

Djibouti, March, 2019



Building Systems for Monitoring in ports and harbors

LAHOUCINE BENGARA



This is Xylem

2011

Roots from 1920

30

Brands

150+

Countries

17,500

Employees

\$5B

Revenue

#7

Fortune's change the world
list



Xylem's Vision

We devote our technology, time and talent to advise the smarter use of water.

We look to a future where global water issues do not exist.

Our brands



WEDECO®

Smith-Blair



AC FIRE PUMP

godwin™

rule®

GOULDS
WATER TECHNOLOGY

FLYGT



SANITAIRE®

LEOPOLD®

LOWARA

JABSCO

FLOJET

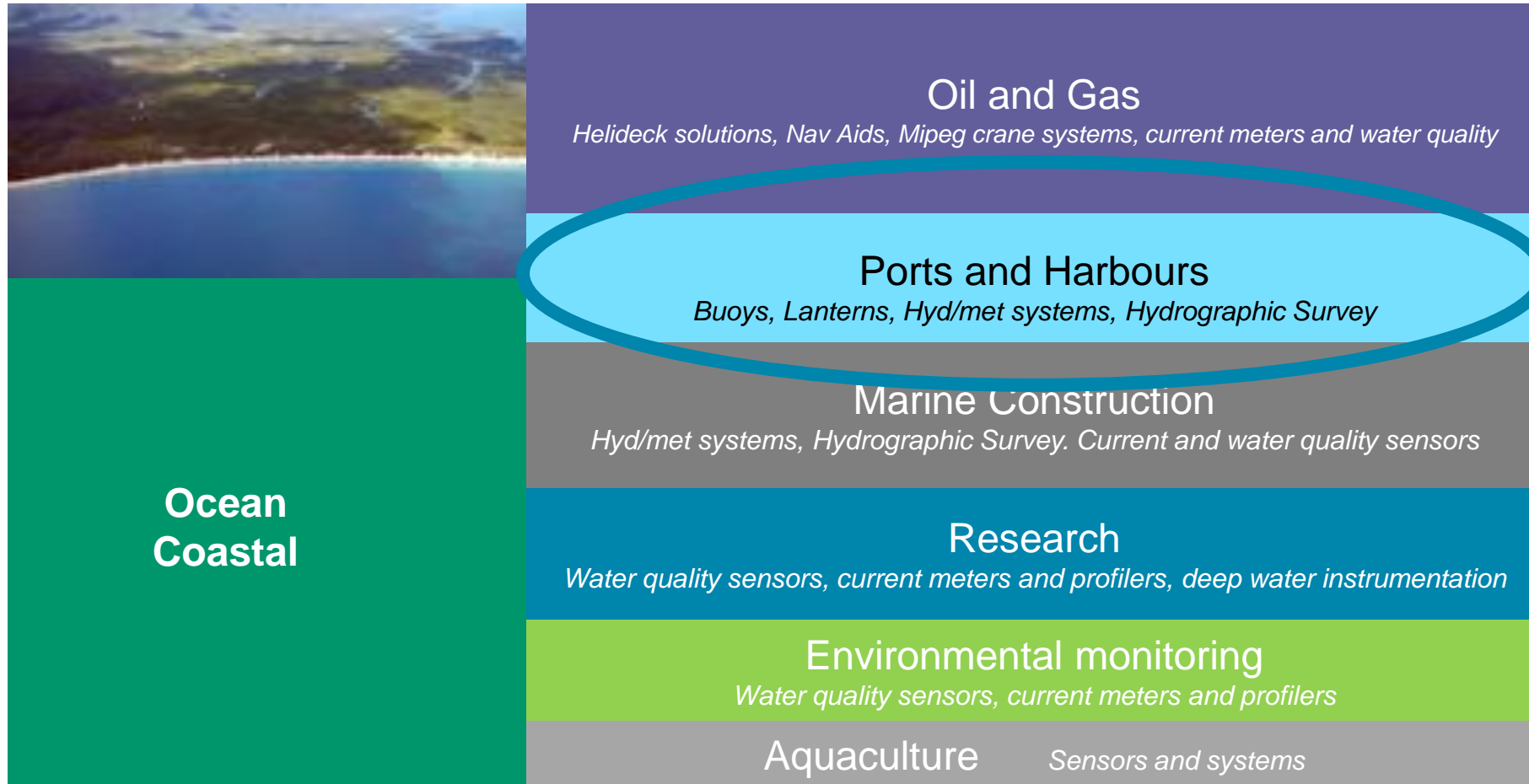
FLOWTRONEX

Standard Xchange®

Bell & Gossett

xylem
Let's Solve Water

The Ocean and Coastal Segments



Solutions Xylem provide to ports and harbours



- Lanterns**
- Fixed
 - Buoy mounted
 - Up to 30-degree vertical divergence
 - LED
 - Upgrades

- Buoys**
- AtoN
 - Data buoys
 - AIS
 - RACON

- MOTUS Data Buoy**
- Met
 - Currents
 - Wave
 - Environmental
 - AIS



SmartGuard Data Logger

VTS Office

rQPOD

- Remote controlled
- Autonomous and manual surveying
- Survey bed for navigation
- Velocity mapping for port dynamics

EXO multi parameter sonde

- Understand quality of water in the harbour
- Point source pollution tracking

SeaGuardII Doppler Current Profiler

- Current speed & direction in many layers
- Water level
- Significant wave height
- Wide range of parameters available

HydroSurveyor

- Autonomous and manual surveying
- Survey bed for navigation
- Velocity mapping for port dynamics

Argonaut-SL500 profiler

- Mooring assistance for SL500

CastAway-CTD

- Speed of sound
- Salinity and conductivity through the profile

xylem
Let's Solve Water

AANDERAA



SonTek

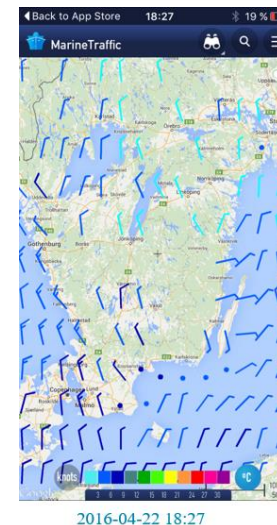


Factors to consider

Factors to be considered on approach;

- Currents and waves
- Tide
- Wind speed and direction
- Salinity

Forecasted models of wind often shows a different direction then what is seen at site,
This is the reason why you also need to monitor in real time and not only use forecast.



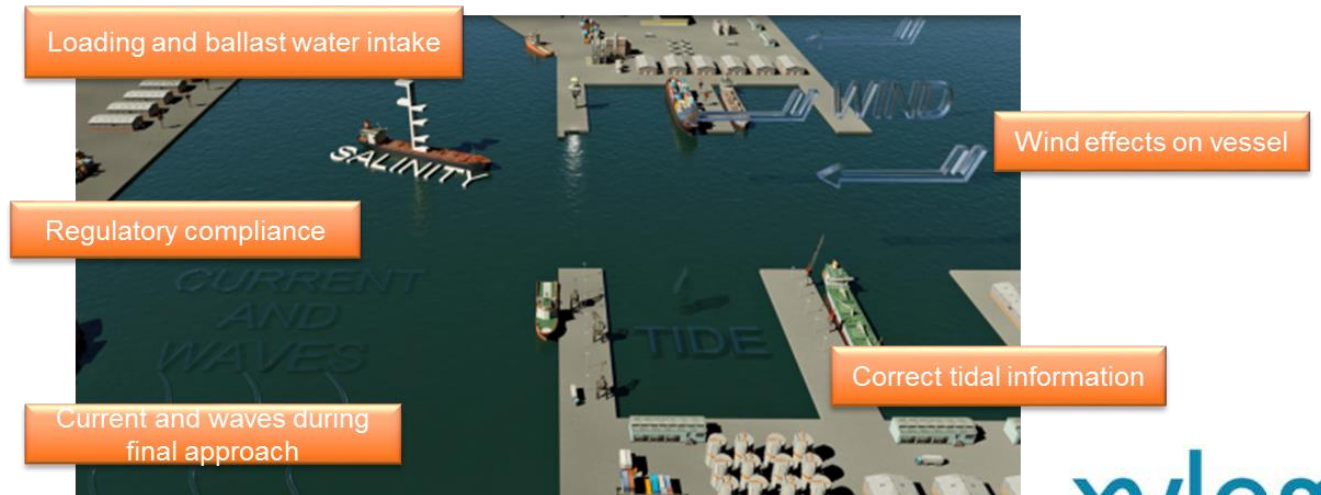
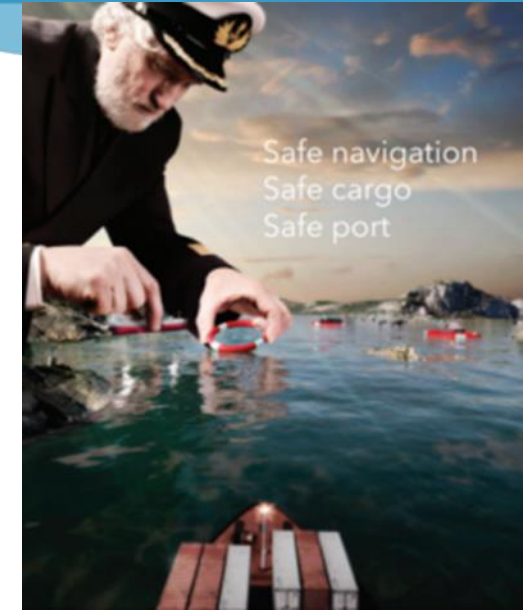
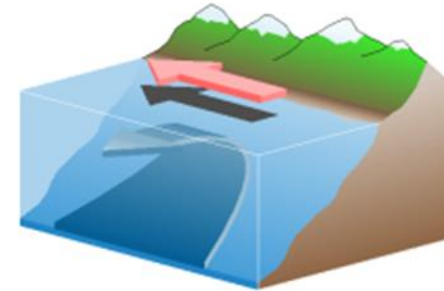
Models & forecast can not replace real measurements

Different winds for the region on April 22, 2016.



How are Xylem solutions used?

- Navigational aids for safe entry to harbour with buoys, lanterns, AIS, audible aids and channel markers
- Safe navigation by knowing the impact of currents, wave and wind displayed on AIS, browser or portable device
- Efficient dredging
- Regulatory compliance
- Control of environmental impact of operation
- Ballasting and load calculation aids



Building Systems for Monitoring in Coastal Environment

Requirements for buoy platform:

- Visible for other traffic during day and night.
- Withstand extreme weather conditions.
- Big enough to accommodate Power system for sensors and communication devices.
- Low maintenance for the buoy and sensors

Tideland SB138P Navigation Buoy



Building Systems for Monitoring in Coastal Environment

Finding the optimum multipurpose buoy platform:

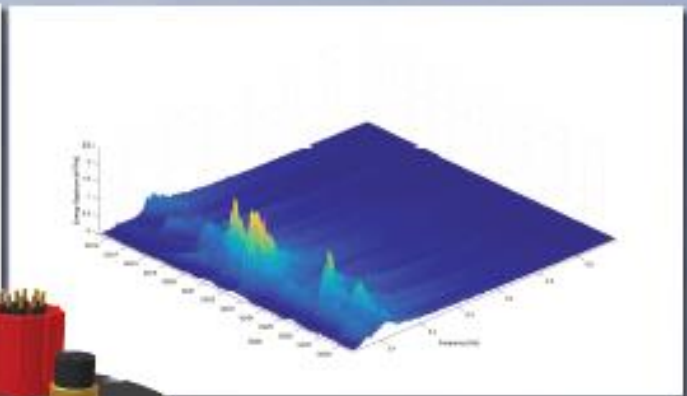
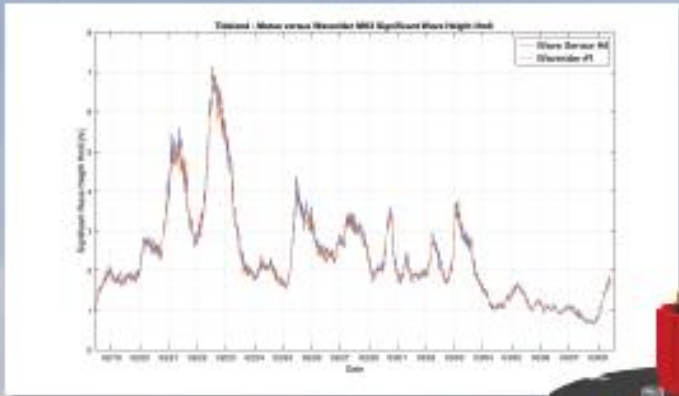
- Measure accurate wave characteristics with the flexibility of a Met Ocean (ODAS) buoy, Cardinal marks or Lateral marks



- Buoy platform: Tideland SB138-P (Diameter: 1.75m)
- Globally proven navigation buoy
- Deployable in waters with up to 500 meter depths
- Low maintenance



MOTUS WAVE BUOY



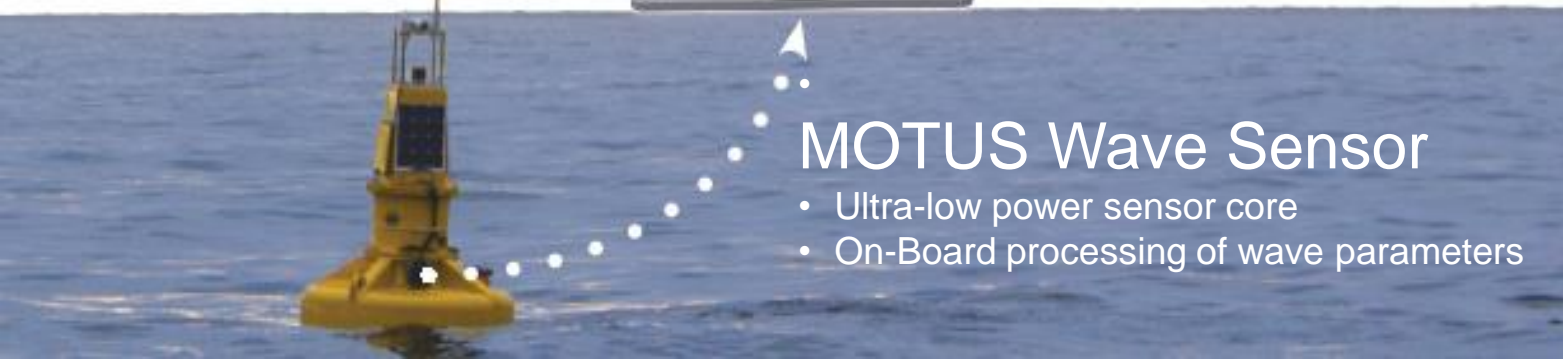
Proven Navigation
Buoy Platform

+



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MOTUS
Wave Buoy



MOTUS Wave Sensor

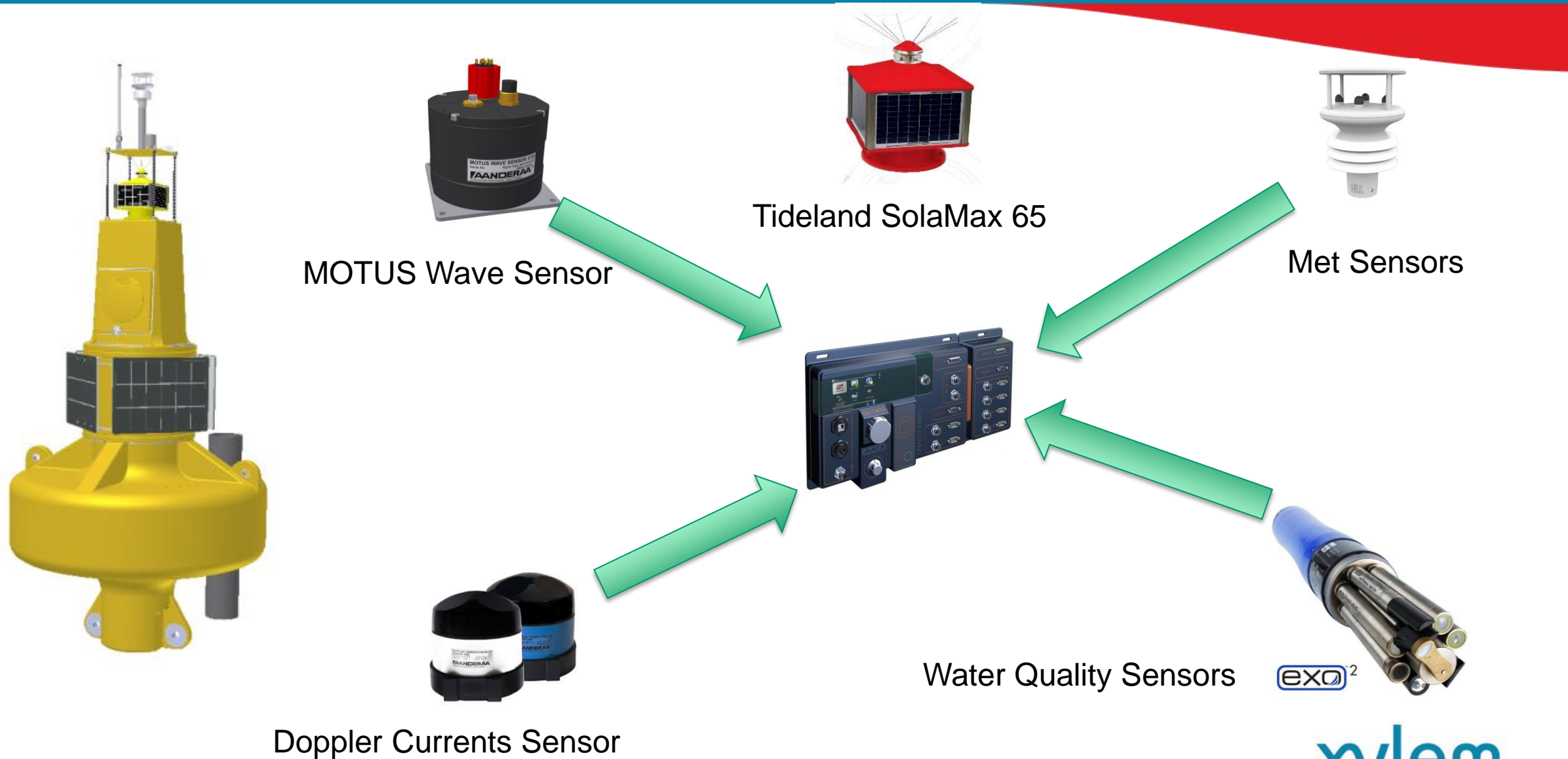
- Ultra-low power sensor core
- On-Board processing of wave parameters

**A UNIQUE WAY
TO MEASURE
WAVES
FROM BUOYS**



Powered by the MOTUS Directional Wave Sensor
MARKET LEADING ACCURACY INTEGRATED SYSTEM DATA IN REAL TIME

MOTUS WAVE BUOY - Adding value as a Multipurpose Buoy



MOTUS WAVE BUOY - Adding value as a Multipurpose Buoy

Maximize your buoy up time

- Real-time data management and display system.
- On-board processing of all measured parameters including wave parameters resulting in lower demands for bandwidth and power.
- Wide range of available real-time transmission devices.



2G/3G



Radio



Satellite



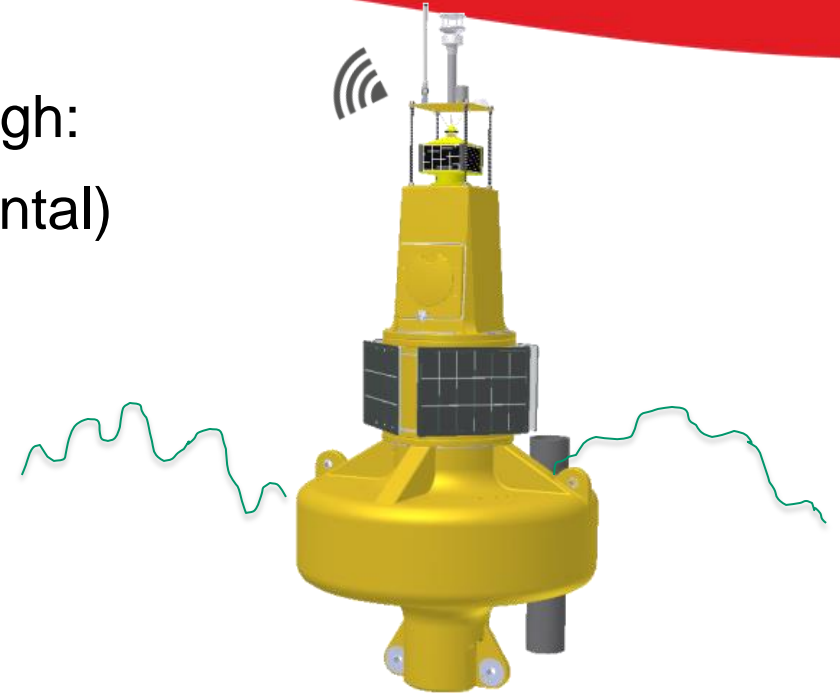
AIS



MOTUS WAVE BUOY

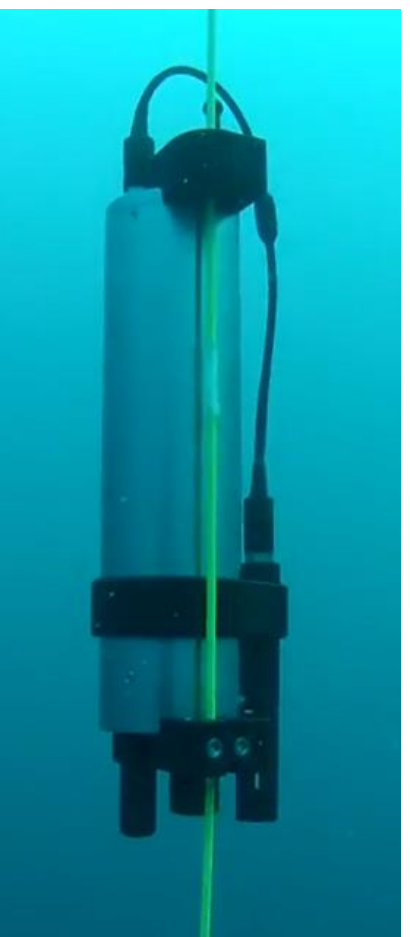
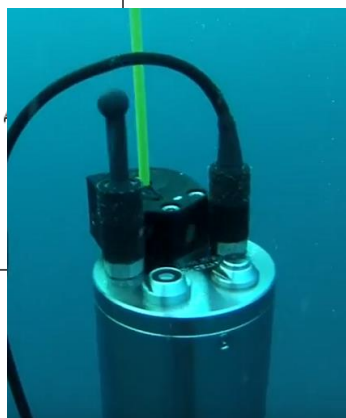
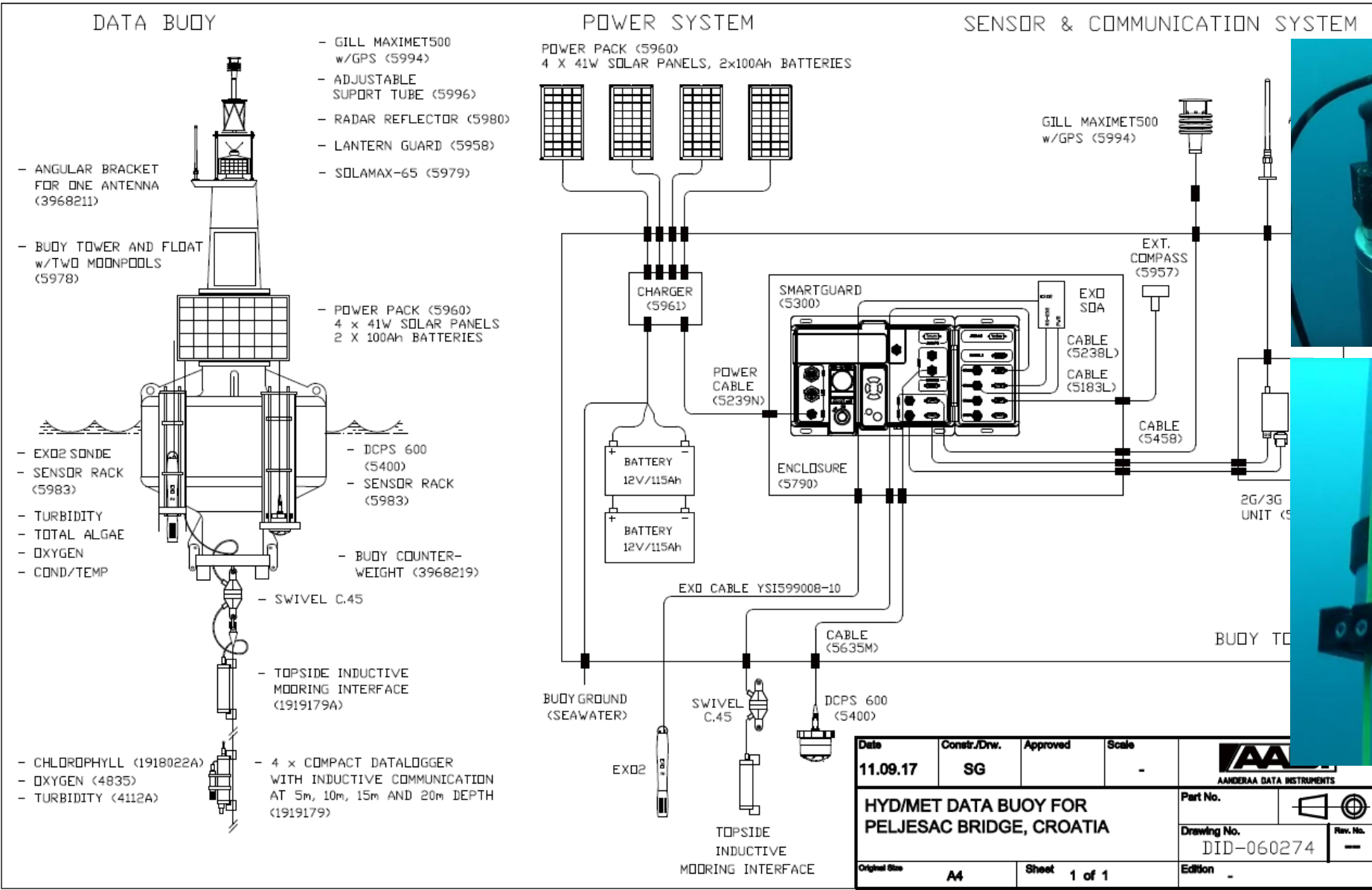
Our vision is to make MOTUS WAVE BUOY a success through:

- Multipurpose Buoy (AToN, Oceanographic & environmental)
- Well tested solutions
- Smart functionality
- Continuous improvement
- Listen to our customers
- Customised solution



References of our Solutions

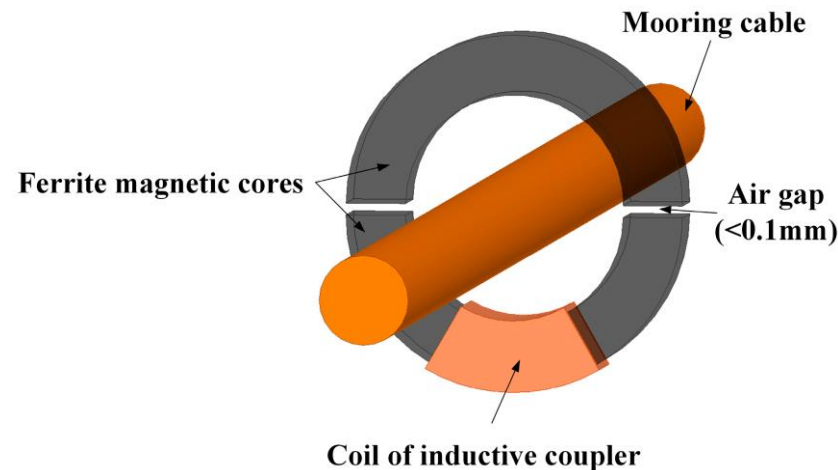
Peljesac Bridge Croatia



MOTUS WAVE BUOY

Sensor string solutions

- Pelješac bridge - Project in Croatia
- Data transmission from submersible multi-parameter sensor nodes utilizing inductive communication via buoy mooring



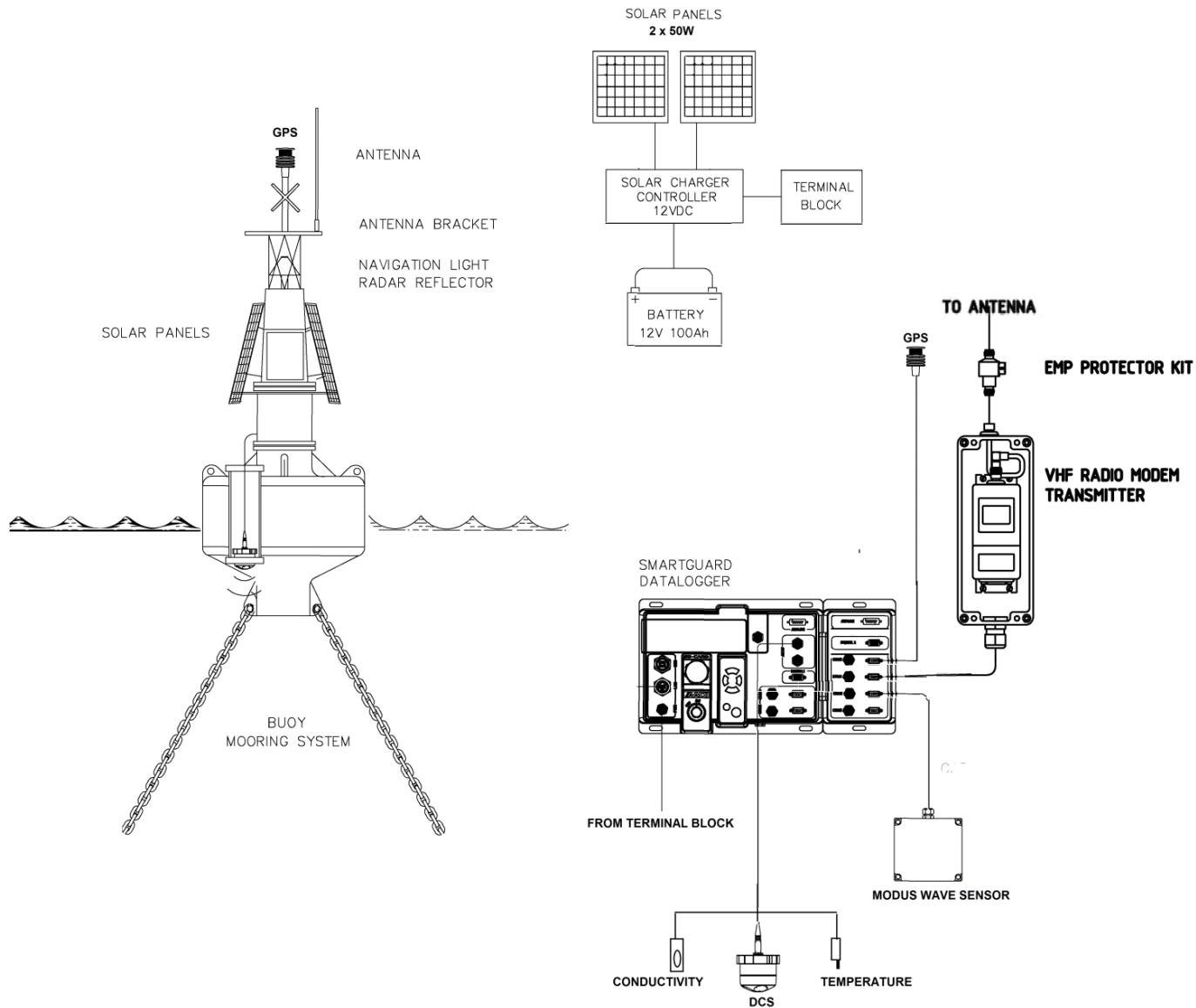
Jazan Port – Saudi Arabia

2 MOTUS buoys + a weather station on land

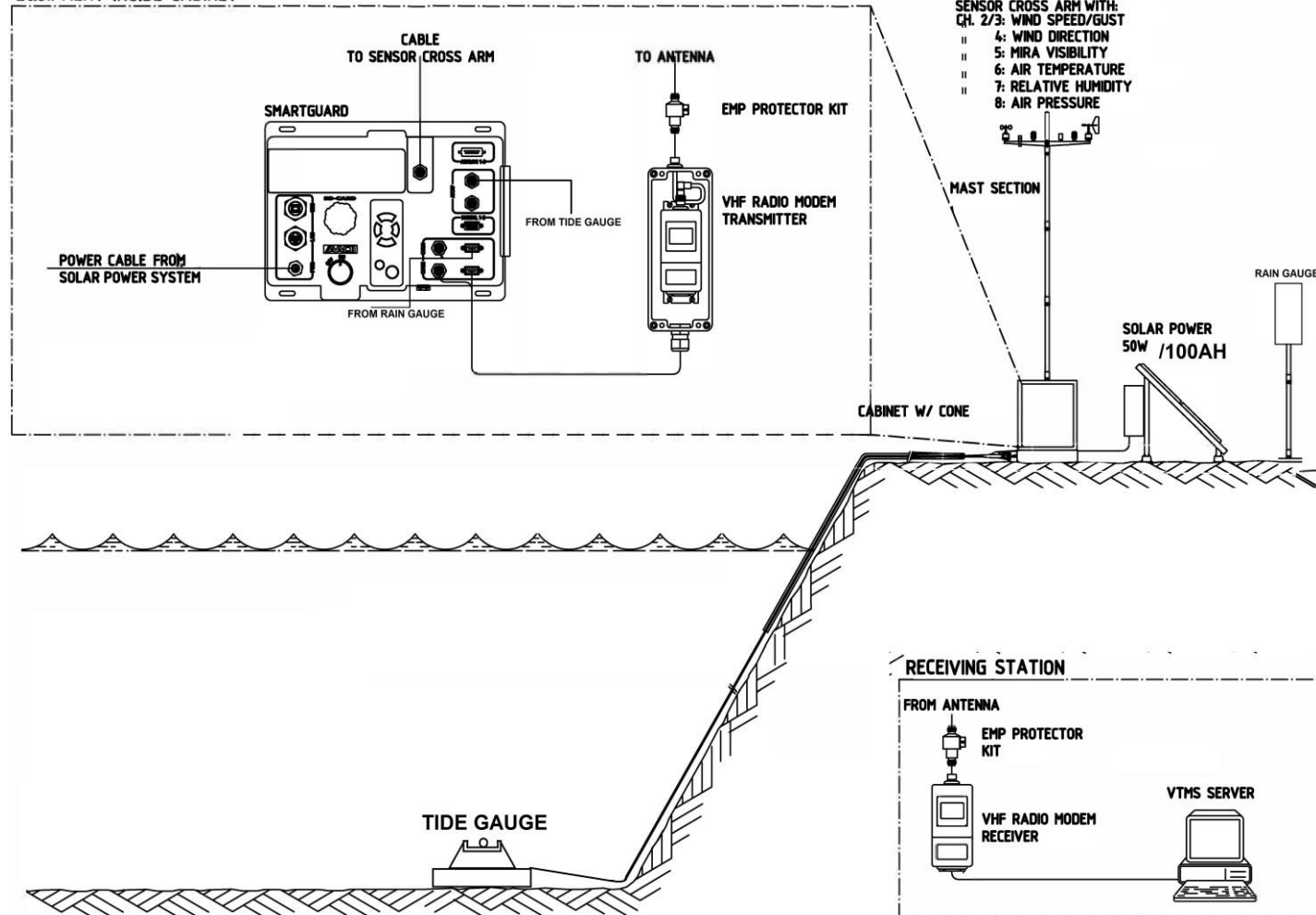
- Port big enough to bring in the biggest vessels in the world for loading of crude oil.
- New port still under construction.
- Located 50 km from Yemen and in an area where pirates operate (red sea)
- Data to be transferred and integrated in the VTS central, VTS operators will see the data on their main screens.
- Measuring surface currents and conductivity using an inline DCS as well as measuring wave using MOTUS sensor. Platform is the 138P



Jazan Port – Saudi Arabia



EQUIPMENT INSIDE CABINET

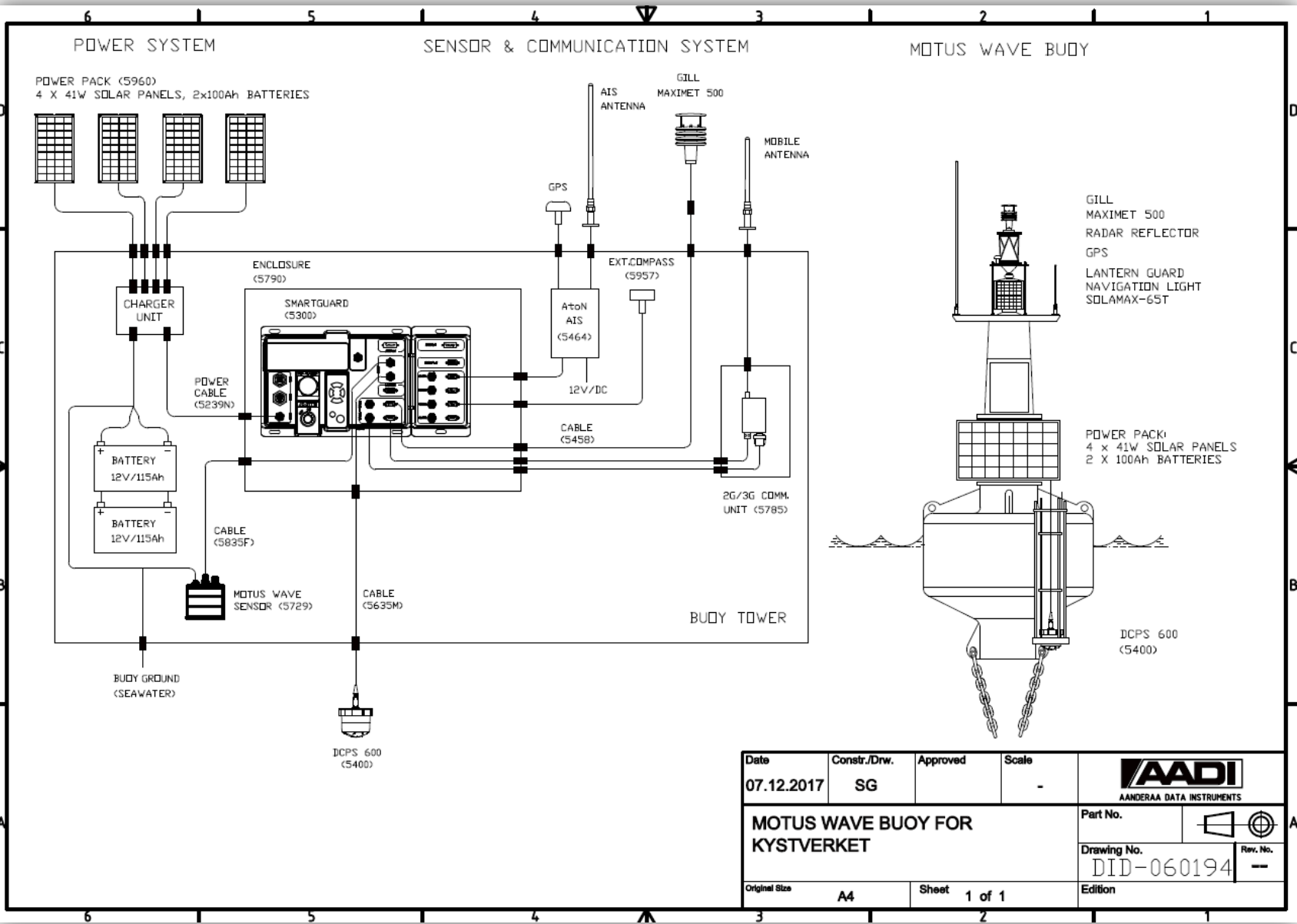


Norwegian Coastal Authority (NCA) - Smart buoy

- 1 MOTUS buoy in exposed site
- First of its kind for NCA.
 - Joint project between NCA and Norwegian MET office.
 - Prepared for an Oil in water sensor.
 - Been tested at Aanderaa for 3 months before deployment is scheduled in May.



Norwegian Coastal Authority (NCA) - Smart buoy



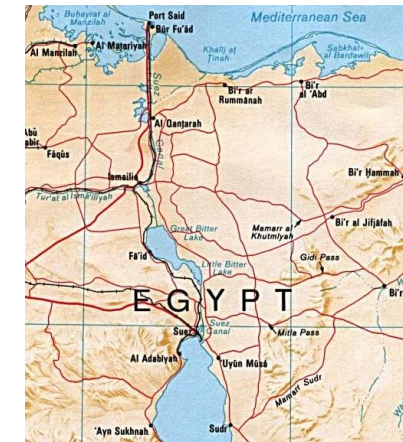
Suez Canal Authority

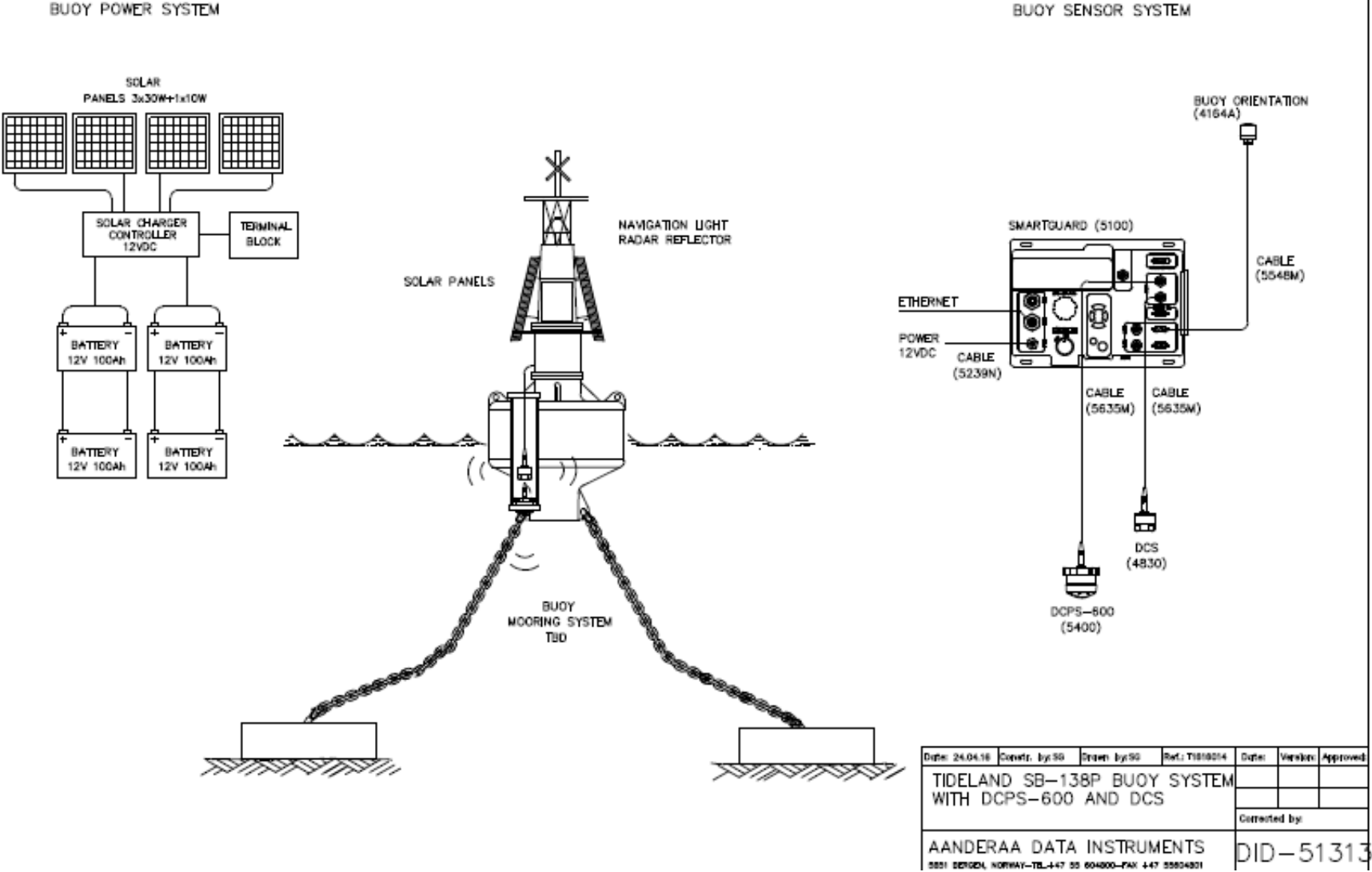
Background: In 2013 Suez Canal Authority (SCA) reached out to look for a solution on measuring currents in the Suez Canal connected to the existing monitoring stations along the Canal from Port Said to Suez. As it was no operational stations for current measurement in the Canal at the time.

Application: 4 current monitoring buoys with DCPS and DCS. Data transfer to VTS and storage in server for other users to access the data.

Value proposition: Deliver 4 databuoys with current measurement in the surface and at multiple levels in the water column to give full visibility of the currents. This helps increasing the uptime of the Canal and increases navigational safety.

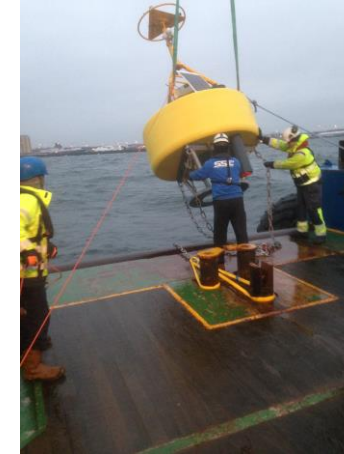
As a bonus it gives the researchers from the SCA valuable data that they use in their models for improving the canal's layout.





Helsingborg Port - Sweden

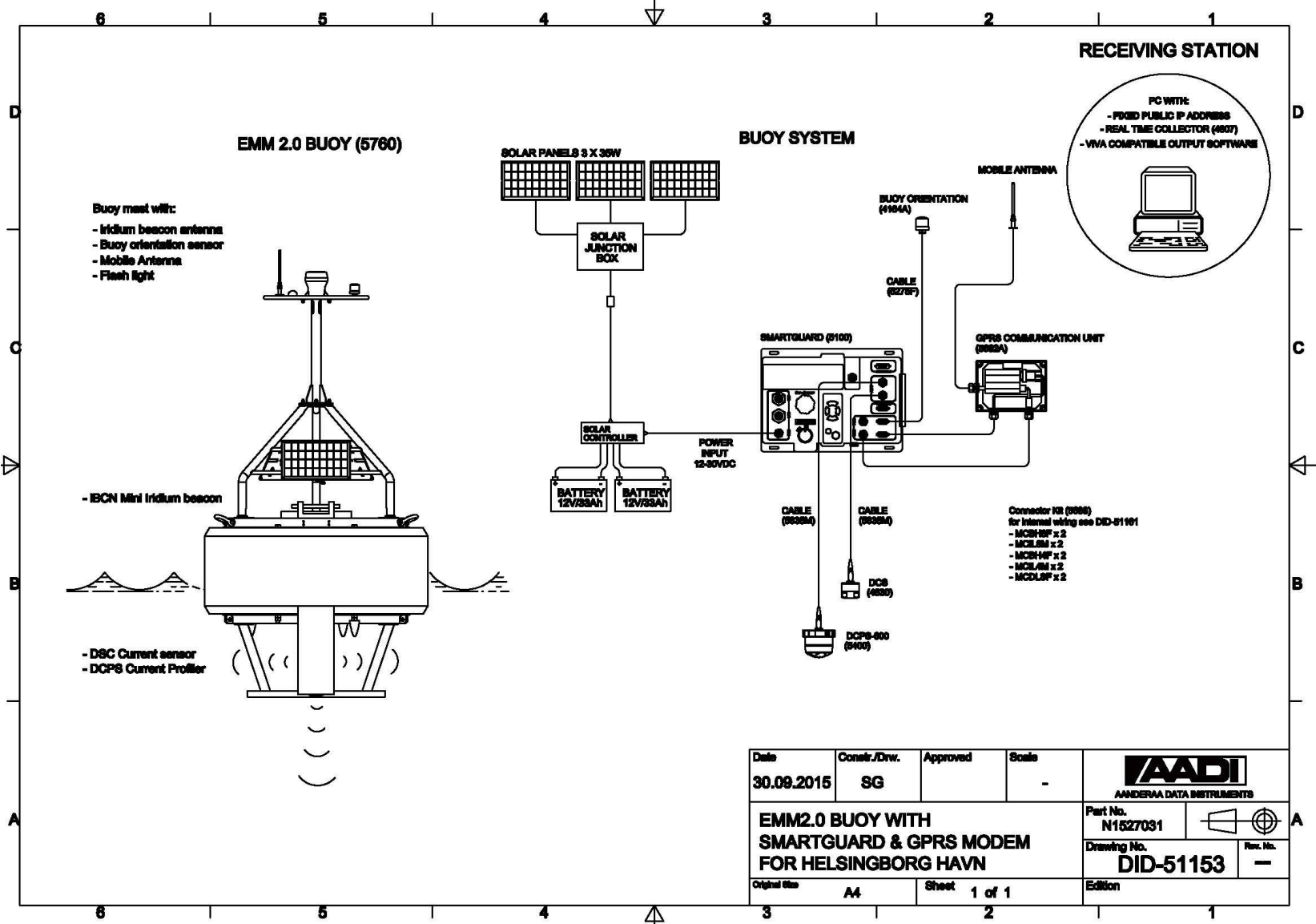
- To increase navigational security in the harbour, 3 monitoring systems installed in 2016.
- 2 x SL 500 for horizontal current measurement
- 1 Data buoy with current measurement at 1 meter depth and down to 17 meters
- All data stored in customers database in real-time and relevant data is sent to ViVa where the data is automatically checked before it is presented on the ViVa app and internet.



SonTek SL500



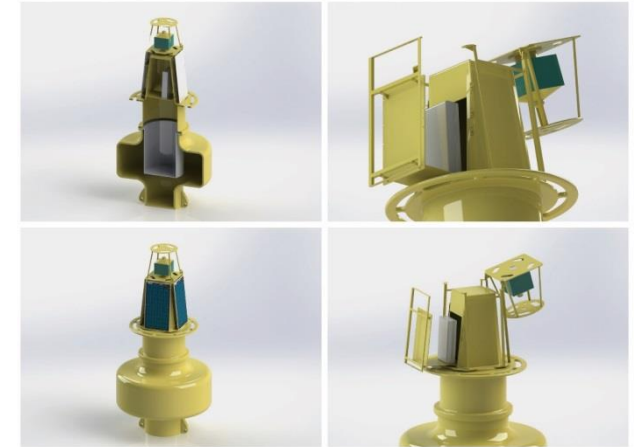
Helsingborg Port -Sweden



MOTUS BUOY SUPPLY FOR THE PORT AUTHORITY OF CARTAGENA



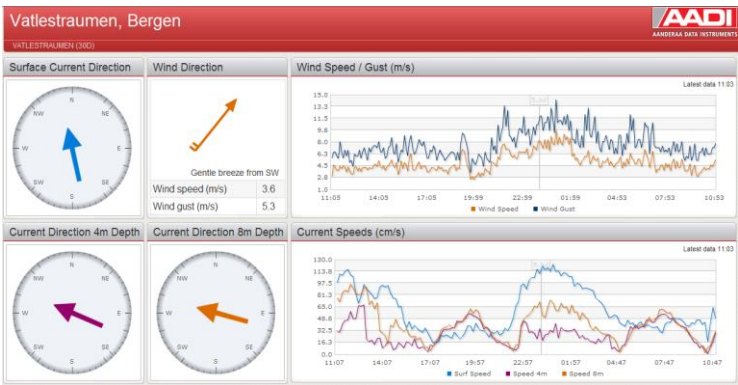
The Port Authority of Cartagena (APC) needs to improve port operations to know precisely, in quasi-real time, the state of the sea (directional waves and wind) in the access channel to the Port of Cartagena, : Deployment site 85 m depth and 7 km from coast



MOTUS BUOY SUPPLY FOR THE PORT AUTHORITY OF CARTAGENA



Buoy deployment test period at APC dock site



THANK YOU

شكرا لكم

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MOTUS wave sensor for buoys

Pressure sensor for
non-directional wave

SeaGuardII DCP Wave
for acoustic wave measurements