

NAVIGATION AND LOCATION: WE ARE HERE!

28 – 30 October 2008 Church House, Westminster, London

Post Event Programme & Exhibition Guide



Royal Institute of Navigation















nowledge Transfer Network

WELCOME TO THE NAV08/ILA37 CONFERENCE & EXHIBITION

Welcome once more to the latest in the series of International Navigation Conferences organised by the Royal Institute of Navigation. This year we are most pleased to be holding it in parallel with the 37th Annual Conference of the International Loran Association. It means that both NAV and ILA followers can get together not only for discussions in the breaks but also to session swap and so hear the details of presentations from a broader range of topics. The conference is mainly comprised of parallel sessions; it will require good planning by delegates to attend all the presentations of personal interest. Session Chairs will do their best to keep strict timings for each presentation to allow delegates to move between papers, mid session.

The conference is designed to have a broad appeal to all having a professional interest in navigational science, engineering and applications. We are fortunate that there is so much of interest going on in our specialist world, as can be seen by the titles of the selected papers. It is most pleasing that the conference series continues to attract papers and delegates from the many diverse fields of navigation, covering all the main applications and many areas of technology.

I would like to thank all of the presenters, including those who have prepared poster sessions, the Session Chairs, the companies and organisations that are exhibiting and the many others who have contributed to the organisation of NAV08/ILA37. My grateful thanks go to the other collaborating organisations, namely:

- The German Institute of Navigation (DGON)
- The Institute of Engineering and Technology (IET)
- The Location and Timing KTN
- The Nautical Institute
- The Netherlands Institute of Navigation (NIN)
- UKspace

The NAV08/ILA37 Organising Committee, consisting of navigation experts across the globe, greatly eased the selection of papers and was instrumental in agreeing the arrangements for the conference. Members of the Committee are listed in the programme.

Finally, I would like to thank the administrative staff of the Institute, particularly Kathy Hossain, who so expertly contributed to and implemented the decisions of the Organising Committee.

Andy Norris Chairman of the NAV08/ILA37 Organising Committee



COMMITTEE & CHAIRS:

Prof Andy Norris, Chairman of the Technical Committee, Royal Institute of Navigation (RIN) Mr Jorge Arroyo, Program & Management Analyst, Office of Navigation Systems U.S. Coast Guard, USA Mr Zachariah Conover, President and CEO CrossRate Technology, USA Prof Paul Cross, University College London, UK Joaquín Cosmen-Schortmann, GMV, Spain Mr Colin Beatty, CBi Ltd., UK Gp Capt David Broughton, Director, RIN Mr Bob Cockshott, Location and Timing KTN, UK Dr Chaz Dixon, EADS Astrium, UK Dr Renato Filjar, Senior Research Engineer, Ericsson Nikola Tesla d. D., Croatia Dr Didier Flament, Head of EGNOS Mission & System Engineering, ESA Alain Geiger, ETHZ, Switzerland Dr Paul Groves, QinetiQ Ltd Dr Norman Hughes, Journal Editor, RIN Mr David Kelleher, VT Communications/ILA, UK **Volker Köhler**, DGON & SAM Electronics GmbH, Germany Dr Sherman Lo, Stanford University, USA Prof Gerard Lachapelle, CRC/iCORE Chair in Wireless Location, University of Calgary, Canada Dr William Michalson, Worcester Polytechnic Institute, USA **Prof Terry Moore**, IESSG, University of Nottingham, UK **Prof Washington Ochieng**, Imperial College London, UK Dr Gerard Offermans, Reelektronika, The Netherlands Mr David Patraiko FNI, Director of Projects, Nautical Institute, UK Mr Richard Peckham, Head of Business Development, EADS Astrium Ltd, UK lan Poyner, IET Mr Tony Scorer, RIN Mr Chuck Schue, UrsaNav Inc, USA Prof Dr-Ing Gert F Trommer, Director of the Institute of Systems Optimisation, Karlsruhe University, Germany Prof Durk van Willigen, Reelektronika and GAUSS Research Foundation Prof František Vejrazka, Czech Technical University in Prague, Czech Republic Peter Vorsmann, DGON Dr Paul Williams, The General Lighthouse Authorities of the UK & Ireland/ILA, UK

TUESDAY 28 OCTOBER

TUESDAY, 0915 - 1035

SESSION I: Plenary

Welcome Addresses:

Chairman:

Prof Andy Norris, Chairman of the Technical Committee, Royal Institute of Navigation

David Barnes, President, Royal Institute of Navigation

Langhorne Bond, President, International Loran Association

Keynote Presentations:

The Importance of Technical Advancement in Maritime Navigation

GNSS into the Future

Prof Paul Cross,

University College, London











TUES	TUESDAY, 1120 - 1300	
Time	SESSION 2A	SESSION 2B
	Addressing GNSS Vulnerabilities	Radar, AIS and ECDIS
	Chairman: Dr Didier Flament, Head of EGNOS Mission & System Engineering, ESA	Chairman: Dr Volker Köehler, DGON & SAM Electronics GmbH, Germany
1120	GPS Timing Criticality Assessment; Preliminary	The Development of AIS as an Aid to Navigation
	Performance Results	A Grant, P Thompson & N Ward, The General Lighthouse
	<u>¹J Carroll</u> & ² K Montgomery	Authorities (GLAs) of the UK & Ireland
	¹ U.S. Department of Transportation/Volpe Center; ² Symmetricom, Inc., USA	
1145	Preparing for the Maximum of Solar Cycle 24	The New Radar Standard – Changes for the
	<u>J Kunches</u> , NOAA Space Weather Prediction Center, USA	Mariner
		<u>D Hannah</u> , Technical Consultant, UK
1210	Failure Modes and Effects Analysis of GNSS	ECS/ECDIS User Feedback
	Aviation Applications	H Gale, The Nautical Institute,
	<u>C Milner</u> & W Ochieng, Imperial College London, UK	
1235	GNSS – eLoran combined receiver benefits for	On the use of AIS binary messages for
	the mass market	exchanging navigational intentions in encounter
	P Mattos, ST Microelectronics R&D Ltd, UK	situation
		J Fukuto, M Minami & Y Niwa, National Maritime Research
		institute, japan

TUESDAY, 1400 - 1515		
Time	SESSION 3A	SESSION 3B
	eLoran: System Status	Maritime Hazard Mitigation
	Chairman: Prof Durk Van Willigen, Reelektronika & GAUSS Research Foundation	Chairman: Dr Norman Hughes, FRIN, Royal Institute of Navigation,
1400	LOng RAnge Navigationso where are we going now and when do we know we've arrived? <u>M Narins</u> , Federal Aviation Administration, USA	Standardisation of Buoy Arrangements in the Korean Navigational Fairway <u>'S G Gug</u> , ² M Bransby, ³ J H Yun, ³ T K Jeong & ³ E B Lee ¹ The GLAs of UK and Ireland (Sabbatical from Korea Maritime University); ² The GLAs of UK and Ireland; ³ Korea Maritime University, Korea
1425	Status of Loran in Europe <u>J Manchard & ²C Quivouron</u> Directorate for Maritime Affairs, France ² DCNS Services Division, France	Proposed Satellite Service for Ice-Edge and Storm warning using GNSS Reflectometry ¹ M Unwin, ² P Jales & ² C Underwood ¹ Surrey Satellite Technology Ltd., UK; ² Surrey Space Centre, UK
1450	Far East Radio-navigation Service (FERNS) Update ¹ S G Gug, ² T Ikeda & ³ P Williams ¹ The GLAs of UK and Ireland (Sabbatical from Korea Maritime University)& FERNS; ² Japan Aids to Navigation Association ³ The GLAs of UK and Ireland	The use of Synchronised and Sequential Lights to improve conspicuity to the Mariner <u>¹R Barker</u> , ² M Nicholson & ² I Tutt ¹ Trinity House; ² The GLAs of UK and Ireland

TUES	DAY, 1545 - 1700	
Time	SESSION 4A eLoran: Interference and Noise	SESSION 4B e-Navigation
	Chairman: Dr Sherman Lo, Stanford University, USA	Chairman: David Patraiko, FRIN, Director of Projects, Nautical Institute
1545	Characterization of P-static for Antenna and Receiver Design Standards <u>R W Lilley</u> & ² R Erikson ¹ Aviation Management Associates,USA ² W J Hughes FAA Technical Center,USA	The Implementation of e-Navigation <u>N Ward</u> & S Basker, The GLAs of the United Kingdom and Ireland
1610	eLoran and Amateur Radio – A Study in Coexistence ¹ P Williams, ² D Last & ¹ N Ward ¹ The GLAs of UK and Ireland ² Consultant to The GLAs of UK and Ireland	E-Navigation: The Dream and the Reality <u>J Clandillon-Baker</u> , Class I Pilot, UK
1635	Reliable GPS – Interference, Jamming and the Case for eLoran <u>P Williams</u> , A Grant, S Basker & M Bransby, The GLAs of UK and Ireland	E-Navigation – SEAMAX, Terrestrial Broadband at Sea <u>R Tremlett</u> , FDC

TUESDAY, 1700 - 1800

SESSION 5: Industry



Chairman: Chaz Dixon

An hour of commercial presentations – introducing the very latest in navigation aids and technology from the leading manufacturers.

WEDI	NESDAY, 0900 - 1040	
Time	SESSION 6A	SESSION 6B
	The Human Element in Marine Navigation	GNSS Technology
	Chairman: Mr Jorge Arroyo, Program & Management Analyst, Office of Navigation Systems, US Coast Guard, USA	Chairman: Dr Chaz Dixon, EADS Astrium Ltd, UK
0900	Engaging the Navigator	Evaluating the performance of NRTK GPS
	<u>D Patraiko</u> , The <i>Nautical Institute</i>	Positioning on Land Navigation Applications <u> Aponte</u> , 'X Meng, 'T Moore, 'C Hill & ² M Burbidge ¹ IESSG, University of Nottingham, UK; ² Leica Geosystems Ltd, UK
0925	Aspects of Technical Reliability of Navigation	Galileo AltBOC E5 signal characteristics for
	Systems and Human Element in Case of Collision	optimal tracking algorithms
	Avoidance <u>¹M Baldauf</u> & ¹ K Benedict & ² F Motz ¹ Department of Maritime Studies, Wismar University, Germany; ² FGAN-FKIE, Bonn-Wachtberg, Germany	<u>P Kačmařík</u> , P Kovář, F Vejražka, Czech Technical University in Prague, Czech Republic
1050	Was it operator error or human error?	Hourly Precise Point Positioning with Ambiguity
	<u>D Squire</u> , The Nautical Institute	Resolution
		<u>J Geng</u> , X Meng, N Teferle & A Dodson, IESSG, University of Nottingham, UK
1015	Developing User needs for S-Mode	The need for GNSS Authentication
	<u>E Jacobson</u> & M Lützhöft, <i>Chalmers University of Technology,</i> Göteborg Sweden	<u>R_Tremlett</u> , <i>FDC</i>

WED	NESDAY, 1120 - 1300		
	SESSION 7A	SESSION 7B Integrated Systems	
	eLoran: Signal Reception		
	Chairman: Mr Chuck Schue, UrsaNav Inc, USA	Chairman: Prof Dr-Ing Gert F Trommer, Director of the Institute of Systems Optimisation, Karlsruhe University, Germany	
1120	eLoran Provider, Monitoring and User	Impact of Extended Coherent Integration Times	
	equipment Performance - Timing and Harbour	on Weak Signal RTK in an Ultra-Tight Receiver	
		C O Driscoll, M G Petovello & <u>G Lachapelle</u> , University of	
	<u>G Offermans</u> , A Heiwig, D van Willigen & R Kellenbach, Reelektronika. The Netherlands	Calgary, Canada	
1145	Commercial Integrated eLoran/GPS Maritime	Optimising the algorithm design for high-	
	Receiver	integrity relative navigation using carrier-phase	
	<u>M Leathem</u> , Z Conover, CrossRate Technology, USA	relative GPS integrated with INS	
		<u>P D Groves</u> , C R Offer, C J Mather, G W Pulford, I A	
		Ashokaraj & A A Macaulay, QinetiQ, UK	
1210	H-field or E-field eLoran Receiver Antenna?	Fusion of Inertial Sensors and Signals of	
	¹ <u>D van Willigen</u> , ² W Pelgrum, ³ R Kellenbach, ³ G Offermans &	Opportunity for Unassisted Navigation	
	³ A Helwig (Declaterarity & CAUSS Decearch Foundations ² Eview Neviewtien	J Crosby, R K Martin, J Kaquet & M M Veth, US Air Force	
	Solutions; ³ Reelektronika, The Netherlands	Institute of Technology, USA	
1235	United States Loran C Performance	Nonlinear SAR/INS Integration using Sigma-	
	E. Thiedeman, US Coast Guard, USA	Point Kalman Filter	
		<u>A Maier</u> , S Kiesel & G F Trommer, Universität Karlsruhe (TH),	
		Germany	

WEDNESDAY, 1400 - 1540		
Time	SESSION 8A	SESSION 8B
	eLoran: Future Technology	Land & Urban Navigation
	Chairman: Dr Gerard Offermans, Reelektronika, The Netherlands	Chairman: Prof Gerard Lachapelle, CRC/iCORE Chair in Wireless Location, University of Calgary, Canada
1400	Loran of the Future – On-Air Tests of Some Possible Changes ¹ IR Hartnett, ² P F Swaszek, ³ G W Johnson, ³ R Shalaev & ³ C Oates ¹ U.S. Coast Guard Academy, USA; ² University of Rhode Island, USA: ³ Alian Science & Technology, USA;	CADRE – Avoiding Congestion with Satnav Systems <u>T Thornton</u> , Smartcom Software Ltd., UK
1425	A Perspective on the Future of eLoran	Positioning with punctured GPS P Duffett-Smith & A B Pratt, University of Cambridge, UK
1450	Group Repetition Interval selection for eLoran ¹ P Williams & ² J Safar ¹ GLAs of the UK & Ireland ² Czech Technical University in Prague	Cooperative Localization Algorithms for Improved Road Navigation <u>E Richter</u> , R Schubert, V Leonhardt & N Mattern, Chemnitz University of Technology, Germany
1515	Statistical Properties of Quiet Space Weather Northern Adriatic Residual GPS Ionospheric Delay <u>¹R Filjar</u> , ² J Kasum, ³ S Kos, ⁴ M Sevrovic, ¹ RIN Croatian Branch; ² University of Split, Croatia; ³ University of Rijeka, Croatia; ⁴ Institute of Transport and Communications, Croatia	A Prototype Positioning System based on Digital Audio Broadcast Signals <u>D Palmer</u> , T Moore & C Hill, IESSG, The University of Nottingham, UK

WEDNESDAY, 1610 - 1750		
Time	SESSION 9A	SESSION 9B: Urban & Indoor Navigation
	Marine Navigation – Evolving techniques and	
	technology	
	Chairman: Prof Andy Norris, Chair of the Technical Committee, Royal Institute of Navigation	Chairman: Dr William Michalson, Worcester Polytechnic Institute, USA
1610	The impact of new signals on precise marine	Realization of an Adaptive Hybrid Low-cost
	navigation- initial results from an experiment in	GPS/INS Integrated Navigation System with
	Harwich harbour	Switched Position-Domain and Range-Domain
	<u>'A Parkins</u> , 'A Grant & 'P Cross	Filtering Strategy
	'University College London, UK; 'The General Lighthouse	$\int \underline{Zhou}$, S Knedlik, E Edwan, Z Dai and O Loffeld, University of
	Authorities of the UK & Ireland	Siegen, Germany
1635	AIS IS IN Space	OFDM Signal Navigation
	<u>R Tremlett</u> , FDC	<u>P Kovař</u> , F Vejrazka, P Kačmařík & M Eska, Czech Technical
1700	DOADSS latest concept of a DDU	University in Prague, Czech Republic
1700	M Potlam 8 2011 C Allen	RIS/CIS mechanism with IEEE802.11 for Indoor
	Fireboan Maritime Pilote Association & Advisor P & D Dutch	I Prioto A Pabillo S Mazuelas II Plas ² P Form'andez 8 ² P M
	European Manufile Phots Association & Advisor R & D Dutch Dilatage The Netherlands: ² European Maritime Dilats' Association	JEFIELO, A Banino, S Mazuelas, J Blas, E Fern andez & R M
		CEDETEL Spain: ² University of Valladelid Spain
		CEDETEL, Spain, Oniversity of Valiadolia, Spain
1725	Sharp Tools for Optimising Navigation Sensor	Error Mechanisms in Indoor positioning systems
	Arrays	without support from GNSS
	<u>M Bishop</u> , Emeritus Solutions Ltd, UK	W Michalson, A C Navalekar & H K Parikh, Worcester
		Polytechnic Institute, USA

THUP	RSDAY, 0900 - 1040	
Time	SESSION 10A	SESSION 10B:
	eLoran: Signal Transmission	Autonomous Vehicle Navigation
	Chairman: Zach Conover, CrossRate Technology, USA	Chairman: Dr Paul Groves, QinetiQ Ltd, UK
0900	Accufix System Enhancements for eLoran	UAV Formation Maintenance in Linear and
	<u>E Johannessen</u> , P R Johannessen & A Grebnev, <i>Megapulse</i>	Curvilinear Trajectories
	Incorporated, USA	<u>T Abdelrahman</u> , California State University, USA
0925	Test and Evaluation of a New eLoran	Software in the Loop Simulation Tool for small
	Transmitter	autonomous VTOL UAV with Teaming
	<u>G Johnson</u> , M Wiggins, K Dykstra, P Swaszek & R	Capability
	Hartnett	O Meister, N Frietsch, J Seibold & G F Trommer, Institute of
	¹ Alion Science & Technology; ² University of Rhode Is; ³ US Coast Guard Academy, USA	Systems Optimization, University of Karlsruhe, Germany
0950	Next Generation LF Transmitter Technology for	Vision Based Landing System for a VTOL-MAV
	(e)LORAN Systems	N Frietsch, O Meister, C Schlaile, J Seibold & G F Trommer
	<u>T Hardy</u> , Nautel Limited, Canada	Institute of Systems Optimization, University of Karlsruhe, Germany
1015	The Next Generation LF Transmitter and its	Adaptive Kalman Filters for Orbit Estimation of
	impact on LORAN, eLORAN, and Tactical	Navigation Satellites for DGPS Applications
	LORAN Systems	<u>R Vepa</u> , University of London, UK
	<u>C Schue</u> , UrsaNav Inc, USA	

THUP	THURSDAY, 1120 - 1300	
Time	SESSION IIA	SESSION IIB
	Air Navigation	Geospatial Applications & LBS
	Chairman: Prof Washington Ochieng, Imperial College London, UK	Chairman: Prof Terry Moore, IESSG, University of Nottingham, UK
1120	Operational Validation of EGNOS for safety of life applications <u>D Pole</u> & R Handford, NATS, UK	Role of Geospatial Content Syndication in Location-Based Services Development <u>R Filjar</u> & L Busic, Ericsson Nikola Tesla d. D., Croatia
1145	SESAR: Getting Good Value for Airlines <u>P Brooker</u> , Cranfield University, UK	New GPS Based Methods for Area Measurement Approved by EU M Grzebellus, NavCert GmbH, Germany
1210	Validation of EGNOS helicopter approach procedures to North Sea oil platforms J Valner & S J Leighton, Helios, UK	Terrain Moisture and stream Level for Integrated Reflected GPS System using Reflectivity and Elevation Map ¹ L-C Shen, ¹ J C Juang & ² C C Chang ¹ National Cheng Kung University, Taiwan ; ² Ching-Yun University, Taiwan
1235	Preliminary Results of Helicopter Navigation Trials with Network RTK GNSS Positioning <u>1X Meng</u> , ² T Marmont, ¹ C Hill, ¹ J Aptone & ¹ S Ince ¹ IESSG, University of Nottingham, UK; ² Beacon Energy Ltd., UK	Commercial exploitation of Great Britain's Permanent GNSS Network Infrastructure <u>N Ackroyd</u> , T Satterthwaite & P Cruddace Ordnance Survey, UK

THUP	RSDAY, 1400 - 1540	
Time	SESSION 12A	SESSION 12B
	eLoran: System Coverage and	GNSS Simulation and Authentication
	Performance	
	Chairman: Greg Johnson, Alion Science & Technology	Chairman: Bob Cockshott, <i>Location & Timing KTN</i>
1400	The Loran Propagation Model: Development,	A Coning Compensation Algorithm with Pure
	Analysis, Test, and Validation	Filtered Angle Rate Input
	¹ J M Blazyk, <u>¹C G Bartone</u> , ¹ F Alder & ² M J. Narins	<u>'Q Zeng</u> , 'J Liu, ² A H Kemp, 'Wei Zhao
	'Ohio University; 'Federal Aviation Administration; USA	'Navigation Research Center, Nanjing University of
		Aeronautics and Astronautics;
		² School of Electronic and Electrical Engineering, University of
		Leeds
1425	Improving Loran Coverage with Low Power	GNSS RF Simulation Systems for Certification
	Transmitters	and Standards Testing
	¹ B Peterson, ² S Lo & ² P Enge	<u>S Smith</u> , Spirent Communications PLC, UK
	¹ Peterson Integrated Geopositioning, USA; ² Stanford University, USA	
1450	The Loran Coverage Availability Simulation Tool	User Requirements for Emergency Management
	'B Peterson, <u>'S Lo</u> & P Enge	Navigation
	'Peterson Integrated Geopositioning, USA; 'Stanford University, USA	C S Dixon, <u>R Haas</u> & N Holubov, Astrium Ltd., UK
1515	LORAN Performance in a GPS Non-Precision	Weak Signal & Multipath Analysis Using
	Approach Environment	GNSScope: A Toolbox for end-to-end Modelling,
	<u>D W Diggle</u> , C Bartone & M J Narins	Simulation and Analysis of GNSS
	¹ Ohio University, USA; ² Federal Aviation Administration, USA	A Ucar, <u>R Kazazoglu</u> , E Cetin & I Kale, University of Westminster, UK

THURSDAY, 1600 - 1630 CLOSING SESSION



RESERVE PAPERS & POSTER PRESENTATIONS

Wide Area Inverse DGPS Model for Improved Positioning Tracking Performance

M AL Nabhan, W Balachandran (Brunel University) & Z Hunaiti (Anglia Ruskin University), UK

A comparison of GPS and Galileo signals for application in a navigation system for visually impaired people

N Al-Salihi, Brunel University, UK

The Role of Satellite Navigation in Improving the Safety and Security of Elderly and Disable People Z Hunaiti, Anglia Ruskin University, UK

Maritime Safety Information Relay through Navigational databases - A step towards E-Navigation P Rafael da Silva, M Bessa Pacheco, R Reino Batista, V Plácido da Conceição & A Lopes, Instituto Hidrográfico, Portugal Adaptive Kalman Filters for Orbit Estimation of Navigation Satellites for DGPS Applications R Vepa & A Zhahir, University of London, UK

A Coning Compensation Algorithm with Pure Filtered Angle Rate Input

Q Zeng, J Liu (Nanjing University of Aeronautics and Astronautics), A H Kemp (University of Leeds) & W Zhao (Nanjing University of Aeronautics and Astronautics), China

Present Status and Future Developments of the Russian Radionavigation System Chayka and Joint Chayka/Loran-C Radionavigation Chains

V I Bass, S P Zarubin, P E Efremov, A E Choglokov (Russian Institute of Radionavigation & Time) & V M Tsarev (Internavigation RTC), Russia

e-Loran Receiver Solution to E-911 Caller location

J F DeLorme, Lormega Systems, USA

COMMITTEE & CHAIRS

Prof Andy Norris, Chairman of the Technical Committee, Royal Institute of Navigation (RIN), UK	Dr Sherman Lo, Stanford University, USA
Jorge Arroyo, Program & Management Analyst, Office of Navigation Systems U.S. Coast Guard, USA	Prof Gerard Lachapelle, CRC/iCORE Chair in Wireless Location, University of Calgary, Canada
Mr Zachariah Conover, President and CEO CrossRate Technology, USA	Dr William Michalson, Worcester Polytechnic Institute, USA
Prof Paul Cross, University College London, UK	Prof Terry Moore, IESSG, University of Nottingham, UK
Joaquín Cosmen-Schortmann, GMV, Spain	Prof Washington Ochieng, Imperial College London, UK
Mr Colin Beatty, <i>CBi Ltd., UK</i>	Dr Gerard Offermans, Reelektronika, The Netherlands
Gp Capt David Broughton, Director, RIN, UK	David Patraiko FNI, Director of Projects, Nautical Institute, UK
Mr Bob Cockshott, Location and Timing KTN, UK	Mr Richard Peckham, Head of Business Development, EADS
	Astrium Ltd, UK
Dr Chaz Dixon, EADS Astrium, UK	Ian Poyner, IET
Dr Renato Filjar, Senior Research Engineer, Ericsson Nikola Tesla d. D.,Croatia	Mr Tony Scorer, RIN UK
Dr Didier Flament, Head of Systems Engineering, Alcatel Alenia Space, France	Mr Chuck Schue, UrsaNav Inc, USA
Alain Geiger, ETHZ, Switzerland	Prof Dr-Ing Gert F Trommer, Director of the Institute of Systems Optimisation, Karlsruhe University, Germany
Dr Paul Groves, <i>QinetiQ Ltd</i>	Prof Durk van Willigen, Reelektronika and GAUSS Research Foundation
Dr Norman Hughes, Journal Editor, RIN	Prof František Vejrazka, Czech Technical University in Prague, Czech Republic
Dr Greg Johnson, Alion Science & Technology, USA	Peter Vorsmann, DGON
Mr David Kelleher, VT Communications/ILA, UK	Dr Paul Williams, The General Lighthouse Authorities of the UK & Ireland/ILA, UK

EXHIBITORS



Chronos Technology is a supplier and system integrator of GNSS and eLORAN solutions for timing and geolocation markets. Product range covers all solutions from silicon GPS engines, antennas, splitters and amplifiers through to system based timing and navigation products and complete system integrated solutions for GPS test environments and geodetic deployment. <u>www.chronos.co.uk</u> or <u>www.gps-world.biz</u>

Email: <u>marketing@chronos.co.uk</u> Tel: +44 (0)1594 862200



Computer Graphics Training was founded in 1992 and has been providing interactive marketing, graphics and training services to a range of companies. Clients have included; Deloitte Consulting, Disney, Boots, Financial Times, Legal & General, as well as numerous small businesses and individuals.

Our aim is to provide the most flexible service possible, to ensure we help keep our clients at the forefront of their market.

We are a small dedicated team of people with an extensive range of skills and are able to support a company's marketing & PR, from one source, with one point of contact, saving both valuable time and money. We pride ourselves on the

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EADS Astrium

Astrium, a wholly owned subsidiary of EADS, is dedicated to providing civil and defence space systems and services. In 2007, Astrium had a turnover of \in 3.5 billion and 12,000 employees in France, Germany, the United Kingdom, Spain and the Netherlands. Its three main areas of activity are Astrium Space

Transportation for launchers and orbital infrastructure, Astrium Satellites for spacecraft and ground segment and its wholly owned subsidiary Astrium Services for the development and delivery of satellite services.

EADS is a global leader in aerospace, defence and related services. In 2007, EADS generated revenues of €39.1 billion and employed a workforce of more than 116,000.

For further information contact:

Andy German Navigation Business Development Manager EADS Astrium Ltd Anchorage Road, Portsmouth, Hampshire, PO3 5PU, United Kingdom

Tel: +44 2392 70 5854 Fax: +44 2392 708290 E-mail: andrew.german@astrium.eads.net Website: www.astrium.eads.net



The European Satellite Services Provider (ESSP) was founded in April 2001. Its shareholders (members) are seven key European air navigation service providers (ANSPs). They are members of the EGNOS Operators and Infrastructure Group (EOIG), and signatories to the ESA ARTES-9 programme. These Air Navigation Service Providers are AENA (Spain), DFS (Germany), DNSA (France), ENAV (Italy), NATS (UK), NAV (Portugal) and skyguide

(Switzerland). ESSP's mission is to become the EGNOS System Operator and Safety of Life Service Provider. ESSP began initial operations of EGNOS in July 2005. Through its members, ESSP has **unique knowledge** on the aviation use of EGNOS. Beyond this, ESSP has a broad view and understanding of the multimodal user market. The nature of EGNOS – *a safety-critical satellite navigation system composed of geographical disseminated elements* – dictated the creation of a **centralised coordination company**.

Currently based in Brussels, ESSP's headquarters will move to Toulouse in 2009.

Contact Persons:

melanie.vritschan@essp.beCommunications Officerdirk.werquin@essp.beGeneral ManagerWebsite: http://www.essp.be



The General Lighthouse Authorities of the United Kingdom and Ireland (GLAs) work together to deliver a reliable, efficient and cost-effective aids to navigation (AtoNs) service for the benefit and safety of all mariners. The GLAs comprise

The Corporation of Trinity House (England, Wales, Channel Islands and Gibraltar), the Commissioners of Irish Lights (all of Ireland) and the Commissioners of Northern Lighthouses (Scotland and the Isle of Man). The tri-GLA Research and Radionavigation (R&RNAV)

Directorate undertakes the research and development of physical and radio AtoNs, support systems and their integration.

E-mail: <u>r&rnav@thls.org</u> Tel: +44 (0) 1255 245118



GRACE is a UK based, *world-class* centre of excellence in Global Navigation Satellite Systems (GNSS) - capitalising on existing world-leading research and training capability at the University of Nottingham. It will focus exclusively on developing commercial GNSS applications in industry by providing access to state of the art research and testing facilities. New GNSS business creation and inward investment will also be key objectives of the Centre. The €13m investment

is jointly funded by the East Midlands Development Agency and the University of Nottingham and will be established in a new facility on the University of Nottingham Innovation Park. The centre will offer:

- GNSS Research Laboratory and Training Services
- Access to industry focussed research funding
- Applications Development
- GNSS simulation, test-bed and testing facilities
- GNSS Performance Observatory
- Industry focussed Training Programmes
- Business Support Services, incubation Units and Galileo Clustering activities
- Access to 22,000 m² of new-build space on the University of Nottingham Innovation Park.

The Centre will be staffed by a new industry facing team including a Business Manager and business development staff backed up by dedicated technical support specialists. Building plans have started and new staff will be recruited during 2008.

Companies and organisations interested in discussing collaboration possibilities are invited to contact:

Terry Moore	terry.moore@grace.ac.uk
Trevor Wright	trevor.wright@nottingham.ac.uk
Sean Ince	sean.ince@grace.ac.uk

+44 (0) 115 951 3886 +44 (0) 115 846 7283 +44 (0) 115 951 3877

Helios is a management and technology consultancy supporting business, HELLOS Helios is a management and technology consultancy supporting business, governments and other institutes. Our key markets are in navigation, ATM, airports and telecoms. We help improve corporate performance through analysis

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The Location and Timing KTN is one of approximately 25 KTNs funded by the Technology Strategy Board to promote wealth creation through innovation in strategic technologies.

The KTN has 870 members in 570 organisations, three guarters in industry with the remainder in academia or government.

We cover all aspects of location and timing, including GNSS, Loran, WiFi, RFID, dedicated RF beacons, mobile phone cell ID, IP address based location, and

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We issue e-mail news alerts, hold focused and topical networking events and inform our members about business and funding opportunities. We are a voice for the UK location and timing community and a point of contact with government.

Membership is free. Contact Karen Barlow for details: 020 8943 8711, Karen.Barlow@locationktn.com, or visit http://www.locationktn.com.

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For further information contact: e-mail: info@reelektronika.nl Tel: +32 182 300 150 Contact person: Gerard Offermans Website: http://www.reelektronika.nl



The Royal Institute of Navigation (RIN) is a learned society formed in 1947. It has three main aims: to unite all those with a professional or personal interest in any aspect of navigation in one unique body; to further the development of navigation in every sphere; and to increase public awareness of both the art and science of navigation, how it has shaped the past, how it impacts our world today, and how it will affect the future. Any company or individual interested in joining the Institute should contact Colin Hatton, the RIN Membership Secretary.

Contact details:

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VT Communications is currently engaged in providing the eLORAN and DGPS recapitalisation program for the General Lighthouse Authorities, other major customers include the UK Ministry of Defence, NPL, BBC WS, the Swedish Navy, European Space Agency and International Peacekeeping and global relief organisations.

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