EtherNet/IP™ ODVA®

By the Numbers

If the Network Fails, the Fish Die

At the edge of the world, a salmon farm the size of a small city runs on one industrial network. Here's what that takes.

200
AUMA EtherNet/IP actuators currently installed at Laxey

1,000
Projected AUMA actuators at Laxey at full build-out

180
AUMA EtherNet/IP actuators in the Aalborg Forsyning installation

36,000 tonnes
Laxey's targeted annual salmon production at full capacity

10–12 months
From salmon smolt to harvest—with zero tolerance for network failure

20+ years
EtherNet/IP maintaining backward compatibility across generations of devices

400+
Member companies building to the EtherNet/IP specification

700+
Licensed vendors building EtherNet/IP devices worldwide



On a volcanic island in the North Atlantic, one of the world's most ambitious land-based salmon farms is being built from scratch.

The industrial network running it is EtherNet/IP, and the engineers who put it there wouldn't have it any other way...



LAXEY

Heimaey, Iceland

Inside Laxey, Iceland's largest land-based salmon farm, every valve, pump, actuator, and tank operates within a closed, automated system. The network cannot go down.

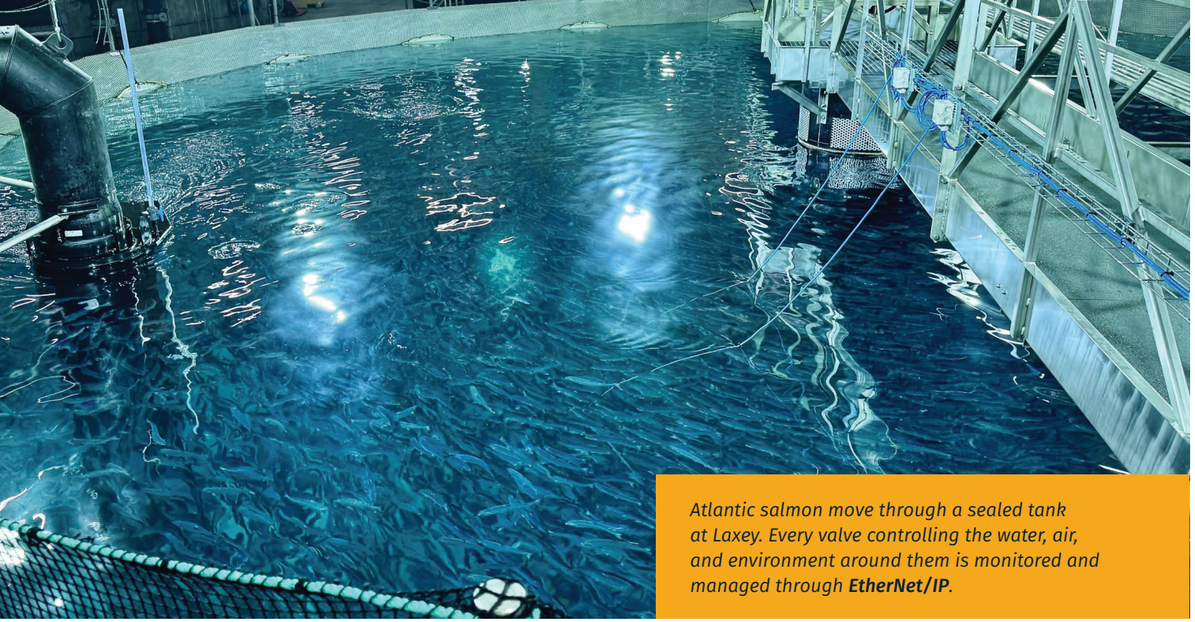
The Westman Islands sit about eight miles off Iceland's southern coast, shaped by volcanic eruptions so recent that the most dramatic—the 1973 Eldfell eruption, which destroyed a fifth of the town before residents stopped the lava flow by pumping seawater onto it—is within living memory.

At the island's northeast corner, on a black lava plateau above the North Atlantic, sits **Laxey**—a grid of massive concrete cylinders that, from the air, looks something like an oil refinery. But inside, the tanks are filled with deep blue-green water and tens of thousands of Atlantic salmon—raised from egg to market size in an environment as controlled and monitored as any pharmaceutical plant.

Laxey is a land-based salmon farm of unusual ambition. Where traditional salmon farming raises fish in open-water sea cages, Laxey raises them entirely in a sealed, climate-controlled facility on land, drawing on seawater pumped up through volcanic rock. At full capacity, it will produce up to 36,000 metric tons of salmon a year—nearly the weight of the Titanic. From a single facility on a volcanic island.

Inside the facility, hundreds of valves manage the continuous movement of water, salt, air, and waste through a system of enormous tanks. The salmon begin in fresh water with no salt at all. As they grow, they are moved progressively through tanks with increasing salinity—a little salt, then more, then more—until the final tank matches the concentration of the open ocean. Oxygen levels, water chemistry, and waste flows are monitored and managed continuously. The environment is sealed. The process is unbroken.

And it all runs on EtherNet/IP.



*Atlantic salmon move through a sealed tank at Laxey. Every valve controlling the water, air, and environment around them is monitored and managed through **EtherNet/IP**.*

Jens Ulrik Jensen has worked with AUMA Scandinavia for twenty-eight years. The German company makes electric actuators: devices that open, close, and modulate the industrial valves controlling the flow of liquids and gases through large facilities. His customers include power plants, pipelines, and water utilities—any facility where precise valve control is what keeps the system running.

The salmon farming industry is intensely competitive. "It took me six years to get into a fishing farm," Jensen explains. "Everything is a secret." When Jensen finally got access, he understood why the secrecy ran so deep.

The process is unforgiving. The steady transition from fresh water to ocean salinity takes ten to twelve months. During that time, the control system cannot fail. "It's life and death for the fish," Jensen says. "If you mistakenly cut off the air, if you get the salt levels even a little wrong, if you move them too quickly—they die."

At the scale Laxey is building toward—around 1,000 actuators—a network failure at the wrong moment is a financial catastrophe. Everything must run at one hundred percent, all the time.

This is the environment **EtherNet/IP** was built for: a continuous process running across hundreds of devices from multiple manufacturers—where every valve position, oxygen level, and chemistry reading must be communicated accurately and without interruption. For the engineers designing Laxey's control architecture, that meant specifying a network with a proven track record across exactly these kinds of demands.



EtherNet/IP is an industrial networking standard built on unmodified IEEE 802.3 Ethernet—the same infrastructure that corporate IT departments already manage. Because every device type is certified and independently conformance tested to the same specification, equipment from different manufacturers can communicate with each other straight out of the box.

At Laxey, that interoperability was not a nice-to-have. Using a PLC (the central controller that coordinates every device in the system) from one manufacturer and actuators from another, Laxey needed a network that would connect them reliably from day one, without a specialist onsite to troubleshoot the integration.

The older fieldbus protocols work by running all connected devices on a single electrical segment. As Christian Seiler, AUMA's product manager for digital communication, puts it, "If a device develops a fault or loose connection, the noise propagates across the entire bus." An issue anywhere on the line can affect everything on the line. And finding the source of a fault means working through the segment one device at a time, often while the system is down.

> **"It takes ten to twelve months to grow a fish you can eat. The network cannot fail once in that time."**
>
> *-Jens Ulrik Jensen, Sales Manager, AUMA*

"Electromagnetic interference on a fieldbus can affect every device on the line simultaneously," Jensen points out. "We saw issues we could not understand." These were not hypothetical failures. They were real losses, in real facilities, traceable to a fundamental limitation of the legacy standard.

EtherNet/IP addresses this by design. Each device connects through its own port and is electrically decoupled from the others. An EMC defect on one device stays with that device. "If you have a problem, you see in which port the problem is immediately," Seiler says. "Very fast to recover." In a high-tech salmon farm, where the cost of downtime is measured in fish, that recovery speed is not a technical detail; it's the point.

Beyond fault isolation, EtherNet/IP offers advantages that compound over the lifetime of a facility.

Scalability is, as Seiler describes it, "almost unlimited." New devices can be added without redesigning the network. Diagnostic data flows seamlessly from field to control room. And because EtherNet/IP runs on standard IT infrastructure, the knowledge already in place at most facilities applies directly to the floor.

For programmers, EtherNet/IP has another advantage: reusability. Once the logic is written for a device type, adding another unit requires no new programming. "When you have done one program for the whole factory, you don't have to do it again," Jensen says. "Everything is reusable."



The technology is automated. The craft is human.

A few days before Jensen visited Laxey, the facility reported a network problem. Jensen arrived, connected his laptop, and found the **EtherNet/IP** network functioning exactly as it should. The issue turned out to be a programmer misconfiguration elsewhere in the system, not the network. The fish were fine.

Jensen's confidence in that moment was not intuition. It was the product of a process. "We know everything is tested. With Rockwell, with Schneider, with Omron," he says. "We know when we go out, it's not going to be an issue. It will work. It's certified."

That certification is administered by ODVA, the independent not-for-profit that has maintained the EtherNet/IP protocol standard for more than two decades. Every product family carrying the EtherNet/IP mark has passed independent conformance testing before it reaches any facility. That independent testing happens in a lab before the product ever ships—not on the job site, not on the programmer's time.

This is a meaningful distinction. Industrial facilities are running tighter maintenance schedules. Engineers are retiring faster than they can be replaced. The guarantee that a replacement device will connect and work without custom configuration is not a convenience; it's an operational requirement.

Jensen thought he knew how industry competitors behaved in a room together. Then he attended his first **EtherNet/IP** industry gathering.

Engineers and product managers from companies that compete directly with each other were openly sharing knowledge, solving problems together, asking each other for code. "I have not seen so many companies work so well together," he says. "Nobody was trying to hide anything from anybody."

He describes a specific moment: A programmer from AUMA's German headquarters spotted a program written by an engineer from another company and asked if he could have it. Within five minutes, the file was in his inbox. "Nobody was there just to make money," Jensen says. "It was for EtherNet/IP."

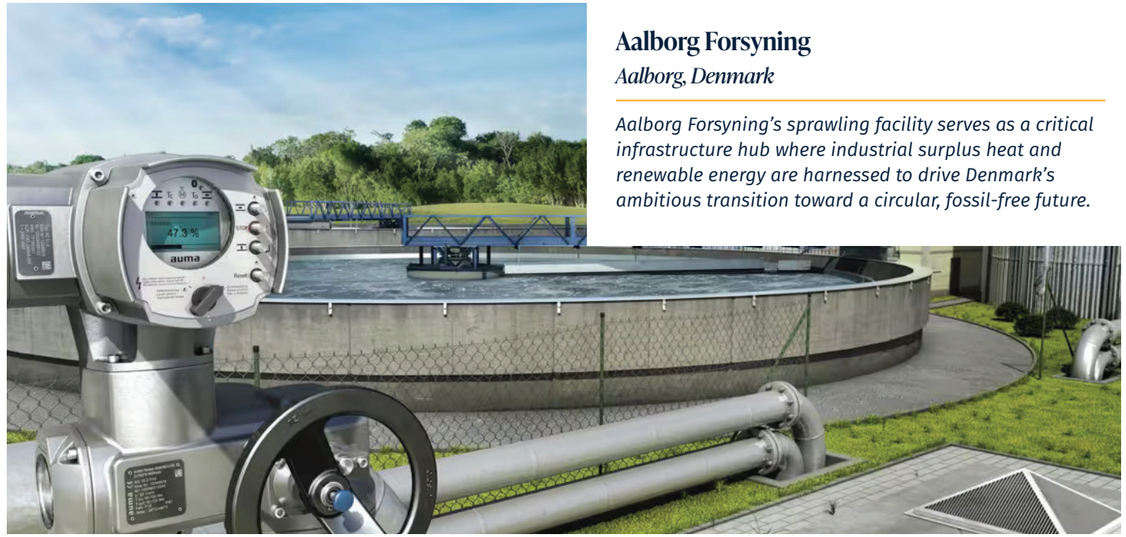
The EtherNet/IP specification is developed collaboratively by competing manufacturers under independent governance. No single company controls it.

This governance model is what makes certification credible and trustworthy. Jensen can plug in his laptop at Laxey and trust what he finds because every device on that network was tested before it left the lab.

That same rigor has kept the standard relevant for more than two decades, updated and improved throughout while remaining compatible—ensuring that equipment developed and installed many years earlier doesn't become obsolete. A facilty's investment doesn't expire when the next generation of devices arrives.

"What makes EtherNet/IP trustworthy isn't the technology alone," says Dr. Al Beydoun, President and Executive Director of ODVA. "It's the process behind it. Independent governance, independent testing, and a community of competitors who have agreed to hold themselves to the same standard."

ODVA CONFORMANT



Aalborg Forsyning

Aalborg, Denmark

Aalborg Forsyning's sprawling facility serves as a critical infrastructure hub where industrial surplus heat and renewable energy are harnessed to drive Denmark's ambitious transition toward a circular, fossil-free future.

Laxey is not an isolated case. In Aalborg, Denmark's fourth-largest city, the municipal utility **Aalborg Forsyning** is upgrading its wastewater treatment infrastructure to comply with the EU's revised Urban Wastewater Treatment Directive, a regulation that mandates a new "fourth treatment stage" to remove pharmaceutical residues and other micropollutants that conventional treatment does not capture.

AUMA recently supplied ~ 180 actuators to the facility for a new installation phase. The system runs on **EtherNet/IP**.

The pattern is similar to Laxey: a facility moving away from legacy infrastructure, adopting a new PLC platform—in this case Allen-Bradley—and specifying EtherNet/IP as the network that connects it all.

"If they're changing one actuator, they stay in the old loop," Jensen says. "But if they're starting a whole new project, they change everything."

Across Europe, implementing the fourth treatment stage is estimated to cost up to €230 billion. Every facility facing that upgrade is also deciding how to connect and control it. Increasingly, the answer is EtherNet/IP.



A salmon farm and a wastewater plant.

Two industries, two countries, one network. **EtherNet/IP** has been earning this kind of trust for more than twenty years. The installations keep coming.