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WILD GOOSE ASSOCIATION

QUARTERLY NEWSBULLETIN

Spring 1987

Bob Miller, Editor		Kaman Tempo
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FOREWORD (Editor)

The next issue is scheduled for publication in the month of September and will cover the 1987 Summer Quarter (June-July-August). September 1 is the deadline for submission of any material for publication.

In the last issue, an article in The Aviation Consumer concerning tests conducted on selected Loran receivers was reported. Several Loran receiver manufacturers have sent us comments containing expressions of concern to the manner in which the tests were conducted.

The Wild Goose Association's Quarterly Newsbulletin is a publication intended to provide its members with information of interest about navigation, in general, and Loran C, in particular. Some information contained in this publication is material that the Editor has included, usually with citation of the resource from which the information was derived and with an objective summary of its content. If elements of the information extracted from other sources on the initiative of the Editor is distasteful to some readers, that practice will be suspended. As a committee of one, the Editor is simply attempting to disseminate a wide variety of Loran general interest material.

PRESIDENT'S COLUMN (Walt Dean)

A number of interesting and important events have occurred in the loran community in the past few months. Some mentioned here are reported in greater detail elsewhere in the Newsbulletin.

WGA Director Ed McGann resigned as President of Racal/Megapulse in April of this year, leading many of us to speculate about the future of the company and the solid state loran transmitters. In May, he and the other original stockholders of Megapulse arranged for financial help to buy back the company from Racal. As of this writing that process is well under way. We wish them well.

A special meeting of the International Association of Lighthouse Authorities (IALA) was held in London on 11-12 March, attended by about 100 delegates from 23 countries, to discuss the future direction of radionavigation service, particularly to Northwest Europe. CAPT Ned Keeler presented a paper at the meeting and a summary of his report is given elsewhere in this issue.

The latest loran non-precision approach to be approved was flown at Orlando, Florida in May. In addition, the FAA announced at a meeting in Anchorage that they are planning to implement a number of loran approaches in Alaska. Details are still sketchy.

A number of discussions have been held with an eye to improving the interchain timing of the present loran system, which could serve to make practical a loran receiver measuring interchain time differences. This would extend the range and improve the integrity of existing and future chains. An additional incentive is the possibility of synergism with GPS. The FAA has stated that the proposed 18 satellite configuration of GPS is not adequate navigation for civil aircraft. The cost of upgrading the system is estimated in the order of a billion dollars. If loran and GPS were timed together, then a combined loran/GPS navigation receiver would have the necessary redundancy that it probably could be certified as a "sole means" IFR navigation system. Representative Danny Smith of Oregon has shown considerable interest in this approach and has stimulated the Coast Guard to study its feasibility.

Martin Shuey has offered a special treat for the spouses at the WGA Convention this year - a trip through the historic site of Harpers Ferry. There will be more on this later.

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<u>1987 WILD GOOSE ASSOCIATION CONVENTION</u> (Jimmie Toms)

OCTOBER 20-22, 1987 <u>LORAN-C - A MID-LIFE SYSTEM</u>
<u>Crowne Plaza Hotel, Rockville, Maryland</u>

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<u>PROGRESS ON MID-CONTINENT CHAIN</u> (Bill Schorr, U.S. Coast Guard)

The site for the first of four new stations has been selected near Boise City, Oklahoma, which is near the western end of the panhandle. Five candidate sites are being evaluated in the vicinity of El Paso, Texas for the second station. The FAA Northwest Mountain Region has been assigned responsibility for site selection of the other two stations - in Wyoming and Montana. It is expected that the process will be completed by July.

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<u>WGA DoD WORKING GROUP MEETINGS</u> (John Illgen)

On 30 May, the WGA DoD Working Group held meetings to review status, discuss strategy, and determine action items for Working Group members. To date committee members have briefed the Office of the Assistant Secretary of Defense and provided recommendations that focus on a need for the DoD to have a mix of <u>both</u> terrestrial and satellite navigation systems in order to place confidence in maintaining survivable navigation and <u>timing</u> systems. This written report has been well received and is in agreement with Mr. Latham's recent public statements on the issues. The committee has also discussed the above issues with the Deputy Assistant Secretary of Defense Test and Evaluation Office.

DoD appears to be interested in using Loran-C. To date the Unmanned Airborne Vehicle (formerly known as Remotely Piloted Vehicle) programs have been using Loran-C successfully in coverage areas that exhibit good GDOP. This Loran use in UAV programs is a result of committee member actions that is influencing both the cause and subsequently our respective business areas. It is the committee members' desires to focus on specific programs (such as the UAV program) and bring Loran-C to the wider attention of cognizant DoD agencies (program offices and higher decision echelons).

At the DoD Working Group Meeting, a list of DoD agencies (and rationale for visiting these agencies) was prepared. Assignments for presentations and discussions with these agencies will be distributed among committee members

(and other WGA members who desire to participate) in a coordinated fashion (to avoid duplicating our visits, control the necessary follow-up actions for each meeting, and maintain a historical file).

A committee report with action items is in the press for distribution. Please contact John Illgen if you desire a copy. WGA officers and Board members will automatically receive a copy.

Committee members, Bob Bronson, John Illgen, Ed McGann, and Bob Miller recently presented Loran-C papers at the Association for Unmanned Vehicle Systems meeting held at the Stanford Research Institute in January. John Illgen was Chairman of the Technology Session for both the morning and afternoon sessions.

Editor's Comment John received an award citing his efforts in developing the Technology Session.

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LORAN-C EARLY IMPLEMENTATION PROGRAM FOR NONPRECISION APPROACHES

(Paul E. Burket,
Oregon Aeronautics Administrator)

On March 5 and 6, sixty persons attended a meeting of the FAA/NASAO Loran Planning/Work Group in New Orleans. This was the eighth meeting of the group since its formation in February of 1985. The first meeting took place at Columbus, Ohio and the Group was formed to provide a coordinating mechanism between the FAA, state aviation officials from the states involved, U.S. Coast Guard, equipment manufacturers, consultant firms, users and user organizations such as the Aircraft Owners and Pilots Association.

This Working Group has proven to be an excellent forum for identifying, analyzing and resolving problems related to the LORAN-C "Limited Implementation Program" for nonprecision approaches established by the FAA Administrator Don Engen in July 1985. That original memorandum has recently been superceded by a new directive to all regions of FAA which extends the program until the eight original monitor receivers have been replaced by National Airspace System operational monitors. That action is scheduled to take place during the coming year when the new monitors are to be delivered at the rate of fifteen per month.

There are now two LORAN receivers certificated for nonprecision approach use in the current implementation program. The Advanced Navigation, Inc., model 7000 has been joined in this unique category by the II Morrow, Inc. model 612A.

It is anticipated that the number of users assisting and gathering data on approach performance of the system will expand rapidly with at least seven more states and several new airports being added to the original six test states and eight airports designated at the beginning of the program in 1985.

A noteworthy development at the New Orleans meeting was the agreement by FAA participants to proceed with development of a stand-alone LORAN-C approach, without an underlying approach procedure, at Venice, Louisiana. While additional restrictions may apply under these conditions, no difficulties are anticipated at this time and the user, Chevron USA, is looking forward to conducting rotorcraft approaches at this location.

The next meeting of the FAA/NASAO LORAN-C Planning/Work Group will be held at the Sheraton Airport Inn, Portland, Oregon on July 16-17. Among the various topics scheduled for discussion will be possible alternatives for development of approach procedures by other that FAA personnel. There will also be a program session dealing with cost/benefit analysis and criteria to be used in determining priorities in selecting airports/runways to have LORAN-C approach procedures.

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IALA RADIONAVIGATION SPECIAL CONFERENCE - LONDON, 11-12 MARCH

(CAPT Ned Keeler,
U.S. Coast Guard)

I represented the U.S. Coast Guard and delivered the keynote address "The Future of Loran-C" at the subject conference. The conference was well attended, attesting to Loran-C's international interest, with over 100 representatives from at least 21 different countries registered. It was hard working and extremely productive, accomplishing the major objectives of the Coast Guard's post mid-1990's, overseas Loran-C, disengagement policy in the name of the effected countries consensus:

a. The Northwest European countries will begin direct political negotiations (10 May 1987) to continue operating our Norwegian Sea and Icelandic Loran-C chains when we leave in the mid 1990's, as well as investigate expanding the coverage.

b. The International Association of Lighthouse Authorities will attempt to coordinate similar results for the Mediterranean.

The foremost concern of all countries represented was that when the Global Positioning System (GPS) becomes operational, it should NOT become the sole means for future radionavigation. They all expressed the need for a terrestrial system.

Excerpts from paper "FUTURE OF LORAN-C" delivered at the conference:

New applications abound; new users are emerging daily; new Loran-C stations are being built by at least three countries; and, many more countries are talking about or seriously considering Loran-C to satisfy some of their radionavigation requirements.

In the United States, the Loran-C user community is presently growing dramatically. General aviation has seized upon Loran-C as the solution to their radionavigation needs. Loran-C has the potential to allow 3000 airports, without an instrument approach today, to have one tomorrow by establishing a Loran-C Non-Precision Approach (NPA). Manufacturers of aviation Loran-C equipment report sales of approximately 1000 receivers a month and forecast that number to grow to 2000 a month by the time the mid-continent Loran-C gap is filled. Four new stations will be built by the end of 1990 to form two new chains.

On the marine side, sales of new receivers range from 50,000 to 75,000 per year. An emerging user, with the potential to overwhelm the rest, is the land user. Vehicle tracking and locating systems are coming in vogue for anything that moves. Timing users are a "hidden" market of some importance. NOAA uses Loran-C to monitor the position of their weather buoys, and the National Weather Service uses it on radiosondes to measure wind speeds.

The U.S. 1984 Federal Radionavigation Plan (FRP) policy statement on Loran-C affirmed the requirement for the system, and scheduled phaseout of the overseas stations as the DoD no longer needed it. The draft version of the 1986 update will acknowledge timing users, address use for NPA's, forecast mid-continent coverage and announce a slip in overseas phaseout commensurate with the shuttle launch delays for GPS.

FORECAST - Loran-C is a radionavigation system for the 21st century. It has not yet reached its full potential. The hyperbolic mode of Loran-C navigation has been sufficient for the marine user. However, as the aviation and land user communities begin to dominate, a migration to other methods of using Loran-C information will emerge. Rho-rho, cross chain, master independent, direct ranging and differential all have the potential to improve accuracy and expand coverage of existing systems. A hybrid system combining

loran and GPS has the potential to eliminate many of the integrity problems presently prophesized for GPS.

CONCLUSIONS - The IALA Special Radionavigation Conference reached the following conclusions:

1. It was noted with great satisfaction that following the Conference, the Governments of the countries listed below will enter into direct negotiations with one another to consider the possibility of extending Loran-C coverage in Northwest Europe: Denmark, France, Federal Republic of Germany, Iceland, Netherlands, Norway, United Kingdom.

2. IALA will continue to pursue the possibility of extending Loran-C coverage along the Iberian Peninsula, and in the Mediterranean, until such time as the Governments concerned are in a position to enter into direct negotiations with each other.

3. It was requested that IALA be kept generally informed of the progress of the negotiations in 1. above to assist the IALA in the pursuit of 2. above.

4. It was agreed that users should be given adequate notice by the Authorities concerned of the intentions to change from one system to another. It was further agreed that an adequate period of overlap should be maintained when changing from one system to another.

5. The efficiency of Loran-C for civil aviation users and land users should be borne in mind when considering the economics of introducing Loran-C.

6. It was agreed that in appropriate national and regional areas, radionavigation systems should be maintained after the introduction of new satellite navigation systems for the foreseeable future.

7. It was agreed that IALA will support the standardization of the coordinate conversion process whether it is accomplished through the Loran-C receiver or through corrections applied to charts.

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<u>MESSAGE FROM JOHN ILLGEN - CANDIDATE FOR PRESIDENT</u> (John Illgen)

I have asked Bob Miller to publish this statement. I feel strongly the WGA has developed a solid structure that we can use and expand upon to continue the initiatives associated with Loran-C as a supplemental navigation aid and approach system in the National Airspace. I plan to work with the Board and WGA members to assure a strategy is developed to assure we impact government financial decisions that will continue the accelerated interest in using Loran-C in the National Airspace.

I firmly believe we need to integrate the capabilities of Loran to both civilian and DoD requirements. This combination of requirements (carefully planned) could have a huge impact on the future of Loran-C (the acceptance and continuation). WGA DoD Working Group members recently met to discuss committee and issues status and develop further action items. I am very encouraged over the outstanding recommendations generated by all committee members.

As your President I would work with the Board and WGA members to focus strongly on the continuation of the National Airspace progress and continue to couple DoD requirements (and provide Loran successes like we are doing in Unmanned Airborne Vehicle [UAV] programs) with Loran capabilities.

Strong attention will be given to integration of the above issues into our annual symposium, forums, journal, newsletter, and Board meetings. I believe Walt Dean's General Membership meeting at the New Orleans convention

was outstanding. I intend to use such methods of communication if elected your President. Finally, communication is very important and, if elected, I will (at my own expense) install a phone in my home for a WGA Hotline and will advertise the number in the newsletter. I will ask the entire membership to call me (collect if necessary) to share their thoughts on the issues, direction WGA is taking, or any other Loran-C/navigation related concern.

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AOPA LORAN USER SURVEY (Editor)

AOPA received more than 3000 responses to their survey on the use and utility of Loran C navigation in the December issue of Pilot. The results:

1. I have a Loran C receiver installed in my aircraft. It is...
   - FAA-certified for IFR navigation - 17.6%
   - VFR only - 82.4%
2. I regularly use Loran as...
   - Augmentation for other enroute nav 27.9%
   - Augmentation and monitoring for standard instrument approach procedures 15.8%
3. I do not now have a Loran C receiver but would be interested in seeing procedures developed by the FAA for expanded use of the existing system, including nonprecision approaches...
   - Yes 95.8%
   - No 4.2%
4. Although I do not have a Loran C receiver now, I am seriously considering purchasing one...
   - Within six months - 26.0%
   - Within a year - 42.9%
   - After one year - 31.0%

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WILLIAM E. JACKSON AWARD (Bob Frank)

Norry Dogan was the 1986 recipient of the RTCA William E. Jackson Award. His paper, "Final Approach Guidance Using an Altimeter-Aided Loran-C Display System," was written while Mr. Dogan was working on his Master's Degree at the Massachusetts Institute of Technology. Mr. Dogan, a WGA member, received $1000 honorarium and a commemorative plaque at a special luncheon. Professor Richard Simpson attended the luncheon and accepted, on behalf of MIT, the duplicate plaque that is customarily presented to the sponsoring school.

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LORAN C AND ELECTRIC UTILITY POWER LINE CARRIERS (CDR R.J. Weaver, (U.S. Coast Guard)

The Interdepartment Radio Advisory Committee (IRAC) is negotiating a memorandum of understanding (MOU) with the North American Electric Reliability Council (NERC) regarding registration of utility power line carriers (PLC) operating in the bands 5-490 kHz. NERC will maintain a database of PLC registrations, advise the IRAC of new assignments, and provide the IRAC updated microfiche copies of their database on a quarterly basis. In turn, IRAC will provide NERC copies of government radio frequency assignments in the same band.

PLC's are a known cause of interference to terrestrial LORAN C users, and a potential cause of interference to aeronautical LORAN users. Interference from PLC's is expected to grow worse once the MID-CONUS LORAN C chain is implemented. PLC's have no radio regulatory status or protection; if interference to LORAN is confirmed, they are liable to correct the problem. However, NERC will take no action to discourage PLC users from using the LORAN C band.

Vol 87-2

Once the MOU with NERC is completed, we plan to screen the NERC database for PLC's using the bands near 90-110 kHz. We hope to make this information available to the LORAN community, provided we can get the IRAC and NERC to loosen language in the MOU restricting use of the database. We are considering sending letters to new PLC users of the LORAN bands (and possibly all existing users as well) advising them of their potential interference to LORAN, and their liability for correcting interference problems.

NERC will not register non-utility users of the power line carriers (e.g. power line telephone devices now being marketed by a growing number of companies). However, IRAC will propose that government users of PLC notify NERC and their data be included in the database.

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GEODETIC POSITION OF THE LORAN C ANTENNA ON GUAM (CDR R.J. Weaver, (U.S. Coast Guard)

The Geodetic Survey squadron of the Defense Mapping Agency has determined the geodetic position of the antenna for LORAN C Station Barrigada to be:

DATUM	LATITUDE			LONGITUDE			ELEVATION
	Deg	Min	Sec	Deg	Min	Sec	Meters
WGS 84	13	27	50.024N	144	49	32.987E	96.0
WGS 72	13	27	49.948N	144	49	32.433E	96.0

Editor's Comment This is the first publication of any WGS84 geodetics in the WGA Quarterly Newsbulletin and the first ever seen by this individual.

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MEMBERSHIP APPLICATION (Editor)

The last page of this edition contains a Membership Application to the Wild Goose Association. Members/recipients are encouraged to reproduce the form for use in obtaining new members.

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RECOMMENDED READING (Editor)

not WGA members

Reference: AOPA PILOT, Volume 30/Number 5, March 1987.

Loran: The Technology Matures, Mark R. Twombly, p. 97.
An update on the expanding uses of Loran C.

Making It Official, Mark M. Lacagnia, p. 103.
A look at the standards for design and certification of airborne Loran receivers.

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TREASURER'S REPORT (Carl Andren)

Balance from January 22, 1987 $10,374.40

Receipts		Expenditures	
Dues	$3,263.00	Journal Expense	$1,101.00
Proceedings/Journals	430.00	Newsletter Expense	525.53
1986 Convention (Late		Secretary's Expense	355.27
(Registration	160.00	Treasurer's Expense	22.00
		1987 Convention Advance	3,000.00
	$3,853.00		$5,004.31

Balance as of April 30, 1987 $9,223.09

MEETINGS OF INTEREST (Editor)

INSTITUTE OF NAVIGATION

NAVIGATION WITH GPS
Satellite Division National Technical Meeting
Colorado Springs, CO, 23-24 September 1987
Contact: Alison Brown, Space and Flight Systems Lab, 1867 Austin Bluffs Pkwy, Suite 202, Colorado Springs, CO, 80907

INTERNATIONAL OMEGA ASSOCIATION

12TH Annual Meeting
Honolulu, HI, 19-23 October 1987
Contact: IOA, Box 2324, Arlington, VA, 22202

1987 WILD GOOSE ASSOCIATION CONVENTION

LORAN-C - A MID-LIFE SYSTEM
Crowne Plaza Hotel, Rockville, MD, 20-22 October 1987
Contact: Mr. Jimmie L. Toms, Advanced Navigation, Inc., 61 Thomas Johnson Drive, Frederick, MD, 21701

INTERNATIONAL ASSOCIATION OF INSTITUTES OF NAVIGATION

Navigation Development and Technique Toward the 21st Century
University of New South Wales, Sidney, 2-5 February 1988
Contact: The Australian Institute of Navigation, GPS Box 2250, Sidney, N.S.W., Australia 2001

HYDROGRAPHIC SOCIETY

HYDRO 88
RAI Congress Center, Amsterdam, 15-17 November 1988
Contact: Mr. David Goodfellow, 23 Derby Avenue, London N12 8DD