



Update on the Korean eLoran Program

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[The Central Radio Management Office, South Korea]

Dates	Aug 23-26, 2010 (4 days)	Mar 4-14, 2011 (11 days)	Apr 28 – May 13, 2012 (16 days)
Jammer locations	Gaesong	Gaesong, Mt. Gumgang	Gaesong
Affected areas	Gimpo, Paju, etc.	Gimpo, Paju, Gangwon, etc.	Gimpo, Paju, etc.
GPS disruptions	181 cell towers, 15 airplanes, 1 battle ship	145 cell towers, 106 airplanes, 10 ships	1,016 airplanes, 254 ships

[NK News, 25 June 2013] – based on a UN report

"Representatives from the North Korean front company Hesong Trading Corporation allegedly offered Mr. Ranger modern and vintage small arms and light weapons, **GPS jammers**, multiple launch rocket systems, and "extraordinarily," ballistic missiles with a range of up to 3,500 km."



- Korean eLoran program was initiated (October 19, 2011)
 - After the second jamming attack (March 4-14, 2011)
- The Korean eLoran program was internationally announced at ENC 2013 (April 23, 2013)
- Procurement issues
 - Three rounds of international competitive bidding from November 2013 to January 2014 were unsuccessful
- New direction of the Korean eLoran program was announced at the Resilient PNT Forum 2014 (April 14, 2014)
 - Starting with 3 transmitters and 2 differential stations instead of 5 transmitters and 43 differential stations of the initial plan
 - A new tender document was released on June 3, 2014



- Two-phase approach
 - First phase: Implement maritime eLoran for the West Sea of Korea with 3 transmitters and 2 differential stations
 - Second phase: If demonstrated performance is satisfactory, more transmitters and differential stations may be deployed to cover other areas





- SK Telecom Consortium won the contract *First announcement*
 - The contract between the government and the Consortium (SK Telecom and Sungkang Telecommunication) was signed on October 22, 2014
 - **SK** telecom is the largest telecommunication company in Korea
 - A Nautel NL series eLoran transmitter (250kW ERP) will be purchased from UrsaNav for the Ganghwa station
 - A 190m antenna will be built for the Ganghwa station
 - The current Loran-C transmitters of the Pohang (150kW) and Gwangju (50kW) will be upgraded to eLoran transmitters



- By February 2015
 - Expropriation of land for the new Ganghwa station
- From March 2015
 - 190m antenna installation for Ganghwa
- March–May 2016
 - Installation of the new transmitter for Ganghwa
 - Upgrade of the existing Loran-C transmitters in Pohang and Gwangju would take about 2-3 weeks
- In 2017
 - Test operation
- In 2018
 - Initial Operational Capability
 - Evaluation for the second phase of the eLoran program



- The procurement process was unexpectedly delayed, but the Korean eLoran program is steadily moving forward
- Integrated GPS/eLoran receiver development to support the Korean eLoran program and the e-Navigation program is also under discussion
 - eLoran Advisory Committee meeting (January 15, 2015)
 - The Korean e-Navigation program recently secured budget of \$121M for 5 years (November 11, 2014)
- "Considering the vulnerabilities of GNSS, there is no doubt on the necessity of a complementary PNT system. We believe that the eLoran system will provide the necessary PNT resiliency on critical infrastructures and support the implementation of e-Navigation."
 - [Hyejung Kim, Director of the Maritime Safety Facilities Division, Ministry of Oceans and Fisheries (MOF)], who is in charge of the Korean eLoran program and the e-Navigation program





Thank you!





 "E-Navigation is the harmonized collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means to enhance berth to berth navigation and related services, for safety and security at sea and protection of the marine environment." [International Maritime Organization (IMO)]