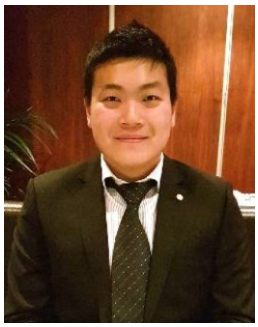
IEEE Control, Aerospace and Electronic Systems Chapter, South Australian Section

University of South Australia

Next Generation Solutions for Passive ISAR and Improved Situational Awareness



Dr. Chow Pui
University of South Australia

Venue: W1-06, W Building, University of South Australia, Mawson Lakes (grid D8 on map)

Date: Friday 19th July
4:00pm - 5:00pm

Abstract

The implementation of inverse synthetic aperture radar (ISAR) technique on passive bistatic radar (PBR) enables the system to detect while construct high resolution image from a moving target covertly. The communication satellites that transmit digital video broadcasting-satellite (DVB-S/S2) signals with relatively large bandwidth are potential illuminators of opportunity to provide excellent range resolution for such purpose. This advantage will become more significant when the signals from multiple transponders are captured and combined coherently to further improve the target image resolution. However, these signals are separated by band gaps due to the filters applied by the transmitters for inter-symbol interference (ISI) minimisation purpose. When ISAR image construction technique is applied, the band gaps between these signals will cause grating lobes at the target image. The compressed sensing (CS) technique is applied to estimate the signal with complete frequency band from the frequency gapped signals by solving an optimisation problem under the constraint of signal sparsity. The grating lobes in the image will be suppressed significantly when performing ISAR image construction using the CS estimated data. The above proposed approaches were investigated using simulations to study the performance of DVB-S2 signals for passive ISAR application.

Speaker

Chow Yii Pui received his B Eng. (Hons) degree (Electrical and Electronic) and PhD. degree from the University of Adelaide, Australia in 2010 and 2017 respectively. He was working as a research assistant for projects involved with tracking the search and rescue downlink signals using a phased array receiver and passive bistatic radar using LTE signals at the Institute for Telecommunications Research, University of South Australia. He is currently working for a passive inverse synthetic aperture radar project as a research assistant at the School of Engineering, University of South Australia. His research interests include passive bistatic radar, phased array and inverse synthetic aperture radar.

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