RESILIENT NAVIGATION and TIMING FOUNDATION

## An eLoran Primer

This comment provides a general description of eLoran for both the general public and technologists who may not be familiar with this particular system.

eLoran uses a high power, low frequency signal that is useable within 1,000 miles of a primary transmitter. Differential eLoran Reference Stations in major metropolitan areas and other locations where greater accuracy is desired provide local corrections that increase the system's location and timing precision.

The system provides a Stratum 1 clock for timing/phase, and frequency; positioning/location; and azimuth. eLoran is the only wireless source of Stratum 1 time besides GPS. It also provides a low-rate data channel that can be used for a variety of one-way communications. The high power, low frequency signal means the data channel is usable in many underground and underwater locations. eLoran's signal includes built-in integrity.

**eLoran is NOT:**

- A replacement for GPS or GNSS
- As precise as GPS)
- A threat to other PNT technologies (in fact, with its hard-to-disrupt, wireless, synchronized, precise time signal, it's an enabler of those technologies)
- Loran-A or Loran-C (just like your 1,000 channel, color HDTV isn't a TV from the 1950's, eLoran is not like those older systems)

**eLoran is:**

- From towers on Earth vs satellites in space
- A very high power, groundwave signal
- A signal that provides:
  - Positioning/Navigation
  - Timing/Phase/Frequency
  - Integrity
  - At least one Loran Data Channel
  - A comparison to other information so you can really trust it all, or know right away that something's wrong

**eLoran Performance:**

The system in the United Kingdom has demonstrated position accuracies between 6 and 8 meters, and timing of 50 ns. Here is a link to a paper presented at the Institute of Navigation:

http://rntfnd.org/wp-content/uploads/2015-ION-ITM-Offermans-eLoran-IOC-in-UK-final-4Feb.pdf