EAA 245 OTTAWA , ONTARIO

NEWSLETTER

REPLY TO: EAA CHAPER 245 , TERMINAL BOX 8412
OTTAWA , ONTARIO
K1G 3H8

CARB HEAT - Hot Air and Flying Rumours

Meetings - 3rd Friday at the National Research Council Building Auditorium
100 Sussex Drive, Ottawa, 8 pm

Nov. "86

Minutes of Oct.17/86 Meeting

Meeting opened at 8:00pm with 33 members in attendance.

Eric mentioned that we are still looking for that $800.00 rider mower.

Meeting dates were announced till May 1987,and they are as follows

Nov.	21
Jan.	16
Feb	20
Mar	20
April	24
May	22

Next Meeting

Gary Palmer will talk about his Lancer 200 project [see inside this newsletter for more details on the Lancer 200]

January Meeting

Lawrence Russel of Camus Plastics will talk on types of plastics and their fabrication.

President: Eric Taada 749-4264
Secretary: Terry Peters 745-7466
Aircraft Operations: Gary Fancy 225-0454
Vice-President: Roger Fowler 225-6070
Newsletter: Dick Moore (home)836-5554(work)~~231~~564-4299
Treasurer: Gord Standing: 224-2879

17 October 1986

Notes on talk by
Doug Laurie-Lean
The Mechanics of Rotary-Winged Flight,
and Amateur-Build Helicopters

Doug is an aeronautical engineer from the land of "Crocodile Dundee", who, like a high-tech-gypsy, has followed the aerospace industry from Australia to England, to the USA and finally to Canada. He has worked at DeHavilland in Australia and England, Boeing-Vertol (helicopters) in the U.S. and is not at the National Research Council (hoping government cut-backs there won't put him out on the street). He is currently President of the Gatineau Gliding Club, and is a member of the Canadian Aerosport Technical Committee. He also wrote the criteria for the Dept. of Transport for acceptance of amateur-built helicopters.

Rotary-winged flight can be broken down into four categories: Auto-gyros, powered rotors, compound rotorcraft, and VSTOL convertiplanes (where the propellor or rotor is turned 90° such as with the tilt-wing CL84 or the Bell X-22A where the rotor is stopped and forms an X-wing).

Interestingly, the first impression of thoughts on rotating-wing flight go back to Leonardi da Vinci.

The problem with early helicopters was that as soon as they started to move forward they tipped over, because of the lack of an articulating blade or "flopping hinge" (to compensate for the different relative speeds of the forward and rearward moving blades when the helicopter moved forward).

The first true helicopter was German, and flew around 1937. The evolution of the helicopter in the U.S. began with Siporski. The commencial helicopter era began in 1939.

Doug dealt in some detail with the technical aspects of helicopter flight and discussed the dynamics and forces in play for helicopter blades in hover and in climb. The height-velocity diagram (or dead-man's curve) was covered along with the need for twin rotors to avoid the dangers of the low height velocity range.

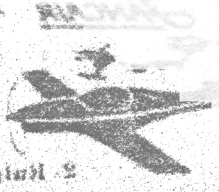
As Doug put it, in a conventional aircraft everything stays the same. In a helicopter, everything changes. In some cases the receding blade is actually going forward (and therefore backward in relation to the airflow) because of the forward speed of the aircraft.

The helicopter is a flying fatigue machine and therefore components must be designed with fatigue endurance in mind.

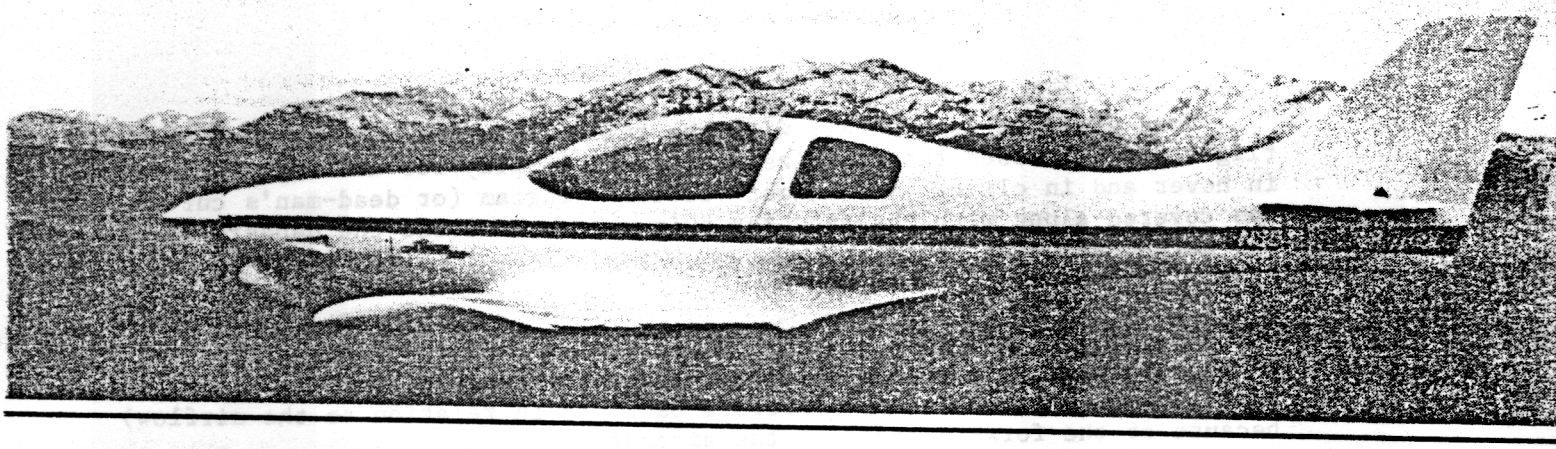
A video on the Rotorway helicopter (built from a kit) was shown. Doug noted that it was a well documented machine and that the hours between failure for components was well known. He advised strongly against attempting to make your own blades. Their design is very critical and they are subject to high strees and strain. It's obviously not worth taking the risk, given the end results of a blade failure.

Doug mentioned that a B.J. Schram has come up with a new bearingless helicopter that has flown 50 hours in the Arizona desert. Apparently Sehram wants to move to Canada.

For those who are interested, Doug has published a manual on helicopters, copies of which can be obtained from Eric Taada.



LANCER 200



The LANCER 200, developed by Neico, is a new, all composite sport plane designed for the amateur built / experimental category. Under development since 1981, the LANCER 200 was first test flown in June of 1984 at Chino, CA.

The aircraft is a roomy, side by side, two place, cross country plane with a cruise of 192 mph @ 2550 rpm's. The power plant of the prototype is the Continental O-200 of 100 hp thus fuel consumption is a very economical 5½-6 gph at cruise.

The landing gear is a fully retractable tricycle arrangement operated electro hydraulically. The gear design is original and of the trailing arm configuration. Suspension is by synthetic rubber "donut" discs; this combination provides for very easy landings and ground operations.

The LANCER 200 kit features a completely premolded airframe including main spars. All parts are made of preimpregnated glass cloth (prepreg) with cores of either Nomex honeycomb or Polyimide Rohacell foam. The parts are all vacuum bagged into the molds and oven cured to a very stable 250°F in F.A.A. certified ovens. These parts employ a unique double joggled overlap joint with matched hole drilling dimples for very easy assembly.

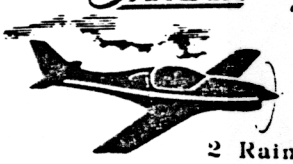
The kit is complete with the entire gear and flight control systems. All parts needing welding are prewelded. In short, the kit is as complete as current laws permit. The builders supply their own engines, installation and instrumentation.

The current kit price is $15,975.00 U.S. 7% deposit ($945) will reserve your delivery position. A full information pack is available from Neico for $12.

LANCER 200 SPECIFICATIONS

LENGTH	19' 8"
WINGSPAN	23' 6"
WING AREA	76 ft²
EMPTY WEIGHT	650 lbs
GROSS WEIGHT	1275 lbs
USEFUL LOAD	625 lbs
COCKPIT LENGTH	62"
COCKPIT WIDTH	42½"
COCKPIT HEIGHT	38½"
SEATING	side by side
ENGINE	C 0-200 (100 hp)
TAKE OFF ROLL	600 ft
LANDING ROLL	600 ft
STALL SPEED	55 mph
LANDING APPROACH SPEED	70-75 mph
MAXIMUM SPEED	213 mph
CRUISE SPEED	192 mph @ 2550 rpm
RANGE	1000 sm
WHEEL BASE	48"
WHEEL TRACK	7'7"
GEAR	tricycle retract

LANCAIR AVIATION Canada

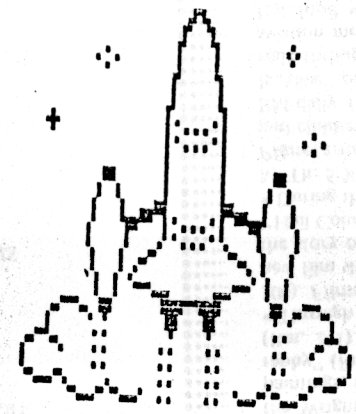


Neil M. Perks
Gary Palmer
2 Rainthorpe Crescent,
Agincourt Ontario
M1W-3S7 (416) 491-8961

NATIONAL AIR & SPACE MUSEUM

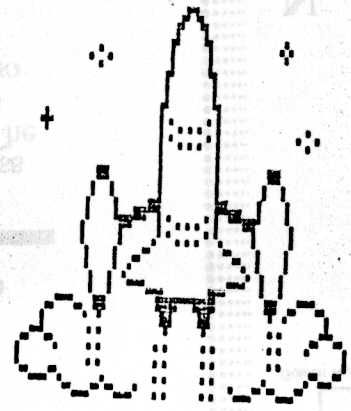
SMITHSONIAN WEEKEND IN WASHINGTON

5-7 DEC.



$185

- RETURN COACH TRIP OTTAWA-WASHINGTON
- 2 NIGHTS ACCOMODATION CAPITOL HILL HOTEL



AQUAVACS TRAVEL

233-8495

SMITHSONIAN WEEKEND BOOKING FORM

First name_____ Last name_____

First name_____ Last name_____

Address_____

_____

Home phone_____ Office phone_____

Please find my/our cheque attached to cover the cost of the SMITHSONION WEEKEND TOUR. I understand I shall have to pay D.C. and room tax at the front desk prior to checking out of the hotel.

I shall be travelling alone and would like you to find me a share to avoid paying the single supplement. I smoke/do not smoke/smoking does not worry me.

I would like single accommodation and have added the single supplement of $80.00 to my cheque.

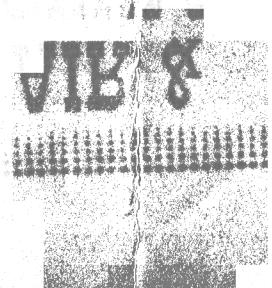
Cost per person with 3 sharing a room is $180.00.
Cost per person with 4 sharing a room is $170.00.

I would like insurance covering full refund if I have to cancel for a valid reason at $8.00 per person and have added the appropriate amount to my cheque.

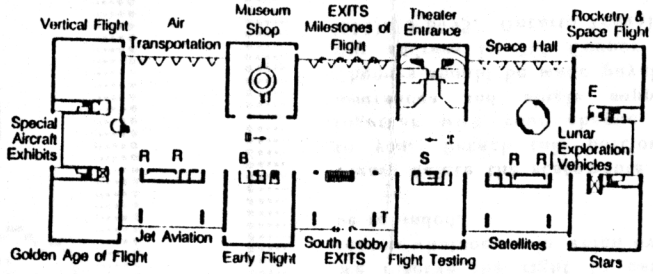
I would like insurance covering accidental death on the coach for $10000, emergency hospital medical insurance for $1000000, loss baggage or personal effects for $300, at a cost of $9.00 per person (coverage quoted is minimum available, additional coverage quotes by request).

We reserve the right to cancel this tour for any reason whatsoever in which event all monies paid will be refunded.

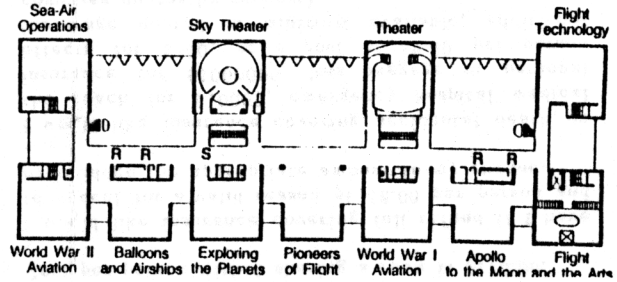
Please delete the statements that are not applicable to you. Detach this portion and return it to us together with your cheque to cover all persons, insurances and single supplement if applicable. Cheques should be made payable to AQUAVACS INC. Our address is: 261 Cooper St., Ottawa, K2P 0G3 (613)233 8495. Ontario Travel Licence # 1896859



First Floor



Second Floor



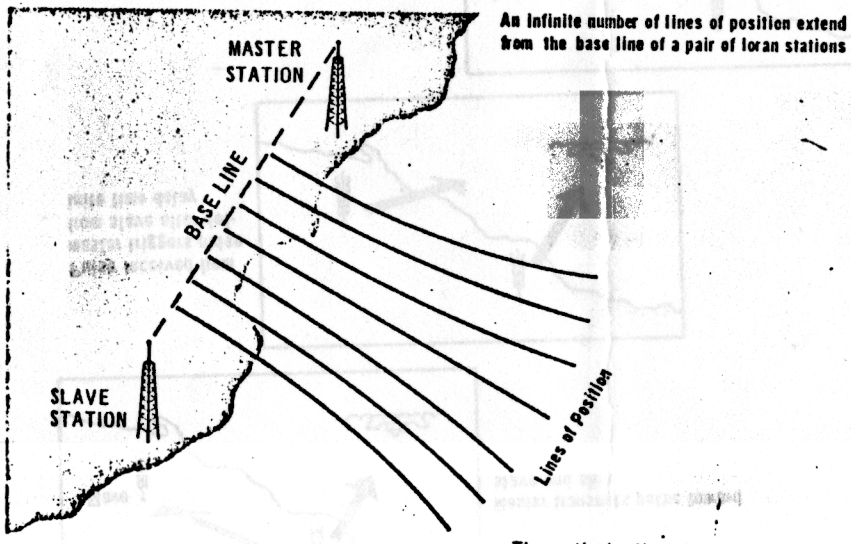
National Air and Space Museum offers a captivating look at over 300 aircraft, missiles and rockets. Opened in 1976, it quickly became the most popular of all the Smithsonian museums. The Milestones of Flight Gallery spotlights the famous airplanes and spacecrafts that have made aviation history. On the Ground Fl. see Friendship 7, Gemini 4, Apollo 11 Command Module and a display of moon rocks. From the upper level, the Kitty Hawk Flyer, "Spirit of St. Louis," Explorer 1, Sputnik 1, and the Gossamer Albatross are among the many attractions. Galleries on the 2nd Fl. offer exhibits on Balloons and Airships, the two World Wars, Pioneers of Flight, Exploring the Planets and "Apollo to the Moon." On the 1st Fl. the Air Transportation Gallery illustrates the evolution of air transport of people and cargo with the Ford Tri-motor, Boeing 247D, Beech D-18, and Douglas DC-7. The Vertical Flight Gallery (Rm. 103) has examples of helicopters, autogiros and special vehicles. During summer 1985, the public can observe the Wright brothers' 1903 flyer being restored at the museum. **Current:** • "Aerial Firefighting" offers paintings, equipment and models (Theatre Lobby). • "Focus on Flight: Four Decades of Aerial Photography" (Rm. 104). • "The Art of Robert McCall" presents 48 paintings and sketches of space and fantasy. (Rm. 211). McCall painted the 75' mural of an Apollo astronaut on the moon located in the lobby. • Through 1986, "Edward H. Hinneman and Clarence 'Kelley' Johnson: Designers of the Jet Age" (Rm. 208). *Films:* • Daily, shown continuously on the five-story screen, "The Dream Is Alive," the spectacular new film shot during several space shuttle missions (see cover story, page 4); the award winning "To Fly;" the story of an American pilot in "Flyers:" an aerial tour of the five continents, "Living Planet;" and "Hail Columbia," a look at the first Space Shuttle. Fee: Adults $1.50. Students, seniors and children: 75¢. • During the evenings, two films are screened: "Grand Canyon—The Hidden Secrets" and "Silent Sky." M-Th: 5:30 PM; F-Su: 5:30 & 6 PM. Adults $3.50. Seniors, students and children $2.50. *Albert Einstein Planetarium:* • Presents "Comet Quest," the history of comets for $1.50 Adults/75¢ Students, seniors and children. Shown continuously through the day. *Tours:* • 2 hr. guided tours begin at 10:15 AM and 1 PM daily. Groups require reservations. **If You Only Have An Hour:** Make every effort to see "The Dream Is Alive" or "To Fly." The line may look long, but it moves fairly quickly. While you're waiting, visit the walk-through Skylab or visit the nearby gift shop which has an excellent collection of models, kits and aviation memorabilia. *Hint:* • Avoid crowds by visiting early in the AM. *Eating Facilities:* • Cafeteria, fast food with specialties such as freeze-dried ice cream, located on 3rd Fl. *Daily 10 AM–7:30 PM. Independence Ave. between 4th and 7th Sts., S.W. Metro: L'Enfant Plaza, 7th and Maryland exit, 2 blk. walk. Meter parking. Underground commercial lot. 357-2700.*

loran

Loran is a system of extremely accurate, long-range radio navigation for ocean-going ships and transoceanic aircraft. Its name is derived from its basic function: namely, *long range navigation*. From the time of its initial development, various types of loran systems have come into use. One of these is called *standard loran*, and is used for commercial air and sea navigation. In this book, we will describe standard loran.

Loran operates on the basis of radio signals transmitted by a pair of shore-based stations. One of the stations is called the *master station* and the other the *slave station*, according to their function in the system. When a ship or aircraft receives the signals from both stations of the pair, it establishes its position as being somewhere on a line, called a *line of position*, that extends outward from the loran stations. As shown, a line of position is not straight, but shaped like a hyperbola. The exact location of the ship or plane can then be established by using signals from another pair of stations to determine a second line of position. The point where these two lines cross is the location of the ship or aircraft.

A loran line of position is determined on the basis of the *difference* in time required for a radio signal to reach the ship or aircraft from the master station and the slave station.



An infinite number of lines of position extend from the base line of a pair of loran stations

The base line is an imaginary line connecting the master and slave stations

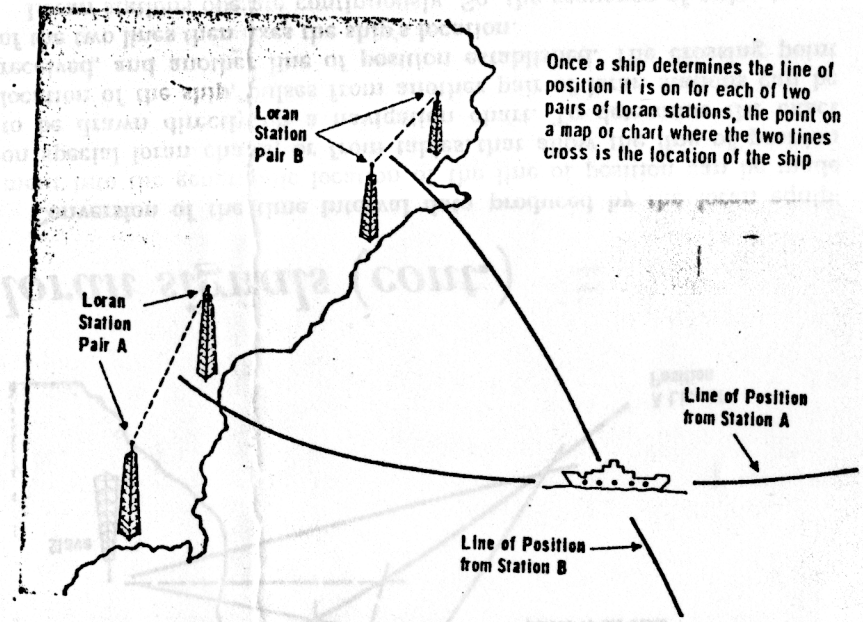
The particular line of position that a ship is on depends on the exact difference in time that it takes a radio signal to reach it from the master station and slave station

loran (cont.)

The extreme accuracy of loran results because, for all practical purposes, radio waves travel at a *constant speed* of approximately 186,000 miles per second. This makes it possible to convert the time that a radio wave travels directly into the distance traveled with a high degree of precision, since:

Distance traveled = speed × time

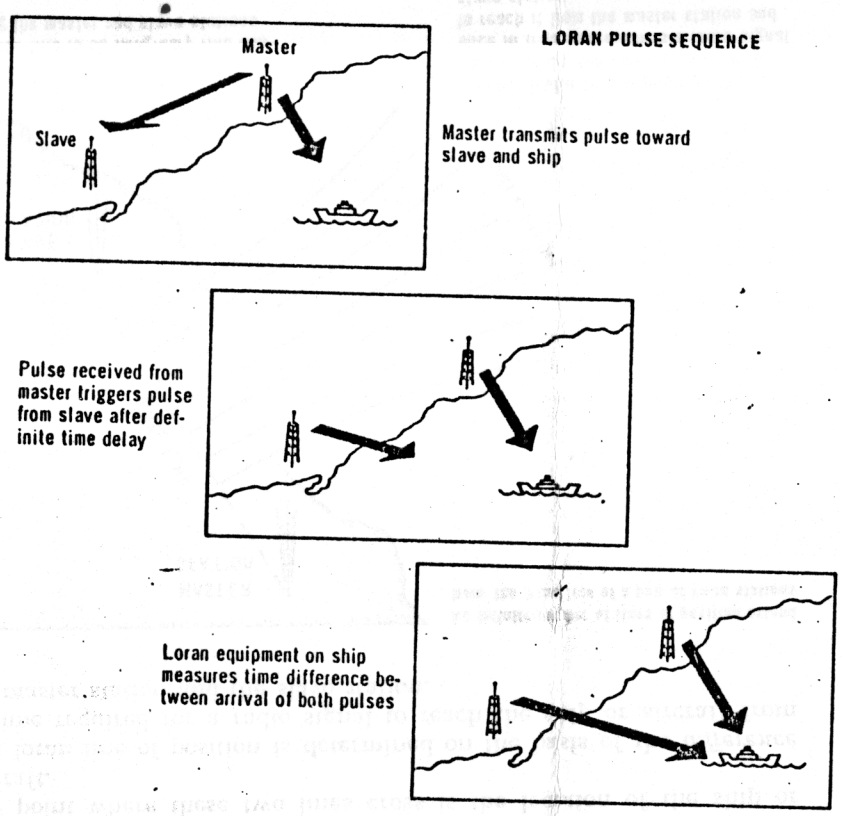
So, if the speed of travel and the time traveled are known with accuracy, the distance can easily be found to the same degree of accuracy. As you will see later, this is the basis on which certain types of radar work. It is also fundamental to the operation of loran systems, although in loran it is the difference in the travel times of two waves that is important.



Once a ship determines the line of position it is on for each of two pairs of loran stations, the point on a map or chart where the two lines cross is the location of the ship

Loran signals consist of *repetitive pulses transmitted* by both the master and slave stations. The pulses from the master station are sent out at precisely timed intervals. The pulses from the slave station are controlled by those from the master station.

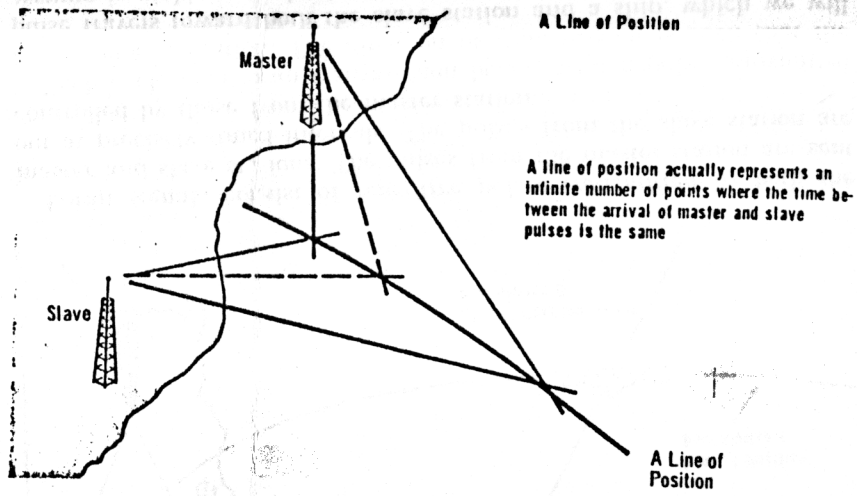
Each cycle of a loran transmission begins with a pulse transmitted by the master station. The direction of transmission is such that the pulse travels toward both the slave station and a ship, which we will assume is picking up the loran signals. The pulse arrives first at the slave station, and after a definite time delay causes that station to transmit its own pulse.



loran signals

The purpose of the time delay is to make the slave pulse always arrive at the ship during the second half of the time interval between master pulses. This is done to simplify the measurement of the time between master and slave pulses at the ship. Since the delay is always the same, it can be easily be compensated for in determining a line of position. Thus, there are *two* pulses traveling toward the ship: one from the slave, and the other from the master. The one from the master arrives at the ship first, followed by that from the slave.

Loran equipment on the ship picks up both pulses and measures the *time interval* between them. There are an *infinite* number of locations within the area served by the loran stations where the time interval between these two particular pulses would be the same. All of these locations, though, lie on *one* hyperbolic line, which is a line of position. Thus, by measuring the time between the slave and master pulses, the loran equipment establishes the line of position on which the ship is located.



loran signals (cont.)

Conversion of the time interval data produced by the loran equipment into the geographic location of the line of position can be made on special loran charts, or from tables that allow the line of position to be drawn directly on a navigation chart. To determine the exact location of the ship, pulses from another pair of loran stations can be received, and another line of position established. The crossing point of the two lines then fixes the ship's location.

Loran stations operate continuously. So, the sequence of pulse transmission described is continually repeated.