

Beamed Wireless Power and Information Transmission

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Abstract/Résumé

Wireless Power Transmission is becoming a reality and a million-dollar industry, mainly for short-range energy conversion, where mobile phones and electric cars are already making a profit from this approach in battery charging using wireless connections.

Nevertheless, with the rise of 5G and future 6G solutions, and massive IoT devices long-range WPT started to be an important asset and an important research area that is being followed by academia, industry, and research labs. Wireless Power Transmission has been sought from several research teams over the years. If short-range WPT is already a viable solution for commercial devices, long-range WPT is not. Long-range WPT suffers from very low energy efficiency, due to several low-efficiency system blocks, mainly the air interface and the RF-DC converters.

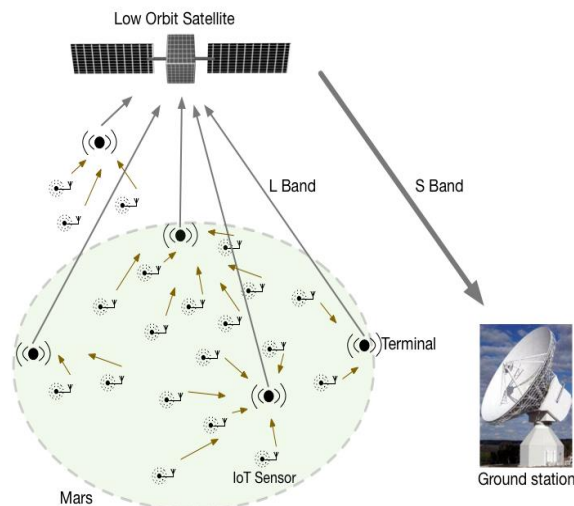


Figure 1: System concept for Internet of Space Things

In this talk, we will address several topics, including the optimization of Focus of energy rather than beams of energy as a way to maximize WPT for a specific point in space, and we will also discuss RF-DC converters, mainly by addressing specially designed waveforms for WPT links. This will be complemented with the proposal and discussion of an information link that will be explored to gather real-time information on the received power at the WPT receiver.

Finally, non-directive far-field low-power Simultaneous Wireless Information and Power Transfer (SWIPT) will be addressed as a way to make Massive IoT and space-based probes a reality using backscattered radio solutions.