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**PLENARY MEETING**

**Addendum 3 to  
Document 6403(Add.24)-  
E  
9 September 2019  
Original: English**

**Member States of the Inter-American Telecommunication Commission (CITEL)**  
**PROPOSALS FOR THE WORK OF THE CONFERENCE**

Agenda item 10

*{Temporary information note to be deleted before the submission via CPI of this document to the WRC-19 Secretariat: In accordance with Resolution 804 (Rev. WRC-12), Administrations are invited to use the template provided in Annex 2 to that Resolution (TIES-protected) when proposing agenda items for WRCs. This template may be filled out for each of the proposed WRC agenda item and annexed to this document.}*

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention.

**Introduction**

WRC-19 agenda item 10, recommends to Council items to include in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible items for future conferences, in accordance with Article 7 of the Convention. For this agenda item, CITEL PCC.II offers the included preliminary proposal for the WRC-27 agenda to review the results of studies related to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors with a view to providing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services.

**Background Information:**

Resolution **810 (WRC-15)** *Preliminary agenda for the 2023 World Radiocommunication Conference* resolves to give the view that item 2.3 should be included on the preliminary agenda for WRC-23. That is, in accordance with Resolution **657 (WRC-15)**, to review the results of studies

relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations space weather sensors, with a view to providing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services. Given their importance globally, exploring the options for regulatory recognition and protection of space weather sensors while not imposing additional constraints on incumbent services is a desirable objective.

While all systems can be afforded some level of regulatory recognition and protection in the Radio Regulations, addressing the systems used for operational detection, prediction and warnings (Category 1) are most critical. Detection and prediction of disruptive solar-induced geomagnetic storms and other space electromagnetic perturbations (hereinafter “space weather”) are critical to the protection of economic and infrastructure sectors globally. Failure to detect and predict disruptive space weather conditions can impact human life and cause loss of property as well as impact national economies and security. As a consequence, space weather observations are critical to protecting national economies, security and the welfare of the world population. Some examples of the vulnerable economic sectors are on-orbit satellite operations, terrestrial communications, radionavigation, air transport and electric power distribution. The effects range from short-term disruptions to permanent system failure.

Study Group 7 agreed to Question 256/7 at its October 2014 meeting, which includes study of the technical and operational characteristics and spectrum requirements of spectrum-reliant space weather sensor systems. The Question also calls for identifying the appropriate radio service(s) for space weather sensor applications as well as identifying the existing frequency allocations in RR Article 5 that are necessary for space weather observations. In response to Question 256/7 and Resolution 810 (WRC-15) preliminary agenda item 2.3, WP 7C has prepared an ITU-R Report on the summary of radio spectrum-reliant space weather sensors. This Report outlines up to seven radiocommunication services that could provide space weather instruments:

***Radiodetermination:*** The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of *radio waves*.

***Radiolocation:*** *Radiodetermination* used for purposes other than those of *radionavigation*.

***Radiolocation service:*** A *radiodetermination service* for the purpose of *radiolocation*

***Radionavigation:*** *Radiodetermination* used for the purposes of navigation, including obstruction warning.

***Radionavigation-satellite service:*** A *radiodetermination-satellite service* used for the purpose of *radionavigation*.

***Meteorological aids service:*** A *radiocommunication service* used for meteorological, including hydrological, observations and exploration

***Other Services/systems:*** Some characteristics of space weather sensor systems that do not fall under any of the previous services.

It is also possible that some receive-only space weather sensors do not belong under any radiocommunication service. This would be similar to the situation for ***Radio Astronomy***, astronomy based on the reception of *radio waves* of cosmic origin, which is not a radiocommunication service, but which is treated as a radiocommunication service for the purpose of resolving cases of harmful interference (see No. 4.6)

Unfortunately, some of the major points raised in Question 256/7 still require further study.

**Proposal:**

CITEL believes that these further ITU-R studies should first be performed to build the necessary Reports and Recommendations on the technical and operational characteristics of these systems, including their protection criteria, in order to help inform administrations on the appropriate measures necessary to protect the measurements made by these sensors. The conclusions of these studies will better inform on the spectrum services involved, the frequency bands required, and the spectrum requirements and nature of operation of space weather sensors, WRC-2027 would be in a better position to determine what regulatory changes may be necessary in the Radio Regulations.

A motivating factor behind this proposal is the concern that space weather sensor technology has been developed and operational systems have been deployed without much regard for domestic or international spectrum regulations, or for the potential need for protection from interference. CITEL remains committed to further studies on this important subject in the ITU-R.

**ADD IAP/6403A24A3/1**

**DRAFT NEW RESOLUTION [IAP/10(C)-2027]**

**Preliminary agenda for the 2027 World Radiocommunication Conference**

The World Radiocommunication Conference (Sharm El-Shiekh, 2019),

*considering*

- a) that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for WRC-27 should be established four to six years in advance;
- b) Article 13 of the ITU Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention relating to their agendas;
- c) the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

*resolves to give the view*

that the following items should be included in the preliminary agenda for WRC-27:

- 1 to take appropriate action in respect of those urgent issues that were specifically requested by WRC-23;
- 2 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC-23, to consider and take appropriate action in respect of the following items:
  - 2.[SW] in accordance with Resolution **657 (WRC-19)**, to review the results of studies relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors with a view to providing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services;
  - 3 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev.WRC-03)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in Annex 1 to Resolution **27 (Rev.WRC-12)**;
  - 4 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the Conference;
  - 5 in accordance with Resolution **95 (Rev.WRC-07)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;
  - 6 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;
  - 7 to identify those items requiring urgent action by the Radiocommunication Study Groups;
  - 8 to consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in

accordance with Resolution **86 (Rev.WRC-07)** to facilitate the rational, efficient, and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;

9 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution **26 (Rev.WRC-07)**;

10 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

10.1 on the activities of the Radiocommunication Sector since WRC-23;

10.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

10.3 on action in response to Resolution **80 (Rev.WRC-07)**;

11 to recommend to the Council items for inclusion in the agenda for the following WRC, in accordance with Article 7 of the Convention,

*invites the Council*

to consider the views given in this Resolution,

*instructs the Director of the Radiocommunication Bureau*

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-27,

*instructs the Secretary-General*

to communicate this Resolution to international and regional organizations concerned.

**Reasons:** To provide recognition and protection of space weather sensors in the Radio Regulations.

**MOD IAP/6403A24A3/2**

## RESOLUTION 657 (WRC-19~~5~~)

### **Spectrum needs and protection of radio spectrum-reliant space weather sensors used for global prediction and warnings**

The World Radiocommunication Conference (Sharm El-Sheikh, 2019~~Geneva, 2015~~),

*considering*

a) that space weather observations are ~~becoming increasingly~~ important ~~in~~ for detecting solar activity events that ~~could~~ impact ~~on~~ services critical to the economy, safety and security of administrations and their population;

b) that these observations are ~~also~~ made from ground-based and space-based systems ~~platforms that may be ground-based, airborne or space-based~~;

c) that some of the sensors operate by receiving signals of opportunity, including, but not limited to, low-level natural emissions of the Sun, ~~or the~~ Earth's atmosphere, and other celestial bodies, and therefore may suffer harmful interference at levels which could be tolerated by other radio systems;

d) that spectrum-reliant space weather sensor technology has been developed and operational systems have been deployed without much regard for domestic or international spectrum regulations, or for the potential need for protection from interference;

e) that a wide variety of spectrum-reliant space weather sensors currently operate relatively free of harmful interference; however, the radio interference environment could change as a result of changes made to the Radio Regulations;

f) that spectrum-reliant space weather sensors may be vulnerable to interference from both terrestrial and spaceborne systems;

g) that, while all spectrum-reliant space weather observation systems are important, the most critical need for radio regulatory protection is for those systems that are used operationally in the production of forecasts and warnings of space weather events that can cause harm to important sectors of national economies, human welfare and national security;

h) that frequency use is not consistent across the limited number of operational systems, as a result global frequency allocations for one or more radio communication services may not be the most suitable solution to regulatory protection;

*recognizing*

a) that no frequency bands have been documented in any manner in the Radio Regulations for space weather sensor applications;

b) that ITU-R Report RS Report ITU-R RS.2456-0 - Space weather sensor systems, using radio spectrum.[SPACE\_WEATHER\_SENSORS] contains a summary of spectrum-reliant space weather sensors and identifies the most critical operational systems (hereafter referred to as operational systems);

c) that the systems used for operational space weather detection, prediction and warnings, documented in ITU-R Report RS Report ITU-R RS.2456-0 - Space weather sensor systemsReport RS.[SPACE\_WEATHER\_SENSORS], are deployed globally but limited in number;

d) that certain, receive-only space weather applications operate in a manner consistent with the definition of the meteorological aids (met aids) service, but for scientific reasons observations cannot be conducted in frequency bands currently allocated to the met aids service,

e) that the ITU Radiocommunication Sector (ITU-R) has a Study Question ITU-R 256/7 to study the technical and operational characteristics, frequency requirements and appropriate radio service designation for space weather sensors;

*noting*

a) that any regulatory action associated with space weather sensor applications should take into account incumbent services that are already operating in the frequency bands of interest,

b) that ITU-R studies may show that protection of some systems to be strictly a national matter rather than requiring WRC action;

c) that while data products are used for forecast and warnings related to public safety, among other purposes, the provisions of Nos. 1.59 and 4.10 of the Radio Regulations do not apply to spectrum-reliant space weather sensors,

*resolves to invite the 2027~~3~~ World Radiocommunication Conference*

while taking into account the results of ITU-R studies and without placing additional constraints on incumbent services, to consider regulatory provisions necessary to provide protection to space

weather sensors operating in the appropriately designated radio communication service or services that is to be determined during ITU-R studies,

*invites ITU-R*

~~1~~ to document, in time for WRC-2319, the technical and operational characteristics of space weather sensors;

12 to determine, in time for WRC-2319, the appropriate radio communication service designations for receive-only space weather sensors, including;

- to determine if receive-only space weather sensors shall be designated as applications of the meteorological aids service;

- to determine the appropriate radiocommunication service, if any, for cases where it is determined that receive-only space weather sensors do not fall under the Meteorological Aids service;

2 to continue to document, in time for WRC-23, the technical and operational characteristics of space weather sensors;

3 to conduct, in time for WRC-273, any necessary sharing studies ~~for~~ with incumbent systems operating in frequency bands used by space weather sensors, with the objective of determining regulatory protection that can be provided to receive-only operational space weather sensors while not placing additional constraints on incumbent services,

*invites administrations*

to participate actively in the studies and provide the technical and operational characteristics of the systems involved by submitting contributions to ITU-R,

*instructs the Secretary-General*

to bring this Resolution to the attention of the World Meteorological Organization (WMO) and other international and regional organizations concerned.

**Reasons:** Resolution 657 (WRC-15) is being updated to reflect studies conducted within the ITU-R and future studies towards WRC-23 and WRC-27. R16-WRC19-C-6403!A24-A3!MSW-E

**ATTACHMENT**

**PROPOSAL FOR ADDITIONAL PRELIMINARY WRC 2027 AGENDA ITEM  
STUDYING TECHNICAL AND OPERATIONAL CHARACTERISTICS,  
SPECTRUM REQUIREMENTS AND PROTECTION OF SPACE WEATHER  
SENSORS**

**Subject:** Proposed Future WRC Agenda Item for WRC-2027 studying appropriate service designations and protection requirements for space weather measurements and modification of Resolution 657.

**Origin:** the CITEL Member States

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**Proposal:** providing appropriate recognition and protection to radio spectrum-reliant space weather sensors in the Radio Regulations without placing additional constraints on incumbent services;

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**Background/reason:** Prediction and detection of disruptive geomagnetic storms and other space perturbations (hereinafter “space weather”) are critical to many economic and infrastructure areas, globally. Some of the larger vulnerable economic areas are satellite operations, air transport and electric power distribution. Failure to detect and predict disruptive conditions could result in loss of life and property as well severe impact to the economy. Space weather observations are critical to many aspects of national economies and the world population. Space weather sensor technology has been developed and operational systems have been deployed without much regard for domestic or international spectrum regulations, or for the potential need for protection from interference. Systems of importance to national economies and the safety of the world population should have some level of recognition and protection in the International Radio Regulations.

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**Radiocommunication services concerned:** To be determined

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**Indication of possible difficulties:** None foreseen

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**Previous/ongoing studies on the issue:** ITU-R Study Question 256/7 and ITU-R Report RS.[SPACE-WEATHER\_SENSORS] documents existing radio spectrum-reliant space weather sensors.25

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<b>Studies to be carried out by:</b> SG7	<i>with the participation</i>
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**ITU-R Study Groups concerned:** SG4, SG 5, SG 6

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**ITU resource implications, including financial implications (refer to CV126): Minimal**

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**Common regional proposal:** Yes/No  
*Number of countries:*

**Multicountry proposal:** Yes/No

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**Remarks**