

# LORAN-C AT A GLANCE

**WHAT** is it? Loran-C is a pulsed hyperbolic radio aid to navigation providing:

- 0.25 nm accuracy, 95% confidence
- 99.7% availability

**HOW** is it used? To use Loran-C, a navigator initializes the automatic receiver, obtains a position display in TDs or latitude/longitude, and plots the position at any point in the voyage.

**WHO** uses it? Loran-C users include navigators on all classes of marine craft, some types of aircraft, and various land users.

**WHY** do they use it? Loran-C provides all-weather, continuous, accurate position determination capability at a relatively low cost.

**WHEN** is it available? Loran-C is available continuously, 24 hours a day.

**WHERE** is it used? Loran-C provides coverage for the continental U.S. and its coastal waters, the Great Lakes, Alaska, and Hawaii. Additional coverage is provided by the U.S. Coast Guard in the Far East, Northern Europe, and the Mediterranean Sea. Overseas coverage, including Hawaii, is expected to change upon termination of DoD's requirement for Loran-C in 1994. Also, other countries provide Loran or Loran-like service.

For additional information, contact:

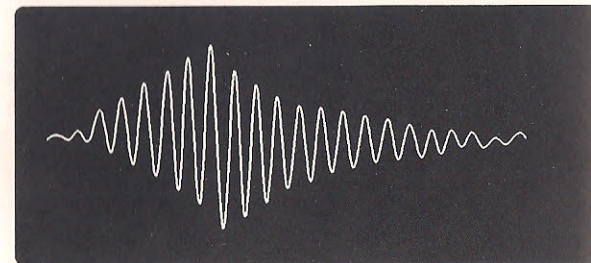
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# LORAN-C FACTS & FIGURES



A FEDERALLY PROVIDED  
RADIONAVIGATION SYSTEM  
FOR LAND, AIR, AND MARINE USE  
IN THE UNITED STATES

U.S. Department  
of Transportation  
United States  
Coast Guard



Loran-C is a low frequency, pulsed, hyperbolic radio aid to navigation system, which operates in the 90 to 110 kHz frequency band. Although primarily used for navigation, Loran-C transmissions may also be used for time dissemination and frequency reference purposes.

Loran-C was developed to provide the Department of Defense (DoD) with a radionavigation capability with longer range and much greater accuracy than its predecessor, Loran-A. Loran-C was selected as the Federally provided radionavigation system for civil marine use in U.S. coastal waters; the U.S. Coast Guard is responsible for system operation and maintenance in the U.S. and certain overseas locations.

Loran-C consists of transmitting stations arranged in groups forming chains. At least three transmitting stations make up a chain. One transmitting station is designated master while the others are called secondaries. Chain coverage is determined by the power transmitted by each station, the distance between them, and their geometry. Coverage details are available in the *Loran-C Users Handbook*, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

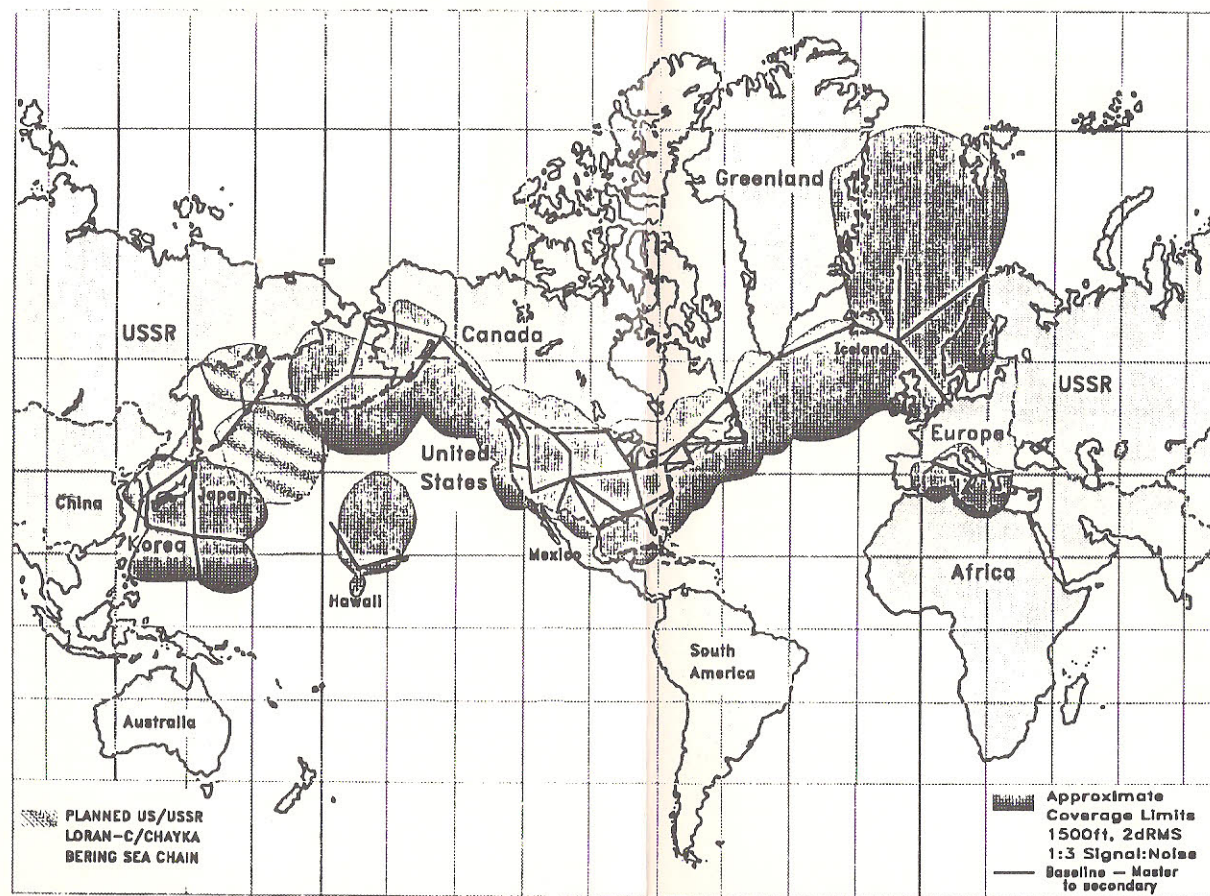
The system operation is based upon measurement of the difference in time of arrival of pulses of RF energy radiated by a chain of synchronized transmitters which are separated by hundreds of miles. The locus of points having the same observed difference in distance to a pair of stations is a hyperbolic line-of-position (LOP). The intersection of two or more LOPs defines the position of the observer. The accuracy of Loran-C depends upon the user's ability to measure the difference between the times of arrival of two signals (time difference or TD) and his knowledge of propagation conditions so that time differences can be converted to LOPs. The measurements

of time difference are made by a receiver which achieves high accuracy by comparing a zero crossing of a specified RF cycle within the pulses transmitted by master and secondary stations within a chain. Precise control over the pulse shape ensures that the proper comparison point can be identified by the receiver.

Within published coverage areas, Loran-C provides suitably equipped users with predictable accuracy of 0.25 nm (2 drms) or better. The repeatable and relative accuracy depends upon the chain's geometry and is usually between 18 and 90 meters.

The inherent accuracy of the Loran-C system makes it a suitable candidate for many land radionavigation applications. Propagation anomalies may be encountered in urban areas where the proximity of large man-made structures affects the signal.

Additional, recently installed Loran-C chains now provide coverage over the mid-continental area of the United States. This expanded coverage will allow aircraft to use Loran-C for en route navigation and standard non-precision approaches. Also, marine, terrestrial, and other Loran-C users have gained expanded coverage.



COVERAGE PROVIDED BY U.S. OPERATED OR SUPPORTED LORAN-C STATIONS