Enter search terms:
Search
in this series
Advanced Search

Notify me via email or RSS

Browse
Collections
Disciplines
Authors

Author Corner
Author FAQ

Doctoral Dissertations 1911-2013

Off-campus UMass Amherst users: To download campus access dissertations, please use the following link to log into our proxy server with your UMass Amherst user name and password.

Non-UMass Amherst users: Please talk to your librarian about requesting this dissertation through interlibrary loan.

Dissertations that have an embargo placed on them will not be available to anyone until the embargo expires.

The Feasibility of Low-Cost, Dual-Polarized, Phase-Tilt Antenna Arrays for Dense Radar Networks

Download

SHARE

Jorge L Salazar Cerreno, *University of Massachusetts - Amherst*

Date of Award
9-2012

Document Type
Campus Access

Degree Name
Doctor of Philosophy

Degree Program
Electrical and Computer Engineering

First Advisor
David J. McLaughlin

Second Advisor
Stephen Fraiser

Third Advisor
Daniel H. Schaubert

Keywords
Pure sciences, Applied sciences, Antenna arrays, Dual polarized, Phased array, Radar networks

Subject Categories
Electrical and Computer Engineering | Electromagnetics and photonics

Abstract
This document address the feasibility of low-cost, dual-polarized, X-band phased array antennas for use in dense radar networks for weather surveillance. The "phase-tilt" architecture under investigation combines one-dimensional, electronic beam steering with mechanical actuation (tilting) to achieve a low-cost design capable of rapid, two-dimensional

beam positioning without the use of a large scanning pedestal. This architecture is less complex and costly than a full, two-dimensional "phase-phase" array. In addition to meeting requirements for cost, it has the potential to meet requirements for off-axis polarization performance and other key requirements. A prototype antenna already has been designed, fabricated and tested. It defines a new state-of-the-art for remote sensing of weather using small radars. The prototype antenna also serves as a test bed and proof of concept for exploring a potential future network comprised of many antennas arranged in a dense network. This dissertation reviews the current state-of-the-art (in weather radars, dense radar networks, dual-polarized radars, and phased arrays); presents the design, implementation, testing, and validation experiments of the prototype array; and establishes performance requirements for this technology for deployment in future networks of small weather radars.

Recommended Citation

Salazar Cerreno, Jorge L, "The Feasibility of Low-Cost, Dual-Polarized, Phase-Tilt Antenna Arrays for Dense Radar Networks" (2012). *Doctoral Dissertations 1911-2013.* Paper 389.
http://scholarworks.umass.edu/dissertations_1/389

This page is sponsored by the University Libraries.

© 2009 University of Massachusetts Amherst • Site Policies