Leading the Deep Blue Revolution
With a track record of helping companies grow and harvest fish in an often-hostile environment, InnovaSea Systems, Inc. delivers tested, proven solutions that not only support the commercial enterprise but also deliver a triple bottom line: They are better for the fish, better for people, and better for the planet.

The proprietary SeaStation™ Submersible Pen design is based on two large steel structures: the spar and the rim. The spar, essentially the central pipe and key structural component of the pen, not only controls the buoyancy of the structure but also contributes to its stability.

Submerging the pen allows the SeaStation to safely ride out stormy weather below. The rim serves as the frame for the pen, providing a structure for the netting. The rim acts as a “stabilizer” for the entire structure.

The stability of the SeaStation offers a distinct advantage for growing healthy fish. Designed to retain a constant volume and remain stable under the most challenging ocean conditions, the SeaStation is simply a better containment system for all species of fish. In addition, its tensioned nets contribute to the consistent delivery of oxygen 24/7, and the lack of “churning” prevents the fish from being tossed about by waves.

_The result: Healthier fish, better growth rates, and excellent harvests._
Proven, Leading-Edge Technology

InnovaSea is the global leader in developing and implementing leading-edge, sustainable, and proven solutions for growing fish in an open ocean environment—in some cases, many kilometers from shore. With its 25-year history in open ocean aquaculture, InnovaSea offers producers the knowledge and expertise that comes from actual in-the-field experience—experience that is vital to companies that are planning to site a new farm or expand existing operations in the open ocean.

As a technology-based company, with the largest group of engineers in this space, InnovaSea has dedicated significant resources to developing and commercializing innovative, fully integrated, sustainable fish farming solutions for open ocean aquaculture.

“Fully integrated” means that we make sure that all components work together seamlessly and efficiently. System components include anchors, mooring lines, fish pens, sensors, cameras, and feeding systems; producers can select optional operational equipment such as stocking nets and nursery nets, treatment, bathing, harvesting, and data collection systems.

In addition, we offer producers a suite of high-tech tools to ensure success:

- GIS technology mapping to quickly and efficiently pinpoint the best area(s) to identify and configure the site;
- A real-time quantitative information platform (web- and smart phone-compatible), which includes a network of wireless sensors and cameras that enable real-time continuous monitoring of specific farm site conditions;
- Mooring systems planning and simulations.

As the aquaculture industry increasingly looks to expand its reach into new frontiers and new species, producers are turning to InnovaSea’s complete solutions that deliver a stress-free, safe, and stable environment for growing fish.

The results speak for themselves: InnovaSea’s submersible pens have demonstrated without a doubt that they can withstand extreme conditions. From hurricanes, typhoons, strong waves and currents, to predator attacks and biological threats such as algae blooms and disease, InnovaSea offers solutions that can withstand the challenges of fish farming in the open ocean.
The Most Advanced Open Ocean Aquaculture System in the World

A Complete Fish Farming Platform from InnovaSea™
The SeaStation™ Submersible Pen: Options

**PEN SIZES**

![Diagram of SeaStation pen sizes]

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
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<tbody>
<tr>
<td>6,400 m³</td>
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<tr>
<td>8,000 m³</td>
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<tr>
<td>14,500 m³</td>
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**NETTING**

Depending on the needs of the producer and the characteristics of the site, three options are available:

- **Dyneema®** - (UHMwPE) Lighter, durable, and stronger than traditional nylon or polyester netting. Dyneema is a good choice for nursery nets and grow-out nets.

- **KikkoNet** - Made from UV-stabilized, extremely strong, lightweight Polyethylene Terephthalate (PET) water-resistant monofilaments that are woven into a double twisted hexagonal mesh, predator-resistant. KikkoNet is suitable for growing many fish species.

- **CAM (Copper Alloy Mesh)** – Used in aquaculture operations for the past 30 years, this predator-resistant brass alloy stays naturally clean, resulting in less drag on the pen, allowing for the use of less expensive mooring systems, and it is 100 percent recyclable. Tests conducted to date on existing sites where CAM netting is used show no increase in the amount of copper levels in the water or sediment. Leading brands include UR30® and BlueSea®.

**JUVENILE REARING (NURSERY NETS)**

A major benefit of the SeaStation is the ability to enclose a similarly shaped “nursery net” inside the net pen. Because these interior nets do not need to be predator-resistant, they are typically made using small-mesh, lightweight Dyneema fiber. Once the fish have grown out to the appropriate size, this net is removed from the net pen and fish are released to the larger grow-out net.

**UNDERWATER FEEDING SYSTEMS**

Because InnovaSea’s net pens stay submerged during most of the grow-out period, the fish must be fed under water—which makes it challenging to evenly distribute the feed among pens. InnovaSea has successfully addressed that challenge—one of only a few companies to do so effectively—by using a water-delivered, proprietary feeding system that includes a disperser inside the pen that distributes the pellets, enabling simultaneous feeding of the fish. A single surface point distributes feed to all pens in the system with minimal loss. Feeding is conducted with the pen submerged and is controlled by monitoring fish behavior with high-resolution cameras. Such observation is essential for reducing waste and producing excellent feed conversion ratios (FCR).

**MORTALITY RETRIEVAL SYSTEM**

Sanitation—including the proper and quick removal of mortalities—is essential to the efficient operation of any fish farm, and is vital to keeping predators away. The SeaStation includes a proprietary mortality containment and removal system that requires only shallow water dives to remove morts at the top of the pen; if configured for that particular application, no divers are needed.

**SENSORS AND CAMERAS**

With the acquisition of Amirix Systems (Vemco, Realtime Aquaculture, and HTI-Vemco), InnovaSea now offers data-driven, best-in-class low-power underwater acoustic telemetry that includes fish tracking technology and wireless environmental monitoring solutions. By offering a combination of aquaculture instrumentation sensor and camera networks, InnovaSea provides a complete, integrated solution for real-time monitoring and data analysis of environmental conditions and other fish health factors, such as current and waves, dissolved oxygen, salinity, temperature, depth, rope tension, biomass, and fish behavior.
The SeaStation™ Submersible Pen: Benefits

**UNMATCHED OPEN OCEAN EXPERIENCE**

InnovaSea's technology has been in use for more than 25 years, in real situations with companies that have successfully grown, harvested, and marketed their fish using our pens and systems. InnovaSea has more experience developing solutions for the open ocean environment than any other company working in the aquaculture field today.

Some 12 species have been successfully grown in the SeaStation, with more coming on line regularly.

- Atlantic Cod (*Gadus morhua*)
- Atlantic Salmon (*Salmo salar*)
- Cobia (*Rachycentron canadum*)
- Croaker (*Larimichthys crocea*)
- Milkfish (*Chanos chanos*)
- North Pacific Bluefin Tuna (*Thunnus orientalis*)
- Pacific Red Snapper (*Lutjanus peru*)
- Pacific Threadfin (*Polydactylus sexfilis*)
- Parrot Fish (*Oplegnathus fasciatus*)
- Sea Bream (*Sparus aurata*)
- Summer Flounder (*Paralichthys dentatus*)
- Yellowtail (*Seriola rivoliana; Seriola lalandi*)

**PROVEN, LEADING-EDGE TECHNOLOGY**

From our use of GIS to help select the right site to other aspects of growing and harvesting, InnovaSea offers the latest technology for all aspects of the operation—from nursery nets that allow for better feed conversion ratios (FCR) and less waste, to proprietary mortality collection systems that deter predators and keep stock healthy. InnovaSea has commercialized the best equipment and solutions to raise fish in the rough ocean environment. Our technology works.

**CUSTOMIZABLE SOLUTIONS**

InnovaSea offers a broad range of solutions that are both flexible and scalable, depending on your needs and your operation. Aquaculture is an industry built on economies of scale: The larger the pen, the lower the operating costs. InnovaSea's innovative aquaculture solution, the SeaStation submersible pen, offers producers a system that, in addition to offering efficiencies at the smallest size, can also be scaled up as needed to meet changing production requirements.

**SIGNIFICANT ROI**

InnovaSea’s systems are built to last. From the patented design of our net pens to the efficiently designed mooring system, the components in an InnovaSea solution are more durable than other submersible systems—making them more cost-efficient over time.

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*When I see storm clouds looming on the horizon, I don’t have to worry. Working with InnovaSea gives me peace of mind knowing that our fish and people are going to be safe, and as a result, I can sleep at night.*

– Erik Vis, Director of Farming Operations
Open Blue, Panama