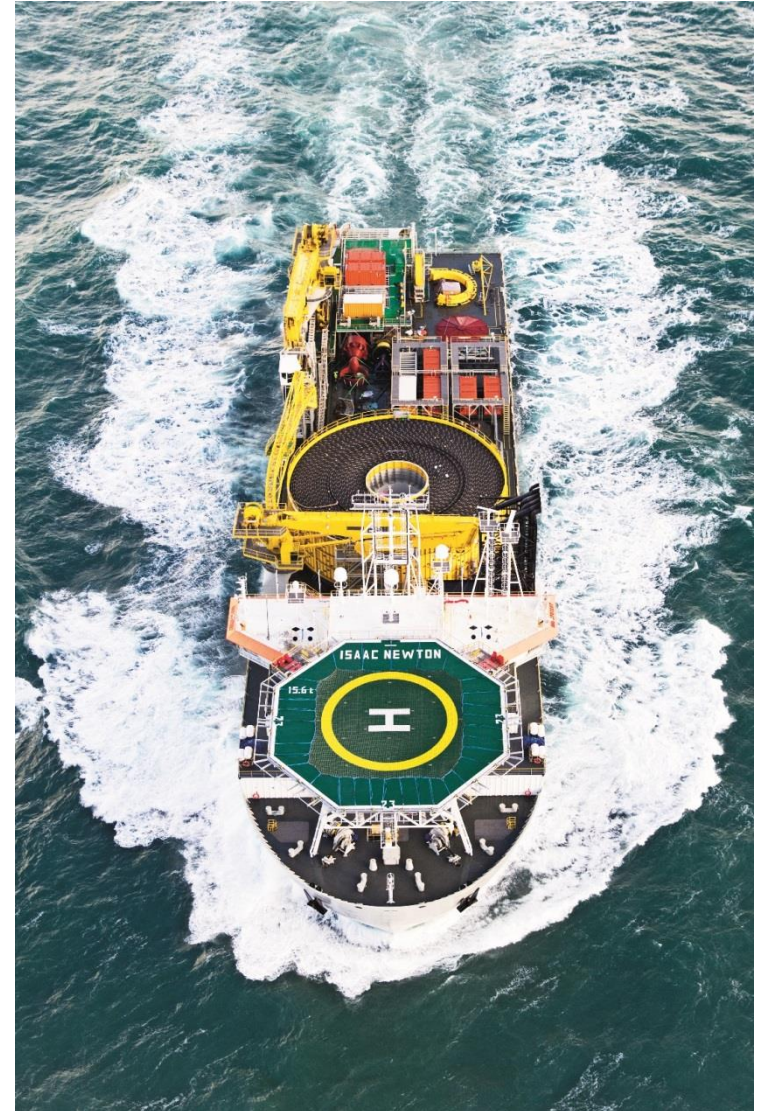


JDN SURVEY DEPARTMENT

Scour protection: maintenance and more

Mike Lycke – 24/10/2018

- Introduction to JDN
- Scour Protection Options
- Positioning during Rock Installation
- Installation Monitoring
- Multibeam Survey Setup



MAIN ACTIVITIES JAN DE NUL



DREDGING AND MARITIME WORKS

Port infrastructure and
port maintenance

Capital and maintenance
dredging

Coastal defence and
riverbank protection

Land reclamation and
beach restoration



OFFSHORE SERVICES

Seabed intervention

Rock installation and
ballasting

Subsea cable and
umbilical installation

Offshore renewables

Heavy lifting and
decommissioning



CIVIL ENGINEERING

Infrastructure works

Maritime engineering
Buildings

Foundation
and piling works

Major earth works



ENVIRONMENTAL WORKS

Environmental dredging
and sediment treatment

Soil and groundwater
remediation

Waste treatment and
valorisation

Soil and sediment
treatment centres

Offshore Services



OFFSHORE RENEWABLES

- Entire wind farm realisation (EPCI)
- Wind Farm Foundations
- Wind Turbine Generators
- (Export) Cables
- Tidal, wave and current energy



SEABED INTERVENTION

- Trenching
- Pre-sweeping
- Seabed levelling
- Boulder clearance
- Land- and outfalls
- Artificial islands



SUBSEA CABLES AND UMBILICALS

- Power Cables (MH, HV, AC, DC)
- Umbilicals
- Inter-Array Cables
- Cable Burial
- Pull-ins



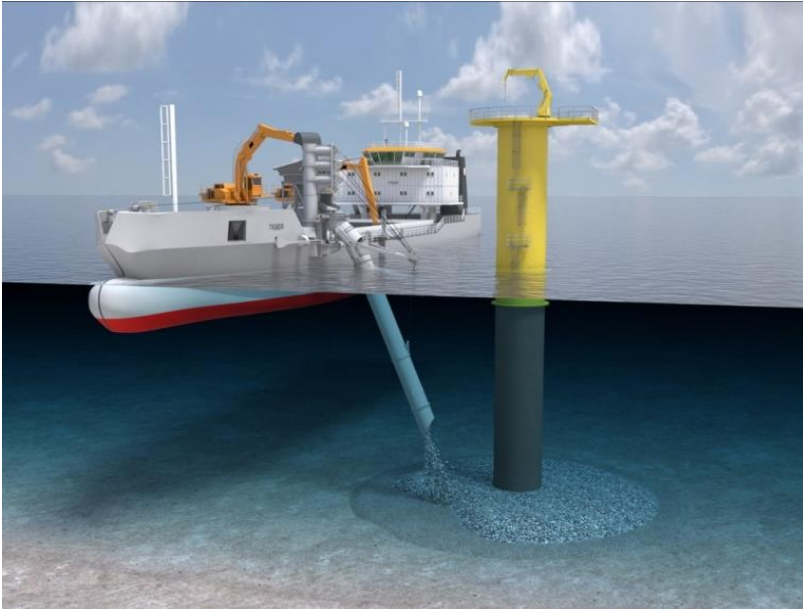
ROCK INSTALLATION AND BALLASTING

- Gravel beds
- Foundation layers
- Burial of cables/pipelines
- Scour protection
- Concrete mattresses
- Ballasting

SCOUR PROTECTION OPTIONS



SCOUR PROTECTION OPTIONS

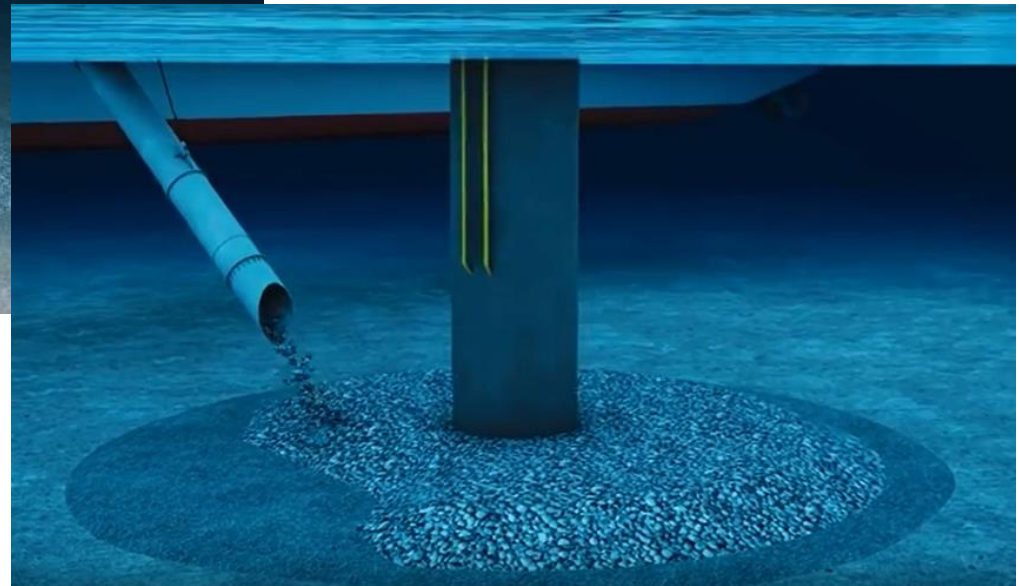
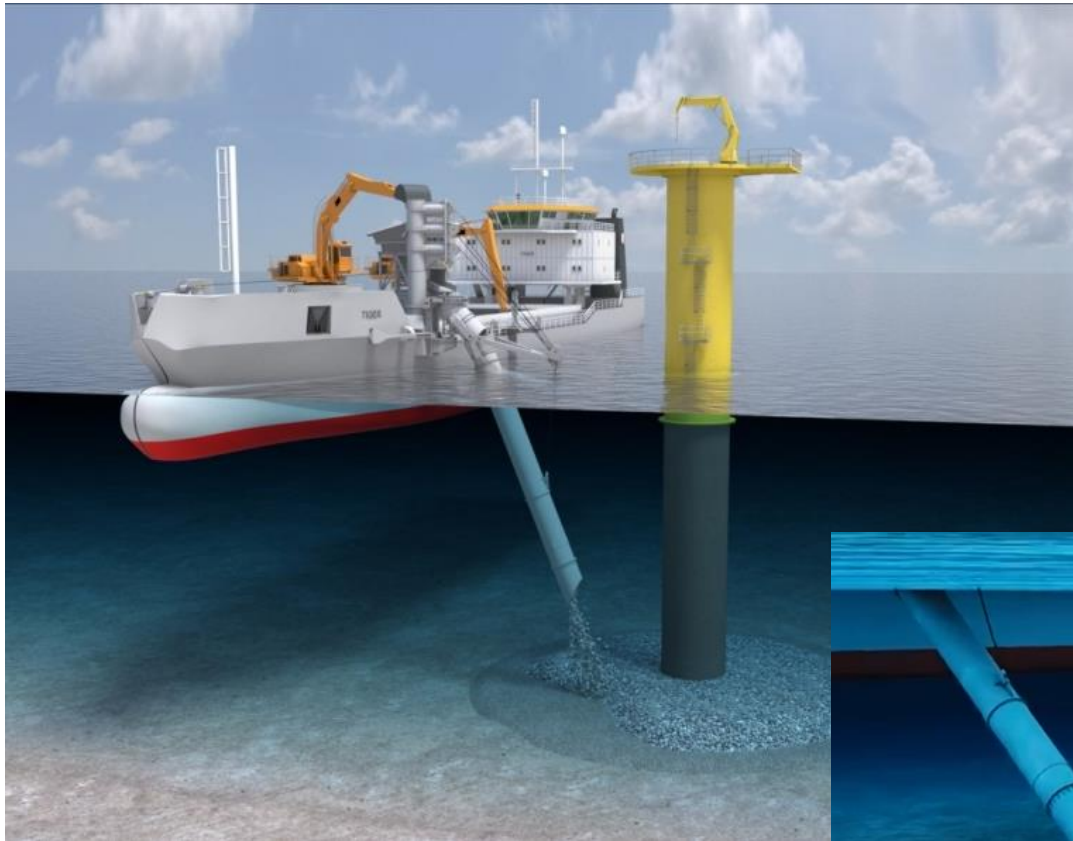


Positioning during Rock Installation

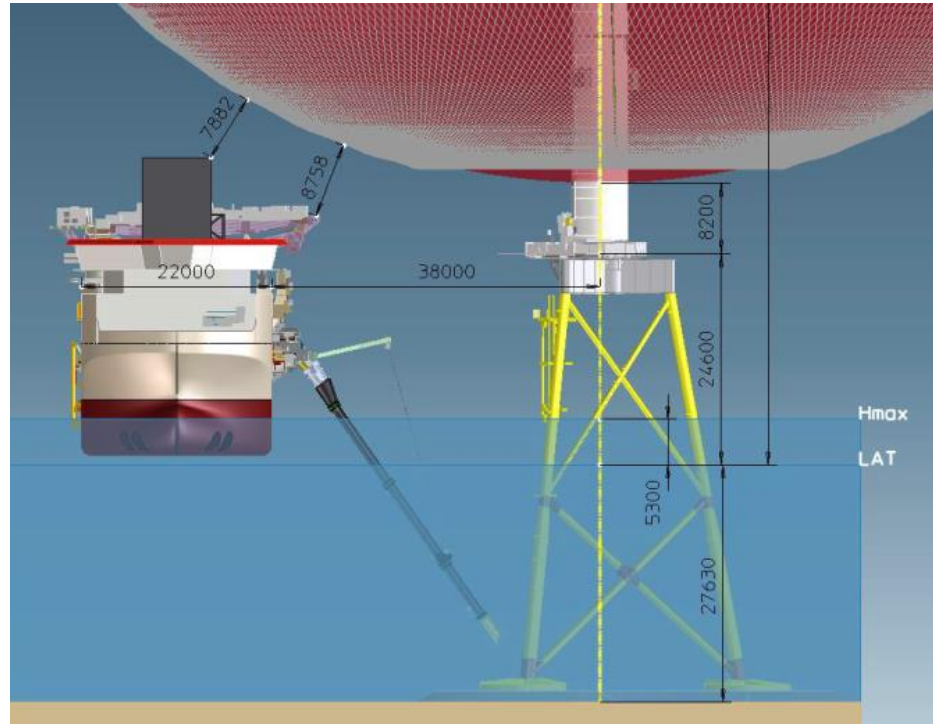
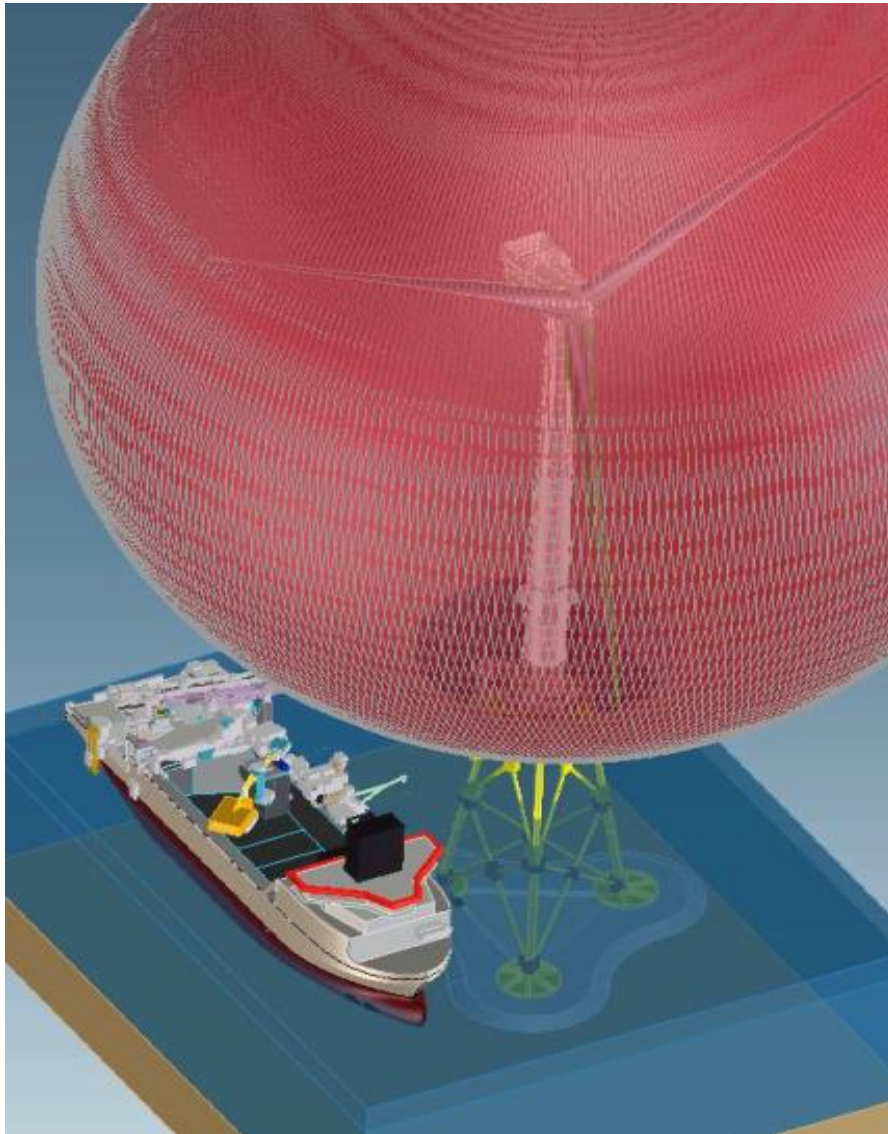
POSITIONING DURING ROCK INSTALLATION



POSITIONING DURING ROCK INSTALLATION



POSITIONING DURING ROCK INSTALLATION





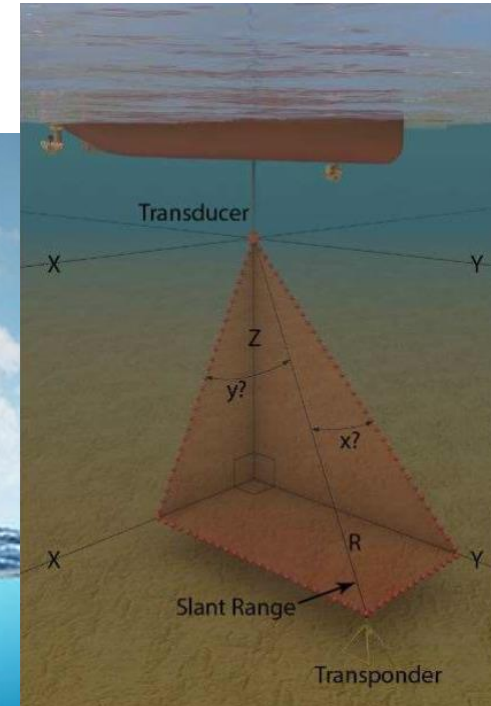
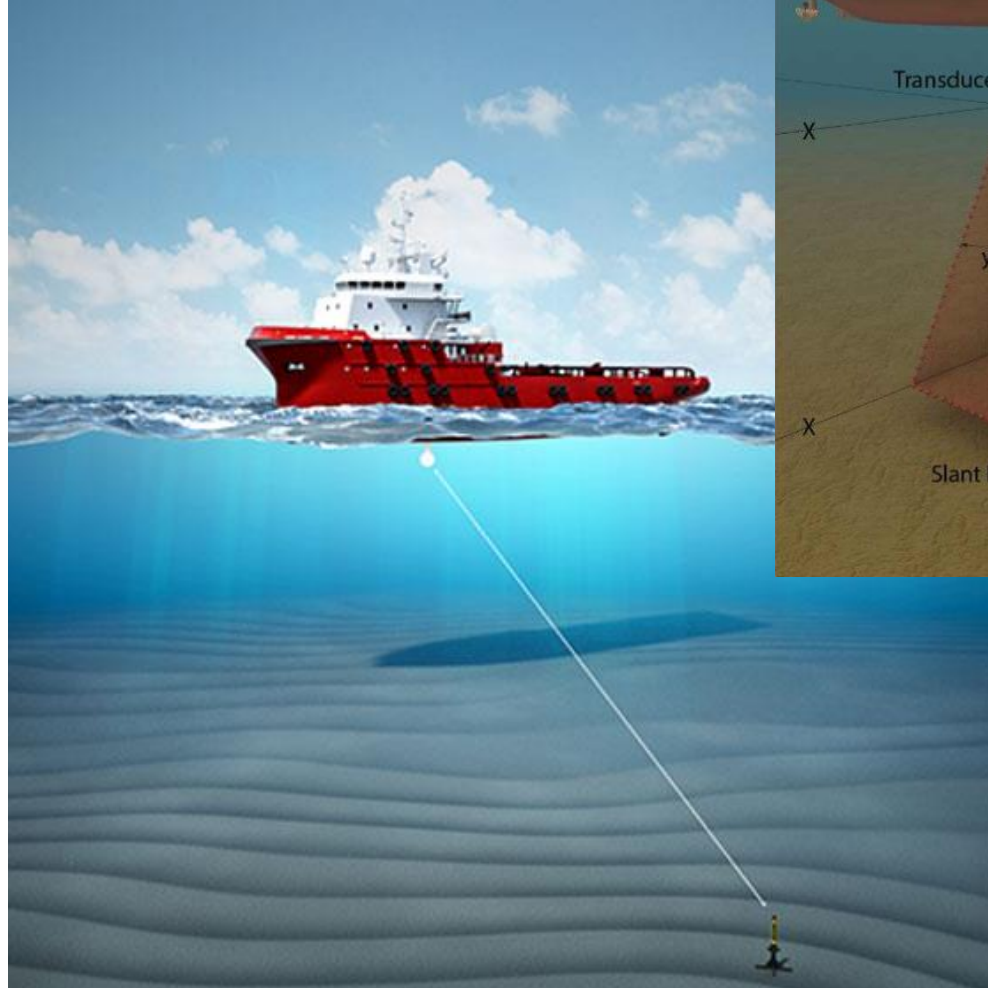
Survey Setup – DGNSS System

- 3 DGNSS Units -> Redundancy
- GPS and GLONASS Satellite Network
- RTK (Real Time Kinematic)
 - If Base Station is available
 - Accurate Elevation ($\pm 5\text{cm}$)
 - Position Accuracy $\pm 10\text{cm}$
- PPP (Precise Point Positioning)
 - Marinestar (Trimble receivers)
 - Terrastar (Septentrio receivers)
 - Starfire (C-Nav receivers)
 - Elevation Accuracy $\pm 30\text{cm}$
 - Position Accuracy $\pm 10\text{cm}$



HiPAP - High Precision Acoustic Positioning

The calculation of positioning is based on **range** and **on vertical and horizontal angle measurements**, from a single multi element transducer. The system provides three-dimensional transponder **positions relative to the vessel**.



The CyScan System

The CyScan system has three main components:

1.

CyScan Targets

One or more targets are mounted on the fixed platform or mobile object

2.

CyScan Sensor

The Sensor is installed on a vessel equipped with a DP system

3.

CyScan Dashboard

Software is used by the DP operator to control the CyScan Sensor. It runs on a marine processor installed on the vessel's bridge

1



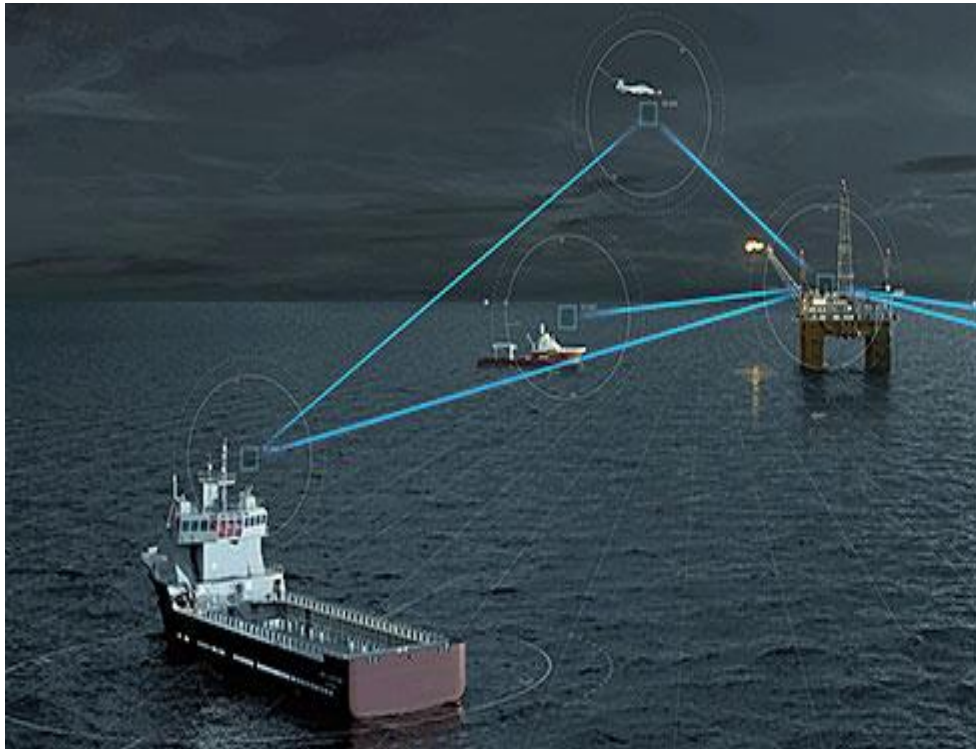
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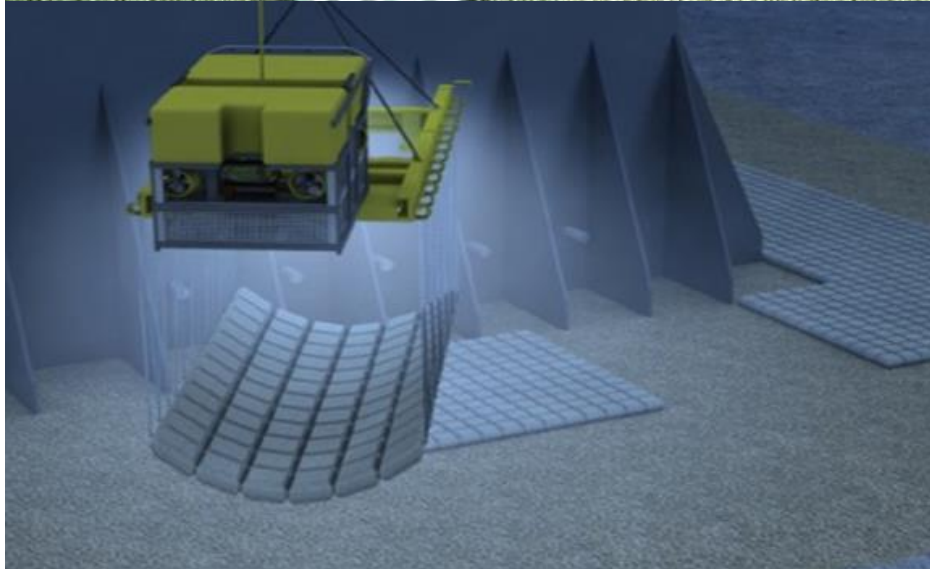


RADIUS SYSTEM – RADAR BASED



Installation Monitoring

INSTALLATION MONITORING

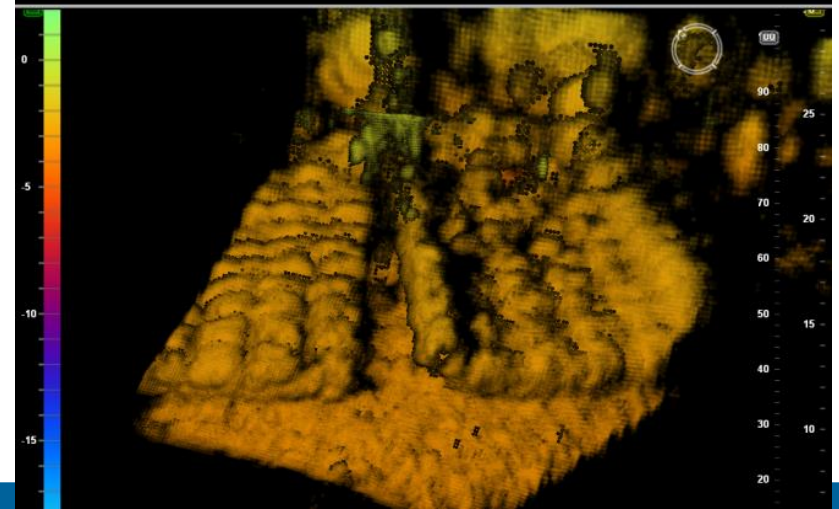
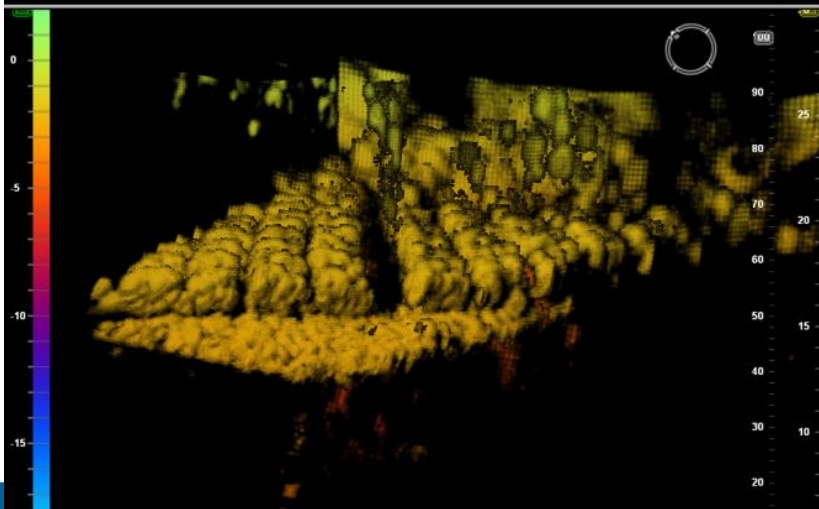
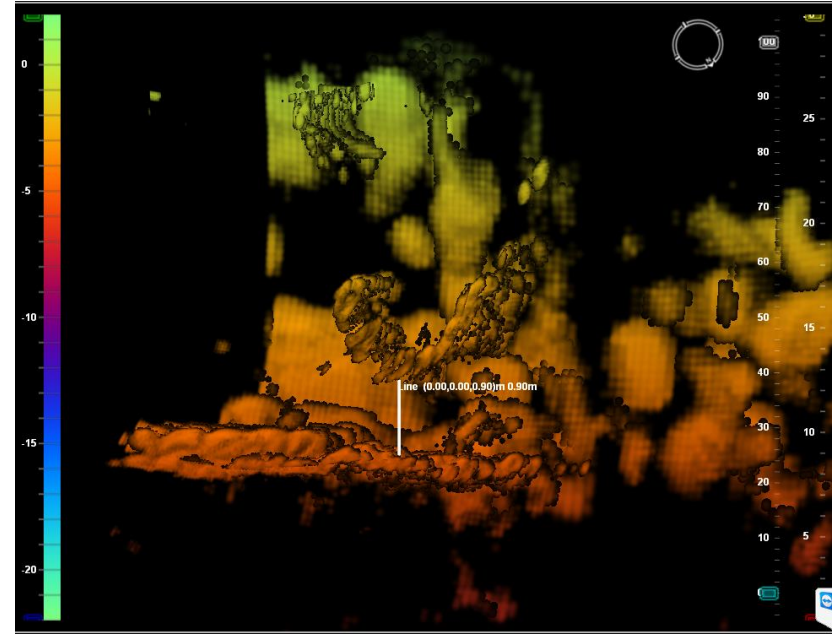
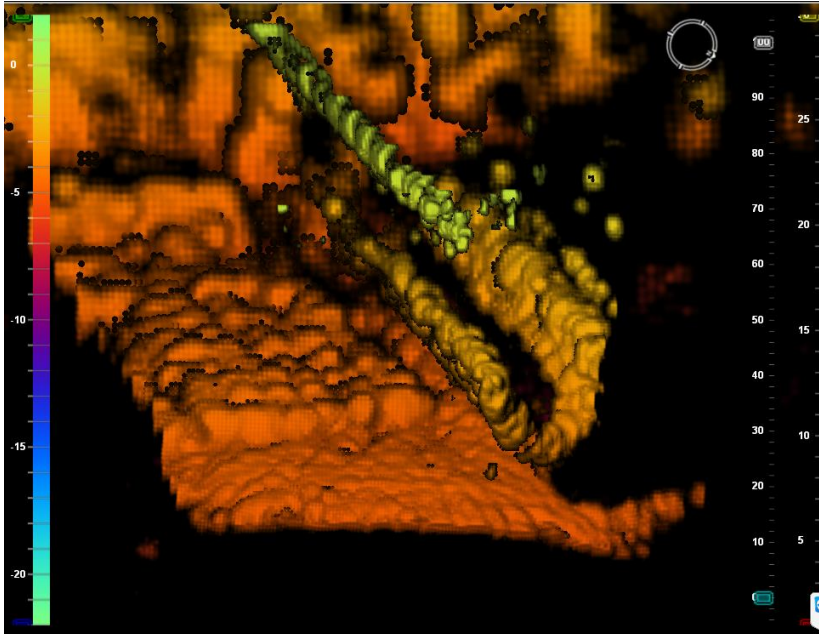


Jan de Nul

Joseph Plana

SGS Wheatstone Platform

INSTALLATION MONITORING

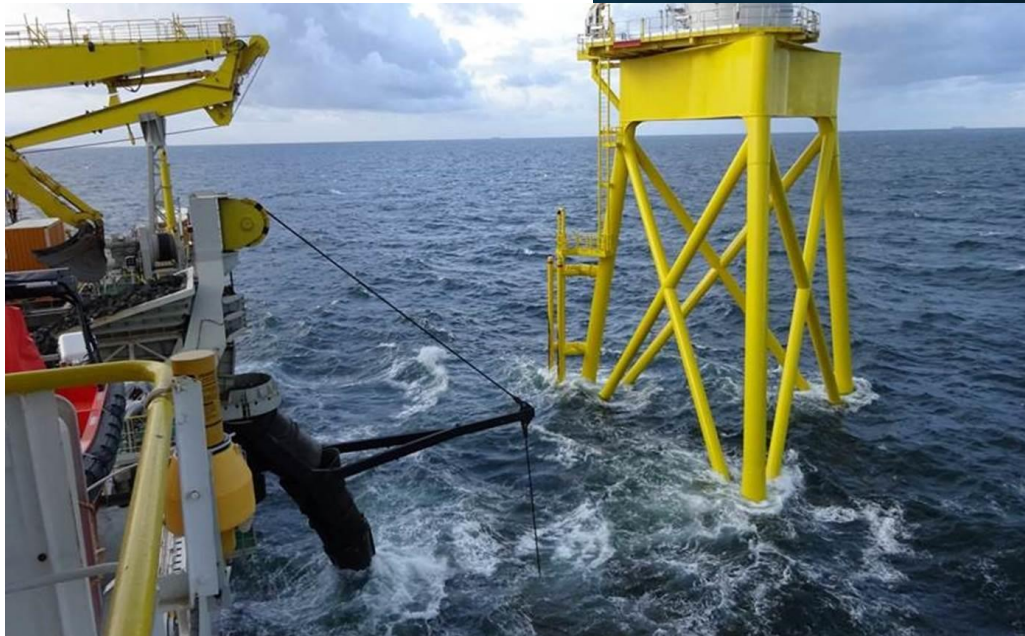
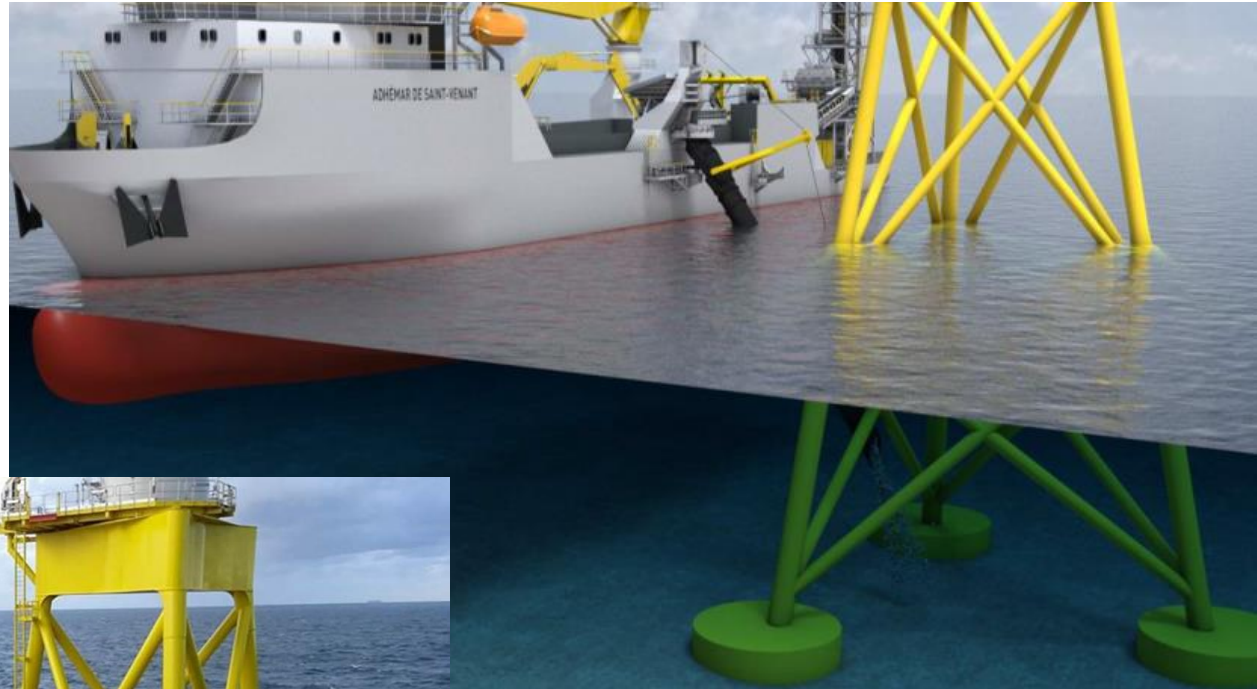


INSTALLATION MONITORING

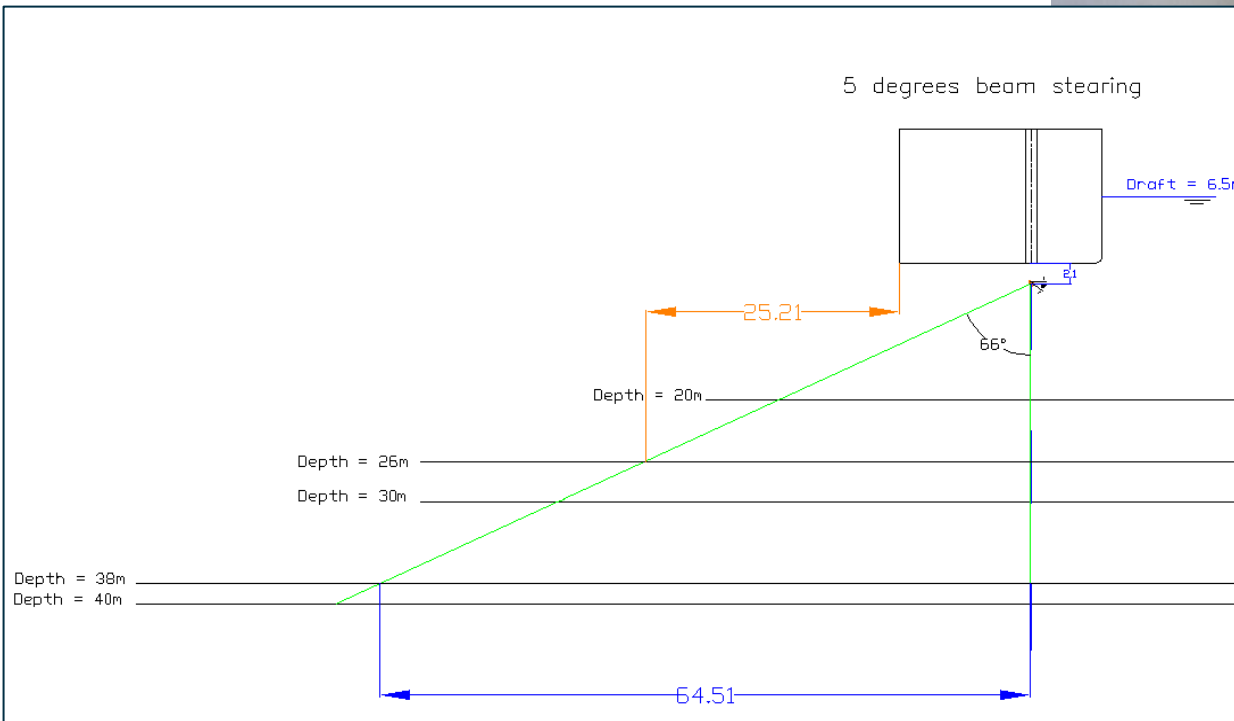


Multibeam Survey Setup

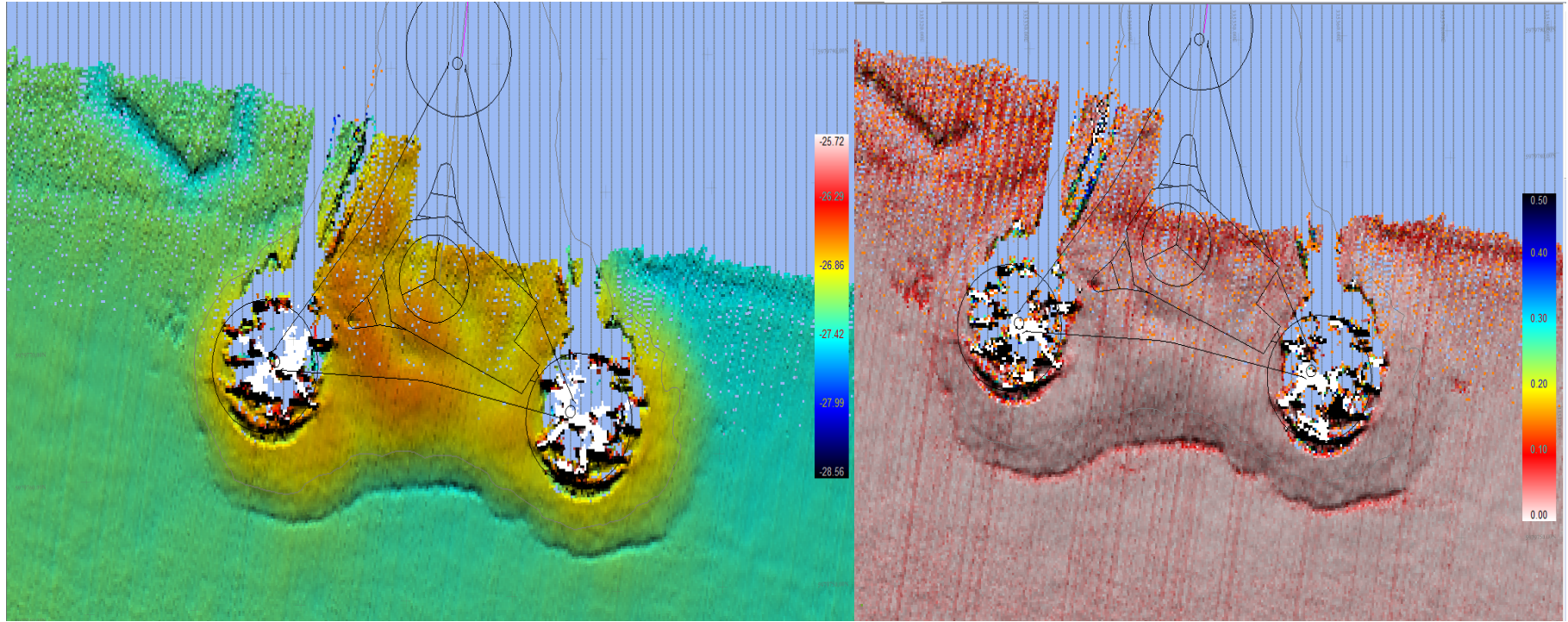
MULTIBEAM SURVEY SETUP



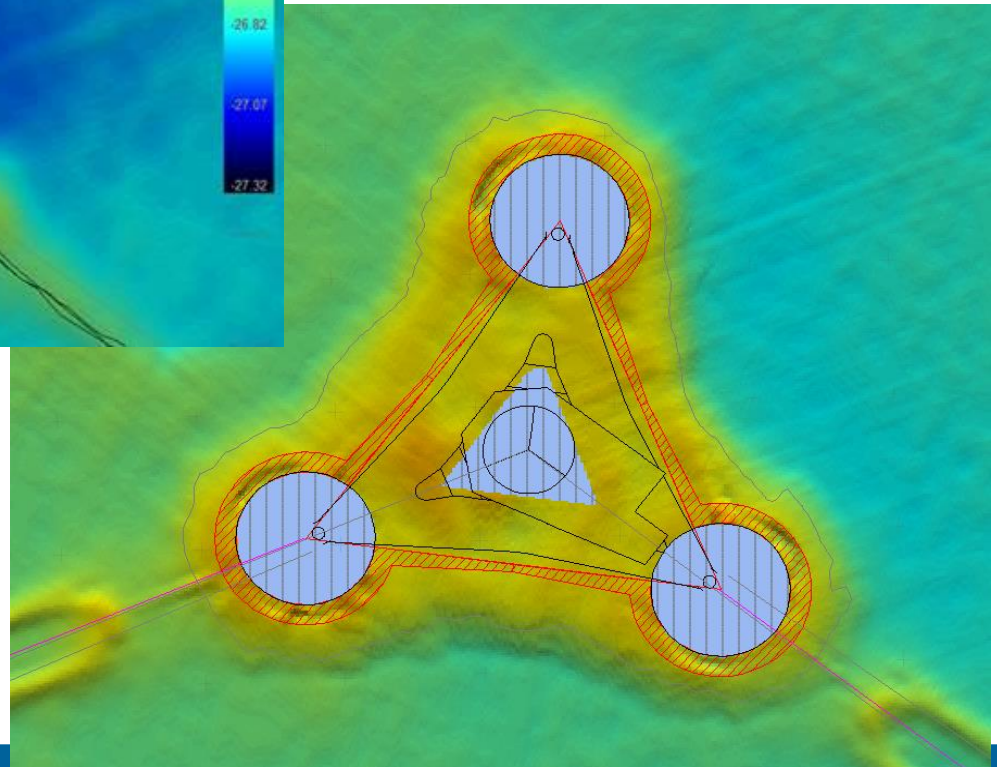
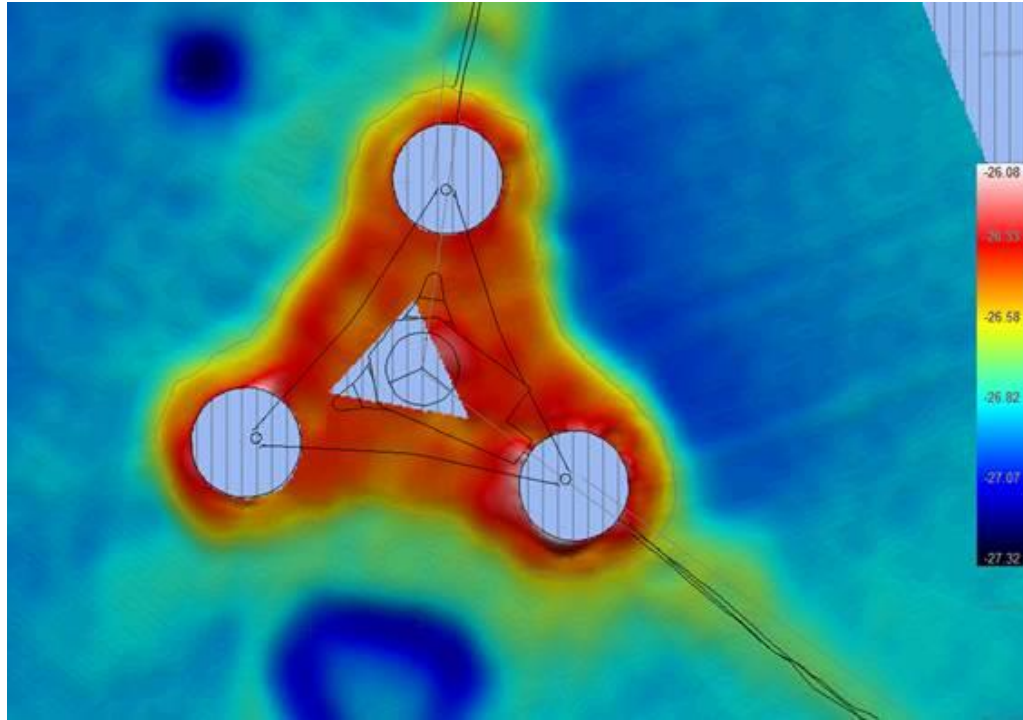
MULTIBEAM SURVEY SETUP



MULTIBEAM SURVEY SETUP



MULTIBEAM SURVEY SETUP



ANY QUESTIONS???



- Website www.jandenul.com
- Facebook  short facts
- Youtube  88 video`s
- Linkedin 
- Twitter  short news, links
- Instagram  impressive pictures