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**Authors:** Damon C. Ladson  
Thomas S. Tycz

**UNITED STATES OF AMERICA  
DRAFT PROPOSALS FOR THE WORK FOR THE CONFERENCE**

**Agenda Item 1.7:** *to consider the results of ITU-R studies in accordance with Resolution 222 (Rev.WRC-07) in order to ensure long-term spectrum availability and access to spectrum necessary to meet requirements for the aeronautical mobile-satellite (R) service, and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz.*

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**BACKGROUND:**

Prior to the 1997 World Radiocommunication Conference (WRC-97), the Radio Regulations contained an exclusive allocation to the aeronautical mobile-satellite (R) service (AMS(R)S) for the bands 1 545-1 555 MHz (space-to-Earth) and 1 646.5-1 656.5 MHz (Earth-to-space). To allow flexibility in frequency coordination and to achieve spectrum efficiency, WRC-97 changed this into a generic mobile-satellite service (MSS) allocation subject to the provision No. 5.357A to prioritize access to the AMS(R)S spectrum with priority categories 1 to 6 of Article 44 of the Radio Regulations.

WRC-2000 adopted Resolution 222 (WRC-2000) resolving that, in frequency coordination of MSS systems in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz, administrations shall ensure that the spectrum needed for AMS(R)S communications within priority categories 1 to 6 of RR Article 44 in the bands where No. 5.357A applies is accommodated. Also administrations shall ensure the use of the latest technical advances in order to achieve the most flexible and practical use of the generic allocations.

WRC-07 revised Resolution 222 to remove the request for studies to determine the feasibility and practicality of prioritization and real-time pre-emptive access issues, and invited ITU-R to carry out a number of additional studies towards ensuring long term spectrum availability for AMS(R)S.

In coordinating MSS systems under the procedure of Article 9, the notifying administrations for MSS systems in the above bands have adopted two multilateral Memoranda of Understanding (MoU) to facilitate the coordination process: one MoU involves the administrations providing MSS over North America and a second MoU involves administrations providing MSS over ITU Regions 1 and 3. Usually on an annual basis under these MoUs, Operator Review Meetings (ORM) coordinate and review assignments across the bands 1 525-1 559/1 626.5-1 660.5 MHz so as to ensure fair and efficient use of the radio spectrum.

This multilateral process recognizes the communications needs of AMS(R)S and the resulting spectrum needed to accommodate the requirements of the systems offering this service, in accordance with the Radio Regulatory provisions. The current coordination process includes a validation process of requested spectrum assignments in order to justify the spectrum requirements and achieve efficient use of the spectrum. By adopting the MoUs, administrations have increased the efficiency of the coordination process. Additional coordination also takes place outside of the MoU process, where necessary.

WRC-12 is invited to consider the results of the above ITU-R studies and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz.

## DISCUSSION

Based on proposals from the United States<sup>1</sup> and Canada<sup>2</sup> the XVth meeting of CITELE PCC.II (“Fortaleza meeting”) incorporated into its Final Report draft Inter-American Proposals (“IAP”) regarding Agenda Item 1.7 (“A.I. 1.7”).<sup>3</sup> Both the United States and Canadian proposals were based on “Method D” of the draft CPM Report text for A.I. 1.7. While similar, the proposals do differ in that the United States’s proposal augmented Method D by including a modification to Resolution 222 (WRC-07) (as drafted for Method D) to include a “invites ITU-R” to develop Recommendation(s) for a methodology to compute spectrum requirements for AMS(R)S communications related to categories 1 to 6 of Article 44.

The attached proposal seeks to replace the United States’s previous proposal to CITELE to align with common U.S./CAN elements of the draft IAP on A.I. 1.7 resulting from the Fortaleza meeting. It also seeks to remove the “invites ITU-R” on spectrum methodology from Res. 222 (Rev. WRC-12) as proposed at Fortaleza by the United States, and replace it with a new proposed Resolution to invite the ITU-R to develop the a methodology to determine AMS(R)S spectrum requirements. This proposal is made so that proposed Res. 222 (WRC-12) can be adopted at WRC-12 without the need to revisit the Resolution in the future to remove the study “invite” once the relevant ITU Recommendation(s) is adopted. Further, a separate study Resolution allows studies on this matter to proceed immediately and without the need for adopting an ITU-R Study Question.

With these changes, the United States and Canada will be in a better position to advocate a CITELE IAP on A.I. 1.7 that reflects the preferred positions of the two countries.

## **PROPOSALS:**

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NOC CAN, USA/1.7/1

### ARTICLE 5

#### Frequency allocations

#### Section IV – Table of Frequency Allocations

(See No. 2.1)

<sup>1</sup> OEA/Ser.L/XVII.4.2 CCP.II-RADIO10/doc.2191/10 , Fortaleza, Brazil 16 August2010

<sup>2</sup> OEA/Ser.L/XVII.4.2 CCP.II-RADIO10/doc.2220/10 . Fortaleza, Brazil 17 August2010

<sup>3</sup> ( OEA/Ser.L/XVII.4.2 CCP.II-Radio/doc. \_\_\_\_ , at \_\_\_\_ (Fortaleza, Brazil, 17 August 2010)

MOD CAN, USA/1.7/2

**5.357A** In applying the procedures of Section II of Article 9 to the mobile-satellite service in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article 44. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44 shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution 222 (WRC-2012), shall apply.) (WRC-2012)

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**Reasons:** Consequential to the proposed MOD to Resolution 222

NOC CAN, USA/1.7/3

**5.362A**

**Reasons:** For the bands covered by agenda item 1.7, the 1 555-1 559 MHz and 1 656.5-1 660.5 MHz bands with the 2 x 10 MHz in No. 5.357A are sufficient to accommodate AMS(R)S operations inside the United States. No additional spectrum is required to satisfy this agenda item.

NOC CAN, USA/1.7/4

ARTICLE 9

**Procedure for effecting coordination with or obtaining agreement of other administrations**<sup>1, 2, 3, 4, 5, 6, 7, 8</sup> (WRC-07)

MOD CAN, USA/1.7/5

RESOLUTION 222 (Rev. WRC-12)

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**Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service, and procedures to ensure long-term spectrum access for the aeronautical mobile-satellite (R) service**

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The World Radiocommunication Conference (Geneva, 2012).

*considering*

a) that prior to WRC-97, the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) were allocated to the maritime mobile-satellite service and the bands 1 545-1 555 MHz (space-to-Earth) and 1 646.5-1 656.5 MHz (Earth-to-space) were allocated on an exclusive basis to the aeronautical mobile-satellite (R) service (AMS(R)S) in most countries;

b) that WRC-97 allocated the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) to the mobile-satellite service (MSS) to facilitate the assignment of spectrum to multiple MSS systems in a flexible and efficient manner;

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c) that WRC-97 adopted No. 5.353A giving priority to accommodating spectrum requirements for and protecting from unacceptable interference distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS) in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz and No. 5.357A giving priority to accommodating spectrum requirements for and protecting from unacceptable interference the AMS(R)S providing transmission of messages with priority categories 1 to 6 in Article 44 in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz;

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d) that AMS(R)S is an essential element of ICAO CNS/ATM to provide safety and regularity of flight in the civil air transportation,

*further considering*

a) that coordination between satellite networks is required on a bilateral basis in accordance with the Radio Regulations, and, in the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space), coordination is partially assisted by regional multilateral meetings;

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b) that, in these bands, geostationary mobile-satellite system operators currently use a capacity-planning approach at multilateral coordination meetings, with the guidance and support of their administrations, to periodically coordinate access to the spectrum needed to accommodate their requirements;

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c) that spectrum requirements for MSS networks, including the GMDSS and AMS(R)S, are currently accommodated through the capacity-planning approach and that, in the bands to which Nos. 5.353A or 5.357A apply, this approach, and other methods may assist in accommodating the expected increase of spectrum requirements for GMDSS and AMS(R)S;

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d) that Report ITU-R M.2073 has concluded that prioritization and inter-system pre-emption between different mobile-satellite systems is not practical and, without a significant advance in technology, is unlikely to be feasible for technical, operational and economical reasons;

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e) that there is existing and increasing demand for spectrum for AMS(R)S and non-AMS(R)S by several mobile satellite systems in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz;

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f) that future requirements for GMDSS spectrum may require additional allocations,

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*recognizing*

a) that absolute priority to all telecommunications concerning safety of life at sea, on land, in air or in outer space is given by No. 191 of the ITU Constitution;

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b) that the International Civil Aviation Organization (ICAO) has adopted Standards and Recommended Practices (SARPs) addressing satellite communications with aircraft in accordance with the Convention on International Civil Aviation;

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c) that all air traffic communications as defined in Annex 10 to the Convention on International Civil Aviation fall within priority categories 1 to 6 of Article 44;

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d) that Table 15-2 of Appendix 15 identifies the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) for distress and safety purposes in the maritime mobile-satellite service as well as for routine non-safety purposes;

e) that any administration having difficulty in applying the procedures of Articles 9 and 11 with respect to No. 5.357A and this Resolution may at any time request assistance of the Radiocommunication Bureau and the Board under the relevant provisions of the Radio Regulations, including Article 7, the relevant provisions of Articles 9 and 11, as well as Articles 13 and 14.

*noting*

that, since spectrum resources are limited, there is a need to use them in the most efficient manner within and amongst various MSS systems.

*resolves*

1 that, in frequency coordination of MSS in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz, the notifying administrations of mobile-satellite networks shall ensure that the spectrum needed for distress, urgency and safety communications of GMDSS, as elaborated in Articles 32 and 33, in the bands where No. 5.353A applies, and for AMS(R)S communications within priority categories 1 to 6 of Article 44 in the bands where No. 5.357A applies, is met;

2 that the notifying administrations of mobile-satellite networks shall ensure the use of the latest technical advances in mobile-satellite systems, in order to achieve the most flexible, efficient and practical use of the generic MSS allocations;

3 that the notifying administrations of mobile-satellite networks shall ensure that, if requirements of an MSS, including AMS(R)S, network is decreasing relative to the previous coordination meeting, the corresponding unused spectrum resources shall be released to facilitate efficient use of spectrum;

4 that the notifying administrations of mobile-satellite networks shall ensure that MSS operators carrying non-safety-related traffic yield capacity, as and when necessary, to accommodate the spectrum requirements for distress, urgency and safety communication of GMDSS communications, as elaborated in Articles 32 and 33, and for AMS(R)S communications within priority categories 1 to 6 of Article 44; this could be achieved in advance through the coordination process in *resolves* 1 and the procedures contained in the Annex to this Resolution shall apply.

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## ANNEX

### Procedures to implement No. 5.357A and Resolution 222 (Rev. WRC-12) to address AMS(R)S Spectrum Requirements

- 1) The notifying administrations of planned MSS, including AMS(R)S, networks shall submit the required technical characteristics and other relevant information of their MSS networks in accordance with Appendix 4. Coordination of these MSS systems with other affected satellite systems operating in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz shall proceed in accordance with Articles 9 and 11 and other relevant provisions of the Radio Regulations, as appropriate.
- 2) To further facilitate coordination under Articles 9 and 11, the notifying administrations of MSS, including AMS(R)S, networks may authorize their respective MSS satellite operators, including AMS(R)S satellite operators, to enter into bilateral and multilateral coordination processes to secure operator agreements on access to spectrum for their satellite systems.
- 3) At frequency coordination meetings, including operator meetings referred to in 2), the notifying administration or its respective MSS satellite operator shall present the spectrum requirements of each AMS(R)S system developed in accordance with an agreed methodology and accompanied with the information justifying such requirements. The other notifying administrations or their respective MSS satellite operators then validate the requirements under agreed criteria. The notifying administrations and/or their MSS operators shall accommodate validated AMS(R)S spectrum requirements in accordance with priority categories 1 to 6 of Article 44. In the event that spectrum requirements of an MSS, including AMS(R)S, network is decreasing relative to the previous coordination meeting, the notifying administration of the MSS network shall release the corresponding unused spectrum resources
- 4) The notifying administrations of MSS systems, including AMS(R)S, have responsibility to ensure that their respective assignments are compatible in the relevant bilateral or multilateral frequency coordination meetings (in particular when those systems span over various geographic area(s)). In the event an administration notifying an AMS(R)S system experiences difficulty in accommodating its validated AMS(R)S spectrum requirements at these meetings, it should invoke No. 5.357A (as per the procedures described in Items 5, 6 and 7 below).
- 5) In the event that a notifying AMS(R)S administration invokes No. 5.357A based on the results of a bilateral or multilateral coordination operators' meeting, that administration shall ensure that its designated operator does not accept the spectrum sharing arrangement developed at the operators' meeting, as acceptance indicates that the agreement satisfies requirements presented. That AMS(R)S administration shall inform the other administrations involved in the coordination process of its intention to invoke No. 5.357A, with a copy to the Bureau. The concerned AMS(R)S administration then calls for an administrations' frequency coordination meeting of all affected notifying administrations, which should be convened within six months. That notifying AMS(R)S administration shall seek the assistance of the Radiocommunication Bureau in accordance with Articles 7 and 13, if any of the affected notifying administrations do not agree to meet to resolve the raised issues.
- 6) At the administrations' frequency coordination meeting, all affected notifying administrations shall review and validate the AMS(R)S requirements of the notifying administration referred to in 5) above. All affected notifying administrations shall cooperate toward accommodating any validated AMS(R)S requirements in accordance with No. 5.357A and Resolution 222 (Rev.WRC-12). In this regard, notifying administrations shall ensure that MSS operators carrying non safety-related traffic yield

capacity, as and when necessary, to accommodate the spectrum requirements for AMS(R)S communications with priority categories 1 to 6 of Article 44.

7) If the matter remains unresolved at the administrations' frequency coordination meeting referred to in 6) above, the notifying AMS(R)S administration shall seek the assistance of the Radiocommunication Bureau pursuant to Articles 7 and 13 and notify the respective administrations indicating that its AMS(R)S requirements have not been satisfied. The Radiocommunication Bureau shall provide a report and assistance in accordance with No. 13.3.

8) To facilitate the users' long term planning, each MSS operator providing AMS(R)S service or its notifying administration may decide to disclose information regarding its coordinated AMS(R)S spectrum resource (e.g. to AMS(R)S users of such service).

**Reasons:**

It is necessary to explicitly identify the coordination process that should be used, highlighting the regulatory provisions in place describing administrations' rights and obligations when seeking priority access to AMS(R)S spectrum as well as the process to be followed when validated AMS(R)S spectrum needs of a system are not fulfilled.

ADD USA/1.7/6

RESOLUTION [SPECT.METHOD] (WRC-12)

Methodology to determine AMS(R)S Spectrum Requirements within the bands 1 545-1 555 MHz (space-to-Earth) and 1 646.5-1 656.5 MHz (Earth-to-space)

The World Radiocommunication Conference (Geneva, 2012).

Considering

a) that coordination between satellite networks is required on a bilateral basis in accordance with the Radio Regulations, and, in the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space), coordination is partially assisted by regional multilateral meetings;

b) that, in these bands, geostationary mobile-satellite system operators currently use a capacity-planning approach at multilateral coordination meetings, with the guidance and support of their administrations, to periodically coordinate access to the spectrum needed to accommodate their requirements, including AMS(R)S spectrum requirements;

c) that spectrum requirements for MSS networks, including the AMS(R)S, are currently accommodated through the capacity-planning approach in the bands to which No. 5.357A applies;

d) that within the ITU-R there is no agreed methodology for computing AMS(R)S spectrum requirements;

e) that within the ITU-R, some administrations have expressed a desire to develop an agreed methodology for computing AMS(R)S spectrum requirements on an ongoing basis for purposes of bilateral and multilateral MSS coordinations conducted pursuant to Article 9 of the Radio Regulations;

f) that, since spectrum resources are limited, there is a need to use them in the most efficient manner within and amongst various MSS systems,

recognizing

a) that WRC-97 allocated the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) to the mobile-satellite service (MSS) to facilitate the assignment of spectrum to multiple MSS systems in a flexible and efficient manner;

b) that WRC-97 adopted No. 5.357A giving priority to accommodating spectrum requirements for and protecting from unacceptable interference the AMS(R)S providing transmission of messages with priority categories 1 to 6 in Article 44 in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz.

*noting*

that AMS(R)S is an essential element of ICAO CNS/ATM to provide safety and regularity of flight in the civil air transportation.

*resolves*

to invite the ITU-R to conduct studies on and develop in one or more ITU-R Recommendations a methodology to compute spectrum requirements for AMS(R)S related to the categories 1 to 6 of Article 44 and to take into account *considering c* in conducting these studies.

**Reason:** To have the ITU-R conduct studies on and develop in one or more ITU Recommendations , a methodology to commute the spectrum requirements for AMS(R)S related to categories 1 to 6 of Article 44 to assist notifying MSS and AMS(R)S Administrations in satellite coordination in their efforts to satisfy AMS(R)S requirements in the bands 1545-1555Mhz and 1646.5- 1656.6 MHZ pursuant to Mod Resolution 222( WRC-12)

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and, when necessary, through other means if such means are identified as a result of studies in <i>invites ITU-R</i>		
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<i>Editor's Note: The following "invites ITU-R" are proposed by USA. These elements would be further considered at the next CITELE meeting.]</i>		
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[ <i>invites ITU-R</i>		
1. to conduct studies on and develop in one or more ITU-R Recommendations a methodology to compute spectrum requirements for AMS(R)S related to the categories 1 to 6 of Article 44 on an urgent basis to support discussions between notifying administrations;		
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2. to take into account <i>further considering c</i> in conducting the studies of <i>invites ITU-R 1</i> ;		
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to conduct, in time for consideration by WRC-11, the appropriate technical, operational and regulatory studies to ensure long-term spectrum availability for the aeronautical mobile-satellite (R) service (AMS(R)S) including:		
i) to study, as a matter of urgency, the existing and future spectrum requirements of the aeronautical mobile-satellite (R) service;		
ii) to assess whether the long-term requirements of the AMS(R)S can be met within the existing allocations with respect to No. 5.357A while retaining unchanged the generic allocation for the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz, and without placing undue constraints on the existing systems operating in accordance with the Radio Regulations;		

- iii) to complete studies to determine the feasibility and practicality of technical or regulatory means, other than the coordination process referred to in *resolves* 1 or the means considered in Report ITU-R M.2073, in order to ensure adequate access to spectrum to accommodate the AMS(R)S requirements as referenced in *resolves* 3 above, while taking into account the latest technical advances in order to maximize spectral efficiency;
- iv) if the assessment identified in *invites ITU-R* i) and ii) indicates that these requirements cannot be met, to study existing MSS allocations or possible new allocations only for satisfying the requirements of the aeronautical mobile satellite (R) service for communications with priority categories 1 to 6 of Article 44, for global and seamless operation of civil aviation taking into account the need to avoid undue constraints on existing systems and other services,

*invites* WRC-11

to consider the results of the above ITU-R studies and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz,

*invites*

the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), the International Air Transport Association (IATA), administrations and other organizations concerned to participate in the studies identified in *invites ITU-R* above.

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