



SINTEF Fiskeri og Havbruk AS

Research Infrastructure Information

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Contents

1	SINTEF ACE/SeaLab in AQUAEXCEL.....	3
1.1	Introduction	3
1.2	SINTEF ACE/SeaLab SSO	3
1.2.1	Facility Unit 1 Information: ACE Tristeinen	4
1.3	Modality of access	5
1.4	Unit of access	6

1 SINTEF ACE/SeaLab in AQUAEXCEL

1.1 Introduction

Operating institution:	SINTEF in cooperation with ACE (AquaCulture Engineering)
Type Operating Institution:	Research Institute
Research Infrastructure(s):	ACE/SeaLab SSO (AquaCulture Engineering/SINTEF Facilities for Surveillance, Simulation and Operation)

1.2 SINTEF ACE/SeaLab SSO

Name of the infrastructure:	ACE/SeaLab SSO (AquaCulture Engineering/SINTEF Facilities for Surveillance, Simulation and Operation)
Location:	ACE: Valsneset, Norway & SeaLab SSO: Trondheim, Norway
Web site address:	www.sintef.no/fish & www.aceaquaculture.com/english
Contact:	Finn Victor Willumsen, Email: fvw@aceaquaculture.com Tel: +47 905 95 661
AQUAEXCEL TNA facility:	Yes, SINTEF and ACE have facilities which are open for Access to external research groups within the framework of the AQUAEXCEL project
Short description	ACE is a new large scale infrastructure developed for research, testing and verification of improved and new technical and operational solutions in sea-based aquaculture. Through offering a combination of full scale facilities for different species, flexible technology test sites at different exposure levels, state-of-the-art monitoring and communication equipment and industrial farms the infrastructure will promote engineering developments for a more sustainable marine aquaculture production. ACE will focus on on-growing stages of fish species in exposed sea sites. ACE is integrated with the SeaLab SSO e-infrastructure laboratory in Trondheim, providing equipment and software for simulation, operations and surveillance as well as for design of technical equipment. This includes support for data capture, storage and analysis of environmental and operational data. Computing clusters and database servers as well as graphical processing equipment and displays are installed. The SeaLab SSO communications infrastructure provides a secure and controlled access to ACE. This includes live video and on-line access to sensors and actuators, thus enabling remote configuration, monitoring and operation of equipment.
Keywords	<ul style="list-style-type: none"> • Aquaculture technology and operations • Marine Resources Technology • Biology monitoring • Benchmarking • Large scale testing
Technical labs	The fisheries and aquaculture related laboratories at SINTEF include laboratories for a wide range of processes and chemical analyses related to marine biomass including extensive lipid analyses, DNA, microbiology. Facilities for production and studies of live feed, hatching and juveniles of different species

	and a processing facility for marine raw material including the possibility to follow a complete processing line and optimise the technological solutions, or to study different processes and equipment included in different phases of such a line
EU projects	COFAWS , Confirmation of the origin of farmed and wild salmon and other fish SEAFOODplus , Tailor-made seafood for consumer health and well-being PreventEscape , Preventing the Escape of Fish from Aquaculture AquaInnova , Supporting governance and multi-stakeholder participation in aquaculture research and innovation MARCOM+ , Towards an Integrated Marine and Maritime Science Community
Number of researchers	100
Number of technicians	10
Lodging facilities	Possibilities for lodging both at land base and at the feeding barge. Office, meeting rooms and storage of equipment at Vaagan Gaard (Valsneset) and at the feeding barge Office, meeting rooms and storage of equipment at SINTEF Sealab
SERVICES - scientific support	SINTEF/ACE can support projects with e-Infrastructure and technical equipment such as oxygen meter, conductivity meter, temperature meter, doppler current sensor, current profiler, wave meter, underwater camera, telcage communication units, telemetric equipment, EAP (Environmental Access Point) and oceanographic buoy. ACE offers transportation of personnel and equipment from landbase to sea site with MS "Torra". MS "Torra" can also be used for minor scientific activity.
SERVICES - electronic databases	Databases with operational and environmental data from the facility
SERVICES - quality assurance	SINTEF/ACE have personnel qualified and approved (FELSA category C for researchers) to carry out experiments which involves live fish
Safety and ethical issues	SINTEF/ACE follows strict rules regarding EHS, transmission of pathogens, fish welfare etc.
Other relevant information	Special equipment designed for measuring a) forces and changes on equipment and b) biological parameters in the fish

1.2.1 Facility Unit 1 Information: **ACE Tristeinen**

Name Facility Unit 1	ACE Tristeinen
TNA	Yes
Contact (Researcher)	Finn Victor Willumsen, Email: fvw@aceaquaculture.com , Tel: 004790595661 Guttorm Lange, Email: gla@aceaquaculture.com , Tel: 004790096411

	Gunnar Senneset, Email: gunnar.senneset@sintef.no , Tel: 004792026107
URL	www.sintef.no/fish www.aceaquaculture.com
Postal Address	SINTEF Fiskeri og havbruk AS Postboks 4762 Sluppen 7465 TRONDHEIM
General description	<ul style="list-style-type: none"> - Feed barge (300 tons) including sleeping rooms, control room, lab, meeting room and office - 4 -6 cages (157m circumference, volume of approximately 35 000 m3) - Automatic central feeding system - R&D barge - Maximum biomass: 2340 tons with Atlantic salmon - Life stage from smolt to slaughter
Technical description	Wireless communication systems from feed barge to shore (SeaLab SSO) and from feed barge to cages and R&D barge. Instrument cabinets on each cage with Ethernet and serial interfaces for deployment of project specific sensors. Basic instrumentation consisting of sensors for sea currents, oxygen levels, temperature, salinity, wind, wave heights etc.
Remote monitoring & control	Remote access to databases, sensors and video feeds through the SeaLab SSO e-infrastructure
Water and environmental conditions	Sea Water site
Flowrate	N/A
Temperature	Temperature range from 2.5-16 degrees Celsius (natural variation), monitored in real-time.
Salinity	Natural fluctuations around 34 ‰ monitored in real-time
Oxygen	Fluctuations from 65-100% saturation monitored in real-time
pH	Natural fluctuations around 8.15
Light intensity and wavelength	N/A
Photoperiod	Natural
Fish measurements	Size, weight, fat content, survival rate, maturation, FCR, filet colour measured manually and/or automatically
Other/additional info	Access to make sampling of the fish after slaughtering at Inovamar, a State-of-the-art slaughter house at Froya

1.3 Modality of access

Modality of access under this proposal:

One main offering consists of two sites with industrial scale salmon farming (cages, feed barge). During the four year access period, three production cycles will be completed. The smolts used in each cycle will have documented genetic background, and low variance in treatment and handling. The sites/cages are equipped with sensors for continuous measurements for documentation of environmental conditions (oxygen, temperature, salinity, currents etc.). Operational data (type of feed, feeding rates, sea lice treatments, biomass growth estimates etc.) are also available. Infrastructure for efficient installation of project related equipment is available on every cage, including communication interfaces for remote monitoring and data transfer via SeaLab SSO.

Reference measurements are supplied by an environmental monitoring buoy, also accessible through SeaLab SSO.

1.4 Unit of access

The unit of access is defined as one week, equalling the occupation of ACE/SSO facility during 5 days each of 7.5 hours for up to 2 persons.