

Triton's Spear Platform

September 2025

Izumi Mikami, PhD in Engineering

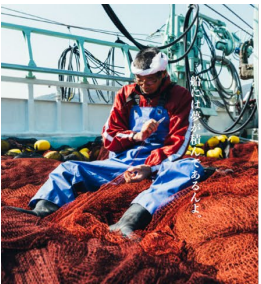


Company Profile



TRITON'S SPEAR

Ocean solution technology is a leading Japanese company focusing on sustainable marine resource utilization and ocean protection. Using advanced remote sensing and GNSS positioning data, we support ocean monitoring, resource management, and enforcement against IUU (MDA).

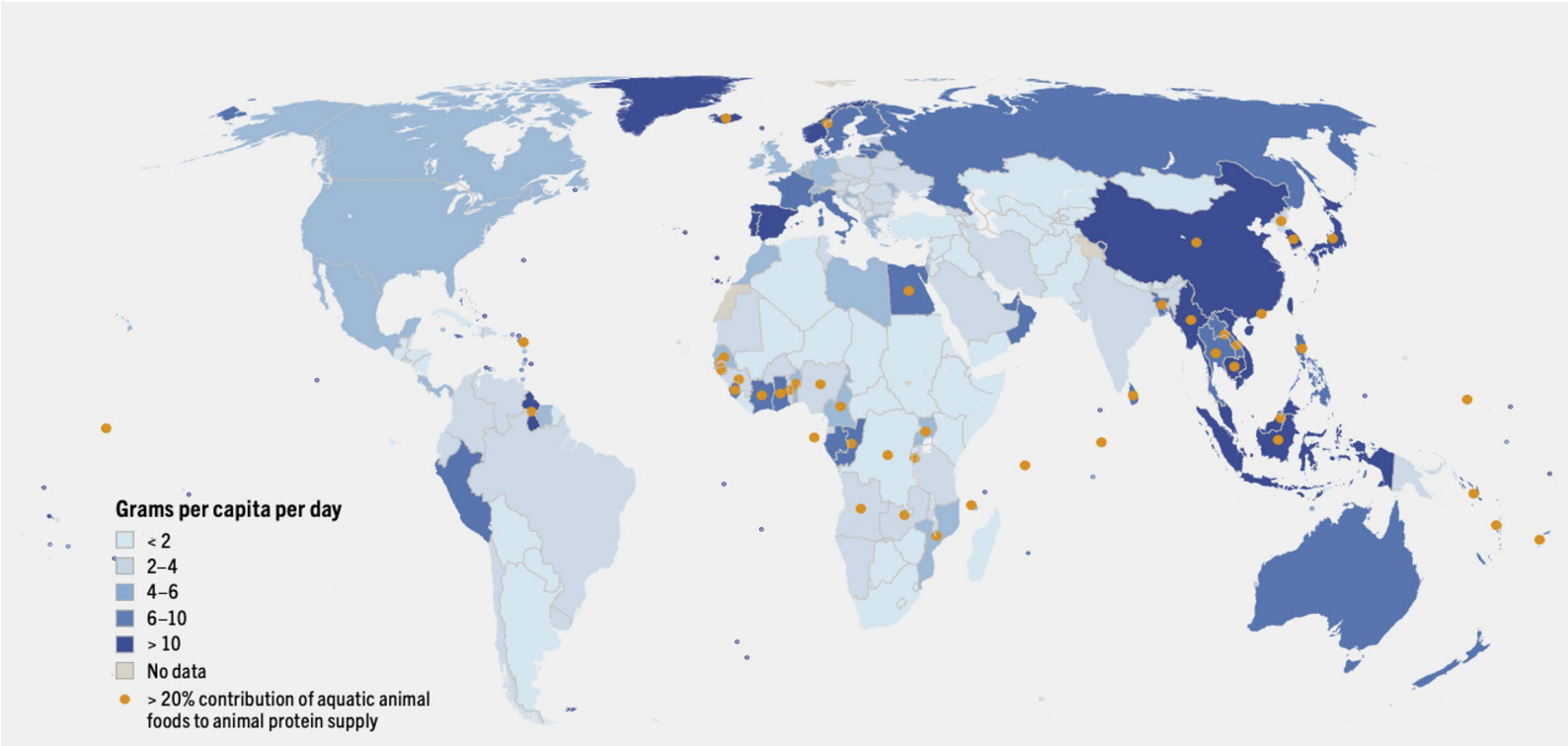


CEO: Yosuke Mizukami
HQ: Sasebo, Nagasaki
Established date: 2017/12/21
Employee: 40



High Demand on Aquatic Animal Food

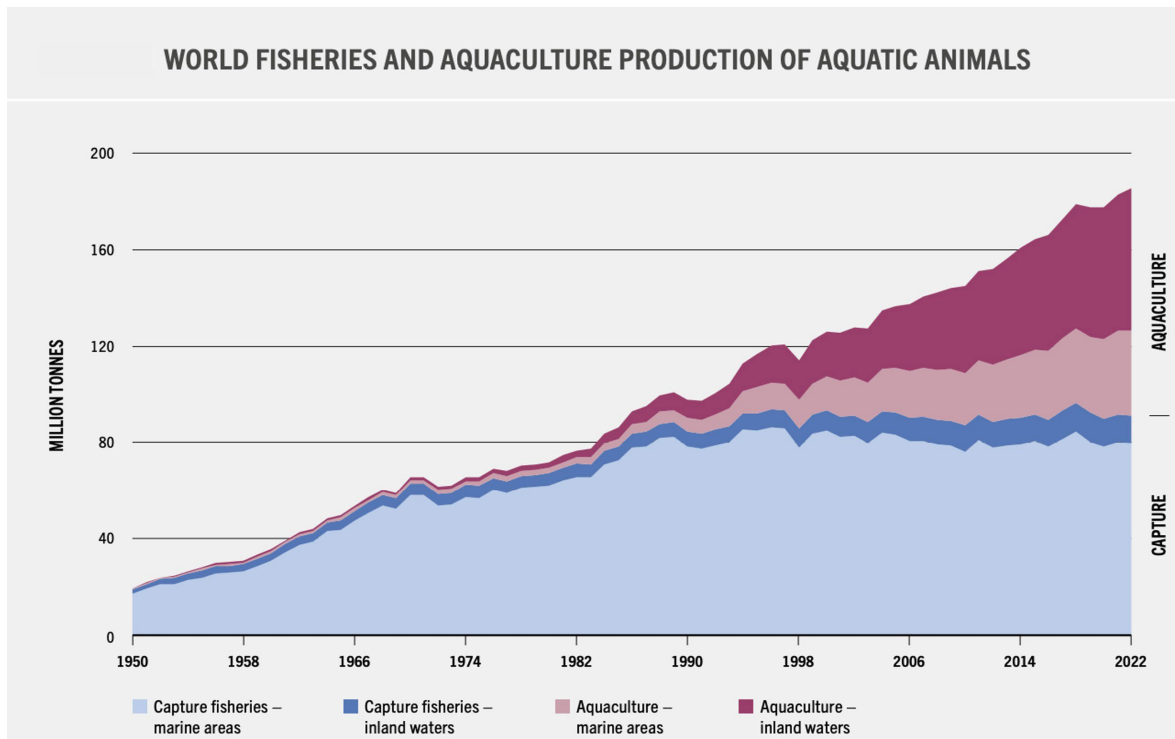
CONTRIBUTION OF AQUATIC ANIMAL FOODS TO ANIMAL PROTEIN SUPPLY PER CAPITA,
AVERAGE 2019–2021



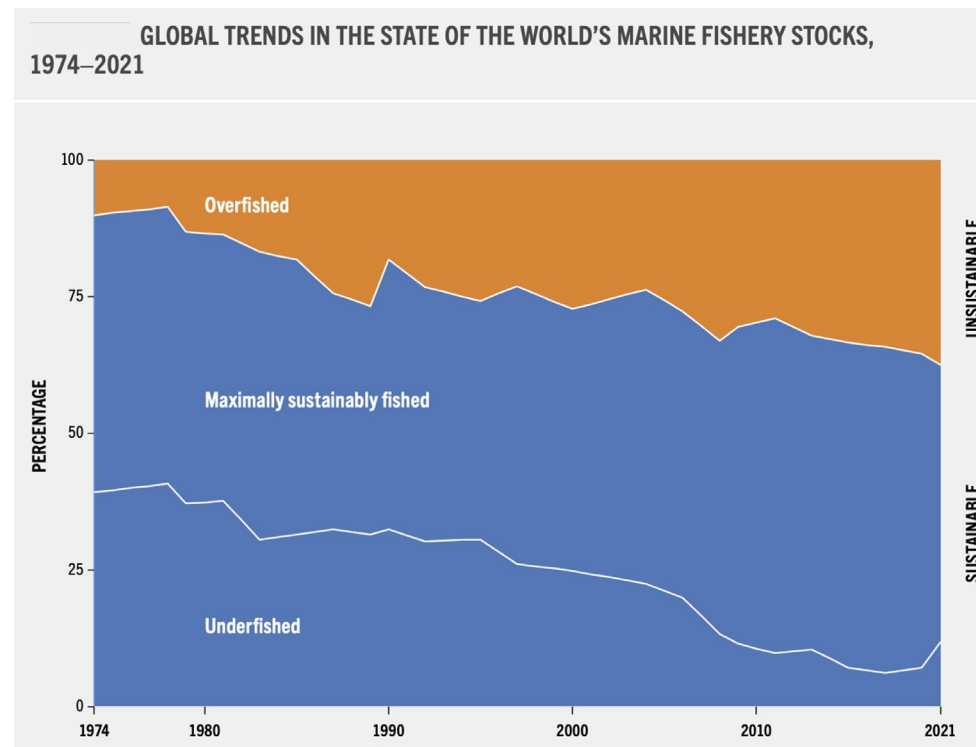
Global per capita annual consumption increased
from 9.1 kg in 1961 to 20.7 kg in 2022

Many country relies on aquatic animal food for proteins

Problems Found from Fisheries & Aquaculture Production and Stocks



- Aquaculture boosting total production of aquatic animals
- Capture fisheries hit a ceiling in 1990



- Underfished and unsustainable fishery stocks increasing

If aquaculture production keeps current capture pace, fisheries resource will be depleted

Fisheries resource management is necessary

Fisheries Resource Management includes not only...

Stock Assessment

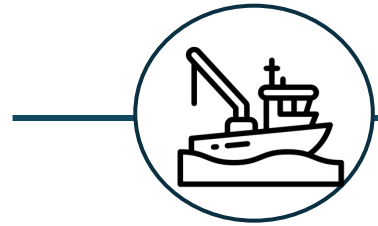
A scientific process analyzing data to estimate fish stock abundance, productivity, and sustainable harvest levels, guiding science-based fisheries management

IUU Fishing Reduction

An useful methodology enforcing IUU fishing that refers to illegal, unreported, and unregulated fishing activities and harms marine ecosystems, depleting stocks, and undermine fisheries management

Executive Summary

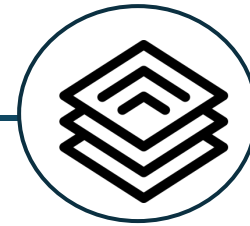
Ocean Solution Technology provides a **“One – Stop Solution”** from data collection to data analysis to support Evidence Based Policy Making in maritime sector and contribute to Fishery Resource Management



TS3 - a compact, cost-effective IoT device enables to collect voyage data and transfer data to designated server



LPWA - cost effective and convenient wireless communication achieves seamless and real-time transmission of TS3-collected data to the designated server infrastructure.



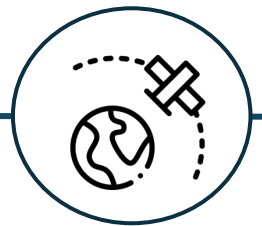
Triton's Spear Platform – robust and interoperable platform connects diverse sources, harmonizes data, and empowers smarter collaboration



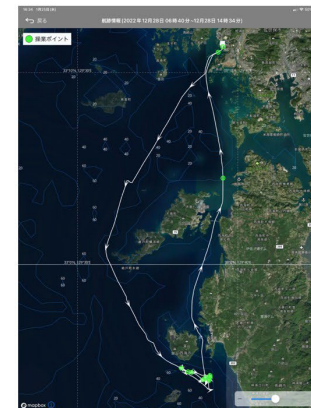
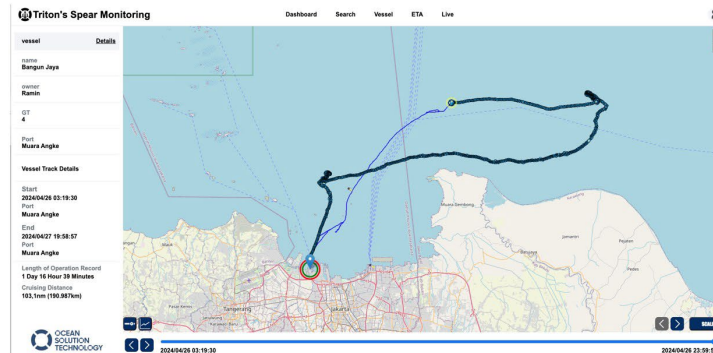
Triton's Spear App – Visualize collected data through tablet and web app to efficientize fishing operation



Triton's Spear AI – Reveal the ground truth of fishing operation to support efficient resource management



Triton's Spear Smart Tasking – Detect dark vessel combining satellite remote sensing data and IoT collected data to enforce against IUU fishing operation

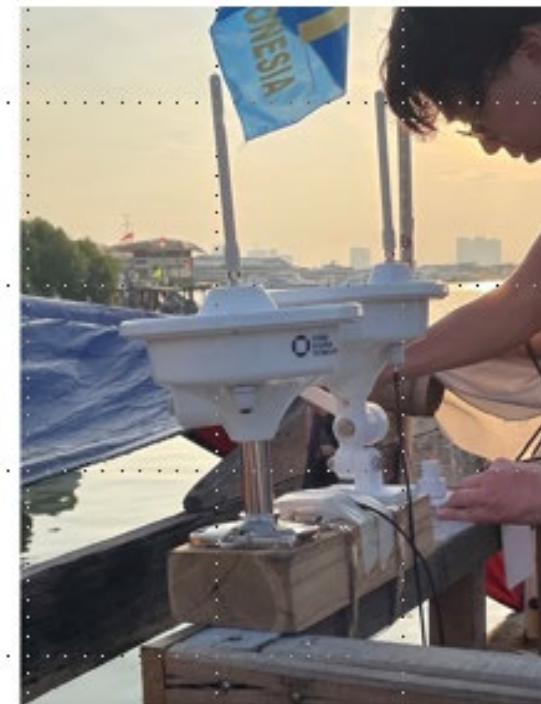


"Triton's Spear 3"(TS3) Product Information

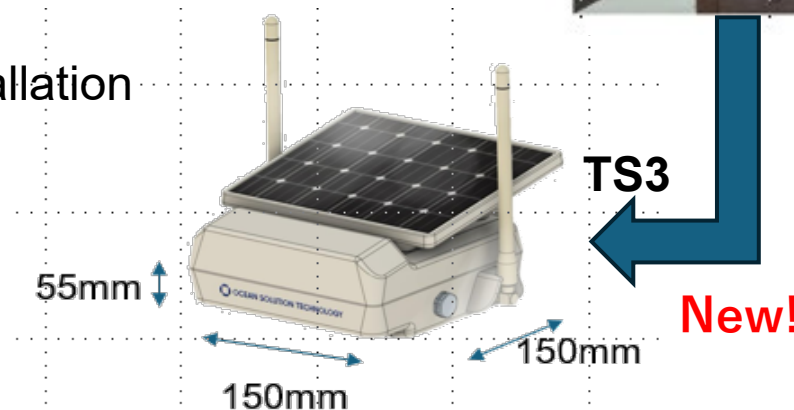
Next-generation multi-purpose IoT device
accelerates marine digital transformation

IoT Device TS3 Features

- ✓ Near-real-time data transfer is realized using ELTRES (LPWA) developed by Sony
- ✓ GNSS-based Vessel's coordinate data, recorded every 30 seconds and stored in memory, is automatically transferred via LTE when the vessel enters LTE coverage area
- ✓ Continuous operation during 5 years' lifetime is ensured by solar panels and lithium-iron phosphate batteries
- ✓ No external power disconnection is possible thereby eliminating the risk of intentional transmission interruption
- ✓ No onboard cabling is required, allowing for easy device installation

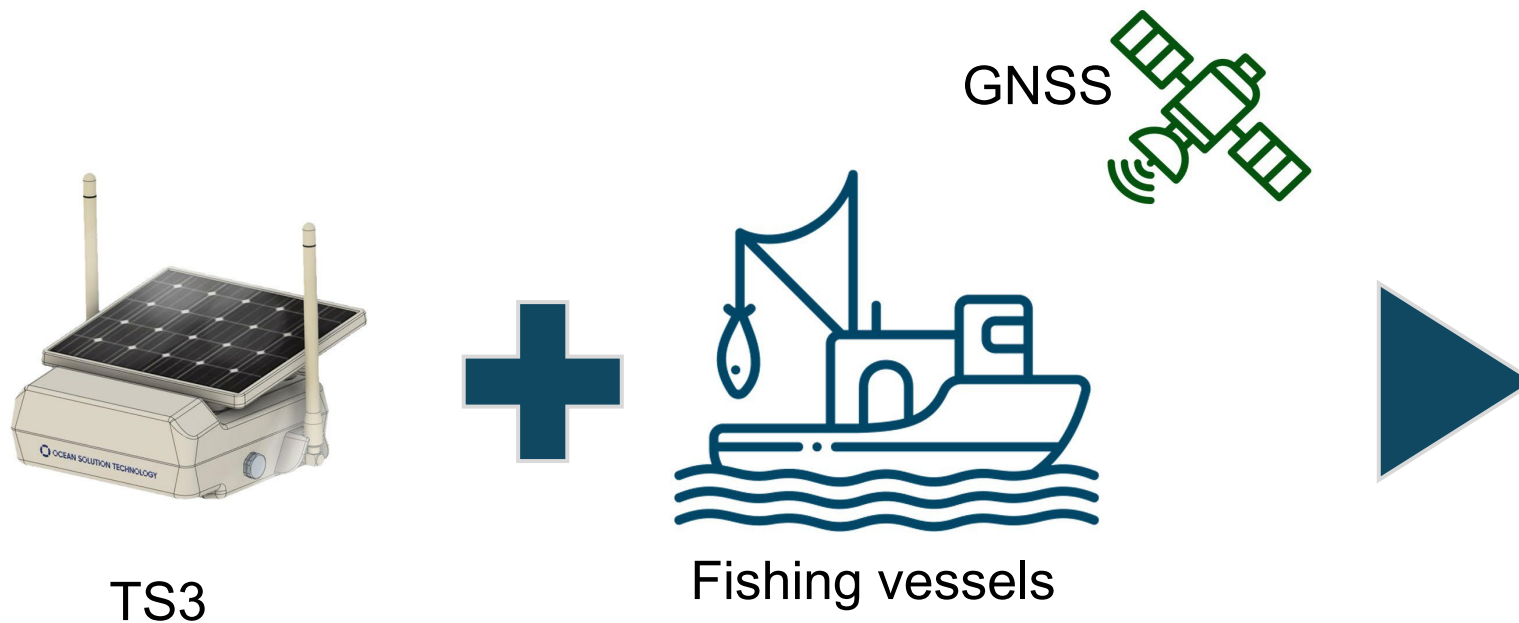


TS2



TS3 Basic functions

Installed on a vessel, TS3 transmits GNSS-based vessel coordinates, visualizes the track both onboard and remotely, develops services to improve legal fishing and counter IUU operation

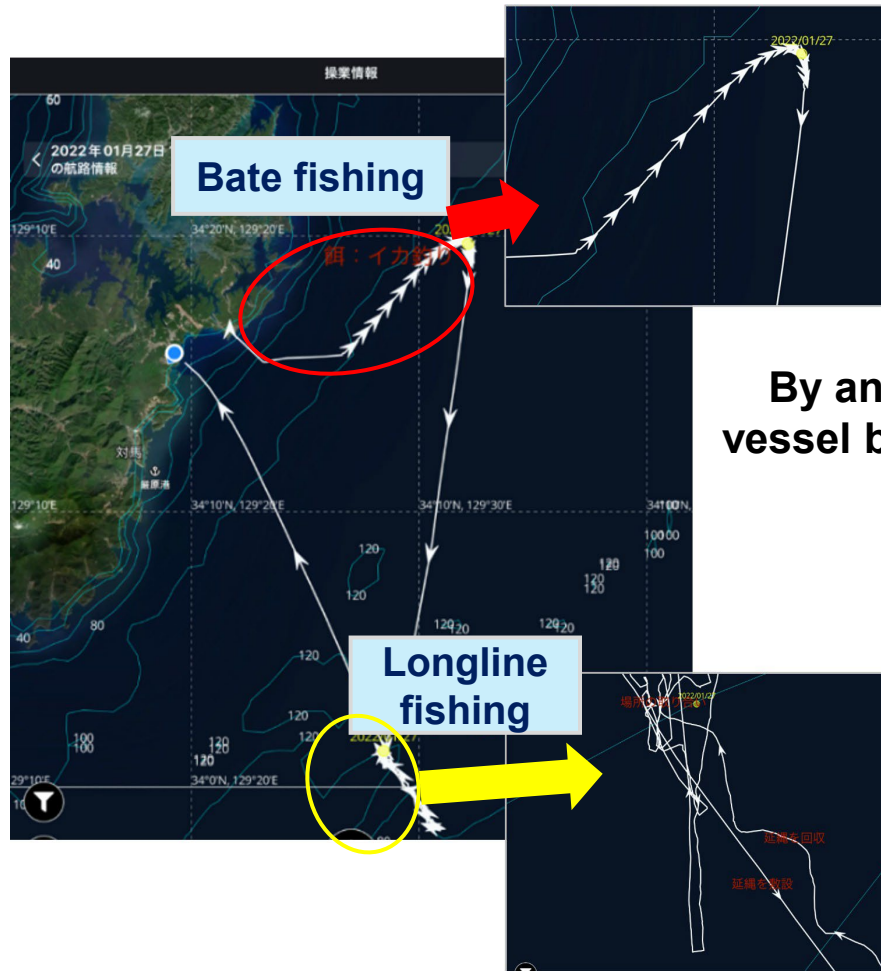


Vessel's Track



Analyzing vessel's track with AI...

Contribute to Fishery Resource Management and Develop New Ara of Legal Seaborne Trade



By analyzing
vessel behavior...



Fishery Resource Management and Stock Assessment

- Automatic calculation of **fishing effort** for **CPUE estimation**
- Integration of fish catch data to enable **stock assessment** for government and research institutions

Fishing effort: The amount of capital and labor used to catch a fish

Fishery efficiency and inheritance

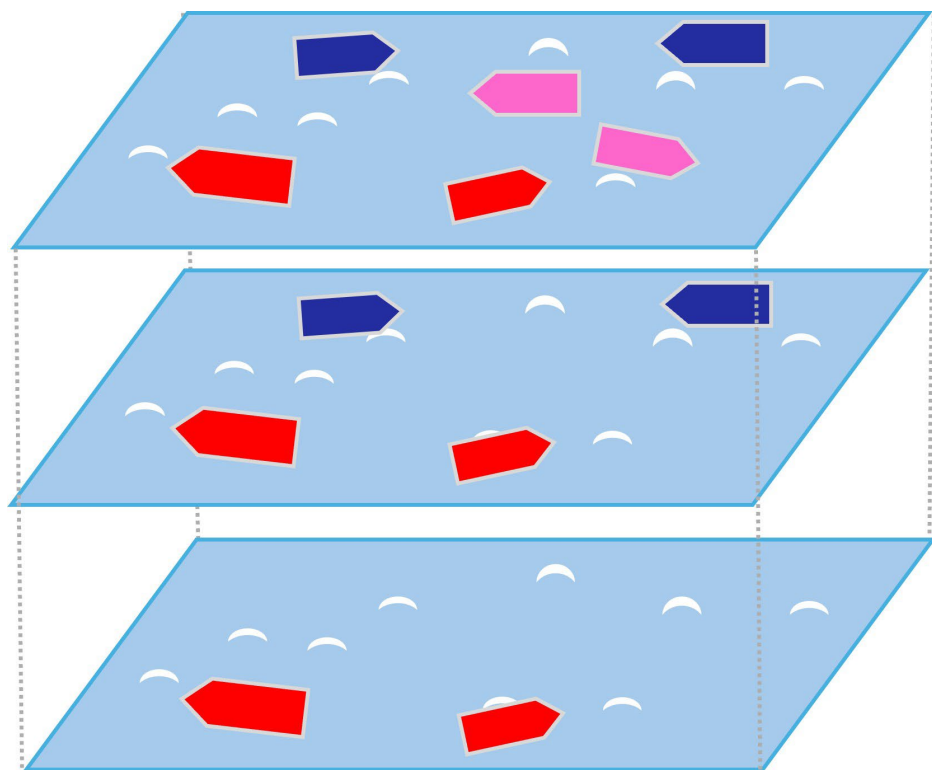
- **Automatic digitization of operation logs**
- **Digitalization of fishing know-how**, such as fishing grounds and ocean conditions
- **Certificate of Origin**

Countermeasures against IUU fisheries

- **Monitor of illegal fishing operations**, such as fishing in unauthorized fishing areas
- **Detection of illegal activities** such as boat-to-boat **drug sales and trafficking**

A fishing vessel behavior analyzed by AI
(Bait squid fishing followed by Yellowtail longline fishing)

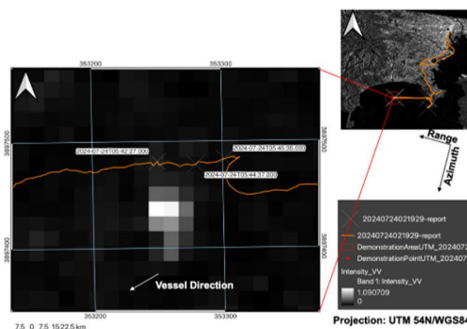
- Triton's Spear Smart Tasking 2.0 (TTST 2.0) **discovers dark vessels** from satellite SAR image



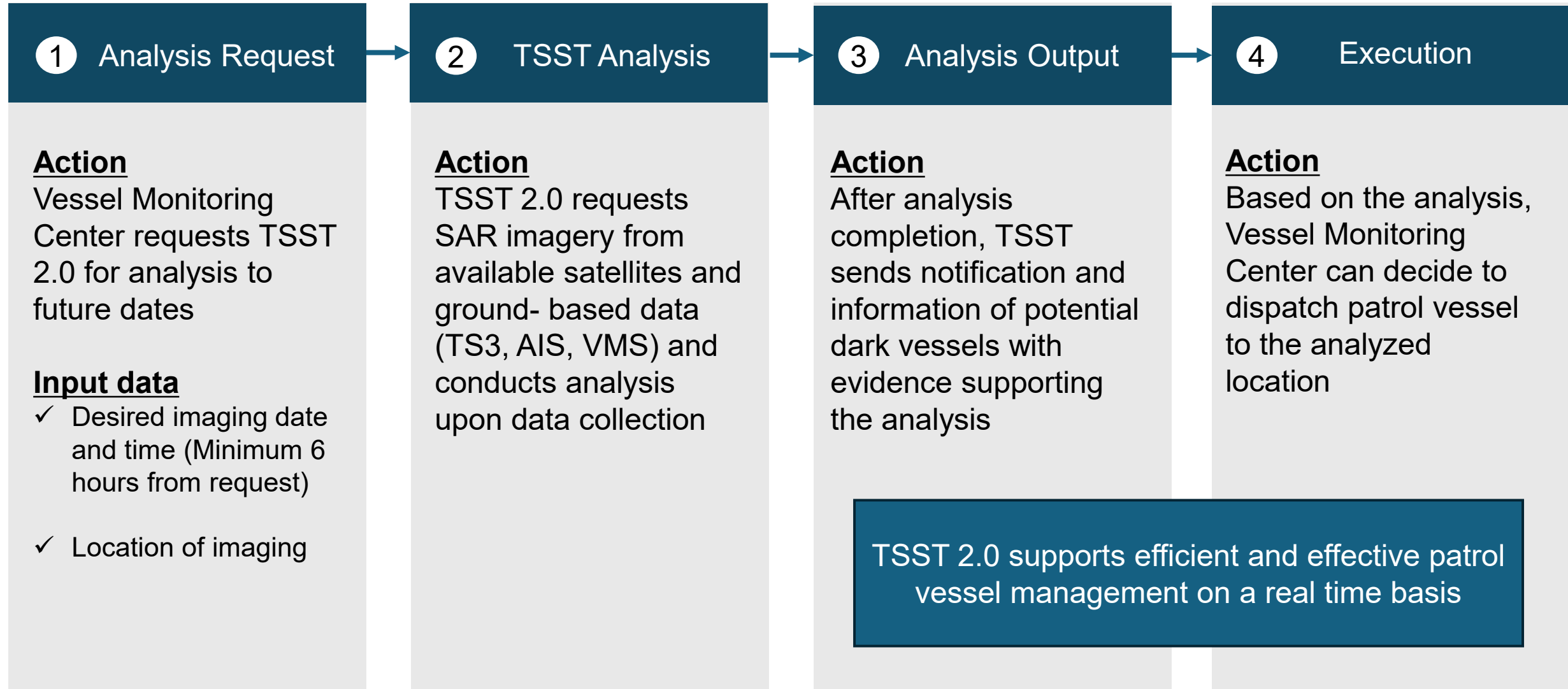
-  Vessels with AIS
-  Vessels with VMS/TS3
-  Dark Vessels

Prerequisite: All registered vessels must have VMS, VMS or TS3

1. Extract vessel shadows from satellite SAR image data
2. Remove AIS, VMS and TS3 vessels from satellite image
3. Discover Dark Vessels



Development is ongoing using JAXA SSF



Why Dark Vessel Detection is Necessary? TRITON'S SPEAR

Answer to demand to protect compliant fishermen from harmful effects of IUU (Illegal, Unreported, Unregulated) fishing vessels and realize sustainable fisheries



Thailand Coast Guard



Malaysian Coast Guard



Maldives Space Research Organization



Fiji Maritime Sector Government Entities



Indonesia MMAF

Next Generation of Triton's Spear

- Proposal Stage -

-OST remains committed to the challenge to promote sustainable fisheries on a global scale-

Optical + ELTRES Sat
(Micro-sat, LEO)

ELTRES Sat
(Nano-sat, LEO)

ELTRES HAPS

ELTRES (LPWA) Achieves seamless data connectivity even in isolated remote areas with extremely low power consumption

On board optical camera with special filters takes images of sea surface

Downlink

Optical Camera Imaging

ELTRES (LPWA)

ELTRES (LPWA)

Existing station

Designated Server

Harmful drifting algae and red tide

IoT buoy with solar battery and sensors supports early tsunami warning, and marine observation

TS3

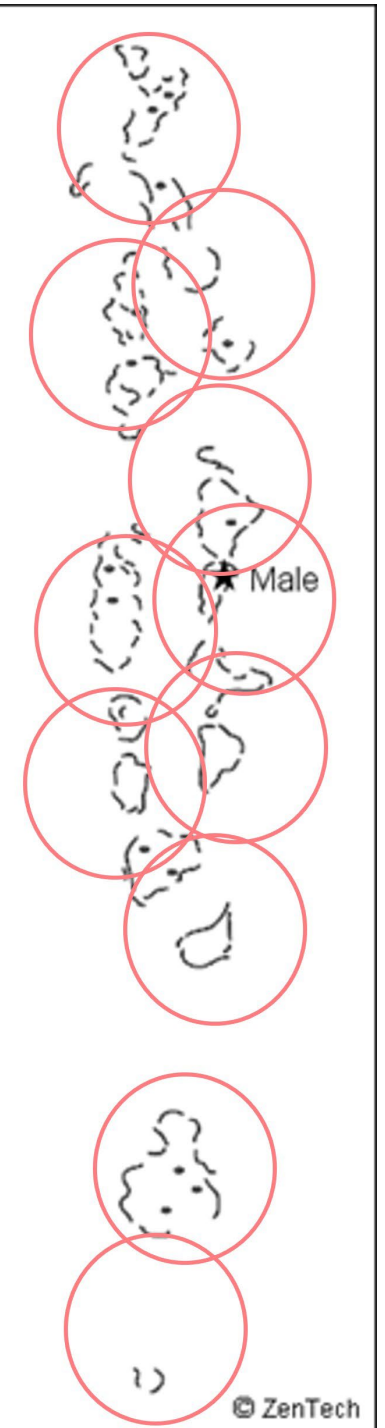
TS3 reports vessel's coordinate and marine observation data and IUU fishing alarm

Server stands for gateway to various users and marine big data center.

ELTRES app for the Maldives Government

As vessels are the dominant mode of transportation, maritime safety stands as a critical national concern in Maldives

In cooperation with MSRO, OST aims to **deploy land-based ELTRES receivers throughout key atolls**, enabling real-time vessel tracking and facilitating swift rescue operations during maritime emergencies. **TS3-derived new devices equipped with ELTRES** transmitters will be key enablers on vessel side.



Thank you for your attention



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