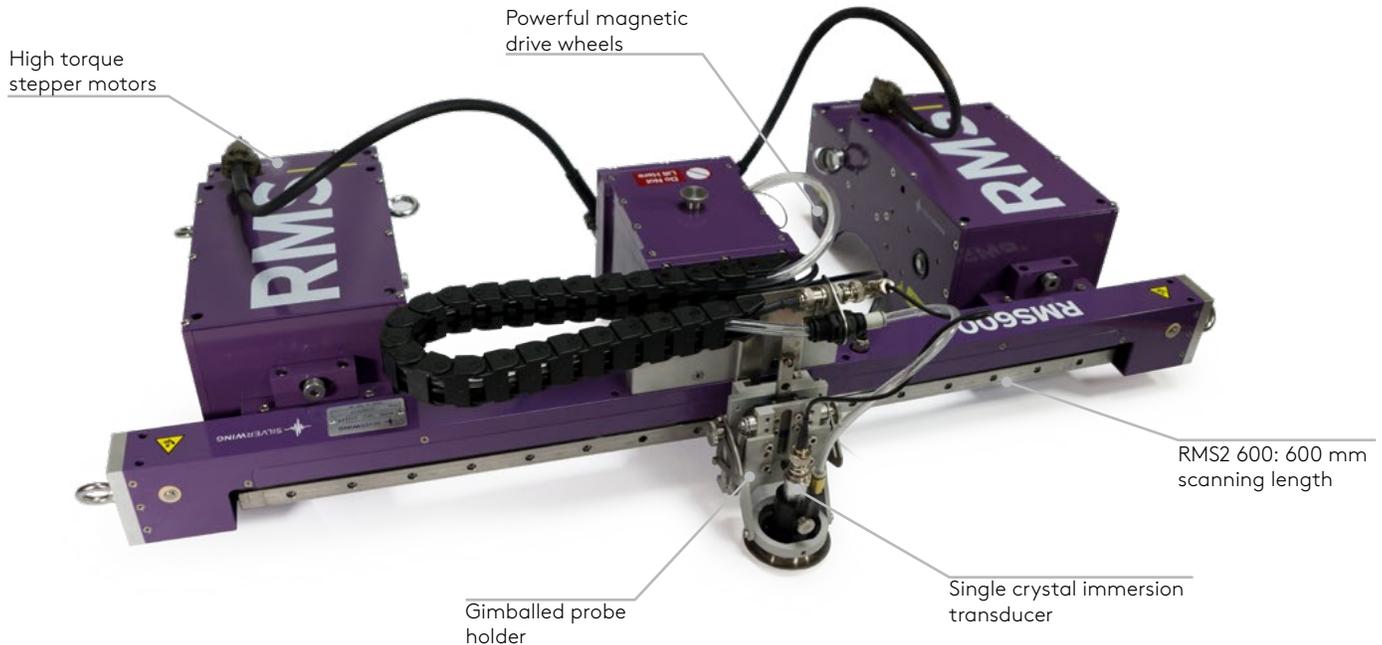# SILVERWING
## RMS2

High Speed, Remote Access Robotic
Corrosion Mapping System

Eddyfi
Technologies

# HIGH SPEED, HIGH ACCURACY CORROSION MAPPING

RMS2 is designed to evaluate the condition of storage tanks, pipelines, pressure vessels and other critical equipment, supporting the integrity management processes to ensure effective and safe operation.



High torque stepper motors

Powerful magnetic drive wheels

RMS2 600: 600 mm scanning length

Gimballed probe holder

Single crystal immersion transducer

RMS2 can give 100% coverage in a band up to 1000 mm wide, significantly increasing Probability of Detection (POD) of defects and corrosion, enabling engineers to determine the optimum repair strategy and improve remaining life assessment (RLA) & risk based inspection (RBI) maintenance programs.

## FLEXIBLE SOLUTION

All RMS2 scanning heads share the same high performance system controller so different scanning heads can be utilised depending on the inspection requirements.

The steerable tractor units incorporate high torque stepper motors and powerful magnetic drive wheels ensuring the scanner remains fixed to the inspection surface even whilst inverted.

A single crystal immersion transducer is held in a gimballed probe holder ensuring it remains perpendicular to the surface and allowing it to ride over weld caps & lap joints up to 8 mm high. The stainless steel wear plate prevents transducer damage when scanning over rough surfaces.

## SCANNING HEADS

**RMS2-600** scanning head is designed to maximize scanning rates on large surface areas such as tank shells, pressure vessels and other structures.
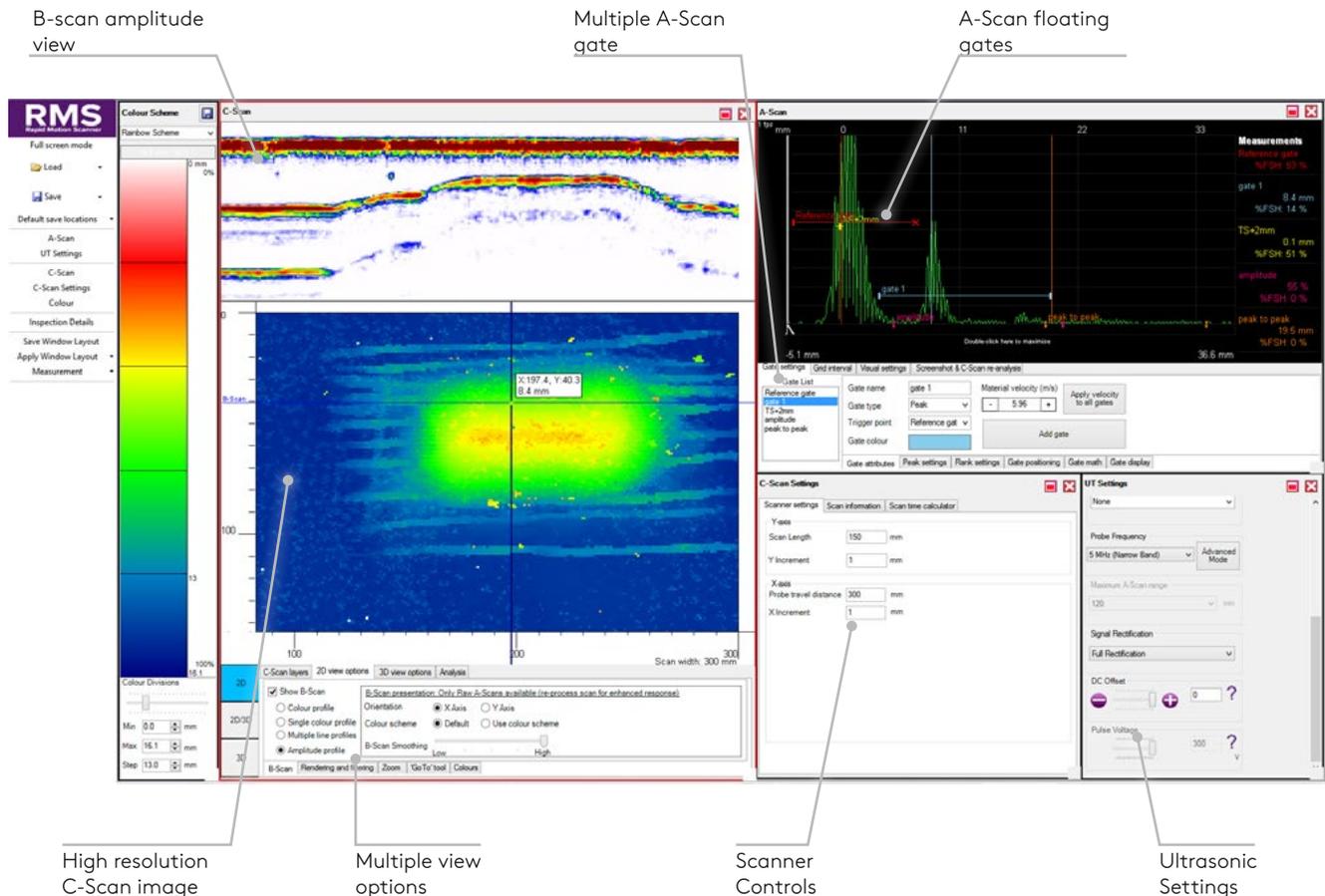
**RMS2-450** scanning head is designed for operating circumferentially on curved surfaces such as pipelines or pressure vessels from 152 mm (6 inches) up to flat plate.

**RMS2-300** scanning head is designed as a general purpose scanner for inspecting areas with limited access, vessel heads or other applications where smaller scan widths are required.

**RMS2 ARC 24 -36** and **RMS2 ARC 36-48**, designed to operate longitudinally on pipe diameters from 24" to 48". The combination of longitudinal pipe scanning and 60° scan width brings a major improvement to inspection efficiency for pipeline and slug-catcher applications while maintaining the high standard of data quality associated with RMS2.

# ADVANCED DATA ACQUISITION
# AND ANALYSIS SOFTWARE

Intuitive design with floating gates for greater accuracy, real-time A-Scan and C-Scan display,
advanced defect sizing tools with increased re-analysis speed for efficient data investigation.



B-scan amplitude view

Multiple A-Scan gate

A-Scan floating gates

High resolution C-Scan image

Multiple view options

Scanner Controls

Ultrasonic Settings

## ACQUISITION AND ANALYSIS SOFTWARE

RMS2 software integrates scanner control, data capture, data analysis and reporting tools. The software shows a real-time display of the ultrasonic A-scan, C-scan, thickness measurement and positional data, with a maximum resolution of 0.5 mm x 0.5 mm. All of this information is recorded when a scan is saved.

## FLOATING GATES & A-SCAN PROCESSING

A-scan waveform processing is fully digital, both in real time and during post processing. The system records A-scans in raw RF unfiltered form, which can then be processed afterwards, including rectification, filtering, wave smoothing and noise reject. This minimizes the set up on site and avoids re-scanning due to incorrect ultrasonic setup.

Floating gate "tracks" to the same % of the signal amplitude. This allows signals to be picked up which are much lower in amplitude improving the accuracy and increasing the efficiently of data analysis and reporting with greater inspection confidence.

## B-SCAN AMPLITUDE

The B-scan amplitude view shows the B-scan profile in both X and Y dimensions at a selected point of the C-scan. Using the B-scan amplitude view, the operator can easily identify any defects or inclusions. Reviewing acquisitions in B-scan mode makes it easier to see indication such as small pits and inclusions.

## C-SCAN LAYERS & MULTIPLE A-SCAN GATES

The intuitive software is designed around the concept of C-scan 'layers'. This allows the operator to quickly switch between each of the multiple C-scan views generated. During an inspection, the A-scan trace, B-scan amplitude view and resulting C-scan image are shown within the software in real time providing immediate inspection feedback.

Multiple A-scan gates can be added to measure between several parts of the A-scan trace. This means it is possible to measure the signal amplitude, part thickness, internal surface profile and external surface profile simultaneously.

## CMAP REPORTING

CMAP can import data from a range of inspection systems building up an overall view of an inspection irrespective of the plant item being scanned e.g. storage tank shell or roof, pressure vessel, road tanker or marine vessel to name a few.

RMS2 data can be automatically positioned and "stitched" together based on scan co-ordinates, this significantly reduces time in analysing inspection data.

CMAP also contains dimension tools to annotate defect areas. These dimension markers can overlap different scans and be used for defect sizing, or adding positional information.
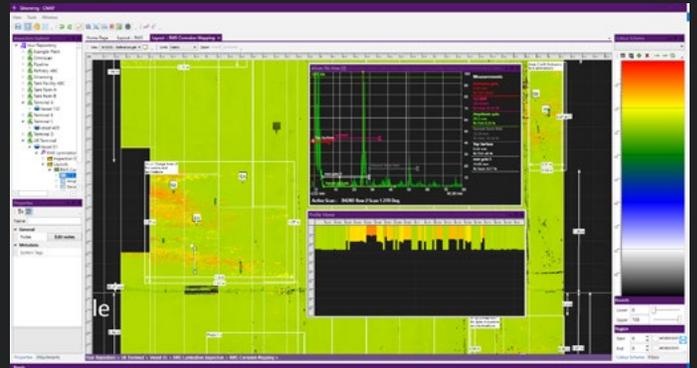


# SPECIFICATIONS

### ULTRASONIC TECHNICAL SPECIFICATION

| | |
|---|---|
| Pulse voltage | 40 to 300 |
| Pulse width | 50 ns to 530 ns |
| Damping | 500Ω |
| Receiver gain | -20 db to 80 db |
| Bandwidth | 0 MHz to 25 MHz |
| Waveform | Full rectified, + half rectified, - half rectified or RF |
| Range | 4.8m in steel with velocity 5920 m/s |
| Transmitter mode | Single, dual |
| Transducer range | 2.5 to 10 MHz |
| Reject | Baseline compression |
| Post trigger delay | 0 to 3.2 ms, 20ns step |

### COMMON SCANNER SPECIFICATION

| | |
|---|---|
| Scan grid | 0.5 to 150 mm in 1 mm steps (0.02" to 6") independent X and Y |
| Maximum scan length | 60 m (200 ft) at 10 mm (0.4") grid |
| Maximum scan speed | 730 mm/s |
| Auto - position | Scanner movement to origin or selected point |
| Scanner identification | Automatic |
| Scanner control | Joystick controller and software |
| Umbilical cable | 15 metre (optional 30 metre) |
| Temperature range | Up to 200°C |
| Power requirements | 100 to 240 VAC - 50-60Hz |

### TRANSDUCER SPECIFICATION

| | |
|---|---|
| Standard Transducer Specification | |
| 5 MHz 50 mm focus | 6–12.5 mm, (0.25 to 0.5 in) |
| 5 MHz 75 mm focus | 12.5– 50 mm (0.5 to 2 in) |
| Optional Transducer Specification | |
| 10 MHz 40 mm focus | 1– 6 mm, ( 0.04 to 0.25 in) |
| 2.5 MHz non-focused | 50–150 mm (2 to 6 in) |
| 5 MHz dual | 2– 100 mm (0.08 to 4 in), requires adapter |
| Others available on request | |
| Transducer Holder Range | |
| Standard | Maximum thickness 100 mm (4 in) |
| Extended | Maximum thickness 280 mm (11 in) |

### SCANNER COMPARISON

| RMS Model | Circumferential | | Longitudinal | | Flat Plate |
|---|---|---|---|---|---|
| | Min Internal | Min External | Min Internal | Min External | |
| 600 | 2 m (79 in) | 0.65 m (26 in) | 5.6 m (221 in) | 5.5 m (217 in) | yes |
| 450 | 1 m (40 in) | 0.15 m (6 in) | N/A | N/A | yes |
| 300 | 2 m (79 in) | 0.65 m (26 in) | 1.65 m (65 in) | 1.4 m (56 in) | yes |
| ARC 24-36 | N/A | N/A | N/A | 0.6 -0.9m (24-36 in) | N/A |
| ARC 36-48 | N/A | N/A | N/A | 0.9 - 1.2m (36-48 in) | N/A |

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**Eddyfi Technologies**

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