UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

Module Title: Software Defined Radio Applications for Radar and Localization Systems

Lecturers:

Prof. Augusto Aubry

University of Naples "Federico II"
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CV: *Augusto Aubry received the Dr. Eng. degree in telecommunication engineering (with honors) and the Ph.D. degree in electronic and telecommunication engineering both from the University of Naples Federico II, Naples, Italy, in 2007 and 2011, respectively. He is currently under research agreement with the Department of Electrical and Information Technology Engineering, University of Naples Federico II. His research interests include statistical signal processing and optimization theory, with emphasis on MIMO communications and radar signal processing.*

Dr. Vincenzo Carotenuto

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CV: *Vincenzo Carotenuto received the M.Sc. degree in telecommunication engineering and the Ph.D. degree in electronic and telecommunication engineering from the University of Naples Federico II, Naples, Italy, in 2010 and 2015, respectively. He is currently under research agreement with the Department of Electrical and Information Technology Engineering, University of Naples Federico II. His research interest lies in the field of statistical signal processing, with an emphasis on radar signal processing.*

Prof. Antonio De Maio

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CV: *Antonio De Maio received the Dr. Eng. (Hons.) and Ph.D. degrees in information engineering from the University of Naples Federico II, Naples, Italy, in 1998 and 2002, respectively. He is currently a Professor with the University of Naples Federico II. His research interest lies in the field of statistical signal processing, with emphasis on radar detection, optimization theory applied to radar signal processing, and multipleaccess communications.*

Credits: 3

Overview

The course provides an overview about Software Defined Radio (SDR) devices and their applications to radar and localization systems. The first part introduces basic concepts and system architectures of SDR devices with some examples of SDR apparatus. The second part provides practical examples on the application of SDR architectures to radar. In particular, after introducing the foundations of Continuous Wave (CW) and Frequency Modulated Continuous Wave (FMCW) radars, their working principles are practically illustrated via COTS SDR devices. The last part of the course is focused on SDR tools applied to Global Navigation Satellite System (GNSS), Automatic Dependent Surveillance-Broadcast (ADS-B), Direction Finding (DF), along with some advanced algorithms involved in the corresponding signal processing blocks.

Schedule

Lecture	Date	Time	Topics	Lecturer
1	22/11/2021	17:00-19:00	Basic concepts and system architectures of SDR devices with some examples of SDR apparatus.	V. Carotenuto
2	23/11/2021	14:30-16:30	Foundations of Continuous Wave (CW) and Frequency Modulated Continuous Wave (FMCW) radars.	A. De Maio
3	24/11/2021	17:30-18:30	SDR applied to CW and FMCW radars.	V. Carotenuto
4	25/11/2021	14:30-16:30	Foundations of Global Navigation Satellite System (GNSS).	A. Aubry
5	26/11/2021	17:30-18:30	SDR applied to GNSS.	V. Carotenuto
6	-29/11/2021	17:00-19:00	Automatic Dependent Surveillance-Broadcast (ADS-B) with SDR implementation.	V. Carotenuto
7	30/11/2021	17:00-19:00	Direction Finding (DF) techniques with practical examples via SDR.	V. Carotenuto
	TBD	TBD	Assessment test	

Online lectures are provided via Microsoft Teams
Team Code: **3k1vqvy**

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