



"have you heard the facts on the new **LORAN C/D** system they've got now."





the **FACTS** on the new **LORAN C/D AN/ARN-85** **SYSTEM**

are ■ That ITT and LEAR SIEGLER have teamed to provide it.

■ This team effort makes available a new Loran airborne system, completely automatic, able to work with the present Loran C ground environment and tomorrow's Loran D ground environment.

■ This Loran system is available for immediate production.

■ Numerical readouts available on cockpit instruments showing:

time differences; latitude, longitude; UTM; track, cross track; bearing, distance to go; velocity, along track distance.

■ The system has automatic standard map presentations.

■ Displays are incorporated into the basic ADI or HSI flight instruments.

■ Computer specifically designed to solve this navigation problem more accurately with greater simplicity (serial organization).

■ Push button controls makes pilot operation a reality.

■ Many new features such as:
total weight of only 66.5 lbs.
total size of 1.416 cubic feet.
total power input of 450 watts.

■ Computer has in excess of 120 hours of airborne test data flown against today's standards. Testing began in April 1964 and was flown in a C-54, C-130, C-135 and a Lear Star.

■ Micro-electronics packaging techniques unsurpassed in the industry:

all interconnections welded or soldered.
connectors proven exhaustively in missile and space programs.
high speed microelectronic logic to eliminate discrete components and/or film circuits.
single layer boards for easiest maintainability, highest reliability and simplest production.

the TEAM

The respective skills, talents, and experience of ITT Federal Laboratories, and Lear Siegler, Inc., Instrument Division, in the field of airborne hyperbolic navigation and hyperbolic coordinate converter systems are well recognized and established. This talent and experience has now been joined under a formal team arrangement to provide a complete airborne LORAN C/D system (AN/ARN-85) for today's military applications.

Specifically, ITT Federal Laboratories is responsible for the overall system design and is providing its micro-electronic LORAN receiver, antenna coupler, and associated controls. Lear Siegler Instrument Division is supplying the microelectronic digital computer, control-indicator, map display, and indicator coupler units. This logical division of responsibility and hardware assures the Military that each firm's expertise is utilized most fully in providing this advanced airborne LORAN System, AN/ARN-85.

the following components make up the SYSTEM

RECEIVER (R-1967/ARN-85*)

The receiver automatically acquires signals in an adverse noise and interference environment. The tracking is an adaptable bandwidth configuration capable of automatically selecting bandwidth dependent upon noise and aircraft maneuvers. Precise time difference readings are sequentially provided to the display & computer. Size: width, 4 $\frac{7}{8}$ " ; height, 7 $\frac{5}{8}$ " ; depth, 15" ; volume .323 ft.³; weight, 17 lbs.



ANTENNA COUPLER (CU-1462/ARN-85*)

Automatically tunes out interference and jamming signals across the Loran band while coupling the antenna signals to receiver. Size: width, 8" ; height, 3 $\frac{1}{8}$ " ; depth, 7 $\frac{1}{2}$ " ; volume .113 ft.³; weight, 4 lbs.



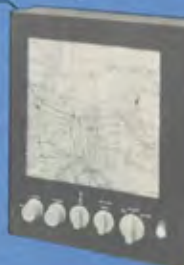
CONTROL INDICATOR (C-6727/ARN-85*)

Contains all controls for selection of Loran complexes, destinations, revised destinations and outputs. A keyboard data insertion panel permits optimum system operation in any tactical situation. Size: width, 5 $\frac{3}{4}$ " ; height, 9" ; depth, 6 $\frac{1}{2}$ " ; volume .194 ft.³; weight, 8 lbs.



MAP DISPLAY (ID-1316/ARN-85*)

Displays present position by a high intensity light "bug" on standard maps. Four different scales and three projections are accommodated. A permanent trace of track can be displayed using a small hole puncher which is part of the "bug". Available in fixed, roller or projected map versions. Size: width, 9 $\frac{3}{4}$ " ; height, 11 $\frac{1}{2}$ " ; depth, 2 $\frac{1}{2}$ " ; volume .162 ft.³; weight, 6.5 lbs.



COMPUTER (CP-837/ARN-85*)

The computer implements nineteen DIVIC algorithms which include all the standard ones plus vector rotation, vector resolution, B to BCD and BCD to B. The outputs are: present position (LAT-LONG); Bearing and Distance to four destinations; Cross Track Error, Along Track Distance; Ground Speed, Track Made Good, Wind Velocity and Wind Direction. Size: width, 4 $\frac{7}{8}$ " ; height, 7 $\frac{5}{8}$ " ; depth, 19" ; volume .409 ft.³; weight, 21 lbs.



INDICATOR COUPLER (IC-1461/ARN-85*)

A Multiplex Analog to Digital-Digital to Analog device which converts all signals into their proper form for use by the computer or external systems such as the auto-pilot and/or a Remote Altitude Direction Indicator (RADI) and Horizontal Situation Indicator (HSI). Size: width 4 $\frac{7}{8}$ " ; height, 7 $\frac{5}{8}$ " ; depth 12 $\frac{1}{4}$ " ; volume .215 ft.³; weight, 10 lbs.



*Equivalent

LORAN C/D AIRBORNE NAVIGATION SYSTEM SPECIFICATIONS

RECEIVER, CONTROL INDICATOR AND COUPLERS

Military Specifications

Carrier Frequency
3db Bandwidth
Receiver Sensitivity
Automatic Anti-Jam

Signal to Noise

Signal Acquisition Time
Aircraft Velocity
AGC & Gain Balance Range
Maneuver Settling Time

Circuitry

Reliability
Power

COMPUTER

Military Specifications:

Number System
Word Length
Radix Point
Instruction type
Negative Number Representation
Clock Rate
Command Repertoire
Memory
Operation Rate

Memory Cycle Time
Power
Reliability
Ambient Temp.
Size

MAP DISPLAY (FIXED VERSION)

Military Specifications
Map Display Surface
Map Storage
Selectable Chart Scales

Power
Reliability

Physical Characteristics

RECEIVER
ANTENNA COUPLER
CONTROL INDICATOR
MAP DISPLAY
COMPUTER
INDICATOR COUPLER

Meets all Loran C requirements of USAF MIL-R-38327; Bureau of Naval Weapons XAV-99; USAF Exhibit SEAGN No. 64-1; MIL-E-5400 class II.

100 KC
23 KC Loran C 16 KC Loran D
0.5 microvolts

Fully automatic search and track operation maintained with CW interference up to 56 times greater than the received signal.

Fully automatic search and track operation maintained under signal-to-noise ratio as low as 1/10.

60 seconds with 1/2 signal-to-noise environment.

2,000 Knots without doppler error

132db

24 seconds without velocity aid, greatly reduced with velocity aid

98 percent microcircuits of total circuits; discrete circuits 2 percent.

1660 hours MTBF (target)

28VDC 212 watts

MIL-E-5400, Class II and MIL-I-6181; mounting per MIL-C-172

Binary

30 bits, including sign

Semi-Fixed, Fractional

Multiple Address

2's compliment

4 mc

128 instructions

2048 words; expandable to 3,072

add time - 9 microseconds

coordinate rotation, resolution, division,

multiplication and square root - 270 microseconds each

2 microseconds

28 VDC 175 watts

7200 hours MTBF

-55°C to +71°C

Standard 1/2 ATR

MIL-E-5400 Class II

7 inches by 7 inches square

Infinite since display has maps inserted.

1:4000 000 40nm/div • 1:2000 000 20nm/div

1:1000 000 10 nm/div • 1:500 000 5nm/div

1:250 000 2.5nm/div • 1:50 000 .5 nm/div

Infinite resolution for each scale selected.

28 VDC 35 watts

2100 hours MTBF

Width	Height	Depth	Volume ft. ³	Weight, lbs.
4 7/8"	7 7/8"	15"	.323	17
8"	3 1/8"	7 7/2"	.113	4
5 3/4"	9"	6 1/2"	.194	8
9 3/4"	11 1/2"	2 1/2"	.162	6.5
4 7/8"	7 7/8"	19"	.409	21
4 7/8"	7 7/8"	12 1/4"	.215	10

For further information on this better Loran C/D
airborne navigation system contact either:

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