



30TH WORLD RADIOCOMMUNICATION SEMINAR

24 – 28 October 2022

Geneva, Switzerland

What's New in SpaceCap v9.1

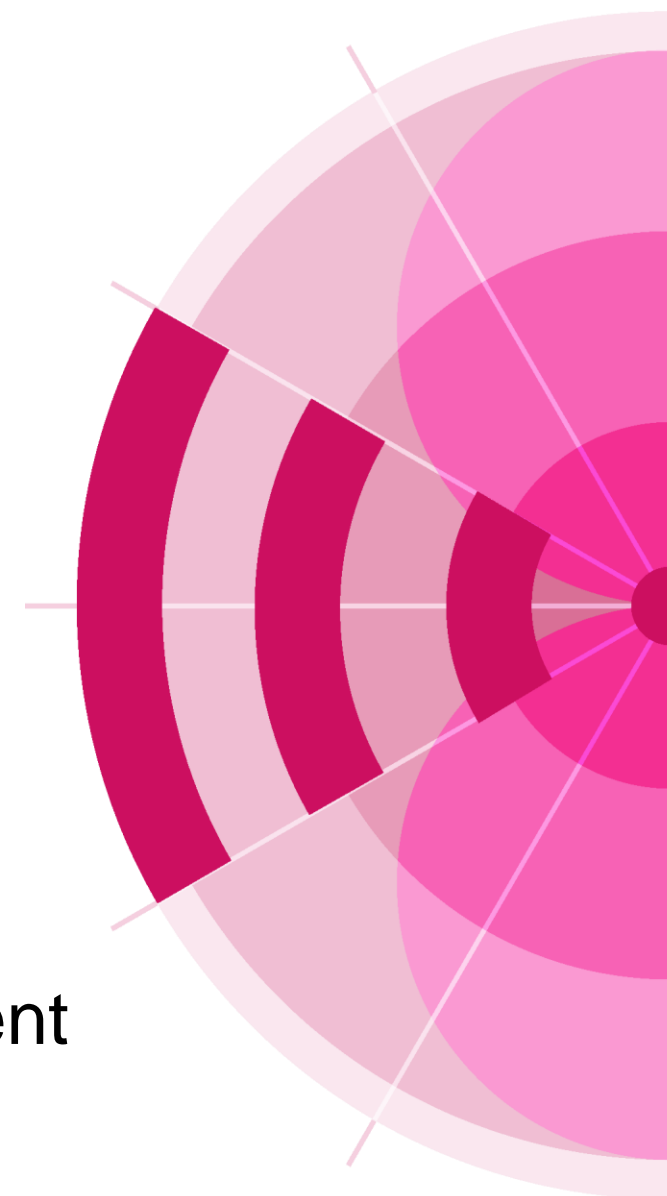
Miroslav Ćosić

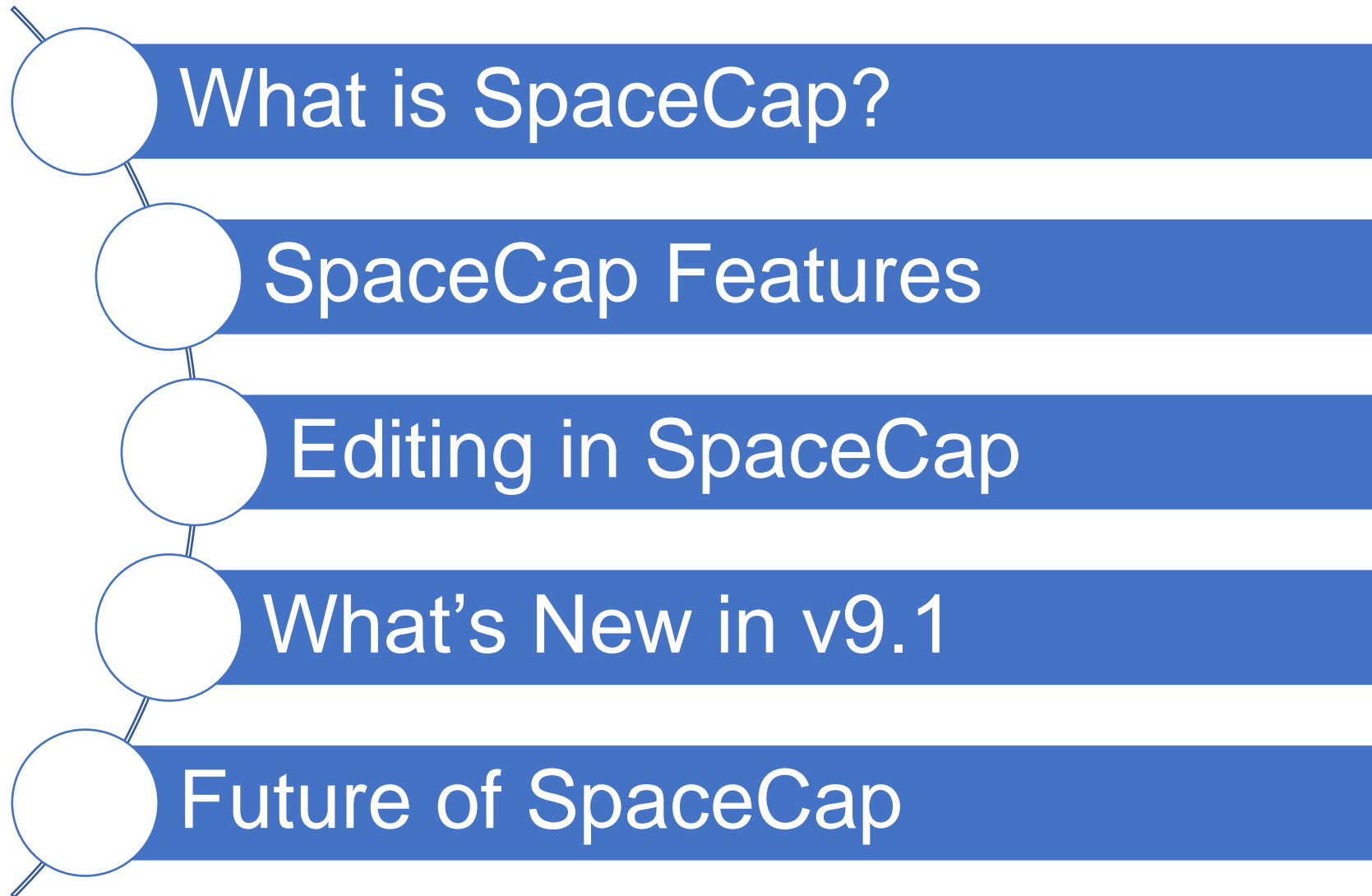
Space Applications Software Division

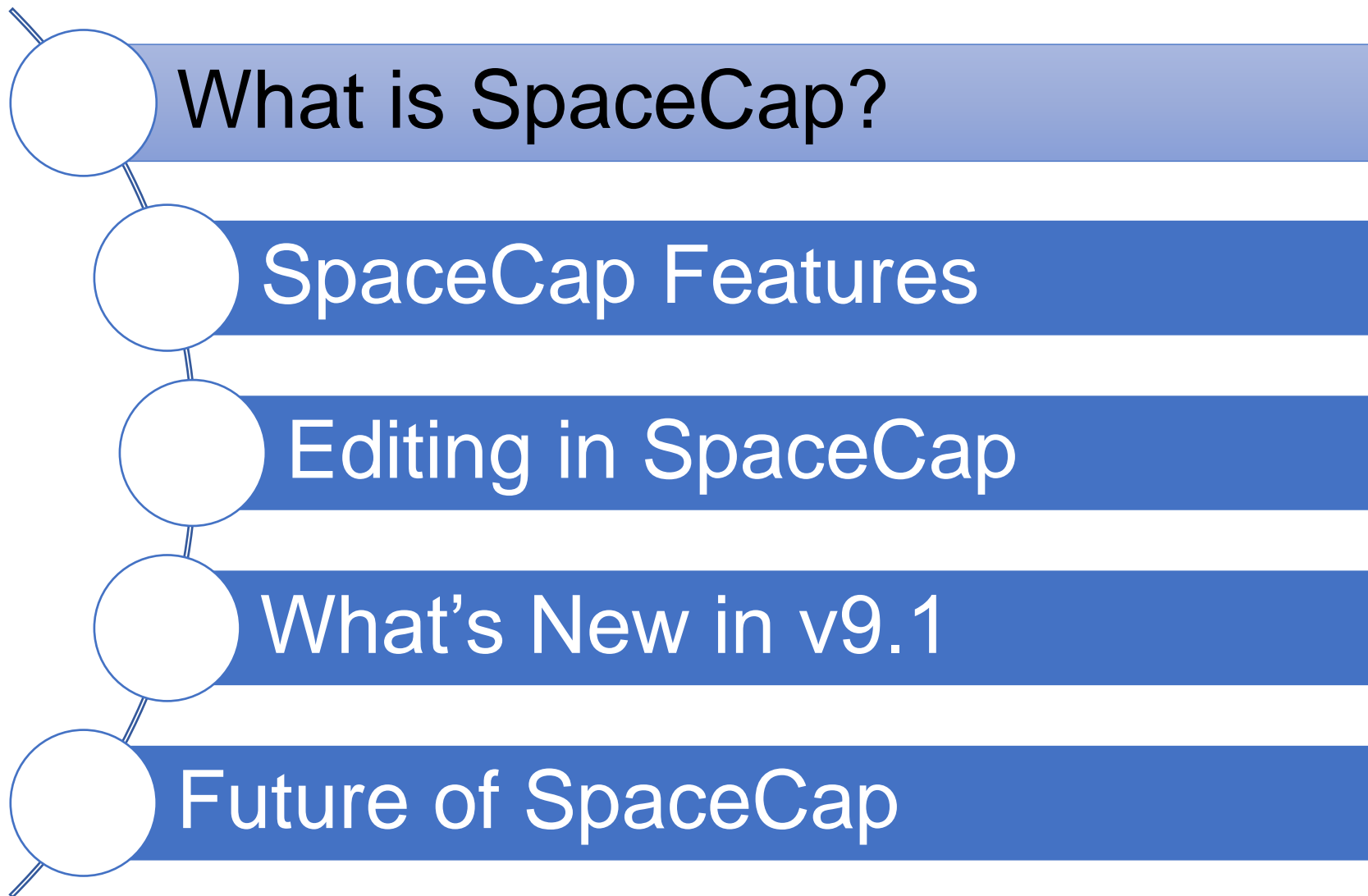
Informatics, Administration and Publications Department

www.itu.int/go/wrs-22

#ITUWRS







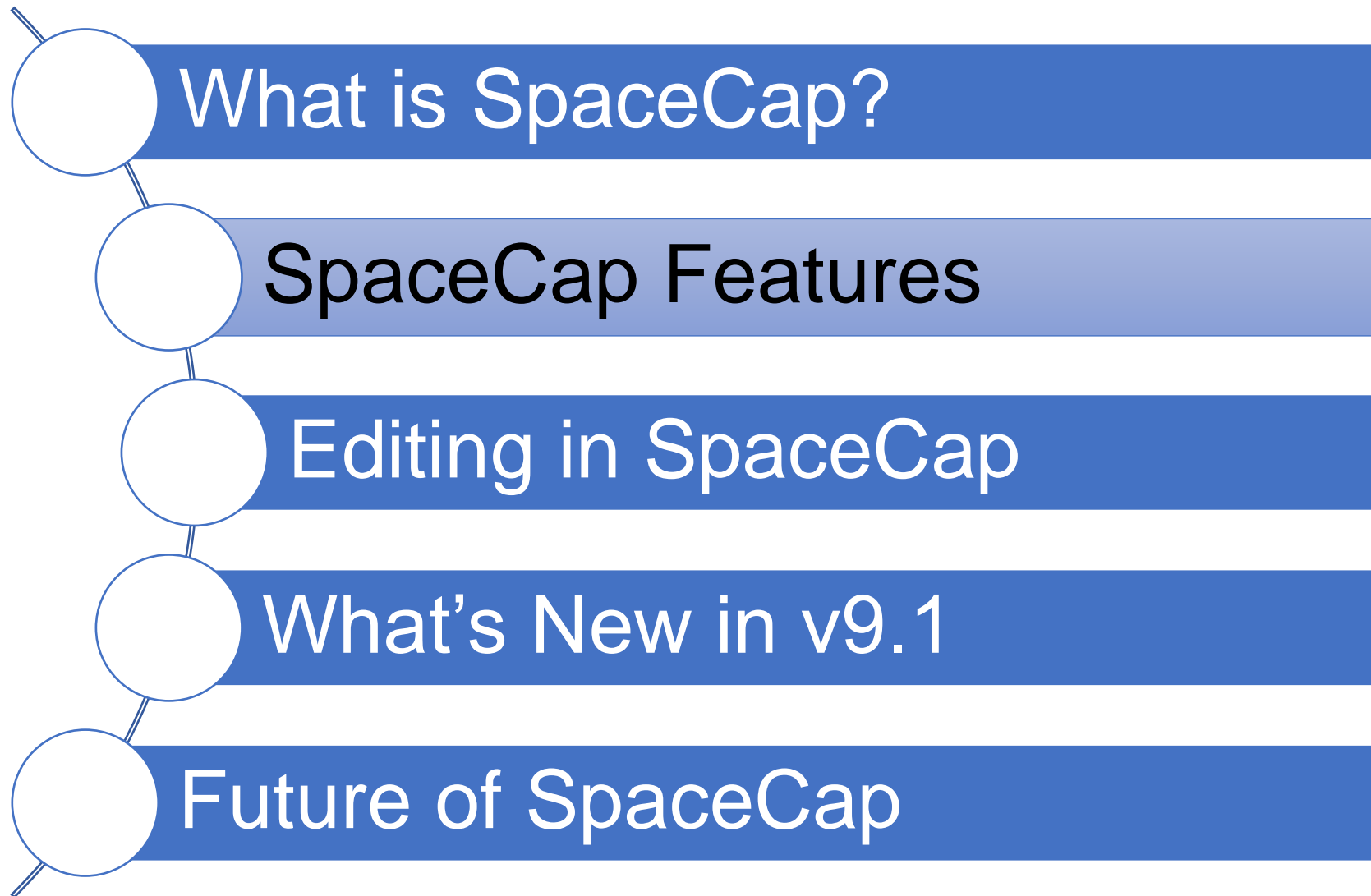
What is SpaceCap?

Main software for capture of space-services related RR Appendix 4 data items

Allows for capture of most data items listed in Preface to BR IFIC (Space)

Other space-services related data capture tools

- Graphical data capture (gain contours, service area) ⇒ GIMS
- Comments on IFIC ⇒ SpaceCom
- Resolution 35 ⇒ Capture directly in e-Submission or upload XML file
- Appendix 7 analysis input parameters ⇒ Simpler to use Ap7Capture



SpaceCap Features

Data Capture

- Wizard for First Notification
- Wizard for Resubmission
- Wizard for Coordination Agreements Capture
- Wizard for Resolution 49/552

Validate Data ⇒ BRSIS-Validation

Cost Recovery Fee Estimation

Browse SNS-format Data

Print Data ⇒ SpacePub

Export Data to SNS-format MDB File

Database Utility Features

- Link MDB Files (compatible only with SRS IFIC MDB files)
- Repair/Compact MDB File (convenience if PC without MS Access)

SpaceCap Features – Data Capture

The image displays three overlapping screenshots of the SpaceCapture v9.1.14 BETA software interface, showing various data capture forms for Notice, Beam, and Frequency information.

Left Screenshot (Notice Form):

- Notice Id: 1
- Date: MM/DD/YY 10/15/2022
- Administration: F
- A1f1. Notifying Administration: F
- A1f3. Intergovernmental Satellite System: GeoStationary Satellite Network
- A1a. Identity of the Network: EXAMPLE1
- A4. Orbital Information:
 - A4b1. Number of Orbital Planes: 1
 - A4b2. Reference body: (T) Earth
 - A4b3a. Nbr of Satellites to NH: []
 - A4b3b. Nbr of Satellites to SH: []
- Orbital information table:

Orbital Plane id	4a. Incl. Angle	4b. Satellites in the plane	4c. Period ddd	4c. Period hh	4c. Period mm	4d. Apogee	4d. apog exp	4e. Perigee
1								

Middle Screenshot (Beam Form):

- Notice Id: 1
- Administration: F
- Characteristics of the Beam:
 - B2. Receiving Beam (selected)
 - B1a. Beam Designation: EXAMPLE
- Antenna Characteristics:
 - B3a1. Maximum Isotropic Gain +/- dBi: 10
- Antenna Radiation Pattern:
 - B3c1. Co-polar Radiation Pattern Id: 609
 - ND-SPACE ==> APSND_499V01

Right Screenshot (Frequency Form):

- Assoc Earth Station Notice: 1
- Assoc Space Station Beam: EXAMPLE1
- Beam Id: EXAMPLE E
- Group Id: 1
- 3. Observed Frequencies and Related Characteristics:
 - CR/NOTIF, API, RAST, PLAN, RS49/552
 - Characteristics Common to a Group of Frequencies
 - General Characteristics
 - C4a. Cls Stn: EA Space stz
 - C4b. Nat Srv: CP Station op
 - C6. Polarization Type: []
 - C6. Polarization If linear, provide angle: []
 - C8f1. Space Station E.I.R.P.: [] dBW
 - Remarks: []



SpaceCap Features - Wizards

Guidelines to assist administrations in capturing coordination agreements, and in creating space station notification notices and their resubmissions <https://www.itu.int/en/ITU-R/space/support/Pages/GuideforNotificationwithSpacecap.aspx>

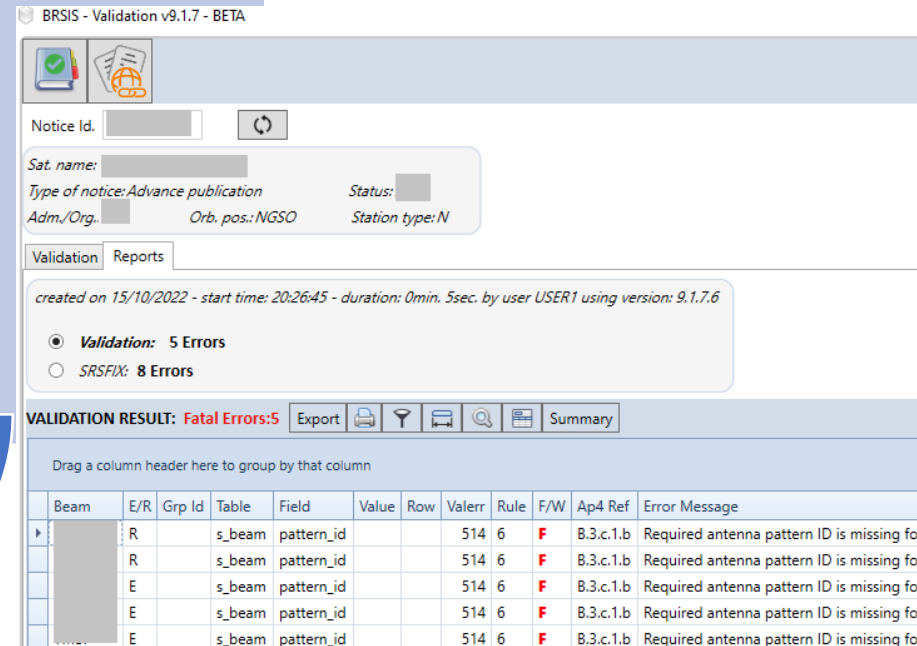
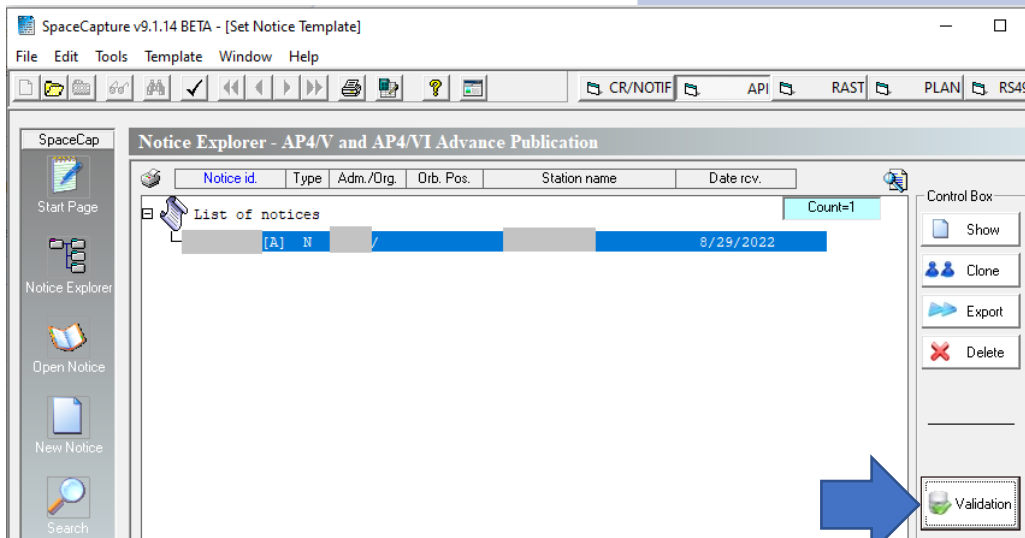
- Wizard for First Notification
- Wizard for Resubmission
- Wizard for Coordination Agreements Capture

Wizard for Resolution 49/552 https://www.itu.int/en/ITU-R/software/Documents/spacecap/new_rs49_552_help.pdf

SpaceCap Features – Validate Data

SpaceCap

BRSIS-Validation



SpaceCap Features – Cost Recovery

The screenshot displays the SpaceCapture v9.1.14 BETA application window. The main interface is titled "Notice Explorer - AP4/V and AP4/V". A blue arrow points to the "Cost Recovery Cat/Unit Calculator v9.1.1.7" window, which is open in the foreground. The calculator window contains the following fields:

- SNS Source: C:\Users\User1\Documents\Databases_v9.1_beta\SRS_Data\NANODEM
- Space RefDB: C:\ProgramData\ITU\BR_Space_v9.1\RefData\SpaceRefdb.mdb
- Log Output Dir.: C:\Users\User1\AppData\Local\Temp\autodelete_costrec_qug3b0dp_n

Below these fields is a "Summary" section with the following text:

NOTICE: 122545224 - Total number of unique groups processed: 0
- Provn:
- Cat:A1
- Unit:0
- CatFee:570
- FlatFee:570

In the background, the "Notice Explorer" window shows a table with the following data:

Notice id.	Type	Adm./Org.
122545224 [A]	N	F /

SpaceCap Features – Browse

SpaceCapture v9.1.14 BETA - [Set Notice Template]

File Edit Tools Template Window Help

CR/NOTIF API RAST PLAN RS49/552

SpaceCap

- Start Page
- Notice Explorer
- Open Notice
- New Notice
- Search

Notice Explorer - AP4/II and AP4/III

Notice id.	Type	Adm./Org.	Orb. Pos.	Station name	Date rcv.	Count=10608
122520031 [A]	G	F /	113W	F-SAT-N10-113W	3/25/2022	
122520032 [A]	G	ARS/ARB	26E	ARABSAT-11B-26E	3/28/2022	
122520033 [A]	G	ARS/ARB	30.5E	ARABSAT-11A-30.5E	3/28/2022	
122520034 [A]	N	USA/		USBO	3/28/2022	
122520035 [A]	N	FIN/		ICEYE-X	3/30/2022	
122520037 [A]	N	D /		PAX-1	4/7/2022	
122520038 [A]	G	UAE/	43W	MADAR-43W-4	4/7/2022	
122520039 [A]	G	UAE/	33E	MADAR-33E-4	4/7/2022	
122520040 [A]	G	UAE/	174E	MADAR-174E-2	4/7/2022	
122520041 [A]	G	UAE/	44E	MADAR-44E-2	4/7/2022	
122520042 [A]	G	UAE/	78.5E	MADAR-78.5E-2	4/7/2022	
122520044 [A]	G	AZE/	67E	AZERSAT-67E	4/11/2022	
122520045 [A]	N	USA/		SHERPA-AC1	4/11/2022	
122520046 [A]	G	USA/	90E	USGAE-3B	4/11/2022	
122520047 [A]	G	USA/	9W	USGAE-8B	4/11/2022	
122520048 [A]	G	USA/	93E	USGAE-11B	4/11/2022	
122520049 [A]	G	USA/	96E	USGAE-13B	4/11/2022	
122520050 [A]	G	USA/	16.5W	USGAE-14B	4/11/2022	
122520051 [A]	G	USA/	31.5W	USGAE-15B	4/11/2022	
122520053 [A]	G	USA/	150W	USGAE-10R	5/3/2022	
122520054 [A]	G	USA/	39W	USGAE-17R	5/3/2022	
122520058 [A]	N	CHN/		DEAR	5/17/2022	
122520061 [A]	G	KOR/	124.5E	KPS-G1	5/30/2022	
122520074 [A]	N	T /		MICROBITER-1	6/10/2022	

Control Box

- Show
- Clone
- Export
- Delete
- Validation
- Esub
- RS49/552

Current DB : C:\Users\User1\Documents\Databases_v9.1_beta\SRS_Data\srs2982_part1of4.mdb

SpaceCap Features – Print

The screenshot displays the SpaceCapture v9.1.14 BETA software interface. The main window shows a list of notices in the 'Notice Explorer' pane, with the notice ID 122520054 selected. The 'Create Documents' dialog box is open, showing the selected notice ID and various print options. A red box highlights the 'SpacePub v9.1 BETA' logo in the top right corner of the dialog. A white arrow labeled '1' points to the 'Print' icon in the main menu bar. A white arrow labeled '2' points to the 'Create Doc.' button in the 'Create Documents' dialog.

Notice id.	Type	Ad
122520031 [A]	G	F
122520032 [A]	G	A
122520033 [A]	G	A
122520034 [A]	N	U
122520035 [A]	N	F
122520037 [A]	N	D
122520038 [A]	G	U
122520039 [A]	G	U
122520040 [A]	G	U
122520041 [A]	G	U
122520042 [A]	G	U
122520044 [A]	G	A
122520045 [A]	N	U
122520046 [A]	G	U
122520047 [A]	G	U
122520048 [A]	G	U
122520049 [A]	G	U
122520050 [A]	G	U
122520051 [A]	G	U
122520053 [A]	G	U
122520054 [A]	G	U
122520058 [A]	N	C
122520061 [A]	G	K
122520074 [A]	M	

Current DB : C:\Users\User1\Documents\Databases\

Current Database: C:\Users\User1\Documents\Databases_V9.1_BETA\SRS_DATA\SRS2982_PART10F4.MDB

SpaceCap Features – Export to MDB

SpaceCapture v9.1.14 BETA - [Set Notice Template]

File Edit Tools Template Windows Help

Target Database

Access Ingres

Set Target Db

Keep History

Group Ids

Export to database name

Doc... > Databases... >

Search Databases_v9.1_beta

Organize New folder

Downloads Music Pictures Videos Local Disk (C:)

Name Date modified Type

AP30_30A 10/13/2022 4:39 PM Fi

AP30B 10/13/2022 4:39 PM Fi

IFIC_Data 10/13/2022 4:40 PM Fi

SRS_Data 10/15/2022 8:19 PM Fi

File name: NANODEMO1.mdb Access mdb

Open Cancel

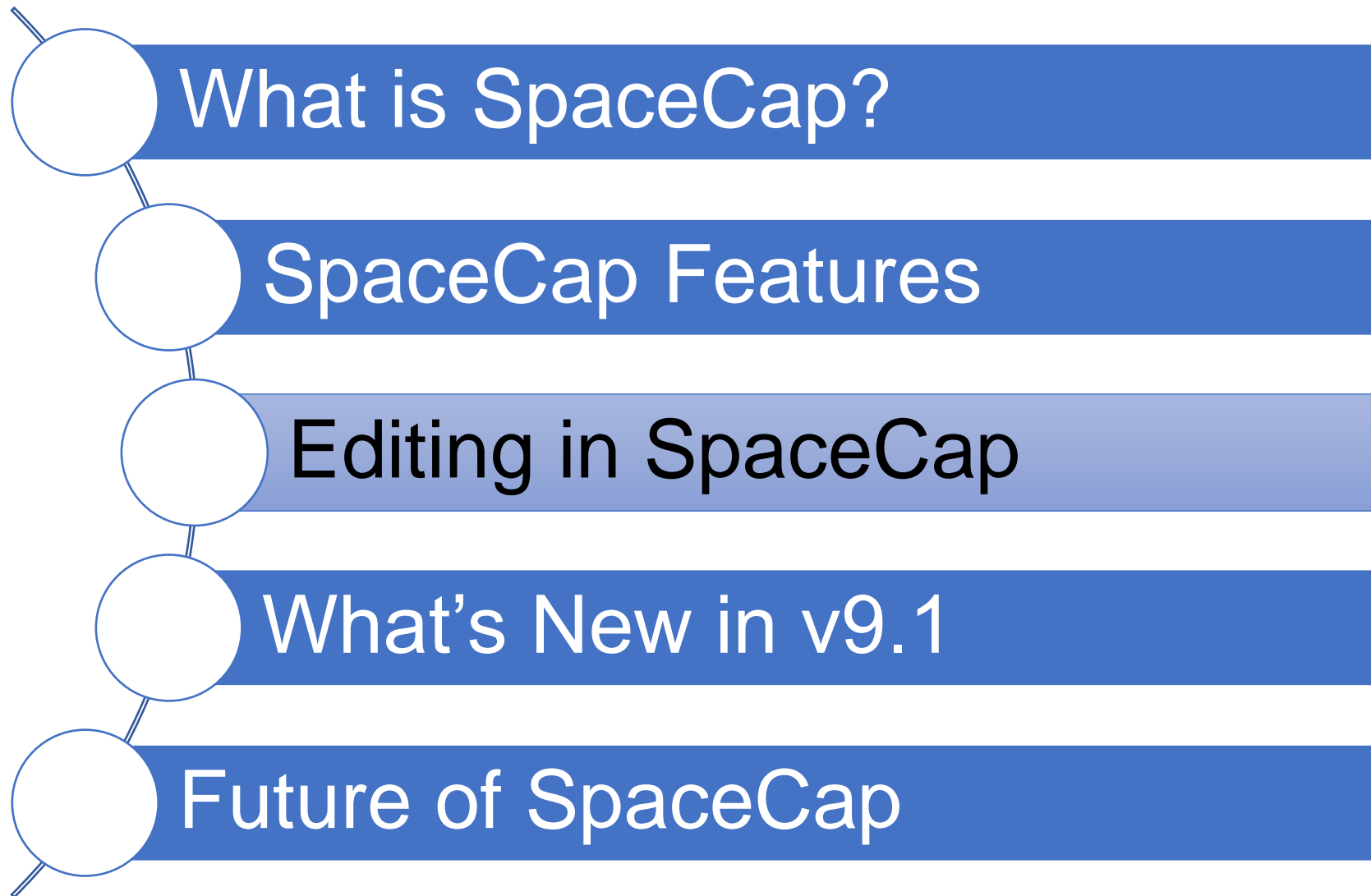
Control Box

Show Clone Export Delete Validation Esub RS49/552

Count=1455

Date rcv.	Count
/19/2022	Count=1455
/20/2022	
/21/2022	

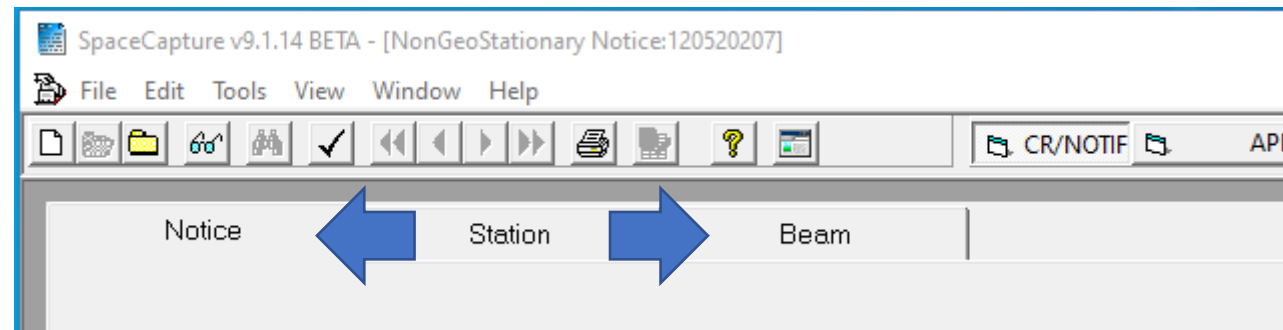
Current DB : C:\Users\User1\Documents\Databases_v9.1_beta\SRS_Data\srs2982_part1of4.mdb

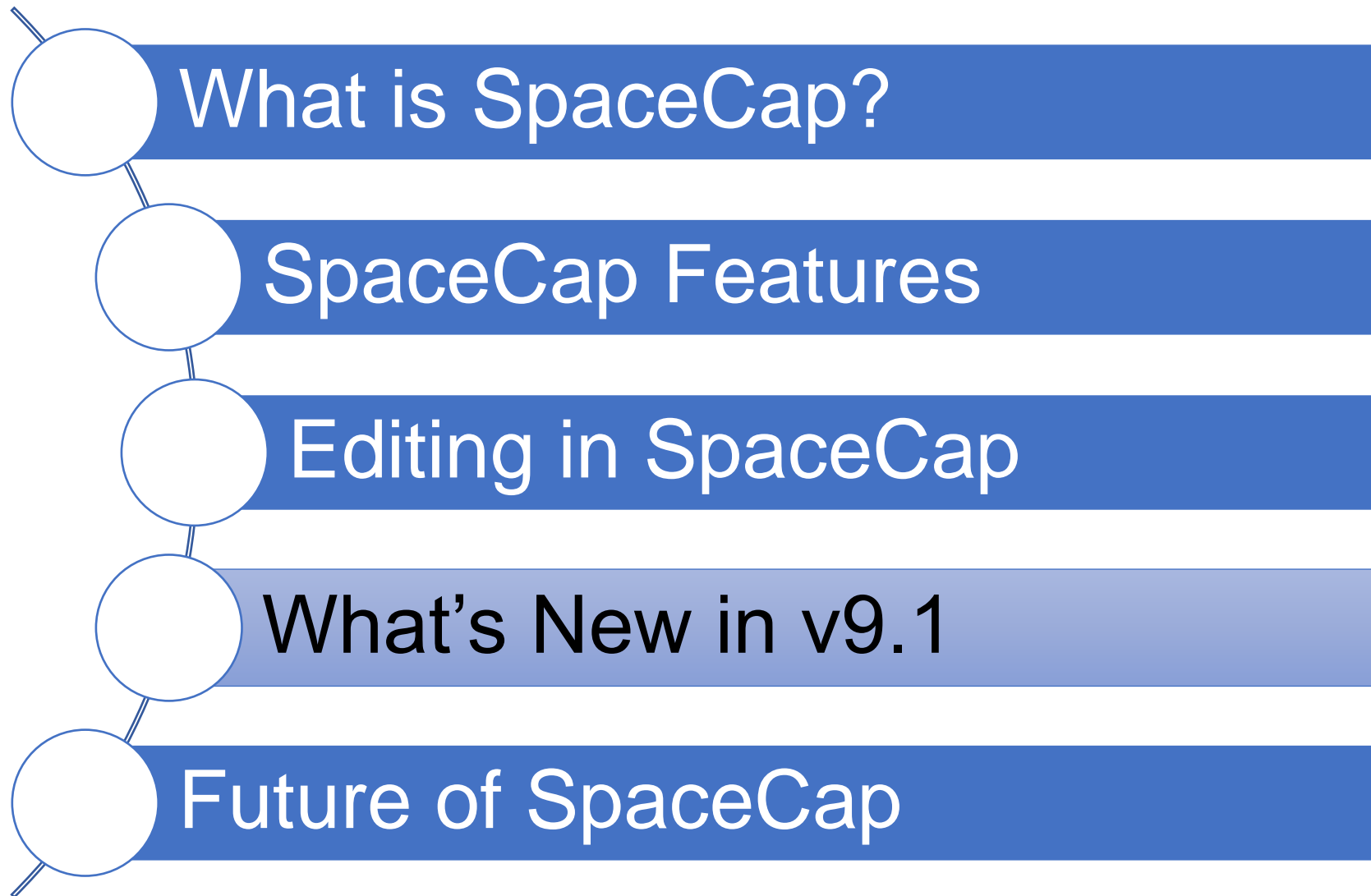


Editing in SpaceCap

After editing a value in a SpaceCap form, it is recommended to click somewhere else in the form, before clicking on a tab or menu item, otherwise the change may be lost.

Saving changes in SpaceCap is performed indirectly by moving to another tab





What is new in SpaceCap v9.1?

SpaceCap v9.1 is in BETA release for WRS-22, implementing the changes in SNS version 9.1 database format and other improvements

SpaceCap v9.1 includes all features of the latest SpaceCap v9, which it fully replaces, except for the differences shown here...

What is new in SpaceCap v9.1?

**Capture of Indication EFFORT_11-41-2
and Confirmation ROP_4-4**

New Features for Non-GSO

New Features for API

Other Non-Cosmetic Changes

**Changes Concerning
Attachments**

Other Changes

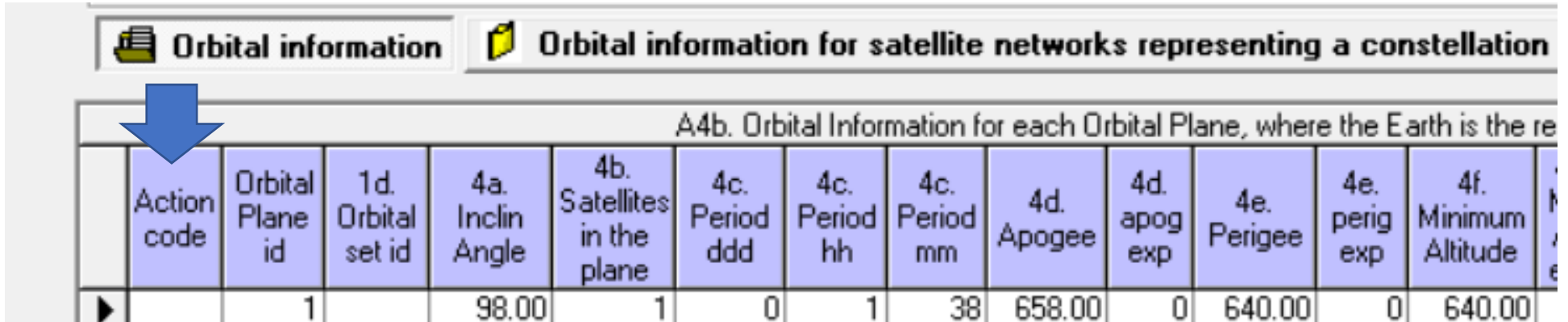
Capture of Indication EFFORT_11-41-2 and Confirmation ROP_4-4

(Please refer to Note 7 in the Preface)

BR108. Indication under No. 11.41.2 that efforts have been made to effect coordination with those administrations whose assignments were the basis of the unfavourable findings under No. 11.38, without success	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A16a. Commitment to meet off-axis power limitations (applicable bands 12.75-13.25 GHz, 13.75-14.5 GHz and 29.5-30 GHz)	<input checked="" type="radio"/> Yes	<input type="radio"/> No
A17a. Commitment to meet power-flux density limits (applicable bands 1164-1215 MHz)	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A18a. Commitment of aircraft earth station (applicable bands 14-14.5 GHz)	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A16c. Commitment to meet separation distance of No. 5.509E and PFD limits of 5.509D	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A19b. Commitment in accordance with resolves 1.5 of Res 156	<input checked="" type="radio"/> Yes	<input type="radio"/> No
A20a. Commitment of conformity with RR and Res 169	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A21a. Commitment to follow the procedures in resolves 4 of Res 169 upon receipt of a report of unacceptable interference	<input type="radio"/> Yes	<input checked="" type="radio"/> No
A22a. Commitment of conformity with pfd limits in Part II of Annex 3 to Res 169	<input type="radio"/> Yes	<input checked="" type="radio"/> No
BR109. Confirmation that the frequency assignments which operate under No. 4.4 will meet the conditions referred to in RoP 4.4 §1.6 a) and that measures have been identified to avoid harmful interference and to immediately eliminate such in case of a complaint	<input type="radio"/> Yes	<input checked="" type="radio"/> No

New Features for Non-GSO (1/9)

- Capture of action code (Add/Modify/Suppress) for orbits (database column *orbit.act_code*)



The screenshot shows a software interface with two tabs: "Orbital information" and "Orbital information for satellite networks representing a constellation". Below the tabs is a table titled "A4b. Orbital Information for each Orbital Plane, where the Earth is the re". A blue arrow points to the "Action code" column in the table.

Action code	Orbital Plane id	1d. Orbital set id	4a. Inclination Angle	4b. Satellites in the plane	4c. Period ddd	4c. Period hh	4c. Period mm	4d. Apogee	4d. apog exp	4e. Perigee	4e. perig exp	4f. Minimum Altitude
	1		98.00	1	0	1	38	658.00	0	640.00	0	640.00


New Features for Non-GSO (2/9)

Capture of orbit configuration identifier (*orbit.orb_set_id*) for multiple configurations (replaces the *non_geo.attch_multi_config* data item)

Reference body (T) Earth A4b1a. Constellation Y

b. Nbr of Satellites to SH 1 (M) Multiple

A4b1c. No of sub-sets A4b1d. Attachm Numb




Reference body (T) Earth A4b1a. Constellation Y

b. Nbr of Satellites to SH 1 A4b1b. Multi Configuration Type (M) Multiple

A4b1c. No of sub-sets

Orbital information **Orbital information for satellite networks representing a constellation**

A4b. Orbital Information for each Orbital Plane, where the Earth is the re

Orbital Plane id	1d. Orbital set id	4a. Inclination Angle	4b. Satellites in the plane	4c. Period ddd	4c. Period hh	4c. Period mm	4d. Apogee	4d. apog exp	4e. Perigee	4e. perig exp	4f. Minimum Altitude	4f. Min Alt exp	4f. st
1		98.00	1	0	1	38	658.00	0	640.00	0	640.00	0	no

New Features for Non-GSO (3/9)

Council Decision 482 for multiple configurations implemented in Cost Recovery Calculation tool

Cost Recovery Cat/Unit Calculator v9.1.1.7

SNS Source: C:\Users\User1\Documents\Databases_v9.1_beta\SRS_Data\METHERA-D mi

Space RefDB: C:\ProgramData\ITU\BR_Space_v9.1\RefData\SpaceRefdb.mdb

Log Output Dir.: C:\Users\User1\AppData\Local\Temp\autodelete_costrec_haoxgnvw_1r4

Notice Id: 12052027

Use Findings:

Calculate Category & Units

RunTime: 00:00:03.9

Summary

NOTICE: 12052027 - Total number of unique groups processed: 127

TOTAL CONFIGURATIONS: 4
- CatFee:82240

CONFIGURATION 1
- Provn:9.11A
- Cat:C1
- Unit:22458
- CatFee:20560
- FlatFee:20560

CONFIGURATION 2
- Provn:9.11A
- Cat:C1
- Unit:22458
- CatFee:20560
- FlatFee:20560

CONFIGURATION 3
- Provn:9.11A
- Cat:C1
- Unit:22458
- CatFee:20560
- FlatFee:20560

CONFIGURATION 4
- Provn:9.11A
- Cat:C1
- Unit:22458
- CatFee:20560
- FlatFee:20560

New Features for Non-GSO (4/9)

Support for indicating geographic area codes to be excluded from the service area - for API only (service area capture UI elements are not shown if the beam has sensors)

C11a. Service Area as List of Countries or Geographic designations

AFS
CAN
F
GUF

Service Area No. (diag provided in)



C11a. Service Area as List of Countries or Geographic designations

+XAA
-ATA

Service Area No. (diag provided in Gims)

New Features for Non-GSO (5/9)

Regrouped orbital information capture for API

Note: A.4.b.4.g was unnecessarily shown for API in SpaceCap v9

Orbital Information (1 of 3) | Orbital Information (2 of 3) | Orbital Information (3 of 3)

A4b4. Orbital Parameters

Orbital Plane id	4a. Inclination Angle	4b. Satellites in the plane	4c. Argument of the Perigee (degrees)	4i. Argument of the Perigee (degrees)
1	98	1		

A4b4h. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle
1	

Initial phase angle

Step

Apply to current orbit

Apply to all orbits with same number of satellites

Orbital Information (1 of 3) | Orbital Information (2 of 3) | Orbital Information (3 of 3)

A4b6. Orbital Operation

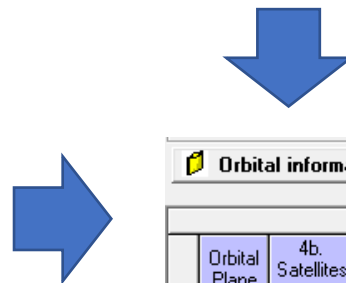
Orbital Plane id	N. of sats	4a. Inclination Angle	4j. Longitude ascending node
1	1	98	

A4b4k/l. Date/time of sat location for Orbital Plane 1

Satellite Number	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1		00:00:00

Select Date and Time for all satellites on Selected Orbital Plane:

/ / : :



Orbital information | Orbital information for satellite networks representing a constellation

A4b4. Orbital Parameters

Orbital Plane id	4b. Satellites in the plane	4i. Argument of the Perigee (degrees)	4j. Longitude ascending node
1	1		

A4b4h/k/l. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle (Degrees)	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1			00:00:00

Initial phase angle

Step

Apply to current orbit

Apply to all orbits with same number of satellites

Select Date and Time for all satellites on all Orbital Planes:

/ / : :

All satellites in all orbital planes must use the same values of A4b4k and A4b4l

New Features for Non-GSO (6/9)

Regrouped orbital information capture for CR/C

Orbital Information (1 of 3) | **Orbital Information (2 of 3)** | Orbital Information (3 of 3)

A4b4. Orbital Parameters

Orbital Plane id	4a. Incl Angle	4b. Satellites in the plane	4g. Right Ascension (degrees)	4i. Argument of the Perigee (degrees)
1	60	32	0	0
2	60	32	45	0
3	60	32	90	0
4	60	32	135	0

A4b4h. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle
1	0
2	11.25
3	22.5
4	33.75
5	45
6	56.25
7	67.5
8	78.75
9	90
10	101.25

In order to calculate automatically phase angles, please insert values below:

Initial phase angle:

Step:

Apply to current orbit

Apply to all orbits with same number of satellites

Orbital information | **Orb. info. for sat. networks subject to No. 9.11A** | Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b4. Orbital Parameters

Orbital Plane id	4b. Satellites in the plane	4i. Argument of the Perigee (degrees)	4j. Longitude ascending node	4g. Right Ascension (degrees)
1	32	0	0	0
2	32	0	45	45
3	32	0	90	90
4	32	0	135	135

A4b4h/k/l. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle (Degrees)	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1	0	01/30/2023	00:00:00
2	11.25	01/30/2023	00:00:00
3	22.5	01/30/2023	00:00:00
4	33.75	01/30/2023	00:00:00
5	45	01/30/2023	00:00:00
6	56.25	01/30/2023	00:00:00
7	67.5	01/30/2023	00:00:00
8	78.75	01/30/2023	00:00:00
9	90	01/30/2023	00:00:00
10	101.25	01/30/2023	00:00:00

In order to calculate automatically phase angles, please insert values below:

Initial phase angle:

Step:

Apply to current orbit

Apply to all orbits with same number of satellites

Select Date and Time for all satellites on all Orbital Planes:

/ / : :

All satellites in all orbital planes must use the same values of A4b4k and A4b4l

Orbital Information (1 of 3) | **Orbital Information (2 of 3)** | Orbital Information (3 of 3)

A4b6bis. Operating parameters indicator (L) Limited Set

A4b6a. Latitude Ranges

A4b6. Orbital Operation

Orbital Plane id	N. of sats	4a. Incl Angle	6c. Stn Keeping	6d. R-prd ddd	6d. R-prd hh	6d. R-prd mm	6d. R-prd ss	6e. Precession / J2 term	6f. Precession Rate $i \dot{\omega} / \text{day}$	4j. Longitude ascending node	6j. Longitudinal tolerance
1	32	60	yes	0	11	28	0	J2 term		0	
2	32	60	yes	0	11	28	0	J2 term		45	
3	32	60	yes	0	11	28	0	J2 term		90	
4	32	60	yes	0	11	28	0	J2 term		135	

A4b4k/l. Date/time of sat location for Orbital Plane 1

Satellite Number	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1	01/30/2023	00:00:00
2	01/30/2023	00:00:00
3	01/30/2023	00:00:00
4	01/30/2023	00:00:00
5	01/30/2023	00:00:00
6	01/30/2023	00:00:00

Select Date and Time for all satellites on Selected Orbital Plane:

: :

A4b7. Performance of the non-geostationary system

7a. Number of Tracked Sats: 7b. Avg Number Assoc E-stn: 7c. Avg Distance:

7d. Exclusion Zone

7d1. Type of zone: Topocentric angle Satellite-based angle other method

7d2. Width of zone: 7d3. Avoidance mechanism. See Attachment No.

Orbital information | **Orb. info. for sat. networks subject to No. 9.11A** | Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b6bis. Operating parameters indicator (L) Limited Set

A4b6a. Latitude Ranges

A4b6. Orbital Operation

Orbital Plane id	6c. Stn. Keeping	6d. R-prd ddd	6d. R-prd hh	6d. R-prd mm	6d. R-prd ss	6e. Precession / J2 term	6f. Precession Rate $i \dot{\omega} / \text{day}$	6j. Longitudinal tolerance
1	yes	0	11	28	0	J2 term		0.5
2	yes	0	11	28	0	J2 term		0.5
3	yes	0	11	28	0	J2 term		0.5
4	yes	0	11	28	0	J2 term		0.5

A4b7. Performance of the non-geostationary system

7a. Number of Tracked Sats: 7b. Avg Number Assoc E-stn: 7c. Avg Distance:

7d. Exclusion Zone

7d1. Type of zone: Topocentric angle Satellite-based angle other method

7d2. Width of zone: °

New Features for Non-GSO (7/9)

Regrouped orbital information capture for Notification

Orbital Information (1 of 3) | Orbital Information (2 of 3) | Orbital Information (3 of 3)

A4b4. Orbital Parameters

Orbital Plane id	4a. Incl Angle	4b. Satellites in the plane	4g. Right Ascension (degrees)	4i. Argument of the Perigee (degrees)
1	99.5	12	0	0
2	99.5	12	31.6	0
3	99.5	12	63.2	0
4	99.5	12	94.8	0
5	99.5	12	126.4	0
6	99.5	12	158	0
7	37.4	9	0	0

A4b4h. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270

In order to calculate automatically phase angles, please insert values below:
Initial phase angle:
Step:
Apply to current orbit
Apply to all orbits with same number of satellites

Orbital information | Orb. info. for sat. networks representing a constellation | Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b4. Orbital Parameters

Orbital Plane id	4b. Satellites in the plane	4i. Argument of the Perigee (degrees)	4j. Longitude ascending node	4g. Right Ascension (degrees)
1	12	0	141.42	0
2	12	0	174.12	31.6
3	12	0	204.62	63.2
4	12	0	237.32	94.8
5	12	0	267.82	126.4
6	12	0	300.52	158
7	9	0	0	0

A4b4h/k/l. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle (Degrees)	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1	0	05/01/2018	00:00:00
2	30	05/01/2018	00:00:00
3	60	05/01/2018	00:00:00
4	90	05/01/2018	00:00:00
5	120	05/01/2018	00:00:00
6	150	05/01/2018	00:00:00
7	180	05/01/2018	00:00:00

In order to calculate automatically phase angles, please insert values below:
Initial phase angle:
Step:
Apply to current orbit
Apply to all orbits with same number of satellites

Select Date and Time for all satellites on all Orbital Planes:
/ / 00:00:00 Set
All satellites in all orbital planes must use the same values of A4b4k and A4b4l



Orbital Information (1 of 3) | Orbital Information (2 of 3) | Orbital Information (3 of 3)

A4b6bis. Operating parameters indicator A4b6a. Latitude Ranges

A4b6. Orbital Operation

Orbital Plane id	N. of sats	4a. Incl Angle	6c. Stn Keeping	6d. R-prd ddd	6d. R-prd hh	6d. R-prd mm	6d. R-prd ss	6e. Precession / J2 term	6f. Precession Rate $i\dot{\omega}$ / day	4j. Longitude ascending node	6j. Longitude tolerance
1	12	99.5	no					J2 term		141.42	
2	12	99.5	no					J2 term		174.12	
3	12	99.5	no					J2 term		204.62	
4	12	99.5	no					J2 term		237.32	

A4b4k/l. Date/time of sat location for Orbital Plane 1

Satellite Number	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1	05/01/2018	00:00:00
2	05/01/2018	00:00:00
3	05/01/2018	00:00:00
4	05/01/2018	00:00:00
5	05/01/2018	00:00:00
6	05/01/2018	00:00:00

Select Date and Time for all satellites on Selected Orbital Plane:
 / / 00:00:00 Set

A4b7. Performance of the non-geostationary system

7a. Number of Tracked Sats: 7b. Avg Number Assoc E-stn: 7c. Avg Distance:

7d. Exclusion Zone **7d1. Type of zone**
 Topocentric angle Satellite-based angle other method

7d2. Width of zone: 7d3. Avoidance mechanism. See Attachment No.

Orbital information | Orb. info. for sat. networks representing a constellation | Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b6bis. Operating parameters indicator A4b6a. Latitude Ranges

A4b6. Orbital Operation

Orbital Plane id	6c. Stn. Keeping	6d. R-prd ddd	6d. R-prd hh	6d. R-prd mm	6d. R-prd ss	6e. Precession / J2 term	6f. Precession Rate $i\dot{\omega}$ / day	6j. Longitudinal tolerance
1	no					J2 term		0
2	no					J2 term		0
3	no					J2 term		0
4	no					J2 term		0
5	no					J2 term		0

A4b7. Performance of the non-geostationary system

7a. Number of Tracked Sats: 7b. Avg Number Assoc E-stn: 7c. Avg Distance:

7d. Exclusion Zone **7d1. Type of zone**
 Topocentric angle Satellite-based angle other method

7d2. Width of zone: °

New Features for Non-GSO (8/9)

Reference date (A.4.b.4.k) and time (A.4.b.4.l) must be the same for all satellites in all orbits – this has been made easy to capture by adding UI elements and internal logic

entering a constellation Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b4h/k/l. Phase Data for Orbital Plane number 1

Satellite Number	4h. Initial phase angle (Degrees)	4k. Reference Date MM/DD/YYYY	4l. Reference Time HH:mm:ss
1	0	05/01/2018	00:00:00
2	30	05/01/2018	00:00:00
3	60	05/01/2018	00:00:00
4	90	05/01/2018	00:00:00
5	120	05/01/2018	00:00:00
6	150	05/01/2018	00:00:00
7	180	05/01/2018	00:00:00
8	210	05/01/2018	00:00:00
9	240	05/01/2018	00:00:00
10	270	05/01/2018	00:00:00

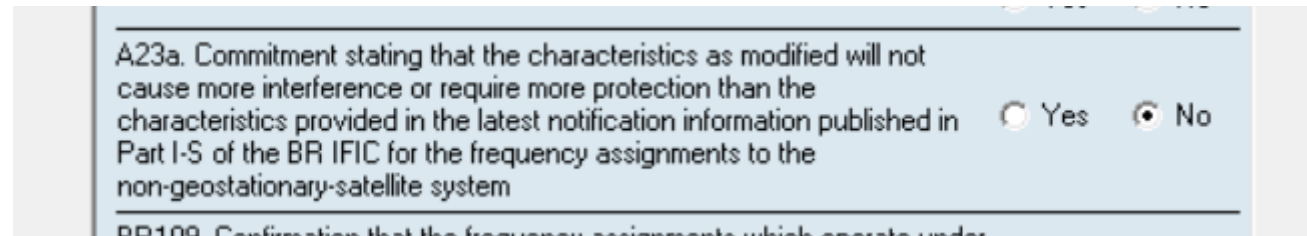
Select Date and Time for all satellites on all Orbital Planes:
05/01/2018 00:00:00

All satellites in all orbital planes must use the same values of 4b4k and A4b4l

In order to calculate automatically phase angles, please insert values below:
Initial phase angle
Step

New Features for Non-GSO (9/9)

- Capture of commitment A.23.a MILESTONE (Note 7 in Preface)



- Showing the “orbit in use” indicator for Notification (read-only)

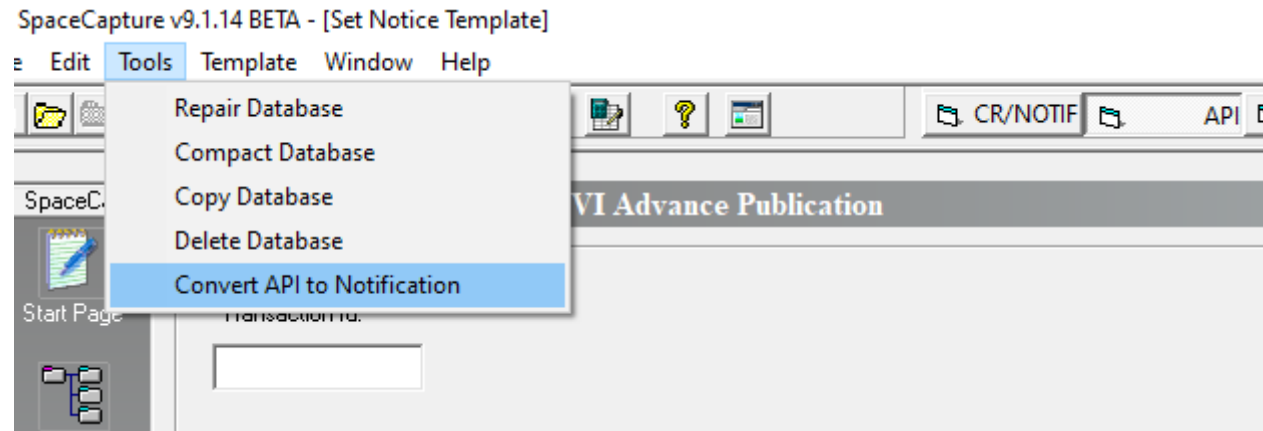
Orbital information | Orb. info. for sat. networks representing a constellation | Orb. info. for sat. network subject

A4b. Orbital Information for each Orbital Plane, where the Earth is the reference body

	4a. Inclination Angle	4b. Satellites in the plane	4c. Period ddd	4c. Period hh	4c. Period mm	4d. Apogee	4d. apog exp	4e. Perigee	4e. perig exp	4f. Minimum Altitude	4f. Min Alt exp	4m. space station uses sun-synchronous orbit	4n. local time reference	4o. local time HH:mm:ss	In use ?
▶	99.50	12	0	1	45	1000.00	0	1000.00	0	1.00	3				<input type="checkbox"/>
	99.50	12	0	1	45	1000.00	0	1000.00	0	1.00	3				<input type="checkbox"/>
	99.50	12	0	1	45	1000.00	0	1000.00	0	1.00	3				<input type="checkbox"/>
	99.50	12	0	1	45	1000.00	0	1000.00	0	1.00	3				<input type="checkbox"/>

New Features for API

- New menu option to launch the “Create first notification” wizard for API



- "Create first notification" wizard can now open any MDB containing an API

Other Non-Cosmetic Changes

- Capture of service area codes for CR/C and Notification has been discontinued - replaced by capture of GIMS service area diagram
- Steerable beams – explicit indication of whether the PFD limit in RoP 21.16 is applied or not (new value ‘X’ in database column *s_beam.f_pfd_steer_default*, equivalent to “unchecked”)

A screenshot of a dialog box with a light gray background and a thin border. It contains three radio button options. The first option is checked and reads 'B3b1b Apply RoP No. 21.16 power flux-density (pfd) limits to steerable beams'. The second option is unchecked and reads 'Limits will be met by applying the method in Annex 1 to RoP No. 21.16'. The third option is unchecked and reads 'Limits will be met by applying other method in attachment No. 1', with a small text input field containing the number '1' to the right of the text.

B3b1b Apply RoP No. 21.16 power flux-density (pfd) limits to steerable beams
 Limits will be met by applying the method in Annex 1 to RoP No. 21.16
 Limits will be met by applying other method in attachment No.

- Improvement in frequencies capture:
 - Support 9 decimal places if the frequency is given in GHz
 - Better support for automatically re-formatting the frequency in kHz/MHz/GHz considering the RR cut-off values (28MHz, 10.5 GHz)

Changes Concerning Attachments

Removal of
"Attachments" tab
(*attch* table was
removed from the
database schema)

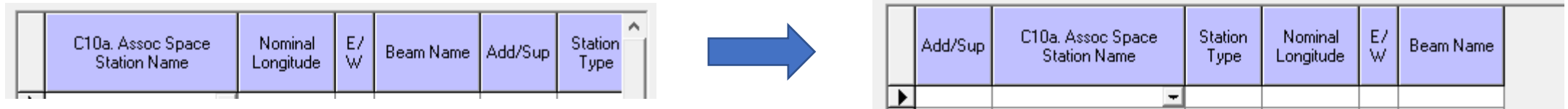
- No longer necessary since the introduction of e-Submission system

Suppression of several
attachment-related
data items:

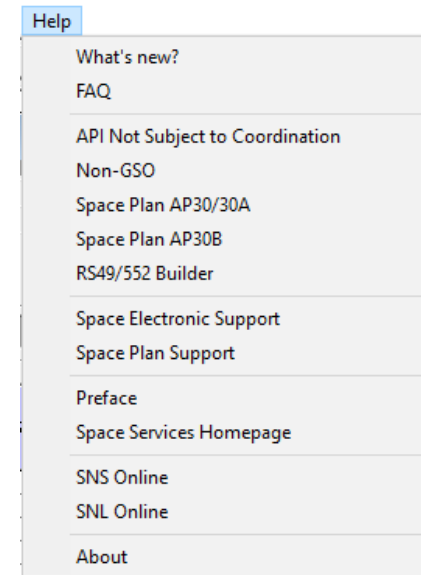
- B.3.b.1 s_beam.attch_gain (must be a GIMS diagram)
- B.4.b.3 s_beam.attch_loss (suppressed by WRC-19)
- A.4.b.7.d.3 non_geo.attch_x_zone (suppressed by WRC-19)
- non_geo.attch_simult_ops (this was already read-only in v9)
- A.4.b.1.d non_geo.attch_multi_config (replaced by orbit.orb_set_id)

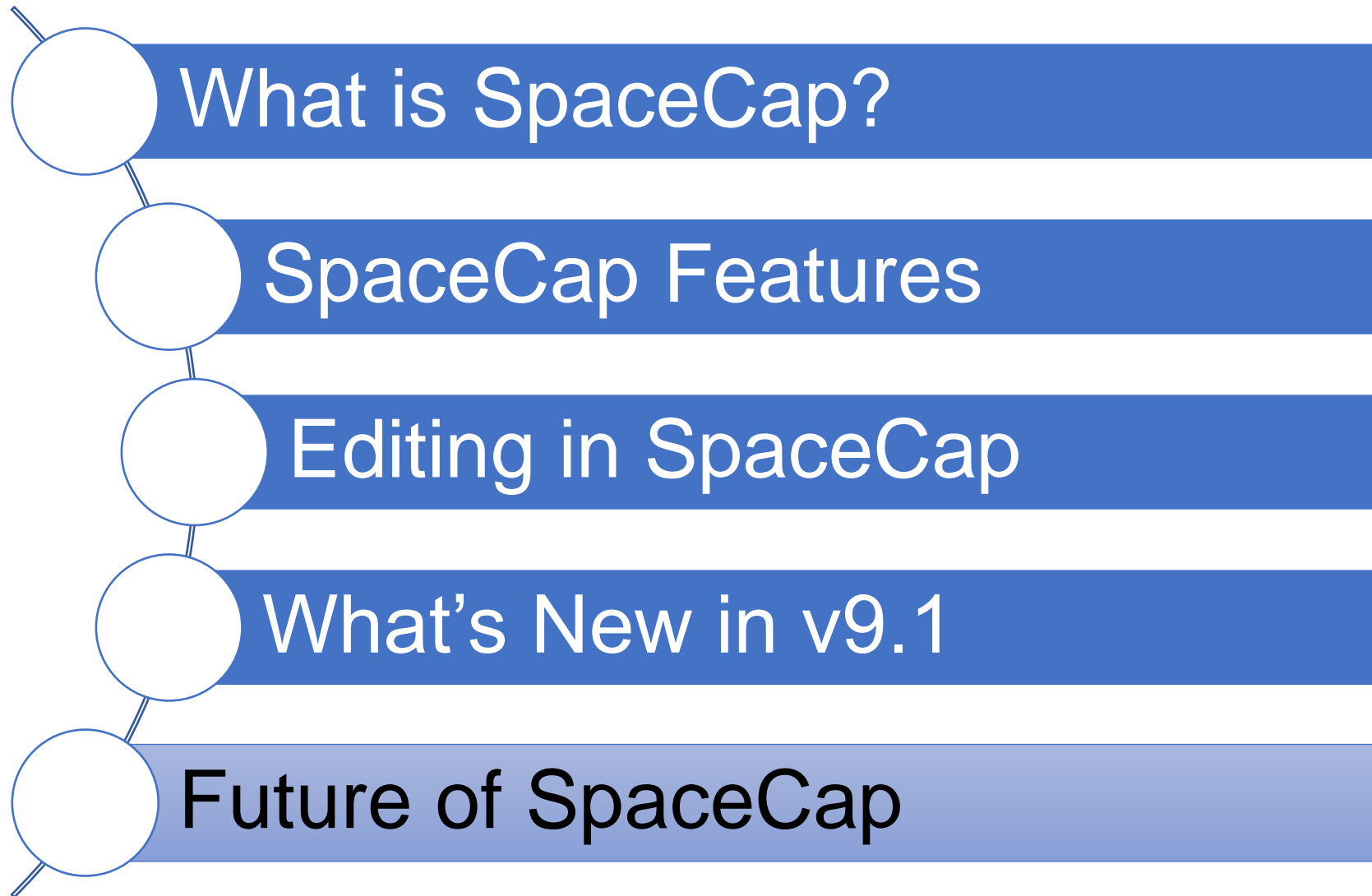
Other Changes

- Rearrange the columns in the “Associated Space Stations” grid



- Help menu entries now point to relevant resources on the ITU Space Services website
- Better error handling in several screens/tabs





Future of SpaceCap

Legacy SpaceCap is maintained and improved

- All code to be reviewed for compatibility with SQL Server master database
- Better error handling
- Better performance



Work is on-going towards a completely new application in BRSIS (BRSIS-Capture)

- Much improved user experience and performance
- More real-time validation ⇒ less need to invoke BRSIS-Validation
- Integration with other “modules” in BRSIS (Validation, SpaceQry, SRSCovert, SpacePub)
- Migration to SQLite database format

Thank you!

ITU – Radiocommunication Bureau

Questions to brsas@itu.int

