



Successes and Challenges in Spectrum Management For Radio Astronomy

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1. Extended Abstract

Radio astronomy's history of involvement with spectrum management extends back nearly 60 years to an era when spectrum allocations above 1 GHz were an innovation and radio transmitters, although powerful, were fixed on the ground and widely separated. In 2017, Agenda Item 1.15 at WRC-19 concerns compatibility of radio astronomy with active services working in spectrum at 275 – 450 GHz. 76 – 81 GHz radar-equipped automobiles are also mobile WiFi hotspots and constellations of thousands of satellites are envisioned for global wireless broadband connectivity. Orbiting radars used for remote sensing illuminate the earth's surface with power fluxes sufficient to burn out radio astronomy receivers in a main-beam encounter.

In this talk I will discuss how spectrum management for radio astronomy is responding to the challenges of observing in an increasingly loaded spectrum, when even the most remote astronomical sites are vulnerable. Radio quiet zones are proliferating and are increasingly discussed in an international context. Coordination agreements prevent the illumination of radio astronomy sites by high-power orbiting radars at some frequencies. Some low frequency spectrum is actually clearer after the digital TV transition and TV band repacking: These are success stories. But challenges are yet more numerous. 76 – 81 GHz automotive radars are being introduced in large numbers without imposition of the coordination zones that were envisioned when the radar allocation was first granted. Pure passive service spectrum bands are under increasing pressure from unwanted emissions in adjacent bands, absent clear protection criteria. Radio astronomy is still struggling after 20 years to regain use of the 1612 MHz OH band, free from harmful interference resulting from unwanted emissions of a mobile-satellite provider operating in nearby spectrum.

That said, terrestrial radio astronomy is operating successfully at frequencies from 50 MHz to 1 THz, and I will try to summarize the role that spectrum management has played and project what will be needed for the future.