

Developing Analytics Capabilities for the Rapidly Growing Aquaculture Industry

Aquafarmers can now bypass GIS and other technical requirements to access daily product growth forecasts, market price trends, environmental parameters, and risk analysis to optimize their operations, all from one cloud-based enterprise application.



Aquaculture: a rapidly expanding industry in the European Union

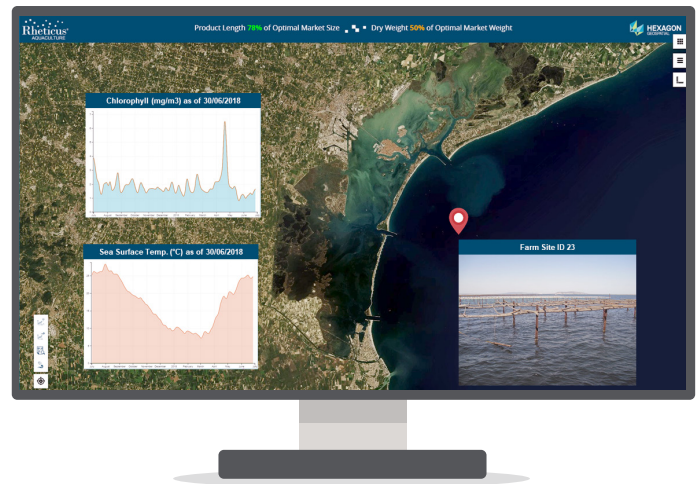
According to the European Commission, seas and oceans help drive the European economy, providing strong potential for innovation and growth within various related industries, including aquaculture. Aquaculture is the cultivation of aquatic organisms such as fish or shellfish, especially for food. The European Commission has designated aquaculture as a key component of both the Common Fisheries Policy, which promotes equal access and fair competition for fishermen in European Union waters, and the Blue Growth Agenda, which supports sustainable growth of marine and maritime sectors. This industry has established its critical role in European Commission considerations thanks to its high potential for sustainable job creation and overall industry growth.

A lack of GIS expertise causes rough waters for aquafarmers

To be successful in this fast-growing industry, aquaculture professionals need accurate estimations and forecasts concerning the growth rate of their production and regarding the start of breeding seasons. This helps them to identify the best harvesting and selling times, minimize the risk of production loss, and reach long-term business viability. Those estimations and forecasts are based on water conditions, therefore making it imperative to have information on sea parameters both as current information and as forecasts.

Such estimations and forecasts can be effectively made by exploiting satellite imagery and numerical models within GIS applications. However, most actors in the aquaculture industry have no knowledge of, or expertise with, such technologies.

Moreover, aquaculture companies face many financial challenges, as the sector is dominated by small and medium-sized enterprises (SMEs), according to the European Commission. These small organizations often face limited funding opportunities. To this regard, aquaculture activities need to be optimized to maximize profitability. Ultimately, optimized and well-supported aquaculture farming practices have a greater likelihood of attracting investors and insurance companies for aquafarmers, as well as aiding them in obtaining licensing and certification in their field.



Removing the technological barrier

Planetek Italia is an Italian company that has specialized in Earth observation (EO), space solutions, and geo-services since 1994. The company provides solutions to exploit the value of geospatial data through all phases of the data lifecycle from acquisition, storage, and management to analysis and sharing. This organization is also the creator and operator of the unique Rheticus® platform (www.rheticus.eu), a cloud-based platform that provides sophisticated satellite-based monitoring services.

Although EO data regularly provides synoptic and useful information on the environment, Planetek Italia wanted to further boost its usefulness specifically within the aquaculture industry. To do so, they created a solution that combines the data with simulation models of finfish and/or shellfish growth rates, as well as with other relevant information to help aquafarmers make critical and informed decisions.

Planetek Italia built the solution to meet the following objectives:

- Provide farmers with forecasts of product growth and market price trends
- Monitor environmental parameters daily, such as chlorophyll, sea surface temperature, turbidity, salinity, dissolved oxygen, significant wave height, and current velocity
- Estimate level of risk connected to unfavorable weather, marine, and/or environmental conditions
- Provide service via a subscription through their Rheticus geoportal
- Provide service to users worldwide.

Simplifying geoprocessing and analytics with M.App Enterprise

Planetek Italia selected M.App Enterprise solution from Hexagon's Geospatial division to develop the Rheticus Aquaculture Smart M.App, a vertical turnkey application that does not require end users to have a GIS background to take advantage of its capabilities.

M.App Enterprise allows users to build and privately host geospatial applications called Hexagon Smart M.Apps. With the Smart M.App Platform, users store their imagery, vector and point clouds, workflows, analytics, and queries in one place. Behind the scenes, the Smart M.App performs all necessary geoprocessing, and the end user sees the data through an interactive map view along with charts and graphs of relevant, non-geospatial data, all of which users can filter in many ways. This simple user interface provides the ease of use Planetek Italia was looking for to best serve aquaculture professionals.

The Rheticus Aquaculture Smart M.App processes high volumes of open EO data, including:

- Sentinel-3 satellite imagery from the European Space Agency's Copernicus program
- Chlorophyll-a concentration, water transparency, sea surface temperature, dissolved oxygen, significant wave height, salinity, current velocity, and other data from the Copernicus Marine Environment Monitoring Service
- Weather data and marine parameters
- Market prices and profitability trends from official open databases such as the ISMEA Mercati for Italy.

These data are processed and delivered through Planetek Italia's Rheticus, the cloud-based infrastructure for the automatic processing of Earth observation data.

The resulting information is then ingested into M.App Enterprise and integrated with an algorithm for estimating finfish and shellfish growth rates. This allows the Smart M.App to automatically highlight any anomaly in the growing rate of finfish and shellfish via an easy-to-interpret dashboard that is automatically updated with relevant EO insight every day.

Rheticus aquaculture Smart M.App: optimizing operations with an easy-to-use application

With M.App Enterprise, Planetek Italia developed a solution that is currently being used by aquafarm professionals in Greece and Italy to gain key information daily from a powerful business information dashboard about their production sites in the Mediterranean Sea. They also receive three-day forecasts for critical parameters that are necessary to monitor for indication of ideal operational conditions. Using this information, farmers can then plan onsite inspections to manage the risk of losing production.

"M.App Enterprise allowed Planetek Italia to build a powerful, bespoke vertical solution for aquaculture professionals who do not need to have any knowledge or expertise with EO data or GIS applications," said Massimo Zotti, Head of Government & Security at Planetek. "While Rheticus Aquaculture makes use of sophisticated algorithms and techniques, these are all done behind the scenes, allowing end users to focus on what they do best: mussel growing, avoiding harmful situations before they become critical, saving money, and producing tasty products."

Rheticus Platform by Planetek Italia, together with M.App Enterprise, solves the complexity of EO data analysis and greatly simplifies the understanding of information gleaned from that data, making the Rheticus Aquaculture Smart M.App a solution fit for all aquaculture professionals, regardless of technological experience.



Relevant data comes together in one place

Rheticus Aquaculture Smart M.App combines EO data and simulation models of finfish and/or shellfish growth rates together with information about market prices and profitability trends in one easy-to-use application. The information can be used for analytics capabilities such as:

- Identifying the best harvesting and selling times
- Estimating product growth rates, days to market size, start of breeding season, and product values in comparison with market prices and profitability trends
- Identifying best locations for new aquaculture farms
- Monitoring and forecasting of environmental conditions for operational aquaculture
- Fact and reasoning-based environmental analysis and characterization derived from historical observation.

Expanding the Service

Thanks to M.App Enterprise platform, Planetek Italia developed a vertical turnkey application that provides aquaculture farmers with daily information for the best management of finfish and shellfish farming in marine waters. The Rheticus Aquaculture Smart M.App empowers aquafarmers to increase production and profitability, while allowing them to overcome GIS and technical requirements they may not have the expertise to meet.

As the Smart M.App is currently used by aquafarm professionals from Italy and Greece who are working in the Mediterranean Sea, Planetek Italia's focus now is to expand the Smart M.App's user base, first by increasing the number of users working from the Mediterranean. Then, the company plans to adapt the service to monitor features from different seas and oceans across the planet, allowing them to expand the use of the Smart M.App globally.



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Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Geospatial division creates solutions that deliver a 5D smart digital reality with insight into what was, what is, what could be, what should be, and ultimately, what will be.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 4.3bn USD. Learn more at hexagon.com and follow us @HexagonAB.

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