

**ITUWRS**  
ONLINE2020

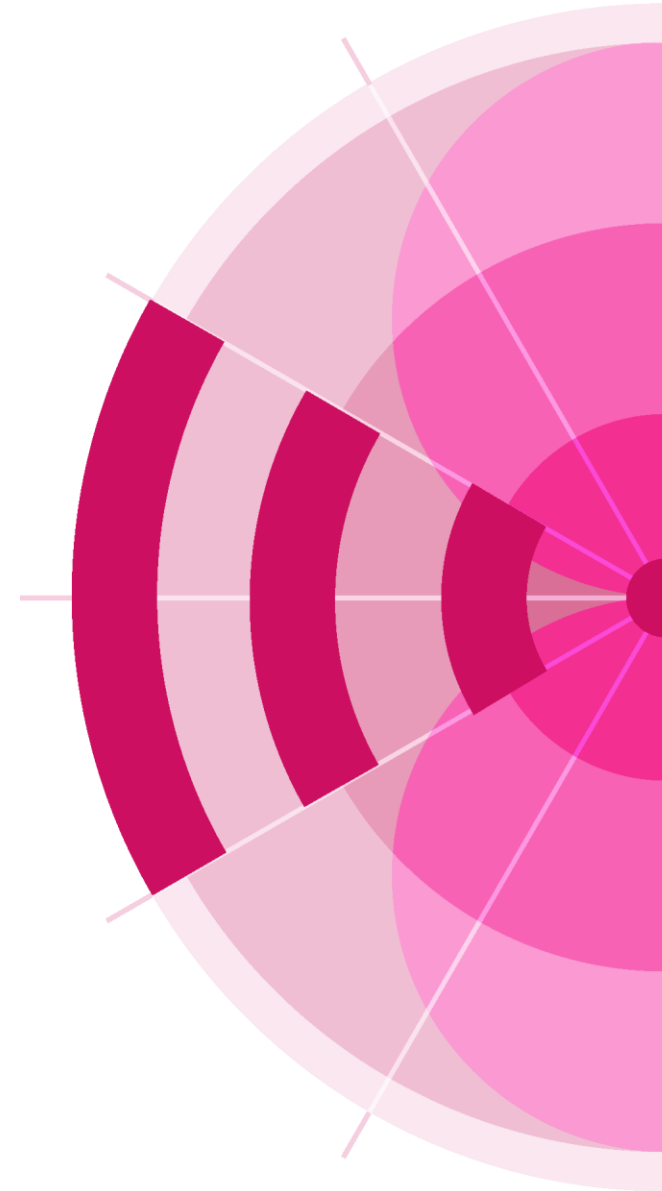
29<sup>TH</sup> WORLD RADIOCOMMUNICATION SEMINAR  
30 November – 11 December 2020

# SpaceCap v9.1

- Improvements in NGSO orbital information support

[www.itu.int/go/wrs-20](http://www.itu.int/go/wrs-20)

#ITUWRS



# Overview

- WRC-19 Appendix 4 changes mostly concerned NGSO systems
- The immediate entry into force of AP4 changes forced the BR to accept submissions of AP4 data in Excel and PDF
- SpaceCap has been updated in two phases:
  - v9 (August 2020) and
  - v9.1 (to be released in January 2021)
- Changes to NGSO orbital information screens for:
  - API
  - CR/C
  - Notification

# Common Changes in NGSO Orbital Information

- Includes all changes for NGSO from v9 (such as constellation details)
- Sun-synchronous orbit indication and local time details
- Action code for orbits (when the submission is a MOD)
- Phase data is no longer split into two screens
- Effort to show individual orbit details without the need for scrolling
- Effort to only display relevant columns in data grids

# ALL SUBMISSIONS

Constellation

Sun-synchronous

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File Edit Tools View Window Help

CR/NOTIF API RAST PLAN RS49/552

Notice Beam Remarks

Notice Id: 1 Advance Publication 06.12.2020 Status: 01

Date: DD.MM.YY 06.12.2020 Administration Serial Nbr

A1f1. Notifying Administration BIH A1f2. Notice submitted on behalf of this administration

A1f3. Intergovernmental Satellite System

GeoStationary Satellite Network Non

Notice intended for Add Mod Sup

BR Identification No. of the Satellite Network to be Modified

Section II Article 9

Subject to coordination Not Subject to coordination Both

A1a. Identity of the EARLY BIRD 2

A4. Orbital Information

A4b1. Number of Orbital Planes 1 A4b2. Ref Earth

A4b3a. Nbr of Satellites to NH A4b3b. Nbr of Satellites to SH

A4b1a. Constellation

Orbital information

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

Orbital Plane 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	4g. Max Alt exp	4m. space station uses sun-synchronous orbit	4n. local time reference	4o. local time HH:mm:ss
1	1.0	1	1									n/a		
												n/a		
												n/a		
												n/a		

## ALL SUBMISSIONS

Action code

	Action code	C
▶		F
	A	
	M	
	S	

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A1f1. Notifying Administration BIH A1f2. Notice submitted on behalf of these administrations.

A1f3. Intergovernmental Satellite System

☐ GeoStationary Satellite Network ☒ Non GeoStationary Satellite Network

Notice intended for: ☐ Add ☒ Mod ☐ Sup

BR Identification No. of the Satellite Network to be Modified

Section II Article 9

☐ Subject to coordination

☒ Not Subject to coordination

☐ Both

More...

A1a. Identity of the S EARLY BIRD 2 ☐ A1g. Short Duration Mission

A4. Orbital Information

A4b1. Number of Orbital Planes 1 A4b2. Reference body (T) Earth ☐ A4b1a. Constellation

A4b3a. Nbr of Satellites to NH A4b3b. Nbr of Satellites to SH

Orbital information

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

Action code	Orbital Plane	4a. Incl 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
▶	1	1.0	1	1									n/a		
													n/a		
													n/a		
													n/a		

# Changes in API NGSO Orbital Information

- Orbital set identifier (when the system is a constellation with mutually exclusive configurations)
- Certain data entry elements and screens only appear for constellations (in addition to orbit set identifier):
  - Argument of the perigee and longitude of the ascending node (LAN)
  - Phase information

## NGSO API

Constellation data

Phase information

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File Edit Tools View Window Help

CR/NOTIF API RAST PLAN RS49/552

Notice	Beam	Remarks
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A1f1. Notifying Administration BIH A1f2. Notice submitted on behalf of these administrations. A1f3. Intergovernmental Satellite System

☐ GeoStationary Satellite Network ☒ Non GeoStationary Satellite Network

Notice intended for ☒ Add ☐ Mod ☐ Sup BR Identification No. of the Satellite Network to be Modified

Section II Article 9 ☐ Subject to coordination ☒ Not Subject to coordination ☐ Both

A1a. Identity of the S EARLY BIRD 2 A1g. Short Duration Mission

A4. Orbital Information

A4b1. Number of Orbital Planes 1 A4b2. Reference body (T) Earth A4b1a. Constellation ☒ A4b3a. Nbr of Satellites to NH A4b3b. Nbr of Satellites to SH (S) Single

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. Phase Data for Orbital Plane number 1			
Satellite Number	4h. Initial phase angle (Degrees)	4k. Reference Date DD.MM.YYYY	4l. Reference time HH:mm:ss
1			00:00:00

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

Initial phase angle Step Apply to current orbit Apply to all orbits with same number of satellites

## NGSO API

### Orbital set identifier

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File Edit Tools View Window Help

CR/NOTIF API RAST PLAN RS49/552

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A1f1. Notifying Administration BIH A1f2. Notice submitted on behalf of these administrations.

A1f3. Intergovernmental Satellite System

GeoStationary Satellite Network Non GeoStationary Satellite Network

Notice intended for Add Mod Sup

BR Identification No. of the Satellite Network to be Modified

Section II Article 9

Subject to coordination Not Subject to coordination Both

More...

A1a. Identity of the SEARLY BIRD 2 A1g. Short Duration Mission

A4. Orbital Information

A4b1. Number of Orbital Planes 1 A4b2. Reference body (T) Earth A4b1a. Constellation (M) Multiple

A4b3a. Nbr of Satellites to NH A4b3b. Nbr of Satellites to SH

A4b1c. No of sub-sets 2 A4b1d. Attachment Number

Orbital information Orbital information for satellite networks representing a constellation

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

Orbital Plane id	1d. Orbital set id	1a. 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
1	1	1.0	1	1									n/a		
2	2	2.0	2	2									n/a		
													n/a		
													n/a		



# Changes for CR/C NGSO Orbital Information

- Same changes as for NGSO API
- Certain data entry elements only appear for submission under 9.11A:
  - Argument of the perigee and longitude of the ascending node
  - Phase information
  - Right ascension of the ascending node
  - Station keeping details
  - Precession details
  - Longitudinal tolerance of LAN

## NGSO CR/C 9.11A

Right ascension

SpaceCapture V9.1 - [NonGeoStationary Notice:1]

File Edit Tools View Window Help

CR/NOTIF API RAST PLAN RS49/552

Notice Station Beam Attachments

Notice Id: 1 Administration: BIH Status: 01 Date: 06.12.2020

A1a. Identity of the Satellite Network  
EARLY BIRD 2

A4b1. Number of Orbital Planes  
A4b2. Reference body (T) Earth  
A4b1a. Constellation  
A4b3a. Nbr of Satellites to NH  
A4b3b. Nbr of Satellites to SH

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	1			

A4b4h. Phase Data for Orbital Plane number 1

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

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

00:00:00 Set

Initial phase angle  
Step  
Apply to current orbit  
Apply to all orbits with same number of satellites

## NGSO CR/C 9.11A

Station keeping etc.

6c. Stn. Keeping
1 n/a
n/a
yes
no

A4b6. C

6e. Precession / J2 term
n/a
Prec
J2 term

SpaceCapture V9.1 - [NonGeoStationary Notice:1]

File Edit Tools View Window Help

CR/NOTIF API RAST PLAN RS49/552

Notice Station Beam Attachments

Notice Id: 1 Administration: BIH Status: 01 Date: 06.12.2020

A1a. Identity of the Satellite Network  
EARLY BIRD 2

A4b1. Number of Orbital Planes  
A4b2. Reference body (T) Earth  
A4b1a. Constellation  
A4b3a. Nbr of Satellites to NH  
A4b3b. Nbr of Satellites to SH

Orbital information Orb. info. for sat. networks subject to No. 9.1 A Orb. info. for sat. networks subject to No. 22.5 C, D, F, L

A4b6bis. Operating parameters indicator

A4b6a. Latitude Ranges

A4b6. Orbital Operation

Action code	Orbital Plane id	6c. Stn. Keeping	6d. R-prd ddd	6d. R-prd hh	6d. R-prd mm	6e. Precession / J2 term	6f. Precession Rate ° / day	6j. Longitudinal tolerance
1	n/a	n/a				n/a		

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  
7d2. Width of zone °

# Changes for Notification NGSO Orbital Information

- Same changes as for NGSO API and NGSO CR/C, except for:
  - Constellation details
- The present is only a partial list of changes coming in SpaceCap v9.1
  - Further improvement of conditional data item display logic (sun-synchronous)
  - Service area changes
  - Coordination agreements capture wizard (network level agreements)
  - RoP 4.4 commitment

# Thank you!

ITU – Radiocommunication Bureau  
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