



Company brochure

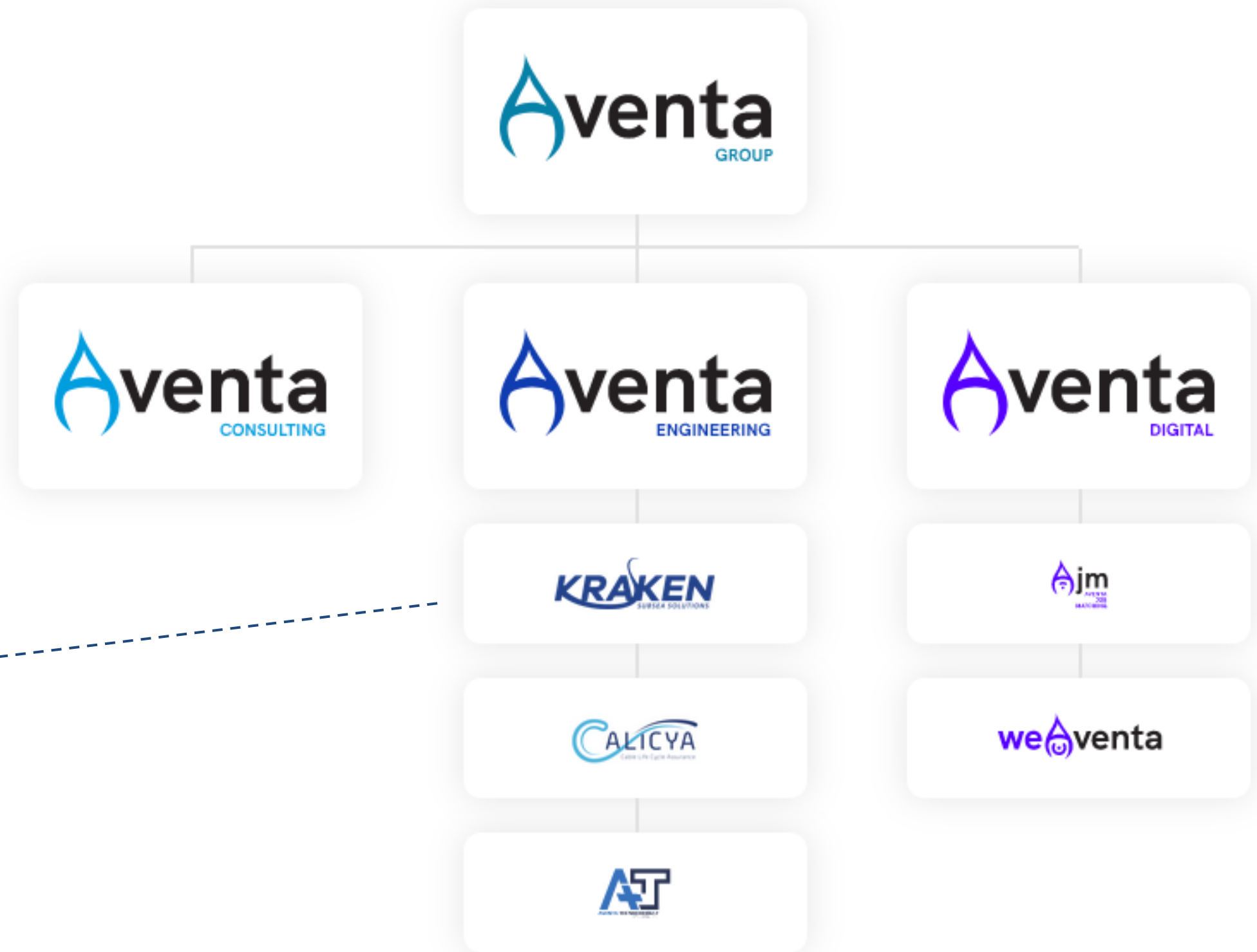
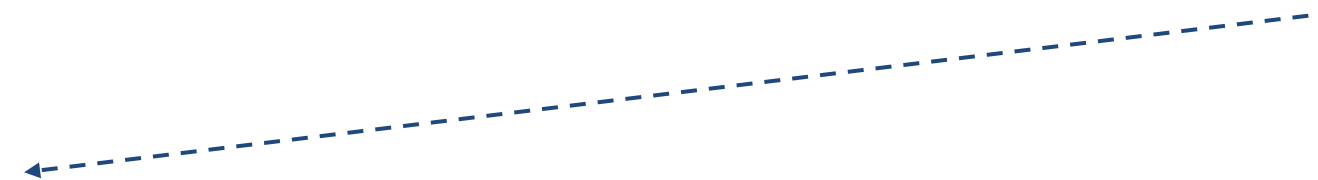
2021



Table of content

ABOUT US.....	4
ENGINEERING STUDIES	12
PROJECT OPERATIONAL SUPPORT.....	14
RESEARCH & DEVELOPMENT.....	19
APPENDIX – TRACK RECORD.....	22

THE GROUP

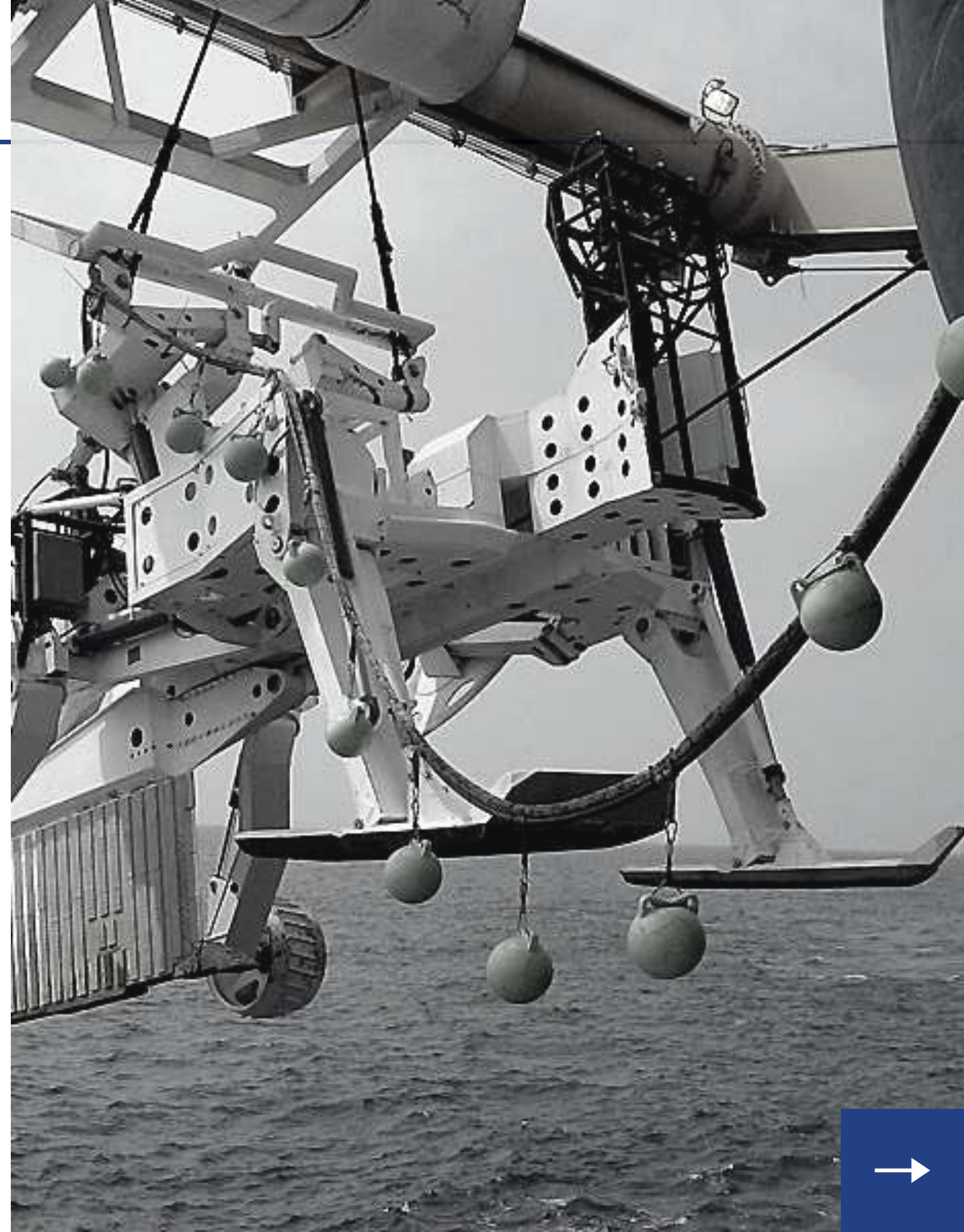


Kraken Subsea Solutions (KSS) is a
100% owned subsidiary of
AVENTA group dedicated to
Submarine Cable Engineering

ABOUT US

Kraken Subsea Solutions is an engineering company entirely specialized in the **Marine Renewable Energy** market and the **Oil&Gas** sector owned by **Aventa Group**.

We have a strong experience in **Power Cable Project development**, from conceptual phases to project executions, Offshore & Onshore.

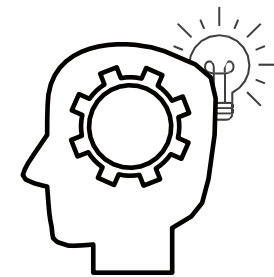


IDENTITY & STRENGTH



MANAGING COMPLEX PROJECTS AND CONTRACTS

KSS team is composed of senior engineers experienced in EPC offshore contracts and MRE contracts management.



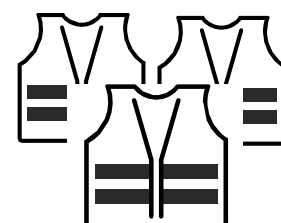
BRINGING INNOVATIVE SOLUTIONS

KSS team aims at taking benefits of its market knowledge and its whole set of interventions/experiences throughout the entire cable life cycle by developing innovative technologies through relevant partnerships. We are developing data management tools in order to optimize our project experiences.



PROACTIVE, REACTIVE AND ADAPTABLE TEAM PLAYERS

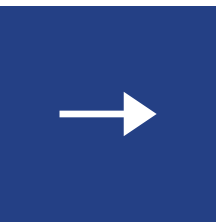
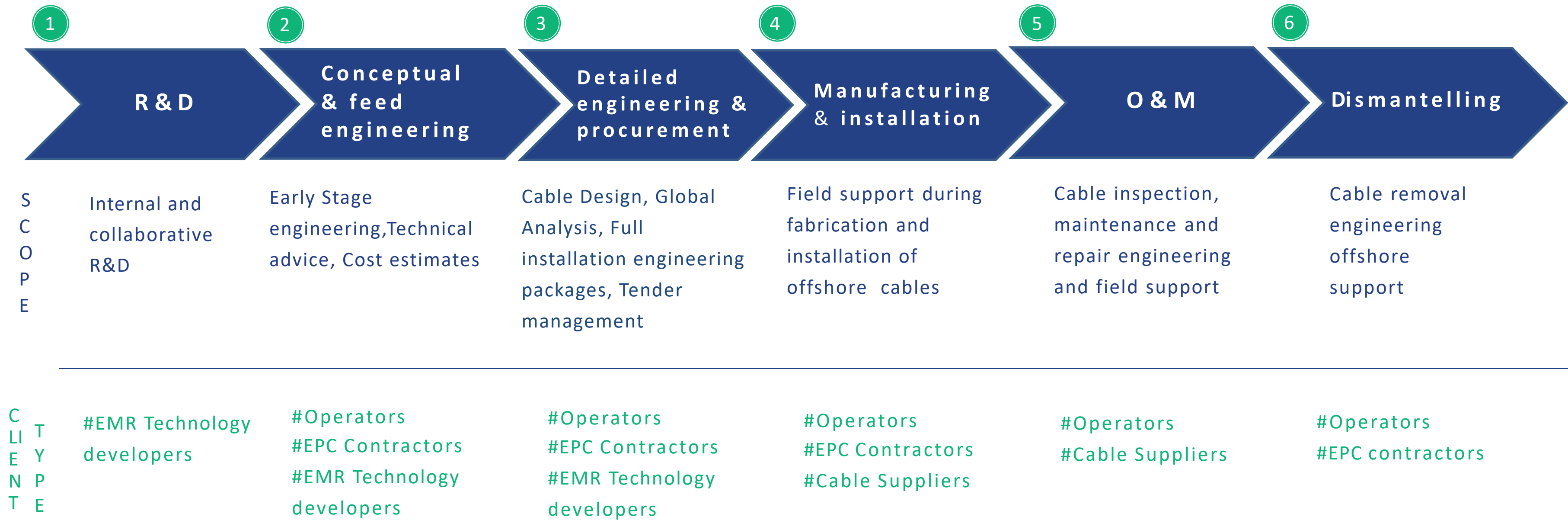
The transparency and proactivity of our studies, advices and engineering processes, and the clear understanding of what is at stake in each of our clients' demands, make us real project team players for all the projects we are responsible for.



A TEAM WITH OPERATIONAL BACKGROUND

We strongly believe that our efficiency comes from our knowledge of operational challenges and our ability to communicate internally on lessons learnt.

SCOPE OF INTERVENTION



CORE ACTIVITIES



OFFSHORE WIND

Infield & export power cables
Engineering & Execution support
for both Offshore fixed and
floating wind turbines field
development



O&G

Umbilicals & Flexibles
Engineering & Execution
support for offshore O&G
field development



OCEAN ENERGY

Power cables
Package support for Tidal, Wave
Converter and OTEC marine energy
technologies



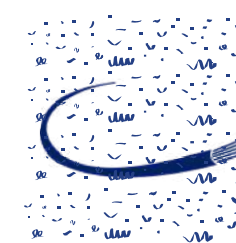
INTERCONNECTOR CABLES

Interconnector power cables
Engineering & Execution support
for international grid projects



OFFSHORE TELECOM

Offshore optical cables
Engineering & Execution
support to optical cable
deployment



ONSHORE CABLES

Onshore power cables
Engineering & installation
support

OUR SERVICES

ENGINEERING STUDIES

We participate in the definition of strategic targets, functional and technical needs, identification of major risks and obstacles throughout the entire project life.

PROJECT OPERATIONAL SUPPORT

From the office up to the operational field, our engineering teams provide all the technical studies, associated documentations, and on-field operational follow-up (client representative) to support each project phases with a high level of service quality.

RESEARCH & DEVELOPMENT

KSS teams develop innovative technologies and methods which will bring better operational efficiency, on-target project completion and optimized LCOE.



OUR ENGAGED COMMUNITY

Kraken: 11 engineers in France & 40 consultants worldwide

+

THIRD LARGEST OFFSHORE EXPERTS COMMUNITY IN THE UE FIRST IN
FRANCE AND ITALY

MORE THAN 30.000 QUALIFIED PROFILES

+

45.000 followers (Aventa Group LinkedIn)

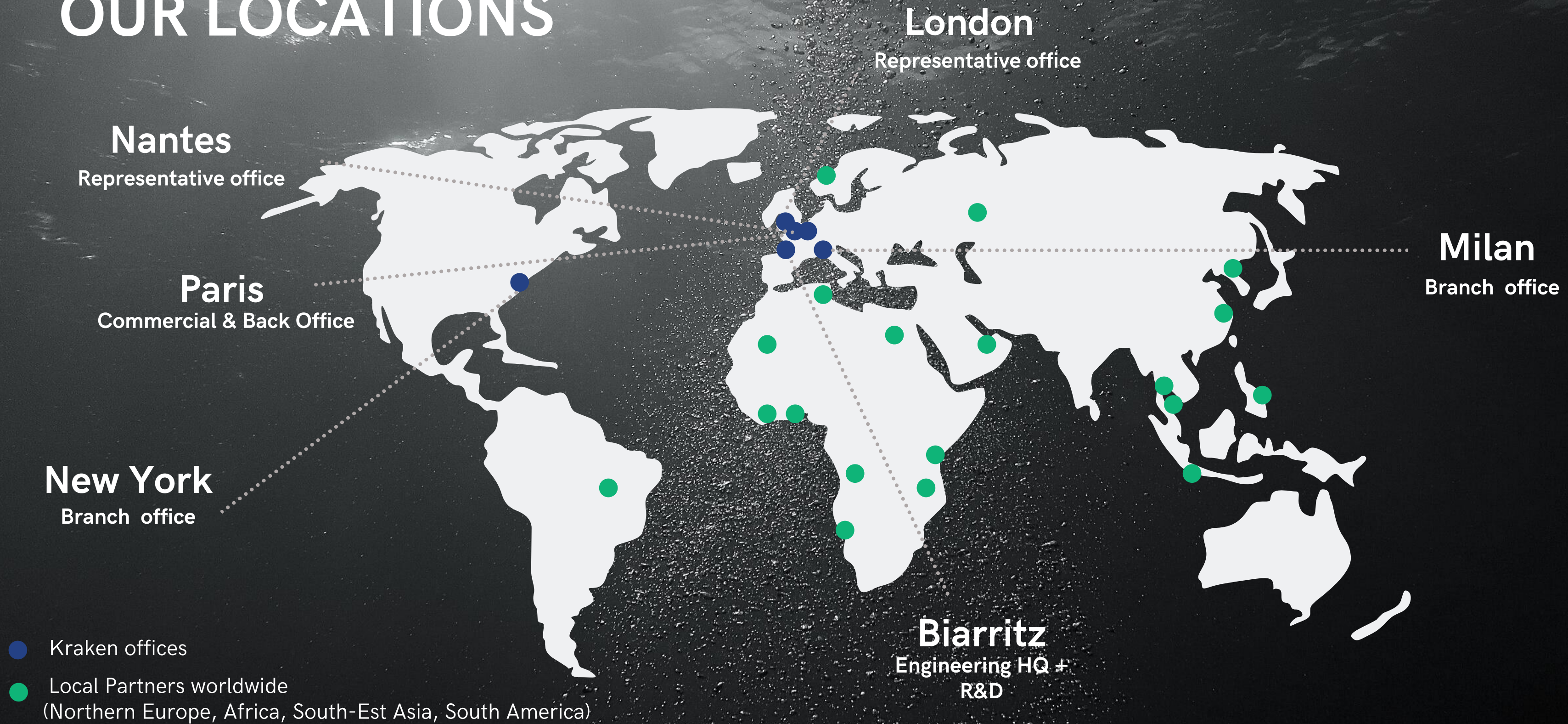
+

Aventa Job Matching (AJM) :
a powerful job matching platform
developed by AVENTA during past 10
years

Surf Engineers, Cable Engineers / Installation
Engineers / Electrical System Design
Engineers / Offshore Client Representatives
(surveyor, installation, termination & testing) /
Project supports : QAQC, HSE, Planning etc.



OUR LOCATIONS



ENGINEERING STUDIES

*« We aim at supporting our clients whatever
level of detail is required »*

CORE COMPETENCIES : POWER AND TELECOM CABLES

CABLES SYSTEM ENGINEERING

- Static and Dynamic Cable Cross-section Design – Mechanical, Electrical/Thermal
- Site Data analysis (Geotech, geophy) & Lay Route design
- Global analysis (Catenary/lazy wave design, VIV analysis, free span analysis, bottom roughness, on bottom stability, ...)
- Mechanical fatigue analysis
- Electro/Thermal fatigue analysis
- FEM, numerical modelling for refined design studies
- Management of call for tenders (technical specifications, SoW definition, review & selection of shortlisted bidders, ...)

CABLES INSTALLATION ENGINEERING

- Dynamic & static installation analysis (pull in, laying, structure deployment,...).
- Installation method design (procedure & task plans)
- Risk analysis (HAZID)
- Cable routing design
- Cable burial risk assessment
- Cable protection studies
- HDD & trenching design for shore approach
- As-built documentation management
- Installation aids design

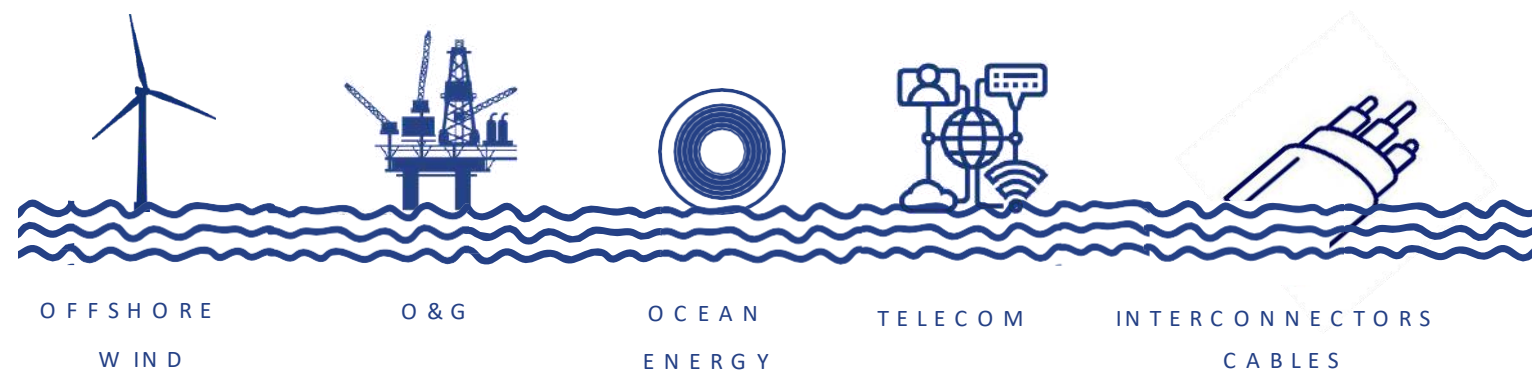


OWNER ENGINEERING AND CONSULTING

Our engineering team is able to provide its services from KSS engineering center or to be mobilized directly in your own offices.



ENGINEERING CAPABILITIES FOR OFFSHORE INDUSTRIES



FEASIBILITY & CONCEPTUAL STUDIES

- System architecture
- Concept screening and pre-design
- Field layout development
- CAPEX estimate

FEED & DETAILED ENGINEERING

- Review and Interpretation of Geophysical & Geotechnical data
- Installation method definition for Umbilicals & Flexible, Mooring and Structures.
- Flying leads (Lifting studies, rigging design, ROV operability, disciplines coordination, procedures)
- In place & Installation analysis
- Installation aids design
- Risk analysis (HAZID)
- Design Review
- Operation follow-up
- As-built & REX documentation management
- Preparation of call for tenders (technical specifications & SoW definition)
- Review of shortlisted bidders (Benchmarking, offer review & evaluation)



PROJECT OPERATIONAL SUPPORT

PROJECT OPERATIONAL SUPPORT

"We provide our highly-skilled engineers & technicians at client premises or onboard the vessel during projects'execution phase"

CABLES OPERATION EXPERTISES

- Boulder Picking and Clearance
- Pre-trenching
- Pre-Survey Shore
- Landing Cable
- Lay Cable Pull-in
- Cable Burial
- Termination and Testing
- Commissioning

OPERATION SUPPORT

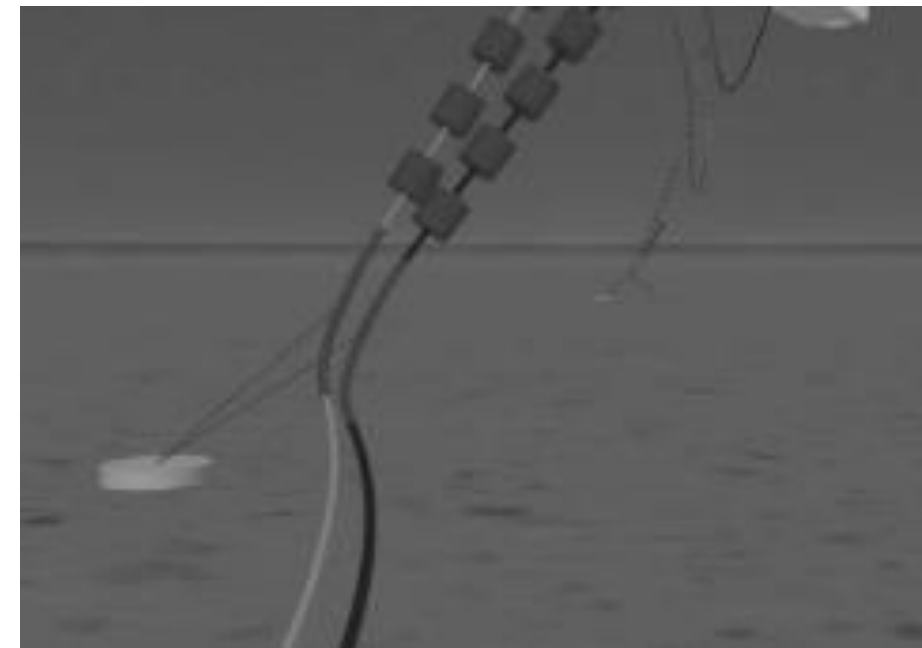
- Client representative
- Package management
- Interface management MWS
- Site manager
-

QHSE SUPPORT

- Site HSE Support
- Quality Control & Quality Assurance

IMR SUPPORT

- Maintenance & Repair operations support
- Dismantling operation support
- Inspection support



OFFSHORE & OPERATIONSUPPORT REFERENCES

Prysmian
Group

SAIPEM

TOTAL

VATTENFALL

LS Cable & System

seai SUSTAINABLE
ENERGY AUTHORITY
OF IRELAND

Rte

orange Orange Marine

NAVAL
ENERGIES

enel
Green Power

B BOURBON

Van Oord

RESEARCH & DEVELOPMENT

RESEARCH & DEVELOPMENT

PHILOSOPHY

Kraken Subsea Solutions considers Research and Development of innovative solutions as a **key Activity** of its development.

We develop **high-quality partnerships** in order to build upon the excellence of our activities and meet the challenges of the Marine Renewable Energy Market.

OUR MAIN THEMATICS

- Cable integrity monitoring and integrative O&M
- Cable design and future needs of cable markets
- Innovative installation methods and tools
- Environmental and social impacts

RESEARCH & DEVELOPMENT PARTNERSHIP CASE

CABLE MONITORING

CONTEXT

- Subsea cable damage represents about 70% to 80% of insurance pay-outs for OWFs.
- Current monitoring tools does not allow for real time continuous monitoring. There are still shadow areas.



NEED

There is a need to better understand and monitor subsea power cable constraints throughout its life cycle.



SOLUTION



Cable Life Cycle Assurance

We develop DSS, DTS & DAS solutions for the offshore cable industry

Total part of Cables on typical OWF CAPEX: ~ 14 %



CaLiCyA was awarded by the French National Research Agency to adapt DSS/DTS technology to offshore cables



Part of AFLOWT (Accelerating market uptake of Floating Offshore Wind Technology) project, 2018-2022, funded by EU Interreg program (€ 14.09 m).

APPENDIX – TRACK RECORD

Over the years, Kraken Subsea Solutions has built an offshore expertise from the conceptual phase to the project execution installation. The following slides are some of the official projects that we have worked on.

NORMANDIE HYDRO TIDAL PROJECT (DCNS-OPEN HYDRO / EDF EN) // NAVAL ENERGIES + EDF ENERGIES NOUVELLES

CATEGORY

Engineering support / Studies

SHORT DESCRIPTION

Installation of 7 x 2MW tidal turbine along with dedicated export and inter-array cables + connectors in the extreme environment of the Race of Alderney in Normandy: up to 10/13 knots current, strong swell and rugged rocky seabed).

SCOPE OF WORK

- Cable Routing
- Export cable stability and protection risk assessment study
- Installation engineering
- Development of export and IA cables installation philosophy
- Planning and cost evaluation
- Definition of export and inter-array cables mechanical parameters
- Preparation of various RFQs and ITTs for client



01

CLIENT



FRANCE



2016

SECTOR



INSTALLATION & CABLE ENGINEERING FRAME AGREEMENT SUPPORT // AVENTA GROUP

CATEGORY

Engineering Support /Studies

SHORT DESCRIPTION

Aventa has won a 2 years frame agreement contract with PRYSMIAN to provide consulting support services to HV submarine cable EPC projects worldwide. KSS is providing support to Aventa on installation and cable engineering.

SCOPE OF WORK

INSTALLATION ENGINEERING SUPPORT

Cable burial risk assessment (CBRA)

- Route Engineering
- Burial assessment study (BAS)
- Cable lay and burial works
- Cable repairs
- Cable pull-ins at landfall
- Cable pull-ins at offshore platform
- Route clearance / dredging / trenching / Jetting / Mattressing /Rock dumping
- Execution procedures, RAMS, ITP (inspection test plan), Task Plans, HAZID, HAZOP, QHSE documentation,

Vessel mobilization plans

- CAD drawings
- Installation Analysis, Calculation notes
- As-built reports

CABLE ENGINEERING SUPPORT

System architecture

- Design of accessories /Termination equipment
- Electrical internal cross section design
- External interactions / Magnetic & Thermal effect design
- Mechanical design

02

CLIENT



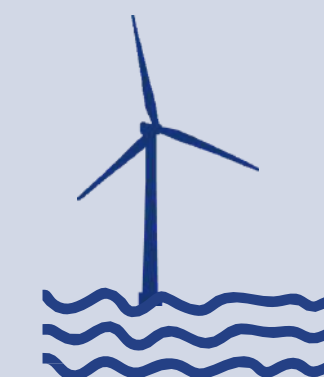
WORLDWIDE



2018 -

ON GOING

SECTOR



WINDFLOAT ATLANTIC // BOURBON

CATEGORY

Engineering Support / Studies

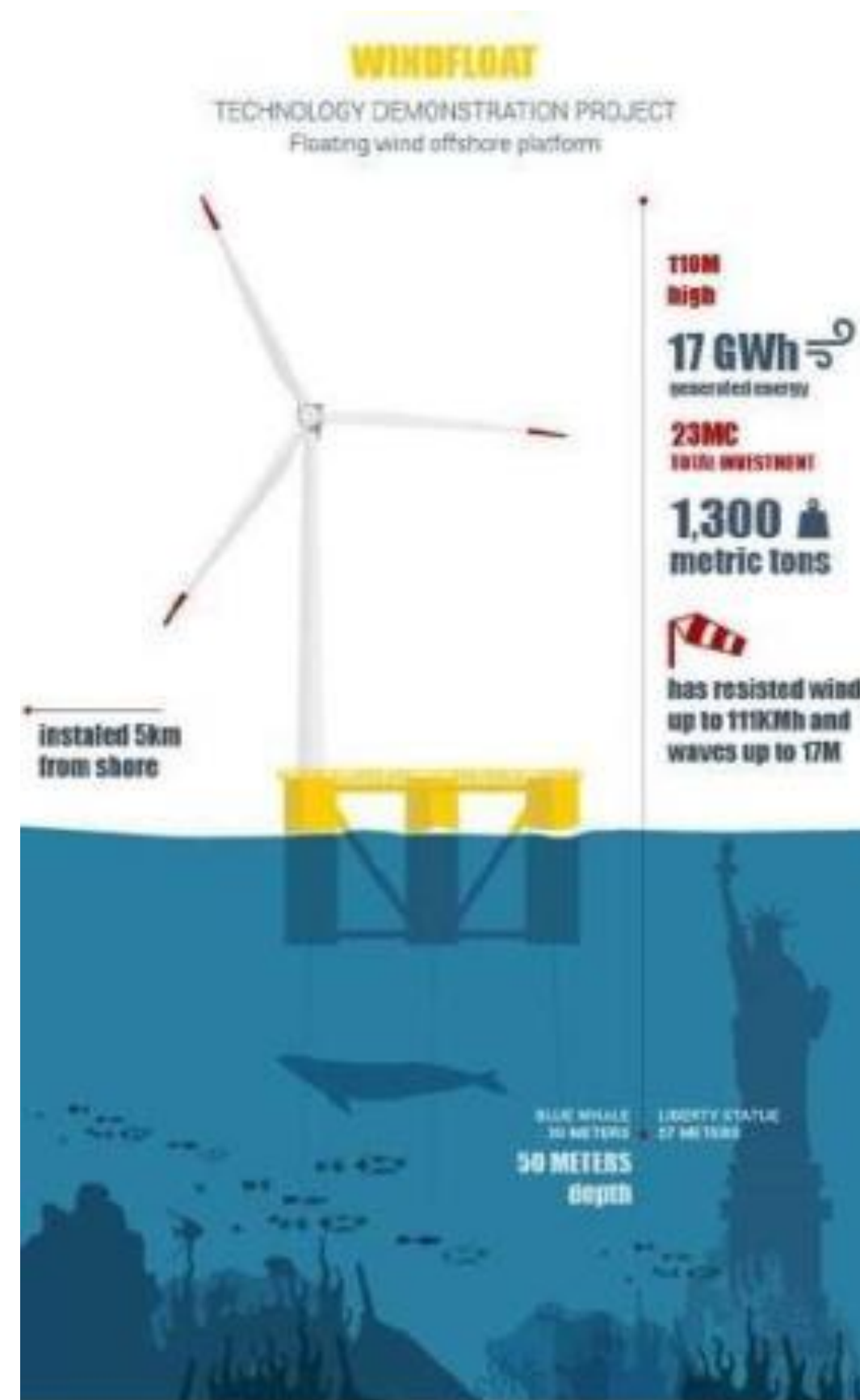
SHORT DESCRIPTION

Pioneering 25MW floating wind farm, off Portugal coast, WD 100m

SCOPE OF WORK

- Dynamic cable installation procedures
- Cable and mooring hook-up analysis
- Installation analysis review Subcontractors
- selection and follow-up
- Operation coordination: Cable loading, transport and installation

PARTICIPANTS



03

CLIENT



SECTOR



AFLOWT PROJECT // SEAI + SAIPEM

CATEGORY

Engineering Support /studies

SHORT DESCRIPTION

We worked on:

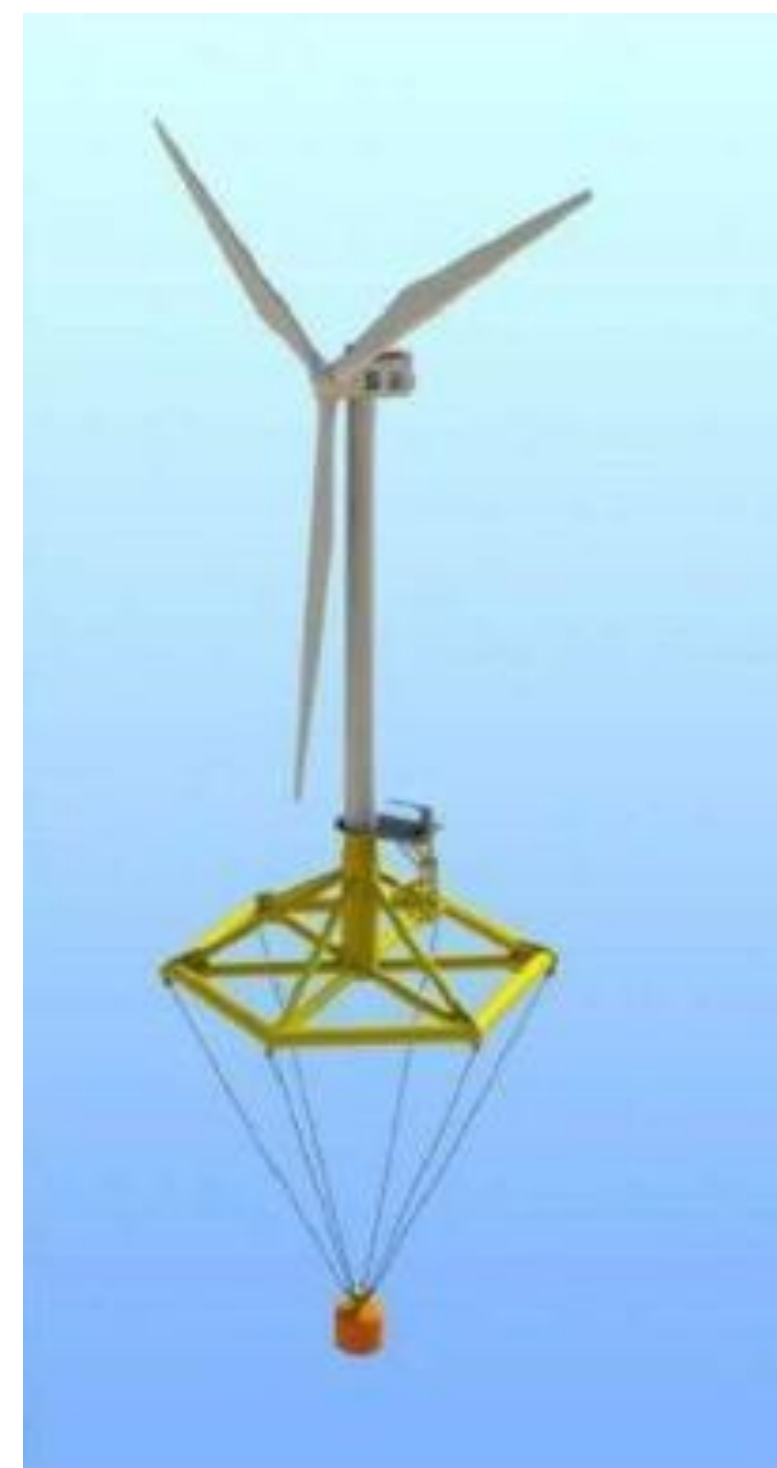
- Development of the Test Site connected to the grid, with the installation of the electrical cable
- The fabrication and operation of the Floating Turbine

SCOPE OF WORK

Cable Owner engineering services & Monitoring system

- Support to power cable specification & configuration
- Support to selection of Cable EPC contractors
- Support to contractors follow up until operation & commissioning
- Specification and implementation of DTS/DSS monitoring system

PARTNERS



WEB SITE

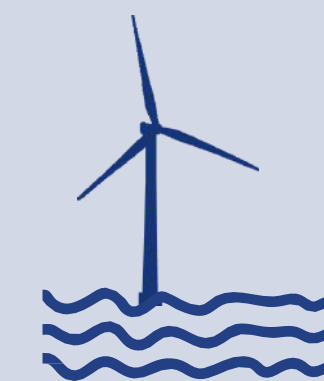
<https://www.nweurope.eu/projects/project-search/afloft-accelerating-market-uptake-of-floating-offshore-wind-technology/>

04

CLIENT



SECTOR



UMBILICAL - SCREENING AND FEASIBILITY STUDY

// TOTAL R&D

CATEGORY

Engineering Support / Studies

SHORT DESCRIPTION

Umbilicals are key facilities for the subsea production system of an offshore oil exploitation, as they most generally provide hydraulic control, electrical power, information (monitoring), and chemicals up to the wellheads of a subsea field.

SCOPE OF WORK

KSS realized the following studies for several scenarios:

1. Umbilical cross-section components sizing
2. Umbilical cross-section arrangement assessment
3. Umbilical cross-section weight and MBR assessment
4. Umbilical packing assessment
5. Installation feasibility study
6. CAPEX estimation (EPCI cost) considering

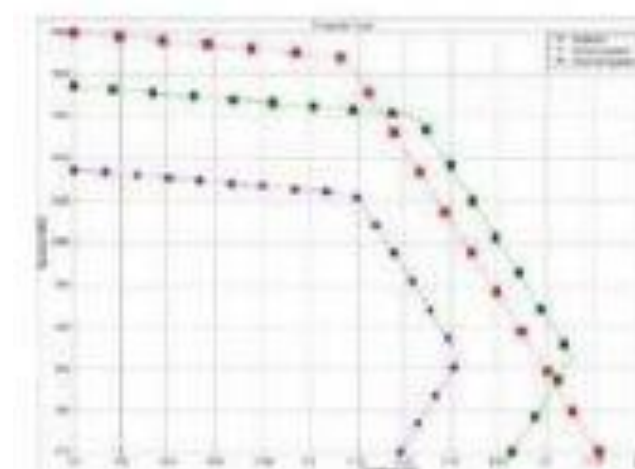


Figure 1 – Typical Tension-Curvature plot

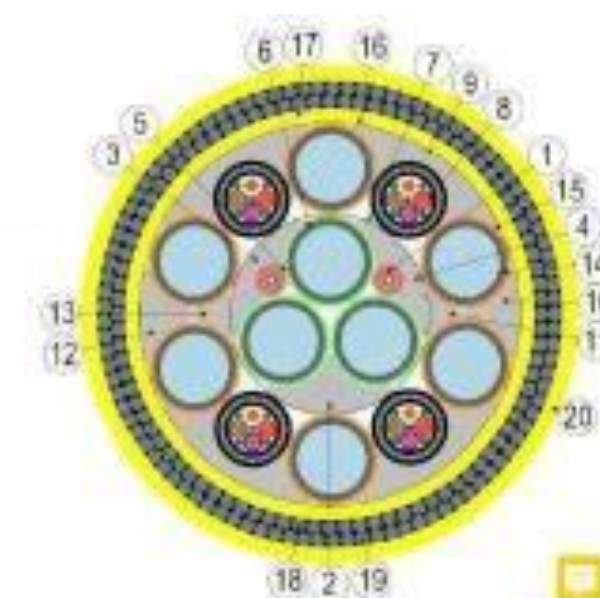


Figure 2 – Typical Umbilical Cross Section

Item	Description	Qty	Unit	Material	Weight (kg)
1	Steel Pipe	1	m	API 5L X70	15.7
2	Steel Pipe	1	m	API 5L X70	15.7
3	Steel Pipe	1	m	API 5L X70	15.7
4	Steel Pipe	1	m	API 5L X70	15.7
5	Steel Pipe	1	m	API 5L X70	15.7
6	Steel Pipe	1	m	API 5L X70	15.7
7	Steel Pipe	1	m	API 5L X70	15.7
8	Steel Pipe	1	m	API 5L X70	15.7
9	Steel Pipe	1	m	API 5L X70	15.7
10	Steel Pipe	1	m	API 5L X70	15.7
11	Steel Pipe	1	m	API 5L X70	15.7
12	Steel Pipe	1	m	API 5L X70	15.7
13	Steel Pipe	1	m	API 5L X70	15.7
14	Steel Pipe	1	m	API 5L X70	15.7
15	Steel Pipe	1	m	API 5L X70	15.7
16	Steel Pipe	1	m	API 5L X70	15.7
17	Steel Pipe	1	m	API 5L X70	15.7
18	Steel Pipe	1	m	API 5L X70	15.7
19	Steel Pipe	1	m	API 5L X70	15.7
20	Steel Pipe	1	m	API 5L X70	15.7

Figure 2 – Typical Material list

05

CLIENT



FRANCE



2020

SECTOR



KAFIREAS EXPORT CABLE PROJECT// EGP

CATEGORY

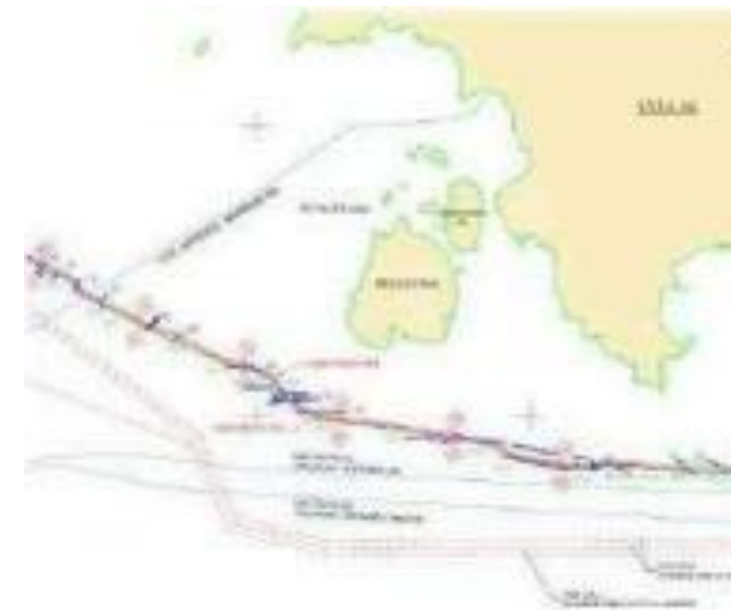
Project Operational Support / Client Representative Survey Support

SHORT DESCRIPTION

KSS assisted Enel Green Power in the routing of the submarine power link connecting the KAFIREAS wind farm on the Evia Island to Greek mainland. The section consists of one submarine, 3-core, 150kV (170kV max), XLPE power cable, section's length is approximately 45km and crosses the Petalion Gulf.

SCOPE OF WORK

- Analysis and review of preliminary Route Survey and CBRA Specify
- requirements for geophysical and geotechnical campaigns
Offshore client representation for the geophysical and
- geotechnical campaigns
CBRA Update



06

CLIENT

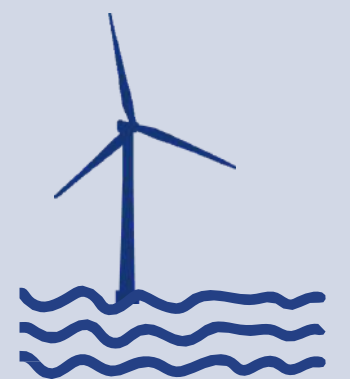


GREECE



2019

SECTOR



DANISH KRIEKERS FLAK PROJECT//VATTENFALL

CATEGORY

Project Operational Support / Client Representative services

SHORT DESCRIPTION

Kraken subsea solutions has been awarded the exclusive provision services of Client Representatives for supervising installation of Inter-Array Cables connecting the DKF 600MW offshore windfarm in Danemark.

SCOPE OF WORK

Kraken Subsea Solutions Representatives are involved in all installation operations for the Inter-Array Cables Package :

- Boulder Picking and Clearance Pre-
- trenching
- Pre-Survey
- Cable Lay Cable
- Pull-in Cable
- Burial
- Termination, Testing and commissioning
-

07

CLIENT



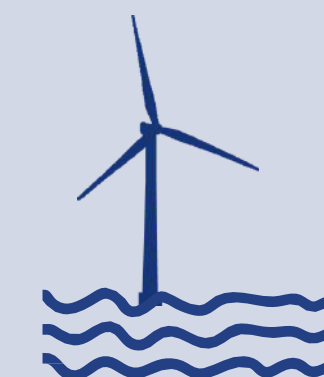
DANEMARK



2016-

ON GOING

SECTOR



SAINT NAZAIRE EXPORT CABLES PROJECT// RTE

CATEGORY

Consulting support / Package Manager

SHORT DESCRIPTION

Kraken Subsea Solutions has won a frame agreement contract with RTE to provide support on execution phases of offshore wind farm export cable projects in France.



SCOPE OF WORK

Package management for following activities :

- Shore landing
- Cable Lay
- Shore Cable Pull-in
- Cable Burial
- Cable Pull-In to the offshore substation



photo © RTE

08

CLIENT



SECTOR





WEBSITE

<https://krakensubsea.com/>



E M A I L

contact@krakensubsea.com



LINKEDIN

<https://www.linkedin.com/company/kraken-subsea-engineering>



MAIN ADDRESSES

HQ – Kraken Subsea Solutions

Engineering & R&D Center
92 Allée Théodore Monod,
Technopole Izarbel,
BIDART 64210, France

Commercial & Back Office
91 Rue du Faubourg Saint Honoré
PARIS 75008, France

HQ – Aventa Groupe

91 Rue du Faubourg Saint Honoré
PARIS 75008, France