Customer Case Study

THE JAPANESE COAST GUARD

THE JAPANESE COAST GUARD USES ZAO-S LIVE-STREAMING TO SERVE AND PROTECT 4 MILLION KM² OF OCEAN TERRITORIES

The Japanese Coast Guard (JCG) is a civilian organisation, which has around 14,000 personnel and is responsible for the protection of the coastline of Japan.

Japan's territorial waters and exclusive economic zone combined are 12 times larger than its landmass. They control around four million square kilometres of the Exclusive Economic Zone (1986 establish U.S. and Japanese Maritime Search and Rescue agreement).

The JCG has divided the nation into eleven regions to facilitate its coast guard operations. Each region maintains a Regional Coast Guard Headquarters, under which there are various Coast Guard Offices, Coast Guard Stations, Air Stations, Hydrographic Observatory and Traffic Advisory Service Centres.

MISSION

The mission of the Japanese Coast Guard is to:

- Secure security
- Marine rescue and Fight Marine Environmental crime
- Anti-piracy
- Counterterrorism
- Measures against suspicious ship/craft
- Security of the waters
- Protect territorial waters and EEZ (Exclusive Economic Zone)
- Salvage rescue - Rescue of deceased/missing persons in ship accidents and beach accidents

The division of jurisdiction between the 11 JCG regions[1]

[1]Source: https://en.wikipedia.org/wiki/Japan_Coast_Guard

GOALS

Since its establishment in May 1948, the Japan Coast Guard (JCG) has been engaged night and day in a variety of activities, including criminal investigations, maritime security operations, search and rescue work, marine environment preservation, disaster mitigation, oceanographic research, and maritime safety operations, and also working to strengthen collaboration and cooperation with other countries, all so that the people of Japan can use and enjoy the various blessings of the ocean environment.

Surrounded on all sides by wide expanses of ocean, Japan is a maritime nation that enjoys the benefits of the sea in the forms of maritime trade and fishing. However, these waters are also plagued by various problems, including maritime accidents, marine crime such as smuggling and illegal migration, and international disputes over the sovereignty of territorial possessions and maritime resources.[2]

Terrorism Countermeasures

Since the terrorist attacks in the U.S. in 2001, countries around the world have been motivated to take coordinated actions against terrorism. The JCG is making absolutely sure that any and all terrorist attempts are checked by continuing its conventional approaches that include deployment of patrol vessels and aircraft for vigilance and surveillance activities at coastal facilities like nuclear power plants.

As Tokyo will soon host the 2020 Olympic and Paralympic Games, the need to jointly discuss how to prevent terrorist attacks at sea and in coastal areas becomes important.[3]

Marine Rescue: Accidents may occur while people are engaged in marine leisure activities. Also, vessels can collide, capsize, run aground, or catch fire, and swimmers can be caught in rip currents and pulled out to sea. The JCG works to prevent accidents and ensure collaboration/cooperation with private rescue organizations and other entities.

Countermeasures against Marine Environmental Crime

Sadly the illegal discharge of wastewater from businesses and oil and other substances from ships, the illegal dumping of waste and scrapped vessels, and crimes committed in attempts to avoid paying proper costs for waste disposal or equipment maintenance is still ongoing. These forms of these crimes can be malicious and subtle, with waste, oil and other substances being dumped under the cover of night or ships being abandoned after their names and numbers have been removed.

To combat such crime, the JCG has collaborated with relevant organizations to build a system for sharing information on crimes affecting the marine environment, and has also stepped up its surveillance activities. Using livestream video, the JCG could film the extent of the discharges and provide HD video evidence.

[2&3] Source: https://www.kaiho.mlit.go.jp/e/english.pdf
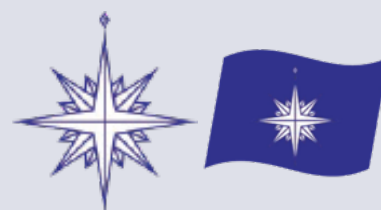
COMPASS MARK

The stylized symbol of a compass, which serves as an aid for safe navigation, is featured on the official flag of the JCG, the guardians of maritime safety.

S-MARK

Painted in blue on JCG patrol vessels, aircraft, and the like, this stylized letter "S" is the symbol of the JCG. The S-mark embodies the JCG's missions of security, search and rescue, safety, and surveying, as well as its key ideals of speed, smartness, smiles, and service.

THE TECHNOLOGY TO BROADCAST HD, ENCRYPTED VIDEO ACROSS 4 MILLION KM² OF OCEAN

In order to protect and carry out its duties as described above, real-time sharing of video information from the scene of the site is critical for prompt judgment and evaluation of the incidents.

Zao-S are mounted on the JCG fleet, which operates 457 watercraft and 74 aircraft (including 46 helicopters),[4] enable live-stream monitoring of this massive aquatic territory. The video footage could be streamed with minimal latency back to the regional Command and Control centres. This not only increases the security of the staff, but captures evidence to be used later in court or enables live judicial review.

Monitoring the vast territory can use GPS mapping transmitted with the video footage. This mapping can be added to the IT eco-system of the command centre, allowing the Coastal Guards to map their regional fleet to the incidents and organising back-up and deploying resources based on the viewed footage and communication from the ships and helicopters.

Future technologies could be adopted, such as thermal image cameras, which use the Zao-S to transmit the thermal image videos live to the command centre. This could be especially useful for scanning pirate ships, suspect ships to view hidden hideaways, and to help with putting out fires on ships and floating devices and potentially with finding floating capsized people.

Soliton's Zao-S is a cost-effective 400 gram device that connects to the camera and can deliver full HD over multiple 4G connections, WiFi or satellite simultaneously. It has a typical latency of less than 1 second to a Command and Control centre ready for ingest and playout.

The 4G bonding system augments secure communication as live, encoded video transmissions are distributed between multiple networks to the Milestone or HDView systems. This collectively adds another level of difficulty to an already complex system to hack. As all footage transmitted from the Zao-S is encrypted, the video transmission has an extra layer of security, which ensures that the footage will not be hacked or viewed unintentionally by people outside of the command centre.

The JCG is also responsible for monitoring and tracking man-made disasters such as oil spills. By travelling around oil spill areas they are able to send live video feeds back to the command centre, showing the extent of the spill, it's direction, size and impact on the natural environment.

The JCG use FleetBroadband (FB) satellite data communication service at sea provided by Inmarsat, as this provides dependable, seamless voice and broadband data coverage across the world's oceans. FleetBroadband provides cost-effective voice and data through a compact antenna, delivered globally via the I-4 satellite and ground network, which maintains over 99.9 per cent network availability.[5]

Although FB can be comparatively slow compared with LTE, Zao 's HEVC Codec and proprietary protocol RASCOW (around 400 Kbps/sec) realize stable transmission in a limited band. Also, when LTE (3G, 4G networks) is available in the near waters, it switches to Fleet Broadband and uses it.

Given the vast territory to cover, the power of live broadcasting from the JCG helicopters, airplanes and ships, enable the command and control centres to have live and accurate video footage to protect their crews and the seafarers.

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[4]Source: https://en.wikipedia.org/wiki/Japan_Coast_Guard
[5]Source: https://www.inmarsat.com/service/fleetbroadband/