ACSER
AUSTRALIAN CENTRE FOR SPACE ENGINEERING RESEARCH

THE UNIVERSITY OF NEW SOUTH WALES
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# PhD Scholarship at Australian Centre for Space Engineering Research

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| Required Background: | Bachelor / Masters Degree in Elec. / Telecom. Engineering |
| Preferred Experience: | Wireless Communications, Signal Processing |
| Application Deadline: | 31/03/2012 |
| Supervisors: | Nagaraj Shivaramaiah, Prof Andrew Dempster |
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## Cognitive GNSS Receiver Design

The aim of this research is to conduct a detailed investigation of the concept of multi-frequency multi-system Global Navigation Satellite System (GNSS) receiver design based on the principles derived from the cognitive radio (CR) technology. The receiver so designed is referred to as "Cognitive GNSS Receiver (CGR)".

Designing a receiver that benefits from multiple GNSS transmitting navigation signals at multiple frequencies has been an attractive research topic in recent years. As the number of signals and systems grows, so does the receiver complexity and hence its practicality comes into question. In contrast to an FM/AM radio where the listener "tunes" the radio to a particular station based on his/her interest and the quality of reception as perceived by his/her ears, a GNSS receiver must be "self-adaptable" since the performance parameters cannot be easily comprehended by the user. The principles of CR that make use of the radio´s "internal states", "external environment" and "system related knowledge" to make the decisions help the radio to be self-adaptable, can come to the rescue at this juncture.

The major objectives of this research are

1) to develop the ontology and its rationale for the design of a CGR,
2) to develop architecture(s) of the cognition/decision module in CGRs, and
3) to study several "use cases" each constrained by a different set of performance metrics such as the cost (resource utilisation and power consumption) per fix, the Time-to-First-Fix (TTFF), the acquisition/tracking sensitivity and the solution accuracy.

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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 Nagaraj Shivaramaiah ( nagaraj@unsw.edu.au ).