

SEAWATCH- The next generation

Fugro Norway AS (OCEANOR)

Inés Martín Grandes

Trondheim/ Norwegian Capital of Technology



- NTNU (The Norwegian University of Science and Technology)
- Largest University in Norway (40.181 students)
- 5 Nobel Prize Winners



Where are we?

R&D

- Sintef, 'largest' R&D technical institute in Northern Europe (2100 employees).
- Ocean Space Center (Sintef Marintek)
- OCEANOR and Seatex a spin-off from Sintef in 1984
- Equinor R&D center
- Siemens R&D center (deep ocean)
- Kongsberg (Seatex, Maritime)

Clusters

- NOWITECH (R&D offshore wind)
- NCEI (Marine Instrumentation)
- NCE Aquaculture
- NTNU AMOS - Centre for Autonomous Marine Operations and Systems

Innovation

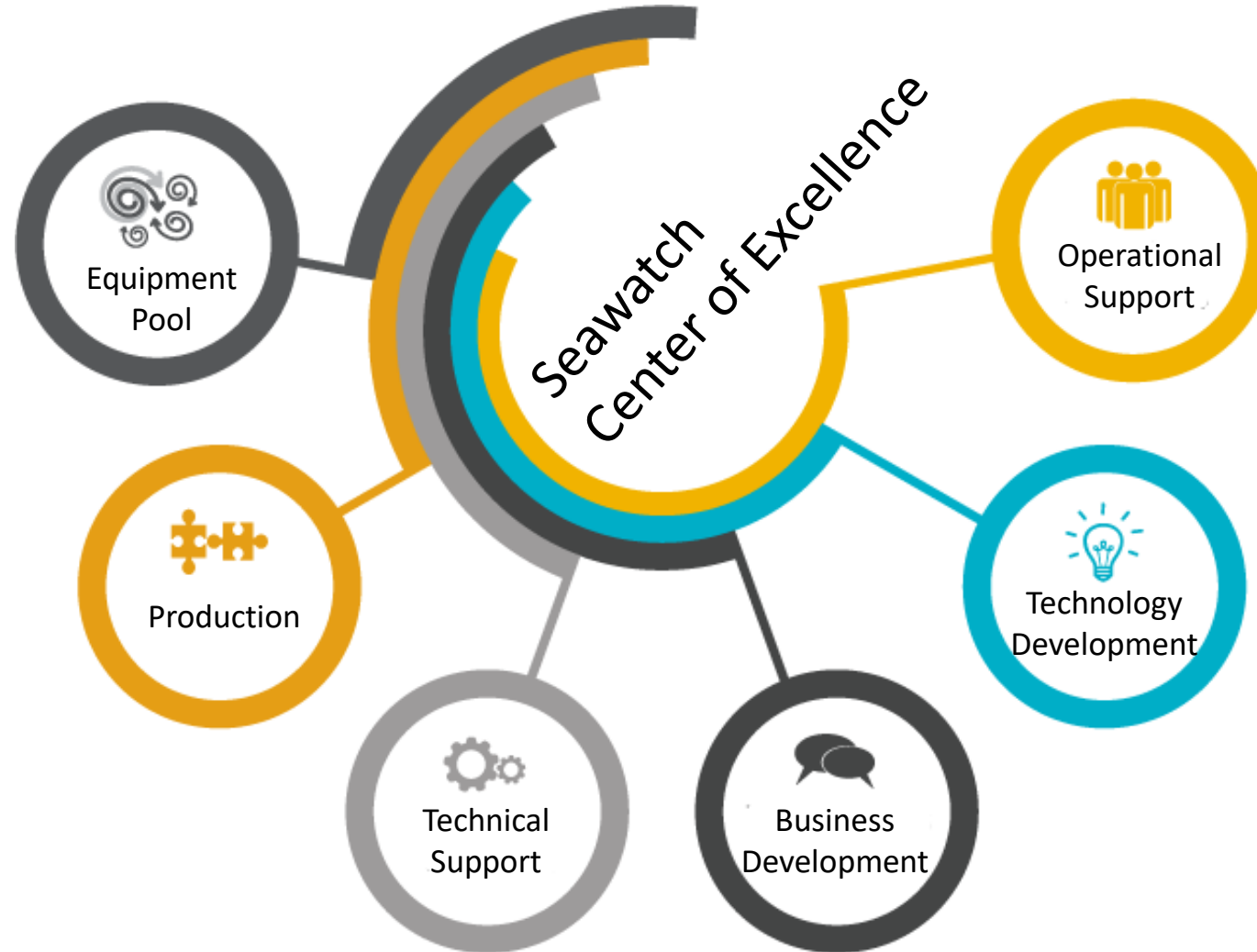
- The region with highest rate of Innovation in Norway



Seawatch business, What are we doing?

- High tech design and manufacturing
- Business development
- R&D/ Innovation/Engineering
- Manufacturing/ assembly/ testing/ Verification
- Pool Management
- Data as a service to Offshore Wind industry
- Sales of Seawatch Buoys
- Operation of buoys
- Aftersales

FNAS – SEAWATCH Center of Excellence



SEAWATCH Next Generation Buoys

- Increased instrumentation capacity
- Higher power capacity
- Improved fault tolerance and control
- Real time wave measurements, motion compensation and transmission
- More connectivity options (IoT)
- Cost-efficient water level measurements



Increased instrumentation capacity

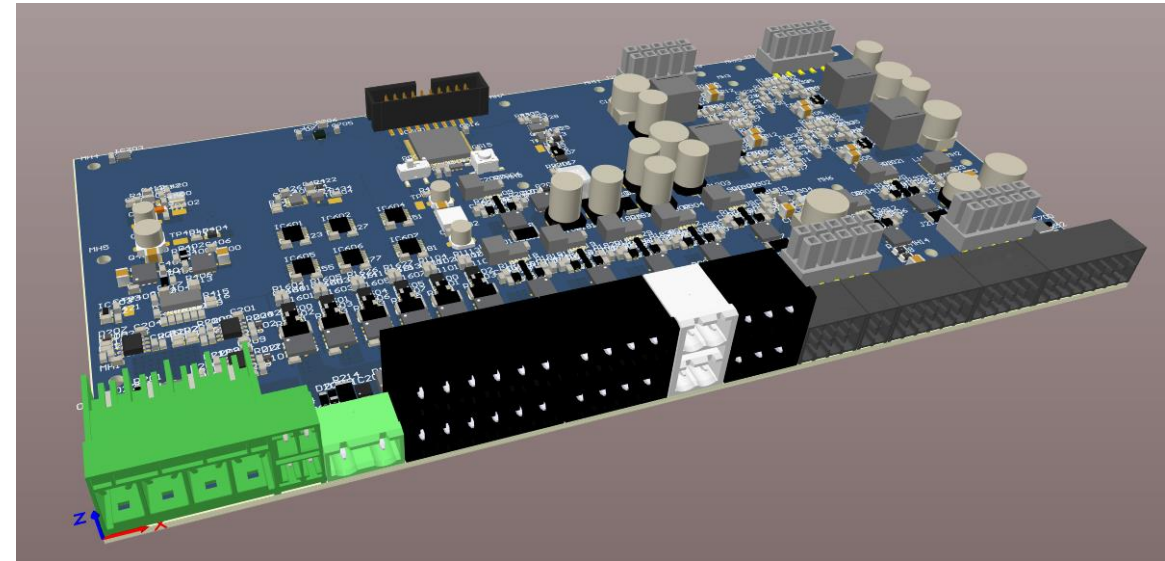
- Increased payload capacity
- High flexibility with many mounting options
- Transportable in standard shipping container (air & sea)

Higher Power Capacity

- Four flexible compartments for current and future energy solutions, as well as instrumentation
- Four 110W methanol fuel cells (one in each compartment)
- Supply high power instrument such as a Lidar continuously for more than a year.
 - Enables long term operation of high-power demanding sensors, such as Lidar, Bird detection, camera systems, hydrophone arrays, ++.
- Increased solar yield by 30%
- Option for small wind turbine (50W – 400W)

Improved fault tolerance and control

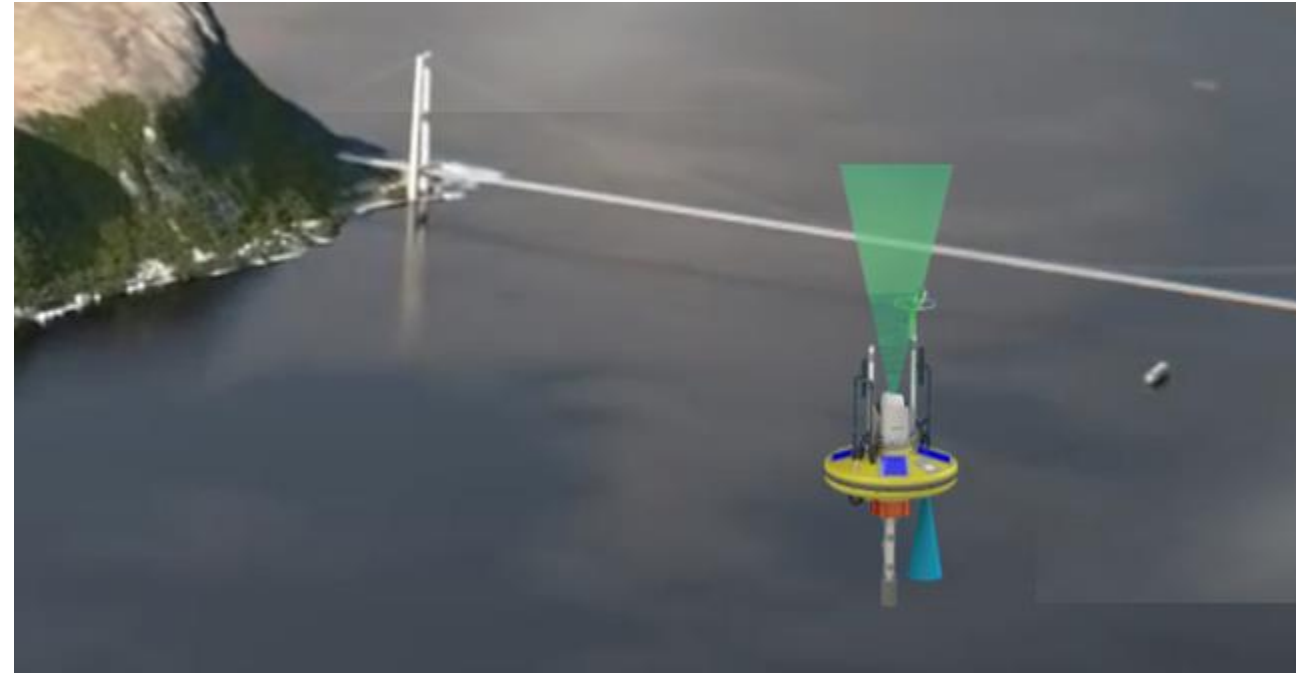
- New Power Management Unit
 - Monitoring of each sensor's power consumption
 - Instrument isolated current protection resettable
 - Higher current capacity
- New Datalogger
 - 20+ sensor interfaces
 - Increased storage capacity and computation power
 - Ready for third-party software installation
 - Increased connectivity with WiFi/4G



Circuit board for Power Management Unit

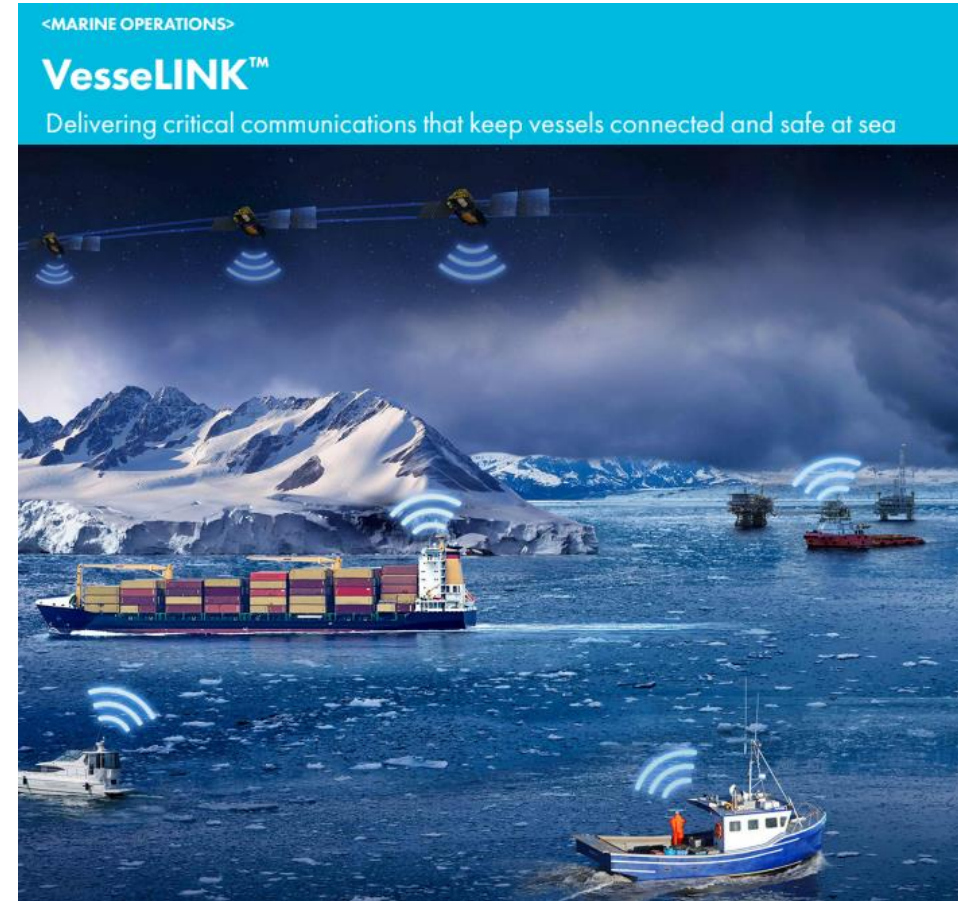
Real time wave measurements, motion compensation and transmission

- Real time translation and orientation motion measurement
 - Enables correction of current meters
 - Enables motion compensation of Lidar measurements
- Real time wave measurements
 - Enables in the loop control of critical operations such as drilling or wave power generator
 - Enables early warning of high incoming waves



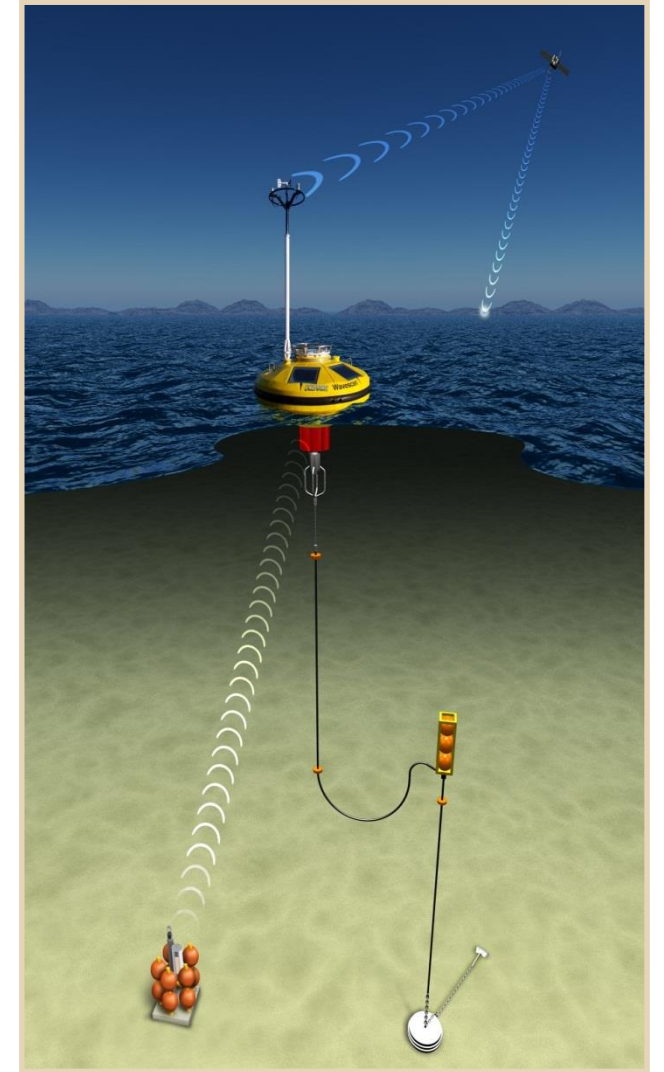
More connected

- Larger power system provides capacity for next generation high speed satellite link, such as Iridium Next.
 - Enabling the buoy to be a communication gateway for long ranging autonomous systems, for example drones or subsea inspection equipment.
 - Enabling high speed transfer of measured data, for example underwater acoustic signals
- 4G/LTE/WiFi interface for full access and easy remote configuration.
 - Enables high speed data download
 - Enables remote configuration from anywhere in the world



Cost-efficient water level measurements

- Shallow water
 - Seabed pressure sensor in water depths up to 200m with acoustic transmission to the buoy. Gives 1cm accuracy
- Near shore
 - Vertical positioning with GPS base station correction through cellular network/radio link with sub centimeter level accuracy
- Far shore
 - Vertical positioning with GPS L-band corrections from Fugro's global network of base stations with sub decimeter accuracy





Thank you



i.grandes@fugro.com



seawatch@fugro.com



+ 47 40430978

