(#64) Real-time Web-GIS as part of Japan's MDA

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Information Provision Services by JCG

Japan Coast Guard (JCG) have provided not only the navigational safety information for mariners but also the marine-related information which is expected to be used various purposes.
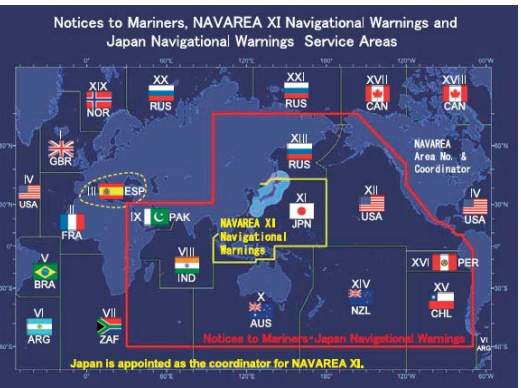
Navigational use

Navigation-related information

Paper Chart

Electric Nautical Chart (ENC)
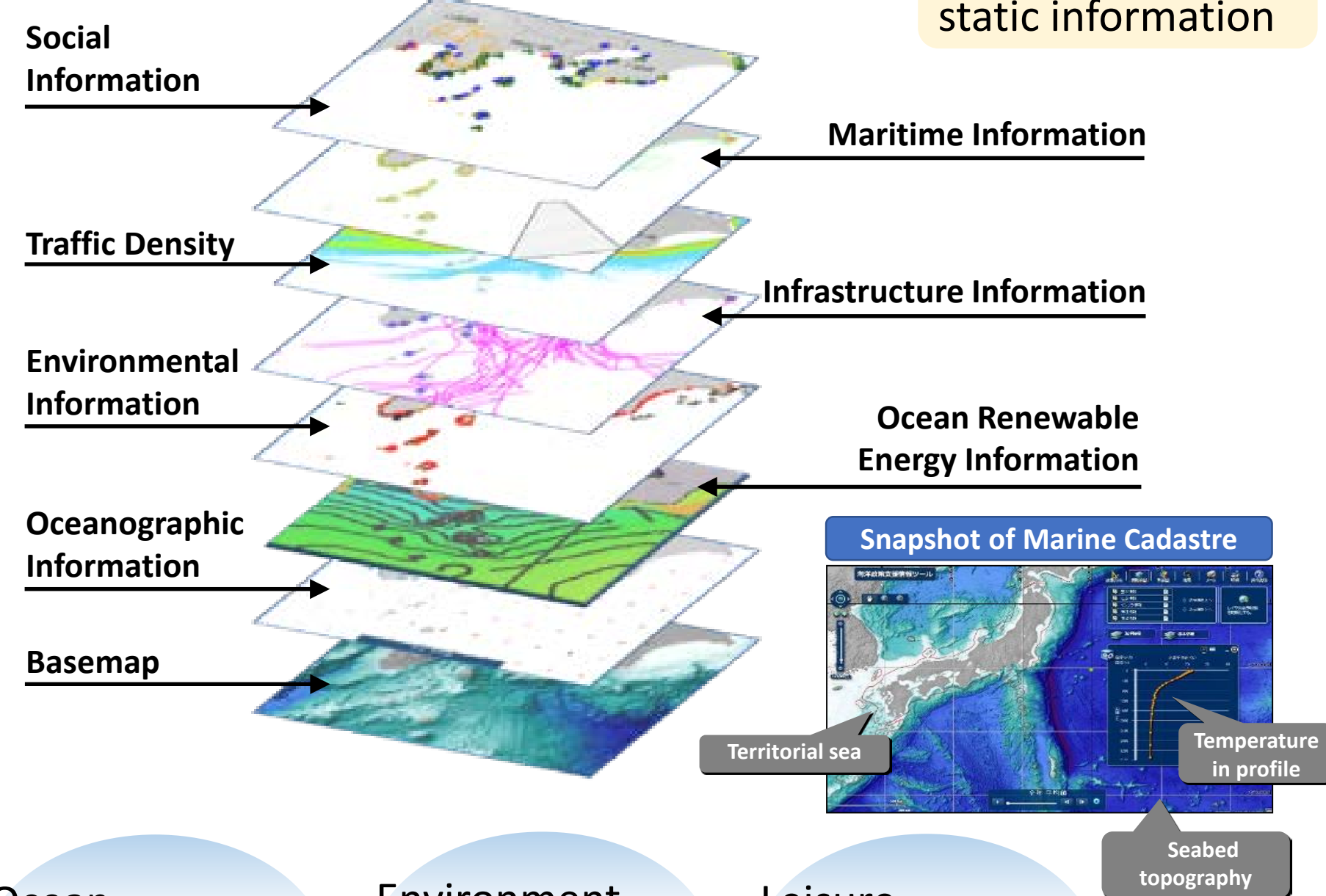
Notice to Mariners & Navigational Warnings

General use

Marine-related information

Marine Cadastre (Web-GIS service)
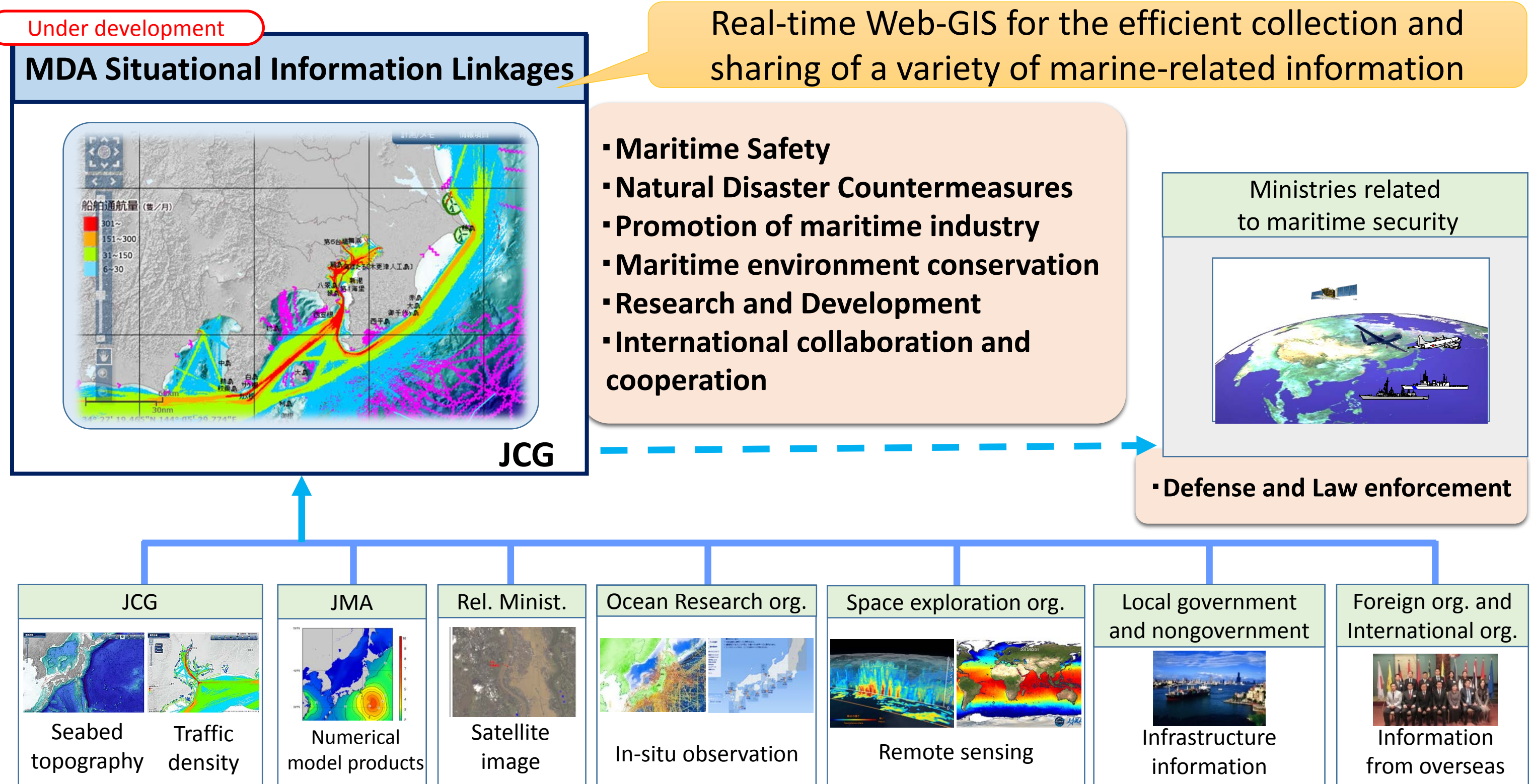
100+ kinds of static information

- Social Information
- Traffic Density
- Environmental Information
- Oceanographic Information
- Basemap

- Maritime Information
- Infrastructure Information
- Ocean Renewable Energy Information

Snapshot of Marine Cadastre

Territorial sea / Temperature in profile / Seabed topography

Ocean development | Environment protection | Leisure activities

Users choose information and overlap them onto a web-based map
cf. Marine Cadastre http://www.kaiyoudaichou.go.jp (until Dec. 2018)

Japan's MDA (Maritime Domain Awareness)

Japan's MDA (Maritime Domain Awareness)
"An effective understanding of marine-related situations and circumstances through the efficient collection and sharing of a variety of marine-related information conducive to Japan's maritime security, marine safety, natural disaster countermeasures, the marine environment conservation, the promotion of marine industries, and the development of science and technology, while paying attention to the handling thereof"

Image of collection and sharing of information

Under development

MDA Situational Information Linkages

Real-time Web-GIS for the efficient collection and sharing of a variety of marine-related information

- Maritime Safety
- Natural Disaster Countermeasures
- Promotion of maritime industry
- Maritime environment conservation
- Research and Development
- International collaboration and cooperation

JCG

Ministries related to maritime security

- Defense and Law enforcement

JCG	JMA	Rel. Minist.	Ocean Research org.	Space exploration org.	Local government and nongovernment	Foreign org. and International org.
Seabed topography Traffic density	Numerical model products	Satellite image	In-situ observation	Remote sensing	Infrastructure information	Information from overseas

Development of "MDA Situational Indication Linkages (MSIL)"

According to the decision about Japan's MDA by the Headquarters for Ocean Policy, JCG is developing "MDA Situational Indication Linkages", the wide-covered, real-time and user-friendly Web-GIS based on Marine Cadastre.
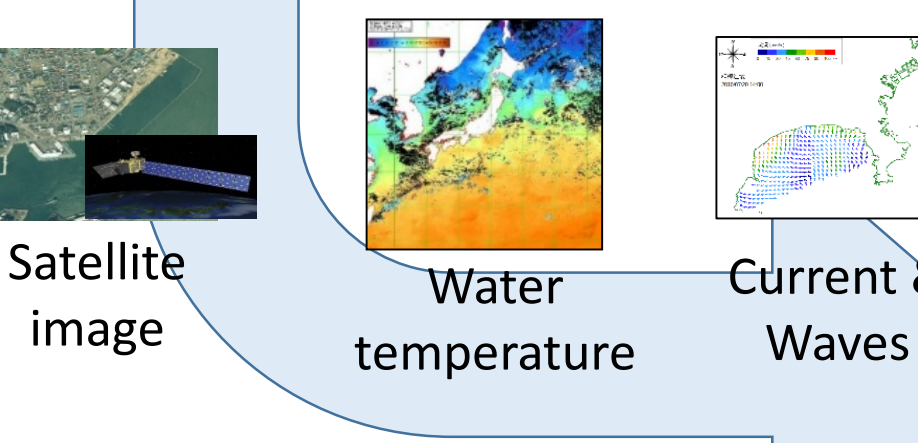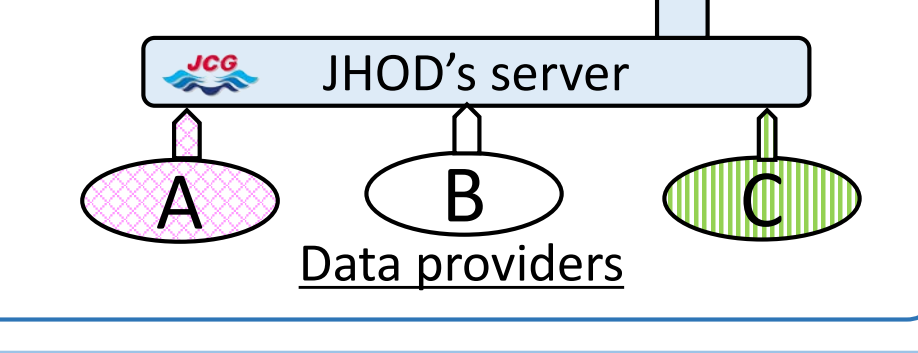
Concept image of MSIL

Marine Cadastre

Non-real-time WebGIS

Overlay

Data are centralized to JHOD and provided.

User's PC

JHOD's server

A B C
Data providers

Satellite image | Water temperature | Current & Waves

Real-time & Global

MSIL (MDA Situational Indication Linkages)

Real-time WebGIS

(Display image)

Tidal Current / Navigational warning / Live Camera / Satellite image

The usage when disaster
- Grasp the damage using satellite image
- Sharing the damage situation with relevant organizations
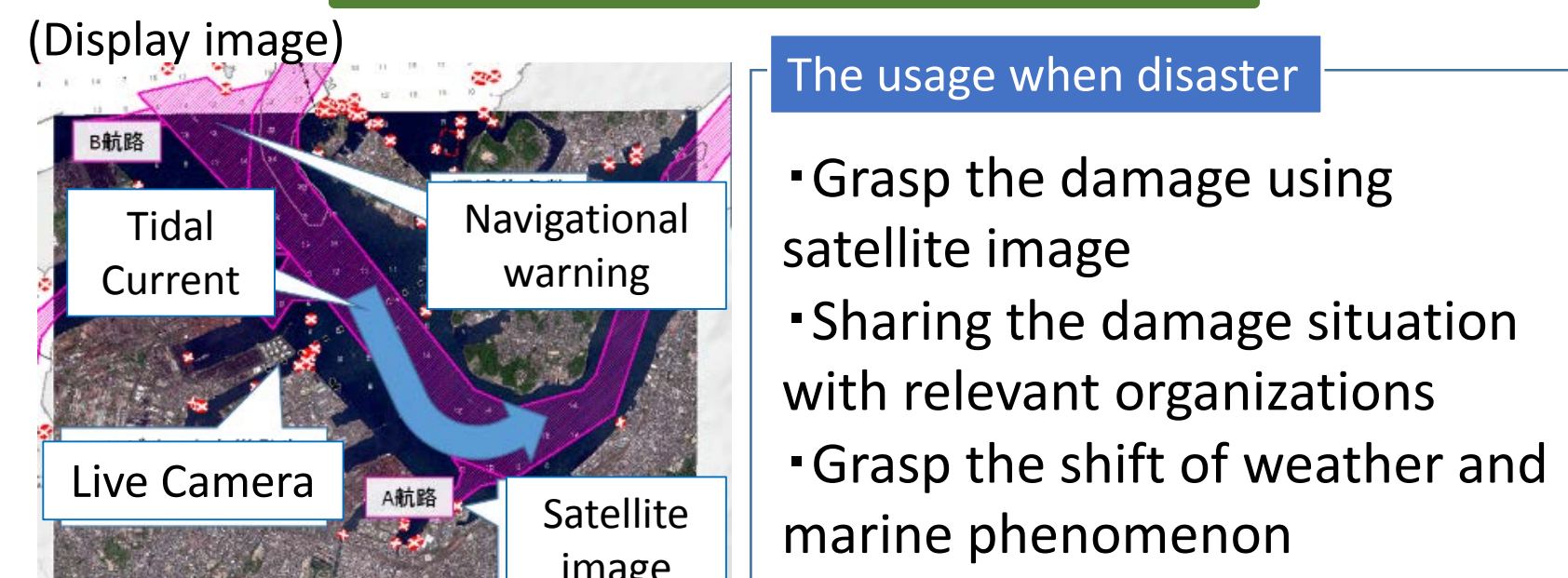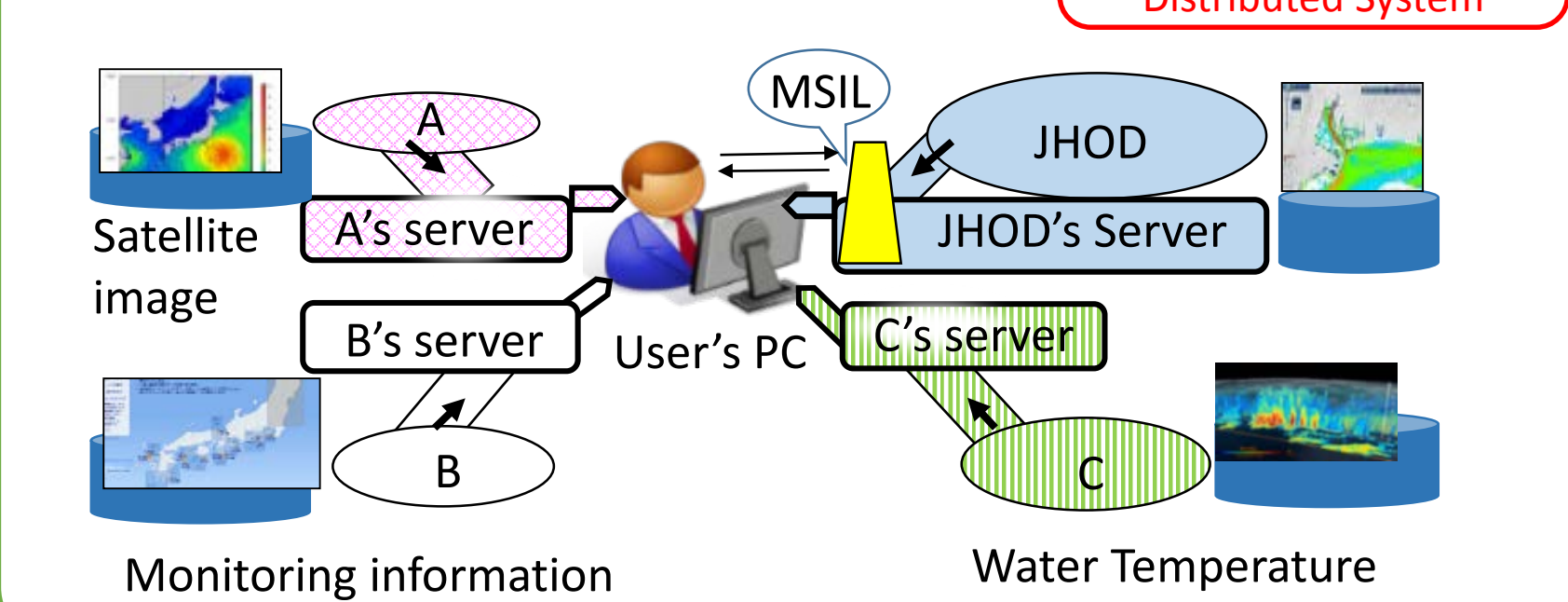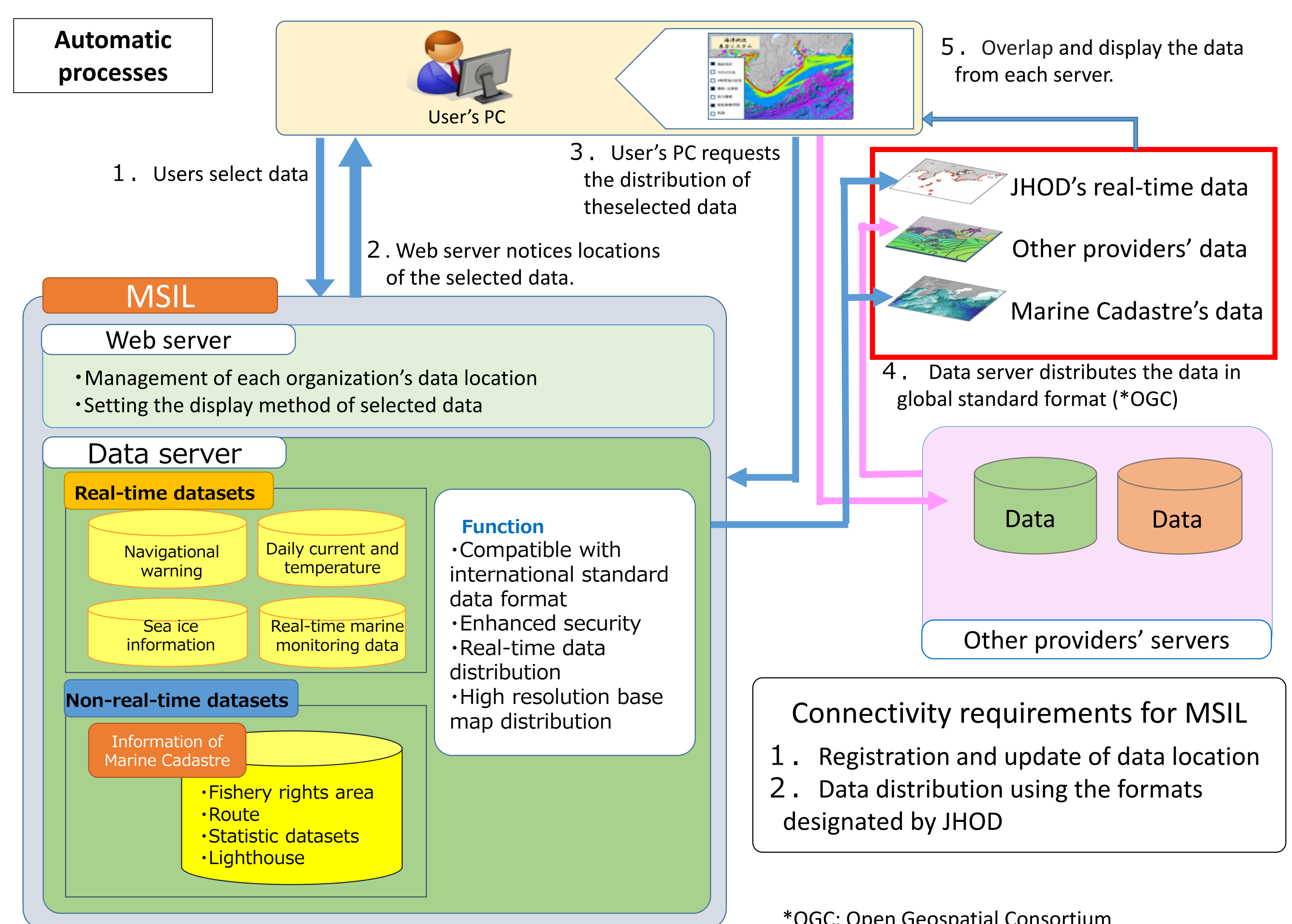- Grasp the shift of weather and marine phenomenon

Image of cooperation with data providers

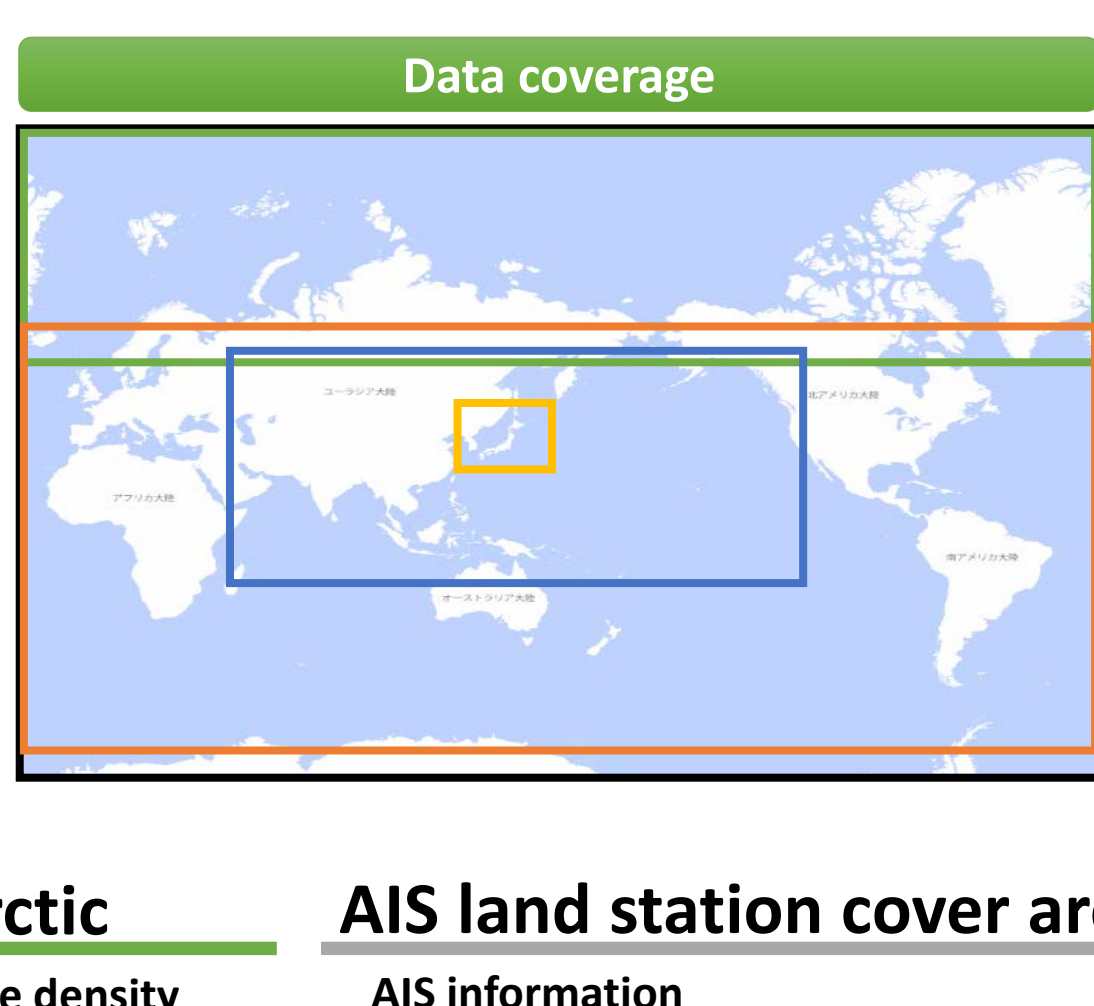To implement providing real-time data, each data owner has to change their policies about data provision.

Distributed System

Satellite image | A's server | MSIL | JHOD | JHOD's Server
B's server | User's PC | C's server
Monitoring information | Water Temperature

Dataflow of MSIL

Automatic processes

User's PC

1. Users select data
2. Web server notices locations of the selected data.
3. User's PC requests the distribution of the selected data
5. Overlap and display the data from each server.

JHOD's real-time data
Other providers' data
Marine Cadastre's data

4. Data server distributes the data in global standard format (*OGC)

MSIL

Web server
- Management of each organization's data location
- Setting the display method of selected data

Data server

Real-time datasets
- Navigational warning
- Daily current and temperature
- Sea ice information
- Real-time marine monitoring data

Non-real-time datasets
- Information of Marine Cadastre
  - Fishery rights area
  - Route
  - Statistic datasets
  - Lighthouse

Function
- Compatible with international standard data format
- Enhanced security
- Real-time data distribution
- High resolution base map distribution

Data | Data
Other providers' servers

Connectivity requirements for MSIL
1. Registration and update of data location
2. Data distribution using the formats designated by JHOD

*OGC: Open Geospatial Consortium

Information items of MSIL

With the cooperation of related ministries and agencies, MSIL will cover wide range of information including real-time or near real-time information such as sea surface temperature, surface current, sea wave, ice condition, weather map (current & forecast), meteorological satellite imagery and navigational warnings in addition to Marine Cadastre's 100+ kinds of static information.

Kinds of information and data coverage (under consideration)

Data coverage

Arctic
Ice density

AIS land station cover area
AIS information

Global
GSI Maps(STANDARD)	Sea surface temperature	Rainfall
GSI Maps(PALE)	Sea surface wind	Chlorophyll Concentration
Seabed topography	Sea surface current	

Wide area
Lightning	Salinity
Current	Tropical cyclone
Cloud	Earthquake

Pacific ocean ~ Indian ocean
Notice to Mariners
Navigational Warnings

Coast
Weather and ocean condition information

Around Japan
Information of "Marine Cadastre" (100+ kinds)	
High-resolution precipitation nowcasts (rainfall)	
Marine forecasts	Marine warnings
Marine distribution forecasts	Weather map
Tide (real-time & prediction)	Tidal stream prediction
Wave	Current
Wind	Sea surface temperature
Marine geology map	Satellite image

Emergency information
Meteorological information
Tsunami warnings and advisories
Live camera
Results of tsunami simulation
Current (real-time)

Land
Weather warnings and advisories

Off Hokkaido
Ice information

Schedule and future work

Schedule of development and operation

- Apr. - Dec., 2018 Development of application
- Jan. - Mar., 2019 Construction and test operation
- 2019 spring Start of formal operation

Future work

- Add new information to meet users' needs
- Add new functions to meet users' needs
- Expand cooperation of related ministries and agencies, foreign organizations and international organizations.

JCG