LouisDreyfus
TRAVOCEAN

General Presentation

Edition 2017 - revision 0

Submarine Cable Installation

LOUIS DREYFUS TRAVOCEAN

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PREAMBLE

LOUIS DREYFUS TRAVOCEAN, a wholly owned subsidiary of LOUIS DREYFUS ARMATEURS, is a submarine cable installation contractor whose track record dates back to 1977 when it was founded in Marseille, France.

Over the years, LOUIS DREYFUS TRAVOCEAN has developed a wealth of expert knowledge in the fields of laying and protection of submarine cables, covering in particular :

- all types of soil conditions (from very soft to very hard),
- shallow water depth,
- all sizes of fibre optic, power and umbilical cables.

As a contractor, LOUIS DREYFUS TRAVOCEAN provides turnkey installations throughout the world, including :

- transportation of cables from factory to site,
- mobilisation of installation vessels or barges,
- loading cables aboard installation vessels or barges,
- laying and burying cables,
- installation of additional protection as required.

Mobilisation of cable installation spread is done in various places to cover our worldwide activities :

- Dunkirk, France to cover Europe and West Africa,
- Abu-Dhabi, United Arab Emirates, to cover the Middle East,
- Singapore, Indonesia, to cover the Asia Pacific,
- New Orleans, USA to cover Central America.
- Aktau, Kazakhstan to cover the Caspian Sea

On top of this contracting activity LOUIS DREYFUS TRAVOCEAN is specialised in the design and construction of trenching equipment required during burial operations :

- trenchers,
- vibro ploughs,
- jetting sledges,
- light weight ploughs,
- deburial crawlers,
- R.O.V.

This capability to design and build tailor-made equipment allows LOUIS DREYFUS TRAVOCEAN to be very responsive to the Client’s requirements.

The LOUIS DREYFUS TRAVOCEAN's Quality Management System has been approved by Lloyd’s Register Quality Assurance (LRQA) to ISO 9001 : 2008 standard.

SUMMARY

1 – SERVICES OFFERED

Laying and protection of submarine cables

- Permitting work
- Risk assessment and route engineering
- Installation procedures
- Cable loading and transportation
- Laying and burial operations
- Subsea link repair and maintenance

Trenching system development

- Specification
- Design
- Construction
- Operations and maintenance

Worldwide turnkey installation contracting

LOUIS DREYFUS TRAVOCEAN performs turnkey installation projects for various sectors of the offshore industry :

- Shore ends for fibre optic cables
- Power cable links to islands
- Power cables or umbilicals between platforms
- Export cable from windfarm to shore
- Any remedial work and post burial activity
- Repair work on fibre optic and power cables

Trenching system operations

LOUIS DREYFUS TRAVOCEAN is operating a full range of burial equipment to deal with all soil conditions :

- Trenchers, chain and wheel
- Vibro ploughs
- Jetting systems
- Dredging tools
- And any combination of the above systems....

LAYING AND TRENCHING SERVICES IN ALL SOIL CONDITIONS ...

Certificate of Approval

This is to certify that the Management System of:

LOUIS DREYFUS TRAVOCEAN

Zone d'activités ATHELIA V, 78 avenue des grenadiers, 13600 La Ciotat, France
has been approved by LRQA to the following standards:

ISO 9001:2008

Frederic Gaudin
Issued By: LRQA France SAS for and on behalf of: Lloyd's Register Quality Assurance Ltd

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Current Issue Date: 2 May 2017
Expiry Date: 14 September 2018
Certificate Identity Number: 10020252

Original Approvals:
ISO 9001 – 8 December 2000

Approval Numbers: ISO 9001 – 0028061

The scope of this approval is applicable to:

Implementation of project for installation, protection and maintenance operations for underwater power and telecommunication cables.

UKAS MANAGEMENT SYSTEMS
001

Issued By: LRQA France SAS, Tour Swiss Life,1 Boulevard Marius Vivier Merle,Cedex 03 69443 Lyon France for and on behalf of: Lloyd's Register Quality Assurance Ltd, 1 Trinity Park, Bickenhill Lane, Birmingham B37 7ES, United Kingdom

Certificate Schedule

Certificate Identity Number: 10020252

Location	Activities
Siège Zone d'activités ATHELIA V, 78 avenue des grenadiers, 13600 La Ciotat, France	ISO 9001:2008 Implementation of project for installation, protection and maintenance operations for underwater power and telecommunication cables.
Quai du Braek, Route de Mardyck, 59279 MARDYCK, France	ISO 9001:2008 Implementation of project for installation, protection and maintenance operations for underwater power and telecommunication cables.

UKAS MANAGEMENT SYSTEMS

001

Issued By: LRQA France SAS, Tour Swiss Life,1 Boulevard Marius Vivier Merle,Cedex 03 69443 Lyon France for and on behalf of: Lloyd's Register Quality Assurance Ltd, 1 Trinity Park, Bickenhill Lane, Birmingham B37 7ES, United Kingdom

LOUIS DREYFUS TRAVOCEAN

IS A WORLD-WIDE

CONTRACTOR MEMBER OF

International Marine Contractors Association

OF THE

REMOTE SYSTEMS & ROV DIVISION

BASED

EUROPE & AFRICA REGION

Bruno Faure

IMCA President 2017

VALID UNTIL 1 FEBRUARY 2018

IMCA members undertake to act as responsible members of the Association and are willing to be audited against compliance with relevant IMCA guidelines by their clients.

2017

Sellihca

Nordic Utility Pre-Qualification System

Pre-Qualification Certificate

Awarded to

Louis Dreyfus Travocean

Company Registration number: R 384310413

Sellihca Id: 108817

Sellihca Qualification hereby confirms that

Louis Dreyfus Travocean

is now fully registered as a supplier in the Sellihca Nordic Utility Pre-Qualification System for the product/service codes listed in the appendices.

Sverre Benestad
Chairman, Sellihca Steering group

Anja Thorsdalen
Operation Manager

Achilles *The participating utilities may use Sellihca as the basis for preparation of bidder lists directly or together with additional qualification criteria established by the individual utility. Other qualification stages may be added by the individual utility if more information is found necessary to complete the preparation of bidders lists.*

01.06.2016
Issued date

02.06.2017
Expiry date

2 – LOUIS DREYFUS TRAVOCEAN HISTORY

The company was initially incorporated in Marseilles in 1977 for the purpose of meeting the local and international demand for maritime engineering works. This activity focused principally on laying undersea power and telecommunication cable for the oil and gas industry, as well as for the operators of short range interconnectors between islands and mainland.

In 1978, the French National power utility EDF contracted the Company within the scope of the installation of the 2 pairs of subsea power cables, each 45 km long, that form the 2000 MW DC interconnector between FRANCE and ENGLAND, better known as "IFA 2000".
This 10-year contract involved the engineering and procurement of all naval and underwater methods and means required for the burial of 2 pairs of cables across the Channel, as well as the development and procurement of all operational equipment and procedures required for the subsequent maintenance of the link.

The organisation set-up originally for the IFA 2000 burial project progressively diversified its position in the offshore oil and gas industry, and later extended and confirmed its expertise in the laying of flexible pipelines and umbilicals, diving, underwater inspection, maintenance and repair of fixed offshore marine structures, subsea robotics and subsea mining. At the end of the 80's TRAVOCEAN refocused on cable installation and burial related operations.

The constant effort maintained since 1986 on power cable installation and servicing prospects eventually resulted in the Company logging and still recording today a number of quite significant achievements in cable laying and protection operations as well as interconnector maintenance. This is even though the last decade more particularly witnessed the crucial development of fibre optics telecommunication cable projects. The Company's contribution to this sector has indeed risen gradually and steadily since 1992, a time when it would merely provide equipment and engineering / field technical assistance services. Today, it has reached the stage where the global management of shallow water cable installation / protection and post-lay inspection and burial operations can be offered to its Clients on a turnkey basis.

In 1998, the company became a 100% subsidiary of LOUIS DREYFUS ARMATEURS and was renamed LD TRAVOCEAN, and after LOUIS DREYFUS TRAVOCEAN in 2013. Operational activities remained managed from Marseille, and later a number of personnel were seconded to LOUIS DREYFUS ARMATEURS in order to assist the successful development of their own operations in the telecom market, either internally or in joint-venture with world-class telecom network suppliers.

LOUIS DREYFUS TRAVOCEAN today teams the know-how and expertise of 50 full-time employees whose background in the engineering of cable laying and burial, the design and development of associated equipment and the subsequent follow-up of site operations worldwide allow the Company to offer our Clients a comprehensive range of services, in accordance with a quality management system certified to ISO 9001.

The mission of LOUIS DREYFUS TRAVOCEAN remains to offer innovative, cost-effective and reliable solutions for the timely completion of all projects undertaken, while maintaining the values that always drove the company : professionalism and quality in the broad sense in order to improve the satisfaction of all our Clients.

3 – LOUIS DREYFUS ARMATEURS

LOUIS DREYFUS ARMATEURS Group (LDA), founded more than 160 years ago, is a French family-owned Group active in maritime transportation and services.

Able to offer its dry bulk supply chain customers a full range of services, LDA is a leading global player in transport and logistics. As an inventive port operator, LDA Group is a valued partner for logistics innovation worldwide.
Thanks to strategic diversification conducted since the late 90s into high added value maritime activities and through the excellence of the French flag, LDA now offers its clients tailor-made industrial maritime solutions.

LDA is a fully integrated shipowner, offering all services, from ship design to maritime operations managed by its own crews.

Offering a worldwide presence with over 1,600 staff and 60 vessels, LDA Group is organised around two core divisions:

Bulk Division: dry bulk transportation with LD BULK; offshore transhipment and port logistics for bulk with LD PORTS & LOGISTICS, SLM (Indonesia) and ALBA (India).

Marine Industrial Division: Fiber optic Cable laying and maintenance (partnership with ASN, a subsidiary of NOKIA); power and communication cable installation/protection in shallow waters particularly for marine renewable energies with LOUIS DREYFUS TRAVOCEAN; maintenance of wind turbines with DONG ENERGY Wind Power; transportation of heavy and specialised cargoes with LD Seaplane for AIRBUS; ship management (Marion Dufresne); seismic research.

4 – COMPANY CORPORATE IDENTITY

Registered name :	LOUIS DREYFUS TRAVOCEAN S.A.S.
Incorporation details :	
Registration number :	384 310 413 R.C.S. Marseille
Place of registration :	Marseille, France
SIRET identification number :	384 310 413 00081
EEC VAT identification number :	FR 18 384 310 413
NAF code :	7112 B
Date of initial registration :	May 1977
Category of Company :	"Société Actions Simplifiées" with a capital of 3 589 397 Euros
Ownership :	LOUIS DREYFUS ARMATEURS S.A.S.
Directors :	
Chairman :	Mr Edouard LOUIS-DREYFUS
General Manager :	Mr Olivier LE NAGARD
Headquarters :	
Address :	Z.A. Athélia V - 78, avenue des Grenadiers 13600 La Ciotat - France
Telephone :	(33) (0)4.42.18.34.00
Fax :	(33) (0)4. 42.70.46.64
E-mail :	ldtravocean@ldtravocean.com
Website :	www.ldtravocean.com
DUNKIRK base :	
Address :	Base IFAMER - Port 5010 - Route de Mardyck Quai du Braek 59279 Mardyck - France
Telephone :	(33) (0)3.28.27.43.51
Fax :	(33) (0)3.28.27.20.38
UAE subsidiary :	
Address :	TRAVOCEAN ME Po Box 44084 - Abu-Dhabi - United Arab Emirates
E-mail :	travoceanme@ldtravocean.com
Netherlands subsidiary :	
Address :	LOUIS DREYFUS TRAVOCEAN B.V. Geinoord 7 3432ND Nieuwegein – Netherlands
Australia subsidiary :	
Address :	LD TRAVOCEAN AUSTRALIA Level 7, 151 Pirie Street Adelaïde SA5000 – Australia

Main contacts :

Managing Director :	Mr Olivier LE NAGARD	olenagard@ldtravocean.com
Projects :	Mr Sylvain GOUILLON	sgouillon@ldtravocean.com
Operations :	Mr Nicolas FIORE	nfiore@ldtravocean.com
Technical Department / R.O.V. Services :	Mr Frédéric MATTERA	fmattera@ldtravocean.com
Finance / Accounts :	Mr Frédéric ROUHIER	frouhier@ldtravocean.com

5 – HUMAN RESOURCES

Human resources are rightly considered as the Company's main asset. The LOUIS DREYFUS TRAVOCEAN workforce is comprised of :

- Permanent staff : around 60 people
- Interim staff : up to 100 people, depending on projects.

Additional expertise required to meet very specific spot requirements can obviously be called upon within sister subsidiaries in the parent Group.

Such personnel is organised as :

- a core of project managers and engineers,
- a team of draftsmen trained in computer-assisted design,
- parties of technicians and skilled workers,

working together within project teams tailored to suit the specific requirements of each of our projects.

This reservoir of manpower therefore participates on an as-required basis in all facets of a given project :

- project management
- design
- mechanics
- electrical engineering
- electronics
- scheduling
- naval engineering
- subsea engineering
- logistics
- computer engineering
- navigation and positioning
- R.O.V. / unmanned interventions

while maintaining at all times and on all projects the highest level of professional workmanship and safety.

6 – FACILITIES AND EQUIPMENT

6.1 - Main office

1,500 m² office space in La Ciotat (France), with management, administration and engineering departments and CAD drawing office.

600 m² workshop and storage area, with 10 tons SWL overhead crane

6.2 - Workshop / Logistic base / subsidiary companies

- Dunkirk (France)

2,500 m² covered space in the Dunkirk harbour zone, with direct access to the sea, 200 tons SWL overhead crane and fully equipped fabrication / maintenance workshop.

- Abu-Dhabi (UAE)

500 m² covered air conditioned space in Mina Zayed port facilities.

800 m² covered air conditioned space in ICAD II port facilities, open storage area of 2,100 m².

- Rotterdam (Netherlands)

LOUIS DREYFUS TRAVOCEAN BV office.

- Adelaïde (Australia)

LD TRAVOCEAN Australia office.

6.3 - Cable trenching and protection machines

Vehicle	Burial Depth (m)	Trench Width (mm)	Water Depth (m)	Inboard Power (HP)	Surface Power (HP)	Burying process used
TM 05 (diverless)	1.25	250 / 400	100	800		Cutting wheel / Jetting and educator system
ROVJET 810	2.20	480	500	800		Water jetting
ROVJET 409	2.00	350	2 500	400		Water jetting
ROVJET 605 VSW	2.00	350	Min. 1.60	600		Water jetting
ROVJET 408	2.00	350	2 500	400		Water jetting
ROVJET 207	1.00	340	2 500	200		Water jetting
ROVJET 806	2.20	480	500	800		Water jetting
EBJ 04	1.50	100	20			Water jetting
EBJ 03	1.50	100	20			Water jetting
ROS			200		150	Mattresses installation
ROVJET 605	2.00	350	1 000	600		Water jetting
ROVJET 404	2.00	350	2 500	400		Water jetting
ROVJET 403	2.00	350	2 500	400		Water jetting

Vehicle	Burial Depth (m)	Trench Width (mm)	Water Depth (m)	Inboard Power (HP)	Surface Power (HP)	Burying process used
ROVJET 402	2.00	350	2 500	400		Water jetting
ROVJET 401	2.00	350	2 500	400		Water jetting
TM 04	1.20 to 2.00	250 / 350	120	740		Cutting wheel / Cutting chain
TM 03	1.20 to 2.00	250 / 350	120	450		Cutting wheel / Cutting chain
TM 02	1.20 to 2.00	280 / 250	65	200		Cutting wheel / Cutting chain
T.O. Mobile	1.00 to 2.00	300	30	20	260	Water jetting
TJV 07/08	2.00	550	60		300	Water jetting
TJV 06	2.00	950	60	305	300	Jetting and eductor system
TJV 05	2.10	100	60	150/300		Water jetting
TJV 04	1.20	185	20			Water jetting
MED 1	1.20 to 1.30	350	100	300		Cutting chain / Dredge pump
ESV 12	2.20	86	60	80		Vibrating ploughshare
ESV 11 / 03	1.10 to 1.30	85	20	150		Multiple cable ploughing
ESV 07 / 03	1.10	85	20		50	Multiple cable ploughing
EBJ 02	1.50	100	20			Water jetting

6.4 – <u>Inspection/Survey R.O.V.</u>

- 1 ROVSee 111 survey, inspection & maintenance R.O.V. (1000 m max. operating depth, TMS, 2 manipulator arms).

- 1 PHANTOM S4 inspection R.O.V. (300 m max. operating depth).

- 2 SEAEYE LEOPARD workclass and inspection R.O.V. (1000 m max. operating depth).

Privileged access to other facilities and equipment available within the share-holding Group clearly enhances the panel of technical resources which can be deployed within the scope of each project.

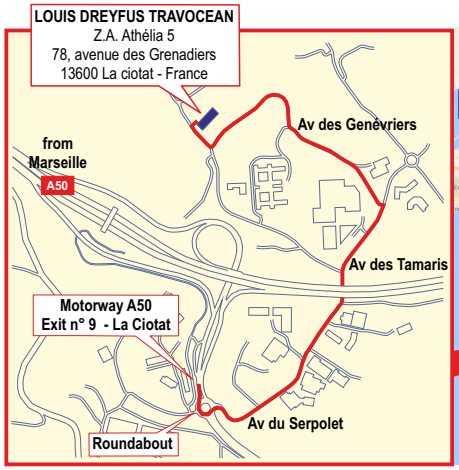
LouisDreyfus
TRAVOCEAN

Main Office

Since October 2016

LA CIOTAT
Z.A. Athélia V

Easily accessible from Marseille Provence Airport and Aix-en-Provence TGV station by motorway, the LOUIS DREYFUS TRAVOCEAN's offices extend over 1500m² office space in La Ciotat,30 km from Marseille (France), with management administration and engineering departments and CAD drawing office.
600m² workshop and storage area, with 10 tons SWL overhead crane.



Submarine Cable Installation

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LouisDreyfus
TRAVOCEAN

Base Européenne

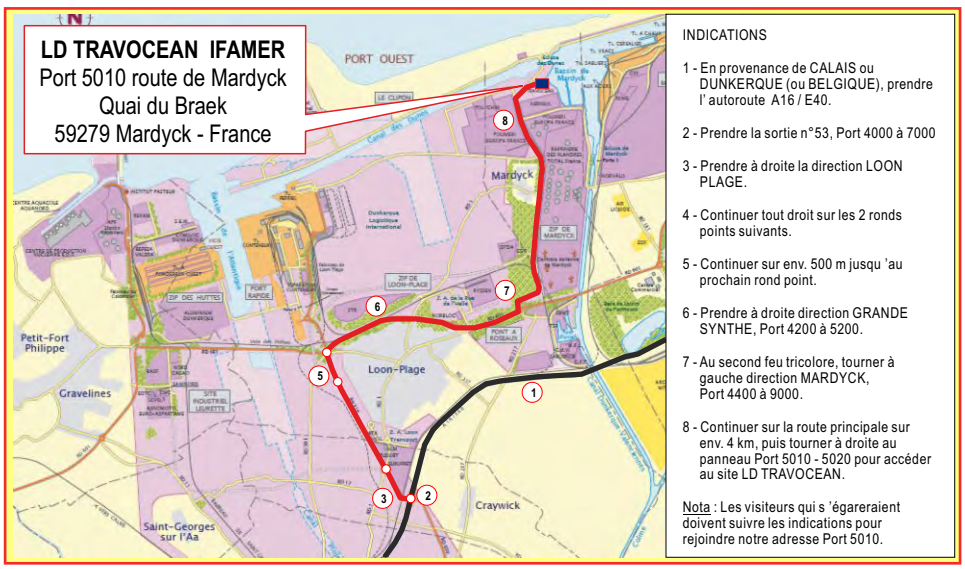
DUNKERQUE
… une base ouverte sur la Mer du Nord

Avec 2500 m² situé dans la zone portuaire de Dunkerque, avec accés direct à la mer, cette base opérationnelle dispose d'un pont roulant de 200 t dans un hangar couvert ainsi que des bureaux et ateliers adaptés au montage et maintenance de nos machines.

Inside view

Quayside

Outside view



Submarine Cable Installation

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LouisDreyfus
TRAVOCEAN

Middle East Base

ABU-DHABI

... an operational base close to the Arabian Gulf

- 500 m² covered air conditioned warehouse in Mina Zayed harbour zone
- 1,200 m² yard
- 800 m² covered air conditioned warehouse in ICAD II
- 2,100 m² yard

TRAVOCEAN Middle East warehouse

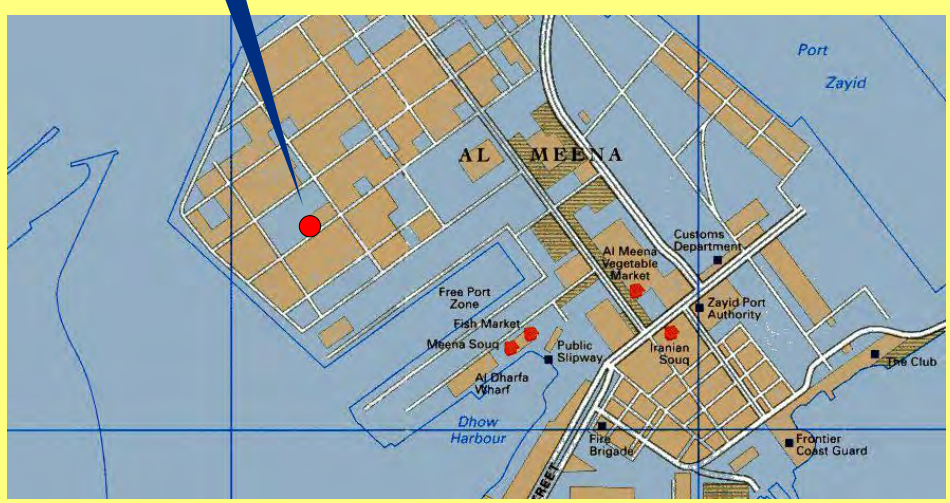
Coming from Abu Dhabi city centre, drive through Mina Zayed port and take" Main gate " entrance direction - (turn on the left at traffic light).
At the first roundabout on 20 th street, continue straight ahead : " Warehouse area " direction (" Free port " on the left - " Mina Zayed " on the right)
Pass through the entrance gate and turn left at the fourth crossroad (Grand store warehouse at the corner) on the 11 th street.
HCF / TRAVOCEAN warehouse is located on the left after four crossroads, at the corner of 11 th and 8 th street (block between 8 and 10 th street and 9 and 11 th).

MINA WAREHOUSE AREA

JUAN SALEM EST

Store No 242-243-244

Free Zone ABU-DHABI



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7 - TRENCHING MACHINES

7.1 - General

LOUIS DREYFUS TRAVOCEAN principally specialises in the design and construction of trenching machines for cable installations in varied soil types and in shallow water.

Also being an operator provides LOUIS DREYFUS TRAVOCEAN with the advantage of consolidating our experience gained at sea to improve our vehicles and tools.

Most common tools comprise bucket chain, trenching chain, water jetting / dredge pumps and mechanical plough.

7.2 - Main technical factors to be considered in the design of a burying vehicle

7.2.1 - Cable product

- Type of cable.
- Number of cables to be buried simultaneously.
- Cable characteristics : maximum outside diameter, nominal in-water weight, minimum bending radius, safe working load, presence and type of external coating and armour, presence of joints, etc.

7.2.2 - Project environmental conditions

- Shore approaches / landfalls, overall length of the link to be buried, minimum and maximum depth along cable route.
- Weather conditions, sea state (waves, tides, tidal streams, currents), seabed conditions (current, visibility, etc.).
- Seabed features including slopes, ridges, man-made obstacles, crossings, etc.
- Seabed geotechnical characteristics : composition, shear strength, compressive strength, hardness, abrasiveness, cohesiveness, presence of boulders, etc. must all be assessed quantitatively per zone of the cable route.
- Maximum burial depth to be achieved and survey requirements.
- Project economics.

7.2.3 - Method of burial

- Either post lay burial,
- Or simultaneous laying and burial.

7.2.4 - Other factors

- Type of support vessel available in the area, availability of a dedicated handling system, electrical power supply available, etc.
- Possibility of diver assistance or requirement for entirely diverless operation.

7.3 - Machines built to date by LOUIS DREYFUS TRAVOCEAN

Year built	Vehicle	Type	In air weight	Main purpose of vehicle
2016	**TM 05** (diverless)	Seabed crawler	40 tons	Rock trencher – wheel 1.2 m
2013	**ROVSEE 111**	Free swimming R.O.V.	2.7 tons	Multipurpose R.O.V. – Inspection - survey - Maintenance
2013	**ROVJET 810**	Free swimming / tracked R.O.V.	13 tons	Multipurpose R.O.V. – PLIB - Maintenance
2013	**ROVJET 409**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2012	**ROVJET 605 VSW**	Free tracked R.O.V.	9.4 tons	Multipurpose R.O.V. – PLIB - Maintenance
2012	**ROVJET 408**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2011	**ROVJET 207**	Free swimming / tracked R.O.V.	8.3 tons	Multipurpose R.O.V. – PLIB - Maintenance
2011	**ROVJET 806**	Free swimming / tracked R.O.V.	13 tons	Multipurpose R.O.V. – PLIB - Maintenance
2011	**EBJ 03 / 04**	Towed jetting sledge	0.3 ton	Light jetting sledge for soft soils
2010	**ROVJET 605**	Free swimming / tracked R.O.V.	12.5 tons	Multipurpose R.O.V. – PLIB - Maintenance
2010	**R.O.S.**	Remote Operated Mattresses Spreader bar	3.7 tons	Alternative Protection
2009	**ROVJET 404**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2009	**TM 03** (upgrade)	Seabed crawler	27 tons	Rock trencher – chain 2.2 m
2009	**T.O. Mobile**	Seabed crawler	1.5 tons	Multipurpose crawler
2008	**TM 04**	Seabed crawler	28 tons	Rock trencher – wheel 1.2 m
2008	**ROVJET 403**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2008	**ROVJET 402**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2007	**ROVJET 401**	Free swimming / tracked R.O.V.	10 tons	Multipurpose R.O.V. – PLIB - Maintenance
2006	**EBJ**	Towed jetting sledge	0.3 ton	Light jetting sledge for soft soils
2005	**TJV 07**	Towed jetting sledge	1.2 tons	Light jetting sledge for soft soils
2004	**TJV 06**	Towed jetting sledge	11 tons	Jetting sledge for soft soils

Year built	Vehicle	Type	In air weight	Main purpose of vehicle
2003	**TM 03**	Seabed crawler	23 tons	Rock trencher
2000	**ESV 12**	Vibro plough	13 tons	Vibro plough into hard soil conditions
2000	**TJV 05**	Towed jetting sledge	8.2 tons	Jetting sledge for soft soils
1999	**TM 02** (upgrade)	Seabed crawler	14.5 tons	Rock trencher
1998	**ESV 07 / 03**	Vibro plough	7 tons	Light vibro plough for river beds
1998	**ESV 11 / 03**	Vibro plough	11 tons	Vibro plough for river beds
1997	**TJV 02**	Towed jetting sledge	1 ton	Jetting sledge for post burial
1996	**COPS**	Seabed crawler	16 tons	Crawler for continuous mattress protection
1996	**TJV 01**	Towed jetting sledge	1 ton	Jetting sledge for post burial
1992	**KOURA 2**	Plough	5.5 tons	Plough for soft soils
1991	**KOURA 1**	Plough	3.5 tons	Plough assessment surveys
1990	**MED 1**	Seabed crawler	18 tons	Multipurpose crawler – PLIB - Maintenance
1988	**MUC 201**	Seabed crawler	20 tons	Crawler for offshore mining projects
1986	**LIMULE D**	Seabed crawler	50 tons	Crawler for disembedding / dredging projects
1984	**LIMULE 2**	Seabed crawler	54 tons	Trencher for power cable
1983	**LIMULE 1**	Seabed crawler	54 tons	Trencher for power cable
1979	**Mini crawler**	Seabed crawler	4 tons	Dredging, miscellaneous civil works

8 - EQUIPMENT DATA SHEETS

Enclosed are the following data sheets showing equipment currently available in LOUIS DREYFUS TRAVOCEAN or recently developed for our Clients :

LouisDreyfus
TRAVOCEAN

TM 05

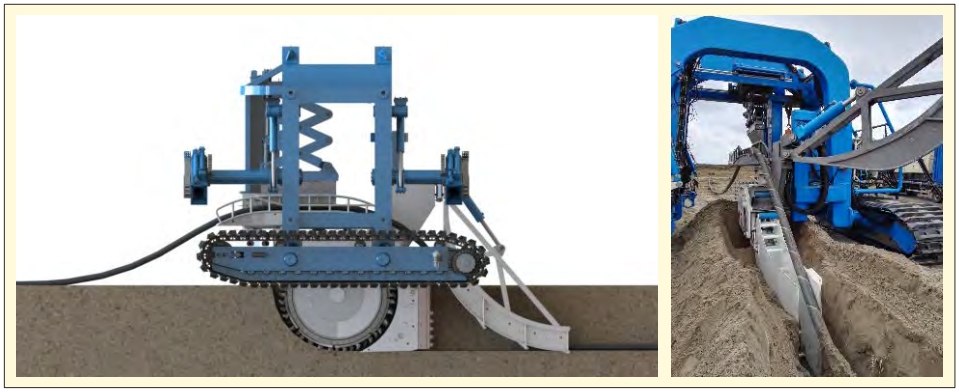
2016

Cable Embedding Vehicle
(diverless)

The TM 05 cable embedding vehicle , is a dedicated powerfull tracked diverless trencher designed for the burial and maintenance of submarine power cable links.
TM05 can be fitted with :
- cutting wheel with layer
- cuting wheel with jetting and eductor system

MAIN SPECIFICATIONS

Lenght O.A.	7.60 m
Width O.A.	7.70 m
Height O.A.	5.00 m
Weight in air	40 t
Weight in water	34 t
Power	880 cv
Max water depth	100 m
Trench depth	1.25 m
Trench width	0.25 to 0.40 m
x2 loading arms (5 fonctions)	2 t



Submarine Cable Installation

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SEAEYE LEOPARD 1710

2015

Work Class ROV

- Leopard ROV with snubber system for vessel marine crane.

MAIN SPECIFICATIONS

Length (O.A.)	2.15 m
Width (O.A.)	1.17 m
Height (O.A.)	1.16 m
Weight in air	1200 kg
Payload	280 kg
Total power	55 kW
Max. rating depth	1000 m
Thrust forward	493 kgf
Thrust lateral	370 kgf
Thrust vertical	225 kgf

- 1x Umbilical winch fitted with 1100 m of lifting armor umbilical
- 1x Control cabin fitted with control et power system
- 1x Snubber to be fitted / integrated with marine crane
- 1x TMS fitted with 200 m of tether
- 1x 20 ft container with tools and spare parts
- 1x Cable tracking system
- 1x Manipulator arms
- cameras, sonar, echosounder, Bathy system, Auto function mode ...

Submarine Cable Installation

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SEAEYE LEOPARD 1711

2015

Work Class ROV

- Leopard ROV with complete launch and recovery system.

MAIN SPECIFICATIONS

Length (O.A.)	2.15 m
Width (O.A.)	1.17 m
Height (O.A.)	1.16 m
Weight in air	1200 kg
Payload	280 kg
Total power	55 kW
Max. rating depth	1000 m
Thrust forward	493 kgf
Thrust lateral	370 kgf
Thrust vertical	225 kgf

- 1x Umbilical winch fitted with 1100 m of lifting armor umbilical
- 1x Control cabin fitted with control et power system
- 1x LARS system (A-frame, Umbilical winch and power pack)
- 1x TMS fitted with 200 m of tether
- 1x 20 ft container with tools and spare parts
- 1x Cable tracking system
- 2x Manipulator arms
- cameras, sonar, echosounder, Bathy system, Auto function mode ...

Submarine Cable Installation

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T.O.Mobile

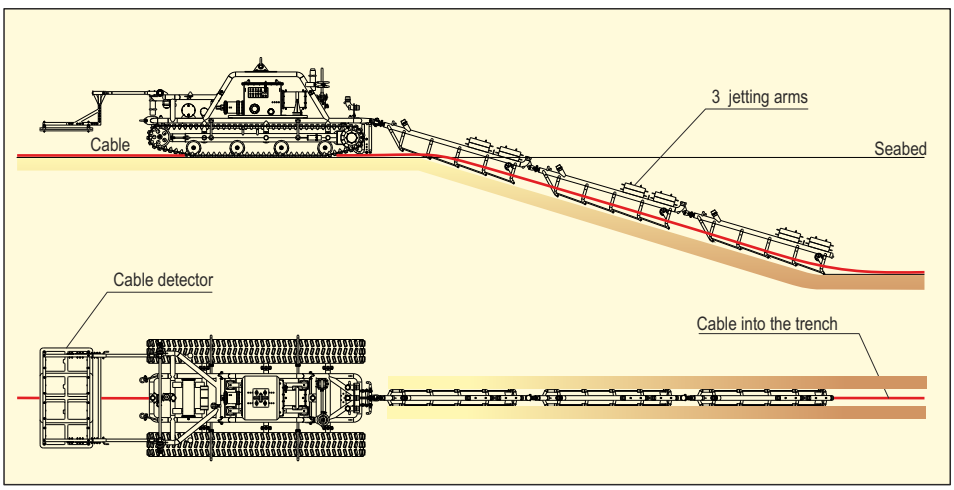
up graded 2015

Multipurpose crawler
(jetting configuration)

T.O.Mobile is a light jetting crawler for post burial operations in soft soils, it can be fitted with 2 or 3 jetting arms.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	4.60 m
Width O.A	2.40 m
Height O.A	1.90 m
Weight in air	2870 kg
Burial depth (standard)	2.00 m
Water depth	50 m
Electrical power / subsea HPU	22 kW
Jetting surface pump	650 m^3/h at 9 bar



MAT 033 C

Submarine Cable Installation

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ROVSee 111

2013

Work Class ROV

The ROVSee 111 is a highly efficient ultra compact ROV fitted with the most advanced technological equipment.

MAIN SPECIFICATIONS

Length (O.A.)	2.70 m
Width (O.A.)	1.54 m
Height (O.A.)	1.70 m
Weight in air	2700 kg
Payload	150 kg
Total power	100 HP (optional 150 HP)
Max. rating depth	1000 m

MANIPULATOR ARMS (Schilling Robotics)

1x 7 functions (Orion manipulator)	Position or rate controlled
Grip force nominal	4.448 N
Wrist rotate	360°
Gripper opening	97 mm

1x 5 functions (Rig Master manipulator)	Position or rate controlled
Grip force nominal	4.448 N
Wrist rotate	360°
Gripper opening	284 mm

Submarine Cable Installation

Etablissement de Marseille

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TRAVOCEAN

ROVJET 605 VSW

2012

Trenching / Inspection ROV for very shallow water

The ROVJET is a highly efficient trencher fitted with the most advanced technological equipment.

MAIN SPECIFICATIONS

Length (O.A.)	6.60 m
Width (O.A. with tracks)	4.31 m
Height (O.A.)	2.80 m
Weight in air	9.4 tons
Weight in sea water	5.8 tons
Trench depth	up to 2.20 m
Trench width	up to 480 mm
Total power	up to 440 kW (600 HP)
Min. rating depth	1.60 m
Speed on tracks	3,400 m/h

CABLE BURIAL TOOL

Main jet tool	Twin jet legs with HP & LP water jet
Forward jet tool	HP flow for surface trenching
HP jetting system (200 HP)	390 m^3/h at 7.5 bar
LP jetting system (200 HP)	660 m^3/h at 4.1 bar
Cable detector / Tracking	TSS 440 / 350

Submarine Cable Installation

Etablissement de Marseille

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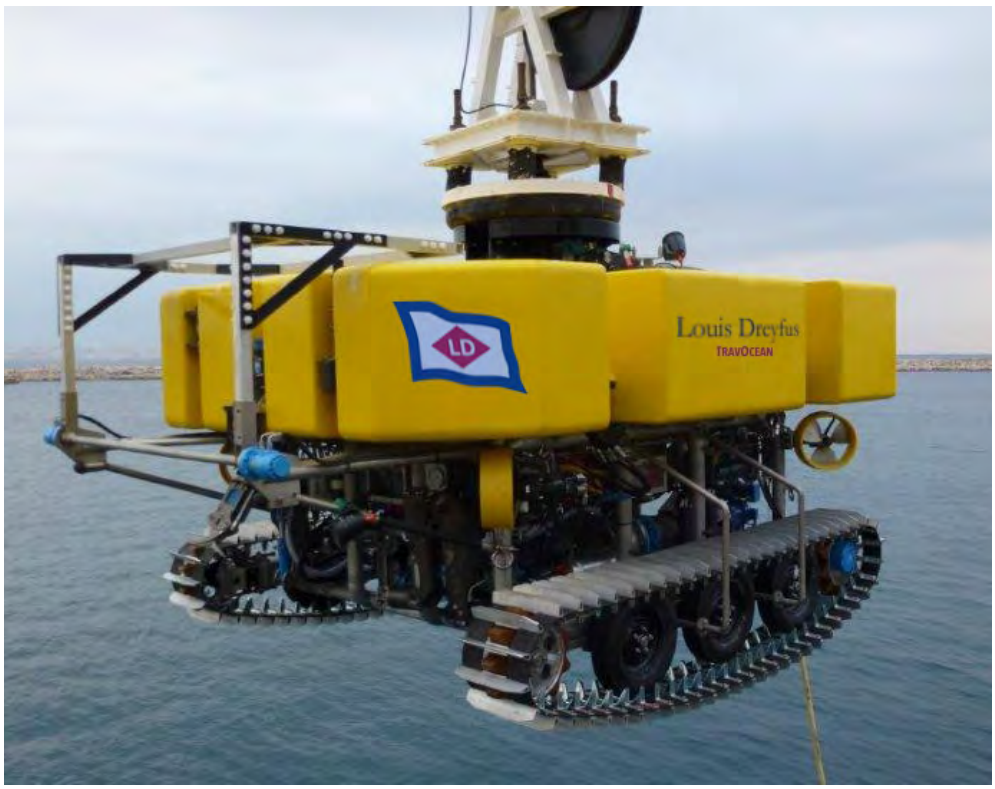
ROVJET 207

2012

Free swimming / Tracked ROV
2,500m water depth



The ROVJET is a highly efficient trencher fitted with the most advanced technological equipment.

MAIN SPECIFICATIONS

Length (O.A.)	5.00 m
Width (O.A. with tracks)	3.30 m
Height (O.A.)	2.50 m
Weight in air	8.3 tons
Trench depth	up to 1.00 m
Trench width	up to 340 mm
Total power	150 kW (200 HP)
Max. rating depth	2,500 m
Speed on tracks	2,500 m/h

CABLE BURIAL TOOL

Main jet tool	Twin jet legs with HP water jet
HP jetting system (200 HP)	300 m^3/h at 7 bar
Cable detector / Tracking	TSS 340 / 350

Submarine Cable Installation

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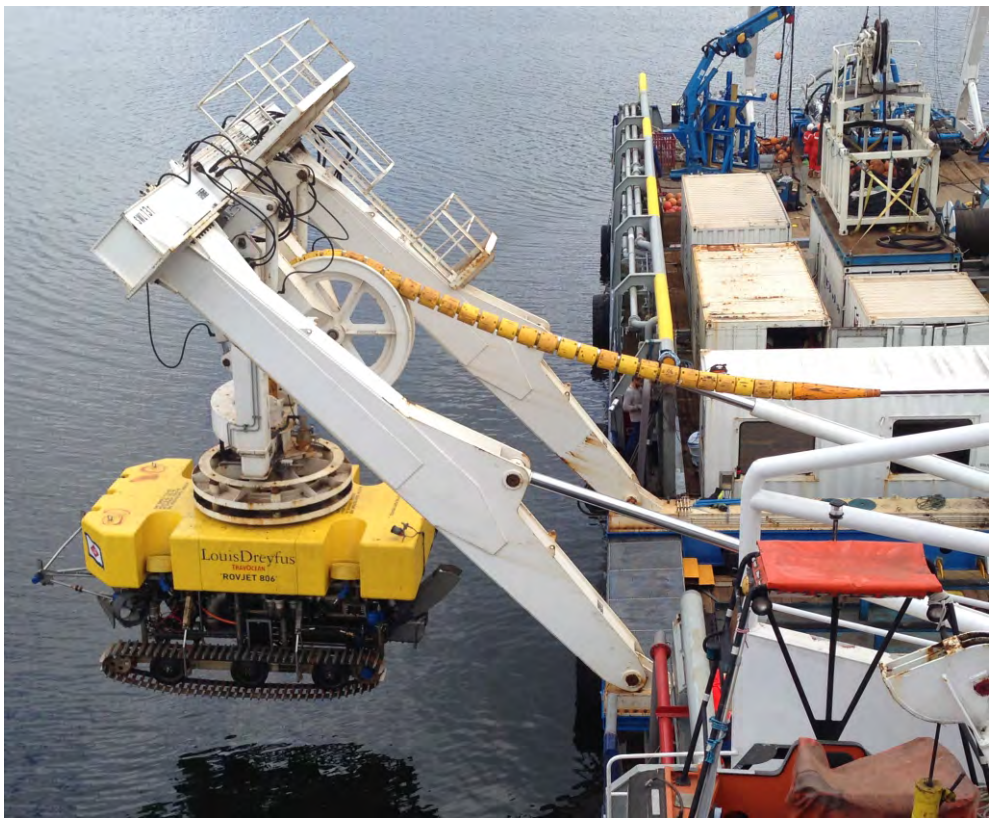
ROVJET 806 - 810

2011 to 2013

Free swimming / Tracked ROV
500m water depth



The ROVJET is a highly efficient trencher fitted with the most advanced technological equipment.

Lifting umbilical on ROVJET 806 and 810 spread.

MAIN SPECIFICATIONS

Length (O.A.)	6.40 m
Width (O.A. with tracks)	3.40 m
Height (O.A.)	2.80 m
Weight in air	13 tons
Trench depth	up to 2.20 m
Trench width	up to 480 mm
Total power	550 kW (800 HP)
Max. rating depth	500 m
Speed on tracks	2,500 m/h

CABLE BURIAL TOOL

Main jet tool	Twin jet legs with HP & LP water jet
Forward jet tool	HP flow for surface trenching
HP jetting system / Eductor (400 HP)	700 m^3/h at 10 bar
LP jetting system (200 HP)	780 m^3/h at 3 bar
Cable detector / Tracking	TSS 440 / 350

Submarine Cable Installation

Etablissement de Marseille

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TRAVOCEAN

ROVJET 605

2010

Free swimming / Tracked ROV
1,000 m water depth

The ROVJET is a highly efficient trencher fitted with the most advanced technological equipment.

MAIN SPECIFICATIONS

Length (O.A.)	6.50 m
Width (O.A. with tracks)	3.40 m
Height (O.A.)	2.80 m
Weight in air	13 tons
Trench depth	up to 2.20 m
Trench width	up to 480 mm
Total power	up to 440 kW (600 HP)
Max. rating depth	1,000 m
Speed on tracks	2,500 m/h

CABLE BURIAL TOOL

Main jet tool	Twin jet legs with HP & LP water jet
Forward jet tool	HP flow for surface trenching
HP jetting system (200 HP)	360 m^3/h at 10 bar
LP jetting system (200 HP)	780 m^3/h at 3 bar
Cable detector / Tracking	TSS 440 / 350

Submarine Cable Installation

Etablissement de Marseille

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ROS 01

2010

Remote Operated mattresses Spreader bar 200 m water depth

The R.O.S. is fitted with 4 thrusters, bollard pull 320 kg at 180 bar each, 2 pan & tilt color cameras, gyrocompas and latch/unlatch hydraulic driven for 2 x 6 locking pins. The R.O.S can intall independently 2 mattresses (6 m x 3 m x 300 mm - 13 t max) in the same lift.

MAIN SPECIFICATIONS

Length (O.A.)	5.80 m
Width (O.A.)	2.20 m
Height (O.A.)	1.22 m
Weight in air	3.7 tons
Total power	150 kW (300 HP)
Max. rating depth	200 m

Umbilical winch :
- 20' ISO container including PDU - HPU
- Hydraulic constant tension driven
- Main power supply 400V (50Hz) / 440V (60 Htz) - 250kW
- Umbilical length 200 m (up to 1,000 m)

Control panel :
- 19" transportable console

Optinal equipment :
- Acoustic positioning
- Sonar
- Profiler
- Cable / pipe detect

Submarine Cable Installation

Etablissement de Marseille

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TM 03

upgraded 2009

Cable Trenching Vehicle

(optional tools : dredging pump or jetting system)

TM 03 cable embedding vehicle : product burial is achieved by means of a cutting wheel or a digging chain.

MAIN SPECIFICATIONS

Length O.A	12.50 m
Width O.A	5.62 m
Height O.A	2.52 m
Weight in air	27 tons
Weight in water	20 tons
Power	450 HP
Max water depth	120 m

TM 03 with cutting wheel

Trench depth	0 to 1.30 m
Trench width	0.25 to 0.35 m

TM 03 with digging chain

Trench depth	0 to 2.30 m
Trench width	0.25 to 0.35 m

Submarine Cable Installation

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TM 04

2008

Cable Embedding Vehicle

(optional tools : dredging pump or jetting system)

TM 04 cable embedding vehicle : product burial is achieved by means of a cutting wheel or a digging chain.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	6.14 m
Width O.A	5.62 m
Height O.A	2.52 m
Weight in air	25 tons
Weight in water	17 tons
Power	730 HP
Max water depth	120 m

TM 04 with cutting wheel

Trench depth	0 to 1.30 m
Trench width	0.25 / 0.35 m

TM 04 with digging chain

Trench depth	0 to 2.30 m
Trench width	0.25 /0.35 m

Submarine Cable Installation

Etablissement de Marseille

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LouisDreyfus
TRAVOCEAN

ROVJET 400 series

2007 to 2013

Free swimming / Tracked ROV
2,500m water depth
(6 ROVs construted: 401,402,403,404,408 and 409)

The ROVJET is a highly efficient trencher fitted with the most advanced technological equipment.

Lifting umbilical on ROVJET 408 and 409 spread.

MAIN SPECIFICATIONS

Length (O.A.)	5.80 m
Width (O.A. with tracks)	3.40 m
Height (O.A.)	2.50 m
Weight in air	10 tons
Trench depth	up to 2.00 m
Trench width	up to 340 mm
Total power	300 kW (400 HP)
Max. rating depth	2,500 m
Speed on tracks	2.500 m/h

CABLE BURIAL TOOL

Main jet tool	Twin jet legs with HP & LP water jet
Forward jet tool	HP flow for surface trenching
HP jetting system (125 HP)	300 m^3/h at 7 bar
LP jetting system (125 HP)	550 m^3/h at 3 bar
Cable detector / Tracking	TSS 440 / 350

Submarine Cable Installation

Etablissement de Marseille

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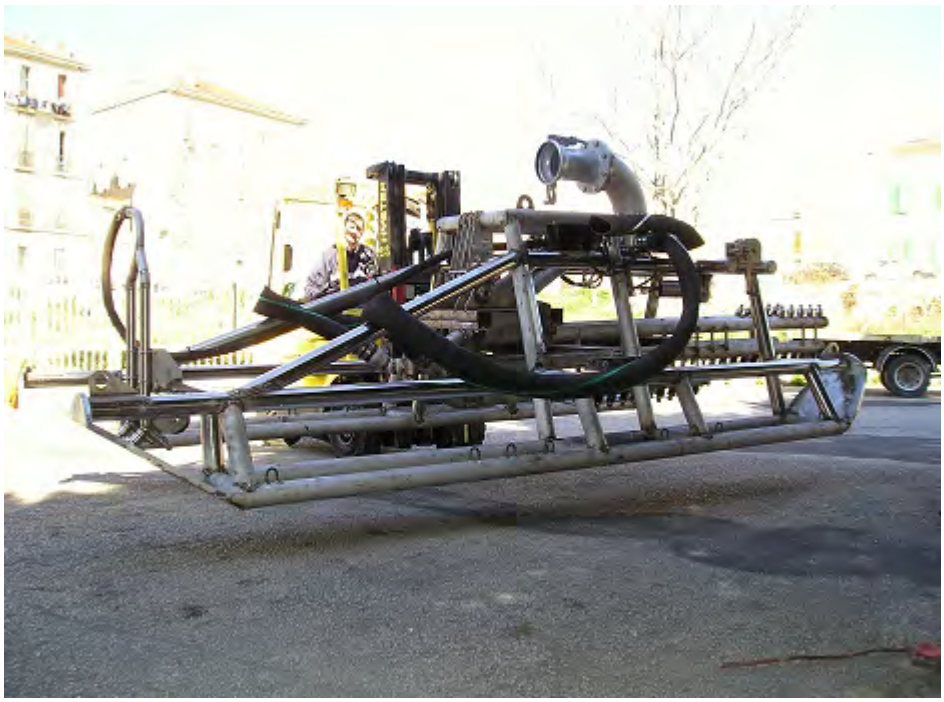
TJV 07 / 08

2005

Jetting sledge



TJV 07 (Towed Jetting Vehicle) was designed and built for the post lay burial of power and telecom cables in shallow water.

TJV 07 is a basic jetting sledge capable to reaching down 2 m burial depth.

TJV 07 is operated by divers. Jetting is delivered by 300 HP Diesel pump installed on the deck.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	4.50 m
Width O.A	2.30 m
Height O.A	1.80 m
Weight in air	1.2 tons
Trench depth	up to 2.00 m
Trench width	up to 550 mm
Max. tow force	2 tons

Submarine Cable Installation

Etablissement de Marseille

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EBJ 03-04-05-06

2005 to 2012

Jetting sledge

EBJ is light jetting towed sledge for post burial operation in soft soils and it can be fitted with 2 or 3 jetting arm.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	2.46 m
Width O.A	2.00 m
Height O.A	0.54 m
Weight in air	300 kg
Burial depth	1.50 m
Trench width	100 mm
Water depth	20 m

Submarine Cable Installation

Etablissement de Marseille

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TJV 06

2004

Towed Jetting Vehicle

(jetting and hydro-ejector system)

The principle of TJV 06 is to trench the seabed around the pipelines using:
- high pressure water jets to fluidize the seabed ahead of the jetting tool.
- fluidized material are removed by water pressure diversion (hydro-ejector) and educted to the side of the pipelines.

According to soil conditions, the target trench depth is reached using a multi-pass burial method.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	8.00 m
Width O.A	5.60 m
Height O.A	4.00 m
Weight in air	11 tons
Weight in water	9 tons
Trench depth	2 m
Trench width	950 mm
Max. tow force	10 tons
Inboard power	305 HP
Surface power	300 HP
Max. water depth	60 m

Submarine Cable Installation

Etablissement de Marseille

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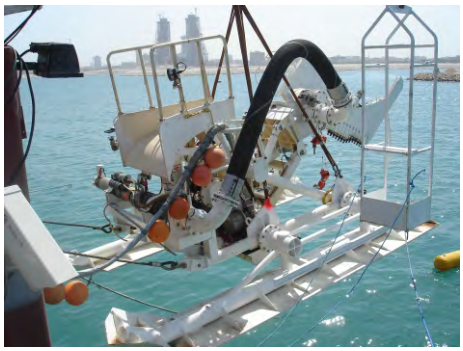
TJV 05

2000

Jetting sledge



TJV 05 (Towed Jetting Vehicle) is a basic jetting sledge capable to reach up to 2.00 m burial depth.
TJV 05 is fitted with a full telemetry system. Jetting is delivered by 150 or 300 HP inboard pumps.

MAIN SPECIFICATIONS

Length O.A	9.50 m
Width O.A	4.10 m
Height O.A	3.60 m
Weight in air	8.2 tons
Weight i water	5.9 tons
Trench depth	up to 2.00 m
Trench width	up to 240 mm
Max. tow force	10 tons
Depth rating	60 m
Flow rate	400 to 800 m^3/h - 7 to 15 bar

MAT 030 D

Submarine Cable Installation

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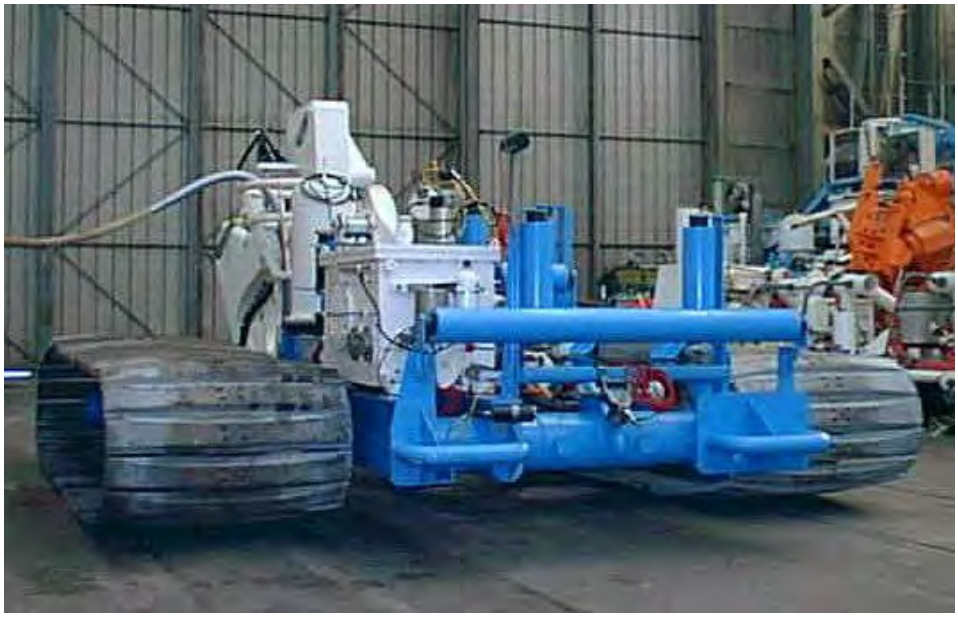
TM 02

1999

Cable Embedding Vehicle

(optional tools : dredging pump or jetting system)



TM 02 cable embedding vehicle : product burial is achieved by means of a cutting wheel or a digging chain. (upgraded in 1999)

MAIN SPECIFICATIONS

Length (O.A vehicle only)	5.80 m
Width O.A	4.50 m
Height O.A	2.60 m
Weight in air	14.5 tons
Weight in water	9.2 tons
Power	200 HP
Max water depth	65 m

TM 02 with cutting wheel

Trench depth	0 to 1.20 m
Trench width	0.28 m

TM 02 with digging chain

Trench depth	0 to 2.00 m
Trench width	0.25 m

MAT 005 I

Submarine Cable Installation

Etablissement de Marseille

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MED 1

1990

Cable Embedding / Disembedding Vehicle

(multipurpose crawler - PLIB - Maintenance)

MAIN SPECIFICATIONS

Length (O.A vehicle only)	3.66 m
Width O.A	5.50 m
Height O.A	3.94 m
Weight in air with pump	17.9 tons
Weight in air with chain	19.1 tons
Weight in water with pump	11.8 tons
Weight in water with chain	13 tons
Max ground pressure in water	295 g/cm^2
Max trench depth	3.00 m
Trench width	0.35 m
Max pulling force	11 tons
Max speed	800 m/h
Disembedding speed	40 to 100 m/h
Power	300 HP
Max water depth	100 m

... jetting tool, excavating pump, trenching chain

MAT 022 H

Submarine Cable Installation

Etablissement de Marseille

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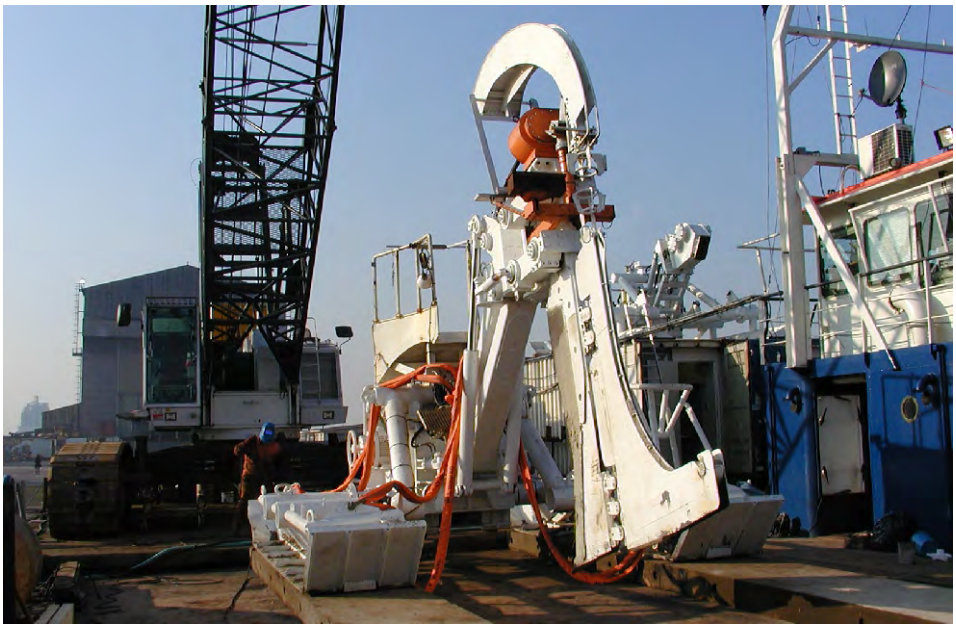
ESV 12

2000

Vibro plough
(vibrating ploughshare)



ESV 12 is a vibrating plough. The combination of the narrow share and vibrating system allows ESV 12 to reach 2 m burial depth with a very low pulling tension.

ESV 12 is specifically designed to reach deep burial depth in hard soil conditions (chalk, gravel, ...)

MAIN SPECIFICATIONS

Length (O.A vehicle only)	9.43 m
Width O.A	4.47 m
Height O.A	3.73 m
Weight in air	13 tons
Trench depth	2.20 m
Trench width	86 mm
Max. tow force	25 tons
Power	80 HP
Max water depth	60 m

Submarine Cable Installation

Etablissement de Marseille

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ESV 11 / 3

1998

Vibro plough in river beds
(vibrating ploughshare)

ESV 11-3 towed plough for simultaneous cable laying / burial of multiple cables.Burial of up to 3 cables is achieved by means of mechanical ploughing of riverbed using a vibrating ploughshare.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	9.23 m
Width O.A	4.48 m
Height O.A	3.38 m
Weight in air	11 tons
Trench depth	1.10 m to 1.30 m
Trench width	85 mm
Max. tow force	20 tons
Max capacity	3 cables Ø 42 mm

Submarine Cable Installation

Etablissement de Marseille

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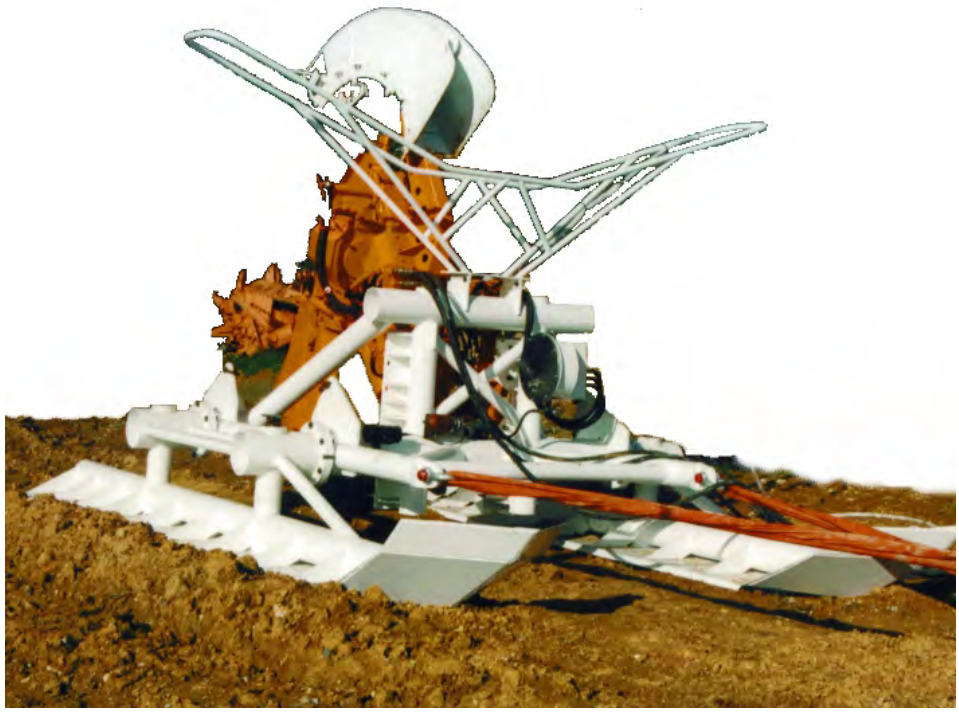
LouisDreyfus
TRAVOCEAN

ESV 07 / 3

1998

Light vibro plough in river beds
(vibrating ploughshare)



ESV 07-3 towed plough for simultaneous cable laying / burial of multiple cables.Burial of up to 3 cables is achieved by means of mechanical ploughing of riverbed using a vibrating ploughshare.

MAIN SPECIFICATIONS

Length (O.A vehicle only)	7.50 m
Width O.A	4.05 m
Height O.A	4.00 m
Weight in air	6.5 tons
Trench depth	1.10 m
Trench width	85 mm
Max. tow force	15 tons
Max capacity	3 cables Ø 30 mm

Submarine Cable Installation

Etablissement de Marseille

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LouisDreyfus
TRAVOCEAN

PHANTOM S4

ROV 300 meter Water Depth

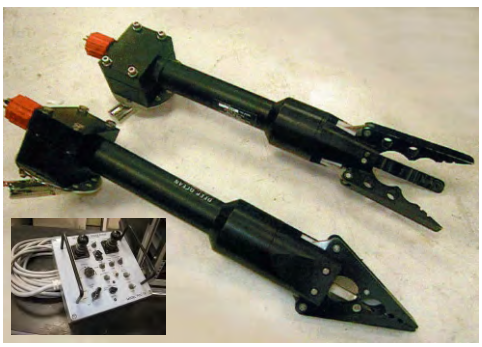
The PHANTOM S4 ROV system combines simplicity with the reliability of a well-proven product line of 600 units in operation world-wide. It comprises a compact vehicle capable of operating in its current version to a design depth of 300 m, with all adaptations for cage deployment in order to extend the vehicle's nominal range of operating conditions.
However, the core of the system comprising the vehicle and its control console and umbilical can be easly removed from the vessel so as to be rapidly implemented on all applications where only a lightweight portable ROV package is required.
The PHANTOM S4 vehicle is quite versatile and is designed to perform varied interventions such as inspection and video survey, light manipulative tasks for assistance to salvage operations, instrumental surveys, etc.

VEHICLE CHARACTERISTICS
- Dimensions (LxWxH) : 1.53 m x 0.87 m x 0.61 m
- Weight in air : 118 kg
- Playload : 11 kg

UMBILICAL
- Length : 500 m, neutral in water, Ø 17 mm

MAXIMUM DIVING DEPTH
- Operating : 300 m
- Test depth : 450 m

POWER AND PROPULSION
- 100-250 VAC - 50/60 Hz
- 6 kVA



THRUSTER SPECIFICATION
- Forward thrust full : 91 kg
- 4 0.5 HP thruster horizontal
- 2 thruster VERTRANS vertical and lateral
- Speed : forward, up to 4 knots
- Speed vertical and lateral : 0.5 knot.

NAVIGATION AND SENSORS
- Heading : fluid gimbled FLUXGATE
- Depth : pressure transducer
- Altitude : TRITECH PA500 Altimeter
- Search & navigation : MESOTECH MS900 scanning sonar 675 kHz VGA display
- CCD high resolution colour camera, PAL, 12:1 zoom, manual / auto focus control
- Tilting instrument platform +/- 90°
- Lights : two tungsten halogen lights, 250 W each


Pilot's control console (front view)


Rear view

MANIPULATOR ARM
- 3 functions manipulator, 35 N gripping force
  * jaw : open / close
  * extend retract : 200 mm
  * jaw slew or rotate : 180°

CONTROL SYSTEM (SPECTRUM " SLAB" CONSOLE)
- Thruster power, off, slow, normal, boost
- Joysticks : 2
- Auto : heading, depth, altitude
- Vertical : trim
- Lighting : selector, 4 position light intensity selection
- Camera : tilt selection block inclination angle, auto / manual focus, zoom
- Leak detector
- Volt meter - Amp meter
- Ground fault
- Time and date
- Console box : 590 x 760 x 520 mm, 90 kg
- Isolation transformer box : 330 x 230 x 180 mm, 36 kg
- Pilot control unit : 260 x 250 x 200 mm, 7 kg


Front view

Rear view

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LouisDreyfus
TRAVOCEAN

COPS

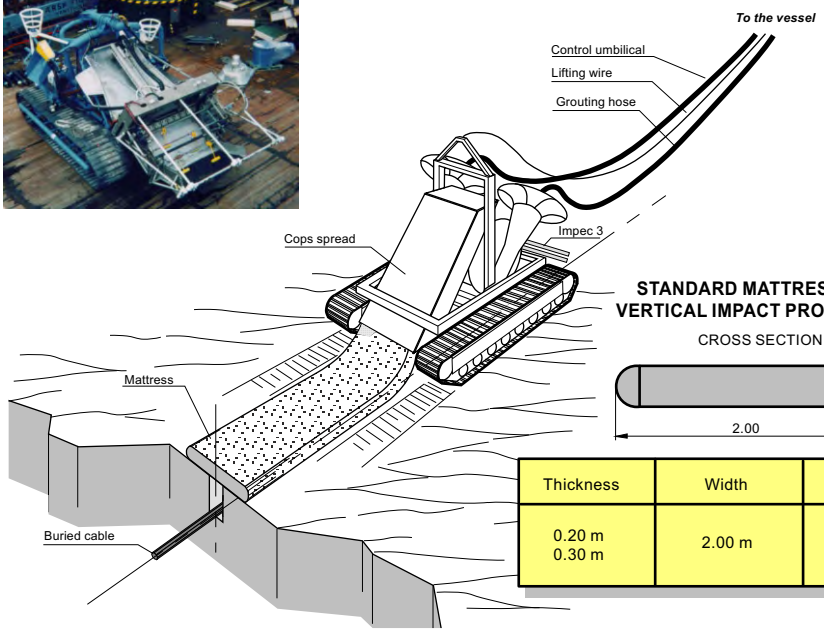
1996

Flexible and Flowline Cable Protection Vehicle

(continuous grout mattress protection)

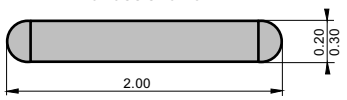
MAIN SPECIFICATIONS

Length O.A	7.00 m
Width O.A	5.50 m
Height O.A	4.20 m
Weight in air	15.9 tons
Weight in water	9 tons



STANDARD MATTRESS FOR VERTICAL IMPACT PROTECTION

CROSS SECTION



Thickness	Width	Submerged linear weight
0.20 m 0.30 m	2.00 m	360 kg / m 540 kg / m

MAT 008 H

Submarine Cable Installation

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9 - PROJECT DATA SHEETS

The following data sheets are describing main last projects completed for our Clients :

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Shore Ends Installation

2017

Quintillion Subsea Network in Alaska project
(fibre-optic cable)

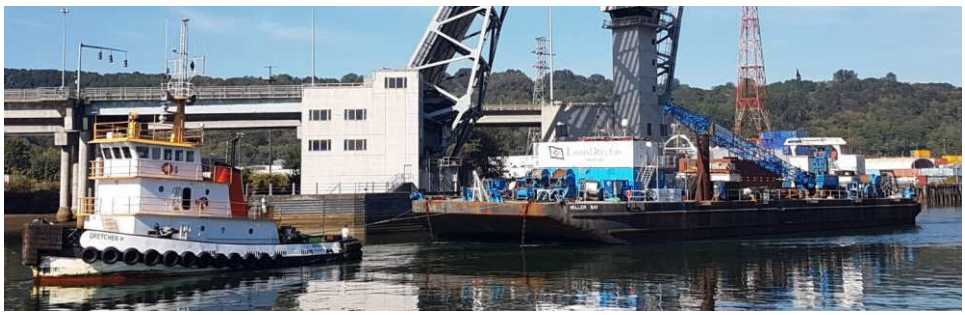
LOUIS DREYFUS TRAVOCEAN has performed a challenging shore end installation during summer 2017 on the north slope of Alaska for Alcatel Submarine Network.
The segment of 16 km installed is part of the first fiber optic network around Alaska : the Quintillion Subsea Network.

The timeframe for this installation was reduced to the open water season which is maximum 3 months in this area. The 260' main lay barge Miller Bay was mobilized in Seattle with a full spread of cable laying equipment, a vibrating plough ESV 12 and a set of mooring winches. The barge was brought to Alaska by towing tug Gretchen H and arrived 24th of July and able to start the work as soon as the ice has cleared the area. The barge was assisted by two anchor handling tugs Maggie M and Dana Cruz, and a very shallow water platform composed of a small barge and Alaskan based river tug Sag River.

The installation was completeted by mid-August in less than 3 weeks and the targeted burial depth of 2 meters was reached all the way.

This barge has been demobilized in Seattle mid-September

Schedule : June - September 2017



Submarine Cable Installation

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LouisDreyfus
TRAVOCEAN

Repair Work

2017

IFA 2000 - Power Link between France & UK (power cable)

LOUIS DREYFUS TRAVOCEAN repaired on behalf of RTE and National Grid 4 of the 8 submarine cables being part of the IFA2000 electrical link between France and England.

These cables are buried in pairs, and form 4 routes about 1 km apart from one another. The defaults concerned 2 of these cable routes and were located about 6 km off Folkestone, in 20 to 25 meters of water depth (LAT).

In addition to a guard ship and Crew Transfer Vessel based in Dover, LOUIS DREYFUS TRAVOCEAN chartered 3 support vessels with dynamic positioning:

– The Olympic Triton, was mobilized at the end of December 2016 in Dunkerque, with the ROVJET 806, the MED1 machine and a diving spread. Its role was to debury the cables, to prepare them to facilitate the work of the repair vessels, and then to protect the repaired cables.

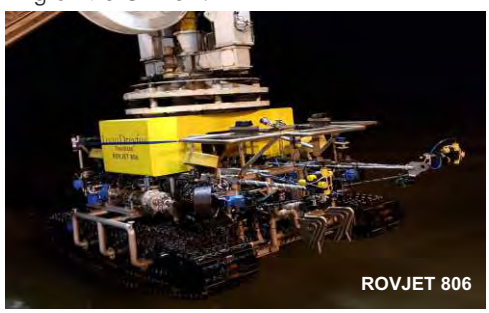
– The Siem N-Sea, was mobilized in Dunkirk in early January 2017, with 1800m of spare cable and repair equipment (cable chute, cable tank, cable way, tensioners, diving spread and ROV). It was charged with repairing a pair of cables.

– The Normand Flower, was mobilized as of the 20th of January 2017, with 1600m of spare cable and repair equipment (cable chute, cable tank, cable way, tensioners, and ROV). It was charged with repairing of the second pair of cables.

Offshore cable repair operations were carried out in parallel on both sites.

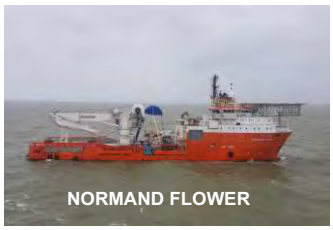
Schedule : End of November 2016 to beginning of March 2017

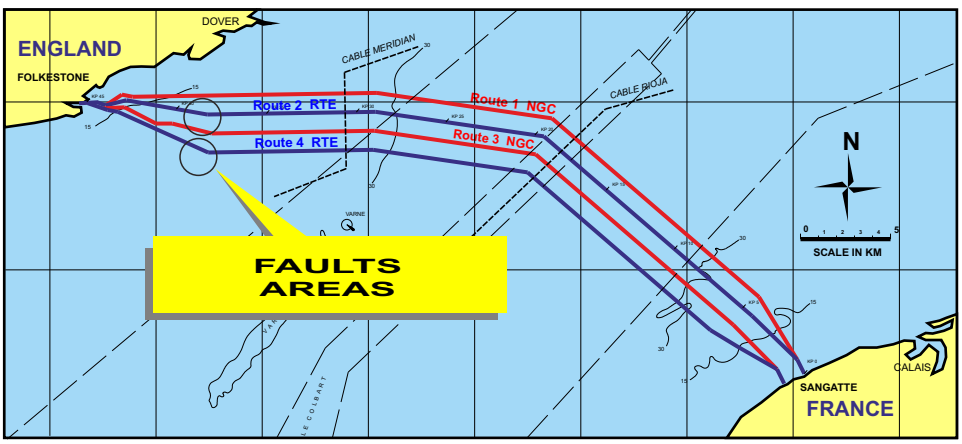

MED 1


ROVJET 806


SIEM N-SEA


OLYMPIC TRITON


NORMAND FLOWER



PRO 076 A

Submarine Cable Installation

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PLIB Work

2016

Veja Mate project
(power cable)

Veja Mate Offshore Windfarm is a project developed by Highland Group Holding Ltd. It consists of a windfarm of 67 windturbines of 6 MW each, totalling 402 MW, located in the North Sea 95km off island of Borkum in Germany.
Our client Siem offshore Contractors (SOC) was contracted the supply and installation of the infield cables, with an overall length of 97km.

LOUIS DREYFUS TRAVOCEAN has mobilised in May 2016, two new ROVs Leopard onboard the Siem Aimery, SOC cable installation vessel, as well as the ROVJET 810 for the post-lay burial of the infield cables.

In the continuity of the Nordsee One project, 73 cables of Veja Mate were successfully laid and then buried with the ROVJET 810 between October 2016 and January 2017, ten weeks ahead of schedule.

Schedule : between October 2016 / January 2017

Submarine Cable Installation

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PLIB Work

2016

Nordsee One project
(power cable)

Nordsee Offshore Windfarm is a project developed by Northland Power Inc and Innogy SE. It consists of a windfarm of 54 windturbines of 6.2 MW each, totalling 332 MW, located in the North Sea 40km north off island of Juist in Germany. Our client Siem offshore Contractors (SOC) was contracted the supply and installation of the infield cables, with an overall length of 70km.

LOUIS DREYFUS TRAVOCEAN has mobilised in May 2016, two new ROVs Leopard onboard the Siem Aimery, SOC cable installation vessel, as well as the ROVJET 810 for the post-lay burial of the infield cables.

The two work ROVs have provided assistance to the vessel's operations: touchdown monitoring during cable laying, cable pulling in the turbine foundations, or installation gravel bags.

The 59 cables were successfully laid and then buried with the ROVJET 810.

Schedule : between June / August 2016

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PLIB Work

2016

Marjan Gosp project
(power & fibre optic cables)

TRAVOCEAN MIDDLE EAST has been contracted by McDermott to provide personnel and equipment to carry out the trenching of 115 kV composite submarine cable from MARJAN GOSP 3 KP 31 to Transition Yard #4 (Safaniya mainland)in the Arabian Gulf off coast of Saudi Arabia.

LOUIS DREYFUS TRAVOCEAN TM03 trenching spread has been mobilised on the INTERMAC 406 cable installation shallow water barge operated by McDermott.

31km of composite submarine cable were buried at 1m depth of burial simultaneously with the laying.

Schedule : March/April 2016

Submarine Cable Installation

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Laying & Burial

2016

Al Nasr Qaffay Project
(power cable)

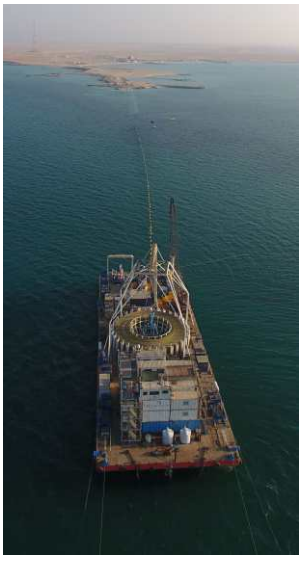
Al Qaffay island, in the UAE, is a private island located 26km off the western coasts of the Emirate of Abu Dhabi.

At the end of 2016, this island was connected to the mainland electricity grid through a 33kV link. Travocean Middle East performed the submarine cable part of this installation for the account of Al Nasr (contractor) and DEWA (final client).

The submarine cable, 40km long and 14cm of diameter was manufactured in Italy by Prysmian. A freighter, mv Han Yi, transported it to Abu Dhabi where it was transboarded to the 280' cable laying barge mobilized by Travocean Middle East. In addition to the cable laying equipment, TM04 trenching machine was mobilized onboard this barge. This machine, designed, built and operated by Louis Dreyfus Travocean is able to trench in the hard soils (Calcarenite) of the Arabic Gulf.
In order to guarantee the best progress of the barge and respect the challenging target of our clients to deliver the cable, 3 vessels were mobilized: the Shoalbuster Sea Delta and the 2 multicats Opua and Rebecca S.

The cable installation barge started at the Ras Musharib peninsula close to Sila, where 1600 meters of submarine cable have been pulled to shore in order to reach the substation. After the 40km of cable was laid and buried to the 1 meter target, the operation ended with the beach landing at Al Qaffay. The island representatives have welcomed the arrival of the submarine cable and will soon be able to switch off the generators…

Schedule : xxxxxxxxxxxxxxxxxx



Submarine Cable Installation

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Shore Ends Installation

2016

Fitzroy Darwin project
(fibre-optic cable)

In Febuary 2016, LOUIS DREYFUS TRAVOCEAN has been contracted by Alcatel Lucent Submarine Networks Ltd to perform a Direct shore end landing in Drawin for the Fitzroy project.

Darwin is located in Australia, Northern Territory. The Fitzroy project is a fiber optic network between Darwin and Port Hedland operated by Nextgen with links to oil and gas platforms. LOUIS DREYFUS TRAVOCEAN has previously performed the 2 x 44km separate shore end landing in Port Hedland, Western Australia, late 2015.

Darwin shore end consists of 3 km fo fiber optic cable installed from the shore to 20 m water depth through a 1 km directional drill.

The installation was performed using a 16 x 7 m barge locally chartered, fitted with 2 thrustmasters units. The work site, located just outside Darwin harbor, is characterized by a strong tidal current and changing weather conditions at this time of the year. Crossing the dry sand bar, right on the cable route, was also a challenge for this operation.

Once cable installed on the pre-defined route, the barge has been modified and the TO Mobile trencher was mobilized onboard. TO Mobile is a dedicated crawler fitted with jetting system. This machine is operated from surface and the water jets are powered with a deck water pump allowing 2 m burial depth target to be reached where the cable was not protected by HDD.

Schedule : January / Febuary 2016

Submarine Cable Installation

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TRAVOCEAN

Shore Ends Installation

2015 - 2016

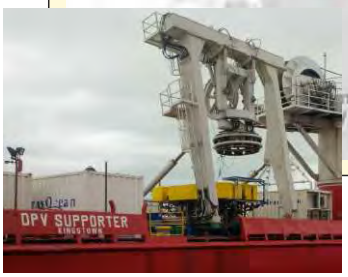
Sea Lion / Rostock project
(fibre-optic cable)

LOUIS DREYFUS TRAVOCEAN has been contracted by Alcatel Lucent Submarine Networks Ltd to perform the laying and burial operations of 2 sections of fibre optic cable for the Sea Lion system linking Santahamina in Finland to Rostock in Germany in the Baltic sea.The two sections of cables are following activities :

- Rostock, Germany, 9.7 km :
  - Separate shore-ends, laying, post burial and installation of articulated pipes
- Gedser Bank, Denmark, 8.2 km :
  - Laying and post burial in low water depths

LOUIS DREYFUS TRAVOCEAN performed the following activities :
- Engineering and project management
- Mobilisation in Dunkirk of ROVJET 404 onboard the vessel DPV Supporter
- Offshore operational phase :
  - Loading of the 2 lengths of cable in Calais
  - Transit to Gedser Bank, Denmark / calibration and tests
  - Installation and burial on Gedser Bank's site
  - Transit to Rostock
  - Installation, protection and burial on Rostock's site
  - Transit to Dunkirk
- Demobilisation of equipments
- Project documentation and final report including depth of burial for each section of cable

Schedule : November 2015 to January 2016



Submarine Cable Installation

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Shore Ends Installation

2016

BBG Fujairah project
(fibre optic cable)

BBG is a 9 segments repeated cable system that routes from Malaysia to the UAE with a number of landings in Malaysia, India, Sri lanka, Oman and UAE.

TRAVOCEAN Middle East has been contracted by Alcatel Lucent to provide beach support services for landing and cable protection works for the Fujairah shore end (UAE).

The scope of work was :
- Perform preparatory works on the beach
- Assist the main lay vessel for cable pulling operations
- Pull the cable from the main lay vessel to the BMH
- Post lay diver swim video survey
- Bury the cable on the beach as specified using excavators on sand conditions
- Install artic pipes and bury the cable at 2 m target depth by jetting in soft soil conditions where feasible
- Install earth plates systems
- Post-burial diver swim video survey
- Document the as-laid / as buried position of cables as required

Schedule : between 31st december 2015 and12th january 2016

Submarine Cable Installation

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PLIB Work

2015

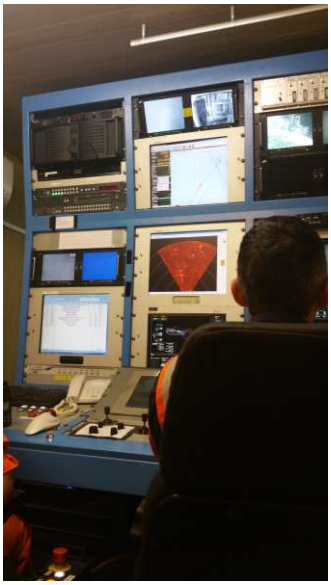
Manifa project
(power & fibre optic cables)

TRAVOCEAN Middle East has been contracted by Mermaid Subsea Services LLc to provide personnel and equipment to carry out the trenching of
3 x 15 kV power submarine cables and 2 optic fiber cables, in the Manifa field situated in the Arabian Gulf off coast of Saudi Arabia.

LOUIS DREYFUS TRAVOCEAN TM03 trenching spread has been mobilized on the Mubarak Supporter cable installation barge.

In maximum 7.5 m water depth LAT, the total of 23.5 km of power submarine cables and 13.5 km of optic fiber cables were buried with a trench depth deeper than 1 m.

Schedule : October / November 2015



Submarine Cable Installation

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Laying & Burial

2015

Fitzroy Port Hedland project
(fibre optic cables)

The FITZROY project is the installation of the North West Cable System that forms a key component to one of Australia's largest nationwide fibre optic networks (17,000 km), developed by Nextgen Group to provide ultra-speed data networking to the northern and western regions of Australia.

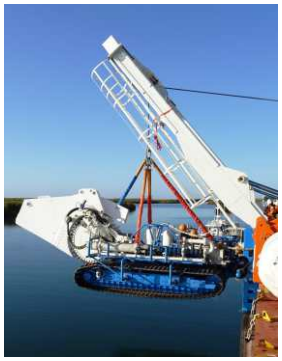
LOUIS DREYFUS TRAVOCEAN has been awarded by Alcatel-Lucent Submarine Networks Ltd to perform 2x44 km separate shore end landings located in Port Hedland. A second landing has been performed in 2016 in Darwin as part of this contract.

Cable installation works in Port Hedland took place between the 9th of September and the 5th of October. A cable laying barge and two tugs were mobilized in Onslow to perform both separate shore end landings.

LOUIS DREYFUS TRAVOCEAN performed to following activites :

- Mobilisation of TM 04 trencher spread onboard the barge
- Loading of approx. 90 km of cable onboard the barge
- Double 44 km cable installation with simultaneous laying and trenching burial at 0.5 m (both cables in the same trench) in hard soil conditions / Calcarenite from the HDD (2 x 1000 m) entrances to the 10 m depth contour.
- Surface lay with a minimum 5 m separation between both cables until the 15 m depth contour (at KP 44.604).
- Installation of 200 m of articulated pipes.

Schedule : September - October 2015



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Surface Laying

2015

Ile d'Yeu project (Yeu3, Yeu4, Yeu5)
(power cable)

The Ile d'Yeu (Vendée, France) is supplied with electricity from the mainland by 3 cables, called YEU3,YEU4 and YEU5.

YEU3 and YEU4 cables have been mechanically damaged, and ERDF has decided to replace two sections, 3000 m on YEU3 and 1800 m on YEU4.

ERDF has awarded LOUIS DREYFUS TRAVOCEAN for the management of the cable drums, the on-site transport and the installation of submarine cables on 2 km from the shore.

These new sections have been installed between the 19th and the24th of September 2015 : each section of cable has been floated and towed up by boats along the route, the floats have been removed and the cable has sunk into its final position on the bottom.

Schedule : September 2015

Submarine Cable Installation

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PLIB Work

2015

Abu Ali project
(power cable)

TRAVOCEAN Middle East has been contracted by Mc Dermott Arabia Company Ltd to provide personnel and equipment to carry out the trenching of 2 x 230 kV cables from Abu Ali Island to Khursaniyah fields shore in the Arabian Gulf.

LOUIS DREYFUS TRAVOCEAN TM03 trenching spread has been mobilized on the INT406 cable installation barge in Jebel Ali in March 2015.

The trenching operations were performed between April and June 2015 and a total of 2 x 5.9 km of cable was buried, in maximum 7.5 m water depth LAT.

Schedule : April - June 2015

Submarine Cable Installation

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PLIB Work

2015

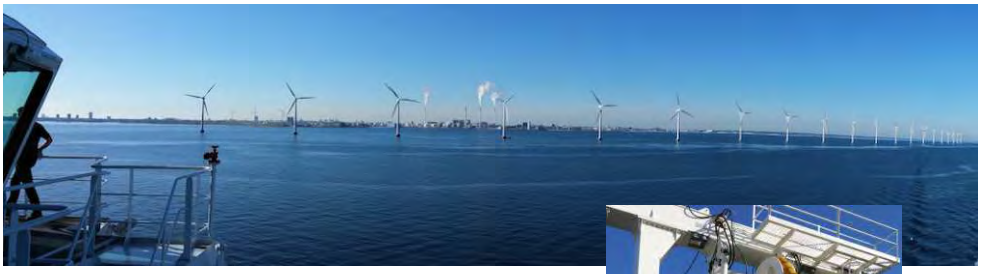
Baltic 2 Offshore Windfarm project
(power cable)

The Baltic 2 Offshore Windfarm in Germany comprises 80 turbines of 3.6 MW, resulting in a total production capacity for the windfarm of 288 MW. This project developed by EnBW is located in the Baltic Sea, approximately 30 km North of the island of Rügen.

Siem Offshore Contractors has subcontracted LOUIS DREYFUS TRAVOCEAN for the post-lay burial in soft soils of 75 infield cables, over a distance of 61 km approx.

For these operations, LOUIS DREYFUS TRAVOCEAN mobilized the ROVJET 806 onboard the Siem Garnet.

Schedule : March to May 2015



Submarine Cable Installation

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PLIB Work

2015

Amrumbank Offshore Windfarm project
(power cable)

The Amrumbank Offshore Windfarm comprises 80 turbines of 3.6 MW, resulting in a total production capacity for the windfarm of 288 MW. This project developed by Eon is located approximately 45 km North of the island of Helgoland in the North Sea.

Siem Offshore Contrators has subcontracted LOUIS DREYFUS TRAVOCEAN for the post-lay burial of the 86 infield cables (burial depth 1.60 m), over a distance of 75 km approx.

For these operations, LOUIS DREYFUS TRAVOCEAN mobilized the ROVJET 810 onboard the Siddis Mariner.

Schedule : April 2014 to April 2015

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Laying & Burial

2015

Quiberon-Belle-île project
(power cable and fibre-optic)

LOUIS DREYFUS TRAVOCEAN was awarded by ERDF the cable installation of a power cable between Belle-île and Quiberon. For the provision of the contracted services, LOUIS DREYFUS TRAVOCEAN utilized the DP2 vessel «Vos Sympathy». The vessel was mobilized in LOUIS DREYFUS TRAVOCEAN facilities in Dunkirk, cable loading was completed in Nordenham (Germany) followed by the installation of the 15km of cable between Port Maria on the mainland and Port Jean.
Echoscope has been used to monitor the touchdown of the cable on the seabed. Using the sonar, the operator was able to visualise in real time the cable's catenary and touchdown point in three dimensions as it was being laid

All of the operations were completed successfully and on schedule.

Schedule : Febuary / March 2015

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PLIB Work

2015

Wasit project
(power cable)

TRAVOCEAN Middle East has been contracted by SUBTECH Ltd to perform a submarine power cable post lay trenching operation in the Arabia & Hasbah field in Saudi Arabia. Subtech is contracted by SAIPEM and the final client is SAUDI ARAMCO. The cable was laid prior to trenching from the Wasit power station onshore to IPP platform.

The Louis Dreyfus Travocean TM04 trenching spread has been mobilized on the Mubarak Carrier barge (62x27m) end of 2014 in Dubai Maritime City. 8.5 km of power cable (Ø 110mm) was buried from 34 meters of water depth to the shore. The target of burial (up to 1m, depending on the water depth) was reached in hard sea bed conditions.

The Wasit project was completed end of january 2015 with the shore approach. To perform this very shallow part, the trencher was operated from a pontoon on which was mobilized the control of machine and generator. This very shallow water operation was completed within 2 days for 1200 meters of trenching, including launching of the pontoon and transit back to main trenching barge.

Schedule : December 2014 end of January 2015

Submarine Cable Installation

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PLIB Work

2014

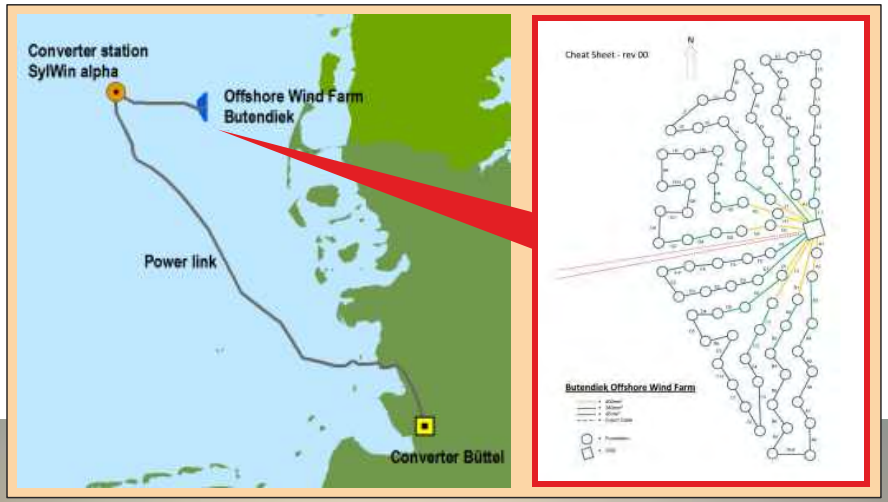
Butendiek Offshore Windfarm project
(power cable)

The Butendiek Offshore Windfarm comprises 80 turbines of 3.6 MW, resulting in a total production capacity for the windfarm of 288 MW. This project developed by WPD is located approximately 32km west of the island of Sylt in the North Sea.

VBMS has subcntracted LOUIS DREYFUS TRAVOCEAN for the post-lay burial and survey of the 86 infield cables, over a distance of 80km approx.

For these operations, LOUIS DREYFUS TRAVOCEAN mobilized the ROVJET 806 onboard the Topaz Commander.

Schedule : June to November 2014



Submarine Cable Installation

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PLIB Work

2014

Safaniya 2 project
(power cable)

TRAVOCEAN Middle East has been contracted by Mc Dermott Arabia Company Ltd to perform a submarine power composite cable trenching project in the Safaniya 2 Oil Field in KSA with Saudi Aramco as final client.

For this work,TRAVOCEAN has proposed a specific burial spread taking into account the specific conditions of the field which is crossing some environmental sensitive areas with shallow water zones (less than 7.5 m) and hard soil conditions (calcarenite).

Louis Dreyfus Travocean's 30 t trencher crawler TM03, fitted with a 1.30 m cutting wheel, has been mobilised onboard the INT406 cable installation barge to perform these post-lay trenching services.

The scope of work was the following :
- Provide the cable trenching spread including TM03 trencher, 1x control room, 1x workshop, 1x rigging and 1x spare parts container.
- Mobilisation/demobilisation of the burial equipment at Mc Dermott yard in Jebel Ali (Dubai).
- Operating of trenching equipment including provision of personnel and spare parts.

Schedule : September - October 2014

Submarine Cable Installation

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PLIB Work

2014

Wintershall project
(umbilical)

Wintershall Noordzee B.V. as operator of a gas production field located in Dutch North Sea territorial waters, has installed a new well unit in this field. This remote unit is controled and powered from the main operational platform by an umbilical, which installation was awared to VBMS.

VBMS has subcontracted LOUIS DREYFUS TRAVOCEAN for the post-lay burial and survey of this 19km umbilical with the ROVJET 806 onboard thr Topaz Commander

Schedule : july 2014

PRO 060 A

Submarine Cable Installation

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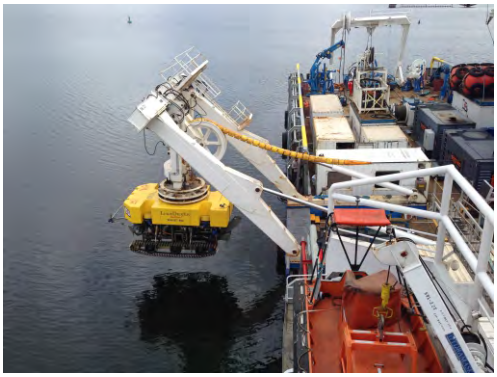
In situ trials

2014

Eolien Maritime France - EMF project
(trenching trials)

As part of preparation of the call for tenders for the construction works of french offshore windfarms, Eolien Maritime france (EMF) has awarded to LOUIS DREYFUS TRAVOCEAN the performance of trenching trials on 3 sites of Fécamp, Courseulles and Saint-Nazaire (French).

These trials were used to evaluate and quantify the performance of different trenching tools in various soil conditions and to deduce a protection methodology for the future infield cables of these windfarms.



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Laying & Burial

2013

Perenco RDC Congorep project
(power/FO cables)

The aim of the Perenco project was the installation of the following power/FO cables in DRC and Congorep for Perenco (MIOC and Congorep subsidiaries) :

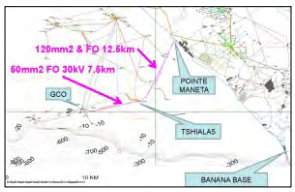
- Congorep / Pointe Noire :
  - 120mm² 33kV power/FO cable laying and burial from platform to platform on 23 km - water depth between 60 to 100m LAT

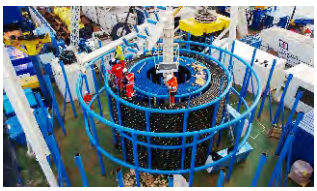
- MIOC / DRC :
  - 120mm² 33kV power/FO cable laying and burial from onshore facilities (Pointe Matena) to Tshiala 5 platform for a length of 12.5km - water depth between 0 to 9m LAT
  - 50mm² 33kV power/FO cable laying and burial extension from Tshiala 5 platform to GCO platform with a length of 8km - water depth between 9 to 18m LAT

The RDC field is characterized by a strong sustained current (up to 7Kts), long swell and shallow water (range from 0 to 18m LAT)

LOUIS DREYFUS TRAVOCEAN performed the following activities :
- Mobilization of ROVJET 806 and EBJ onboard the support spread Stemat 89 in Dunkirk
- Transit to loading place (NSW factory/Nordenham/Germany)
- Cable loading
- Transit from Europe to Africa
- Cable lay & burial as per agreed specifications including shore pull for RDC operation and J-tube pull in including temporary securing of the cables at platform deck level
- Uraduct type / cable protection system installation on crossings
- Transit from Africa to Europe

Schedule : October 2013 to April 2014





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Laying & Burial

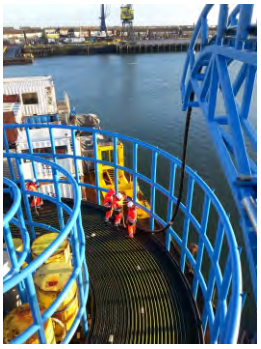
2013

Geocean-Benin-Seme Field Redevelopment project
(power cable)

LOUIS DREYFUS TRAVOCEAN has completed a power cable installation for the Seme Field Redevelopment Project in Benin for Geocean.
The barge Stemat 81 and the AHT/Multicat Nova K were chartered and mobilized for the operations.

LOUIS DREYFUS TRAVOCEAN's scope of work has been contracted to install, protect, and bury up to 8 m LAT the submarine power cable, linking Seme oilfield OPF with the CSP (drilling rig) and provide the following services :

- Engineering and project management
- Reporting and documentation
- Pre-offshore operations :
  - Pre-mobilization engineering activity
  - Turn table engineering and fabrication
  - Stemat 81 and Nova K mobilization in Dunkirk
  - Cable loading of 14 km at JDR factory Hartlepool UK
  - Transit to Benin (West Africa)
- Offshore operations :
  - Transit to worksite, complete sea trials
  - Complete installation, protection and trenching operations
- Onshore operations :
  - Beach preparation for pulling
  - Cable pulling
  - Cable protection works
  - Beach reinstatement
- Post offshore operations :
  - Transit back to Europe
  - Demobilization
  - Prepare and submit « as-built report »



Schedule :
Overall operation : October 2013 to April 2014
Cable installation : January 2014

Submarine Cable Installation

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Shore Ends Installation

2013

AMX -1 project
(fibre-optic cable)

LOUIS DREYFUS TRAVOCEAN has been contracted by Alcatel Lucent to perform the separate shore end landing, inshore and beach works for the 2 AMX-1 separate shore and landings located in Cartagena & Barranquilla- Colombia within the network of submarine cables American Movil.
A cable laying barge and two tugs were mobilized in Cartagena to perform both separate shore end landings. The two cable ends were made available for the cable ship "Ile de Bréhat " & "Ile de Batz " in charge of the main lay on the different segment.

The scope of works was :

- Engineering and project Management

- Reporting and documentation

- Pre-offshore operations :
  - pre-mobilisation engineering activity
  - vessel mobilisation in Coremar Offshore Base, Cartagena

- Offshore operations :
  - Load the 14.4 km of cable in Cartagena
  - Transit to offshore site, complete calibrations and checks
  - Complete installation, protection and trenching operations
  - Transit to offshore site in Barranquilla, complete calibrations and checks
  - Complete installation, protection and trenching operations in Barranquilla

- Post-offshore operations :
  - Prepare and submit "as built " report

Schedule : August to September 2013

Submarine Cable Installation

Etablissement de Marseille

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PLIB Work

2013

London Array Offshore Windfarm project
(power cable)

The London Array Offshore Windfarm consists in 175 turbines, bringing th fields capacity to 630 MW total production.

The project has been developed by London Array Ltd, formed by E.ON, DONG Energy, La Caisse de dépôt et placement du Québec and Masdar. The project is located approximately 20 km (12 miles) from the Kent and Essex coasts in the outer Thames Estuary.

Visser & Smit Marine Contracting BV has subcontracted LOUIS DREYFUS TRAVOCEAN for the post-lay burial and survey of 54 infield cables in very shallow water condition.

LOUIS DREYFUS TRAVOCEAN mobilized and operated the ROVJET 605 VSW, an ROV jetting specially designed for trenching and inspection in very shallow water.

Schedule : March to September 2013

Submarine Cable Installation

Etablissement de Marseille

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PLIB Work

2013

Anholt Offshore Windfarm project
(power cable)

The Anholt Offshore Windfarm is a 111 turbines project developed by DONG Energy and located in the Kattegat sea, East of Denmark. The windfarm is designed to deliver 400 MW.

The internal distribution grid of the windfarm is made of 111 cables with a total length of 142 km. While Visser & Smit Marine Contracting BV was responsible for the laying operation of these array cables, LOUIS DREYFUS TRAVOCEAN performed their post-lay burial and survey at a 1.50 m target burial depth.

LOUIS DREYFUS TRAVOCEAN mobilized the ROVJET 806 operated from a Dp2 vessel for these burials works.

Schedule : July 2012 to Febuary 2013

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Laying & Burial

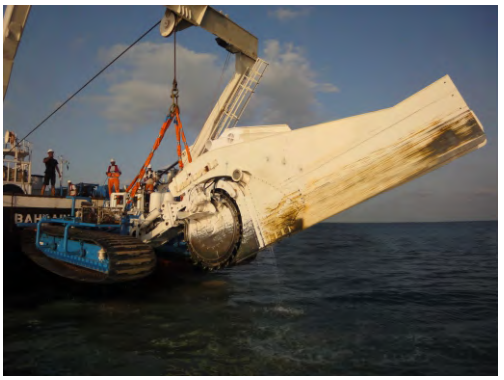
2012 - 2013

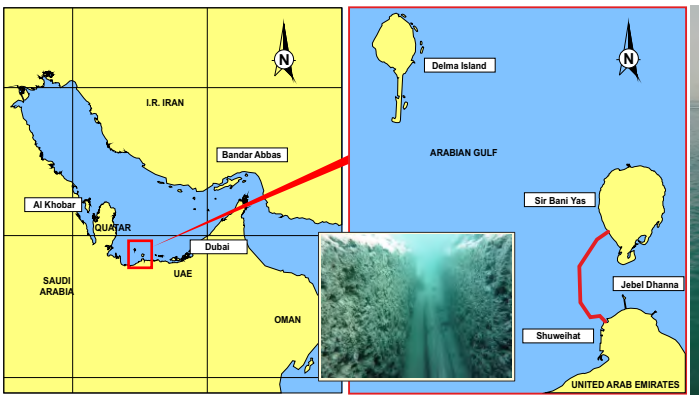
VISCAS-SIR BANI YAS project
(2 power and 2 fiber optic cables)

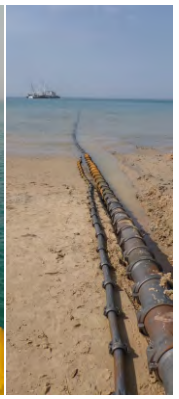
The Sir Bani Yas project was located about 200 km north of Abu Dhabi (UAE).
The project purpose was the installation for four submarines cables connecting Shuweilhat to Sir Bani Yas Island.
Two 220 mm power cables and two fiber optic cables were installed in three separates trenches for a total weight of 2100 tons of cable.

LOUIS DREYFUS TRAVOCEAN was in charge of :
- Overall project management
- Cable route survey and desktop study
- Cable route engineering
- Provide suitable naval supports for cable installation (main lay barge with associated shallow draft multi purpose vessel and tug boat for towing and anchor handling purpose)
- Provide the TM04 trenching spread including trencher, control room, workshop, rigging and spare parts containers, and 30 tons launch and recovery system
- Provide the cable laying system installed onboard main lay barge : two linear cable engine with control cabin, deck rollers, cable gantry and cable chute
- Provide trained personnel
- Cable loading from freighter
- Cable installation and burial along the routes
- Shore pulls, beach excavation and cable protection works
- Charting

The project started in September 2012 with the mobilization of the cable laying barge and was completed in May 2013







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Shore Ends Installation

2012

CAT project
(fibre-optic cable)

LD TRAVOCEAN has been awarded the contract by Alcatel Lucent to perform the separate shore end landing, inshore protection and beach works for 2 fibre-optic cables located in Bang Lamung & Songkhla.
The CAT Submarine Network (CSN) is a repeatered cable system, connecting the two landings to a number of offshore rigs.

The scope of works was :

- Engineering & project management

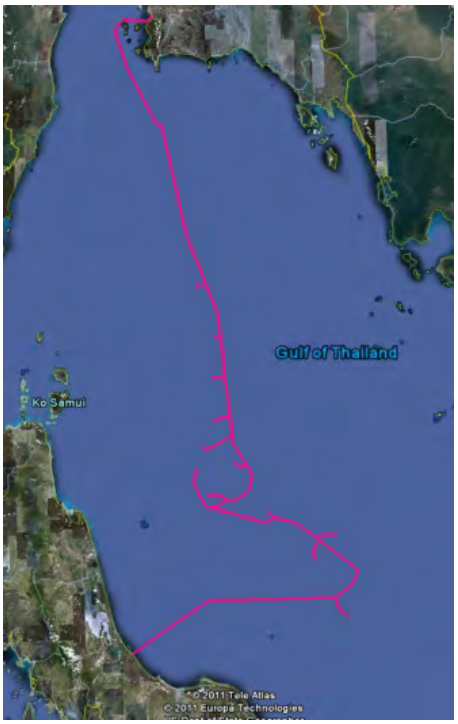
- Reporting & documentation

- Pre offshore operations :
  - pre mobilisation engineering activity
  - barge mobilisation in Singapore

- Offshore operations :
  - Load the 27 km of cable in Singapore
  - Transit to offshore site in Songkhla, complete calibrations and checks
  - Complete installation, protection and trenching operations in Songkhla
  - Transit to Bang Lamung, complete calibrations and checks
  - Complete installation, protection and trenching operations
  - Transit barge back to Singapore and demobilise spread

- Post offshore operations :
  - Prepare and submit "as built " report

Schedule : April 2012 to July 2012



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PLIB Work

2012

Thornton Bank Offshore Windfarm project
(power cable)

Thornton Bank Offshore Windfarm is a 54-turbines project designed to deliver 325 MW to Belgium. It has been developed by C-Power, a Consortium of Belgian and international shareholders, including EDF EN, DEME, RWE Innogy.

2 parallel 150 kV export cables each 35 km approx. deliver the produced power to shore. While Visser & Smit Marine Contracting BV was responsible for the laying operation of the second cable, LD TRAVOCEAN performed its post-lay burial and survey at a 1.50 m target burial depth.

LD TRAVOCEAN mobilized 2 different burial spreads :
- the ROVJET 605 operated from a barge for the shallow waters on 10 km
- the ROVJET 806 operated from a DP2 vessel for the offshore part of the route.

Schedule : April to August 2012

Submarine Cable Installation

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Laying & Burial

2012

E.D.F. Paimpol-Bréhat project
(power cable)

EDF is developing a tidal generation project located 16 km offshore NE of Paimpol, France.The project will initially comprise 4 seabed tidal turbines and a seabed offshore substation containing an AC/DC converter module. The turbines/converter will be locally inter-connected by secondary umbilicals.A main cable totalling 16 km will export power from the converter module to the shore, making landfall in the "Anse de Launay" and connecting to a converter/substation 120 m inland of the High Water Mark.

LD TRAVOCEAN has been awarded by EDF of the contract for the installation of the main DC cable, and has proposed a specific lay and burial spread dedicated to the shallow water area and high current working zone. Cable protection has been done with the burial on the 1st 5 km and Articulated Pipes protection installation on 10 km taking into account the specific soil conditions of the area which is crossing several types of seabed.

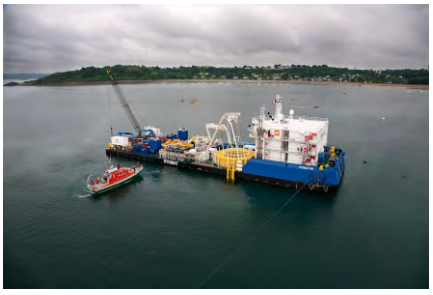
LD TRAVOCEAN has performed and completed the following activities :

- Overall project management as required for execution of the work

- Engineering studies and spread preparation

- Provide suitable naval supports for cable installation (Main Lay Barge with associated shallow draft Multi Purpose Vessel and Tug Boat for towing and anchor handling purpose)

- Provide the TM03 trenching spread including trencher, control room, workshop, rigging and spare parts containers, with 30 tons Launch And Recovery System



- Provide the cable laying system installed onboard Main Lay Barge : two Linear Cable Engine with control cabin, deck rollers, cable gantry and cable chute

- Design and mobilization of articulated pipes installation line onboard the barge

- Cable loading from factory and transport

- Cable lay and burial along the route including shore pull and final cable end abandon

Schedule : June - July 2012

Submarine Cable Installation

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PLIB Work

2011

Walney Offshore Windfarm 2 project
(power cable)

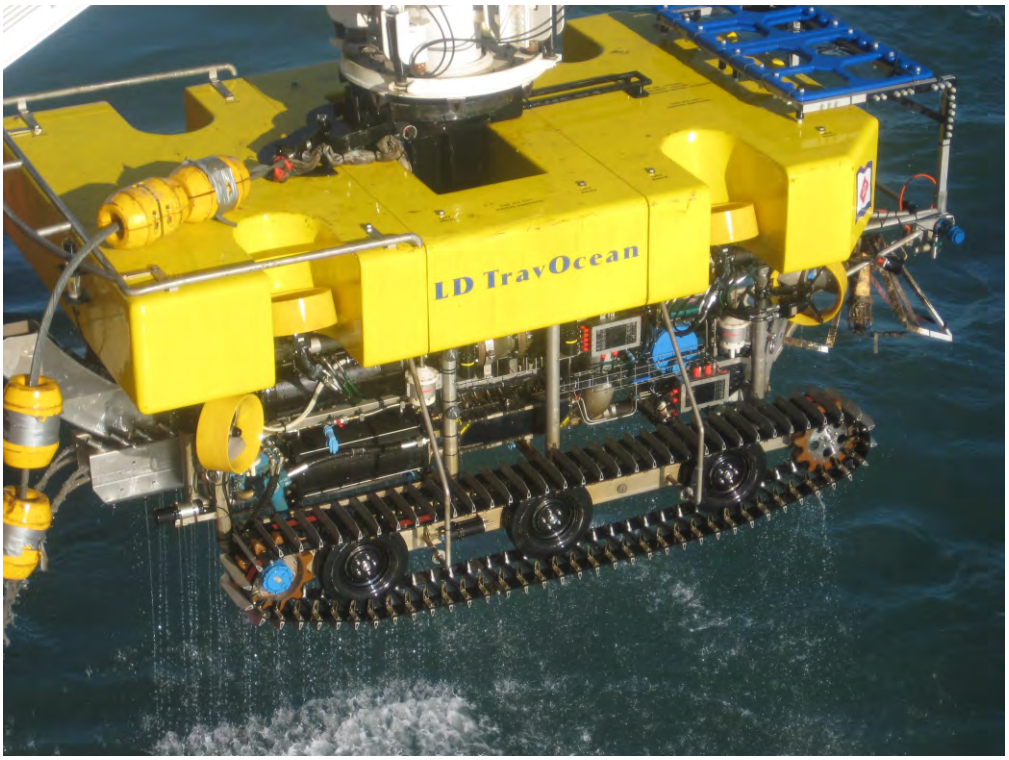
The Walney Offshore Windfarm phase 2 is replica of phase 1. It consists in 51 turbines of 3.6 MW each, bringing Walney field capacity to 367 MW total production.

The project has been developed by Walney (UK) Offshore Windfarms Ltd, formed by DONG Energy and Scottissh Southern Energy.

Visser & Smit Marine Contracting BV, responsible for the installation of 51 infields cables, has subcontracted LD TRAVOCEAN for the post-lay burial and survey with 2 m target burial depth.

As for Walney 1 project, LD TRAVOCEAN mobilized and operated the 605 ROVJET for the burial and inspection operations on 50 km of cable mechanical protection to the foot of the turbines.

Schedule : July 2011 to January 2012



Submarine Cable Installation

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Shore Ends Installation

2011

ACE project
(fibre-optic cable)

LD TRAVOCEAN has been contracted by Alcatel Lucent to provide support services for the landing and protection works for 2 direct shore-ends in Dakar, Senegal as a part of African Coast to Europe (ACE) submarine cable system.

The scope of works was :
- Diver swim and beach video surveys
- Shore end landing operation, pulling into BMH and seabed positionning of the cable
- Post-lay manipulation of the cable to ensure zero significant suspension and conformance across the seabed along the planned installation route
- Protection of the shore end cable with either articulated pipes, grout bags, anchor clamps, burial by jetting for each landing site
- Documentation: burial depth for the whole route for each cable

Schedule : August 2011 to October 2011

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Repair Work

2011

DELMA Repair project
(power cable)

LD TRAVOCEAN has been contracted by Nexans to provide submarine power cable repair assistance on the link between Shuweihat and Delma (UAE), where a fault occurred at the crossing with an existing pipe (in 6 m water depth LAT).

The scope of works was:
- Recovery of a spare cable length (which was stored in 30 m water depth near the link)
- Transportation of this length to work site with floats
- Cable repair assistance services
- Installation of 25 m of Uraduct on pipe crossing
- Post burial of 90 m at 1 m target (with divers)

For this work, LD TRAVOCEAN has chartered the following support vessels:
- Barge Kathleen Ann (4 points mooring system)
- Tug Grouper Ann
- Anchor handling tug Manta Ann
- Supply vessel Setia Tepag (for accommodation and logistics)

Schedule : End of May 2011 to beginning of July 2011

Submarine Cable Installation

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PLIB Work

2011

Ormonde Offshore Windfarm project
(power cable)

Ormonde Offshore Windfarm consists in 30 turbines of 5 MW. This project, located about 10 km west of Walney Island in the Irish Sea (Cumbria, UK), has been developed by Ormonde Energy Limited, part of the Swedish group Vattenfall.

Visser & Smit Marine Contracting BV, responsible for the installation of cables 32 cross-wind turbines, has awarded the contract to LD TRAVOCEAN for a 2 m target burial depth.

LD TRAVOCEAN mobilized and operated the ROVJET 605, an jetting ROV specially designed for trenching and inspection of 19.3 km of array cables.

Schedule : April 2011 to January 2012

Submarine Cable Installation

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Laying & Burial

2011

KASHAGAN 2011 project
(power/FO and Umbilical cables)

LD TRAVOCEAN Kazakstan LLP has completed the Sonsub Project "Kashagan flexibles EPC 2 / EPC 3 / EPC 4 installation 2011 Campaign" which is part of the SAIPEM activities and infrastructure in the Caspian sea.

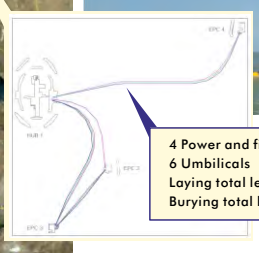
In addition to the pipeline installation, some cables and umbilicals have been installed during the 2011 flexibles campaign. The project specifications for the supply of the cable lay and burial services for the installation of flexible products at Kashagan field were:

- EPC 2 / EPC 3 installation:
  - Cables lay and burial services

- EPC 4 installation:
  - Assistance for flexibles transpooling operation, from storage reels to turntable onboard the Caspian Spider at ERSAI base (Kuryk).
  - Cables lay and burial services for the installation of EPC 4 flexible products at Kashagan field.

LD TRAVOCEAN has performed and completed the following activities:
- Delivery of TM03 burial spread in Kuryk for mobilisation onboard Caspian Spider barge
- Provide necessary personnel for project needs
- Operating of the laying and burial spreads equipment to protect ten flexibles with min. burial depth specification of 2 m and associated reporting

Schedule : March 2011 to September 2011



4 Power and fibre-optic cables	Ø100 - Ø107
6 Umbilicals	Ø171 - Ø155
Laying total length	41 km
Burying total length	34 km

Submarine Cable Installation

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Shore Ends Installation

2011

WACS project
(fibre optic cable)

LD TRAVOCEAN 's scope of work was to install, protect and bury 3 WACS project fibre optic cables. The project consisted in 2 separate shore end landings in Muanda (Congo Kinshasa) and Matombi (Congo Brazzaville) and 1 direct shore end in Cabo Ledo (Angola).

LD TRAVOCEAN provide the following services :
- Engineering and project management
- Reporting and documentation
- Pre-offshore operations :
  - Pre-mobilisation engineering activity
  - Vessel mobilisation in Pointe Noire, Congo Brazzaville
- Offshore operations :
  - Load the 38 km of fibre optic cable length in Pointe Noire
  - Transit to Muanda (Congo Kinshasa), complete calibrations and checks
  - Complete installation, protection and trenching operations in Muanda
  - Transit vessel back to Pointe Noire (Congo Brazzaville)
  - Transit to offshore site, complete calibrations and checks
  - Complete installation, protection and trenching operations in Matombi
  - Transit vessel back to Pointe Noire and demobilize spread
- Post-offshore operations :
  - Prepare and submit " as-built " report

To perform this operation the following equipments were dispatched to PNR and were mobilized on DP2 barge locally :
- 6 mooring winches
- launch and recovery system
- TJV05, jetting towed sledge
- diving spread
- shallow water spread

Schedule : January to June 2011

Submarine Cable Installation

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PLIB Work

2011

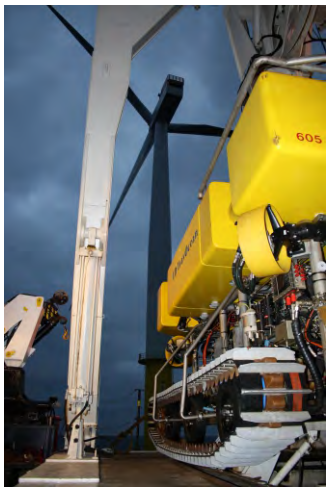
Walney Offshore Windfarm 1 project
(power cable)

The Walney Offshore Windfarm phase 1 consists in 51 turbines of 3.6 MW each, located approximately 15 km off Walney Island, Cumbria, in the Irish Sea in the U.K.
The project has been developed by Walney (U.K.) Offshore Windfarms Ltd, formed by DONG Energy and Scottish Southern Energy.

LD TRAVOCEAN has been subcontracted the post-lay burial and survey of the 51 infield cables (40km approx.) by Visser & Smit Marine Contracting BV as part of the infield cable installation works.

The ROVJET 605 was used to achieve the required 2 meters burial depth. ROVJET 605 is part of ROV 600 series, fully designed, constructed and operated by LD TRAVOCEAN for the inspection and burial of cables.

Schedule : August 2010 to Febuary 2011



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Shore Ends Installation

2010

Honotua project

(Bora bora, Huaihina, Raiatea, Moorea, Papenoo x2, Hawaii)

LD TRAVOCEAN has been contracted by Alcatel Lucent to provide support services for the lading and protection works for 6 direct shore-ends of optic cables (Honotua Cable System : interconnection between French Polynesia islands, and between French Polynesia and Hawaii).

The scope of work was :
- An initial (Pre-lay) diver swim and beach video survey.
- Shore end landing operation, pulling into BMH and seabed positioning of the cable
- An intermediate (Post-pulling/Pre-burial) diver swim and beach video.
- Post-lay manipulation of the cable to ensure zero significant suspensions and conformance across the seabed along the planned installation route.
- Protection of the shore end cable with either articulated pipes, grout bags, anchor clamps, burial by jetting or other reqirements for each landing site.
- A final (Post-operations/Post burial) diver swim and beach video survey.
- Documentation : burial depth for the whole route and for each cable.

Schedule : November 2009 to March 2010

Submarine Cable Installation

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Shore Ends Installation

2010

IMEWE / MENA / TEN / EIG project

(Egypt, Lebanon, France, Saudi Arabia, Monaco)

The series of shore ends intallations concerns different place during years 2009 and 2010 :
- 1 shore end in Tripoli-Lebanon
- 2 shore ends in Jeddah-Saudi Arabia
- 2 shore ends in Marseilles-France
- 1 sore end in Monaco
- 5 shore ends in Alexandra-Egypt
- 1 shore end in Suez-Egypt

The scope of work was :
- An initial (Pre-lay) diver swim and beach video survey.
- Shore end landing operation, pulling into BMH and seabed positioning of cable.
- An intermediate (Post-pulling/Pre-burial) diver swim and beach video.
- Post-lay manipulation of the cable to ensure zero significant suspensions and conformance across the seabed along the planned installation route.
- Protection of the shore end cable with either articulated pipes, grout bags, anchor clamps, burial by jetting or other requirements for each landing site.
- A final (Post-operations/Post-burial) diver swim and beach video survey.
- Documentation : burial depth for the whole route and for each cable.

As burial system LD TRAVOCEAN has used :
- EBJ jetting towed sledge
- T.O. Mobile jetting crawler

Schedule : September 2009 to July 2010

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Laying & Burial

2010

MANIFA project
(Power cable)

TRAVOCEAN Middle East has been contracted by VALENTINE MARITIME SAUDI LIMITED to perform Power Cables laying and trenching sevices in Manifa Oil Field in KSA with Saudi Aramco as final client.
For this work, TRAVOCEAN has propsed a specific burial spread taking into account the specific conditions of the field which is crossing some environmental sensitive areas with shallow water zones (approx. 6 to 11m) and hard soil conditions (calcarenite).TM04 LD TAVOCEAN trencher has been used to perform the power cables protection on areas below 7.50 m water depth.

The scope of work was the following :
- Laying of six power cable segments between Drill Sites facilities and offshore platforms.
- Simultaneously burial of the cables where the water depth was less than 7.50 m below the Lowest Astronomical Tide (LAT).
- 30 km of power cables (OD 109mm) where laid with 14 km buried in hard soil conditions.

TRAVOCEAN Middle East has performed and completed the following activities:
- Provide the cable trenching spread including TM04 trencher, 1 control room, 1 workshop, 1 rigging and 1 spare parts container, 30 tons A-Frame and associated handling system.
- Provide the cable laying system to be installes onboard Maridive Constructor barge: 2 Linear Cable Engine with control cabin, deck rollers, cable gantry, cable chute.
- Provision of personnel for assembly and loading of equipment onboard Maridive Constructor barge.
- Mobilisation/demobilisation of burial equipments at VALENTINE yard in Mussafah (UAE).
- Operating of the laying (Linear Cable Engine) and burial equipment including provision of personnel and spare parts.
- Document the as buried position of the cables using a full electronic logging system.

Schedule : June to September 2010

Submarine Cable Installation

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Laying & Burial

2009

KASHAGAN 2009 project
(Power and Umbilical cables)

For this project, 1 power cable and 2 flexible products have been laid and simultaneously buried between Island D and Island A, and pulled in at each island through a dedicated J-tube.

LD TRAVOCEAN Kazakhstan LLP has been contracted by Saipem Kazakhstan Branch and has proposed a specific burial spread taking into account the prevailing conditions of the Kashagan field.

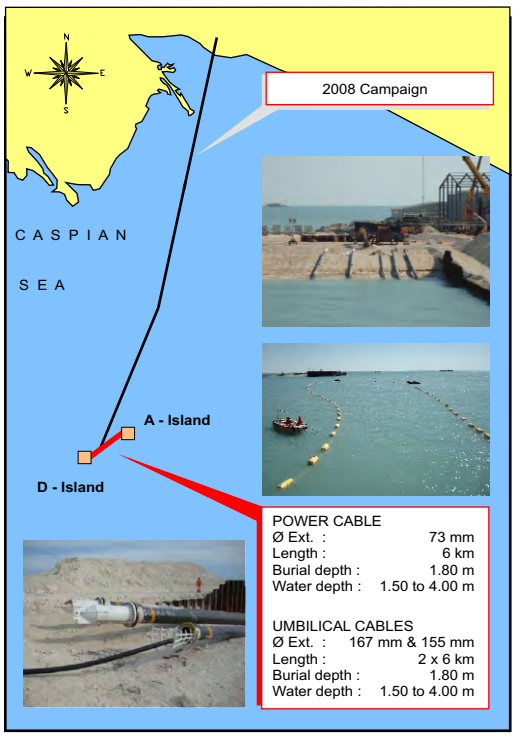
The machine proposed was the TM03 trencher which had been used during the 2008 campaign for laying and burial of fibre optic cable.

In collaboration with Saipem, some modifications and upgrades have been done on the TM03, and a new digging chain with new layer and depressor has been notably designed and built, to achieve the 2 m burial depth target.

LD TRAVOCEAN performed and completed the following activities :

- Provision of competent and experienced personnel with relevant defined tasks
- Provide of a complete quality plan including method statement and mobilisation plan
- Mobilisation of the Caspian Spider barge in Kuryk Port (ERSAI base)
- Operation of the TM03 spread on 24h / 24h basis
- Provide of regular reports and duly update the client on the project development in accordance with the contract conditions

Schedule : June. 2009 to October. 2009



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PLIB Work

2008

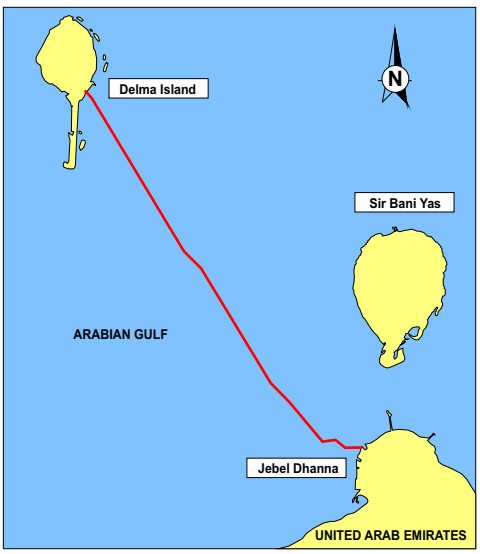
DELMA Island project
(power cable)

Delma Island project consisted of the Post Lay Burial of 2 power cables between Delma Island and the mainland.
Nominally 85 km of power submarine cable is involved.

Scope of work was :

- Engineering and project preparation
- Post- trenching of the submarine cable all along the route from Shuwaithat to Delma Island, except for the cable crossing
- Protection at landfalls
- Documentation

Schedule : June to November 2008



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Laying & Burial

2008

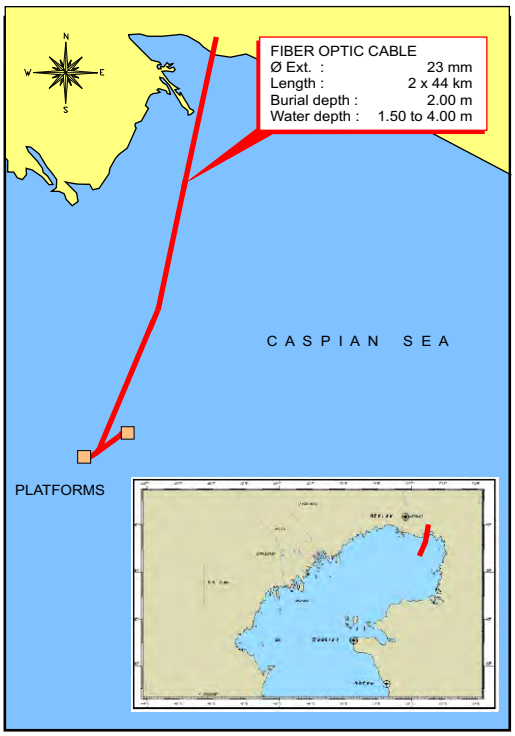
KASHAGAN Field 2008 project
(fiber-optic cable)

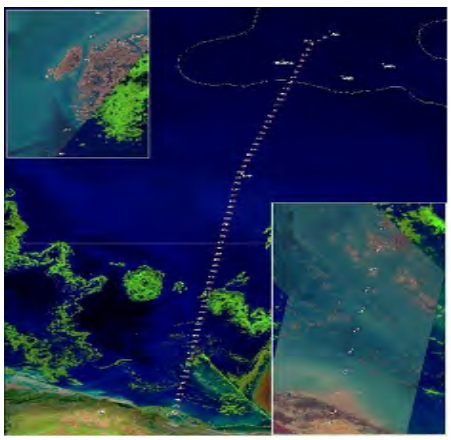
The aim of the SAIPEM Kashagan Field 2008 project was the installation (laying and burial) of a Ø 23 mm FO cable; cable length was 42.511 km (FOC A) and 42.556 km (FOC B) between Island D and Atyarau in The Caspian Sea / Republic of Kazakhstan.

Scope of work was :

- Delivery of ESV12 vibrating plough and TM03 trencher burial spread in Abu Dhabi for mobilisation onboard Caspian Spider barge.
- Provide GE 1x800kVA and 1x 100kVA and cable laying system to be installed onboard Caspian Spider barge in Abu Dhabi (LCE, Cable chute and cable way)
- Provide necessary personnel for assembly and loading of equipment.
- Mobilisation of the burial equipment at Client yard / ERSAI base in Caspian Sea.
- Operating of the laying (LCE) and burial spreads equipment to protect two Fiber optic cable along a route of 44 km between Island D (KP0 - water depth 4.10 m LAT) up to KP 43.5 (water depth 1.70 m LAT)
- Min. burial depth was be 2 m Top Of Cable (TOC).

Schedule : Feb. 2008 to Nov. 2008





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Laying & Burial

2008

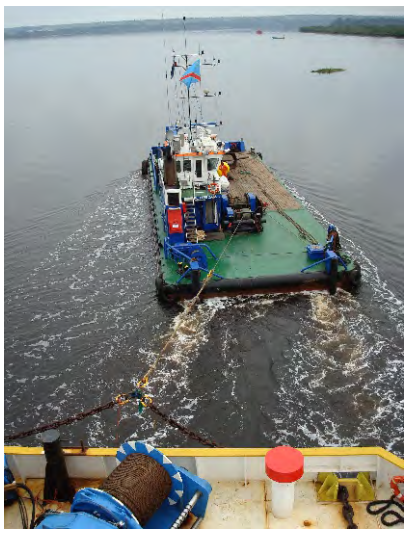
PERENCO RDC project
(power cable)

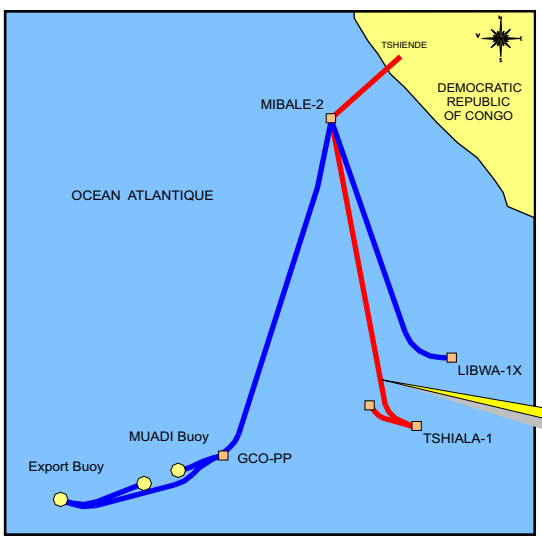
The aim of the PERENCO RDC project for MIOC was the installation (laying and burial) of 22 km of 36 kv power cable between the shore and platforms of RDC oil field. The RDC field is characterized by a strong sustained current (up to 5 kts), long swell and shallow water (ranging from 4 to 35 m).
In addition of the Power Cable Installation, operating of the barge and AHT for lifting operations and pipe laying (Zap-Lock System) of 6, 8, 10 and 12" lines has been conducted.

Scope of work was :
-Mobilisation onboard the barge OSLO in Dunkirk and Muanda (Banana Port) of all necessary cable laying equipment: cable tank, cable way, LCE, cable chute ...
- Mobilisation of one suitable AHT to work in such area
- Cable transfer in Muanda/Perenco facilities
- Laying and burial of the cables between plaforms: total 20400 m horizontal length with 1 shore landing and 7 J-tube pull-in.

The installation spread was supported by:
- OSLO barge (76 x 22 m) fitted with:
  - Accommodation unit for 40 pax
  - 8 x 30 tons and 1x 75 tons mooring winches
  - cable tank , LCE
  - cable way and cable chute
  - TJV jetting spread
  - 250 tons crawler crane
- NOVA K AHT
(30 tons bollard pull capacity multicat)

Schedule : Dec 2007 to April 2008





36 kV cable	
Length :	1 x 13.5 km and 1 x 8.5 km
Ø Ext. :	95.7 mm
Weight in air :	14.3 kg / m
MBR during installation :	1.90 m
MBR storage / installed :	2.25 m

Submarine Cable Installation

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Trenching Services

2008

TAURT Field Development project
(umbilical)

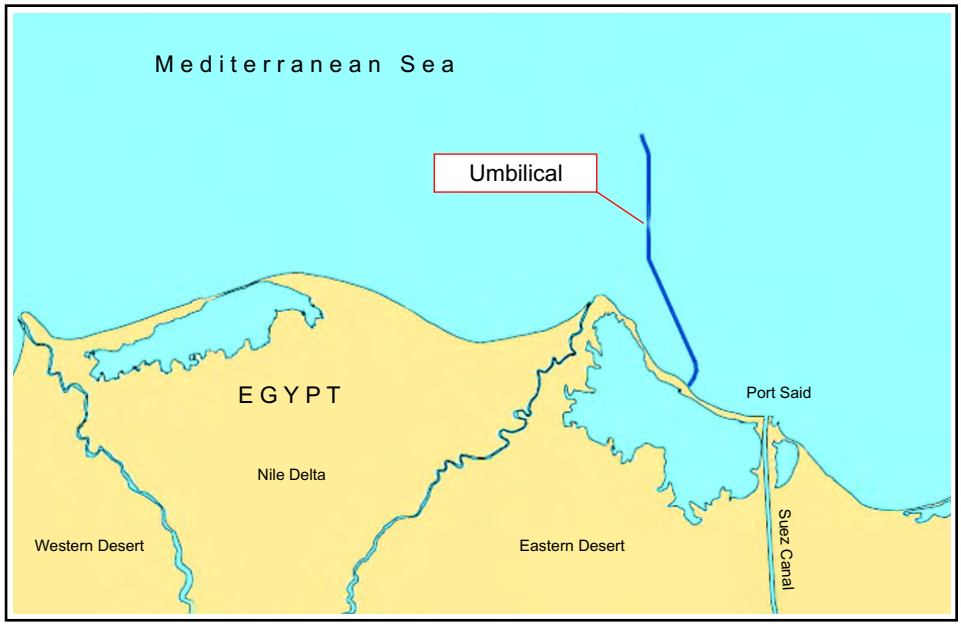
Subsea umbilical post trenching for British Petroleum / GUPCO / FOS.
- The Taurt control umbilical connects the land based West Harbor Terminal with the Control Support Structure (CSS) of the southern drill center.
The planned Trenching Work was to provide burial coverage for the Taurt Control Umbilical starting from the 8 m depth contour to approximately 400 meters south of southern drill center (approx. 63.800 km).

Scope of work :

LD TRAVOCEAN provided the following services :
- Enginneering and project preparation
- Mobilisation of ROVJET 401 onboard DP vessel Peter Faber
- Post-Trenching of the umbilical on 63 km.
- Reporting

All trenching equipments mobilized for this project was designed,built and operated by LD TRAVOCEAN.

Schedule : Febuary / March 2008



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Shore Ends Installation

2007

Gondwana / Picot projects
(fibre-optic cable)

The Picot cable system consists of a series of segments, which interconnect the New Caledonia islands of Grande Terre, Ouvéa and Lifou. LDTRAVOCEAN was contracted to provide beach support services for all Picot segments.

Picot and Gondwana project consisted of providing beach support services for all segments. The Picot cable interconnects the New Caledonia islands of Grande Terre, Ouvéa and Lifou. The Gondwana cable system connects New Caledonia to Australia.

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Laying & Burial

2006

THAILAND project - Koh Samui / Kha Nom (power cable)

The Aim of Koh Samui project for Nexans Norway was the transport and installation of 24 km of 123 kV power cable between Koh Samui and Kha Nom on Thailand / October 2006.

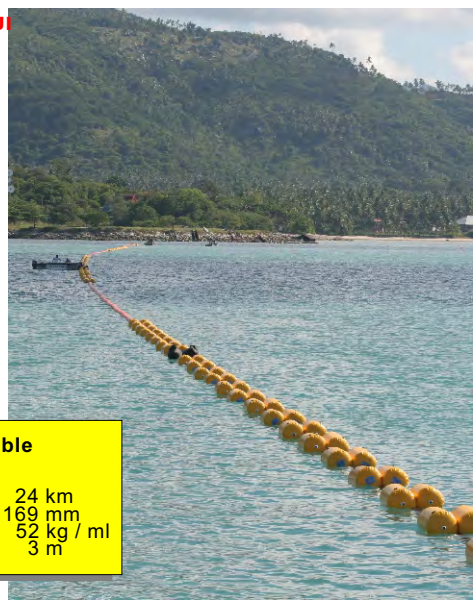
Scope of work was :
- Collection of 24 km of power cable (OD 169 mm - weight 52kg/m) in Halden / Norway onboard a freighter (MV Pantanal)
- Transport by freighter of this cable to Thailand
- Mobilisation of a cable laying barge and associated AHT in Singapore and Batam
- Loading of the cable onboard our cable laying barge
- Laying and burial of the cable between Koh Samui and Kah Nom

The installation spread was supported by 5 vessels:
- Swissco 80 barge (85 x 24 m) fitted with :
  - 6 point mooring system
  - Cable tank, LCE
  - Cable gantry and cable chute
  - Diving spread
  - TJV 05 jetting spread
- Ocean Fluorite AHT
- Swissco Shentosha AHT
- Mermaid Responder accommodation vessel
- Mermaid One shallow water vessel with very shallow water pontoon and TJV 08 jetting sledge

Product Details

Cable type	Cable length	Cable diameter	Burial depth
123 kV 3x1x24 mm² KQ	24 km	169 mm	1.5 m

- Schedule : August to December 2006



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Laying & Burial

2006

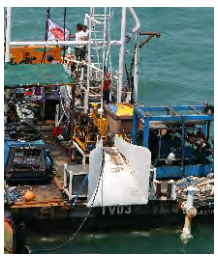
JAKASUSI project
(fibre-optic cable)

The aim of the JAKASUSI project for ASN was the installation of the Jakasusi Separate Shore End Fiber Optic cables (segment B1 and B2) in Banyu Urip / East Java and Takesung / Kalimantan in July and August 2006.

Scope of work was the following :
- Collection of cable lengths at Singapore port
- Shore ends laying and burial up to 1.20 m : for the following locations
  - Banyu Urip / Java : 12700 m
  - Takesung / Kalimantan (segment to Java - Banyu Urip) : 9700 m
  - Takesung / Kalimantan (segment to Sulawesi) : 10700 m
  - Total cable length : 33100 m

For this installation work, LD TRAVOCEAN has used a specific spread dedicated to the work. The installation spread was supported by one logistic and accommodation barge "Promoter 12" and TVO3 shallow draft pontoon fitted as a cable laying and burial spread.

TVO3 was fitted with the following equipment :
- Cable tank taking into account the cable min. bending radius
- LCE
- Cable way and cable chute and necessary equipment
- All necessary rigging and posit system
- EBJ 04 jetting spread for soft soil conditions



Submarine Cable Installation

Etablissement de Marseille

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Fibre Optic Cable Link

2005

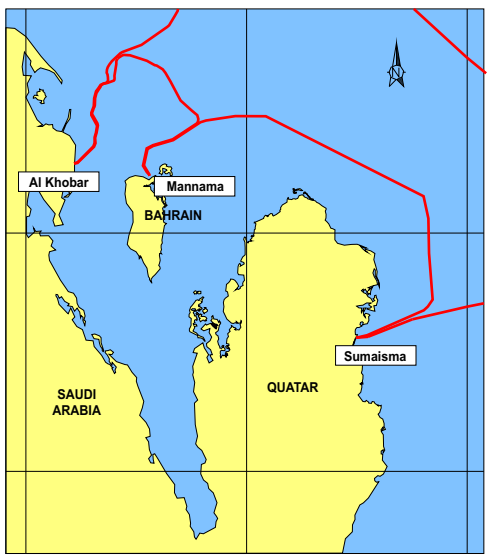
ASN Falcon - FLAG Telecom

The purpose of this operation was to simultaneously lay and bury 228 km of fibre optic cable (Ø 35.9mm - 4kg/m) in Dubai, Qatar, Barhain, Iran, Saudi, Yemen, in water depth less than 12 m, burial depth 1 m.

For this operation, LD TRAVOCEAN has used a specific cable laying spread dedicated to shallow water :
- Coastal Spider barge fitted with a 20 t A-frame, 1 cable tank, LCE, cable gantry and cable chute, 6 mooring point system, 2 spuds.
- Shallow water potoon fitted with 1 cable tank, motorised sheave, cable gantry and cable chute.

The following burial spreads were mobilised :
- TJV 05 and EBJ 03, towed jetting sledges

- Schedule : September 2005 / April 2006



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Power Cable Link

2005

PERENCO Gabon

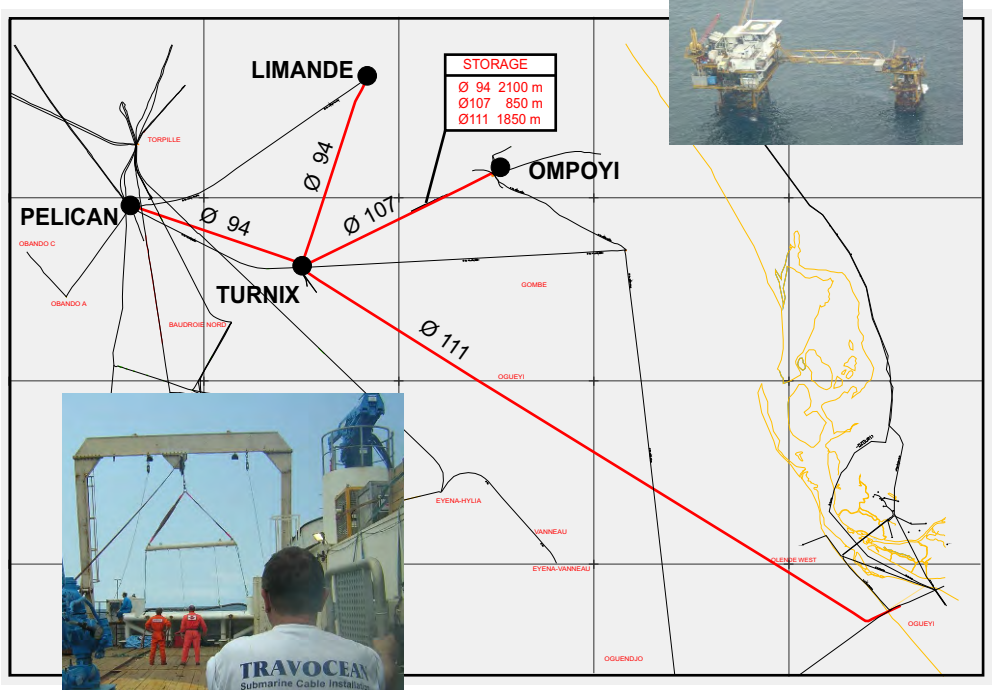
The purpose of this operation was to surface lay 70 kM of power cable in Perenco Gabon Fields, in water depth less than 35 m.

Scope of work :
- Cable transportation from Norway to Gabon
- Laying of 4 cables links :

from shore to Turnix Platform	38,750 m (Ø111 mm - 22 kg/m)
from Turnix to Ompoyi platform	12,250 m (Ø107 mm - 19 kg/m)
from Turnix to Limande platform	11,750 m (Ø 94 mm - 14 kg/m)
from Turnix to Pelican platform	10,150 m (Ø 94 mm - 14 kg/m)

For this operation, LD TRAVOCEAN has chartered a DP2 vessel MV MARINER SEA fitted with a 25 t A-frame, 2 cable tanks, LCE, cable gantry, cable chute and J-tube pull-in spreader bar.

- Schedule : September / November 2005



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Maintenance

2004 to 2014

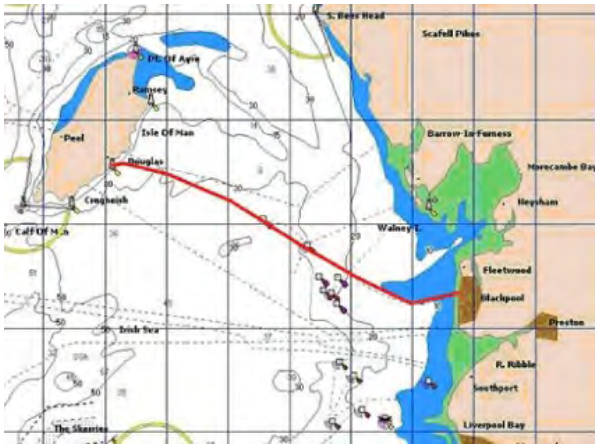
Isle of Man Interconnector project
(90kV power cable & co-joined F.O. cable linking Isle of Man to UK)

Clients : Manx Cable Company (Manx Electricity Authority)

The electrical interconnector and co-joined fibre optic cable (the Interconnector) was installed in 2000 between Blackpool (UK) and Douglas (IOM), across the Irish Sea. The cable is approximately 100 km long and is buried in the seabed to a depth of approximately 1.50 to 2.00 m (up to 3.00 m in some locations).

In case of fault on the submarine cable, LD TRAVOCEAN shall retore the full operatonal capability of the Interconnector in the shortest possible time, using naval means available on the market on a call-out basis and in liaison with a submarine cable Specialist appointed by MCC.

The cable repair spread includes :
- MED 1 : deburial-reburial crawler : operational since 1990, designed and built for call-out interventions on the Cross Channel link, fitted with pump, chain or jetting tool.
- cable chute, spare cable drums, Linear Cable engine, ...
- cable jointing equipment (operated by the Cable Specialist).



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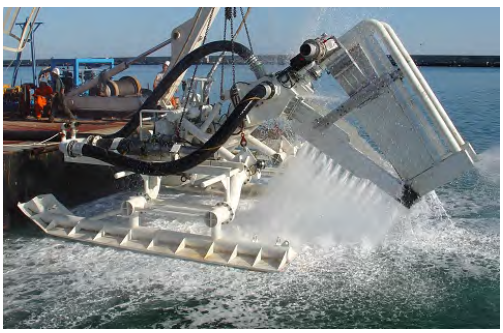
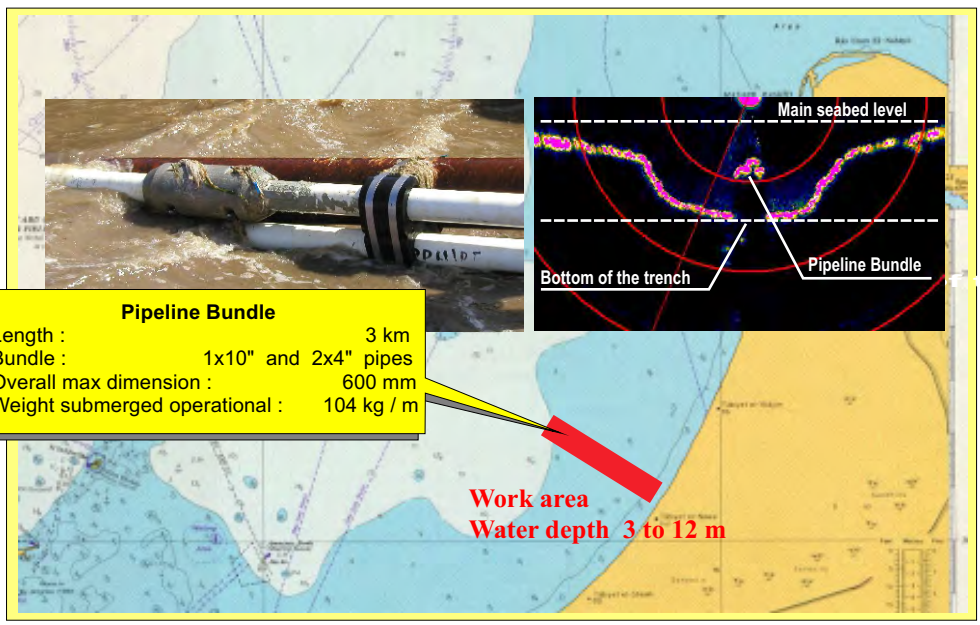
PLIB Work

2004

Simian / Sienna & Saphire Operation

- Near shore trenching in Abukir bay - Egypt - for Technip Aberdeen
- Post burial of a bundle made of 3 pipes (one 10" and two 4") from 3 m to 12 m water depth using a 6 point mooring barge.
- Burial spread : TJV 06, towed jetting-eductor sled of 600 HP with 2 m DOT capability
- Burial depth : more than 1.00 m top of product
- Total length approx. 3000 m
- Schedule : October / November 2004





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Laying & Burial

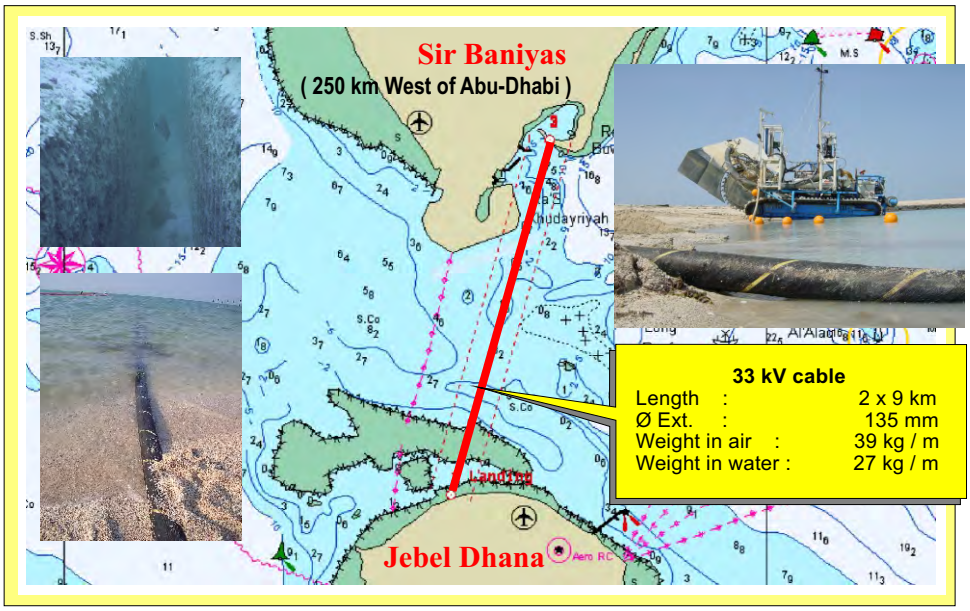
2004

Sir Baniyas / Jebel Dhana Operation

The aim of the Sir Baniyas Operations was the provision of submarine power cable installation services for two sections (9 km each) between Jebel Dhanna and Sir Baniyas Island (UAE).
Our client was Nexans Norway with Larsen & Toubro and ADEWA as final customers.

The scope of work was the following :
- loading of 2 x 9 km of cable in Abu-Dhabi (Ø Ext. 135 mm - weight 39 kg/m)
- laying and burial of 2 cables between Jebel Dhanna and Sir Baniyas Island.
- shore pull of cables and beach works.

The installation spread was supported by three vessels :
- CASPIAN ANN, one supporting barge (60 x 40 m) fitted with the following equipment :
  - 4 point mooring sytem + 2 spuds to warp properly along the cable routes.
  - cable tank : centre cone in the tanks 8 m Ø (2 m MBR is permissible during installation)
  - one 4 wheel pairs Linear Cable Engine (LCE)
  - cable gantry and cable chute + necessary equipment
  - TM03 rock trencher - depth of burial 1.30 m with cutting wheel / 2.00 m with trenching chain
  - TJV04 jetting sledge - depth of burial 1.50 m
- SUBTEC II, one accommodation vessel (50 persons + crane and storage facilities)
- ELIZABETH, one anchor handling vessel to move the anchors in shallow water.



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Repair Work

2003

IFA 2000 - Power Link between France & UK (power cable)

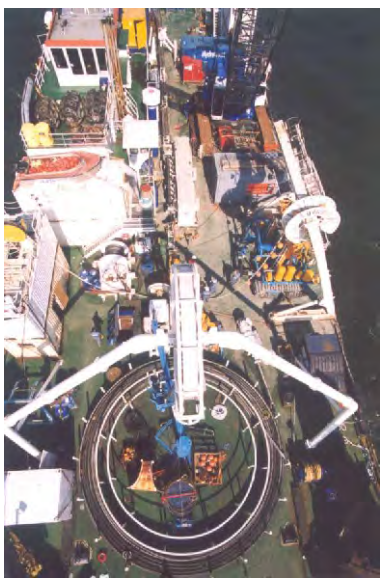
The scope of work was to repair 1 of 8 power cables of the IFA 2000 link, 5 km offshore Folkestone, in 25 m water depth.

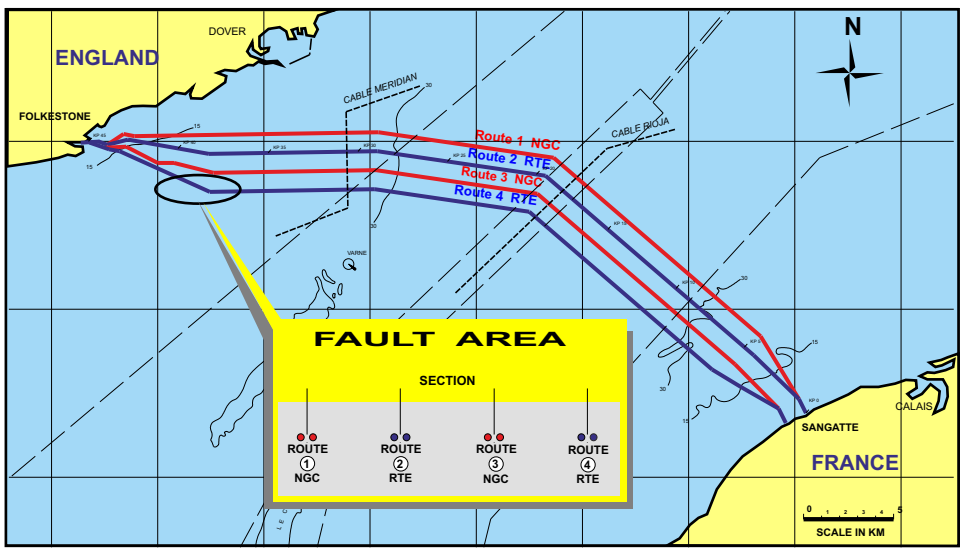
A ROV survey of area was made a few days after the notification of the fault, and less than one month later, we mobilised a repair spread in our Dunkirk base :

- Anchored barge Fetsy-L with associated tug and anchor handler
- Complete "cable spread" (storage tank, cable way, cable chute, LCE ...)
- Diving spread
- Cable repair and testing spread under Nexans responsibility
- MED 1 burial spread

Main features of this operation were specific constraints : the cable was buried at 1.50 m and was in the same trench as onother cable, so we had to select and to cut the right cable.

The repair work was completed in less than 3 months. The repaired section is now fully protected by burial and concrete mattresses.





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Submarine Cable Installation

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Power Cable Link

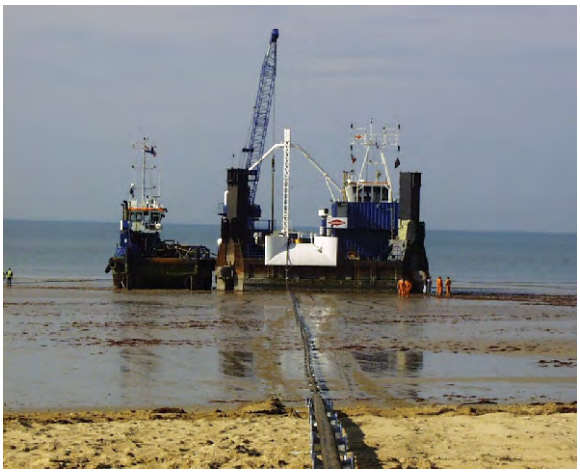
2003

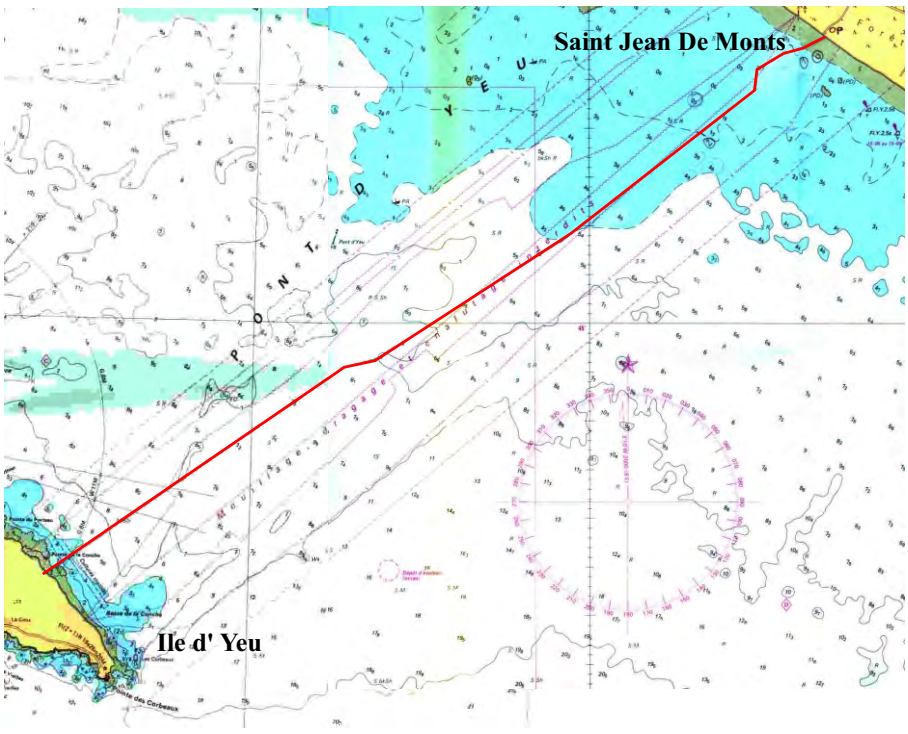
Ile d' Yeu 20 kV Submarine Cable
(power cable)

The purpose of this operation was to surface lay on 18 km a 20 kV power cable between Saint Jean-de-Monts (France Main Land) and Yeu Island for EDF-GDF Services, in water depth lower than 10 m.

For this operation, LD TRAVOCEAN has used a specific cable laying spread :
- shallow water barge FETSY-L
- Anchor Handling Tug Multicat
- one aditional tug

This operation was done in 4 days during September 2003.





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Laying & Burial

2003

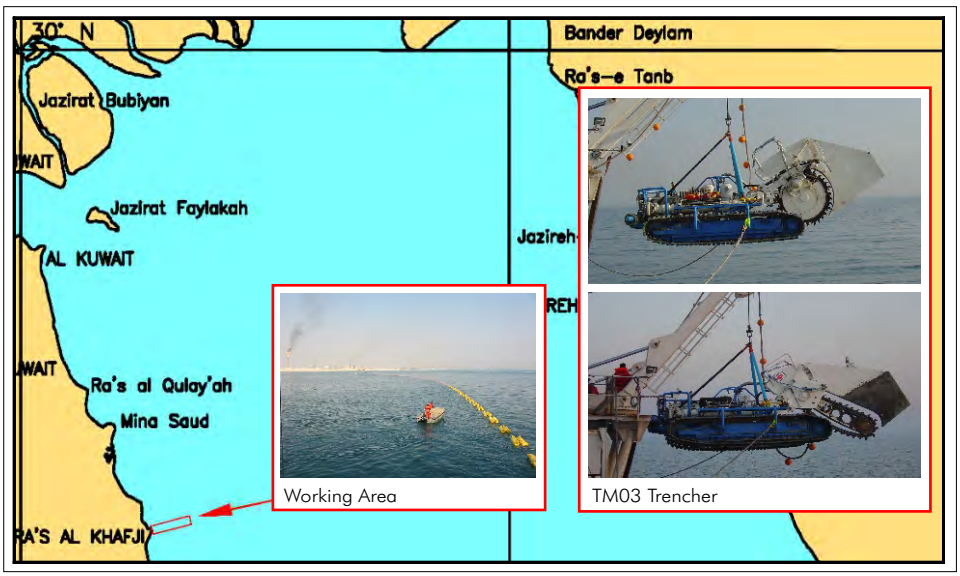
Khafji Joint Operation
(Installation of 40 kV submarine cable)

This project covers the marine operations carried out by LD TRAVOCEAN, for the laying and burial of 40 km of Al Khafji submarine 40 kV cable in Saudi Arabia during August and September 2003 (cable characteristics : Ø 146 mm, 54 kg/m in air)

LD TRAVOCEAN has used a specific cable laying spread dedicated to shallow water (30 m) area and encountered hard soil conditions up to 6 MPa :
- Shallow draft DP 2 vessel Miss Marie, able to load 2 000 t of cable on deck
- Anchor handling tug Manta Ann
- TM03 Trencher

The operations started with the mobilisation of vessel Miss Marie in Abu Dhabi, UEA, in June 2003, before transiting to Djebel Ali (UAE) to load 41.4 kilometres of cable. After 5 day of loading, Miss Marie transited to Khafji (Saudi Arabia), arriving in August 2003.

After clearing into Saudi Arabia waters, the cable was landed ashore in Al Khafji, and the cable was laid and buried towards the Offshore platform (namely UTP). The cable was finally laid down in front of the UTP location in September 2003.



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PLIB Work

2002

FLAG ATLANTIC 1 - South Segment
(fibre optic cable)

Post Lay Burial work on the FLAG Atlantic 1 Cable System South between Kp43 and KP55 : 12 km.

LD TRAVOCEAN has performed remedial work on the complete length using MED1 fitted with the dredging pump with the following objectives :

- to reduce as much as possible the free spans

- to bury the cable where the superficial layer is comprised of sandy gravel and small cobbles and small rocks.

The spread used for this work was the M/T EAS (DP support vessel - 9500 cv / 25 t sidethrust) fitted with a 25 t A-Frame and the burial spread MED 1 with a dredging pump.

Submarine Cable Installation

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Shore Ends Installation

2001

SAT 3 / WASCS project
(Cameroon - Gabon)

The purpose of this operation was to lay and bury Douala shore end and to surface-lay Libreville shore end of SAT3 / Western Africa Submarine CableSystem (WASCS) linking South Africa, Angola, Gabon, Cameroon, Nigeria, Benin, Ghana, Ivory Coast, Senegal, Gran Canaria, Spain and Portugal.

For these separate landings, LD TRAVOCEAN has used a specific cable laying spread dedicated to the Douala and Libreville shore ends operations.

- Very shallow draft barge, less than 1.5 m draft fully loaded (PONTRA MARIS barge + ADAD Tug + Anchor Handling Vessel Neptun 6).

- 6 mooring point system to move on anchors properly in the river (current up to 3 knots) and lay a total length of 79 km of fibre-optic cable.

- ESV12, powerful vibrating plough to bury at 2 m in the bed of the river.

- TJV05, jetting sledge used as a back up of the vibrating plough.

- Shallow burial spread including jetting sledge TJV04 for burial of the cable in a very shallow water depth area in Douala between the Low Water Mark and KP 1.4

CHARACTERISTICS OF THE SHORE END

Location	Cable Length	Burial Length	Burial depth	Water depth	Protection
Douala Cameroon	56 km	56 km	2.0 m	20 m	1 km artic pipe
Libreville Gabon	23 km	1 km	0.8 m	20 m	1 km artic pipe

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Remedial Work

2001

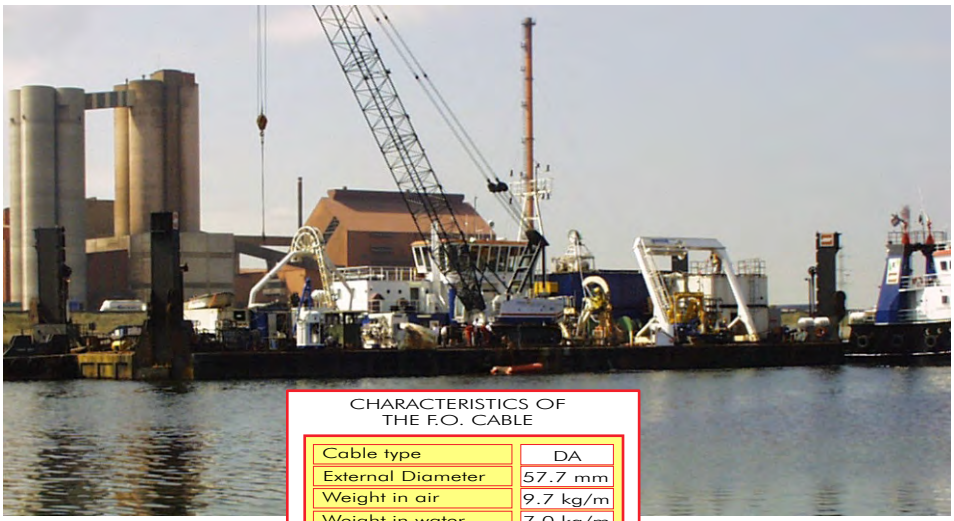
ULYSSES 1 project

5.1 km section of Ulysses 1 South F.O.cable

The operation was located 12 km offshore from Calais (France) in 15 to 30 m water depth and the objective was to cut and recover the damaged section, splice the new cable and simultaneous lay and bury it to 2 m.

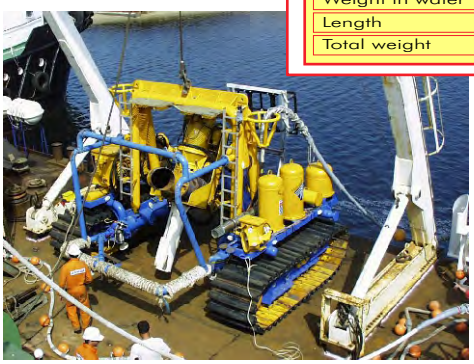
For this work, LD TRAVOCEAN proposed a specific cable laying spread dedicated to this operation :
- Working barge, tug and associated anchor handling vessel
- 8 mooring point system to move on anchors properly in this high current area
- ESV 12, powerfull vibrating plough to bury at 2 m
- MED 1, crawler vehicle fitted with suction pump and cable detector system TSS 340

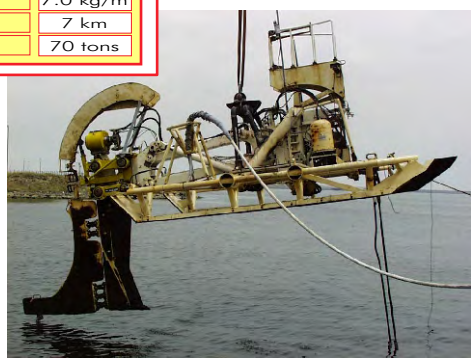
The scope of work included the following main services :
- Use of a freighter for the transfer of cable between Portland (UK) to Dunkirk (France)
- Storage of the cable on a 6 m Ø drum in LD TRAVOCEAN technical base in Dunkirk
- Transfer of the cable on the working barge
- Mobilisation/demobilisation of the FETSY L barge fitted with cable tanks, laying system, ESV 12, MED 1, and diving spread, in Dunkirk
- Loading of the cable in Dunkirk
- Sail to site
- Cut and recover existing cable
- Lay and bury simultaneously 5.1 km of DA cable using vibrating plough ESV 12
- Post burial of the initial and final splices using a specific crawler vehicle MED 1
- Unload existing and spare cable in Dunkirk
- Provision of a complete final report



CHARACTERISTICS OF THE F.O. CABLE

Cable type	DA
External Diameter	57.7 mm
Weight in air	9.7 kg/m
Weight in water	7.0 kg/m
Length	7 km
Total weight	70 tons





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PLIB Work

2001

TAT 14 project
(fibre-optic cable)

The purpose of this project was the post-lay burial at the crossings of TAT 14 segment 1 with NGC/EDF (Now become NGIL/ RTE) power cables.

The scope of work included :

- Survey of TAT 14 cable left exposed and confirmation of power cables position.

- Cable burial of a total exposed length of approx. 4,300 m
(seabed description : gravel and altered chalk).

- Final survey, with as-buried position of the cable.

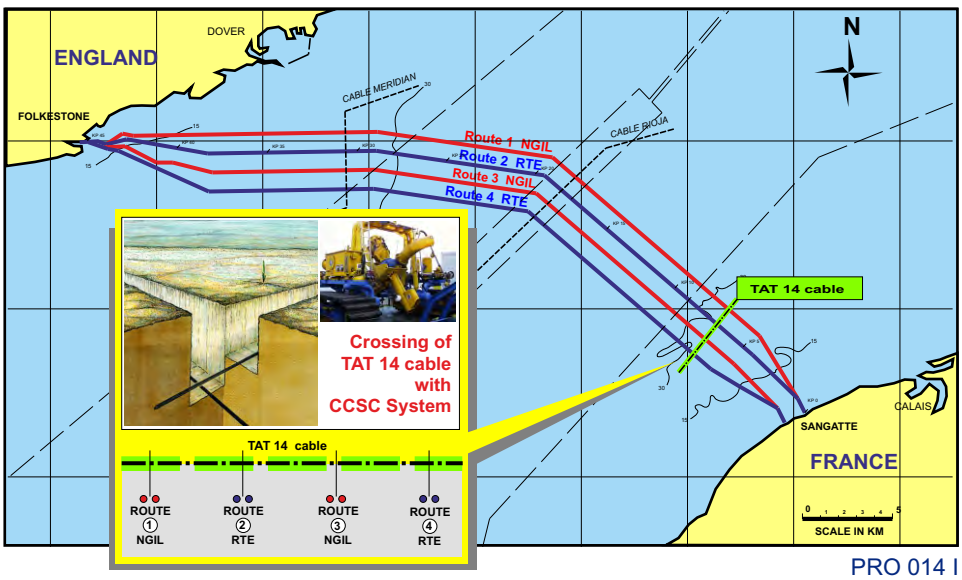
For this operation LD TRAVOCEAN used a specific spread dedicated to post-lay operations :

- DP support vessel.

- MED 1, vehicle fitted with suction pump.

- Cable detection system for fibre-optic cable.

- Cable detection system for power cable.



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Shore Ends Installation

2001

i2i CHENNAÏ / ASN
(fibre-optic cable)

The purpose of this operation was to lay and bury the Chennaï shore end of the i2i Fibre Optic Submarine Cable System linking Tuas / Singapore and Chennaï (Madras) / India.

The spread used for this work was a shallow draft support vessel fitted with a four point mooring system (MV ORIENT EXPLORER) fitted with a 25 t A-frame, cable storage tank, a linear cable engine and with the following characteristics :

- Shallow draft support vessel, less than 4.40 m draft fully loaded.

- 4 mooring point system to move on anchors and lay a total length of 8 km of fibre optic cable between 6.00 m and 23.00 m of water depth.

In addition to MV ORIENT EXPLORER, two vessels has been chartered :

- Towing tug GURPUR

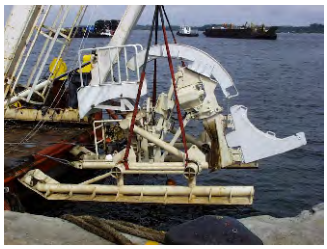
- Anchor handling vessel PUANCH

The following burial spreads were mobilised :

- ESV 07, vibrating plough to bury at 1.20 m in hard soil conditions

- TJV 05, jetting sledge used as a back up of the vibrating plough -2.00 m burial depth in soil conditions.

- Shallow burial spread including rubber boat, jetting pump and water hoses to bury the cable fitted with articulated pipes between the LWM and the 5.00 m water depth contour, by divers.



CHARACTERISTICS OF THE SHORE END

Location	Cable length	Burial length	Burial depth	Water depth	Protection Articulated pipes
Chennaï	8 km	8 km	0.8 m	23 m	From BMH to 5 m water depth

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Shore Ends Installation

2000

FLAG ATLANTIC 1 project
(fibre-optic cable)

Porth Curnow (UK) :

- 3 km simultaneous lay and burial with ESV 11
- burial depth 1.20 m

Les Rosaires (France) :

- 34 km simultaneous lay and burial with MED 1 - Jet
- burial depth 3.00 m

Le Palus (France) :

- 17 km simultaneous lay and burial with MED 1 - Jet
- burial depth 3.00 m

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PLIB Work

2000

PEC / LEVEL 3 / FLUTE projects
(fibre-optic cable)

On different links :
- PEC UK-Belgium
- LEVEL 3 UK- Belgium
- FLUTE concerto

Mobilisation of MED 1 crawler fitted with suction pump onboard two vessels :
- ASV AQUAMARINE (January to March 2000)
- CS HEIMDAL (May 2000)

About 8000 m of telecom cable were buried in hard soil conditions (gravel, chalk, ...)
Burial depth up to 1.20 m
About 10 000 m of cable were surveyed

Submarine Cable Installation

Etablissement de Marseille

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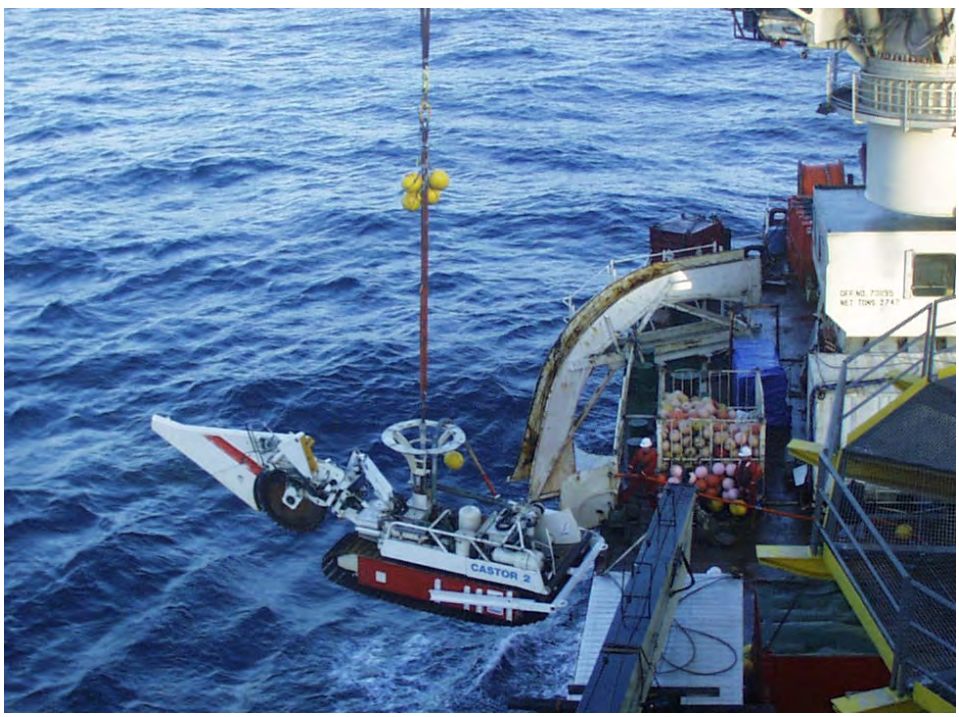
Trenching Services

2000

ELGIN / CSO project
(umbilicals and power cables)

Post burial of two umbilicals and two power cables on ELGIN-FRANKLIN oil field for Coflexip Stena Offshore (November 1999 - February 2000)

- Trencher : upgrade of CASTOR 2 Simec trencher to handle 140 mm Ø umbilical.
- Support vessel : CSO Well Services
- Total length buried : about 19 000 m
- Burial depth : 0.8 to 1.00 m



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Remedial Work

2000

Dumpton Gap project
(LEVEL 3 - UK - Belgium - August 2000)

- Simultaneous lay and burial of 5.4 km of telecom cable offshore Dumpton Gap.
- Burial depth 1.40 m.
- Soil conditions : chalk, flint and gravel.

Submarine Cable Installation

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Remedial Work

1999

CIRCE project
(fibre-optic cable)

- Mobilization/demobilization of a complete spread including :
  * one disembedding crawler MED 1
  * one trenching vehicle.
- Post lay inspection and burial measurement (MED 1).
- Cable disembedding (MED 1).
- Cable burial to 1.20 m (trenching vehicle + MED 1).

Submarine Cable Installation

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Cable Protection

1998

KOREA project (COPS)

a world first in submarine cable protection using steel fibre reinforced grouted mattresses

PROJECT SUMMARY :
Area / Period :
Far East - Febuary to August 1997
Project :
Protection of a 300 MW power link in water max depth 35 m.

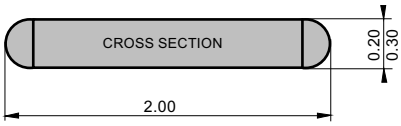
LD TRAVOCEAN SCOPE OF WORK :
(in cooperation with COFLEXIP STENA OFFSHORE) Protection of 48 km power cable, previously buried at 0.5 m, with an additional protection cover against vertical impact aggression. Such protection is capable of withstanding the impact of a 600 kg steel pole falling in water from 35 m height.

LD TRAVOCEAN SCOPE OF SUPPLY :
Design, build, test and operate the 15.9 tons crawling vehicle " COPS " for remote deployment of mattress form work.
Develop and operate continuous logistic support for on-site delivery of :
- dry cement (37 000 tons)
- fresh water (15 000 tons)
- metallic fibres (800 tons)
- mattress reels (90)

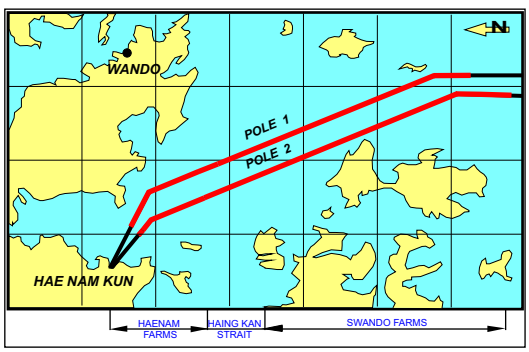
Marine means :
- 1 DSV (offshore operation)
- 1 barge (shallow water operation)
- Logistics :1 bulk carrier as floating logistic base, 1 feeder vessel.

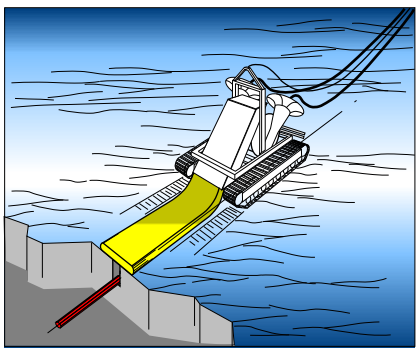
METHOD : (COFLEXIP concept)
Deployment of mattress form work (600 m/unit - 2 m wide - 0.25 m thick) over the cable with subsea vehicle. Simultaneous filling of mattress form work by injection of cement grout with steel fibres.

STANDARD MATTRESS FOR VERTICAL IMPACT PROTECTION



Thickness	Width	Submerged linear weight
0.20 m 0.30 m	2.00 m	360 kg / m 540 kg / m





Submarine Cable Installation

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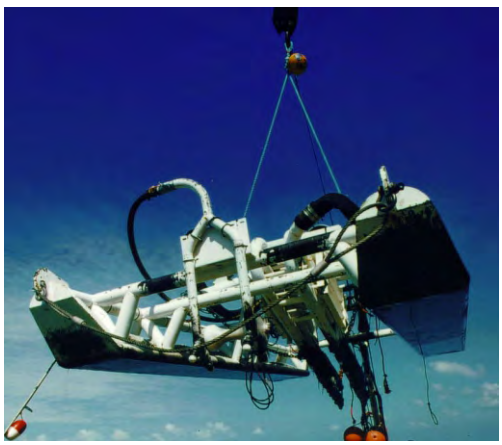
Laying & Burial

1998

BELIZE project
(power cable)

- Project engineering in our main office in Marseilles.
- Cable transportation from Calais to Belize. (Ø 110 mm cable)
- Marine support mobilization in New Orleans.
- 20 km laid in max.3 m water depth.
- 7 km simultaneously laid and buried to 1.20 m depth.
- Installation of alternative cable protection.



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Waterways

1998 to 2000

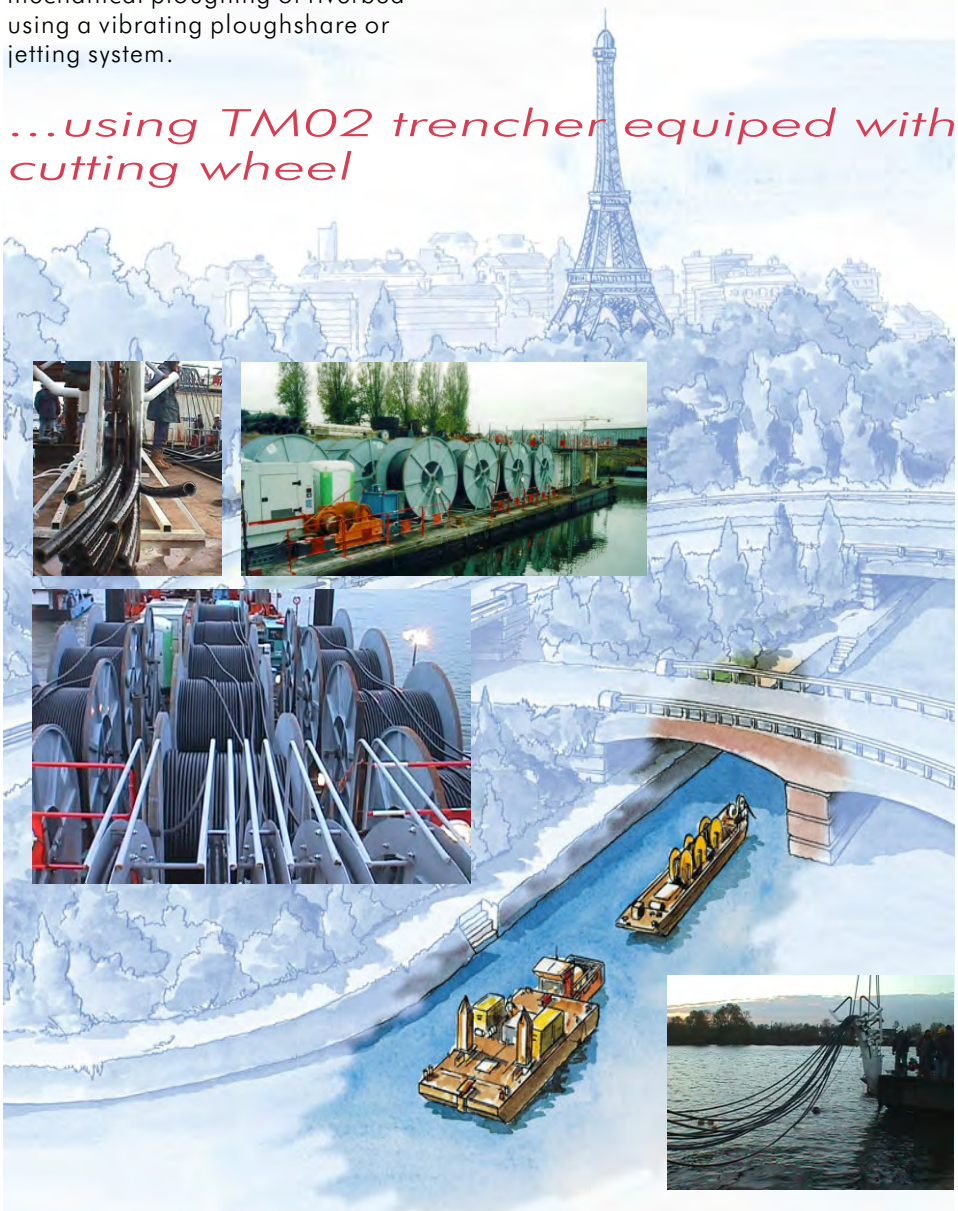
Telecommunication Infrastructure Installation
(fibre-optic cable and ducts)

...up to 13 ducts in one go in rivers

LD TRAVOCEAN has already installed more than 900 km of fibre-optic cables through the heart of Paris in the river Seine.

Developped and operated by LD TRAVOCEAN, ESV and EBJ towed ploughs are used for simultaneous cable laying / burial of multiple cables : burial of up to 4 cables achieved by means of mechanical ploughing of riverbed using a vibrating ploughshare or jetting system.

...using TM02 trencher equiped with cutting wheel



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Turnkey Project

1996

THAILAND project
(power cable)

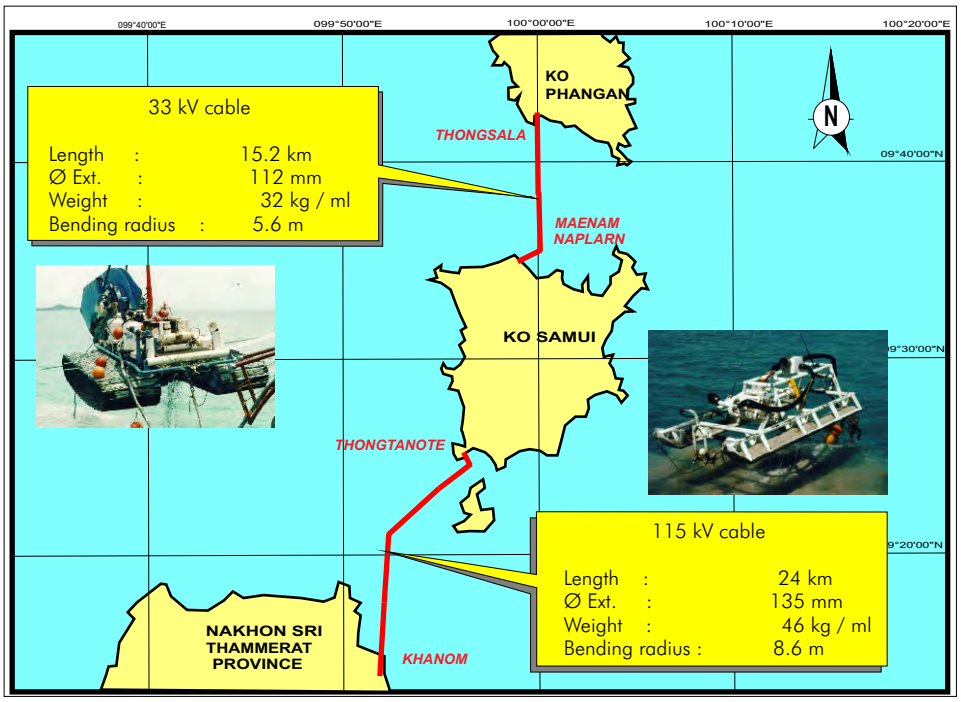
- Project engineering in our main office in Marseilles.

- Cable transportation from Calais to site :
  * 15 km long 112 mm Ø cable
  * 24 km long 135 mm Ø cable

- Marine support mobilization in Singapore.

- 39 km simultaneously laid and buried at 1.50 m depth.

- Installation of alternative cable protection.



Submarine Cable Installation

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LouisDreyfus
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Maintenance

1991 to 2013

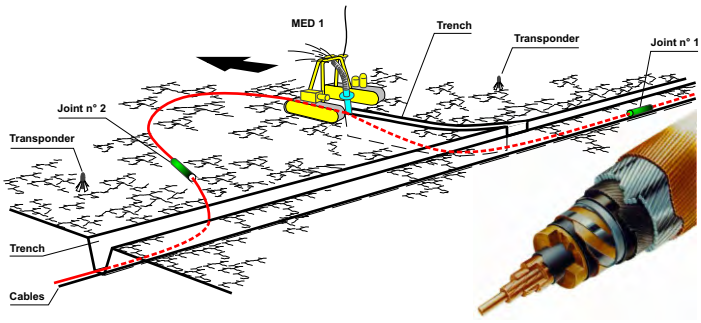
IFA 2000 MW project
(4 pairs of 46 km long power cables linking France to UK)

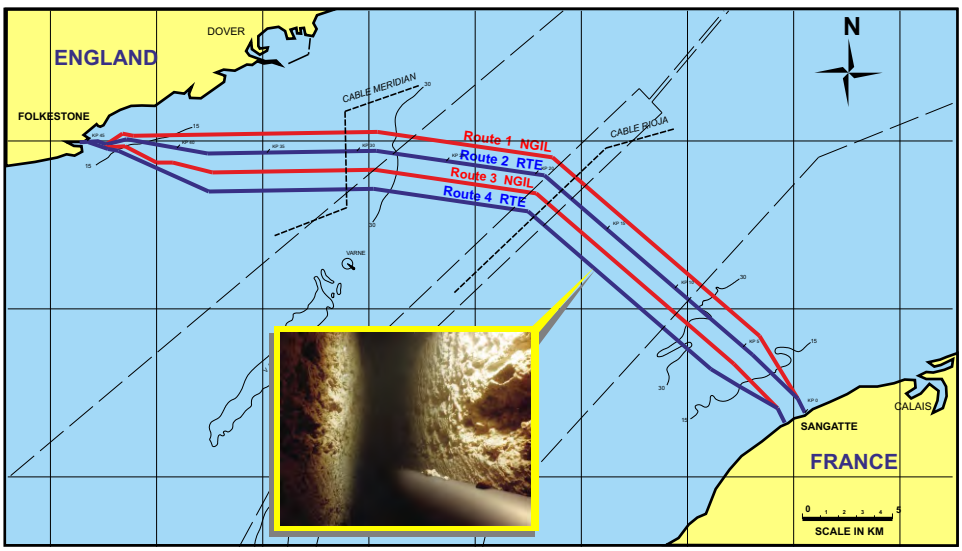
Clients :
- Réseau de Transport d'lectricité (RTE)
- National Grid Interconnectors Limited (NGIL)

In case of fault, LD TRAVOCEAN shall charter an appropriate vessel of opportunity (DSV, Laying vessel, Barge) mobilise the cable repair spread and the spare cable onboard the vessel, and repair the faulty cable in limited period of time.

The special feature of this link is that 2 cables are buried side by side in each trench.

The cable repair spread includes :
- MED 1 : deburial-reburial crawler operational since 1990, designed and built for call-out interventions on the Cross Channel Link, fitted with pump, chain, or jetting tool.
- cable chute, cable way, LCE, ...
- cable jointing equipment (operated by NEXANS)





PRO 006 J

Submarine Cable Installation

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LouisDreyfus
TRAVOCEAN

Marine Engineering

since 2000

Cable ship maintenance and assistance

ALDA Marine

ALDA Marine is a joint venture formed by Alcatel Submarine Networks (51%) and Louis Dreyfus Armateurs (49%), dedicated to the ownership and the management of cable laying and cable maintenance ships.

Thanks to its experience in the engineering of cable installation and the management of site operations, LD TRAVOCEAN proposes his know-how for maintenance and personnel assistance :

- Surveyors :
  - engineers
  - technician software specialist
  - offshore bridge engineers
- Project manager :
  - engineers
- Plough technician :
  - ROV and trenchers technicians

Submarine Cable Installation

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LouisDreyfus
TRAVOCEAN

Marine Engineering

1981 to 1996

Conversion and modification of support vessel

TVO 2 Barge Conversion for IFA 2000 project

INITIAL STATUS
FLAT BARGE

INTERMEDIATE
STATUS

POWER CABLE
BURIAL BARGE

POWER CABLE
MAINTENANCE
BARGE

Submarine Cable Installation

Etablissement de Marseille

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Marine Engineering

Conversion and modification of support vessel

Vessel Conversions for Cement Logistics
Alcatel Korea 2 project

DSV ALLIANCE





CARGO VESSEL TADORNE





Submarine Cable Installation

Etablissement de Marseille

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10 - TRACK RECORD

LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
								Depth (m)	Length (km)	Machine
2017	QUINTILLION ALASKA	Prudhoe Bay / Alaska (Alcatel Lucent)	Separate Shore end. Laying and burial of 1 FO cable.	15	Barge	L B SE	16	2	16	ESV12 (Plough)
2017	IFA 2000 REPAIR	IFA2000 link - France to England Channel (RTE)	Repair of 4 IFA 2000 power cables .	25	DP Vessels	R	-	0.6	-	MED1 (Dredge pump) + ROVJET806 (jetting)
2016	VEJA MATE	Veja Mate Windfarm/ German waters (SOC)	Provision of personnel and equipment to carry out the post lay burial of 73 infield power cables.	40	DP Vessel	B PLIB	87	1.5	87	Rovjet810 (jetting)
2016	NORDSEE ONE	Nordsee One Windfarm/ German waters (SOC)	Provision of personnel and equipment to carry out the post lay burial of 54 infield power cables.	29	DP Vessel	B PLIB	62	1.5	62	Rovjet810 (jetting)
2016	AL NASR QAFFAY	UAE (Al Nasr Contracting Company L.L.C)	Lay and burial of 40 km of 33kV power cable between Silah and Qaffay Island.	10	Barge	L B SE	40	1.3	40	TM04 (trenching)
2016	MARJAN GOSP	Saudi Arabia (McDermott Arabia Company Ltd)	Provision of personnel and equipment to carry out the post lay burial of one 115 kV power cable.	30	Barge	B PLIB	31	1	31	TM03 (trenching)
2016	FITZROY Darwin	North Australia (Alcatel Lucent)	Separate Shore end. Laying and burial of 1 FO cable. Installation of articulated pipes.	21	Barge	L B SE	3	2	3	TO MOBILE (jetting)
2016	BBG FUJAIRAH	Fujairah-UAE (Alcatel Lucent)	1 direct FO shore-end in Fujairah (UAE). Protection of FO cable (burial and articulated pipes).	15	-	PLIB SE	2.2	2	2.2	EBJ (jetting)
2015	SEA LION ROSTOCK	Germany- Danemark (Alcatel Lucent)	1 shore end (Germany) : laying and burial of FO cable + installation of articulated pipes. Laying and burial of the same cable offshore (Denmark), in low water depths.	15	DP Vessel	L B SE	17.9	1	17.9	ROVJET404 + EBJ (jetting)
2015	FITZROY Port Hedland	North West Australia (Alcatel Lucent)	Separate Shore ends. Simultaneous laying and burial of 2 FO cables (both in the same trench) + surface lay with a 5 m separation between both cables + installation of articulated pipes.	17	Barge	L B SE	44	0.5	18.9	TM04 (trencher) + EBJ (jetting)
2015	MANIFA	Saudi Arabia (Mermaid Subsea Services LLc)	Provision of personnel and equipment to carry out the trenching of 3 x 15 kV power cables and 2 FO cables.	15	Barge	B	42	1.3	42	TM03 (trencher)
2015	ILE D'YEU	France (ERDF)	Surface lay of 2 portions of cables YEU3 and YEU4, 2km from the shore, between St Jean de Monts and Ile d'Yeu (France).	10	-	L	4.8	-	-	N.A.
2015	ABU ALI	Saudi Arabia (Mc Dermott Arabia Company Ltd)	Provision of personnel and equipment to carry out the trenching of 2 x 230 kV cables from Abu Ali Island to Khursaniyah fields shore.	11	Barge	B	12	1.3	12	TM03 (trencher)

(*) : L = Laying - R = Repair - B = Burial - PLIB : Post Lay Inspection and Burial - SE = Shore-ends/ Protection

LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

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								Depth (m)	Length (km)	Machine
2015	BALTIC 2	BALTIC 2 Windfarm / German Baltic Sea (SOC)	Provision of personnel and equipment to carry out the post lay burial of 75 infield power cables.	45	DP Vessel	B PLIB	61	2	61	Rovjet806 (jetting)
2015	AMRUMBANK	AMRUMBANK Windfarm / North Sea (SOC)	Provision of personnel and equipment to carry out the post lay burial of 86 infield power cables.	24	DP Vessel	B PLIB	75	1.6	75	Rovjet810 (jetting)
2015	QUIBERON BELLE ILE 4	Quiberon and Belle Isle - Brittany (France) (ERDF)	Laying of a hybrid cable between Quiberon and Belle Isle.	25	DP Vessel	L SE	14.5	N.A.	-	N.A.
2015	WASIT	WASIT field (Saudi Arabia) (Subtech/ Saudi Aramco)	Provision of personnel and equipment to carry out the post lay trenching of a 15 kV power composite cable.	35	Barge	B PLIB	9.2	0.6 to 1.1	9.2	TM04 (trenching)
2014	BUTENDIEK	BUTENDIEK Offshore Windfarm / German North Sea (VBMS)	Provision of personnel and equipment to carry out the post lay burial of 86 infield power cables.	22	DP Vessel	B PLIB	81	1	81	ROVJET806 (jetting)
2014	WINTERSHALL	Dutch sector of North Sea (VBMS)	Provision of personnel and equipment to carry out the post lay burial of 1 umbilical between 2 offshore platforms.	30	DP Vessel	B PLIB	19	1	19	ROVJET806 (jetting)
2014	SAFANIYA 2	SAFANIYA 2 oild field (Saudi Arabia) (Mc Dermott / Saudi Aramco)	Provision of personnel and equipment to carry out the trenching of a 115 kV power composite cable in shallow water.	7.5	Barge	B SE	7.4	1	7.4	TM03 (trenching)
2014	EMF Trials in situ	Fécamp, Courseulles, Saint Nazaire - France (EMF)	Performance of trenching trials on the 3 sites of Fécamp, Courseulles and Saint-Nazaire as part of the preparation of the call for tenders for the construction works of the french offshore windfarms.	30	DP Vessel	B	4	1	4	ROVJET806 (jetting) + TM03 (trencher / vibrating plough)
2014	PERENCO RDC Congo	Democratic Republic of the Congo - Congo (Perenco)	Laying of 43 km of power cable between mainland / platforms and platforms. Post lay burial of 22.5 km of cable. I-tube and J-tube pulling.	100	Barge	L B PLIB SE	43	1	22.5	ROVJET806 + EBJ (jetting)
2014	GEOCEAN Bénin	Benin (Geocean)	Laying of 14km of power cable between mainland and a platform. Burial in shallow water from 8m to the beach. Installation of articulated pipes.	26	Barge	L SE	14	1.5	0.6	EBJ (jetting)
2013	AMX COLOMBIA	Barranquilla / Cartagena (Alcatel Lucent)	2 separate shore ends at Cartagena and Barranquilla + Installation of mattresses.	14	Barge	L B SE	15	1	15	EBJ (jetting)
2013	ANHOLT	ANHOLT Offshore Windfarm / Kattegat Sea (Danemark) (VSMC/Dong)	Post Lay Inspection and Burial of 111 infield power cables.	20	DP vessel	B PLIB	141	1.5	141	ROVJET806 (jetting)

(*) : L = Laying - R = Repair - B = Burial - PLIB : Post Lay Inspection and Burial - SE = Shore-ends/ Protection

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								Depth (m)	Length (km)	Machine
2013	LONDON ARRAY	LONDON ARRAY Offshore Windfarm / Thames Estuary (UK) (VSMC)	Provision of personnel and equipment to carry out the post lay burial of 54 infield cables, some in very shallow water.	23	Barge	B PLIB	55	1.5	55	ROVJET605 (jetting)
2013	VISCAS SIR BANYAS	Sir Banyas Island (UAE) (VISCAS)	Lay and burial of 2x13 km of 132kV power cable + 2x13km FO cable between Shuweihat and SIR BANIYAS (mainland to Island).	12	Barge	L B SE	52	1	39	TM04 (trencher)
2012	PAIMPOL BREHAT	English Channel / PAIMPOL (France) (EDF)	Main DC power cable installation between mainland and 15 km offshore as part of EDF's tidal generation project. Simultaneous protection : burial (4km) / Articulated pipes (11 km).	40	Barge	L B SE	15.3	1	4	TM03 (trencher)
2012	CAT Thailand	Sri Racha and Songkhla / Gulf of Thailand (Alcatel Lucent)	2 separate pre-laid shore ends at Sri Racha and Songkhla + Installation of articulated pipes.	28	Barge	L B SE	27	2	27	EBJ 04 + ESV12 (jetting)
2012	THORNTON BANK WINDFARM	Thornton Bank Windfarm, Ostende (Belgium) (VSMC / C-Power)	Post lay burial of the export power cable of the Thornton Bank Offshore Windfarm.	26	DP vessel + Barge	B SE	36	1.5m	36	ROVJET605 (jetting) + ROVJET806 (jetting)
2011	WALNEY 1 WINDFARM	Walney Offshore Windfarm – Irish Sea (VSMC-Dong)	Post Lay Inspection and Burial of 51 infield power cables.	20	DP Vessel	B PLIB	40	2	40	ROVJET605 (jetting)
2011	WACS	Congo-Angola (Alcatel Lucent)	2 separate FO shore-ends in Muanda (Congo Kinshasa) and Matombi (Congo Brazzaville) + 1 direct FO shore-end in Cabo Ledo (Angola). Installation of mattresses with ROS.	20	DP2 Barge	L B SE	38	1	40	TJV05 + EBJ (jetting) + ROS (mattresses)
2011	KASHAGAN	Kashagan oil field - Kazakhstan (Sonsub for SAIPEM)	Provison of burial services for 4 power and FO cables and 6 umbilicals.	4	Barge	L B	41	2	34	TM03 (Trencher)
2011	ORMONDE WINDFARM	Ormonde Offshore Windfarm – Irish Sea (VSMC-ORMONDE ENERGY)	Post Lay Inspection and Burial of 32 infield power cables.	21	DP Vessel	B PLIB	19.3	2	19.3	ROVJET605 (jetting)
2011	WALNEY 2 WINDFARM	Walney Offshore Windfarm – Irish Sea (VSMC-Dong)	Post Lay Inspection and Burial of 51 infield power cables.	20	DP Vessel	B PLIB	50	2	50	ROVJET605 (jetting)
2011	DELMA REPAIR	Delma Island (UAE) (Nexans)	Provision of submarine power cable repair assistance. Post burial of cable / Installation of Uraducts.	6	Barge	R B	-	1	0.09	Dredge pump (with divers)
2011	ACE	Senegal (Alcatel Lucent)	2 direct FO shore-ends in Dakar (Senegal). Protection of cable (burial, articulated pipes, grout bags).	15	-	L B SE	1.85	1 to 2	1.85	EBJ (jetting)

(*) : L = Laying - R = Repair - B = Burial - PLIB : Post Lay Inspection and Burial - SE = Shore-ends/ Protection

LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
								Depth (m)	Length (km)	Machine
2010	HONOTUA - TAHITI	Bora Bora, Huaihina, Raiatea, Moorea, Papenoo (Alcatel Submarine Networks)	FO cable shore ends, PLIB and installation of articulated pipes.	30	Barge	B PLIB SE	3	0.2	0.2	Dredge pump (with divers)
2010	MANIFA	Manifa oil field (Valentine Maritime Saudi Ltd)	Provison of technical and engineering services / Cable laying and trenching services.	11	Barge	L B	29.2	1	13.2	TM04 (Trencher)
2009	KASHAGAN	Kashagan oil field - Kazakhstan (Sonsub for SAIPEM)	Provison of burial services for 1 power cable and 2 umbilicals.	6	Barge	L B	18	2	18	TM03 (Trencher)
2009	IMEWE - TEN - EIG - MENA	Alexandria & Suez (Egypt) - Tripoli (Lebabon) - Marseille (France) - Jeddah (Saudi Arabia) - Monaco (ASN)	FO cable shore ends, PLIB and installation of articulated pipes.		Barge	B PLIB SE	11.7	2	3.5	TO Mobile
2008	TAURT FIELD	Egypt (Five Oceans Services - BP)	PLIB works on umbilical.	110	DP Vessel	B PLIB	64	1.5	64	ROVJET401 (Jetting)
2008	PERENCO RDC	Democratic Republic of the Congo (Perenco)	Cable laying and burial between mainland and platforms. Barge operating for pipe laying + special liftings + J-tube pull-in.	12	Barge	L B SE	57	0.8	22	EBJ 04 (jetting)
2008	PERENCO CAMEROON	Cameroon (Perenco)	Barge operating for pipe laying.	35	Barge	L	8.6	-	-	N.A.
2008	DELMA	Delma Island (UAE) (Nexans Norway)	Post trenching of 2 power cables between Shuwaihat (mainland) and Delma Island. Installation of articulated pipes.	35	Barge	B SE	85	1	84.7	TM04 (Trencher)
2008	KASHAGAN	Kashagan oil field - Kazakhstan (Sonsub for SAIPEM)	Fibre optic cable laying and burial between Island D and Atyrau (Kazahkstan).	4	Barge	L B SE	85	2	85.1	TM03 (Trencher) + ESV12 (Plough)
2007	ATLAS OFFSHORE	Asilah - Morocco (Alcatel Lucent)	FO cable shore ends - Post lay burial.	20	Pontoon	B SE	1.7	2	1.7	EBJ 04 (jetting)
2007	PICOT / GONDWANA	New Caledonia / Australia (Alcatel Lucent)	FO cable shore ends - Articulated pipes and clamps installation.	20	Inflatable / works craft	SE	3	-	-	N.A.
2006	JAKASUSI	Java Sea (Alcatel Submarine Networks)	FO cable shore ends.	15	Pontoon	L B SE	33.2	1	33.2	EBJ 04 (jetting)
2006	THAILAND KHO SAMUI	Gulf of Thailand (Nexans Norway)	Mainland to island / 115 Kv.	28	Barge	L B SE	24	1.5	24	TJV05 + TJV08 (Jetting)

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LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
								Depth (m)	Length (km)	Machine
2005	PERENCO Gabon	Gabon / South of Port-Gentil (Perenco France)	Mainland to platforms. Surface lay + J-tube Pull-In.	30	DP Vessel	L SE	72	-	-	N.A.
2005	FALCON	Dubaï -Qatar - Barhain - Iran - Saudi - Yemen (Alcatel Submarine Networks)	FALCON separate shore ends.	20	Barge	L B SE	228	1	172	TJV05 + EBJ03 (Jetting)
2005	SEA-ME-WE 4	Mediterranean Sea (Alcatel Submarine Networks)	SEA-ME-WE 4 direct shore ends (FO).	12	Pontoon	B SE	3	0.8 to 2	3	Dredge pump (with divers)
2005	ORASCOM MED CABLE	Mediterranean Sea (Alcatel Submarine Networks)	MED CABLE direct shore ends (FO).	12	Pontoon	B SE	3.8	0.8 to 1	3.8	TJV07 (Jetting)
2004	SIR BANIYAS Power cable Installation	Sir Baniyas Island - UAE (Nexans Norway)	Lay and burial of 2x9 km of 33kV power cable between Jebel Dhanna and SIR BANIYAS (mainland to Island).	15	Barge	L B	18	1	18	TM03 (Trencher)
2004	SIMIAN SAPHIRE	Golf of Alexandria - Egypt (Technip Offshore UK Ltd)	Provision of nearshore trenching services.	11	Barge	B PLIB	3	1.5	3	TJV06 (Jetting)
2003	IFA 2000 - CABLE 11 REPAIR	France to England Channel (RTE)	500 MW HVDC Power cable repair.	25	Barge	R B	0.6	0.6	0.6	MED1 (Dredge pump)
2003	AL KHAFJI	Saudi Arabia - AL KHAFJI oil field (Mc Dermott)	Mainland to platform / 40 kV power cable.	32	DP Vessel	L B SE	40	1.8	40	TM03 (Trencher)
2003	ILE D'YEU	France - Ile d'Yeu /Saint Jean de Monts (Nexans)	Mainland to island / 20 kV power cable.	8	Barge	L SE	18	-	-	N.A.
2002	FLAG SOUTH PLIB	French Brittaby coasts / FLAG Atlantic 1 South segment (Alcatel Submarine Networks)	PLIB works on telecommunication fibre optic cable.	60	DP Vessel	PLIB	11.2	1	11.2	MED1 (Dredge pump)
2001	SAT 3	Cameroon and Gabon / SAT 3 WASC (Alcatel Submarine Networks)	Telecommunication cable lay and burial - DOUALA and LIBREVILLE shore ends.	20	Barge	L B SE	79	2	56	TJV05 + TJV04 (Jetting) + ESV12 (Plough)
2001	CROSSING TAT 14	English Channel / TAT 14 FO cable system (KDD - SCS)	PLIB works on telecommunication fibre optic cable crossings with EDF / NGC power cables.	35	DP Vessel	B	4.3	0.38	4.3	MED1 (Dredge pump)
2001	ULYSSE	English Channel / ULYSSES 1 South FO Cable (MCI WorldCom)	Recover of existing cable (5 km), simultaneous lay and burial work (ESV12), PLIB work of joints (MED 1 and diver pump).	35	Barge	L R B PLIB	5.1	2	5	MED1 (Dredge pump) + ESV12 (Plough)

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LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
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2001	APOLLO UK SHORE END	English Channel / APOLLO Transatlantic cable system (Alcatel Submarine Networks)	Cable lay and burial BUDE shore end (UK).	14	Vessel	L B SE	1.29	1	1.3	TJV04 (Jetting)
2001	ANTARES	France / La Seyne-Sur-Mer (Alcatel Submarine Networks)	Cable lay between LA SEYNE SUR MER and the Neutrinos Telescope ANTARES (max. depth 2400 m).	2400	DP Vessel	L	41.5	-	-	N.A.
2001	I 2 I / Shore end MADRAS	India / Madras i2i cable (Alcatel Submarine Networks)	Cable lay and burial - 8 km CHENNAI shore end.	23	Vessel	L B SE	8	1	8	TJV05 + TJV04 (Jetting) + ESV07 (Plough)
2000	VNF LILLE	France / Lille (Telecom Operators / LD COM Networks)	Along river - canal / 1 telecommunication fibre optic cable.	10	River barge	B	3.2	0.7	3.2	Plough
2000	PEC	English Channel / North Sea PEC FO cable system (Alcatel Submarine Networks)	PLIB work on telecommunication fibre optic cable crossing.	56	DP Vessel	B PLIB	7.2	0.8	7.2	MED1 (Dredge pump)
2000	LEVEL 3	English Channel / North Sea LEVEL 3 FO cable system (Alcatel Submarine Networks)	PLIB work on telecommunication fibre optic cable crossing.	53	DP Vessel	B PLIB	5.3	0.8	5.3	MED1 (Dredge pump)
2000	FLUTE	English Channel / North Sea FLUTE FO cable system (Alcatel Submarine Networks)	Remedial work on telecommunication fibre optic cable crossing.	30	DP Vessel	B PLIB	1.3	0.8	1.3	MED1 (Dredge pump)
2000	DUMPTON GAP - LEVEL 3	English Channel / Offshore DUMPTON GAP LEVEL 3 FO cable system (Alcatel Submarine Networks)	Remedial work : Lay and simultaneous burial of fibre optic cable.	25	Barge	B PLIB	5.4	1.2	5.2	ESV11 (Plough)
2000	FLAG ATLANTIC 1	Cornwall and French Brittany coasts / FLAG Atlantic 1 Interlink & South segment (Alcatel Submarine Networks)	3 separate shore end installations as part of the FLAG Atlantic 1 telecommunication cable system.	55	Barge	L B SE	53.5	1.4 / 3	52.9	MED1 (Jetting) + ESV11 (Plough)
1999		France / Toulon (Acatel Cable/ DCN)	Power and composite cables inside miltary harbour.	12	Inflatable / works craft	L	5.8	-	-	N.A.
1999	VNF	France / Neuilly-Conflans Seine River (MCI WorldCom / LD COM Networks)	Along river / 3 multiple fibre optic cables laid in one go.	15	River barge	L B	45	0.75	45	ESV11 (Plough)
1999	VNF OISE	France / Conflans - Compiegne - Oise River (MCI WorldCom / LD COM Networks)	Along river / 3 multiple fibre optic cables laid in one go in OISE river and using 2 spreads.	15	River barge	L B	80	0.75	80	ESV07 (Plough)

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LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
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1999	VNF MARNE	France / Marne River (Viatel / Telia / LD COM Networks)	Along river / 3 multiple fibre optic cables laid in one go.	10	River barge	L B	100	0.75	100	ESV07 (Plough)
1999	VNF STRASBOURG	France / Strasbourg (Viatel / LD COM Networks)	Along river - canal / 15 HDPE FO cable ducts laid (and buried) in one go.	10	Inflatable / works craft	L B	3	0.9	3	TJV04 (Jetting)
1999	VNF PARIS SEINE AMONT	France / Seine River (Telecom Operators / LD COM Networks)	Along river / Multiple simultaneous laying. 13 HDPE FO cable ducts laid (and buried) in one go.	15	River barge	L B	25.9	0.9	25.9	TM02 (Trencher)
1999	CIRCE / BAIE DE SOMME	France / Cayeux-Sur-Mer (Alcatel Submarine Networks)	Cable deburial / reburial and cable loop burial on CIRCE fibre optic cable system.	22	Spud Barge	B	3.9	1.2	3.9	MED1 (Dredge pump) + CASTOR (Trencher)
1999	CSOL ELGIN FRANKLIN	North Sea / Elgin - Franklin Shearwater Fields (Elf Exploration UK / Coflexip Stena Offshore)	Platform to platform / Composite power and communication cable + 1 composite power / communication cable + 1 umbilical.	92	DP Vessel	B	23.1	0.75 to 0.9	23.1	CASTOR 2 (Trencher)
1998	BELIZE	Belize / Bomba - Boca Chica (Alcatel / Belize Electricity)	Main land to island / 34.5 kV power extension.	3.3	Spud Barge	L B	19.5	1	9	TJV04 (Jetting)
1998		France / Paris Melun Seine River (MCI WorldCom / LD COM Networks)	Along river / 3 multiple fibre optic cables laid in one go.	15	Spud Barge	L B	58	0.75	58	ESV11 (Plough)
1998	VNF SUD	France / Fos - Montpellier (MCI WorldCom / LD COM Networks)	Along river - canal / Dual fibre optic cable.	6.5	Spud Barge	L B	45	0.5	45	EBJ 02 (jetting)
1998		Sweden - Denmark (Alcatel Submarine Networks / Tele Danmark International)	Mainland to mainland / Fibre optic cable.	30	DP Vessel	L B	18	0.65	18	KOURA2 (Plough)
1998	VNF PARIS	France / Paris Seine River (LD COM Networks)	Along river / 1 telecommunication fibre optic cable.	15	River barge	L B	12	1.2	12	ESV11 (Plough)
1997		South Africa / MOSSGAS FA Field (Coflexip Stena Offshore)	Satellite well control umbilicals.	105		B	18.5	0.5	18.5	CASTOR 2 (Trencher)
1997		South Korea / Main land to Cheju Island (Alcatel Cable)	Main land to Island / HVDC power cable extension with piggy-backed fibre optic cable.	36		B	48	-	48	COPS (mattresses protection)
1996	THAILANDE	Thailand / Main land to Koh Samui (Alcatel / PEA)	Mainland to Island / 115 kV power cable.	26	Barge	L B	38	1.5	36.4	TM02 (Trencher) + TJV04 (Jetting)

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LIST OF LOUIS DREYFUS TRAVOCEAN's PROJECTS

Year	Project	Location (Client)	Description	Max Depth (m)	Vessel	Type (*)	Length (km)	Burial data		
								Depth (m)	Length (km)	Machine
1996	THAILANDE	Thaïlande / Koh Samui - Koh Phangan (Alcatel / PEA)	Island to Island / 33 kV power cable.	20	Barge	L B SE	14.6	1.5	13.5	TM02 (trancheuse) + TJV04 (Jetting)
1995		North Sea / K5 Field (Elf Petroland / Coflexip Stena Offshore)	Platform to platform / Insulated flexible flowline and Electro-hydraulic umbilical.	35		B	12.6	-	12.6	FLEXJET (Jetting)
1995		North Sea / TROLL Field (Norske Shell /Coflexip Stena Offshore)	Platform to shore / 4" OD rigid glycol pipeline.	300		B	62	-	62	FLEXJET (Jetting)
1995		North Sea / YME Field (Statoil / Coflexip Stena Offshore)	Flexible pipeline.			B	6.2	-	6.2	FLEXJET (Jetting)
1995		France / Brest (Alcatel Contracting)	Defence system Communication cable.	35	Barge	B	7	-	7	TM02 (Trencher)
1994		North Sea / L8 Field (Wintershall / Coflexip)	Platform to platform / Flexible pipeline.	30		B	14.5	-	14.5	FLEXJET (Jetting)
1994		North Sea / TORDIS Field (Saga Petroleum / Coflexip)	Satellite to platform / 12 short length satellite jumper umbilicals.	190		B	1.5	-	1.5	FLEXJET (Jetting)
1993		South East Asia / THAILAND (STC Submarine Systems)	Domestic telecommunication system fibre optic cable.	30		B	1150	0.7	1150	KOURA2 (Plough)
1993	MORECAMBE BAY	United Kingdom (British Gas)	Power cable.	22		B	7	0.8 to 1.5	7	TM02 + TM09 (Trencher)
1993		South Korea / Phase 1 (Alcatel Cable Contracting)	2 power cables + 1 Communication cable.	60		B	45	-	45	FLEXJET (Jetting)
1993		South Korea / Phase 2 (Alcatel Cable Contracting)	2 power cables + 1 Communication cable.	50		B	30	-	30	FLEXJET (Jetting)
1993		North Sea / LILLE FRIGG Field (Elf Norge / Coflexip)	Platform to platform / Subsea control umbilicals and electro-hydraulic bundles.	115		B	45.5	-	45.5	FLEXJET (Jetting)
1993		North Sea / TORDIS Field (Saga Petroleum / Coflexip)	Platform to platform / Methanol line+ umbilical bundle.	217		B	11.5	-	11.5	FLEXJET (Jetting)
1992		South East Asia / Thailand (STC Submarine Systems)	Domestic telecommunication system fibre optic cable.	30		B	100	0.7	100	KOURA2 (Plough)

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1990		South Pacific (Confidential)	Defence System Communication fibre optic cable.	80	Vessel	L B	7	-	7	KOURA (Plough)
1990	IFA 2000	France to England Channel (E.D.F. / N.G.C.)	500 MW HVDC Power cable (Simulation).	65	Barge	R	-	-	-	MED1 (Dredge pump)
1990	IFA 2000	France to England Channel (E.D.F. / N.G.C.)	500 MW HVDC Power cable pair.	65	Barge	B	1	-	1	MED1 (Dredge pump)
1988		Canada / St Laurent (HydroQuebec)	River crossing 3 x 15 kV.	70	Vessel	L	3.5	-	-	N.A.
1987		U.S.S.R. (Nokia)	Platform to platform / 3 power cables (3 x 35 kV).	100	Barge	L	3.5	-	-	N.A.
1986		Congo / SENDJI and TCHIBOUELA fields (Elf Congo)	Platform to platform / 2 power cables.	97	Barge + ROV assistance	L	28.7	-	-	N.A.
1986		Angola / Pacassa - PALANCA (Elf Angola)	Platform to platform / Power cable.	84	Barge + ROV assistance	L	14	-	-	N.A.
1986		United Arab Emirates / Total ABK (Total)	Platform to platform / Composite (Power cable + optical fibre).	43	Barge	L	1.2	-	-	N.A.
1986	IFA 2000 - Cable N route 4 Repair	France to England Channel (E.D.F.)	500 MW HVDC Power cable repair.	35	Barge	R	-	-	-	N.A.
1986	IFA 2000 - Cable S route 4 Repair	France to England Channel (E.D.F.)	500 MW HVDC Power cable repair.	25	Barge	R	-	-	-	N.A.
1985	IFA 2000 Installation	France to England Channel (E.D.F.)	500 MW HVDC Power cables pair.	65		B	42	1.5	42	LIMULE (Trencher)
1984		Cameroon / KITA Field (Elf Serepca)	Platform to platform / Power cable 20 kV.	5	Vessel	L	1.4	-	-	N.A.
1984		Cameroon / BAVO Field (Elf Serepca)	Power cable 20 kV.	10	Barge	R	-	-	-	N.A.
1984		Cameroon / YANGA Field (Elf Serepca)	Power cable 30 kV.	103	Barge + Saturation Diving	R	-	-	-	N.A.

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1984		Gabon / BARBIER Field (Elf Gabon)	Transmission / Power cable 20 kV.	60	Barge	R	-	-	-	N.A.
1984	IFA 2000 Installation	France to England Channel (E.D.F.)	500 MW HVDC Power cables pair.	65		B	42	1.5	42	LIMULE (Trencher)
1983		Congo / SENDJI Field LIKOUALA (Elf Congo)	Platform to platform / Power cable 5.5 kV - Transmission cable.	100	Barge	L	9	-	-	N.A.
1983		Cameroon / EKOUNDOU Field (Elf Serepca)	Power cable 20 kV.	20	Barge	R	-	-	-	N.A.
1983		Congo / YANGA and SENDJI Fields (Elf Congo)	Platform to platform / 8 Flowlines.	100		L	2.6	-	-	N.A.
1983		France to England Channel (E.D.F.)	500 MW HVDC Power cable pair.	50		B	4	-	-	Trencher
1983		France / Manche - Meridian cable (Alcatel)	Communication cable.	35		B	5	-	-	Trencher
1982		Congo / YANGA and EMERAUDE Fields (Elf Congo)	Platform to platform / Power cables 5.5 / 30 kV.	103	Barge	L	20.3	-	-	N.A.
1982		Congo / YANGA and EMERAUDE Fields (Elf Congo)	Platform to platform / Power cables 15 kV.	60	Barge	L	0.8	-	-	N.A.
1982		Cameroon / KOLE Field (Elf Serepca)	Platform to platform / Power cable 20 kV.	17	Barge	L	17.5	-	-	N.A.
1982		Cameroon / BAVO Field (Elf Serepca)	Platform to platform / 2 power cables 20 kV - Transmission cable.	10	Barge	L	20	-	-	N.A.
1982		Cameroon / EKOUNDOU Field (Elf Serepca)	Platform to platform / Power cable 20 kV.	12	Barge	L	9	-	-	N.A.
1982		Congo / YANGA Field (Elf Congo)	Platform to platform / 7 Flowlines.	100		L	3.5	-	-	N.A.
1982		Cameroon / EKOUNDOU Field (Elf Serepca)	Platform to platform / 3 Flowlines.	15		L	1.9	-	-	N.A.
1982		Congo / YANGA and SENDJI Fields (Elf Congo)	Platform to platform / 10 Flowlines.	100		L	2.26	-	-	N.A.

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1981		Pacific / China Sea (Les Câbles De Lyon)	Island to island / Communication cable.	100	Vessel	L	271.3	-	-	N.A.
1981		France / Carry le Rouet (E.D.F.)	160 MW HVDC Power cable.	30		B	1	-	1	ZEZETTE (Trencher)
1980		Arabian Gulf / Iran SIRRI Field (Sofiran)	Platform to platform / Power cable 15 kV + 3 quads.	65	Vessel	L	1.8	-	-	N.A.
1980		France / Manche (E.D.F.)	Power cable 100 kV.	28	DP Vessel	R	-	-	-	N.A.
1980		Arabian Gulf / Iran SIRRI Field (Sofiran)	Platform to platform / Power cable 33 Kv.	61	Vessel	R	-	-	-	N.A.
1979		Atlantic / Canada - Campobello Grand Manan (Les Câbles De Lyon)	Island to island / Power cable 69 kV.	90	Vessel	L	14.5	-	-	N.A.
1979		France to England Channel (E.D.F.)	Power cable.	65		B	7	-	7	ZEZETTE (Trencher)
1978		Atlantic / Canada - Deer Campobello (Les Câbles De Lyon)	Island to island / Power cable 69 kV.	85	Vessel	L	3.5	-	-	N.A.
1977		Atlantic / France - Re Island - Aix Island (E.D.F.)	Mainland to island / Power cable 15 kV - Power cable 5.5 kV.	13	Barge	L	10.8	-	-	N.A.
1977		Atlantic / Azores Islands (D.G.S.M.)	Island to island / Power cable 15 kV.	100	Vessel	L	8.5	-	-	N.A.
1977		Atlantic / Congo - CONGO Field (AGIP Congo)	Platform to platform / Power cable 10 kV + 2 quads + 1 twin + 53 wires.	82	Barge	L	5.2	-	-	N.A.
1977		Arabian Gulf / Iran SIRRI Field (Sofiran)	Island to platform / 2 power cables 33 kV.	65	Vessel	L	33	-	-	N.A.
1977		North Sea / Holland PETROLAND Field (Elf Petroland)	Power cable 15 kV + 3 quads.	40	Vessel	R	-	-	-	N.A.
1977		Arabian Gulf / Iran SIRRI Field (Sofiran)	Platform to platform / 5 power cables 15 kV + 15 quads.	65	Vessel	L	3.6	-	-	N.A.

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1976		North Sea / Holland PETROLAND Field (Elf Petroland)	Platform to platform / Power cable 15 kV + 3 quads.	40	Vessel	L	8.7	-	-	N.A.

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