Experiences on UK Offshore Windfarms

THE STORY SO FAR .....

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Subocean Limited

Subocean Limited formed in June 2005 from the previous Cns Subsea Group. Subocean purchased all the assets associated with Cns Subsea Group and have retained the personnel

Subocean Group Limited aim to provide offshore renewable energy developers with well proven cable installation and burial solutions to their export and infield cable installations.

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Solutions gained from our 25 years experience in the oil & gas, submarine fibre optic telecommunications cable and offshore renewable energy wind-farm projects.

This transfer of skills and personnel, along with some of the most advanced technology in the market place ensure developers get a safe, professional solution to the hostile environmental challenges they face.

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Subocean assets and personnel have carried out over 50% of the cabling for offshore windfarms in the UK.

North Hoyle Project, Rhyl, North Wales
(export cable lay and burial)

Scroby Sands Project, Great Yarmouth
(export and infield cable lay and burial)

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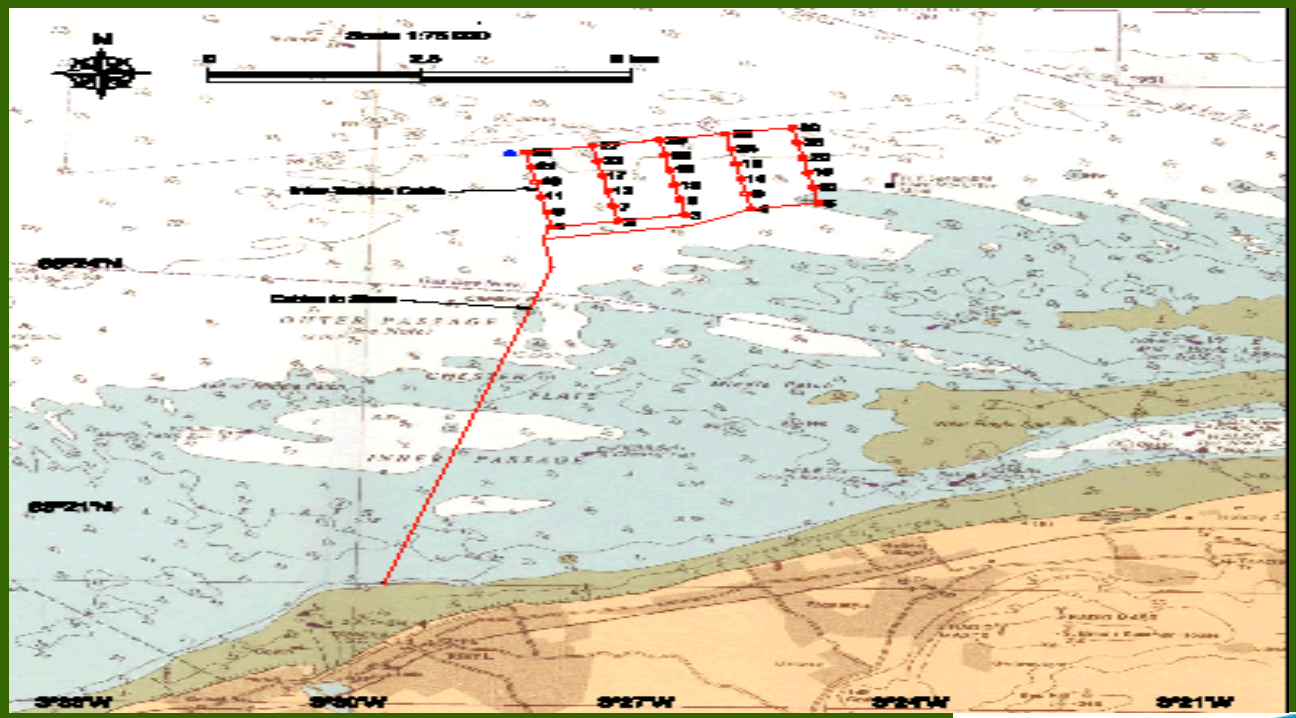
North Hoyle Project

North Hoyle Project, Rhyl, North Wales

First Major UK Offshore Windfarm. 12 km out to sea, 30 turbines producing 75 Mw of clean energy, to meet the annual demand of 80,000 homes

July – Sept 2003



Cable Route

2 x 12 km Export Cables – 1.5 m burial to specification (100%)

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North Hoyle – Workscope

- Pre-mattress installation at BHP pipeline crossing location
- Load-out and installation - export cables (2x12km) Export cable burial to 1.5 m
- Local permitting and consents
- Shore end pull-in at pre-installed conduits
- Foreshore burial to 2 m
- Beachside preparatory works
- Simultaneous lay and burial - shore end plough
- BHP pipeline crossing – 20’ + 2 No. 3” pipelines

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North Hoyle – Workscope

- J-tube pull-in and protection
- Testing, jointing and commissioning – onshore and offshore
- Water depths ranging from 0 m – 12 m LAT
- Post-mattress installation at both turbines and BHP pipeline crossing
- Air diver hand jetting to lower export cables at turbines and BHP pipeline crossing location due to harder than expected soils

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‘Pontra Maris on Rhyl beach 26/8/03 0715 hrs

North Hoyle - Equipment

Shore End Cable Plough

3 m DOB
(upgraded with water jetting)

21 te Weight
(air)

Radio and umbilical controlled

Low light cameras

Load Cells

Sonars

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Towing plough 31/8/03 1119 hrs

Beaten by the tide ! 31/8/03 1133 hrs

Wait until next low tide! 31/8/03 1137 hrs

North Hoyle – Problem Areas – Cost and Risk Impact

SHALLOW WATER	-	Suitable installation assets
CURRENT & TIDE	-	4 knot currents impact on air diving, cable lay and burial equipment operations
WEATHER	-	Obviously high wind areas thus high risk of weather downtime
SOILS	-	Harder than expected. 1.5 m burial
SHORE END WORKING	-	Environmental impact with local community/council – Bank Holiday week-end working
PIPELINE CROSSINGS	-	Live gas pipeline. Lack of Oil & Gas knowledge and interface not just a Telecoms cable to cross
CONTRACTING	-	Too many companies involved in the contracting chain
J-TUBE DESIGN	-	Lack of operational input. Air diving work

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Scroby Sands Project

Scroby Sands - Export

Nov 03 – Jan 04

- 2.5 km off coast near Great Yarmouth. The development consists of 30 x 2 Mw turbines, providing enough electricity to power 41,000 homes

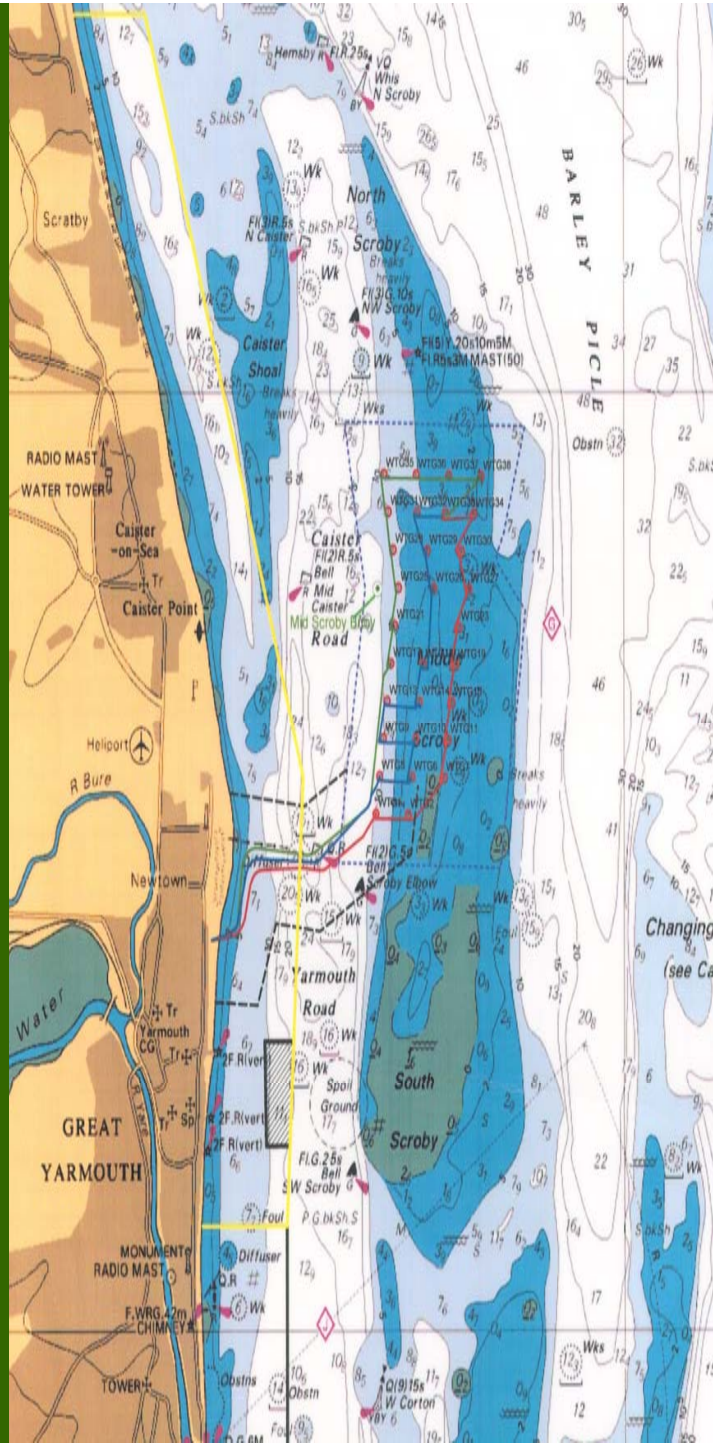
  3 x 4 km Export Cable
  3.0 m burial to specification (98%)

Scroby Sands - Infield

May – July 2004

- Installation of 29 x 600-650 m 33 Kv subsea power cables totalling approximately 18.3 km and 430 tonnes

  3.0 m burial to specification (100%)



Scroby Sands – Problem Areas – Cost and Risk Impact

SHALLOW WATER	-	Suitable installation assets
CURRENT & TIDE	-	6 knot currents impact on air diving, cable lay and burial equipment operations
WEATHER	-	Obviously high wind areas thus high risk of weather downtime
SOILS	-	Harder than expected in some areas 3.0 m burial
SAND WAVES	-	No water depth working required
SHORE END WORKING	-	Environmental impact with local community/council and fishing authorities
CONTRACTING	-	Too many companies involved in the contracting chain
J-TUBE DESIGN	-	Lack of operational input. Air diving work

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Reduce Cost and Risk Impact to Contractor

SHALLOW WATER	-	Development of new installation assets including DP vessels, anchor and DP barges and burial equipment to suit future offshore windfarm developments to complement Cns existing assets
CURRENT & TIDE	-	Reduce air diving operations
		Diver-less J-tube operations
		Diver-less burial operations
WEATHER	-	Install the offshore windfarm developments in the summer months
		If winter working required then put together realistic installation schedules and budgets which take into consideration the appropriate weather and working parameters

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Reduce Cost and Risk Impact to Contractor

SOILS	-	Conduct proper burial assessment surveys
		CPT's every 1 km does not reduce the risk with regards to burial. A continuous burial assessment survey along the whole cable route is required with a BAS tool
		Burial index – Provide burial which gives the protection required. Do not pick a burial depth without understanding the financial consequences. If you are pulling 120 tons with a cable plough and only achieving 1.5-2.0 m then nothing else is going to penetrate the seabed either to damage the cable
SAND WAVES	-	More consideration needs to be given to site selection at the feasibi[illegible] regards to installation acti[illegible] no dry working required on[illegible]

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Subocean Solutions
Reduce Cost and Risk Impact to Contractor

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Reduce Cost and Risk Impact to Contractor

SHORE END WORKING	-	Start talking to local authorities and councils earlier about the installation activities and what impact the operations have on their environment and community rather than just a few weeks prior to the start of the installation works
J-TUBE DESIGN	-	No more hinged J-tubes. Use “I” tubes with a slight bell-mouth at the bottom and install “I” seal and bend restrictor to the cable during the diver-less pull-in operations to secure the cable in the J-tube at the bottom Proper pad eye design and location on the turbine for cable pull-in operations

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Reduce Cost and Risk Impact to Contractor

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Reduce Cost and Risk Impact to Contractor

CABLE PROCUREMENT	-	Installation input into the design
		Infield cables should be provided in one length saving manufacturing time and cost as well as shipment costs. At the end of the project ensure one good length of spare cable instead of the scrap lengths that are presently being left
		Testing and commissioning should be put in cable manufacturers scope of supply reducing interfaces
CONTRACTING	-	Reduce the amount of middle-man companies in the contracting chain who add no real value but only cost for the offshore windfarm developers

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Reduce Cost and Risk Impact to Contractor

FEASIBILITY - Bring marine installation companies into the feasibility of the offshore windfarm developments earlier to gain the 35 years of Oil & Gas marine installation experience that already exists in the UK

These project are offshore marine construction projects not civil engineering projects. Ensure right input early

CONTRACTS - The EPIC contracts need to be split into:

Turbine Supply

Pile Installation

Turbine Installation

Cable Procurement, Installation and Burial with Commissioning

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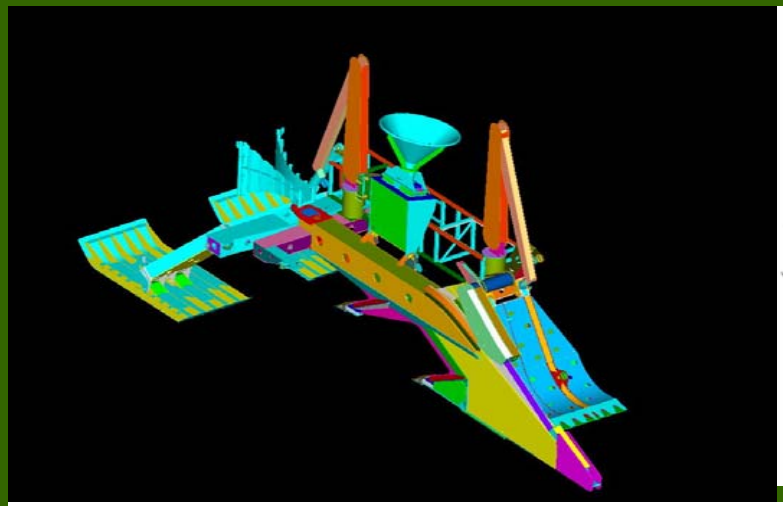
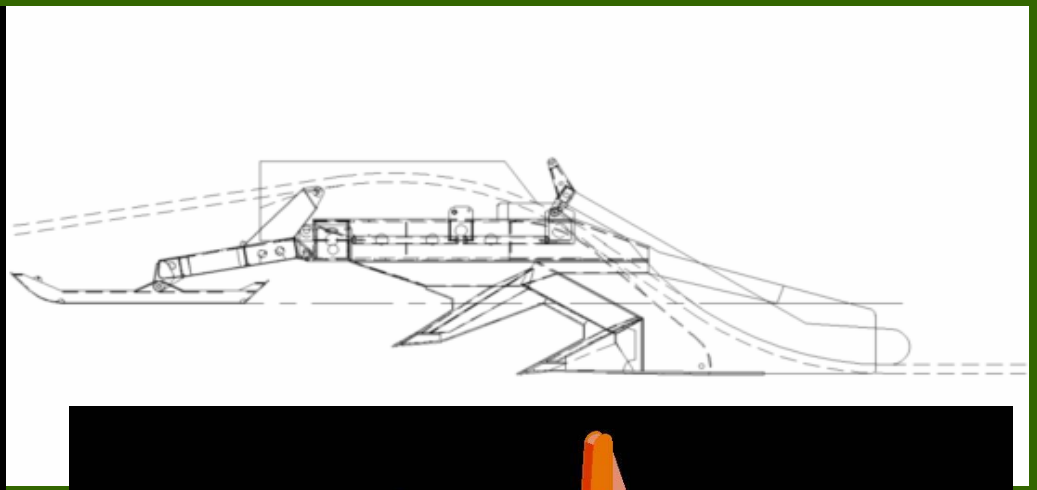
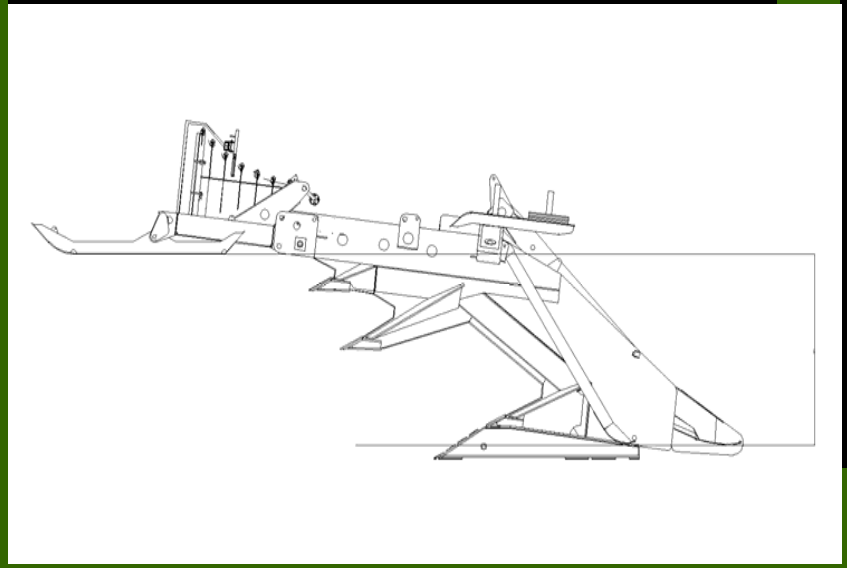
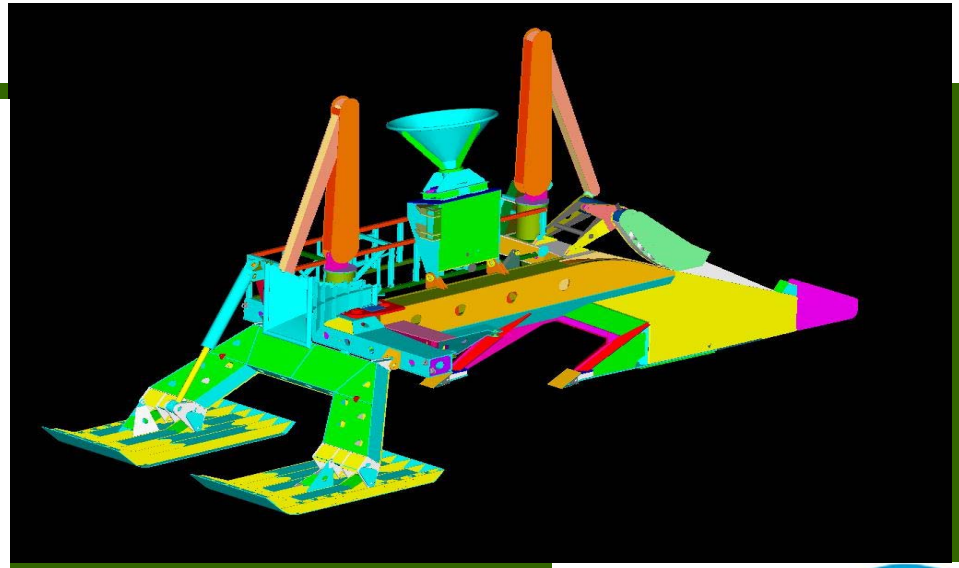
Reduce Cost and Risk Impact to Contractor









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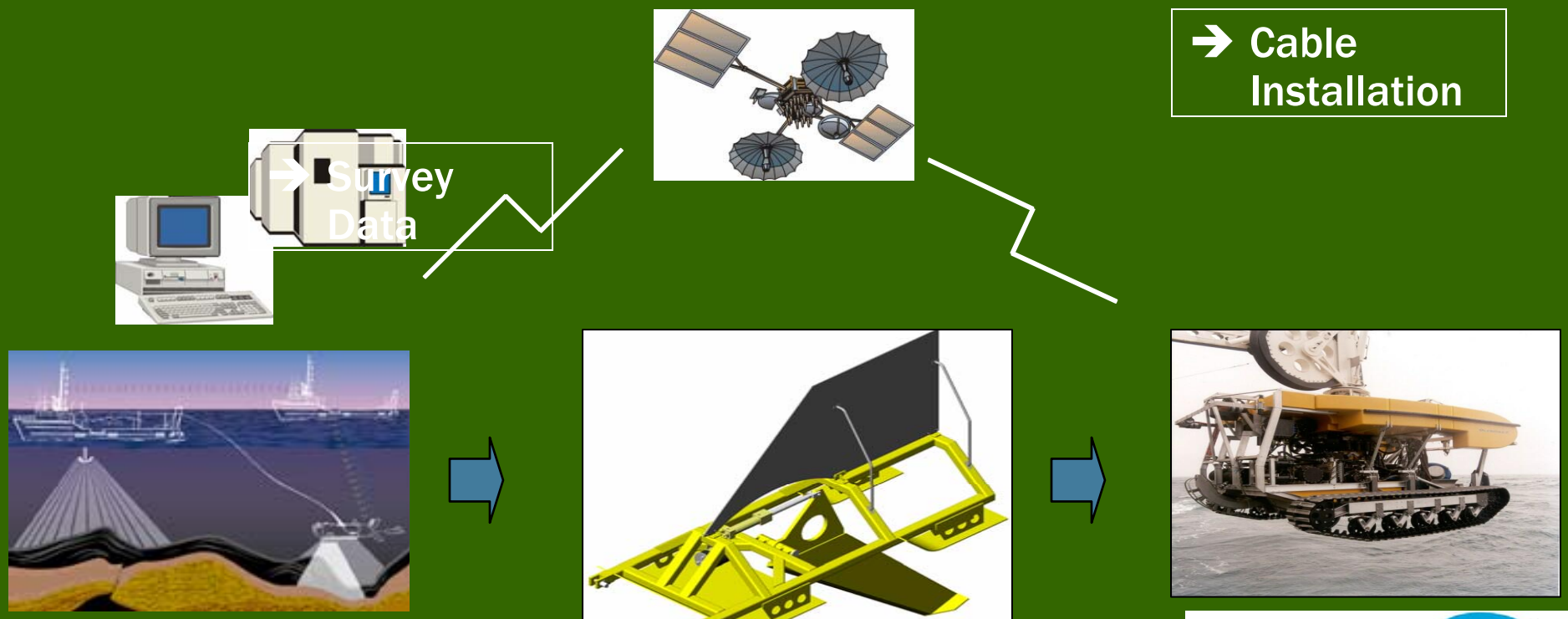
New Route Survey Technology – "Closing the Loop"



Burial Assessment Survey Tool

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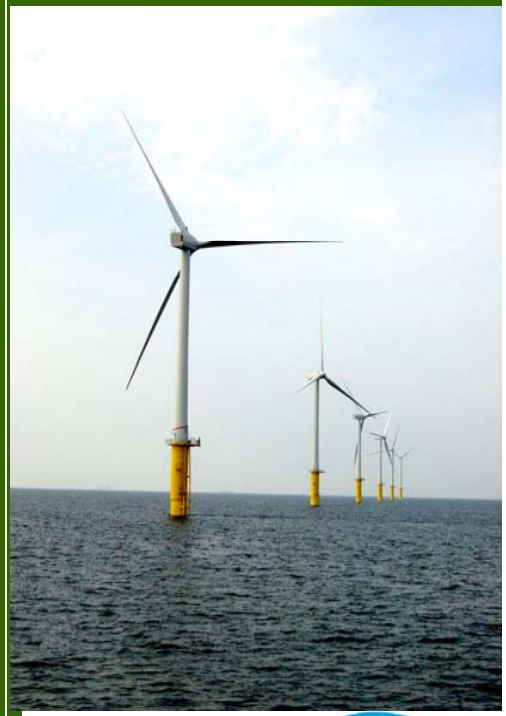
- Feasibility Studies
- Burial Assessment Surveys
- Project Management
- Cable Procurement, Installation & Burial
- Pre & Post lay Route Surveys
- Complete Shore End Management
- Air Diving when required
- Permitting



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