

# **Uncovering Blue Technology: An Inventory and Analysis of Technologies Addressing Illegal, Unreported, and Unregulated Fishing**

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## EXECUTIVE SUMMARY

Overfishing disproportionately impacts the public health and economies of coastal developing nations (Golden et al. 2016). Illegal, unreported, and unregulated (IUU) fishing drives overfishing by undermining the ability of fishery managers to set and enforce harvest quotas and other management strategies (Sumaila et al. 2020). A variety of technological solutions – from satellite monitoring of fishing vessels to transparency tools facilitating consumption of legal catch – have been proposed as potential solutions to IUU fishing. Despite growing investment in these tools, no comprehensive inventory and analysis of these solutions exists, undermining collaboration in technological development, use of promising tools, and optimization of global funding. This project employed a systematic review of news media articles and seafood technology databases to catalog 168 anti-IUU technologies – the most comprehensive inventory of these technologies to date. Within these 168 technologies, the most commonly observed types of technologies were tools which integrate and synthesize data to support manager decision-making (Data Synthesis), tools which facilitate the reporting of catch (Electronic Catch Reporting), and tools which track vessel locations (VMS). The most frequently discussed parent organization within the news media corpus was Global Fishing Watch, and the species group to which technologies were most frequently applied was Tuna. Application location of these technologies covered the globe with no clear geospatial pattern while headquarters were concentrated in Europe and North America. We hypothesize that these results suggest a) a lack of collaboration in this space, b) the role of regulatory compliance and technology mode in driving technology development, c) the impact of demand by wealthy consumers on technology application and d) the export of anti-IUU technologies from Europe and North America to

nations around the globe. We hope that this inventory provides insight and support to the development and application of technologies addressing IUU fishing.

## **INTRODUCTION**

Overfishing is a significant global challenge. 35.4% of assessed stocks are fished at biologically unsustainable levels and 32.6% of all shark and ray species are classified as threatened under the IUCN Red List – two-thirds of which are solely threatened by overfishing (FAO 2020, Dulvy et al. 2021). This overfishing disproportionately effects smaller unassessed fish stocks which – though they do not provide a majority of the world’s catch – do provide critical nutrition to coastal communities (Costello et al. 2012).

Overfishing has tangible negative impacts on coastal and inland communities. 19% of the globe’s population is vulnerable to nutritional deficiencies from projected declines in and range adjustments of fish populations – patterns in population change driven in part by fisheries industrialization and increased catch by foreign fleets in coastal nations heavily reliant on seafood-sourced micronutrients (Golden et al. 2016). Fisheries are particularly important because the micronutrients they provide are bioavailable and include ‘global problem’ nutrients zinc and iron (Golden et al. 2016). Fish consumption is linked with a host of positive health outcomes including disease prevention, reduction in pre-term delivery, and improved brain function (Thilsted et al. 2016). Some analyses have explicitly linked overfishing with nutrient deficiency, finding that 20 million people worldwide could have avoided undernourishment in the year 2000 had overfishing not existed (Srinivasan et al. 2010).

Overfishing also has significant economic ramifications for coastal nations. Total global economic losses from overfishing and other mismanagement cost the globe an estimated \$83 billion (USD) in 2012, with the greatest losses concentrated in Asia and Africa (The Sunken Billions Revisited 2017).

While overfishing can occur legally, it is often the result of illegal, unreported, and unregulated (IUU) fishing. IUU fishing – as incorporated in 2001 by the FAO’s Committee on Fisheries into the International Plan of Action – IUU (IPOA-IUU) – are fishing behaviors which are *illegal* (Fishing against the laws of the state or the international obligations to which the state is bound), *unreported* (Fishing which has not been reported or which has been misreported to the given state or – where required – the international body which governs the fishery – in contravention of state laws or international body reporting requirements), or *unregulated* (Fishing in an area governed by an international body without being flagged to a member state of that international body or fishing in an area or stock without fisheries regulations which a member state to an international fisheries body has committed to regulate) (FAO). IUU fishing has specifically been credited with annual losses of between \$26 and \$50 billion (USD) and is frequently linked with labor abuse (Tickler et al. 2018, Sumaila et al. 2020).

Technology and the ongoing ‘fourth industrial revolution’ – the current global explosion in connectivity, analytics, automation, and robotics - is frequently presented as a solution to overfishing and the IUU fishing which drives it (McKinsey & Company 2020, Cusack et al. 2021, Leape et al. 2020). Proponents of technology argue that the improvements in data collection, transmission and analysis improve resource managers’ abilities to monitor and control catch and effort in fisheries as well as seal off supply chains from illegitimately sourced fish, thereby reducing motivation for fishers to act illegally (Toonen & Bush 2018, Hosch & Blaha

2017). These technologies monitor and control fisheries production or seal off legitimate supply changes through many avenues, but often execute these tasks by improving the following broad categories of functions (modified from Fujita et al. 2018 and Cusack et al. 2021):

- 1) *Catch accounting*: Accounting for the biophysical nature of legal or illegal catch – species, size, volume, and other information necessary for management.
- 2) *Effort accounting*: Accounting for fishing effort – including spatial and temporal distribution of fishing as well as gear type – in a given fishery or management area.
- 3) *Supply Chain Solutions*, within which lie:
  - a. *Fraud Reduction*: Addressing mislabeling of seafood or verifying sourcing information.
  - b. *Transparency/Sourcing*: Directly informing or facilitating sustainable seafood purchases.
  - c. *Traceability*: Facilitating the passage of information – often about the production, processing, or distribution – associated with a specific unit of product through the supply chain.

Within each of these function categories lie several types of technologies – each of which accomplish one or more of the functions defined above. A non-exhaustive list of these technology types – informed by Cusack et al. 2021 and Fujita et al. 2018 - includes:

- 1) *Data Synthesis*: Integration, analysis, or visualization of data to support fisheries management decision-making. These include technologies which apply machine learning

to satellite-sensed vessel tracks to identify fishing behavior or portals which integrate fisheries data to help managers track quota use.

- 2) *Satellite – based data collection and analysis*: Collection of AIS (Automatic Identification Systems) or VMS (Vessel Monitoring System) signals, or SAR (Side-Aperture Radar), high spatial resolution optical, or VIIRS (Visible Infrared Imaging Radiometer Suite) imagery.
- 3) *Onboard Camera systems*: Onboard camera systems – also known as electronic monitoring (EM) systems - record catch information and other onboard behavior, such as discard practices, as a variably less expensive, more scalable alternative to human observers (Bradley et al. 2019).
- 4) *Electronic Catch Reporting*: Electronic catch reporting – often through logbook apps - helps fishermen easily digitize self-reported catch and effort information for personal and public use (Bradley et al. 2019).
- 5) *Unmanned Vehicles (UVs)*: Unmanned vehicles – including aerial, surface, and underwater applications – are increasingly used to collect information about fishing effort and catch practices. UVs often carry an array of sensors to collect optical and acoustic data (Zuzanna et al. 2022, Toonen & Bush 2018).
- 6) *DNA Testing*: DNA testing has been used extensively to determine the veracity of sourcing information and combat seafood mislabelling; defined as the inaccurate characterization of seafood product information, such as the species or originating population of a given product (Donlan & Luque 2019).
- 7) *Traceability Systems*: Traceability solutions – such as blockchain databases, QR codes or RFID tags – are designed to facilitate the passage of information about a given product

unit along a supply chain. Information can include production information – such as gear type or catch location – processing information – such as batch number, processing location, weight conversions – or distribution information (Olsen et al. 2019, Lewis & Boyle 2017).

- 8) *Vessel Monitoring Systems (VMS)*: Vessel tracker which provides location information at regular intervals. Often required by governments for fishing vessels (Pew Charitable Trusts 2017).
- 9) *Radar Monitoring (Non-Satellite)*: Shore and vessel-based radar units identifying vessel activity through radar signals.
- 10) *Law Enforcement Support*: Technologies which support law enforcement training or data collection.
- 11) *Optical Monitoring (Non-Satellite)*: Cameras designed to monitor vessel behavior.
- 12) *Acoustic Monitoring*: Technologies using acoustic data to track vessel activity. These are mostly underwater hydrophones designed to detect blast fishing.
- 13) *Smart Scales*: Scales with attached cameras to collect weight, length, and species information, thereby facilitating information provision along the supply chain.

While researchers have become familiar with the broad sweep of this growing landscape of technologies and have effectively inventoried a few of the specific types of technologies listed above (electronic monitoring and recreational catch reporting apps - Bradley et al. 2019, IUU machine learning applications – Zuzanna et al. 2021, broad overview - EDF 2021), no researcher has attempted to comprehensively inventory the full range of technologies designed or used to address IUU fishing.



This gap in knowledge is significant. Without a strong understanding of this technology landscape, interested parties have little ability to shape future directions of technological development: to fund or innovate new technologies which might fill in gaps in solution coverage, to support promising technologies which already exist, to share production information or lessons from implementation, or even to evaluate the effectiveness of those already in use. This gap exists not only as a result of a lack of knowledge about which technologies exist and their specific functions, but also where and how these technologies are being applied and who is producing them.

This project has created the first known inventory and analysis of the full range of these technologies. While it is important to note that this inventory can never be complete given the inherent disconnect between on-the-water reality and internet discussion, we hope that this effort provides an increased understanding of the landscape and application of these technologies.

## **METHODS**

To produce this technology inventory, the authors conducted a systematic review of both online news articles and databases of seafood and ocean-focused technologies.

### *NEWS ARTICLE REVIEW*

The authors created the corpus of news articles by applying the search terms below to Google News. All articles were produced before January 2023.

- 1) List of search terms
  - a) “illegal fishing” AND tech\*
  - b) “illicit fishing” AND tech\*
  - c) “IUU” AND tech\*
  - d) “illegal, unreported and unregulated” AND tech\*
  - e) “illegal trade” AND seafood AND tech\*
  - f) “illicit trade” AND seafood AND tech\*

The author automatically included the first 100 results produced by each search term. After that point, the author reviewed the titles of each consecutive set of twenty articles. If any of those articles' titles indicated that the article discussed similar topics to IUU fishing, all twenty articles were included in the corpus. This process ended when the twenty articles' titles did not indicate that the articles contained relevant information or when Google News stopped providing results. This usually happened around the 300<sup>th</sup> article. This process produced a corpus of 1,043 news articles.

Each of these articles was reviewed for inclusion and use based on their discussion of a) technologies (defined as unique, discrete stand-alone software or hardware tools) which are framed as being used or being designed to be used to address illegal, unreported or unregulated fishing or their negatives (negatives such as: supporting compliance with fisheries regulations or non-specific regulations, facilitating reporting of data to governing bodies, or supporting regulation of fisheries) or b) organizations which are framed as creating or owning (where owning refers to the exclusive ownership of - not the use of) technologies (ie qualifying technologies as discussed in section a) addressing IUU fishing.

If an article fit the above criteria, it was listed in the database and reviewed to identify the information in the table below. These variables were selected to capture the nature of the technologies themselves (ie Solution Name, Summary, Parent Organization, Website), their application (Fishery, Location, and Organization of Application, Small-Scale versus Industrial), their origins (Parent Organization Headquarters) and their documented impact (Documented Impact, Observation Type).

Variable	Description
Found Name	Originally identified term within the article for the technology or company
Solution Name	Name of the specific qualifying tool
Summary	Basic function of the tool
Parent Organization	Organization which created the technical aspects of the tool or – where unidentifiable – the organization framed as the exclusive owner/applicant of the tool
Parent Organization Type	NGO, Business, Academia or Government
Website	the web page of the parent organization which discusses the tool
Source	News Media Articles or Database
Technology Category	<p>Inductively created categories to capture the broad breadth of technological solutions. Each category contains at least 2 technologies. Categories capture the central framed intent of the tool – only one category per tool. See the Introduction for full descriptions of each category. The categories are as follows:</p> <ul style="list-style-type: none"> <li>• Data Integration and/or Visualization and/or Analysis</li> <li>• Satellite Technology</li> <li>• Electronic Catch Reporting</li> <li>• Onboard Cameras and Supporting Systems</li> <li>• Optical Monitoring (Non-Satellite)</li> <li>• Radar Monitoring (Non-Satellite)</li> <li>• Acoustic Monitoring</li> <li>• Unmanned Vehicle</li> <li>• VMS: Vessel Monitoring System</li> <li>• Traceability System</li> <li>• Other</li> <li>• Law Enforcement Training and Reporting</li> <li>• Smart Scales</li> </ul>

	<ul style="list-style-type: none"> <li>• DNA Testing</li> </ul>
Fishery/Species of Application	Fishery or species to which the given technology was applied
Location of Application	Location where the given tool was applied. All locations were normalized to the country level where possible. Multiple uses of a single tool within a single contiguous landmass of a country were not documented – only each new use of a tool in a new country was documented.
Organization of Application	Organization(s) applying the given tool. Each organization represents an individual application of the tool. In cases in which multiple organizations collaborated to apply a single tool, the organization closest to the impact was listed (ie the community fishermen’s organization was prioritized over the multinational NGO funding the application).
Organization Type of Application	NGO, Business, Government or Academia
Location of Parent Organization Headquarters	The nation of origin of the parent organization identified above. Where the parent organization was a subsidiary of a global company, that global company’s headquarters was used.
Small-Scale vs. Industrial	Whether or not the given tool was explicitly framed as being designed to address issues with monitoring of or by small-scale fishermen. Explicit application of the tool in question to dynamite fishing qualified those tools as small-scale.
Documented Impact of Technology	Discussion of the impact of the given technology
Impact Observation Type	Type of observation (Anecdotal, Causal, Correlational)

*Table 1: Variables collected for each technology within the inventory.*

After reviewing all articles in the corpus, the author reviewed the parent websites of all produced technologies to collect additional information on the variables above. Parent company websites not in English were translated using the Google Translate extension.

#### *DATABASE REVIEW*

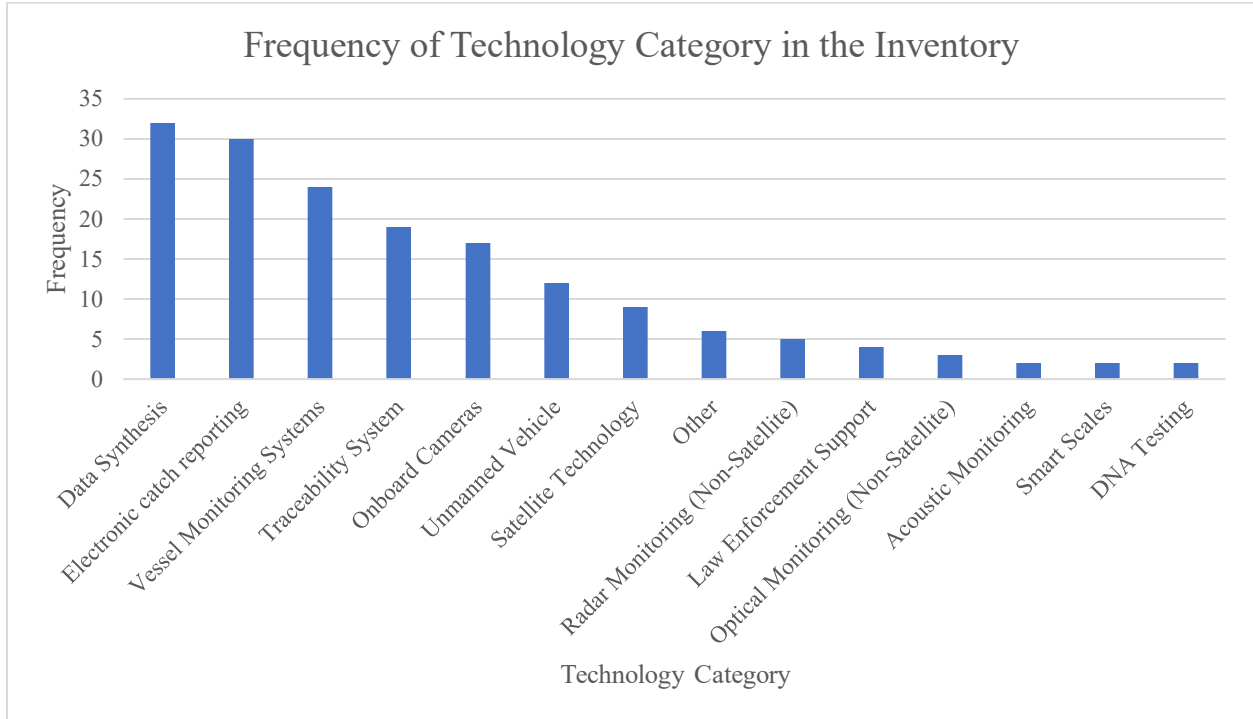
After reviewing all news articles, the author also reviewed two previously-created databases of seafood and ocean-focused technologies. These databases were the Thisfish Seafood Software Directory (<https://this.fish/software-directory/>) and a publicly available list of ocean-focused technologies produced by the expert [Kate Wing](#). The technologies from each were collected during January 2023. The websites of each of the technologies in these databases were reviewed for inclusion based on the same criteria as inclusion for the news media articles. The websites of included technologies were then reviewed for the variables listed above. These searches did not extend beyond the bounds of the parent company website itself. Parent company websites not in English were translated using the Google Translate extension.

#### *TARGETED SEARCH*

Any parent organizations that couldn't be sourced from the news media articles or the website review were identified through a targeted search of the "technology name" + "fish".

### **RESULTS**

This systematic review identified 168 qualifying technologies designed to address IUU fishing. The method that these technologies used to address IUU fishing ranged vastly, from shore-based optical monitoring of coastlines (ie Tianwang) to cryptocurrency-motivated seafood traceability systems (ie FishCoin) to wave-powered autonomous surface vessels (Wave Glider).



*Figure 1.* Frequency of observation of each technology category within the inventory. Data synthesis was the most common technology, followed by electronic catch reporting, Vessel Monitoring Systems and Traceability Systems.

Frequency of technology category within the inventory ranged significantly, with the most common technology category – Data Synthesis – occurring in the inventory 32 times, while Acoustic Monitoring, Smart Scales and DNA Testing each occurred only twice.

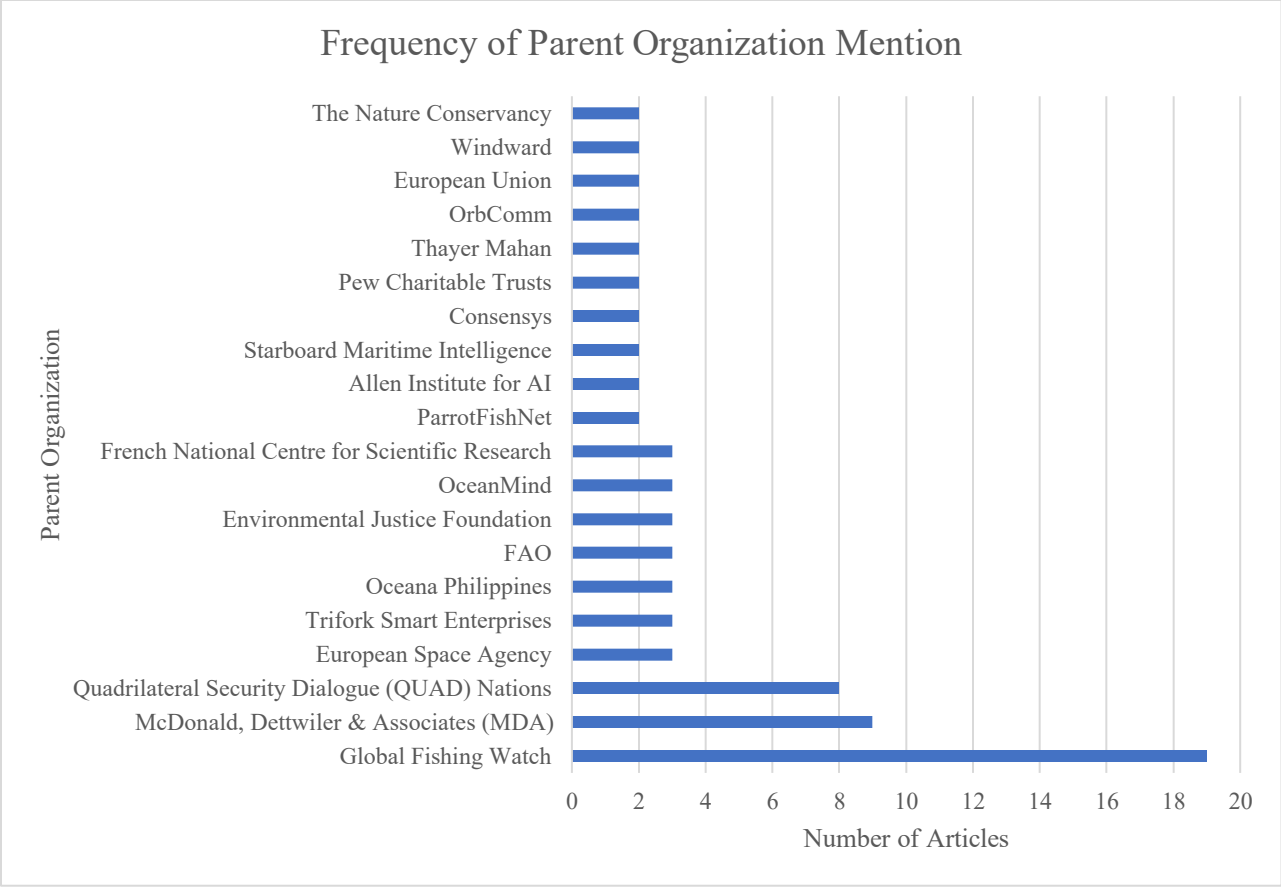


Figure 2. Number of articles which discuss a given parent organization or one of its owned technologies. Only parent organizations with two or more mentions were included. Global Fishing Watch was discussed the most frequently of any parent organization, followed by two other data synthesis and satellite-focused organizations – MDA and the QUAD nations.

The frequency with which parent organizations were framed as being or owning qualifying technologies (i.e. discrete, standalone tools designed to address or used to address IUU fishing) also ranged vastly within the article corpus. Global Fishing Watch dominated news media coverage, with over twice as many mentions as the next most mentioned parent organization (19 mentions). The next most frequently mentioned parent organizations after Global Fishing Watch were two maritime security – focused organizations also using satellites and satellite-produced data to track illegal fishing: MDA (9 mentions) and the QUAD Nations (8 mentions). The tier

below – all with three mentions – included one private company (Trifork Smart Enterprises), three NGOs and three national or international government organizations.

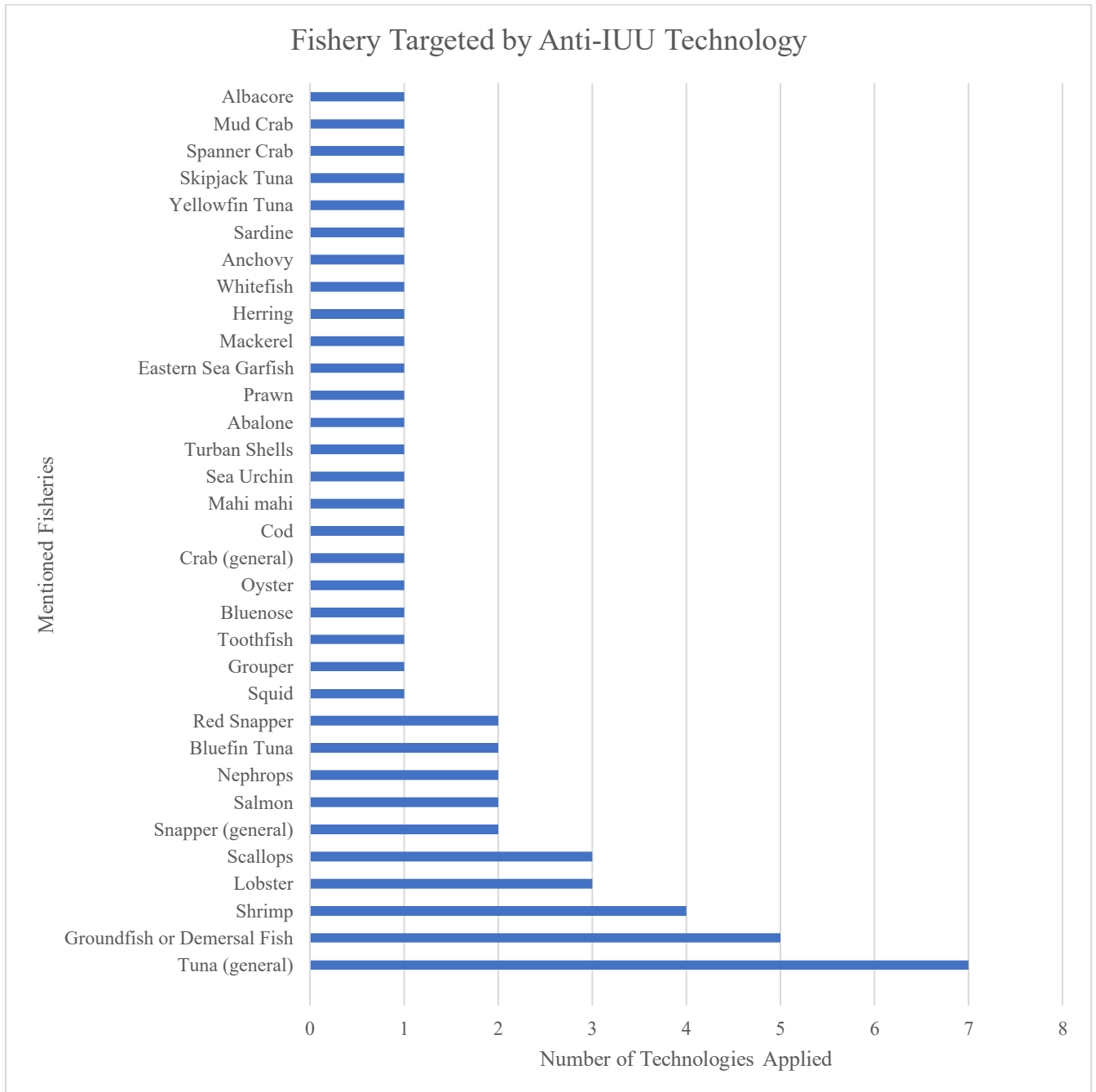
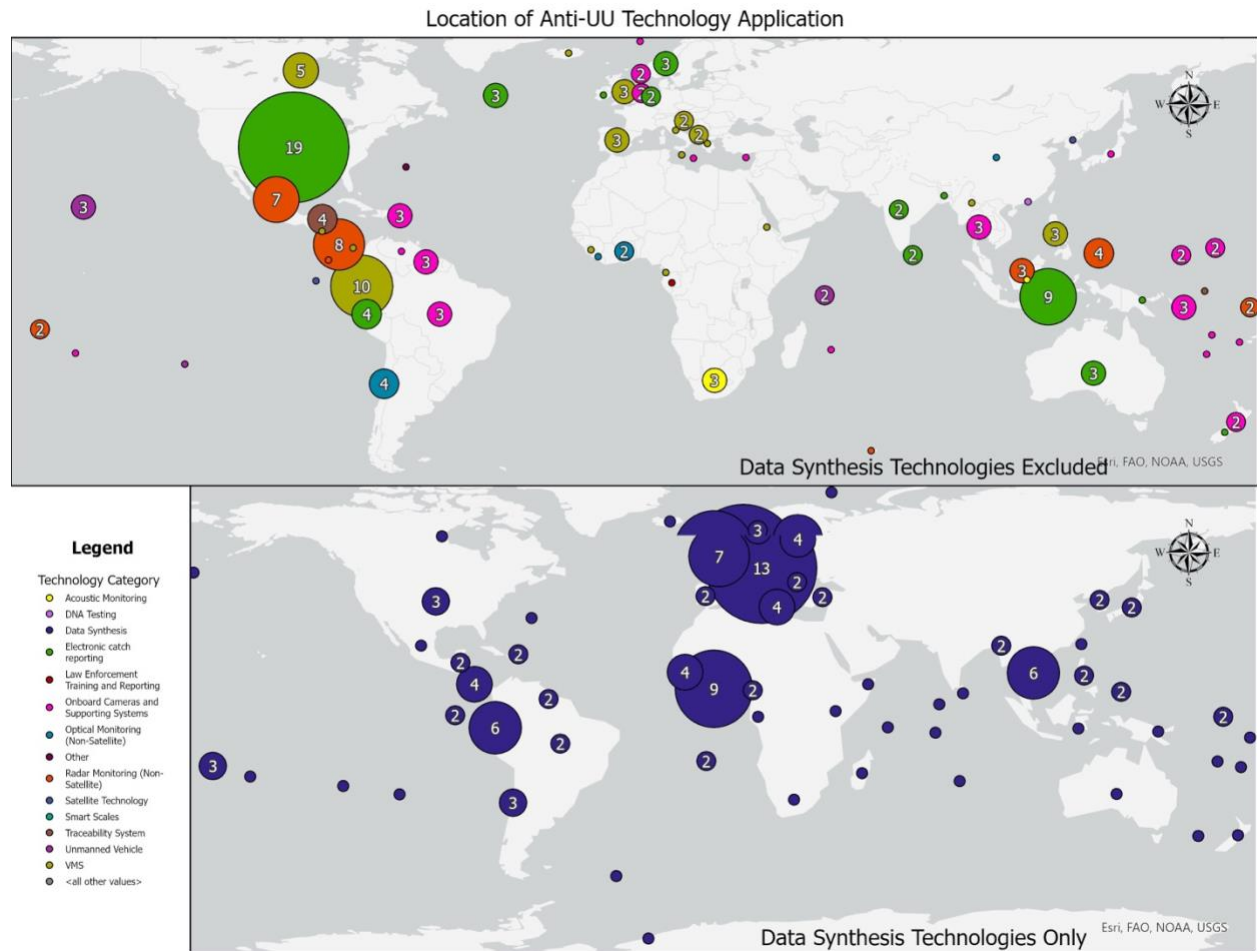


Figure 3. Number of technologies which have been applied to the given fishery. All fisheries represent the fisheries as framed by the article or website from which this application information was drawn. The fishery to which the most technologies had been applied was Tuna,



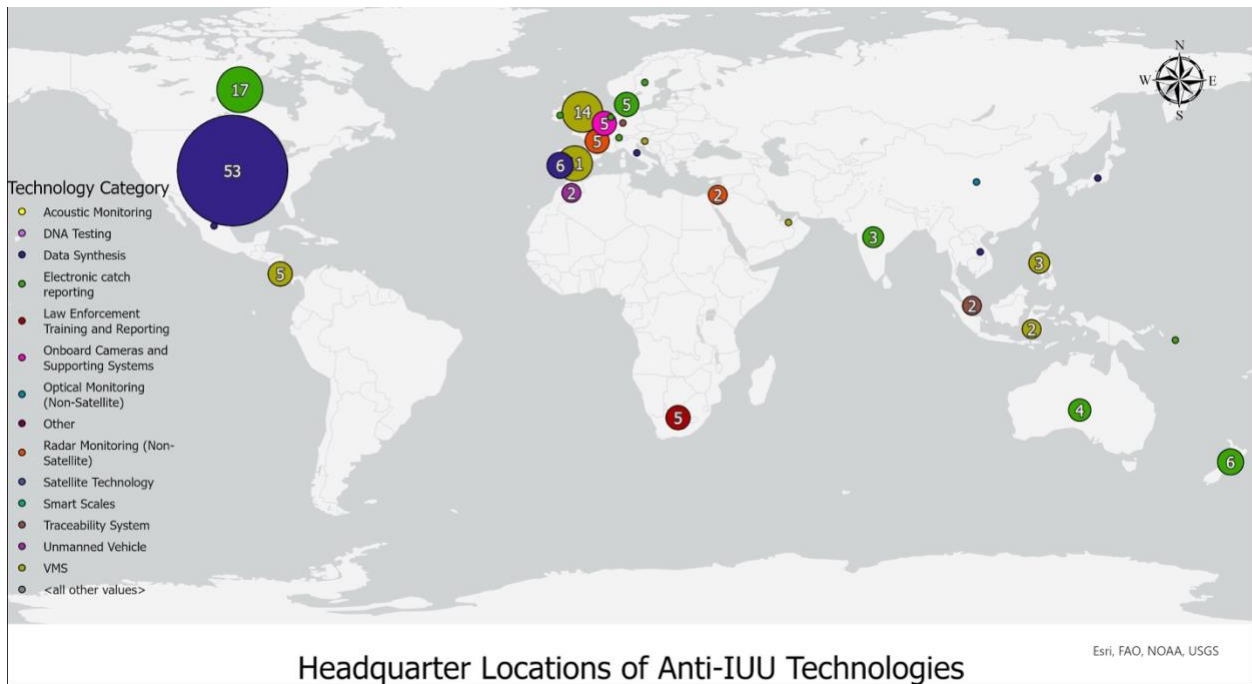
followed by Groundfish or Demersal Fish, Shrimp, Lobster and Scallops. Most technologies within the inventory did not have identifiable fisheries to which they had been applied.



*Figure 4.* Map of location of application of technologies within the inventory. Upper panel represents all technology categories except for Data Synthesis technologies. Bottom panel represents only Data Synthesis technologies. These were differentiated to permit the visualization of non-Data Synthesis technologies given the frequency of Data Integration technologies across almost all geographies. Multiple applications for single technologies were visualized independently. Cluster number represents the number of applications of technologies within that cluster. Cluster color represents the most common technology category within that cluster. Points without values represent single applications. Each technology was only documented as being applied once in a single country – even if they had functionally been applied many times in that nation. Product of ArcGIS Pro.

Data synthesis technologies dominated the geographic distribution of anti-IUU technology application, having been applied across every continent and ocean space. Outside of this

technology category, technology applications vary across the entire globe, with no clear visual pattern.



*Figure 5.* Map of headquarter locations of parent organizations of anti-IUU technologies. Parent organization headquarters were assumed on the global scale, even if a local wing of a parent organization was involved in the production of the given technology. Parent company headquarters were documented in this map the number of times one of their owned technologies appeared in the inventory. Note the clear concentration of the headquarter locations of these technologies in Europe and North America, despite the broad geographic scope of their application visualized in Figure 4. Product of ArcGIS Pro.

While application of technologies varied vastly across the globe with no clear geographic patterns, headquarters of the parent companies of these technologies clearly congregated in Europe and North America. Other hubs of production include Australia, New Zealand, South Africa and Costa Rica.

## **DISCUSSION**

This study has produced, to the author's knowledge, the most comprehensive inventory of technologies designed to address IUU fishing to date. 168 technologies and 14 distinct technological categories suggest both broad interest in and support of technologies designed to address IUU fishing.

This inventory also suggests a broad range of takeaways about the landscape of technological development in this space.

First, this inventory suggests a lack of collaboration among technological developers. Multiple technologies within this inventory have nearly identical names. E-Catch from EFice closely mirrors eCatch from Farallon Geographics (developed to support the work of The Nature Conservancy). Each of these solutions perform the same task – facilitating electronic catch reporting – yet are produced by entirely distinct organizations. OFish from Numer8 Data Analytics and O-FISH from the MongoDB Developer Community also have nearly identical names yet execute very different tasks – electronic catch reporting in the case of OFish and support for law enforcement data collection in the case of O-FISH. This near duplication of technology names within the inventory suggests a lack of inter-developer communication and awareness of the space.

Second, these results suggest the importance of regulatory compliance and technology mode in anti-IUU technology development. Some technological categories – such as Data Synthesis or Electronic Catch Reporting – are observed within the inventory over 20 times. Other categories

are observed very infrequently. We hypothesize that this variation is driven by regulatory compliance and ‘technology mode’ – or the hardware versus software status. Several of the most frequently observed technological categories are technology types which typically assist with compliance with fisheries regulation. Electronic Catch Reporting, Vessel Monitoring Systems, Traceability Systems, and Onboard Cameras – the second through fifth most common technologies in the inventory - all tend to be used to comply with government regulations ranging from government mandates for VMS or Onboard Cameras to broad reporting and import sustainability compliance for Electronic Catch Reporting and Traceability Systems (Vince et al. 2020, overlap with and value of fishery dependent data collection – Bradley et al. 2019). Technologies not associated with compliance – such as Unmanned Vehicles or Radar Monitoring – tend to be less commonly identified in this inventory. This may come as a result of the intersection between these technologies – which unlike compliance technologies surveil participants without their consent - and the secretive world of maritime security, information about which is often kept private (Grady 2023, Filipoff 2021) The outlier in this explanation is the most common technology in the inventory, Data Synthesis technologies, which do not generally assist with regulatory compliance but rather support resource manager decision-making. One explanation for the frequency of Data Synthesis technologies is their ease of development. Software solutions tend to be quicker to develop and more agile in a business environment than hardware solutions (Garbajosa et al. 2017). They also have fewer initial barriers to entry than hardware startups (Berg et al. 2020). Electronic catch reporting – the second most common technology type in the inventory - also tends to be a software solution.

These results also suggest the power of public-private collaboration in shaping news media discourse. The most frequently discussed parent organization in the inventory – Global Fishing Watch – was discussed more than twice as frequently as the next most frequently mentioned parent organization. We hypothesize that this healthy discussion and coverage of Global Fishing Watch results from both its birth from a collaboration between Google, SkyTruth, and Oceana and its early, public-facing application of artificial intelligence (Drakopoulos et al. 2022). This early success – and ongoing relationships with many governments around the world – likely spurs their density of news media coverage.

The fisheries to which anti-IUU technologies are applied appear to be fisheries with high value species demanded by wealthy consumers. Data on this topic is limited – the majority of technologies in the inventory do not have associated information about the fishery or species to which they have been applied. However, of those technologies with documented application to specific fisheries or species, tuna was the most applied group of species, followed by groundfish, shrimp, lobster and scallops. The frequency with which IUU technologies have been applied to these species likely comes as a result of both the management challenges inherent to their harvest – tuna specifically are both high value and highly migratory, theoretically making their harvest a particularly choice target for IUU fishing – and their demand in wealthy nations with consumers able and willing to pay a premium for sustainability (Liddick 2014, Petrossian 2015).

Finally, our results suggest an export of anti-IUU technologies from Europe and North America to locations around the globe. Both panels of Figure 4 display the broad geographic distribution of applications of both Data Synthesis technologies (bottom panel) and other technologies (upper

panel). In contrast, Figure 5 clearly displays a concentration of technology headquarters in Europe and North America. This finding suggests support for the observations of Drakopoulos et al. (2022) concerning the export of anti-IUU technologies from Western countries to non-Western countries.

It is important to note the limitations inherent to this study. Online discourse is both inherently incomplete – there will never be a perfect match between on the water reality and online discussion – and subject to patterns of secrecy particularly with national security issues, which IUU fishing has recently become (Grady 2020, Filipoff 2021). Because of these secrecy of these technologies – and particularly technologies used by governments to spy on actors without their consent – the volume of these technologies in the inventory is likely artificially low, and the application of these technologies is underrepresented globally, but particularly in the wealthy nations from which these technologies originate. At the same time, the application of technologies by NGOs or wealthy nations in lower-income nations may be prioritized in online discussion to shape global opinion or raise funds (Goldsmith et al. 2014, Vince et al. 2020). This would result in the overrepresentation of application of these technologies in lower-income countries in this inventory relative to real-world conditions.

The second major limitation to this study lies within the FAO's definition of IUU fishing itself. The term 'IUU' and FAO's definition of its component parts – particularly that of reporting *to a governing body or state* or regulation *by a governing body or state* – is inherently built around a top-down conceptualization of fisheries management. As such these results are undoubtedly skewed towards technologies which address IUU fishing through top-down methods. In fact the

relatively well-known, small-scale fishing focused solution Abalobi was excluded from these results as it had no stated focus on communicating or reporting data to the government. This is despite the role that these tools can play in communicating catch and effort data to community organizations, who can thereby self-organize to improve management or enforce fisheries management rules (Petrik & Raemaekers 2018).

The third limitation to this study was its reliance on English language text. While websites were translated to English using Google Translate, news media articles were searched using English terms, thus limiting the scope of results only to English language results. In addition, the databases reviewed were produced by North American organizations and experts, likely limiting their geographic scope.

## **CONCLUSION**

This study identified 168 unique tools designed to address IUU fishing – the most comprehensive inventory of these tools to date. The nature of these tools – from the density of data synthesis technologies to the concentration of headquarters in Europe and North America – suggest a need for enhanced collaboration and the impact of regulation, consumer demand, and ‘technology mode’ on development in this space. We hope that this inventory provides insight and future guidance for technologies addressing IUU fishing.

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## APPENDIX

Solution Name	Summary	Website
OceanMind AI	AI technology which integrates a variety of datasets to identify IUU fishing	<a href="https://oceanmind.global/impact/">https://oceanmind.global/impact/</a>
Global Fishing Watch Public Map	Online map platform which displays AIS and other data to increase transparency around illegal fishing	<a href="https://globalfishingwatch.org/">https://globalfishingwatch.org/</a>
Tianwang	Shore-based cameras with AI data analysis to monitor for illegal fishing	NA
M2 Cloud Viewer	Analysis of radar signals to identify IUU fishing	<a href="https://m2marinemonitor.com/">https://m2marinemonitor.com/</a>
M2 Control Center	Shore-based radar to monitor IUU fishing	<a href="https://m2marinemonitor.com/">https://m2marinemonitor.com/</a>
SafeSeaNet	vessel traffic monitoring and information system integrating information across the EU	<a href="https://www.emsa.europa.eu/ssn-main.html">https://www.emsa.europa.eu/ssn-main.html</a>
Indo-Pacific Maritime Domain Awareness program	tracking system for illegal fishing from the Indian Ocean to the South Pacific by connecting surveillance centres in Singapore and India	NA
CSIRO hydrophones	Hydrophones used for illegal fishing	<a href="https://research.csiro.au/iuu/case-studies/hydrophones/">https://research.csiro.au/iuu/case-studies/hydrophones/</a>
FISHFORCE	Immersive training technology	<a href="https://www.seamonster.co.za/portfolios/fishforce/">https://www.seamonster.co.za/portfolios/fishforce/</a>
Dark Vessel Detection program	military-grade satellite imaging and processing system	<a href="https://mda.space/en/dark-vessel/">https://mda.space/en/dark-vessel/</a>
Cocos Island Radar	Shore-based radar and analysis for IUU fishing	NA
Supply Chain Risk Tool	tool to use satellite data to inform company decisionmaking	NA
STAR-X 3D Naval Radar	on-board radar for illegal fishing	<a href="https://www.iai.co.il/p/elm-2238x-star-x">https://www.iai.co.il/p/elm-2238x-star-x</a>
Starboard	Synthesizes satellite and other data to identify IUU fishing	<a href="https://starboard.nz/">https://starboard.nz/</a>
Skylight	AI analysis of satellite imagery to identify suspicious fishing vessels/activity	<a href="https://www.skylight.global/">https://www.skylight.global/</a>
Spire Maritime	Satellite technology used by GFW to address IUU	<a href="https://spire.com/maritime/">https://spire.com/maritime/</a>
Trifork Smart Enterprises A/S iPhone app	iPhone app for reporting catch info by fisherman.	<a href="https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios">https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios</a>
Trifork Smart Enterprises A/S iPad app	iPad app for reporting weight, quality data	<a href="https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios">https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios</a>
Trifork Smart Enterprises A/S Web app	Web app for integrating information from previous apps and reporting	<a href="https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios">https://trifork.com/?portfolio=documenting-sustainable-fishing-with-user-friendly-ios</a>
Global Information Exchange System	IT platform to help PSMA governments share information about IUU vessels	<a href="https://psma-gies.review.fao.org/">https://psma-gies.review.fao.org/</a>
RADAR-SAT 2	Satellite technology to address illegal fishing	<a href="https://www.asc-csa.gc.ca/eng/satellites/radarsat2/">https://www.asc-csa.gc.ca/eng/satellites/radarsat2/</a>
Marine Manager	dashboard which integrates multiple datasets to improve fisheries management	<a href="https://globalfishingwatch.org/marine-manager-portal/">https://globalfishingwatch.org/marine-manager-portal/</a>
IUU Vessel Tracker	Tool which visualizes AIS location of all vessels on RFMO's IUU vessel lists	<a href="https://usa.oceana.org/iuuvesseltracker/">https://usa.oceana.org/iuuvesseltracker/</a>

OCEAN SENTINEL	attaching radar sensors to albatrosses to detect illegal fishing	NA
Vessel Viewer	provides information on vessel identity, fishing activity, port visits etc. to managers	<a href="https://www.tm-tracking.org/our-tools">https://www.tm-tracking.org/our-tools</a>
Export Certification System	Online platform to submit catch certificates for Irish exporters	<a href="https://www.gov.ie/en/publication/d6a9f-export-certification/">https://www.gov.ie/en/publication/d6a9f-export-certification/</a>
Dase	app to submit geo-located videos or pictures of fisheries infractions	<a href="https://ejfoundation.org/news-media/new-phone-app-is-effective-weapon-in-ghanas-fight-against-illegal-fishing">https://ejfoundation.org/news-media/new-phone-app-is-effective-weapon-in-ghanas-fight-against-illegal-fishing</a>
ATLAN Pro	AI to help drones to address illegal fishing	<a href="https://atlanspace.com/atlan-pro/">https://atlanspace.com/atlan-pro/</a>
ATLAN Insights	AI to help drones to address illegal fishing	<a href="https://atlanspace.com/atlan-pro/">https://atlanspace.com/atlan-pro/</a>
PDS Ultra-Light Vessel Tracking System	VMS tech for small scale fisheries	<a href="https://www.pelagicdata.com/details#hardware">https://www.pelagicdata.com/details#hardware</a>
Seamaster	portable, solar-powered GPStracker for vessels	NA
Karagatan Patrol	online platform for reporting illegal fishing and visualizing VIIR	<a href="https://www.karagatanpatrol.org/">https://www.karagatanpatrol.org/</a>
Fathom5	industrial technology ensuring secure digital backplane for maritime trade	<a href="https://www.fathom5.co/#Divisions">https://www.fathom5.co/#Divisions</a>
Dark Vessel Detection program	Satellite SAR data to address illegal fishing	<a href="https://www.iceye.com/use-cases/security/dark-vessel-detection/interactive-demo">https://www.iceye.com/use-cases/security/dark-vessel-detection/interactive-demo</a>
Tuna traceability pilot	Use of blockchain, QR codes and RFID tags to trace tuna through supply chain	<a href="https://wwf.panda.org/wwf_news/?320232/New-Blockchain-Project-has-Potential-to-Revolutionise-Seafood-Industry">https://wwf.panda.org/wwf_news/?320232/New-Blockchain-Project-has-Potential-to-Revolutionise-Seafood-Industry</a>
Provenance	Tuna traceability solution	<a href="https://www.provenance.org/tracking-tuna-on-the-blockchain">https://www.provenance.org/tracking-tuna-on-the-blockchain</a>
Electronic Bluefin Catch Documentation	Electronic system to track Atlantic bluefin catch and trade	<a href="https://www.iccat.int/en/ebcdprog.asp">https://www.iccat.int/en/ebcdprog.asp</a>
Japan Satellite AI	AI analysis of satellite imagery to identify suspicious fishing vessels/activity	NA
Interactive Port Tool	Tool using satellite and other data to display IUU risks at ports	<a href="https://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2020/port-activity-study-reveals-potential-for-illegal-fish-to-enter-markets">https://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2020/port-activity-study-reveals-potential-for-illegal-fish-to-enter-markets</a>
ZenVMS Satellite	VMS tech	<a href="https://www.zen-vms.com/zenvms-satellite">https://www.zen-vms.com/zenvms-satellite</a>
ZenVMS LTE	VMS tech	<a href="https://www.zen-vms.com/zenvms-satellite">https://www.zen-vms.com/zenvms-satellite</a>
OmniCom VMS	VMS tech	<a href="https://metocean.com/environment/vessel-monitoring-system/">https://metocean.com/environment/vessel-monitoring-system/</a>
iTrac VMS	VMS tech	<a href="https://metocean.com/environment/vessel-monitoring-system/">https://metocean.com/environment/vessel-monitoring-system/</a>
Hali Iridium	VMS tech. Small craft	<a href="https://www.polestarglobal.com/software-solutions/fisheries-vms">https://www.polestarglobal.com/software-solutions/fisheries-vms</a>
ST 6100	VMS tech. Standard	<a href="https://www.polestarglobal.com/software-solutions/fisheries-vms">https://www.polestarglobal.com/software-solutions/fisheries-vms</a>
ROMTrax Wi-Fi VMS	VMS tech	<a href="https://www.romcomm.com/VesselMonitoringSystem.html">https://www.romcomm.com/VesselMonitoringSystem.html</a>
PB3 PowerBuoy	MDA buoys to address illegal fishing	<a href="https://oceanpowertechnologies.com/platforms/">https://oceanpowertechnologies.com/platforms/</a>
Sentinel-1	Satellites which include radar imagery and was used by GFW for dark vessels	<a href="https://sentinel.esa.int/web/sentinel/missions/sentinel-1">https://sentinel.esa.int/web/sentinel/missions/sentinel-1</a>
Data Explorer	USV to address IUU fishing. Includes radar and hydrophone	<a href="https://openoceanrobotics.com/datexplorer/">https://openoceanrobotics.com/datexplorer/</a>
Outpost	USV to address IUU fishing. Tows underwater sensors	<a href="https://www.thayermahan.com/systems/outpost">https://www.thayermahan.com/systems/outpost</a>
SeaWatch	USV to address IUU fishing. Surface data collection	<a href="https://www.thayermahan.com/systems/outpost">https://www.thayermahan.com/systems/outpost</a>
WAM-V	USV to address IUU fishing	<a href="https://wam-v.com/">https://wam-v.com/</a>
ZaCube-2 Satellite	Nano satellites to address illegal fishing	<a href="https://www.cput.ac.za/newsroom/news/article/3540/south-africa%E2%80%99s-most-powerful-nano-satellite-sent-off-yesterday">https://www.cput.ac.za/newsroom/news/article/3540/south-africa%E2%80%99s-most-powerful-nano-satellite-sent-off-yesterday</a>
TNC EM System	onboard cameras for tuna to address IUU	<a href="https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/transforming-the-last-tuna-stronghold/">https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/transforming-the-last-tuna-stronghold/</a>
OrbComm Satellite Technology	Satellite data provider. Used by GFW	<a href="https://www.orbcomm.com/en/solutions/maritime/ais-data">https://www.orbcomm.com/en/solutions/maritime/ais-data</a>
ATLAS	intelligence as a service' with stated design for IUU use	<a href="https://www.tekever.com/models/ar5/">https://www.tekever.com/models/ar5/</a>
AR5	Drone with stated design for IUU use	<a href="https://www.tekever.com/models/ar5/">https://www.tekever.com/models/ar5/</a>
O-FISH	Reporting app for fisheries enforcement officers	<a href="https://www.mongodb.com/blog/post/mongodb-cloud-rescue-protecting-oceans-open-source-application">https://www.mongodb.com/blog/post/mongodb-cloud-rescue-protecting-oceans-open-source-application</a>
SharkTrace	traceability solution for sharks across supply chain (production, processing etc.)	<a href="https://www.traffic.org/sharktrace/">https://www.traffic.org/sharktrace/</a>
Detect IT: Fish	online tool to help global customs and enforcement agencies better detect illegal trade in fish	<a href="https://www.traffic.org/news/using-technology-to-save-the-oceans-new-tool-to-detect-illegal-fishing/">https://www.traffic.org/news/using-technology-to-save-the-oceans-new-tool-to-detect-illegal-fishing/</a>
FINDNA	DNA testing kit for IUU prevention	<a href="https://www.peclabfiu.com/post/new-portable-dna-tool-rapidly-identifies-cites-listed-shark-species">https://www.peclabfiu.com/post/new-portable-dna-tool-rapidly-identifies-cites-listed-shark-species</a>

TransparenSea	QR code tracking for US Gulf produced seafood	<a href="https://www.gulfwild.com/Main/Programs/TransparenSea">https://www.gulfwild.com/Main/Programs/TransparenSea</a>
Maritime Security Solution	Satellite monitoring of illegal fishing. Thermal and SAR	<a href="https://aistechspace.com/technology/">https://aistechspace.com/technology/</a>
CATCH	Online database of catch certificates to support EU controls on seafood imports	<a href="https://oceans-and-fisheries.ec.europa.eu/fisheries/rules/illegal-fishing_en">https://oceans-and-fisheries.ec.europa.eu/fisheries/rules/illegal-fishing_en</a>
Wind-ward Predictive Maritime Intelligence	predictive maritime intelligence platform	<a href="https://windward.ai/solutions/iuu-fishing/">https://windward.ai/solutions/iuu-fishing/</a>
FishFace	AI support for electronic monitoring - species ID and activity on deck	<a href="https://www.natureaustralia.org.au/what-we-do/our-priorities/oceans/ocean-stories/fishface/">https://www.natureaustralia.org.au/what-we-do/our-priorities/oceans/ocean-stories/fishface/</a>
SeaTracker	GPS iphone app that permits rangers to upload instances of illegal fishing	<a href="https://theseapeople.org/sea-tracker/">https://theseapeople.org/sea-tracker/</a>
ShotSpotter	sensors and hydrophones to detect blast fishing	<a href="https://www.shotspotter.com/blog/fighting-the-scourge-of-blast-fishing/">https://www.shotspotter.com/blog/fighting-the-scourge-of-blast-fishing/</a>
Blue Shield Program	Blue shield - passive acoustic devices + satellite devices - implemented in Bermuda. Not presumed owned but is specific application of technology	<a href="https://www.gov.bm/articles/bermuda-becomes-first-overseas-territory-join-blue-shield">https://www.gov.bm/articles/bermuda-becomes-first-overseas-territory-join-blue-shield</a>
OpenSC	blockchain traceability across seafood supply chain	<a href="https://opensc.org/">https://opensc.org/</a>
xyzt.ai	innovative no-code geospatial platform for visualizing and analyzing vast amounts of movement and time series data	<a href="https://xyzt.ai/use-case-iuu-fishing/">https://xyzt.ai/use-case-iuu-fishing/</a>
AAC SpaceQuest	satellite data provider which provided first AIS data for GFW	<a href="https://www.aac-clyde.space/who-we-are/our-brands/aac-spacequest#brio">https://www.aac-clyde.space/who-we-are/our-brands/aac-spacequest#brio</a>
Noro e-Port CDT System	electronic catch-documentation scheme at the Noro Port	<a href="https://solomons.gov.sb/solomon-islands-leading-the-region-for-a-digitally-integrated-cds-traceability-e-port-system/">https://solomons.gov.sb/solomon-islands-leading-the-region-for-a-digitally-integrated-cds-traceability-e-port-system/</a>
Saildrone Explorer	USV designed to help with IUU fishing. Low cost long endurance	<a href="https://www.saildrone.com/">https://www.saildrone.com/</a>
Saildrone Voyager	USV designed to help with IUU fishing. Specific MDA	<a href="https://www.saildrone.com/">https://www.saildrone.com/</a>
Movimar System	satellite tracking technology for Vietnam	<a href="https://fisheries.groupcls.com/movimar-project-cls-helps-vietnamese-government-manage-fishing-resources-sustainably/">https://fisheries.groupcls.com/movimar-project-cls-helps-vietnamese-government-manage-fishing-resources-sustainably/</a>
VnFishbase Software	Vietnam's national fisheries database	NA
Norpac Fisheries Export Traceability System	Barcodes to attach catch information to individual fish	<a href="https://www.norpaceport.com/quality/traceability/">https://www.norpaceport.com/quality/traceability/</a>
Snap IT EM Technology	EM technology	<a href="https://www.tridentsystems.co.nz/our-work/collecting-data/video-observation/">https://www.tridentsystems.co.nz/our-work/collecting-data/video-observation/</a>
ELB2020	Location reporting beacon (VMS) for industrial application	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
INDUSTRIAL NANO VMS	Location reporting beacon (VMS) for industrial application	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
ARTISANAL NANO VMS	VMS for small scale fisheries. Solar powered	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
Fishing Management Center	Visualization and support for managers of VMS information	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
Electronic Reporting System	Electronic logbook for reporting to state managers	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
SeaTube	Electronic Monitoring system	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
Fleet Management Tools	Tools for managers to visualize fishing vessel location and images	<a href="https://www.satlink.es/en/solutions/fleet-management-and-monitoring">https://www.satlink.es/en/solutions/fleet-management-and-monitoring</a>
Sphyrna ALV	Unmanned Surface Vessel	<a href="http://www.seaproven.com/">http://www.seaproven.com/</a>
REMORA VMS	VMS	<a href="https://www.remoraxyz.com/technologies.html">https://www.remoraxyz.com/technologies.html</a>
REMORA Smart Scale	Image capture and weight for traceability	<a href="https://www.remoraxyz.com/technologies.html">https://www.remoraxyz.com/technologies.html</a>
REMORA WhatsFish	Mobile app to create marketplace to connect fishermen and consumers	<a href="https://www.remoraxyz.com/technologies.html">https://www.remoraxyz.com/technologies.html</a>
REMORA Fishing Data Platform	Data intelligence platform to compile Remora information	<a href="https://www.remoraxyz.com/technologies.html">https://www.remoraxyz.com/technologies.html</a>
FlyWire EMS	EM technology	<a href="https://www.flywirecameras.com/">https://www.flywirecameras.com/</a>
Fish Trax	Fisheries data collection and sharing platform	<a href="http://fishtrax.org/">http://fishtrax.org/</a>
Tagging app	Tagging and harvest logs for shellfish producers	<a href="https://www.blue-trace.com/">https://www.blue-trace.com/</a>
Distributor app	Traceability tracking for shellfish distributors	<a href="https://www.blue-trace.com/">https://www.blue-trace.com/</a>
Nadir	Seafood production and traceability software	<a href="http://plenumssoftmarina.com/en/">http://plenumssoftmarina.com/en/</a>
eCatch V2.0	online platform to make querying, visualizing, and reporting fisheries data easier for fishermen	<a href="https://fargeo.com/blog/project/nature-conservancy-ecatch-version-2-0-ios/">https://fargeo.com/blog/project/nature-conservancy-ecatch-version-2-0-ios/</a>
OFish	provides information to small scale fishers and receives information on catch	<a href="https://www.numer8.in/">https://www.numer8.in/</a>
Fish Online eVTR App for iOS	Online platform to submit catch information to US government	<a href="https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/electronic-vessel-trip-reporting-software-options#garfo-fish-online">https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/electronic-vessel-trip-reporting-software-options#garfo-fish-online</a>

Fish Online Web App	Online platform to submit catch information to US government	<a href="https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/electronic-vessel-trip-reporting-software-options#garfo:-fish-online">https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/electronic-vessel-trip-reporting-software-options#garfo:-fish-online</a>
Fleet One Vessel Monitoring System	VMS tech	<a href="https://www.inmarsat.com/en/solutions-services/maritime/solutions/sustainable-fishing.html">https://www.inmarsat.com/en/solutions-services/maritime/solutions/sustainable-fishing.html</a>
Wave Glider	USV with IUU application	<a href="https://www.liquid-robotics.com/markets/defense-security/">https://www.liquid-robotics.com/markets/defense-security/</a>
BigOceanData	Vessel tracking data synthesis. IUU application	<a href="https://www.bigoceandata.com/applications/fisheries-vessel-monitoring-systems-vms/">https://www.bigoceandata.com/applications/fisheries-vessel-monitoring-systems-vms/</a>
Dynamic Data Logger	on-board unit capable of capturing, managing and reporting all marine-related data	<a href="https://elog.olsps.com/">https://elog.olsps.com/</a>
Dynamic Data Manager	complete, web based, vessel registry and quota management system	<a href="https://elog.olsps.com/">https://elog.olsps.com/</a>
BlueTraker VMS System	VMS system	<a href="https://www.bluetraker.com/solutions/vessel-monitoring-system/">https://www.bluetraker.com/solutions/vessel-monitoring-system/</a>
Pointrek	VMS tech and electronic logbook	<a href="https://www.pointrek.net/">https://www.pointrek.net/</a>
E-Catch	electronic logbook	<a href="https://efice.com/en/oplossingen-en/solutions-to-be-use-on-shore/efcie-e-catch/">https://efice.com/en/oplossingen-en/solutions-to-be-use-on-shore/efcie-e-catch/</a>
FishVue Lime	EM technology	<a href="https://www.archipelago.ca/our-products">https://www.archipelago.ca/our-products</a>
FishVue Mobile	ipad based EM camera	<a href="https://www.archipelago.ca/our-products">https://www.archipelago.ca/our-products</a>
FishVue Float	electronic logbook	<a href="https://www.archipelago.ca/our-products">https://www.archipelago.ca/our-products</a>
TraceSeaFood	blockchain traceability technology for seafood	<a href="https://trace.quillhash.com/traceseafood">https://trace.quillhash.com/traceseafood</a>
Deckhand	electronic logbook	<a href="https://deckhandlogbook.com/product/">https://deckhandlogbook.com/product/</a>
CSB Seafood ERP	Seafood inventory management and data collection	<a href="https://www.csb.com/en/industries/food-beverages/fish">https://www.csb.com/en/industries/food-beverages/fish</a>
MarineStar	VMS and electronic logbook solution	<a href="https://www.thuraya.com/en/services/thuraya-sattrack-for-marine">https://www.thuraya.com/en/services/thuraya-sattrack-for-marine</a>
KnowYour.Fish	Traceability software	<a href="https://vericatch.com/products/fisheriesapp/">https://vericatch.com/products/fisheriesapp/</a>
ELOGS	electronic logbook	<a href="https://vericatch.com/products/fisheriesapp/">https://vericatch.com/products/fisheriesapp/</a>
FisheriesApp	fisheries catch reporting platform	<a href="https://vericatch.com/products/fisheriesapp/">https://vericatch.com/products/fisheriesapp/</a>
Blue Box V77	VMS tech	<a href="https://zunibal.com/en/localisation-and-monitoring/blue-box-v77/">https://zunibal.com/en/localisation-and-monitoring/blue-box-v77/</a>
i-Fish	electronic catch reporting	<a href="https://www.ifish.id/?q=id">https://www.ifish.id/?q=id</a>
Mabel Systems	seafood traceability and inventory management software	<a href="https://www.mabelsystems.com/">https://www.mabelsystems.com/</a>
MarineObserve	EM technology	<a href="https://www.marineinstruments.es/products/remote-electronic-monitoring-rem/">https://www.marineinstruments.es/products/remote-electronic-monitoring-rem/</a>
750 Dual-Band MTU	VMS technology	<a href="https://fariabeede.com/2-pages/entelnet_wd750_vms.php">https://fariabeede.com/2-pages/entelnet_wd750_vms.php</a>
LegitFish	Seafood traceability and transparency technology based on government record verification	<a href="https://legitfish.com/services/">https://legitfish.com/services/</a>
Goldfish	Seafood import/export compliance check software	<a href="https://www.goldfish.io/">https://www.goldfish.io/</a>
TrazApp	Catch documentation and seafood traceability system	<a href="https://www.trazapp.org/">https://www.trazapp.org/</a>
NABIT	DNA testing for IUU prevention	<a href="https://conservationlabs.com/nabit">https://conservationlabs.com/nabit</a>
Fish Activity and Catch Tracking System (FACTS)	electronic logbook and fishing effort reporting	<a href="https://www.fisheryfacts.com/products#features">https://www.fisheryfacts.com/products#features</a>
Saga	seafood traceability technology	<a href="https://psqr.eu/seafood-traceability/">https://psqr.eu/seafood-traceability/</a>
eLogs	electronic logbook	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
Catch Documentation System	catch reporting for artisanal fishers	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
FishTrace	seafood traceability	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
Barcoding and RFID Tracking	barcode solution to facilitate traceability and consumer transparency	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
SeaObserver	EM technology	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
Solar Tracker	VMS technology for small scale fishers	<a href="https://www.traceallglobal.com/tracking-tracing.html">https://www.traceallglobal.com/tracking-tracing.html</a>
FAME Transponder	Transponder and associated catch documentation and location tracking	<a href="https://www.fameph.com/blog/">https://www.fameph.com/blog/</a>
OurFish	SSF catch reporting	<a href="https://play.google.com/store/apps/details?id=com.tellybug.fishapp&amp;hl=en_CA&amp;gl=US">https://play.google.com/store/apps/details?id=com.tellybug.fishapp&amp;hl=en_CA&amp;gl=US</a>

FisherMobile	Catch reporting app	<a href="https://www.dpi.nsw.gov.au/fishing/fishonline/fishonline-commercial/fishermobile">https://www.dpi.nsw.gov.au/fishing/fishonline/fishonline-commercial/fishermobile</a>
RockFLEET	Fixed VMS tech	<a href="https://www.tracertrak.co.nz/gpr/">https://www.tracertrak.co.nz/gpr/</a>
RockSTAR	Hand-held VMS tech	<a href="https://www.tracertrak.co.nz/gpr/">https://www.tracertrak.co.nz/gpr/</a>
SeaSurveillance	Integration of SAR, VMS, and AIS data for identification of IUU	<a href="https://www.xsealence.pt/en/">https://www.xsealence.pt/en/</a>
SeaPatrol	Marine patrol optimization and communications with the command center	<a href="https://www.xsealence.pt/en/">https://www.xsealence.pt/en/</a>
SeaCatch	electronic logbook	<a href="https://www.xsealence.pt/en/">https://www.xsealence.pt/en/</a>
Tally	Seafood processing data analytics, automation, and traceability	<a href="https://this.fish/workflows/compliance/">https://this.fish/workflows/compliance/</a>
Black Box Video	Electronic Monitoring system	<a href="http://anchorlab.net/EFM.aspx?tab=Video">http://anchorlab.net/EFM.aspx?tab=Video</a>
FINNZ ELEMENTS	Electronic logbook and management system	<a href="https://www.finnz.com/products/fisheries-management-solution/">https://www.finnz.com/products/fisheries-management-solution/</a>
Fishbrain app	Recreational fishing information app	<a href="https://fishbrain.com/mission">https://fishbrain.com/mission</a>
Fishcoin	Seafood traceability system with cryptocurrency-based incentive scheme	<a href="https://fishcoin.co/fishcoin-protocol/">https://fishcoin.co/fishcoin-protocol/</a>
iSnapper app	catch reporting app	<a href="https://www.sportfishcenter.org/outreach/isnapper-app">https://www.sportfishcenter.org/outreach/isnapper-app</a>
mFish	catch reporting for artisanal fishers	<a href="https://eachmile.co/mfish/">https://eachmile.co/mfish/</a>
Planet	High resolution optical satellite imagery for IUU	<a href="https://www.planet.com/markets/maritime/">https://www.planet.com/markets/maritime/</a>
Odaku VMS System	VMS system - includes traceability	<a href="https://www.odaku.in/">https://www.odaku.in/</a>
SWIM	EM system with cameras etc.	<a href="https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/">https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/</a>
SWIM+	EM system with cameras etc., data transmission and QR code reader	<a href="https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/">https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/</a>
SWIM-Mobile	EM system that can switch between vessels	<a href="https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/">https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/</a>
SWIM-Nano	Small EM system for SSF	<a href="https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/">https://www.saltwaterinc.com/electronic-monitoring/electronic-monitoring-products-services/onboard-em-systems-support/</a>
Vessel Camera	Vessel EM solution	<a href="https://web.shellcatch.com/emonitoring">https://web.shellcatch.com/emonitoring</a>
eReporting	Catch reporting and analysis software	<a href="https://web.shellcatch.com/emonitoring">https://web.shellcatch.com/emonitoring</a>
Coastal Camera	Shore-side camera for IUU	<a href="https://web.shellcatch.com/emonitoring">https://web.shellcatch.com/emonitoring</a>
Scale Camera	Scale-based camera for traceability and reporting	<a href="https://web.shellcatch.com/emonitoring">https://web.shellcatch.com/emonitoring</a>
Spyglass	Listing and visualization of fishing vessels' criminal records to target surveillance	<a href="https://spyglass.fish/about">https://spyglass.fish/about</a>
eLog	electronic logbook	<a href="https://teem.fish/elogs/">https://teem.fish/elogs/</a>
TR5	seafood traceability	<a href="https://www.traceregister.com/why-trace-register/tr5-traceability/">https://www.traceregister.com/why-trace-register/tr5-traceability/</a>
VESL	Fisheries data reporting platform	<a href="https://www.bluefindata.com/">https://www.bluefindata.com/</a>
CatchScanner	3D machine vision system for catch analysis on on-board conveyor belts	<a href="http://smartfishh2020.eu/technologies/">http://smartfishh2020.eu/technologies/</a>
CatchSnap	handheld 3D machine vision unit for inspecting catch samples on smaller fishing vessels	<a href="http://smartfishh2020.eu/technologies/">http://smartfishh2020.eu/technologies/</a>
CatchMonitor	system for automatic monitoring and analysis using CCTV cameras	<a href="http://smartfishh2020.eu/technologies/">http://smartfishh2020.eu/technologies/</a>