

DESIGN OF SOFTWARE DEFINED RADIO (SDR) WAVEFORMS FOR PORTABILITY AND INTEROPERABILITY

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Abstract

The way war is fought depends on the age. The war fighting tactics have been evolving along with the technology innovation. Accordingly, military community is transforming the battlefield of 21st century around Network-Centric Warfare (NCW). As such, the armed forces fight future wars that will be Network-centric. Anything from satellite to soldiers and everything in between whether manned ships, aircraft, ground vehicles, unmanned missiles, sensors and UAVs, secure wireless communications will be the core. The NCW demands voice, video and data capabilities with megabit bandwidths and security so that, seamless sharing of battle field information happens in a timely manner. Hardware intensive radio systems that are currently in use with many armed forces across the globe has limited utility, since parameters for each of the functional modules are fixed. Therefore, existing communication systems is being replaced with digital radio systems called as Software-Defined Radio (SDR). Once deployed, these radios need to be reconfigured periodically to meet the prevailing operational needs. Accordingly, wireless devices and network equipments are reconfigured, enhanced and upgraded through software updates that define the radio functionalities. In military terms it is called as "waveforms". SDR deployed in the battle field vary in size and capability with variety of form factors such as handheld, man pack, airborne, base station, maritime/ ship borne etc. However, the common requirement for all of them is the need to remain in network with portable and interoperable waveforms. It implies that, the waveforms can be used across all platforms with minimal modification with the same baseline architectures while satisfying the specific demands of the application.

This paper highlights the portability and interoperability design requirements, prevailing standards, methods of compliance etc, so that they become eligible for network-centric warfare. Paper also make proposal for centralized SDR waveform configuration control through the approach called "certified waveform repository".

Keywords: NCW, SDR, Waveforms, Interoperable, Portable