SEA TECHNOLOGY

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UNDERSEA DEFENSE
ANTISUBMARINE WARFARE

FEATURING:
Naval Unmanned Systems
Long-Range UUV
Predictive Maintenance

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Marine fisheries support billions of people around the world and contribute $100 billion each year to, as well as support about 260 million jobs in, the global economy, according to the United Nations Development Program. But, increasingly, fisheries are subject to overexploitation, pollution and habitat loss. Sustainable fisheries management has never been more urgently needed, yet it faces a significant challenge: data management.

New technologies are introduced for industrial vessels every day: fuel and gear sensors, cameras, electronic catch reports and more, all in addition to the existing VMS transponders. It is a challenge to know which equipment to choose, and, often, new hardware is added without a clear plan of how to use the data it will provide.

Moreover, there is a global push to track small-scale fishing vessels. In the next few years, fisheries monitoring centers will have to adjust from tracking a few hundred vessels to tens of thousands of vessels. Such a massive increase, together with more equipment on large vessels, means huge quantities of data.

To make sense of all this information, it must be properly analyzed and correlated. Yet data management has been a neglected subject compared to high-tech equipment,

even though data are just as valuable an asset. The future of fisheries depends on big-data analytics.

Big data offers vital tools for managing fisheries. For example, fishing trips could be tailored to meet quotas in the shortest time frame, reducing fuel consumption and crew costs. Real-time catch data could help administrations close a fishing zone immediately once quota is reached, rather than weeks later using paper logbooks and hours of human analysis. Fishing ministries could use big-data analytics to move fast to preserve marine protected areas and their fish stocks.

Effectively making use of data means more than installing software. Anyone applying big data has to address the five "V"s: velocity, variety, volume, veracity and value. This means that to generate useful information, you must address the velocity (speed) of processing, handle the wide variety of types of data, manage a massive volume, ensure accuracy, and confirm that the data have value for the output desired.

Fisheries data are typically still recorded on paper or in Excel files, with the associated risks of being lost, incomplete, inaccurate or difficult to use. A fleet manager examining multiple spreadsheets will find it hard to identify what decisions to make.

Furthermore, big data may require a cultural shift, as fishermen have traditionally been reluctant to share information. Knowledge and fishing spots are closely guarded, and in increasingly difficult market conditions, fishermen want to keep their data secure as a competitive advantage. Flag states want to protect their resources and the sovereignty of their EEZ (exclusive economic zone), making data security a crucial issue for them as well. This barrier can be overcome by choosing analytics providers that guarantee data security and client ownership of data.

As just one example, in 2018, CLS Fisheries worked with a client to develop a business intelligence platform, DOLFIN. The client, one of the biggest fishing companies in North America, had a wealth of information generated by its vessels, which carry more than 100,000 tons of yellowfin tuna annually. The first step was identifying the client's primary output need: an intuitive dashboard offering clear insights. The next challenge was to see which data would provide that result. CLS quickly realized that incorporating vessel data, catch data, VMS, logbooks and sensor data was not enough; oceanographic data were needed as well—a massive amount to process. Data-mining techniques were then used to identify the most interesting correlations.

The resulting dashboard allows users to search by zone, species type, vessel and period. DOLFIN mines 20 years of ocean and fisheries data, allowing fishermen to optimize fleet strategy. Captains can decide where to go before leaving the harbor, optimizing the time spent to reach quotas. Fisheries administrations can monitor catch efforts over an entire region and decide which zones to close, improving management of stocks and fishing licenses. In addition, some governments give fuel allowances, which could be better managed and distributed according to a vessel's behavior.

The insights provided by big data and advanced analytics offer a valuable way forward for both regulators and fishermen, enabling them to capitalize on their data—an asset just as valuable as technology. Fisheries information needs more attention as we transition not only to a more sustainable blue economy but also to the knowledge economy.

Neglecting data assets means losing efficiency and resources. Adopting advanced data analytics is the key to succeeding in the future of fisheries. **ST**