IAU XXIX: Resolution B4 Briefing Paper

This document provides additional background information for the proposed IAU Resolution B4 (Protection of Radio Astronomy Observations in the Frequency Range 76 - 81 GHz from Interference Caused by Automobile Radars).

Commission 40 has jointly drafted this Resolution with IUCAF, an Inter-Union Committee on Allocation of Frequencies (see at http://www.iucaf.org/), which the IAU subsidizes to support its activity in protecting radio astronomy.

International rules in using "radio frequency", the Radio Regulations, have been established by the International Telecommunication Union (ITU). The Radio Regulations are routinely revised every three to four years at a World Radiocommunication Conference (WRC) based on "agenda items". No other issues than those listed in the agenda items will be revised. The next WRC is scheduled to be held November this year in Geneva. Several agenda items in the next WRC are related to radio astronomy and one of these, agenda item 1.18, considers possible new allocation to car radars; please see "considering"s 4 and 5 of the draft Resolution B4.

Radio astronomy has allocated frequency ranges 76 – 77.5 GHz and 79 – 81 GHz. If the car radar applications are allowed to use the whole frequency region between 76 and 81 GHz, strong interference to radio astronomy observations is highly plausible in the frequency ranges 76 – 77.5 GHz and 79 – 81 GHz. Therefore, the ITU was requested to conduct technical studies on how to avoid such interference (this is called "sharing studies"). A major problem has been that the car radar community attending the sharing studies REFUSED TO IDENTIFY MEASURES to protect radio astronomy observations (see "considering" 6 of the draft Resolution) ! This is a very unusual situation.

An IUCAF document was submitted to a Conference Preparatory Meeting (CPM) held in late March 2015 to solve such situation. The CPM is a meeting held to create a supporting document for administrations (governments) in preparing their proposals towards the next WRC.

At the CPM meeting, IUCAF and other administrations supporting radio astronomy repeatedly requested, to the proponents of car radars, the establishment of "coordination

zones" around radio astronomy observatories. This would be the only way to protect radio astronomy observations between 76 and 81 GHz. This has been fairly standard practice for avoiding interference between different radio services.

The car radar proponents who attended the CPM refused, again, this request without any convincing reasons. In a part of the 76-81 GHz range, radio astronomy and (car) radar services have equal status. Under such a situation both radio services need to discuss how to coexist. As the car radar community has been refusing to coexist with radio astronomy, this may be a violation of the international radio regulatory measures.

The last relevant meeting where this topic was discussed was held in late May in Geneva by Working Party 7D (WP7D). Participants from administrations (mainly from western Europe) supporting radio astronomy stated that they have been seeking a way to protect radio astronomy observations between 76-81GHz.

Following the May discussion, the IUCAF chairman (Masatoshi Ohishi, Japan) contacted the president of Commission 40 (Jessica Chapman) to discuss the idea on a possible IAU Resolution as the IAU is a sector member of the ITU.

This “focused” resolution would provide a united voice on this matter for radio astronomy. This may help improve the situation regarding the interference at 76 to 81 GHz by making it easier to collaborate with supportive administrations and in negotiations at the ITU- related meetings, as well as in discussions with the public and media. Adoption of this Resolution would be a good precedent, showing that the whole astronomy community is concerned about the impact of interference on radio astronomy observations.

The frequency range under discussion is at the low-frequency end of the 3-mm radio astronomy band. This frequency range is used by several millimetre radio telescopes including the Mopra radio telescope in Australia, the NRAO Green Bank Telescope in the US, the 45 m radio telescope in Japan, and the Large Millimeter Telescope (LMT) in Mexico. It will also be used later by ALMA in Chile (Band 2: 67 to 90 GHz). The band is unique to transitions of deuterated species such as HDO, DNC, N_2D^+ that are sensitive probes of molecular clouds and star formation, and is also used for surveys of red-shifted CO.

Masatoshi Ohishi, Chair IUCAF

Jessica Chapman, President Commission 40

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