

New rental agreements

AKVA group - Nordic introduced a new procurement model at the end of 2014 that involves renting out products and systems to customers

A press release sent out early 2015 stated that the new model allows customers to move costs away from investment budgets and over to operational budgets.

So far the new concept has been well received, as everyone expected. AKVA group Scotland has already been offering rental agreements for several years, and this procurement model now form a significant part of their total turnover.

"The Nordic model is based largely on experience from the UK, and we have already signed 12 contracts worth about 30 million NOK since we started at the end of last year", says Frank Jørgensen, a very pleased Rental manager. "Right now there is a great deal of interest in the market for rental agreements and I think the interest will grow", he continues.

For business-crucial operational systems, regular maintenance and systems for service and follow-up is critical. This rental model will ensure stability, maximum uptime and safeguard customers operations. "Our goal is to maximise profit by increasing utilisation of AKVA group products and equipment", Jørgensen explains.

AKVA group has a very skilled and experienced service network along the Norwegian coast. There will always be a service technician less than six 6 hours away. "Our rental agreements allow our customers to focus their attention on feeding fish, while we make sure that the equipment is continuously performing", Jørgensen continues.



Feed Systems



Underwater Light Systems



Camera Systems.

All contracts run over a specified contractual period based on a fixed monthly rental price. The price includes installation, service and 24/7 support. This type of agreement has no establishment fee and requires no deposits. The price is the same for all customers, no matter where they are located in Norway.

"In other words, there are no hidden costs and the customer get better cost control of their operations", Jørgensen says. He emphasizes that the model allows customers to purchase larger deliveries within operational budgets instead of always relying on large investment budgets.

AKVA group offer rental agreements on camera systems, lighting systems, mort handling, net cleaning systems and feeding systems. The term of the contracts varies slightly depending on product. Cameras and sensors are typically rented out for 2 - 5 years, while feeding systems can be rented for 4 - 8 years. Certain products are also available for short-term rental. "Long term, if the rental model turns out to be the success we believe it will be, we will most definitely look into the possibilities of expanding the procurement model to include larger technological solutions", Jørgensen.

Cleaner pipes improves the profits!



The automated system will inject cleaning plugs (sponges) into the feeding pipes.

Preventive cleaning of feed pipes is important to prevent blockage of pipes.

Condensation and deposits in feed pipes are well-known challenges to fish farmers. Feeding over time can lead to accumulation of feed dust and feed oils inside hoses and piping systems creating problems. By partially clogging pipes, the air pressure will rise leading the pellet speed to increase. Increased speed can cause breakage of feed and, in worst case, lead to further buildup and blockage of pipes.

Preventive cleaning of feed pipes is important to prevent blockage of pipes, simplify maintenance and reduce downtime at the farm. AKVA group now launches a completely new concept for automatic cleaning of feed pipes.

"The idea was that if one could easily inject a cleaning (or sponge) into the airflow it would be possible to blow this through the feed pipes on a regular basis to avoid accumulation and deposits. After many trial and a long series of testing we came up with this solution," says Jan Inge Tjølset, head

of R&D department at AKVA group's headquarters in Bryne, Norway.

This system will not only contribute to a more stable operation and simplify maintenance. Preventive cleaning will also have a positive impact on the financial results. Poor cleaning of feed pipes could result in more feed breakage (dust). Let's say you have an annual production of 5,000 tons, an FCR of 1.2 and 0.5% extra waste of feed due to breakage, this will result in a total loss of 30 tons feed with a direct cost of NOK 300,000 per year. If the price per kilo salmon is NOK 36 we are looking at a possible loss in fish growth of NOK 900,000 (or USD 115,000) per year.

"This example demonstrates well how clogging of feed pipes can impact the overall financial performance of the fish farm. Much can be gained through optimized operations and preventive maintenance. We invest in innovation and we are constantly seeking to solve the challenges that our customers face daily and by that contribute to increased profits through our technology solutions", concludes Jan Inge Tjølset.



Land Based and Cage Farming AKVA group catalogues

Download our catalogues

Our updated catalogues are currently available in English and Norwegian. Open our web sites to download our new cage farming and land based product catalogues.



AKVA NEWS

Visit us at Aqua Nor Trondheim, 18. - 21. August - Stand 340 in Hall D and Skansen Docks

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Rental of equipment?

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Land based farming or traditional cage farming?

EcoNet ensures maximum water flow to the fish

High performance, durability and escape prevention provide better aquaculture results.

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Lumpfish against sea lice

Can lumpfish become a new adventure for the Norwegian aquaculture industry?

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Production Paradigms in Salmon - where does the industry head? - PAGE 2

Land based for large rainbows

Fifax Ab on Åland in will produce 3.200 tons rainbow trout on 15.000 square meters each year and will be the first large land based location in the Baltic area - PAGE 6





Trond Williksen,
CEO
AKVA group ASA

■ **“Pride, is the word best describing what we are feeling in AKVA group going into another Aqua Nor”.**

Pride, because AKVA group again will be a large and visible contributor at the worlds leading aquaculture technology exhibition. Pride, because we in AKVA group again will show our technologies and some of the innovations we continously develop to a wide and international aquaculture world. Pride, because we in AKVA group know that we are part of something larger than ourselves, a movement, a sustainable aquaculture industry, playing a crucial role in producing healthy food to a growing global population.

Every Aqua Nor is an important milestone for AKVA group. This year’s exhibition is no exception. We bring to the show our newest solutions both for cage based and land based aquaculture. Solutions more developed and sophisticated, with use of the newest technologies and most updated knowledge. Technologies enabling aquaculture to become more sustainable, in all meanings of the word. Facilitating our valued customers to solve their challenges and take out their potential. Wherever they are, not only in Norway or in the salmon sector, but also in other geographies working with other species important in aquaculture.

We in AKVA group are blessed with having the opportunity to work with customers all over the world, providing a very wide range of technologies and services. In this edition of AKVA News we are proud to give you some insight into the wide variety of different projects we are working with on a daily basis. It shows an aquaculture world in rapid development, with vast opportunities.

In AKVA group we define ourselves to be a Technology and Service Partner to the global aquaculture industry. We strongly believe we can contribute through partnerships with our customers. With very many of you we have been honored to have such partnerships over many years. You know us. For others AKVA group represent something new. We hope to meet all of you during Aqua Nor. The AKVA group team is well prepared, looking forward to meet with you. Strengthening existing partnerships, discussing new solutions, or starting new partnerships opening new joint opportunities.

Welcome to AKVA group at Aqua Nor!

Trond Williksen
CEO

AKVA group facts:

- **Renowned as a pioneer and global supplier of aquaculture technology for over 40 years**
- **Offices in 8 countries**
- **More than 740 staff**
- **2014 turnover of NOK 1.246 million**
- **Public company listed on the Oslo Stock Exchange since 2006**



Future growth in salmon farming through traditional farming at sea or with new technology on land?



By **Anders Milde Gjendemsjo, PhD**
Head of Seafood
Deloitte AS

■ **Currently the traditional salmon farmers around the world face the following facts:**

- **Prices are high**
- **Demand is good**
- **Fish health is driving production cost**
- **Increasing feed prices drives production cost**
- **Growth is limited due to strict regulations and biological challenges**

Taking Norway as an example, the government has stopped all calls for new production licenses until the Norwegian aquaculture industry can control its sea lice challenges. The only available growth offered, comes with strict regulations - growth of 5% with a demand of a

maximum level of 0,2 mature female salmon lice per fish and maximum 2 medicamental treatments per production period.

In these circumstances, development of new technology for both treatment and preventive measures against sea lice are ever increasing and different research and industry projects have achieved promising results. However, despite significant efforts, none of these have so far been able to solve the biological challenges, only to a certain extent mediated them.

It is this reality, combined with a steady improvement of RAS technology and production experience, a constant push towards a new paradigm: post smolt and land based farming, has arrived. Classic arguments against land based farming have been too high investment and energy costs and not enough available land area.

Through detailed calculations, Deloitte disagree with these arguments. We have looked at the production and investment cost for both traditional

open pen farming and land based farming in RAS. The calculations shows an estimated production cost per kilo at 26,50 NOK for the traditional production regime with smolts transferred to sea at 100 grams. The interesting result is that the estimated production cost on land is nearly the same, at 26,75 NOK per kilo.

With regards to investments, a production of 5000 metric tons of salmon in open pen cages at sea, the cost is in the range of 325-400 million Norwegian Kroner. This includes four licenses with a market price of 60-80 million Norwegian Kroner. Looking at land based farming – where we assume that the licenses will be free – the investment cost of a corresponding production volume is estimated to be in the range of 300-450 million Norwegian Kroner.

With these figures in mind, prepare for an increase in the worlds salmon production, not at sea but on land.

Completing the best year ever!



■ AKVA group ASA: 2014 financial reporting

Financially this has been the best year ever for AKVA group with total revenues of 1.246 MNOK and an EBITDA of 103 MNOK. The market activity has been very good throughout the year. AKVA group ended the year with the second highest order backlog ever.

“We are proud of completing the best year ever in AKVA group’s history. High order backlog and continued high market activity also give positive expectations for the financial performance in the quarters to come”, says CEO of AKVA group ASA Trond Williksen.

Cage Based Technology (CBT)

The increased revenues and margins in 2014 are mainly explained by increased activity in Nordic and increased activity in the rest of the markets in the Northern Hemisphere. Chile had positive development in 2014. However, we continue to monitor the development closely. Canada completed a very good year, with high technology and service

and after-sales. Export activity to emerging markets had lower activity in 2014 due to fewer project in the last second half of 2014. UK completed a good 2014 with high activity in both technology and service. Our Turkey operation also completed a good and profitable year.

Software (SW)

AKVA group Software AS in Norway continues to deliver stable revenues and good margins and have ended another good year financially. Wise Lausnir ehf in Iceland has had a good second half of 2014. This combined with a slightly slower start of the year, completes a decent full year 2014 financially. Software continues to invest in new product modules. These modules will strengthen the financial performance of the SW segment further.

Land Based Technology (LBT)

LBT has increased activity and improved performance in 2014 compared to previous years and AKVA group Denmark is profitable in 2014. Despite significant financial improvement over the last years, we

are still not satisfied with the overall performance. However, we believe improved organization, controlled cost and cash flow will secure a profitable operation going forward.

Order Backlog

Good market activity has materialized in a good order inflow and as a consequence the order backlog is the second best ever for AKVA group. The order inflow in 2014 was 1 231 MNOK (1 132 MNOK). The order backlog at the end of 2014 was 504 MNOK (520 MNOK).

Balance sheet

The balance is considered as strong. Working capital in percentage of 12 months rolling revenue is improved YoY from 12% to 10%. We are able to maintain low working capital despite significant activity ramp up in 2014. Cash and unused credit facilities amounted to 144 MNOK at the end of 2014 versus 96 MNOK at the end of 2013. Total assets and total equity amounted to 904 MNOK and 389 MNOK respectively, resulting in an equity ratio of 43% (47%) at the end of 2014.

Outlook

We have a strong short term outlook due to high market activity and order backlog. Our target is to outperform 2014. The strong demand in the Nordic market is expected to continue. The positive operational development in the Chilean market is expected to continue in the next quarters due to a solid order backlog. However, our Chilean customer’s struggle with low earnings brings some uncertainty to investments in the medium term. The volcano eruption in Chile in Q1 2015 might have a small impact short term on CBT investments, but pose an opportunity for LBT. We are monitoring the Chilean market closely and will adjust our operation according to the development. UK and Canada are expected to continue to perform well in the next quarters with a significant order backlog and a large portion of reoccurring business. Land based technology is expected to have a positive development with a growing order backlog and prospect mass. We experience historically high market interest for land based technology. Export sales to emerging markets will continue to fluctuate short term, but represents a large

potential over time. New geographical regions continuously emerge as markets for our technology. We continue our effort to build service and after sales as a key business element in all markets and segments.

About AKVA group

AKVA group is a technology and service partner to the aquaculture industry worldwide. The company has around 726 employees, offices in 8 countries and a total turnover of 1.246 MNOK in 2014. We are a public listed company operating in one of the world’s fastest growing industries and supply everything from single components to complete installations, both for cage farming and land based aquaculture. AKVA group is recognized as a pioneer and technology leader through more than 40 years. The Corporate Headquarter is in Bryne Norway.





New silo loading system means only 4 hatches are opened to load 16 silos, thereby shortening loading time.

Largest ever AKVA feed barge to Marine Harvest



By **Tore Obrestad**
Technical Manager
AKVA group ASA

■ **During Aqua Nor in August 2015, AKVA's largest feed barge will be handed over to Marine Harvest Norway. This is the second Wave-master 850 Panorama ever sold. The first one was sold to Grieg Seafood late autumn last year, and is already in operation. These barges are the world's largest steel feed barges, with a holding capacity of 850 tons salmon feed and 12 parallel feeding lines.**

The advanced feeding system was the main reason why this feed barge was chosen. Feed accounts for around 70% of the production cost in salmon farming, so feeding correctly is number one priority.

The barge will be put into operation in Fosen, Mid Norway, and serve a site with up to 7200 tons of salmon, with plans to expand. High feed storage capacity, advanced on-board control systems for all the machinery and technology are central features. But, the feeding system is by far the most important feature for us, says Operations Manager in Marine Harvest, Torbjørn Skjervøy.

■ Innovations and scale of economy

Tore Obrestad, Technical Manager at AKVA group headquarters, confirms that the AC 850 Panorama feed barge has impressive specifications and feeding capacity of well over 150 tons per day. But Fosen is a large salmon farm with significant demands and 150 tons per day are actually required to feed the maximum biomass at this site.

The barge also has a fully automated silage system that simplifies mort handling, while we continuously

log and maintain the pH value. This ensures high quality silage that can be sold as a by-product, instead of having to pay to get rid of it. In order to maintain full operational control, the barge is delivered with AKVAconnect Barge Control.

This system will show online feed levels for each silo and remote controlled silo hatches allow loading feed with no farm staff onboard. With this system and broadband internet, it is possible to operate the barge and run feeding processes from any other location, ends Tore Obrestad.

■ Online information at your fingertips

AKVAconnect is a modular system for complete operational control of farm operations. The system is designed to give the farm staff full overview and control of all operations through different modules.

The new module, AKVAconnect Barge Control, provides updated information about all the systems on board at all times. This information is available on monitors strategically located around the barge, as well as in the control room. This gives the farm staff and Operation

Manager access to a lot of information simultaneously. AKVAconnect help them stay in control of the operations giving them a complete overview of every process taking place on board the barge, says Alf Kåre Ulfnes, Project Manager at AKVA's barge department.

This AC 850 Panorama is equipped with 12 feeding lines, with the option of an additional four. The barge is over 44 meters in length and designed to handle significant wave heights of approximately 4,5 meters (8,5m maximum).

To minimize the overall environmental emissions from the barge, Marine Harvest has chosen environmentally friendly solutions.

The barge will run off the main power grid from shore as the main power source, minimizing the use of onboard diesel electric generators.

They have also chosen to install AKVA group's new modular system for biological handling and re-use of wastewater (BioAKVA), thereby reducing the need for freshwater substantially.

"During Aqua Nor 2015, everyone can visit and explore this state-of-the-art feed barge at Skansen Docks floating display area".

EcoNet - High performance, durability and escape prevention



By **Trond Severinsen**
Chief Operating Officer - Export
AKVA group ASA

■ **EcoNet ensures maximum water flow to the fish. This has resulted in best ever production results in large scale salmon farming, such as higher SGR, lower FCR, lower mortality and higher fish harvest quality.**

Since AKVA group first introduced EcoNet to the salmon industry in 2009, the company has focused substantial resources on comprehensive laboratory and field testing, as well as proper documentation and NS9415:2009 certification. This has been done in close cooperation with the Italian manufacturer, Maccaferri Industrial Group, Sintef in Norway and key customers around the world. Prior to this, fish farmers in Japan have used this proven and unique netting material for more than 20 years. Today, EcoNets are successfully used in large scale salmon farming by Cermaq Norway, Grieg Seafood Hjølland (Shetland) and Tassal in Tasmania (called Kikkonet in this market).

Cermaq Norway and AKVA group have cooperated in testing and further development of the EcoNet concept since early 2012 when the first 120m circumference net was installed at Cermaq in Steigen, Northern Norway. In the spring of 2014 the company ordered EcoNets for a complete salmon farm, using large 160m circumference nets (51m diameter x 34m deep). This was followed by ordering more of the same EcoNets for a second complete salmon farm in April 2015. It is the continued good production results from this testing and full scale production of several fish generations that has resulted in continued use of EcoNets.

Snorre Jonassen, Director at Cermaq Norway AS, confirms the good production results with EcoNets. We transferred 1,5kg salmon into the EcoNet cage in June 2012 and



Experienced salmon farmers state that EcoNet is very easy to operate, handle and clean during ongoing farming operations.



More than 250 EcoNets and Kikkonets have now been sold worldwide.

harvested 6,5kg salmon 7 months later, with a biological FCR (Feed Conversion Rate) of 1,09 and Economical FCR of 1,10. I was uncertain how to handle this net during harvest and lice treatments, but we had no problems and used standard Cermaq net handling procedures. Another advantage with EcoNet is also that we eliminate risk of breaking net meshes during lifting as we don't need to use steel hooks to pull up the net on the railing.

When asked why he thinks they achieved this result Mr. Jonassen replies: It is most likely the good water flow through of the EcoNet that is the main factor. Simply better water quality and environment for the fish. In addition to this we also consider EcoNet as more escape proof than traditional nets.

Trond Severinsen, COO - Export at AKVA group ASA, has been in charge of the company's EcoNet concept since 2009. He agrees with Mr. Jonassen's comments. EcoNet is made of PET monofilament (solid twine) that has a very hard and smooth surface.

This results in very low water drag resistance due to low "total wetted surface area" compared to multifilament (fiber nets). Smooth and hard surface also makes net washing in the sea very fast and efficient.

Customers claim they clean EcoNet twice as fast as regular nets. In addition, the net panels are thermoformed in the "knitting machine" so that the net mesh and net wall remains stiffer without deformation, even in strong currents.

The low water drag resistance allows use of light weight sinker-tube (10-15 kg/m compared to 40-70 kg/m).

This makes handling the net during harvest, grading, sea lice treatments and similar, easier and safer for the farm crew.

Lastly, EcoNet offers our customers a good opportunity to reduce the risk of fish escapes by using this net technology also for salmon farming. This has resulted in several new "green licenses" being awarded to fish farms in Norway using EcoNets as a main concept for their applications, adds Severinsen.

Around the world, EcoNet has proven very resistant to predator attacks (Grey Seals, Fur Seals, Sharks, Tiger Tooth Fish, Barracuda, Travelli etc.) due to the strong PET monofilament and semi-rigid and tightly stretched net walls. Should damage to the net occur, the semi-rigid structure has proven to have self-closing properties that prevent fish escape. The thermo-formed double twisted PET mesh also prevents unraveling.

In addition to the minimum requirements of NS9415:2009 (Norwegian Standard for aquaculture equipment), we have also conducted further testing at SINTEF in Norway in order to document additional unique EcoNet material properties. They include high tensile strength, chafe resistance and long lifespan.

EcoNet is now NS9415 certified to stay in the sea for 14 years. This also eliminates the need for handling or changing nets, and thereby also a considerable escape risk and operating cost. Further design details are being continuously improved in cooperation with our customers, and EcoNet is now becoming a proven net concept also in large scale salmon farming, concludes Severinsen. EcoNet is now available in 3 different hexagonal mesh sizes and PET twine thicknesses:

- **Small:** 35mm wide x 43mm high mesh opening / 2,5mm Ø PET thread (used for 150g Atlantic Salmon smolts and up)
- **Large:** 45mm wide x 71mm high mesh opening / 3,0mm Ø PET thread
- **Super Large:** 73mm wide x 100mm high mesh opening / 3,5mm Ø PET thread (suitable for predator nets)



The semi-rigid net structure maximize water flow and oxygen to the fish.

Land based for large rainbows



The farm will produce 3,200 tons large rainbow trout per year in saltwater. The design is based on the newest recirculation technology.



By **Jacob Bregnballe**
Business Director, M. Sc,
Land Based Aquaculture
AKVA group Denmark AS.

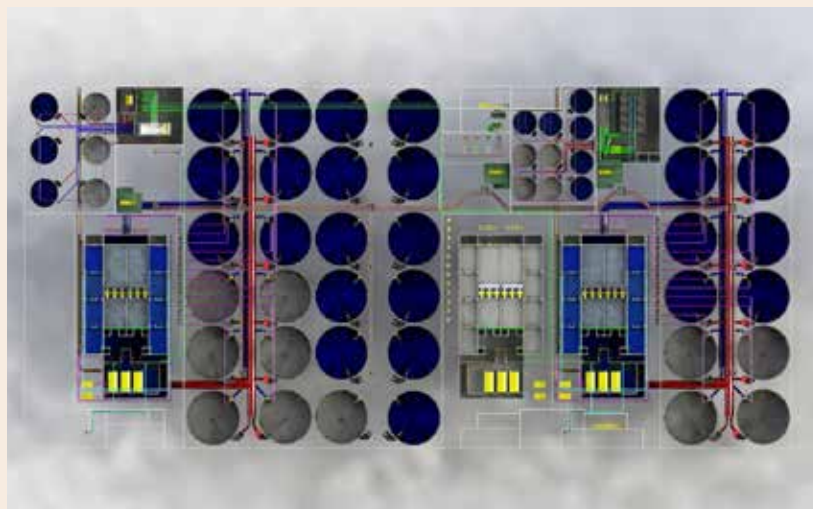
AKVA group is supplying recirculation system for the largest land based fish farm in Finland.

The investor group Helmet Capital holds the majority of the investment behind the FIFAX project on the island Aaland in Finland. Together with loan financing from Export Credit Norway the project took off in spring 2015.

The shareholders firmly believe in large rainbow trout as a premium product with less fat and intense red meat. The CEO of FIFAX, Mr. Pontus Nikula explains: "Rainbow trout holds by nature less fat than salmon and has unique ability to

utilize the natural red color in fish feed also found in crayfish, shrimp and lobsters. We will use fish feed developed specially for recirculation and keep the water circulating in tanks at all times to exercise the fish. This gives us a premium fish to eat".

The grow-out system consists of 36 large tanks covered with a fully insulated building of 15.000 m², which makes it possible to keep a constant temperature all year round. The recirculation system will treat the internal water flow and discharged fish manure will be used in a biogas plant producing electricity. Waste from the fish processing will also be used in biogas production.

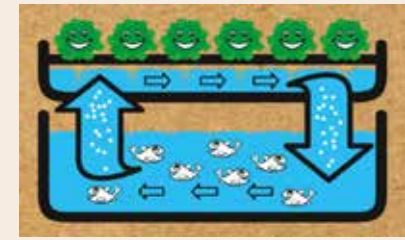


Layout drawing showing the large land based farm.



From left: Fredrik Karlström (Finland's Minister of Trade), Rune Söderlund (Mayor of Eckerö), Lennart Joelsson (Development Manager in Åland) and Björn Geelnard (Partner and Member of the Board).

Fish & Salad



Growing plants and fish together has been accomplished already thousand years ago in ancient China.



Testing greenhouse in Copenhagen.

AKVA group steps forward towards industrial aquaponics

Growing plants and fish together has already been accomplished over a thousand years ago in ancient China. The plants grow by using the nutrients excreted from the fish, and both fish and plants can be harvested for

consumption. Modern aquaculture combined with hydroponics (culturing plants in water) is called "aquaponics", and the technology is about to become industrialized.

Together with Dr. Paul Rye Kledal, founder of Institute of Global Food & Farming (IGFF), AKVA group has developed and built a small scale aquaponics system in an existing

greenhouse research facility near Copenhagen. System includes fish rearing tanks and salad tables together with a recirculating water system with two independent water loops.

One of the loops run through a water filtering system and can be routed to plant tables or back to fish tanks. The other loop supplies water directly to plant tables for growing lettuce or herbs such as sage, basil and thyme.

Dr. Paul Rye Kledal: "The aquaponics test plant we have designed in cooperation with AKVA group will be modified to fit our new plan for a 3.000 m² semi-commercial pilot production on ground. In my vision we are cooperating with AKVA group for them to have a first mover position on their products and skills within this novel area.

As a research driven company we can support documentation on the various factors associated with aquaponics as well as to help eliminate risks.

IGFF is currently in close cooperation with Copenhagen municipality of installing a Roof Top Farm of 400 m² aquaponics production as part of an educational and more visionary platform integrating food production with urban farming aimed for climate resilient cities.

Copenhagen municipality has some strong goals of being CO₂ neutral in 2025, and proposing more green roofs as part of stopping the huge costs and damages from 'monster rains'.



Dr. Paul Rye Kledal, founder of Institute of Global Food & Farming.

Remote feeding control by specialists at Nordlaks

Nordlaks Oppdrett AS is one of Norway's largest and most successful privately owned fish farming companies, with fully integrated production of salmon and rainbow trout.

They are now one of the first fish farmers to implement AKVAconnect, the latest process control platform innovation from AKVA group, to centralize the control of the feeding process at their head office in Stokmarknes, Northern Norway. This means the most experienced feeding specialists in the company can ensure perfect feeding at multiple sites, while working out of a "normal office in town".

With fish feed being the major cost of production, the goal is to focus 100% on feeding. The fish should always have the right amount of feed at the right time, says Pål Henning Kristiansen, IT Manager at Nordlaks Oppdrett.

Nordlaks Oppdrett started with AKVAconnect early 2014. When fully developed and all the installations are completed, the central operations center will remote control over 20 farm sites. The video cameras on the farm sites continuously monitor and transmit images to the control room. The operators can then monitor the status of all the cages (controlling both underwater and surface cameras) as well

as all other important areas of the farms and feed barges. This frees up resources, increase efficiency and profitability as feed remains the biggest part of the production costs, says Kristiansen.

The AKVAconnect system is transmitting the data first from the cages to the feed barge, and then through a private wireless broadband that connects and provides internet access to all the farm sites. Kristiansen is impressed about how well it works. I must admit I was sceptical about how this would work over such long distances, he says.

Nordlaks will initially roll out this project until the summer of 2016. But we already have very good experience with the system, and our staff really believe this is the way to go. Video camera monitoring of the feeding process in the cages provides much better control than observing only the surface feeding activity. Now we can consistently interpret the signals from the fish in all the cages, regardless of cage sizes, depths of the nets and the ever changing weather conditions. All the sites from one control room, says Pål Henning Kristiansen.

Tore Obrestad, Technical Manager at AKVA group Nordic says that Nordlaks is the first company to do this in such a large scale. We started to develop the remote feed control module in AKVAconnect in 2012. The challenge for a larger fish farming company is to attract 20 skilled and specialized staff who can feed



Technical Manager at AKVA group Tore Obrestad, testing a new CCS feed system.

the fish correctly and consistently at 20 different sites. Every day of the year and according to the company's best practice experience. With this new technology, 4-5 such specialists can feed 20 different sites from a comfortable office in town and go home to their families every day, smiles Obrestad.

Water quality parameters such as oxygen, temperature and current are the most important factors that affect the feeding in commercial fish farming. Overfeeding leads to feed waste, possible pollution of the seabed and of course poor feed conversion rate (FCR). Underfeeding also leads to poor FCR, as well as poor specific growth rate (SGR), and prolonged production time.

Inge Berg, CEO at Nordlaks Oppdrett AS, says that AKVAconnect provides greater biological control and higher efficiency. It is too early to conclude on profitability, but so far we are pleasantly surprised by our experiences. Once the system has been fully implemented this will be really good!

AKVAconnect

Process Control Platform designed to have control of all processes and activities at the farm. Whether this is RAS (Recirculating Aquaculture Systems) water treatment for land based farms or camera and feeding control at cage farms.

AKVAconnect is fully scalable and therefore suitable to all types of farm facilities, from the smallest local farmers to the larger multinational aquaculture corporations.

Facts about Nordlaks AS:

- Established in 1989.
- Headquarters at Stokmarknes, in Vesterålen, Northern Norway.
- Have fish farms in 12 municipalities south of Tromsø and in northern Nordland counties.
- Also produces smolts at its own facilities.
- Employing around 420 people.

Steel Cages around the world



By **Christian Stange Smith**
Sales & Marketing Manager
AKVA group Chile SA



Rifaino, Brazil.

■ **Markets for Wavemaster Steel Cages from AKVA group Chile are on the increase around the world.**

For decades, AKVA group Chile has been the leading producer of steel cages to the salmon industry in Chile with hundreds of cages going into the water each year. This is where steel cages are preferred over plastic. But the Wavemaster brand of steel cages have also been very popular for salmon farms in Scotland and Canada (BC), and more recently in Alaska, Tasmania and New Zealand. But now we

also see a big increase in the need for these cages in emerging markets around the world. To recommend steel cages or plastic cages have been a source for discussions in the past, but now we conclude that there are clear advantages and disadvantages for both concepts. Steel cages have proven to be a very good and stable working platform to farm

fish from, especially in strong currents. They are easy to ship and install, even into the most remote regions of the world. The high quality build and hot dip galvanizing also makes for a long lifespan. But, they are more suited for low- or semi-exposed farm sites rather than high exposure sites.

The biggest market now developing is in lakes and large rivers,

including projects delivered in Lesotho, Brazil and Iran. For high exposure or high salinity warm waters, Polarcirkel Plastic Cages are the recommended choice.

Adding our Wavemaster Platform Feed and Work Barges for remote locations, this means we have efficient and complete farm solutions for any fish farm anywhere.



New marked cages like here in Lesotho, Africa are now emerging.

Feed camera boom and new production records!

■ **In 2014 we delivered a total of 860 Akvasmart underwater feeding and inspection cameras. That is a new production record at AKVA's headquarters.**



The new digital CAP surveillance and feeding camera.

The release of the new Digital CAP (Cage Access Point) wireless link between cages and feed barge, and other new infrastructure from the R&D department, also helped us break all records. The new high performance CAP is simply a great success, both in Norway and abroad. The system has proven very stable, and our deviation statistics shows only minor faults reported. So far in 2015, we are on track to pass 1000 cameras, breaking the production record yet again.

The majority of the orders comes from the salmon industry in Norway, Scotland, Canada and Chile. But the trend is clear also in other markets and for different species. Feed cameras are the best tools towards the lowest possible FCR (Feed Conversion Rate).

Our factory here at Bryne headquarters also produce our famous Akvasmart feed systems. AKVA invented the world's first centralized feed system in 1979 and thousands of systems are now in use worldwide.

Akvasmart remains the leading brand in feeding technology and is an AKVA group corner stone product. In 2014 we also produced record numbers of key components for these, with 250 Feed Selector Valves, 370 Feed Dosers and 1100 Rotor Spreaders.

Due to the overall increased volumes, the production department in Bryne is hiring more staff. This is really good news for the Stavanger region, due to the layoffs in the oil and gas industry.

I would also like to take this opportunity to thank everyone working so hard in the production department. They have all shown outstanding efforts and willingness to perform. Thanks to them, we have been able to achieve our goals and hit new records without compromising on quality. Without skilled and dedicated staff and a good working environment where people enjoy themselves, we would not have been able to pull it off.

Polarcirkel Cages to Iceland



Cages built for rough conditions.

■ **Arnarlax in Iceland recently took delivery of six 400mm 120m Polarcirkel Cages.**

Salmon farming may now become a new seafood opportunity for Iceland. New and stronger Polarcirkel cage solutions make it possible to farm at more exposed sites than before.

Project manager Glenn Antonsen and Kim Rune Einmo from Helgeland Plast (an AKVA group com-

pany) just spent 15 days assembling and welding the 6 cages. They enjoyed spending time in the spectacular scenery of Patreksfjörður in the West Fjords. But the Icelandic scenery also comes with rough weather. Heavy winds made it hard to get the cages launched into the sea. But people from Iceland are also tough and used to the sea, so with their help we managed to launch the cages in the end, concludes Glenn Antonsen. The delivery is now complete and Arnarlax is farming salmon in Iceland!

New barge perfect for remote locations

■ **Seløy sjøfarm started producing salmon all the way back in 1977. In 2010 they started their production at the site of Gåsvar in Herøy, Northern Norway. In 2014 they started their cooperation with Sinkaberg-Hansen AS. To take full advantage of the excellent environmental conditions at this remote farm site they have now invested in a new innovative feed barge from AKVA group.**

General Specifications:
Model: AKVA Base 650 Comfort (AB650C) with 8 parallel feed lines
• Length (with platforms): 33.0 m
• Length (without platforms): 30.0 m
• Beam: 19.0 m
• Hull height to main deck: 3.6 m
Capacities:
• Salmon feed capacity: 650 tons (8 silos)
• Mort silage (approx.): 45.0 tons
• Diesel fuel: 27.0 m³
• Fresh water: 4.0 m³
• Grey water: 16.5 m³
• Sewer: 4.0 m³
Machine room:
• Generators: 3x160 kVA plus 1x75 kVA with full synchronization
• Feed blowers: 8 x 30 kW
Other:
• Extended platform: 16 m x 3 m
• Storage areas below deck: Appr. 100 m²
• Hydraulic crane: 31.3 ton meter



Seløy Sjøfarm invests in a large AB650C feed barge from AKVA group to optimize production at one of their remote salmon farm sites in Northern Norway.

The goal is to streamline operations while ensuring fish growth and performance are maximised. The remote site of Gåsvar is an abandoned fishing outpost, far west into the Norwegian Sea near the Arctic Circle. Salmon grow fast and thrive in the sea around Gåsvar, but the weather can get quite tough, making it difficult to do major farm operations and loading feed into the feed barge. That is one of the reasons why we are now replacing our old feed barge with one of AKVA groups largest and most recent models, the AB 650 Comfort, especially designed for locations like this, says Jan Erik Jakobsen from Seløy Sjøfarm.

Reliable operations with onsite- and remote control

The AKVA Base 650 Comfort is

33 meters long and 19 meters wide, with a feed storage capacity of 650 tons, with plenty of deck space and room for equipment storage down below. The barge comes with complete video camera systems for monitoring the entire site and the fish. There are very comfortable quarters for up to four farm crew who will live and work on board while on duty. If the weather gets too rough, the entire feed barge and camera systems can be remote controlled from shore. Thereby no feeding days or profits are lost. This is a feed barge for future demands and economy of scale. Having a production site so remote

makes operating from a land base a challenging task. That is why such a large barge with all facilities and good storage capacity will make operations at Gåsvar more effective as well as safer for the crew, says Jørn Sivertsen, Sales Manager at AKVA group. We see this trend towards more flexible solutions, with bigger and more self-sufficient feed barges (farm bases) in many parts of Norway. Years ago, most farms operated from onshore bases with farms nearby. Now the farms are moved further out into more exposed areas with superior water quality, which is a major success factor for profitable salmon farming, concludes Sivertsen.

AKVA group as partner combined with a great farm site

This is a big investment for Seløy Sjøfarm, but they are confident that the investment will improve their overall performance on this site by optimizing feeding and fish production, while saving time and reducing operating costs per kilo produced fish.

We have been very satisfied with the two previous feed barges purchased from AKVA group, so we are confident that they will deliver once again. As our operations in exposed

farm locations so far have been very successful, we have every reason to believe that this investment will just further enhance our performance in the Herøy area, concludes Jacobsen.

Seløy Sjøfarm has never experienced operational incidents and never had to do sea lice treatments at their production site in Herøy. This is a testimony to the excellent environmental conditions at remote sites such as this. They are now investing in a new feed barge from AKVA group to streamline operations and ensure good working conditions for their employees.

BioAKVA saving freshwater in feed barges

■ **AKVA group and Xylem Water Solutions Norway AS have developed a unique automated solution for biological treatment of wastewater aboard feed barges. With BioAKVA installed, it is possible to reduce the total freshwater consumption by up to 75%, by cleaning and reusing gray water for non-potable purposes.**

BioAKVA is built in PE plastic and is a modular concept making it easy to customize the system to fit various feed barges. In addition to saving freshwater and reducing biological waste, there are many more advantages of investing in biological treatment of wastewater.

The new feed barge delivered to the Norwegian salmon farming com-

pany Salaks AS, is the first in the world equipped with this concept, and Deputy General Manager, Ken Rune Bekkeli is satisfied with the investment.

The new feed barge "Hjerttind" is a good investment for the future. It has state of the art facilities and it is equipped with the first biological wastewater treatment system of its kind. By investing in this technology, we seek to meet future certification requirements at an early stage. While we grow with the industry, we are gearing up for the future, says Deputy Ken Rune Bekkeli and Operations Manager Kent Inge Bekkeli.

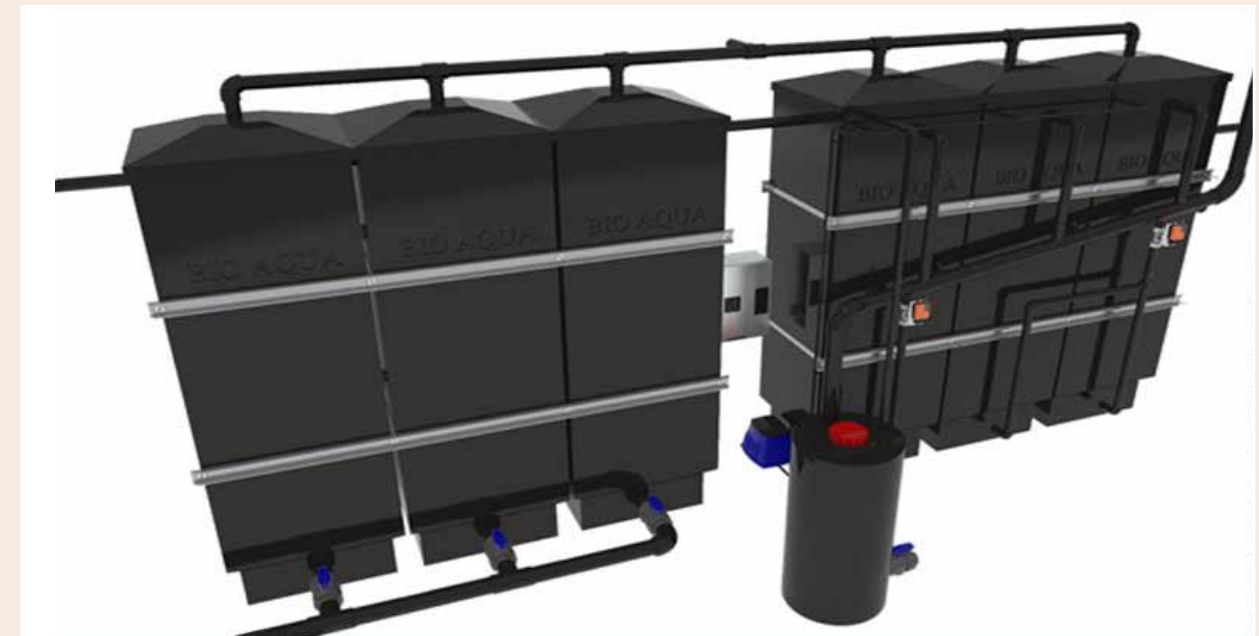
Installation of the BioAKVA system will also result in better financial performance, reducing costs and handling of freshwater and sewer, adds Odd Jan Haaland, Service & After-Sales Manager at AKVA group - Nordic. He further explains that AKVA group is experiencing an increased trend to focus on technology aimed at improving the

environmental profile of fish farmers along the Norwegian coast.

The increased interest in environmentally friendly solutions, such as biological handling of wastewater, testifies to a responsible industry focused on sustainability.

AKVA group develops technology aimed at solving current and future challenges. Environmental and bio-security challenges are key drivers in all our R&D projects. In order to remain the preferred partner to the aquaculture industry, we must ensure that we also meet these

demands, concludes Haaland. remain the preferred partner to the aquaculture industry, we must ensure that we also meet these demands, concludes Haaland.



A modular and flexible Bio Aqua concept.

Grieg implements Fishtalk Plan and Finance

■ Grieg Seafood Group chooses Fishtalk planning and budgeting tool.

Grieg Seafood globally has implemented Fishtalk Plan and Fishtalk Finance from AKVA group Software AS. The solution includes modules that supplement Fishtalk with Production planning, finance and budgeting.

Grieg Seafood ASA is one of the world's leading fish farming companies, specializing in Atlantic salmon. They have an annual production capacity of more than 90 000 tons gutted weight. Grieg is present in Norway (head office), British Columbia (Canada) Sky and Shetland (UK) with 700 employees in total.

■ What is the story of Grieg Seafood?

Grieg Seafood started up in Rogaland in Norway in 1990 and during the 2000'th century the company expanded with acquisitions in Canada, merging with Volden Group in Finnmark, Northern Norway, in 2006 followed by other acquisitions in BC. Then, in 2007 Hjalmland Sea-farms became part of the company on Shetland.

The Company was listed on the stock exchange in 2007. In 2010 Ocean Quality was established. Ocean Quality is owned by Bremnes Seashore (40 %) and Grieg (60%), and this company forms the global sales organization promoting salmon and trout produced by its owners.

■ Grieg have production sites in both Norway, Shetland and Canada, what are the main focus areas of the company?

We base our business on effective practical work and innovative solutions. Experience and competence is the foundation for safe, clean and efficient farming of high quality salmon. To ensure shared knowledge on the locations in Grieg Seafood, we have established a team of expertise where our employees can meet and exchange ideas and experience. We employ our operational managers based on to their management skills, long experience in the aquaculture business and their ability to conduct smart solutions that increase the effectivity on the sites. Our technicians are genuinely dedicated about their occupational pride, environment and welfare of the fish. We are proud to stay ahead of the technological development in the business. In addition to remaining focused on sustainable production of salmon and trout, we take good care of our employees.

■ Could you tell us how it is to implement systems like Fishtalk when there are several countries involved? What is the focus? What takes time? Could you say that the farming production in the different countries becomes more alike when the processes and the systems are the same?

We have already implemented Fishtalk Control and Plan in all our regions, and now we implement Fishtalk Finance. It can be challenging introducing new systems, especially when different countries often have different cultures for handling change. We have spent a lot of time figuring what a new system can give us/contribute to and we have tried to be ahead of potential problems in order to create a positivism when

changing systems. The organization has therefore been well prepared. This has made the transition quite streamlined going from an old system to a new system. We have now focused on gathering all information in one system, which improves presentation and transparency.

Aligning the systems have given us the opportunity to standardize the collection of data and to set up common routines for production planning. In the future you will see that fish farming in all countries are getting more and more standardized, but the local conditions are still essential for optimal operation and adaptations related to main standards.

■ When you combine Fishtalk Plan with Finance in Fishtalk, you can estimate production cost related to one or several production plans. What do Grieg Seafood see as the most important aspect in a budget period?

We use Fishtalk Finance to simulate the effect of costs of the different biological plans. The system is fast and simple and we get answers rather quickly. When importing data from the accounting system we receive good analysis of the status of our fish generations at sea.

■ What is the future production of salmon, how are things in 5, 10 and 20 years from now?

We have many challenges that need to be solved in the years to come, especially to secure growth within the industry. As an example, we have a lot to undertake in order to solve the sea lice challenge. New solutions



Stein Halstensen, feed coordinator in Grieg Seafood out on site.



Grieg Seafood, Hjalmland.

and treatments are the way to solve it. As for all industries there will be new challenges in the future that must be solved. Biological production will always be challenging since we are depending on natural conditions and fluctuations.

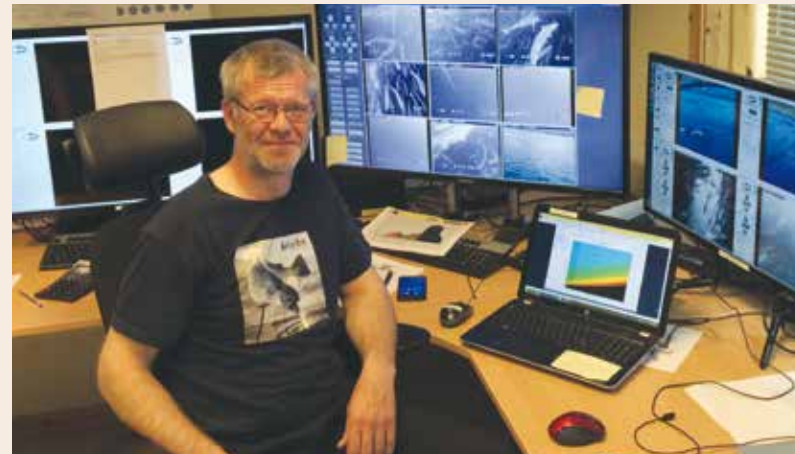
Other things to come will be new technological solutions within feeding and cage systems. One good example is centralized feeding. This process started decades ago and will probably continue in the future. Solutions like that will bring us more expertise in those tasks we need to solve. Sustainable production is also another topic on the agenda. We have to work together as an

industry to become even better than we are today. We need to be more visible and transparent on how we operate today to show how far we have come. Aquaculture is a "young" industry that needs some years on its' feet to get to where we need to go. However, with so many wise and competent men and women in the industry and our ability to invest in a safe and sound food production, I am sure we will overcome present and future challenges.

By **Lisbeth Plassen**
Sales Manager, Fishtalk Nordic
AKVA group Software AS.

AOS online environmental data to SalMar

■ The SalMar central feeding center, on the island of Senja in Northern Norway, controls and monitors feeding operations for up to 14 of their salmon farm sites in the region.



Alf Arild Jakobsen, Operations Manager at SalMar.

temperature and oxygen at all sites every 10 minutes. They recently also installed salinity sensors at one site and the AOS Sensor Buoy with Doppler current sensors at four other sites.

In order to optimize this feeding process, SalMar has invested in the AOS system (AKVA Online System) with sensors that continuously log

Alf Arild Jakobsen would like to share some of his experience with the readers of AKVA News, and explains; As we now continuously monitor oxygen levels in the cages during feeding, we see in some cases that the oxygen levels are low

in the cages with small fish where we use lice-skirts. Larger fish seem to create enough water movement to maintain oxygen levels, simply by schooling in a circle. The data from all the sensors are online (web based) through the RealFish software solution. This enables real time control and adjusting the feeding based on true environmental data, such as to avoid feeding during periods of low oxygen.

We have also started using salinity sensors at one site in order to learn more how a surface freshwater layer affects the production. This is especially important in fjord areas with lots of freshwater coming from the mountains. By utilizing Doppler current sensors connected to the AOS Sensor Buoys we can also monitor currents, and build

knowledge about how the current behaves and affects our operations. It is important for us to measure continuously at several depths. With this knowledge, we can optimize our feeding, avoid peak currents and position the Rotor Spreaders properly in the cages.

The system also enables efficient logging and analyzing of the data so that we can benchmark between sites and establish best practices. This has resulted in new knowledge and a better understanding of how this data affects our production. Now we are feeding fish in a different way than we did previously. Our central feeding center is quickly becoming a SalMar center of expertise based on true data from the AOS system, concludes Jakobsen.

Complete overview “down under”

■ Fishtalk has managed to significantly simplify and strengthen the fish planning process ensuring a more accurate and faster process.

New Zealand King Salmon Co. Ltd. went live with Fishtalk in February 2013. This transition has proved very successful over several areas.

It enabled the decentralisation of the data input process whilst still maintaining the required administrative overview. Very quickly Fishtalk became the “one stop shop” for almost all of our data and reporting needs, including a wide range of fully automated environmental captures. Overall we have a productive relationship with AKVA group Software who are very perceptive to new ideas and the constant development of the software.



Kim Hooper - Aquaculture Information Analyst.



NZ King Salmon location in New Zealand.

Great feeding capacity with AC 650

■ SalMar's salmon farm in Halså, mid Norway, has been using the new AC 650 Panorama feed barge since March 2015. We have got a very good AKVA group product – perfectly according to our requirements, says Kjell Ove Betten at SalMar.



The barge has a carrying capacity of 650 tons of salmon feed in 12 silos, and it will make the farming operations at the farm very efficient. In addition to a more economic and accurate feeding process, the AC 650 also has extra storage space, comfortable and functional crew quarters.

- It's just great, says Kjell Ove Betten. He particularly likes the large silo capacity and that they now can feed 12 large cages at the site.
- How many salmon do you feed at the Halså site?
- Two million, answers Betten.

We have a small crew working at this site, but only one is controlling the feeding process from the barge control room. SalMar has also done substantial business with AKVA group earlier this year, and this was one of the reasons to do it again.

- We were confident with AKVA and knew they would deliver a quality product on time again, concludes Betten. And we preferred a big barge this time so we are well prepared for future expansions.

Facts about SalMar

Established on the island of Frøya, outside Trondheim in 1991. This is also where their head office and value added processing plant InnovarMar are today. Their products are sold worldwide.

SalMar is Norway's third largest salmon farming company with several farms from mid Norway and northwards, totaling approx. 100 salmon licenses and 1000 employees. They also produce their own juveniles and salmon smolts.

Vision: Passion for salmon!

AC 650 Panorama

One of AKVA group's largest feed barges with a feed storage capacity of 650 tons salmon feed and length overall of 37.5 meters. Crew cabins for 4-8 persons. Designed to handle 4.5 m significant wave height (8.5 m maximum wave height). AKVA group is the leading international aquaculture technology and service partner, with a wide range of feed barges suitable for all types of cage farms worldwide. They include feed systems, machine room with generators, mort silage tanks, control room, living quarters, safety equipment and everything else needed for efficient and full operational control of the fish farm.

By **Kari Arnøy**



Digital wireless communication

■ AKVA group now launches its new digital wireless communication system linking fish farm cages to the feed barge. Akvasmart Digital CAP (Cage Access Point) now connects camera and environmental sensors to the feed barge with higher image quality, capacity and range than ever before.

“The previous analogue CAP has proven to be a robust housing for electronics installed onto cages. Consequently, we have used the same concept for this new digital version” says Mr. Jan Inge Tjolsen, Product Manager at AKVA group in Norway.

The new Digital CAP now uses Ethernet based wireless communication network that links with the feed barge network. Bandwidth for transmitting video and control commands is dimensioned for multiple parallel video signals. The Ethernet technology also greatly improves video image quality compared to analogue signals.

The surface video camera in this Digital CAP has also been upgraded to a powerful pan/tilt/zoom camera that is controlled from the feed barge control room. This allows video surveillance of the cages, nets, moorings, workers and other tasks on the cages. A very practical feature that also increases worker's safety.

Wireless transmission of video and data also reduces the need for subsea cables that are prone to damage and corrosion, thereby increasing dependability and simplifies installation.

“In order for AKVA group to remain a preferred aquaculture technology and service partner to our customer, we have to ensure we develop innovative technology such as this, that meet both current and future needs”, ends Jan Inge.



Akvasmart Digital CAP.

Big investments in lumpfish against sea lice



By **Ole Gabriel Kverneland**
Sales Manager — Land Based (Nordic)
AKVA group ASA

Can lumpfish become a new adventure for the Norwegian aquaculture industry?

AKVA group, together with its subsidiary Plastsveis AS (a company specializing in land based farms, HDPE piping and tank solutions), now deliver technology and solutions to several exciting land based projects producing lumpfish to combat sea lice. The interest and commitments to seriously invest in these projects show we have a responsible industry making a sincere effort to fight sea lice in an environmentally friendly and sustainable way.

Why produce lumpfish?

With sea lice being one of the main problems limiting the growth of the salmon farming industry, many alternative solutions to chemical and medical treatments to prevent or remove sea lice are being researched and developed industry wide. This is a result of the intensified focus on bio-security and fish welfare. But, there is no doubt that the best biological and financial results are also achieved when fish welfare is safeguarded. Lumpfish eating the sea lice parasites off the salmon, while swimming

together inside the cages, has proven to be a very gentle and effective method to remove the lice.

AKVA group emphasize that an important factor in development of such new solutions is that they also are sustainable over time. We must avoid a situation where we only depend on chemical or medical treatments that the sea lice can develop resistance to.

Approximately 8–10% lumpfish per cage has proven to effectively removing sea lice. This means a need for almost 40 million lumpfish per year in Norway. This is such a volume that the industry cannot rely solely on wild caught lumpfish, so farming them is the solution. By doing so we can avoid overexploitation of natural populations and minimize our footprint in nature.

Extensive ripple effects for the supplier industry

For us, this is also an opportunity into a new aquaculture adventure, says Sten Roald Lorentzen, Managing Director at Plastsveis AS. He continues on reflecting on the growing interest and serious investments in biological solutions to our industry's challenges. This interest proves that an entire industry, and



Lumpfish - a new sustainable export article?



The lumpfish has quite different needs those of the more common species.

Photo: Nordland Rensslisk AS

all of us working in it, are making serious efforts to defeat sea lice in a way that protects both fish and environment. As a direct result of these investments, a new branch of the aquaculture industry is about to take form along the Norwegian coast, creating new jobs and opportunities in rural areas. For the supplier industry, this is already the start of an exciting new journey. We are very happy to lead the way and to prove our role as a solid technology partner, both able and willing to help our customers solve new challenges, Mr. Lorentzen ends.

A new Norwegian export article?

Lumpfish is a relatively new specie used to fight sea lice within the salmon industry. With sea lice also being a problem in other salmon farming regions, lumpfish may also be a solution there. But, this is a specie with special biological needs completely different from salmon. Norway's advantage here is that we have both the biological and technical aquaculture knowhow, acquired over several decades, needed to develop such a new specie into industrial scale farming.

Combined with an industry culture willing and able to share experience and knowledge, this has resulted in domestication and commercialization of lumpfish production in record time. AKVA group expects the solutions and competence acquired from this pioneering work will bring us opportunities and profitable business also in export markets in the near future.

Lifeboat Rescue Service using Polarcirkel Boats

“Redningsselskapet” (RS) is the Norwegian Lifeboat Rescue Service, a charity membership association working to keep our coastline safe, largely based on volunteers and donations.

Heading out into the worst of weather year round to save lives at sea, they depend on the most seaworthy and dependable boats available. The Polarcirkel Diving 685 met our stringent criteria and after thorough testing it came out on top of the list as our new summer patrol boat, says Kristin Wiig Sandnes, Regional & Prevention Manager in RS.

These tough boats are built by Helgeland Plast, an AKVA group company located in Mo i Rana, right at the Arctic Circle in Northern Norway. Thousands of boats have been built since 1987, and this

rugged boat concept is well proven worldwide in aquaculture, marine construction, leisure, tourism, arctic exploration, defense, rescue, police, fast rescue launch boats aboard ships and the list goes on.

The Polarcirkel Boats are so-called RBBs (Rigid Buoyancy Boats). This means that the boat has 12mm thick solid HDPE pipe pontoons filled with polystyrene, unlike common RIBs (Rigid Inflatable Boats) that are prone to puncture. This makes it virtually indestructible reliable and unsinkable, perfect for use in RS along Norway's rocky coastline.

An adventure in HDPE plastic

Helgeland Plast AS began manufacturing HDPE plastic pipes in 1971. In 1974 the world's first circular HDPE plastic cage was produced and delivered to Lovund Sjøprodukter AS. Cages currently account for 50% of turnover while 25% comes from boat sales. Today, Helgeland Plast produce approxi-



A new Polarcirkel Diving 685 with 40 knots top speed.

mately 80 boats per year and exporting these high quality workboats worldwide.

Safe and stable workboat

The new Polarcirkel boats will replace the so-called summer patrol boats in RS, and used for preventive work, courses and training. This will be a very safe and stable working platform for the district's activities, says Kristin Wiig Sandnes. The boats will also be used to take

elderly and disabled people on boat tours, and to educate the public about RS and the work that they do. As well as patrol-duty along the shorelines during festivals and events. The pontoons ensure superior stability, especially important when boarding or rescuing someone from the water.

The V-shaped hull angle of 21° provides excellent seaworthiness, and these boats handle waves and

rough seas exceptionally well. When turning hard it stays in good contact with the water and in full control. This means even less inexperienced drivers have no problems driving it safely.

The four first boats for the RS were customized with center driver's console and three pilot seats aft, freeing up more space on the foredeck. A wide and low access ramp in the port side gunwale also allows for wheelchair access. Equipped with the latest navigational and communications electronics, and 40 knots top speed, makes this a high performance patrol boat for the RS.

We hope we will be able to acquire more Polarcirkel Boats for operation in several other districts along the Norwegian coastline, but we also need more volunteers in order to keep the boats in operations, ends Kristin Wiig Sandnes.

Platform Feed Barges for remote locations



By **Andrew Campbell**
COO Americas & Australasia
AKVA group Chile SA

AKVA group is now taking modern technology to the far corners of the world, enabling delivery of modular feed barges anywhere you can ship a 40' container.

This barge concept is easily adapted to customer's needs in terms of size and purpose, and enables cost efficient feed logistics and modern feeding technology in lakes or remote places where conventional feed barges cannot be built.

In June 2015, AKVA group handed over a complete cage farm for Rainbow Trout production to DunAn in Longyangxia Reservoir, 2600m up into the Tibet mountain regions of China. The delivery included a large Wavemaster AP120 Platform Feed Barge that was shipped in 26 containers and assembled on site.

The barge is designed and manufactured by AKVA group Chile. It measures approx. 18x28m, has a feed warehouse capacity of 120t, Quattro Akvasmart feed system, dual generators in addition to control room, living areas and full crew accommodation in four cabins. Included in the delivery were also 20 pcs. Polarcirkel Cages, nets, moorings, camera system and work boat etc.

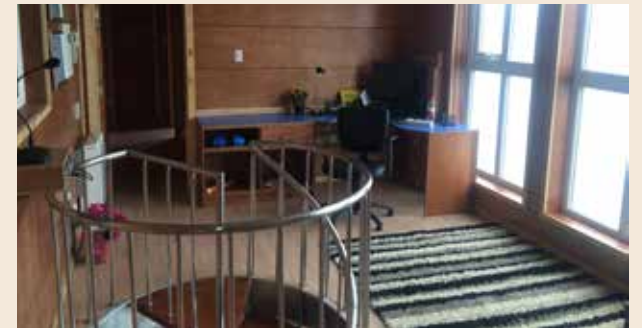
This innovative product addresses our customer's needs of bringing the latest feeding technology to semi-exposed farm sites in lakes and places that were inaccessible before, says Andrew Campbell, COO - Americas and Australasia. There are hundreds of large lakes and hydro dam reservoirs around the world suitable for modern and sustainable fish farming in cages. AKVA group's focus on being “Your Aquaculture Technology and Service Partner” led us to



The latest feed technology can be shipped to lakes and places that were inaccessible before, like here at DunAn in the Tibet mountain regions of China!



Polarcirkel cages at DunAn in China.



The new barge platform also includes control room and living areas.

develop this innovative range of modular platforms in order to provide technological solutions for customers in these areas. Enabling also these farms to benefit from the scale of economy that has proven so important for the success in the salmon industry, adds Mr. Campbell.

These tailor made barges are available from 50-400t carrying capacity, and the level of outfitting can be adapted to any customer needs. In the fall of 2015, we are also shipping two barges to a new customer in a hydro dam reservoir in Iran.

One smaller feed barge and one self-propelled work barge with hydraulic anchor winch and crane, concludes Mr. Campbell.

New Feed Barge for high exposure sites

Many of the most experienced Norwegian salmon farmers come from a background in the fishing industry, and are used to severe weather along a rugged coastline from 60° to 70° North.

The North Sea and Norwegian Sea are well known for back-to-back gales and storms during fall and winter months.

Ola Helge Holmøy, owner of the salmon farming company Eidsfjord Sjøfarm AS and the fishing company Prestfjord AS, have long experience with advanced offshore trawlers capable of handling these conditions.

After acquiring two AF 400 Barges from AKVA group previously, they now wanted an even better and more seaworthy design, capable of operating in high exposure sites in Northern Norway. Their offshore fishing experience and specific requests lead to a feed barge looking more like a ship, longer and sleeker with reinforced bow design and deep V-shaped hull.

The idea of working with AKVA to design the feed barge based on our offshore fishing experience was to achieve better and safer working conditions for our farm crew at our most exposed farm sites in Vesterålen and Senja. With this construction, we will get better stability and a more comfortable movement in heavy seas. Thus enabling people to work and stay aboard the barge also in bad weather, says Roger Simonsen, Managing Director at Eidsfjord Sjøfarm AS. The process started with discussing the ideas with Jørn Sivertsen, Sales Manager at AKVA group – Nordic. We have worked with AKVA group and Jørn Sivertsen for many years, and got a very positive response to our idea of developing this new barge concept together.

The new Wavemaster AC 600 PV with its new bow design, V-shaped hull and full keel, is truly designed for tough and exposed sites, says Sivertsen. The V-shaped hull increases stability as a larger area of the hull will be in contact with the water all the time. This will reduce rolling and the risk of the bottom of the hull being slammed by large waves.

The barge has a feed holding capacity of 635 tons in 8 silos, and



The new Wavemaster AC600 PV feed barge at Eidsfjord Sjøfarm.

thereby will not depend on frequent feed deliveries which can be a challenge on rough sites.

Eidsfjord also requested large mort silage capacity in freestanding circular PE plastic tanks, totaling 65 m³ holding capacity. The V-shaped bottom also allows for easier cleaning down below. Rainwater is collected from main silo decks for the

built-in pressure washers used for cleaning, while bilge pumps at the bottom of the keel pump the gray water into storage tanks.

The end-result looks very good, and seems to meet our expectations we had from the start of this project. We now have a barge that behaves very well in all sea conditions, and allow for uninterrupted

feeding operations every day of the year. I would also like to take this opportunity to complement key staff at AKVA, Per Andreas Hjetland (COO-Nordic), Alf Kåre Ulfnes (Barge Project Manager) and Jørn Sivertsen for a job well done in completing this new design with us, ends Roger Simonsen.

New barges to Scotland



AC 450 Panorama Feed Barge.

■ AKVA group Scotland secures 2 new barge contracts with Marine Harvest Scotland.



AM 320 Comfort Feed Barge.

MHS and AGS recently agreed on the delivery of 2 new barges to Scotland in 2015. The barges are the AC 450 Panorama and AM 320 Comfort.

AKVA steel barges are designed to withstand the rough Scottish conditions (some barges up to 6m significant wave heights). Some other advantages of steel are easy disinfection if required, recyclable and low carbon footprint.

The barges can carry 450 and 320 tons of feed with eight and six line feed systems respectively to ensure feeding and fish performance is optimised. The barges also provide a safe and comfortable working environment with full overview and control of all the systems. The latest feeding and integrated feedback monitoring technology can now be monitored and controlled remotely from a shore base using the AKVAconnect software platform.

AKVA barges are covered by a 5-year limited paint warranty and these barges were given added protection with a metallised finish. Other features of the barges include automated silo hatches internal camera monitoring, custom designed control room, wet and dry labs, cranes and mort silage handling system

AKVA group Scotland continue to develop their existing Scottish service team, employing around 50 people mostly based in Inverness but also in Argyll and the Western Isles. AKVA group is a leading technology and service partner to the aquaculture industry worldwide, offering both Cage- and Land Based Farming aquaculture operations with complete technical solutions.

“Hurtigruten” choose Polarcirkel Boats

■ The famous coastal steamers running people and cargo along the Norwegian coast since 1893 is called “Hurtigruten” (The Fast Route). It is no longer the fastest means of transportation, but remains one of the main tourist attractions in the country, running the route year round.



“Hurtigruten” M/S Fram.

these boats are proving to be a great success for the famous cruise line.

We really enjoy these safe and versatile Polarcirkel Boats! On the latest cruise, more than 90% of the passengers have booked tours with the boats, and we have already

had many unforgettable experiences close to nature in some of the world's most fascinating areas. The crew of M/S Fram also recently got a great thrill ride in these boats, and this was a great success, smiles Erik Eng, Chief Officer aboard the “Hurtigruten” M/S Fram.

One of their latest exploration ships, M/S Fram, recently acquired two Polarcirkel Boats for sightseeing tours in arctic regions and on Svalbard and Greenland. These boats were custom built, approx. 7m long and powered by a 200hp Yamaha outboard. With seating for 12 passengers, measurements to fit Fram's cargo hold and a single lifting point,

Connect to Chile



AKVAconnect provides full overview.

■ AKVAconnect to Nova Austral in Chile.

The first installation of the AKVA-connect control platform for camera systems using fiber optics will take place in Punta Arenas during the winter of 2015. The system will link and control SmartEye 360 cameras and SmartWinches at Nova Austral's Coochburn salmon farm. This customer also has trusted AKVA group Chile to provide additional technology for this site, such as twelve new 40x40m Wavemaster Steel Cages and Akvasmart Feed System.

Several of their feed systems at other sites are now also being upgraded. Other customers in Chile are also showing great interest in the new AKVAconnect system, and experiences from Nova Austral are expected to spur further installations in this large salmon farming region.



First ever 160m cage delivery in Turkey

■ AKVA group Turkey has delivered 14 x 160m Polarcirkel 450mm cages to Agromey.

The photo above shows one of the 14 cages after assembly and welding was completed. The agreement was for 14 Polarcirkel 450mm cages in total and the project was delivered on time according to contract by the 12th of July. Polarcirkel Cages are PROVEN in some of the most extreme conditions and aqua-

culture installations throughout the world and our 2 ring catamaran design is the ultimate combination of strength, flexibility and high reserve buoyancy, providing a safe working platform with excellent seaworthiness. This was the first ever 160m 450mm cage project undertaken by AKVA group Turkey in their history, and we hope this project will further enhance our strong relationships with our industry partners in the area and improve the strong presence of Polarcirkel and AKVA group brands in Turkey and the Mediterranean.

Giant production plant for post smolt



Production starts in January 2016.

■ Helgeland Smolt is building a giant production plant for post smolt on Rødøy, in Nordland, Northern Norway.

The capacity of the recirculation system for the water supply is over 30,000 cubic meters per hour. The total construction cost for this facility is estimated at NOK 300 million (37 MEUR).

Helgeland Plast, part of AKVA group, is supplying PE pipes and parts for the plant. The majority of the piping system is 630 mm.

The project is well underway, the building for the hatchery and start feeding is up and the concrete foundation for the grow-out areas has already been poured.

The facility includes seven main areas from hatchery to on-growing of large post-smolts, and will total 13,000 square meters when completed. The plant will handle both salt and fresh water, and overall tank volume will be 21,700 cubic meters. The production target is 7-8 million salmon smolts annually with a total biomass (weight of fish) of 2,000 tons.



One of the new cages being launched into the ocean at the installation site.

Large cage contract in Canada

■ 28 Polarcirkel cages are being built in Port Hardy, BC on Vancouver Island in Canada.

Among other projects, AKVA group North America has been busy getting ready for the 2015 Marine Harvest Polarcirkel cage project delivery. This year's plan is to build 28 pcs. 120m circumference

cages making it the largest project to date in North America for Polarcirkel! These are a mixture of 450mm and 500mm float pipe cages. All cages are being built in Port Hardy, British Columbia, on Vancouver Island in Canada. We have many resources working hard to ensure success on this project which is in full production swing, with a goal to have all cages delivered during the summer and fall of 2015.

The project has been a team effort with resources from Norway, Scotland, Chile and Canada. All contributing to the design in order to meet the requirements of Marine Harvest Canada. There has also been great collaboration with the customer and we look forward to the continuing relationship and further installations of the quality Polarcirkel Cages in North America.

United Arab Emirates invest in aquaculture

■ A new recirculation broodstock, hatchery and nursery system has just been delivered.

In March 2015 AKVA group handed over a marine fish hatchery and nursery to the Ministry of Environment & Water of the UAE. The fish farm consists of recirculation broodstock, hatchery and nursery system. The initiative is the first step of a long-term strategy to develop the aquaculture industry in the region. Wild fish stocks in the Gulf have decreased and the local fishing industry is suffering. It is hoped that the new national strategy for aquaculture will give opportunity for new businesses and job creation.

AKVA group delivered and installed the equipment for the marine system in cooperation with UAE based company ANAF and local contractor Ghantoot.



Many small units makes it possible to produce a wide range of different species.



The local staff is checking the finish.

The facility is designed for a production of 10 million marine fish fry. The range of many small facilities makes it possible to produce different species and assess their commercial value.

Farm management support of the daily operation will be carried out by ANAF in collaboration with specialists from AKVA group to ensure that the system is operating efficiently.

Announced AKVA group Scotland voted Winner Aquaculture Supplier of the Year 2015



At the Scottish Marine Aquaculture Awards Ceremony in Edinburgh in June 2015, AKVA group Scotland were voted Aquaculture supplier of the year 2015.

It was tremendous to be recognised by the industry for all the efforts of our staff, as service and customer focus are our main priorities. The business in Scotland has grown

steadily and now has around 50 employees and revenues over 10 million GBP this year. As a partner to the industry this award recognised the reliability and enthusiasm of our staff and the contribution we make to growth and profitability for our customers in the aquaculture industry, says a proud General Manager, David Thorburn.