Analysis of Protocols for High-assurance Networks

(Research Internship Offer in Computer Science/Engineering)

Background

The project aims to provide authentication and reliable communication protocols for unmanned aerial vehicles (UAVs). It covers both internal communication within the UAV and external communication between a ground station and the vehicle. External communication must be resistant against common attacks, such as replay, eavesdropping or pretending to be another party. A necessary requirement therefore is authentication (and often encryption). Since there already exist good solutions for authentication and encryption for communication protocols, we use off-the shelf solutions whenever possible. However, due to hard- and software requirements, these solutions sometimes need adaptation. We follow the same approach with regard to reliability. To show feasibility of the approach, the project aims at building a research demo vehicle, which is a modified quadcopter.

Research Question and Tasks

Aims of the project are the design and the validation of a communication protocol, which also needs to be implemented for our research vehicle. Hence the project combines theoretical aspects with practical implementation.

This project deals with the communication aspects of the SMACCM project. The SMACCM project is part of DARPA's HACMS program for high-assurance cyber-military systems. SMACCM (which stands for Secure Mathematically-Assured Composition of Control Models) is a joint multi-million USD project running for 4.5 years. The team consists of formal verification and synthesis groups in Rockwell Collins, NICTA, Galois Inc, Boeing and the University of Minnesota.

General Information

NICTA (National ICT Australia) is Australia's Information and Communications Technology (ICT) Centre of Excellence. It is an independent company in the business of research, commercialisation and research training. With over 700 people, NICTA is the largest organisation in Australia dedicated to ICT research.

The internship is integrated in *Concurrency and Protocol Verification* (`http://ssrg.nicta.com.au/projects/concurrency/home.pml`), a highly motivated group with different backgrounds (e.g., formal methods and network engineers), working at different institutes (UNSW, NICTA, UQ, and Macquarie University). The successful applicant will work together with Prof. Rob van Glabbeek and Dr. Peter Höfner.

Sydney is the largest and most populous city in Australia. It is located on Australia's south-east coast of the Tasman Sea. With an approximate population of 4.5 million in the Sydney metropolitan area the city is the largest in Oceania. Sydney also ranks among the top 10 most liveable cities in the world according to Mercer Human Resource Consulting and The Economist.

Unfortunately, NICTA, as the host institute, cannot offer further financial scholarships.

Contact Information

If you have any questions concerning the internship, please do not hesitate to contact us:

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