

Appendix D

U.S. Proposals for WARC Malaga=Torremolinos, Spain, 1992

INTRODUCTION

I. General Remarks

The 1992 International Telecommunication Union World Administrative Radio Conference provides the opportunity to update the Radio Regulations to facilitate further advances in telecommunications. The United States, in preparing for the 1992 WARC, has been guided by certain principles in line with the purposes of the Union. These are:

- a. To promote the implementation of a variety of new operational programs as rapidly as practicable so that all countries may realize the benefits and spectrum savings promised by modern telecommunication technologies;
- b. To provide flexibility in the international regulations to ensure that the needs of all countries can be met;
- c. To reduce regulatory, technical, and operational barriers so that technologies can rapidly be introduced and used to the benefit of all mankind; and
- d. To provide up-to-date regulations that assure greater safety-of-life on land, on the sea, in the air, and in space.

During the last Plenipotentiary cycle (1982-1989), several radio conferences were held that addressed mobile, space, and broadcasting services. These conferences recognized that technology was advancing rapidly and recommended that future conferences address a number of topics in adapting to changing needs.

The Plenipotentiary Conference, Nice, **1989**, responded by deciding to hold a conference in **1992, to once again** examine and update the Radio Regulations. The agenda adopted by the ITU Administrative Council provides for consideration of a broad range of telecommunication topics. The reports from the International Radio Consultative Committee (CCIR) and the International Frequency Registration Board (IFRB), together with proposals of ITU Members, will constitute the principal input documentation for the work of the conference. We are hopeful that a collaborative effort will enable the ITU Members to update the Radio Regulations to further advance the development and availability of telecommunications services, economically, on a worldwide basis.

This document sets forth the views of the United **States** regarding the needs of the changing telecommunications environment. Study of some of these matters is continuing and there may be some additional United States proposals at a later date.

II. Broadcasting Service at High Frequency

There is a need for additional high frequency (HF) spectrum for broadcasting. To meet that demand we propose an additional 1325 kHz for HF broadcasting above 5900 kHz in ITU Region 2, and an additional 1125 kHz in Regions 1 and 3. Except for the proposal at 18/19 MHz, these new allocations are contiguous to existing broadcasting bands. We also propose that reduced carrier single sideband (SSB) emission be implemented earlier in the existing broadcasting bands and in the new bands, that the fixed and mobile services have access to any new broadcasting allocations, and that a reaccommodation procedure be adopted which would assure protection of displaced existing HF assignments.

New Allocations for Broadcasting.

We **propose** the following additional allocations for HF broadcasting:

5900-5950 kHz	13800-13900 kHz
7400-7525 kHz	15600-15700 kHz
9350-9500 kHz	17450-17550 kHz
11550- 11650 kHz	18900- 19300 kHz

Changes Consequential to Aligning Broadcasting Allocations at 7 MHz.

We also propose to shift broadcasting in Regions 1 and 3 from the current 7100-7300 kHz to the band 7200-7400 kHz. For Region 2, we propose to allocate 7200-7300 kHz to broadcasting in place of the current amateur allocation. To compensate for this loss of 100 kHz by the amateur service, we propose to allocate the band 6900-7000 kHz to amateur; this would be a consequential action. These actions result in an exclusive worldwide proposed allocation for the amateur service from 6900-7200 kHz, and for the broadcasting service from 7200-7525 kHz. The present unsuitable regional sharing situation would be resolved with this proposal.

The Use of SSB.

Our proposals require that any new frequency allocations for HF broadcasting be limited to reduced carrier SSB using characteristics as specified in Appendix 45 of the Radio Regulations. Additionally, in order to encourage the early use of reduced carrier SSB, we are proposing the advancement of the date when all broadcasting must be converted to SSB from 2015 to the year 2007. These proposals promote spectrum efficiency and enhance frequency utilization.

Reaccommodation.

The protection of existing radio services through a reaccommodation procedure is an essential part of any new allocation of spectrum to the broadcasting service. We have used Resolution Nos. 8 and 9 from the 1979 WARC as a basis for a procedure to ensure reaccommodation of displaced assignments. This procedure requires that the changeover from the old to the new assignment take place not later than 1 July 2007.

Access by Non-Broadcasting Services in Broadcasting Allocations.

Technical studies and current operational practice demonstrate that in certain instances, time and geographical sharing amongst different HF radio services is feasible. Therefore, we propose permitting access to new broadcasting allocations by fixed and mobile services on a secondary basis. This proposal does not replace the requirement to accommodate the existing fixed and mobile assignments.

III. Low Earth Orbiting Satellites Below 1 GHz

Recent research and operational testing indicates that low earth orbit satellite systems can offer a number of radio services which can complement those provided by geostationary satellite operations. These newer technologies offer the potential to meet demands for data communication services using lightweight pocket-sized terminals. Low earth orbit systems offer the possibility of providing low-cost two-way data communications. A wide range of

applications can be implemented to support economic development worldwide. To obtain efficiencies in the satellites and earth terminals, VHF bands are preferred. As these bands are used extensively, techniques have been developed to facilitate sharing with existing services.

The United States proposes allocations for the mobile-satellite service to be added to three bands for use by low earth orbit systems. The bands proposed are: 137-138 MHz (downlink), 148-149.9 MHz (uplink), and 400.15-401 MHz (downlink). In the 137-138 MHz band we propose an additional provision to protect the meteorological-satellite service.

IV. New Space Service Applications for Communications with Manned Space Vehicles Conducting Space Research Activities around 400 MHz

Extra-Vehicular Activity at 410-420 MHz.

Extra-vehicular activity (EVA) is work activities undertaken by astronauts outside the shelter of their base space vehicle, protected only by a life support space suit. A primary allocation in an appropriate radio service is needed to provide for communications between astronauts and base spacecraft, such as the Space Shuttle and Space Station Freedom, while they are performing activities, such as maintenance, outside the base vehicle.

Operating range for an EVA link would normally be confined to about 100 meters of the primary spacecraft, though reliable operation at up to 1 km is required to support contingency operations. The band selected must be between 270-575 MHz to comply with extremely limited power, on the order of 250 mW, and size restrictions of the astronaut's life support suit. Limited EVA communication capabilities are currently provided below 300 MHz. However, with the future expansion of EVA activities, new systems require additional capacity up to 10 MHz bandwidth. Because of present spectrum usage, a frequency band below 400 MHz is not available. For these reasons, the United States proposes that this new space service application concerning manned space vehicles be satisfied with a primary space research (space-to-space) allocation at 410-420 MHz, restricted to these activities by a footnote. We also propose to protect fixed and mobile operations in this footnote.

Proximity Operations at 400.15-401 MHz.

There is a requirement to communicate with approaching space vehicles, for example, during docking maneuvers and for interrogation of co-orbiting unmanned experimental containers, at distances up to 37 km. This activity requires transmit power levels somewhat higher than those available from an astronaut's suit. The United States proposes to allocate the frequency band 400.15-401 MHz to the space research service (space-to-space direction) for communications with manned space vehicles. The restriction to manned space vehicles in the proposed footnote to the allocations table is important, but further restriction as to distance would not be useful.

V. Mobile Services In The Approximate Range 1-3 GHz

Mobile Service Allocations and Future Public Land Mobile Telecommunications Systems

The demand for spectrum for the mobile services is growing. Considerable emphasis has been placed on accommodating future mobile service needs by providing suitable allocations in the 1700-2450 MHz band. These needs include personal communication

networks, cordless telephones and future public land mobile telecommunication systems (FPLMTS). As the table of frequency allocations contains a primary mobile allocation in Region 2 from 1700-2690 MHz, which could permit future implementation of mobile services, we see no need to make specific allocation proposals for Region 2.

Further, we note that the WARC will specifically consider possible designation of a band of frequencies for use by future public land mobile telecommunication systems (FPLMTS). This concept, which embraces a wide variety of personal communications applications, has been under intensive study by the CCIR. Proponents wish to set aside a band of frequencies for future use which they indicate would facilitate global roaming of personal stations. While we support the work of the CCIR on FPLMTS, we believe that the WARC must exercise caution before reserving spectrum, particularly because of the numerous demands in the 1-3 GHz frequency range. Furthermore, technical standards such as modulation parameters, protocols, and channelization schemes will be just as important as an allocated band in facilitating any requirements for global roaming. These standards and protocols may obviate the need for a common worldwide band for international roaming. We believe that it is premature to designate a frequency band until the CCIR has progressed further in its work.

Terrestrial Aeronautical Public Correspondence.

The United States and some other administrations have already implemented a terrestrial aeronautical public correspondence system in the 849-851 MHz and 894-896 MHz bands. Since this system has become fully operational and hundreds of aircraft are already equipped with systems operating in these bands, we believe that these band segments should be used for this purpose on a worldwide basis. Therefore, we propose to allocate 849-851 MHz (air-ground) and 894-896 MHz (ground-air) for this purpose.

VI. Mobile-Satellite Services at 1-3 GHz

The demand for additional spectrum for the mobile-satellite service is growing. The CCIR recognized this situation and estimated the spectrum requirements of these services. Our proposals exceed the minimum amount projected by CCIR.

Because of the demands being placed on the 1-3 GHz spectrum by a multitude of services, we believe it is extremely important to utilize the spectrum efficiently. The current service specific allocations in the 1.5/ 1.6 GHz bands are too restrictive to permit flexible usage to adapt to dynamic changes in communication needs. We recognize, however, that special provisions are necessary so that safety services will be protected from interference, and that these services will be ensured priority access over other communications in these bands.

The United States proposes to reallocate the land mobile-satellite and maritime mobile-satellite service bands at 1530-1544 MHz (space-to-Earth) and at 1626.5 -1645.5 MHz (Earth-to-space) to the mobile-satellite service. These proposals provide additional spectrum, permit flexibility based on operational demands, and provide priority access with real-time preemptive capability for maritime safety needs. We also propose to allocate the band 1525-1530 MHz to the mobile-satellite service (space-to-earth) to balance the amount of spectrum allocated downlink with that already available in the corresponding 1.6 GHz uplink band.

In the bands 1545-1559 MHz (space-to-Earth) and 1646.5 -1660.5 MHz (Earth-to-space), the United States proposes to reallocate the aeronautical mobile-satellite (R) (AMS(R)S) and land mobile-satellite services to the mobile-satellite service. This proposal for a mobile-

satellite service also provides priority access with real-time preemptive capability for the aeronautical mobile-satellite service (R).

These allocation proposals will enhance flexibility for future usage. Existing operations in the bands will not be adversely affected, as we have been careful to preserve the integrity of distress and safety communications for the Global Maritime Distress and Safety System (GMDSS) and AMS(R)S. We do so by continuing to provide sufficient capacity and priority access with real-time preemptive capability over all other communications in the bands proposed for reallocation from service specific use. This is accomplished by linking our proposals to specific footnotes, (ADD) RR's 726C and 730B, addressing safety requirements in the maritime mobile-satellite service bands and the AMS(R)S bands. Along with **these** footnotes, we propose a consequential change in Article 61. These measures assure that the GMDSS and the AMS(R)S can fulfill their respective safety requirements.

The United States proposes new worldwide allocations of 40 MHz, in each direction, for the mobile-satellite service. The proposed allocations are 2110-2130 MHz and 2160-2180 MHz in the space-to-Earth direction, and 2390-2430 MHz in the Earth-to-space direction.

The United States proposes to add a co-equal primary allocation for the mobile-satellite service in the radiodetermination-satellite service (RDSS) bands at 1610 -1626.5 and 2483.5-2500 MHz. Footnotes are proposed to require that such use would be in accordance with appropriate CCIR Recommendations to ensure compatibility with the RDSS. The MSS and RDSS complement one another in these bands and in some cases may be provide by the same system. Therefore, in order to ensure equality of these services on a worldwide basis, we are proposing to upgrade the radiodetermination-satellite allocations in these bands in Region's 1 and 3. We also propose a secondary allocation (space-to-Earth) for the mobile-satellite service from 1613.8 -1626.5 MHz to permit a possible bi-directional use of the band.

We also propose an allocation footnote to add the mobile-satellite service to the band 1850-1990 MHz. This addition is intended to complement the existing services. The added flexibility should permit greater sharing of the band and promote development of a variety of personal communications services.

We are examining the use of low earth orbit satellite systems in the mobile-satellite service at 1-3 GHz. Mobile-satellite service allocations can accommodate this requirement; some systems of this type contemplate use of common bands for both uplink and downlink. The CCIR has already begun studies on the sharing parameters for these systems and some information is provided in its report to the WARC.

VII. Broadcasting-Satellite Service at 500-3000 MHz

The United States is evaluating possible spectrum allocations for the broadcasting-satellite service (sound) in the spectral region between 500 and 3000 MHz. The radio listener markets that may be served by this allocation include both domestic and international radio program listeners of direct satellite broadcasts, as well as complementary local terrestrial broadcasts. The CCIR and other international organizations have performed recent additional studies. A United States proposal on particular bands for this service will be presented in a supplemental proposal.

VIII. Space Research and Space Operation Services at 2 GHz

WARC-ORB-88 in Recommendation 716 noted that the 2025-2110 MHz and 2200-2290 MHz bands are allocated to the space research and space operations services, subject to the provisions of Article 14 of the Radio Regulations. The WARC recognized that there is increasing use of these bands by the space research and space operation services, leading to increased coordination difficulties under the provisions of Article 14.

Major space programs of several administrations depend on use of the allocations at 2 GHz for reliable communication, data acquisition, and command and control. In the United States, these include the shuttle, Space Station Freedom, Hubble Space Telescope, and the Tracking and Data Relay Satellite Systems. For these reasons, the United States proposes that the space service allocations in these bands be upgraded to primary with consequential regulatory changes to apply existing power flux density (PFD) limits.

IX. Fixed-Satellite Service at 14.5 -14.8 GHz

The WARC agenda includes consideration of the allocation of the frequency band 14.5 -14.8 GHz to the fixed-satellite (Earth-to-space) service. Because of mobile and fixed uses, the United States cannot agree to fixed-satellite service operations in this band. In the United States, we cannot agree to any licensing of fixed-satellite operations, nor can we agree to protect such operations from interference from other users of the band. Accordingly, the United States proposes no change in the allocation at 14.5 -14.8 GHz and associated footnote 863.

X. High Definition Television Broadcasting-Satellite Service

The United States proposes a two-pronged approach to satisfying future needs for high definition television (HDTV) via satellite. We believe that the existing 12 GHz broadcasting-satellite service (BSS) allocations and associated plans can serve as the basis for meeting this demand. We recognize that this approach may require changes to the modification procedures for these plans. Such changes, however, should not be extensive and could be accomplished at some future conference. We further note that there could be difficulty in accommodating a few specific HDTV-BSS assignments within the 12 GHz BSS plans, so we also propose to allocate the 24.65-25.25 GHz band for use by the broadcasting-satellite service.

XI. Space Services Above 20 GHz

A. Inter-Satellite Service Requirements.

The WARC agenda permits consideration of allocations for new space service applications above 20 GHz, and we propose a number of allocations. We also propose a minor modification to the inter-satellite definition to provide for links between data relay satellites and other satellites that may not necessarily be Earth-orbiting.

1. Inter-Satellite Requirement at 22 GHz.

We propose to allocate the 21.7-22 GHz band to accommodate projected requirements such as cross-links between satellites of the mobile-satellite services.

2. Future Data Relay Satellite and Space Station (Proximity) Wideband Links.

The United States proposes a primary allocation in an appropriate service and associated sharing criteria for wideband space-to-space links. The wideband links would be between low orbiting user spacecraft, such as the United States space shuttle or space station Freedom, and geostationary data relay satellites (DRS), such as the U.S. Advanced TDRS. Forward DRS-to-user links are planned to operate in the inter-satellite service in the 22.55-23.55 GHz band based on the availability of bandwidth and the feasibility of sharing. For similar reasons, return user-to-DRS links are proposed to operate in a new primary allocation in the 25.25-27.50 GHz band. In addition, wideband space-to-space links are required between the space station and a variety of co-orbiting space vehicles in close proximity to the space station. It would be preferable if these proximity links operate under the same service allocation as used for the DRS links.

B. Space Research Service Requirements.

1. Narrowband and Wideband Space Research Links for Future Planetary Mission and Other Applications.

The United States, in cooperation with other countries, plans to establish a lunar settlement early in the 21st century followed by manned exploration of Mars. These activities will require wideband communications. There are no frequency bands allocated in the Radio Regulations that could be used for wide bandwidth links between the Earth and the Moon and between the Earth and Mars. Use of the same band for both sets of links is desirable because it would permit use of common equipment. Smaller bandwidth transmissions can occur in the space research allocations near 2 and 8 GHz. In addition, other space research activities such as Very Long Baseline Interferometry (VLBI) by satellite will require wider operating bandwidths. The definition of deep space does not permit space research service allocations for deep space to be used to communicate with the Moon. For these reasons, the United States proposes that 37-38 GHz and 39.5 -40.5 GHz be allocated on a primary basis for space research to support communications associated with a lunar or Martian research base or colony. These bands should not be restricted to deep space.

2. Space Research (Deep Space) Allocations Near 32/34 GHz.

The trend toward international cooperative missions for deep space exploration creates the need for a worldwide primary allocation for space research (deep space) service with direction indicators. The nature and status of allocations to the space research service near 32 and 34 GHz are complex, not uniform and not worldwide. For three administrations, the space research allocations are restricted to deep space only. There is a serious potential for interference to national and international deep space missions because the current allocations allow uplinks and downlinks for space research conducted by Earth orbiters to use the same bands as deep space links. These links are not compatible because of the widely different transmission e.i.r.p. and received signal strengths. Therefore, the United States proposes an upgrade of the space research service (deep space) allocations at 32/34 GHz. The proposal is for a worldwide primary allocation to support increasing space activities in these bands.

C. Earth Exploration-Satellite (passive) near 61 GHz and 157 GHz.

The passive bands are being used increasingly by space sensors to obtain higher quality data and data in regions of the atmosphere that are not available by the use of other bands.

To avoid the potential of future interference to passive bands now in use or planned for use in the near term, allocation of passive bands above 60 GHz are proposed. Bands below 60 GHz are affected by Earth's magnetic field when being used to measure mesospheric temperatures at heights between 45 and 75 km. The band at 157 GHz is needed to avoid interference from local oscillators in the same sensor measuring temperatures in the 50 to 60 GHz bands. Therefore, the United States proposes primary earth exploration-satellite (passive) allocations at 60.7 -60.8 GHz and 156-158 GHz.

D. Uplink Power Control Beacon near 27 GHz.

The United States notes that uplink power control systems will be required for fixed-satellite (FSS) systems operating near the 20/30 GHz range to achieve FSS uplink availability and performance standards. To accomplish this, the uplink earth station should monitor a narrow-band beacon transmission from the satellite. At present, the 27.5 -29.5 GHz band is allocated to the FSS for uplink use only. To accommodate a downlink beacon transmission in this band, the United States proposes to add a footnote to permit the use of downlink beacon operations within the 27.5 -29.5 GHz band in support of uplink power control.

E. General-Satellite Service near 20/30 GHz.

In a number of administrations throughout the world, including the United States, efforts are underway to develop and implement communications satellites integrating a wide variety of capabilities on a single space platform. These include fixed, mobile, and point-to-multipoint applications. Accordingly, the United States proposes a new service definition. The United States proposes the creation of a primary allocation to the general-satellite service at 19.7 -20.2 GHz and 29.5 -30.0 GHz, replacing current primary fixed-satellite and secondary mobile-satellite service allocations within these frequency bands.

F. Radiolocation-Satellite Service Near 25 GHz.

We propose to define a new space service - the radiolocation-satellite service - and to provide a primary allocation for this service in the band 24.55-24.65 GHz. The Radio Regulations currently define the radiodetermination-satellite service and a sub-category, the radionavigation-satellite service. However, the regulations do not now provide for a radiolocation sub-category of radiodetermination. This new definition and allocation will provide for satellite-based radiolocation services to a variety of users. The type of protection associated with a radionavigation service need not be applied.

XII. Aeronautical Mobile Off-Route (OR) Service Issues

In its report to WARC-92 concerning aeronautical mobile (OR) service, the IFRB noted that it is not possible to develop modifications to Article 12 without modifying Appendix 26. The IFRB suggests changes to Article 12, a draft revision to Appendix 26 (except for the allotment plan which is being developed) and draft resolutions to implement the changes. The United States considers that the IFRB has carried out the Plenipotentiary Conference action assigned to it and met administration requirements to retain flexible and maximum access to the exclusive aeronautical mobile (OR) service frequency bands.

While the United States generally concurs with the IFRB work mentioned above, a final determination will be made when the frequency allotment plan being developed by the IFRB is available. Concerning draft Resolution AER-1, the United States agrees with the implementation date for new assignments but proposes that the dates for operating on replacement

frequencies and ceasing all double sideband emissions should be respectively, 1 March 1994 and 1 March 1996. Dates in draft Resolution AER-2 should be aligned accordingly. Consequential to adopting changes to Article 12 and Appendix 26, WARC-92 should suppress Recommendation 406 as no further action will be required.

XIII. Licensing of Radio Operators

The WARC Mob-87 revised Articles 55 and 56 of the international Radio Regulations to specify certificates for radio personnel operating in the Global Maritime Distress and Safety System (GMDSS). Unfortunately, the outcome of the 1987 Conference was at variance with the decisions at the 1988 International Convention for the Safety of Life at Sea (SOLAS) concerning radiocommunications for the GMDSS. Many countries delivered protocol statements to the Final Acts of the WARC Mob-87 and the ITU Plenipotentiary Conference, Nice, 1989, which reserved their position on Articles 55 and 56.

As a result of study of Articles 55 and 56 and the SOLAS Convention, the United States seeks to realign the texts so as to make them consistent. The United States proposes to do so by deleting the mandatory First-Class Radio Electronic and Second-Class Radio Electronic Certificates from Article 55, while making consequential changes to Article 56. The United States proposals reaffirm the need to ensure adequate safety is provided aboard ship by qualified individuals.

XIV. Updating of Definitions (Resolution 11)

The WARC agenda requires the Conference to provide, under the terms of Resolution 11, that any changes to definitions appearing in the Radio Regulations *and* in Annex 2 to the Convention (Nairobi, 1982) “shall be submitted to the Administrative Council for onward transmission to the Plenipotentiary Conference...”. The United States proposes changes to some definitions appearing in Article 1; however, none of these proposals affect the definitions appearing in Annex 2 to the Convention.

XV. Sharing Between Space and Terrestrial Services (Resolution 703)

The WARC agenda requires the Conference to review Resolution 703 in light of the procedure adopted by the XVIIth CCIR Plenary Assembly. The United States proposes to amend Resolution 703 to bring it into conformance with the approval process adopted by the CCIR.

XVI. New Resolutions and Recommendations

Resolution and Recommendation Relating to Wind Profiler Radars.

The WARC-92 agenda invites development of recommendations and resolutions in relation to the agenda of the Conference including the meteorological aids service in frequency bands below 1000 MHz. The wind profiler is a radar operating as a meteorological aid to measure wind direction and speed. Experimental units operating near the 406 MHz region cause interference to the COSPAS-SARSAT system at 406-406.1 MHz. The United States proposes a Resolution to urge administrations to avoid making frequency assignments to wind profiler radars in the 402-406 MHz band, and suggests that this issue be treated at a future conference.

Resolution Relating to Meteorological Satellites 401 -403 MHz.

The WARC agenda also permits inclusion of future consideration of meteorological satellites in the 401 -403 MHz band. We propose in a resolution that a future WARC address this issue.

SOURCE: Reproduced from U.S. Department of State, *United States Proposals for the 1992 World Administrative Radio Conference for Dealing With Frequency Allocations in Certain Parts of the Spectrum*, Publication No. 9903 (Washington DC: July 1991).