



Loran Lines

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The newsletter of the *International Loran Association*; the international loran radionavigation forum. (Formerly the *Wild Goose Association's* journal, *the Goose Gazette*)

Volume 95-3 - News of the Summer, 1995

President's Message

by Dale Johnson

The world wide Loran system has the largest navigation user base of any system in use today, with 1.3 million users. Many governments and international navigation associations recognize the need for a mix of navigation systems to meet integrity and continuity-of-service requirements. Loran and Chayka, the Russian equivalent of Loran, coverage is being improved and expanded in Europe, Russia, Korea, Japan, and the Peoples Republic of China. Other nations are considering the use of Loran as a low cost component of their navigation infrastructure.

Most marine operators prefer the superior 25 to 50 foot repeatable accuracy of loran for their specific operations. These users require extreme accuracy to return to fishnet markers in a rough sea; they typically leave from the same dock every day and calibrate their Loran equipment prior to departure, to eliminate any small seasonal variance.

In contrast to international focus on expanding Loran coverage, the 1994 Federal Radionavigation Plan (FRP) calls for the phase-out of Loran in the USA after 2000 subject to validation of a continuing requirement. This is a drastic change from the 1992 FRP commitment that there would be a 10 to 15 year advanced notice given for the phase-out of any navigation system. As of December 1994, all Loran stations outside the United States had been turned over to host nations for ownership, operation and control. European host nation reaction to the US announcement to phase out Loran early has been one of strong disappointment. Some feel that the US has betrayed them by turning over the operation of Loran and then announcing a planned early phase-out a short time later.

At least six Senators and several House members have stated their concern about safety and an orderly transition to satellite technology; they have indicated strong support of the GPS / Loran partnership concept. User organizations which support maintaining Loran as a part of the navigation system mix include the National Association of Aviation Officials, Aircraft Owners & Pilots Association, The National Business Aircraft Association, the Experimental Aircraft Association, and most of the marine publication editors. Earlier this year, a cruise ship ran aground off Nantucket island en route Boston Harbor as a result of relying on one navigation system, without maintaining an adequate cross check of other navigation aids.

The annual operating cost of the domestic Loran system is \$17 million and if the system were upgraded to solid state transmitters it would be reduced to \$10 million. Latest Loran Technology developments promise improved accuracy and coverage offering the ability to receive stations up to 5000 miles away, and track 24 stations simultaneously.

The use of a Loran / GPS partnership for precise timing is equally as important as the application of both technologies for navigation. Precise timing is extremely critical for maintaining electrical power grids to the standards required by our modern computerized equipment. Precise timing is an absolute requirement of almost all communications systems, including telecommunications, television, and radio. Some large companies have been using Loran for many years and now that GPS is available, they want to use both systems for improved integrity and continuity-of-service.

Both the House and Senate versions of the FY 1996 Coast Guard Authorization bills include language requiring user input and a plan for the operation, maintenance and upgrade of the Loran-C navigation system. This includes mechanisms to make full use of compatible satellite and Loran technology by all modes of transportation, the communications industry, and the National Weather Service. This language also calls for ensuring that Loran receivers purchased before the year 2000 will have a useful economic life.

We now know that geomagnetic storms, which usually result in ionospheric storms, affect all navigation systems, but in different ways. It has been shown that large increases in the total electron content of the ionosphere will directly affect the accuracy of a GPS position, while having a minimal effect on Loran in primary coverage areas. Conversely, solar flares, a different phenomenon, may affect low frequency systems such as Loran, but are not a problem for GPS.

It seems clear that a large number of users and policy makers around the world agree that utilizing a mix of Loran/Chayka and satellite systems is the wisest, safest and most prudent course to follow for at least the next 10 to 15 years.

INTERNATIONAL RADIONAVIGATION CONFERENCE

International Loran Association; International Navigation Association; GPS International Association
WESTFIELDS Conference Center, Chantilly, Virginia November 16-17, 1995

Loran Lines

Formerly the Goose Gazette

Loran Lines is an official publication of the International Loran Association (ILA). This newsletter is published quarterly, with cutoff dates of 1 February for the Winter issue, 1 May for the Spring issue, 1 August for the Summer issue and 1 November for the Fall issue.

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ILA Decals

The Operations Center has International Loran Association decals available. There are two versions, one with stickum on the back, as for a filing cabinet, and the other with stickum on the front, as for the inside of a window. The decals are \$1.00 each. You can pay for all ILA items by Visa or Mastercard.

1994 Conference Reports

The ILA has mailed the report of the 1994 Conference and Technical Forum, Newport, Rhode Island. If you attended, or ordered the report, and have not received your copy of the report, get in touch with Ellen Lilley at the ILA Operations Office. (614 797-2081 voice and FAX)

Loran Lines Publication Plan

The ILA newsletter *Loran Lines* is scheduled for publication four times a year, but the editor has come short of that goal. The previous issue was a special (unnumbered) issue, and this issue is Summer 95, Volume 95-3.

We plan to publish the Fall 95 issue following the November conference.

Copyright Information

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ILA Charter

"The International Loran Association is formed to provide an organization for individuals who have a common interest in Loran and who wish to foster and preserve the art of Loran, to promote the exchange of ideas and information in the field of Loran, to recognize the advances and contributions to Loran, to document the history of Loran, and to commemorate fittingly the memory of fellow members.

"The Association was originally named after the majestic bird that navigates thousands of miles with unerring accuracy. Its membership represents many interests including those of planners, promoters, designers and users of loran equipment throughout the world."

Membership

Any individual or organization that has an interest in loran is eligible for membership. There are several classes of membership:

Individual

Annual membership is \$25.00 for the first year and \$20.00 annually after the first year. Life membership is \$200.00.

Members in countries other than the U. S., Canada and Mexico are assessed an additional \$10.00 per year to defray international mailing costs.

Organizational

Corporate Class 1 and 2 memberships provide options for organizations that wish to be involved directly in ILA activities. Class 1 permits nomination of ten regular members from the corporate member; Class 2 permits five. Dues for Class 1 are \$435.00 for the first year and \$400.00 afterwards. For Class 2, dues are \$220.00 and \$200.00.

Associate membership is provided for organizations which desire only to receive ILA publications. Associate membership is \$105.00 for the first year and \$100.00 annually thereafter, and does not carry the privilege of voting or holding ILA office.

Payment for all ILA matters may be by check, Visa, or Mastercard.

INTERNATIONAL RADIONAVIGATION USERS CONFERENCE



Presented By

THE INTERNATIONAL LORAN ASSOCIATION
FORMERLY THE WILD GOOSE ASSOCIATION
THE INTERNATIONAL NAVIGATION ASSOCIATION
INCORPORATING THE INTERNATIONAL OMEGA ASSOCIATION
THE GPS INTERNATIONAL ASSOCIATION

WESTFIELDS

International Conference Center

Near Washington - Dulles International Airport

November 16 - 17, 1995

“Navigation, Positioning & Precise Timing - Meeting User Requirements”

PLANNED SESSION TOPICS

Users' Needs -- Applications, experiences, requirements
Safety Considerations -- Accuracy, continuity, integrity, reliability
Achieving Operational Stability -- Agreements, economics, ownership
Government Policies -- Control, management plans, regulatory matters
Systems Operation -- Signal-in-space monitoring, specifications, status reports
Technology -- Equipment, scientific studies, signal propagation

MEETING ARRANGEMENTS

The meeting will be held at Westfield's International Conference Center south of Dulles International Airport. Special accommodations will be available to those attending the Conference.

This meeting will feature papers and presentations, and include a user's forum fostering informal exchange of ideas and experiences regarding navigation systems. Unique social events of special interest to attendees and their guests have been planned to complement the technical program.

For further information contact Ellen Lilley, ILA Operations, 150 S. Plains Rd., The Plains, OH 45701, USA
Telephone/Fax: 614-797-2081 or E-Mail: ocenter1@ohiou.edu

1995 Convention Registration

November 16 and 17
Westfields International Conference Center
Chantilly, Virginia (Near Dulles airport)

Name: _____ Spouse/guest _____

Company/Organization _____

Address: _____ Address: _____

State, Zip, Country _____ State, Zip, Country _____

Member of: ILA ___ (# ___); INA ___ (# ___); GIA ___ (# ___)

Registration fees: \$395 _____ (U.S \$)
One day fee \$195 _____

Hotel accommodations at Westfields:

Conference attendee, per night \$110 _____
Guest in room \$57 _____

After 16 Nov, without food single \$95 _____
double \$110 _____

total \$ _____

Check # _____ Mastercard/Visa # _____ expiration date _____

Arrival date _____ Departure date _____

Smoking/nonsmoking _____ Airport shuttle? _____ (\$8.50)

The registration fee is firm and includes a copy of the Conference Proceedings, attendance at all sessions, user forums and workshops, the reception Nov. 15 and the banquet (black tie optional) on Nov. 16, plus breakfast, lunch and snacks Nov. 16 and 17.

Registration and hotel reservations at Westfields MUST BE MADE through Ellen Lilley, Conference Manager. Complete a separate registration for each conference attendee. Please complete all of the above information and make checks (U.S. dollars) payable to the International Loran Association, (ILA) or use Visa or Mastercard, and remit payment by to:

Ellen Lilley
Radionavigation Conference Treasurer
ILA Operations Center
150 S. Plains Road
The Plains, OH 45780
614 797-2081 (phone or FAX)

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AOPA GPS/Loran Usage Guide

From Aviation Daily, 7/27/1995:

"The AOPA Air Safety Foundation has published a guide to using global Positioning System and Loran equipment. GPS/Loran - A Guide to Modern Navigation explains how the systems work and provides tips on usage, including strategies for filing direct off-airways instrument flight rules routes across ATC center boundaries. For a free copy of the guide, write GPS/Loran - A Guide to Modern Navigation, AOPA Air Safety Foundation, 421 Aviation Way, Frederick, Md. 21701. Enclose a large, self-addressed envelope with 55 cents postage affixed.

Radionavigation News from Russia

Organization: RTC Internavigation Date: Thu, 21 Sep 1995 13:15:01 +0400 (MSD)
From: "Vladimir I. Denisov"

Dear Mr. Beukers,

I thank you very much for your high appreciation of our efforts to provide the users with information on the functioning of the GLONASS system and our combined efforts to provide the world community with a combined GLONASS/GPS system. I will send you all available information and reports present in Russia and CIS-countries on the use of space and land-based radionavigation systems. On March 7th, 1995 the Russian Government issued a Resolution "On the carrying out of works for the exploitation of the global navigation satellite system GLONASS in the interest of civil users" which enacts the following:

- determination of the assignments of the Ministries and Departments of the Russian Federation for the further development of the GLONASS system and to make this system available to civil users which includes the start of its exploitation in a complete composition in 1995 to serve Russian military and civil users, as well as foreign users in concordance with present obligations;

- instruction to create a coordination council for the use of the GLONASS system by Russian and foreign civil users;

- assignment to present to ICAO and IMO necessary material for the preparation of agreements for the use of the GLONASS system as an element of the international global navigation system for civil users.

The global space navigation system GLONASS, which has been put to use by the Military Space Command of the RF in accordance with the Presidential Decree of September 24th 1993, has been created to provide navigation determination to military and civil users. The intergovernmental radionavigation programme of the CIS

member-countries as well as the enactment of its realization has been ratified by the decision of the Council of Head of CIS States of April 15th 1994. This programme states that at this moment the GLONASS system is being used in a composition of 22 satellites. After its complete deployment at the end of 1995 it will be the principal means for providing radionavigation to all user groups. The multi-purpose space navigation system GLONASS-M with high tactical and technical characteristics has been in development since 1990. In forming integrated radionavigation fields in remote regions and waters the GLONASS system is planned to be used as a basic system, with "CHAYKA" and "ALFA" as supplementary systems, and they are to be conjugated with the analogue foreign radionavigation systems GPS, "LORAN-C" and "OMEGA" in order to enable their entry into the European and world radionavigation networks.

-2-The Russian Radionavigation Plan has been approved by the decision of the Intergovernmental Committee "Internavigation" of March 31st 1994 and the Russian Government. It states that the state policy should be directed to support the use of the GLONASS space system, the "CHAYKA" and "ALFA" land-based radionavigation systems in both regular and differential regimes, and conjugate with the foreign analogue GPS, "LORAN-C" and "OMEGA" radionavigation systems. To use GLONASS as an international system in the composition of a combined GLONASS/GPS system additional requirements which should be met by a global navigation satellite system (GNSS), are demanded of the GLONASS system (availability, integrity, and others). Examination of the concept of autonomous use or combined use with the "CHAYKA" and "LORAN-C" systems when unified

international systems are created in remote distance and differential regimes in:

- the Pacific Ocean
- an American/Russian chain;
- the East-Asian region (Japan, China, South Korea and Russia);
- the Mediterranean and Black Sea regions together with France, Italy, Turkey, Egypt, Spain, Greece, Russia, Tunisia, Algeria and Morocco;
- the North-West region and the Baltic Sea together with Denmark, France, Germany, the Netherlands, Norway and Ireland.

The financing of the works for the realization of the Russian Radionavigation Plan is supposed to be taken on by the budgets of the Ministries and Departments involved including help from foreign investors for the creation of integrated radionavigation systems. The coordination of the works in the field of radionavigation in the Russian Federation is realized by the Intergovernmental Committee "Internavigation".

Faithfully Yours, V.I.Denisov

**NAVIGATION
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LORAN
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**SELECTS LORAN-C
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1307 FRANCIS AVE.
HALETHORPE, MD. 21227**

Cruise Ship Grounds; Officers Blame GPS.

"This vessel would never hit the sand because this ship has all the advanced technology it needs to prevent something like that from happening." *Royal Majesty* Captain Nicholas Aslanis

About 10:30 P.M. on Saturday, 10 June, 1995, the 568', 32,400 ton cruise ship *Royal Majesty* enroute Boston from Bermuda made an unplanned stop on Rose and Crown shoal, about 10 miles east of Nantucket. This was about 17 miles west of the ship's intended track. How could a modern ship, carrying a full suite of the latest navigational equipment, on a regular run, during a clear, moonlight night, get so far off?

There is a theory that high-tech equipment will eliminate accidents. Following WW II when RADAR was released to civilian use, people thought that collisions would decrease. They increased. The *Andrea Doria/Stockholm* collision is the classic case of mis-used RADAR information. LORAN should have reduced groundings, but the *Argo Merchant* didn't carry LORAN, grounded and broke up.

Aha! Pass a law! MAKE tankers carry LORAN. *EXXON Valdez* carried LORAN-C, in addition to RADAR with ARPA and a full set of navigation equipment, yet went far, far off-course and sliced into Bligh Reef. Now people say ECDIS combined with DGPS will end navigation problems. It won't.

Navigation requires knowledge, experience, judgment, and a healthy bit of suspicion. Today's navigation equipment is so sophisticated that many a navigator barely understands it--yet tends to trust the newest marvel with a child-like faith. The saga continues: more and better equipment, less and less attention to navigation.

The *Royal Majesty* was slowed to about 12 knots to arrive at Black Falcon Terminal on Sunday. The ship's officers thought she was in the Boston Harbor Inbound Traffic Lane. The ship had:

- GPS (RAYTHEON 920)
- Loran-C (RAYNAV 780)
- An integrated navigation system

(Atlas/Krupp NACOS-25)

- Two RADARs (X-and S-band)
- Depthfinder
- Gyrocompass
- Autopilot

Second officer Evangelos Roukas of Athens was the watch officer at the time of the grounding. He stated that he was relying solely on GPS "because that is the most accurate." He violated a basic principle of navigation: never rely on a single aid to navigation. After the grounding, the ship's officers blamed GPS for the grounding.

GPS is the best aid to navigation yet developed, but it isn't perfect. Much that has been written about it has been in similar to advertising: overstating its capabilities, and disparaging other aids to navigation. In this case modern, old, and very old technology was available, but unused.

Let's start with the oldest. Sankaty Head Light on Nantucket was built in 1849, specifically to help ships avoid Nantucket Shoals. Its light flashes every 7.5 seconds, is 158' high, and has a nominal range of 24 miles. The inbound shipping lane is about 28 miles east of Nantucket, at or beyond the extreme limit of Sankaty Head Light's visibility. It is clearly visible from Rose and Crown shoals, about 10 miles away, and would have been visible from the ship for at least an hour prior to grounding. In fact, the quartermaster (lookout) even saw the red lights of the Nantucket Loran-C tower prior to the grounding.

There is a lighted whistle buoy "2RC" on Rose and Crown shoal, showing a flashing red light. The *Royal Majesty* went aground about two miles southwest of LWB 2RC, at which distance its light would be bright. There are no buoys with red lights near the traffic lanes. Seeing a flashing red light where you don't expect one is a warning--of a wreck, an obstruction, or that you're lost.

The traffic lanes are marked by buoys. The Chief Mate had the 4 to 8

watch, and saw a buoy he identified as "BA" on radar about 7:15 P.M., before dark. He didn't even have to alter course from 333°. Backtracking from Rose and Crown shoal reveals that the ship passed buoy "AR" about 7:15, not "BA." Buoy "AR" marks Asia Rip, and the southeast corner of the "Area to be Avoided," set up after the *Argo Merchant* wreck. If the *Royal Majesty* were in the traffic lane, she would have passed "BB" about 9:40 P.M. They didn't see it: another warning.

Let's progress to technology of the 1930s: depthfinders. In the traffic lanes, the water is about 30 to 45 fathoms deep. Along the path to Rose and Crown shoal, the *Royal Majesty* steamed in water less than 20 fathoms--occasionally much less--for over two hours. Ironically, she also passed close by the *Argo Merchant* wreck on Fishing Rip. A glance at the depthfinder and the chart would have revealed this huge discrepancy. The depthfinder had an automatic alarm, but it was set to three meters. Why not 50 meters?

Now to 1940s technology. The ship has two radars. Sankaty Head Lighthouse is on a cliff that makes an excellent radar target. It was abeam at about 10 miles when the ship hit the shoal. The radars, however, were set to the six mile scale. If set to a long range scale, even briefly, it would have shown Nantucket island long before the grounding.

The ship also carried a Loran-C receiver, with technology developed in the 1960s and 70s, and improved since. It would have shown the ship's position correctly. After the grounding, they checked the Loran-C; it showed the position right on Rose and Crown shoal.

Now to GPS, the technology of the 1980s and 1990s. The ship's GPS was supplying data to a navigation computer and to the autopilot. The ship's watch officer was relying solely on GPS. Unfortunately he, like many people, seems to have fallen prey to the siren song that GPS is so good that nothing else is needed.

The ship's navigator--the only officer who claimed to understand the naviga-

Cruise Ship Grounding (continued)

tion computer--may have entered an incorrect waypoint. In that case a radionavigation system guides the ship unerringly to the wrong destination. There also can be a receiver failure. In this case, the GPS receiver lost signals due to a poor antenna connection. Without a GPS input, the navigation computer shifted to the dead reckoning mode automatically. It took a long time for the ship to stray from the intended track. You simply can't get off to one side 17 miles quickly. It seems inconceivable to me that the failure could go undetected for a day or more, but it happened. In DR mode, there is never a cross-track error, never a difference between position and DR.

Celestial navigation as practiced for 100 years would have revealed an error of more than two or three miles. Ship's officers must prove competent in celestial navigation during their license examinations.

The easiest cross-check would be Loran-C. Using Loran-C to verify GPS positions would have revealed the huge discrepancy. In any reasonable navigation computer system, there should be inputs from two navigation systems, to

guard against failure of one system or its receiver. If the navigation computer can accept inputs from both Loran-C and GPS, the ship's officers didn't know how to set it up.

Coast Guard investigators have noted the need to use more than one system, and rightly so. Yet the Coast Guard's leaders are working hard to end Loran-C service by the end of the century. That would deny the possibility of reliable, all-weather cross-checking in U.S. coastal waters.

This ship didn't use the lighthouse, the depthfinder, the buoys, the Loran, or the radar--any one of which would have shown that something was wrong with the GPS. Resist the temptation to rely totally on new, impressive equipment. If you use any aid to navigation by itself, and don't check your instruments or other receivers, sooner or later you too will fetch up on a shoal. Check everything against something else. That will keep equipment failure or a navigator's blunder at the level of a minor annoyance rather than a disaster.

Yachting magazine, September 1995
author: Capt. Bill Brogdon

Radionavigation Conference 1995

The International Loran Association, in conjunction with the International Radionavigation Association and the GPS International Association, will hold its Technical Symposium and Conference 15-17 November 1995 at Westfields Conference Center, Chantilly, Virginia.

This will be an opportunity for U.S. navigators to present information to support design of a logical mix of Aids to Navigation systems to meet their needs over the next few decades. While the rest of the world has invested in independent systems to enhance safe navigation, the U.S. bureaucracy is moving to GPS-only navigation.

There will be a session on govern-

ment policy on 17 November to address issues that are important to the navigation community, such as:

- marine and air navigation safety requirements
- system integrity
- system interoperability
- cost analysis of overlap periods
- GPS selective availability
- Loran-C and Omega termination schedules
- GPS enhancements
- position integrity
- usable time
- Glonass/GNSS system
- ECDIS failure modes and fault detection

ILA letter to DoT Secretary Pena

June 19, 1995

The Honorable Federico Pena
Secretary of Transportation
U.S. Department of Transportation
400 Seventh Street, SW
Washington, DC 20590

Dear Secretary Pena,

I am writing to direct your attention to the lessons that must be learned from the recent incident where the *Royal Majesty* cruise ship ran aground off Nantucket Island while using the Global Positioning System (GPS) as their sole means of navigation.

My point is not that the Global Positioning System or the GPS receiver may have caused a navigation error, but that the crew was using only one navigation system and thought the system was perfect. In fact, GPS has limitations just like every other positioning system. The tragedy is that the best positioning system the world has ever known, has been touted to be a perfect system by a long list of GPS proponents. For years high ranking DOT and DoD officials have been making public statements that in effect say "GPS is all we need."

The *Royal Majesty* had a complete suite of navigation equipment, yet only one system (GPS) was being used without verifying their position with another system (Loran). In this case the Loran was displaying a correct position.

I urge you to make a public statement that the DOT encourages marine and aviation users to constantly verify their position using different technologies if available. I also urge you to plan for the continued use of Loran as a permanent part of United States navigation infrastructure.

Sincerely,

Dale E. Johnson, President,
International Loran Association

U.S. House Appropriations Bill

"Loran-C.-The committee has indicated to the FAA in past years that the agency should take full advantage of the compatibility of Loran with GPS technology so the substantial investment made by users in the technology can continue to be utilized, and so Loran can be used as a cost effective alternative system to GPS. The committee has also heard from every segment of the Loran user community, and there is broad consensus to continue support and funding for Loran, until it is determined that satellite technology is available and reliable as a sole means of safe and efficient air navigation. The Loran system is established, operationally proven, reliable and cost effective. In view of the favorable benefits versus costs associated with Loran, and because of the substantial enhancement it provides to user safety, the committee remains convinced that the Federal Government and users can benefit from the technology well into the next century.

"The committee last year indicated to the FAA that it might be necessary for the agency to assume increased funding responsibility for Loran-C/GPS related initiatives in conjunction with other elements of DOT. The committee believes that some funding responsibility should be transferred to the FAA. Therefore, the Committee directs the FAA to provide a plan, within 120 days of the enactment of this bill, for future funding, upgrading, and support of Loran-C in cooperation with other elements of DOT. Moreover, the FAA is directed to expedite the implementation of the automatic blink system, and the agency should fully support actions to permit promulgation of Loran non-precision approaches for which funds have been previously approved. The FAA is also urged to continue developing GPS approaches which are compatible with Loran technology, so that full benefit can be gained from both technologies.

U.S. Senate Appropriations Bill

"Loran-C.-The committee has previously indicated that FAA should take full advantage of the compatibility of Loran with GPS, and believes that Loran can be used as a cost-effective alternative system to GPS until satellite technology is available as a sole means of safe and efficient navigation. Total system infrastructure operations and maintenance costs are about \$17,000,000 annually. The technology is established, operationally proven, reliable and cost effective. In view of the favorable benefits versus costs associated with Loran, and because of the enhancement it provides to user safety, the Committee concurs with the House report language which calls for a plan that addresses future funding for Loran in cooperation with other Federal entities both within and outside of DOT. Given advances in GPS, the Committee expects decreased funding in future years for this navigation system. The Committee does not support expedited implementation of the automatic blink system, pending receipt of the requested funding plan. Given the budget outlook for the future, FAA should address its role with less resources.

**Report from the (C.I.S.)
Internavigation Committee**

1. The Intergovernmental Conference was held in Moscow from 26th to 30th June, 1995. During the technical session the subjects addressed were: Satellite and terrestrial navigation and communication systems; The Loran-C/Chayka, Alpha/Omega and differential systems; ILS, MLS, VOR/DME and landing systems in the 21st century; User requirements, performance and availability guarantees for the marine, land air navigation systems; and, The global navigation systems.

"All appropriate international organisations and governments be urged to coordinate their activities relating to issues concerning satellite and terres-

**Internavigation Committee Report
(cont.)**

trial radionavigation services and systems with particular attention being paid to the necessity of developing and implementing a world wide radionavigation plan. Was resolved that such kind of Conference will be regular. Next Conference will be in 1997.

2. In period from 30 of June to 10 of July, 1995 Maritime Safety Agency of Japan with RTC "Internavigation" conducted joint works on calibration, it was made by decision of FERNS Russian-Japan radionavigation system "Chayka", "Loran-C" (chain B), also conducted measurement in working zone of this system with using of "Tushima" vessel (JMSY). First switching on of Tokatibuto Station in GRI-7950 with code emission delay 46.000 mks was on 1 of July, 1995. Measurement conducted with using of users equipment of "Chayka", "Loran-C" which had been made in Japan, US, Russia. Calibration of chain B on base of Alexandrovsk-Tokatibuto conducted by method of crossing continuation of a baseline after master and secondary station. For definition standard coordinate of vessels position used equipment users of GPS made in US, firm "Magnavox." During this time results of measurement are analysing by Japan and Russian sides. From 1 of October, 1995 chain B is planing to switching on in experimental operation.

3. RTC "Internavigation" worked out program-software complex of management system at motortransport on satellite and terrestrial radionavigation systems of wide purposes. During this time with Ministry of Transport Russia conduct experimental works on inculcating a system to some city of Russia.

4. 24th of July, 1995 in Russia from space launching site Boykanur conducted usual launch of 3 space apparatus by system "GLONAS" to the second plane of group. Mounting of launch satellites planing to the systems points 10,11,15.

Director RTC "Internavigation"
V.I.Denisov.

NATIONAL TRANSPORTATION SAFETY BOARD RECOMMENDATIONS

Due to the potential hazards of integrated bridge systems providing misinformation similar to the events surrounding the Royal Majesty grounding, on 10 June 1995, the National Transportation Safety Board has issued the following Class I, Urgent Action recommendations to the US Coast Guard:

M-95-26: Immediately recommend that the International Maritime Organization urge its administrators to advise maritime vessel operators of the circumstances of the Royal Majesty grounding and to encourage the operators to review the design of their integrated bridge systems with the manufacturer to identify potential system and operational safety modes that might result in undetected changes to the autopilot function, and develop modifications as required.

M-95-27: Immediately advise maritime vessel operators of the circumstances of the Royal Majesty grounding and urge them to review the design of their integrated bridge systems with the manufacturer to identify potential system and operational safety modes that might result in undetected changes to the autopilot function, and develop modifications as required.

The Safety Board also issued urgent safety recommendations regarding the Royal Majesty grounding to the International Council of Cruise Lines, the International Chamber of Shipping, the American Institute of Merchant Shipping,

the International Association of Independent Tanker Owners, the National Marine Electronics Association, and STN ATLAS Elektronik.

In its preliminary report, the NTSB notes that: "The bridge officers of the Royal Majesty had several means, other than the GPS, by which to determine or evaluate their position. Their other resources included a Raytheon LORAN-C navigation unit, three radars, a radio direction finder (RDF), and a fathometer. However, at this point in the Safety Board's investigation, it appears that the bridge officers relied primarily on the GPS for navigating the vessel and did not effectively cross check with these other sources of position information. After the accident, the bridge officers checked the position shown by the LORAN-C navigating unit, and found that it correctly showed the vessel at the position on the shoal where it had run aground. It was also determined that prior to the accident, the vessel's radars had all been set on the 6-mile range scale. As a result, the bridge officers were unaware how close they were to Nantucket (about 10 miles) and Rose and Crown shoals. The NACOS 25 depth alarm function could also have been used to detect the abnormally shallow depths that were encountered during the three hours of the vessel's operation prior to the grounding."

Bill Polhemus Recovering at Home

At press time, we talked with Bill Polhemus, who is having a very slow recovery from heart surgery six months ago. Bill is one of the greats of WGA, the ION, and navigation: invented a navigation computer, won the Harmon trophy, was instrumental in selecting Loran-C for the coastal system, and has a seemingly

unlimited supply of tales about navigating lost airplanes. Bill is at home, on a ventilator, and just beginning to take steps. He is in good spirits and appreciates our prayers and calls. His phone number is 802 644-5569. His wife Jan needs our support, too.

-the editor

GPS Availability for 1995

	H	%
Jan.	588.52	96.84
Feb.	24.8	99.85
Mar.	266.5	98.57
Apr.	259.1	98.56
May	582.4	96.87
June	567.5	96.85
July	212.6	98.86

H = Total outage hours for month
% = % signal availability for month

The GPS average signal availability the first seven months of 1995 was 98.03%. The unavailable time is about six times that of a Loran-C triad, which typically has navigation signals available 99.7% of the time.

The Air Force provides this GPS information to the U.S. Coast Guard NAVCEN. Monthly outage data is available on the NAVCEN computer bulletin board at 703 313-5910, and on INTERNET <http://www.navcen.uscg.mil/>

AOPA is Online

From Compuserve 14-Jul-95:

"Hit the sky with the world's largest general-aviation membership organization, the Aircraft Owners and Pilots Association, in AOPA Online. The organization's focus, general aviation, includes all flying other than airline and military and accounts for more than half of all flying hours. Founded in 1939, the organization has more than 335,000 members, who collectively own and operate the majority of the civil aircraft that exist in the U.S.

"AOPA Online's main menu offers access to data bases and services, Aviation Weather (soon to include vivid Jeppesen weather graphics), an Air Safety Foundation area, information about AOPA's certified services, learning-to-fly and flight-instructor programs, the AOPA Online Mall store, and more. Parts of AOPA Online, including the AOPAForum, are open only to AOPA members. For membership information, click on the "Welcome" icon.

"To access AOPA Online, part of CompuServe's extended services, GO AOPA."

Beukers Responds to Donohue Statement

George Donohue (FAA) statement, as published in Aviation Daily 7/7/1995:

"INTELLIGENCE Loran-C is 'a technology whose time has come and gone,' according to George Donohue, FAA associate administrator for research and acquisition. Aviation and maritime users bought Loran equipment on the strength of a U.S. promise to support Loran until 2015, but Donohue said that 'while there needs to be a transition time, all technology has a natural life to it.'"

The response:

Mr. George Donohue
Federal Aviation Administration
800 Independence Avenue
S.W. Washington DC 20591

Dear Mr. Donohue,

Re July 7, 1995 Aviation Daily Article

The statement attributed to you that appeared in the July 7, 1995 issue of Aviation Daily relating to Loran-C is unfortunate and has not been received well by the international community interested in a common global radionavigation policy that finds Loran-C as one of the cornerstones of this policy.

It is only recently that the U.S. Government transferred the overseas Loran-C assets to host States. Unlike the U.S., these States do not regard Loran-C as obsolete technology. They and other bordering States are actively engaged in negotiation and devoting resources for recapitalization to make Loran-C the worldwide complement to satellite technologies. Loran-C is already covered by multilateral agreements and further such agreements are anticipated in the near future.

The international radionavigation community is very sensitive to pronouncements made by responsible individuals in the U.S. government service. This sensitivity has been heightened by the recently released NAPA/NRC Summary Report which recommends that the U.S. "forestall" the

introduction of an international satellite system and regards GLONASS as being an "unnecessary competitive rival" to the U.S. "GPS monopoly".

The recent Moscow Conference on Global Radionavigation Planning confirmed the requirement for both terrestrial and satellite navigation systems. In recent definitive and binding language the European Commission and Parliament have made it clear that no single satellite provider will be acceptable and that nationally-owned Loran-C will be the terrestrial system to complement a GNSS-1 composed of GPS and GLONASS as a prelude to an internationally funded and controlled GNSS-2.

Noting the language relating to Loran-C in the Coast Guard Authorization Act (Bill HR 1361) and the accompanying report and also noting the language in the Report accompanying the Department of Transportation Appropriations Bill for 1996, it would appear that Loran-C is a technology that is far from "come and gone" as you reportedly stated.

Perhaps now is the time to follow the lead of the international community and recapitalize some of the aging U.S. Loran-C facilities. The figures clearly show the potential for savings derived from the reduction of Coast Guard billets by automation of station operation.

It also appears that there is even disagreement within your own agency over future radionavigation policy and, in particular, Loran-C, as evidenced by your statement and those of the FAA Administrator.

I urge you to make a public statement clarifying what was reported in the Aviation Daily article, to avoid further confusion over U.S. radionavigation policy.

Yours sincerely,

John M. Beukers

1994 U.S. Federal Radionavigation Plan Policy for Loran-C:

The latest FRP ignores the previously stated policy of keeping Loran-C in operation until the year 2000. The section on Policy states, with reference to Loran-C:

"Loran-C provides radionavigation coverage for maritime navigation in U.S. coastal areas. It provides navigation, location, and timing services for both civil and military air, land and marine users. Loran-C is approved as a supplemental air navigation system and also serves a large number of users that operate under Visual Flight Rules (VFR). The Loran-C system serves the 48 conterminous states, their coastal areas, and certain parts of Alaska. The system is expected to remain part of the radionavigation system until the year 2000, to accommodate the transition to GPS. Continued operation beyond that date will depend on validating requirements for Loran-C that cannot be met by another system.

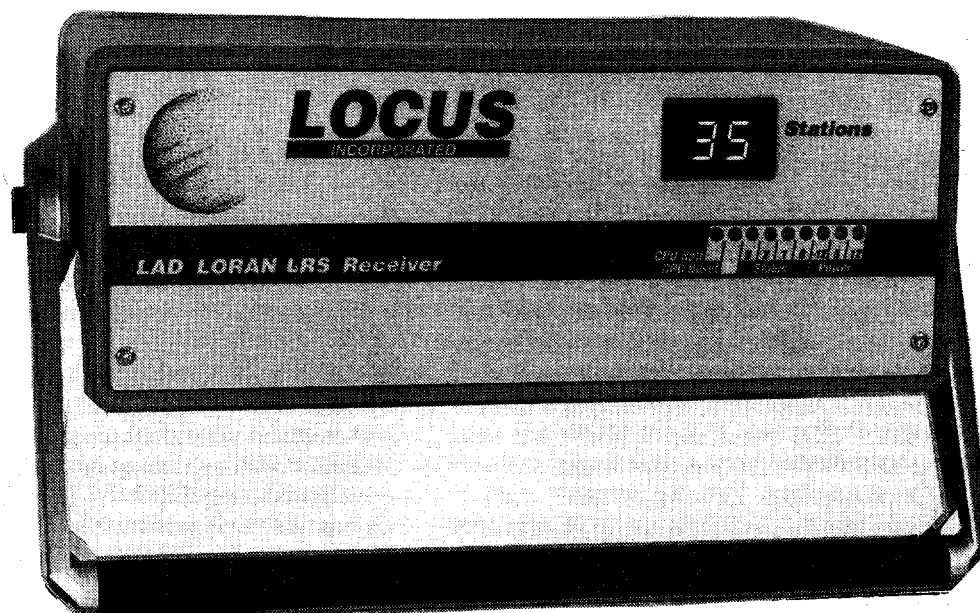
"The DOD requirement for the Loran-C system ended December 31, 1994. Operations conducted by the USCG at overseas stations were phased out by the end of 1994."

COMMENT: Coastal areas? Loran-C coverage has extended from coast to coast since the mid-continent chains came on line in early 1991.

COMMENT 2: VFR? The FAA approved Loran-C for IFR supplemental use about a decade ago.

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Excerpt from New (1994) Federal Radionavigation Plan

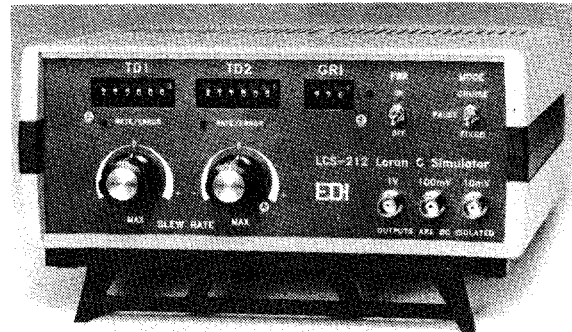
"Decisions to discontinue Federal operation of existing systems will depend upon many factors including: (a) resolution of GPS accuracy, coverage, integrity, financial {and institutional} issues; (b) determination that the {resulting} systems mix meets civil and military needs currently met by existing systems; (c) availability of civil user equipment at {economically acceptable} prices; (d) establishment of a {suitable} transition period [deleted: of 10-15 years] {based on user equipment and acceptance, budgetary considerations, and public interest} ; and (e) resolution of international commitments."

note {new wording}

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