2013-2022

Centre for Autonomous Marine Operations and Systems

AMOS

CoE - Centre of Excellence

Norwegian University of Science and Technology (NTNU)

11th April 2014 SMI Seminar: Automation and Autonomy

Egil Rensvik,

Science & Technology Counsellor

Royal Norwegian Embassy / Innovation Norway

Singapore

Norwegian Centre of Excellence

Autonomous Marine Operations and Systems (AMOS) - Next step in research, education and innovation

Knowledge fields & research methods

Hydrodynamics and Structural Mechanics

Guidance, Navigation and Control

Numerics

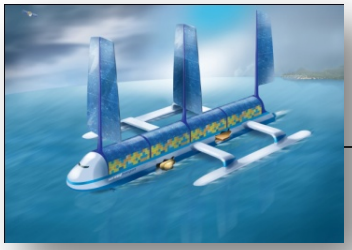
Theory

Experiments

AMOS

Centre for Autonomous Marine Operations and Systems

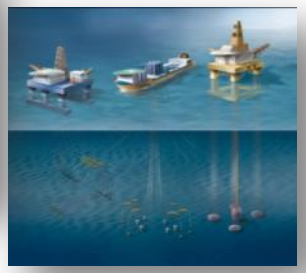
Interdisciplinary research areas & challenges



Greener operations

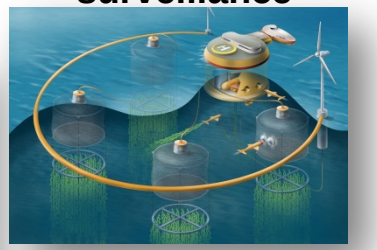
Autonomous surveillance

Offshore renewable energy



Deeper water operations

…. and in Arctic areas



Open water biological production

Norwegian Centre of Excellence

Vision

- To establish a world-leading research centre on autonomous marine operations and systems
- Fundamental knowledge is created through multidisciplinary theoretical, numerical and experimental research within the knowledge fields of hydrodynamics, structural mechanics, guidance, navigation and control.
- Cutting-edge interdisciplinary research will provide the needed bridge to make autonomy a reality for ships and ocean structures, unmanned vehicles and marine operations, to meet the challenges related to greener and safer maritime transport, monitoring and surveillance of the seas and oceans, offshore renewable energy, and oil and gas exploration and production in deeper and Arctic waters.

The Centre of Excellence (CoE) will contribute to improved international competitiveness of Norwegian industries as well as to safety and protection of the marine environment.

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Innovation and Creativity

National Partners

- Norwegian Research Council
- NTNU
- SINTEF Fishery and Aquaculture
- MARINTEK
- SINTEF ICT
- STATOIL
- DNV GL

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International Partners

- Denmark Technical University, Denmark
- Eindhoven University of Technology, Netherlands
- University of Linköping, Sweden
- Instituto Superior Técnico, Portugal
- CNR-INSEAN, Italy
- University of California Berkeley, USA
- Woods Hole Oceanographic Institution, USA
- University of Newcastle, Australia
- National Academy of Science of Ukraine, Ukraine
- Jet Propulsion Laboratory, NASA, USA
- University of Delaware, USA

- Singapore Partners??

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Research Areas

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Greener Operations

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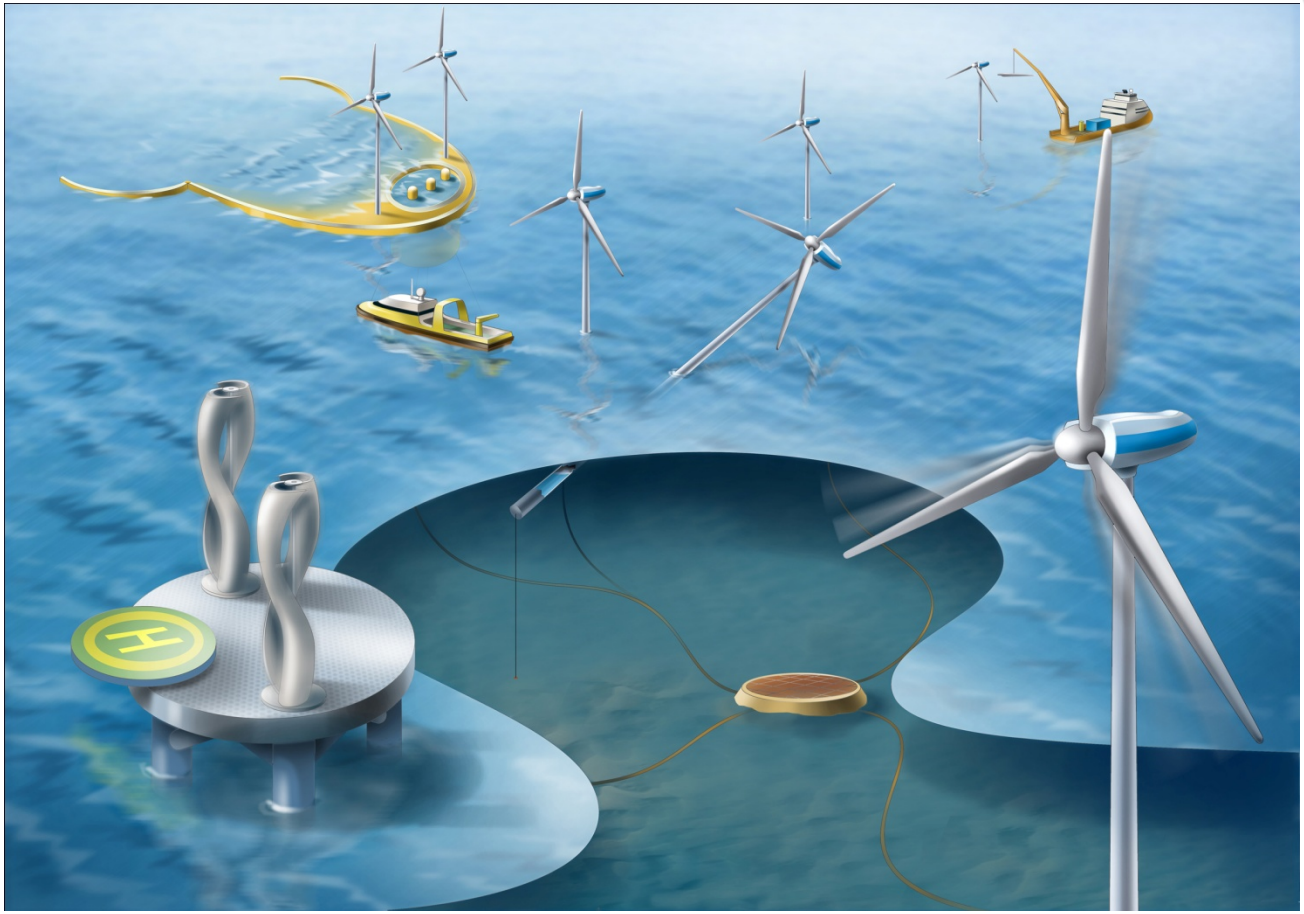
Offshore Renewable Energy



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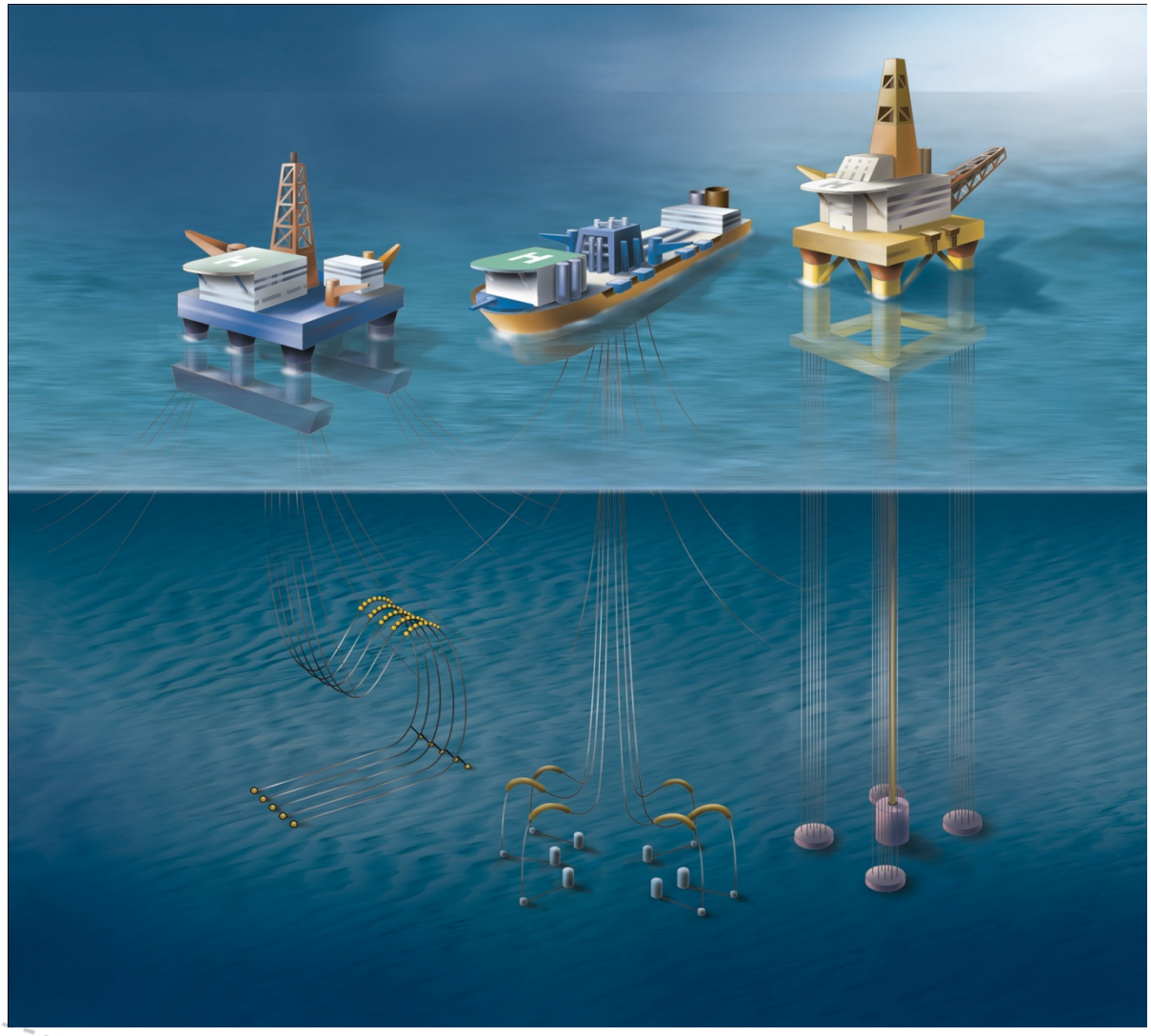
Deep Water Operations



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Arctic Operations

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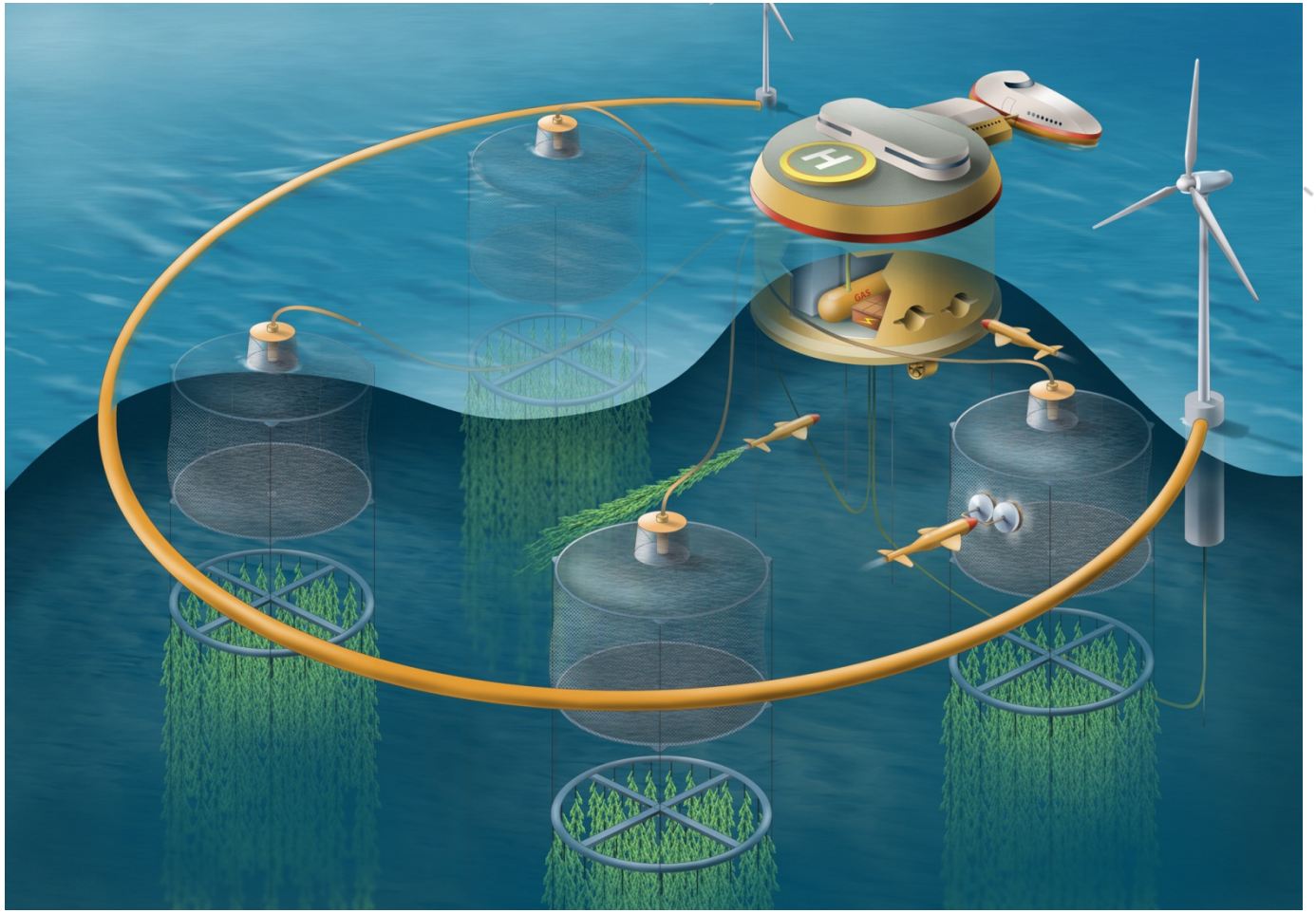
Seafood Production



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Monitoring and Inspection

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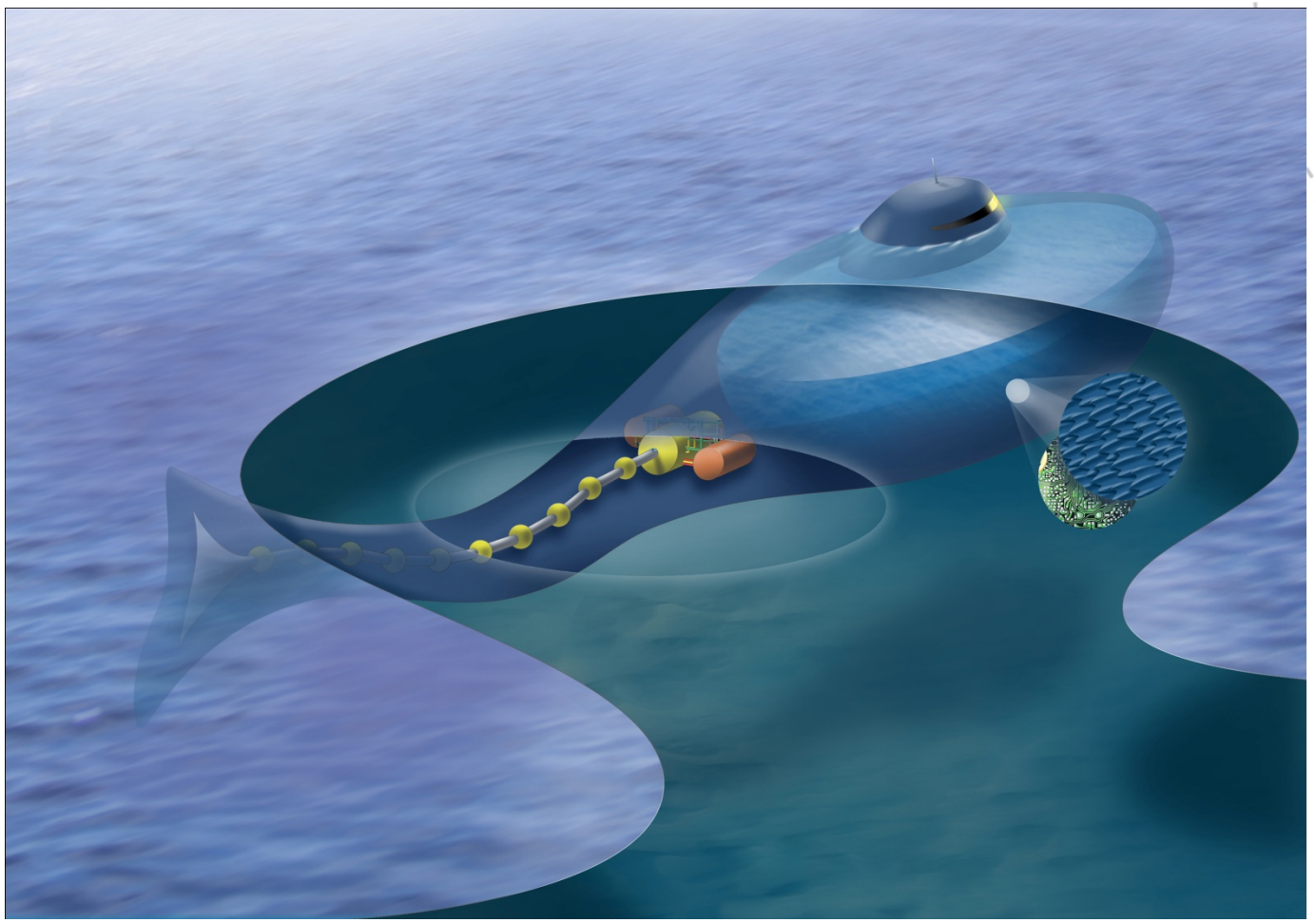
Novel concepts



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Knowledge fields

1. Hydrodynamics
2. Structural mechanics
3. Guidance systems
4. Navigation and sensor systems
5. Control and optimization

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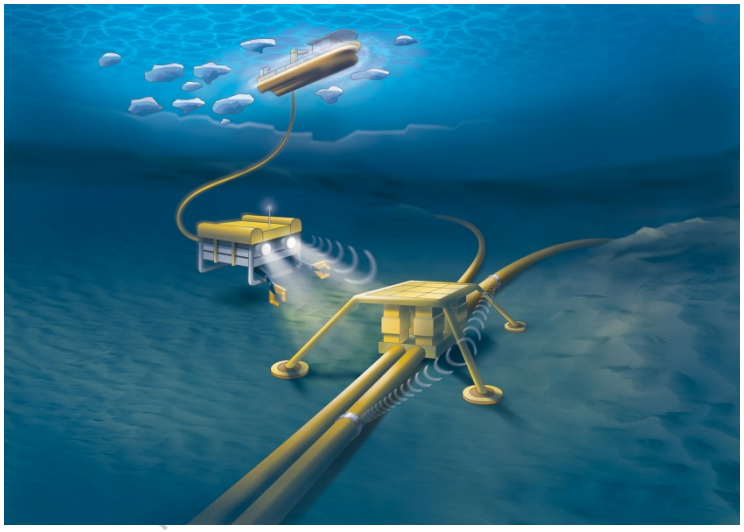
Laboratories

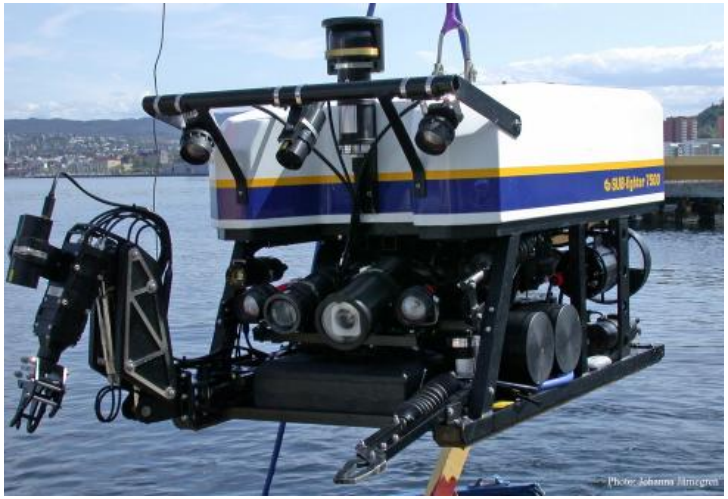


NTNU Research Vessel Gunnerus

NTNU's research vessel, R/V Gunnerus, was put into operation in spring 2006. The ship is fitted with a dynamic positioning system and a HiPap 500 unit, optimal for ROV operations and the positioning of any deployed equipment.

The vessel is arranged with wet lab, dry lab and a computer lab in addition to a large aft deck.

Accommodation comprise three double berth scientific personnel cabins and three single berth crew cabins. The large mess hall functions as a lecture room for 25 people.



ROV MINERVA

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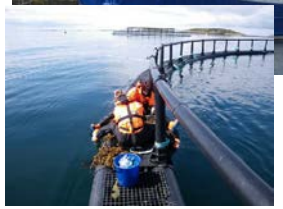
Theory – Simulation – Experiments – Operations

Bridging the gap from theory to practice

RV Gunnerus

AUR-Lab

Unmanned Vehicles Lab



ACE

Marine Cybernetics Laboratory

Full-scale and prototype applications

Simulator Environment

- Control and instrumentation
- Hydrodynamics
- Mechanics
- Run time infrastructure
- Machinery systems
- Databases, analysis
- Visualisation

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Experimental techniques & prototyping

- Cavitation Tunnel
- Ocean Basin
- Structural Laboratory
- Towing Tank

- Hydrodynamics and Structural mechanics
- Guidance, Navigation and Control

NTNU

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2013-2022

Centre for Autonomous Marine Operations and Systems

AMOS

Cost: NOK 650 million - 900 million AMOS

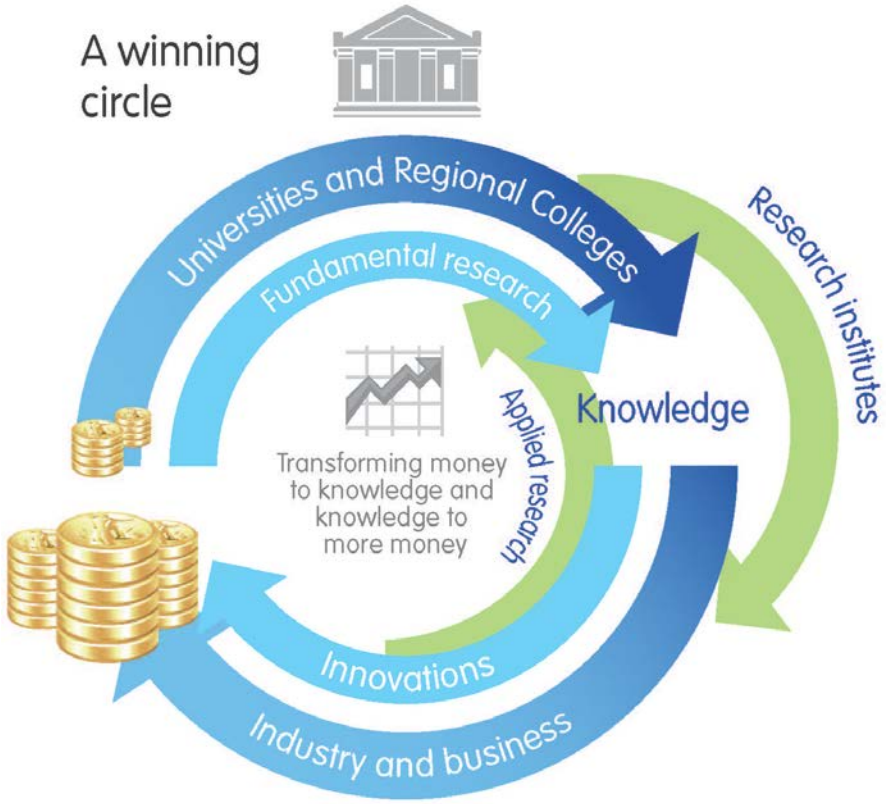
Funding: NTNU
RCN
SINTEF Fisheries and Aquaculture, MARINTEK, SINTEF ICT,
Industry partners DNV GL and Statoil

Norwegian Centre of Excellence

Bridging the gap between fundamental research and applications and innovations

Values created by AMOS

- Setting the agenda for research, education and further industrialization and governance on important national areas
- Enabling research cooperation on high level between NTNU, SINTEF Group, Statoil, DNV, national and international partners
- Provide top qualified MSc and PhD candidates for industry and academia
- Publications in internationally leading journals and conferences
- Dissemination and knowledge transfer to industry through candidates, research institutes, and direct collaboration



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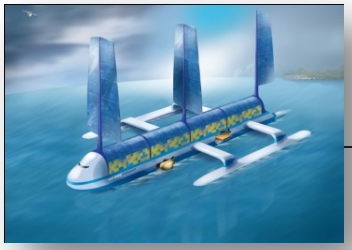

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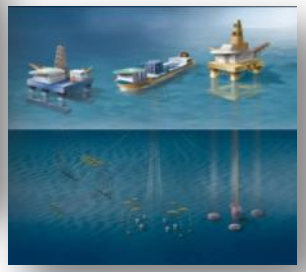

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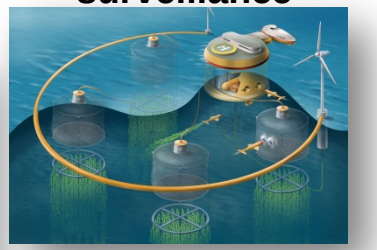

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