



The Goose Gazette

The newsletter of the *Wild Goose Association*,
the international Loran radionavigation forum.

Volume 92-2 - News of the Spring, 1992

21st Convention and Technical Symposium Information Inside!

President's Message - Bob Lilley

This Convention Issue of the *Gazette* contains everything you need to get registered for our Twenty-First Annual Convention and Technical Symposium! Also, you will note that several of the stories in this issue relate to international Loran-C developments, which is exactly why we are holding our meeting in the U.K.

The action is in Europe this year! The Northwest Europe program got a boost from the Norwegian Parliament, and the U.S./Russian Loran-C/Chayka combine is still promising.

The European marketplace should be of intense interest to Loran-C equipment manufacturers. Now is the time to join the WGA exhibitors and get the word out!

Northwest Europe

From John Beukers

On June 17, 1992 the Norwegian Parliament voted 62 to 38 in favor of the Northwest European Loran-C program. The Conservatives and extreme right parties voted against the program on the basis that GPS and Decca would serve the needs of Norway. The Parliament majority vote permits Norway to sign the Northwest Loran-C Agreement along with Denmark, France, Germany, Ireland and the Netherlands. Other members of the original policy group, namely Canada, Iceland and the United Kingdom may become signatories at a later date. Signing of the Agreement is tentatively scheduled for the week of August 3, 1992.

Legal problems with the Agreement's language remain to be resolved in some countries before the signing, however all member countries of the Policy Group are now in agreement to move ahead with the program to build the Northwest European Loran-C System.

Iceland has indicated that it will consider rejoining the group once the Agreement has been signed and this may re-involve Canada.

In writing the contract with Racal Decca, Trinity House of the United Kingdom included break points that permit the contract for the operation of Decca stations to be terminated, if the U.K. were to receive acceptable Loran-C coverage. At that time the U.K. indicates it would wish to become party to the agreement.

Russia has also made overtures to become a group member contributing Chayka (Loran-C) and interoperation between Chayka and the Northwest Europe Loran-C operation.

The WGA Convention and Technical Symposium will be conducted in the light of this background. It will serve as a useful forum to explore the ramifications of expanded Loran-C coverage and the interoperation of Loran-C with satellite systems for restoring degraded GPS accuracy, providing signal integrity and improving navigation signal availability.

Loran-C/Chayka

Bill Brogdon

The Soviet Union proposed a joint effort in 1987 to link their Chayka 100 KHz system to the U.S. Loran-C system in the north Pacific. This led to a bilateral agreement which was signed in 1988, and to tests which began in July, 1991. This chain could close the gap between U.S. and Russian (former Soviet) radionavigation systems in the Bering Sea. The master station is at Petropavlovsk, with secondaries at Aleksandrovsk and Loran-C Station Attu, using GRI 5980. The U.S. Coast Guard and the former Soviet Internavigation Committee have agreed to use INMARSAT-C satellite communications between stations. The difference in the signal envelope shapes between Chayka and Loran-C posed a problem for receiver acquisition. The Russian engineers have altered the shape of the first eight cycles of the Chayka signal to match the rise time of the Loran-C envelope. This imaginative solution has allowed Loran-C receivers to lock on to the Chayka pulse at the correct cycle crossover in tests. NOTE: There remain many problems prior to continuous operation of this chain. Differences in control philosophy and operational practices which have occurred as the two systems developed independently must be reconciled. The political and economic turmoil following the breakup of the former Soviet Union has undoubtedly made the task of the Russian engineers difficult, and it is quite encouraging to see their continued effort and that of the U.S. Coast Guard to make this unique chain possible.

The Goose Gazette is an official publication of The Wild Goose Association (WGA). Period of publication is quarterly, with cutoff dates of 1 March for the Winter issue, 1 June for the Spring issue, 1 September for the Summer issue and 1 December for the Fall issue.

Readers are encouraged to submit material for publication. Materials should be sent directly to the Editor. All other correspondence for the WGA should be addressed to the Association's Operations Center address:

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Printed by:

Messenger Publication Services
Athens, Ohio 45701

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FRP Working Group Thanks WGA

[The WGA received the following letter from the U. S. Department of Transportation, Research and Special Programs Administration, represented by member Heywood Shirer. The WGA Secretary can provide copies of the WGA Submission to the FRP, if you need further details.]

Thank you for the letter of February 14, 1992, submitting the Wild Goose Association's (WGA) comments on the 1990 Federal Radionavigation Plan (FRP). We appreciate the WGA input, and the comments have been reviewed and discussed at recent meetings of the Joint DoD/DoT Radionavigation Working Group.

I would like to briefly comment on your concerns. We have received funding to continue with development of the 1992, FRP, which should be published in December 1992. The section on the interoperability of systems is under review and will be expanded as appropriate. FAA will consider expanding the text on interoperability related to civil aviation. Regarding User Conferences, we plan to conduct three in the November/December timeframe, 1993. The third conference will be somewhere in the Central U.S., but we have not yet decided on a location. Paragraph II.B. of your comments is correct regarding the lack of specific Government responsibility under law to provide radionavigation systems for civil land use. DoT is not prepared at this time to seek this specific responsibility; however, the DoT land modes have permanent status on the Navigation Council and Working Group and are actively participating in our navigation meetings to insure that their radionavigation needs are considered. Regarding instrument approaches, the Working Group appreciates the dangers in using unapproved approaches, but have concluded that the FRP is not the forum for educating pilots.

Regarding the seven suggestions under Paragraph II.D. of your comments in order: the Coast Guard will terminate Hawaii Loran-C operations at the end of June 1992; the Coast Guard no longer has a differential Loran-C program and has noted the ambiguity in the FRP; the FAA will consider suggested change of text regarding hybrid GPS/Loran-C; the Coast Guard will consider your suggestion regarding "Fix Rate" on page A-7 and Table A-1 of the FRP; the Coast Guard will investigate and consider a modification regarding "Reliability" on page A-7 and Table A-1 of the FRP; the "Fix Dimension" statement on page A-7 will be modified to parallel a similar statement for GPS on page A-35; and the DoD has previously acknowledged discrepancies in the GPS characteristics table and will be providing a revision.

Regarding your discussion of Accuracy Measures, we have received input from other users regarding this issue. It is considered to be a complex issue and is being discussed at length by the Joint DoD/DoT Radionavigation Working Group.

Thank you again for your interest in our policy and plans development. As demonstrated, we do consider comments and concerns from the user community and really appreciate the type of input that you have provided us.

Heywood O. Shirer
Radionavigation and Communications Program Manager

Loran-C Goes International

International Market Beckons Loran-C Industry

Marketing Managers - take heed. Attendance at the 1992 Convention and Technical Symposium being held in Birmingham, England, August 24-27, 1992, is a must for marketing and technical personnel interested in exploiting new opportunities in international radionavigation equipment and systems!

After years of negotiation and indecision, the international Loran-C program is finally into place. The transfer of United States owned and operated Loran-C facilities to host countries is well underway and the transmitting equipment is being upgraded with host country funds. Bills have been passed in the parliaments of all of the countries currently involved in the Northwest Europe Loran-C group that will permit signing of an implementation agreement, scheduled for August 1992. New transmitting facilities for new chains are to be procured to support this program. The United Kingdom's recently signed 21 year contract for the continued operation of the Decca chains was modified to include a break point in 1998 for the discontinuance of Decca if the Northwest Europe Loran-C coverage is proved to meet the U.K.'s requirements. The Far East Loran-C Technical Group consisting of China, C.I.S., Korea, and Japan are scheduled to sign a cooperative agreement in September 1992. The Mediterranean group is not far behind and the C.I.S. are actively pursuing the Loran-C/Chayka chain interoperation. Other countries are negotiating for Loran-C transmitting facilities.

Loran-C will shortly be a truly international, civil radionavigation system no longer operated, controlled or funded by the United States. This is new territory for Loran-C business and those involved in an advisory capacity.

The Plans and Policy session of the Technical Symposium and Panel Discussion will report on and explore the impact of these developments and how they will affect the future of national and global radionavigation.

One could ask what were the satellite Global Positioning System GPS proponents doing during all of this governmental activity -- a lot. There is a very strong international GPS lobby, essentially made up of special interest groups, that has tried to scuttle the Loran-C program on numerous occasions. But in the end three factors mitigated against the unreserved embracement of GPS. (1) There is general international recognition that GPS is primarily a military system, owned and operated by the U.S., and sole dependence on such a system is considered to be imprudent. (2) The repeatable GPS accuracy being offered to the international civil community is inadequate and inferior to that of Loran-C. (3) There is confusion as to the future of GPS. It is unclear what the final global system will be: plain vanilla GPS, enhanced GPS, GPS/GLONASS, GPS/INMARSAT, a European System, or a new commercial system.

Looking downstream to a time when the smoke clears it would appear that there will be a global network of interconnected national Loran-C/Chayka chains for local and mid-range use with an umbrella of satellites. And not to leave out Omega, a complimentary system that will remain in operation for many years to come.

But why not come, find out for yourself and be part of the transition of Loran-C from a United States to an internationally owned and operated radionavigation asset. You too can form an opinion and lead your enterprise to make the appropriate product decisions. If you are a manufacturer of radionavigation equipment be sure to take part in the exhibition, your products will receive international exposure.

For further information, registration or exhibitors kit please contact Mike Moroney - phone 617-494-2026, fax 617-494-2628 in the United States or John Beukers - phone 44(0)451-870777, fax 44(0)451-870222 in the United Kingdom.

Looking forward to seeing you in Birmingham.

The International Loran Radionavigation Forum Program of Events
21st Annual Convention and Technical Symposium
“Loran-C/GPS Mix — Sharing the Success”
August 24-27, 1992 Birmingham, England

PRELIMINARY

Note: Items marked * are to be confirmed

Convention Organization
 General Chairman: John Beukers
 General Co-Chairman: Mike Moroney
 Technical Chairman: John Illgen
 Technical Co-Chairman (Europe): David Last
 Technical Co-Chairman (U.S.): Frank Cassidy
 Technical Program Manager: Carolyn McDonald
 Exhibition Manager: Mark Morgenthaler
 Exhibition Coordinator (U.K.): John Beukers
 Hospitality and Industry Liaison: Dale Johnson
 International Coordinators: Norman Mathews
 Ed McGann
 Publicity: Ellen Lilley
 Spouse Program: Marilyn Beukers
 Joanne Culbertson
 Pauline Moroney
 Sports Program: Mike Moroney

Convention Organizer: Birmingham Convention
 and Visitors Bureau
 Philippe Taylor, Chief Exec.
 Registration & On-Site Manager: Kim Bate

Pre-Convention Tutorial
 Navtech Seminars, Inc. U.S.A.: Carolyn McDonald, President

Facility Managers
 Copthorne Hotel: Helen Relihan
 Lecture Hall: Des Workman
 Birmingham Conservatoire: Sandra Fisher
 (Exhibition Areas)

Tours and Travel
 Birmingham Convention
 and Visitors Bureau: Kim Bate

“Loran-C/GPS Interoperability”

- 08:30 Fundamentals of Radionavigation
- 09:45 Fundamentals of GPS
- 10:30 *Coffee and Tea Break*
- 11:00 Fundamentals of Loran-C
- 12:00 *Lunch*
- 13:15 Loran-C Propagation Effects and Errors
- 14:30 Differential GPS
- 15:15 *Coffee and Tea Break*
- 15:45 Concepts of Loran-C/GPS Interoperability

For further details regarding the Navtech Tutorial
 contact Carolyn McDonald

- 15:00-18:00 WGA Board Meeting
- 17:00-18:45 Hospitality Suite open

**Convention Ice-Breaker Banquet
 at Coombe Abbey**

- 19:00 Coaches depart from Copthorne Hotel for Abbey
- 20:00 Mediaeval Banquet
- 22:00 Coaches return to Copthorne Hotel

Tuesday, August 25

- 07:30-08:30 Speakers' Breakfast, Cullinan Room, Copthorne Hotel
- 08:00-17:00 WGA Registration, Library Foyer
- 09:00-17:00 Spouse Program outing to Stratford-upon-Avon
- 09:30 – 10.30 **Opening Ceremony**
- 09:30 Welcome and declaration of Opening of 21st WGA
 Convention - Dr. Robert Lilley, President,
 Wild Goose Association.
- 09:35 Introduction of the Lord Mayor of Birmingham -
 John Beukers.
- 09:40 Welcome to the City of Birmingham -
 The Right Worshipful, The Lord Mayor,
 Councillor Peter Barwell.
- 09:45 Introduction to Birmingham City -
 Birmingham Convention and Visitors Bureau.
- 09:55 Introduction of Convention Committee - John Beukers
- 10:00 Introduction of Keynote Speaker - John Illgen.
- * 10:05 Keynote address - Director General for Transport,
 Commission of the European Communities.
- 10:25 Opening of Exhibition - Maurice J. Moroney.

Sunday, August 23

- 18:00-23:00 Hospitality Suite open for welcome and greetings.

Monday, August 24

- 08:00-17:00 WGA Registration Library Foyer
- 09:00-18:00 WGA Sports Activities
- 09:00-17:00 Spouse Program – free choice
 Trip to Blenheim Palace suggested

08:30-17:00 Navtech Tutorial

Library Lecture Hall
 Lecturers: Dr. Durk van Willigen
 Dr. David Last

10:30 Coffee and Tea Break

11:00-13:00 Session A: Management and Policy (1)
Session Chairman: Andreas Stenseth

- 11:00 The U.S. Coast Guard and Loran Turnover Overseas, What's Happening? - CDR William Thrall, USCG.
- 11:30 Status and Plans for the Chayka (Loran-C) System in the C.I.S. - V. Denisov, Internavigation Committee
- 12:00 Plans and Use of Loran-C within IALA Member States - Norman Matthews, Secretary General IALA.
Status and Plans of the China Loran-C Program
Progress in the Transition of Loran-C to Host Nations in Japan & Korea. Reports given by Norman Matthews.

12:45 Lunch - Copthorne Hotel, Cascade Suite
Radionavigation - A European Perspective, Walter Blanchard

14:00-17:00 Session B: Management and Policy (2)
Session Chairman: Frank Holden

- 14:00 Status of the N.W. European Loran-C System - Andreas Stenseth, NODECA.
- * 14:30 Radionavigation in the U.K. and the Future of Decca - Frank Holden, Trinity House.
- 15:00 Civil GPS Service - CDR Thomas Gunther, USCG

15:30 Tea Break

16:00-17:30 Session C: Panel Discussion
"Why Loran-C in Europe"
Panel Chairman: Dr. Peter Ryder, U.K. Met Office

18:00-20:00 Industry-Sponsored Reception
Copthorne Hotel

Hospitality Suite open from 20:00-23.30

Wednesday, August 26

- 07:30-08:30 Speakers' Breakfast, Cullinan Room, Copthorne Hotel
- 08:00-17:00 WGA Registration, Library Foyer
- 09:00-14:00 Spouse Program outing to Warwick Castle

09:00-10:30 Session D: Loran-C Coverage and Use (1)
Session Chairman: Capt. James Culbertson

- * 09:00 Implementation of the N.W. Europe Loran-C Program - Erik Tangen.
- 09:30 Loran-C Coverage of the East Mediterranean - Enrico Rubiola.
- 10:00 Loran-C Receiver Performance in the Presence of Carrier-Wave Interference - Dr. David Last, Bian Yi.

10:30 Coffee and Tea Break

11:00-12:30 Session D: Loran-C Coverage and Use (2)
Session Chairman: Frank Holden

- 11:00 Coverage and Performance Predictions for the N.W. Europe Loran-C System - Dr. David Last et al.
- 11:30 U.K. Experience in the Use of Loran-C Windfingding - Dr. John Nash, U.K. Meteorological Office.
- 12:00 Analysis of Envelope-to-Cycle Difference in the Far Field - B. Peterson, K. Dewalt, USCG Academy.

Lunch Break - Delegates on their own

14:00-17:00 Sessions E, F, G, H, Tutorials

- 14:00 Loran-C Overview. Transmitters, Antennas, and Equipment Control Monitors - Ed McGann, Bill Roland, Megapulse, Inc.
- 15:00 Loran-C Pulse Definition, Receiver Technology, Signal Processing, and Displays - Walter Dean, Robert L. Frank

16:00 Tea Break

16:00-17:00 Atmospheric Noise, EM Propagation, Skywaves, Coverage, Geometric Dilution of Precision Interference - Dr. David Last

19:00-22:00
Black Tie Reception and Banquet
hosted by the City of Birmingham
in the City Council House

Hospitality Suite open 22:00-24:00

Thursday, August 27

- 07:30-08:30 Speakers' Breakfast, Cullinan Room, Copthorne Hotel
- 08:00-10:00 WGA Registration, Library Foyer
- 09:00-17:00 Spouse Program Cotswold Tour

08:30 - 09:30 General Assembly of the WGA

Session I: Receiver Technology
Session Chairman: Maurice J. Moroney

- 09:30 Digital Interfaces for Navigational Equipment - Frank Cassidy, Mike Fox.
- 10:00 Detection of Automatic Blinking Beyond FAA Limits - André Nieuwland, Delft University.

10:30 Coffee and Tea Break

Session J: Signal Characteristics and Simulation
Session Chairman: Dr. Durk van Willigen

- 11:00 Loran-C Signal Analysis, Test Data and Simulation - John Illgen, Illgen Simulation Technologies, Inc.
- 11:30 An Improved Cycle Identification Algorithm - André Nieuwland, Delft University.
- 12:00 The Use of Simulated Atmospheric Noise in the Calibration and Characterization of Loran-C Receivers - J. Weitzen, J. Carrol, B. Dao.

12:45-14:00 Lunch: Copthorne Hotel, Cascade Suite
Installation of Officers and Awards Ceremony

Session K: Integrated Systems
Session Chairman: Dr. Rolf Johannessen

- 14:15 An Economic Implementation of a Combined Loran-C/GPS Receiver - Philip Mattos.
- 14:45 The Gollum Integrated Navigation System - Eric Aardoom, André Nieuwland.
- 15:15 A Gollum Implementation of a High End Loran-C Receiver - André Nieuwland, Eric Aardoom.

15:45 Tea Break

Session L: Receiver Techniques
Session Chairman: Ron Campbell

- 16:15 Realtime Mitigation of GPS SA Errors Using Loran-C - Soo Braasch, Avionics Eng. Center, Ohio University.
- 16:45 Novel Techniques for the Identification of Loran-C Skywaves - Bian Yi and David Last, University of Wales.
- 17:15- Discussion and closing remarks.

17:30-18:00 WGA Board Meeting #2.

Hospitality Suite open 17:00 - 19:00



Tutorial for Wild Goose Association 1992 Convention: GPS and Loran-C Fundamentals & Interoperability

Copthorne Hotel • Birmingham, England
August 24, 1992 • £150 or \$285 USD

About Loran-C/GPS Interoperability

The world's navigation services are poised for major changes. In 1994, Loran-C transmitters outside of the United States that are currently run by the US Coast Guard, will be operated by host countries, along with their own existing and soon-to-be-installed transmitters. In this same time period, navigation by satellite will become a reality. These two developments alone, coupled with unprecedented global political change, pose difficult questions to nations formulating future air, sea and land radionavigation policy. A basic understanding of Loran-C and GPS is indispensable to those involved in this process and to those who will be using these systems. Interest is mounting in both Loran-C and GPS, operating independently or in concert. This course will address the fundamentals of Loran-C and GPS and the factors involved in combining the systems for improved signal availability, integrity and accuracy.

Course Objectives

- To provide attendees with the fundamentals of both Loran-C and GPS
- To convey the strengths and limitations of each system
- To introduce the Loran-C/GPS hybrid system concept designed to enhance performance and solve some of the limitations of either system
- To provide a good working knowledge of both Loran-C and GPS and how these two systems complement each other.

This tutorial is an excellent introduction to the Wild Goose Association's Technical Symposium which follows.

About the Instructors

Prof. dr. Durk van Willigen heads a group of PhD and Master students and staff working on electronic navigation systems at Delft University of Technology. Their research is focussed on the integration of MLS, GPS and Loran-C, and on man-machine-interface aspects of navigation. He is further active in CWI studies for setting up the new Northwest European Loran-C chains. Dr. van Willigen is active in Loran-C research since 1979.

Dr. David Last is a Reader in the University of Wales, Bangor. He acts as a consultant on radio navigation and communications to companies and government departments in the UK and elsewhere. He was awarded the degree of BSc (Eng) by the University of Bristol, England in 1961 and received his PhD from the University of Sheffield, England in 1966. Dr. Last is a Fellow and Council Member of the Royal Institute of Navigation, a Member of the Wild Goose Association, a Fellow of the Institution of Electrical Engineers and a Chartered Engineer. He has published many papers on radio-navigation systems, especially the Decca Navigator System and Loran-C. He is an instrument-rated pilot and aeronautical user of Loran-C.

08:30	Prof. dr. Durk van Willigen <i>Delft University of Technology</i>
	Fundamentals of Radionavigation Range-range positioning; pseudo range-range positioning Hyperbolic positioning; position computation Error sources; error definitions
09:45	Prof. dr. van Willigen
	Fundamentals of GPS GPS concept; signal structure Range measurements: code, carrier phase, ambiguity Data transfer; accuracy performance Acquisition; low-PDF visibility tracking
11:00	Prof. dr. van Willigen
	Fundamentals of Loran-C Loran-C concept; hyperbolic vs. pseudo range-range rcvrs TOT vs. SAM transmitter timing control Loran-C signal structure; carrier tracking Ambiguity problem/envelope tracking; tracking dynamics
12:00	<i>Lunch (on your own)</i>
13:15	Dr. J. David Last <i>University of Wales</i>
	Loran-C Propagation Effects and Errors Propagation at 100 kHz; atmospheric noise Continuous wave interference; coverage areas Urban environment problems Northwest European Loran-C plans; some test results
14:30	Prof. dr. van Willigen
	Differential GPS Error decorrelation with distance Error decorrelation with time Non-correctable errors; European DGPS activities Integrity; system supplied integrity; RAIM
15:45	Prof. dr. van Willigen
	Concepts of Loran-C/GPS Interoperability Hybridizing and integration Time synchronization aspects of interoperable systems ASF calibration with DGPS; RAIM Eurofix; prospects
17:00	

Materials You Will Receive: The tutorial fee includes a three-ring notebook containing copies of all vugraphs presented by the instructors. Refreshments will be offered throughout the day.

Registration Form: You may pay Navtech directly with a check in U.S. dollars drawn on a U.S. bank, or you may use a check in pounds sterling made payable to the Wild Goose Association. Complete the form on the back of this page, or the WGA Convention Registration.

**Registration for Wild Goose Tutorial:
GPS and Loran-C Fundamentals & Interoperability**

To register for this tutorial, either complete the "Navtech Tutorial" line on your Wild Goose Association 21st Annual Convention Registration Form *OR* complete the following:

- Please register me tentatively. I am awaiting approval and will confirm later.
- A purchase order or check is being sent, so please hold my place.

(You may fax this form to Navtech at +1 (703) 931-0500 if there are no enclosures.)

Additional persons at this address who would also like to be registered for the tutorial:

Name 1: _____ Name 2: _____

I am enclosing a check for \$ _____ (payable to Navtech) or £ _____ (payable to WGA) for _____ registrations for the tutorials. (The fee is \$285 or £150 for each registrant.)

I would like to pay by Visa Mastercard Diners Club

Card number: _____ Exp. date: _____

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Telephone: _____ Fax: _____



Make checks payable to, and send payments with this registration form to:

Navtech Seminars, Inc.
2775 S. Quincy Street, Suite 610
Arlington, Virginia 22206-2204 USA



**Information for you
on the Wild Goose Association Tutorials**



August 24 in Birmingham, England

The 21st WGA Convention

Until recently, Loran-C has generally been considered to be a United States radionavigation system with transmitting stations in countries other than the U.S. being funded by the U.S. Department of Defense and operated by the U.S. Coast Guard. This is about to change. Ownership and operational responsibility for overseas Loran-C facilities is currently being transferred to host countries, a process that is to be completed by 1994. Also, in the same time frame, the U.S. satellite navigation system, GPS, and the C.I.S. system, GLONASS, are expected to become operational.

It is fitting, therefore, that as Loran-C comes of age internationally, the WGA should celebrate its 21st birthday by conducting its first-ever Convention and Technical Symposium outside the United States.

To reflect the WGA's policy of endorsing a mix of terrestrial and satellite systems to satisfy global radionavigation needs, the 21st Convention will cover the interoperation of Loran-C with GPS and include tutorials on both systems.

Birmingham City, "The Big Heart of England", located within minutes from some of the most historic places in Great Britain, has been chosen as the venue. The City is to welcome the WGA and its international delegates by sponsoring a black-tie reception and banquet in the City Council House adjacent to the Convention hotel and lecture hall.

The 21st Convention is being held at a time when we are reaching important milestones in global radionavigation so we trust that you will be able to join us to share in the discussions. The Convention Committee looks forward to greeting you personally.

Vacationing in Britain – Travelling Abroad

WGA members in the United States have expressed a desire to combine the Convention with a vacation in Great Britain and to travel abroad to Europe and elsewhere. With this in mind, Birmingham is shown on the opposite page as the heart of England with distances to a few notable places given. With the excellent motorway system, most locations can be reached by car in one to three hours. To assist in travel arrangements and to help decide on places of interest to visit, Birmingham Convention and Visitor Bureau personnel will be on hand for consultation.

For travel abroad, the new Birmingham International Airport is just minutes away with daily direct flights to many destinations in Europe. For domestic travel, rail and bus travel passes are available for use on the extensive public transportation system.

Loran-C/GPS Tutorial

As a prelude to the 21st Convention, Navtech Seminars, Inc. from the U. S. has been invited to provide a one day Loran-C/GPS Tutorial. The morning will be devoted to lectures on the fundamentals of Loran-C and the U.S. Global Positioning System. The afternoon sessions will discuss the combined use of Loran-C and satellite systems to enhance the performance of both systems. Experts, well known in their respective fields, will conduct the seminar.

The course is an excellent introduction to the WGA Technical Symposium that follows. Course materials will be provided.

WGA Technical Symposium

To many in the international community, Loran-C technology may be new and because the choice between radionavigation systems is becoming a key issue for both governments and users, the 21st Convention is to have a different emphasis than is customary.

The first day is to be devoted to Management and Policy aspects of radionavigation ending with a panel discussion on these topics. On the second day, following papers on Loran-C coverage and use, noted experts will lecture on a wide range of Loran-C topics including transmitters, receivers and propagation. The traditional presentation of papers will occupy the balance of the program.

Exhibition and Displays

In support of the Convention there will be an international exhibition of Loran and satellite receivers and associated hardware. In addition, government and private institutions will be showing poster displays of applications and research work in progress in the radionavigation field. A bulletin board for posting radionavigation consultant's business cards will be available. The exhibition is located adjacent to the lecture hall and in the area where the morning and afternoon coffee/tea breaks are to take place.

Details for potential exhibitors have been mailed separately. However, if you have not received the exhibition package and wish to participate, please indicate on the registration form.

Social and Sports Activities

The Convention will open on Monday with an ice-breaker evening at the ancient Abbey of Coombe where we will be wined, dined and serenaded by candlelight by the Baron and Baroness and Court in mediaeval style.

The much appreciated industry-sponsored reception will take place in the Copthorne Hotel on Tuesday evening.

Then on Wednesday, in the setting of the Birmingham City Council House, delegates and their guests have been invited to attend a reception and black-tie banquet given by the City in recognition of the international representation of the Association. We are privileged and grateful to the Lord Mayor for this gesture.

Previous delegates will confirm that one of the most enjoyable aspects of WGA Conventions is the social program conducive for the interaction of delegates in an informal atmosphere. The industry-sponsored hospitality suite, to which everyone is invited, has always been a highlight of the Convention and will once again be provided.

For sports and exercise there will be the traditional golf and tennis tournaments. Nearby there are squash courts and an ice-skating rink. Within the hotel there is a heated pool, spa bath, sauna, solarium and gym. And for the more ambitious, jogging and walking routes within the city are beckoning.

Spouse Program

WGA Conventions have always enjoyed the strong support of the spouses and friends of delegates, and we anticipate the 21st will be no exception. In fact we are planning for a record turnout! Four trips have been arranged to include something of interest for everyone. The numbers refer to the locations on the opposite page.

1. Monday, August 24th. A one day trip to Blenheim Palace where Winston Churchill grew up as a boy. A place of immense historic interest with extensive gardens.

2. Tuesday, August 25th. A one day trip to Stratford-on-Avon to visit Shakespeare's home and Ann Hathaway's house with an afternoon of browsing and shopping in the delightful town of Stratford.

3. Wednesday, August 26th. A half day trip to Warwick Castle, one of the most famous in England, returning in good time to get rested and prepared for the City Council Reception and Banquet.

4. Thursday, August 27th. A full day in the Cotswold area of Gloucestershire, one of England's designated areas of natural beauty, stopping in Broadway, Bourton-on-the-Water, Stow-on-the-Wold and the Gardens at Sezincote in Longborough. Lunch will be served at East Ridge in Longborough.

TRANSPORTATION – Coaches have been reserved for these trips, however, if there are sufficient cars, it may be possible to avoid the expense of hired transportation. Please indicate on the yellow registration and booking sheet whether you anticipate having a car and, if so, how many spare seats would be available for others.



Please return to:
 John Beukers
 East Ridge, Longborough
 Moreton-in-Marsh
 Glos. GL56 0QX, England

Wild Goose Association 21st Annual Convention

Name of Applicant: _____ Date: _____
 Address: _____
 Telephone: _____ Fax: _____

We are holding rooms for the Conference at the Copthorne Hotel which is a four star hotel located in the centre of Birmingham.

The rates are:-
 Single room with bathroom - £45 per night.
 Twin-bedded or one double-bed room with bathroom -£60 per night.

The rate includes taxes and English breakfast.
 Parking is available in a multi-storey garage opposite the hotel.
 If you wish to reserve accommodation, please complete the form and return it to John Beukers at the address given at the top of this sheet.

Accommodation required:
 Please complete in block capitals, inserting names of occupants and other details.

Arrive	Depart	Single	Twin	Double	Please list visitors' names below

Your hotel reservation will be made for you by the Birmingham Convention and Visitor Bureau, National Exhibition Center, Birmingham B 40 1NT. Telephone 44-(0)21-780-4321, Fax: 44-(0)21-780-4260

In the event of non-arrival or late cancellation the client may be liable to cancellation charges at the discretion of the hotel. Cancellation or amendments should be made in writing as early as possible to the Birmingham Convention and Visitor Bureau.

Birmingham Convention & Visitor Bureau accepts no liability in connection with this booking and it is understood that you will accept responsibility for all legitimate charges made by the hotel.

Office Use Only
Hotel
Date Booked
Ref.
Allocation Request
Rooms
Rate. £
Inclusive CB/EB/VAT
Date Typed

Wild Goose Association 21st Annual Convention Registration and Hotel Information

Complete this yellow form and send with remittance to: John M. Beukers, East Ridge, Longborough,
Moreton-in Marsh, Gloucestershire, GL56 0QX, England. *Early registration deadline - July 15, 1992*
Phone: 44 (0)451-870777, Fax: 44 (0)451-870222.

First Name: _____ Last Name: _____
 Title: _____
 Name as it is to appear on badge: _____
 Organization: _____
 Spouse/Guest Name: _____
 Mailing Address: _____

 City: _____ State/County: _____ Post Code: _____
 Country: _____ Telephone: _____ Fax: _____

Complete Program

(Includes all sessions, meals, City Banquet, events, and a copy of the Proceedings.)
 (Navtech one-day Tutorial and Ice-breaker Banquet at Coombe Abbey are not included.)
Early Registration before July 15, 1992
 Members: \$376 (£205), Non-Members \$410 (£225)
Registration at Convention
 Members: \$415 (£225), Non-Members \$450 (£245)
 (Note: Non-Member registration includes a one-year membership in the WGA.)
Ice-breaker Mediaeval Banquet at Coombe Abbey on August 24, including transportation: \$46 (£25) per person

Guest Tickets

Ice-breaker Mediaeval Banquet at Coombe Abbey: \$46 (£25) per person
 Lunch, Copthorne Hotel, Tuesday, August 25: \$28 (£15)
 Black-Tie Banquet, Wednesday, August 26, no-charge but **a ticket is required**, please check box for guest ticket
 Lunch, Copthorne Hotel, Thursday, August 27: \$28 (£15)
 Additional copies of the Proceedings: \$40 (£22)
 Student admission to sessions only: \$35 (£20)

Navtech Tutorial

Navtech Loran-C/GPS Interoperability one-day Tutorial: £150 (\$285)
OR, Complete Navtech Tutorial Registration form, and mail directly to Navtech Seminars, Inc.

(Note: Dollar to Sterling exchange rate may vary and is currently at \$1.82 to the pound.) Total: _____

Pre-registrants will receive an advance information package that will include travel information and sightseeing brochures. If you are unable to register in advance but would like to receive this information, check here:

Payment

Payment may be made by check in U.S. dollars drawn on a U.S. bank, or in pounds sterling drawn on a bank in the U.K., or Eurochecks. Eurochecks should be made out in pounds sterling. Personal or Corporate checks drawn on national banks other than the U.K. or the U.S. will incur a £10 bank charge for negotiation. All checks should be made payable to The Wild Goose Association.

Spouse Program

(Includes transportation and admission, no meals except Thursday.)
 Please indicate if you wish to participate but **do not include payment at this time.**
 Monday, August 24, Blenheim Palace: \$37 (£20)
 Tuesday, August 25, Stratford-on-Avon: \$32 (£17)
 Wednesday, August 26, Warwick Castle: \$29 (£15.50)
 Thursday, August 27, Cotswold tour, shopping and lunch at East Ridge: \$23 (£12.50)
 Note: Most of the cost is for transportation and is based upon a minicoach for 12. These costs can be avoided if there are sufficient cars available. Please indicate if you have a car, and are willing to drive, how many people you could transport

Exhibition

If you or your organization have not received an exhibition package and would like one, check here



The International Loran
Radionavigation Forum

Wild Goose Association

21st Annual Convention and Technical Symposium
August 24 – 27, 1992, Birmingham, England

Contact:

John M. Beukers, East Ridge, Longborough
Moreton-in-Marsh, Glos. GL56 0QX, England
Phone: +44 (0)451-870777, Fax: +44 (0)451-870222

Loran-C/GPS System Mix and Interoperability Exhibition Information

We will be holding a business exhibition in conjunction with the Association's Annual Convention and Technical Symposium, and believe you will be interested in participating. This venue will afford your organization a unique opportunity to present radionavigation equipment and systems or, your institution to provide background material on your involvement in radionavigation matters, to a broad audience of international delegates. The 1992 Convention occurs at a time when significant changes to global and local radionavigation policy are being considered.

The 21st Convention of the Association is the first ever to be held outside of the United States. The decision to venture overseas was prompted by the transfer of Loran-C transmitting facilities and operational responsibility from the U.S. Coast Guard to the host countries in which they are located. The occasion will provide a forum for debate on the role of terrestrial and satellite systems in the future radionavigation mix.

Enclosed is a copy of the preliminary program and a recent press release.

The Exhibition is being held in the Polytechnic Conservatoire, Paradise Place adjacent to the City Library Theatre where the conference is to take place. Morning and afternoon coffee/tea breaks will be provided in the exhibition area for delegates to the conference and exhibitors.

Three display options are available, illustrated overleaf:

1. **A Booth in the Arena Foyer (a secure area) - Cost £650**

Size - 6 feet by 6 feet using blue Velcro nylon loop panels
1 literature holder Velcro fixed to panels
2 spotlights and Company Name plaque
1 moveable plinth, 3 feet high with 2 feet square top (a second plinth can be ordered)
Power point (13amp rated at 1Kw)

2. **A Stand-Alone Poster Board in the Foyer - Cost £275**

Size 6 feet by 6 feet using blue Velcro nylon loop panels
Optional literature holder Velcro fixed to panels
Company Name Plaque

3. **A Stand-Alone Poster Board in the Foyer - Cost £225**

Size 6 feet by 3 feet wide using blue Velcro nylon loop panels
Optional literature holder Velcro fixed to panels
Company Name Plaque

The cost includes coffee, afternoon tea in the exhibition area, lunch on Tuesday and Thursday at the adjacent Cophorne Hotel and attendance at the Industry-Sponsored Reception, all for two persons. It does not include attendance at the Tutorials, Technical Symposium or a copy of the Proceedings.

In addition, a single poster board will be set aside for display of consultant's business cards and professional service listings. Cost for display is £10 for each card or listing.

Due to space limitations the number of booths is limited and units will be issued on a first-come, first-served basis. Early reservation of booth space is suggested. Call or write John Beukers at the address above for space reservation or for further details.

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