

Postscript

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Abstract. A summary is given of the results of WRC-2000 for radio astronomy and other developments since the end of Symposium 196 (up to April 2001).

1. Apologia

The interval between the end of Symposium 196 and the final editing of these proceedings saw great progress of the issues of our Symposium. I therefore took the liberty of adding a summary of some major results, to complement Section 4 of the article by Johannes Andersen (these proceedings).

2. Results from WRC-2000

Radio astronomers made major gains at WRC-2000 in Istanbul. The month-long meeting was attended by about 2,500 delegates, including 17 radio astronomers. Our success was largely due to international coordination of the radio astronomy position over several years. The articles by Ruf and Ohishi (these proceedings) explain the background to the WRC.

2.1. New allocations above 71 GHz

Under WRC-2000 agenda item 1.16, new allocations above 71 GHz, guaranteed access was secured to nearly all of the spectrum that is observable from the ground through the three major atmospheric windows. Under the new allocations radio astronomy now has primary allocations to most of the spectrum in the three atmospheric windows between 71 and 275 GHz. In return radio astronomy has given up some of its exclusively passive spectrum.

The allocations before and after WRC-2000 are shown in Figure 1. In essence, radio astronomers have gained access to almost the entire useable spectrum in this frequency range, while renouncing exclusive possession of a small part of it (totalling 3.45 GHz). Furthermore, radio astronomy use of bands up to 945 GHz is now officially acknowledged via footnote S5.565. The current limit of ITU-R allocations is 275 GHz. Allocations above 275 GHz have been placed on the agenda for WRC-2006.

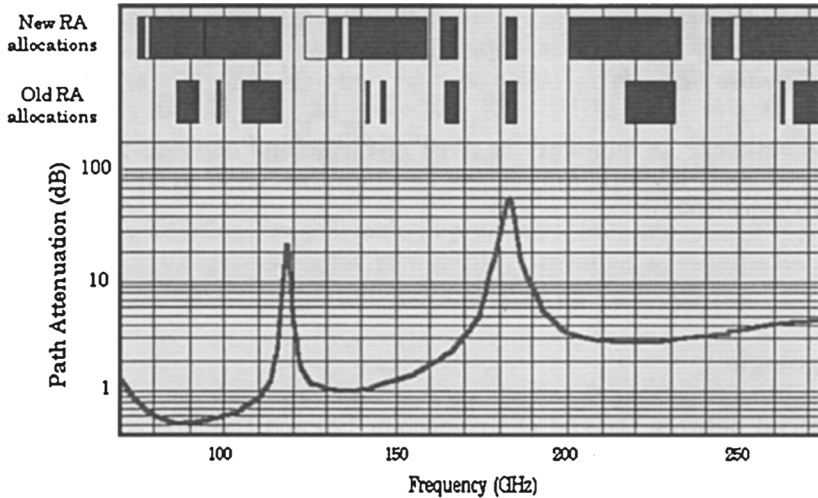


Figure 1. New frequency allocations to radio astronomy in the frequency range 71 to 275 GHz, compared to previous allocations. The solid curve shows how atmospheric attenuation varies with frequency. (Figure courtesy of John Whiteoak, ATNF.)

2.2. Unwanted emissions

WRC-2000 finalized several issues concerning spurious emission limits. The design objectives for spurious emissions from satellites are now hard limits which will apply to all new systems from 1 January 2003 and to all systems from 1 January 2012. This is an important step for the protection of radio astronomy. The actual limits introduced at WRC-2000 will not guarantee protection of radio astronomy in all frequency bands, but the possibility has been left open for WRC-03 to set tighter regulatory limits in specific bands for specific satellite services (either for spurious emissions or out-of-band emissions). A new ITU-R Task Group 1/7 is responsible for the technical studies.

2.3. Regulatory protection from new satellites

Under agenda items 1.4, 1.14 and 1.15, radio astronomy had mixed fortunes. WRC-2000 made further allocations of satellite downlinks very close to radio astronomy bands. However regrettable this may be to astronomers, the administrations have tried to help us. The affected radio astronomy bands have been given strong regulatory protection from the relevant satellite transmissions, via a new generation of tough footnotes. The new footnotes state that the satellite systems *shall* protect radio astronomy observatories to specified power flux-

density levels calculated by radio astronomers, for a percentage of time agreed by radio astronomers. This is the first time that interference thresholds for radio astronomy have appeared in the Radio Regulations.

3. Developments within the UN

The seeds planted by Symposium 196 have started to bear fruit in the UN arena. In February 2000 the IAU contributed, by invitation, to the COSPAR/IAF Symposium on "Space Commercialization: An Era of New Opportunities and Challenges", held during the thirty-seventh session of the UN Committee for the Peaceful Uses of Outer Space (COPUOS). The following year, the IAU, ITU and OECD were invited to make presentations on the regulatory mechanisms for radio astronomy to the Scientific and Technical Subcommittee of COPUOS at its thirty-eighth session, in Vienna in February, 2001. The IAU also made an invited contribution to a COSPAR/IAF Symposium on "Terrestrial Hazards from Outer Space Objects and Phenomena", held in conjunction with the COPUOS meeting. Johannes Andersen was asked to summarise the Symposium on behalf of COSPAR, and also read an official statement on behalf of the IAU, which outlined the broader environmental perspective.

As an unexpected windfall, the US delegation announced that Congress had passed a law banning, in quite sweeping terms, all "Obtrusive space advertising" (i.e., visible from the ground with the naked eye), and had instructed the President to initiate negotiations towards international agreement to the same end.

4. Other Progress

On 1st October 1999, the Chilean Lighting Guideline (Norma Luminica) for controlling light pollution was established (Decreto Supremo No. 686/99, signed by President Frei); this guideline sets up a legal framework for protecting the skies of Northern Chile, based on environmental legislation. There is now an "Office for the Protection of the Chilean Skies" (Oficina Para la Protección de los Cielos Chilenos, OPCC, with its own web site <http://www.opcc.cl>).

In August 2000 the IAU General Assembly in Manchester set up a new Commission 50 Working Group on Light Pollution, with Malcolm Smith as the first Chairman. Division X, Commission 40 (Radio Astronomy), also set up a new Working Group on Interference Mitigation, with Tassio Tzioumis (ATNF) as its first chairman.

The OECD Global Science Forum Task Force on Radio Astronomy held its first meeting in March 2001, under the chairmanship of Mike Goddard (Radio-communications Agency, UK). The terms of reference of the group are given in Appendix 2.