

## UNITED STATES OF AMERICA

## DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 8.2:** *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, taking into account Resolution 806 (WRC-07)*

**Background Information:** The use of nanosatellites and picosatellites, satellites having mass less than 10 kg,<sup>1</sup> is increasing for a variety of applications, including meteorology, space research, and telecommunications. A large number of administrations from all ITU regions have launched these satellites. Academic and research institutions, [commercial entities, and amateur radio groups](#) are designing and developing many more [nanosatellite and picosatellite](#) projects, with launches planned over the next few years.

These satellite systems exhibit certain characteristics:

- a) they are built at low cost using off-the-shelf equipment, often based on a standard structural design;<sup>2</sup>
- b) they employ off-the-shelf radiocommunication hardware that is small, lightweight, economical, and adaptable to a wide variety of missions;
- c) they are launched as secondary payloads when space is available on launch vehicles; thus the launch date is not known well in advance;
- d) the launch vehicle deploys them in a low-Earth orbit, though orbital parameters are not known in advance with any precision;<sup>3</sup>
- e) they generally have no attitude control and must use antennas with little directional gain for both uplinks and downlinks;
- f) data download and command and control uplinks may involve a variety of earth stations depending on requirements, including earth stations not operated by those responsible for the satellite; and
- g) their useful lifetime is unpredictable, but can range from a few weeks to a few years.

To date, a number of these satellites have been using frequency bands near 400 MHz allocated to the meteorological-satellite service or the amateur-satellite service<sup>4</sup> for data downlinks, though the satellite mission may not be consistent with those services. This proposal addresses the need for one or more frequency bands [in an appropriate service](#) to support command, control, and data relay for nanosatellites and picosatellites performing a variety of functions. It also addresses regulatory procedures for these satellites.

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<sup>1</sup> The terms *nanosatellite* and *picosatellite* may refer to satellites having mass in the range 1-10 kg, or less than 1 kg, respectively.

<sup>2</sup> The academic and amateur-satellite communities, and others, developed the *Cubesat* standard for low-cost satellites in the late 1990's; the basic *Cubesat* standard, now widely adopted, consists of a 10 cm cube with mass of about 1 kg; a nanosatellite may consist of several stacked *Cubesat* modules; some launch vehicles include spring-loaded containers designed to deploy satellites built to the *Cubesat* standard.

<sup>3</sup> The trajectory of the launch vehicle, which is optimized for delivery of the primary payload, largely determines the orbital parameters of the nanosatellite or picosatellite.

<sup>4</sup> [Some have also been using the amateur-satellite service allocation at 144-146 MHz.](#)

**Proposal:**

**ADD** USA/8.2/1

RESOLUTION ~~806~~ (REV. WRC-12)

**Agenda for the 2015 World Radiocommunication Conference**

**Reasons:** To add a new item to the preliminary agenda of WRC-~~15~~.

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**ADD** USA/8.2 /2

**2.AA** to consider appropriate regulatory procedures for nanosatellites and picosatellites, and to consider an allocation to the space research service of up to 10 MHz in the 400-2 025 MHz range to accommodate command, control and data relay of nanosatellites and picosatellites, taking into account the results of ITU-R studies, in accordance with Resolution [ZZZ] (WRC-12).

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**Reasons:** Nanosatellites and picosatellites have characteristics unlike those of larger satellites and provide a growing variety of functions, including meteorology, space research, and Earth sciences.

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**ADD** USA/8.2/3

RESOLUTION ZZZ (WRC-12)

**Studies for identifying up to 10 MHz of spectrum for the space research service in the 400-2 025 MHz range for the operation of nanosatellites and picosatellites**

The World Radiocommunication Conference (Geneva, 2012),

*considering*

- a) that nanosatellites and picosatellites are low-cost satellites having mass no greater than 10 kg;
- b) that the lifetime of these satellites ranges from a few weeks to a few years;
- c) that these satellites are increasingly used in studies of the Earth, the Earth's atmosphere and the near-Earth environment, and in a variety of other fields;
- d) that these satellites have distinctive characteristics that affect spectrum and regulatory requirements for command, control and data relay;
- e) that it is desirable to have one or more designated bands to accommodate command, control and data relay for these satellites;
- f) that it is also desirable to have regulatory provisions for these satellites that take into account their unique characteristics;
- g) that some experiments require the simultaneous operation of several such satellites and that fifty or more of these satellites may be released during a single launch;

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*recognizing*

- a) the need to protect existing services in the 400-2 025 MHz range;
- b) that the requirements in Article 9 for the advanced publication of information of satellite systems that are not subject to coordination and Article 11 for notification and recording of frequency assignments apply,

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*resolves to invite ITU-R*

1 to conduct studies to identify up to 10 MHz in the 400-2 025 MHz range to accommodate command, control and data relay operations for nanosatellites and picosatellites, while ensuring the protection of the services, particularly safety-of-life services, allocated to these bands;

2 to study the regulatory procedures applicable to these satellites,

*resolves to invite WRC-15*

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1 to review the results of the studies in *resolves to invite ITU-R* 1 and 2, with a view to provide one or more designated bands in the space research service to accommodate command, control and data relay for nanosatellites and picosatellites on a primary, worldwide basis;

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2 to consider appropriate modifications to the Table of Frequency Allocations and to develop appropriate regulatory provisions based on proposals from administrations,

*invites administrations*

to participate actively in the studies by submitting contributions to ITU-R.

**Reasons:** Nanosatellites and picosatellites that have distinctive characteristics and are increasingly used for many purposes require one or more designated bands that can be used for operations, including command, control, and data transmission.

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ATTACHMENT

PROPOSAL FOR AGENDA ITEM

**Subject:** Proposed Future Agenda Item for WRC-2015, to conduct studies to identify up to 10 MHz in the 400-2 025 MHz range, designated for the operations of nanosatellites and picosatellites,  
**Origin:** United States of America

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**Proposal:** to consider the results of ITU-R studies, and based on the studies to identify up to 10 MHz of spectrum in the 400-2 025 MHz range, in order to support operations of nanosatellites and picosatellites, in accordance with Resolution [ZZZ] (WRC-12).

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**Background/reason:** The use of nanosatellites and picosatellites is increasing for a variety of applications, including meteorology, space research, and telecommunications. The increasing variety of activities that are conducted from these satellites makes it necessary to find one or more dedicated bands for their operations, under a suitable service.

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**Radiocommunication services concerned:** services operating in the 400-2 025 MHz bands.

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**Indication of possible difficulties:** TBD

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**Previous/ongoing studies on the issue:** TBD

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**Studies to be carried out by:** WP 7B

with the participation of: WP 4C, WP 5A, WP 5B, and WP7C

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**ITU-R Study Groups concerned:** SG7

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

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**Common regional proposal:** Yes/No

**Multicountry proposal:** Yes/No

Number of countries:

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**Remarks**