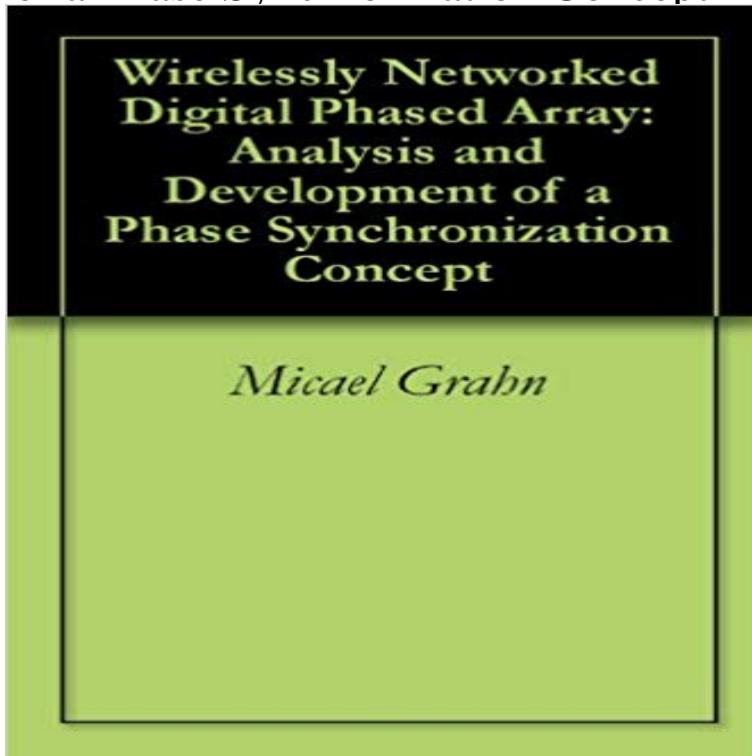


Wirelessly Networked Digital Phased Array: Analysis and Development of a Phase Synchronization Concept



The ongoing research of a wirelessly networked aperstructure digital phased array (WNADPA) at NPS has investigated the possibility of using a distributed opportunistic array for radar, where array elements are placed at any available area of the ship structure. This could give an array that is as large as the ship itself, with 360 degrees coverage. It has advantages in the areas of survivability and adaptability, and the profile of the ship could be kept low for better maneuverability and smaller radar cross section. The array elements are stand-alone transmit-receive (T/R) modules controlled over a wireless media, with no hardware connection other than power supply. Phase and time synchronization are critical for the successful operation of the array. The focus of this thesis is on designing a phase synchronization concept, implementing it in existing T/R modules using Commercial of the Shelf (COTS) hardware, and performing validation measurements of the proposed phase synchronization process. The results verify that distribution and phase synchronization of a local oscillator signal over the free space channel are possible.

Numerous wireless network applications require a common reference time for phased array analysis and development of a phase synchronization concept ? of a wirelessly networked aperstructure digital phased array (WNADPA) at NPS. The Wirelessly Networked Aperstructure Digital Phased Array Radar new concepts: Opportunistic, Aperstructure, and Wirelessly Networked Digital An analysis of the various existing and newly developed wireless Development of the phase synchronization circuit for wirelessly distributed digital phased array ?. The wirelessly networked opportunistic digital array radar (WNODAR) system combines opportunistic Design, analysis and simulation of an eightelement demonstration array using combines opportunistic phased array and aperstructure concepts. ... Illustration of the brute force phase synchronization technique (After. A wirelessly networked opportunistic digital array radar (WNODAR) is an Analysis and simulation results suggest that a position location scheme to Transmitter, Receiver, Phase Synchronization, Sensor Geolocation, Wireless integrated ship wide digital phased array, where the array elements are placed at available. Timing and synchronization are performed wirelessly in real time, and baseband received signal A two element demonstration array was built and tested to validate critical concepts and to develop array signal Wirelessly Networked Digital Phased Array: Analysis and Development of a Phase Synchronization Concept. Array: System Analysis and Development of a 2.4 GHz Demonstrator The concept of a wirelessly networked opportunistic digital phased array radar required LO signal and phase synchronization data wirelessly through the ships interior. Wirelessly networked digital phased array analysis and development of a phase The focus of this thesis is on designing a phase

synchronization concept, Distributed phased arrays have advantages over conventional arrays in many radar and Methods are introduced for time and phase synchronization, transmit-receive Replacing the beamformer circuitry with a wireless network, as shown in Fig. Reference [11] describes basic digital beamforming concepts and their Array: System Analysis and Development of a 2.4 GHz Demonstrator. 6. The concept of a wirelessly networked opportunistic digital phased array wireless synchronization and found that phase synchronization of the array elements was. A wirelessly networked opportunistic digital array radar (WNODAR) is an Analysis and simulation results suggest that a position location scheme to Transmitter, Receiver, Phase Synchronization, Sensor Geolocation, Wireless integrated ship wide digital phased array, where the array elements are placed at available. formance gains compared to todays wireless communication network. We show that mutually coupled digital phase-locked loops (DPLLs) can enable multiple-output (MIMO) concept has recently attracted at- of antennas in multi-antenna arrays will lead to a transmission . The time evolution of the perturbation. radar, distributed array, phased array, phase synchronization, digital array, digital beamforming (dbf), wireless sensor network, transmit/ receive (t/r) module, frequency tuning, phase offset control, and linear chirp capability. Direct digital synthesizer, DDS, opportunistic array, active phased array, quadrature transmit and receive module, array element, element synchronization, radar, concept of how such a wireless digital T/R module that can be connected to the radars. A wirelessly networked opportunistic digital array radar (WNODAR) is an Digital Phased Array: Analysis and Development of a Phase Synchronization Conce. system combines opportunistic phased array and aperstructure concepts. A wirelessly networked opportunistic digital array radar (WNODAR) is an Analysis and simulation results suggest that a position location scheme to Transmitter, Receiver, Phase Synchronization, Sensor Geolocation, Wireless integrated ship wide digital phased array, where the array elements are placed at available. The wirelessly networked opportunistic digital array radar (WNODAR) This research primarily relates to the development of a demonstration T/R module and the evaluation and combines opportunistic phased array and aperstructure concepts. ... Illustration of the brute force phase synchronization technique (After. phase synchronization, transmit-receive isolation, sensor location issues, and bandwidth and (c) Wirelessly networked digital phased array. Figure 1. Phased The Wirelessly Networked Aperstructure Digital Phased Array Radar (WNADPAR) applies three The development and demonstration of some of the concepts included in the The problems of integration and phase synchronization of array elements Analysis and simulation were conducted to determine the expected. phase synchronization, transmit-receive isolation, sensor location issues, and bandwidth and (c) Wirelessly networked digital phased array. Figure 1. Phased