



DATA, TECH AND INNOVATION IN UK FISHING

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OVERVIEW

- Technology is becoming increasingly relevant within the UK fishing industry and wider fisheries sector.
- Advances in technology can help solve practical challenges, such as through mitigating bycatch.
- Collection of and access to data can help inform fishermen, scientists and other practitioners about how best to manage fisheries.
- Technology has a strong role to play in making the seafood supply chain more efficient, fairer and more transparent.
- Collaboration between the fisheries sector and other stakeholders is crucial to successful implementation of innovative measures.

THE RISE OF INNOVATION

Across the UK, innovators are helping to revolutionise the fisheries sector. Improvements in technology onboard fishing vessels are helping fishing to become more efficient, catching a greater proportion of target species while reducing bycatch or damage to the marine ecosystem. Refined data collection and analysis systems help improve the precision and

flexibility of fisheries management efforts, ensuring that stocks are protected without unduly hampering the efforts of the fishing fleet. The use of technology to improve the supply chain opens doors for fishermen, traders and consumers alike. Key to all such efforts is collaboration, ensuring that fishermen, scientists, managers and regulators all work together towards shared goals.

This briefing summarises the outputs from the APPG on Fisheries open Parliamentary webinar, 24 March 2021. The meeting brought together a diverse array of stakeholders from across the UK to discuss the latest advances in technology and their implications for the fisheries sector. This document is a synthesis of the discussions that took place both at the event and online (via #FishingTech).

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REDUCING BYCATCH

Bycatch is one of the most significant challenges that the fishing industry faces, especially for vessels in mixed fisheries (1). As well as potentially damaging a fishery's sustainability credentials, bycatch can also take an economic and psychological toll on fishermen, especially when large charismatic species are involved (2). There is a diverse range of innovative solutions being used and developed to mitigate bycatch, including gear modifications, information sharing, and changes to fishing practices.

Smartrawl is a pioneering solution being developed by the University of Aberdeen, with funding from Fisheries Innovation Scotland (3). It involves underwater cameras within trawl nets that will identify species within the net using artificial intelligence. If the camera identifies a non-target species, it will send a signal to open an automated trawl gate that releases the fish. The developers hope the project could achieve a step-change in trawl selectivity once development is complete.

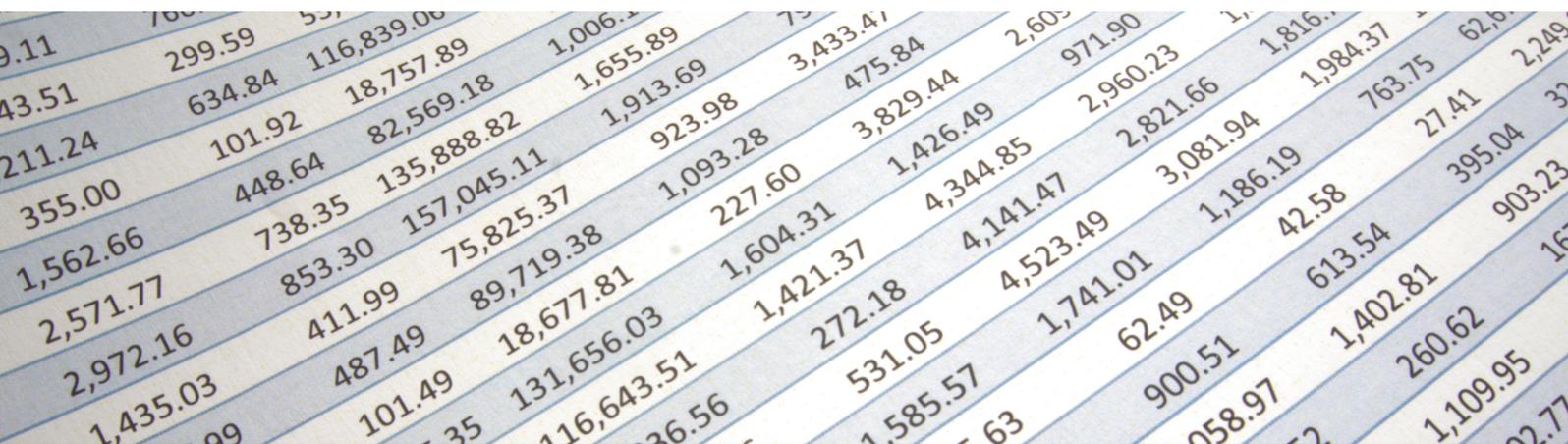
Pisces is a SafetyNet Technologies Ltd creation that consists of a series of gear-mounted LED lights (4). It aims to help fishermen reduce bycatch by attracting target species and deterring non-target species. There is growing scientific evidence to support its effectiveness, though given the complexity of the marine environment there are many factors that complicate results. In one shrimp fishery, Pisces has been shown to reduce bycatch by over 90% (5).

Populations of certain species, including many species of cetacean, are especially vulnerable to bycatch. There is evidence that fitting Fishtek Marine Ltd's Acoustic Deterrent Devices ('pingers') on nets can provide a solution, by emitting sounds that deter and reduce the accidental entanglement of dolphins and porpoises (6). While pingers are mandatory for over-12m UK vessels in certain ICES areas (7), under-12m UK vessels face a legislative challenge in obtaining a licence to use them (2). This can lead to disengagement from fishermen, which has resulted in proposals to make the adoption process more inclusive, discreet and straightforward (2).

INFORMATION SERVICES

The marine environment is complex, both in terms of its physical and biological features, and the various human activities that take place within it. Technology can lend useful insights into this environment, aiding a variety of marine users including fishermen.

The Kingfisher Bulletin makes use of marine data and technology to alert fishermen in real time to hazards and other marine activities in their fishing area (8). Available online and as an app, the Bulletin delivers high-quality data through advanced mapping technologies, audited information directly from marine users, and an automated alert system. The Kingfisher Bulletin was developed by Seafish, and includes a large range of information: hazards to fishing, activities such as offshore wind farms and oil and gas rigs, and general news such as safety zones.



Fishermen can also be directly involved in collecting information about the marine environment. SafetyNet Technologies Ltd's Enki sensor is designed to fit onto fishing gear, and provides fishermen with information about local conditions, enabling them to make more informed decisions about their fishing practices (9). In a similar vein, the Scottish Inshore Fisheries Integrated Data System (SIFIDS) project includes an 'ecotag' that can be attached to inshore vessels and collects environmental information, helping fishermen understand the link between catch composition and environmental factors (10).

The SIFIDS project has also developed a device for identifying and counting scallops on the seabed using artificial intelligence (10). Elsewhere in the UK, Bangor University is leading an EMFF-funded project on an automated catch data collection system for crustacean fisheries, which uses video data with machine learning to count and measure brown crabs and lobsters, and integrate measurements with environmental data (11). The data will then be used to supplement landings data to use within stock assessments and stock indices.

SUPPLY CHAIN

The seafood supply chain faces a number of challenges. For fishermen, time and information constraints can mean that they have little choice in who they sell their catch to, and for what price (12). This can lead to several issues: without competition, buyers may only purchase catches at low prices; fraud is more likely; buyers dictate which species they will buy, which may not match what fishermen are catching; and new markets are hard to access. At the other end of the supply chain, consumers can lack information about the provenance, sustainability, and catch date of their purchases.

Bullfish Market, a unique two-stage digital marketplace, aims to address these issues to make the seafood supply chain smoother and more transparent (12). For fishermen, Bullfish uses live market trackers to inform users of the genuine market price of their catch, and securely connects them to markets around the world, meaning they can sell a greater variety of species. Bullfish also uses geo-location tagging to capture the source of harvesting. This is maintained throughout the supply chain, meaning that consumers are better informed about what they are buying. Bullfish Market aims to fully launch by May 2021.

COLLABORATION

Inter-sector collaboration is crucial for making progress in the fisheries industry. Increasingly, fishermen are working with academics, policymakers, NGOs and other stakeholders towards common goals, namely: ensuring that fishing remains sustainable and economically viable into the long term.

The Scottish Inshore Fisheries Integrated Data System (SIFIDS) project, which concluded in 2020, involved the development of open source systems to collect data from inshore fishing vessels, with the intention of supporting co-management and stock assessment in a collaborative fashion (13). The EMFF-funded project involved fishermen in the data collection process, and also pioneered the automation of many aspects of data collection and analysis. Data from fishing vessels, such as where fish are caught and the quantity and species composition of catches, is used to build up a picture of fishing effort and, subsequently, stock assessments.



The Fishing into the Future project also emphasises the importance of collaboration (14). In a leading example, the Newlyn fishing fleet worked with regulators to find a constructive solution to bycatch of juvenile haddock. Fishermen agreed to use Remote Electronic Monitoring (REM) to help stakeholders understand the impact of gear modifications on catch and bycatch. Now, more fishermen are agreeing to work with regulators to further this work and find solutions that work for everyone.



SUMMARY

This policy brief provides simply a snapshot of the pioneering work taking place in the UK to improve the fisheries sector. Many other projects, each with their own innovative characteristics, are also bringing benefits to the industry. Key to all is collaboration: only with the cooperation of all involved stakeholders can these benefits be effectively adopted and help the fisheries sector become increasingly sustainable, economic, and equitable.

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