

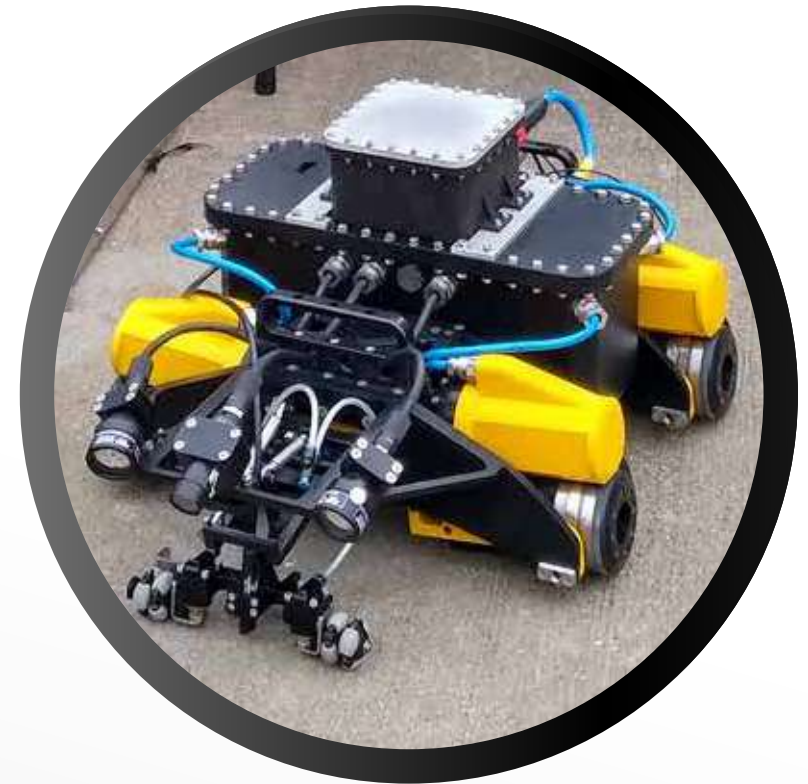


DELIVERED TO YOU BY

INNVOOTEK
INSPIRING INNOVATION

Amphibian

Robotic platform for inspection and maintenance of critical infrastructure.



Changing the future of NDT inspection for large offshore assets

Inspection and maintenance of critical offshore assets in offshore renewable energy, oil & gas, ship-care, or other industrial sectors, is expensive, with approximately **65% of all costs being operational.**

Inspection of assets is potentially hazardous and can put operators at great risk. It is a time-consuming process due to the large, complex nature of the infrastructure. Harsh environments, including the splash zone, working at height, toxic gas and confined spaces, make inspection even more challenging.

Robotics can offer a **safe alternative** to hazardous and reactive inspection conditions, especially for **offshore, underwater structures.**

Inspection robots can provide a real competitive advantage by performing tasks **safely, quickly and with great precision.** Single machines and teams of robots can deliver not just a visual check but also **structural assessment and immediate cleaning.** This enables the asset owner to acquire high-quality data for a lower cost, reduce risks to personnel, and optimise the maintenance schedule.



Key features of the platform

**SAFE CLIMBING ON
CURVED FERROMAGNETIC
SURFACES, INTERNAL
AND EXTERNAL**

**ALL WHEEL DRIVE
WITH ACTIVE
TRACTION CONTROL**

**MULTI-SENSOR
ENABLED
LOCALISATION AND
VISUALISATION**

**REMOTE INSPECTION
OF CRITICAL
INFRASTRUCTURE**

**MARINISED DESIGN
FOR UNDERWATER
OPERATION**

**MOBILITY OVER
WELD CAPS AND
PLATE JOINTS**

**CLEANING OF
BIOFILM
AND CORROSION**

**AUTOMATED WELD
FOLLOWING
MODULE**

Advanced inspection and maintenance made safe.

Amphibian is a robotic platform that enables remote access to large critical infrastructure, such as offshore assets, to carry out **inspection and maintenance**.

Amphibian is designed for **harsh marine environments** and can operate in both the splash zone and at depths of up to **60 metres in saltwater**.

Amphibian is uniquely agile on curved and domed structures whilst carrying inspection and tooling payloads of over 25 kg. The robot's chassis design ensures conformance of the magnetic wheels to the surface, resulting in good traction and **constant adhesion**. The operator can drive Amphibian in **any direction** with complete confidence.

A set of powerful lights and a high-definition camera provide clear **visual** inspection. Amphibian is compatible with a suite of **advanced NDT sensors** that can be integrated to best meet the application requirements (e.g. corrosion mapping, weld inspection etc.). Furthermore, Amphibian can effectively remove marine biofouling using its modular **cleaning** system.



SHIP-CARE



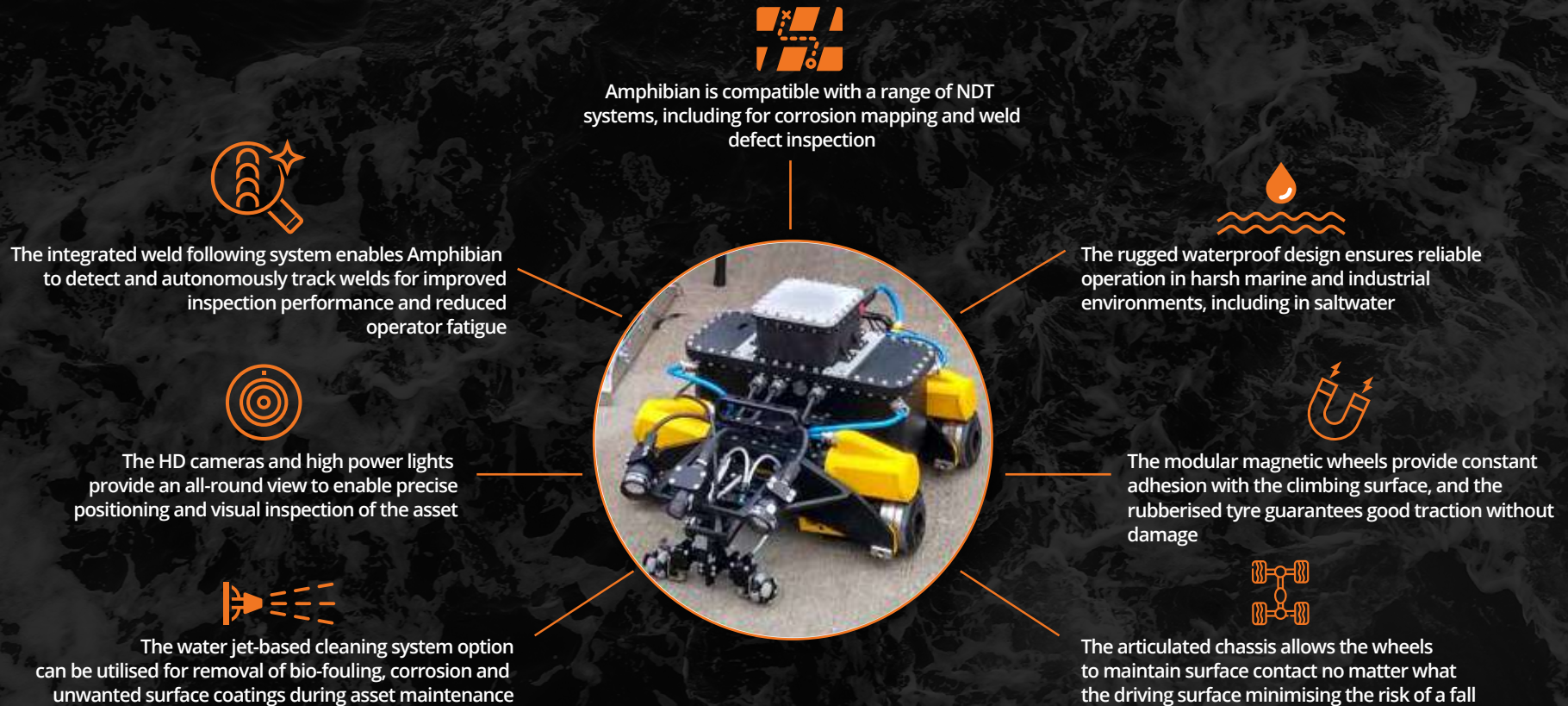
OFFSHORE
ENERGY



CHEMICAL



State-of-the-art robotic platform for high performance operations



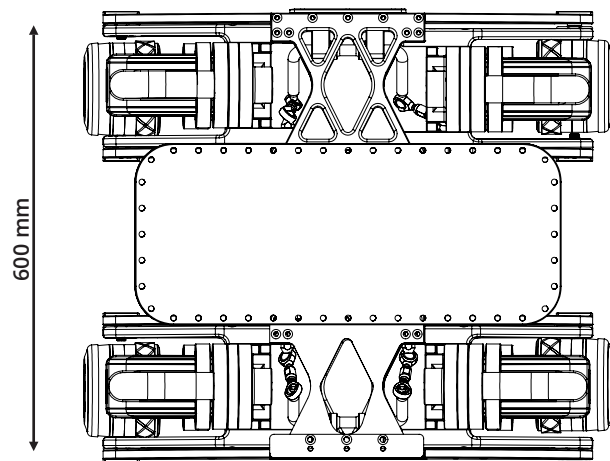
Deployment: 2 people



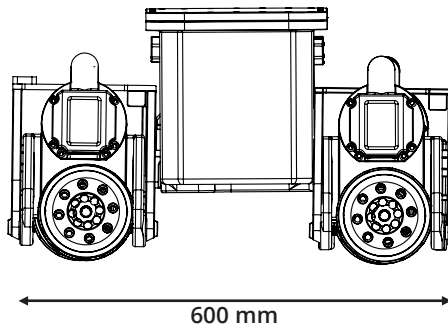
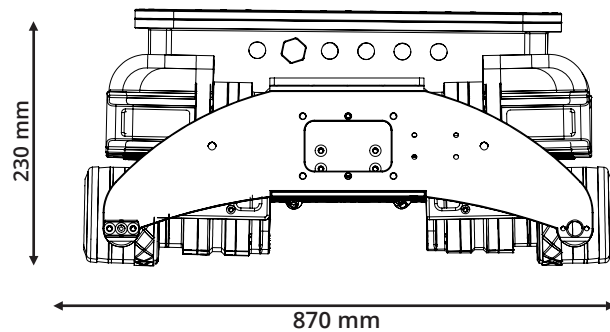
Control: 1 person

A compact and mobile assistant

Specification and dimensions



Dimensions	870 x 600 x 230 mm
Weight	42 kg (not including umbilical)
Payload	25 kg
Operation	Rated to 60 m water depth
Speed	Variable 0-50 mm/s
Power supply	110-240 Vac
Power and communications tether	Integrated 60 m standard, longer available upon request
Control	Command station with rugged PC, user interface and industrial joystick
Camera system	Forward And Rearward Facing
Video camera formats	HD 1080 p
NDT integration	A range of advanced NDT can be supported, including UT



Optional

Surface cleaning	High Pressure Water Jet Module
Tether control	Tether Management System
Automated Weld Following	Vision-based weld cap following system

Optional features

Tether Management System

The TMS is designed to store and deploy a soft tether for Amphibian. Fitted with a variable speed electric drive, the TMS can be operated using the simple control panel. This makes it straightforward to pay out and haul in the tether as required.

It is ruggedly constructed from stainless steel and is corrosion and saltwater resistant. It provides a safe, dry environment to store Amphibian's command station.

Should power be lost during operation, the TMS can supply back-up power for up to 2 hours to ensure Amphibian can be safely recovered. Its compact design allows operation in space-constrained environments.

TMS Specification:

Pay-out and haul in speed	100 mm/s
Dimensions	1000 x 1000 x 1200 mm
Weight	400 kg
Lifting	Standard crane, integrated lifting points
Storage	Provides secure storage for the command station and accessories
Back-up power	2-hour battery power for emergency recovery
Environment	IP67

Surface Cleaning Module

Amphibian can be operated with a water jet cleaning module to clean surfaces of biofouling or corrosion. An array of nozzles direct high-pressure water at the contaminated surface in the direction of travel. This ensures fouling is removed prior to inspection to achieve best results. The water pressure can be adjusted depending on the type of fouling or to protect surface coatings.



Compatible with all **industrial NDT systems**

Amphibian provides a **robust and stable platform** for asset inspection when incorporating advanced **NDT** methods. Both **ultrasonic** and **electromagnetic** solutions are suitable for integration with Amphibian.

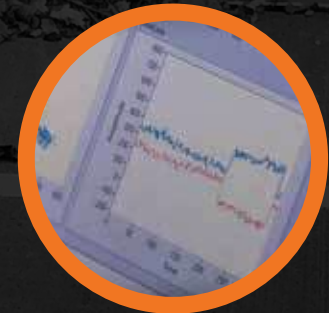
The choice of NDT system is dependent upon the application, including **corrosion mapping**, **thickness measurement** and **weld inspection**. Amphibian can support a variety of industry-standard solutions, including:

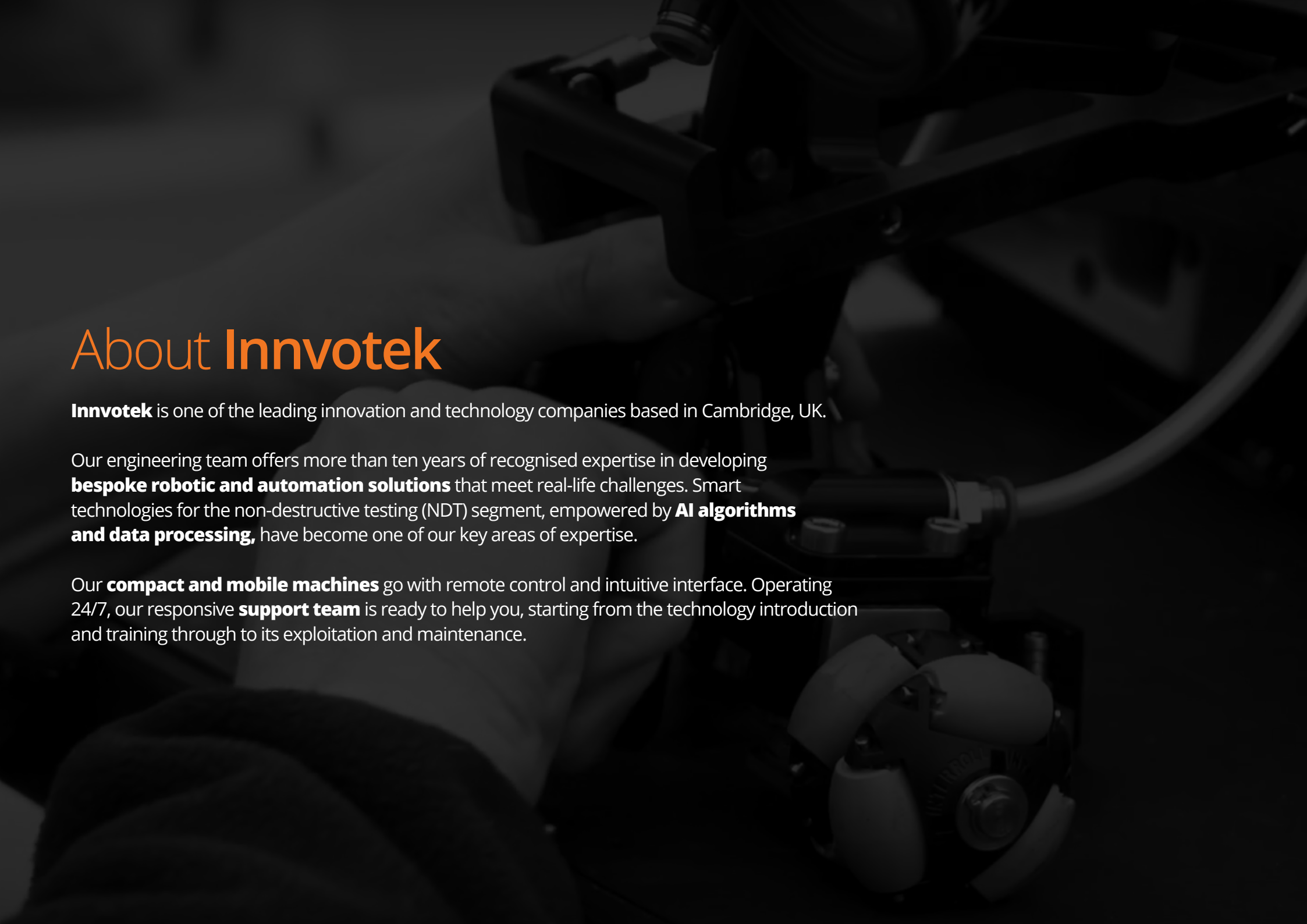
- ToFD (time-of-flight diffraction)
- UT (ultrasonic testing)
- PAUT (phased array ultrasonic testing)
- EC (eddy current)

Bespoke NDT probe integration and actuation is also supported to suit customer requirements. The NDT data is streamed directly to the user interface and can be viewed in real-time.

Autonomous Weld Following Package

Amphibian has the capability to follow weld caps with no input required from the operator while NDT inspection is underway. Many assets have hundreds of metres of weld that require inspection. In the marine environment, visibility is often poor, making manual identification of the welds difficult for the operator. The Autonomous Weld Following Package takes the strain off the operator and allows time to focus on the inspection data rather than operating the robot.





About Innvotek

Innvotek is one of the leading innovation and technology companies based in Cambridge, UK.

Our engineering team offers more than ten years of recognised expertise in developing **bespoke robotic and automation solutions** that meet real-life challenges. Smart technologies for the non-destructive testing (NDT) segment, empowered by **AI algorithms and data processing**, have become one of our key areas of expertise.

Our **compact and mobile machines** go with remote control and intuitive interface. Operating 24/7, our responsive **support team** is ready to help you, starting from the technology introduction and training through to its exploitation and maintenance.



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