

ROK eLoran Service Status and Future Plan

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Ministry of Oceans
and Fisheries

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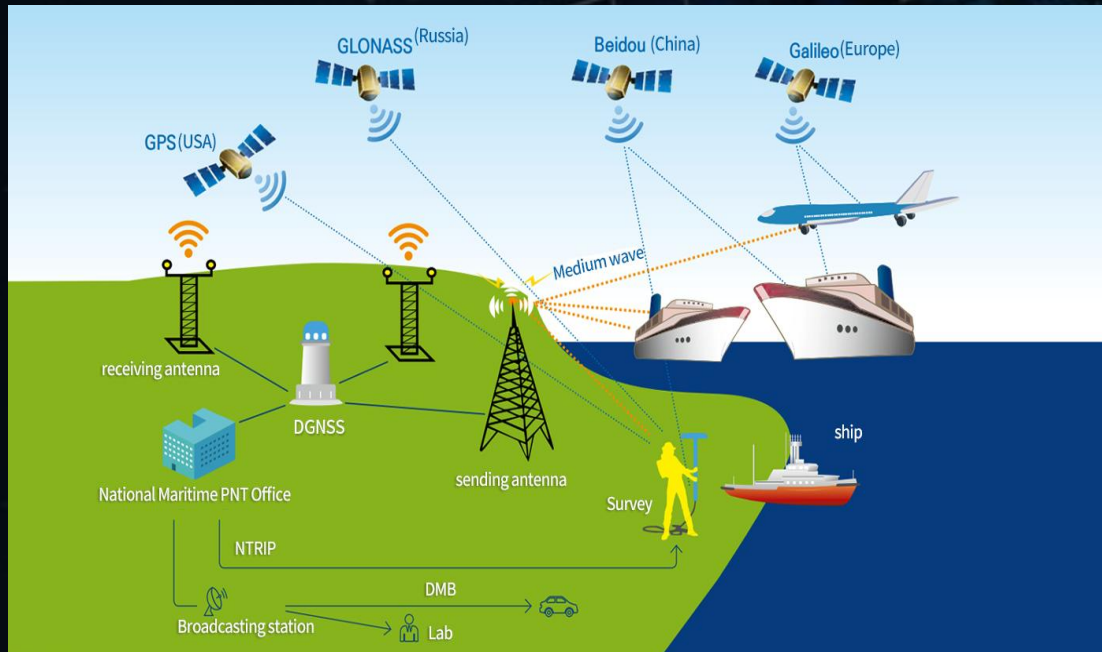
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1. ROK Maritime PNT Service

▪ Differential GNSS : MF, NTRIP



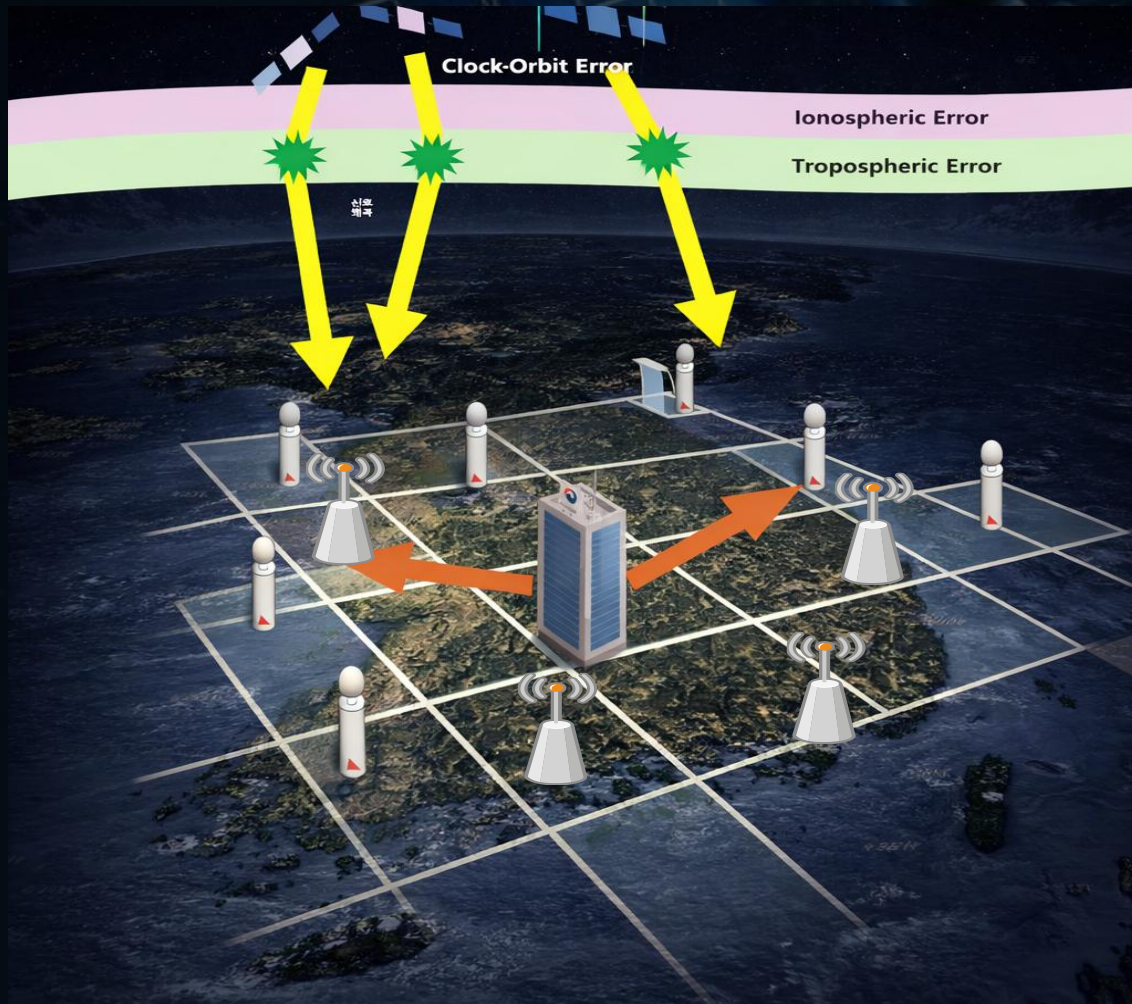
- ✓ Meter Level Service($\leq 1m$)
- ✓ MF/NTRIP Service ('99~)
- ✓ 17 Station (Marine 17, Inland 6)
- ✓ Coverage 100NM
- ✓ Accuracy: 1m



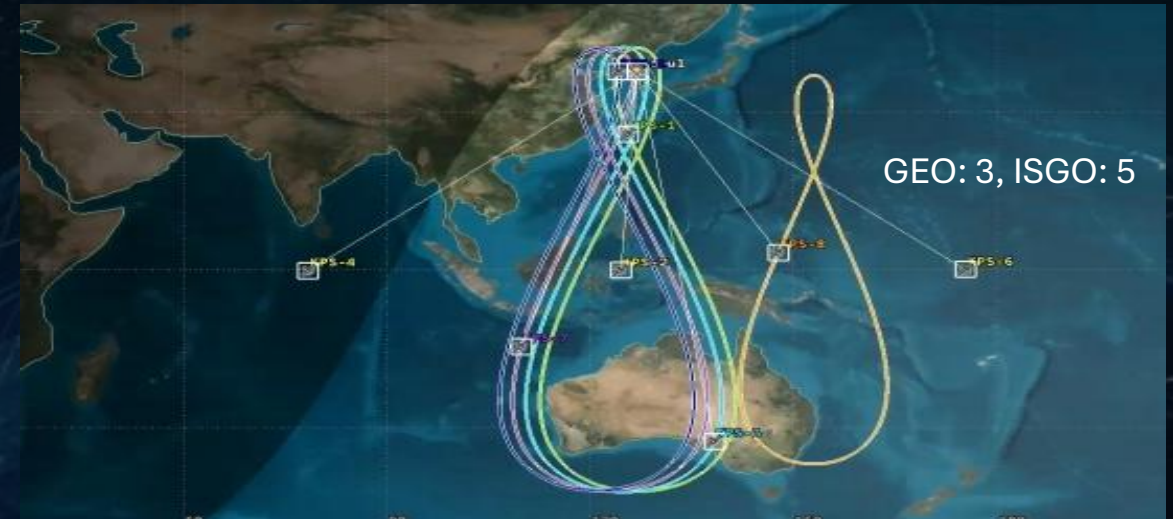
1. ROK Maritime PNT Service

- Differential GNSS : PPP-RTK (**POINT**: Point **PO**sitioning **INT**egrity Service)

POINT (Internet based)



K-POINT (KPS Satellite based)

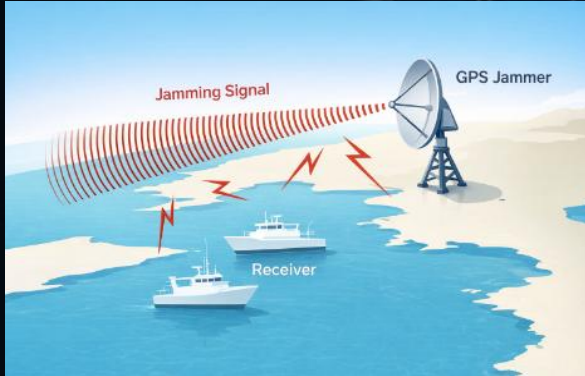


- ✓ Centimeter Level Service (CLS, 'K-POINT', $\leq 5\text{cm}$)
- ✓ GPS/Galileo correction messages have been broadcast via terrestrial communication channels since Dec. 2024
- ✓ The correction messages will be broadcast through KPS satellites at a later stage

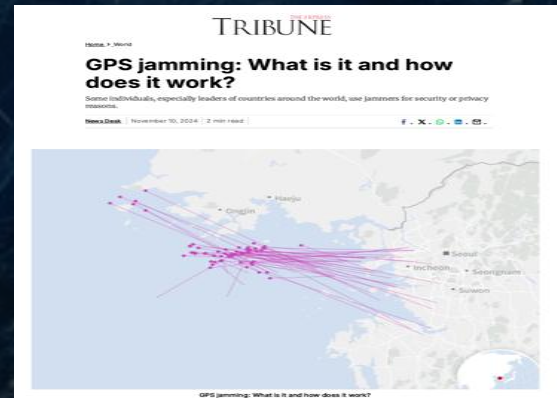
1. ROK Maritime PNT Service

Terrestrial Radio Navigation System

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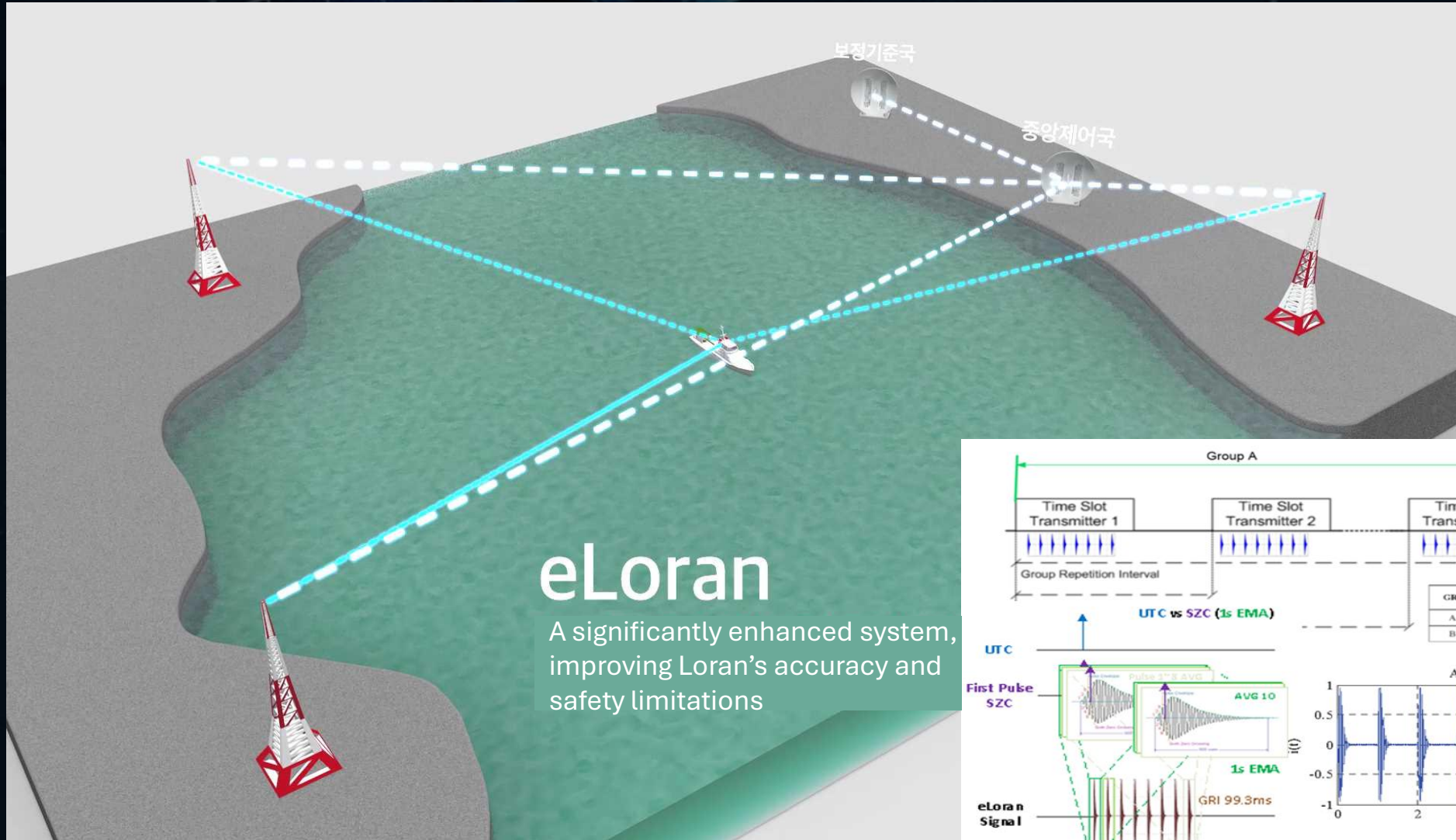


✓ When GNSS jamming occurs, impossible to determine the positions of the vessel itself and nearby vessels. (GPS Plotter, AIS, e-Nav, etc)



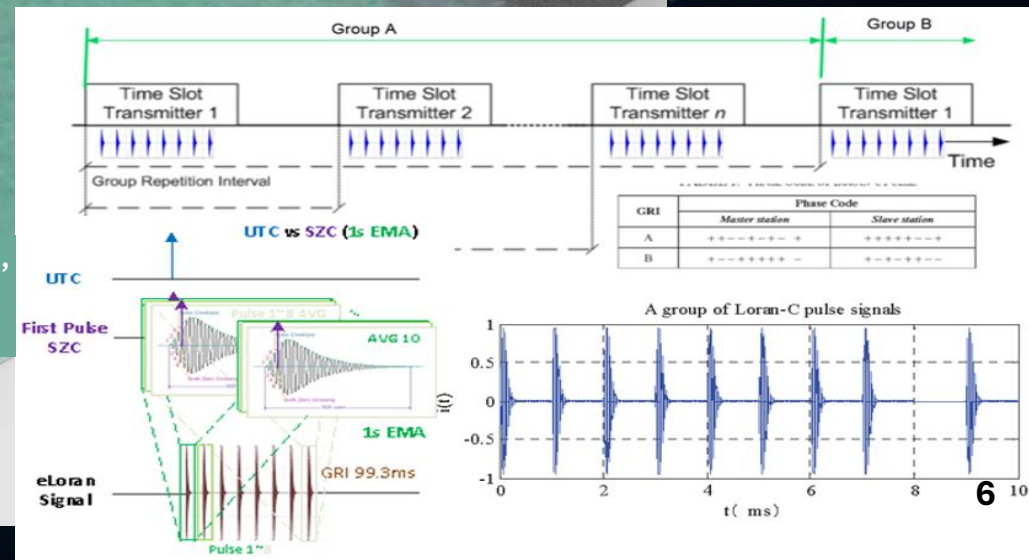
1. ROK Maritime PNT Service

- Terrestrial Radio Navigation System : eLoran



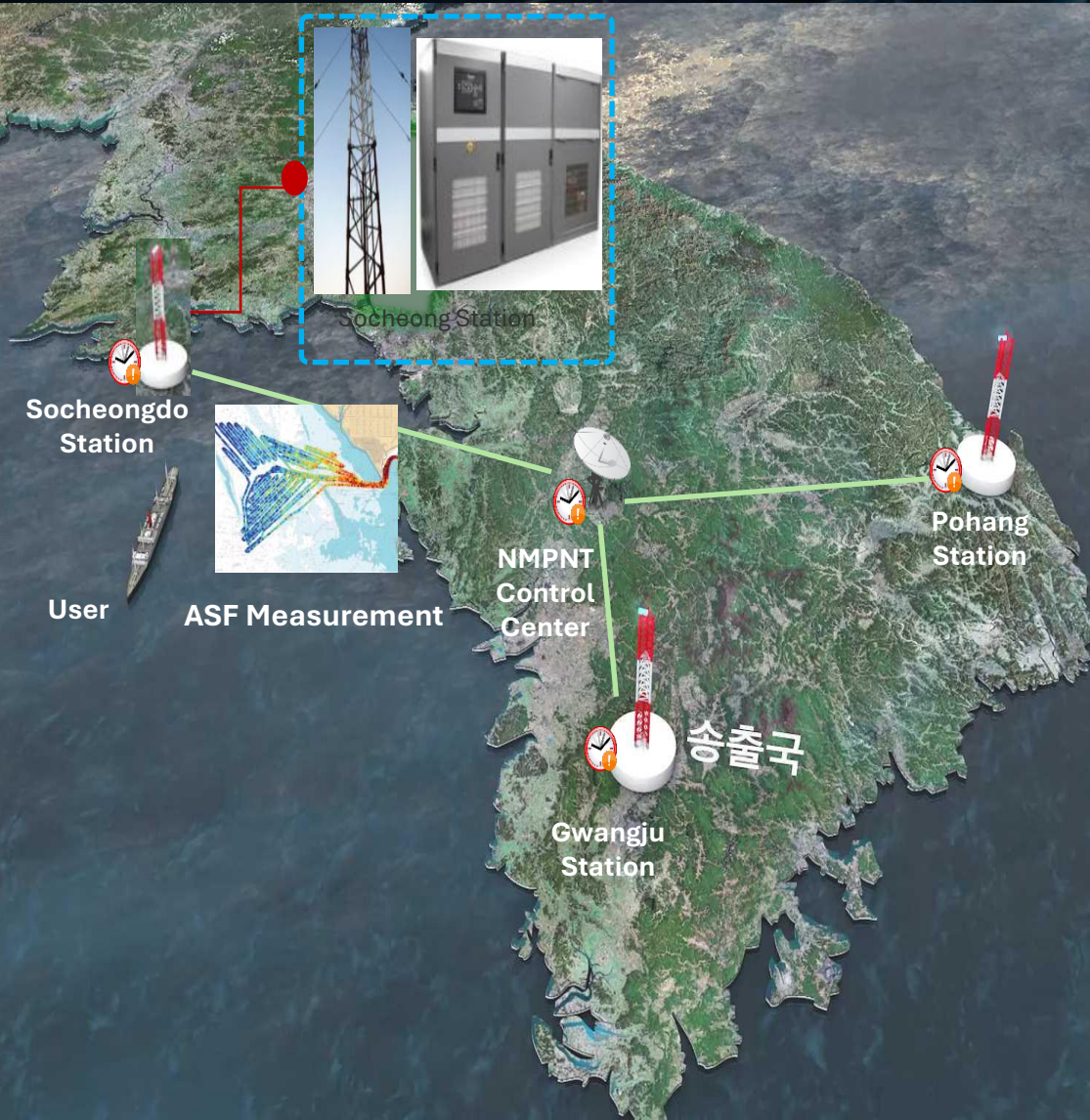
eLoran

A significantly enhanced system, improving Loran's accuracy and safety limitations



2. eLoran Service Status

Terrestrial Radio Navigation System : eLoran



✓ R&D Outcomes ('16-'20)

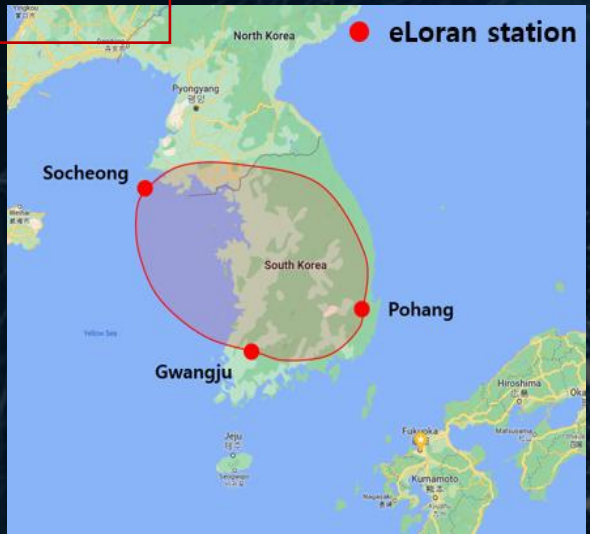
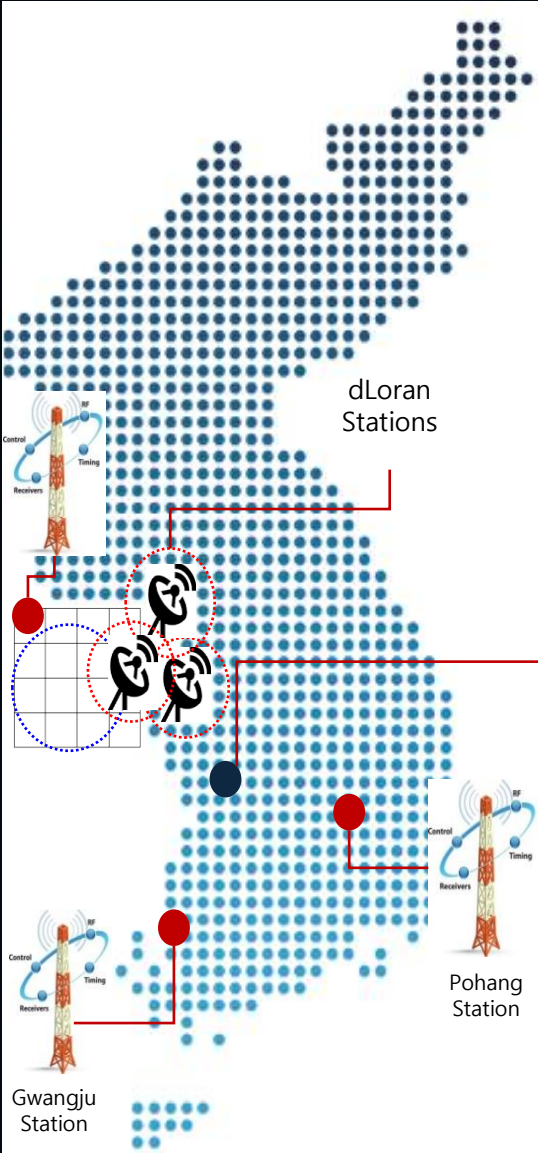
- Transmitter(50kW), Exciter & Modulation (Eurofix, 9th pulse)
- dLoran Stations & ASF Survey
- Integrated Operation & Control System

✓ IOC: '23.1~ , Coverage: A Part of West Sea(Yellow Sea)

- Accuracy: Min 20m
- Operation: National Maritime PNT Office(NMPNT)

✓ Advanced eLoran R&D('24~'27)

2. eLoran Service Status



Station	Frequency(kHz)	Power	Antenna Height	Initial Operation
Pohang (M)	100	150kW	137m	'79.12.1.
Gwangju (W)		50kW	122m	'79.12.1.
Socheong (V)		8kW	80m	'21.12.

< eLoran Transmitter Specifications >



- Automatic ECD Generation
- Redundant Operation



2. eLoran Service Status

- **Integrated Navigation Support**

- ✓ Provides reliable navigation by integrating with onboard GPS Plotter and ECDIS with automatic signal quality management

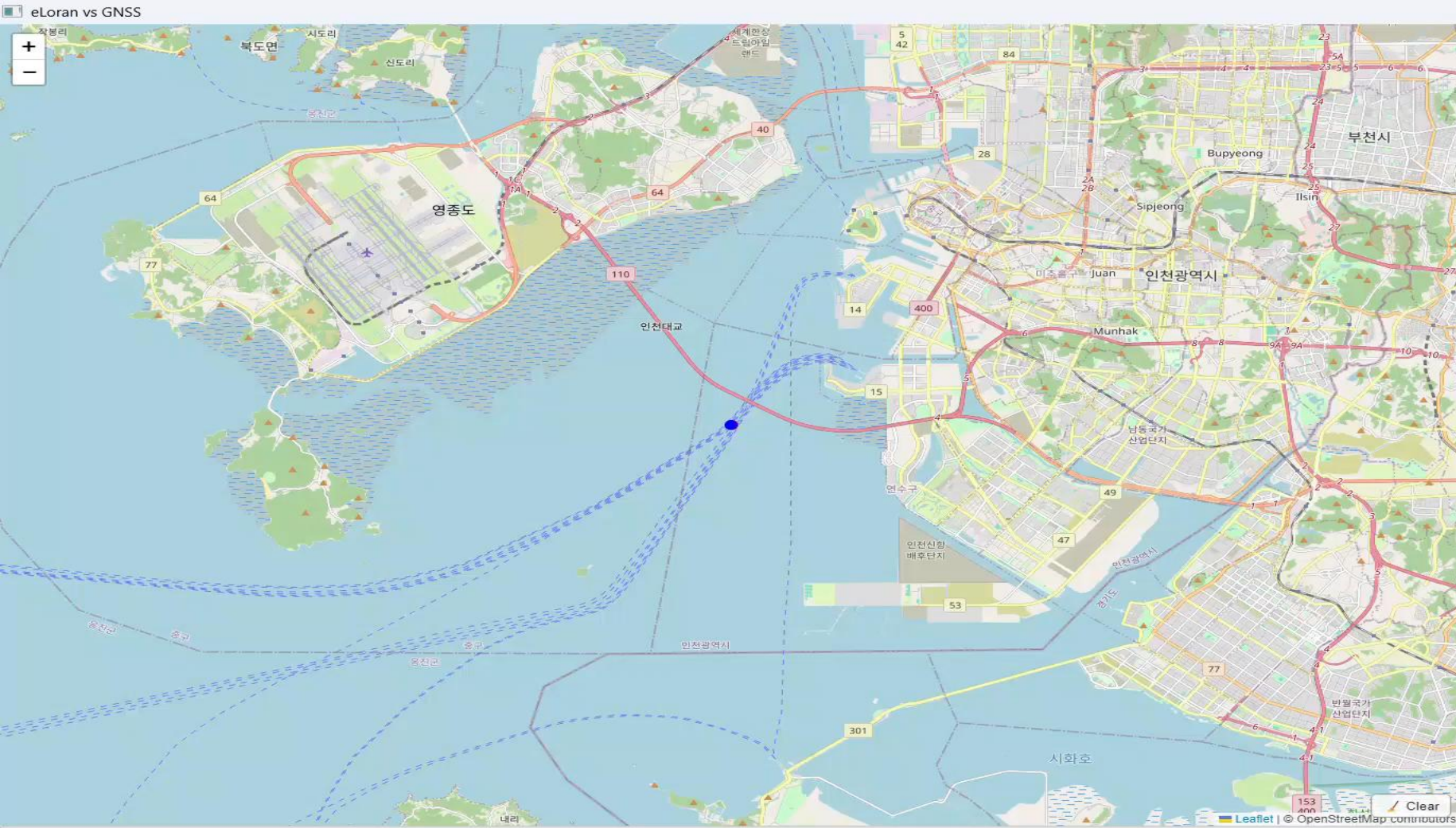
- **Autonomous ASF Correction Map Generation (Outside the dLoran coverage)**

- ✓ Enhancing positioning accuracy through self-learned ASF correction map with integrated navigation system



2. eLoran Service Status

■ Demonstration in Incheon



GNSS	
Lat.	37.40663
Lon.	126.55956
eLoran	
Lat.	37.40668
Lon.	126.55959
ΔPos. to GNSS (m)	5.96

Loran Stations			
Station	SNR	TOA	ECD
9930M	28.10	13660.01	1.44
9930W	26.40	25537.14	1.36
9930V	24.90	94624.86	1.76
7430M	38.40	29403.23	-0.71
7430X	20.20	44928.03	1.99
7430Y	19.70	61096.81	-1.76

▶ Play ⏸ Pause Speed (row step): 20

3. Future Plan

- **Receiver Deployment**

- ✓ **(Plan, '26) Total 41 Receiver (Vessels)**

- Government Fishing Patrol vessel , Coast Guard vessel, Ferry, etc.



- **Next-Generation Receiver Development (In Progress)**

- ✓ **(Entry Level) SDR (Software Defined Radio) based Receiver**

- Cost reduction through the development and application of technology that transitions eLoran/GPS signal processing from hardware circuit-based methods to software-based methods

- ✓ **(Embedded Korea e-Navigation Equipment) Embedding the eLoran receiver into**

- Korea e-navigation equipment for small fishing vessels



Korea e-Navigation

3. Future Plan

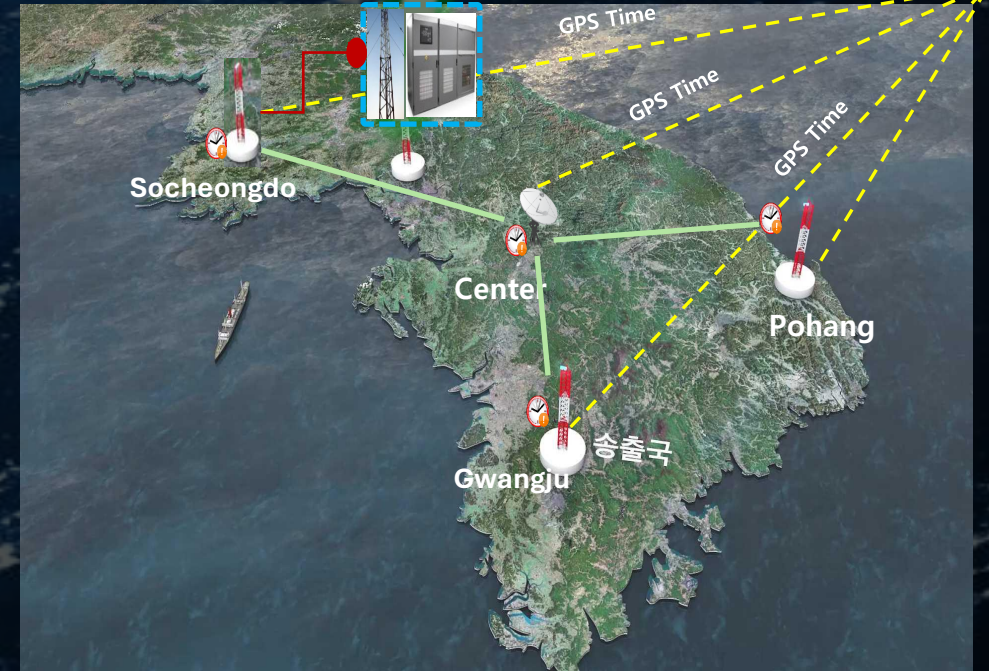
Target Performance Level

Accuracy

- Standard Receiver
 - ✓ Coastal Water(~30km) : Min 20m→10m (Wide Area Augmentation-based)
 - ✓ Offshore Water(30km~) : 100m
- Entry level Receiver : 100m

Time Synchronization

- Timing service accuracy : 100 ns (rms)
- Time Synchronization of the Transmitting Station
 - ✓ Method : GPS CV → TWSTT - based
 - ✓ Accuracy : 50 ns → 10 ns (rms)
 - ✓ Hold-over : 14days → Unlimited

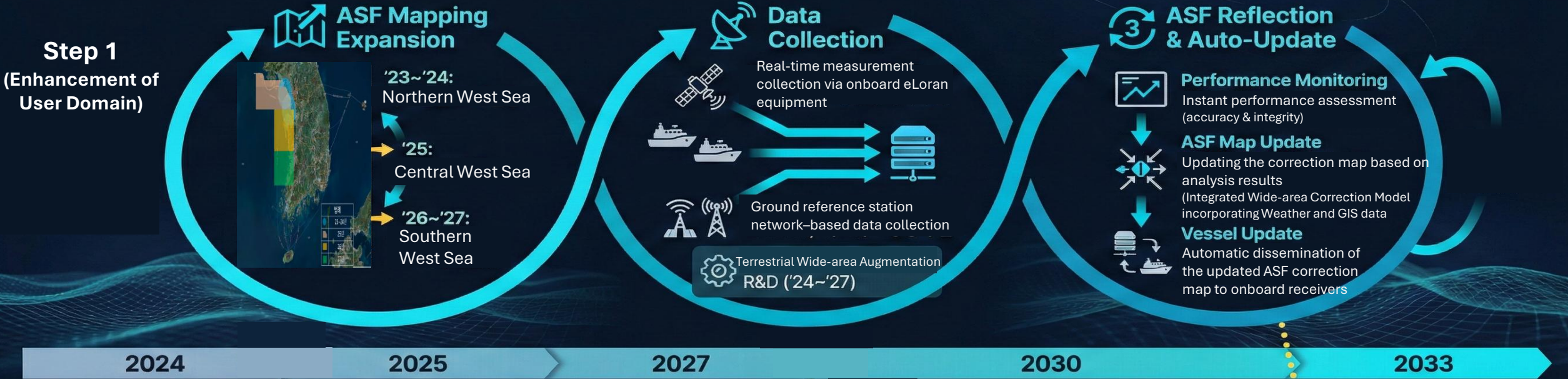


3. Future Plan

Roadmap for eLoran Nationwide Maritime Service

- Real Maritime data driven feedback loop → Expansion to nationwide service (~2033)

**Real Maritime
Feedback Driven
Nationwide
Service by 2033**



Initial service phase

Expanded data collection channels

Full operational service phase

Step 2 (Enhancement of Infrastructure Domain)



Infrastructure Enhancement(2024~2027)

Time synchronization(10ns),
High-power transmitter (150kW)



Additional 3 transmitting stations

in the East and South Seas
→ Nationwide network completion



Thank you