

Confined Spaces: An Arena for Endless Possibilities

Reducing the risks of entry with robotic
vessel inspection solutions.



A worker enters a confined space and collapses.

Coworkers attempt to rescue the fallen worker but also become casualties of a toxic environment.

Despite increased training, greater availability of safety equipment and rescue personnel, and written entry safety rules mandated by OSHA, workplace deaths in 2018 were nearly double that of 2012. This all-too-common occurrence can be avoided with robotic vessel inspection solutions from Waygate Technologies.

- Pan, tilt, zoom, and see everything you need to see in high definition with the PTZ HD30.
- Automatically geotag images with the telescoping 3D LOC POLE.
- Gather better data across every inch of a vessel's internals and externals from a safe, remote location with the BIKE robotic crawler.
- Combine all inspection data to a single digital twin using 3D LOC software.

Beyond providing a safer, lower-risk method for observing conditions, our API-compliant inspection solutions outperform the competition at every turn, generating high-quality NDT data and images that exceed human capabilities of using eyesight alone. Looking at the bigger picture, our solutions reduce the total turnaround time by up to 70%, saving you both time and money.

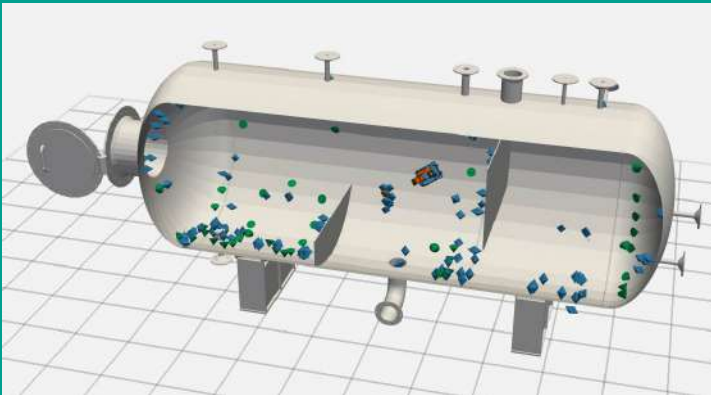
How the BIKE Reports Better Data

Confined Space API 510 Compliant Inspection Report

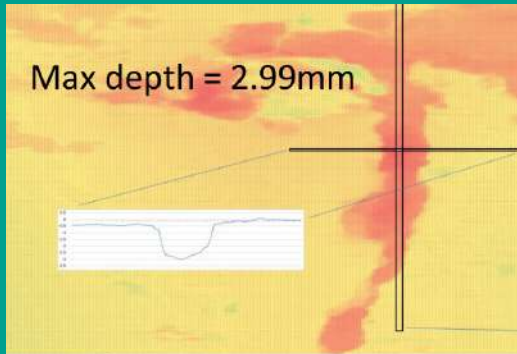
Internal inspections are about collecting important data, determining the cause of the observed damage, and then using that data to determine if the equipment can continue to operate safely. Our inspection reports generate automatically, and the data can be uploaded into asset performance management systems. Below is the type of data you'll receive from a generated report.



3D-structured light for detailed mapping inside a vessel.



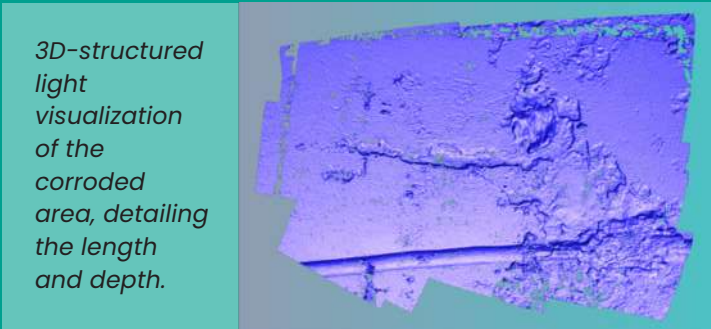
3D LOC scan plan for a complete digital record of the exam and report.



River-bottom plots showing maximum depth in the affected region of the ID corrosion from the 3D data analytics.



Visual confirmation of corrosion on the ID surface of the vessel.



3D-structured light visualization of the corroded area, detailing the length and depth.



PTZ HD30

See the full picture without having to take it yourself.

When too close is too dangerous, the PTZ HD30 answers the call. This powerful, industrial camera comes equipped with a 30x optical zoom for sharp, clear images – even at long distances. The full HD image quality comes with noise reduction and de-fog features, making its LED illumination superior to any other inspection camera on the market. The PTZ HD30 is 3D LOC-enabled so images can be geotagged to a digital twin. Its capacity for image collection allows for historical comparisons to identify and track changes to tanks or vessel profiles.

The camera can also be attached to the Waygate Technologies BIKE and FAST RVI robotic platforms to extend the reach and obtain close-up images inside confined spaces.

Applications:
Pressure Vessels | Storage Tanks | Catch Basins | Sewer Lines | Elevated Targets

Technical Specifications	
Minimum Size of Entry	128mm
Image sensor	Full HD / 2.38 Megapixels
Zoom	30x optical / 12x digital
Field of view	63.1° wide end – 2.3° tele end
Pan / Tilt	Infinite / 220°
Illumination	4 x 20W LED
Dimensions	246mm x 117mm x 113mm 9.7" x 4.6" x 4.5"
Minimum diameter deployment	128mm 5.04"
Weight	Weight
Operating temperature	0°C ... 60° 32°F ... 140°F
Radiation	1500 rad/h / 25000 rad total
Watertight	50m / 5bar



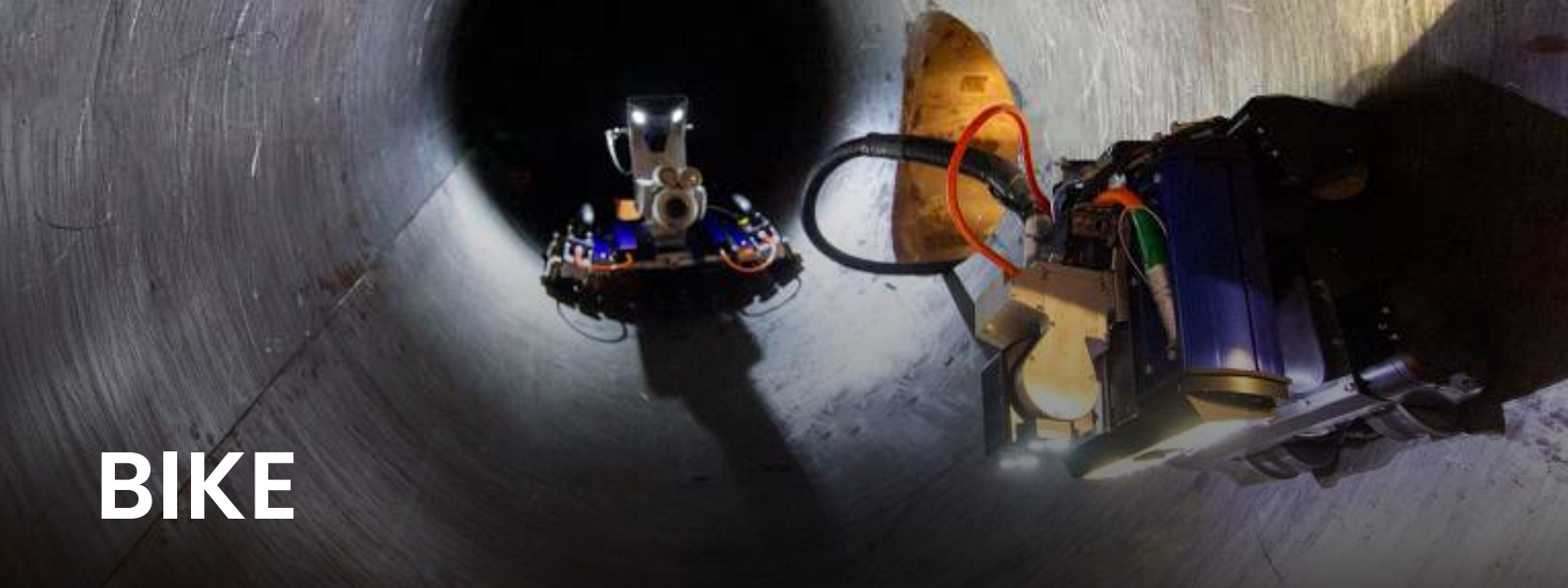
3D LOC and 3D LOC POLE

Spatial intelligence for more efficient inspections.

A novel approach to confined space robot localization, 3D LOC software provides full spatial awareness inside the inspected asset. Inspection data is automatically tagged with the precise position in the asset, and a digital twin containing all the inspection data (e.g., text, images, files) is maintained. Inspection reports are generated automatically, and the data can be uploaded into asset performance management systems.

And with the 3D LOC POLE, you won't have to resort to twisting a pole up and down. The 3D LOC POLE does all of the positioning for you – providing 3D spatial awareness for inspection inside the asset, as well as 3D interactive camera control.

General		
Telescope Pole		
Dimensions (collapsed)	1560mm x 266mm x 161mm	
Dimensions (expanded)	4520mm x 266mm x 161mm	
Min Nozzle/deployment hole size	100mm (4")	For the Tube (depends on camera as well) min. deployment diameter OTZ HD30 128mm 5.04"
Weight	10kg	
Operating Temperature	0°C ... 45°	
Input Voltage	48V DC	
Max Power	10W Standalone 55W with TZ1 camera	
Communication	100mbps ethernet	
IP	IP65	
Manway mounting bracket		
Applicable Range	100mm to 1200mm	
Dimensions	232mm x 312mm	
Weight	5kg	



BIKE

Overcome every obstacle. Literally.

Get better inspection data remotely across every inch of confined space with the BIKE, the only magnetically wheeled robot capable of maneuvering in even the most rugged environments. The BIKE boasts an ability to work through size constraints, temperature extremes, and difficult geometries to nonetheless reach target locations. Equipped with ultrasonic probes and/or a pan-tilt-zoom camera, this four-wheeled robot can climb vertical walls, inside and outside pipeline structures, and pass over complex combinations of convex and concave step obstacles. With the use of 3D LOC, the BIKE automatically tags NDT data with its exact coordinates to the 3D digital twin.

Multiple additional modules such as ultrasonic or eddy current probes, video borescope probes, or structured light cameras are available to extend the function of the robot and open new ways for inspection without human entry in confined spaces.

Technical Specifications		
Size of Entry	350mm	500mm
Dimensions	Length	247mm (9.72")
	Width	190mm (7.48")
	Height	217mm (8.54")
Weight	w/o cables and water hoses	9.6kg (21.2 lbs.)
Speed	Fully adjustable	-50mm/s ... 50mm/s (-2"/s ... 2"/s)
Payload	On clean ferromagnetic surfaces	10kg (22 lbs.)
	Overhead	5kg (11 lbs.)
Drives	4 integrated drive units with 48V brushless DC motors (Maxon)	
Power Supply	48V via umbilical cable from Integrated Control Station	
Motor Controller	Integrated Inspection Robotics motor controller	
Communication	Gigabit ethernet with power over ethernet	
Cable Length	ICS2 to robot standard version	30m (100 ft.) (longer on request)
	ICS2 to robot (with UT module, incl. couplant)	10m (33 ft.)(longer on request)

Entry into confined spaces no longer needs to be a major risk to the safety and health of those involved in operations, thanks to robotic vessel inspection solutions from Waygate Technologies.

With the BIKE, PTZ HD30, 3D LOC POLE, and 3D LOC software, you can increase safety while ensuring more accurate, consistent, and efficient inspections.





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