The
International Symposium
on GPS/GNSS

GNSS

SYDNEY 2004

6 - 8 December 2004
The University of New South Wales
Sydney Australia
www.gnss2004.org

Registration Brochure

ABN: 43 248 254 931

INVITATION

The School of Surveying and Spatial Information Systems at the University of New South Wales is proud to host the 2004 International Symposium on GPS/GNSS - GNSS2004, in the beautiful harbourside city of Sydney, Australia.

GNSS2004 Symposium will feature specialised workshops on Sunday 5th December followed by the symposium's keynote speakers, oral sessions and a free trade exhibition from Monday 6th to Wednesday 8th December, 2004. On Monday 6th December, the symposium will feature a session of presentations from the Civil GPS Service Interface Committee (CGSIC).

We invite you to learn and update your skills in hands-on workshops and training sessions, hear compelling keynote presentations from leaders in our profession and evaluate the latest technologies and techniques from our trade exhibitors. Network with your peers and discuss the benefits of the latest technologies.

ORGANISING TEAM & TECHNICAL COMMITTEE

▲ Symposium Convenor: **Dr Jinling Wang** *(University of New South Wales)*

▲ Chair of the Scientific Committee: **Prof. Chris Rizos** *(University of New South Wales)*

▲ Chair of the 5th CGSIC/IISC Meeting: **Mr. Keith McPherson** *(Airservices Australia)*

▲ Chair of the International Program Committee: **Prof. Sang Jeong Lee** *(Chungnam National University)*

▲ Chair of the Publicity and Exhibition Committee: **Dr Craig Roberts** *(University of New South Wales*

▲ Symposium Advisors:

   Prof. Chris Rizos *(University of New South Wales)*   **Rob Henshaw** *(Director, Organisers Australia)*

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GPS WORLD

SUPPORTING ORGANISATIONS

THE UNIVERSITY OF NEW SOUTH WALES

CPGPS

Australian
Global Positioning Systems *Society Inc.*

FIG

IAIM

The symposium is being supported by the following organisations:

▲ **Australian Global Positioning Systems Society Inc.** (GPS Society Inc)
   Free membership and information regarding the GPS Society can be located on www.gps-society.org.

▲ **Australian Institute of Navigation** (AION)

▲ **International Association of Chinese Professionals in Global Positioning Systems** (CPGPS)

▲ **International Association of Geodesy** (IAG) Commission 4

▲ **International Association of Surveyors** (FIG) Commission 5

▲ **The Satellite Navigation and Positioning Group** (UNSW)

▲ **International Association of Institutes of Navigation**

ABOUT THE CIVIL GPS SERVICE INTERFACE COMMITTEE (CGSIC)

On Monday between 11:00am and 3:30pm 6th December, the symposium will feature a session of presentations from the CGSIC.

All interested parties are invited to attend this session only on a complimentary basis. Catering is not included in this complimentary session. Attendance at all other sessions will attract the registration fee listed below.

The CGSIC has existed since 1987 to promote the exchange of information about the NAVSTAR Global Positioning System (GPS) among the worldwide civil user community. The U.S. Department of Transportation Assistant Secretary for Transportation Policy chairs the CGSIC. The Deputy Chair is the Commanding Officer of the U.S. Coast Guard Navigation Center. The CGSIC has several Sub-committees.

CGSIC INTERNATIONAL SUB COMMITTEE

▲ Provides an open international forum to collect and exchange information concerning GPS user needs and suggests courses of action to the Chair of the CGSIC on subjects of concern to the international community.

▲ Identifies the needs of nations for GPS information and distribution methods.

▲ Responds to requests and concerns submitted by the international civil user community, and forwards issues to the Chair of the CGSIC.

▲ Conducts international GPS information studies on civil user needs as requested by the Chair of the CGSIC.

SYMPOSIUM REGISTRATION FEES (6th - 8th December, 2004)

	Early (Before 5th October 2004)	Late (After 5th October 2004)
Full Registration	$695.00	$795.00
Day Registration	$295.00	$345.00
Student Registration*	$395.00	$445.00
CGSIC Session	Complimentary	

A copy of your full-time student/concession card must accompany your registration to receive this discounted rate.

WORKSHOP REGISTRATION FEES (5th December, 2004)

2 hour workshops - Symposium Registered Delegates	$195 per workshop
3 hour workshops - Symposium Registered Delegates	$295 per workshop
2 hour workshops - Symposium Non-Registered Delegates	$295 per workshop
3 hour workshops - Symposium Non-Registered Delegates	$395 per workshop

Full Symposium and Student Registrations include:

▲ Attendance to all Symposium Sessions
▲ Attendance at the Trade Exhibition
▲ Morning/afternoon tea and lunch on 6, 7 & 8 December
▲ Attendance at the Aussie BBQ

▲ Symposium Handbook
▲ Symposium Satchel
▲ Symposium Proceedings CD
▲ Delegate list

A copy of your full-time student/concession card must accompany your registration to receive this discounted rate.

Day Registration includes:

▲ Attendance to Symposium Sessions on registered day
▲ Attendance at the Trade Exhibition
▲ Morning/afternoon tea and lunch on registered day

▲ Symposium Handbook
▲ Symposium Satchel
▲ Symposium Proceedings CD
▲ Delegate list

Day registrations exclude the Aussie BBQ

Workshop Registration includes:

▲ Attendance at registered workshop/s
▲ Workshop Notes
▲ Continuous tea and coffee for all attendees

▲ Lunch box for workshop attendees who book two or more workshops.

CGSIC Session includes:

▲ Complimentary attendance on Monday from 11.00am to 3.30pm. No catering is provided.

SOCIAL FUNCTIONS

Aussie BBQ   *(Inclusive for full delegates, students and trade exhibitors only)*
Monday 6th December, 2004   5.15 - 7.30pm
The Pavilions, UNSW - Kensington Campus
Additional tickets can be purchased at $50.00 per ticket

After an informative first day, the Aussie BBQ will be the ideal opportunity to catch up with friends - old and new. Enjoy a true blue Aussie BBQ, consisting of a variety of delicious salads, meats and bread, topped off with a limited supply of wine, beer and soft drink. Under the warm December star-lit skies, the Aussie BBQ should not be missed.

Coogee Bay Hotel - Networking Dinner   *(Optional - not included in registration)*
Tuesday 7th December, 2004   6.30pm till late
Brasserie Bar, Cnr Coogee Bay Rd & Arden St, Coogee

What better way to enjoy a mouth-watering meal than with first-class views of Coogee Beach? The Coogee Bay Hotel Brasserie offers a large variety of contemporary Australian and International Cuisine from succulent seafood to perfect pastas, or you may prefer the Cook-Your-Own-Steak, like many of the locals do. This evening will be a relaxed opportunity for you to network with your colleagues, whilst enjoying a few cold beverages by the sea. Dinner and drinks are at your own expense.

DISCOUNTED AIR TRAVEL

Corporate Travel Management (CTM) has been appointed the Official Travel Agency of the Symposium. CTM is offering special symposium airfares at up to 40% discount in economy class on QANTAS services, and the best published and Internet airfares on any of the domestic airlines. For all flight reservations and airfare conditions please contact CTM on 1800 630 866 or e-mail: groups@travelctm.com. Please quote tour code "GNSS04".

ACCOMMODATION

Basser College - Symposium Venue
The University of New South Wales - Kensington Campus
Gate 6, High Street, Kensington (see map of UNSW)

Located a hop, skip and jump from the symposium rooms. Basser College provides comfortable and affordable accommodation for those wanting to stay on campus. Basser College rooms are basic consisting of a single bed, desk, chair, wardrobe and hand basin. Showering facilities are communal, but private. There are common areas where guests can watch TV or chill out with a book. Breakfast is provided each morning. If you'd like to stay in, dinner packs can be pre-ordered and collected during breakfast. Coogee Bay restaurants and facilities are located 10 mins away, via public transport.

Student* $36 inc breakfast	Non-student	$50 inc breakfast

Student ID is required to receive student rate.

All of the following apartments are located in central Coogee Beach, 2km (a brisk 30 minute walk) to the University of New South Wales - Kensington Campus. Local bus transport to the University is located almost at your front door and is a short 10 minute bus trip to the University.

Medina Executive Apartments - Coogee

183 Coogee Bay Road, Coogee

At Medina, you will enjoy the difference between staying in a hotel and a Medina Serviced Apartment. With the beach only 200m from the doorstep and centrally located in Coogee Bay, Medina offers a resort lifestyle including indoor heated pool, gymnasium and sauna as well as an abundant choice of cafes, restaurants and bars. Undercover security parking is complimentary. One and two bedroom apartments include separate lounge and kitchen facilities. Two bedroom apartments have a choice of four single beds, one queen bed and two singles, or two queen beds. Please indicate your bedding preference on the registration form.

Studio	$ 129 per studio per night
One Bedroom	$ 197 per apartment per night
Two Bedroom	$ 236 per apartment per night

Coogee Sands Hotel & Apartments

161-167 Dolphin Street, Coogee

Coogee Sands offers a relaxed beachside village atmosphere on one of Sydney's most picturesque beaches, Coogee. A short stroll away you can find yourself immersed in the metropolis of Coogee's finest bistro's, cafes, restaurants and clubs. Each room includes a kitchenette with microwave, air-conditioning, private bathroom/shower, satellite TV, pay movies, direct dial telephone, radio, iron and ironing board, and tea and coffee making facilities.

Deluxe Standard Studio	$145 per room per night
Ocean View Studio	$185 per room per night

Crowne Plaza Hotel

242 Arden Street, Coogee

Crowne Plaza rooms offer a sense of Australian beach life. Each guest room has individually controlled air conditioning, in-house movies and free cable channels, mini-bar and coffee making facilities. At the end of the day you can plunge into the swimming pool, play some tennis, work out in the gym or take a yoga or pilates class in the nearby gym. A full buffet breakfast is served in the Promenade restaurant at $15 per person for conference delegates. Single rooms include a king size bed, twin rooms include two double beds. Crowne Plaza offers two restaurants and two bars, with something to suit everyone. Complimentary undercover parking is available for all guests.

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Single/Double Rooms or Twin rooms	$ 170 per room per night

GENERAL INFORMATION

The Location

University of New South Wales - Kensington Campus

The University of New South Wales (UNSW) is one of the leading teaching and research Universities in Australia. Located in Sydney, the University of New South Wales is situated near the business hub of Australia's largest city, providing easy access to a wide range of academic, cultural and social activities, and less than 5km from some of the most famous beaches in the world.

Map of UNSW
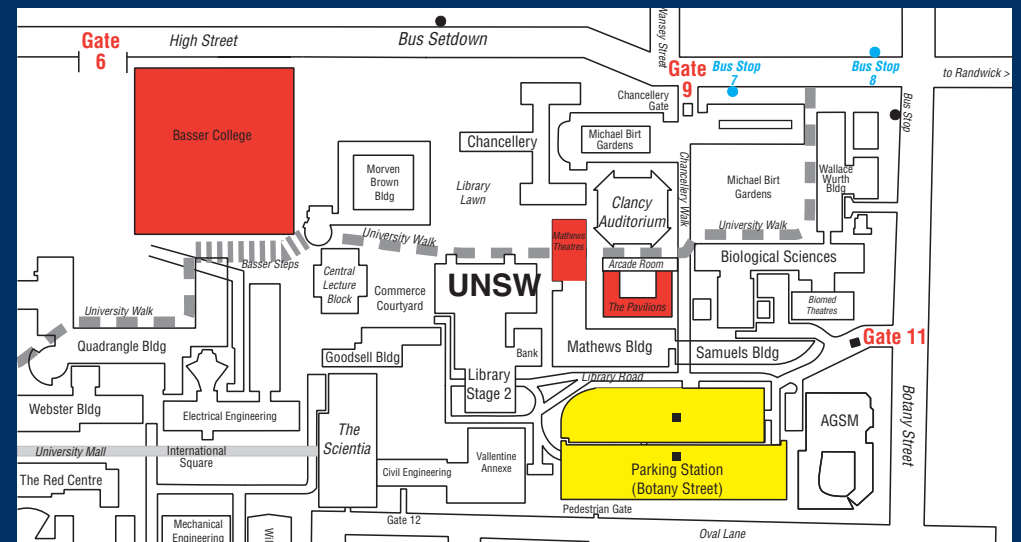
The Mathews Theatres form part of the UNSW symposium district and are only one minutes' walk from The Pavilions. The Pavilions located adjacent to the Mathews Theatres is the location for the trade exhibition and posters. All catering will be served in this area.

Access by Bus

Delegates who will travel from Coogee Beach to the UNSW each day, can do so from Arden Street on Bus 370 (refer to Coogee Beach Map - Accommodation Section). The drop off point at UNSW is Bus Stop 7 (refer to map of UNSW), High Street. Gate 9 is the closest pedestrian access, just a short walk to the symposium.

At the end of the day Bus 370 will stop at Bus Stop 8 (refer to map of UNSW) and travel to Coogee Beach, a 10-minute ride. The majority of our accommodation and the networking dinner have been arranged in the Coogee area for delegates.

Further information can be found on the following web-site by entering (370) into the timetable and map search: www.sydneybuses.info

On Site Parking

Tickets for daily parking at the University can be purchased via the registration form at a cost of $5.00 per day. Entrance is via Botany Street, Gate 11 — see the UNSW map above for directions to the Botany Street Parking Station.

Temperature

During December the average temperatures in Sydney can range between 17 and 25ºC or 63 and 77ºF.

Symposium Office Hours

Sunday 5th December 2004	8.00am - 5.00pm
Monday 6th December 2004	8.00am - 5.00pm
Aussie BBQ	5.15pm - 7.30pm
Tuesday 7th December 2004	8.00am - 5.00pm
Wednesday 8th December 2004	8.00am - 5.00pm

Symposium Website www.gnss2004.org

Restaurants

There are an abundant number of restaurants to suit all tastes and budgets to choose from in the Coogee Bay area.

Dress

A good standard of casual dress is required for attending the symposium. Dress for the Aussie BBQ and Coogee Beach Hotel Networking Dinner is smart casual. The weather can be very warm, so cool loose clothing is recommended for all functions. Don't forget to bring your swimming attire for an early morning swim at the beach.

Name Badges

Your name badge must be worn at all times as it is your entry to all sessions and inclusive functions. Entry will not be permitted unless you are wearing your name badge or have a ticket to attend.

Cancellation Policy and Disclaimer

Registration will only be accepted in writing. Cancellations made prior to 6th November, 2004 will be refunded less $125.00 to cover administration costs. No refunds will be made after this date. As an alternative to cancellation, your registration may be transferred to another person without incurring any penalty. The organisers must be advised of the transfer in writing.

The information in this brochure is correct at the time of printing. The committee and organisers of the International Symposium on GPS/GNSS 2004, reserve the right to change, without notice, any aspect of the symposium program.

Personal Insurance

Participants shall be regarded in every aspect as carrying their own risk for personal injury and, loss or injury to property, including baggage during the symposium. We strongly recommend that at the time of booking your travel and tours, you take out a travel insurance policy of your choice. The policy taken should include loss of deposit through cancellation, medical insurance, loss or damage to personal property, financial loss incurred through disruption to accommodation or travel arrangements due to strikes or other industrial action. The organisers will be in no way responsible for any claims concerning insurance.

Liability

In the event of industrial disruptions, the symposium and the organisers accept no responsibility for losses incurred by delegates and partners.

Payment

All prices are in Australian dollars and are inclusive of GST (unless otherwise stated). Cheques should be made payable to "GNSS2004" and forwarded to Organisers Australia. Cheques or bank drafts must be made out in Australian currency and drawn on an Australia bank. Payment by credit card is acceptable for registration and function tickets. Registrations will not be processed until payment is received. Discounted Early Bird registration fees are only applicable if the registration form AND PAYMENT are received by no later than 5.00pm on 5th October, 2004.

Accommodation

Group bookings have been arranged at discounted rates and all accommodation should be booked through Organisers Australia. Please indicate your 1st and 2nd preference. Although every effort will be made to secure your 1st, your 2nd preferred choice will automatically be selected if your 1st preference is not available. A minimum deposit of one night's room charge is required to secure your booking if payment is made by cheque. When payment is made by credit card, no monies will be deducted by Organisers Australia, however your credit card details will be forwarded to your hotel as security for your booking. If the credit card is in the name of a person other than yourself, it will be necessary to complete the authorisation attached to the Registration Form.

No Wheel Chair Access to Mathews Theatres

The Mathews Theatres at the University of New South Wales are located on the first floor of the Mathews building and only have access via stairs. No lifts are provided and it is strongly recommended that delegates with walking disabilities do not consider attendance at this symposium.

GNSS2004 OPTIONAL WORKSHOPS - Sunday 5th December, 2004

To complement the symposium, the following series of workshops are available for delegates to book and are in addition to the symposium which is scheduled from Monday 6th December to Wednesday 8th December, 2004.

WORKSHOP 1A: 9.00am - 11.00am *(2 hours)* **TITLE:** Real-time Kinematic Positioning **INSTRUCTOR:** Professor Will Featherstone - *Curtin University of Technology WA*	**WORKSHOP 1B:** 11.45 - 1.45pm *(2 hours)* **TITLE:** GPS Receiver Technology **INSTRUCTOR:** Dr Rod Bryant - *SigNav Pty Ltd ACT*	**WORKSHOP 1C:** 2.00pm - 5.00pm *(3 hours)* **TITLE:** GALILEO. Development and Design of the European Global Navigation Satellite System **INSTRUCTOR:** Professor Guenter W Hein - *University FAF MUNICH*
WORKSHOP 2A: 8.30am - 11.30am *(3 hours)* **TITLE:** GPS Modernization **INSTRUCTOR:** Professor Per Enge - *Stanford University CA*	**WORKSHOP 2B:** 11.45 - 1.45pm *(2 hours)* **TITLE:** GPS Data Collection for Integration with Geographic Information Systems (Precision GIS) **INSTRUCTOR:** James Millner - *Dept of Sustainability & Environment VIC*	**WORKSHOP 2C:** 2.30pm - 4.30pm *(2 hours)* **TITLE:** Aviation Applications of GNSS in Australia **INSTRUCTORS:** Professor Brian O'Keeffe AO - *Fans Plans ACT* Captain Ian Mallett AFC - *CASA ACT*
WORKSHOP 3A: 9.00am - 11.00am *(2 hours)* **TITLE:** Pseudolites **INSTRUCTOR:** Dr Joel Barnes - - *University of New South Wales NSW*		

WORKSHOP 1A: *(2 hours)*

TITLE: Real-time Kinematic Positioning.

INSTRUCTOR: Professor Will Featherstone

INSTRUCTOR'S BIOGRAPHY: Professor Featherstone holds a first class BSc (Hons) in Geophysics and Planetary Physics from the University of Newcastle-upon-Tyne and a DPhil in Geodesy from the University of Oxford. His primary research area is geoid determination and he was chief investigator on a project to determine the Australian geoid released as AUSGeoid98. His other research interests include satellite geodesy, coordinate systems, map projections, GPS height determination, exploration geophysics and regional geodynamics. He is the author of over 110 peer-reviewed publications in these fields since 1991 and has attracted over $2.5m to the University for his research since 1994. He is a consultant to Government and several Western Australian surveying, mapping and mining companies. In 2001, Will was appointed as Associate Dean (Research) for the Division of Resources and Environment. He is currently editor-in-chief of the Journal of Geodesy and editorial board member of Geomatics Research Australasia. He is also Western Australian Node Coordinator for the CRC in Spatial Information. He was senior author on one of the earliest papers testing the integrity of real-time kinematic (RTK) GPS systems, and has been engaged as a consultant to Main Roads Western Australia to set standards and best practices for RTK GPS surveys. He has also served as an expert witness in the Western Australian courts on matters of GPS and coordinate geodesy.

WORKSHOP SYNOPSIS: This two-hour workshop will cover the following topics in real-time kinematic (RTK) positioning from satellite-based systems:

1. **Principles** *(fundamental concepts, modes of operation, satellite systems, error sources and their mitigation)*

2. **Equipment** *(basic configurations, hardware and software, communication options, what to look for when purchasing an RTK system)*

3. **Methods** *(classical, semi-kinematic and OTF techniques, practical tips, quality control and quality assurance, accuracy expectations, coordinate transformations)*

4. **Problems and best-practice procedures** *(data latency, OTF ambiguity resolution, radio communications, field calibrations, datum definition, occupation time)*

5. **Applications summary** *(vehicle navigation - land sea and air, topographic and hydrographic surveying, machine guidance)*

6. **Future developments and accuracy expectations** *(new satellite systems, integration with complementary sensors, long-range RTK positioning)*

A comprehensive set of course notes will be supplied to each participant. You may also bring RTK data or case studies to be discussed during the workshop. If you intend to do this, please contact the presenter (08 9266 2734, 0438 923 018, W.Featherstone@curtin.edu.au) at least one-week before the workshop.

WORKSHOP 1B: *(2 hours)*

TITLE: GPS Receiver Technology

INSTRUCTOR: Dr Rod Bryant

INSTRUCTOR'S BIOGRAPHY: Rod Bryant is the CEO and CTO of SigNav Pty Ltd. SigNav's mission is to deliver embedded GPS technology to world markets in conjunction with partner semiconductor companies. The company supplies OEM modules and embedded GPS receiver development kits and offers intellectual property and engineering services associated with GPS integration. Until 1994, Dr. Bryant worked at Auspace Limited for 8 years in a variety of Engineering, Management and Business Development roles associated with Satellite Engineering. Before joining Auspace, Rod was engaged in realtime ultrasonic imaging research at the University of Adelaide. He was awarded a William Culross Prize for his PhD research on the related topic of Optimal Systems For Echo-Location. Prior to 1981 Rod was a Telecommunications Engineer with Telecom Australia where he commenced as a Trainee Technician in 1969.

WORKSHOP SYNOPSIS: This workshop will review the fundamentals of GPS receiver design with reference to the past, present and future. Elements of the discussion will include:

1. GPS Receiver Hardware Blocks - yesterday, today and tomorrow,
2. GPS Correlator Hardware concepts,
3. GPS Receiver Signal Processing options,
4. Navigation Filter options,
5. Carrier Smoothing Filter concepts,
6. Embedded GPS,
7. Weak Signal GPS - what is it and what are the implications of it?

The level of detail will be sufficient to provide practicing electronics and software engineers and other experienced GPS professionals with an oversight of GPS receiver technology.

WORKSHOP 1C: *(3 hours)*

TITLE: GALILEO. Development and Design of the European Global Navigation Satellite System

INSTRUCTOR: Professor Dr Guenter W Hein

INSTRUCTOR'S BIOGRAPHY: Guenter W. Hein is Director of the Institute of Geodesy and Navigation, University FAF Munich. Present research activities include high-precision satellite positioning and navigation and the combination with other sensors. Prof. Hein´s main interest is the development of GALILEO, Europe´s global navigation satellite system, where he serves as member in the EC Galileo Signal Task Force. Prof. Hein received the 2002 Johannes Kepler Award for "sustained and significant contributions to satellite navigation" from the US Institute of Navigation.

WORKSHOP SYNOPSIS: This three hour workshop informs attendees of the decisions leading to the GALILEO system development, the present state-of-the-art in the overall development and design of GALILEO

including institutional issues and a summary of current issues and the planned services and corresponding frequency and signal plans.

Module 1. Institutional Issues, Market Prospects and Service Concept

1. Background and Path to the Development of GALILEO
2. The Joint Undertaking and the Implementation Schedule
3. Market Prospects, Economic Studies and Service Concept
4. Cost Estimates and Public Private Partnership Considerations

Module 2. Frequency and Signal Plan, GPS Interoperability

1. Requirements, Basic Considerations and Issues
2. Galileo Frequency and Signal Plan
3. GPS Interoperability, Interference and Security Considerations
4. Time Standards and Coordinate Reference Frames

Module 3. Overall Architecture

1. High-Level Architecture
2. Space Segment
3. Ground Segment and Satellite, Navigation and User Integrity Control
4. Search and Rescue Mission Elements

WORKSHOP 2A: *(3 hours)*

TITLE: GPS Modernization

INSTRUCTOR: Professor Per Enge

INSTRUCTOR'S BIOGRAPHY: Per Enge is the Kleiner-Perkins, Mayfield, Sequoia Capital Professor of Engineering at Stanford University, where he is Director of the GPS Research Laboratory. The Laboratory conducts research on the: Wide Area Augmentation System (aka SBAS); Local Area Augmentation System (aka GBAS); Joint Precision Approach and Landing System (JPALS); and Radio Frequency Interference to GNSS. He has received the Kepler, Thurlow and Burka Awards from the U.S. Institute of Navigation (ION), and he is a Fellow of the IEEE and ION.

WORKSHOP SYNOPSIS: Currently, GPS is undergoing stunning changes that will enhance both military and civil capabilities. GPS Modernization certainly includes new civil and military signals. New civil signals at 1227.60 MHz and 1176.45 MHz will be used to mitigate the effects of radio frequency interference and eliminate errors due to the onosphere. New signals from GPS and Galileo will also enhance the performance of augmentation systems that provide aviation integrity. We will discuss the Wide Area Augmentation System (WAAS) and upcoming WAAS changes to leverage the new signals from both systems. GPS Modernization includes a suite of technical measures to address vulnerability to radio frequency interference. Technical cures include the use of television signals, inertial sensors, Loran-C and adaptive antennas. Finally, institutional progress will be discussed including key developments on Galileo and vulnerability.

WORKSHOP 2B: *(3 hours)*

TITLE: GPS Data Collection for Integration with Geographic Information Systems (Precision GIS)

INSTRUCTOR: James Millner

INSTRUCTOR'S BIOGRAPHY: Before joining Department of Sustainability and Environment (DSE) as a Geodesist James worked with the Product Planning Group Nikon Corporation in Tokyo Japan. With extensive experience developing GPS applications - James received the Sir Thomas Mitchell Excellence in Surveying Award 1997 for innovations in technology transfer and international promotion of the surveying profession. James is currently the Location Based Services Positioning System Project Manager Spatial Information and Infrastructure, Strategic Planning and Policy Group DSE and instigator of the departments GPS Standards, Specifications and Best Practice for GIS/Mapping data collection.

WORKSHOP SYNOPSIS: This two-hour workshop will cover the following topics in GPS Data Collection for Integration with Geographic Information Systems (Precision GPS/GIS)

1. GPS Principles: fundamental concepts and definitions, accuracy and precision, error sources and their minimisation, Spatial Data Infrastructures - requirements for sharing data;

2. GPS Equipment: basic configurations, hardware and software, communication options, what to look for when purchasing a precision GPS/GIS system;

3. Guidelines for precision GPS/GIS data collection: planning, equipment settings, static data collection, dynamic data collection, feature mapping;

4. Processing and Quality Control: GPS base stations, automatic processing, quality control, Datum compliance, real-time versus post-processing;

5. Tutorial example: mapping the Australian Alps Walking Track - equipment verification, logistics, data dictionary, attributing, shared uses of high value data sets.

6. Future developments and accuracy expectations: new satellite systems, integration with other equipment, Code and Phase positioning.

A set of course notes will be supplied to each participant. You may also bring GPS/GIS data or case studies to be discussed during the workshop - please notify the Instructor.

WORKSHOP 2C: *(2 hours)*

TITLE: Aviation Applications of GNSS in Australia

INSTRUCTORS: Professor Brian O'Keeffe AO and Captain Ian Mallett AFC

INSTRUCTORS' BIOGRAPHIES: Brian O'Keeffe is the Managing Director of FANS PLANS P/L which provides high level advice on the planning and implementation of the satellite based communication, navigation, surveillance and air traffic management (CNS/ATM) System. He is also Adjunct Professor in Communications Engineering at the University of Canberra. He has had nearly 50 years of experience in the development of electronic systems for civil aviation.

Ian Mallett is the Head of Aerodrome and CNS/ATM Standards in the Australian Civil Aviation Safety Authority, responsible for the development and maintenance of regulations and associated documentation for aerodrome, fire fighting, navigation, communication, surveillance and air traffic management system and provides advice to industry on the use of these standards. He has had 37 years of experience in the RAAF and civil aviation and has been involved in the ICAO CNSS Panel since its establishment in 1995.

WORKSHOP SYNOPSIS: This two-hour workshop will cover the following topics:

1. Overview of Satnav
2. Operational Requirements and the Regulatory Environment
3. Augmentation Systems
4. En-route and Terminal Area Operations
5. Non-precision and Precision Approaches
6. Current and Future Developments
7. Conclusions

WORKSHOP 3A: *(2 hours)*

TITLE: Pseudolites

INSTRUCTOR: Dr. Joel Barnes

INSTRUCTOR'S BIOGRAPHY: Dr Joel Barnes is one of the senior researchers within the Satellite Navigation and Positioning (SNAP) group, at the School of Surveying & SIS, the University of New South Wales (UNSW), Sydney, Australia. He obtained a PhD in satellite geodesy from the University of Newcastle-upon-Tyne, UK, and worked as a research fellow at the Department of Geomatic Engineering, UCL, UK. Joel is actively conducting pseudolite research for applications such as deformation monitoring, machine guidance, and precision approach landing of aircraft. In addition, Joel is assisting in the development of a new advanced pseudolite based technology from an Australian company, Locata Corporation.

WORKSHOP SYNOPSIS: Pseudolites are ground-based transmitters of GPS-like signals ("pseudo-satellites") that can significantly enhance the receiver-satellite geometry in circumstances where complete sky coverage is not available. In such cases pseudo-range and carrier phase measurements on the pseudolite signals can augment the GPS observations, leading to improved accuracy and reliability of positioning results. In principle pseudolites can even replace the GPS satellite constellation completely, allowing positioning indoors. Over the last few years a number of important developments have occurred that have made pseudolite technology more feasible than ever. One of these developments is the design of an advanced pseudolite technology from an Australian company, Locata Corporation. This workshop will:

▲ Introduce the pseudolite technology.

▲ Discuss pseudolite hardware, including the latest technology from Locata.

▲ Discuss the modelling issues associated with integrated GPS & pseudolite systems and pseudolite-only systems.

▲ Describe the implementation and configuration issues, including demonstration of pseudolite hardware operation.

▲ Discuss some of the current and future applications which pseudolite systems may be deployed, including results from real-world trials.

GNSS 2004 TECHNICAL PROGRAM & ORAL FLASHING SESSIONS

Registration: 8.00am - 9.00am

MONDAY 6TH DECEMBER, 2004

9.00 - 10.30am	**Official Opening** **Session 1: THE INTERNATIONAL PERSPECTIVE** *"Expected Performance of the European Satellite Navigation System GALILEO"* P222 **Guenter Hein** UNIVERSITY OF FAF MUNICH, GERMANY *"GPS and Galileo: Prospects for Building the Next Generation of GNSS "* P221 **Glen Gibbons** GROUP EDITORIAL DIRECTOR, ADVANSTAR COMMUNICATIONS, USA *"Indoor Location Technologies"* P216 **Gerard Lachapelle** UNIVERSITY OF CALGARY, CANADA
10.30 - 11.00am	Morning Tea & Trade Exhibition
11.00 - 12.30pm	**Session 2: CGSIC** *"Overview of CGSIC & Activities"* **Mike Shaw** DIRECTOR, RADIO NAVIGATION & POSITIONING, US DEPT OF TRANSPORTATION *"Overview of International Sub Committee"* **John Wilde** CHAIR CGSIC INTERNATIONAL SUB COMMITTEE *"GNSS Coordination at the National Level: the Australian Experience"* P198 **Don Sinnott** CHAIR AUSTRALIAN GNSS COORDINATION COMMITTEE *"Real world applications of GPS"* **Jim Miller** DEPUTY DIRECTOR, OFFICE OF NAVIGATION & SPECTRUM POLICY, US DEPT OF TRANSPORTATION *"GPS/Galileo agreement between US and EC"* **Ralph Braibanti** DIRECTOR, SPACE & ADVANCED TECHNOLOGY, US DEPT OF TRANSPORTATION
12.30 - 1.30pm	Lunch & Trade Exhibition
1.30 - 3.00pm	**Session 3: CGSIC Cont.** *"Overview of US Coast Guard Navigation Center & GPS Operation"* **Curt Dubay** COMMANDING OFFICER, NAVIGATION CENTRE, US COAST GUARD *"Overview of how the US Coast Guard operates NANUs"* **Rebecca Casswell** CHIEF, GPS BRANCH, US COAST GUARD *"GRAS - An Australian innovation in navigation"* **Keith McPherson** MANAGER GNSS, AIR SERVICES AUSTRALIA, CGSIC VICE CHAIR AUSTRALIA & PACIFIC ISLANDS PANEL DISCUSSION **Mike Shaw, Curt Dubay, Ralph Braibanti & Keith McPherson**
3.00 - 3.30pm	Afternoon Tea & Trade Exhibition

3.30 - 5.00pm	**Session 4A: Flashing Presentations**	**Session 4B: Flashing Presentations**	**Session 4C: GNSS & Augmentations**

	"The development and enhancement of GPS/GNSS infrastructure to support Location Based Service Positioning Systems in Victoria" P103
	  James Millner DEPT OF SUSTAINABILITY AND ENVIRONMENT (DSE), VICTORIA, AUSTRALIA
	
	"Global Navigation Satellite System (GNSS) Applications in Malaysia: Status Updates" P101
	  Mustafa Subari UNIVERSITI TEKNOLOGI MALAYSIA (UTM), MALAYSIA
	
	"An e-GPS Framework for Location Based Service" P63
	  Ching-Liang Tseng NATIONAL CHENG KUNG UNIVERSITY, TAIWAN
	
	"Performance Analysis of Real-Time Kinematic GPS Positioning using Continuous Operating Reference Station in Korea" P57
	  Bae Kyoung-Ho DONG-A UNIVERSITY, SOUTH KOREA
		"Analysis of regional ionospheric disturbance with HK GPS network" P49
		  Wu Chen THE HONG KONG POLYTECHNIC UNIVERSITY, HONG KONG
		
		"Triple-frequency methods for correcting higher-order ionospheric refractive error in the context of modernised GPS" P32
		  Zemin Wang RMIT UNIVERSITY, AUSTRALIA
		
		"Baseline Analysis about Linear Combination Using GPS Data" P59
		  Hong Jung-Soo DONG-A UNIVERSITY, SOUTH KOREA
		
		"An analysis of the spatial and temporal correlation of the ionospheric bias affecting GPS carrier phase observations" P68
		  Scott Wyllie RMIT UNIVERSITY, AUSTRALIA
			"U.S. Coast Guard Loran Modernization Program" P54
			  John Merrill FEDERAL AVIATION AUTHORITY, USA
			
			"A Performance Analysis of Future Global Navigation Satellite Systems" P124
			  Allison Kealy THE UNIVERSITY OF MELBOURNE, AUSTRALIA
			
			"Time Keeping Systems for Future GNSS Applications" P86
			  Jon W Schnabel ITT INDUSTRIES, USA
			
			"CGSIC/IISC Asia Pacific and GNSS-2004" P192
			  Hideto Takahashi ITOCHU CORPORATION, JAPAN
			
			"Would a GNSS need a backup?" P208
			  Walter Blanchard UK

8.40 - 10.30am

Session 5A: CORS Network Infrastructure

"Benefits of Modernized GPS/Galileo to RTK Positioning" P92
Herbert Landau *TRIMBLE TERRASAT GmbH, GERMANY*

"An Innovative Concept in Managing GPS Reference Stations Network and Implementation Examples in Asia" P61
Vincent Lui *LEICA GEOSYSTEMS LTD, HONG KONG*

"Application of Shanghai GPS Comprehensive Application Network on Weather Service" P30
Zhu Wenyao *CHINESE ACADEMY OF SCIENCES, CHINA*

"Contemporary realisation of a spatial datum using a continuously operating reference station network in Victoria" P159
Peter Ramm *DEPT OF SUSTAINABILITY & ENVIRONMENT, AUSTRALIA*

"Development of Sydney permanent real-time GPS network" P189
Thomas Yan *UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA*

"Real Time Quality of Assessment for CORS Networks" P85
Simon Fuller *THE UNIVERSITY OF MELBOURNE, AUSTRALIA*

Session 5B: LBS & Telematics

"NAVIO - A Navigation and Guidance Service for Pedestrians" P71
Gunther Retscher *VIENNA UNIVERSITY OF TECHNOLOGY, AUSTRIA*

"A New Positioning Method using Force Handover Algorithm in GSM Mobile Communication" P17
Chin Lin *NATIONAL CHANGHUA UNIVERSITY, TAIWAN*

"A Step, Stride and Heading Determination for the Pedestrian Navigation System" P137
Jeong Won Kim *CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA*

"Alternative Positioning Method using GSM Signals" P76
Goh Pong Chai *NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE*

"Secure Tracking using GALILEO "Safety of Life" Service" P130
Oscar Pozzobon *QASCOM, ITALY*

"Seamless people mobility tracking - the next challenge?" P67
Kefei Zhang *RMIT UNIVERSITY, AUSTRALIA*

Session 5C: Algorithms & Methods

"Recent Improvements to the Starfire Global DGPS Navigation Software" P24
Ronald Hatch *NAVCOM TECHNOLOGY, USA*

"A Complete Geometry-Free Approach to Three Carrier Ambiguity Resolutions" P18
Yanming Feng *QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA*

"Geometry and Statics of Mixed Integer GPS Models" P191
Peiliang Xu *KYOTO UNIVERSITY, JAPAN*

"Baseline Precision Performance using Partially-Fixed Multi-GNSS Phase Observations" P64
Adam Mowlam *THE UNIVERSITY OF MELBOURNE, AUSTRALIA*

"Treatment of Biased Error Distribution in SBAS" P128
Todd Walter *STANFORD UNIVERSITY, USA*

10.30 - 11.00am | Morning Tea & Trade Exhibition

11.00 - 12.30pm

Session 6A: Direct Geo-Referencing

"Airborne digital cameras and GPS-aided inertial technology for mapping the San Andreas fault system" P1
Richard Sanchez *US GEOLOGICAL SURVEY, USA*

"Direct Georeferencing with GPS/INS for the Photogrammetry" P55
Youn Kyung Song *DONG-A UNIVERSITY, SOUTH KOREA*

"3-Dimensional Urban Data Construction and Management System Utilizing 4S-Van" P156
Seong Baek Kim *ETRI, SOUTH KOREA*

"GIPSICAM: Using dGPS, IPS and Videography to aid Road Information Management" P215
Steve Greening *RTA, AUSTRALIA*

Recent results of long-range airborne kinematic GPS positioning research at the Western Australia Centre for Geodesy" P204
Will Featherstone *CURTIN UNIVERSITY OF TECHNOLOGY, AUSTRALIA*

Session 6B: Non-GNSS Positioning

"Comparisons of TDOA Triangulation Solutions for Indoor Positioning" P28
Hyonmin Kong *CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA*

"Indoor Positioning Using Wireless LAN Signal Strength of Reference Points" P135
Jaywon Chey *SEOUL NATIONAL UNIVERSITY, SOUTH KOREA*

"The next generation in ubiquitous positioning technology from Locata" P166
Joel Barnes *UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA*

"Using RFID for Accurate Positioning" P167
Hae Don Chon & Sibum Jun *SAMSUNG ELECTRONICS CO. LTD, SOUTH KOREA*

"iPL Software for RTK Positioning with Pseudolites" P193
Ivan Petrovski *TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN*

Session 6C: CORS Network Algorithm

"Troposphere Modeling in a Regional GPS Network" P201
Susan Skone *UNIVERSITY OF CALGARY, CANADA*

"Development of Navigation Algorithm to improve Position Accuracy by Using Multi-DGPS Reference Stations'PRC information." P176
Kyung Ryoon Oh *KOREA AEROSPACE RESEARCH INSTITUTE, SOUTH KOREA*

"The analysis of the effects of different network-based ionosphere estimation models on the rover positioning accuracy" P39
Dorota Grejner-Brzezinska *THE OHIO STATE UNIVERSITY, USA*

"A Method for Calculating and Applying Estimated Variance-Covariance Information of Multiple Reference Station Corrections" P60
Gerard Lachapelle *THE UNIVERSITY OF CALGARY, CANADA*

"Analysis of biases influencing successful rover positioning with GNSS-Network RTK" P129
Hans-Juergen Euler *LEICA GEOSYSTEMS AG, SWITZERLAND*

12.30 - 1.30pm | Lunch & Trade Exhibition

1.30 - 3.00pm

Session 7A: Deformation Monitoring

"The Deformation of Bromo Volcano as Detected by GPS Surveys Method" P48
Hasanuddin Abidin *INSTITUT TEKNOLOGI BANDUNG (ITB), INDONESIA*

Session 7B: A-GPS & Weak Signals

"Process for Improving GPS acquisition assistance and server side location determination for cellular networks" P11
Neil Harper *NORTEL NETWORKS, AUSTRALIA*

Session 7C: Multi-Sensor Integration

"GNSS/INS Integration Architectures: Theoretical Concepts and Practical Examples" P70
Bernd Eissfeller *UNIVERSITY FAF MUNICH, GERMANY*

"High Frequency Deflection Monitoring of Bridges by GPS" P90
Gethin Roberts THE UNIVERSITY OF NOTTINGHAM, UK

"Low-cost deformation measurement system for volcano monitoring" P118
Cedric Seynat GPSAT SYSTEMS AUSTRALIA

"Regional deformation monitoring and analysis using Victorian continuously operating GPSnet data" P45
Youjan Hu CHINA UNIVERSITY OF GEOSCIENCES, CHINA

"Test and Evaluation of GPS Multi-antenna Switch for Deformation Monitoring" P6
Xiufeng He HOHAI UNIVERSITY, CHINA

"Lessons learnt in Assisted GPS" P138
Rod Bryant SIGNAV PTY LTD, AUSTRALIA

"An Assisted GPS Acquisition Method using L2 Civil Signal in Weak Signal Environment" P180
Deuk Jae Cho CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA

"Assisted GPS Navigation System for aftermarket telematics system" P170
Pyo JongSun SAMSUNG ELECTRONICS CO. LTD, SOUTH KOREA

"A Review of GPS Cross Correlation Mitigation Techniques" P125
Eamonn Glennon SIGNAV PTY LTD, AUSTRALIA

"Adaptive Integrated Navigation for Multi-Sensor Adjustment Outputs" P4
Yuanxi Yang XIAN RESEARCH INSTITUTE OF SURVEYING AND MAPPING, CHINA

"A Real-time Experiment of Feature Tracking/Mapping using a vision and low-cost GPS/INS System on an UAV platform" P36
Jonghyuk Kim THE UNIVERSITY OF SYDNEY, AUSTRALIA

"A method of Low-cost GPS/INS Integration for Autonomous Micro Air Vehicle Navigation" P132
Stefan Winkler TECHNICAL UNIVERSITY OF BRAUNSCHWEIG, GERMANY

"A Fuzzy Adaptive Kalman Filter for INS/GPS Integration" P145
Wang Wei NORTHWESTERN POLYTECHNICAL UNIVERSITY, CHINA

3.00 - 3.30pm	Afternoon Tea & Trade Exhibition

3.30 - 5.00pm	

Session 8A: Flashing Presentations

"Availability of the EGNOS System for a Land Mobile User" P112
Pavel Kovar CZECH TECHNICAL UNIVERSITY, CZECH REPUBLIC

"Differential Loran" P53
John Merrill FEDERAL AVIATION AUTHORITY, USA

"New Berthing Support System with StarFire-GPS" P181
Shunsuke Horie AKISHIMA LABORATORIES (MITSUI ZOSEN) INC., JAPAN

"Planned IGS Global Data Center at Korea Astronomy Observatory" P154
Jong-Uk Park KOREA ASTRONOMY OBSERVATORY, SOUTH KOREA

"Initial Investigation of Land Subsidence Using GPS Data and Rigorous Analysis" P25
Halim Setan UNIVERSITI TEKNOLOGI MALAYSIA, MALAYSIA

"A Demonstrative GPS-aided Automatic Landslide Monitoring System in Sichuan" P218
Yanming Feng QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

"Structural Deformation During a Typhoon as Monitored by an Integrated Multi-sensor System" P175
Xiaojing Li UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Integration of GPS, InSAR and GIS for Topographic Mapping and Ground Movement Detection" P213
Linlin Ge UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Long-term Differential Radar Interferometric Techniques" P212
Tianzhen Yao UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Study on GPS Height Transformation Using BP Neural Network" P47
Lao-Sheng Lin NATIONAL CHENGCHI UNIVERSITY, TAIWAN

"Measurement of the Delay-Time in each Time-Code sent from JJY by using the GPS Receiver" P110
Kazuaki Yoshimura TOIN UNIVERSITY OF YOKOHAMA, JAPAN &
Akio Yasuda TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

Session 8B: Flashing Presentations

"Test Bed for Satellite-based Positioning System using Quasi Zenith Satellite" P69
Takeshi Ono NEC TOSHIBA SPACE SYSTEMS LTD (NTSPACE), JAPAN

"Research on Remote Synchronization System of On-board Crystal Oscillators for Quasi-Zenith Satellites" P38
Toshiaki Iwata AIST, JAPAN

"The Possibility of Precise Positioning in the Urban Area" P40
Nobuaki Kubo TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

"Time Management System for Satellite Positioning System using Quasi-zenith Satellites" P143
Yasuhiro Takahasi NATIONAL INSTITUTE OF INFORMATION & COMMUNICATIONS TECHNOLOGY, JAPAN

"Quasi-Zenith Satellite System Orbit Estimation Improvement" P206
Ivan Petrovski TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

"Pseudolite Architectures: Current Limitations and Alternatives" P188
Mustafa Ozgur Kanli UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Application of nonlinear smoothing to GPS/INS integrated navigation system" P72
Jaewon Seo SEOUL NATIONAL UNIVERSITY, SOUTH KOREA

"MEMS IMU and Two-Antenna GPS Integration Navigation System for Land Vehicles" P5
Xiufeng He HOHAI UNIVERSITY, CHINA

"A Tightly Coupled GPS/INS Integration Based on the Unscented Particle Filter" P163
Woo-Jin Jun KONKUK UNIVERSITY, SOUTH KOREA

"Performance improvement of GPS/INS integrated system using Allan variance analysis" P187
Hyunseok Kim SEOUL NATIONAL UNIVERSITY, SOUTH KOREA

Session 8C: Multipath Mitigation

"FPGA Implementation of a Single Channel GPS Interference Mitigation Algorithm" P80
Doug Gray UNIVERSITY OF ADELAIDE, AUSTRALIA

"Benefits of Reconfigurable Software GNSS Receiver in Multipath Environment" P131
Massimiliano Spelat POLITECNICO DI TORINO, ITALY

"Quality Monitoring for Multipath affected Signals Using an Extended Kalman Filter" P150
Maurizio Fantino UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Time Delay Estimation of Superimposed Coherent Multipath Signals using EM Algorithm for Global Positioning System" P127
Francis Chan UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"The Possibility of the Precise Positioning and Multipath Error Mitigation in the Real-time" P91
Takashi Suzuki TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

"Deriving Doppler shift and its change rate in real time from precise GPS carrier phase measurement" P65
Jason Zhang RMIT UNIVERSITY, AUSTRALIA

"GNSS for Olympics - an advanced rower tracking system" P75
Kefei Zhang RMIT UNIVERSITY, AUSTRALIA

"An Integrated Position and Attitude Determination System to Support Real-Time, Mobile, Augmented Reality Applications" P98
Stephen Scott-Young THE UNIVERSITY OF MELBOURNE, AUSTRALIA

"Design of Couriers Optimising System with Storage and Transportation Recognizement and Special Tracking" P172
Israel Quintanilla Garcia UNIVERSIDAD POLITECNICA DE VALENCIA, SPAIN

"Integrating GPS with Standalone MVEDR" P226
Samir Omar UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"GPS Oriented Re-Locatable Internet Kiosk with Wireless Technology for Remote Computer-Based Administration" P225
Samir Omar UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Efficient Handoff using Mobile IP and Simplified Cellular IP" P223
Joon-Ho Lee UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Design and Analysis of a Tightly Coupled Kalman Filter for a point GPS/INS System" P16
Yufeng Zhang THE UNIVERSITY OF CALGARY, CANADA

"Acquisition Performance Analysis for BOC modulated signals" P149
Maurizio Fantino POLITECNICO DI TORINO, ITALY

"Aperture Jitter Effects in Software Radio GNSS Receivers" P19
Andrew Dempster UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"On the Reception and Processing of GPS Reflective Signals" P141
Jyh-Ching Juang NATIONAL CHENG KUNG UNIVERSITY, TAIWAN

"Possibility Analysis of Polarization Diversity Scheme for Multipath Mitigation in GPS Receivers" P140
Dinesh Manadhar THE UNIVERSITY OF TOKYO, JAPAN

"Analysis of Multipath Signal Propagation" P142
Yongcheol Suh THE UNIVERSITY OF TOKYO, JAPAN

"Inverse Diffraction Parabolic Wave Equations Localisation System (IDPELS)" P121
Troy Spencer QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

"Evaluation of GPS anti-jam algorithms using a data logging/playback system" P82
Doug Gray UNIVERSITY OF ADELAIDE, AUSTRALIA

WEDNESDAY 8TH DECEMBER, 2004

8.40 - 10.30am

Session 9A: Land Applications

"The Application of Integrated GPS and Dead Reckoning Positioning in Automotive Intelligent Navigation System" P190
Li Hanwu WUHAN UNIVERSITY, CHINA

"21st Century in the Building and Agricultural Machines Navigation" P33
Vera Vostova CZECH TECHNICAL UNIVERSITY, CZECH REPUBLIC

"The Australian Intelligent Access Program (IAP)" P12
Chris Koniditsiotis THE AUSTROADS INTELLIGENT ACCESS PROGRAM (IAP), AUSTRALIA

"Analysis of the track competition vehicles with high accuracy positioning" P173
Israel Quintanilla Garcia UNIVERSIDAD POLITECNICA DE VALENCIA, SPAIN

"Reliability and Integrity Issues for Vehicle Positioning Systems" P52
Wu Cheng THE HONG KONG POLYTECHNIC UNIVERSITY, HONG KONG

"Long Range RTK - What's Now Possible" P185
Rod MacLeod SAGEM AUSTRALASIA PTY LTD, AUSTRALIA

Session 9B: Advances in Receiver Design

"JAMFEST - A Cost effective solution to GPS Vulnerability Testing" P13
Desiree Craig & Paul Benshoof USAF, HOLLOMAN, USA

"New GNSS Signals: Receiver Design Challenges" P194
Andrew Dempster UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"A FPGA-based software GPS receiver design using Simulink" P169
Bu sung Chun KONKUK UNIVERSITY, SOUTH KOREA

"An Open GNSS Receiver Platform Architecture" P43
Frank Engel UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Evaluation of the pseudorange performance by using software GPS receiver" P109
Shun-Ichiro Kondo TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY JAPAN

"Commercial GPS Receiver Design for High-Dynamic Launching Vehicles" P147
Seok Bo Son NAVICOM R&D CENTER, SOUTH KOREA

Session 9C: Ionospheric Monitoring

"Modified Tomographic Estimation of the Ionosphere using the Set of Adequate Bases" P114
Youngho Sohn & Changdon Kee SEOUL NATIONAL UNIVERSITY, SOUTH KOREA

"Gaussian Random Process and its Application for Detecting the Ionospheric Disturbances using GPS" P35
Zhang Hongping CHINESE ACADEMY OF SCIENCES, CHINA

"Absolute ionospheric delay estimation based on GPS PPP and GPS active network" P50
Wu Chen THE HONG KONG POLYTECHNIC UNIVERSITY, HONG KONG

"Near-Real Time Modeling of Total Electron Content Over South Korea Using a Regional GPS Network" P155
Jong-Uk Park KOREA ASTRONOMY OBSERVATORY, SOUTH KOREA

"An Ionospheric forecasting System" P209
Boris Khattatov FUSION NUMERICS INC., USA

"Performance Evaluation of the Wide Area Augmentation System for Ionospheric Storm Events" P202
Susan Skone UNIVERSITY OF CALGARY, CANADA

10.30 - 11.00am	Morning Tea & Trade Exhibition

11.00 - 12.30pm	(three columns below)

Session 10A: Airborne Applications

"SLAM aided UAV Navigation in GNSS Denied and Unknown Environments" P37
    Jonghyuk Kim UNIVERSITY OF SYDNEY, AUSTRALIA

"UAV flight test of GPS attitude determination system" P148
    Geun Woo Lee CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA

"Using the Multiple Reference Station GPS Networks for Aircraft Precision Approach and Airport Surface Navigation" P8
    Ahmed El-Mowafy THE UNITED ARAB EMIRATES UNIVERSITY, UNITED ARAB EMIRATES

"Joint Australian Engineering (Micro) Satellite (JAESat) - A GNSS Technology Demonstration Mission" P157
    Werner Enderle QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

"ADS-B Operational in Alaska" P197
    Dennis Beres FEDERAL AVIATION AUTHORITY, USA

Session 10B: Signal Structure

"Shift register generated pilot codes with good cross-correlation properties" P22
    Seppo Turunen NOKIA CORPORATION, FINLAND

"Nominal Signal Deformations: Limits on GPS Range Accuracy" P107
    R. Eric Phelts STANFORD UNIVERSITY, USA

"Galileo Receiver Core Technologies" P113
    Pavel Kovar CZECH TECHNICAL UNIVERSITY, CZECH REPUBLIC

"Proposals on new signal structure for next generation satellite navigation system" P195
    Ivan Petrovski TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY JAPAN

"Multi-Channel GPS RF Signal Logging and Playback Facility" P83
    Doug Gray UNIVERSITY OF ADELAIDE, AUSTRALIA

Session 10C: Communication Issues

"Efficient RTK Positioning Using the WCDMA Network" P111
    Dinesh Kumar-Mills UNIVERSITY OF QUEENSLAND, AUSTRALIA

"Augmentation of Low-Cost GPS Receivers Via the Internet and Mobile Devices" P78
    Roger Fraser THE UNIVERSITY OF MELBOURNE, AUSTRALIA

"Utilisation of Developments in Telecommunications Technology and Protocols for GPS Users" P119
    Thomas Yan UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Variable Length Encoding of DGPS Corrections for Mobile Devices via the Internet" P120
    William Kellar QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

"Using GPS to enhance digital radio telemetry" P196
    Kevin Parkinson UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

12.30 - 1.30pm	Lunch & Trade Exhibition

1.30 - 3.00pm	(three columns below)

Session 11A: Geodesy & Scientific Applications

"Kinematic GPS Precise Point Positioning (PPP) for sea level monitoring with GPS buoy" P51
    Wu Chen THE HONG KONG POLYTECHNIC UNIVERSITY, HONG KONG

"Discussion of On-board GPS Phase Measurement Zero-difference Kinematic Precise Orbit Determination" P9
    Zuo-Ya Zheng CHINESE ACADEMY OF SCIENCES, CHINA

"Coseismic and Postseismic displacments in southeastern Taiwan following the 2003 Dec 10 M_L=6.6 Cheng-Kung earthquake" P26
    Horng-Yue Chen & Shui-Beih Yu ACADEMIA SINICA, TAIWAN

"Non-linear Term Parameters required for Terrestrial Reference Frame Presentation" P199
    Peng Fang UNIVERSITY OF CALIFORNIA SAN DIEGO, USA

"Preliminary result of CHAMP orbit determination with PANDA software" P200
    Liu Jingnan & Qile Zhao WUHAN UNIVERSITY, CHINA

Session 11B: Jamming & Antenna Design

"Null-Steering LMS Dual-Polarised Adaptive Antenna Arrays for GPS" P81
    Doug Gray UNIVERSITY OF ADELAIDE, AUSTRALIA

"An Interference Mitigation Approach Against Pseudolites" P144
    Jyh-Ching Juang NATIONAL CHENG KUNG UNIVERSITY, TAIWAN

"GPS Interference Cancellation using a MVR based Adaptive Beamforming" P162
    Sunghyuck Im KONKUK UNIVERSITY, SOUTH KOREA

"A Novel Antenna Array for GPS/INS/PL Integration" P219
    Mingquan Lu TSINGHUA UNIVERSITY, CHINA

"GPS Reference Station Quality Degradation due to In Band Interference from Satellite TV System" P207
    Ivan Petrovski TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY JAPAN

Session 11C: Innovative Applications

"Low Cost GPS Differential Carrier Phase for Attitude Determination" P77
    Matthew Cranwell & Paul Pearce UNIVERSITY OF ADELAIDE, AUSTRALIA

"On sub-centimetre per second accuracy of ground velocity determination using GPS Doppler measurements" P66
    Jason Zhang RMIT UNIVERSITY, AUSTRALIA

"Performance Analysis of Precise Point Positioning Using Real-Time GPS Orbit and Clock Products" P14
    Yang Gao THE UNIVERSITY OF CALGARY, CANADA

"Syren - A Ship Based Location - Aware Audio Experience" P210
    Daniel Woo UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Time Transfer using the Maritime DGPS beacon signal" P151
    Sang Yoon Lee CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA

3.00 - 3.30pm	Afternoon Tea
3.30 - 4.00pm	Closing Session

POSTER PRESENTERS (ALPHABETICAL-SURNAME ORDER)

"A time dependent correction model for tropospheric error of GNSS" P84
Alireza Ardalan UNIVERSITY OF TEHRAN, IRAN

"Comparative study of interpolation techniques for ultra-tight integration of GPS/INS/PL sensors" P108
Ravindra Babu UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Estimation of Gyro Misalignment Angle Using Kalman Filter Technique for Land Navigation" P7
Chandan Bhunia B.E. College (D.U.), INDIA

"Examination of the Conventional Methods and Fuzzy Logic Approach in Outlier Detection" P23
Yuksel Boz KARADENIZ TECHNICAL UNIVERSITY, TURKEY

"Time Synchronization Capability of GPS Receivers at Queensland University of Technology (QUT)" P160
Troy Bruggemann QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

"GPS measurements of near-fault crustal deformation in the south Longitudinal Valley, southeastern Taiwan" P27
Horng-Yue Chen ACADEMIA SINICA, TAIWAN

"KOMPSAT-2 Orbit Determination using GPS Signals" P164
Dae-Won Chung KOREA AEROSPACE RESEARCH INSTITUTE, SOUTH KOREA

"Climate Change and Sealevel Along Alexandria Coast" P168
Hany Emam NATIONAL WATER RESEARCH CENTER, EGYPT

"A GPS/DR positioning system for the aftermarket telematics terminal" P178
Hyunsu Hong SAMSUNG ELECTRONICS CO. LTD, SOUTH KOREA

"Issues of Longhouse Ownership in Sarawak" P21
Shaikh Ibrahim UNIVERSITY TECHNOLOGY MARA, MALAYSIA

"Analysis of Long Term Continuous GPS Coordinate Time Series" P165
Minghai Jia GEOSCIENCE AUSTRALIA, AUSTRALIA

"A Carrier Phase Tracking Receiver for Difficult GPS Environments" P182
Xiaodong Jia UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"The effect of the stochastic modeling on GPS coordinates time series" P116
Shuanggen Jin UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Detection of Anomalous Measurements via Testing Hypotheses of Innovation Processes in GPS Positioning" P93
Yukihiro Kubo Ritsumeikan University, JAPAN

"The Performance of RTK GPS Campaigns for Plane Figure Mapping near The Forest" P161
InSu Lee UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"RTK GPS Campaigns for Validation of InSAR Derived DEMs" P211
InSu Lee UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Utilizing Krigging to Generate a NLOS Error Correction Map for Network Based Mobile Positioning" P179
Binghao Li UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Real-Time Coordinate Transformation of Position Provided by (RBN)/DGPS in Coastal Bathymetric Surveying" P29
Zhang Lihua DALIAN NAVAL ACADEMY, CHINA

"Crustal Deformations in the Bhuj region of Gujarat after the 26th January 2001 Earthquake" P203
Supriya Likhar IIT BOMBAY, INDIA

"Recognizetion factors of flood in Golestan province by use of landsat satellite image" P2
Mehrdad Madani Kivi GEOLOGICAL SURVEY OF IRAN (GSI), IRAN

"Marine Navigation Training in Crisis: Tradition, Present, Future" P104
Ravi Nijjer MARINE CONSULTANCY GROUP, AUSTRALIA

"Navigation Wireless LAN Device" P227
Samir Omar UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"The Application of GPS in Land use monitoring In Hubei, China" P171
Han Qiong WUHAN UNIVERSITY, CHINA

"An investigation of improved atmospheric modelling for large scale high-precision positioning based on GNSS CORS networks in Australia" P106
Craig Roberts UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Design of an Autonomous AGPS/INS Navigation System for Guided Bomb with Wing Adapter Kit" P134
Sang Heon Oh NAVICOM R & D CENTER, SOUTH KOREA

"Development and validation of high-accuracy models for the simulation of navigation performance from future satellite navigation systems" P117
Cedric Seynat GPSAT SYSTEMS AUSTRALIA, AUSTRALIA

"The Application of GPS Technique in Determining the Earth's Potential Field" P126
WenBin Shen WUHAN UNIVERSITY, CHINA

"LAMBDA-based single epoch algorithm for deformation monitoring using single frequency GPS receivers" P42
Zhenjie Wang UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Tropospheric Delay Estimation for Pseudolite Positioning" P105
Jianguo Jack Wang UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Two new algorithms for indoor wireless positioning system (WPS)" P183
Yufei Wang UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"Online Stochastic Modelling for Network-Based GPS Real-Time Kinematic Positioning" P186
Jinling Wang UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

"An Alignment Method for GPS/DR Land Navigation Systems Using a Large Heading Error Model" P136
Jeong Won Kim CHUNGNAM NATIONAL UNIVERSITY, SOUTH KOREA

"Development of a Software-Based IF GPS/QZSS Signal Simulator" P97
Falin Wu TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

"A Study on the Information Fusion of GPS and Radar" P10
Zhang Xinggu JIMEI UNIVERSITY, CHINA

"An algorithm for network-based real-time kinematic GPS using VRS technique" P89
Ming Yang NATIONAL CHENG KUNG UNIVERSITY, TAIWAN

"Precise Determination of Position, Velocity and Acceleration Using GPS and Its Applications in Sports" P99
Yong Li RMIT UNIVERSITY, AUSTRALIA

"Multiple Model Filter Approach for Precise Real-Time Attitude Determination Using GPS" P100
Yong Li RMIT UNIVERSITY, AUSTRALIA

"Accuracy on the Edge Detection of Topography for Digital Map Manufacture" P56
Kim Yong-Suk DONG-A UNIVERSITY, SOUTH KOREA

"Extension of the transmission distance of position communication system using PPS signal generated by a GPS receiver" P146
Masashi Yoshida TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY, JAPAN

"The Determination of a Hazard Grade on a Cut Slope of Highway Using GIS" P87
Young-Joo Kwak PUSAN NATIONAL UNIVERSITY, SOUTH KOREA

"Determination of Local Geoid with GPS in Trabzon/Turkey" P133
Kemal Yurt KARADENIZ TECHNICAL UNIVERSITY, TURKEY

"Pre-Processing & Analysis software 'OCTAVA_PPA': concept, possibilities and features, initial test results" P73
Alexey Zhalilo NATIONAL ACADEMY OF SCIENCES OF UKRAINE, UKRAINE

"An investigation of GALILEO carrier phase measurement combination model and multiple carrier ambiguity resolution method" P31
Kefei Zhang RMIT UNIVERSITY, AUSTRALIA

"Radar Interferometry: A Review" P214
Jing Zhao UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

REGISTRATION FORM

ABN: 43 248 254 931   *Please complete and return this form along with your full payment to GNSS2004 Symposium - see contact details at the bottom of the registration form.*

1. Personal Details

Title: _____ First Name: _____

Surname: _____

Position: _____

Organisation: _____

Postal Address: _____

_____ State: _____ P/code: _____

Phone: _____ Fax: _____

Email: _____

Special Requirements eg. Disability/Dietary: _____

_____

2. Delegate List

❏   Please tick if you do not wish to be included on the delegate list. The delegate list will be provided to all attendees at GNSS2004.

3. Registration Details

	Early (before 05/10/04)		*Late (after 05/10/04)*
Full Registration	❏ $695.00		❏ $795.00
Day Registration	❏ $295.00		❏ $345.00
Student Registration*	❏ $395.00		❏ $445.00
CGSIC Session	❏ Complimentary (11am - 3.30pm only)		

A copy of your full time student/concession card must accompany your registration

✔ Please indicate which day you wish to attend

❏ Monday   ❏ Tuesday   ❏ Wednesday

4. Workshop Registration Details - Sunday 5th December

Please indicate which workshops you wish to register for:

❏ 1A   ❏ 1B   ❏ 1C
❏ 2A   ❏ 2B   ❏ 2C
❏ 3A   Number of workshops registered for: _____

Symposium Delegates:

2 hour workshops _____ @ $195 per workshop   Total: $ _____

3 hour workshops _____ @ $295 per workshop   Total: $ _____

Non-Symposium Delegates:

2 hour workshops _____ @ $295 per workshop Total: $ _____

3 hour workshops _____ @ $395 per workshop Total: $ _____

5. Parking Permit

Please indicate which days you will be purchasing a daily $5.00 parking permit:

❏ Sunday   ❏ Monday   ❏ Tuesday   ❏ Wednesday

Number of Permits @ $5.00 per day _____   Total: $ _____

6. Social Functions

Aussie BBQ - *inclusive for fully registered delegates only*
The Pavilion, UNSW   Monday 6th December 5.15pm - 7.30pm

Please indicate if you definitely do not wish to attend:

❏ No I do not wish to attend

Extra Tickets @ $50.00 per person _____   Total: $ _____

Guest name/s: _____

Coogee Bay Hotel, Brasserie Bar Networking Dinner *(optional function)*

❏ Please indicate ✔ if you have an interest in joining us at this function

Guest name/s: _____

7. Accommodation

Please indicate your 1st and 2nd preference. To secure your booking a deposit of one night's accommodation is required upon registration. You may pay the full accommodation by cheque. Credit card details will be forwarded to your chosen hotel.

Basser College - Single room only

❏ Bed & Breakfast $50 per room per night - Non-student
❏ Bed & Breakfast $36 per room per night - Student

Medina Executive Suites

❏ Studio $129 per studio per night
❏ 1 Bedroom Apartment $197 per apartment per night
❏ 2 Bedroom Apartment $236 per apartment per night
  ❏ Queen + 2 Singles   ❏ 2 x Queen   ❏ 4 x Singles

Coogee Sands

❏ Studio $145 per room per night
✔ Please indicate your room type ❏ Single   ❏ Double   ❏ Twin

Crowne Plaza Hotel

❏ $170 per room per night
✔ Please indicate your room type ❏ Single   ❏ Double   ❏ Twin

Check in date: _____ Arrival Time: _____

Check out date: _____ No. of nights: _____

Sharing with: _____

_____

8. Payment Summary

Registration	$ _____
Workshops	$ _____
Aussie BBQ	$ _____
Parking Permit	$ _____
Accommodation *(if paying by cheques only)*	$ _____
TOTAL:	**$ _____**

Credit Card Authority for Registration

Debits to your credit card will appear as Sharnay Pty Ltd trading as Organisers Australia on your credit card statement.

Bankcard ❏   Master Card ❏   Visa ❏

Cardholder Name: _____

Signature: _____

Account Number:_____

Expiry Date: _____ Verification number is: _____

NB The verification number is the last three digits on the reverse of your card in the signature section.

Credit Card Authority for Accommodation only

I authorise the hotel to debit my credit card for the following:-

1 night's deposit ❏   All accommodation (excluding incidentals) ❏

All accommodation (including incidentals) ❏

Other ❏ _____

Amex ❏   Diners ❏   Bankcard ❏   Master Card ❏   Visa ❏

Cardholder Name: _____

Signature: _____

Account Number:_____

Expiry Date: _____ Verification number is: _____

NB The verification number is the last three digits on the reverse of your card in the signature section.

For further information please contact:

GNSS 2004 Symposium   ABN 43 248 254 931   C/- Organisers Australia, PO Box 1237   Milton Qld 4064   Ph: 07 3371 0333   Fax: 07 3371 0555
Email: gnss@orgaus.com.au   Website: www.gnss2004.org