DC TO DAYLIGHT: SPECTRUM MANAGEMENT AND THE NEW RADIO ASTRONOMY

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Abstract Submission Form

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Radio astronomers are increasingly outfitting existing radio telescopes with the capability to acquire data well outside of bands allocated to the radio astronomy service. Envisioned next-generation radio telescopes, such as the Square Kilometer Array, will go one step further by *requiring* this capability to carry out some of their fundamental scientific goals. At the same time, the general population (including radio astronomers) is driving unprecedented demand for access to the radio spectrum by licensed services and unlicensed devices for the provision of cellular phone communications, wireless networks, satellite radio and television, and a wide range of other ubiquitous modern conveniences. As a result, radio astronomers face a number of significant issues that impact the future of radio astronomy:

1) The increased reliance on interference mitigation and excision techniques that, although promising, remain nascent and unproven on a large scale. Out-of-band observing will increasingly require robust hardware and software that can simultaneously contend with strong signals originating from a multitude of directions at multiple frequencies and with differing modulation waveforms.

2) The development of cognitive radios, software-defined radios, and other opportunistic transmission technologies that will make it harder to predict the specific nature of interfering signals. In addition, many concepts for listen-before-transmit schemes to be used in cognitive and software radios either cannot or do not take into account the existence of sensitive and purely passive services such as radio astronomy. At the same time, radio astronomers hoping to increase the efficiency of out-of-band observing may draw upon some of the opportunistic techniques developed for cognitive radios.

3) The increased non-regulation of new and potentially interfering technologies as "unlicensed devices," a designation that tends to increase the penetration rate of the devices while simultaneously complicating the ability to identify the specific source(s) of interfering transmissions. Ultrawideband (UWB) transmitters, vehicular radars, and Broadband over Power Line (BPL) systems are examples.

4) The deployment of next-generation millimeter and sub-millimeter radio telescopes that portend the need to extend radio astronomy frequency allocations, and the allocation tables themselves, beyond the present 275 GHz limit.

5) Consideration of "out-of-the-box" concepts such as possible trade-offs in the blanket designation of protected radio astronomy bands in exchange for enhanced regulatory protection in the vicinity of radio astronomy observatories.

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2. J - Radio Astronomy
3. (a) Plenary
4. I - Invited Paper, Program chair: Andrew Clegg
5. This abstract is for the first of two talks for the plenary session. The second is being submitted by Al Gasiewski.