SEMS: RESEARCH PROJECT DESCRIPTION

1. Project Background and Description

Advanced Control and Guidance Systems for Intelligent Airport Operations

The Active Routing framework has been developed within the on-going EPSRC project (TRANSIT: Towards a robust airport decision support system for intelligent taxiing, EP/N029496/2), aiming to develop the next generation of air traffic control and management systems and flight deck automation systems. TRANSIT has led to two ongoing EPSRC-QMUL Impact Acceleration projects. Successful applicants will join the multi-disciplinary research team of TRANSIT and have chances to interact with world-renowned industrial partners.

The proposed research will be set within this well-structured UK research environment and run initially in conjunction with TRANSIT and two EPSRC-QMUL IAA projects. The project will extend the Active Routing framework to include appropriate control and guidance systems (e.g. using 'Follow the Greens' concept and future flight deck automation systems). The control and guidance systems will work seamlessly with the Active Routing framework in a dynamically changing airport environment. The project will also investigate human-machine interaction to facilitate the design of best control and guidance systems for intelligent airport operations.

Through the TRANSIT project, successful applicants will have chance to be involved in evaluating the integrated routing, control and guidance capability and pilots' workload, using the in-house developed flight deck simulation and EEG/fNIRS/physiological acquisition facilities at QMUL.

Successful applicants will also be encouraged to apply for the Enrichment scheme offered by the Alan Turing Institute to boost their skills, grow their network and work alongside other Turing researchers, enriching their research and broadening their skills during their time at the Turing.

Successful applicants will also visit my collaborator, Prof Elsa Rubio at National Polytechnic Institute of Mexico for collaborations related to human factors.

2. Project Scope

Three major challenges will be addressed.

(1) The impact of control and guidance systems on routing and scheduling.

(2) The accuracy of control and guidance systems in the context of Trajectory-based taxi operations.

(3) The implications of control and guidance systems on human factors.

3. Desired Skills from the Student

A top Master or undergraduate degree (top 5%) in at least one of the following subjects: operational research, computer science and control systems. Preferably with relevant research experience in human-machine interface, machine learning, computer graphics and feedback control systems, as well as some decent publications.

4. Supervisory Team

Primary: Dr Jun Chen, Senior Lecturer in Engineering Science.

Secondary: Dr Guang Li, Senior Lecturer in Engineering Science.

Additional: Dr Mihcal Weiszer, PDRA in SEMS