

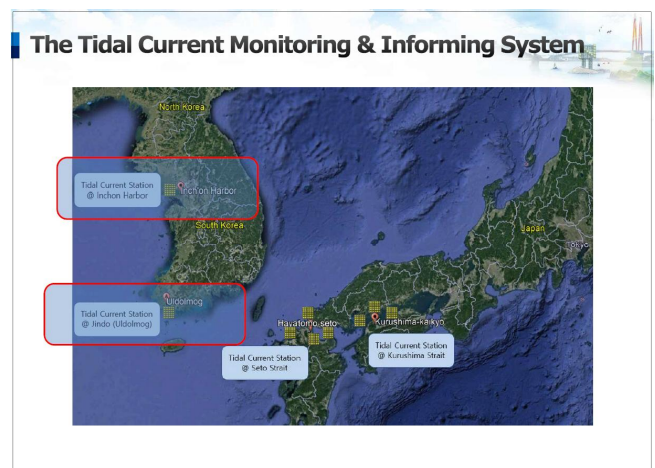
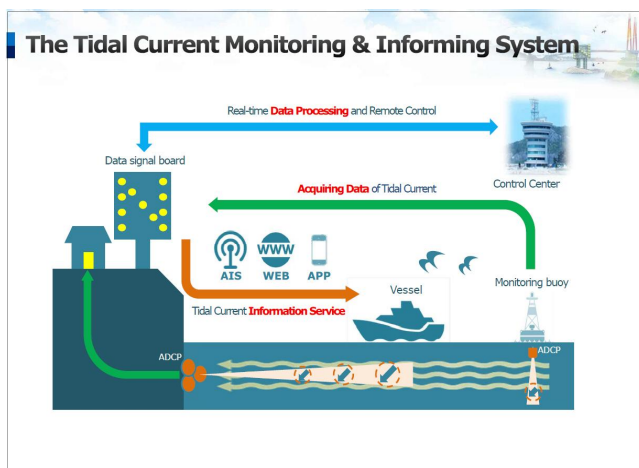
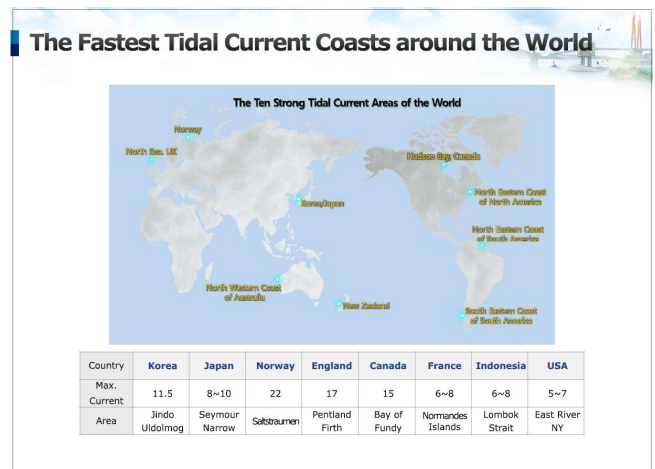
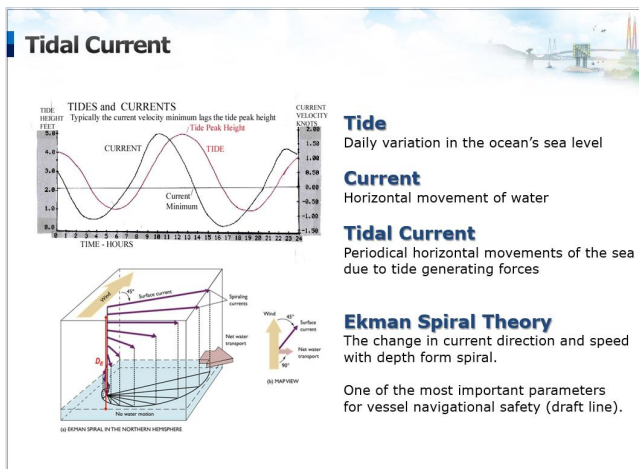
진도조류신호시스템 구축현황 및 조류정보 신뢰도 향상에 관한 연구

† 김성준 · 김무건 · 이형의 · 김학석*

† (주)지오시스템리서치, *목포지방해양수산청 진도항로표지사무소

요 약 : 조석간만의 차가 크고 강한 조류가 흐르는 진도해역 명량수도 및 장죽수도 항로에 조류관측시스템과 대형 LED등기구 전광판을 설치하여 이용자에게 조류의 방향, 속도, 경향을 실시간으로 제공하는 조류신호시스템을 구축하였다. 통항선박의 안전을 확보하고, 항로표지 시설 인프라를 활용한 이용자 중심의 안전정보를 다양한 매체를 통해 제공하는 방법과 지속적으로 안정적인 조류정보를 제공하기 위한 신뢰도 향상에 관한 연구를 수행하였다.

핵심용어 : 진도해역, 조류신호시스템, 조류정보, 안전항행



The diagram illustrates the Tidal Current Monitoring System at Jindo Coastal Area. It features a central **Operation Center** (a tower) that serves as the hub for data collection and distribution. The center is connected to four external services: **WEB**, **ARS**, **AIS**, and **KMA**, all accessed via **Data Service**. Additionally, the center is linked to the **Internet** for **Real-time Tidal current data**.

Two monitoring buoys are deployed in the coastal area:

- Jang-Juk Channel:** This buoy consists of a yellow tower structure. At the top is the **Monitoring Buoy**, which is connected to a **Data Logger** and a **GPS** receiver. Below the surface, there is a **Water Surface Buoy** and a **Bottom Layer** sensor. The buoy is connected to the **Operation Center** via **Real-time Tidal current data**.
- Myung-Ryan Channel:** This buoy is similar to the Jang-Juk Channel buoy but includes a **Water Surface Buoy** and a **Bottom Layer** sensor. It is also connected to the **Operation Center** via **Real-time Tidal current data**.

The buoys are connected to the **Operation Center** via **Real-time Tidal current data** and **Internet** connections. The **Operation Center** also provides **Data Service** to **WEB**, **ARS**, **AIS**, and **KMA**.

Tidal Current Signal System at Jindo Coast

Tidal Current Signal System at Jindo Coast



The image consists of four photographs arranged in a 2x2 grid, illustrating the Tidal Current Signal System at Jindo Coast. The top-left photo shows a tall, lattice-structured tower with many small lights illuminated at night. The top-right photo shows a wide view of the tower and surrounding coastal area under a cloudy sky. The bottom-left photo shows a view of the tower reflected in the water at dusk. The bottom-right photo shows a view of the tower and surrounding area, including a road and a yellow building.

Tidal Current Signal System at Jindo Coast



The image consists of four photographs arranged in a 2x2 grid, illustrating the Tidal Current Signal System at Jindo Coast. The top-left photo shows a tall, white, lattice-structured tower with a green base and a green roof, situated on a grassy area. The top-right photo shows a view of the tower on a hill, with a large, dark, rectangular structure in the foreground. The bottom-left photo shows a view of the tower on a hill, with a large, dark, rectangular structure in the foreground. The bottom-right photo shows a view of the tower on a hill, with a large, dark, rectangular structure in the foreground.

Tidal Current Monitoring & Control Center in Jindo



No.	Units
1	Data Signal Board Monitoring Unit
2	Data Observation Monitoring Unit
3	System Monitoring & Remote Control Unit
4	Data Time-Series Graph Monitoring Unit
5	Security System Monitoring Unit
6	Integrated Visualization Display

Tidal Current Monitoring Software

[Data Signal Board Monitoring]

[System Monitoring & Remote Control]

[Tidal Current Observation System Monitoring]

[Tidal Current Time-Series Graph]

The reliability Improvement of Tidal Current Data Acquisition, Processing

1 Preliminary Study

Site selection, monitoring location, information service study

2 Tidal Current Numerical Modeling Study

Observing & data processing evaluation with modeling study

3 Verification of Observation Data

Observed data quality control & quality assurance

4 Applying Environment Variables

Data processing and applying with other environmental parameters, such as weather and geological information

Tidal Current Information Services

1 Data Signal Board

Data information service using large electronic display boards : the intuitively delivering real-time data

2 WEB Service

Data information service using web page

3 AtoN AIS (MSG 8)

Data information service using AtoN AIS (Message 8)

4 ARS & FAX Services

Data information service using ARS & Fax

An Example of Tidal Current Signal Board

Repeated Display (updated every 10 min.)



1 Direction (2sec. ON) 2 Off (2sec. OFF) 3 Speed (2sec. ON) 4 Off (2sec. OFF) 5 Inclination (2sec. ON)

Meaning Tidal current is North-going, 6 knot speed, and decreasing condition

Direction N, S, W, E Speed 0~11 knots Inclination ↑ (increasing), ↓ (decreasing)

Benefits of Tidal Current Signal Systems

- The tide and current data are an essential to provide vital information for safe and efficient navigation of vessels, but also knowing how fast water is moving (and in what direction) is important for anyone involved in water-related activities.
- The large electronic display board information service is the intuitively delivering real-time data directly to the surrounding vessels provides detailed information for vessels and improve visibility and convenience for safe navigation.

Confidence Level	Source of Benefit	Nature of Benefit
Usually quantifiable with high degree of confidence reasonably good confidence and/or direct evidence for benefits	Avoided groundings (commercial vessels)	Avoided costs (surplus)
	Increased draft, cargo loading	Efficiency (surplus)
	Reduced delays (commercial vessels)	Avoided costs (surplus)
	Improved spill response (present practice)	Avoided costs (surplus)
	Reduced distress cases (recreational boats)	Avoided costs (surplus, value of life)
Usually quantifiable with lower degree of confidence more significant assumptions required to estimate benefits; less direct evidence	Improved weather forecasts	Non-market consumer surplus
	Improved storm surge forecasts	Avoided costs (surplus)
	Improved spill response (with additional models)	Avoided costs (potential)
	Enhanced recreational boating	Non-market consumer surplus
	Enhanced recreational and commercial fishing	Efficiency (surplus)
Non-quantified benefits	Educational use	Non-market
	Scientific research	Non-market