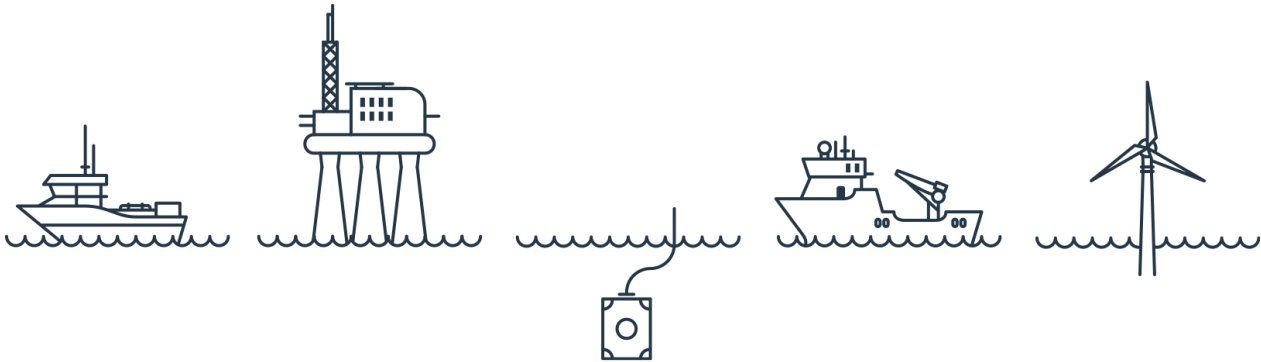




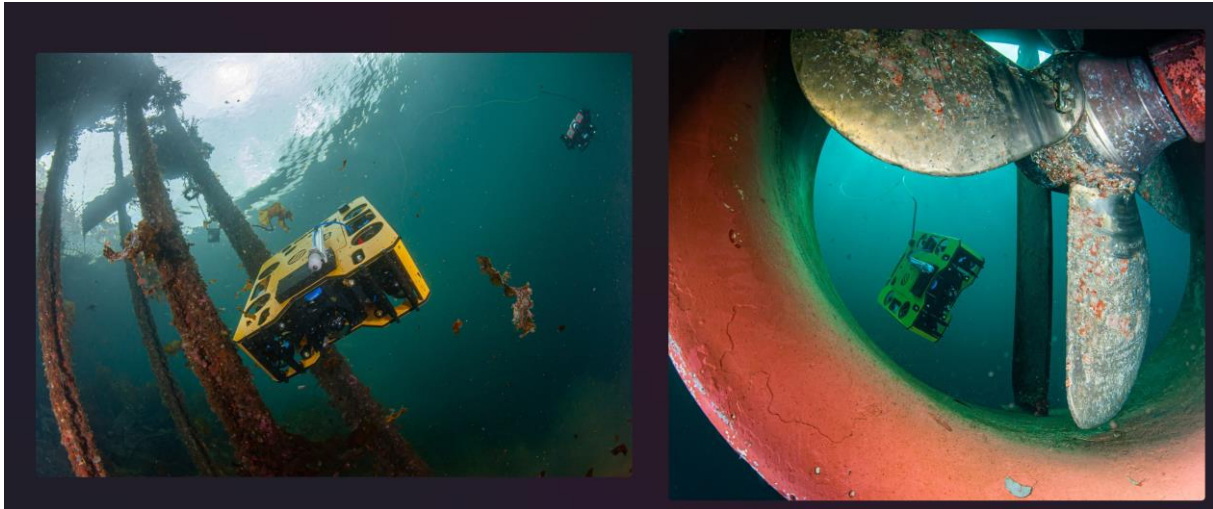
Mini ROV services
2024



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Mini ROV services from BeyonC AS



ACRO mini ROV

The ACRO mini ROV is a small ROV with a weight of approximately 40 kg, depending on sensor spread and equipment. The ROV is designed to operate in all orientations and has 6 degrees of freedom. The ROV comes with a power supply, tether, and survey computers. The ACRO is ideal for shallow water operations and is field proven with more than 60 jacket CP inspections and GVI / CVI operations in Angola between 2022 and 2023.

Patented integration with FiGS® for CP Inspection

The ACRO ROV can be delivered with a fully integrated FiGS® 2.0 sensor for CP inspections. FiGS® is FORCE Technology's proprietary CP sensor, delivering CP data for assessment of CP protection potential and remaining life calculations. The ACRO ROV is the only mini ROV available with fully integrated FiGS® sensor.

FORCE Technology is our sub-supplier for CP inspection and assessment and will provide certified CP inspectors and all related CP services.

CP with stabber

The ACRO ROV comes standard with a CP stab probe which can be used as a stand-alone equipment or in combination with FiGS®.

GVI and CVI

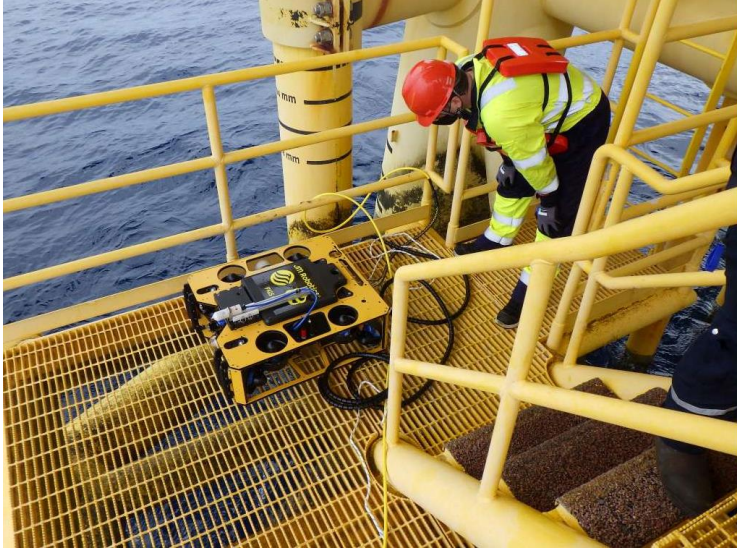
The unique flying capabilities of the ACRO ROV in combination with very good cameras and light makes it ideal for GVI and CVI. The ROV can access areas inaccessible with working class and even inspection class ROV's. With 6 degrees of freedom flight capabilities, the ACRO can capture video in the most demanding locations. Equipped with fiberoptic tether, several high-definition camera streams can be delivered topside. BeyonC does not provide CSWIP certified inspectors but will strive to provide certified inspectors in the future.

The ACRO ROV can be fitted with a cleaning tool, Flexi clean micro from Lateral, which is suitable for spot cleaning. Larger areas to be inspected with CVI must be prepared by other means.

Operations

Work and LARS from platform

The ACRO ROV can be launched from a platform deck or boat landing by use of a small crane or a pulley system.



Work from small vessel

The ACRO can be launched from a small vessel by hand or by use of a small crane.

Limitations (depth)

Ideal working depth is from 2 to 100 meters, but the ROV is rated for 300m.

Work-space requirements

The ACRO ROV can be controlled by a single laptop computer and a hand controller. The ROV power requirement is 16A at 230V.

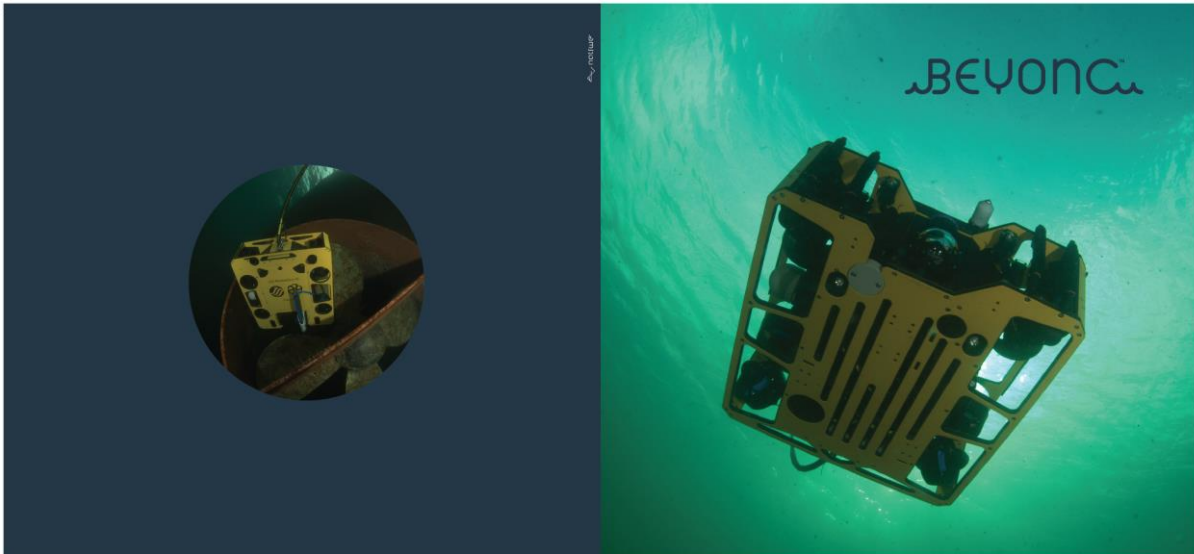
Personnel / operators

BeyonC AS can provide ROV supervisor, ROV pilots and certified FiGS® personnel. BeyonC AS can also offer training for local ROV pilots. FORCE Technology Norway provide FiGS® training for local CP inspectors.

ROV Equipment

HD color camera with tilt	Blue Robotics	Standard
Light	12000 lumen	Standard
Auxiliary camera	On request	Optional
Sonar:	Gemini 1200ik and 720is from Tritech	Standard
DVL:	DVL 50 from Water Linked	Optional
USBL:	Subsonus from Advanced Navigation	Optional
CP stabber:	DigiCP from Ocean Tools	Standard
CTD sensor:	Mini CTD from Star-Oddi	Standard
Gripper:	Newtoon Subsea Gripper from Blue Robotics	Optional
Cleaning tool	Flexi clean micro from Lateral	Optional
CP field gradient tool:	FiGS® 2.0 from FORCE Technology	Standard

ACRO ROV Datasheet



Contact

sales@beyonc.no

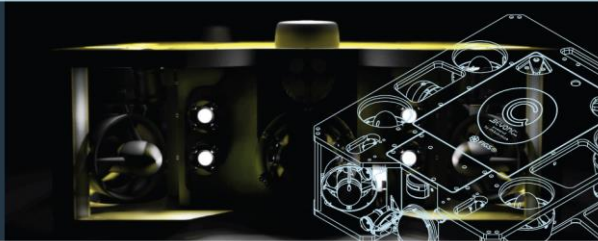
Online Support:

Remote support is pre installed on ROV and Topside Power supply.
With Remote support we can troubleshoot, update and maintain your ROV system.
ROV is prepared with 2x auxiliary for extra equipment. (USB and Ethernet 12V and optional Serial data)



BeyonC AS · Org.Nr 928295761 · beyonc.no

BeyonC Mini ROV



Developed by BeyonC® AS

JM HD3C-FIGS® is a patent pending ROV system developed in collaboration with JM Robotics® AS. The ROV is designed to handle cold waters and demanding environments. This is a proper underwater tractor that can withstand use in the most demanding conditions along the coast. It has a depth capacity down to 300meters, and it comes with 3kW Topside Power System with ground fault monitoring. JM HD3C-FIGS® is robust, flexible with DVL, sonar and underwater positioning.

JM HD3C-FIGS® is the only mini ROV fully integrated with FIGS®



TECHNICAL SPECIFICATIONS

Physical

Length 740 mm
Width 660 mm
Height 240 mm w.o. sensors
Weight in Air w/o ballast 36kg
Weight in Air w/ ballast 38 kg
Construction Frame HDPE Plastic
Electronics Enclosure 4" Series aluminum
Power Supply 3" Series aluminum
Buoyancy Rated to 488m
Ballast Weight 6 x 200 g Stainless Steel

Performance

Maximum Rated Depth 300 msw
Maximum Forward Speed 1,5m/s, 3 knots
Thrusters BR T500 with connectors
ESC Basic 500 Max Current 50A
Thrusters Configuration 8 thrusters
- 4 Vecteded
- 4 Vertical
Forward Bolland Thrust 35kgf
Vertical Bolland Thrust 50kgf
Lateral Bolland Thrust 35kgf

Camera

Camera 1080p HD, low-light
Camera Field of View 110° horizontally
Tilt Servo Mitac HS-5055HG
Lights 12000 Lumens total
Brightness (with dim control) 8 x 1500 lumens
Light Beam Angle 135°

Sensors

FIGS® 2.0 sensor
DVL
CTD sensor
CP stabber
Realtime sonar
3-DOF Gyroscope
3-DOF Accelerometer
3-DOF Magnetometer

Internal Temperature sensor
BR Bar 30 Pressure/Depth & Temperature Sensors,
external Current and Voltage Sensing
Leak Detection

Aux equipment:

Side Scan sonar
USB
Scanning sonar
3D Camera
Laser Scanner

External interface

2 AUX Input and 24V w/ USB and/or Ethernet

Power supply

Length 420 mm
Width 480 mm
Height 220 mm
Weight 11,5 kg
Input Voltage 180-240 VC, 50-60 Hz
Input Current Max(fuse) 16 A
Output Voltage 340 - 400 VDC
Output Current Max 7,5 A
Output Power Max 3000 W
Operating Temperature -20 to 60°C
Humidity 20-90% RH non-condensating
Safety Auto. Ground failure detection
IP ratings IP20 (waterproof case)

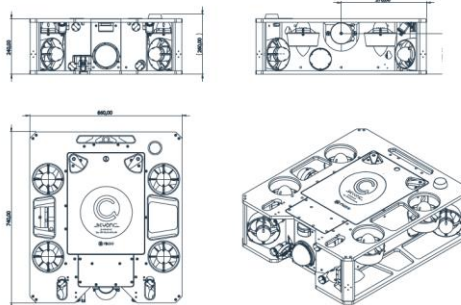
Tether

Sheath colour Yellow
Diameter 13 mm
Buoyancy in salt water Neutral
Working strength 150 kg
Breaking strength Min 230 kg
Max Voltage Power Conductors 1 Kvolts
Max Voltage Data Conductors 600 volts
Static bending radius >5 x outer diameter
Dynamic bending radius >12 x outer diameter

BOTH ROV AND POWER SUPPLY COMES WITH REMOTE SUPPORT!

Special features

Worlds only mini ROV fully integrated with FIGS®
6 DOF flying capability with attitude control, 6 DOF station keep with DVL
All auto functions (Heading, depth, altitude, attitude)
Full instrument integration capabilities
Gigabit ethernet
Hand carry size



CP services (FORCE Technology Norway)

CP survey using FiGS (field gradient sensor)

FiGS®, Field Gradient Sensor is a state-of-the-art non-contact CP inspection tool that performs highly accurate measurements of electric currents in seawater with a resolution and detection level that surpasses all other field gradient sensors available on the market. The sensitivity of the sensor enables the identification of corrosion problems and the characterization of CP system status on pipelines and subsea structures, even when buried.



FIGS 2.0.

Accurate field gradient data from FiGS® combined with FORCE Technology's proprietary CP modelling expertise will not only give our clients confirmation of a protected structure, like traditional CP inspection techniques, it will give life expectancy of the system, interaction between connected systems, drain to buried structures and real steel current densities. The steel current density will tell you how much current and anode mass is required to protect a given structure.

Design codes are usually overly conservative when calculating the steel current density and using real values in retrofit CP designs have demonstrated typical cost savings of 50%.

The FiGS® technology has proven substantial cost savings at several levels, from more efficient and quicker inspections, to eliminating the use of divers and excavation of buried or covered structures, when compared to alternative methods. The high-quality mapping of field gradient data offered by FiGS® has opened possibilities not only to predict the future performance and degradation of a CP system, thereby reducing the frequency of inspections, but also to pinpoint areas of interest, offering only necessary and coordinated intervention. Due to the added value and cost saving potential, several customers have now established FiGS® as their preferred CP Inspection tool, for everything from baseline to standard periodic and life extension surveys.

Together with subsea companies we have performed several inspections of CP systems via our innovative FiGS®.

Currently FiGS® been used to have inspected:

- Jackets
- Buried and exposed pipelines and flexibles
- Wellheads
- Risers
- SSIV
- X-mas tree
- Manifolds
- Flexibles
- Umbilicals

Major oil and gas operators such as Equinor, Chevron, BP, ConocoPhillips, Shell and Eni have already experienced the benefits of using this innovative way of performing CP inspections.

A generic method statement for FiGS® is attached in **Error! Reference source not found.** (attached as separate file).

Complementary CP services

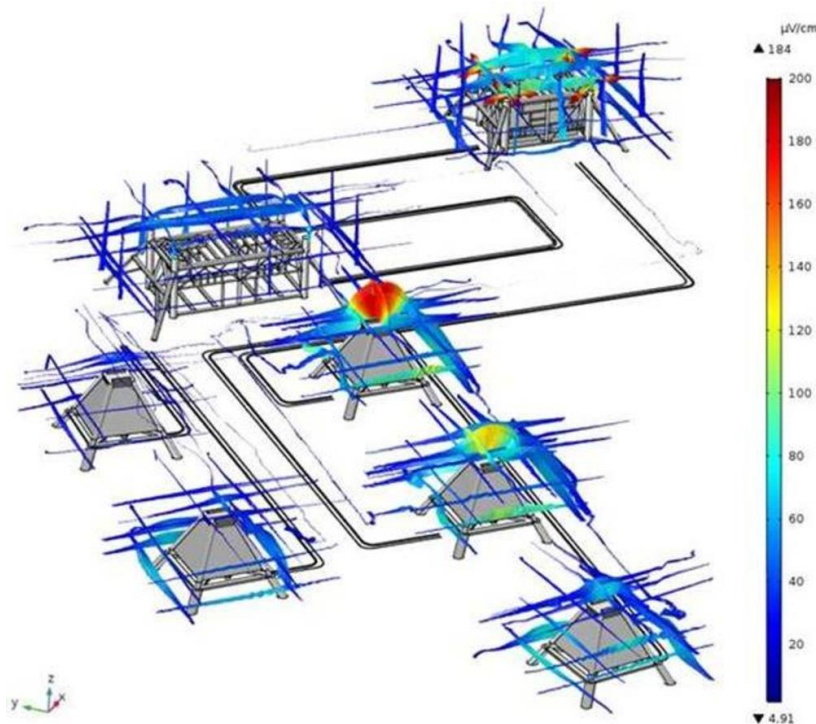
In addition to CP inspection, we provide a wide range of cathodic protection (CP) services and solutions that prevent and control corrosion as a part of integrity management of fixed platforms, including:

- CP modelling
- CP design
- CP management and consulting.

Proper CP management is important and necessary to stay in control of the cathodic protection system. Staying in control may result in improved cost efficiency with regard to inspection intervals and prevention of otherwise unforeseen corrosion damages and breakdowns.

CP modelling

We provide cathodic protection modelling of all types of structures and pipelines. Our experts have developed a powerful software solution for this purpose, SeaCorr™, which can be used to simulate a wide range of structures. The main objective of CP modelling is to demonstrate the actual performance of a CP system. We simulate CP performance throughout its service life on structures, with or without coating, using sacrificial anodes, impressed current and hybrid systems. SeaCorr™ is an excellent tool to use when considering anode retrofit and life extension, as it utilises our unique database with real-life data in order to simulate the exact number of retrofit anodes needed.



Mapped subsea structures

This comprehensive approach gives us a competitive edge with regard to the quality and reliability of our CP modelling results, and we can demonstrate large savings by using real-life current densities as opposed to conservative design codes. We can also verify CP designs, using design code values. In addition to using our real-life database, we also utilise CP and Field Gradient inspection data, from FIGS® surveys, in order to optimise the simulation results to the actual performance of the structure in question. Specific parameters, like historical over protection from an impressed current system, may give individual structures polarisation conditions which will deviate from the expected conditions. Field gradient data may therefore give valuable input in addition to the SeaCorr™ database.

With CP modelling, you can try out different scenarios in order to ensure the optimal protection of your asset.

CP design

When designing a structure, whether it's a new one, a retrofit modification or a life extension, it is important to ensure full cathodic protection throughout its entire design life. This is achieved through a proper cathodic protection design, where the required amounts of anodes are calculated, and anode placement is determined.

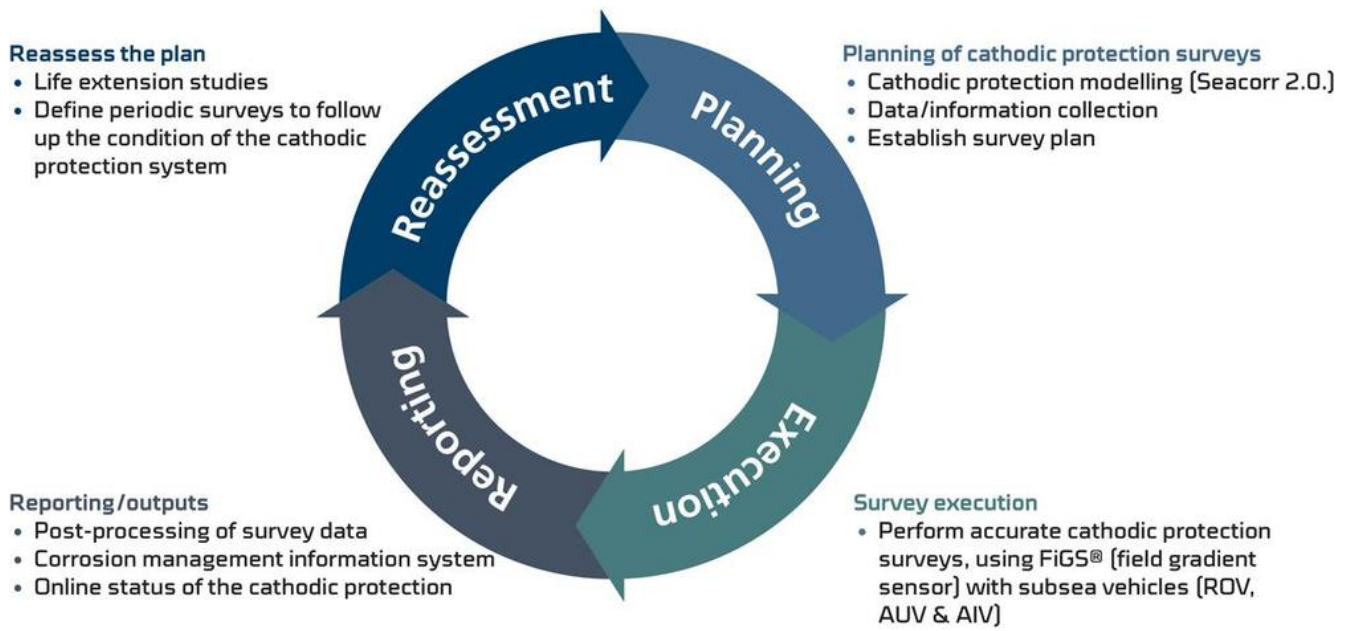
We hold a large team of experts, with experience from deep waters to onshore facilities, and from case studies to research and development. We provide CP design and evaluations of jackets, subsea structures, pipelines, FPSOs, semi submersibles, wind turbine foundations, caissons and other confined areas, chain connectors and more.

Our design and modelling experience combined with on-site inspection allows us to keep CP retrofit cost at a minimum, as well as ensuring optimal operation.

CP management & consulting

Proper CP management is important and necessary to stay in control of the cathodic protection system. Staying in control may result in improved cost efficiency with regard to inspection intervals and prevention of otherwise unforeseen corrosion damages and breakdowns.

We offer full management of cathodic protection systems, including site inspection and inspection management, data analyses and reporting as well as various assessments of CP systems. The figure below illustrates our integrated management concept for CP systems.



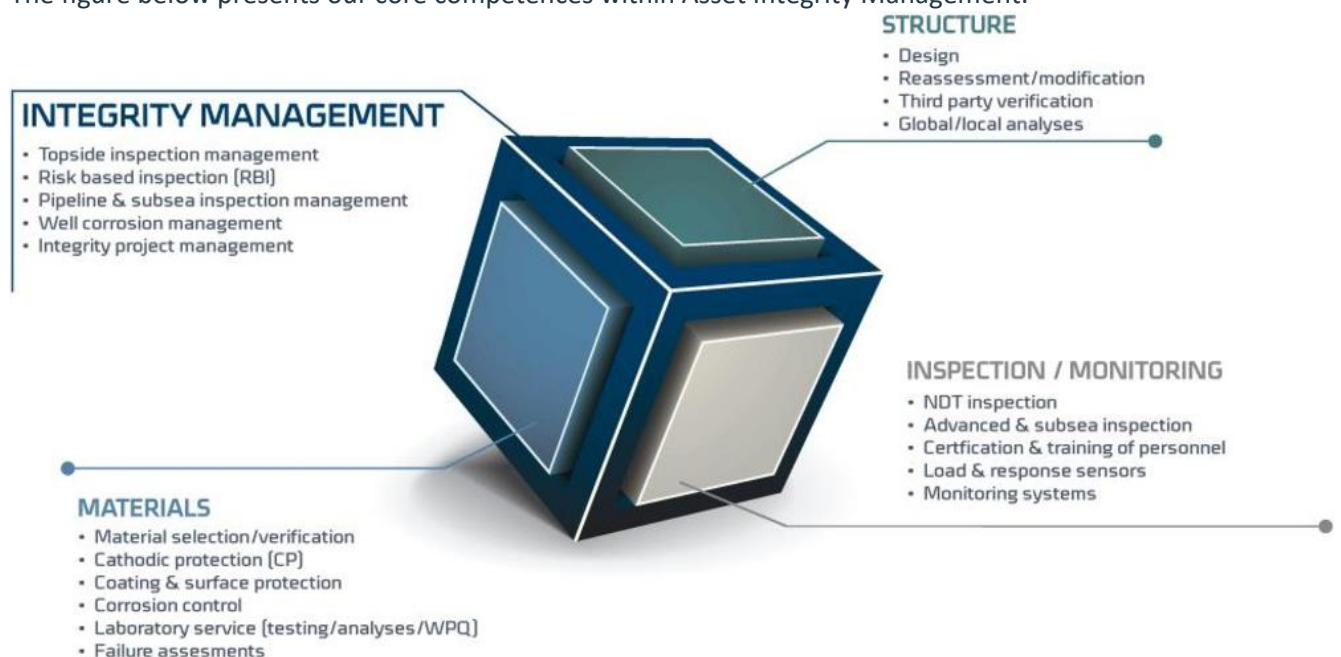
FiGS survey management circle

Our Corrosion Management Information System (CMIS) allows us to share CP inspection, monitoring data and more with all relevant personnel. It is a web-based data management system that allows the comparison of inspection data and monitoring data with results from CP simulations and what-if analyses, given that these results are available. Dedicated personnel receive an e-mail notification whenever a report has been uploaded, or if an action has been assigned to them. CMIS shows the system status as traffic light colours for easy status review and interpretation.

Other related services

For more than 25 years, we have provided Asset Integrity Management services to onshore and offshore facilities. Through collaboration with our clients, we contribute to reduce risk, increase safety and improve environmental performance of assets.

The figure below presents our core competences within Asset Integrity Management.



Asset integrity management

Below we elaborate on the services that might be relevant for the scope of work of subsea CP inspections.

Pipeline & subsea inspection management

Pipelines and subsea equipment represent a very important part of the energy infrastructure. Proper management of pipelines and subsea equipment is critical for maintaining continuous production for oil companies. This includes identification of high risk areas for corrosion, effective use of mitigation, implementation of monitoring activities and inspection resources in addition to improved public health, safety and environmental protection. We offer several solutions for these types of challenges. This includes among others:

- Operational support
- Inspection planning
- Risk analysis
- Data analysis (e.g. pipeline degradation)
- Corrosion modelling (e.g. remaining service life estimations, software)
- Recommendations regarding corrosion and materials
- Cathodic protection inspection (FIGS®), modelling and analysis
- Advanced inspection/monitoring for subsea (e.g. vibration, automated ultrasonic and eddy current inspection)

Corrosion & materials technology

A prerequisite for safe operation is the understanding of how materials perform under normal operating conditions, as well as under unintended exposure. Among other material related services within asset integrity management, we can assist with:

- Material selection/ verification
- Corrosion rate simulations
- Coating and surface protection
- Welding consultancy/ certification
- Laboratory services (testing and analysis)
- Failure assessment.