Technical and Regulatory Examinations with related BR Software

Space Plans Workshop (AP30/30A)

Presented by: THONG PHAM VIET
Space Notification and Plans Division

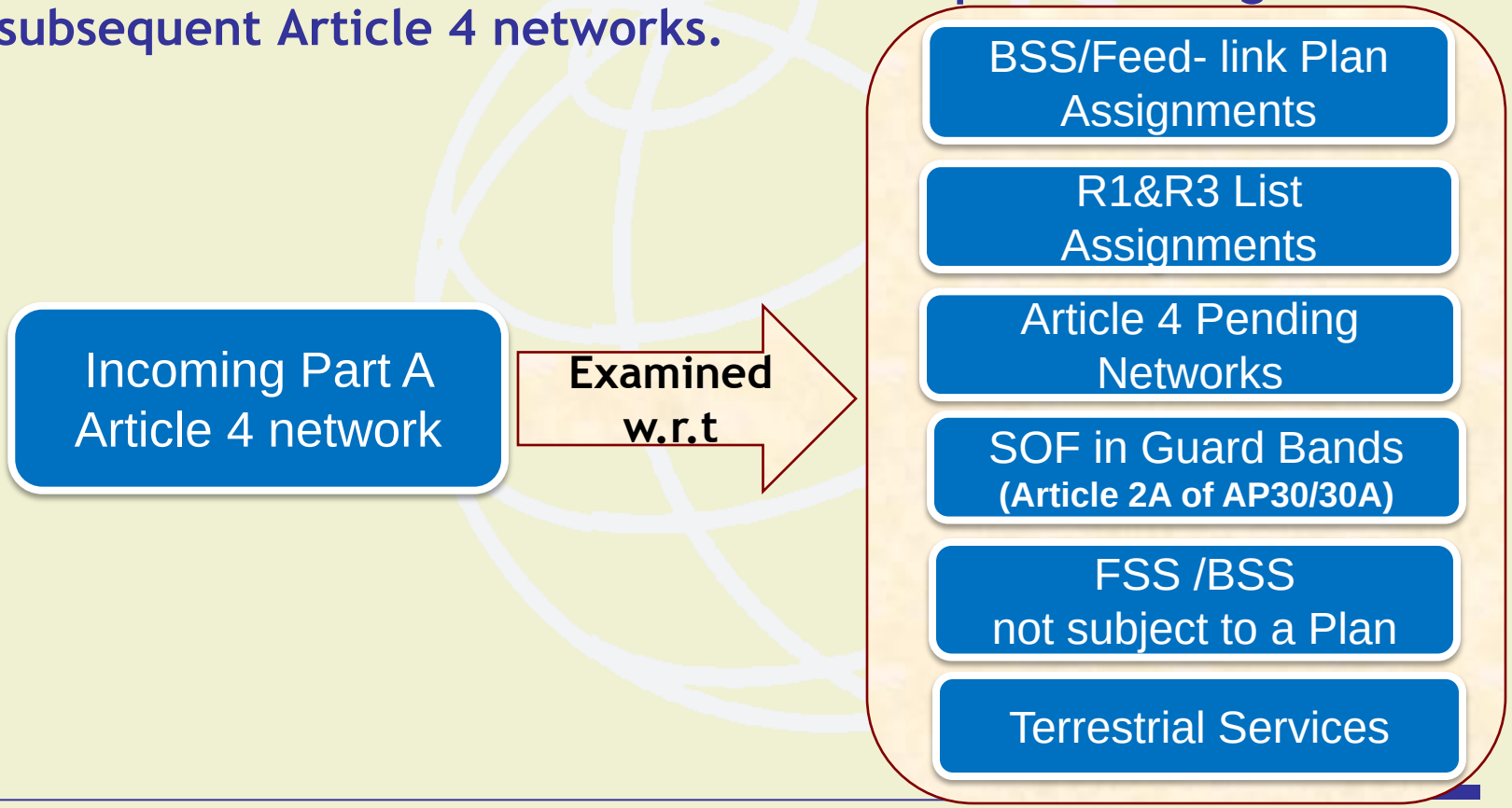
International Telecommunication Union

Outline

- Purpose of BR's Technical Examinations
- Protection Criteria
- List of BR Software used for Technical Examinations
- BR Software Packages SPS and GIBC
  - SPS Package
  - Examination flow chart with SPS
  - GIBC Package
  - Examination flow chart with GIBC
- Demonstration of how to run SPS and GIBC
- Annexes

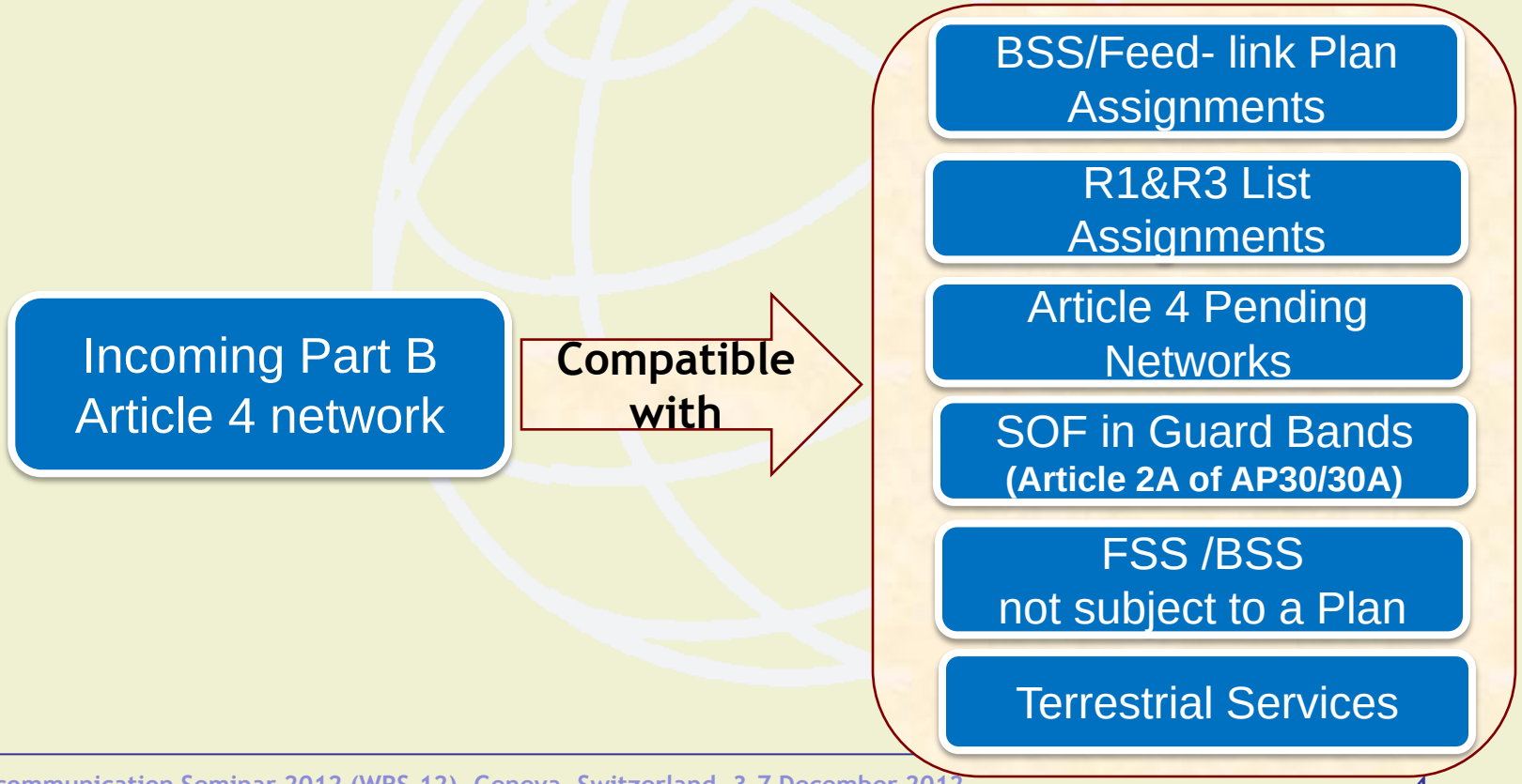
Purpose of BR's Technical Examinations (1)

- Part A submission
  - Conformity with the Table of Frequency Allocations and any applicable hard limits
  - Identification of affected Administrations/Networks
  - Establishment reference situation for its protection against subsequent Article 4 networks.



Purpose of BR's Technical Examinations (2)

- Part B submission
  - Conformity with the Table of Frequency Allocations and any applicable hard limits
  - An Agreement required but still missing
  - For Regions 1 & 3, Part B characteristics do not cause more interference than Part A characteristics.

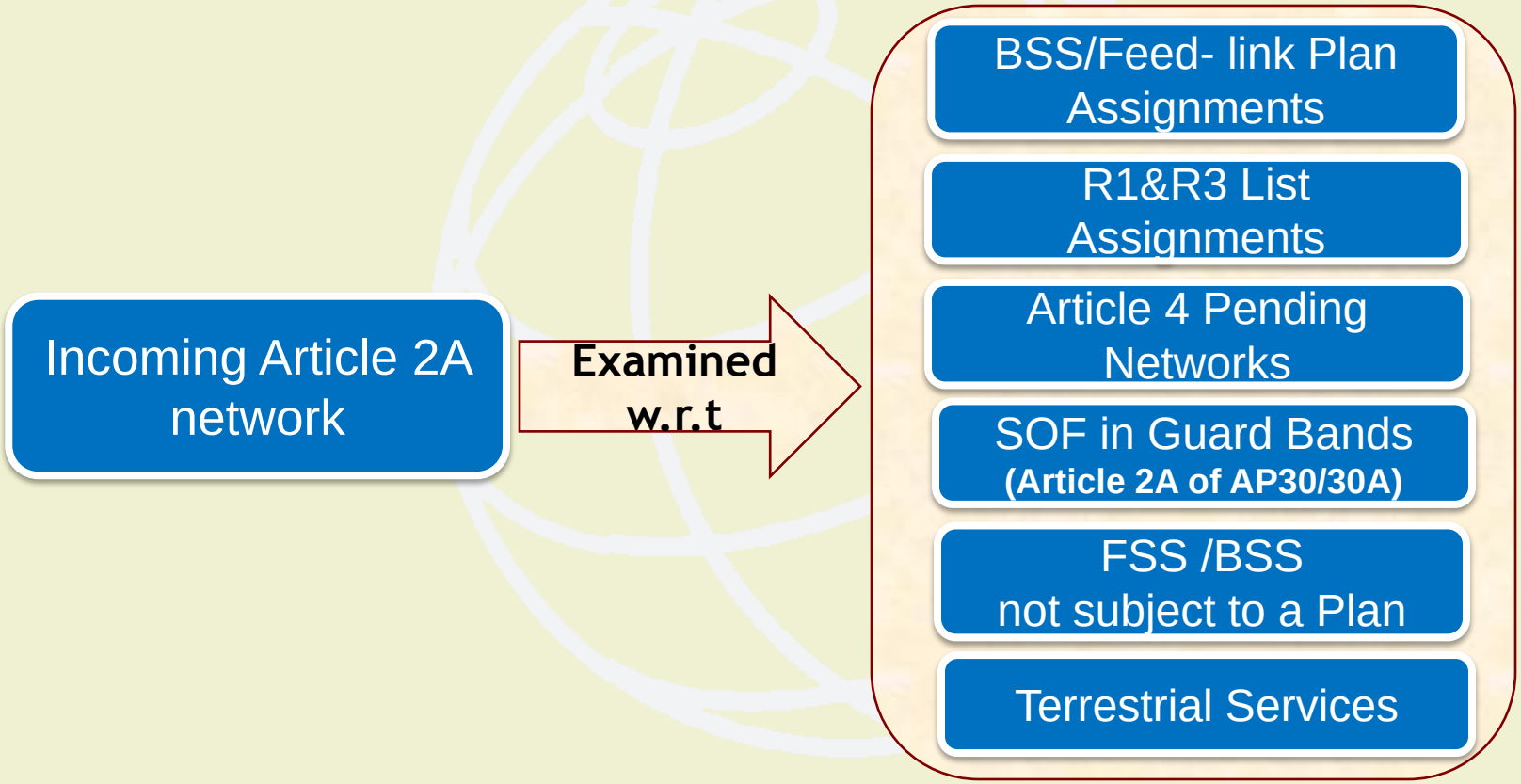


Purpose of BR's Technical Examinations (3)

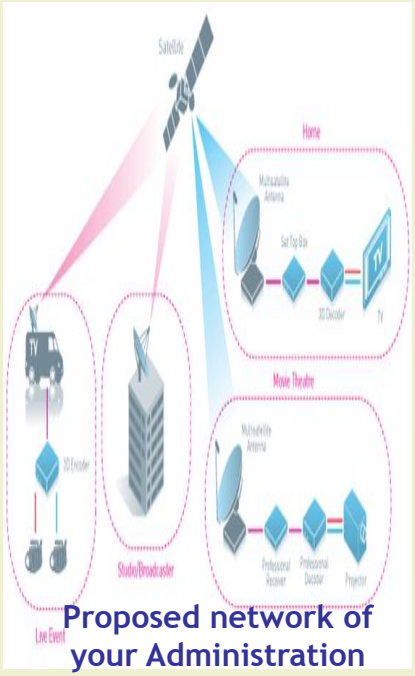
- BR Databases used for Part A and Part B examinations:
  - Part A:
    - ✓ The latest SPS_ALL, SRS_ALL and GIMS REFDB
  - Part B:
    - ✓ The same SPS_ALL, SRS_ALL and GIMS REFDB used for Part A
    - ✓ In addition, for Regions 1&3, the latest SRS_ALL, SRS_ALL and GIMS REFDB at the time of Part B processing for examination under 4.1.11.
  - In preparing the above-mentioned SPS_ALL, pay attention to:
    - ✓ Resolution 548: resolve 5 and associated ROP for Regions 1& 3
    - ✓ Rules of Procedure concerning the receivability when multiple Part A submissions are received on the same date.

Purpose of BR's Technical Examinations (4)

- Article 2A
  - Conformity with the Table of Frequency Allocations and any applicable hard limits
  - Identification of affected Administrations/Networks



Protection Criteria Concept



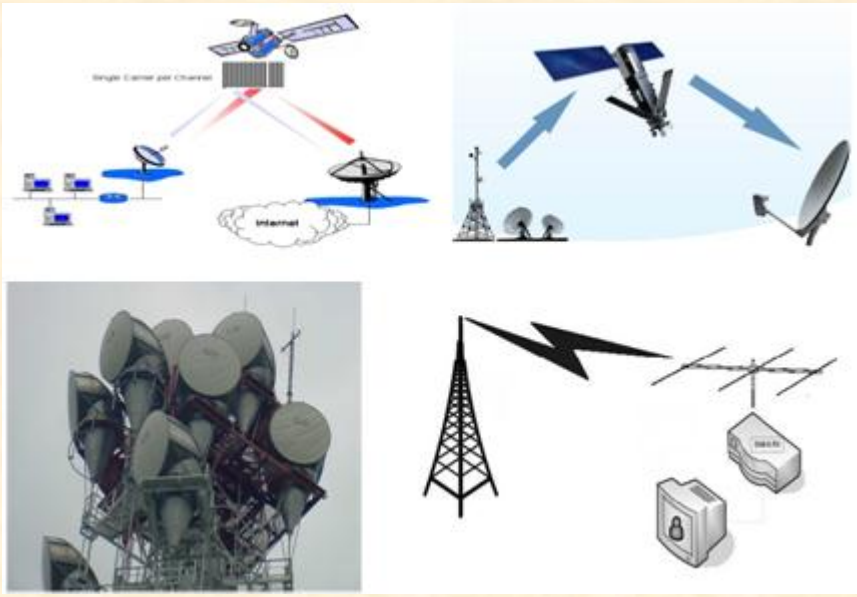
Proposed network of your Administration

Potential incompatibility!

Based on

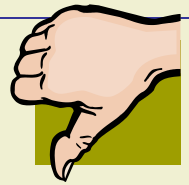
Protection Criteria

- Frequency bands
- Orbital separation
- EIRP Limits
- ΔT/T
- PFD Limits
- EPM/OEPM, etc



Radiocommunication Services of other Administrations

Protection Criteria Categories



Hard Limits

- ✓ If exceeded ➔ the Submission is not receivable (unfavorable) and virtually returned to notifying administration
- ✓ To preserve current and future use of a Radiocommunincation Service in general

Coordination Trigger Limits

- ✓ Agreements (implicit or explicit) of affected administrations is required
- ✓ To protect:
  - **Existing assignments** of Space Services Networks:
    - BSS Plans and List - AP30/30A
    - Pending complete AP4 information
    - Networks with overlapping necessary bandwidth
  - **Existing and future terrestrial services** on territories of administrations

List of BR Software used for Technical Examinations (1)

➢ Regions 1 and 3 Article 4 Downlink Network

Hard Limits	AP30 Provision	BR Software
PFD hard limit of -103.6 dB(W/m^2.27MHz)	§ 1 Annex 1	GIBC/AP30-30A
Annex 7	Annex 7	SpaceVal/GIMS

Examined w.r.t	AP30 Provision	BR Software	Criteria
Regions 1 & 3 BSS Plan Assignments	4.1.1 a	SPS/MSPACEg	EPM PFD Orbital Separation
Regions 1 & 3 BSS List or Pending Assignments	4.1.1 b		
Region 2 BSS Assignments	4.1.1 c	GIBC/PFD (space)	PFD
Terrestrial Services	4.1.1 d	GIBC/PFD (terres.)	PFD
Non-planned FSS Assignments, Article 2A Assignments	4.1.1 e	GIBC/PFD (space)	PFD

List of BR Software used for Technical Examinations (2)

➢ Regions 1 and 3 Article 4 Feeder-link Network

Hard Limits	AP30A Provision	BR Software
PFD hard limit of -76 dB(W/m^2.27MHz)	§ 4 of Annex 1	GIBC/AP30-30A
Relative off-axis E.I.R.P Limits		

Examined w.r.t	AP30A Provision	BR Software	Criteria
Regions 1 & 3 Feeder-link Plan Assignments	4.1.1 a	SPS/MSPACEg	EPM
Regions 1 & 3 Feeder-link List or Pending Assignments	4.1.1 b		
Region 2 Feeder-link Assignments	4.1.1 c	GIBC/Appendix 8	ΔT/T
Region 2 non-planned FSS Assignments, Article 2A Assignments	4.1.1 d		

List of BR Software used for Technical Examinations (3)

➢ Region 2 Article 4 BSS/Feeder-link Network (1)

Hard Limits	AP30 Provision	BR Software
Annex 7	Annex 7	SpaceVal

Examined w.r.t	AP30 Provision	BR Software	Criteria
Regions 1 & 3 BSS Plan Assignments	4.2.3 a	GIBC/PFD (space)	PFD
Regions 1 & 3 BSS List or Pending Assignments	4.2.3 b		
Region 2 BSS Assignments	4.2.3 c	SPS/MSPACEg	OEPM
Terrestrial Services	4.2.3 d	GIBC/PFD (terres.)	PFD
Non-planned FSS Assignments, Article 2A Assignments	4.2.3 e	GIBC/PFD (space) GIBC/Appendix 8	PFD ΔT/T
Non-planned BSS Assignments	4.2.3 f	GIBC/PFD (space)	PFD

List of BR Software used for Technical Examinations (4)

➢ Region 2 Article 4 BSS/Feeder-link Network (2)

Examined w.r.t	AP30 Provision	BR Software	Criteria
Regions 1 & 3 Feeder-link Plan Assignments	4.2.2 a	SPS/MSPACEg	OEPM
Regions 1 & 3 Feeder-link List or Pending Assignments	4.2.2 b		
Region 2 Feeder-link Assignments	4.2.2 c	GIBC/Appendix 8	ΔT/T
Article 2A Assignments	4.1.1 d		

List of BR Software used for Technical Examinations (5)

❑ Article 2A Network

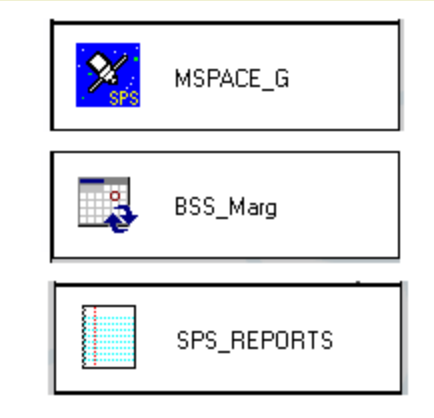
Hard Limits	Ap30 Provision	BR Software
Annex 7	Annex 7	

Examined w.r.t	Provision	BR Software	Criteria
BSS subject to a Plan	AP30/2A.1.1	GIBC/PFD (space)	PFD
Other Article 2A	AP30/2A.1.2	GIBC/PFD (space)	Coord. Arc
Terrestrial Services	AP30/2A.1.2	GIBC/PFD (terres.)	PFD
Non Planned networks	AP30/2A.1.2	GIBC/PFD (space) GIBC/Appendix 8	Coord. Arc ΔT/T
BSS Feeder-link subject to a Plan	AP30A/2A.1.1	GIBC/Appendix 8	ΔT/T
Other Article 2A	AP30A/2A.1.2	GIBC/Appendix 8	Coord. Arc
Non Planned networks	AP30A/2A.1.2	GIBC/Appendix 8	Coord. Arc

SPS Software Package (Space Plans Systems)

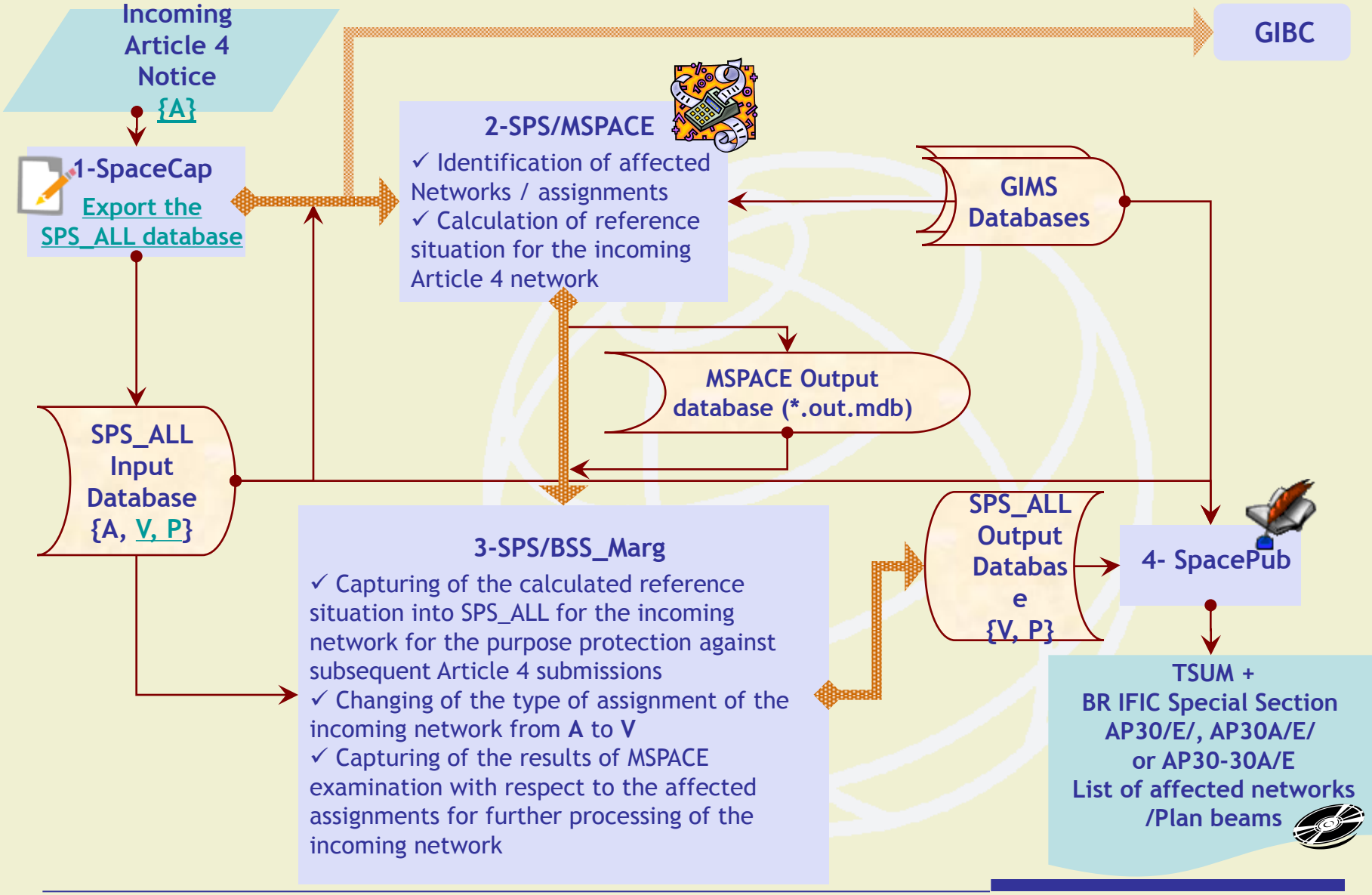
Coordination Requirements

Minimize Interference



What If Studies

SPS Package - Ap.30/30A Art.4, Inter-service/region Tech. Examination

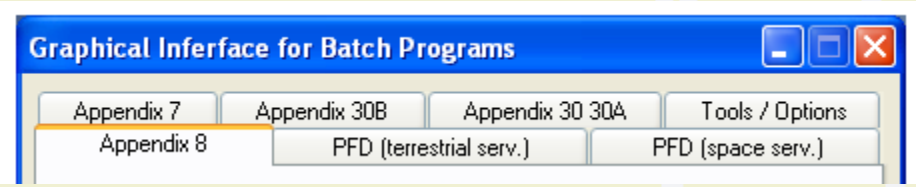


GIBC Software Package (Graphical Interface for Batch Calculation)

Inter-service, Inter-region coordination requirements

PFD Analysis Terrestrial

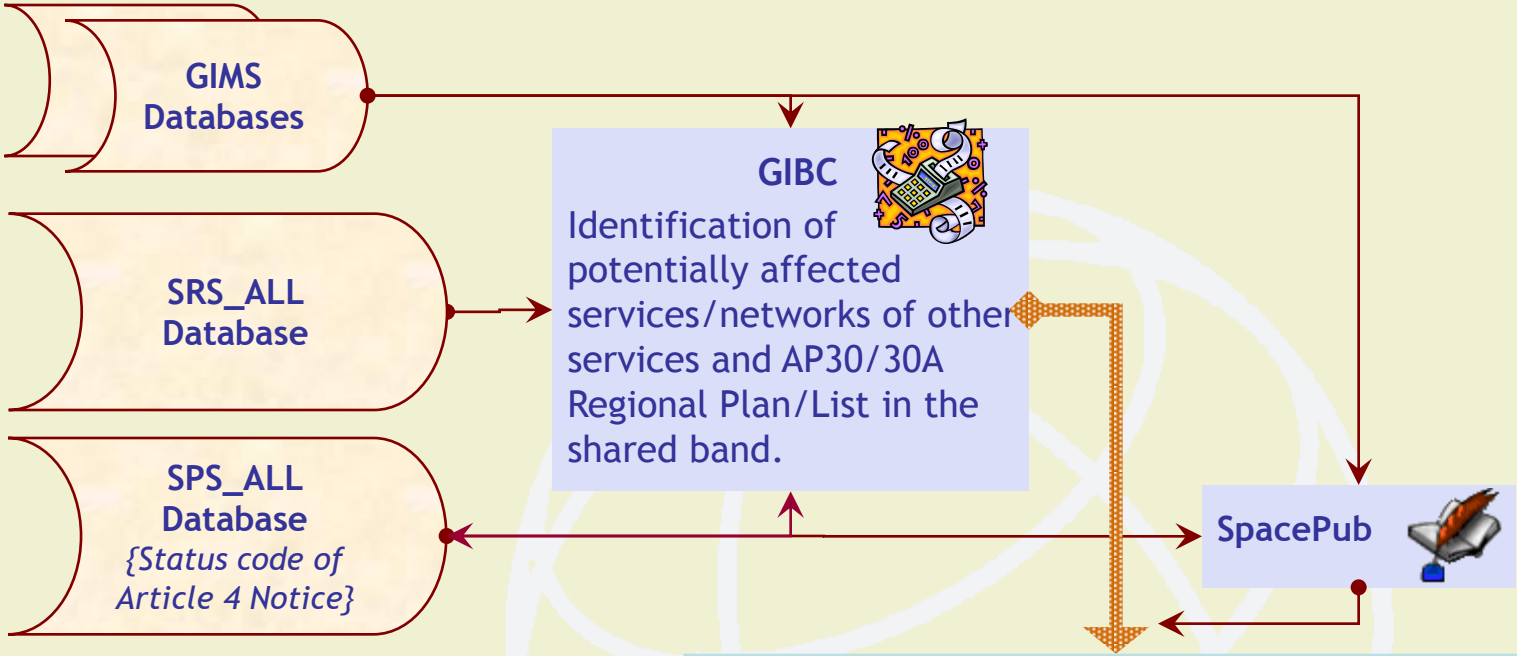
PFD Analysis Space



GIBC

ΔT/T

GIBC Package - Ap.30/30A Art.4, Inter-service/region Tech. Examination

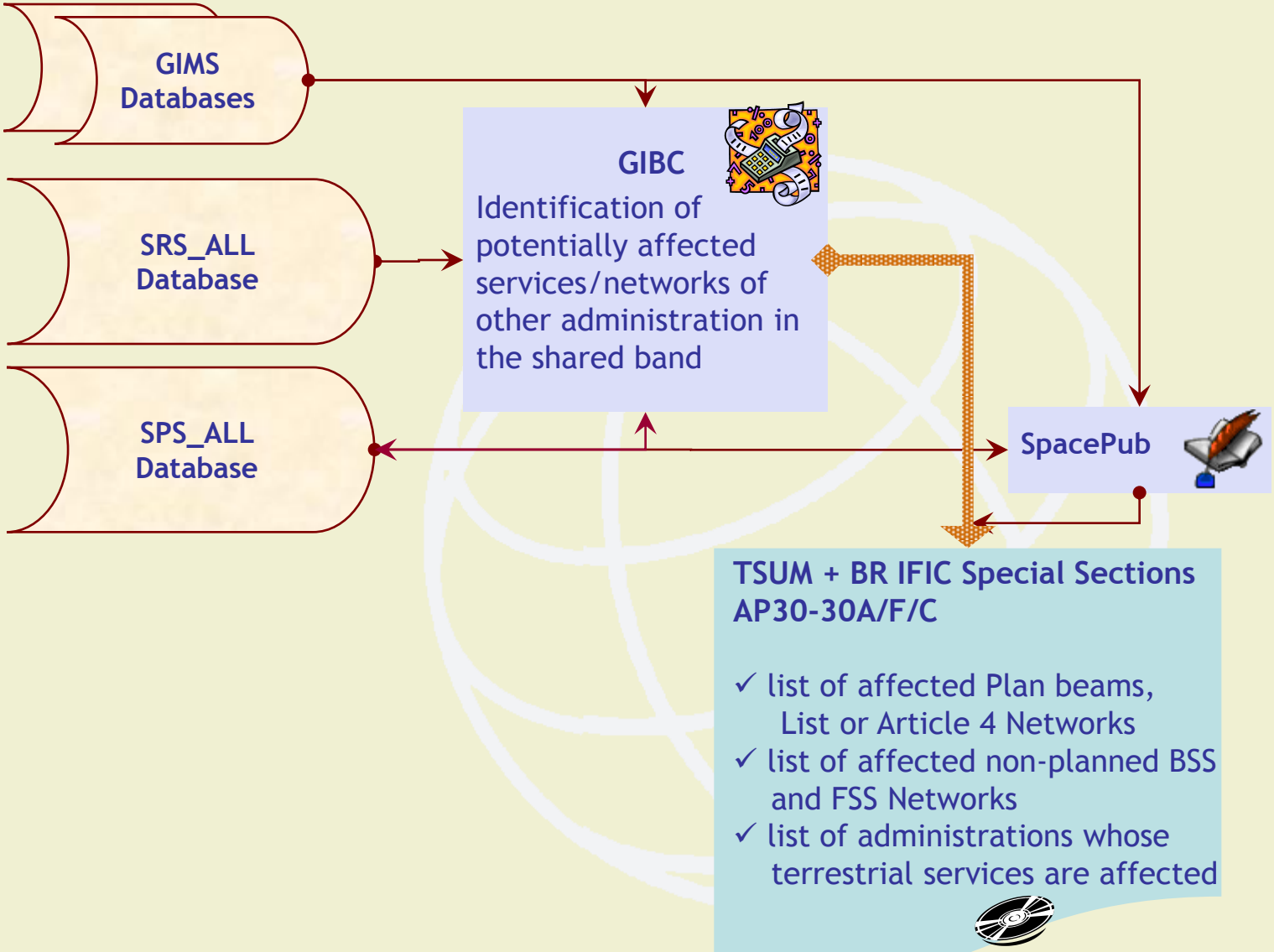


TSUM + BR IFIC Special Sections AP30/E/, AP30A/E/ or AP30-30A/E

List of:

- ✓affected Plan beams, List or Article 4 Networks in the other regional Plan/List
- ✓list of affected non-planned BSS and FSS Networks
- ✓list of administrations whose
- ✓terrestrial services are affected

GIBC Package - Ap30/30A Art.2A, Technical Examination



Demonstration of how to run SPS and GIBC

- SPS/MSPACEg
- GIBC/AP30-30A (PFD Hard Limits)
  - Downlink
  - Feeder-link

  (Slides 76, 77)
- GIBC/PFD(terrestrial serv.)
- GIBC/PFD(space serv.)
- GIBC/APP8

Any questions?

About Space Plans

Main contact point:

Mitsuhiro.Sakamoto@itu.int

Software:
brsas@itu.int

International Telecommunication Union

Annexes

- Exercises on Appendix 30 Article 4 networks:
  - I. Publication of Part A Special Sections
  - II. Publication of Part B Special Sections

- Technical Examinations of submissions under Article 4 of Appendices 30 and 30A
  - ✓ Hard Limits
  - ✓ Trigger Limits
  - ✓ Intra-service/region Examinations
  - ✓ Inter-service/region Examinations in the shared band
  - ✓ Examinations at different Stages of Article 4 Networks:
    - Publication of Part A Special Sections
    - Publication of Part B Special Sections

- BR Software Package SPS (Space Plans' System)

- BR Software Package GIBC (Graphical Interface for Batch Calculations)

- Technical Examinations of submissions under Article 2A of Appendices 30 and 30A

I. Publication of Part A Special Sections

II. Publication of Part B Special Sections

Exercise I : Reporting (1)

This exercise will show you how to use SPS_Reports to get the coordination requirements under 4.1.1 a) & b) of Appendix 30.

In the exercise scenario, you have just received BR IFIC 9999 that contains the Part A publication of three Article 4 networks.

The database SPS_ALL_IFIC9999.mdb is the SPS database distributed on the BR IFIC DVD (Space Service)**.**

The three networks are:

- ✓ 97552999 / R13DN-LINK
  - Regions 1&3 Downlink
- ✓ 97554999 / R13FD-LINK
  - Regions 1&3 Feeder-link
- ✓ 102555999 / R2-NETWORK
  - Region 2

Launch SPS_Reports from Start Menu/BR Space applications/SPS/

1. Open the database *AP30_R13DN-LINK_mspace_result.MDB* in the folder *\Exercise I*

   Note that SPS_Reports works with the MSPACE output database that is also published on the BR IFIC

2. Click on the Compressed Report button

3. In the report window, select the option PFD and EPM and click on the button Create Draft of Special Section

4. Rename the file *SS_AP_30C.rtf* that was just created into *DL_PartA.rtf*

5. Have a look at that file to see the information it provides

You will now change the characteristics of your network in order to decrease the number of affected networks with SpaceCap

Run MSPACE and check that fewer administrations are affected Sample MSPACEg Software Output Report Files

Use GIBC to evaluate coordination requirements with terrestrial services and FSS networks

Startup SpaceCap to prepare the notice

1. Open the database *SPS_ALL_IFIC9999.mdb* in the folder *\Exercise II* (This is a copy of the SPS database as published on BR IFIC 9999)

2. Export the notice 97552999 into a new database *Part B.mdb* in *\Exercise II*
   Uncheck the option Keep Findings and Ref. Situations.
   This is important to ensure that the notice is now viewed as an addition and not left as "Victim", so that interference from it is calculated
   - ✓ **Check** the option Keep group ids of the source

3. Open the database *Part B.mdb*. Uncheck the status 01 read only
4. Delete beams 5 and 6 and the group 384 in beam 3

5. Export the modified notice back into *SPS_ALL_IFIC9999.mdb* in the folder *\Exercise II*
   - ✓ **Check** the option Replace Notice in Target
   - ✓ **Check** the option Keep group ids of the source

Exercise II: SPS Package application - Part B analysis (3)

Startup MSPACE to calculate new interference

1. As input database select *SPS_ALL_IFIC9999.mdb* in the folder *\Exercise II*
2. Select the R1&3 down link plan
3. Accept the proposed output database name and findings file name
4. Start the analysis and leave the analysis description empty
5. When the analysis is completed, go to the Compressed Report tab
6. Check the option PFD and EPM
7. Create a draft of Special Section (in RTF format)
8. You can compare results with those of Exercise I

Startup GIBC to calculate new interference

1. **Go to the tab** PFD (Terrestrial serv.)

   - Type in the network ID: 97552999
   - Select *Triggers* as the **Examination**

2. **Go to the tab** Tools/Options

   - As the **SRS Database**, select *SPS_ALL_IFIC9999.mdb* in the folder *\Exercise II*
   - As **Additional GIMS Database**, choose *gims.mdb* in *\Exercise II*
     Although all beams are elliptical, the PFD program does not take that information from the SPS database but from GIMS, which means that each ellipse defined in SPS must also be defined in a GIMS database

3. **Start the analysis and check the file *PFD.LST* in the output folder**

4. **You may also run a** PFD (Space serv.) **analysis. If you do so, do not forget to add an** Additional SRS DB **in the Tools/Options tab; select the database *srs.mdb* in the folder *\Exercise II***

Article 4 of Appendices 30 and 30A

Hard Limits Examinations

Coordination Trigger Limits Examination

I. Intra-service/region Examination

- ✓ **BR Software Package:** ***SPS*** *(MSPACEg, BSS_Marg)*
- ✓ **To protect:** Assignments of Plan/List and those of pending Article 4 submissions in the same regional AP30/30A Plan/List

II. Inter-service/region Examinations in the shared band

- ✓ **BR Software Package:** ***GIBC*** *(PFD* (Space/Terrestrial services), *Appendix 8)*
- ✓ **To protect:**
  - Assignments in the Plans and Lists
  - Assignments of pending submissions under Article 4 in the other regional AP30/30A Plan/List
  - Non-planned FSS and BSS
  - Satellite Networks in support of Space Operation Functions submitted under Article 2A of AP30/30A
  - Terrestrial Services

Tech. Exam. at different Stages of Article 4 Networks

I. Part A Special Section: Publication under § 4.1.5/4.2.8 in BR IFIC

- ✓ Calculation of potential interference from the incoming Article 4 network to other services/assignments based on the relevant protection criteria using the latest SPS_ALL / SRS_ALL database
- ✓ Creation of Reference Situation for the incoming Article 4 network for its protection against subsequent Article 4 networks
- ✓ Establishment of list of potentially affected administrations

II. Part B Special Section: Publication under § 4.1.15/4.2.19 in BR IFIC

- ✓ Re-calculation of potential interference would be required only if the initial network characteristics as published in Part A Special Sections have been modified SPS_ALL/SRS_ALL database
- ✓ Comparison of protection limits excess resulting from the modified characteristics with those produced by the Part A ones for establishment of list of administrations whose agreements are required for successful completion of Article 4 procedure

Examination of Part B submissions (Art.4 of Ap30/30A)

- ✓ Comparison of the results with those of Part A Special Section
- ✓ To verify whether or not an objecting administration's networks/territories are still identified as affected by the modified parameters, or
- ✓ An additional interference is imposed on an administration that has not objected or has previously agreed after an objection
- ✓ For the SPS Package examination the SPS_ALL database included in the BR IFIC of the network's Part A publication is used as common existing reference situation scenario for comparison

Article 2A of Appendices 30 and 30A

- ✓ BR Software Package: ***GIBC*** ***(PFD*** (Space/Terrestrial services)**,** ***Appendix 8)***

- ✓ To protect:
  - Assignments in the Plans and Lists
  - Assignments of pending submissions under Article 4 in both regional AP30/30A Plans/Lists
  - Non-planned FSS and BSS
  - Satellite Networks in support of Space Operation Functions submitted under Article 2A of AP30/30A
  - Terrestrial Services

Appendix 30 Hard Limits

Appendix 30 Provision	Limit Type	Examination of Compatibility of Article 4 network with	
		Region	Service ⇨ Frequency band
Annex 1: Section 1, Paragraph 1	Power Flux Density	1 3	Planned Band BSS Downlink ⇨ 11.7 – 12.5 GHz 11.7 – 12.2 GHz Protection of existing assignments and preservation for future assignments of satellite networks whose orbital position is separated by more than 9° from the assignment under examination
Annex 7: Paragraph A1	Orbital position	2	FSS Downlink ⇨ 11.7 – 12.2 GHz
Annex 7: Paragraph A2	Orbital position	1	FSS Downlink ⇨ 12.5 – 12.7 GHz
		3	FSS Downlink ⇨ 12.2 – 12.7 GHz Non-planned Band BSS Downlink ⇨ 12.5 – 12.7 GHz
Annex 7: Paragraph A3	Orbital position and E.I.R.P	2	FSS Downlink ⇨ 11.7 – 12.2 GHz

Appendix 30A Hard Limits

Appendix 30A Provision	Limit Type	Examination of Compatibility of Article 4 network with	
		Region	Service ⇨ Frequency band
Annex 1: Section 4, Paragraph 1	Power Flux Density and off-axis EIRP	1 and 3	Feeder-link to Planned Band BSS Downlink ⇨ 14.4 – 14.8 GHz and 17.3 – 18.1 GHz Protection of existing assignments and preservation for future assignments of satellite networks whose orbital position is separated by more than 9° from the assignment under examination

Appendix 30 Coordination Trigger Limits – SPS Package (I)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 a) 4.1.1 b)	Section 1	PFD and EPM within ±9° arc	1	BSS Downlink Assignments of Plan, List and pending Article 4 networks ⇨ 11.7 – 12.5 GHz	***SPS*** PACKAGE (***MSPACEg*** and ***BSS_MARG***) using ***GIMS*** and ***SPS*** databases Protected area: Service area represented by a set of maximum 20 test points
			3	11.7 – 12.2 GHz	
4.2.3 c)	Section 2	OEPM Overall downlink and feeder-link protection criteria	2	12.2 – 12.7 GHz	

Appendix 30A Coordination Trigger Limits - SPS Package (2)

Appendix 30A Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 a) 4.1.1 b)	Section 4	EPM within ±9° arc	1 and 3	BSS Feeder-link Assignments of Plan, List and pending Article 4 networks ⇨ 14.5 – 14.8 GHz (outside Europe) 17.3 – 18.1 GHz	***SPS*** PACKAGE (***MSPACEg*** and ***BSS_MARG***) using ***GIMS*** and ***SPS*** databases
4.2.2 c)	Section 3	OEPM Overall downlink and feeder-link protection criteria	2	17.3 – 17.8 GHz	Protected area: Feeder-link receiving space station on its Service area represented by a set of maximum 20 test points

Appendix 30 Coordination Trigger Limits - GIBC Package (I)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 c)	Section 3 1st mask	PFD Mask as a function of orbital Separation Angle	2	BSS Downlink Assignments of Plan, List and pending Article 4 networks ⇨ 12.2 – 12.5 GHz	***GIBC-PFD*** (Space) using GIMS and SPS databases Output Report File Name: ***PXT.LST*** Protected area: -Service area represented by a set of maximum 20 test points. -Service area for Region 3 in 12.5-12.7 GHz.
4.2.3 a) 4.2.3 b)	2nd mask		1	12.2 – 12.5 GHz	
4.2.3 f)	2nd mask		3	Non-planned BSS Downlink Assignments ⇨ 12.5 – 12.7 GHz	

Appendix 30 Coordination Trigger Limits - GIBC Package (2)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 d) 4.2.3 d)	Section 4	PFD Mask as a function of Arrival Angle Or PFD comparison as appropriate	1	Terrestrial Services ⇨ 11.7 – 12.5 GHz	***GIBC-PFD*** (Terrestrial) using GIMS and SPS databases and the latest updated PFD extract file (bss_sstn.dat) Output Report File Name: ***PFD.LST*** Protected area: Affected parts of territories of administrations that have no BSS assignments in the Plan/List whose necessary bandwidth overlaps that of assignment under examination
			2	11.7 – 12.1 GHz 12.2 – 12.7 GHz	
			3	11.7 – 12.7 GHz	

Appendix 30 Coordination Trigger Limits - GIBC Package (3)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 e)	Section 6 1st mask	PFD Mask as a function of orbital Separation Angle Or PFD comparison as appropriate	1	SOF Downlink ⇨ Region 1 Lower and Upper Guard Band: 11.7 - 11.714 GHz /12.489 - 12.500 GHz	***GIBC-PFD*** (Space) using GIMS, SPS and SRS databases Output Report File Name: ***PXT.LST*** Protected area: Service area
			2	FSS Downlink ⇨ 11.7 - 12.2 GHz SOF Downlink ⇨ Region 2 Lower Guard Band: 12.200 - 12.212 GHz	
	1st or 2nd mask		3	FSS Downlink ⇨ 12.2 - 12.5 GHz	
	1st mask			SOF Downlink ⇨ Region 3 Lower and Upper Guard Band: 11.7 - 11.714 GHz / 12.189 - 12.200 GHz	

Appendix 30 Coordination Trigger Limits - GIBC Package (4)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.2.3 e)	Section 6 1st mask	PFD Mask as a function of orbital Separation Angle Or PFD comparison as appropriate	1	FSS Downlink ⇨ 12.5 – 12.7 GHz SOF Downlink ⇨Region1 Upper Guard Band: 12.489 – 12.500 GHz	***GIBC-PFD*** (Space) using GIMS, SPS and SRS databases Output Report File Name: ***PXT.LST*** Protected area: Service area
			2	SOF Downlink ⇨ Region 2 Lower and Upper Guard Band: 12.2 – 12.212 GHz / 12.688 – 12.700 GHz	
			3	FSS Downlink ⇨ 12.2 – 12.7 GHz	
	Section 7	ΔT/T	1	FSS Uplink ⇨ 12.5 – 12.7 GHz	***GIBC-Appendix 8***, Case II using GIMS, SPS and SRS databases Output Report File Name: ***APP8.LST*** Protected area: Feeder-link receiving space station on its Service area

Appendix 30A Coordination Trigger Limits - GIBC Package (5)

Appendix 30A Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 c)	Section 5	ΔT/T	2	BSS Feeder-link Assignments of Plan, List and pending Article 4 networks ⇨ 17.3 – 17.8 GHz	***GIBC-Appendix 8***, Case I using GIMS and SPS databases Output Report File Name: ***APP8.LST*** Protected area: Feeder-link receiving space station on its Service area represented by a set of maximum 20 test points
4.2.2 a) 4.2.2 b)			1 and 3		

Appendix 30A Coordination Trigger Limits – GIBC Package (6)

Appendix 30A Provision		Limit Type	Examination of Compatibility of Article 4 network with		
Article	Annex 1		Region	Service ⇨ Frequency band	BR Software
Article 4 4.1.1 d)	Section 6	ΔT/T	2	Non-planned BSS Feeder-link Assignments ⇨ 17.8 – 18.1 GHz	***GIBC-Appendix 8***, Case I using GIMS, SPS and SRS databases Output Report File Name: ***APP8.LST*** Protected area: Feeder-link receiving space station on its Service area
Article 4 4.1.1 d) and Article 2A			1 and 3	SOF Feeder-link ⇨ Regions 1 & 3 Lower and upper Guard Bands: 17.300 - 17.314 GHz 18.089 - 18.100 GHz 14.500-14.5118 GHz 14.78814-14.800 GHz	
			2	SOF Feeder-link ⇨ Region 2 Lower and upper Guard Bands: : 17.300 - 17.312 GHz 17.788 - 17.800 GHz	

Appendix 30 Coordination Trigger Limits - GIBC Package (7)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 2A network with		
Article 4	Annex 1		Region	Service ⇨ Frequency band	BR Software
4.1.1 d) 4.2.3 d)	Section 4	PFD Mask as a function of Arrival Angle	1	Terrestrial Services ⇨ Region 1 Lower and Upper Guard Bands: 11.700 - 11.714 GHz 12.489 - 12.500 GHz	***GIBC-PFD*** (Terrestrial) using GIMS and SPS databases and the latest updated PFD extract file (bss_sstn.dat) Output Report File Name: ***PFD.LST*** Protected area: Affected parts of territories of administrations that have no BSS assignments in the Plan/List whose necessary bandwidth overlaps fully that of assignment under examination
			2	Region 2 Lower and Upper Guard Bands: 12.200 - 12.212 GHz 12.688 - 12.700 GHz	
			3	Region 3 Lower and Upper Guard Bands: 11.700 - 11.714 GHz 12.189 - 12.200 GHz	

Appendix 30 Coordination Trigger Limits - GIBC Package (8)

Appendix 30 Provision		Limit Type	Examination of Compatibility of Article 2A network with		
Article	Annex 4		Region	Service ⇨ Frequency band	BR Software
Article 2A and Article 7 7.1 & 7.2	Section 4 1st mask 3rd mask 1st or 2nd mask	PFD Mask as a function of orbital Separation Angle	1	BSS Downlink Assignments of Plan, List and pending Article 4 networks ⇨ Region 1 Lower and Upper Guard Bands: 11.700 - 11.714 GHz 12.489 - 12.500 GHz	***GIBC-PFD*** (Space) using GIMS, SPS and SRS databases Output Report File Name: ***PXT.LST*** Protected area: Service area
			2	Region 2 Lower and Upper Guard Bands: 12.200 - 12.212 GHz 12.688 - 12.700 GHz	
			3	Region 3 Lower and Upper Guard Bands: 11.700 - 11.714 GHz 12.189 - 12.200 GHz	

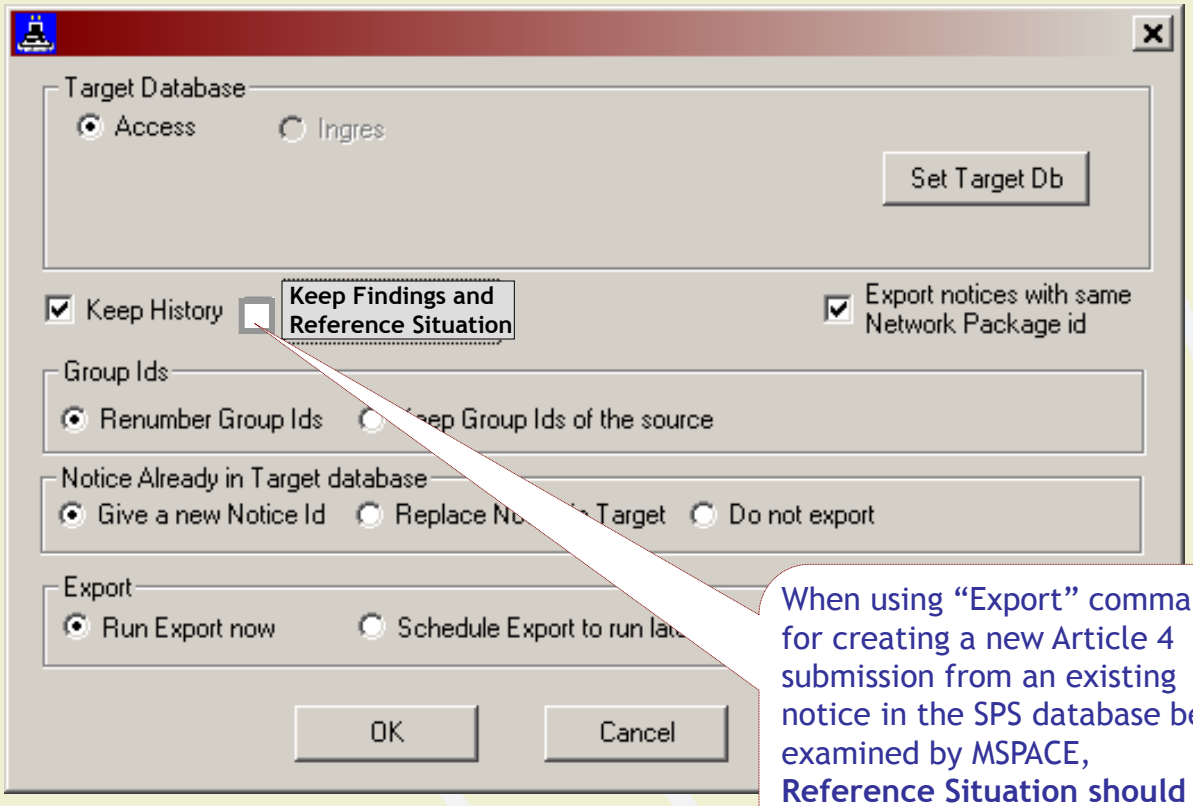
Appendix 30A Coordination Trigger Limits - GIBC Package (10)

Appendix 30A Provision		Limit Type	Examination of Compatibility of Article 2A network with		
Article	Annex 4		Region	Service ⇨ Frequency band	BR Software
Article 2A, Article 4 4.1.1 d) and Article 7 7.1 & 7.2	Section 2	ΔT/T	1 and 3	BSS Feeder-link Assignments of Plan, List and pending Article 4 networks ⇨ Regions 1 and 3 Lower and upper Guard Bands: 17.300 - 17.314 GHz 18.089 - 18.100 GHz	***GIBC-Appendix 8***, Case I using GIMS, SPS and SRS databases Output Report File Name: ***APP8.LST*** Protected area: Feeder-link receiving space station on its Service area
			2	BSS Feeder-link Assignments of Plan, List and pending Article 4 networks ⇨ Region 2 Lower and upper Guard Bands: 17.300 - 17.312 GHz 17.788 - 17.800 GHz	

Comparison Examination for Part B submissions

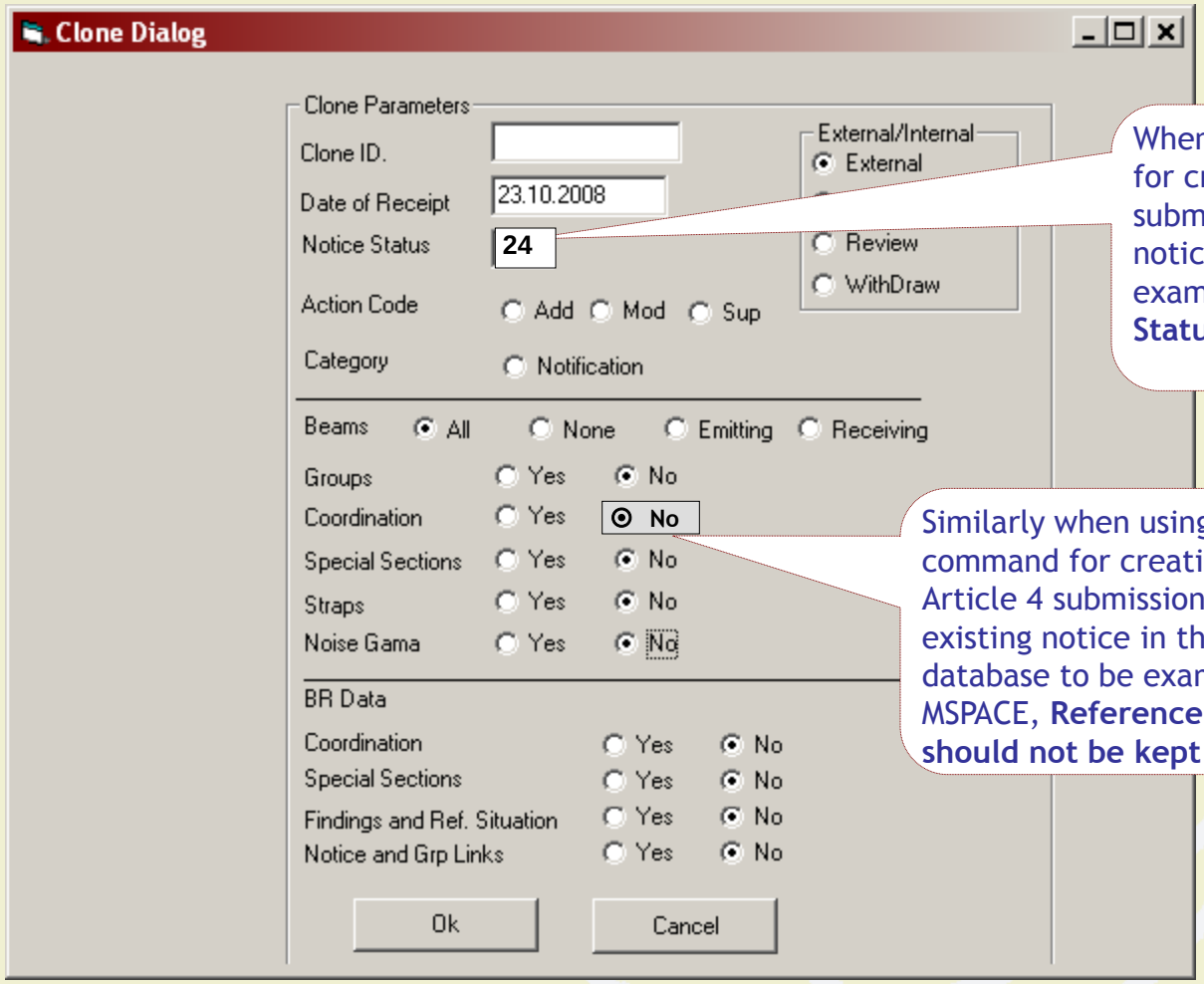
Network/Plan Beam identified as affected in results of examination with			Inter-ference Levels Com-parison	Affected Adm. Objected or not on Part A	Agreement Required for Part B?	Remark
No.	Part A parameters	Part B parameters				
1	***Identified*** with Level **X**	Not Identified	N.A.	Not objected	No	**Since the affected network/Plan Beam/Country is no more identified in the updated Part B results, agreement is not required**
2				***Objected***		
3		***Identified*** with Level ***Y***	X ≥ Y	Not objected	No	**Since the level of interference of Part B is not greater than that of the published Part A, the previous implicit agreement of the affected administration is still valid**
4			N.A.	***Objected***	***Yes***	**Since the objecting administration is still identified as affected, its agreement is required**
5			X < Y	Not objected	***Yes***	**Since the level of interference of Part B is greater than that of the published Part A, the previous implicit agreement of the affected adm. is no longer valid. An explicit agreement is therefore required**
6	Not Identified		N.A.	Not objected	***Yes***	**The agreement of the affected administration whose service/network has been newly identified as affected, is required**
7	Not Identified	Not Identified	N.A.	**N.A.**	No	**This evident case is only included for the sake of the completeness of all possible combinations**

Creating new submission with SpaceCap Export



When using "Export" command for creating a new Article 4 submission from an existing notice in the SPS database be examined by MSPACE, **Reference Situation should not be kept**

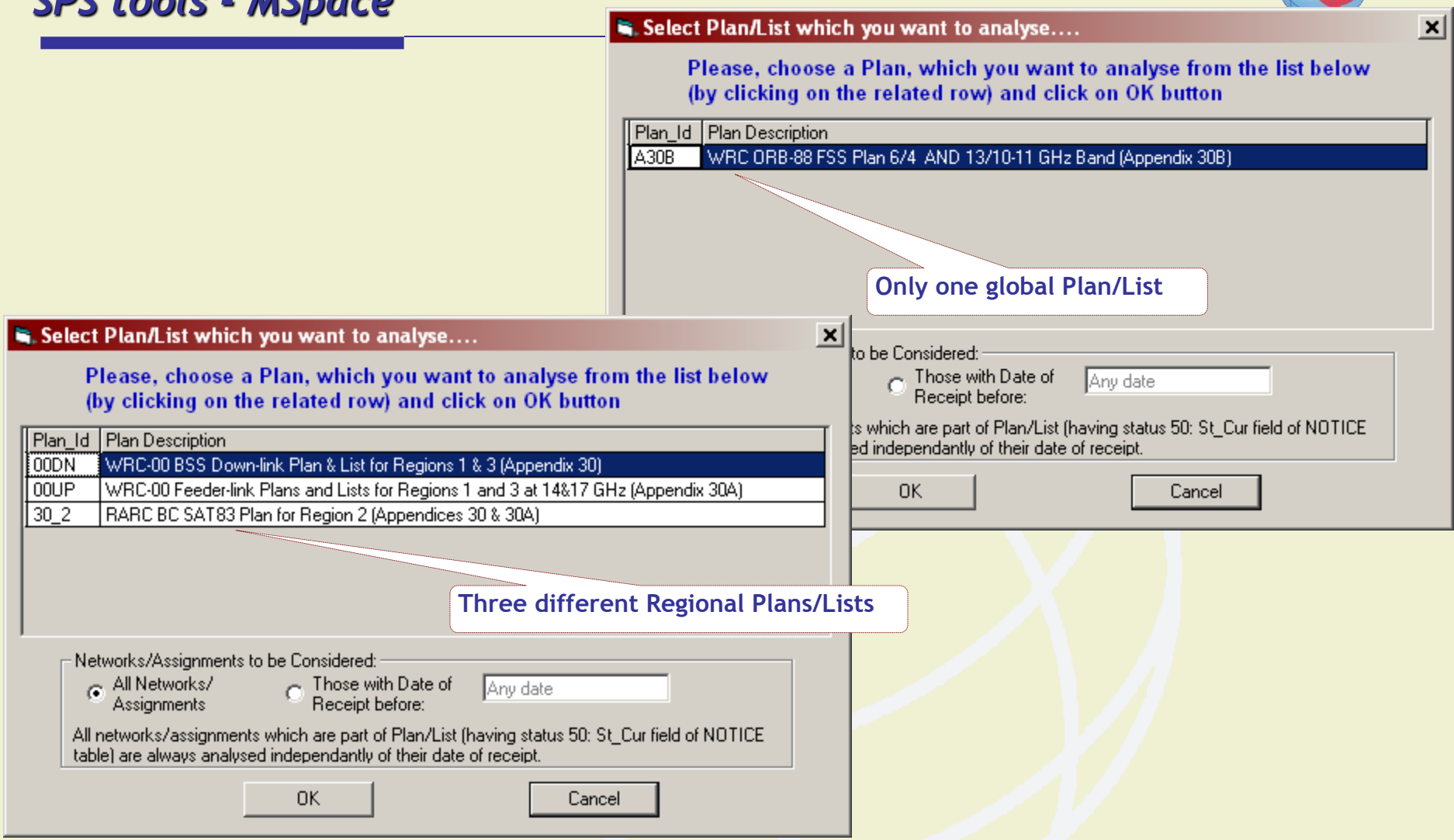
Creating new submission with SpaceCap Clone



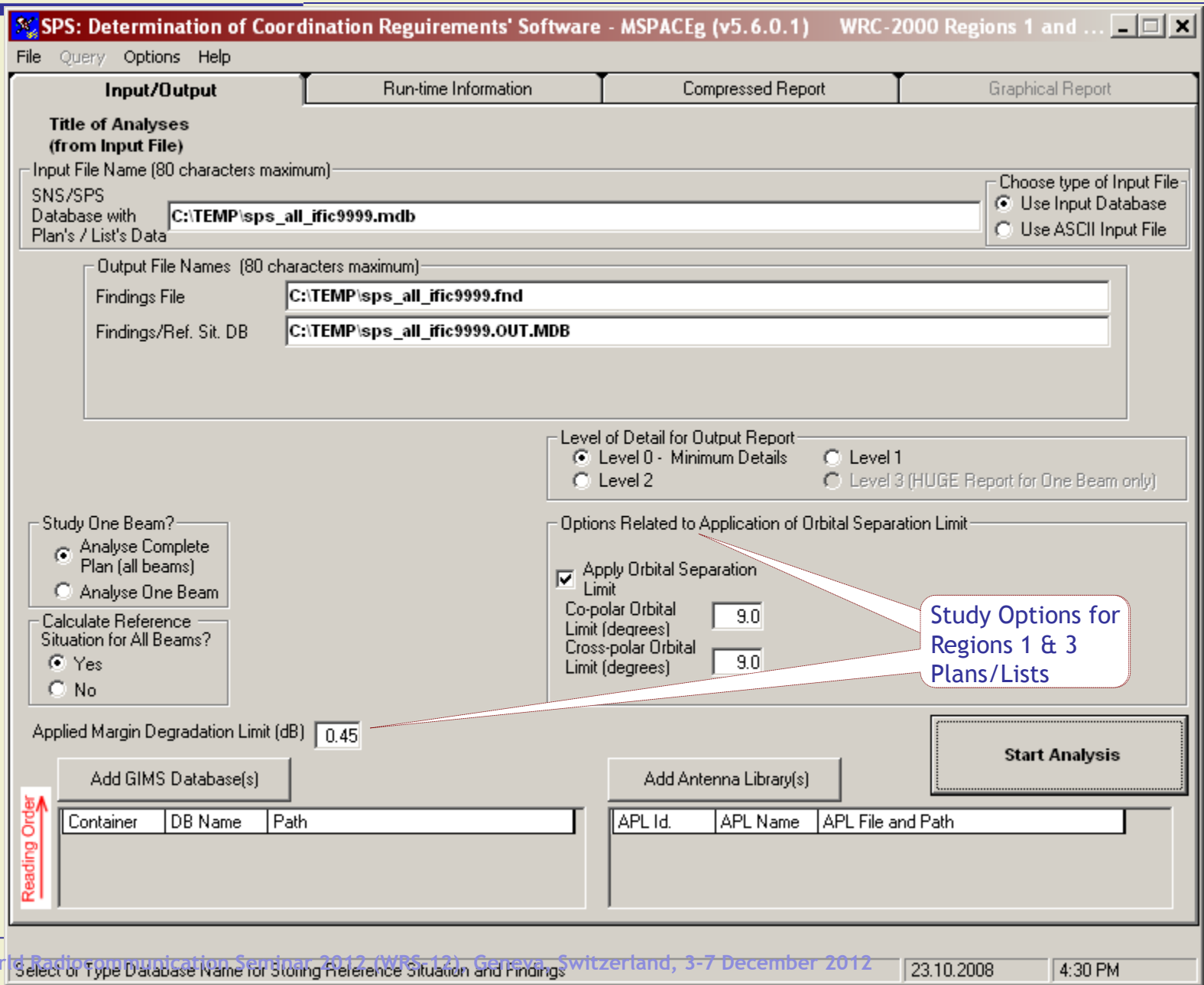
When using "Clone" command for creating a new Article 4 submission from an existing notice in the SPS database to be examined by GIBC, **the Notice Status should be set to 24**

Similarly when using "Clone" command for creating a new Article 4 submission from an existing notice in the SPS database to be examined by MSPACE, **Reference Situation should not be kept**

SPS tools - MSpace



SPS tools MSpace – AP30/30A



References and Explanatory Notes (1)

Back

Assignment Type	***A***: Incoming Article 4 under examination without Reference Situation. ***V***: Pending Article 4 network published in Part A – receives interference from other types of assignments but its interference caused to them is not taken into account. ***P***: Plan/List assignment.
EPM/OEPM	*Equivalent Protection Margin* *Overall Equivalent Protection Margin*
Pending Article 4 submissions	Article 4 submissions whose Appendix 4 information is received by the Bureau on or before the date of receipt of the incoming network.

References and Explanatory Notes (2)

Back

SPS_ALL	*Space Plans' Systems Database* Contains currently AP30/30A Plans, Lists, Article 4 and Article 2A assignments. Released each two weeks in the BR IFIC DVD. It can be downloaded from the following URL: http://www.itu.int/ITU-R/go/space-plans-ap30-30a/en
SRS_ALL	*Space Radiocommunications Stations Database* Contains non-planned Spaces Services Notices. Released each two weeks in the BR IFIC DVD.

Back

BR Software Package SPS (Space Plans System)

Introduction

Main Concepts

SPS Package

SPS ?

1. Package of software programs to determine **intra-service and intra-region coordination requirements** for space networks of the **planned services**
2. **Availability**
   - ✓ BR IFIC DVD
   - ✓ http://www.itu.int/ITU-R/go/space-plans-ap30-30a/en
     - Latest version
     - Latest data files
3. **Requires GIMS to be installed**
   - ✓ GIMS data up to date!
4. **Support**
   - ✓ MSPACE manual
   - ✓ Software related question: brsas@itu.int

When to use SPS?

BSS Down Link R1&3 Plan
Appendix 30

BSS Feeder Link R1&3 Plan
Appendix 30A

Region 2 Plan
Appendices 30/30A

What Is the Purpose of SPS?

Coordination Requirements

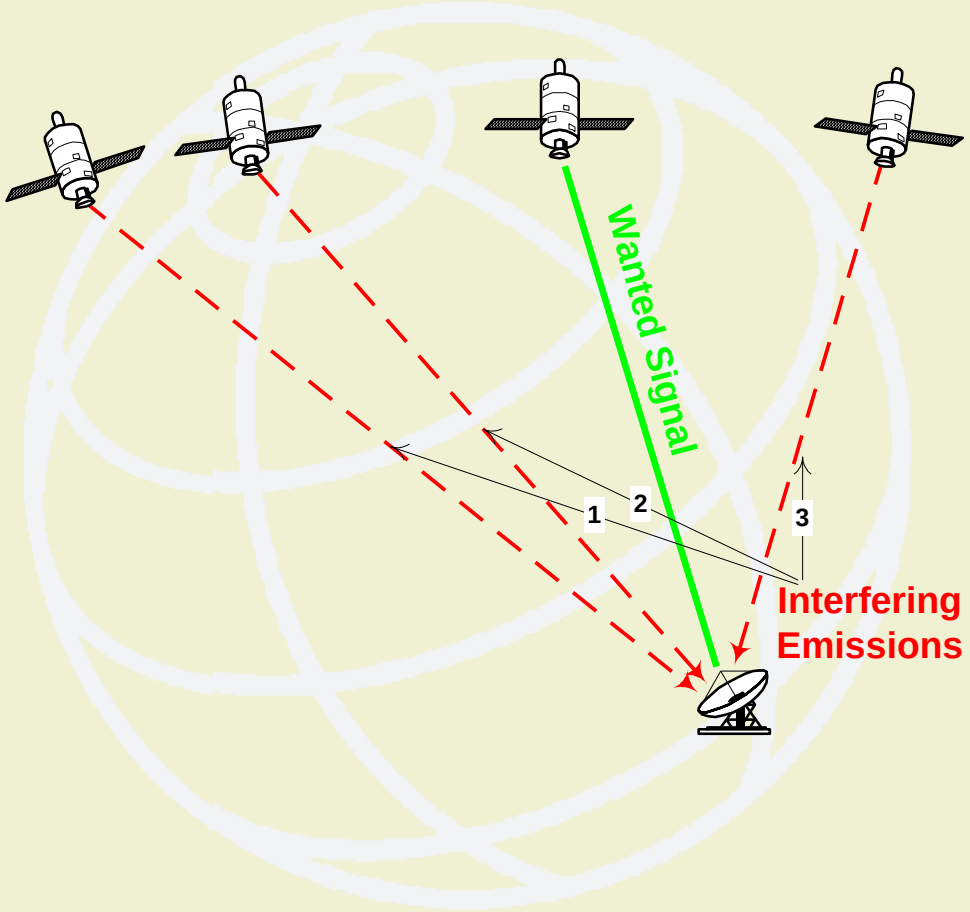
Minimize Interference

What If Studies

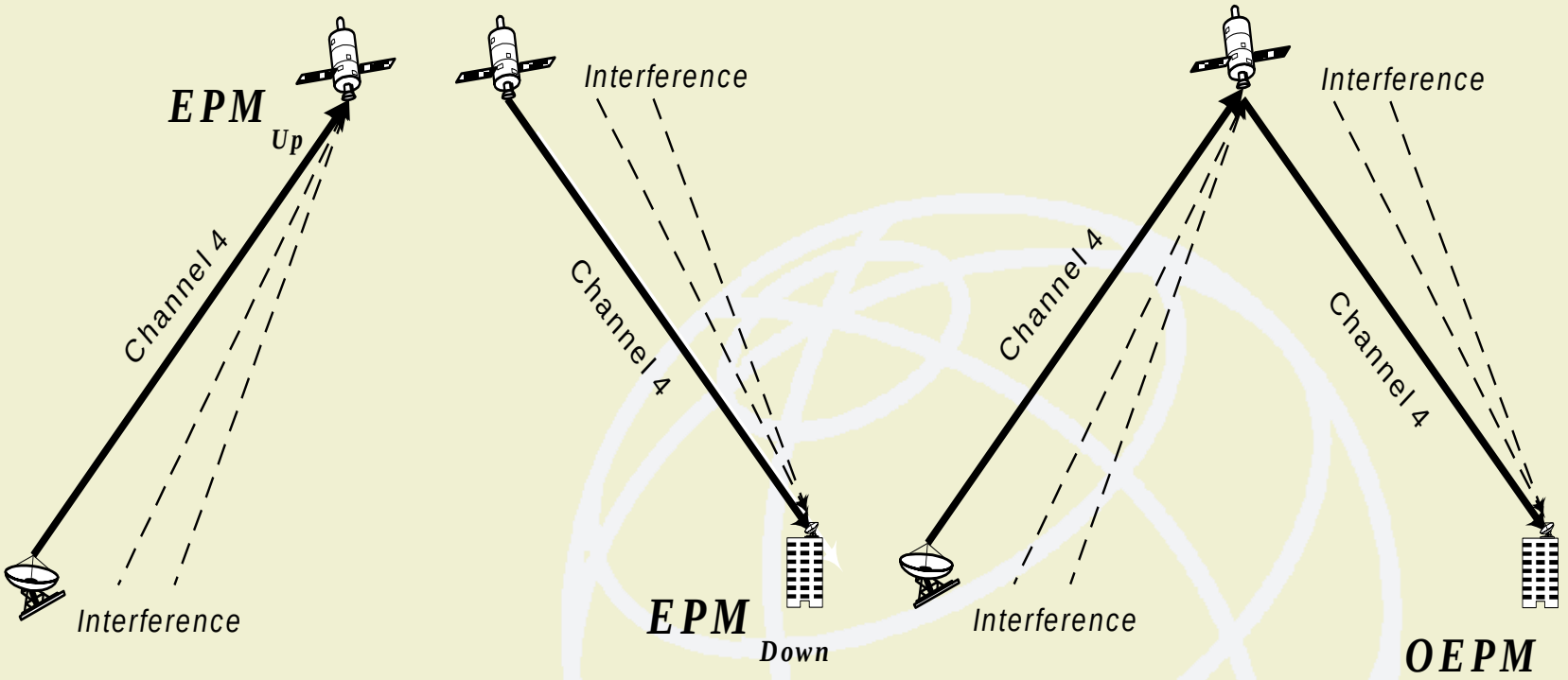
Main Concepts

Aggregate interfering effect from all interfering sources

Interferers are "existing" and "virtual" networks



BSS Appendix 30/30A



Regions 1 and 3 Approach

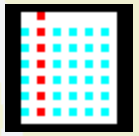
(separated links)

Region 2 Approach

(overall link analyses)

MSPACE
Parameter Input, calculation

BSS_Margin
Update of reference situation (BSS)

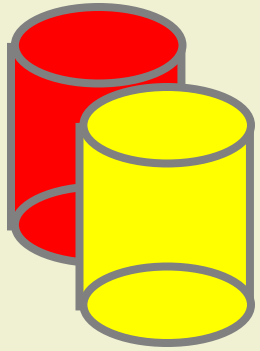


SPS_Reports
Reporting tool

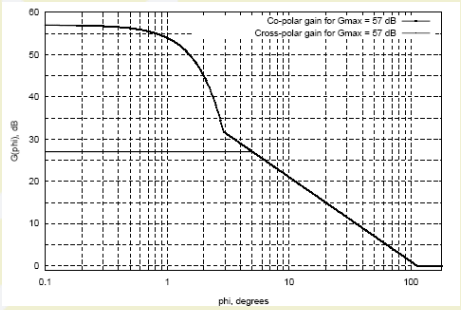
Space Plans' System Input

SNS-Like Database

MSPACEg

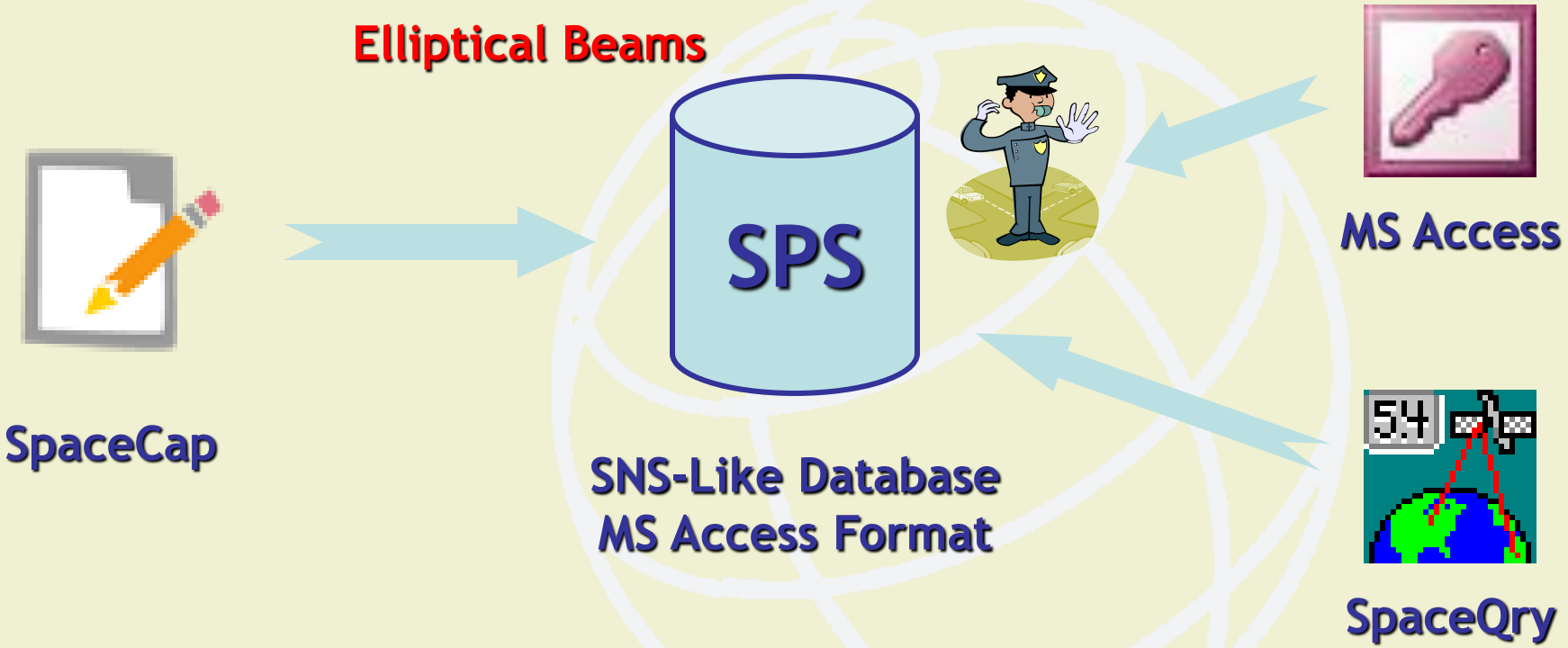


GIMS Database

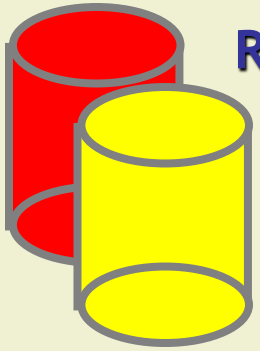


Antenna Pattern Library

- **Preferred editing tool of SPS database is** SpaceCap

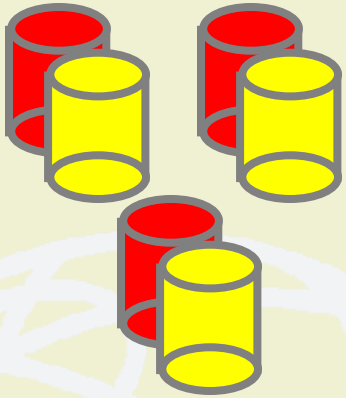


Space Plans' System Input (GIMS)



Read Only DB

Shaped Beams

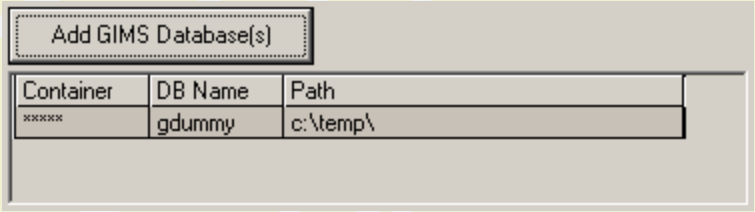


New diagrams
Or
Modifications
to REFDB
diagrams

GIMS Reference Database

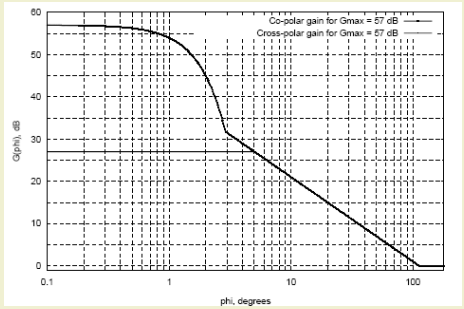
Additional Databases

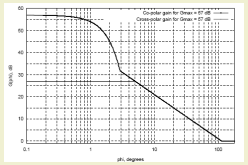
- GIMS installation
- Automatic connection

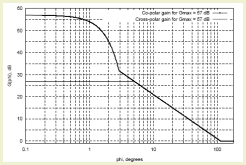


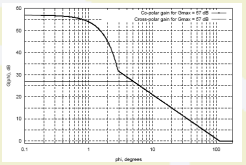
SPS data must be matching diagram key elements: notice ID, notification reason, satellite name…

Space Plans' System Input (APL)



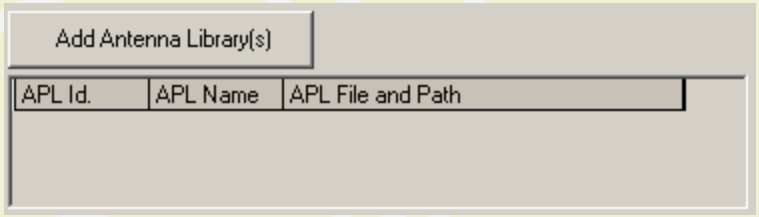






APL

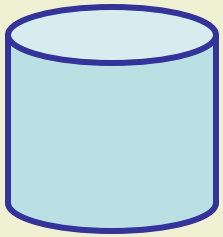
Users' defined pattern



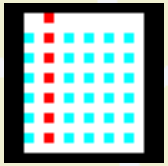
Programmatic mean of allowing SPS to use new antenna patterns.

Space Plans' System Output

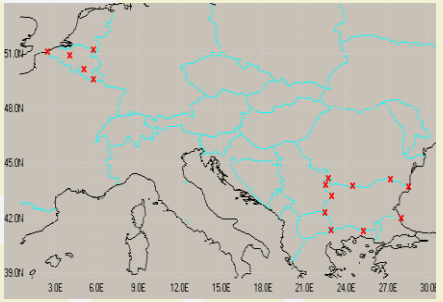
Text Files



Output Database

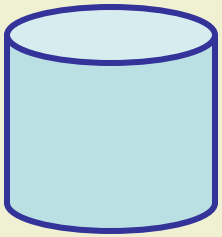


SPS_Reports



			Aggregate C/I		Single Entry C/I		
Orb.Pos.	Adm.	Beam Name	Test Point	C/I Degrad.	Test Point	C/I Degrad.	Interferer
53.55	BEL	BEL00000	1		1	24.47	BUL00000
		BEL00000	2		2	25.83	BUL00000
		BEL00000	3		3	25.20	BUL00000
		BEL00000	4		4	24.93	BUL00000
		BEL00000	5		5	25.08	BUL00000
55.55	BUL	BUL00000	1		1	10.50	BEL00000
		BUL00000	2		2	10.50	BEL00000
		BUL00000	3		3	10.50	BEL00000
		BUL00000	4		4	10.50	BEL00000
		BUL00000	5		5	10.50	BEL00000
		BUL00000	6		6	10.50	BEL00000
		BUL00000	7		7	10.50	BEL00000
		BUL00000	8		8	10.50	BEL00000
		BUL00000	9		9	10.50	BEL00000
		BUL00000	10		10	10.50	BEL00000

Space Plans' System Output (DB)



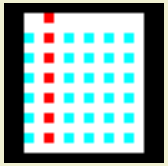
Output Database

Schema description in SPS manual

Can hold results of multiple MSPACE runs (use *vrs_no* field).

Basic Queries

User Defined Queries



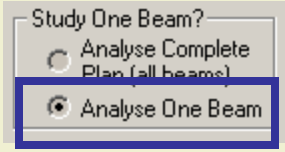
SPS_Reports

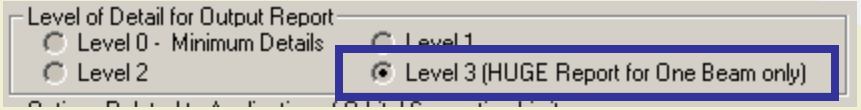
Space Plans' System Output (Text)

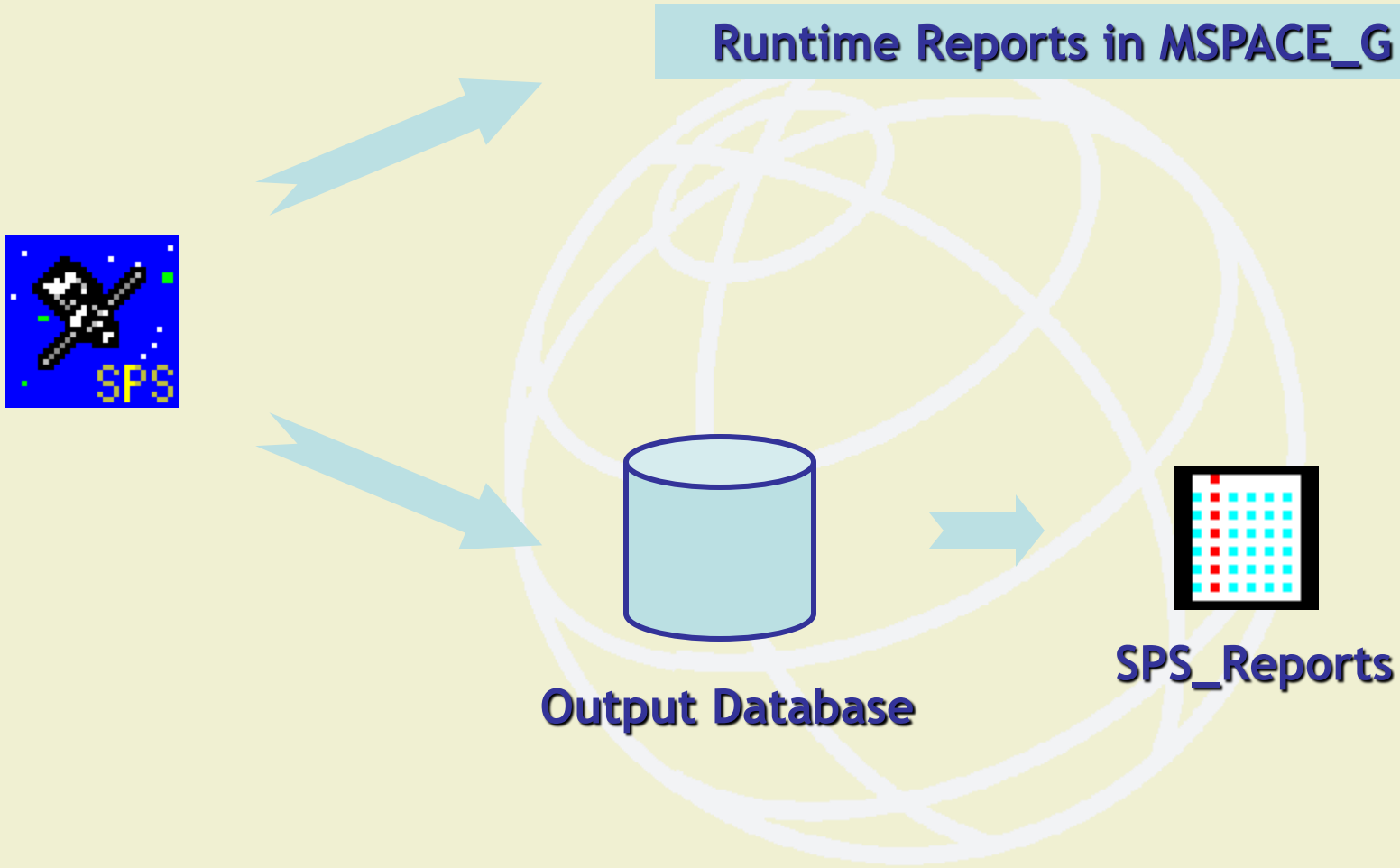
Text Files

1. **Findings File (.fnd)**
   - ✓ All plans
   - ✓ Summary of **affected** beams
   - ✓ Error and warning messages

2. **Detailed Report (.det)**
   - ✓ Only for one beam analysis
   - ✓ Log intermediate values
   - ✓ Used mainly for debugging



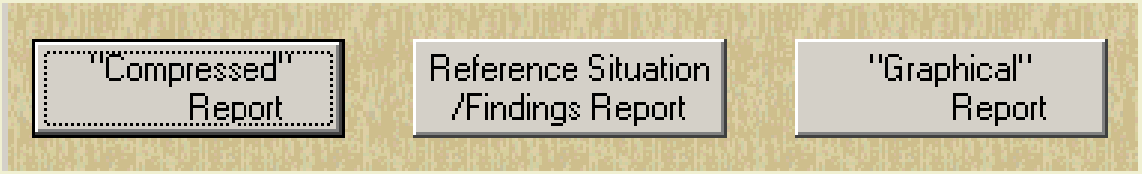



Runtime Reports in MSPACE_G
SPS
Output Database
SPS_Reports

1. **Compressed Report**
   - ✓ Built while MSPACEg is running
   - ✓ Shows affected beams
   - ✓ Print at the end of the run

2. **Graphical Report**
   - ✓ At the end of the run
   - ✓ Display affected test points
   - ✓ Can copy map picture

Reporting with SPS_Reports



Similar to Compressed Report in MSPACE_G

- PFD & EPM values
- Selection criteria

Plot (affected) test points on map

.fnd File R1&3 BSS Downlink Analysis

MSPACEG Version 5.300 (MS Windows) 26.09.2006 08:16:25
WRC-2000 Regions 1&3 BSS Down-link Plan/List

(Tolerance for margin degradation is 0.45 dB)

BEAM	CHN	TP	ADM		MARGIN	REFERENCE	DELTA
00000039	1	1	IRN	25.90	-9.5291	23.0390	-32.5681
00000039	1	2	IRN	25.90	-11.5759	21.0220	-32.5979
00000039	1	3	IRN	25.90	-9.7840	22.7020	-32.4860
00000039	1	4	IRN	25.90	-15.1903	17.4330	-32.6233
00000039	1	5	IRN	25.90	-18.1190	14.5160	-32.6350
00000039	1	6	IRN	25.90	-11.0666	21.3630	-32.4296
00000039	1	7	IRN	25.90	-16.0122	16.5890	-32.6012
00000039	1	8	IRN	25.90	-11.2340	21.1830	-32.4170
00000039	1	9	IRN	25.90	-25.0367	7.5220	-32.5587
00000039	1	10	IRN	25.90	-29.6969	8.6710	-38.3679
00000039	1	11	IRN	25.90	-27.4077	9.4510	-36.8587
00000039	3	1	IRN	25.90	-9.6537	22.8260	-32.4797
00000039	3	2	IRN	25.90	-11.7005	20.8090	-32.5095
00000039	3	3	IRN	25.90	-9.9087	22.4930	-32.4017
00000039	3	4	IRN	25.90	-15.3149	17.2180	-32.5329
00000039	3	5	IRN	25.90	-18.2437	14.3000	-32.5437
00000039	3	6	IRN	25.90	-11.1913	21.1570	-32.3483
00000039	3	7	IRN	25.90	-16.1368	16.3750	-32.5118
00000039	3	8	IRN	25.90	-11.3586	20.9770	-32.3356
00000039	3	9	IRN	25.90	-25.1613	7.3100	-32.4713
00000039	3	10	IRN	25.90	-29.8225	8.2320	-38.0545
00000039	3	11	IRN	25.90	-27.5333	9.0870	-36.6203
00000039	5	1	IRN	25.90	-9.7739	22.7310	-32.5049
00000039	5	2	IRN	25.90	-11.8207	20.7140	-32.5347
00000039	5	3	IRN	25.90	-10.0289	22.3970	-32.4259

Back

BR Software Package GIBC
(Graphical Interface for Batch Calculations)

What's the Purpose of GIBC?

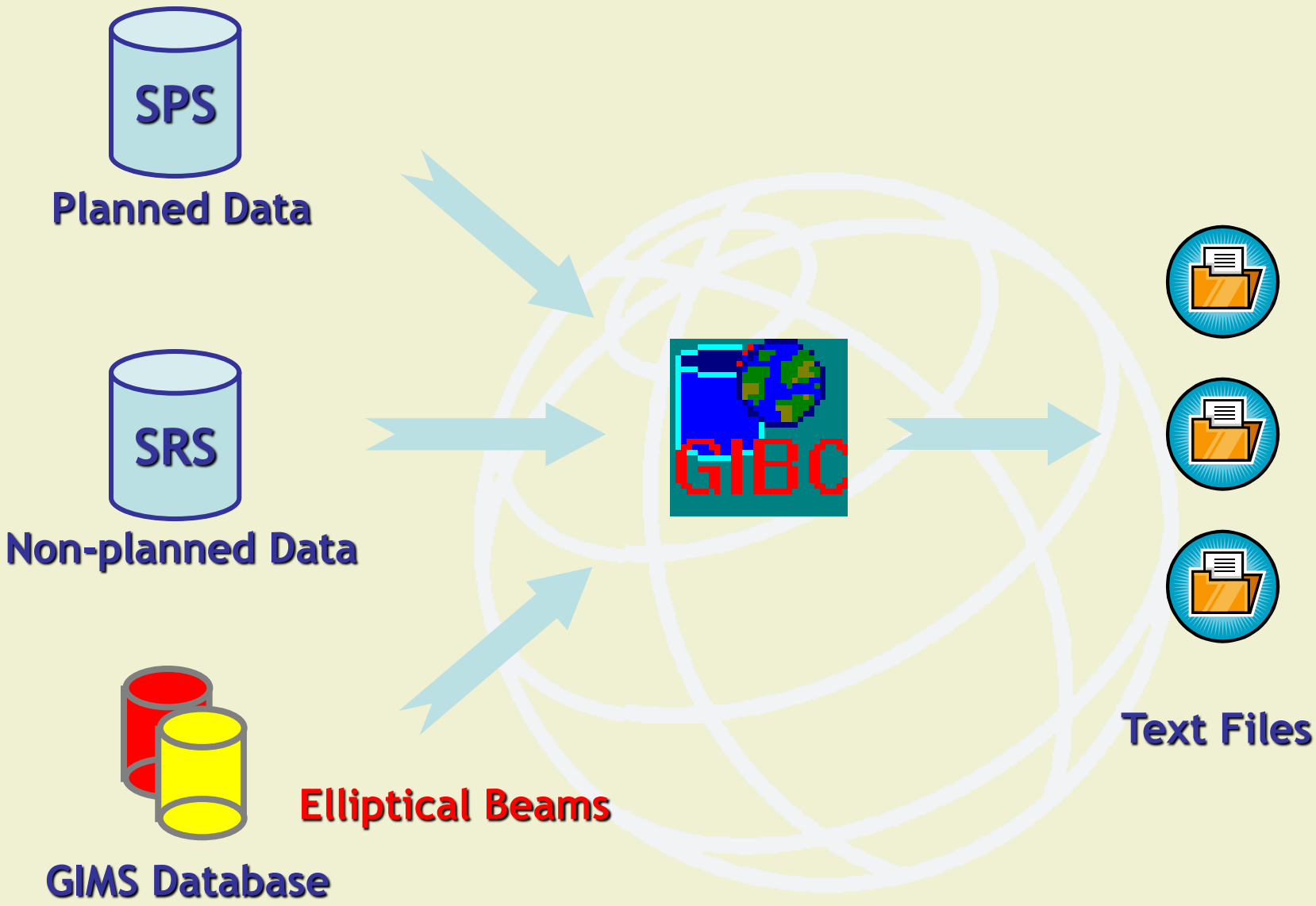
PFD Analysis Terrestrial

PFD Analysis Space

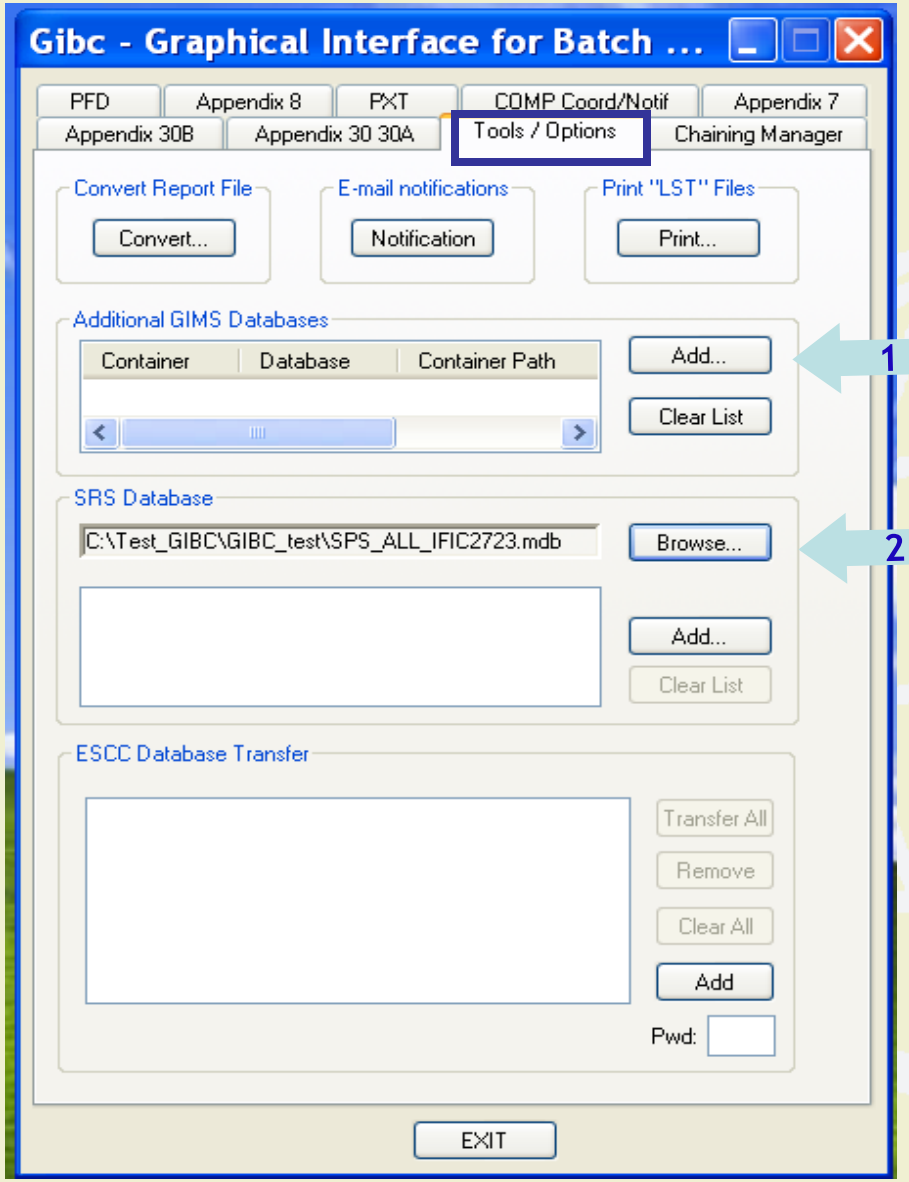
Inter-service, inter-regions coordination requirements

ΔT/T

GIBC Input/Output



AP30/30A Hard Limits Examination with GIBC/AP30-30A (1)



1

Click to connect to the GIMS data of the analyzed network (not required for an AP30A network)

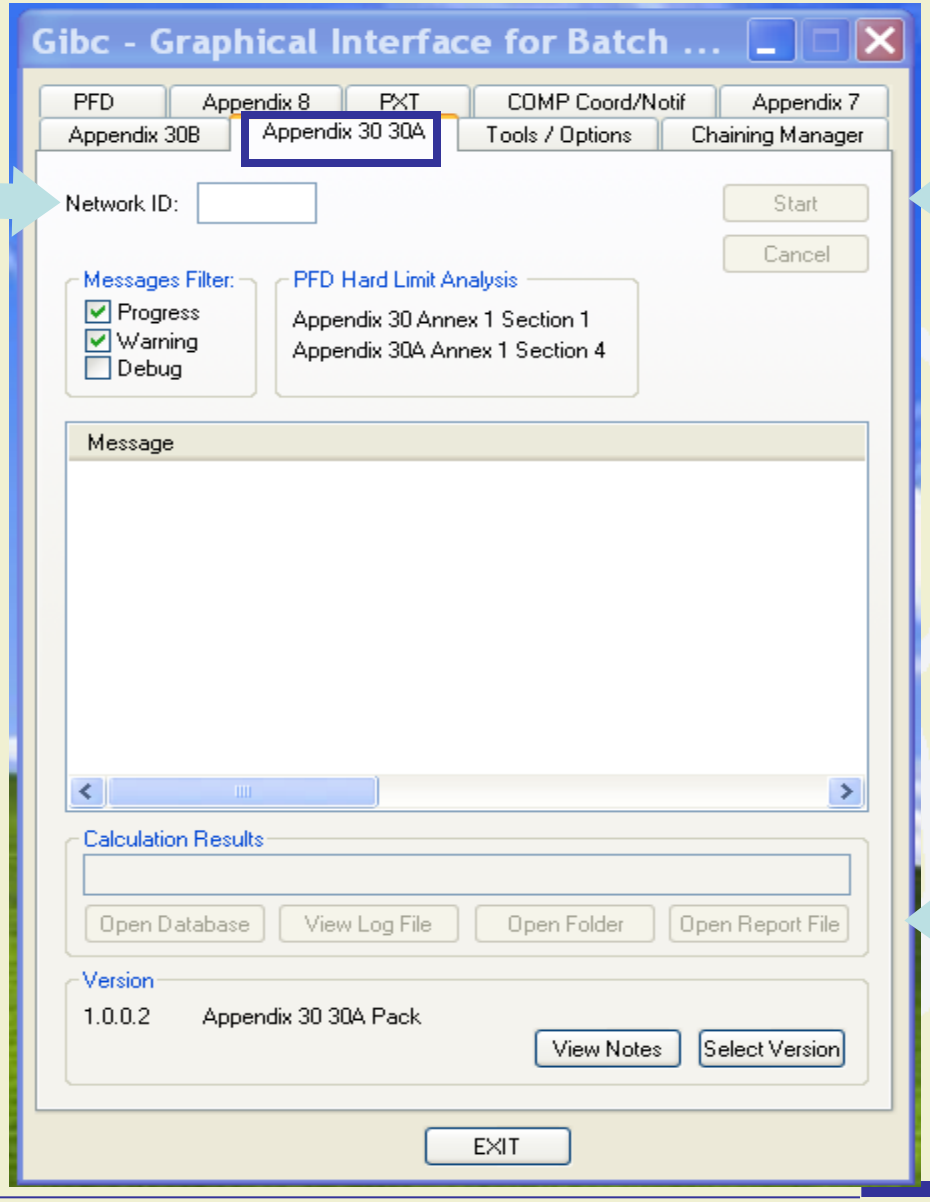
2

Click to connect to the latest SPS_ALL database which contains the analyzed network or SPS single database in case of an AP30A network

AP30/30A Hard Limits Examination with GIBC/AP30-30A (2)

Enter Notice_id of the analyzed network

3



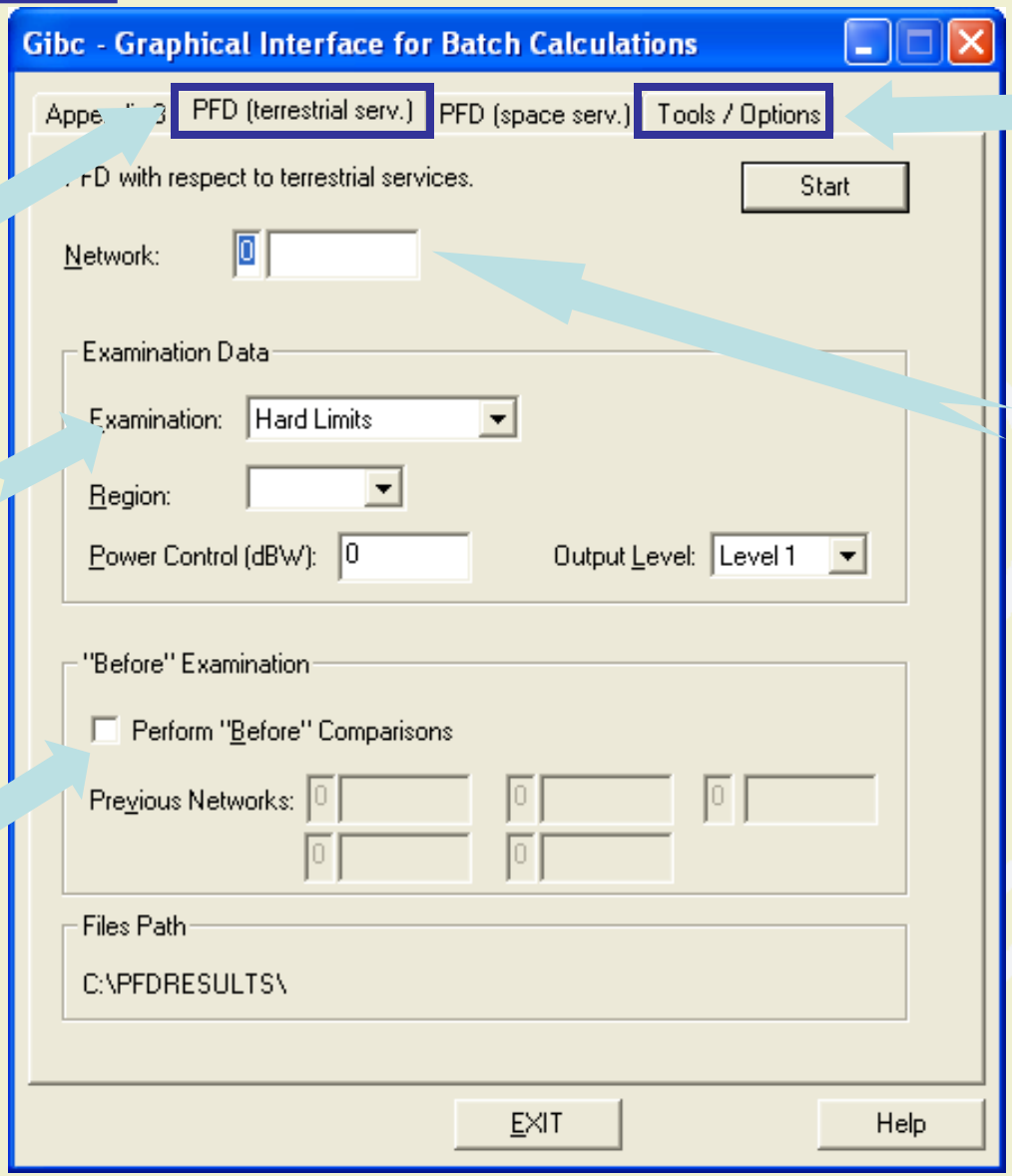
4

Click to run

5

Click to view the results

Protection of Terrestrial Services



Select PFD (terrestrial)

Select Trigger Limits

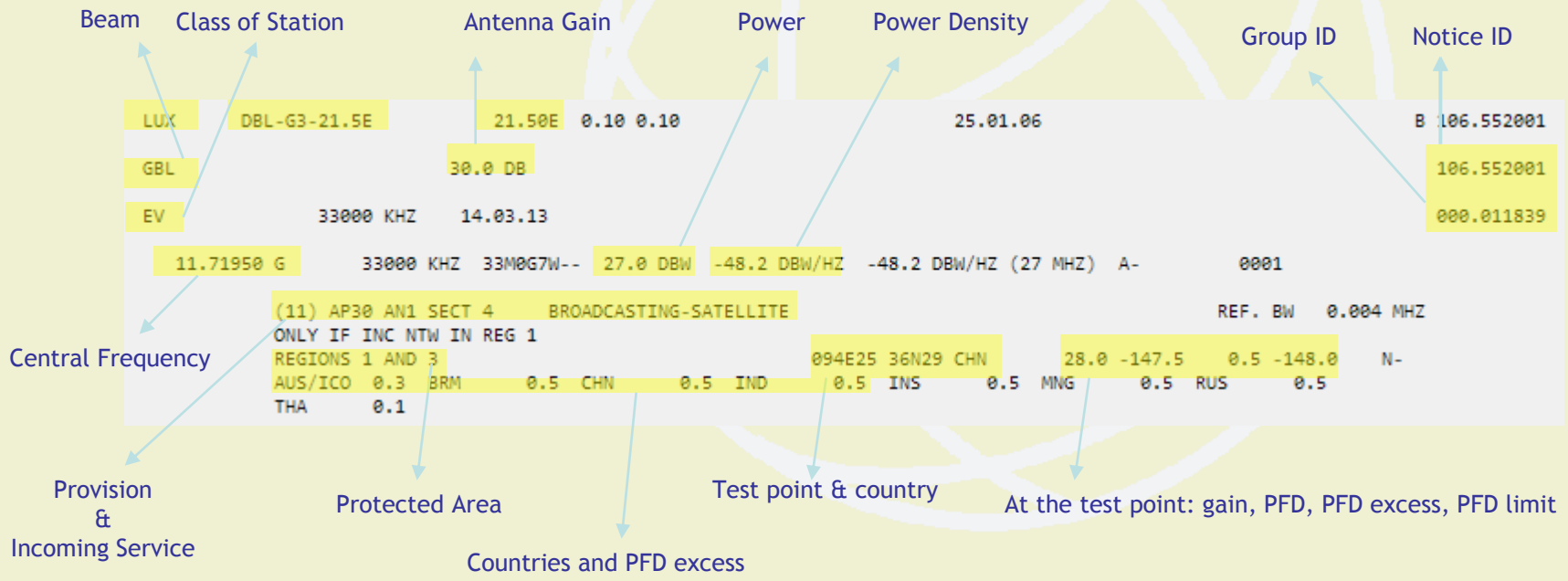
ID of notice in corresponding plan

SPS DB path GIMS DBs

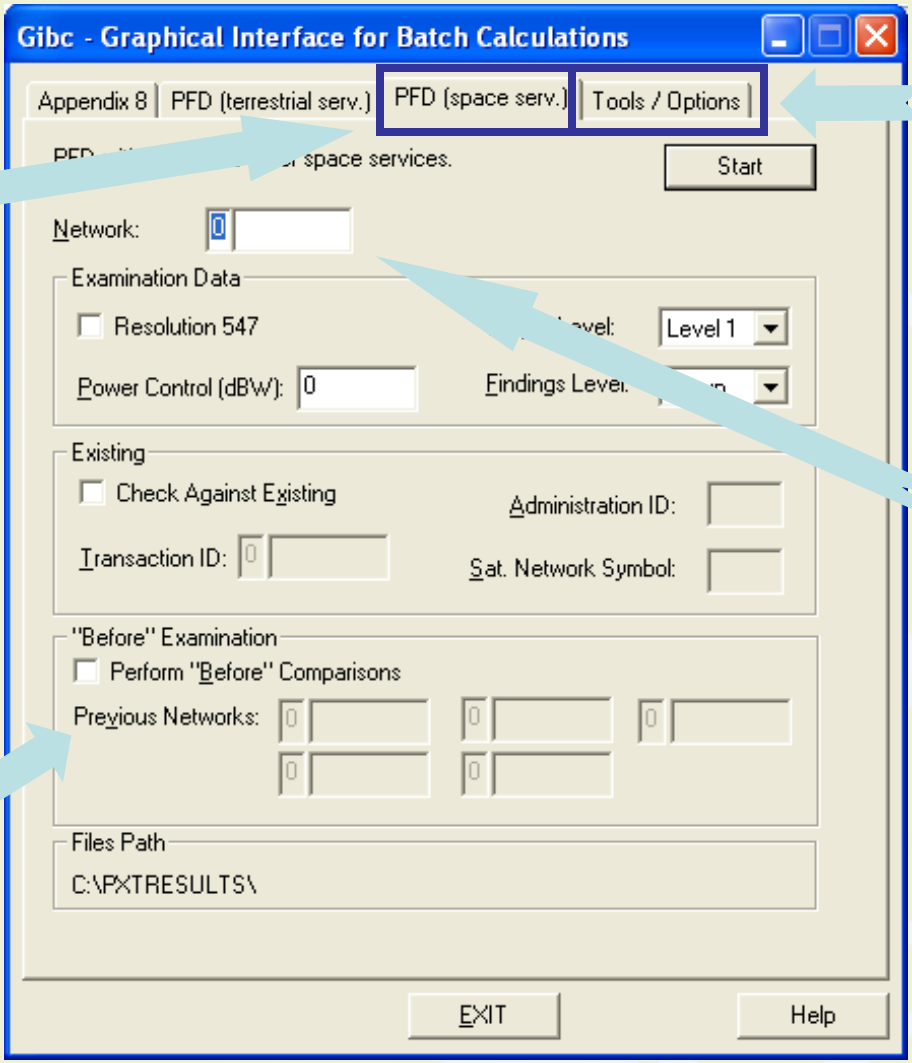
Type in ID of notice to examine

1. Output Files

- ✓ C:\PFDRESULTS\
- ✓ MSG.LST
  - Error messages
  - Always check !
- ✓ PFD.LST
  - Report file
  - Affected administrations



Protection of Space Services



Select PFD (space serv.)

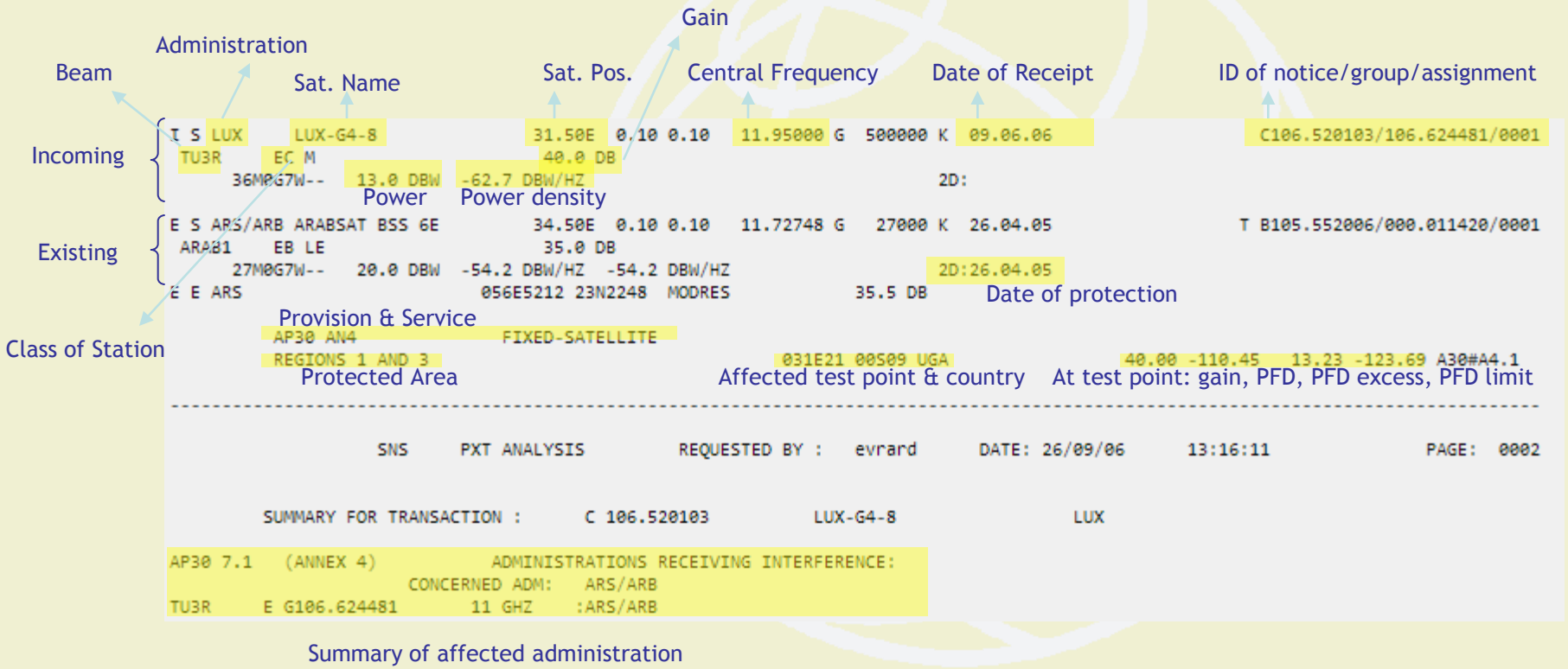
SPS DB path
SNS DB path
GIMS DBs

Type in ID of notice to examine

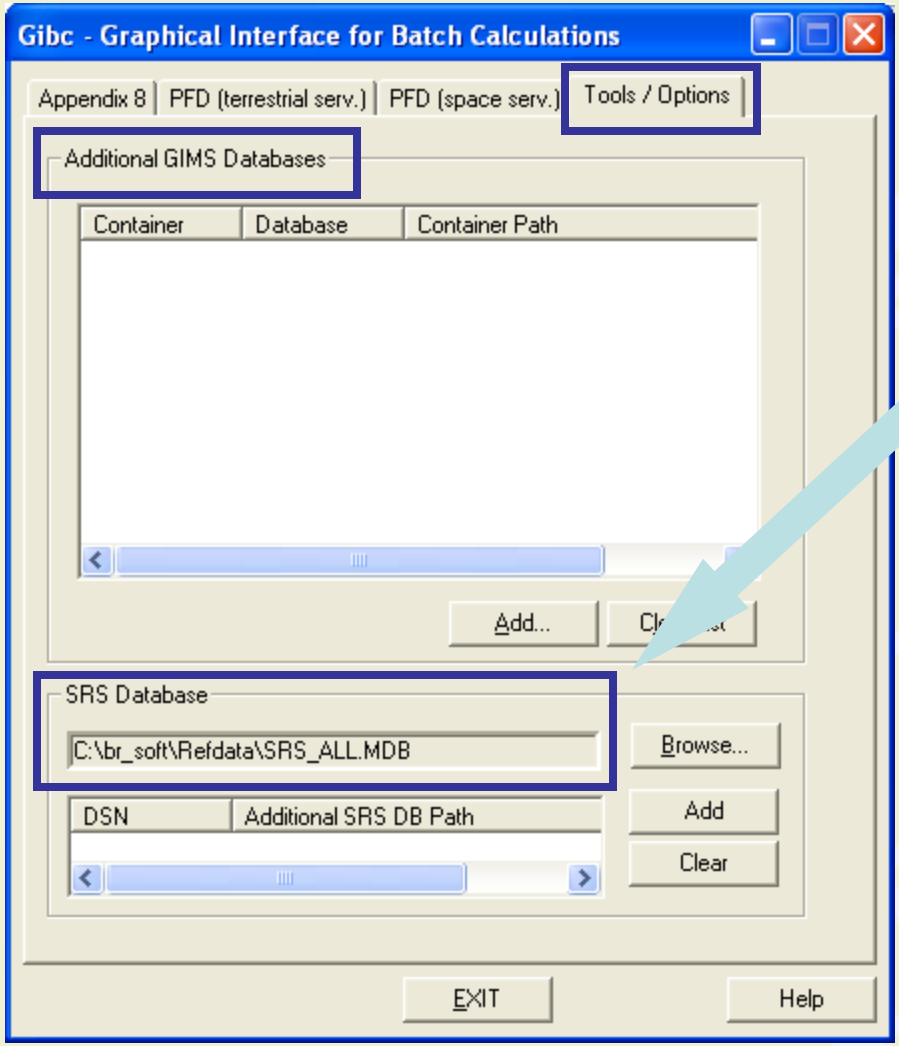
ID of notice in corresponding plan

Protection of Space Services (PFD)

1. **Output Files**
   - ✓ C:\PXTRESULTS\
   - ✓ MSG.LST
     - Error messages
     - Always check !
   - ✓ PXT.LST
     - Report file
     - Affected administrations



GIBC Tool/Options

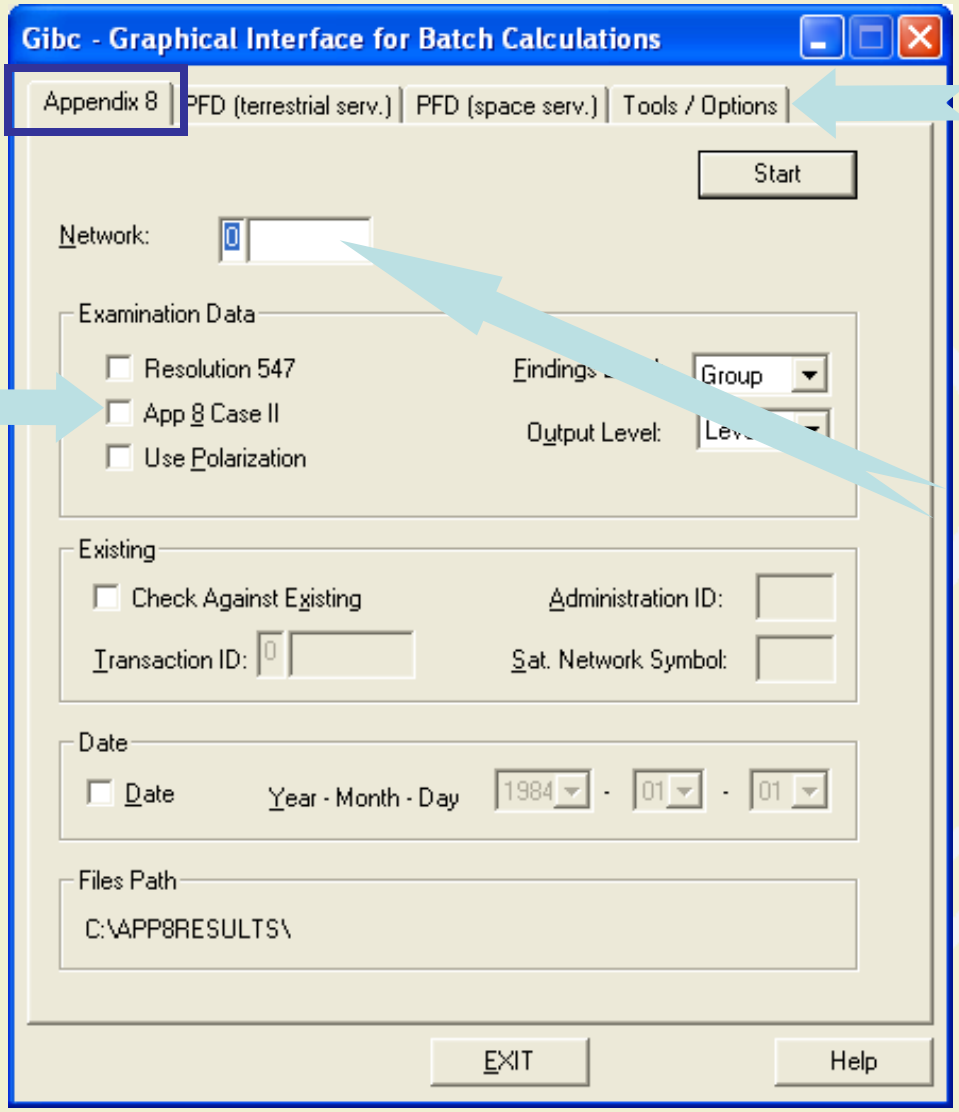


Database that contains the network to analyze

Protection of Space Services (ΔT/T)

Select Appendix 8

Activate Appendix 8 Case II



SPS DB path
SNS DB path
GIMS DBs

Type in ID of notice to examine

Protection of Space Services (ΔT/T)

1. Output Files

- ✓ C:\APP8RESULTS\
- ✓ MSG.LST
  - Error messages
  - Always check !
- ✓ APP8.LST and APP8_OPT.LST
  - Report file
  - Affected administrations