

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Technologies for Space Communications and Navigation (3)

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30755497@qq.comTHE PROGRESS OF SOFTWARE DEFINED RADIO TECHNOLOGY FOR SPACE
COMMUNICATION**Abstract**

This paper mainly focuses on the progress of software defined radio (SDR) for space communication application. Since the term of SDR was first introduced by Joe Mitola in 1991, it becomes one of the most attractive communication technology with the advantages including inherent dynamic flexibility and upgradeability based on open architecture and consists of a common, generic hardware platform. Compared with the conventional communication modes, SDR defines a collection of hardware and software technologies where some or all of the radio's operating functions are implemented through modifiable software or firmware operating on programmable processing technologies. These devices include field programmable gate arrays (FPGA), digital signal processors (DSP), general purpose processors (GPP), programmable System on Chip (SoC) or other application specific programmable processors. The use of these technologies permits new wireless features and capabilities to be added to existing radio systems without requiring new hardware. SDR have been successfully deployed in defense applications such as the SPEAK easy program. At the same time, the superiorities of SDR also attract the attention of space communication and navigation. Several cases are demonstrated in this paper. NASA is developing a space experiment of multiple SDRs each with various waveforms to communicate with TDRSS satellites and ground networks, and GPS constellation. Another case is for CubeSat system. SDR permit that CubeSat will be able to change operations at any point during the lifetime allowing satellites to be re-tasked after their primary mission finished. Finally, the future of SDR technologies for space applications are mainly presented.