

FLOORMAP3Di-R

High Speed MFL Floor Scanner with STARS Top & Bottom
Defect Discrimination & MFLi Advanced Defect Analysis



TANKS



PIPES



VESSELS

- > COMPLETE TANK FLOOR MAPPING
- > ENHANCED PROBABILITY OF DETECTION
- > VARIABLE SPEED UP TO 1 M/S
- > FIELD PROVEN DURABILITY & RELIABILITY

FLOORMAP3Di-R

ADVANCED MFL TANK INSPECTION WITH STARS TOP & BOTTOM DEFECT DISCRIMINATION & MFLi ADVANCED DEFECT ANALYSIS

The Floormap3Di-R is fastest tank bottom inspection system developed by Silverwing, with scanning speeds of up to 1 m/s which is twice the speed of the previous model. The Floormap will improve your inspection efficiency whilst improving accuracy and data quality.

The Floormap combines two distinct technologies, MFL and STARS. The introduction of STARS (Surface topology air-gap reluctance sensors) enables the scanner to determine whether there is corrosion top side, bottom side or below the surface coating.

Improved signal to noise ratio combined with STARS and MFL ensures a more accurate and efficient inspection of coated and thicker plates.

KEY FEATURES

- > Full tank floor data recording and mapping
- > Custom motor, variable speed up to 1 m/s
- > High resolution 64 channel sensor arrays to maximise detection capability
- > 256 individual sensors for 4.6 x 2 mm scanning resolution
- > Advanced signal processing and defect classification tools
- > 30 years MFL development in over 66 global locations
- > Through coating inspection up to 6 mm including FRP, GRP and SS
- > Fixed sensor head for improved reliability and accuracy
- > Digital calibration for different plate thicknesses
- > Battery powered, no external cables required
- > Touch screen computer providing immediate plate view for defect assessment
- > Field proven durability & reliability
- > Floormap3DiM adds free scan and stop on defect mode with adjustable threshold

DATA CAPTURE AND ACCURACY

Unlike other manual "stop on defect" systems all the data is captured and stored. This data retention enables tank engineers to compare and review historically pertinent data sets to determine the optimum repair strategy.

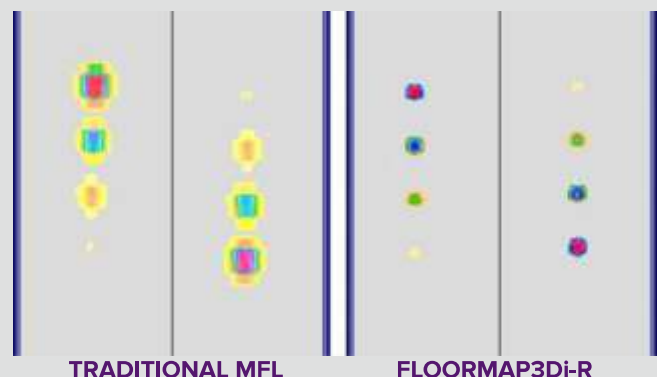
The high resolution sensor heads provide excellent probability of detection down to indications that measure 2mm in diameter. This coupled with advanced signal processing and defect classification tools significantly improves the corrosion detection and sizing capability when compared with previous generation systems.



DEFECT PRESENTATION

New signal processing algorithms developed for the Floormap introduce greater accuracy for defect area presentation, and automatically separate and filter 'noise' indications from the displayed plate view.

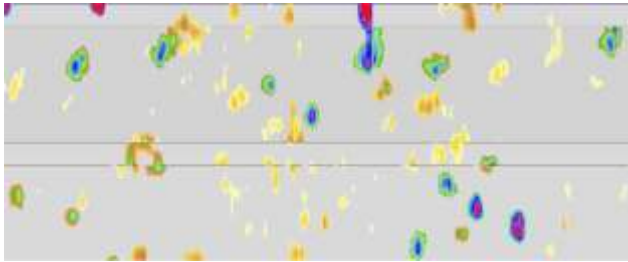
Providing a detailed visual representation of the tank bottom means less 'prove up' is required, inspection efficiency is increased and overall inspection quality is improved.



CALIBRATED MFL VIEW

The Floormap system produces a detailed geometrical view of the inspected area. This view immediately provides the operator with an understanding of the tank bottom – basically the operator can determine the nature and geometry of the indication meaning the following questions can be answered; *is the indication due to a weldment or corrosion? Is the indication wide or deep?*

By answering these questions important decisions can be made and time required for prove up reduced.

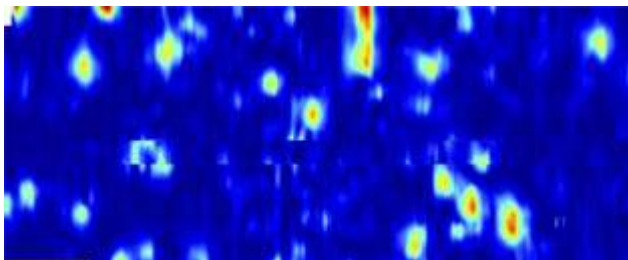


MFLi VIEW

The Floormap introduces a new high contrast plate view based on the intensity of the MFL signal response.

The MFLi defect map uses multiple colour palettes to highlight areas of corrosion, reduce the effect of spurious indications and can be used to classify defect type.

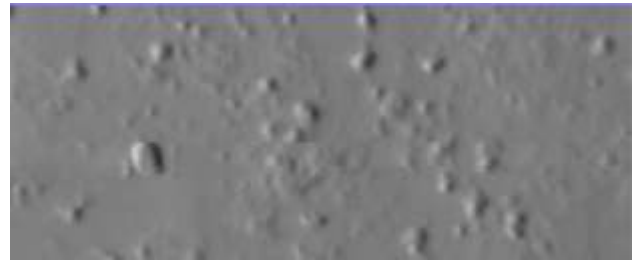
This powerful detection and classification tool can reveal the presence of small diameter pitting, SRB attack, erosion patterns and other features that require further verification.



STARS TOP VIEW

The innovative STARS technology adds an additional 64 channel sensor array to detect variations in magnetic field strength caused by top side defects. STARS and MFL signals are combined and processed within the software to distinguish top side defects from bottom side defects.

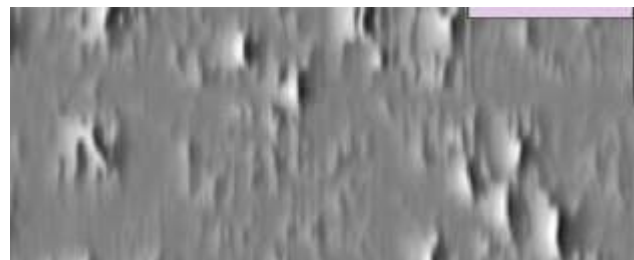
The STARS view provides a picture of the top surface even through coatings up to 6 mm (1/4"). Visually, seeing an image of the top surface dramatically reduces errors as no signal interpretation is required.



MFL RAW VIEW

The Floormap has been made possible by the industry's highest resolution sensor array and advanced signal processing capabilities. These high resolution sensors are essential in providing the detailed MFL raw view.

The MFL raw view is an unfiltered depiction of all the data collected, both top side and bottom side. The MFL raw view allows the operator to analyse and verify the inspection data, this process will increase inspection efficiency and confidence and reduce the likelihood of MFL inspection errors.

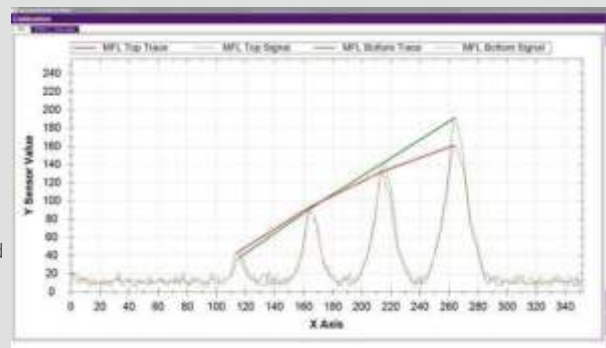


CALIBRATION CONFIDENCE

The Floormap system incorporates a novel calibration routine that creates separate calibration curves for top side and bottom side corrosion.

During the inspection, the software first identifies if a signal is generated from the top side or bottom side, and then automatically applies the most relevant calibration curve for more accurate defect depth estimates.

These calibration curves are linked to the inspection data and reproduced in the report along with the scanner serial number to provide an auditable inspection data archive which increases inspection confidence for both inspection companies and asset owners.



CALIBRATION SCREEN



DYNAMIC CURSOR

The unique Dynamic Cursor (DC) sizing and verification tool assists in identifying difficult to size defects such as deep pits, bacterial attack and through holes.

Dynamic Cursor is based on the expected volume loss and diameter of 'known depth' reference defects. The screen cursor forms a ring when moved over an indication which dynamically changes to show the expected diameter of the defect.

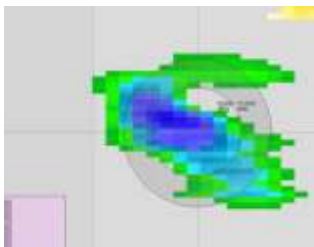
By using the DC, prove-up inspections such as pit gauging and ultrasonic measurements can be targeted towards the most relevant defects, reducing overall inspection time and improving inspection accuracy.

At a glance, the operator is able to determine which indications are likely to have been sized within expected accuracy levels, and which defects may have been oversized or undersized due to volumes being significantly different to the reference defects.



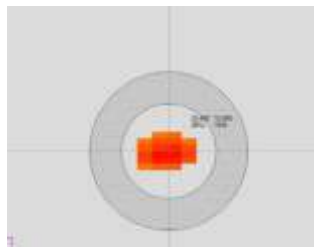
CORRECTLY SIZED

Indication within Dynamic Cursor



OVERSIZED

Indication outside Dynamic Cursor



UNDERSIZED

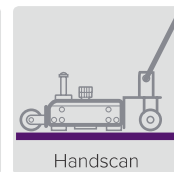
Indication inside Dynamic Cursor

THE SILVERWING SYSTEM

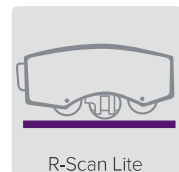
Silverwing produce a full range of equipment for corrosion inspection of storage tanks, including floor plate, wall and roof structures. The product range includes MFL mapping and manual systems, ultrasonic crawlers for thickness measurement, and vacuum boxes for weld inspection. By supplying a complete range we can offer unrivalled support, and ensure the highest quality inspection in the most efficient way. All our products are field proven by our in house teams and used by the most respected global inspection companies. For a complete overview contact our technical sales team.



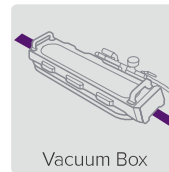
MFLi3000



Handscan



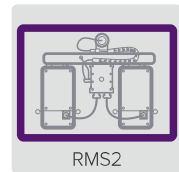
R-Scan Lite



Vacuum Box



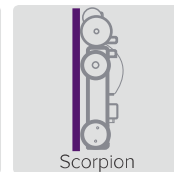
RMS2



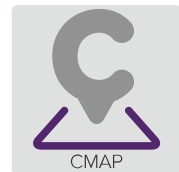
RMS2



SIMS



Scorpion



CMAP

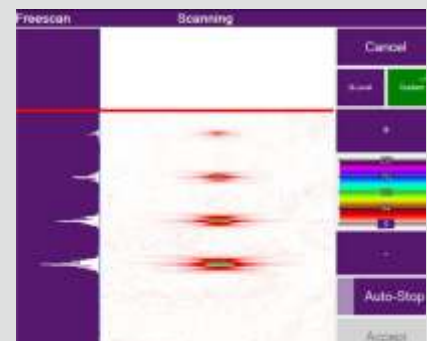
For more information on Silverwing Systems please visit our web site: www.silverwingndt.com

FLOORMAP3DiM-R

The Floormap3DiM model adds "Freescan" and a "stop on defect" mode, which bring together the advanced defect detection capability of our Floormap systems with the simple to use MFLi3000.

The Floormap3DiM has a unique "Real Time Scan" view that displays the MFL signal response whilst scanning, and the latest MFLi defect analysis view for evaluation at the end of each scan. An innovative reverse drive mode allows the technician to retrace the scan and easily locate areas of interest which can significantly reduce prove up times. Also incorporated is Silverwing's patented STARS technology which gives a detailed image of top side corrosion.

For more information on the M features please visit our website or view the MFLi3000 brochure.



SIMS REPORTING SUITE

Silverwing Inspection Mapping Software (SIMS) reporting suite provides the most powerful and efficient means to create high quality reports on tank condition, and archiving of inspection results for traceability.

SIMS imports data from the Floormap and automatically positions each of the separate plate files together to produce a CAD drawing of the entire tank floor showing the location and severity of all corrosion over 20% loss or specified value with 10% colour banding.

TANK CONDITION ANALYSIS

Corrosion can be displayed as individual coloured pixels to provide precise information on the condition of specific areas of the tank floor. Alternatively the plates can be coloured according to the maximum corrosion detected on each track to provide an overview of the general condition of the tank.

A 'Plate View' allows the operator to view tank inspection data in more detail. The precise position and estimated percentage loss of individual corrosion indications can be displayed by holding the cursor over a specific point on the plate.

Tank data imported from the Floormap has been further enhanced allowing the location of all top surface / bottom surface / combined corrosion to be available at a press of the button.

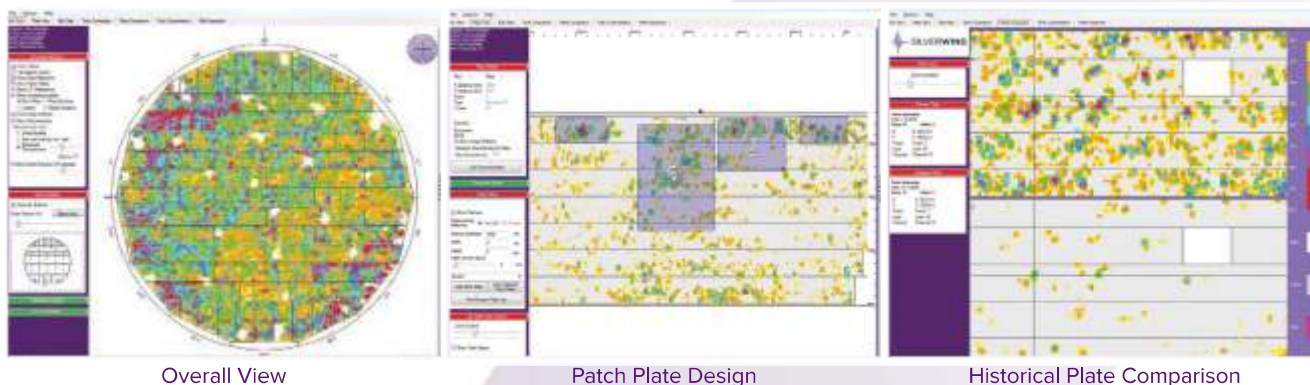
KEY FEATURES

- > Displays complete tank floor inspection data
- > Automatic CAD layout when used with Floormap systems
- > CAD layout tool for manual recording
- > Measurement tools for sizing areas of corrosion
- > Patch plate design tool (includes API standardised plates)
- > Incorporate Manual MFL, Vacuum box, MT, UT test results as well as visual observations
- > Top / Bottom defect views
- > Comparison of historic inspections
- > Add areas for further verification
- > UT prove up lists and data recording
- > Free viewer for report distribution

ADDITIONAL INSPECTION DATA

A unique feature of SIMS is the ability to add results from other inspections carried out on the tank floor. Results from visual, ultrasonic, Handscan, MFL and even weld inspections can be added to the SIMS report to produce a complete 'fingerprint' of the tank floor condition.

Digital images taken during the inspection can be added to the tank data and linked to specific areas of the tank floor to add a further level of detail into the report.



REPORTING TOOLS

To compliment the powerful reporting features, SIMS includes several tools to aid decision makers while evaluating the inspection data.

A repair plate tool is seamlessly integrated into the software allowing the user to quickly design patch plate locations. Once all patch plates have been entered, the software will automatically produce a cutting list showing the total amount of material required to repair the tank.

An innovative feature of the software is the data comparison tool, allowing the user to overlay two separate sets of tank data recorded on different dates and provide a direct comparison of corrosion growth at either the tank or plate level and assess as part of RLA/ RBI programme.

The comprehensive and easy to use SIMS reporting and analysis tools are further enhanced with statistical displays and a comprehensive and customisable report printing tool.

TECHNICAL SPECIFICATION

Patent Number: EU GB12161913.4

Principle of operation:	Magnetic Flux Leakage & Magnetic Field Reluctance (STARS)
Method of detection:	256 Hall Effect sensors, 64 channels
Top and bottom discrimination:	Yes, using STARS technology
Test through coatings:	Yes, if non magnetic
Speed:	Variable from 500 mm / second (19.7" / second) to 1 m / second (39.4" / second)
Scan width:	300 mm (12")
Maximum single scan length:	32 metres (1,260")
Scan coverage:	9 m ² / minute (97 ft ² / minute) to 18 m ² / minute (194 ft ² / minute)
Positional accuracy:	± 0.04% (± 3 mm over 8 metres) (± 3/32" over 315")
Method of propulsion:	DC motor, anti-static drive wheels
Rollers:	Heavy duty, multi compound rollers
Dimensions:	Height: 980.5 mm (38.7") - Width: 510 mm (20") - Length: 690 mm (27.1")
Weight:	57.5 kg (126 lbs)
Minimum man-way size:	500 mm
Transit case:	Meets IATA requirements for transporting magnetisable material
Power requirements:	1 x 12V, 42 amp-hour sealed lead acid batteries
Batteries supplied:	3 supplied and 2 chargers for continuous use
Typical battery operational time:	Up to 4 hours
Operating temperature:	-30°C to 55°C (-22°F to 131°F)
Storage temperature:	-35°C to 75°C (-31°F to 167°F)
Humidity:	10 - 95% RH
Minimum defect detection sensitivity:	2 mm (0.08") diameter pipe type 50% deep
Minimum defect sizing sensitivity:	20% material loss (ball type) under floor and top surface **
Maximum coating thickness for accurate sizing:	6 mm (1/4") coating on 6 mm (1/4") plate
	5 mm (3/16") coating on 8 mm (5/16") plate
	3 mm (3/32") coating on 10 mm (3/8") plate
	1 mm (5/64") coating on 12 mm (15/32") plate
Supported plate types:	Rectangle, annular and sketch
Scan overlap:	0 to 250 mm (9.8") with transparent tracks to show all defects
Un-scanned area:	10 mm (3/8") from plate weld, 160 x 160 mm (6.3 x 6.3") corner dead zone
Real time analysis:	Defect size, x / y position, plate view, top/bottom, MFL, MFLi, STARS
Desktop analysis software:	3 user license included.
SIMS reporting suite:	Full version – 3 user license included.
	Read only version – unlimited
	Operating system requirement – Windows XP, Vista, 7, 8 or 10
Training:	4 days Silverwing based training and examination available
	2 week level 1 and level 2 SNT course available