

Aviation Frequency Spectrum

&

the ITU World Radiocommunication Conferences

2009-06-19



Overview

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- ITU World Radio Conferences (WRCs), General Overview (1)
- WRC-07 Results (9)
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- WRC-11 Preparation (5)



Aeronautical Frequency Spectrum Management

QUOTE: IATA & the Air Transport Action Group

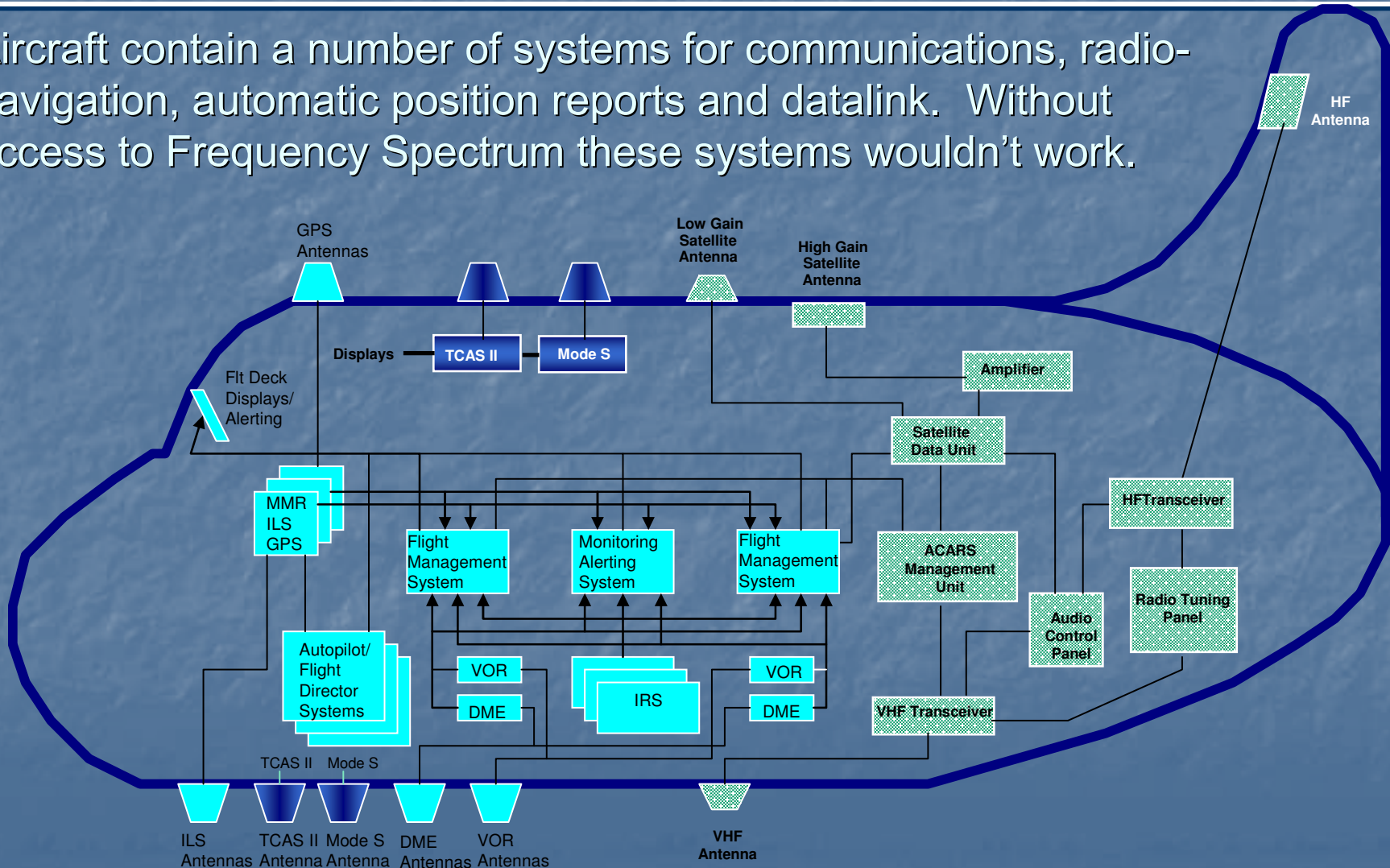
- Aviation's top priority is safe operations. In order to achieve this, aircraft rely on secure airspace, airports and **radio spectrum**
- Radio spectrum, the third requirement for aviation's safe operations, is the least understood and the most difficult to protect as this limited invisible resource has to be shared with other users





Aeronautical Frequency Spectrum Management

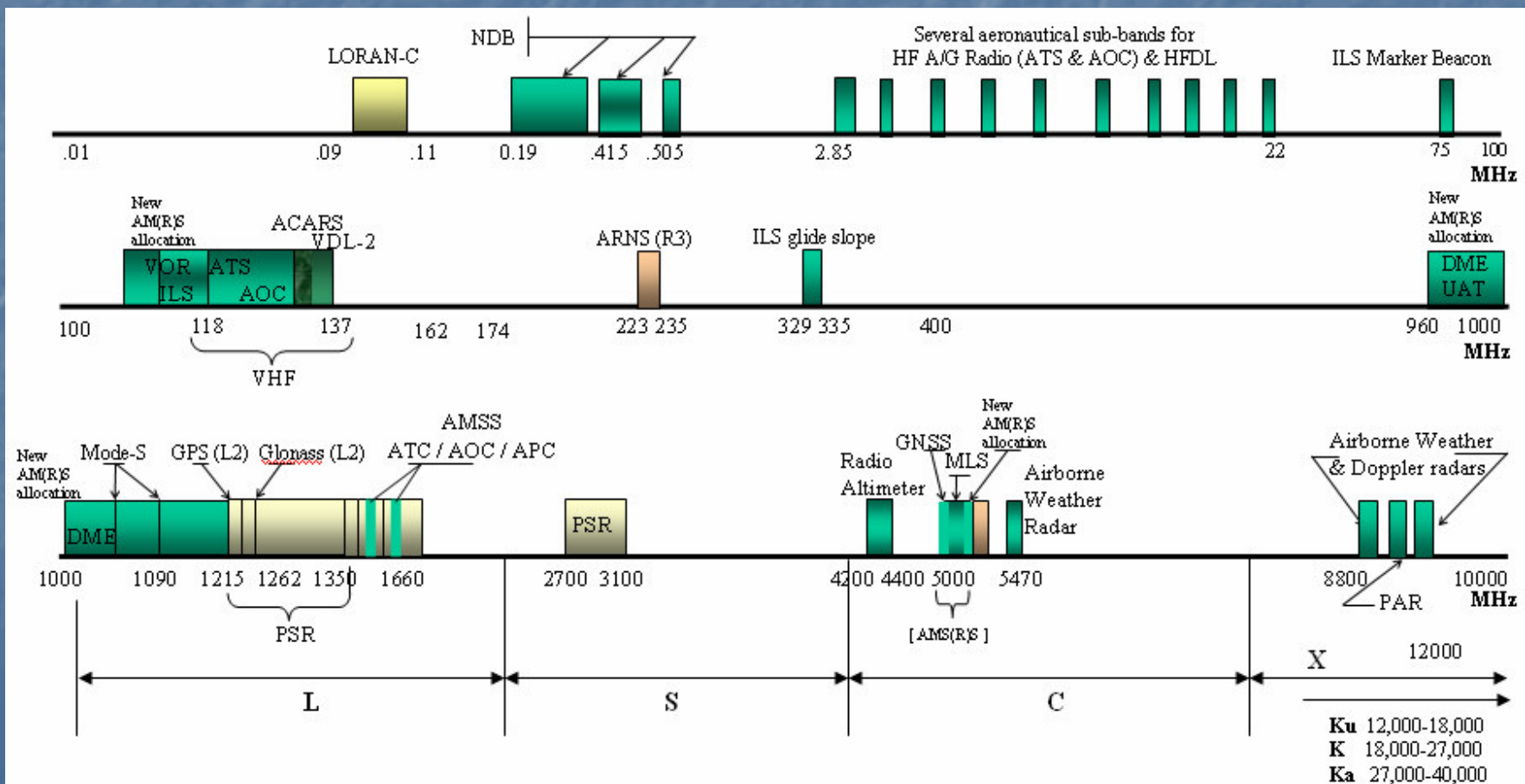
Aircraft contain a number of systems for communications, radio-navigation, automatic position reports and datalink. Without access to Frequency Spectrum these systems wouldn't work.





Aeronautical Frequency Spectrum Management

Overview of spectrum allocations to aeronautical services utilized by Civil Aviation





Aeronautical Frequency Spectrum Management

- Radio Frequency Spectrum is a scarce natural resource with finite capacity limits and constantly increasing demands
- Radio Frequency Spectrum congestion imposes the need for efficient frequency spectrum management
- Spectrum management:
 - combination of administrative and technical procedures
 - necessary to ensure interference free and efficient operation of radio services (e.g. Air/Ground Communications and Radionavigation)





Aeronautical Frequency Spectrum Management

The highest level of Spectrum Management takes place at the ITU World Radiocommunication Conferences (WRC), held every four years:

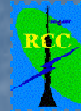
- Maintenance of the International provisions for Spectrum Management, which are contained in the ITU Radio Regulations (RR)
- This includes maintenance of the Table of Frequency Allocations
- A consequence of this is that aviation frequency managers need to develop, and lobby for an aviation position on frequency spectrum use





Aeronautical Frequency Spectrum Management

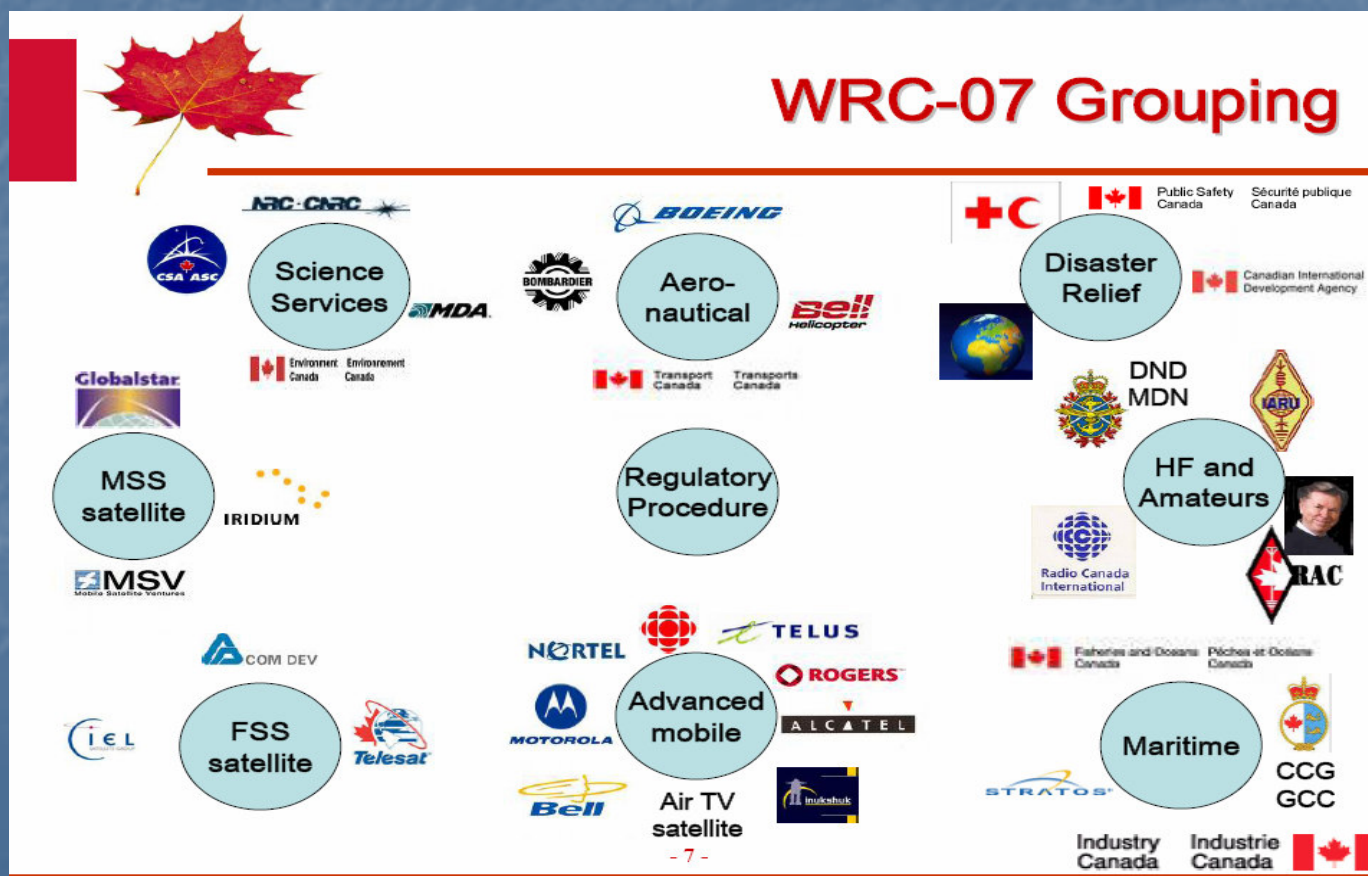
- Co-ordination of aviation position for ITU World Radiocommunication conferences
 - At the national level:
 - National position is developed and co-ordinated by the National Frequency Spectrum authority. Aviation is but one of many elements that lobby for attention
 - At the regional level:
 - National telecommunications authorities co-ordinate their position through regional organizations. Aviation representatives may not be allowed to speak up as the National Frequency Spectrum Authority has only “one official position”. ICAO is allowed to participate
 - At the international level:
 - National telecommunications authorities (and Regional) co-ordinate their position through the ITU-R Study Groups. Although aviation may be represented in the national delegations, they may not be allowed to speak up, as the national delegation has only “one official position”. States look to ICAO for guidance on aviation matters





Aeronautical Frequency Spectrum Management

A slide borrowed from Industry Canada shows a good example of the many “special interest” groups represented in any national position.





Aeronautical Frequency Spectrum Management

- The ITU Radio Regulations Update cycle:
 - A very competitive environment
 - Neutral to Aviation
 - Those that do their homework and participate succeed, others lose.

Definition of Radio Frequency Management:

"Radio frequency management is done by experts who meld years of experience with a curious blend of regulation, electronics, politics and not a little bit of larceny. They justify requirements, horsetrade, coerce, bluff and gamble with an intuition that cannot be taught other than by long experience."

Vice Admiral Jon L. Boyes
U.S. Navy



ITU WRCs

General Overview

- WRCs update the International Radio Regulations
- Held every 2 - 4 years
 - **Last was in 2007**
 - **Next in 2011**
- Main purposes:
 - **To revise the Radio Regulations (RR); and**
 - **To address Radiocommunication issues of a worldwide character.**
- Radio Regulations: International treaty governing the use of the Radio Frequency Spectrum
- Why participate at World Radiocommunication Conferences:
 - To protect existing services
 - To obtain access to spectrum for new services and enhance spectrum access for existing services
 - To facilitate market access for radio equipment manufacturers; and
 - To provide regulatory certainty to operators.





WRC-07 in numbers

- **Participation: 2822 delegates**
- **Budget of \$3.5 million US Dollars**
- **4 weeks (5 1/2 weeks counting RA-07 and CPM)**
 - 161 Administrations
 - 5 regional telecommunication organizations
 - 4 intergovernmental organizations
 - 3 UN specialized agencies (ICAO, IMO, WMO)
 - 4 other international agencies
 - 30 recognized operating agencies
 - 23 scientific/industrial organizations
 - 22 regional /international organizations
- **Over 3100 proposals in 350 documents, 11800 pages translated, 2,380,000 downloads.**
- **Over 1100 meetings, 30 meetings/day. Marathon sessions (9am Wed – 5pm Thu with less than 3 hours break).**
- **Final Acts: ~500 pages**



WRC-07 Main Thrust

International Mobile Telecommunications (IMT)

Additional spectrum identified for IMT

450–470 MHz (((

))) 698–862 MHz
R2 & R3 (9 countries)

))) 790–862 MHz
R1 & R3

3.4–3.6 GHz band (((
(no global allocation)

))) 2.3–2.4 GHz



- Higher frequencies: to face growth in densely populated areas.
- Lower frequencies to provide, at a reasonable cost, high speed mobile services everywhere, in particular in less densely populated areas.



WRC-07: Main results for Civil Aviation (1)

- Protection of the GNSS (GPS/GLONASS) improved by downgrading the Fixed Service operating in 34 countries in the 1559 – 1610 MHz band.
 - By end of 2009, the remaining 9 countries in the Middle East and Africa will also downgrade their Fixed Service in this band.
 - Fixed Service to be terminated in this band by 2015.





WRC-07: Main results for Civil Aviation (2)

- 9 GHz bands used by the Aeronautical Radionavigation Service (ARNS) will now share their primary allocation with the Radiolocation Service, the Earth Exploration Satellite Service (active) and the Space Research Service (active)
- However, as per the ICAO Position, ARNS has been provided regulatory protection over the new primary services sharing those bands.





WRC-07: Main results for Civil Aviation (3)

- New allocations to the Aeronautical Mobile (route) Service (AM(R)S) in support of future requirements
 - The band 108 - 117.975 MHz was allocated to the AM(R)S with some limitations to the band below 112 MHz.
 - The band 960 - 1164 MHz was allocated to the AM(R)S
 - The band 5091 - 5150 MHz was allocated to the AM(R)S limited to surface applications at airports.
 - The bands 112 - 117.975 MHz and 960 - 1164 MHz cannot be used until sharing studies with existing systems have been completed. Regulatory provisions for these bands should be reviewed at the next WRC.
- All the above bands share an allocation with the ARNS

**NextGen
&
SESAR**



WRC-07: Main results for Civil Aviation (4)

- The band 5000 - 5030 MHz should be studied with respect to the possibility of assigning it to the aeronautical mobile (R) service limited to surface applications at airports and that these studies should be reviewed at the next WRC.

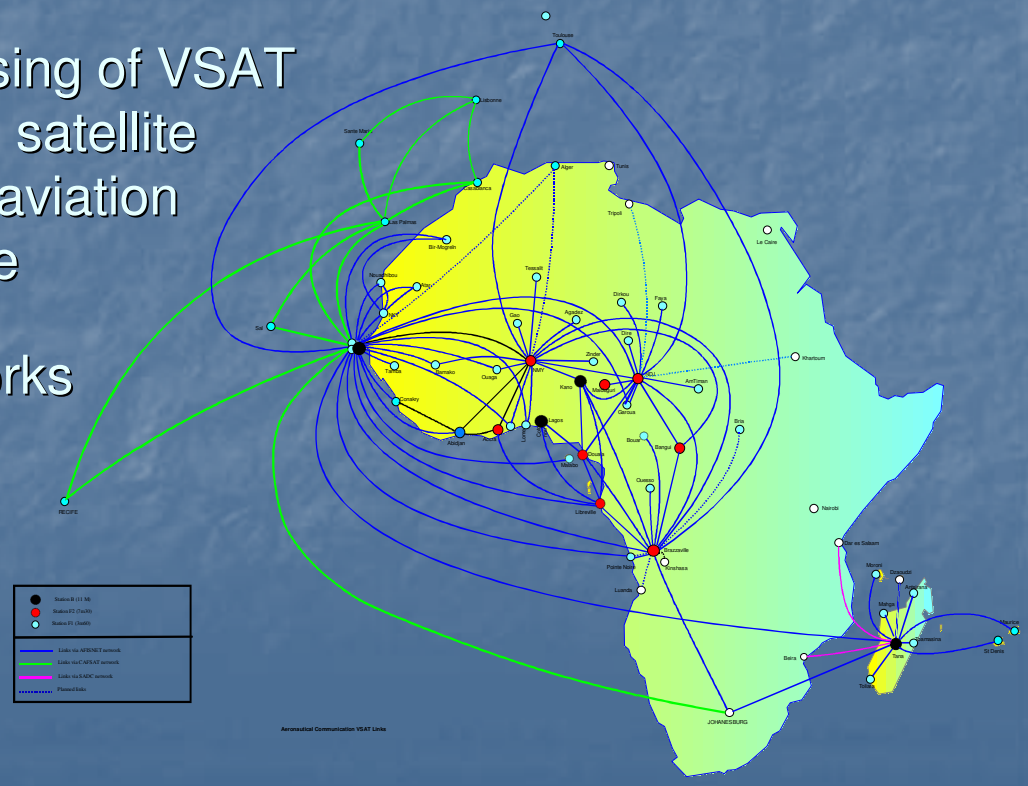




WRC-07: Main results for Civil Aviation (5)

- New ITU recommendation in support of infrastructure development in underdeveloped regions:

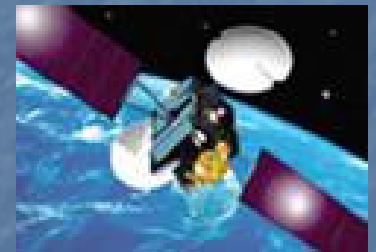
- Aimed at facilitating the licensing of VSAT (very small aperture terminal) satellite ground stations in support of aviation communications infrastructure
- Recognizes that VSAT networks operating in the fixed satellite service can be used to carry aeronautical safety related traffic





WRC-07: Main results for Civil Aviation (6)

- Inclusion of an agenda item for WRC-11 to ensure long-term spectrum availability for the Aeronautical Mobile Satellite (route) Service
 - At WRC-97 the exclusive AMS(R)S allocations in the L-band were replaced by a generic allocation to the Mobile Satellite Service (MSS). Priority and pre-emption was afforded to AMS(R)S through a footnote. Studies have identified that these methods are insufficient to ensure long-term spectrum availability to aviation
 - This agenda item affords aviation the opportunity to conduct technical, operational and regulatory studies of existing and future spectrum requirements for aviation





WRC-07: Main results for Civil Aviation (7)

In general, conference results conformed to the ICAO Position. Major factors contributing to this include:

- Early development and dissemination of the draft ICAO Position
- Active participation by ICAO experts in the preparatory work of the ITU, including the relevant meetings of the ITU-R
- Increased participation by ICAO experts (from HQ and regional offices) in meetings of the regional telecommunication organizations
- Increased awareness in the Regions through ACP WG-F meetings and ICAO Radio Frequency Seminars in the Regions
- Active Participation of the ICAO Delegation at WRC-07 allowed ICAO to counter and refute proposals which would have adversely impacted aeronautical spectrum





Preparation for a WRC

ICAO Strategy (1)

Strategy for establishing and promoting the ICAO position for future ITU World Radiocommunication Conferences. Developed by ANC and adopted by Council in 2001 (Doc 9718, Att E):

- Basis for the ICAO position
- Guidance for the development of the ICAO position
- Guidance for the promotion of the ICAO position
- Discusses new trends, including the economic value of spectrum
- Incorporates Assembly Resolution A36-25, which gives further guidance to ICAO and States, especially as regards the necessary attribution of resources to this process.





Preparation for a WRC

ICAO Strategy (2)

- Basis for the ICAO Position
 - Current and future aviation requirements for radio frequency spectrum
 - Long term implementation strategy contained in the Global Air Navigation Plan (Doc 9750)
 - ICAO policy on radio frequency spectrum requirements, as approved by Council
 - Framework for development and support of ICAO Position is contained in Assembly Resolution A36-25





Preparation for a WRC

ICAO Strategy (3)

■ Guidance for the development of the ICAO Position (1)

- Established as early as possible after the agenda for that WRC is established
- Position presents ICAO views on all agenda items of interest to international civil aviation on the agenda of the WRC, with particular regard to the impact on safety, regularity and efficiency of flight
- Focal point on all aspects related to the development of the ICAO Position is ACP Working Group F
- Proper co-ordination with regional offices





Preparation for a WRC

ICAO Strategy (4)

■ Guidance for the development of the ICAO position (2)

- Position reviewed by ANC, sent to States and relevant International Organizations for comments, and a consolidated ICAO Position is submitted to ANC and Council for approval
- Position is sent to States for use in coordination process when developing national positions
- Following development of the Position, consequential amendments to policy statements are developed for approval by the Council
- Subsequent developments arising from ICAO and ITU activities in preparation for the WRC are considered by the Council with a view to update the Position as necessary



Preparation for a WRC

ICAO Strategy (5)

■ Guidance for the promotion of the ICAO position

- Assembly Resolution A36-25 shall be fully implemented so as to secure support from States to the ICAO Position and ensure that the resources necessary to support increased participation by ICAO to international and regional spectrum management activities are made available.
- ICAO contributes to the WRC preparatory activities conducted by ITU and Regional Telecommunications Organizations, by submitting additional technical papers supporting the ICAO Position
- ICAO maintains close co-ordination and co-operation with other aviation organizations participating in the Conference, such as IATA
- Regional ICAO co-ordination meetings to present and discuss the ICAO Position should be organized as required. These meetings to be held in conjunction with meetings of ACP WG-F



Preparation for a WRC

ICAO Strategy (6)

- **New trends in spectrum management may affect the availability of adequate and protected spectrum for aviation**
 - Increased role of the private sector in the work of the ITU
 - Increased economic value of spectrum for certain applications
 - Increased availability of radio devices that do not require licensing
 - Increased pressure for sharing aeronautical spectrum with non-aeronautical services



Preparation for a WRC

Assembly Resolution A36-25 (A32-13) (part 1)

- *Urges* Contracting States and International Organizations to support firmly the ICAO position at WRCs and in regional and other international activities conducted in preparation for WRCs by the following means:
 - a) undertaking to provide for aviation interests to be fully integrated in the development of their positions presented to regional telecommunications fora involved in the preparation of joint proposals to the WRC;
 - b) including in their proposals to the WRC, to the extent possible, material consistent with the ICAO Position;
 - c) supporting the ICAO position and the ICAO policy statements at ITU WRCs as approved by Council and incorporated in the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718);



Preparation for a WRC

Assembly Resolution A36-25 (A32-13) (part 2)

- d) undertaking to provide experts from their civil aviation authorities to fully participate in the development of States' and regional positions and development of aviation interests at the ITU; and
 - e) ensuring, to the maximum extent possible, that their delegations to regional conferences, ITU study groups and WRCs include experts from their civil aviation authorities or other aviation officials who are fully prepared to represent aviation interests;
- *Requests* the Secretary General to bring to the attention of ITU the importance of adequate radio frequency spectrum allocation and protection for the safety of aviation; and
- *Instructs* the Council and the Secretary General, as a matter of high priority within the budget adopted by the Assembly, to ensure that the resources necessary to support increased participation by ICAO in international and regional spectrum management activities are made available.



WRC 2011 Position (1)

C-WP-13361, ICAO Position and Policy

- Initial draft of the ICAO Position was developed by ACP, reviewed by the ANC (179th session, 18 Nov 2008) and sent to States for comments (28 Nov 2008)
- AN-WP/8392 presented to the ANC (181st session, 5 May 2009) included the following material:
 - Results of the consultation with States on the initial draft ICAO position (42 replies received)
 - Updates to the Policy Statements in the “*Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies*” (Doc 9718)
- C-WP-13361 contains the draft ICAO Position and Policy statements, as updated by the ANC review





WRC 2011 Position (2)

C-WP-13361, ICAO Position and Policy

- The ANC recommends that the Council:
- a) approve the ICAO Position for the ITU WRC-11 as contained in Appendix A;
 - b) request the Secretary General to submit to the ITU WRC-11, in an appropriate format, the contents of Appendix A, together with any additional supporting material from ICAO studies;
 - c) approve the amendments to the ICAO radio frequency (RF) policy statements as contained in Appendix B, for later incorporation in the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies* (Doc 9718);
 - d) request the Secretary General to transmit the approved ICAO Position to regional offices, States, international organizations and relevant regional telecommunications organizations, indicating the need for their support; and
 - e) request the Secretary General to ensure adequate resources and participation of ICAO Secretariat personnel in the ITU and regional preparatory groups leading to this conference, and during the WRC.



WRC 2011 preparation (1)

- **Beyond the ICAO Position, Project:** Secure and maintain the ICAO Position at ITU WRC 2011
 - ACP Working Group F to meet in the Regions / Regional Aviation Frequency Spectrum Seminars, 2 two-week missions per year
 - ICAO Secretariat (HQ) to participate in ITU-R Study Groups (SG-5 / WP5B & SG-4 / WP4C), 4 two-week missions per year
 - ICAO Secretariat (HQ / Regional) to participate in meetings of regional telecommunications organizations, 2 – 4 one-week missions per year
 - In 2011, participation in WRC-2011, 3 ICAO Officers, 4 weeks.
- **Dependency:** Mission Travel Budget



WRC 2011 preparation (2)

WRC 2011 Agenda Items

- 30 Agenda Items total
- 6 standing Items, some of which affect aviation
- 24 specific Agenda Items, 13 of which affect aviation
- 3 support the development of aviation spectrum
- 10 pose a threat to aviation spectrum allocations





WRC 2011 preparation (3)

Agenda Items supporting the Development of Aviation Spectrum:

■ Agenda Items 1.3:

- To consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies

■ Agenda Item 1.4:

- To consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112-117.975 MHz, 960-1 164 MHz and 5 000-5 030 MHz

■ Agenda Item 1.7

- To consider the results of ITU-R studies 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



WRC 2011 preparation (4)

Direct threats to Aviation Spectrum:

- Agenda Item 1.12
 - To protect the primary services in the band 37-38 GHz from interference resulting from aeronautical mobile service operations, taking into account the results of ITU-R studies
- Agenda Item 1.19
 - To consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies
- Agenda Item 1.21
 - To consider a primary allocation to the radiolocation service in the band 15.4-15.7 GHz, taking into account the results of ITU-R studies.
- Agenda Item 1.22
 - To examine the effect of emissions from short-range devices on radiocommunication services
- Agenda Item 1.23
 - To consider an allocation of about 15 kHz in parts of the band 415-526.5 kHz to the amateur service on a secondary basis, taking into account the need to protect existing services



WRC 2011 preparation (5)

Potential threats to Aviation Spectrum:

- Agenda Item 1.5
 - To consider worldwide/regional harmonization of spectrum for electronic news gathering (ENG), taking into account the results of ITU-R studies
- Agenda Item 1.9
 - To revise frequencies and channelling arrangements of Appendix 17 to the Radio Regulations in order to implement new digital technologies for the maritime mobile service
- Agenda Item 1.14
 - To consider requirements for new applications in the radiolocation service and review allocations or regulatory provisions for implementation of the radiolocation service in the range 30-300 MHz
- Agenda Item 1.15
 - To consider possible allocations in the range 3-50 MHz to the radiolocation service for oceanographic radar applications, taking into account the results of ITU-R studies
- Agenda Item 1.25
 - To consider possible additional allocations to the mobile-satellite service, in accordance with Resolution 231 (WRC-07)

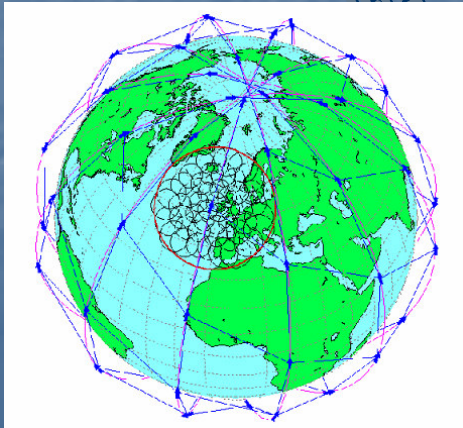
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Thank You!



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