Australian
Global Positioning Systems Society Inc.

SatNav 2003

The 6th International Conference on Satellite Navigation Technology Including Mobile Positioning & Location Services

REGISTRATION BROCHURE

22ND – 25TH JULY 2003

GRAND HYATT MELBOURNE AUSTRALIA

ABN: 60 429 268 823

INVITATION

The Australian Global Positioning Systems Society (GPS Society Inc.) is proud to host SatNav2003, a conference featuring specialised workshops, oral sessions and free trade exhibition. The 6th International Conference on Satellite Navigation Technology Including Mobile Positioning and Location Services will be held at the Grand Hyatt Melbourne fromTuesday 22nd July to Friday 25th July, 2003.

The Conference is co-sponsored by the International Association of Chinese Professionals in Global Positioning Systems (CPGPS) and is supported by the Australian Institute of Navigation, Australian GNSS Coordination Committee (AGCC) and leading organisations in surveying, navigation and positioning. This support ensures that SatNav2003 will again be the premier event on navigation and location services in the Australasian region.

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

This is an invitation for you to:

- *Discuss current developments in navigation and location based services.*
- *Learn about the newest products on the market.*
- *Interface with users, manufacturers and service providers.*
- *Interface with integrators, system builders and vendors.*
- *Mix with professionals from varying backgrounds in a true cross-disciplinary event.*
- *Access International and Regional Specialists on Navigation and Location Based Services*

THE ORGANISING TEAM & TECHNICAL COMMITTEE

CONFERENCE CHAIR: Professor Kurt Kubik - *University of Queensland*
PROGRAM DIRECTOR: Professor Chris Rizos - *The University of New South Wales*
CHAIR OF REVIEWING COMMITTEE: Professor Will Featherstone - *Curtin University WA*
ORGANISING TEAM AND TECHNICAL COMMITTEE:

- Mr Gavin Abbott - *Fugro Starfix*
- Professor Yanming Feng - *Queensland University of Technology*
- Mr Tony Griffiths - *Department of Transport and Regional Services*
- Mr Rob & Krys Henshaw - *Australian GPS Society*
- Mr Graeme Hooper - *GPSat Systems*
- Mr Keith McPherson - *Airservices Australia*
- Dr Don Sinnott - *Chair of the Australian GNSS Coordination Committee*
- Dr. Nick Talbot - *Trimble Navigation*
- Captain Murray Warfield - *Qantas Airways*

SPONSORS

Australian Global Positioning Systems Society Inc.

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EXHIBITORS

- *C.R. Kennedy Total Surveying Solutions*
- *GPSat Systems & NovAtel*
- *OmniSTAR Pty Ltd*
- *Spirent Communications*
- *Thales Navigation*
- *Trimble Navigation*
- *Ultimate Positioning*

ABOUT THE AUSTRALIAN GPS SOCIETY INC

The aims of the society are:

- *To foster, develop and assist the Global Positioning Systems disciplines and other associated disciplines.*
- *To encourage, stimulate and aid networking among members and between the members, government and business in general.*
- *To gather information of interest to members which will benefit members in everyday applications.*
- *To provide members with an opportunity to hear high calibre speakers from business and government.*
- *To act as a voice for members and business to government, professional bodies and educational bodies.*
- *To be a link for the continuing education and training of members.*

Membership to the Australian GPS Society Inc. is ***FREE.*** Please complete the form on the website www.gps-society.org to obtain discounted registration fees for SatNav2003.

THE AUSTRALIAN GPS SOCIETY AWARDS FOR EXCELLENCE

Pursuant to its aims of developing and advancing national and international co-operation in the GPS disciplines, the Australian GPS Society recognises individual accomplishments through the sponsorship of awards and honours which will be granted at each SatNav Conference.

Individuals and organisations will be recognised for accomplishment in the following areas of achievement:

1. *Best Student Paper*
2. *Best Academic Paper*
3. *Best Workshop*
4. *Best Exhibition and Trade Booth*

Winners of each of the above categories will be announced at the beginning of Session 10 on Friday 25th July, 2003. Winners will be presented with an award plaque and certificate.

ABOUT THE AUSTRALIAN GNSS COORDINATION COMMITTEE (AGCC)

The Australian Government has identified a need for effective national coordination of GNSS implementation. The Australian GNSS Coordination Committee (AGCC), was established by the Minister for Transport and Regional Services in May 2000. The Committee's role is:

- *To develop mechanisms to coordinate all land, sea and air aspects of GNSS*
- *To promote the safe and effective utilisation and development of GNSS in Australia*
- *To coordinate national security issues, the application of augmentation systems and the national use of GNSS in other relevant applications.*

Membership of the AGCC is drawn from a range of GNSS users and providers across aviation, communications, timing, geomatics and geophysics, maritime, defence, security, emergency services, land transport, academia and industry providers. The committee is chaired by Dr. Don Sinnott.

An important task outcome of the AGCC's activity is development of a national strategic policy for GNSS implementation in Australia. This was launched in 2002 and can be accessed from the AGCC website www.agcc.gov.au.

There will be an AGCC Session on Accuracy Augmentation Systems for Surface Vehicle and Agriculture Applications – Session 9(b) – Friday 25th July, 2003

With the growing penetration of GNSS services, delivered predominantly to date by GPS, has come user demand for enhancements to the basic GNSS positioning accuracy. Worldwide, both government agencies and commercial providers are active in offering augmentation services to various client groups, with varying degrees of regional coverage and with service costs met either by individual users, by a user collective or by government.

REGISTRATION BROCHURE 2003

This AGCC session targets specifically applications in agriculture and surface vehicle positioning. It is both information-giving and a forum for exchange and feedback from current or potential Australian surface transport and agriculture users of GNSS augmentation services, to assist the AGCC in assessing stakeholders' current needs, priorities and expectations.

Designated presenters will provide input by way of a review of basic principles of augmentation services, descriptions of typical current and near-term systems and trends in service provision. The floor will then be turned over to other participants to raise issues and present points of view in an interactive forum.

CONFERENCE REGISTRATION FEES

	Early (Before 21st May)	*Late (After 21st May)*
GPS Member Full Registration	$695	$795
Non-Member Full Registration	$795	$895
Presenter Registration	$495	$495
Student Full Registration*	$395	$395

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

Day Registration	$395	$395

Workshops – Conference Registered Delegates	$245 per workshop
Workshops – Conference Non-Registered Delegates	$295 per workshop

Full, Presenter and Student Registration Includes:

- Attendance at trade exhibition and all technical sessions on 23, 24 & 25 July
- Morning/afternoon tea and lunch on 23 &24 July and morning tea on 25 July
- 1 ticket to the Happy Hour
- Conference Handbook and Satchel
- 1 x Conference CD including all conference papers
- Delegate list*

Day Registration Includes:

- Attendance at trade exhibition and technical sessions on specified day
- Catering on specified day (morning tea only on 25 July)
- Conference Handbook and Satchel
- Delegate list*

**Due to new Privacy Laws delegate lists will only contain name and organisation. No further contact details will be distributed. If you do not wish to be on this list please tick the appropriate box on the registration form*

TECHNICAL SITE VISITS-FRIDAY 25TH JULY

Technical Site Visits are not included as part of the Conference Registration Fee and are an additional cost. Minimum and maximum numbers apply for each tour. Tours may be cancelled if minimum numbers are not reached.

STARS, COWS, SPIDER-WEBS AND GPS

Departing Grand Hyatt at 1.30pm and returning at approx. 4.00 pm *$37 per person – please book via Registration Form.*

A guided walk of discovery into both the hidden histories of the Old Melbourne Observatory and its current role as a site for one of the Australian Regional GPS Network (ARGN) GPS base stations.

This tour incorporates a walk back in time and straight into the work and life of the Old Melbourne Observatory.

The stories show us a glimpse of early Melbourne and bring to life some of our first and most important scientific endeavours. At the other end of history is a modern GPS base station contributing data to national and international programs. It is also part of Victoria's cooperative GPS base station network (GPSnet). Technical specialists will be available to discuss the details of the operations.

PATRICK STEVEDORES - EAST SWANSON TERMINAL PORT MELBOURNE

Departing Grand Hyatt at 1.30pm and returning at approx. 4.30pm. *$37 per person – please book via Registration Form*

Patrick Stevedores' core activity is container handling at each of Australia's major ports, moving over a million containers per year. The company has implemented a container positioning system which records the "set-down" and "pick-up" positions of all terminal container movements. The actual container positions are then passed to a central management system via data radio.

An informative boardroom presentation will be followed by a coach tour out in the working yard amongst the working machines loading ships. Coach commentary will be provided by Peter Gibson of Patrick Stevedores and Graeme Hooper, GPSat Systems - responsible for the design and implementation of the new high accuracy and high reliability positioning system based on Real time Kinematic GPS technologies.

SOCIAL FUNCTIONS

Happy Hour

Wednesday 23rd July, 5.30pm - 7.30pm (included in the full, presenter and student registration fee)

Your chance to catch up with old friends and meet new ones in a relaxed environment. The Happy Hour will be held in the Trade Exhibition area directly after the end of sessions on Wednesday 23rd July. Beverages including beer, wine, champagne and soft drinks will be available as well as hot and cold canapes. Extra tickets for partners or colleagues not registered for the conference may be purchased via the registration form at a cost of $45 per person.

Rialto Towers Conference Dinner

Thursday 24th July, 6.30pm - 10.00pm (optional - not included in conference registration fees - limited numbers apply)

Take a wander down Collins Street to the remarkable Rialto Towers. Here you will have the enjoyment of riding the elevator to the 55th floor and the Observation Deck where a 'room with a view' will welcome you for the Conference dinner. Enjoy fine food, exquisite wine and a view to rival all views. Includes free entry to the Observation Deck and an optional viewing of 'Melbourne – The Living City' in the theatrette on plaza level. This dinner is optional and tickets can be purchased via the registration form at a cost of $85 per person.

Pre and Post Conference Touring

Pre and post conference activities in Victoria are a tourist's delight. Every region in Victoria has its own unique atmosphere, landscape and range of experiences and because of each regions close proximity to Melbourne, all are within easy reach. Your biggest decision will be where to go!

- Great Ocean Road
- Geelong
- Mornington Peninsula
- Yarra Valley
- Barwon Heads
- Phillip Island
- Werribee Open Range Zoo
- The Grampians
- Melbourne Cricket Ground Tours including the Cricketers Hall of Fame

… and more! For further information and bookings on pre & post conference touring please call the Victorian Tourism Information Service on 132 842 (from within Australia) or go to www.visitvictoria.com

ACCOMMODATION AND DISCOUNTED AIR TRAVEL

DISCOUNTED AIR TRAVEL

Corporate Travel Management (CTM) has been appointed the Official Travel Agency of the Conference. *CTM is offering special conference airfares at up to 45% 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 email groups@travelctm.com. Please quote Tour Code SATNAV.

ACCOMMODATION:

Grand Hyatt - THE CONFERENCE & EXHIBITION VENUE - *123 Collins Street, Melbourne*

The Grand Hyatt Melbourne is located in the heart of Melbourne's central business and shopping districts. It is conveniently located close to arts, parks, theatres, an abundance of restaurants and the casino. All guest rooms feature individually controlled heat/air conditioning, 3 telephones, mini bar, fridge, tea/coffee making facilities and data points for computers.

Standard Room $175 per room per night

Mercure Hotel - *13 Spring Street, Melbourne*

The Mercure Hotel is located 2 blocks around the corner from the Grand Hyatt. It features air conditioning, radio, television, tea/coffee making facilities, 24 hour room service and a fridge and mini bar. Standard rooms can be single, twin share or double.

Standard Room $138 per room per night

Punt Hill Serviced Apartments - *267 Flinders Lane, Melbourne*

Punt Hill Serviced Apartments are located 2 blocks away from the Grand Hyatt. All apartments feature fully equipped kitchens, living room, separate bedrooms, air conditioning, laundry facilities and high speed modem connections.

One Bedroom $188 per apartment per night
Two Bedroom $210 per apartment per night

**ACCOMMODATION AT THESE SPECIAL CONFERENCE RATES IS LIMITED, SO PLEASE BOOK EARLY. All prices quoted are GST inclusive. To secure your booking a minimum deposit of one night's accommodation or credit card details is required upon booking with the balance paid direct to the Hotel on departure. The full amount for accommodation may be prepaid by cheque if desired. It is essential that any changes to your plans be notified in writing to the GPS Society at least 24 hours prior to check in as each Hotel has its own cancellation policy and cancellations or 'no shows' may incur part or whole of any monies paid. No responsibility will be taken for these charges by the GPS Society.*

SATNAV 2003 WORKSHOPS

Tuesday 22nd July, 2003

To complement the conference, the following series of workshops are available for delegates to book and are in addition to the symposium which is scheduled from Wednesday 23rd to Friday 25th July, 2003.

WORKSHOP TIMETABLE

WORKSHOP 1A: 8.30am – 10.30am *The Future of Satellite Navigation Systems* (Instructor: Mr Keith McPherson)	**WORKSHOP 1B: 8.30am – 10.30am** *Real-time Kinematic Positioning* (Instructor: Professor Will Featherstone)	**WORKSHOP 1C: 8.30am – 10.30am** *Introduction to Maritime GPS* (Instructor: Captain Curtis Dubay)	**WORKSHOP 1D: 8.30am – 5.00pm** *GNSS Simulator Workshop* (Instructors: Graeme Hooper, Andrew Addy and Andy Proctor) Full day workshop
WORKSHOP 2A: 10.45am – 12.45pm *GPS Receiver Technology* (Instructor: Dr Rod Bryant)	**WORKSHOP 2B: 10.45am – 12.45pm** *Introduction to Location-Based Services - (Intelliwhere Perspective)* (Instructor: Mr Neil Crisp)	**WORKSHOP 2C: 10.45am – 12.45pm** Pseudolites – The Technology & Applications (Instructor: Professor Chris Rizos)	
WORKSHOP 3A: 1.45pm – 4.45pm *GPS Modernisation* (Instructor: Professor Per Enge)	**WORKSHOP 3B: 1.15pm – 3.15pm** *GPS and Timing* (Instructor: Dr Peter Fisk) **WORKSHOP 4A: 3.30pm – 5.30pm** *Interference Issues Potentially affecting GPS* (Instructor: Mr Jules G. McNeff)	**WORKSHOP 3C: 1.45pm – 3.45pm** *FEDSAT GPS: Navigation in Space* (Instructors: Dr Rodney Walker & Dr Yanming Feng)	

WORKSHOP 1A: *The Future of Satellite Navigation Systems (2 hours)*

Instructor: Mr Keith McPherson

Keith McPherson is the Manager GNSS at Airservices Australia where he manages the development of a new Ground base Regional Augmentation System (GRAS). He spent 22 years in the RAAF as a navigator, flight test navigator and program manager responsible for GPS testing. He was assigned to the USAF GPS Joint Program Office at Los Angeles AFB 1990-92 where he received several awards for his innovative approaches to GPS systems integration. He is the Member for Australia on the International Civil Aviation Organisation's GNSS Panel where he chairs a subgroup developing and validating the GRAS Standards and Recommended Practices; a member of the federal government's Australian GNSS Coordination Committee; Vice Chair of the US Department of Transportation's Civil GPS Service Interface Committees' International Sub Group and is a member of the Republic of Korea's GNSS International Participation Panel.

Workshop Synopsis:

The evolution of GPS and its competitors had led to a plethora of applications. This workshop will cover the underlying technologies that are available and being planned. The subjects covered include:

- GPS – Current and future plans
- GLONASS - the Russian alternative
- Galileo – the European alternative
- SBAS (Space Based Augmentation Systems): WAAS, EGNOS, GBAS
- Cat-I (Ground Based Augmentation Systems): LAAS Cat-I
- ABAS (Aircraft Based Augmentation Systems): FANS 1/A
- GRAS (Ground-based Regional Augmentation System): Current Status

Time will be available to raise issues of concern.

WORKSHOP 1B: *Real-time Kinematic Positioning (2 hours)*

Instructor: Professor Will Featherstone

Will Featherstone is currently Professor of Geodesy and Director of the Western Australian Centre for Geodesy at Curtin University of Technology. He holds a first-class bachelors degree in Geophysics and Planetary Physics from the University of Newcastle-upon-Tyne and a doctorate in Geodesy from the University of Oxford. He is also Fellow of the International Association of Geodesy, the Royal Astronomical Society, and the Institution of Surveyors, Australia. His research interests include physical geodesy, satellite positioning and coordinate systems. A notable outcome of his research activities is AUSGeoid98, the national geoid model, which is required to transform GNSS-derived heights to the Australian Height Datum. 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:

- *Principles (fundamental concepts, modes of operation, satellite systems, error sources and their mitigation)*
- *Equipment (basic configurations, hardware and software, communication options, what to look for when purchasing an RTK system)*
- *Methods (classical, semi-kinematic and OTF techniques, practical tips, quality control and quality assurance, accuracy expectations, coordinate transformations)*
- *Problems and best-practice procedures (data latency, OTF ambiguity resolution, radio communications, field calibrations, datum definition, occupation time)*
- *Applications summary (vehicle navigation - land, sea and air, topographic and hydrographic surveying, machine guidance)*
- *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, 04389-23018; W.Featherstone@curtin.edu.au) at least one-week before the workshop.

WORKSHOP IC: *Introduction to Maritime GPS and DGPS (2 hours)*

Instructor: Captain Curtis Dubay

Captain Curtis L. Dubay is a 1979 graduate of the United States Coast Guard Academy. He has a Masters Degree in Electrical Engineering and is a Licensed Professional Engineer. Captain Dubay is presently serving as Commanding Officer of the U.S. Coast Guard Navigation Center in Alexandria, Virginia where he is the Operational Commander for Coast Guard radionavigation systems in North America. He serves as the Deputy Chair of the Civil GPS Service Interface Committee, and represents the Coast Guard on the IGEB GPS Senior Steering Group (SSG). He is also currently serving as the Coast Guard representative to the Secretary's Radionavigation Capabilities Assessment Task Force for multi-modal radionavigation planning.

Workshop Synopsis:

The basic GPS is defined as the constellation of satellites, the navigation payloads which produce the GPS signals, ground stations, data links, and associated command and control facilities which are operated and maintained by the Department of Defense. GPS permits land, sea, and airborne users to determine their three dimensional position, velocity, and time, 24 hours a day in all weather, anywhere in the world. The Global Positioning System (GPS) was designed as a dual-use system with the primary purpose of enhancing the effectiveness of U.S. and allied military forces. It is rapidly becoming an integral component of the emerging Global Information Infrastructure, with applications ranging from mapping and surveying to international air traffic management and global change research.

Augmentations such as Differential GPS (DGPS) improve upon the basic accuracy and integrity of GPS. This correction signal improves the accuracy of the GPS and can be broadcast over any authorized communication channel. Maritime DGPS signal are typically broadcast via medium frequency marine radiobeacons. The basic principles of GPS augmentation are presented.

GPS is managed by the Interagency GPS Executive Board (IGEB), supported by the IGEB Executive Secretariat. The IGEB manages GPS and U.S. Government augmentations to GPS, consistent with national policy, to support and enhance economic competitiveness and productivity, while protecting national security and foreign policy interests. An overview of this management structure is provided.

Maritime radionavigation services in the United States are currently structured around conventional aids to navigation and GNSS and its augmentations. This workshop includes a brief overview of modal transportation requirements, current and planned maritime, terrestrial and aeronautical GNSS augmentations, including Maritime DGPS, Nationwide DGPS, WAAS, and LAAS, and the plan for GPS modernization. The final report of the President's Commission on Critical Infrastructure Protection and the Volpe study of GNSS vulnerability are also discussed.

The main segments would include the following briefings:

- *Introduction to Differential GNSS*
- *Introduction to the GPS Management Structure (from a Civil Perspective)*
- *Current and Planned U.S. GNSS Augmentations*

WORKSHOP ID: *GNSS Simulator Workshop (full day)*

Please note this is a "hands-on" workshop using Spirent equipment

Instructors:

Graeme Hooper - Engineering Manager GPSat Systems

Since graduating from Monash University Electrical Engineering in 1980, Graeme has been employed as Systems Engineer on numerous Australian defence projects with several companies. In 1987, after joining Rockwell International (Aust), he spent many years contributing to military GPS integrations, with two years in Cedar Rapids Iowa USA, performing military equipment qualification and design. In 1993 he formed GPSat Systems Australia, an engineering company solely focused on satellite navigation applications and continues to work in this profession today.

Andrew Addy - Senior Sales Manager Spirent

Andy is responsible for PA-PT global sales and is in charge of the sales department for PA-PT. He is based in the Paignton Office. Andy has worked on the GPS simulator since 1987 and was involved in the host software development of the very first multi-channel simulator. He has moved from Software to customer training in the mid 90's then to Sales application support, Sales Management for the Asia region and then to Senior Sales Manager.

Andy Proctor - Application Manager Spirent

Andy is responsible for all aspects of pre-sale technical support for all of Spirent's Positioning Technology (PA-PT) business in the Asia region. He is also responsible as a technology specialist in the Telecoms and Wireless application area on a global basis. Prior to assuming this role within the Sales team, Andy was responsible for the global Customer Support for PA-PT products, ensuring that customer's equipment gives the maximum operational availability and that all customer issues are dealt with in a prompt and timely manner. This included provision of technical support, customer upgrades, maintenance services (including repairs) and management of customer maintenance agreements and warranties.

Workshop Synopsis:

GNSS Signal Simulators are sophisticated electronic test devices specifically designed to generate artificial "RF GNSS signals in space". The idea is to produce RF signals in the office environment that are identical to those a GPS /GNSS receiver would see in a real application. For example, a GPS Receiver may be tricked into believing it's in a jet fighter in a 6G turn at 30,000 ft, but in reality, it is sitting on a laboratory bench connected to a Spirent 6500 Signal Simulator. The reasons for purchasing a GPS signal simulator are exactly the same as those for an airline company using flight simulators for pilot training. Both the time and expense of the real world application are avoided if a true simulation can be generated in the comfort of the office. In a comprehensive simulation environment, full control and 100% repeatability is maintained over every minute scenario detail. Thus, the identical simulation scenario can be run repeatedly until all the desired outcomes are achieved. A Signal Simulator is the perfect tool for those engineers designing, developing or testing GPS products or their integrations.

During the one day workshop, a joint morning presentation will be provided by both SPIRENT and GPSat Systems, introducing modern "GNSS Simulators" and their potential applications. In the afternoon session, it's anticipated that Spirent will make available at least Qty 1 Model 6560 and Qty 1 Model 4500 GPS/GNSS L1Simulators available for general participant "hands-on" evaluation. All participants are welcome to bring along any GPS RCVR for testing during the "hands on" session.

WORKSHOP 2A: *GPS Receiver Technology (2 hours)*

Instructor: Dr Rod Bryant

Rod Bryant is the CEO and CTO of Sigtec Navigation Pty Ltd (Signav) and a Director of Sigtec Pty Ltd. Signav's mission is to deliver embedded GPS technology to world markets in conjunction with partner semiconductor companies. The company supplies 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 Ph.D. 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 2B: *Introduction to Location-Based Services (2 hours)*

Instructor: Mr Neil Crisp, Product Architect - IntelliWhere Division, Intergraph Corporation.

Neil entered the Spatial Information industry in 1983 as an analyst programmer with Brisbane City Council working on the initial development of the Intergraph-based BIMAP system. He joined Intergraph in 1987 as a Consultant covering Intergraph's software offerings in the areas of Geographical Information Systems, Asset Management/Facilities Management, Electronic Document Management, Scanning and Plotting. He developed the concept of the Spatial Query Engine upon which IntelliWhere LocationServer is based and is now the Product Architect for the IntelliWhere division of Intergraph Mapping and Geospatial Solutions which was established in Brisbane to develop software to address the Location-Based Services market. In that capacity he has been involved with the Open Location Services Initiative of the Open GIS Consortium, assisting with standards development for the OpenLS1 Testbed project.

Workshop Synopsis: *Introduction to Location-Based Services (IntelliWhere Perspective)*

The Location-Based Services industry is a confusing array of changing requirements, emerging standards and rapidly developing technologies. This stems from its position at the confluence of a number of previously independent technologies: mobile communications, positioning systems, mobile computing, the storage and manipulation of spatial information in relational databases, and the availability of large spatial datasets.

This workshop will provide an overview of Location-Based Services, examine some of the key technologies, standards and trends that have influenced it and give an indication of where it may be going. It will take a broad view of what Location-Based Services are, looking at not just the "Where's my nearest restaurant?" type of scenario, but also the significant value of location-enabling many traditional enterprise applications.

WORKSHOP 2C: *Pseudolites - The Technology & Applications (2 hours)*

Instructor: Professor Chris Rizos

Chris Rizos is a professor at the School of Surveying & Spatial Information Systems, The University of New South Wales. Prof. Rizos has been researching the technology and high precision applications of GPS since 1985 and has published over 100 papers, as well as having authored and co-authored several books relating to GPS and positioning technologies. Prof. Rizos is currently leader of the Satellite Navigation and Positioning group at UNSW, the premier academic GPS and wireless location technology R&D lab in Australia. He is a Fellow of the Australian Institute of Navigation, and a Fellow of the International Association of Geodesy.

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, making possible indoor positioning. Over the last few years a number of important developments have occurred that have made pseudolite technology more feasible than ever.

This workshop will:

- *introduce the pseudolite technology,*
- *discuss the modelling issues associated with GPS+pseudolite systems and pseudolite only systems,*
- *describe the implementation and configuration issues,*
- *discuss some of the scenarios in which such systems may be deployed, and*
- *mention some of the current and future applications of pseudolite systems.*

WORKSHOP 3A: *GPS Modernisation (3 hours)*

Instructor: Professor Per Enge

Per Enge is Professor of Aeronautics and Astronautics 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.

Workshop Synopsis:

Currently, GPS is undergoing stunning changes that will enhance both military and civil capabilities. This workshop will focus on the new civilian signals and the capabilities they enable. A second civil signal, at 1227.60 MHz, will broadcast from satellites launched in 2004 and later. A third civil signal, at 1176.45 MHz, will broadcast from satellites launched in 2010 and later. These signals will greatly improve the robustness, accuracy and integrity of the civil capability. They can be used to mitigate the effects of radio frequency interference. The new signals will also enable GPS use in the difficult signal environments found indoors and downtown. They will certainly ease ionospheric delay estimation by the user equipment. The new broadcasts will also enable geometry-free integer determination for centimeter-level positioning. The new signals will also increase the power of the augmentation systems that are used for aviation.

WORKSHOP 3B: *GPS and Timing (2 hours)*

Instructor: Dr Peter Fisk

Peter Fisk completed his PhD degree in atomic physics at the Australian National University (ANU) in 1986. Between 1987 and 1991 he was a Research Fellow in the Laser Physics Centre, Research School of Physical Sciences, ANU. During this period he also spent some time at the IBM Almaden Research Center, in San Jose, California. In 1991 he joined the CSIRO National Measurement Laboratory, where he is currently a Senior Principal Research Scientist, and Manager of the RF, Microwave, Time and Frequency Section.

Workshop Synopsis:

This workshop will cover the following issues:

- Concepts and definition of time in science and measurement
- Coordinated Universal Time (UTC)
- Definition of time in Australian Law
- National and international time infrastructure
- The importance of time in the GPS system
- The relationship between time and position
- GPS time
- Types of GPS-based timing devices
- Traceability and integrity of GPS-based timing
- Practical issues related to GPS timing: Errors and uncertainties

WORKSHOP 3C: *FedSat GPS: Navigation in Space (2 hours)*

Instructors: Dr Rodney Walker and Dr Yanming Feng

Dr Rodney Walker has been the FedSat GPS program manager for the last 5 years. In this position, he has been responsible for the development of a space qualified GPS receiver that will operate in the difficult FedSat mission environment. During this time he has worked closely with NASA's GPS development team at JPL and managed a million dollar budget. He is also a lecturer in the avionics group at the Queensland University of Technology, where he lectures in the areas of systems engineering, flight control systems and navigation systems. He has 10 years experience in the field of Satellite and Land Based Navigation systems, consulting extensively to the mining and transport industries. He conducted his PhD research in the field of multipath propagation modelling and error effects on the GPS system. The bulk of his research into this area was conducted at the Rutherford Appleton Laboratory in the UK. He is also a private pilot and is working on the development of robust avionics architectures for fully autonomous robotic aircraft in integrated airspace. He is currently working towards his command instrument flight rating. He has degrees in Electrical Engineering and in Computer Science.

Dr Yanming Feng is Senior Research Fellow with the Cooperative Research Centre for Satellite Systems (CRCSS) at Queensland University of Technology (QUT) where he has served since 1992. He is currently the Project Manager for FedSat Real Time Positioning and Precise Orbit Determination (POD). His research Interests also include Wide Area DGPS, GPS Meteorology and Real Time Kinematic GPS. He holds a Master in Geomatics and PhD degree in Satellite Geodesy from Wuhan Technical University of Surveying and Mapping (WTUSM).

Workshop Synopsis:

It has been over 30 years since Australia built a home-grown satellite. In December 2002, the launch of FedSat signalled Australia's re-entry into the space program. On-board FedSat are 4 payloads, one of which is a GPS receiver developed jointly between QUT and NASA JPL.

In the first hour Dr Walker presents an overview of the technical hurdles faced during the development of the GPS payload for FedSat. The workshop presents the history of the CRC for Satellite Systems to date. An introduction to the testing and test procedures that were employed. An overview of the general performance of the receiver to date, including some very interesting examples of GPS occultation data. Overviews of the single antenna attitude experiment on-board FedSat and the amount of GPS multipath present on a small satellite are also presented.

In the second hour, based on first-hand experiences in processing FedSat flight data Dr Feng will cover the following topics:

Overview of GPS applications for satellite Orbit Determination (OD). Principles and methods of Orbit Integration (OI) and Orbit Estimation (OE). Technical challenges and strategies for the FedSat Orbit Determination. FODT algorithms and software structure. FedSat data quality control issues. Data analysis for FedSat flight data . Application 1: Real time state knowledge for Ka-band tracking . Application 2: After-the-fact precise orbit determination for atmospheric studies.

The launch of FedSat heralds a new era for Australia. This workshop will bring you up to date with the FedSat program, and more specifically, for modern navigation applications in space.

WORKSHOP 4A: *:Interference Issues Potentially affecting GPS (2 hours)*

Instructor: Mr Jules McNeff - Special Assistant to the NASA Administrator (Space Information Systems)

Jules McNeff has had a thirty-year involvement with space systems development, acquisition, implementation and application which includes the following:

- *20-year career in Air Force space systems (1972-1992)*
- *Retired from AF in 1992 - remained in Department of Defense until 1996*
- *Represented DoD in all major system studies/policy deliberations affecting GPS (1989-1996)*
- *Joined SAIC in May 1996 - as National Security Space Architect until Aug 2002*
- *Reentered government in August 2002 - Special Assistant to the NASA Administrator (Space Information Systems)*

He is a graduate of USAF Academy (1972 - BSEE) and Harvard Business School (1982 - MBA)

Workshop Synopsis:

This workshop will address interim results from an extensive NASA investigation of the effects of wideband wireless technologies on the noise floor and therefore, on signals from low power systems such as GPS. With the advent of proposed commercialization of Ultrawide band technology through unlicensed devices, it is imperative that the effects of such devices, individually and in the aggregate, on systems such as GPS be thoroughly evaluated and documented to assist in effective regulation and preclude disruption of spectrum allocated for public safety, security and science.

SATNAV2003 TECHNICAL PROGRAM & INTERACTIVE SESSIONS

REGISTRATION: 8.00AM – 9.00AM

Wednesday 23rd July, 2003

9.00am - 10.30am

Official Opening

SESSION 1 – THE GLOBAL PERSPECTIVE

- *"The Role and Activity of the Australian GNSS Coordination Committee (AGCC)" P53*
  Dr Don Sinnott - *Chair of the Australian Global Navigation Satellite Systems (GNSS) Coordination Committee – Canberra ACT*
- *"Current Operations and Future Evolution of the GPS Support Centre" P4*
  Mr Joseph P Lortie - *Overlook Systems Technologies Inc – Vienna USA*
- *"The Future of JRANS Concept" P84*
  Mr Hideto (Duke) Takahashi - *Itochu Corporation – Tokyo JAPAN*

10.30am – 11.00am

Morning Tea & Trade Exhibition

11.00am – 12.30pm

SESSION 2 – MOBILE LOCATION SERVICES

- *"The Regulation of Location Information for Emergency Call Service Purposes" P65*
  Mr Robert Johnston - *Australian Communications Authority – Melbourne VIC*
- *"Telematics Service using a PDA and Mobile Phone" P8*
  Mr Simon Haylock - *Telstra - Melbourne VIC*
- *"Introduction to Location-Based Services" P66*
  Mr Neil Crisp - *Intergraph Corporation, Milton QLD*
- *"In-Vehicle Location-Based Services - Opportunities for extending telematics beyond safety/security" P74*
  Mr Anthony Eaton - *Intelematics Australia - Abbotsford VIC*

12.30pm – 1.30pm

Lunch & Trade Exhibition

1.30pm – 3.00pm

SESSION 3A – AVIATION APPLICATIONS

Proudly sponsored by Airservices Australia

- *"The Use and Future of Satellite Navigation in High End Aircraft" P64*
  Captain Murray Warfield - *Qantas Airways - Mascot NSW*
- *"ADS-B from a US Perspective – FAA Capstone Program in Alaska" P9*
  Mr Dennis Beres - *Federal Aviation Authority, Honolulu HAWAII*
- *"The Future of Ground Based Regional Augmentation Systems (GRAS) P31*
  Mr Keith McPherson - *Airservices Australia - Canberra ACT*
- *"Application of GPS to Low Airspeed Measurement for Helicopter Usage Monitoring Systems" P5*
  Mr Soon-Aik Gan - *Defence Science and Technology Organisation - Fishermans Bend VIC*

SESSION 3B – PRECISE POSITIONING

- *"The South Pacific Sea Level and Climate Monitoring Program: Data Processing of CGPS Network and Analysis of Height Time Series" P17*
  Mr Minghai Jia - *Geoscience Australia - Canberra ACT*
- *"Implementing Network RTK: the SydNET CORS Infrastructure" P50*
  Professor Chris Rizos - *the University of New South Wales - Sydney NSW*
- *"Geodesy Considerations for Precise Wide Area Differential Global Positioning Systems" P33*
  Mr Malcolm Jones - *Fugro Survey - Perth WA*
- *"Spacial Accuracy Validation using RTK GPS" P15*
  Mr Murray Dolling - *Department of Land Administration - Midland WA*

3.00pm – 3.30pm

Afternoon Tea & Trade Exhibition

3.30pm – 5.00pm

SESSION 4A – SPACE APPLICATIONS

- *"GPS Experiments with the German Mini-satellite Mission CHAMP" P78*
  Professor Wolfgang Keller - *University of Stuttgart - GERMANY*
- *"Flight Evaluation of a GPS Attitude Determination System" P55*
  Mr Yong Li - *RMIT University - Melbourne VIC*
- *"Preliminary In-Orbit Performance Analysis of the FedSat GPS Receiver" P38*
  Dr Rodney Walker - *Qld University of Technology - Brisbane QLD*
- *"GPS Receiver on JaeSat" P71*
  Professor Werner Enderle - *Qld University of Technology - Brisbane QLD*

SESSION 4B – MARINE & TRANSPORT APPLICATIONS

- *"Future Directions in Maritime Radionavigation" P80*
  Captain Curtis Dubay - *United States Coast Guard Academy - Alexandria USA*
- *"Maritime use of GPS" P79*
  Captain Mahesh Alimchandani - *Australian Maritime Safety Authority - Canberra ACT*
- *"Practical GPS Applications in Agriculture Today" P68*
  Mr Greg Fisher - Full On Technology - Rutherglen VIC
- *"Pedestrian Navigation in Three Dimensions Using a Handheld Computer" P30*
  Ms Mandy Voigt - *University of Applied Sciences Stuttgart -GERMANY*

Thursday 24th July, 2003

9.00am – 10.30am

SESSION 5A – LAND APPLICATIONS

- *"Tracking - A Global Solution" P85*
  Mr David Wilson Le Moine - *Thales Navigation - FRANCE*
- *"The Role of GPS in Improving the Quality of Traffic Engineering Data" P34*
  Dr Stephen Greaves - *Monash University VIC*
- *"Using GPS to monitor the impact of an in-vehicle navigation system on driving behaviour" P12*
  Ms Merle Chan & Associate Professor Geoffrey Rose - *Monash University VIC*
- *"GPS Measurement of Travel Times, Driving Cycles and Congestion" P23*
  Professor Peter Stopher - *The University of Sydney NSW*

SESSION 5B – INTEGRATED SYSTEMS 1

- *"MEMS IMU and TCXO Effect on Ultra-tightly coupled GPS/INS Tracking Performance" P2*
  Mr David Lewis - *Raytheon Company - El Segundo CA* & Dr John Kim - *Office of Naval Research - Arlington VA USA*
- *"IMU/GPS/BARO Integrated Navigation Loop for an Autonomous Uninhabited Aerial Vehicle (UAV) P1*
  Mr Jong-Hyuk Kim & Dr Salah Sukkarieh - *University of Sydney NSW*
- *"Preliminary Results of the Carrier Smoothed Code Phase Differential GPS/Pseudolite System" P48*
  Mr Ben K.H. Soon - *DSO National Laboratories - Singapore*
- *"Issues Concerning the Implementation of a Low Cost Attitude Solution for an Unmanned Airborne Vehicle" P44*
  Mr Michael Moore - *The University of New South Wales - Sydney NSW*

SESSION 5C – INTERACTIVE SESSIONS

- *"A Short-arc Robust Batch Estimation Strategy for Decimetre Level GPS-based Onboard LEO Orbit Determination" P60*
  Mr Ning Zhou - *Qld University of Technology - Brisbane QLD*
- *"Single Antenna Attitude Determination for FedSat with Improved Antenna Gain Patterns" P25*
  Mr Charles Wang & Dr Rodney Walker - *Qld University of Technology - Brisbane QLD*
- *"Orbit Determination of FedSat based on GPS Receiver Position Solutions - First Results" P69*
  Professor Werner Enderle - *Qld University of Technology - Brisbane QLD*
- *"FedSat Orbit Determination Methods and Results with onboard GPS Code Measurements" P61*
  Dr Yanming Feng - *Qld University of Technology - Brisbane QLD*
- *"Geospatial Information Technology in Site-Specific Agriculture: Turning Data into Information" P22*
  Mr Adrian O'Connor - *Good Shepherd College - Hamilton VIC*
- *"Quantitative Subsidence Monitoring. The Integrated InSAR, GPS and GIS Approach" P40*
  Mr Linlin Ge - *the University of New South Wales - Sydney NSW*
- *"Timing Characteristics of the IPPS Output Pulse of three GPS Receivers" P45*
  Mr Peter Mumford - *The University of New South Wales - Sydney NSW*
- *"New Algorithms for GPS Satellite Velocity and Acceleration Determination" P83*
  Mr Jason Zhang & Dr Kefei Zhang - *RMIT University - Melbourne VIC*
- *"An Investigation of GPS Multipath error using Spectral Analysis Techniques" P82*
  Mr Lucas Holden - *RMIT University - Melbourne VIC*

10.30am – 11.00am

Morning Tea & Trade Exhibition

11.00am – 12.30pm

SESSION 6A – ATMOSPHERIC MONITORING

- *"A Comparison of Ionospheric Models for Precise GPS Positioning" P57*
  Mr Scott Wyllie - *RMIT University - Melbourne VIC*
- *"The South Pacific Sea Level and Climate Monitoring Program: Change of Integrated Water Vapour monitored by CGPS Network" P37*
  Mr Minghai Jia - *Geoscience Australia - Canberra ACT*
- *"GPS Water Vapour Estimation using Hourly Meteorological Data from Australian Automatic Weather Stations" P62*
  Mr Zhengdong Bai - *Qld University of Technology - Brisbane QLD*

SESSION 6B – INTEGRATED SYSTEMS 2

- *"LocataNet: the Positioning Technology of the Future?" P49*
  Dr Joel Barnes - *University of New South Wales - Sydney NSW*
- *"Low cost IMU/GPS Integration by Raw Data Fusion" P26*
  Dr Shaojun Feng - *Nanyang Technological University - SINGAPORE*
- *"An Intelligent Navigation Aid for Land Mobile Applications using Augmented Reality Technologies" P24*
  Mr Stephen Scott-Young - *University of Melbourne - VIC*
- *"Effective Cycle Slip Detection and Identification for High Accuracy Integrated GPS/INS Positioning" P43*
  Mr Hung Kyu Lee - *the University of New South Wales - Sydney NSW*

SESSION 6C – INTERACTIVE SESSIONS

- *"Current development of a low-cost, high output rate, RTK GPS multisensor system for rowers" P76*
  Dr Kefei Zhang & Dr Ron Grenfell - *RMIT University - Melbourne VIC*
- *"Recent development of the Victorian High Precision Permanent GPS Tracking Network with Real-time Positioning Capability" P77*
  Dr Kefei Zhang - *RMIT University - Melbourne VIC*
- *"Quality Control and Integrity Monitoring of Victoria's Global Positioning System Reference Station network GPSnet" P81*
  Mr Neil Brown - *University of Melbourne - VIC*
- *"GPS – Essential Tool for the 21st Century" P6*
  Mr John Jamieson - *Denmark Survey & Mapping - Denmark WA*
- *"From Dust to Data" P10*
  Mr Peter Davis - *Hema Maps - Brisbane QLD*
- *"Development of GPS Israeli Active Network" P14*
  Mr Moshe Rosenblum - *Survey of Israel - ISRAEL*

	• *"Tropospheric Delay Corrections to Differential InSAR Results from GPS Observations" P42* Mr Volker Janssen - *The University of New South Wales - Sydney NSW*		• *"The Analysis of Positioning Accuracy for the Supplementary Control Point with Real Time Kinematic GPS and Real Time Kinematic GPS/GLONASS" P19* Mr Yongbo Kim - *Dong-A University - SOUTH KOREA* • *"An Investigation of GPS Precise Point Positioning Methods" P56* Mr Manoj Deo - *RMIT University - Melbourne VIC* • *"Air Target Detection using Synthetic Aperture Bistatic Radar with Non-cooperative GPS based transmitter: Case Study" P75* Dr Bijan Mojarrabi - *University of Queensland, St Lucia QLD*
12.30pm – 1.30pm	Lunch & Trade Exhibition		
1.30pm – 3.00pm	SESSION 7A – GPS INTEGRITY & VULNERABILITY ISSUES • *"GPS Vulnerability and Mitigations in Australia" P32* Mr Keith McPherson - *Airservices Australia - Canberra ACT* • *"Threat Flow in GPS Integrity Machines" P7* Professor Per Enge - *Stanford University - CA USA* • *"Critical Considerations in Addressing Geo-location of Interference Sources" P3* Mr Joseph P. Lortie - *Overlook Systems Technologies - Vienna VA USA* • *"Prediction and Analysis of GPS Susceptibility to Multipath and Spoofing Interference for Land and Space Applications" P16* Mr Troy Spencer & Dr Rodney Walker - *Qld University of Technology - Brisbane QLD*	SESSION 7B – ALGORITHMS • *"Sensitivity of the Quasi Ionospheric Free Ambiguity Resolution Strategy to Changes in the Ionosphere Stochastic Model" P13* Mr Neil Brown - *the University of Melbourne VIC* • *"Stochastic Modelling for Network-Based GPS Positioning" P41* Mr Tajul A. Musa - *the University of New South Wales - Sydney NSW* • *"Design and Analysis of DGPS Filters with Consistent Error Covariance Information" P47* Mr Hyung Keun Lee - *the University of New South Wales - Sydney NSW* • *"An Improved Knight Method for Instantaneous Ambiguity Resolution in Attitude Determination using GPS" P58* Mr Yong Li - *RMIT University - Melbourne VIC*	SESSION 7C – PRECISE KINEMATIC POSITIONING • *"A Study on the Calculation of Earth Volume of the Development District of Residential Land with GPS and TS" P18* Mr Kyoungho Bae - *Dong-A University - Busan SOUTH KOREA* • *"Performance Evaluation of Inertial Navigation Systems for Surveying Applications" P39* Mr Steve Hewitson - *the University of New South Wales - Sydney NSW* • *"Integrating Kinematic GPS and Tiltmeters for a Rail Alignment Survey" P67* Mr Don Abbey - *AAM Surveys - Subiaco WA* • *"Kinematic Positioning of the Vehicles within the Combined GPS/GLONASS" P20* Mr Kisuk Back - *Dong-A University - SOUTH KOREA*
3.00pm – 3.30pm	Afternoon Tea & Trade Exhibition		
3.30pm – 5.00pm	SESSION 8A – GPS & WIRELESS • *"Incorporating GPS into Wireless Networks: Issues and Challenges" P46* Mr Samir Omar - *the University of New South Wales -Sydney NSW* • *"DGPS Navigation Systems for Mobile Platform Devices" P36* Dr Samsung Lim - *Inha University - Inchon SOUTH KOREA* • *"An Indoor Wireless Positioning System Based on WLAN Infrastructure" P54* Mr Yufei Wang - *the University of New South Wales - Sydney NSW* • *"Implementation of the Wireless Internet Protocol for Real Time DGPS Systems" P35* Dr Samsung Lim - *Inha University - Inchon SOUTH KOREA*		SESSION 8B – RECEIVER TECHNOLOGY • *"High Speed Search Architectures and Strategies for Acquisition of Weak GPS Signals" P72* Dr Rod Bryant - *Sigtec Navigation - Fyshwick ACT* • *"Power Minimisation Techniques for GPS Dual Polarised Antenna Arrays" P11* Mr Matthew Trinkle - *the University of Adelaide – SA* • *"A Novel Signal Processing Scheme for Software Radio GPS Receivers" P51* Mr Deuk Jae Cho - *Chungnam National University – KOREA* • *"GPS Time Restitution using GPS Raw Measurements and a Holdover Algorithm for Non-Constant Aging" P27* Mr Sang Jun Yun - *Chungnam National University - KOREA*
Friday 25th July, 2003			
9.00am – 10.30am	SESSION 9A – GPS/GALILEO • *"The Architecture of the European Global Navigation Satellite System - Galileo" P70* Professor Werner Enderle - *Qld University of Technology - Brisbane QLD* • *"New Concept of Generic Software Defined Navigator using GPS/Galileo Simulink Simulator" P29* Professor Rene Jr. Landry - *Ecole de Technologie Superieure - Montreal CANADA*		SESSION 9B – Australian GNSS Coordination Committee (AGCC) Session on Accuracy Augmentation Systems for Surface Vehicle and Agriculture Applications • *"Location Accuracy Requirements for Surface Transport & Agriculture" P86* Dr Don Sinnott - *Chair of the AGCC - Canberra ACT* • *"Review of basic principles of GNSS Accuracy Augmentation" P87* Professor Chris Rizos - *the University of New South Wales - Sydney NSW*

	• *"Combined use of Galileo and GPS: Towards Innovative Navigation Research and Applications P52* Mr Cedric Seynat - *VEGA IT GmbH - Darmstadt GERMANY* • *"The Influence of Galileo and Modernised GPS on Fast Ambiguity Resolution over Extended Distances" P21* Mr Adam Mowlam - *the University of Melbourne - VIC*	• *"GPS and Robotics - Agriculture Applications" P88* Mr Geoff Glazier - *Fugro OmniSTAR - West Perth WA* • *"High Accuracy DGPS Demonstration Project" P89* Captain Curtis Dubay - *United States Coast Guard Academy - USA* • *"Are Australian user requirements being addressed?"* Open discussion session chaired by Dr Don Sinnott
10.30am – 11.00am	Morning Tea & Trade Exhibition	
11.00am – 12.30pm	Session 10 – GPS Networks • *"Use of Networked Geodetic GNSS Receivers to enable Instantaneous Positioning with Decimeter Accuracy" P28* Mr Hans Kunze - *Thales Navigation - Santa Clara USA* • *"Experiences with a Decimetre-Level Real-Time Carrier Based Positioning System at Ranges of over 500kms" P63* Tony Moss - *Fugro Survey - Perth WA* • *"Towards network-based RTK corrections for Victoria's GPSnet" P59* Dr Craig Roberts - *RMIT University - Melbourne VIC* • *"Starfire: The New RTG Differential Correction" P73* Mr Peter Terrett - *Rapid Map Global - Bundoora VIC*	
12.30pm	Close of Sessions and Trade Exhibition	
1.30pm	Technical Site Visits Depart from Grand Hyatt	

GENERAL INFORMATION

Payment

All prices are in Australian Dollars and include GST. Cheques should be made payable to "Australian GPS Society Inc." Cheques or bank drafts must be made out in Australian currency and drawn on an Australian bank. Payment by credit card is acceptable for registration, function tickets and tours. No credit card monies will be deducted for accommodation but credit card details will be forwarded to your hotel as security for your booking. Registrations will not be processed until payment is received.

Confirmation of Bookings

A confirmation letter will be sent to you upon receipt of your registration and full payment. Please check this letter and advise of any changes immediately, preferably by fax or email, as all changes will need to be made in writing. A GST Tax Invoice will be forwarded to you with your confirmation letter.

Cancellations and Refunds

Registration cancellations will not be accepted unless made in writing. Cancellations made prior to 20th June, 2003 will be refunded less a $125 administration fee. No registration refunds will be made after this date. As an alternative to cancelling, your registration may be transferred to another person without incurring any penalty. The GPS Society must be advised of this transfer in writing.

Conditions

Participation in the 6th International Conference is at the sole discretion of the Australian GPS Society Inc. and is subject to conditions laid down by the Association. The Australian GPS Society Inc. reserves the right to amend or substitute any part of the preliminary program and workshops contained herein and any condition, provision or undertaking.

Disclaimer

Participation is knowing that no blame, liability or responsibility can be attributed to the Australian GPS Society Inc. its staff or agents for any loss, damage or injury resulting from failure to carry out any undertakings or provision or from substitution of any undertaking or provision.

Insurance

Participants shall be regarded in every aspect as carrying their own risk or loss or injury to property, including baggage during the conference. 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 GPS Society is in no way responsible for any claims concerning insurance.

Messages

A message board will be located adjacent to the Conference Registration Desk. Please advise potential callers to contact the Grand Hyatt on 03-9657 1234 and ask for the SatNav 2003 Registration Desk. All messages will be posted on the message board so please check this frequently if you are expecting any calls.

Name Badges

Your name badge must be worn at all times as it is your entry to all sessions, catering areas and the Happy Hour.

Special Needs

Every effort is made to ensure people with special needs are catered for. Should you require any specific assistance please indicate this in the relevant section of the registration form.

SATNAV 2003 REGISTRATION FORM

ABN: 60 429 268 823

Please complete and return this form along with your full payment to Australian GPS Society - see contact details at the bottom of the registration form.

1. Personal Details

Title: First Name:

Surname:

Position:

Organisation:

Postal Address:

State: Postcode:

Phone: Fax:

Email:

Special Requirements eg. Dietary, wheelchair access:

2. Delegate List

☐ Please tick if you ~~do not~~ wish to be included on the delegate list.

3. Registration Details

	Early (before 21/05/03)	Late (after 21/05/03)
GPS Member Full Registration	☐ $695	☐ $795
Non-Member Full Registration	☐ $795	☐ $895
Presenter Full Registration	☐ $495	
Student Full Registration*	☐ $395	

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

Day Registration ☐ $395

✔ Please indicate which day you wish to attend

☐ Wednesday ☐ Thursday ☐ Friday

4. Workshop Registration Details

Please tick which workshops you wish to register for:

☐ 1A ☐ 1B ☐ 1C ☐ 1D

☐ 2A ☐ 2B ☐ 2C

☐ 3A ☐ 3B ☐ 3C

☐ 4A

Number of workshops registered:

Conference Delegate

Workshops @ $245 per workshop Total: $

Non-Conference Delegate

Workshops @ $295 per workshop Total: $

5. Site Visits

Stars, Cows, Spiderwebs and GPS

Tickets@ $37 Per person

Number of Tickets: Total: $

Attendee name/s:

Patrick Stevedores

Tickets @ $37 Per person

Number of Tickets: Total: $

Attendee name/s:

6. Social Functions

Happy Hour *(inclusive for full, presenter and student registrations)*

Please indicate if you will be attending ☐ Yes ☐ No

Extra Tickets @ $45 per person

Number of Tickets: Total: $

Additional attendee name/s:

Rialto Towers Dinner *(optional function)*

Tickets @ $85 per person

Number of Tickets: Total: $

Attendee name/s:

Australian

Global Positioning Systems *Society Inc.*

REGISTRATION BROCHURE 2003

SATNAV 2003 REGISTRATION FORM ABN: 60 429 268 823

Please complete and return this form along with your full payment to Australian GPS Society - see contact details at the bottom of the registration form.

7. Accommodation

Please indicate your accommodation preference from 1-3.

☐ Grand Hyatt ☐ $175 per room per night

☐ Mercure Hotel ☐ $138 per room per night

✔ Please indicate your room type

☐ Single ☐ Double ☐ Twin

☐ Punt Hill Serviced Apartment

☐ $188 One Bedroom Apartment

☐ $210 Two Bedroom Apartment

Check in date: Time:

Check out date: No. of nights:

Sharing with:

8. Payment Summary

Registration Fees	$
Workshop Fees	$
Technical Site Visits	$
Social Functions	$
Accommodation *(if paying by cheques only)*	$
Total:	$

Cheques: Please make cheques payable to 'Australian GPS Society'

Important Information: If a company credit card is being used, and it is in another colleagues name, the cardholder will be required to fill out and sign the relevant section on the booking form below to authorise payment. If this form is not completed then the card will only be used as security for your booking and you will personally need to make payment for all your accommodation and incidentals when you check in/out of your accommodation venue.

Please accept this credit card for my booking (credit card details will be forwarded to your specified Hotel to secure your booking)

I authorise the above person to use my credit card for the following:

☐ Registrations/Workshops/Social Functions/Technical Site Visits

☐ As security for accommodation booking only – delegate to pay for all accommodation

☐ One night's accommodation deposit only

☐ All accommodation (excluding incidentals)

☐ All accommodation (including incidentals)

☐ Other:

☐ Bankcard ☐ Mastercard ☐ Visa

**Diners and American Express can only be used for accommodation and not for Registration Fees.*

☐ Diners* ☐ American Express*

Name on Card:

Card Number:

Expiry Date: Verification Number:

NB. The verification number is the last 3 digits on the reverse of your card in the signature section

Signature:

For further information please contact:

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PO Box 1237, Milton Qld 4064
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Email: mail@gps-society.org Website: www.gps-society.org

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