

TRACK 4: AVIONICS**“ALTERNATIVES TO GPS FOR PRECISION AIDING
OF INERTIAL NAVIGATION SYSTEM”**

BY

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Inertial Navigation System (INS) is the equipment of choice for aircraft, Unmanned Aerial Vehicle (UAV) and precision munition Guidance, Navigation and Control (GNC) functions. However, the INS drifts and the errors render it inaccurate after a period of time. The Global Positioning System (GPS) is most commonly used to constrain the errors, but its availability is not assured. Unfortunately, its availability is commonly assumed and most INS do not have alternatives to GPS for aiding. Precision aircraft navigation, flight controls and weapon delivery could be compromised when GPS is unavailable.

This presentation introduces promising alternatives to GPS for aiding the INS. Innovative alternatives such as celestial, image, gravity and magnetic aiding will be presented although the former two will be discussed in greater detail. Through this presentation, the audience will have greater awareness of the GPS's limitations and gain insights into the new technologies that aim to preserve accurate INS operations in GPS-denied environment.

BIOGRAPHY OF SPEAKER

ME5 Eng Kwee Guan joined the RSAF in 1996 as a Senior Technician and is presently an Air Force Engineer. He has served in various appointments in both Air Operations Department (AOD) and AELD. Presently, ME5 Eng is a section head in AELD, overseeing the airworthiness engineering of all RSAF helicopter, transport and trainer aircraft avionics systems.

A Singapore Polytechnic merit and book prize holder, ME5 Eng was the Best RSAF Trainee in his Joint Polytechnic – SAF Diploma Scheme cohort, and Best Knowledge and Trainee from the Officer Cadet School Air Force Service Term.

Awarded the SAF Academic Training Award, he was amongst the top Electrical Engineering (EE) graduate from the Imperial College London and his published and award winning research was the department's top project. He was also placed as U.K.'s top 3 EE student in a national competition.

A recipient of the SAF Postgraduate Award, ME5 Eng obtained a MSc in Defence Technology and Systems from the NUS, and a MSc in EE from the U.S. Air Force Institute of Technology (AFIT). Placed 2nd in his AFIT graduating cohort, ME5 Eng is an honour member of invite-only Tau Beta Pi and Eta Kappa Nu societies, and Institute of Electrical and Electronics Engineers (IEEE). His research was selected for international publication.