

## PhD Scholarship at Australian Centre for Space Engineering Research

Required Background: Bachelor Degree in Elec/Telecom/ Computer Science Engineering  
Preferred Experience: Signal Processing, Wireless Communications, Optimisation, GPS  
Application Deadline: 31/03/2012  
Supervisors: Dr Jinghui Wu, Prof Andrew Dempster  
Contact: Dr Jinghui Wu ([jinghui.wu@unsw.edu.au](mailto:jinghui.wu@unsw.edu.au))

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### Snap-Shot GNSS Receiver Design

#### Introduction

Multi-system Global Navigation Satellite System (GNSS) is a rapidly developing area of research. It provides opportunities for researchers to explore further the approaches for integrating existing and future GNSS for positioning and timing enhancement. Different satellite systems have different signal characteristics based on CDMA communications.

Processing all of the available GNSS signals and calculating the position in a stand-alone GNSS receiver could require complex hardware and algorithms compared with existing GPS receivers, requiring extra hardware resources with high power consumption. A recent alternative receiver structure utilises an Assisted-GPS concept by utilising a “Snap-Shot” data processing algorithm, similar to the “Collective Detection” method for signal sensitivity enhancement.

#### Work Description and Expected Outcomes

The major objectives of this research are to investigate the possible implementation algorithms and system architectures for the efficient data collection in the client receiver, data processing in the server receiver and the network communication (synchronisation) between client and server receivers.

The major research work and outcomes could be:

- 1) Precise estimation of all the visible satellites' positioning related parameters;
  - 2) Search engine design and optimisation;
  - 3) Signal compression for efficient data collection and transmission;
  - 4) Network communication structure between receivers;
  - 5) Design and implementation of weak signal detection algorithms and mathematical prediction for the associated maximum likelihood estimation;
  - 6) Performance analysis for error source mitigation such as for thermal noise, multipath, and interference.
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ACSER and the Garada Project will be providing scholarships for some students. All prospective students should, however, apply for:

- Australian Postgraduate Award (APA; for Australian citizens) OR an
- International Postgraduate Research Scholarship (IPRS; International students).

Suitability for the ACSER and Garada scholarships will be assessed in the same way as applicants for APA and IPRS. For more information about these scholarships please go to <http://research.unsw.edu.au/postgraduate-research-scholarships>.

Further Information on the project may be obtained from Dr Jinghui Wu ([jinghui.wu@unsw.edu.au](mailto:jinghui.wu@unsw.edu.au)).