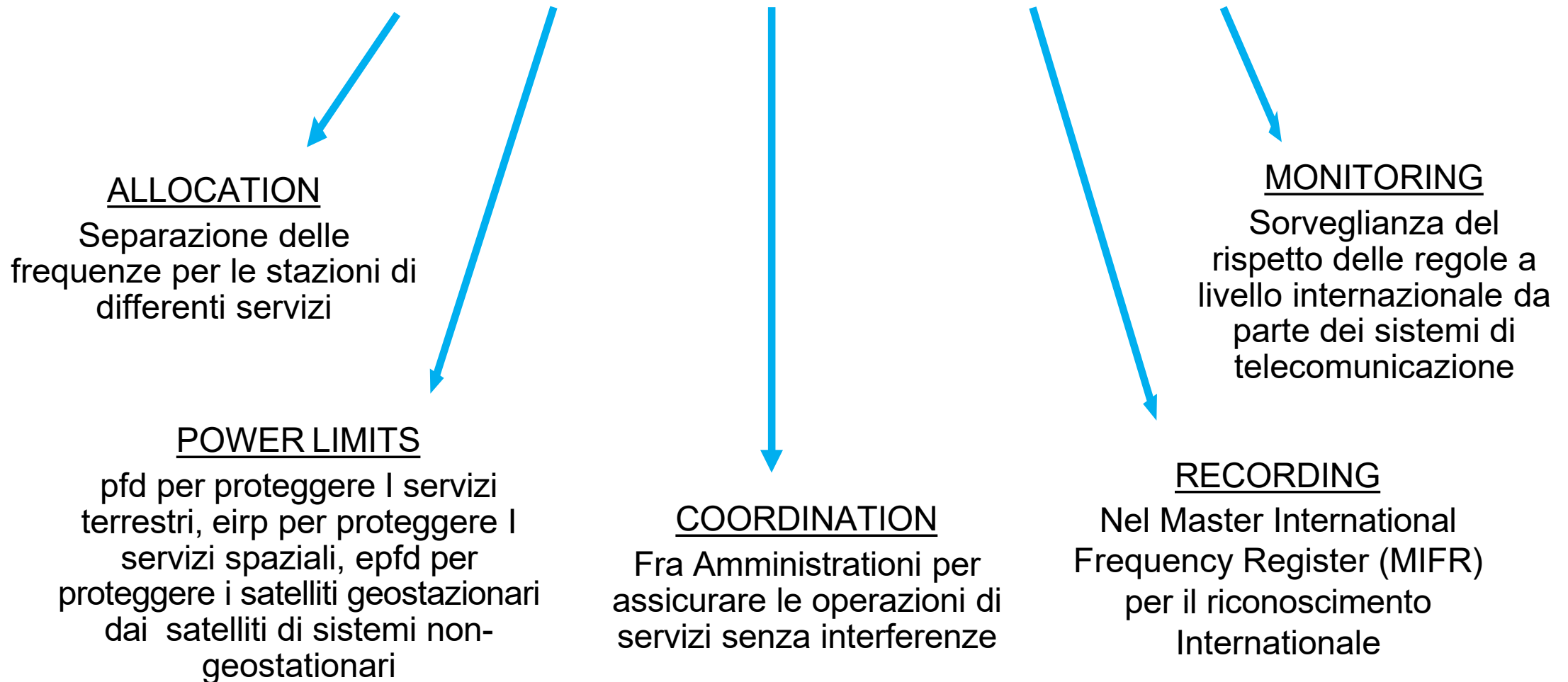
Non-GSO regole per il coordinamento



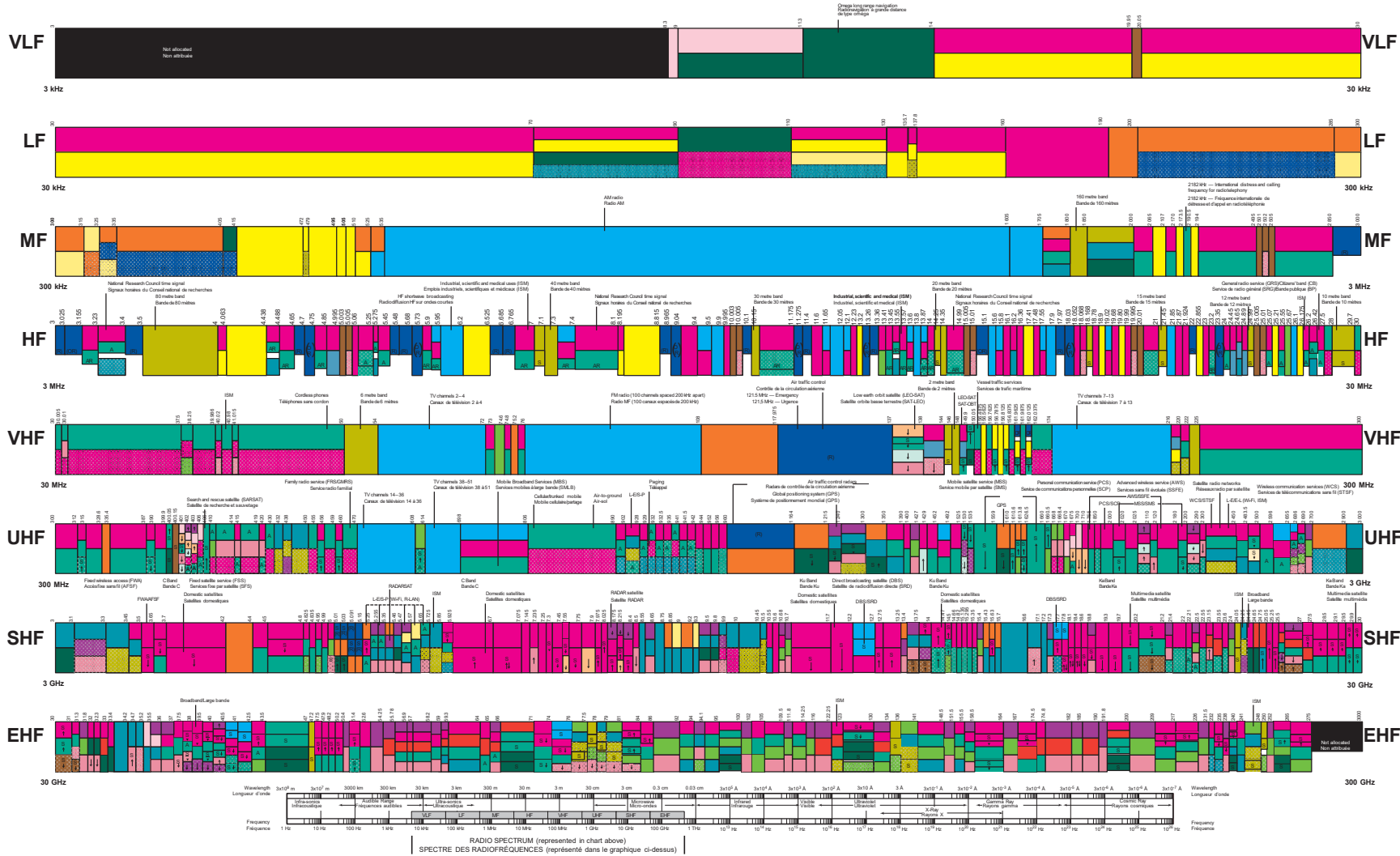
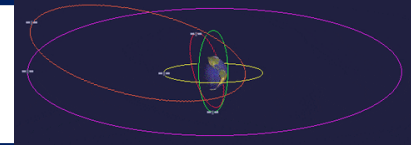
RR – Regolamentare e soluzioni tecniche



5 meccanismi per assicurare il controllo delle interferenze ed un utilizzo equo dello spettro elettromagnetico



RADIO SPECTRUM ALLOCATIONS IN CANADA



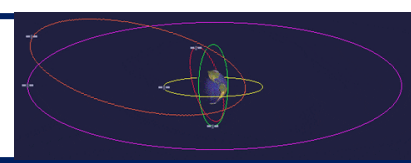
- Aeronautical mobile
- Mobile aéronautique
- Aeronautical radionavigation
- Radionavigation aéronautique
- Amateur
- Amateur
- Broadcasting
- Radiodiffusion
- Fixed
- Fixe
- Land mobile
- Mobile terrestre
- Maritime mobile
- Mobile maritime
- Maritime radionavigation
- Radionavigation maritime
- Meteorological aids
- Auxiliaires de la météorologie
- Mobile
- Mobile
- Radiolocation
- Radiolocalisation
- Radionavigation
- Radionavigation
- Standard frequency and time signal
- Fréquences étalon et des signaux horaires
- Earth exploration-satellite
- Exploration de la Terre par satellite
- Inter-satellite
- Inter-satellites
- Meteorological-satellite
- Météorologie par satellite
- Radio astronomy
- Radioastronomie
- Radiodetermination-satellite
- Radiopéage par satellite
- Space operations
- Exploitation spatiale
- Space research
- Recherche spatiale
- Secondary
- Secondaire
- S
- Satellite
- R
- Route
- Route
- OR
- Off route
- Hors route
- I
- Light link
- Liaison montante
- J
- Downlink
- Liaison descendante
- A
- Except aeronautical mobile
- Sauf mobile aéronautique

Please note: The space allotted to the services in the spectrum segments shown is not proportional to the actual amount of spectrum occupied.

Veuillez noter que l'espace attribué aux services dans les segments du spectre n'est pas proportionnel aux plages réelles des fréquences occupées.

Cat. No. 1464-47/2014-POF
ISBN 978-1-100-54875-9

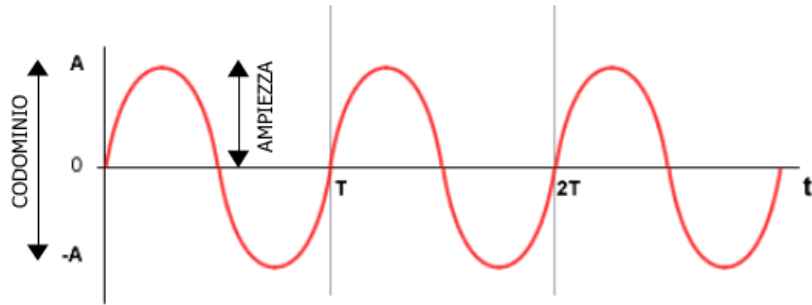
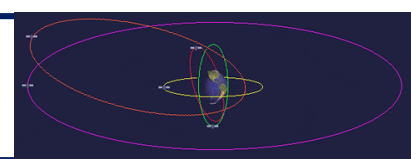




Perchè si parla di frequenze?
Cosa sono le frequenze in un segnale che viaggia nello spazio?



I fondamentali



La **frequenza angolare (o pulsazione)** misura i radianti al secondo e dipende dal periodo T della sinusoide.

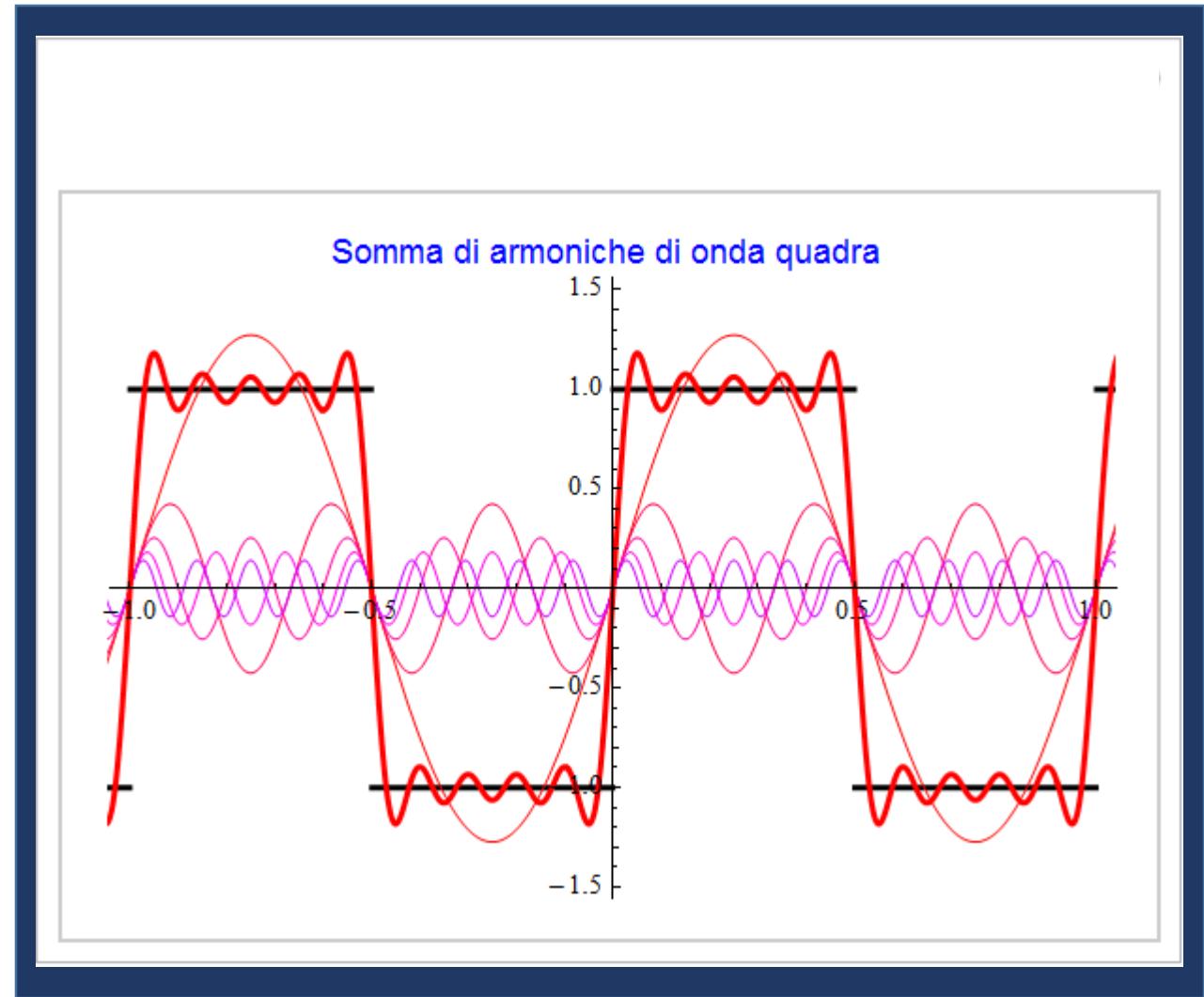
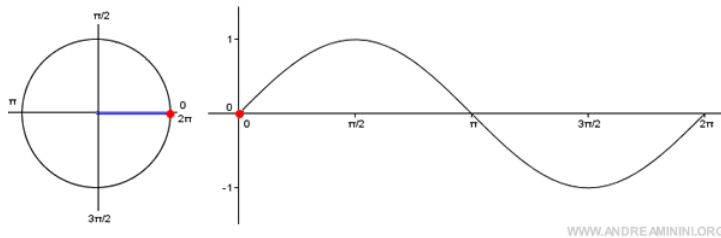
$$\omega = 2\pi/T$$

Poiché tra il periodo T e la frequenza f c'è la relazione inversa

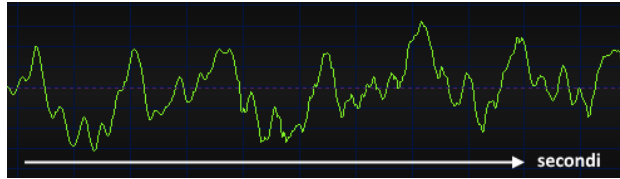
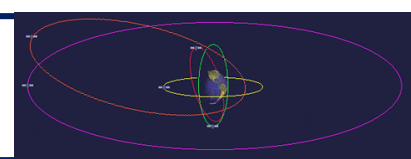
$$f = 1/T$$

si ottiene la relazione $\omega = 2\pi f$

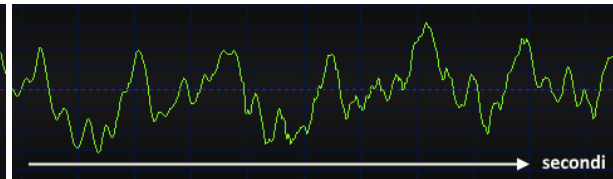
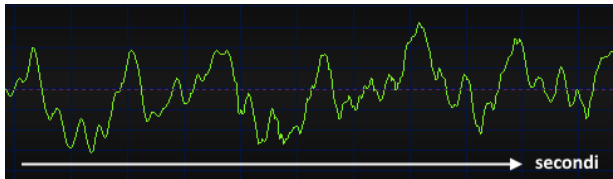
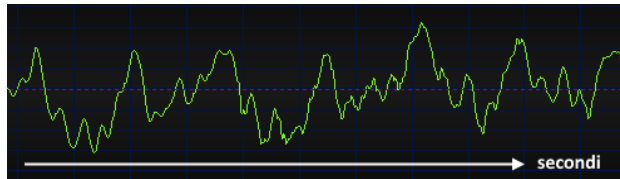
Quanti più radianti o periodi (T) compie la funzione sinusoidale in un secondo, tanto maggiore è la sua frequenza angolare o pulsazione ω in rad/s.



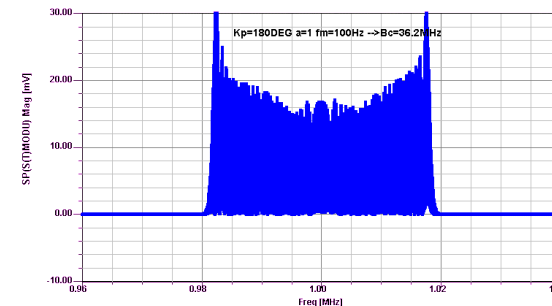
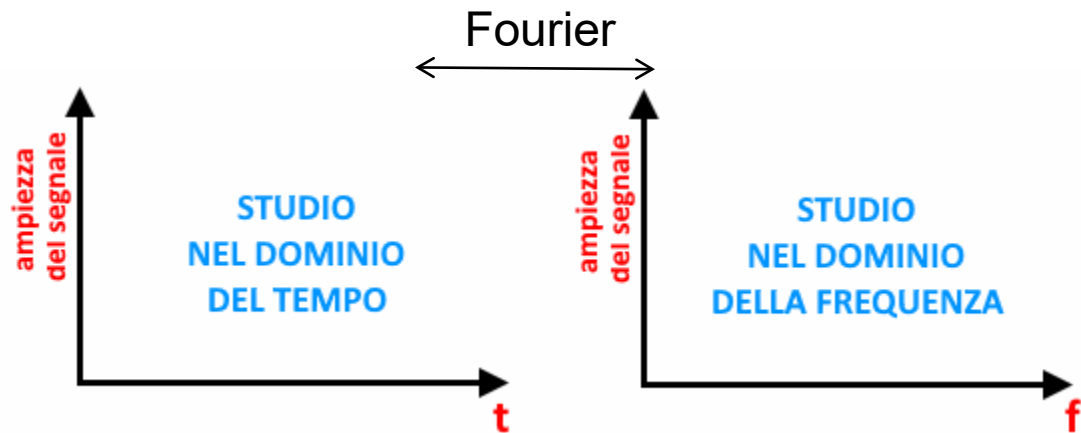
Il trucco



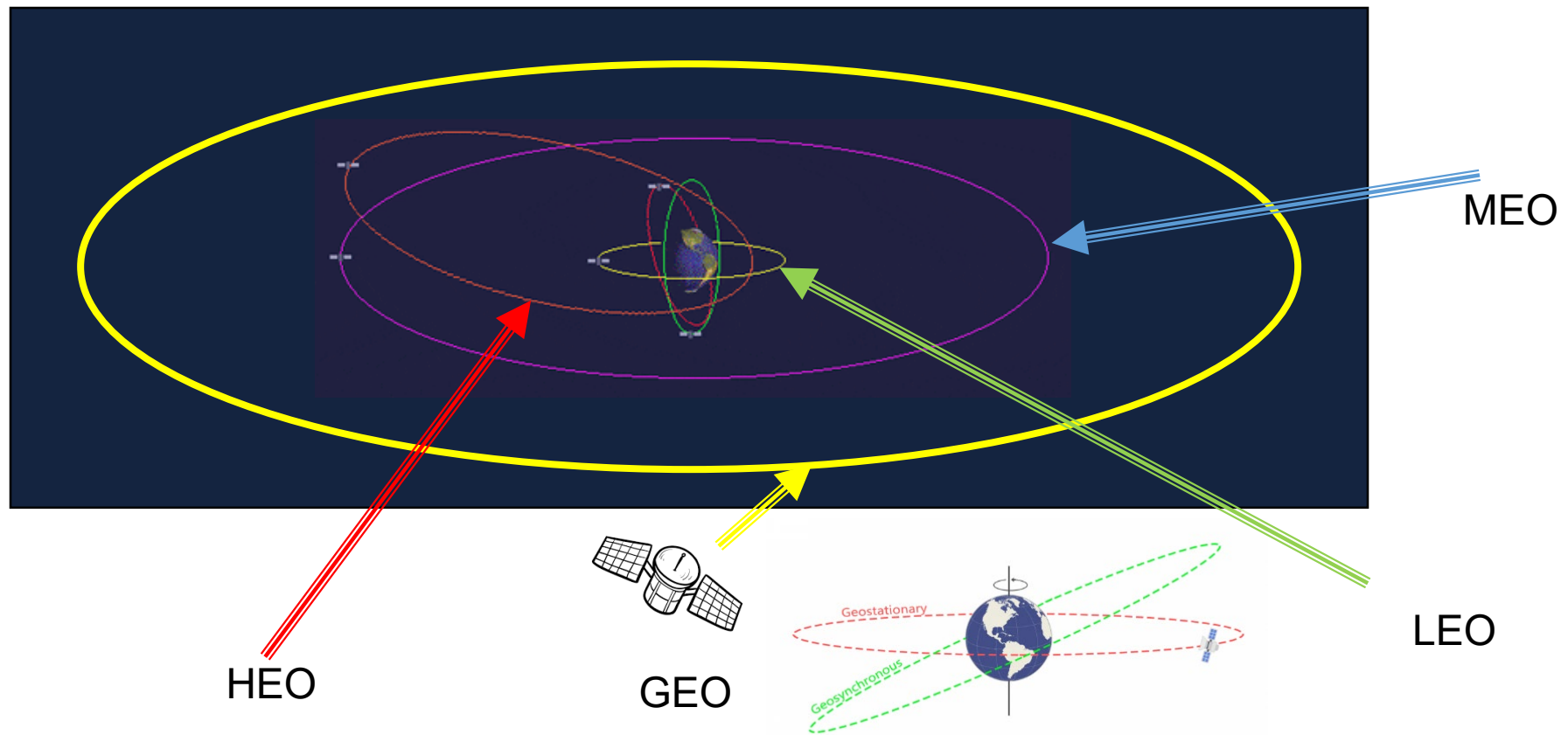
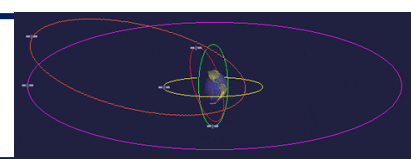
L'analisi in frequenza dei segnali aperiodici tempo continuo è uno dei contributi più importanti sviluppati da Fourier nel suo lavoro originale. Partendo dalla rappresentazione in frequenza di un segnale periodico, un segnale aperiodico può essere visto come un segnale periodico di periodo infinito. All'aumentare del periodo le componenti armoniche che costituiscono il segnale periodico tendono ad avvicinarsi in frequenza, al limite si ottiene uno spettro continuo, e si passa dallo sviluppo in serie a quello mediante integrale.



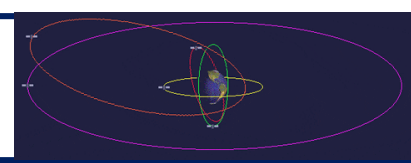
.....



La geometria dei sistemi satellitari

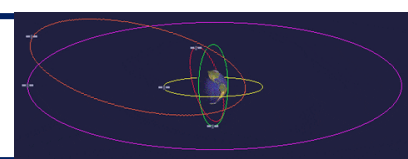


Domande ?



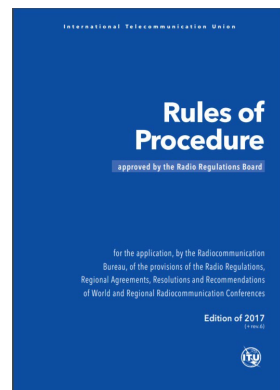
Un diavolo della Tasmania "[sbadiglia](#)" mettendo bene in mostra la potente dentatura !!!!

Il Software ITU per lo spazio



Radio Regulations (RR)

Raccoglie le decisioni della World Radiocommunication Conference



Rules of Procedure

Sono un complemento dei RR fornendo chiarimenti sull'applicazione di specifiche disposizioni e procedure contenute nei RR

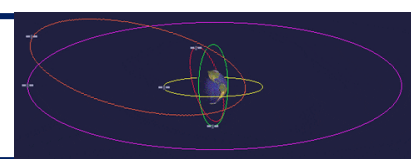


Permette di attuare quanto previsto dai RR e dalle Rules of Procedure

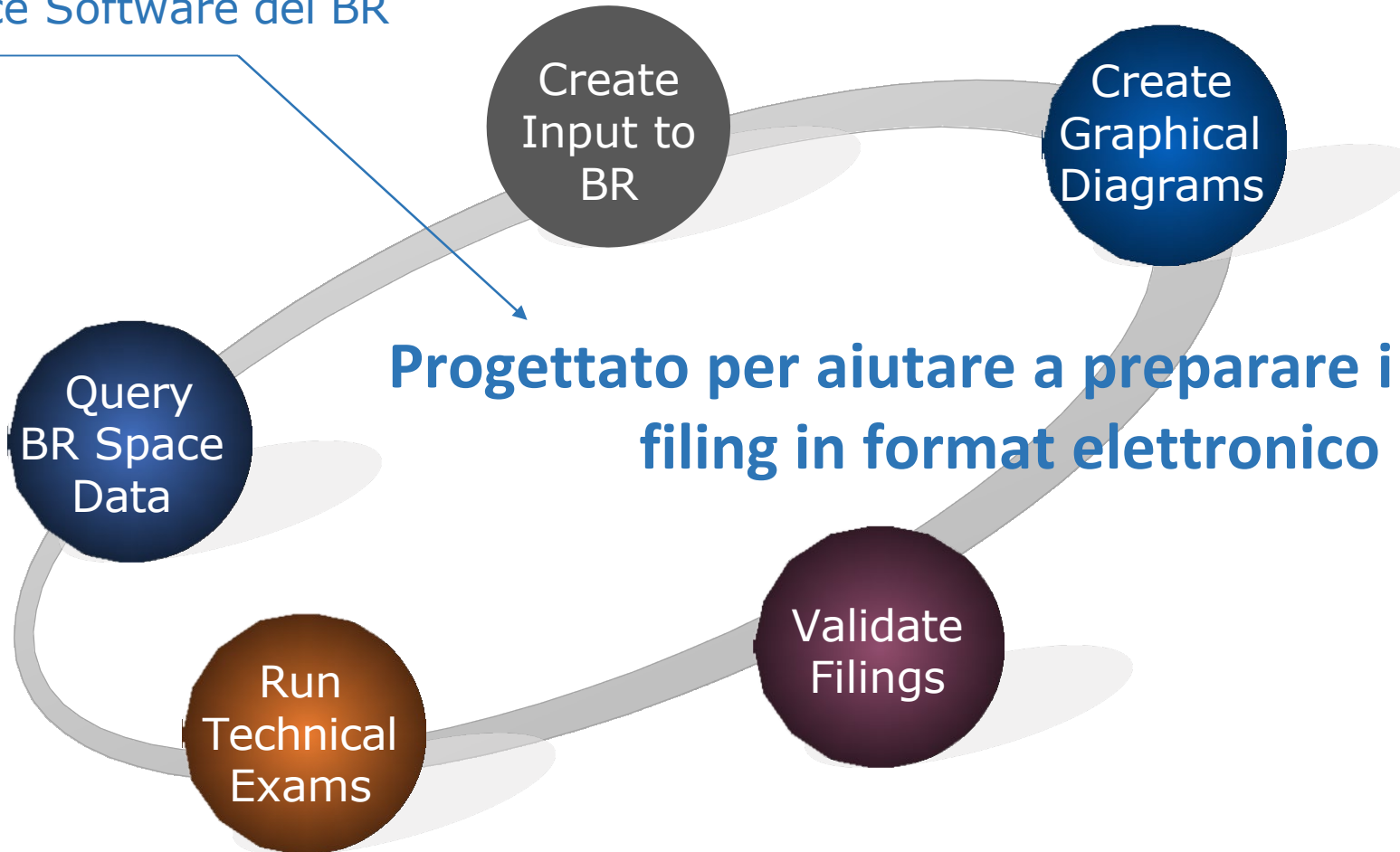
Consente di preparare i filings in formato elettronico in linea con i RR

Verifica ed invia al BR i filings elettronici

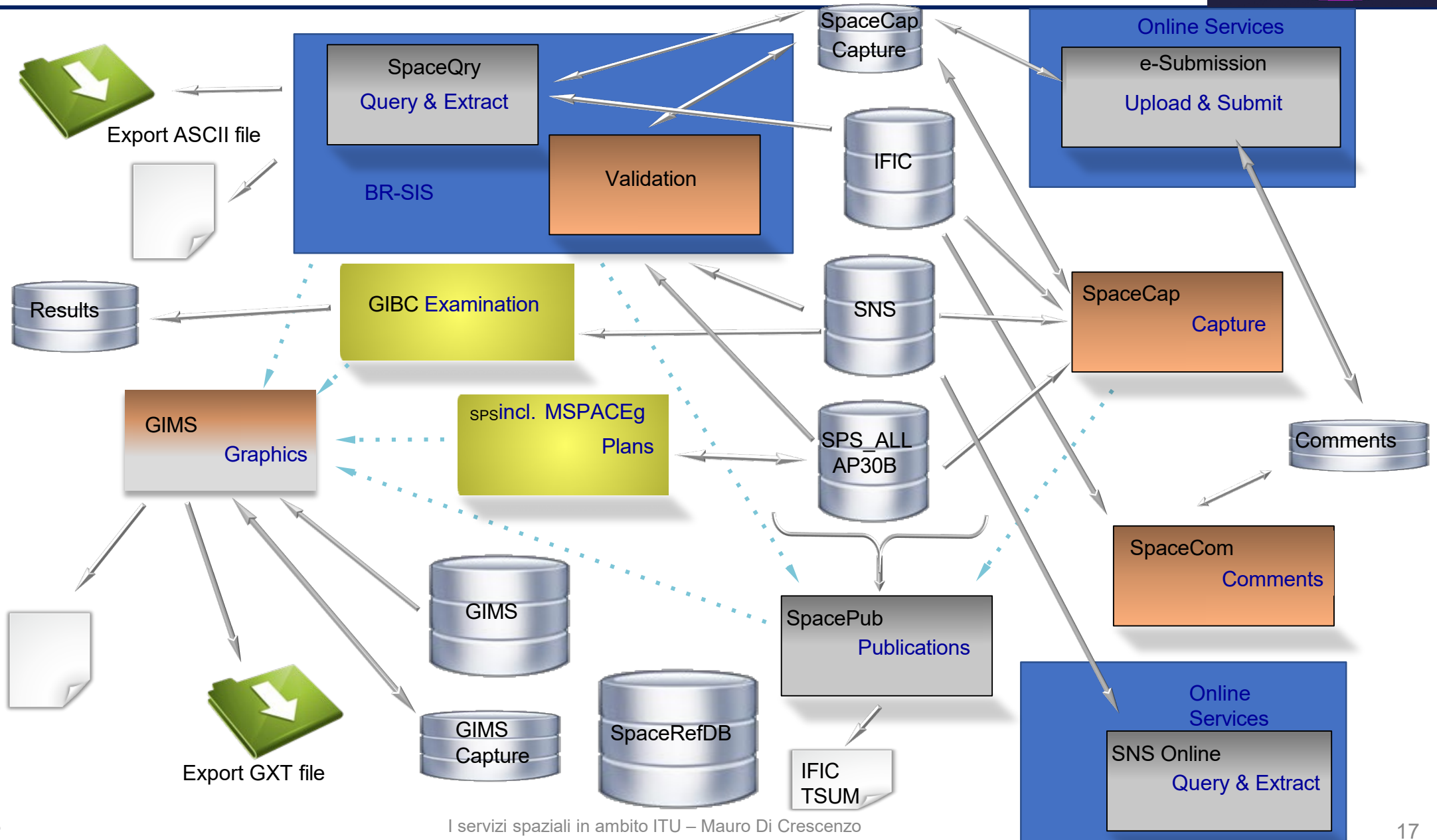
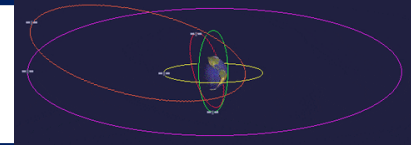
Gli Obiettivi dello Space Software



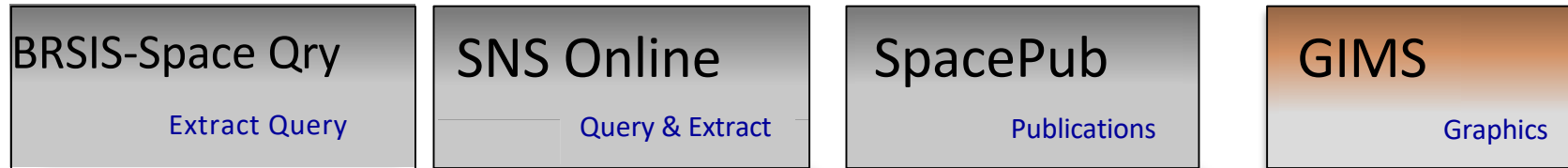
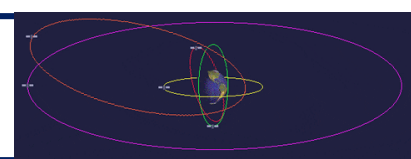
Lo Space Software del BR



Space Network System

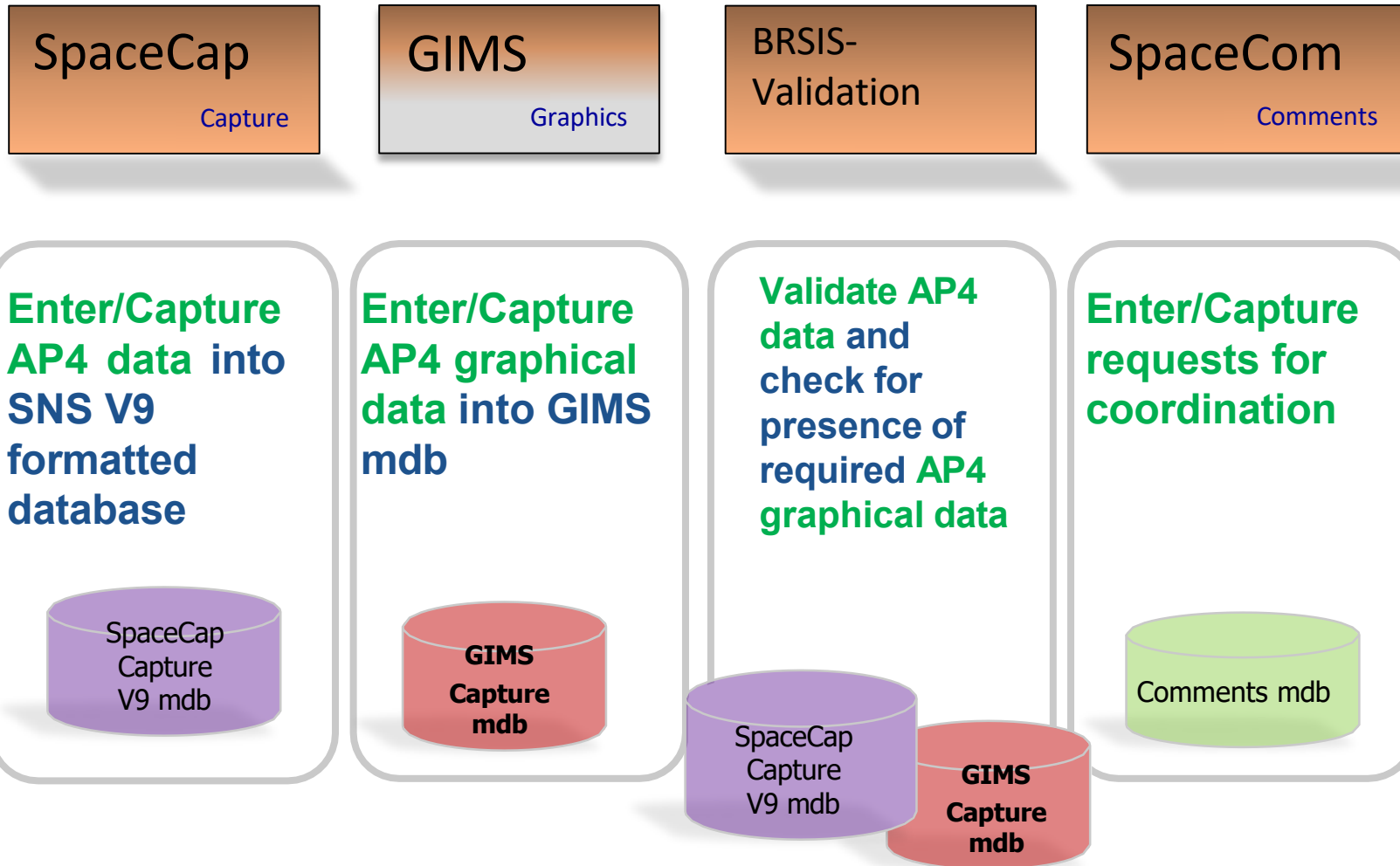
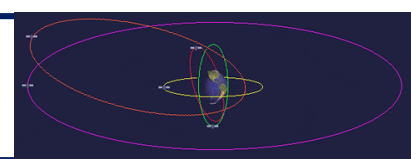


Space Services Data Query Software

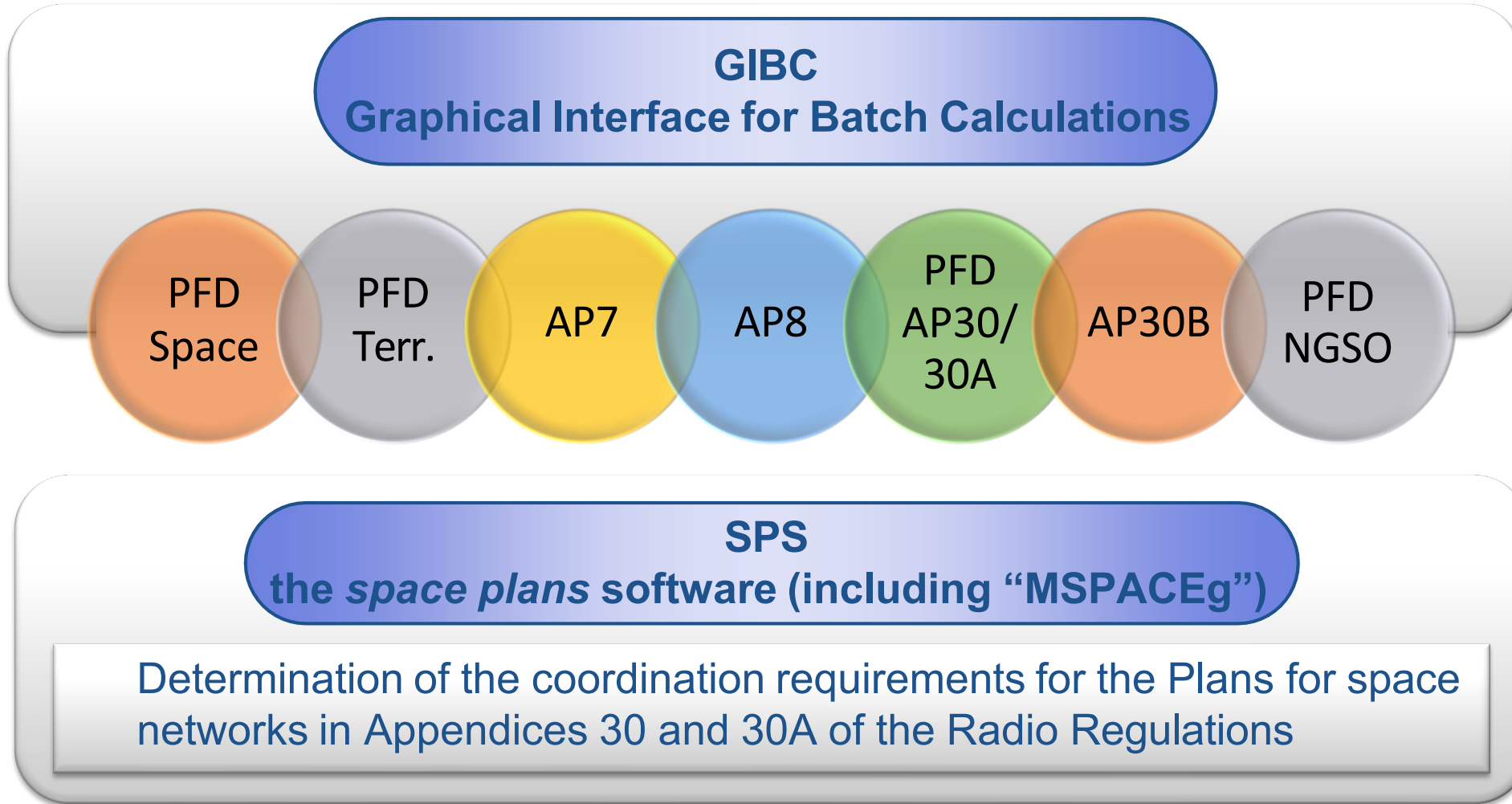
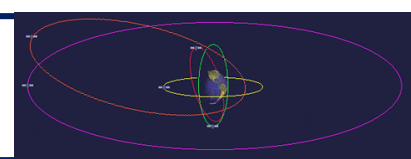


Ulteriori informazioni nella Space Network List (SNL)

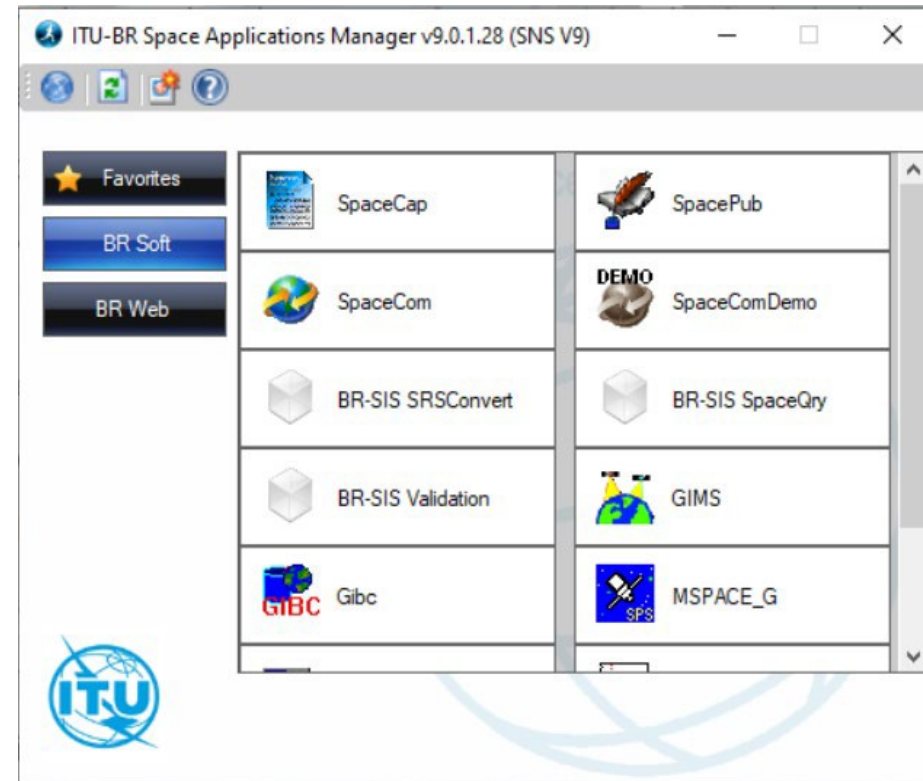
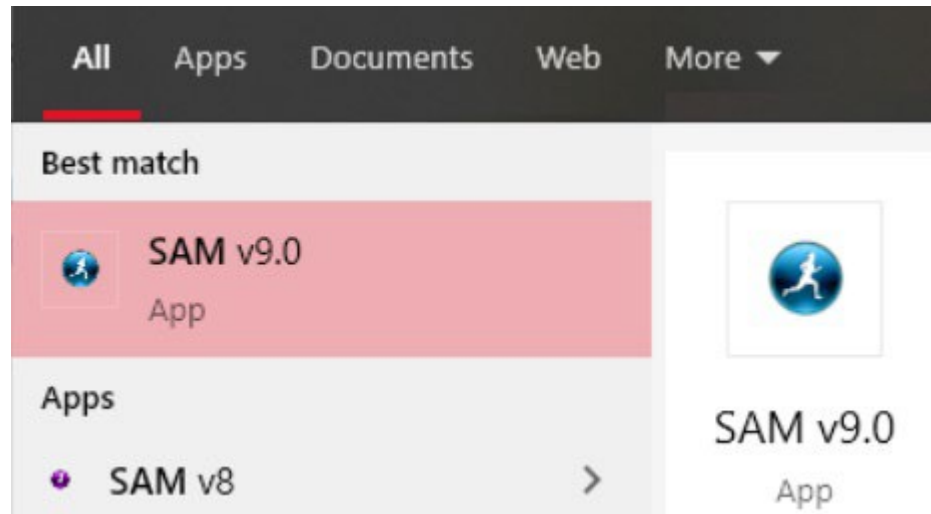
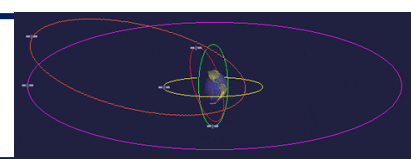
Space Services Data Entry Software



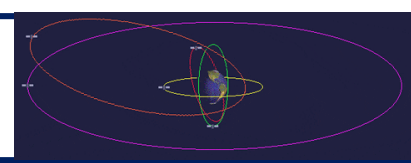
Space Services SW per le valutazioni tecniche



Space Application Manager



L'ultima versione dello Space SW



Download from the BR web site

<https://www.itu.int/ITU-R/go/space-software/en>

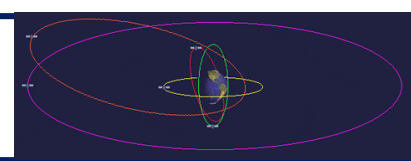


From the BR IFIC (Space) DVD

<https://www.itu.int/en/ITU-R/space/Pages/brificMain.aspx>

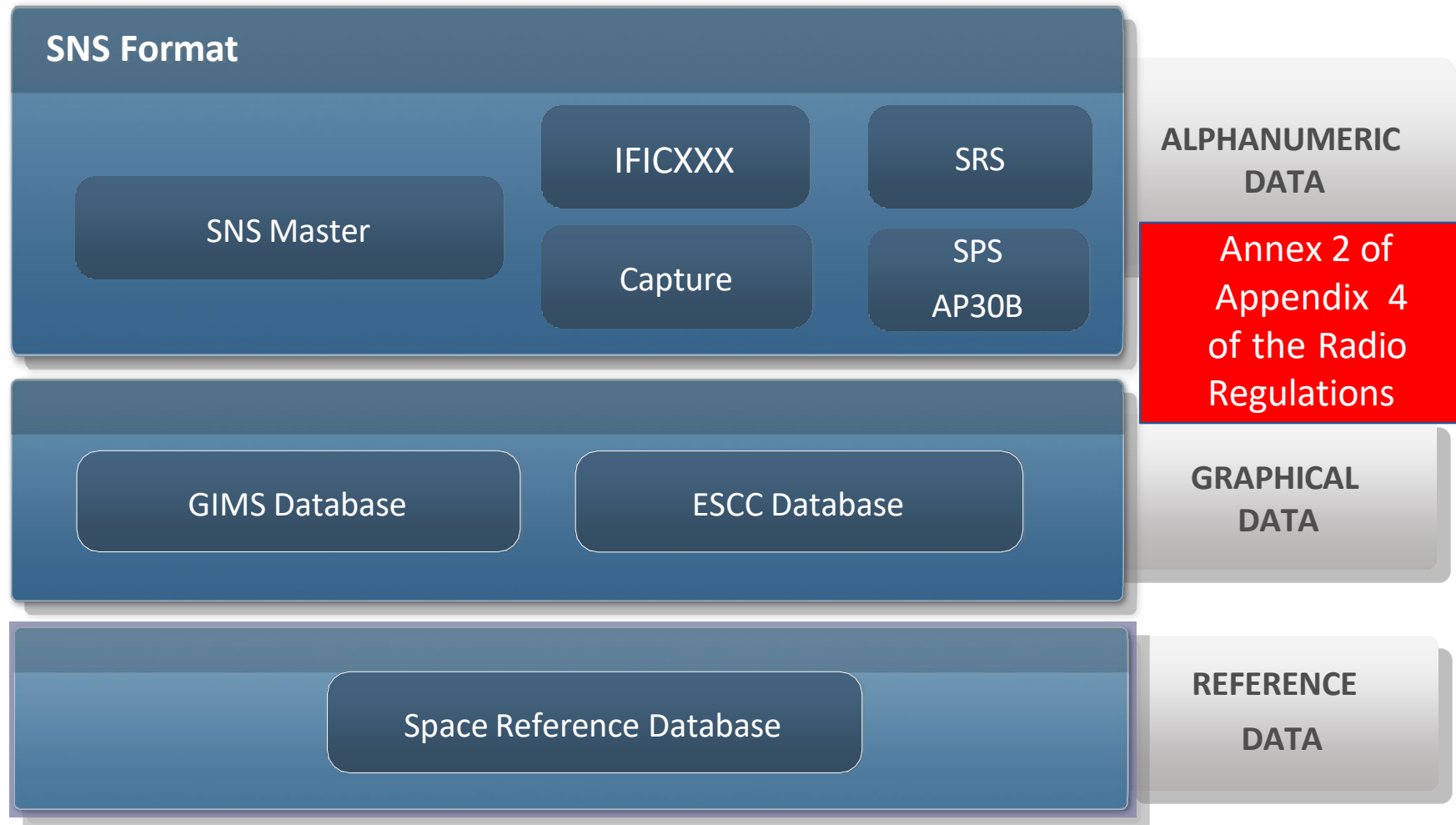
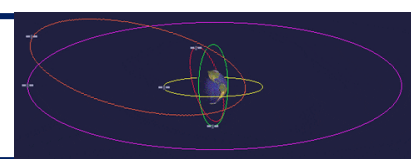
- **Installation requires administrator privileges**
- **Your network administrator may need to whitelist some legacy software components**

More details: BR_Soft\Notes on installing ITU BR Space Applications V9.pdf



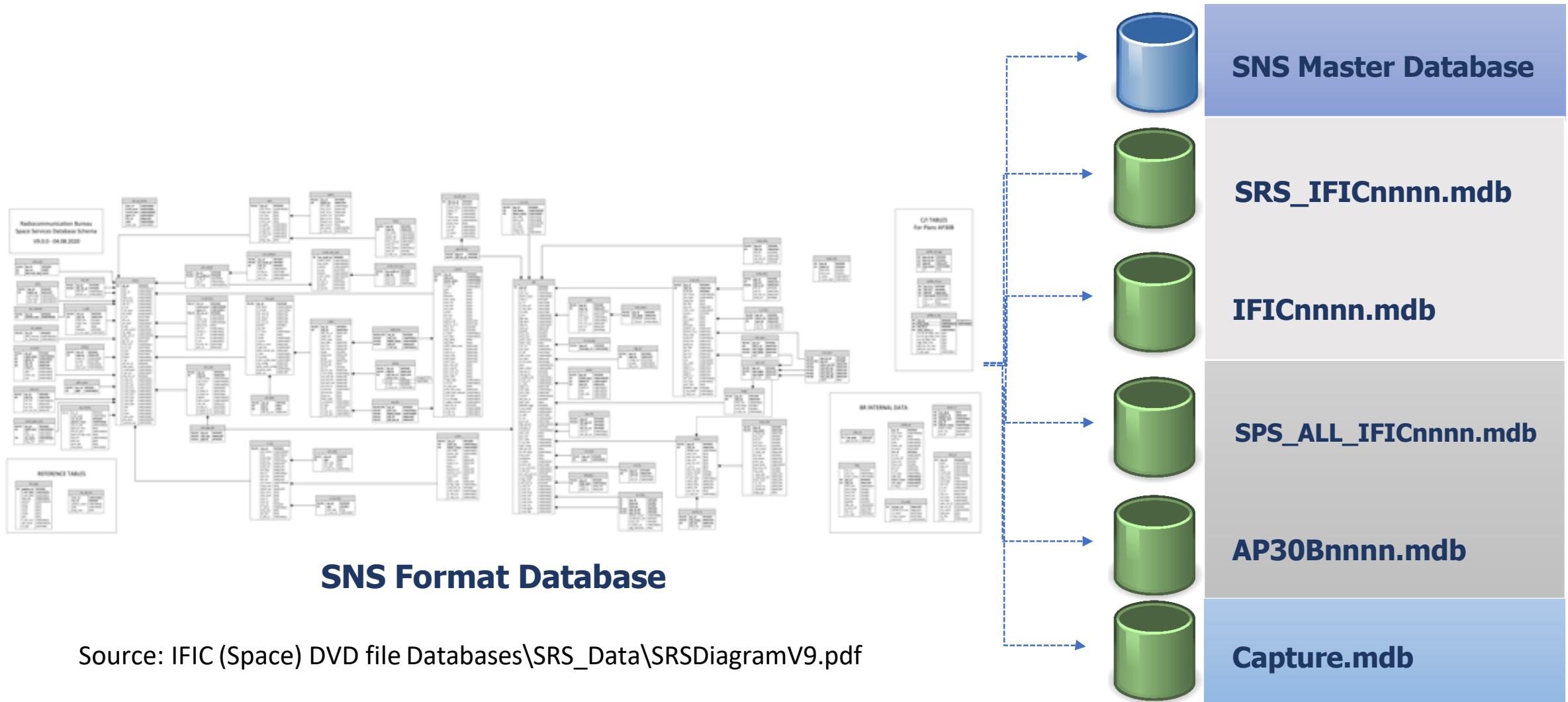
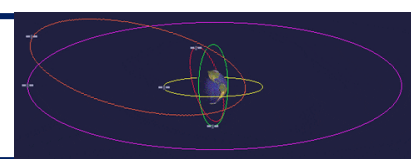
- Each World Radio Communication Conference introduces new resolutions and changes to the Radio Regulations
 - **Decisions taken at WRC-15: v8 (January 2017)** (e.g. A16c as new AP4 data for a commitment to meet separation distance of No. 5.509E and PFD limits of 5.509D)
 - **Decisions taken at WRC-19 (first phase of implementation): v9 (August 2020)** (e.g. support for NGSO constellations) - Impact on all desktop and web applications
 - **Decisions taken at WRC-19 (second phase of implementation): v9.1 (January 2021)** (e.g. RES35) - Impact on all desktop and web applications
 - **Data structure improvements/modernization: [v9.2 (January 2022)]**
- Transitions are announced in Circular Letters
 - **CR/411 and CR/415 for v8, CR/464 for v9**
- Where to find information on the V9 SNS Format?
 - **Section III of the Space Preface:** Description of the SNS V9 format
http://www.itu.int/en/ITU-R/space/Preface/preface_e.pdf

Le Categorie dello Space Databases



ESCC Diagrams – Earth Stations Coordination Contours

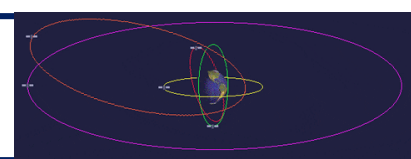
Il format del SNS Databases



SNS Format Database

Source: IFIC (Space) DVD file Databases\SRS_Data\SRSDiagramV9.pdf

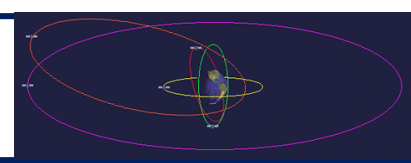
nnnn is the IFIC publication number, such as 2997 (published 31 Maggio 2023)



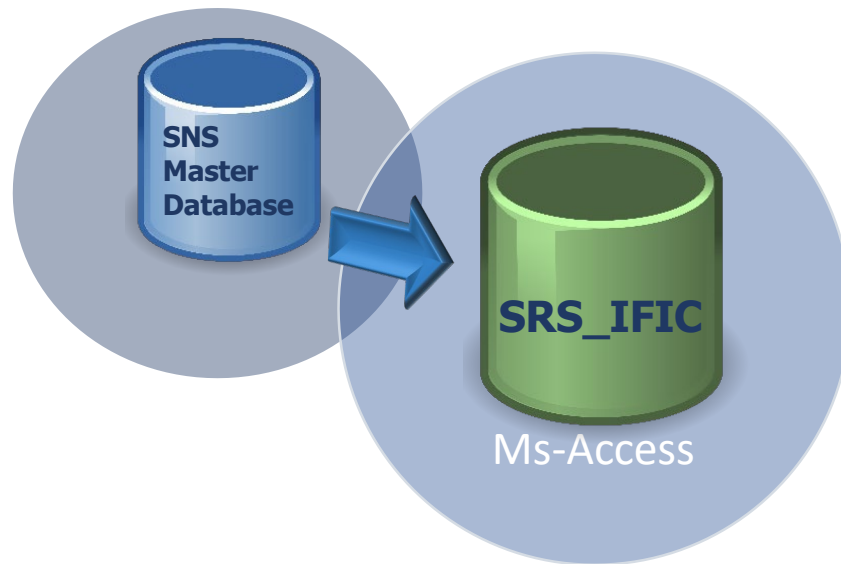
- **In the Master Register**
 - Coordination and Notification
 - Advance Publication of Information
 - Due Diligence (Resolution 49)
- **Electronic Filings received by the BR**
 - New assignments
 - Mod of existing
 - Delete existing
- **Notifications in Technical Examination**



SRS_IFICnnnn.mdb sul BR IFIC (Space) DVD

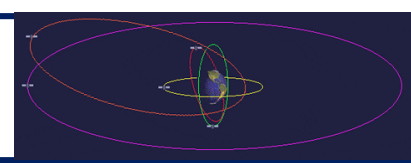


- Published every IFIC DVD (2 weeks)
- Snapshot of the SNS Master Database

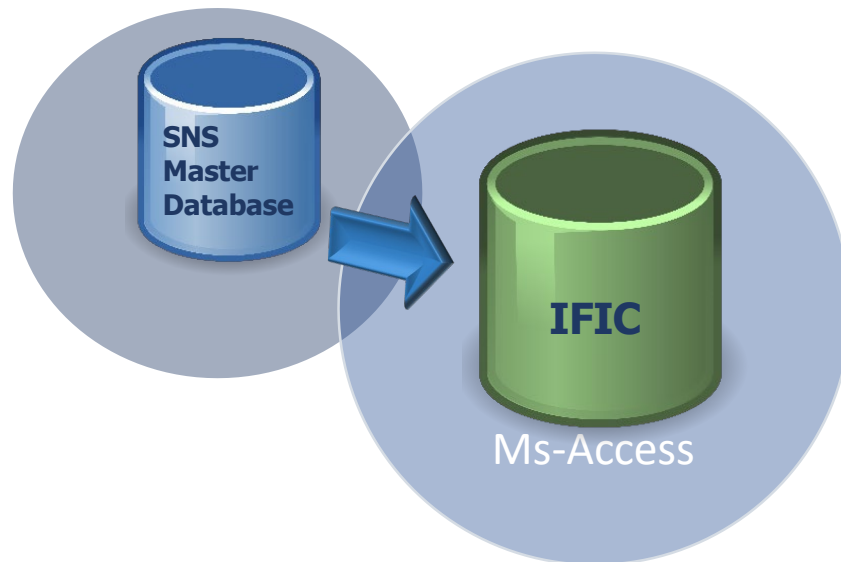


- Coordination and Notification recorded in the **Master Register**
- in **Technical Examination**
- for **Advance Publication of Information**
- for **Due Diligence (Resolution 49)**

Space Radiocommunication Stations (SRS)



- Published every IFIC DVD (2 weeks)

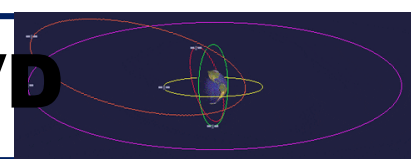


- **Part IS** – New frequencies or modifications, cancellations of assignments in the Master Register received by the BR
- **Part IIS** – Updates to the Master Register with Findings
- **Part IIIS** – Notifications returned to ADM with unfavourable findings
- **Special Sections** – Submissions published API/A, CR/C, CR/D, CR/E, CR/F

- Download from

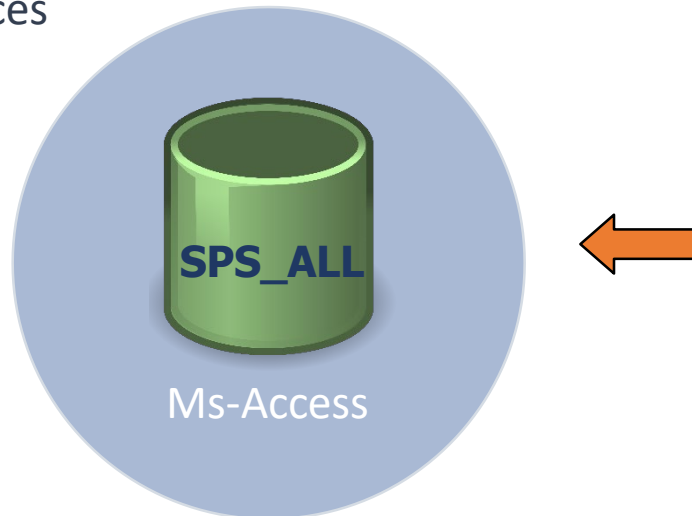
<https://www.itu.int/sns/wic/demowic.html>

SPS_ALL_IFICnnnnn.mdb sul BR IFIC (Space) DVD



- **Published every IFIC DVD (2 weeks)**

Technical characteristics and reference situation for networks of the planned space services



Space Plan System (SPS)

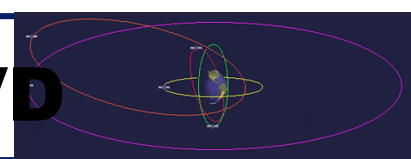
- **Appendices 30/30A**
 - Region 1 and 3 Plan, List and pending Article 4 networks
 - RARC SAT-R2 Region 2 Plan
 - Article 5 of Appendices 30 and 30A
 - Pending Article 2A networks of Appendices 30 and 30A

- **Due Diligence (Resolution 49)**

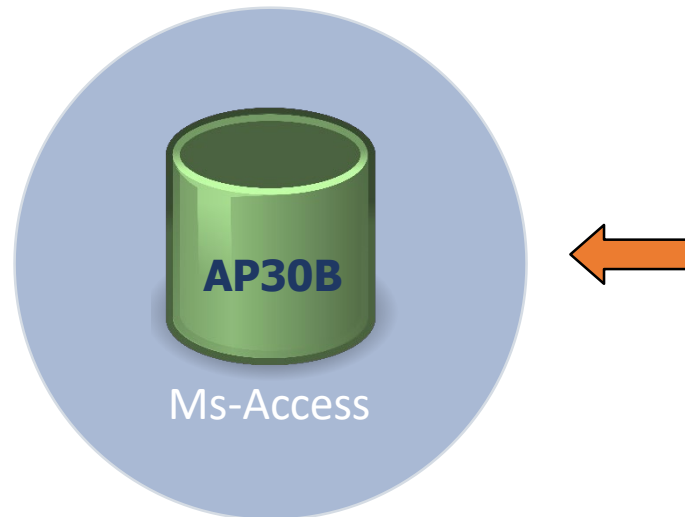
- **Download from**

<http://www.itu.int/en/ITU-R/space/plans/Pages/AP30-30A.aspx>

Appendix 30B Database sul BR IFIC (Space) DVD



- Published every IFIC DVD (2 weeks)



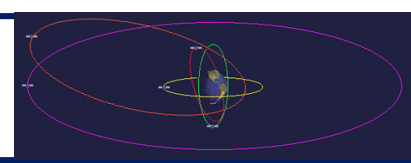
- **Appendix 30B**

- Plan, List and Pending Article 6 networks
- Article 8 of Appendix 30B

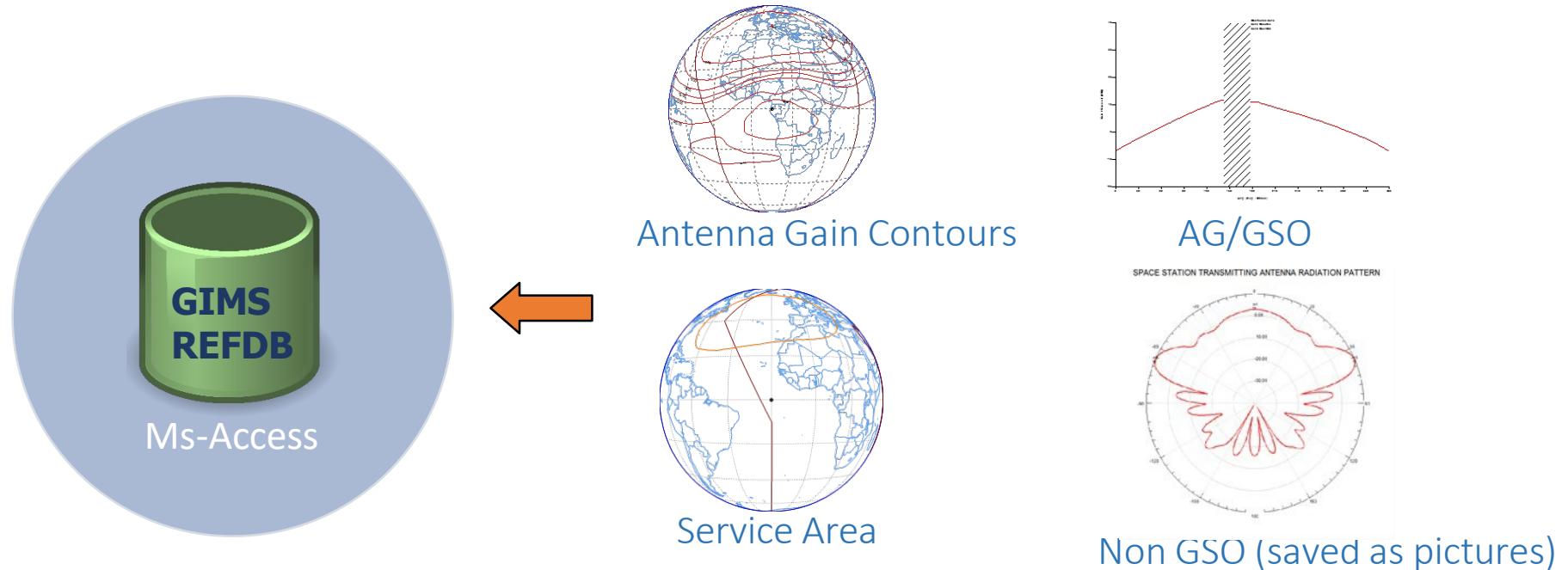
- **Due Diligence (Resolution 49)**

- Download from

<http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>

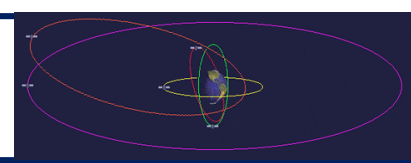


- Published every IFIC DVD (2 weeks)

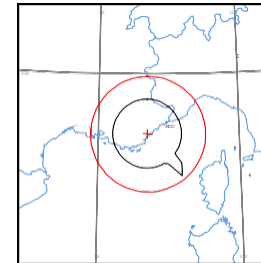
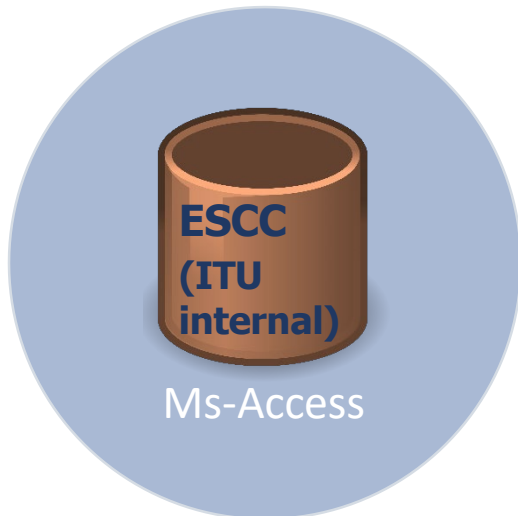


Graphical Data for **GSO and Non GSO Satellites**

- used by Technical Examination software
- Available in IFIC DVD (**grefdbnnnn.mdb**) and accessible via **GIMS software (REFDB)**



Master Repository for Earth Station Coordination Contours

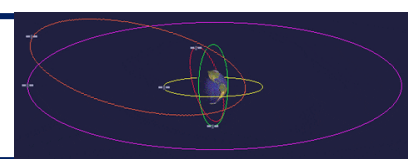


Generated by the Appendix 7 software

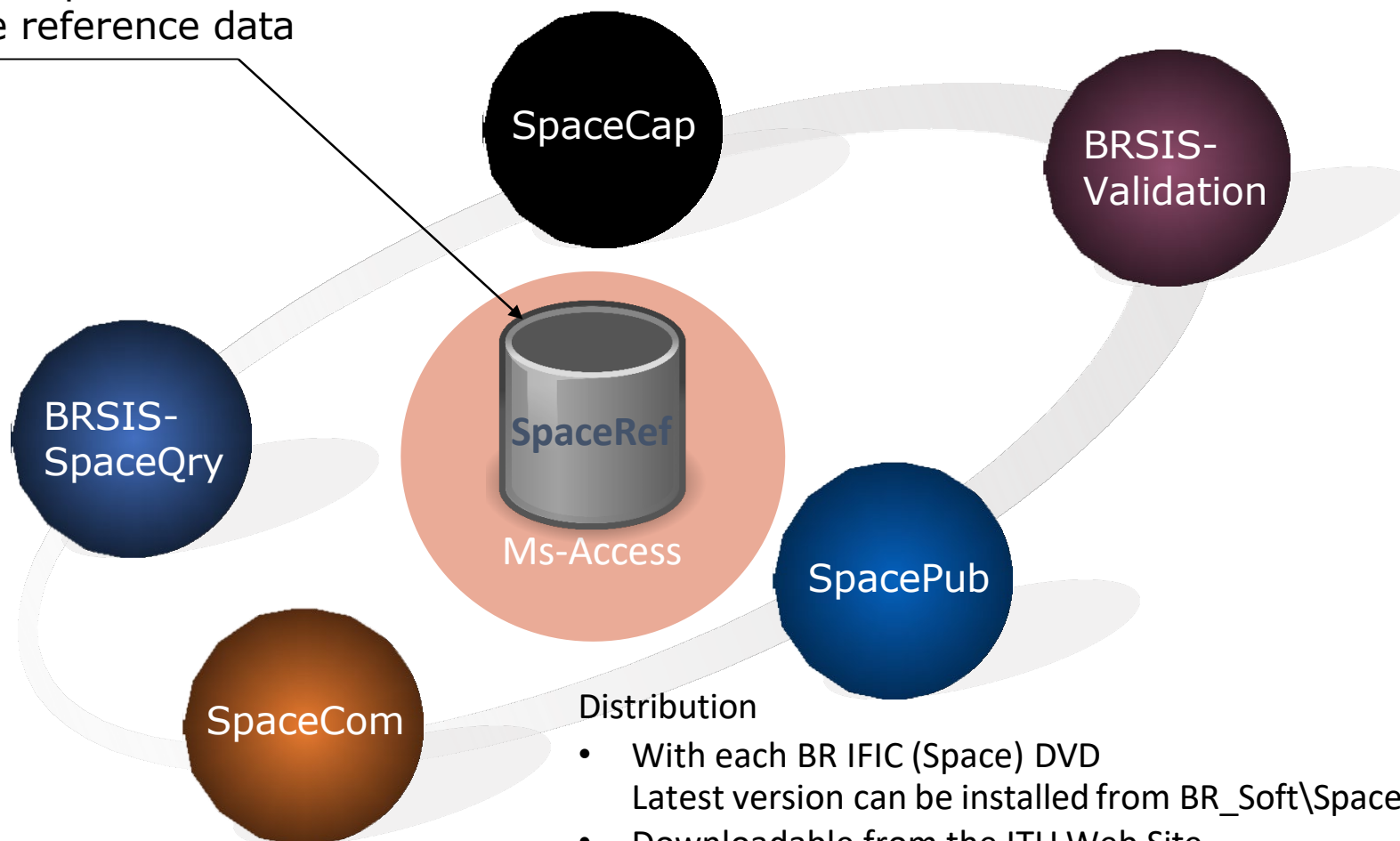
Graphical Data for **Earth Stations**

- used in-house
- used by Technical Examination software

Space Reference Database



Ensures all BR Space Software use the same reference data



Distribution

- With each BR IFIC (Space) DVD
Latest version can be installed from BR_Soft\SpaceRefDB folder
- Downloadable from the ITU Web Site
<https://www.itu.int/en/ITU-R/software/Pages/spacerefdb.aspx>