Challenges and Initiatives for Social Implementation in Fisheries DX for the Revival of Japan as a Maritime Nation

OCEAN SOLUTION TECHNOLOGY CO.,LTD.

OCEAN SOLUTION TECHNOLOGY

ABOUT

Company name ： OCEAN SOLUTION TECHNOLOGY CO.,LTD

Representative ： Representative Director YOSUKE MIZUKAMI

Headquarters ： 27-3 Mikawachishinmachi, Sasebo City, Nagasaki Prefecture

Capital ： 10 million yen

Established ： December 21, 2017

Number of employees： 9 people

Partner companies：SASEBO KOKAI SOKKISYA Co., Ltd.※

Main business： Software planning, development, operation and provision of related services

Corporate philosophy：Continue to protect those who protect this country

※SASEBO KOKAI SOKKISYA Co., Ltd.
Established: February 1950
Main business: Maintenance and fitting work of nautical and optical machinery mounted on naval ships

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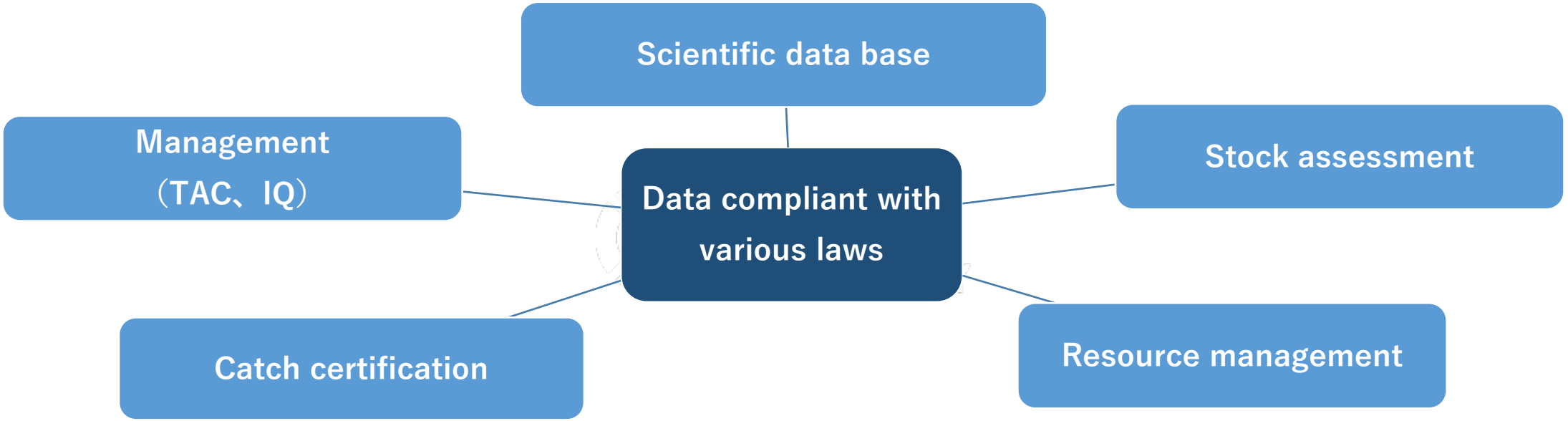
Electronic Reporting in the Smart Fisheries Industry

Electronic reporting that links catch, operation, location and other information, is the foundation of the smart fisheries industry.



Through electronic reporting that connects a variety of information

Fishermen, fishermen's cooperatives, local governments, researchers, and related people can sustain/develop Japanese fisheries industry.

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Challenges in implementation

Cooperation of fishermen is necessary but place a big burden on them

【 Revenue and Cost Challenges 】

■ Administrative and costs burden increase but no increase in revenue to fishermen

■ Average annual income of coastal fishermen is low (about 2 million yen per year)

→ Difficult to pay for ICT equipment for reporting purposes

【 Labor and workload challenges 】

■ Creating a report from a month's worth of handwritten operation logbooks for one vessel takes about three days to do the data entry.

■ With the present labor force, it is extremely difficult for the fishermen's cooperative to manage what is reported on paper.

Set up to enable easy electronic reporting is essential.

Accelerating smart fisheries leads to protection of fishery cooperatives and fishermen.

Based on the above, we conducted verifications in several prefectures.

Data requirements vary by legal purpose

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Data		Purpose				
		Resource management (Clauses 9・10)	TAC (Clauses 26・30)	Fishery management (Clausesv52・90)	Business use	Distribution (Clause 6)
ID		Required	Required	Required	Required	Required
Location		Required	Required	Required	Required	Optional (Required)
		Not required	Not required	Optional (Required)	Optional	Optional (Required)
Time		Required	Required	Required	Required	Optional (Required)
		Not required	Not required	Optional (Required)	Optional	Not required
Fishery effort		Required	Required	Required	Required	Optional (Required)
		Optional	Not required	Optional (Required)	Optional	Not required
		Optional	Not required	Optional (Required)	Optional	Not required
		Optional	Not required	Optional (Required)	Optional	Not required
Catch		Optional	Not required	Optional (Required)	Optional	Not required
		Optional	Not required	Optional (Required)	Optional	Not required
		Required	Required	Required	Required	Required
		2 out of 3 data types required Extracted data permitted	Required	Required	Required	Required
			Not required	Not required	Optional	Optional (Required)
			Not required	Optional (Required)	Optional	Optional
		Not required	Optional (Required)	Not required	Required	Not required
Others		Not required	Not required	Not required	Not required	Required

Our initiatives (Administrative work efficiency)

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1.Fishery

Operation info **Data entry**

Logbook tailored to region and fishing method

Electronic operation logbook

2.Co-op and market

Journal entry **Data entry**

- Batch registration of catch and price information
- Can connect to existing systems
- Zero increase in administrative burden

Catch report

3. Municipalities and other administrators

Check catch report

Prefectural fishery dept.

Dramatic reduction in administration labor

Monthly catch volume in chart or graph

Sent to research institutes, government, and agencies

【 Resource evaluation】

(Research institutes)

- Research institutes and resource assessment results
- Resource management goals, etc.

【 Resource management goals】

(Government agencies)

【 Regulations/Catch Scenarios 】

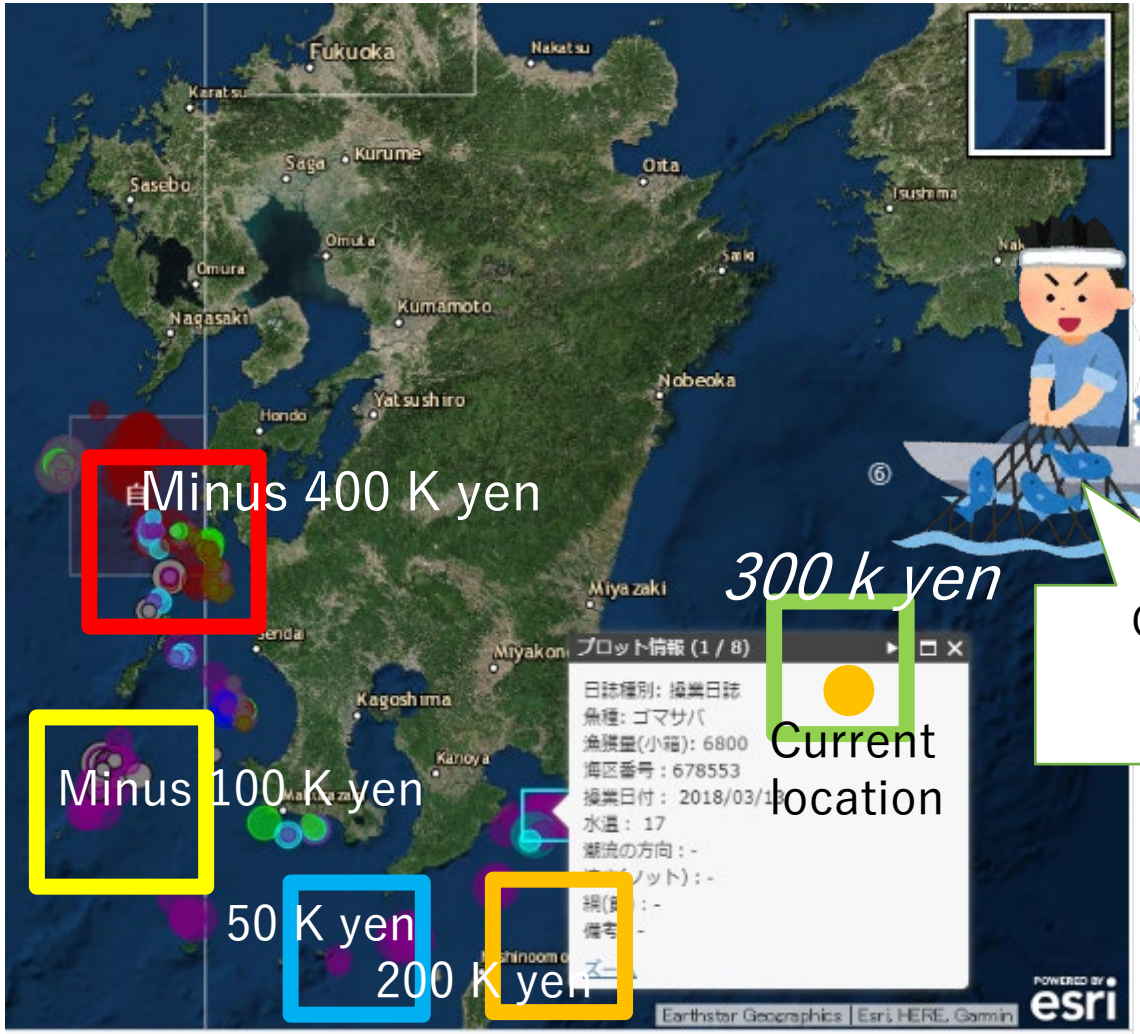
(Government agencies)

【 Control measures】

・ＴＡＣ・ＩＱ ・ Resource Management Agreement

Our initiatives （Use of AI）

AI analysis to select the most profitable and optimal fishing days and grounds



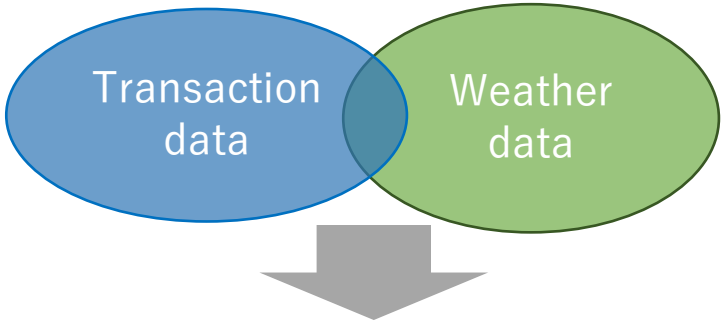
When
Where
What species
Maximum price for catch

Given the cost, better not to travel/move!

AI Prediction of Fishing Decisions Based on Logbook Data　Experiment result (Wakayama Prefecture)

・Catch prediction vs actual
82% (14 trips/17 trips)

・No catch prediction vs actual
64% (21 trips/33 trips)



AI can provide market forecasting information, etc.

Operation Log Entry Screen

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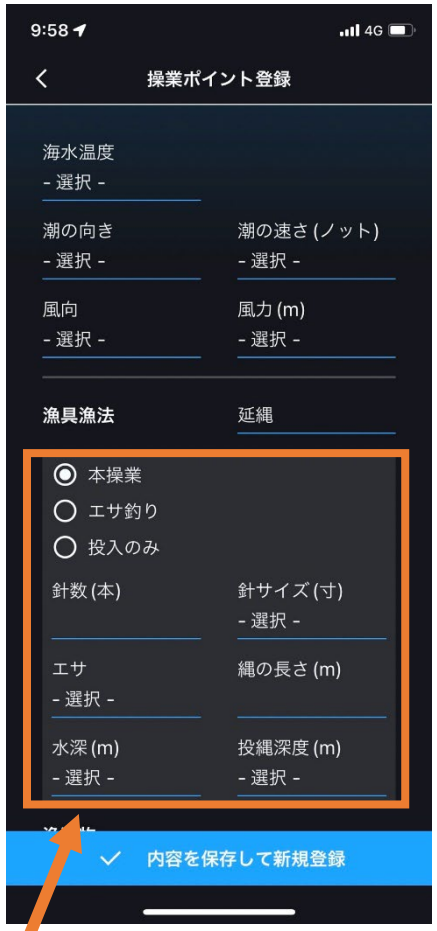
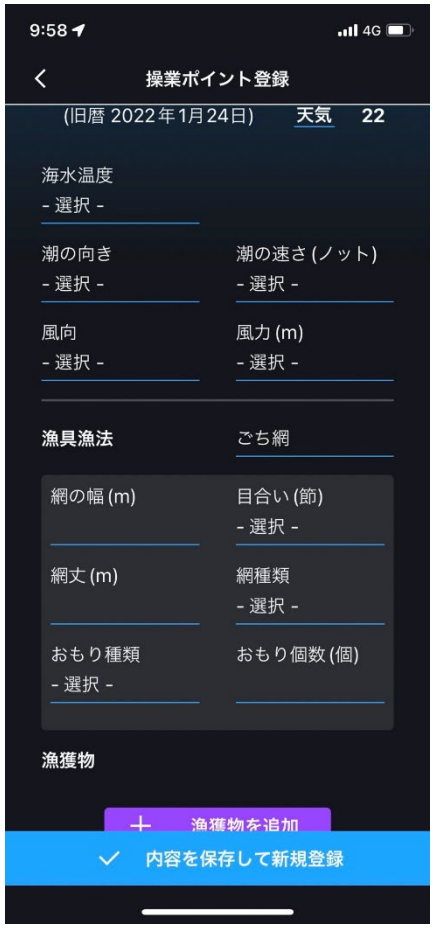
Night squid fishing

Trawl net

Sein net



Longline



Beach seine

Support with satellite data
(sea water temperature, tide direction, tide speed, wind direction, wind force)

Fishing gear can be selected depending on the fishing regulation(longline: hook number, hook size, bait, rope length, water depth)

Fishermen's thoughts

"What a bother"

"Can't make money"

"More work…"

We need to improve their environment

“Fishermen’s thoughts” Supporting non smartphone users

■ “Fishermen’s thoughts” found through research

They know they should keep logs but

- ✓ My way is the best
- ✓ I know everything through past experience
- ✓ I can’t mess with smartphone to deal with living fish
- ✓ What a bother!

Automation of logbook is needed

IoT device・LTE(4G)GPS tracker

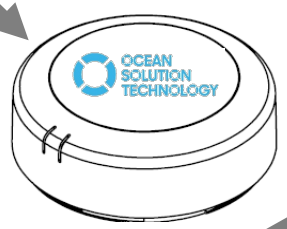
By synchronizing "PIKE OF TRITON" app with IoT device, gain automatic access to “when, where, who” information

What is IoT device?

"PIKE OF TRITON" IoT (Smart fishing boat)

（出典：内閣府）

GNSS



Automatic cloud log information through
"PIKE OF TRITON"
(Automatic Track Recording)

"PIKE OF TRITON"
Cloud server

Turn ON "PIKE OF TRITON" IoT
（ Synchronized with fishing boat breaker ）

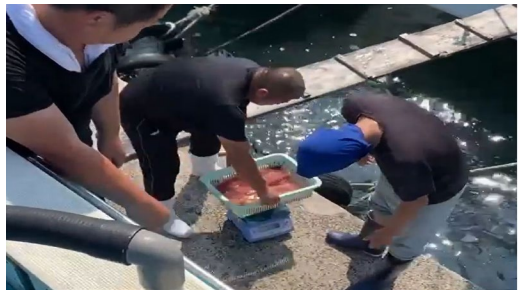
LTE-M

Automatic recording “who, when, where”
（No need for data entry ）

“PIKE OF TRITON” IoT turn OFF
(Synchronized with fishing boat breaker)

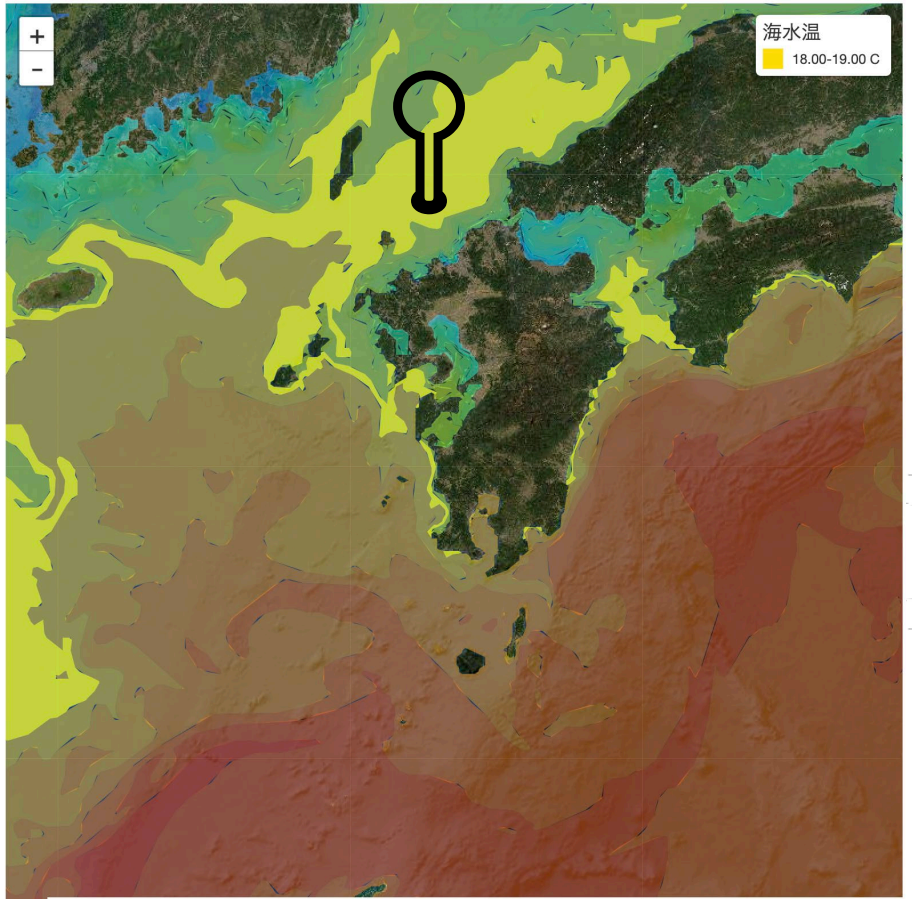
【 Departure 】

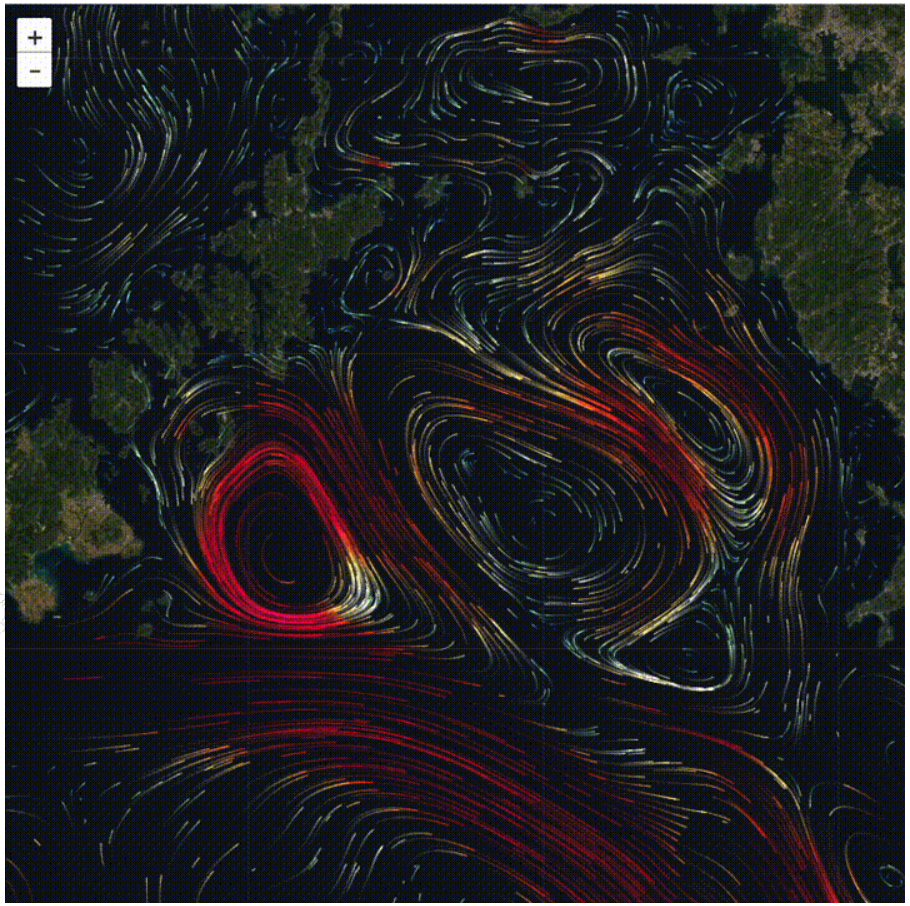
【Operation】



【Return】

Intuitive images for sea surface temperature and ocean currents





- Fishermen's behavior →

  Search for areas with specific temperatures

- Highlight target temperature range

- Fishermen's behavior →

  Searching for tides

- Supports depths from 0m to 300m

Smartphone App Sample Screen

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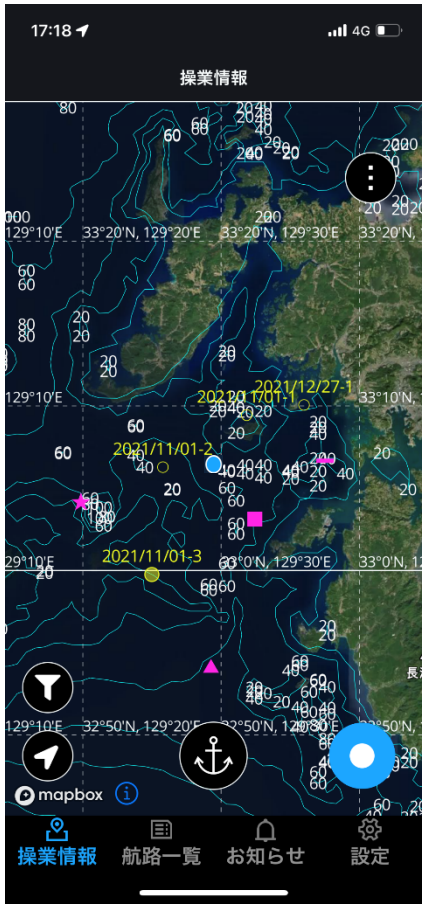
"PIKE OF TRITON"
Log in



Operation info

Operation point
Additional info

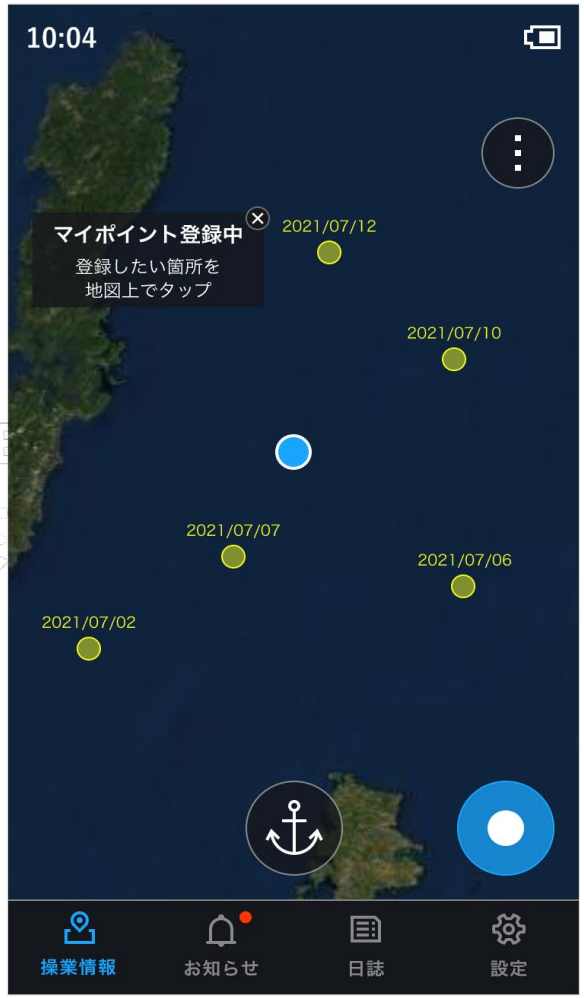
List of past routes

Route display

Smartphone App Sample Screen

Catch Performance Indicators: Part 1

Catch Performance Indicators: Part 2



Register MyPoint

Layering satellite data and historical operations

Track record at remote Islands of Nagasaki Prefecture

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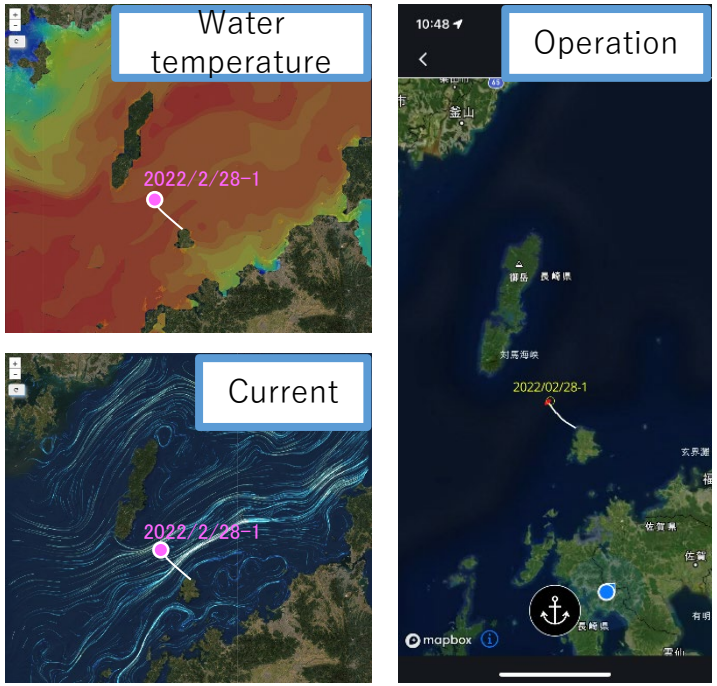
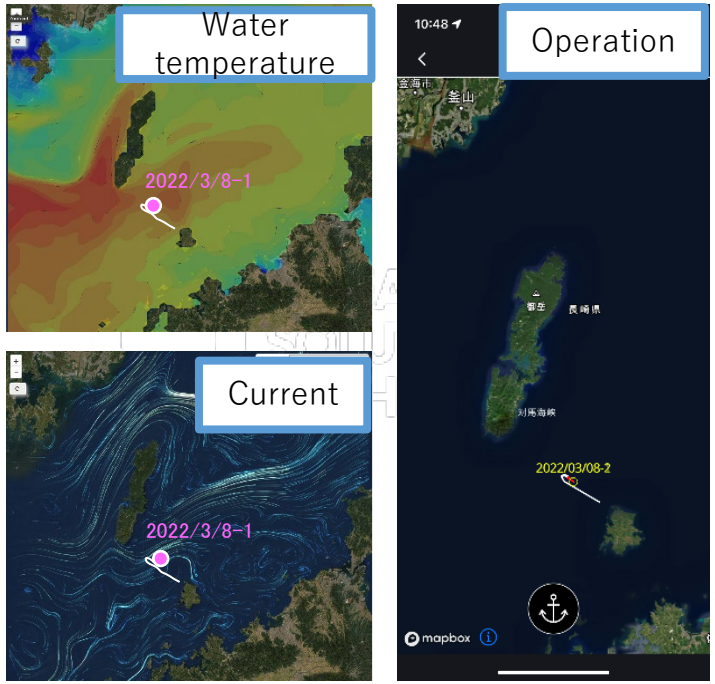
Layers of oceanographic and operational data obtained from satellite data

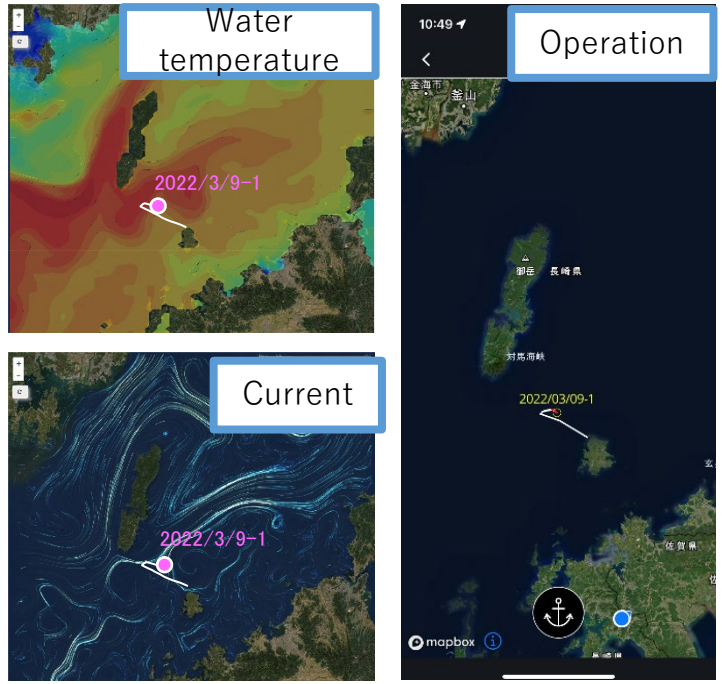
Fishing method：Pole fishing



2022/2/28
Catch result：3 Tuna
3 Japanese millet
1 Goldstriped amberjack
12 Yellowtail



2022/3/8
Catch result：6 Tuna
2 Japanese millet
2 Goldstriped amberjack



2022/3/9
Catch result：1 Tuna
4 Yellowtail

Weekly AI Sea Conditions Forecast Visual

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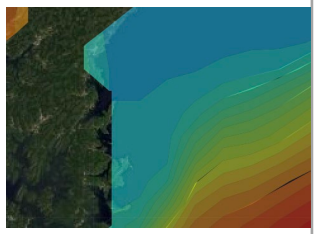
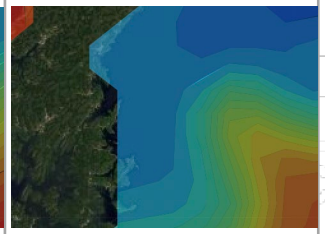
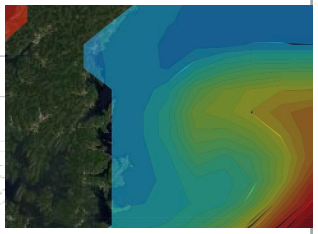
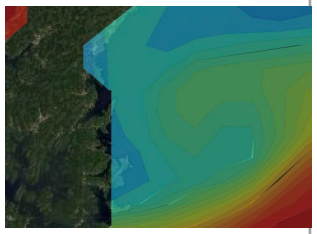
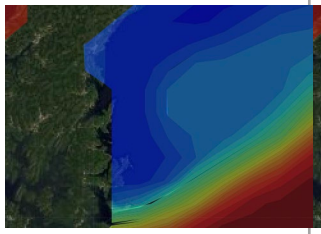
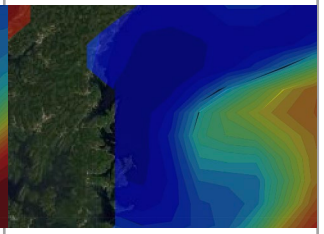
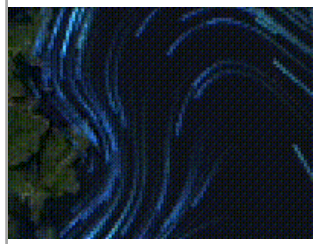
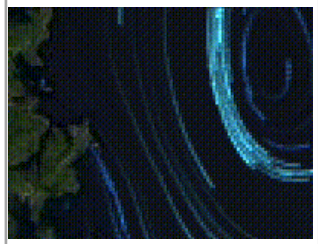
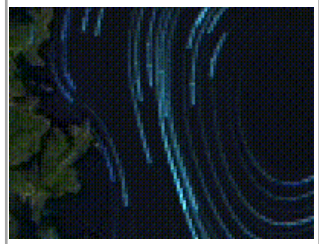
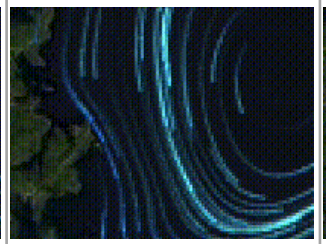
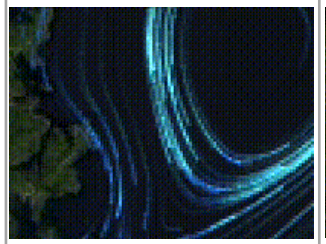
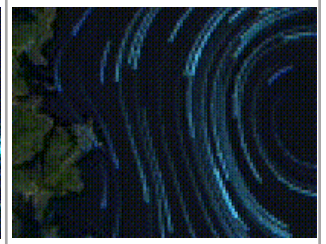
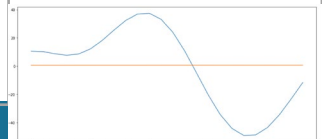
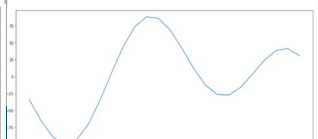
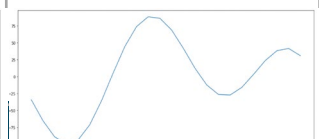
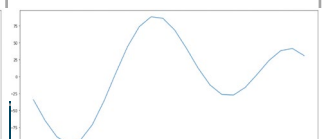
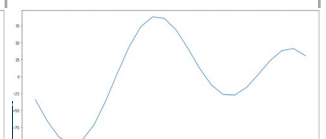
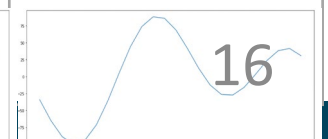
Fishing ground	At 9AM	Today Moon phase 4	Tomorrow Moon phase 5	Day after tomorrow Moon phase 6	3 days later Moon phase 7 (First quarter))	4 days later Moon phase 8	5 days later Moon phase 9
Tsushima coast 123 miles from location 	AI Catch Prediction						
	Water temperature	14.4°C 	13.5°C 	13.6°C 	13.9°C 	13.2°C 	13.0°C 
	Current	0.19 kn 	0.073 kn 	0.020 kn 	0.047 kn 	0.14kn 	0.29 kn 
	Tide	High: 21:41 Low: 3:21 Difference:138cm 	High 22:10 Low: 3:51 Difference:149cm 	High: 22:37 Low: 16:29 Difference: 152cm 	High: 10:47 Low: 16:55 Difference: 148cm 	High: 11:13 Low: 17:25 Difference: 138cm 	High: 0:00 Low: 17:59 Difference: 121cm 

Functions for Municipalities and Research Institutes

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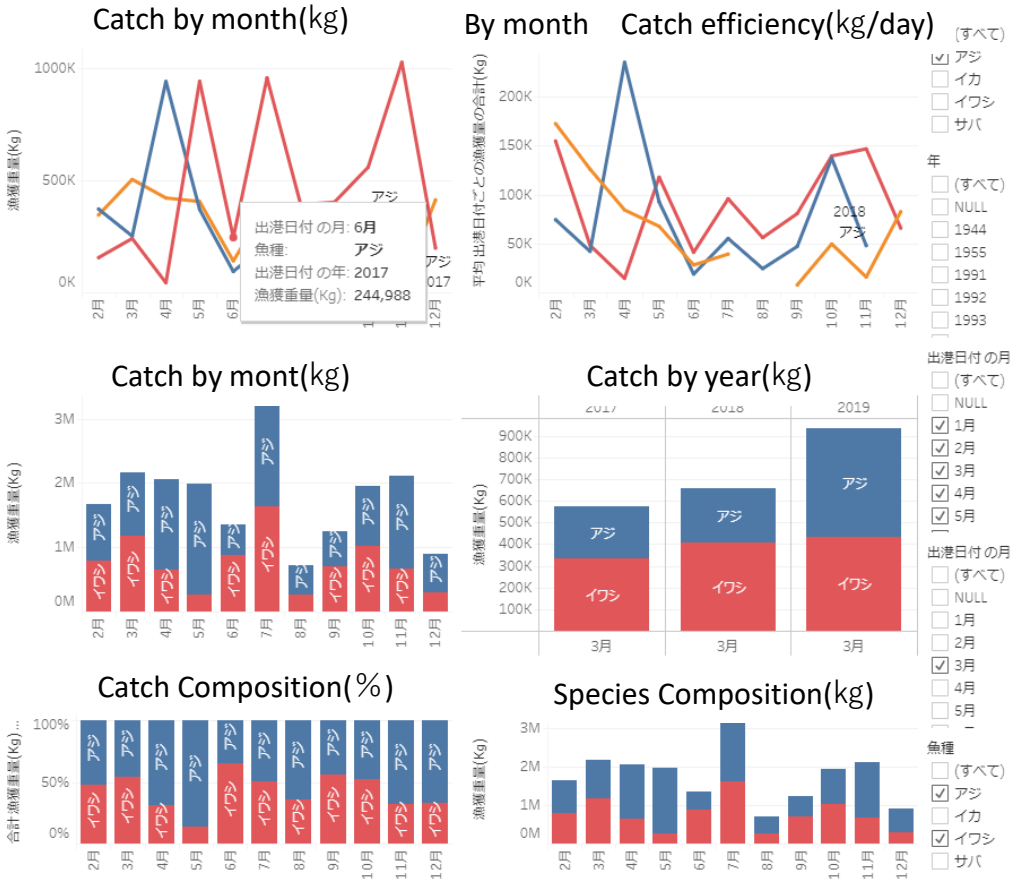
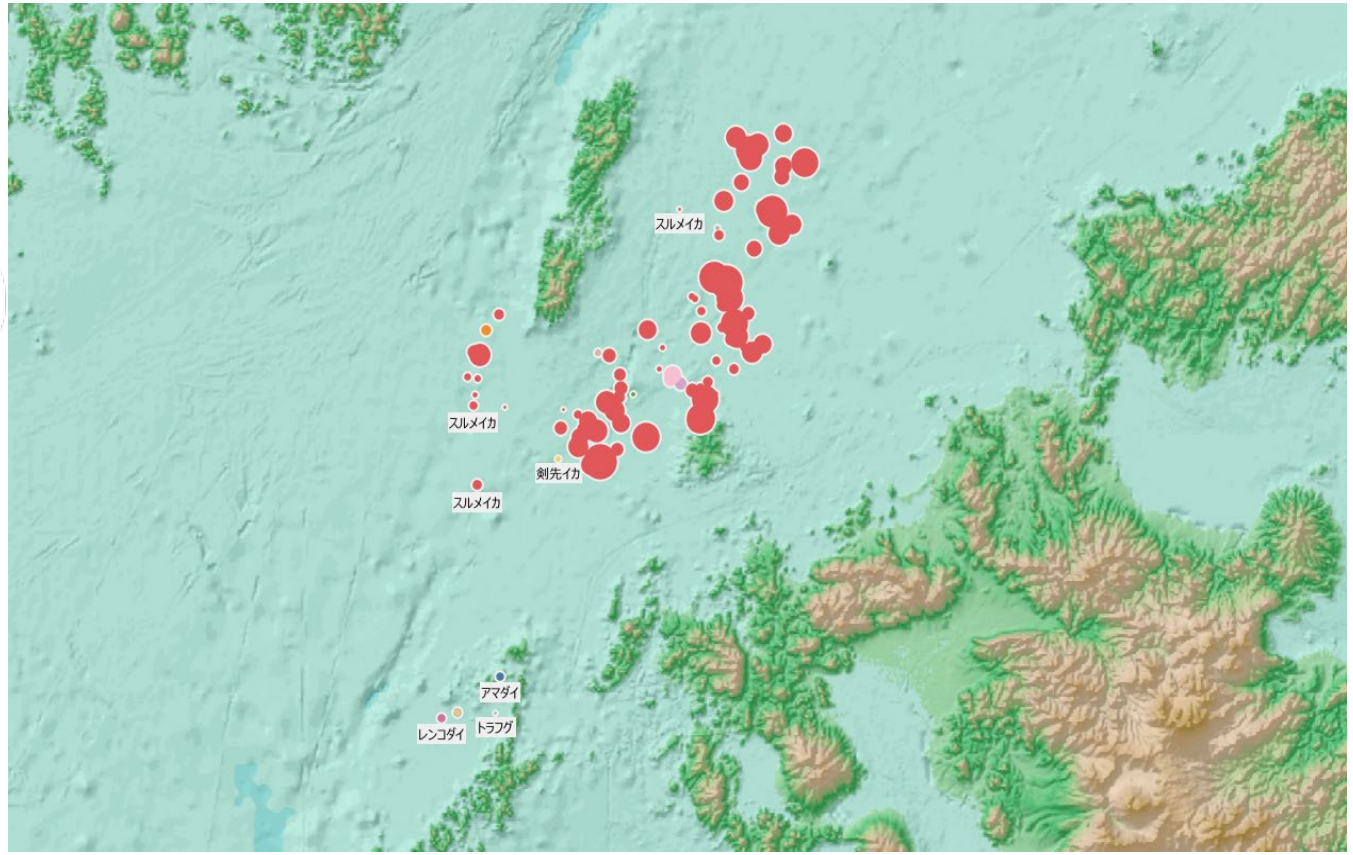
Visualization of operational information entered into the app





JAXA's Initiatives （SAMRAI）

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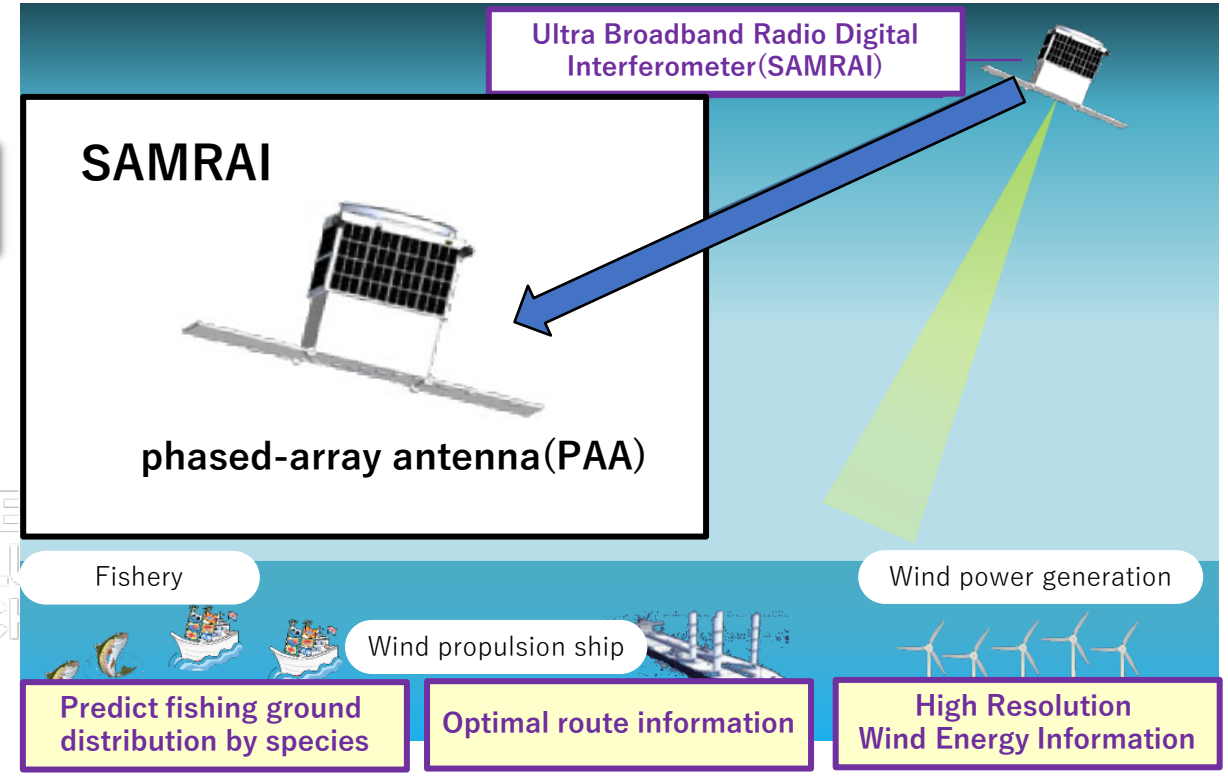
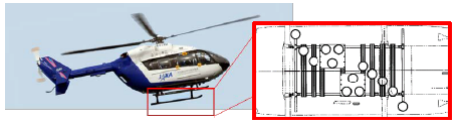
2021 Japan Science and Technology Agency
(JST) Mirai Program (Large-scale type project)

Social Contributions through SAMRAI

Development and verification of radar and radiometer using ultra broadband antenna

Innovative microwave measurement technology for a safe, secure, and smart society



	【First phase】SAMRAI on airborne machines	【Second phase】SAMRAI on satellite
External schedule	 Develop／evaluate：2022～2023	 Develop／evaluate：2022～2027 Operate／verify：2027～2030 Implementation (with another satellite)：2031～

Ultra Broadband Radio Digital Interferometer : SAMRAI (**S**canning **A**rray for hyper-**M**ultispectral **RA**diowave **I**maging)

Feature For sea surface salinity, water temperature, and sea surface wind speed, microwaves are observed in a continuous spectrum of 1 to 41 GHz at 27 MHz intervals over a wide area, removing the influence of artificial radio waves.

Cooperation and sharing with JAXA（SAMRAI）

JAXA and Ocean Solution Technology cooperate for social contribution through SAMRAI

Agreement (New)

JAXA	• Provision of ocean observation data by aircraft-mounted SAMRAI
OCEAN SOLUTION TECHNOLOGY	• The results of surveys and analysis of user needs related to fisheries/fisheries, etc., and the results of business plan studies • Information on fishing decisions using observation data from aircraft-mounted SAMRAI • Evaluation/verification results

Analyze logbooks, weather/sea conditions, etc. with "PIKE OF TRITON" AI engine

Basic research (JAXA) → Measurement data (Accel data) → Analysis information (OST) → Fishery use

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Fishing Decision / Fishing Site Selection

【Effects on fishery】
- Prevent unproductive trips
- Reduce operation time
- Reduce fuel costs
- No experience required to operate

Building a value chain from data to information customers value

Using operational data to provide information for production area

Using QR codes

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Fishery

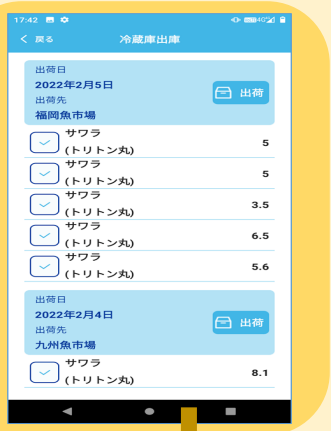
Smartphone APP （"PIKE OF TRITON"）

・Blockchain-based tamper-proof

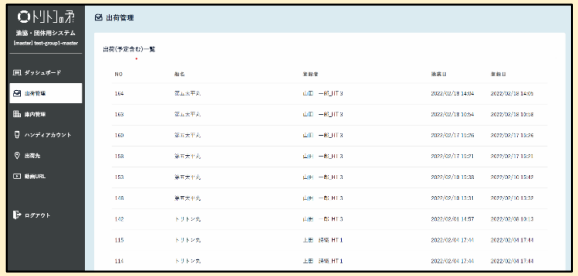
QR code

Fishery Co-op

Catch composition information
・What
・How much



"PIKE OF TRITON"Co-op management screen



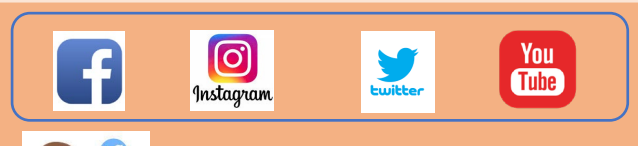
Attach QR and ship out

- Supports shipping management
- TAC management based on catch information

Information for consumers

Consumer

- Check information on seafood products
- Obtain information on fish deals
- Branding increases desire for purchase



SNS Information on Fishermen's Co-op Recipes & Menu ideas

Accurate data

With approval by fishery

Can be used for fisheries resource management in cooperation with national and government agencies

Disseminating information to consumers

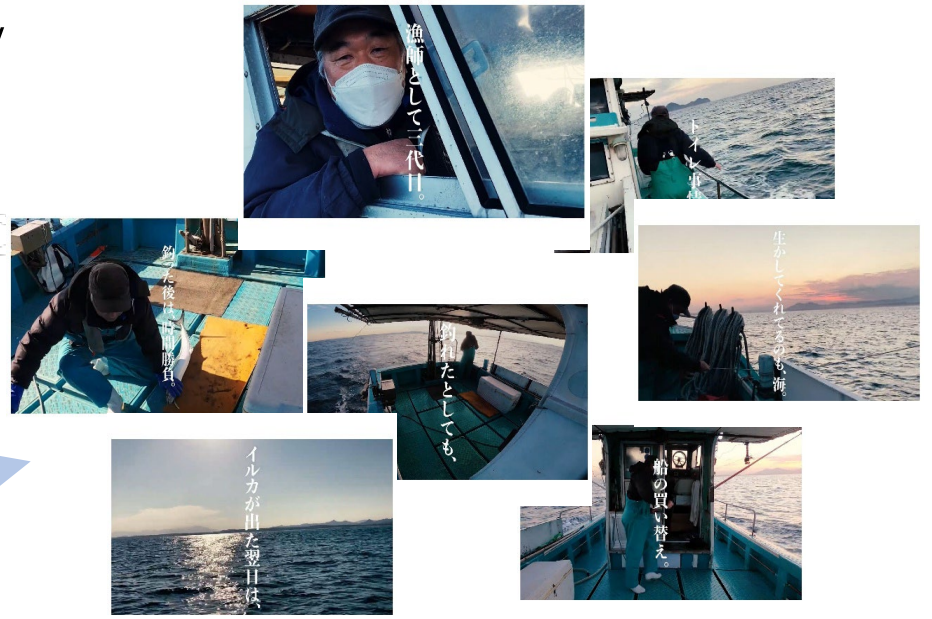
By reading the QR code attached to the product, information on the fish (species, fisherman, vessel, landing, and URL for recipes, menus, videos, etc.) is provided.

Sample

No 5 Taheiimaru
Spanish
Mackerel

Fish information

- Emphasizes the importance of traceability of marine products using QR codes
- Emphasize the time and effort by fishermen to keep fish fresh and tasty



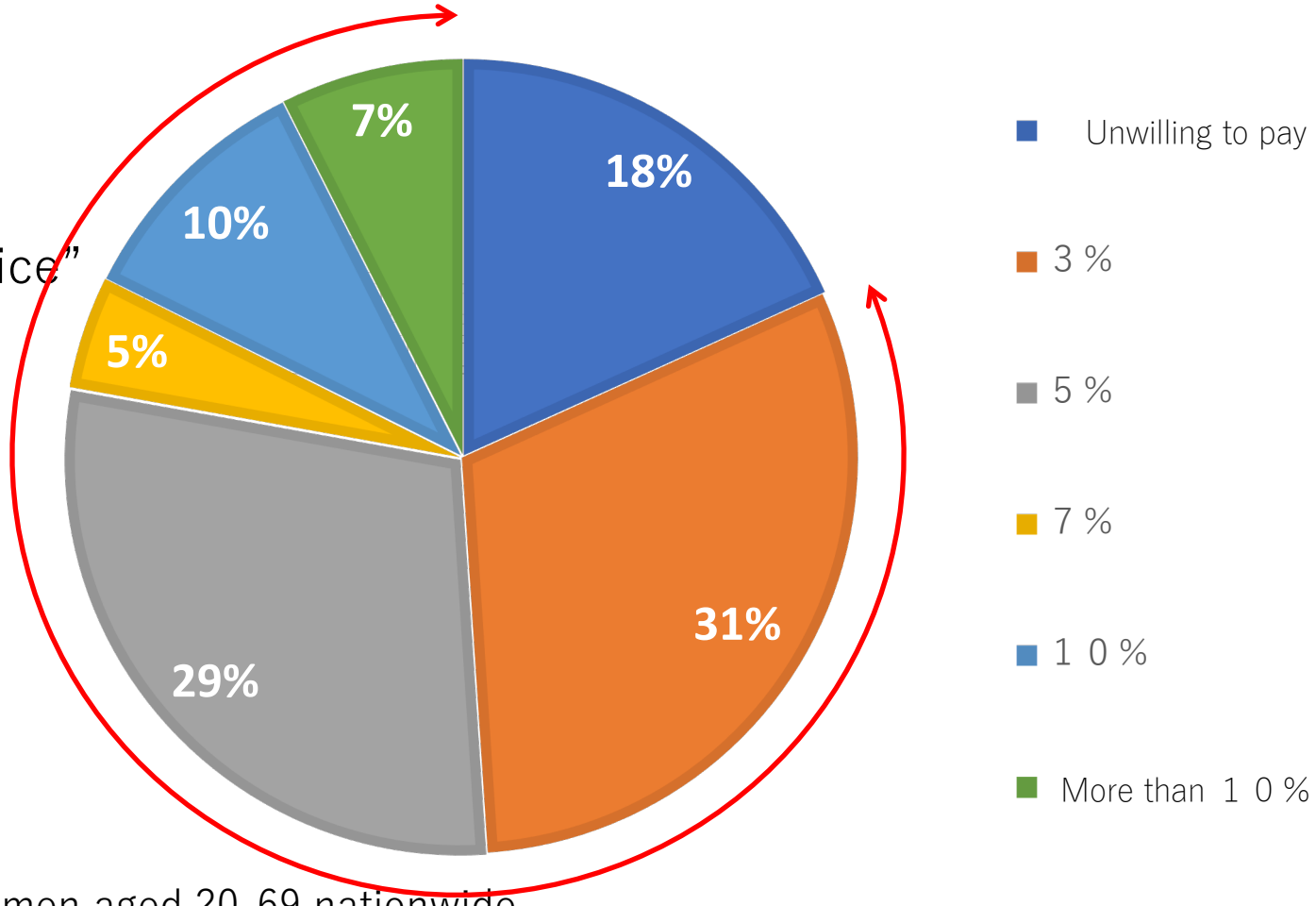
Safe and secure food on the table

Consumer Awareness

HOW MUCH MORE ARE YOU WILLING TO PAY TO ENSURE A STABLE SUPPLY OF SEAFOOD SO THAT "SEAFOOD CAUGHT IN JAPAN'S OCEANS" DO NOT DISAPPEAR FROM YOUR TABLES?

“Over 3% addition to current price”

82%



Questionnaire survey of 10,000 men and women aged 20-69 nationwide.

Advantages for the Prefectural Government in "Digitization of Operational Information"

OCEAN SOLUTION TECHNOLOGY

Catch report・TAC
(Fishery Promotion Division)
Catch report by fishermen
Administrative resource assessment
Research based on accurate data

Electronic reporting of catches needed to protect Japan's fisheries

Fishing efficiency improvement
(Fisheries Management Division)
Fisheries management guidance efficiency through use of visualization tool

Catch #, traceability
(Fisheries Processing and Distribution Division)
QR codes enable transparency from catch to consumption

Facing social issues such as:
-Serious aging issues of the domestic fisheries industry
-Lack of successors for the next generation
-Significant decrease in marine product resources

We provide services that:
-Support the transformation and development of the fisheries industry aiming for both sustainable fisheries industry with high profitability.

Thank you

OCEAN SOLUTION TECHNOLOGY