

Electronic Monitoring Systems: The AGAC Experience

MIGUEL HERRERA

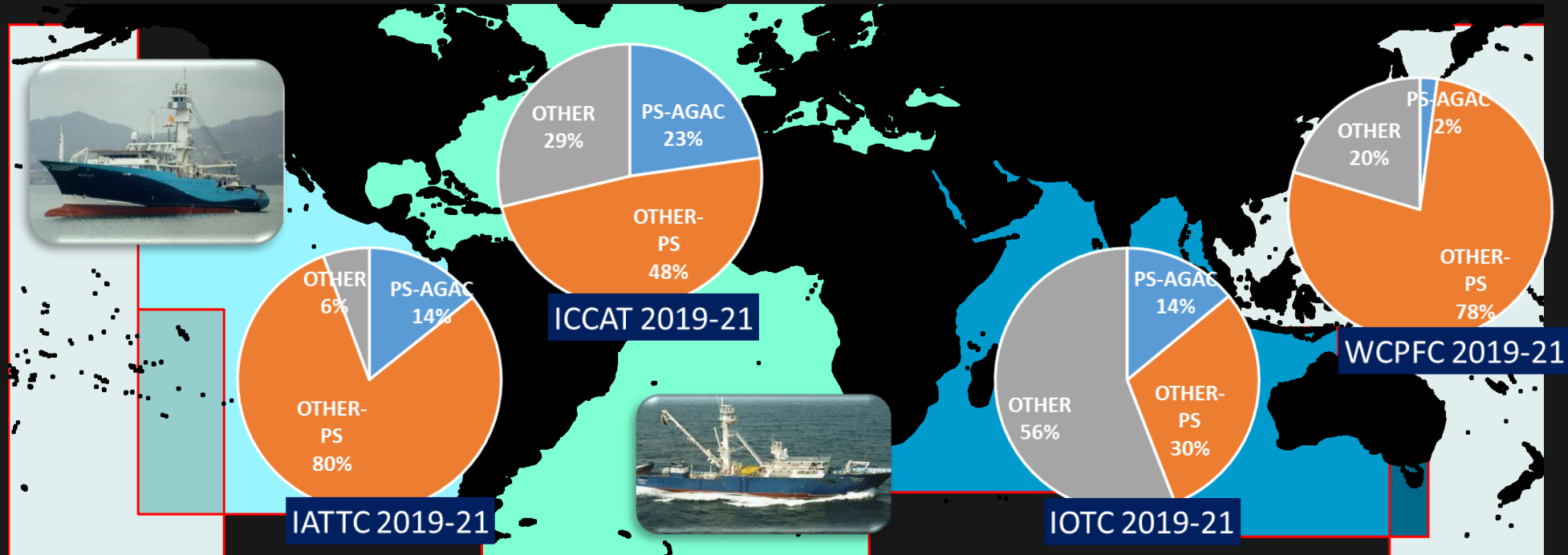
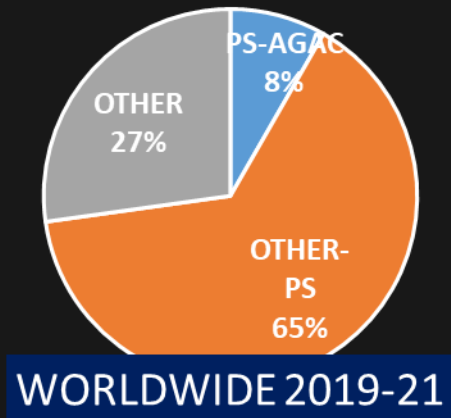
An aerial, black and white photograph of a tropical coastline. The image shows a dense line of palm trees along a sandy beach, with the ocean visible in the lower right corner. The sky is filled with soft, wispy clouds. A semi-transparent rectangular box is centered over the image, containing the text 'AGAC In the World' in a white, handwritten-style font.

AGAC In the World

AGAC in the World

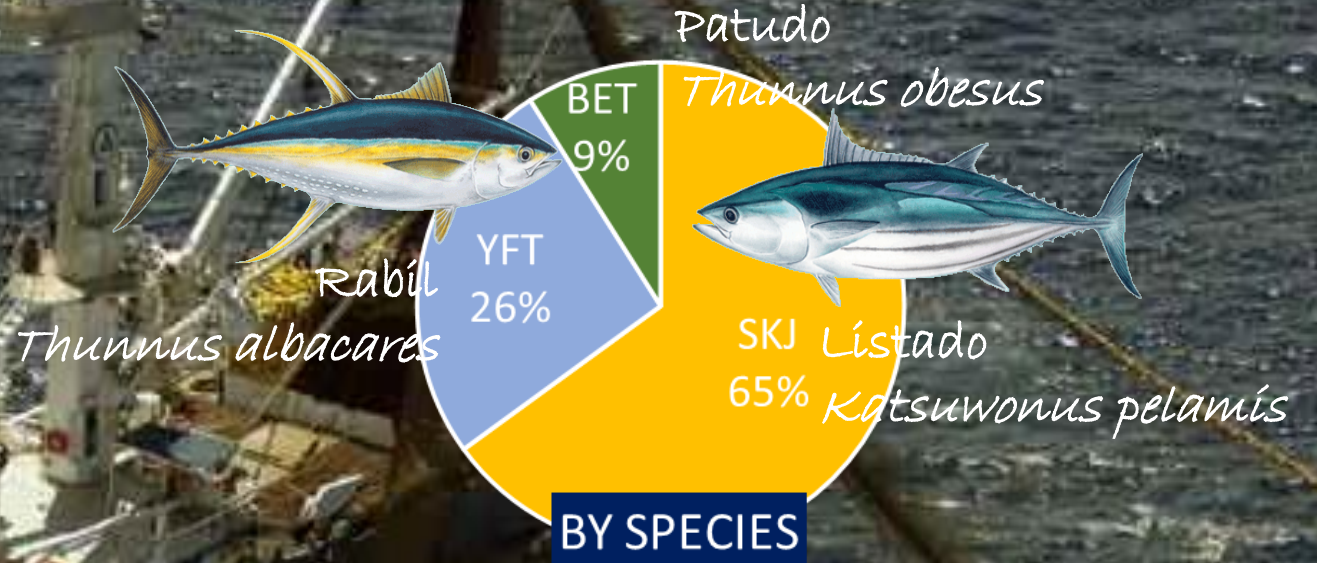


- OPAQAC: 9 Fishing Groups (some integrated), 48 Seiners
- ≈380,000 t Tropical Tunas (8% del total) in the three oceans
- Tropical tunas as target species (SK & YF), mostly for canning
- AGAC Fishery awarded MSC Certification for 6 stocks in 2022 (4 Pacific + 1 Atlantic + 1 Indian)
- All AGAC vessels have Social Certification (Tuna from Responsible Fisheries - APR-AENOR)



The Fishery

Target species make over 95% of total catch



Bycatch makes 2-5% of total PS catch

An aerial photograph of a fishing vessel's deck. A large, circular metal haul is suspended in the center, filled with a massive quantity of small, silvery fish. The deck is cluttered with fishing equipment, including ropes, nets, and various mechanical components. A prominent white crane arm extends from the right side of the frame. The background shows the dark, choppy surface of the ocean. The text "Electronic Monitoring System" is overlaid in a white, handwritten-style font across the middle of the image.

Electronic Monitoring System

Technical Standards

Electronic Monitoring / CCTV

Key Elements to consider

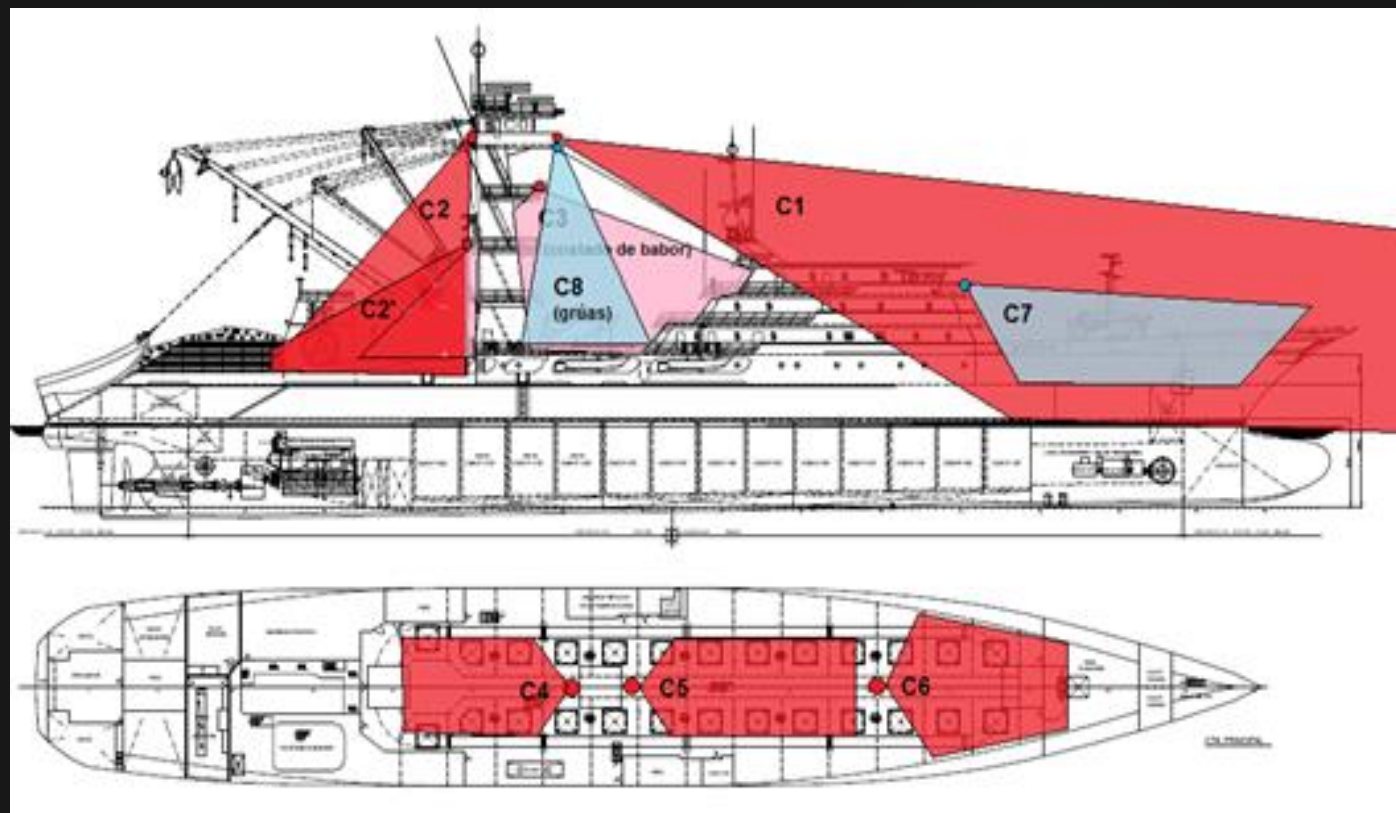
- ✓ Integration with VMS
- ✓ High value Information (not just videos)
- ✓ Data Integrity (against manipulation)
- ✓ Data Confidentiality
- ✓ Encryption
- ✓ Passwords for decryption of HDD through Satellite
- ✓ Real-Time Alarms through Satellite
- ✓ HD cameras
- ✓ Robustness, tamper-proof and sea environment design



Customized Coverage

Tailor made design for each vessel:

- Vessel Equipment
 - Type of data to be collected
 - Vessel Dimensions
 - Shape of fishing decks
 - Fishing and loading operation
- Data review
 - Vessel activity (Effort)
 - Data on target species
 - Good Practices
 - FAD design and activity
 - Bycatch quantification, handling at release and fate



Freezer Purse-seine, ≈80m length, 8 cameras

Data review (DOS)

Dot description		Count
<input type="radio"/>	<input type="text"/>	0
<input type="radio"/>	<input type="text"/>	0
<input type="radio"/>	<input type="text"/>	0
<input checked="" type="radio"/>	YFT	13



TARGET SPECIES

Dot description		Count
<input type="radio"/>	BET	9
<input type="radio"/>	SKJ	13
<input type="radio"/>	<input type="text"/>	0
<input checked="" type="radio"/>	YFT	4



RETAINED BYCATCH
& DISCARDS

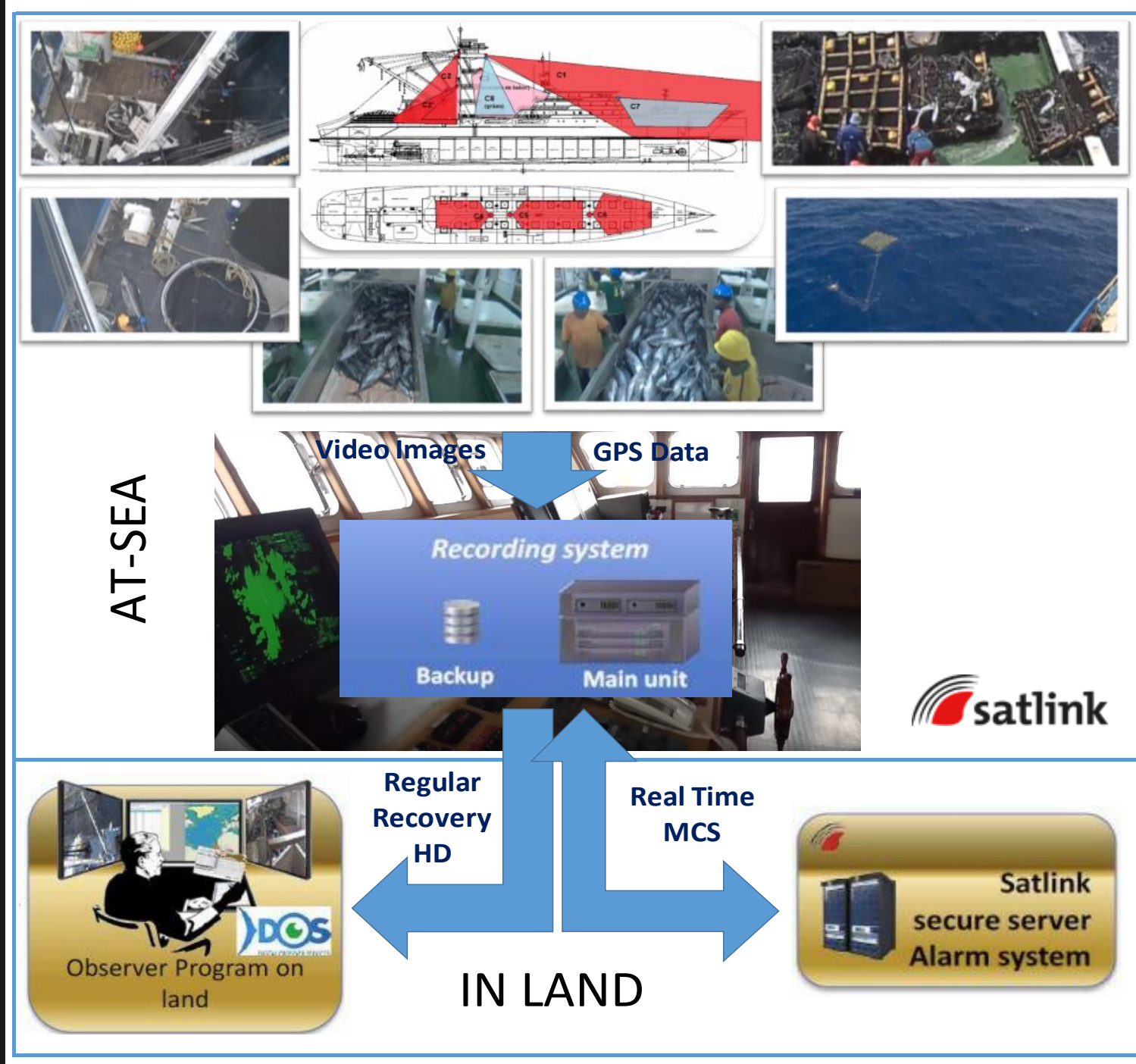


Conformity Good Practices (AZTI)

Bycatch: Handling at release
FAD: Non-entangling Design



EMS in a Nutshell

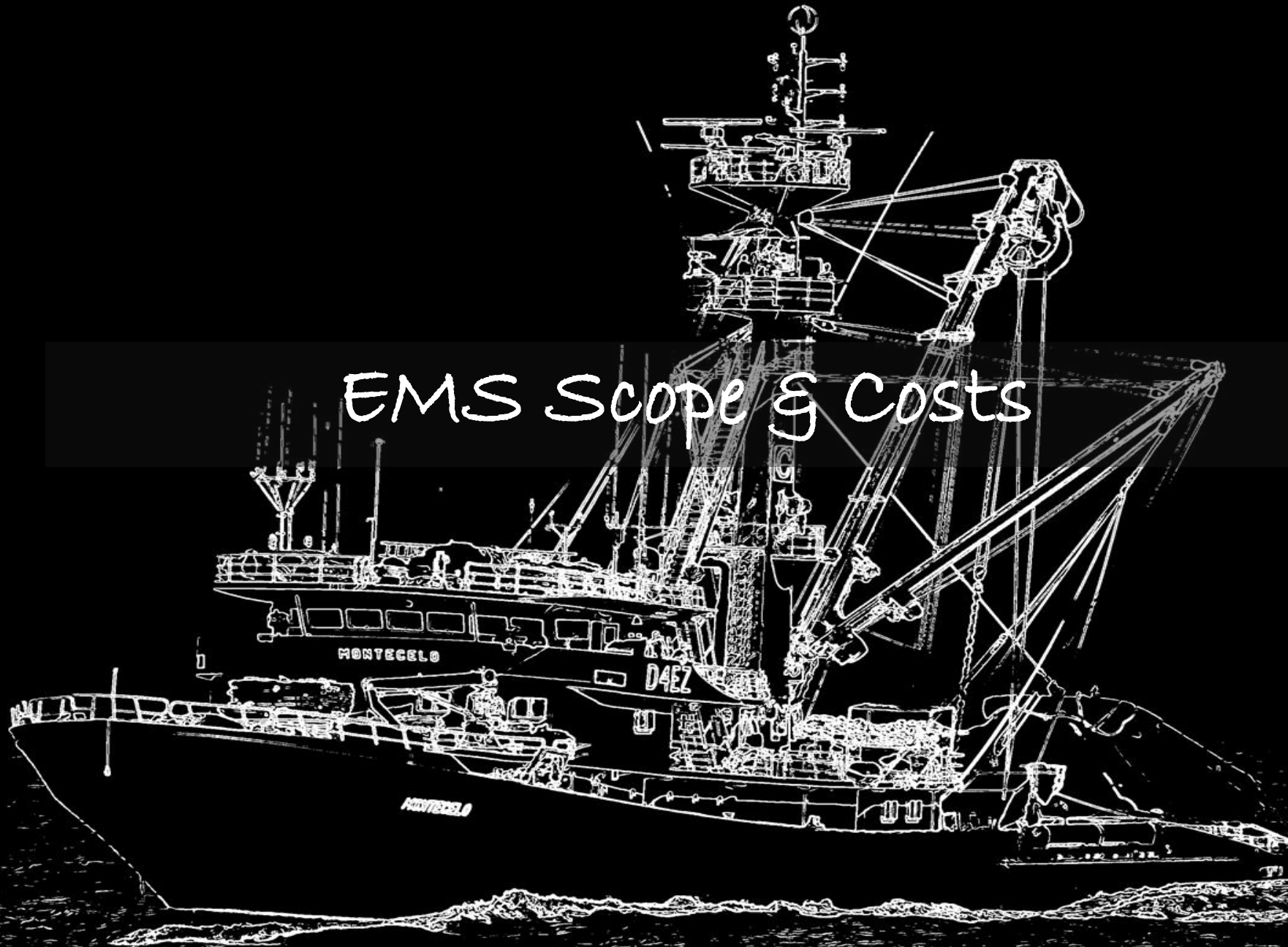


MSC (6+ Stocks) &
FIP (6- Stocks)



100% Fishing
and loading
activities covered
through
observers (EMS
+ Human)

EMS Scope & Costs



The Context

Ocean	Coverage PS Required / Type	#PS AGAC	Human Observers	#PS EMS
Pacific	100% Regional Human	19	100%	9
Atlantic	100% Flag State Combined	13	25%	9
Indian	5% Flag State Human	16	10%	15

- IATTC & WCPFC have implemented regional observer programs for purse seiners that require 100% coverage through human observers
- ICCAT requires 100% observer coverage on purse seiners, which may be implemented through a combination of human and EMS (humans always required at the time of the FAD Closure)
- IOTC only requires 5% coverage for purse seiners (humans)
- Bearing in mind the above, the AGAC companies decide the type of implementation that they prefer
 - 70% of the AGAC purse seine fleet has EMS

Observer Costs



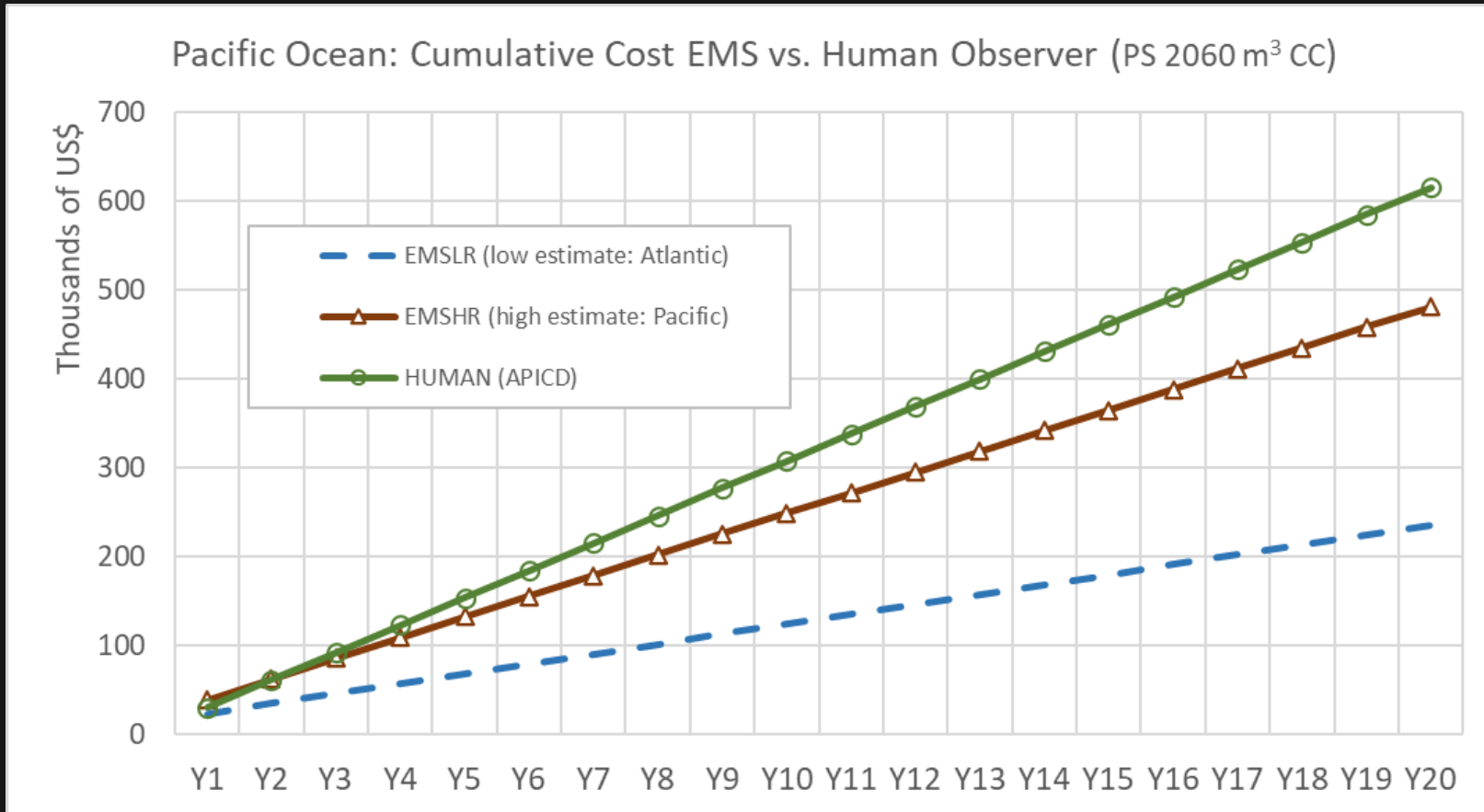
	OPAGAC BBPP (PS)		
	Low range	High range	
Hardware (SeaTube + 6 cameras + SSDs + Other)	11.000		
Installation Cost (Including travel expenses)	1.500	5.000	Depending on location
Yearly Maintenance Cost (including local and remote support via satellite)	1.800	2.550	Depending on location, frequency and additional services
Yearly Disk shipping	250	2.500	Depending on frequency
Yearly Footage analysis	9.000	18.000	Depending on scope of analysis
Daily cost (8 years service life for hardware and 320 fishing days per year)	39,41	78,28	



- Estimates for 2023
- The prices don't include the costs of training that are likely to be the same for at-sea (human) and in land (dry) observers

AIDCP 2023 flagged vessels assessments			
VESSELS LISTED AS ACTIVE			
1	2	3	4
Vessel	Well volume m ³	2023 assessment (m ³ x 14.95) (US\$)	Assessment with penalty of 10% (US\$)
<i>Incognito 1</i>	2,060	30,797	33,877

EMS versus human: Projected Costs



- Prices depend on:
 - Type of data analysis
 - Distance between port of unloading and data review service
- High range shows full data review for farthest port of unloading (e.g., Pago-Pago)
- Costs of human observer are always higher
- Investments on EMS pay-off from 4th year of installation
- Costs of EMS will decrease as AI catches up


A large wooden crate is filled with a massive catch of fish, likely sardines or anchovies, which are packed closely together. The fish have silvery scales and some show dark vertical stripes. In the background, two workers are visible. One worker on the right is wearing a red shirt and a yellow hard hat, and is wearing grey work gloves. Another worker on the left is wearing a green shirt. The scene appears to be on a ship or a fishing dock.

Conclusions

EMS Strengths



- **Transparency:** Human observers are not always accurate (purposely or not); option for third party (Government) verification CCTV images;
- **Adaptation:** All ships, large or small, can be covered and Fishing activities can be observed in full (24/7/365);
- **Human rights watch:** Fishermen and observers protection and behaviour enhancement;
- **Cost-Effectiveness:** The cost of EMS per trip, including video analysis, is lower than human observation and technological improvements will lead to further reduction in video-processing time & cost;

An aerial view of a fishing boat's deck. A large, circular net is suspended in the center, filled with a large quantity of small, silvery fish. Several crew members wearing blue and orange safety gear are visible on the deck, working with the net. The boat's structure, including railings and equipment, is visible around the net. The ocean is visible in the background.

Thanks For Your Attention

E-mail: miguel.herrera@opagac.org

<http://opagac.org/en/>