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#### **ITU**Events

### 2<sup>nd</sup> ITU Inter-regional Workshop on WRC-23 Preparation

29 November - 1 December 2022 Geneva, Switzerland

www.itu.int/go/ITU-R/wrc-23-irwsp-22 #ITUWRC Session 5 – Science Issue WRC-23 agenda item 9.1, Topic a)

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# Background

- Space weather: environmental conditions in space as influenced by solar activity
- Space weather observations
  - becoming more and more important, in particular for the detection of solar activity events that can harmfully affect national economies, human welfare and national security



(www.swpc.noaa.gov)







# **Resolution 657 (WRC-19)**

### • ITU-R was invited:

- to identify specific space weather sensors which need to be protected by appropriate regulation;
- to conduct any necessary sharing studies with incumbent systems operating in frequency bands used by space weather sensors with the objective of determining potential regulatory provisions that can be provided to receive-only operational space weather sensors for their appropriate recognition in the Radio Regulations, while not placing additional constraints on incumbent services;
- to develop potential solutions to describe in the Radio Regulations, in Articles 1 and 4, and/or as a WRC resolution, if deemed appropriate, for consideration by WRC-23, space weather sensor systems and their corresponding usage, as well as protection requirements for receiveonly space weather sensors;
- to conduct studies on the technical and operational characteristics of active space weather sensors and conduct necessary sharing studies with incumbent systems operating in frequency bands used by active space weather sensors, with the objective of determining the appropriate radiocommunication service for those sensors.



## **ITU-R studies**

- **Responsible group:** ITU-R WP 7C (Chaired by Mr. Markus Dreis)
  - 6 Meetings (April 2020 ~ September/October 2022)
- Contributing groups: ITU-R WPs 1B, 3J, 3K, 3L, 3M, 4A, 4C, 5A, 5B, 5C, 5D, 6A, 7D
- Outcomes:
  - Working document towards a preliminary draft new Report ITU-R RS.[SPEC\_REQTS\_TX\_SPACE\_WEATHER] Spectrum requirements and applicable radio service designations for active space weather sensors that provide data critical for predictions and warnings;
  - Working document towards preliminary draft new Report ITU-R RS.[RXSW\_INTERF\_CRITERIA] Interference criteria of receive-only space weather sensors;
  - Views on Working document towards a preliminary draft new Report ITU-R
    RS.[SPEC\_USE\_RX\_SPACE\_WEATHER] Spectrum requirements and applicable radio service designations for receive only space weather sensors that provide data critical for predictions and warnings;
  - Preliminary draft revision of the Report ITU-R RS.2456-0 *Space weather sensor systems using radio spectrum;*
  - Elements regarding WRC-23 agenda item 9.1, topic a);
  - Draft CPM text on WRC-23 agenda item 9.1, topic a).



## **Draft CPM text**

#### Example space weather definition

- ITU-R WP 7C provided the definition to the ITU CCT(Coordination Committee for Terminology).

**Space Weather**: information relating to the characteristics of natural phenomenon in space and in <u>high atmosphere</u> that impact Earth's environment and human activities

- CCT mentioned that the expression "high atmosphere" was too vague and does not correspond to a precise level and highlighted that usually proposed terms and definitions are included in source draft recommendations or reports being developed.
- ITU-R WP 7C reviewed its proposal by using terms already used in the RR, an example for definition in the RR Article 1 that could be considered is:

**Space weather**: natural phenomena, mainly originating from solar activity and occurring beyond the major portion of the Earth's atmosphere, that impact Earth's environment and human activities



### Draft CPM text (cont'd)

#### Potential radio services designation

- In accordance with Resolution 657 (Rev.WRC-19), ITU-R has conducted a review of existing radiocommunications services as potential candidates under which space weather sensors can operate.
- The inclusion of space weather systems under the MetAids, with a subset of the MetAids (space weather) could be proposed with following considerations.
  - This would help ensure that any regulatory protection provided for space weather applications under the MetAids can be applied only to space weather sensor applications and not to other applications that also fall under the MetAids (e.g. radiosondes, dropsondes, lightning detection).
  - Active sensor systems could also be included under the MetAids (space weather).
  - The inclusion of space weather systems under the MetAids (space weather) should ensure that there will be no impact on any space weather observations currently using RAS allocations.



### Draft CPM text (cont'd)

#### Possible solution under RR Articles 1 and 4

- Potential solutions were proposed to provide definition and appropriate radiocommunication service for space weather sensor.
- Some examples of provisions that WRC-23 could implement:
  - Example definition in RR Article 1:

**Space weather**: natural phenomena, mainly originating from solar activity and occurring beyond the major portion of the Earth's atmosphere, that impact Earth's environment and human activities

• Example provision for an appropriate radiocommunication service in RR Article 4:

Space weather sensors systems may operate under the meteorological aids service (space weather) allocations.



### Draft CPM text (cont'd)

### Sharing studies

- Resolution **657 (Rev.WRC-19)** asks for necessary sharing studies with incumbent systems operating in frequency bands used by space weather sensors.
- To achieve the objectives under *resolves* 2 and 4 of Resolution **657 (Rev.WRC-19)**, the candidate frequency bands to be protected need to be finalized.
- All sharing studies and identification of new allocations to the MetAids (space weather) for space weather sensors in frequency bands currently not allocated to the MetAids could be done at WRC-27.

#### Potential new WRC-23 Resolution on the importance of space weather sensor systems

- An example of draft new Resolution was proposed to describe space weather sensor systems and their corresponding usage.
- Two conflicting views concerning the inclusion of this draft new Resolution were expressed and included in the draft CPM text.

