POLITECNICO
MILANO 1863

DIPARTIMENTO DI
SCIENZE E TECNOLOGIE
AEROSPAZIALI

New Results in orbit Determination and Space Situational Awareness Applications

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Abstract
The proliferation of space objects since the launch of the first man-made satellite in 1950s has made the near-earth space more congested and contaminated. In order to perform space missions well and avoid any collisions between objects, the acquisition of highly accurate and reliable state information of space objects is necessary. My research interests of advanced estimation/filtering in astrodynamics aims to fill in this research gap. In this talk, I will present the orbit determination problem for space objects and our solutions to tackle it. Our new findings in space tracking based on the theory of random finite set and data association based on optimisation methods will also be presented. In addition, I will introduce the current status of the SERC (Space Environment Research Centre) project and activities associated with the RMIT's Robotic Optical Observatory (ROO) for space situational awareness applications.

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30 April 2019 at 11:30
Sala Consiglio DAER, 2nd Floor, Building B12, Campus Bovisa
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