Progress Report of EMS Trials by Japan
(as of 31 May 2022)

1. Summary of Trials

Trials for offshore longline vessels were conducted for 3(Three) EMS on the market.

Trials for distant water longline vessels were conducted for 1(one) EMS on the market as well as 1(one) EMS developed by Japanese private sector (LL industry and maritime monitoring company).

Offshore Longline	EMS provider A	2021/2 – 2021/6 (WCPFC) 2021/2 – 2021/12 (WCPFC)
	EMS provider B	2021/2 – 2021/5 (WCPFC) 2021/2 – 2021/11 (WCPFC)
	EMS provider C	2021/2 – 2021/4 (WCPFC) 2021/2 – 2022/2 (WCPFC)
Distant Water Longline	Japan Tuna EMS	2021/10 - 2021/12 (ICCAT) 2021/8 - 2021/12 (IOTC/CCSBT) 2022/4 (WCPFC/CCSBT) 2022/5 - 2022/7 (ICCAT/CCSBT)
	EMS provider A	2022/3 -（IATTC）

Technical specifications for each EMS are provided in Annex.

2. Identified Challenges in Collecting Video Footage on the Vessels

i) Flicker noise

Flicker noise caused by lighting was observed. Adjustment of frame rate would be necessary. Or, EMS should use cameras that have a software to address/remove flicker noise.

ii) Interference with the radio system

Radio communication systems of fishing vessel was interfered with the EMS. The cause is not identified yet. In some cases, GPS for EMS was not functioning possibly due to an interference with other equipment of the vessel.

iii) Malfunction of camera

Several cases of malfunction in cameras were observed. No image was recorded in those cases. These were due to unsuccessful interlocking between the EMS and UPS (Uninterruptible Power Supply) or overall technical problem in the EMS.

iv) Corrosion of fixing frame/ screw/ bolt

Corrosion of metal frame/ screw/ bolt used for fixing cameras was observed. Treatments on those materials to prevent (electronic) corrosion are necessary.

v) Vibration of the footage

Fixing cameras by bolts was not strong enough in particular for small vessels. Welding could be an alternative way of fixing cameras, but that would be more costly and damage vessel’s body.

vi) Unclear image due to dirty lenses

Camera lenses should be cleaned periodically by crew. While ‘tamper proof’ is sometimes considered as one of EMS requirements, involvement of crew should not be categorically rejected.

vii) Unclear image due to condensation on the inside of camera cover

Condensation is often observed when there was significant temperature difference between day and night or when the vessel changed fishing grounds

viii) Fogging camera due to physical damage on cameras

Camera covers were damaged by physical contacts with fishing equipment. In those cases, repairing and/or replacement of cameras are necessary.

ix) Failure of automatic transmission of status reports

There were cases where periodic status reports were not received. Since VMS were functioning during these incidents and video footage was properly recorded, it is assumed that there were technical problems withing the EMS. This issue indicates the necessity of careful consideration in establishing guidelines in the case of failure of status report. Fishermen should not incur liability for the failure if the cause of such non-reporting is a technical problem within the EMS. If the EMS is for scientific purpose, there is no need to call a port to fix the EMS simple because of non-submission of status reports as the video footage continue to be recorded successfully.

x) Unexpected re-starting of EMS due to lack of electricity

Power supply is sometimes unstable and insufficient in particular in the case of small vessels. In order to secure stable power supply to the EMS, additional UPS that can sustain power supply for the EMS including up to 4 cameras for 30minutes of power failure would be necessary.

While several EMSs are on the market, how to install such EMS to vessels is not straightforward. The best way to install EMS would be different even among longline vessels depending on their specifications. CPCs need significant experiences and practices to ensure proper installment of EMS.

There are several problems caused by technical issues of the EMS. Any possible guidelines for implementation of EMS should take into account such intrinsic limitation/uncertainty of EMS. For example, fishermen should not incur all the costs to address the problems of the EMS especially when the cause of such problem is a technical issue of the EMS.

3. Identified Challenges in Extracting Data from the Video Footages

Reviewing and analyzing video footages to extract data is time consuming though each EMS provider has developed software to assist such review. At this stage, such review of video footage has to be conducted manually although AI technology would hopefully replace human in the future. In our trials, in order to analyses a video footage for one longline operation (16-18 hours, # of hooks: 2,500-4,000) as detailed as possible, it took 7-12 hours depending on the capabilities of the analysts.

Those who have experiences in human observers can analyze EM video footages efficiently. However, such human resources are limited. This means increasing observer coverage by EMS will be also subject to the availability of human resources who are well trained and experienced in this field. Until automatic analysis on video footage would become possible, prioritization on data fields to be extracted from the footage would be necessary.

The video footages are encrypted, and provider-specific software is required to review the footages. For this reason, it would be unpractical for inspectors to check the video footages for compliance purpose.

4. Collectable Data Fields

i) Data fields that can be collected by EMS

- Catch information (species, condition (dead/alive), length, the number of branch line)
- Condition of Discards (dead/alive)
- Date, Time & geographical coordinates of each set
- Number of floats, number of branch lines
- Bait type (fish/squid)
- Bycatch mitigation measures (Blue dyed bait, Line Shooter, Side setting)

Note: Items such as length, bait type, number of floats and number of branch line can be collected more easily by human observers

ii) Data fields with significant difficulty in collecting by EMS

- Catch information (weight, sex)
- Biological samples (e.g., otolith, muscle)

- Oceanographic and metrological information
- Specifications of gear (e.g., length of main line, length of branch line, interval between branch lines, hook type)
- Depth of hooks
- Bycatch mitigation measures (offal disposal, type of tori-line, equipment for releasing sea turtles)

Note: Specifications of gear can be collected from logbook

EMS can collect bycatch information, including discards and fate of discards, that is the main purpose of deploying a human observer. Also, EMS can collect information on seabird mitigation measures being implemented, that is one of the roles of a human observer.

EMS cannot collect environment information such as Sea Surface Temperature and gear specifications to be used for scientific analysis (e.g., standardization of CPUE). Other data source such as satellite image, logbook as well as interview with crew should be considered to complement EMS. Biological samples cannot be collected by EMS. If more biological samples are needed, independent data collection program such as port sampling should be considered.

5. Cost

Human Observer (per trip): 8,500 USD

EMS (per vessel):

Main Unit of EMS:	3,600 –12,500USD
Installation to a vessel:	11,000 – 25,000 USD
Running cost:	3,900 USD
Maintenance & Repair:	1,600 – 11,000 USD
Review & Analysis:	6,100 USD
Software:	7,800 – 19,700 USD/year

With regard to initial cost, EMS (i.e., purchase main unit and install to a vessel) would be more costly than human observer (training cost). Even though running cost for EMS seems to be non-significant, costs for reviewing video footages as well as license fee for software should be taken into account in comparing the running cost of EMS to that of human observer.

In the case of human observer, fishing vessels to which observers will be deployed can be chosen flexibly every year. In the case of EMS, given the high cost of installation of EMS to a vessel, the same vessels will continue to be monitored by EMS.

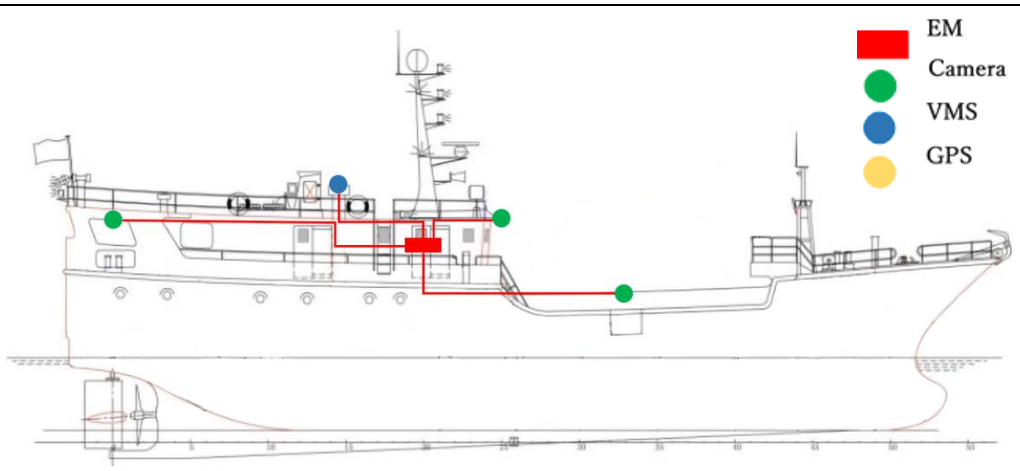
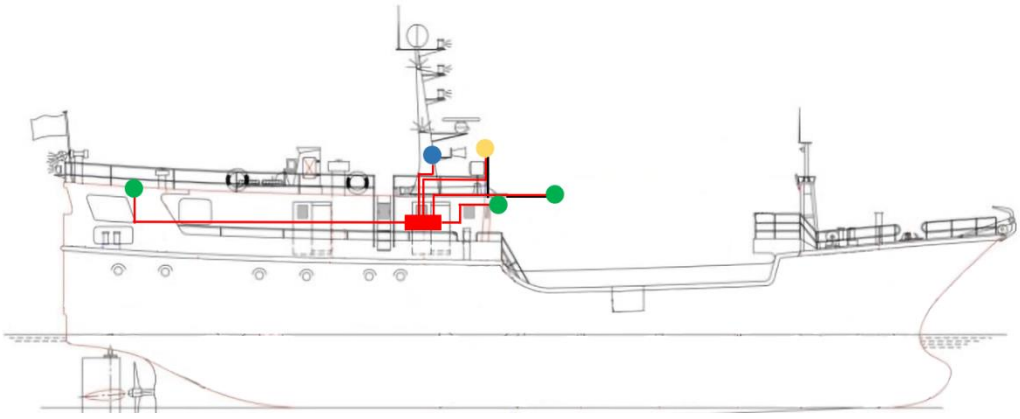
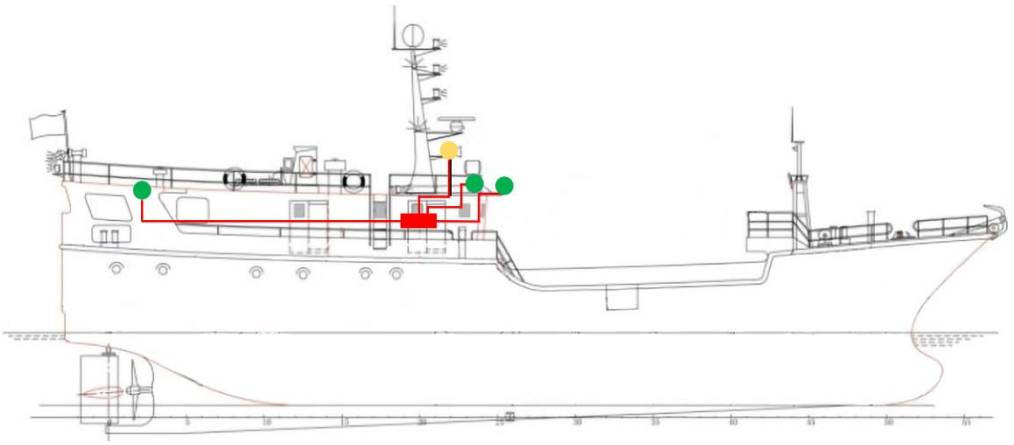
6. Future plan

More trials for distant water longline vessels are planned, including those in the Atlantic.

(Annex)

Specifications of EMS examined by Japan

	EMS provider A	EMS provider B	EMS provider C	Japan Tuna
# of cameras	3	3	3	3 connected by WiFi
Storage (default)	SSD 2.0TB * 2	SSD 2.0TB	HDD 8.0TB	HDD 5.0TB
VMS/GPS	Inmarsat	Irridium + GPS	GPS or VMS	GPS
Data Transmission	via SSD	via 4G (info on fishing trip) via SSD (video data)	via HDD	via HDD
Encryption of video data	Yes	Yes	No	No
Frame Rate	24fps (default) (can be changed from 1 to 30)	1fps, 2fps, 3fps, 5fps (default), 8fps, 10fps, 15fps, 30fp	25fps	1 picture/second (during fishing operation) 1 picture/hour (otherwise)
Resolution	1280*720 (defalt) Can be changed in 35 steps	1360*786 (defalt) Can be changed in 6 steps	1280*720 704*576	280*72
Recordable Times (default settings)	50 - 100 days	150 - 200 days	100 - 150 days	400-420 days
Status Report	Yes	Yes	No	No
Initial Cost (Equipment only)	9,400USD	12,500 USD	3,600 USD	7,800USD

EMS provider A	
EMS provider B	
EMS provider C	
Japan Tuna