



Loran Lines

April 2003

Newsletter of the International Loran Association

Volume 2003-1

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RIN Resolution supports need for alternative navigation systems

THE Royal Institute of Navigation Conference NAV02 held at Church House, Westminster, London on 5-7 November 2002 approved the following Resolution:

“In order to ensure that Galileo can contribute to a robust global navigation and timing infrastructure, this conference strongly recommends that European Administrations recognise the key findings of the US Volpe Report, the NAV02 proceedings and other studies of the significant vulnerability of GNSS to loss of signal, interference and jamming. The conference noted that many of these concerns apply to Galileo as well as GPS.

“The Volpe Report identifies the need to ensure that appropriate and adequate alternative systems are maintained as required for use by maritime, aeronautical and land navigators, as well as for timing and telecommunications applications.

“An Action Plan should be formulated as a matter of urgency to address these issues. This should be used as an input to the European Radionavigation plan.”

12 November 2002 ■

NBF urges unequivocal DOT support for Loran-C

SPEAKING AT ILA-31 in Washington, Earl Swaesche, Legislative Director of the National Boating Federation (NBF), stressed the importance of a clear and unequivocal declaration by the US Department of Transportation of a commitment to the permanent retention and modernization of the Loran C system. In this way, the confidence of the user community would be restored and the industry could move ahead with the development of a line of economical receivers. Despite continued

Continued on page 3

Congress votes increased level of LORAN support

THE FAA REQUEST for FY 2003 of \$13 million for Loran development was increased to \$25 million by the House while the Senate proposed a figure of \$21 million. The full amount of the House figure was supported by the joint committee and was included in the budget for FY 2003. This represents a substantial increase over the \$19 million provided last year. Undoubtedly Congress was aware of the message of the Volpe report on GPS vulnerability and the stated intent of the DOT after 9/11 to provide a robust backup system for GPS. Analyses by consultants Booz, Allen Hamilton have shown that Loran is the best option for this backup role in the future. Loran does not have the vulnerability of the GPS signal and could in its own way provide timing information and message transfer. House and Senate support has been firm in urging the FAA to move ahead with the development and installation of an enhanced Loran ground-based transmitter network.

This action by the Congress in funding the continued revitalization of Loran will serve to accelerate the development of new systems and the on-going upgrades to the Loran transmitter network. Additional work is required, however, to verify RNP-0.3 coverage throughout the United States and to establish certification standards and specifications before extensive receiver production can begin. ■



ILA32 Convention and Technical Symposium

The week of November 3, 2003, in Boulder, Colorado

Be there!



International Loran Association

Board of Directors and Committee Chairs 2003

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Past President: John Beukers	2003	jb20@earthlink.net
<i>Elected Directors (three year terms):</i>		
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James Doherty	2004	jimdoherty@erols.com
Erik Johannessen	2005	ejohnnessen@megapulse.com
David Last (Vice President)	2005	jdl@navaid.demon.co.uk
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Thomas Rice	2004	trice@navcen.uscg.mil
William Roland	2003	broland@knology.net
Charles Schue	2005	cshue@wrsystems.com
Durk van Willigen	2003	d.vanwilligen@reelektronika.nl
One vacancy		

Board member terms end at the close of the ILA convention of the year shown

Appointed Directors (1 year term):

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Nomination/Election	James Doherty
Membership	Erik Johannessen
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A complete listing of the Board Membership, addresses and phone/fax numbers can be found on the ILA website www.loran.org

ILA32 Call for Papers

Abstracts of papers to be considered for presentation at the Convention should be submitted to:

ILA Operations Center
741 Cathedral Pointe Lane
Santa Barbara CA 93111 USA

ILA members who have not yet paid this year's dues are asked to do so now. Membership forms can be downloaded from ILA's website:

<http://www.loran.org/Membership/Formindividual.htm>

Please note ILA's web site address: <http://www.loran.org>
and e-mail address: ila@loran.org

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The ILA encourages readers to submit material for publication. Any and all news related to Loran and ILA members is welcome. Send information (with pictures, if possible) to either of the co-editors:

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NBF support

(continued from page 1)

support by the navigation and timing community, DOT has only repeated its assertion of an indefinite and tentative continuation of Loran C. Having thus clouded the future availability of Loran, the decline in the number of users, which is not surprising, has been used to justify reduced support. Those agencies within DOT who seek to eliminate Loran have been active in creating this self-justifying and circular argument. As never before the current capability of Loran as a backup to satellite based systems been thoroughly documented and verified.

With the vastly expanded scope of responsibilities imposed on the US Coast Guard as it is incorporated into the Department of Homeland Security, a totally reliable navigation system is essential, with solid backup support to satellite systems in the event of outages – either deliberate or accidental.

Loran, a system with a long history of robust and dependable operation, currently being upgraded with Congressional support, is without question that back-up modality. A long overdue commitment by DOT in support of Loran is all that is needed for an immediate increase in the use and availability of state-of-the-art Loran receivers and an expanding user community. ■

Enhanced Loran highlighted in David Last's presentation to ATCA

SPEAKING TO THE US Air Traffic Control Association in Washington on 30 January 2003, Dr David Last, Vice President of ILA, provided a detailed and documented review of the capabilities of enhanced Loran as a backup to GPS. While earlier Loran receivers were limited to using data from a single group or chain of transmitters, state-of-the-art receivers using digital signal processing and large-scale circuit integration can now acquire and track 12 or more stations. This all-in-view strategy serves to significantly increase the database from which arrival time differences can be computed and subsequently converted to an array of pseudorange determinations.

Precision navigation and position finding requires that a local correction be introduced into the nominal propagation delay time reflecting regional perturbations as the signal encounters major obstacles or passes over bodies of water or areas of wet or dry terrain. With the aid of GPS this information can be accumulated and stored as an operating data file and automatically entered into the range calculations. Recent flight tests on aircraft approaches into Atlantic City and Madison, Wisconsin have reported

GPS and Loran tracks with an average separation of just six meters. Performance is further improved with the use of loop style H-field antennas which are unaffected by weather-induced static interference.

In addition to these system improvements, Dr. Last pointed out the significant developments in using the nationwide Loran signal as a carrier for information such as GPS status or WAAS-derived signal corrections. The Eurofix system currently activated for European Loran provides GPS data while remaining ready to take over navigation in those situations or environments where the satellite-based signal is unreliable or unavailable.

Dr. Last stressed that in the future, Loran as a "backup" will become one part of a composite receiver system which collects and combines all the navigation inputs from Loran, GPS, WAAS, LAAS and other currently available nav aids into a dynamic solution to the position problem. With any interruption or failure of GPS, for whatever reason, guidance is immediately provided by Loran. The user need not be concerned with or aware of a switch between sources since their functions are at all times fused into a single seamless capability depending in varying degrees on the multiple inputs. ■

US Coast Guard reports interference to GPS from TV antennas

THE US COAST GUARD has published in the Notice to Mariners an advisory warning that certain powered (active) UHF/VHF marine television antennas are creating interference to GPS receiver operation. This interference may result in a display of inaccurate position information or a complete loss of GPS acquisition and tracking ability. This interference interaction has

been reported at distances of up to 2000 feet from the interference source.

The concerns expressed in the Volpe Report and by many other writers of the inherent vulnerability of the very low power GPS signal have focused primarily on the dangers to be encountered in the presence of a deliberate effort to jam the GPS signal. However, equal attention must also be paid to the loss of GPS data due to exposure to RF radiations from a wide range of on-board or local devices. Clearly

this recent report of interference due to an active antenna documents one of many possible but unsuspected scenarios that might impair the moment-to-moment reliability of the navigation support provided by GPS. Such a situation once more supports the need for a continuously integrated navigation system including Loran both to flag the signal degradation or loss and provide a smooth and uninterrupted flow of navigation data. ■

John Beukers retires from ILA

THE FOLLOWING STATEMENT from ILA President John M. Beukers was read at the ILA-31 Membership meeting October 30, 2002.

"A memorandum to the Board of Directors:

"On August 26th I informed the Executive Committee of my intention to retire permanently from radio navigation matters and in particular the International Loran Association and matters concerning loran. This has been a difficult decision that has been made unavoidable for personal reasons. Influencing the decision is the recognition that the resolution of navigation issues within the US Government has been elevated to the cabinet level where it now has a life of its own.

"Also influencing the decision is the situation in Europe that poses even greater challenges than we have encountered in the United States. To have any significant impact in Europe while the focus is

on achieving Galileo operational status requires a full time presence within the European Union that I am unable to provide.

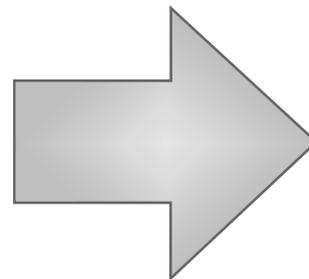
"It has been a privilege and a rewarding experience working with such a dedicated group of professionals to achieve so much when faced with what appears to be insurmountable. I wish the same fortitude to those who must climb the European mountain.



"I will be working with the Operations Center to clean up outstanding matters and assist in making a smooth transition to the new President and Board. It is most unlikely that we will be with you personally for the Convention but will certainly be there in spirit."

John Beukers

2002.09.18 ■



Special letter to ILA members

On the following page is a copy of a letter sent by ILA president G. Linn Roth to U.S. ILA members.

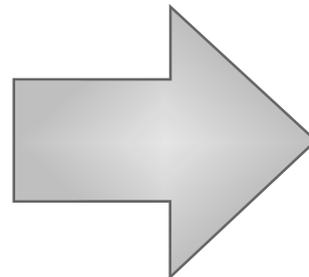
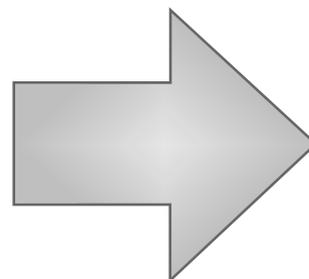
The letter asks all members to urge their Washington representatives to continue Congressional funding for the Loran-C modernization / recapitalization program.

James Carroll, ILA Medal of Honor, keynote speaker at RIN NAV02

IN RECOGNITION of the significant impact on all sectors of the navigation community of the Volpe Report "Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System" presented by James Carroll at the CGSIC meeting in Salt Lake City on Sept 10, 2001, Dr. Carroll was awarded the ILA Medal of Merit at the ILA31 Banquet in Washington, DC. The following week, he was in London as keynote speaker at the annual meeting NAV02 of the Royal Institute of Navigation (RIN).

The Volpe report highlighted the ease with which the low energy

level of satellite based signals could be jammed with inexpensive devices, easily capable of causing GPS and GPS augmentation signals to fail or provide seriously misleading navigation information. It also pointed out that the significantly stronger terrestrial based Loran signals operating in a different frequency band and signal mode made Loran a satisfactory backup navigation aid in the event of GPS system failure or signal interference. ■



International Loran Association



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March 27, 2003

Dear ILA Member:

I am contacting US members with an urgent request to fax your Representative and Senators a letter requesting his/her support for the continuation of the Loran modernization effort, at a minimum of its current level of \$25 million. As most of you know, the USCG is being transferred to the Department of Homeland Security, and the Administration's budget request for FY2004 does not contain funding for the Loran recapitalization program. While bipartisan Congressional Loran support has been extremely strong over the last several years, resulting in approximately \$100 million for the modernization program, the deficit projections and Iraqi situation put next year's funding in extreme jeopardy. Ironically, the program is already beginning to pay off in reduced operations and maintenance costs and improved performance (i.e. we are seeing the precursors to the "Enhanced Loran" of the future), and publicity regarding GPS jammers has reinforced interest and justification for Loran as the best national complement to GPS.

I have attached one sample from letters I have submitted on behalf of the ILA to Senate and House leaders sitting on Homeland Security Appropriations Subcommittees. I believe this letter represents a reasonable summary of the issues, and might provide some ideas for your letters.

Please remember that a brief note in your own words is most effective, and that time is of the essence, as all letters should be sent in as quickly as possible. Also note that fax is likely the best mode of communication, as letters could be delayed for prolonged periods because of mail inspections. You can readily obtain fax numbers for your Congressional delegation at <http://capwiz.com/c-span/home/>. I would also request that you ask other colleagues and friends to submit letters as well, regardless of whether they are ILA members. Fellow employees, vendors, etc. are likely candidates, as their future could be directly affected by Congressional actions.

The ILA and Loran has made enormous progress since 1995. As we approach a positive Loran policy decision, the benefits of the modernization program, and the promise of "Enhanced Loran," I urge each of you to spend a small amount of time to ensure we attain these goals in the very near future.

Very truly yours,
International Loran Association

G. Linn Roth, Ph.D.
President

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President's Message

Spring 2003

SINCE OUR MEETING in Washington last October, there has been a tremendous amount of positive activity in the Loran world, and I am pleased to provide a brief review:

1. The US Congress has passed an Omnibus FY2003 bill that includes \$25M for continuing the Loran modernization program, a clear validation of strong, bipartisan Congressional support for Loran as the most complementary, most cost effective GPS backup for national navigation and timing needs. This figure is a substantial increase from last year's \$19M, and we will be asking for another increase next year. Including this year's appropriation, nearly \$100M will have been allocated to modernizing the US Loran system, and we will soon begin to see the performance improvements the modernization program will generate.

2. On January 30, 2003, Professor David Last gave a Loran presentation at an Air Traffic Controllers Association (ATCA) symposium in Washington, DC, that was organized by Langhorne Bond and others. David's presentation was extremely well received, and it will be published in ATCA's journal, so the information will be broadly disseminated to an audience that often gets little information on the benefits modern Loran can provide.

3. On January 31, Langhorne Bond, David Last, Larry Barnett and I met with Jeff Shane, DOT Associate Deputy Secretary, FAA Administrator Marion Blakey and Deputy Administrator Bobby Sturgill, and key members of their staffs. There was an open exchange of information at this meeting, and these officials are well aware of Secretary Mineta's instruction (in a March 6, 2002 memo to heads of the DOT's

operating administrations) to make a Loran policy decision by the end of 2002. Congress and the ILA will continue to press for a positive policy decision, which has been promised over the years. I believe this meeting opened a new level of dialogue, and was pleased to see these leaders were genuinely engaged and open-minded on the Loran issue.

4. The FAA's Loran evaluation program continues to go well, and a program to make ASF measurements has begun. In addition, the USCG has begun to evaluate use of differential Loran for harbor entrance and approach, which would enable continued port operations during GPS loss. These program efforts will provide a clear, objective assessment of modern Loran capabilities, and should eliminate perceptions of Loran based on the performance of antiquated receiver and transmitter equipment.

5. The GNSS2003 meeting will take place this April in Graz, Austria, and 10 Loran papers were accepted. This number of papers indicates a high level of global Loran interest, and GNSS2003 will be very well attended. David Last will be giving the keynote address for this meeting, and the ILA's GAUSS Standardization Group will have a meeting in concert with GNSS2003. For details, see <http://www.gnss2003.com/>.

6. The DGON (German Institute of Transportation) has rescheduled its annual meeting on the integration of GPS, EGNOS, Galileo and Loran for June 4-5, 2003 in Munich. For those of you interested in presenting, please note the abstract deadline is March 17. See <http://www.dgon.de/content/index.htm> for details.

7. There are at least four programs currently underway that are

developing integrated GPS and Loran systems, and I am aware of efforts in Asia, Europe, and the US. Several presentations have reviewed some of these programs, and I expect to see many more presentations and publications on these efforts – and additional programs – in the future.

8. The Institute of Navigation's National Technical Meeting (ION NTM) was held in January, and several Loran papers were presented. The FAA Loran team's Loran Integrity Performance Panel (LORIPP) and Loran Accuracy Performance Panel (LORAPP) took this opportunity to have back-to-back meetings in Anaheim.

9. The National Boating Federation (NBF) has once again provided critical Loran support and input to Congress. As most of you are aware, Mr. Earl Woesche (the NBF's Legislative Director) gave a strong Loran endorsement at ILA31 last October. In the most recent edition of "Lookout," the NBF newsletter that is distributed to all members of Congress, Earl writes "Our desire is to see Loran remain as a viable navigation system for use as the primary backup system to GPS. ... Today, any seafarer or pilot will testify to the importance of this navigation system, the absence of which can place life and property in jeopardy. When the primary system fails, a fully independent backup is required." I would like to thank Mr. Woesche and his NBF colleagues for their longstanding support and continuing efforts on behalf of their constituents.

10. Japan has begun modernization of its Loran infrastructure. In February 2003, the first new Accufix 7500 transmitter control subsystem was successfully installed at the operational Loran site at Niijima. This system incorporates a new timer, UTC synchroniza-

tion equipment, and monitor receivers along with the transmitter control equipment used in the USCG Loran Re-capitalization effort.

11. The final accounting for ILA31 has been completed, and I am extremely pleased to report that the Convention netted over \$19,300 for the ILA. This success further solidifies our financial stability and indicates we will continue to grow stronger with the revitalized interest in Loran. On behalf of the ILA, I would like to express our sincerest thanks to the conference co-chairs, Chuck Schue and Jim Doherty, and all other contributors for their tremendous work. That was a great convention and a great result.

12. The ILA website is regularly updated with important news and information, and we continue to modernize ILA operations and improve efficiencies. Our most sincere thanks are due to Bob and Ellen Lilley for these efforts at the

Ops Center. Loran Lines also continues to look better with each issue, and I would like to extend our thanks to Al Frost and Otis Philbrick for their exceptional work.

13. Finally, the ILA's 32nd Annual Convention and Technical Symposium has been set for the week of November 3, 2003 in Boulder, CO. Please set this time aside on your calendars, and thanks to Tom Celano and others for the initial organizational work. With all this activity and more to come in the intervening months, this will undoubtedly be another tremendous success. Please check the ILA website periodically for details at <http://www.ila.org>.

In conclusion, I have never seen this level of positive activity and interest since my first exposure to the ILA approximately 15 years ago. Unquestionably, there is growing international recognition that no one system will be able to support a

national navigation and timing infrastructure in a truly reliable, safe and secure manner, and that Loran is uniquely complementary to satellite systems for numerous technical, economic, and political reasons. This realization is progressing rapidly and globally, and I believe an era of integrated GPS/Loran navigation and timing systems is in its infancy. However, we still need to ensure Loran's future through policy decisions by various governments, so Loran can play the role in integrated systems that it unquestionably deserves. I urge all ILA members throughout the world to join me in continuing active support for Loran, and I look forward to working with you in the future.

Respectfully submitted,
G. Linn Roth, Ph.D.
President ■

ILA proceedings now available on Association web site

THANKS TO THE EFFORTS of a member, proceedings of past ILA conventions and technical meetings will be available for download from the association website www.loran.org. Proceedings for

meetings prior to 1999 are PDF image files scanned from the original documents. They are suitable for local storage and viewing or for printing in part or whole but can not be searched for keywords. These files require Adobe Acrobat to retrieve. Many are quite large, up to 17MB, and need a high speed Internet connection. For 1999 and afterwards CDs of the proceedings

were produced and have been posted. Formats vary but most are in WORD or Power Point.

Contact the ILA Operations center to purchase original print copies or CDs if available. ■

Mary Grace Van Etten 1920 – 2002

MEMBERS OF ILA were saddened to hear of the death on August 2, 2002 of Mary Grace, wife of Jim Van Etten, long-time officer and member of ILA. Born in Scranton PA, daughter of Patrick and Mary Lavelle, she attended school in Scranton.

Mary married Jim, a recent Coast Guard Academy graduate in 1947, and raised a family of seven, five of whom were born during his tours

of duty at Boston MA, Wildwood NJ, Morehead City NC, and Silver Springs MD. In 1957 they moved to Nutley NJ where Jim began a new career with ITT and their two youngest children were born.



She is survived by her husband of 54 years, sons James, Bill, Stephen and John, and her daughters Mary Grace and Joan Sattler,

brother John Lavelle and sister Mrs. E.T. Nuttall of Scranton PA, and twenty three grandchildren

Her friends remember her as possessing an infectious positive view of the world with faith in each and every person. An active attendee and participant in many ILA events she will be missed by her many friends in the Association. ■

Awards

Outstanding Service Awards

John M. Beukers

For his contributions to Loran and the Association as General Chair of the International Loran Association 30th Annual Convention and Technical Symposium, 2001

Terje Jörgensen

For his contributions to Loran and the Association as Policy Chair of the International Loran Association 30th Annual Convention and Technical Symposium, 2001

Wolfgang Lechner

By virtue of his contributions to Loran and the Association as Technical Co-Chair of the International Loran Association 30th Annual Convention and Technical Symposium, 2001

Dr. Robert Lilley

For his contributions to Loran and the Association as Sponsor and Exhibitor Chair of the International Loran Association 30th Annual Convention and Technical Symposium, 2001

Torsten Krüüse

For his contributions to Loran and the Association as Sponsor and Exhibitor Chair of the International Loran Association 30th Annual Convention and Technical Symposium, 2001

2001 Technical Symposium Best Paper Award

Dr. Benjamin Peterson, *Peterson Integrated Geopositioning, LLC*

"Wagging the Tail & Flying with Loran-C Data Communications" presented at the 30th Annual International Loran Association Convention and Technical Symposium, 2001

William L. Polhemus Student Paper Award

Wouter Pelgrim, *Technical University of Delft*

"Loran-C Signal Propagation, Reception and Processing Aspects in Urban Areas" presented at the 30th Annual International Loran Association Convention and Technical Symposium, 2001

President's Award

James Baumgarner

As an investigative reporter and editor for the McGraw Hill publication *Aviation Daily*, James Baumgarner has for many years successfully presented an unbiased and balanced assessment of radionavigation systems for airline, business and general aviation. He has shown courage in his articles on the retention of multiple navigation systems keeping Loran in the news while contrary to government policy.

Coupled with his outstanding journalism, his unique ability to distill key points from complex, highly technical and, at times, controversial issues has provided a valuable service to the government, the industry and the user community.

Medal of Merit

James V. Carroll

Dr. Carroll was the Lead Investigator at the US DOT Volpe National Transportation Systems Center, for the document "Study and Report on the Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System." The insight shown in this report, its in-depth analysis of the risks of sole means dependence on GPS, and the related advantages of augmentation with dissimilar systems have had a worldwide impact.

His consistent and compelling presentation of the case for a balanced navigation policy has contributed to greater public safety, U.S. national security, and to the development and implementation of extended applications of Loran-C.

■

RIN awards 2002 Gold Medal to Dr. van Willigen

At the October meeting of the Royal Institute of Navigation in London, ILA board member Professor Dr. Ir Durk van Willigen was awarded the Institute Gold Medal for 2002.

The award citation stated:

"Professor van Willigen is an internationally recognized expert in the field of electronic navigation. He held the chair of Electronic Navigation Systems at the Delft University of Technology, the Netherlands, from 1989 to 2000 where he led a group of researchers and students on navigation projects.

"In 1989 he initiated the Eurofix concept of integrated navigation and was principal inventor throughout its development. Eurofix, a technique for broadcasting differential GPS and GLONASS corrections using Loran-C, is now implemented in the European Loran system. Under his leadership, the Multipath Estimating Delay Lock Loop (MEDLL) GPS receiver was invented and patented. MEDLL, which subsequently reduces the effect of multipath signal reflections, is used at all US Wide Area Augmentation System (WAAS) reference sites. His group was also responsible for the development of advanced navigation displays, the first of which were flight tested during approaches into Aberdeen airport in 1994. Meanwhile, the results of his research is being used in the context of the NASA Aviation Safety Program. He is founder and president of Reelektronika.bv

"Professor van Willigen is a Fellow of this Institute and a recipient of the Medal of Merit of the International Loran Association. In 2000 he received the Thurlow Award of the US Institute of Navigation for his contributions to the development of Eurofix, MEDLL and small antennas for navigation receivers." ■

Resolution

Preamble: The 31st Annual Convention and Technical Symposium of the International Loran Association was convened in Washington, DC, USA, on October 27, 2002. Participants at the Technical Symposium presented management information, technical papers and discussions with the theme "Determining Loran's Role in Mitigating Vulnerabilities in a Post-9/11 World." The Convention also took place at a time when important decisions affecting Loran-C are being prepared in the United States. The US Loran-C infrastructure is being rebuilt, but the system is being considered for termination in Canada and Europe, and there is uncertainty in other parts of the world.

Recognizing that satellite technology is being adopted worldwide for positioning, navigation and the distribution of precise time and that the future Global Navigation Satellite System (GNSS) may include but not be limited to the United States Global Positioning System (GPS), the Russian Global Navigation Satellite System (GLONASS), and the proposed European Galileo constellation;

Noting the release on September 10, 2001 of "Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System" conducted by the United States Volpe National Transportation Systems Center (VNTSC) and that the report identifies GPS vulnerabilities including potential terrorist acts intended to disrupt the GPS service;

Considering the conclusions of the VNTSC Report recommending the identification of appropriate GPS backup systems and encouraging the development of low cost systems as backups to GPS;

And accepting that those regions covered with a Loran-C or Chayka service are already provided with an appropriate alternative and backup to GPS and its augmentations, and that Loran-C and Chayka services support the national and worldwide critical infrastructure by providing a comprehensive alternative source of positioning information, precise time, and a data communications channel for the dissemination of correction and integrity information;

Resolved that providers of Loran-C and Chayka services throughout the world be encouraged to:

- continue to provide Loran-C/Chayka services and establish these services on a permanent basis as a complement to satellite technology, and as a backup for satellite-based services;
- continue development and evaluation of integrated GPS and Loran-C user equipment, and encourage industry cooperation in the development of performance specifications, test methods and certification criteria;
 - seek international protection of the Loran-C spectrum under ARNS regulations;
 - invite nations adjacent to areas now covered by Loran-C or Chayka to implement extensions to the current service;
 - provide information and assistance to nations whose territories are not covered by these services but have determined that an alternative to GPS is required; and
 - coordinate international development and implementation of the Loran-C data communications channel for Loran-C optimization and for GNSS augmentation.

Meetings

MobiC-Nav 2003 conference to combine indoor position finding and location finding for cell phones

Meeting 15–16 July in Munich, MobiC-Nav 2003 will offer an international symposium on mobile computing in navigation. In addition to navigation-only receivers, multimode navigation and communications devices for portable use are now entering the market and providing new business opportunities. Responding to these changes in technical development, the German Institute of Navigation (DGON) has elected to combine the previous symposia LOCELLUS (Location based Services for Cell phone Users) and InLoc (Indoor Location and Position Finding).

MobicC-Nav2000 will provide a forum for all domains to meet, present latest research results and to discuss technical experiences and new ideas. Topics on the program will include user requirements for Personal Mobility and Mobile Computing, status reports on GPS, EGNOS, GNSS and Galileo, Terrestrial-based positioning and navigation systems, Cell ID, GNSS, Loran C, W-LAN, and Bluetooth.

For further information contact:

German Institute of Navigation
Symposium Coordinator "MobiC-Nav2003"
Kohnstrasse 70 D-53111
Bonn, Germany
e-mail: schulze-thesing.dgon.bonn@t-online.de

GNSS Conference in Graz, Austria 22–25 April 2003

The Austrian Institute of Navigation (OVN) will host the Seventh International Global Navigation Satellite Systems conference, GNSS 2002, from 23 to 25 April in Graz. Dr. David Last, ILA Vice President, will give the keynote address.

This conference will focus not only on GNSS but also on other navigation systems such as Loran-C, GSM/UMTS positioning, autonomous navigation and more. Other topics will include Meteorological Applications of Navigation Systems, Indoor Navigation, Search and Rescue, and Security and Safety in Aviation.

Satellite-based navigation is an emerging technology that must serve a

huge market in the near future. Technical and scientific aspects of GPS and GLONASS will be covered with special emphasis on the European satellite navigation system Galileo. Related to this is the challenging task of sensor fusion, integrating dissimilar systems like GPS and Loran C to provide a powerful and reliable position system.

With the realization that research institutes and manufacturers are reluctant to spend funds on system development if the future of these systems is uncertain, representatives of political and other organizations (such as NELS) have been invited to provide clear statements of the future of LORAN-C Galileo and GPS and plans for their operation, funding and access permission. An industry exhibition will run in parallel with the conference. Social events will include an ice breaker party on April 22,

a Gala Dinner on April 23 and a Styrian Night on the 25th.

Further information may be obtained from:

Gunther Berger, Conference Manager
Steyrergasse 30/11
8010 Graz Austria
FAX: 43 316 873 8888
e-mail: office@gnss2003.com

GAUSS meeting April 22 2003 at GNSS 2003

The Global Augmentation of Satellite Systems (GAUSS) Standardization Group will meet in concert with the GNSS 2003 conference in Graz, Austria. Further information can be obtained from Gerhard Offermans.

e-mail: G.Offermans@Reelektronika.NL

European Radio Navigation Network Symposium to meet June 4–6 2003 in Munich

Under the sponsorship of the German Institute of Navigation (DGON), EURAN 2003 will provide up-to-date information on the future integration of GPS, EGNOS, Galileo and LORAN-C / EUROFIX. Recent studies have highlighted the vulnerability of GNSS. Many users, including both the safety and security user and commercial enterprises, are increasingly reluctant to rely only on GNSS.

The conference will provide a unique chance to get an overview on the international Loran-C situation and to

discuss specific issues with system providers, manufacturers, system integrators and various user communities.

Program topics announced include receiver developments, ASF models and integration of terrestrial networks with GNSS/EGNOSS.

Further information is available from:

German Institute of Navigation
Attn: Symposium Coordinator "EURAN 2003"
Kohnstrasse 70
D-53111 Bonn, Germany
Phone: +49-228-201970
Fax: +49-228-2019719
e-mail: schulze-thesing.dgon.bonn@t-online.de

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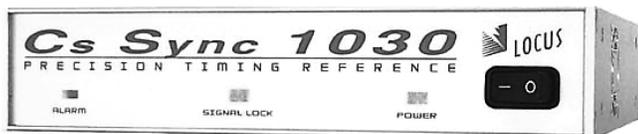
Modern Loran Technology to Complement GNSS and GPS

SatMate 1030 — Navigation Applications



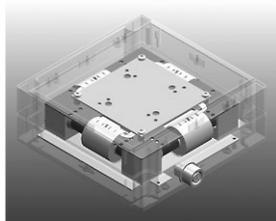
- New DSP based receivers
- All-in-view station acquisition / tracking
- 12 chain, 40 station capabilities
- Adaptive interference cancellation
- E-field or H-field antenna operation
- NMEA 0183 output messages

CsSync 1030 — Timing Applications



- Cesium-like (Stratum 1) timing performance
- Independent UTC source
- Time and frequency outputs
- All-in-view station acquisition / tracking
- Adaptive interference cancellation
- E-field or H-field antenna operation

H-Field Antenna



- P-static immunity
- Small form factor
- No ground required
- Penetration into non line-of-sight areas
- Can be integrated with GPS into single unit