SEMS: RESEARCH PROJECT DESCRIPTION

1. Project Background and Description

Simulating Intelligent Airport Airside Operations

A simulation platform for airport ground movement has been developed within the two on-going EPSRC-QMUL Impact Acceleration projects and EPSRC project (TRANSIT: Towards a robust airport decision support system for intelligent taxiing, EP/N029496/2). This platform is capable of processing real-world traffic surveillance data, simulating different operational concepts and analysing airport performance under future traffic demand. 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 simulation platform to include agents for air traffic control and artificial intelligence techniques (e.g. and fuzzy logic) for strategic and tactical decision making. The agents and artificial intelligence methods will leverage the simulation platform capabilities to provide simulated performance indicators for transparent risk evaluation and enable the search for the best air traffic control strategies. The project will focus on creating automated agents 'playing' the role of air traffic controller under current and future trajectory based operations and a collision risk modelling approach to quantify the likelihood of ground incidents to be transformed into accidents and their risk tolerance levels.

Through the EPSRC-QMUL IAA projects, successful applicants will have chance to be involved in evaluating the trajectory based operations, associated risks and automated agents on wider air traffic control operations through the simulation facilities for in-flight air traffic control at the Alan Turing Institute.

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.

2. Project Scope

Three major challenges will be addressed.

(1) Air traffic controller strategies for current and future trajectory based operational concepts.

(2) Accurate and transparent approaches for the severity information of ground incident cases.

(3) Evaluation of agents and risk modeling using real-world case studies.

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, artificial intelligence. Preferably with relevant experience in programming (including design of graphical user interface, web development or cloud computing), 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 Michal Weiszer, PDRA in SEMS