

# EFFICIENT AND ACCURATE TANK SHELL INSPECTION.



THE CHALLENGE	THE SOLUTION	THE BENEFITS
<p>Increase efficiency, probability of detection and improve data quality of ultrasonic tank shell inspections whilst reducing safety risks.</p>	<p>Scorpion2 high speed remote access crawler with Swift rugged ultrasonic instrument.</p>	<p>Complete inspection efficiency improvements with higher probability of detection and improved data quality for greater accuracy.</p>

API653 and EEMUA159 standards recommend a periodic visual and ultrasonic inspection of above ground storage tank shells. The diameter of a tank will determine the number of vertical scan lines with a minimum of three ultrasonic thickness measurements per shell course.

Three measurements per course provides a low probability of detection, it also makes it difficult to identify any corrosion patterns, calculate corrosion rates, nor does it provide a detailed insight to the condition of a tank.

Traditional inspection methods of ultrasonic thickness gauging require an operator to access each of the shell courses which is often achieved by either erecting scaffolding, utilizing a Mobile Elevated Work Platform or abseiling down the side of the tank.

The first generation of ultrasonic crawlers produced a higher probability of detection but would typically travel at speed of 25 mm/s, which doesn't provide much of an efficiency improvement compared to traditional spot reading methods.

These methods can be very costly, time consuming and can pose health and safety risks to NDT personnel.

Scorpion2, Silverwing's latest generation crawler system overcomes the problems with spot readings and the early crawlers. Scorpion2 when combined with Swift delivers major efficiency improvements to tank inspections.

The easy to deploy system consists of just 3 components: Scorpion2 crawler, Swift data acquisition instrument and 50m umbilical cable.

Scorpion2 crawler can collect ultrasonic thickness measurements at speed reaching 180 mm/s (7 in/s).

The probe holder with a compact wheel probe allows the Scorpion2 to collect thickness measurements within critical heat affected zone, 25mm above and below horizontal course welds.

The dry-coupled probe eliminates the requirement for additional couplant such as water or ultrasonic gel to be applied to the inspection surface.

Data is collected by the Swift ultrasonic instrument. Swift is a rugged, handheld touch screen data acquisition and crawler control instrument.

Swift integrates powerful ultrasonic electronics and data capture and analysis software to produce superior inspection results.

### Increased Efficiency

Inspection speed up to 180mm/s which is 7 times faster than the first generation of crawlers.

### Higher Probability of Detection

Scorpion2 can recorded a thickness measurement every 1 mm, which equates to 2000 reading over a typical 2 meter high course or 12000 reading over a 12 meter high tank compared to the recommended 18 readings.

### Improved Data Quality

The intuitive software introduces floating gates. Floating gates track to the same percentage of the signal amplitude. This enables signals of much lower amplitude to be picked up, improving the accuracy and increasing the efficiency of data analysis.

### Simple Reporting

Real time inspection data collected is displayed as A-Scan, B-Scan amplitude and profiling views. The full-amplitude B-scan mode helps characterize wall loss, which, in turn, makes detailed post-inspection analysis and accurate corrosion assessments possible. Inspection data can then be exported as a CMAP or .csv file.

## System Comparison - Scorpion1 vs Scorpion2

Description	Scorpion1	Scorpion2
Capture speed	25mm/s	180mm/s
Straight line guidance	No	Yes
Steerable	No	Yes
Battery Source	Lead - Acid (Heavy)	Li-ion
UT Signal loss recovery - 12mm weld step	80mm	40mm
UT Floating gates	No	Yes
Joystick integrated	No	Yes
Joystick variable speed	No	Yes
Magnetic grip	2 wheels and belly magnet	4 wheels
Magnetic transducer holder	Manual adjustment	Auto adjustment
System Components	6 pcs	3 pcs
Total weight	58kg	36.8kg



Traditional tank shell inspection



Remote crawler tank shell inspection

## Swift Software

The feature packed Swift B-scan data acquisition software has been designed for easy navigation and intuitive inspection setup. All the important inspection data is contained within one screen with convenient quick access menu bars for settings, gate configuration and analysis.

Floating gates track to the same percentage of the signal amplitude. This enables signals of much lower amplitude to be picked up, improving the accuracy and increasing the efficiency of data analysis.

Data reprocessing can be simply carried out post inspection by changing gate settings which then updates the B-scan amplitude and profile views. This allows an operator to make fine adjustment to an inspection dataset without repeating the inspection process.

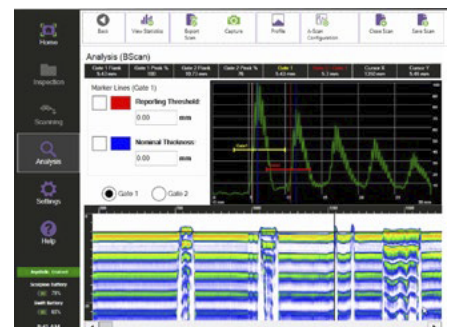
The full-amplitude B-scan mode helps characterize wall loss, which, in turn, makes detailed post-inspection analysis and accurate corrosion assessments possible.

Placing the cursor over any part of the B-scan profile shows the A-scan trace for that specific section of the scan. Furthermore, you can display an adjustable reporting threshold indicator over the B-scan profile, helping identify reportable defects at a glance and enabling rapid analyses of complete scans.

Inspection data can be exported as CSV files, A-scan and B-scan images, or as CMX files, which you can then import in CMAP inspection management software.



A-scan setup



Real time B-scan and A-scan view