Eddyfi Technologies
Beyond current

Getting Started with

FLOORMAP® X

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FloormapX User Manual Version D-01

Original instructions supplied with the FloormapX system

SIMS GO Software version 1.3R1

August 2024

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Chapter 1

Precautions and conventions

1. *General Precautions and Conventions*

1.1 General Precautions

The following safety precautions must always be observed when using the Floormap®X system. Please ensure that you review them before turning on the system:

- Keep this document in a safe place for future reference.
- Carefully follow the installation and operation procedures detailed herein.
- Observe all warnings, notes and instructions as marked on the packaging, the scanner, and detailed in the user manual.
- FloormapX system should **only** be used by trained operators.
- When transporting FloormapX, it is your responsibility to follow all safety precautions as dictated by the relevant local governing bodies.
- The equipment must not be used for purposes other than those intended. Eddyfi assumes no responsibility for any damage resulting from such improper usage.
- If you use the system in a manner that deviates from the one specified by Eddyfi, the protection provided on the equipment may be rendered null and void.
- Do not use substitute parts or perform unauthorized modifications to the system.
- Service instructions, when applicable, are intended for trained service personnel only.
- Ensure by regular checks that the working site, equipment, and environments are kept in a clean and clearly arranged state.
- Rules and regulations regarding the prevention of accidents that apply to the working site should be observed.
- If the system does not operate normally, please contact Eddyfi for assistance.
- Do not leave the FloormapX system unattended when not in use.

1.2 Safety Precautions

Observe the following safety precautions rigorously when using FloormapX.

WARNING

Pinch Hazards & Powerful Magnets

The FloormapX system utilizes powerful magnets and as such presents an inherent pinch/crush hazard. Care must always be taken when handling and using the FloormapX system. It is important to identify in which state the FloormapX magnets are by referring to the magnet position indicators.

Figure 1: System magnet position indicators

- FloormapX magnets **ON (a non-zero magnet position indicator)**. Here the FloormapX **does** impart magnetism into the inspection surface and so is powerfully attracted to the inspection surface or any other ferrous surface or object.

- FloormapX magnets **OFF** (**magnet position indicator at zero**). Here the FloormapX **does not** impart magnetism into the inspection surface and so is **not** attracted to the inspection surface.

  ### NOTE
  There will still be some low-level residual magnetism around the system and there are places that magnetically attract small ferromagnetic items.

Removal / Deployment

Due to the powerful magnets involved, and regardless of the magnet being in an on or off position, care must always be taken when handling and using the FloormapX system including when operating the variable bridge (high / low) mechanism, as the system will exhibit a strong force and present a finger trap. When investigating the scanning head of the FloormapX system it is **recommended to set the magnet position to the off position.**

Handling / Carrying / Tank entry

When required to carry the FloormapX system, firstly ensure it is safe to do so and it is recommended to have the magnets situated in scanning head in the 'off' position. If moving the FloormapX over a longer distance it is recommended to use the dedicated transit cases.

During tank entry, it is recommended that the FloormapX is broken down into its component modules. If possible, tank ingress and egress should be performed with the FloormapX still contained within the transit cases.

Operators manually handling the system, whether fully assembled or in modular form, should be aware of safe manual handling practices. Care should be taken during tank ingress and egress through the access manway. The system must be lifted by two suitably strong persons.

Magnetic Attraction

Due to the strong magnetism involved, loose ferrous material near the FloormapX system, such as tools, metal objects or magnets will be attracted to the systems magnetic bridge and may cause injury as they move towards the poles. Always ensure to work in a **clean area**, carefully follow handling instructions and be vigilant.

Pacemakers or other medical devices and mechanical implants

Powerful magnets may interfere with medical electronics such as pacemakers, defibrillators, or other internal and external medical devices. The interference can be severe and cause malfunctions. Individuals wearing such devices should not handle strong magnets. If any user has any type of electronic, mechanical, implanted, or external medical device, they should consult a physician and the manufacturer of the medical device to determine its susceptibility to static magnetic fields prior to allowing them to handle the FloormapX. All magnetic products should be kept at a safe distance from individuals with such devices.

Damage to magnetic media, electronics, and mechanical devices

Any form of credit card, security pass, computer or programmed equipment may be permanently affected if exposed to the powerful magnetic field of the unit.

Laser

The FloormapX system utilizes a Class 2 (II) laser for indication location. While laser protection eyewear is not normally necessary, do not deliberately look or stare into the laser beam. Avoid accidental exposure to eyes. Do not aim at aircraft or vehicles, it is unsafe and illegal.

1.3 Conventions

Marking and Symbols

The following symbols pertain to safety regulations that should be carefully observed:

This label is used as a general warning sign. Always refer to the user's manual to obtain the necessary information for proper protection of the instrument and its users.

This label is used to indicate the presence of strong magnets that generate magnetic fields. Always refer to the user's manual to ensure proper protection and safety.

This label is used to indicate the presence of a class 2 (II) laser. Always refer to the user's manual to ensure proper protection and safety.

The RoHS compliance logo signifies that this product complies with the Restriction of Hazardous Substances directive 2011/65/EU and 2015/863/EU. This directive restricts the use of Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominated Biphenyl, Bis (2-Ethylhexyl) phthalate, Benzyl butyl phthalate, Dibutyl phthalate, Disobutyl phthalate and Polybrominated Diphenyl Ethers in certain classes of electrical and electronic units as of July 22, 2019.

The FloormapX system is designed to meet the safety requirements in accordance with electrical safety and electromagnetic compatibility. It has been tested and has left the factory in a condition in which it is safe to operate. The equipment, when used as intended according to its user manual, complies with the essential requirements of the following Low Voltage Directive (LVD) 2014/35/EU, the Radio Equipment Directive (RED) 2014/53/EU, the Electromagnetic Compatibility (EMC) Directive 2014/30/EC, and the Machinery Directive (MD) 2006/42/EC.

This label acts as a reminder that you should dispose of this system in accordance with your local Waste Electrical and Electronic Equipment (WEEE) regulations. Due to its nature, this product may contain small quantities of substances known to be hazardous to the environment and to human health if released in the environment. As such, it falls under WEEE regulations should not be disposed of in the public waste stream.

Safety Indications in This Document

The safety indications in this document are intended to ensure operator safety and the integrity of the system.

DANGER!
Danger statements are a description of an imminent hazardous procedure or a practice (or the like) that, if performed incorrectly, can result in severe injury or death if not avoided and should be limited to the most extreme situations. Do not ignore danger indications, ensure the condition is understood before proceeding.

WARNING!
Warning statements are a description of a potentially hazardous procedure or a practice (or the like) that, if not avoided or if performed incorrectly, could result in injury. Do not ignore warning indications, ensure the condition is understood before proceeding.

CAUTION!

Caution statements are a description of a potentially hazardous procedure or a practice (or the like) that, if not avoided or if performed incorrectly, could result in material damage, loss of data, or both. Do not ignore warning indications, ensure the condition is understood before proceeding.

READ MANUAL

FloormapX system is designed for a specific use. Using the FloormapX system outside of its intended use is dangerous. Severe injury or death could result. Read and understand this manual before use.

WARNING MAGNETIC MATERIAL

Due to magnetic material, consult IATA documentation before air shipping and ensure the appropriate labelling is used to identify the magnetized material contained within the scanner head transit case.

The FloormapX contains strong magnets that produce an extremely strong magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, and medical or other electronics devices.

Strong magnetic fields pose a variety of risks, especially to people who wear implanted cardiac devices like pacemakers and defibrillators. People with pacemakers or ICD's must stay at least 2 m (6.5 ft) away.

WARNING FINGER TRAP

Tools, magnets, and metal objects can cut, pinch, or entrap hands and fingers. HANDLE WITH CARE.

WARNING LASER

The FloormapX system contains a Class 2 (II) laser. While laser protection eyewear is not normally necessary, do not deliberately look or stare into the laser beam. Avoid accidental exposure to eyes. Do not aim at aircraft or vehicles, it is unsafe and illegal.

HOT SURFACE

The FloormapX system contains front LED headlights. While hot temperatures are not expected when lit, care must be taken in this region when touching the system.

REMOVE BATTERY

When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

IMPORTANT

Calls the attention to information important to completing tasks.

NOTE

Calls the attention to an operating procedure, a practice, or the like that requires special attention.

Acronyms in this Document

The following acronyms can be found this document.

EPL	Estimated Percentage Loss
MFL	Magnetic Flux Leakage
UT	Ultrasound
Est. Remain	Estimated Remaining Thickness
WT	Wall Thickness

1.4 EMC Directive Compliance

The FloormapX system has undergone EMC tested and has found to be in compliance with electromagnetic compatibility directive 2014/30/EU which are covered by the following harmonized standards EN61326-1 (2013) – *Electrical equipment for measurement, control, and laboratory use*. The system configuration of the scanner and tablet can be used in an industrial electromagnetic environment. The system configuration of the tablet and charger can be used in a basic electromagnetic environment.

The system has also been found to be in compliance with FFC part 15 subpart B, and ICES-003.

FCC Compliance (USA)

This equipment was tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user's guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case you will be required to correct the interference at your own expense.

ICES Compliance (Canada)

This device complies with Canadian ICES-001(A).

Cet appareil est conforme à la norme NMB-001(A) du Canada.

1.5 EU Declaration of Conformity

EU Declaration of Conformity

Eddyfi Technologies

Clos Llyn Cwm, Swansea Enterprise Park
Swansea, W Glam, SA6 8QY
United Kingdom

Declares under our sole responsibility that the product to which this declaration refers, when used as intended according to its user manual, complies with the essential requirements of the following directives:

- Low Voltage Directive (LVD) 2014/35/EU
- Radio Equipment Directive (RED) 2014/53/EU
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Machinery Directive (MD) 2006/42/EC
- RoHS directives 2011/65/EU and 2015/863/EU

The following reference standards were applied to assess the conformity:

EMC Standards:
EN 61000-6-3:2007+A1:2011
EN 61000-6-2:2019
EN 55011:2009+A1:2010
EN 61326-1:2013

Safety Standards:
IEC 61010-1:2010+A1:2016
EN 61010-1+A1:2010
IEC60825-1:2014
EN60204-1:2018

RoHS Standard:
IEC 63000:2018

Product Type:	Tank Floor Inspection System
Trademark:	Eddyfi Technologies
Manufacturer:	Eddyfi UK Ltd.
Models:	FloormapX System, FLOORMAPX-AT and FLOORMAPX-MN
Date of Issue:	May 20th, 2021

SPKenny

Stuart Kenny
Director, COE MFL & NDT Scanners
Eddyfi Technologies

1.6 Calibration and Warranty Seals

The internal electronics module of the FloormapX is equipped with a warranty seal.

IMPORTANT

Broken seals void the calibration certification and product warranty.

1.7 Limited Warranty

LIMITED PRODUCT WARRANTY: Except as otherwise agreed to by EDDYFI in writing, products such as instruments, mechanical products, spare parts, probes and cables are warranted, to the original Customer only, for use solely by Customer or direct affiliate, against defects in material and workmanship for a period of twelve (12) months from the date of delivery. Additional coverage may be provided under any Hardware Maintenance Plan (HMP) purchased by the Customer. Probes and cables are considered consumables and require periodic replacement due to wear. EDDYFI does not warrant the service life of probes, cables and other consumables. EDDYFI does not warrant any products against damages or defects caused by wear and tear, negligence, misuse, abnormal operating conditions, alterations or damage caused by events beyond the control of EDDYFI. EDDYFI shall not be liable for product defects caused by or resulting from any inaccuracies in any drawing, description or specification supplied by the Customer. Upon Customers written request during the warranty period, EDDYFI, at its choice, will repair or replace defective products within a reasonable time. The original term of warranty applies, without extension, for repaired or replacement products. All defective product shall be sent to EDDYFI freight prepaid by Customer in packaging appropriate to prevent damage in transit. The Limited Product Warranty does not apply to periodic calibration or minor maintenance as described in products operating manuals. All Customer paid repairs performed by EDDYFI are warranted against defects in materials and workmanship for ninety (90) days from the completion of repair. Upon Customer's written notice of defect within the ninety (90) day period, EDDYFI will replace the defective part(s) and/or re-perform the service. This warranty is limited to failures in areas directly related to the repair performed. EDDYFI does not warrant any non-EDDYFI products.

SOFTWARE: Any software related to the products is subject to specific Software License Agreement or Software Subscription Agreement. The software is not sold but granted under a non-exclusive and restrictive license. The software must be used with the software-enable hardware or software key supplied by EDDYFI.

TECHNICAL SUPPORT: Eddyfi shall have no obligations to provide technical support and expertise for i) Hardware Product that are not under a valid calibration certificate or under a valid Hardware Maintenance Plan (HMP), and ii) Software that has not been updated to the latest version available under a Software Subscription or a Software Maintenance Plan.

LIMITED SERVICE WARRANTY: EDDYFI agrees to perform service for Customer on the expressed condition that EDDYFI's sole obligation will be that the service will be performed in a professional and competent manner and will be of the kind and quality described in the EDDYFI quotation. EDDYFI does not warrant the fitness, suitability, or condition of Customer's equipment upon which EDDYFI services are performed. If there is a specific problem with the quality of the service performed, Customer shall inform EDDYFI in writing and, if feasible, the service will be re-performed at no additional charge. In the event corrective services are performed by EDDYFI, Customer must provide adequate access to the equipment to allow EDDYFI to perform these services. Any additional costs incurred to provide access to the equipment will be the responsibility of the Customer. If re-performance of the service is not feasible, EDDYFI and Customer shall negotiate in good faith to arrive at an equitable solution.

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The information contained in this document is subject to change without notice.

Chapter 2

FloormapX System Overview

Introducing FloormapX

The FloormapX is a battery powered, motor driven Magnetic Flux Leakage (MFL) Array tank floor scanner, tailored towards large scale inspection of flat, ferrous, inspection surfaces to identify areas of reduced thickness and provide a value of Estimated Plate Loss (EPL) where appropriate. The dedicated data acquisition software SIMS GO is used to inspect in one of the two scanning modes; mapping or Freescan, both of which modes can adopt a pause on defect workflow.

2.1 What's in the Box

The FloormapX is supplied in two rugged transport cases and comes with the following standard accessories:

Mainframe box

- FloormapX mainframe.
- FloormapX user control.
- 3x NiMH batteries and 2x chargers.
- FloormapX tablet with stylus and SIMS GO acquisition software.

- FloormapX tablet charger.
- Motorization and sensor probe cables.
- Documentation.

Scanning head box

- FloormapX scanning head.

- Documentation.

2.2 FloormapX Overview

The FloormapX system comprises of the following key components:

- Scanning head.
- Mainframe.
- User control.
- Tablet.
- Batteries.

Figure 2: FloormapX front overview

Figure 3: FloormapX rear overview

Scanning head

The scanning head connects to the mainframe and consists primarily of the variable strength magnetic bridge, the MFL and STARS sensor head modules. The main components of the scanning head are identified below. The scanning head product and serial number label is located at the rear of the unit and is only visible when the mainframe is not attached.
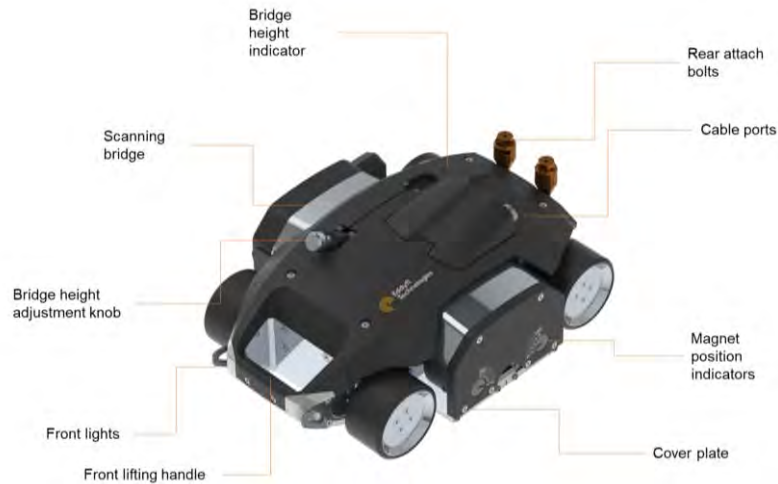
Figure 4: Scanning head overview

Figure 5: Scanning head product and serial number label

Magnet Position Indicators

On the right-hand side of the scanning bridge, when viewing the system from the front, is the magnetic position indicator. The indicator identifies how much magnetic strength is imparted into the inspection surface between a range of 0 to 100. When the indicator points to the zero '0' position then the FloormapX magnets are deemed off and do not impart magnetism into the inspection surface. When the magnetic indicator points at any other value then the FloormapX magnets will impart magnetism into the inspection surface or any other ferrous surface or object. The greater the value on the magnetic position indicator the stronger the magnetic attraction.

> NOTE
>
> When at the zero position there will still be some low-level residual magnetism around the system and there are places where magnetically attract small ferromagnetic items.

Scanning Bridge Height Adjuster

The scanning bridge can be set at two different height positions, low or high, using the height adjustment level.

Before setting the bridge height either set the magnets to the zero position (magnets off) or lie the system in a horizontal position so the scanning bridge is clear of the inspection surface.

The bridge height is set by lifting the black collar below the height adjustment knob then moving the

lever to the required height position before releasing the collar to lock in place. The positions are indicated on the scanning bridge by a **H** for high, and an **L** for low.

WARNING

A strong magnetic attraction exists between the scanning bridge and inspection surface. Ensure the bridge is clear of the inspection surface or the magnets are set to the zero position before adjusting the bridge height.

IMPORTANT

During an inspection if the bridge height position is changes, ensure the correct calibration is used. A separate calibration is required at a low and a high scanning bridge position for the same plate thickness.

Cable Ports

The color-coded ports at the top of the scanning head are for connecting the mainframe to the scanning head cabling. When viewing the system from the front the left-hand side port is colored orange and is for the scanning head motorization. The right-hand side port is colored blue and is for the probe cables.

NOTE

To avoid damage when assembling the FloormapX please ensure cables are attached after the modules have been correctly assembled and verified as secure.

Cover Plate

The cover plate is located on the underside of the scanning head and provides protection to the MFL sensor head, the two STARS sensor heads and magnetic bridge during an inspection. The cover plate is secured by clips and bolts. At the side of the cover plate are indents to show sensor head poitions. The MFI sensor head is in the middle of the bridge with the STARS sensor heads located approximately 80mm to the front and rear of the MFL sensor head.

IMPORTANT

Always ensure cover plate is attached during use, failure to do so will invalidate the warranty.

Front Lights

At the front of the scanning head are two LED headlights which are operated using the Lighting power button on the user control. The light can be switched off, then on and cycle through the brightness settings until they are switched off.

NOTE

During a system power sequence, it is normal for the front headlights to flash. If a battery life is critical flashing may also occur depending upon the criticality of the battery.

HOT SURFACE

While hot temperatures are not expected when lit, care must be taken in this region when touching the system.

Main Wheels

The scanner head has four wheels, the two rear wheels are motor driven, while the two front wheels provide steering and encoded. The steering angle can be set using the steering knob on the user control.

NOTE

The steering angle cannot be adjusted during a scan.

Mainframe

The Mainframe is the vertical chassis that connects the user control and tablet to the scanning head. The main components of the Mainframe are identified below. The Mainframe product and serial number label is located at the rear of the unit on the user control rail and is only visible when the user control is not attached.
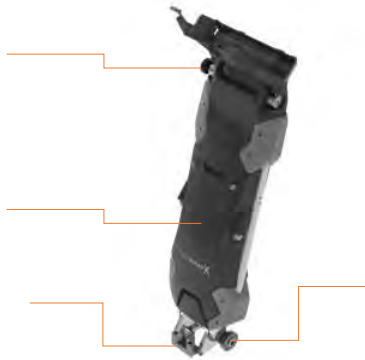
Figure 6: Mainframe front overview

Figure 7: Mainframe rear overview

Figure 8: Mainframe product and serial label

Tablet docking station

Located at the top of the mainframe is the docking station for the FloormapX tablet. At the top of the docking station is a tablet quick release catch that secures the tablet in place. The viewing angle of the tablet can be set by using the docking angle adjuster which is situated on the right of the scanner when viewing the system from the behind. On the right-hand side of the tablet is the connector for the tablet to mainframe cable. This cable runs through the docking station and into the Mainframe.

IMPORTANT

Care must be taken during assembly, disassembly and altering the viewing angle to ensure the cable is loose and not pinched by the docking station.

To avoid damage, it is recommended that the cable connecting the tablet to the mainframe is disconnected from the tablet prior to undocking.

The docking angle adjustor knob only needs to be turned a few times to disengage the locking teeth. It is not necessary to remove it from the system completely.

Battery compartment

In the front of the Mainframe behind the removable cover is the battery compartment. Here two battery slots are located. When viewing the system from the front the right-hand active battery slot is active and allows the battery to power the FloormapX. The left-hand battery slot is used only for battery storage.

Cable Ports

The color-coded ports at either side of the lower mainframe are for connecting the mainframe to the scanning head. When viewing the system from the front the left-hand side port is colored orange and is for the scanning head motorization. The right-hand side port is colored blue and is for the probe cables.

NOTE

To avoid damage when assembling the FloormapX please ensure cables are attached after the modules have been correctly assembled and verified as secure.

Reposition wheels

Located at the bottom of the mainframe are the reposition wheels. These are used for disengaging the FloormapX scanning head from the inspection for maneuvering and positioning.

Emergency stop

When activated the emergency stop prohibits the drive motors, the magnet motors and steering motors functionality. It does not shutdown the power to the entire system. To activate press and the switch latches. To reset rotate clockwise.

NOTE

If the system is not operating as expected then please ensure the Emergency Stop has not been accidentally pressed, especially when assembling the FloormapX from the component modules.

Laser and rear light module

Located at the rear of the mainframe is the rear light and laser module. When the system is powered on the rear lighting is remains on continually and at a constant brightness. The red laser line can be switched on and off using the laser guide button on the user control. The specifications for the laser fitted to the scanner are:

- Laser Class: 2.
- Wavelength: 650nm.
- Maximum output power: 1mW.
- Emission type: Continuous wave.
- Maintenance: If required.

Figure 9: Laser and rear light module

NOTE

The user control light button does not control the rear lighting – it is a constant brightness.

WARNING LASER

Do not deliberately look or stare into the laser beam. Avoid accidental exposure to eyes.

Lateral tilt knob

Located at the rear of the Mainframe is the lateral tilt know. This allows the Mainframe to lean either left or right so the scanning head can get up close to the tanks shell and other restricted areas.

To lean the Mainframe, unscrew the lateral tilt knob and pull to disengage the plunger. Lean the Mainframe in the desired direction until the plunger engages then screw the lateral tilt knob.

User Control

This is a quick release, detachable module that connects to the rear of the Mainframe and contains all the necessary controls buttons to operate the system. At the rear of the Mainframe is a connecting cable that attaches to the bottom of the user control. The height of the user control can be adjusted to suit the operator. Pull the knob situated directly below the user control to disengage the plunger. To set the height, slide up or down until the plunger engages. There are five height adjustment positions available.

NOTE

To avoid damage when the user control is removed **ensure** the Mainframe connecting cable is disconnected.

IMPORTANT

After installation or adjustment of the user control height, ensure the locking plunger is properly engaged before using the system. Failure to do so will invalidate the warranty.

The user control product and serial number label is located at the rear of the unit on the user control rail sliders and is only visible when the user control is not attached.

Figure 10: User control product and serial label

The location and function of each button on the user control is provided below.

Figure 11: User control button overview

Name	Button	Description

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System power		Hold for 2 seconds to turn system on or off. Hold for 4 seconds to force a power off shutdown.
Lighting power		Turn the front lights on and off. Press the button to cycle through the brightness settings. The rear light is always on and at a constant brightness.
Laser guide		Turns the laser line on and off. The laser line is simulated in SIMS GO software to help location scan indications on the tank floor.
SMARTmagnet™		Turns the powerful rare earth permanent magnets on or off. When switched off it provides safer storage, shipping, and manipulation during inspection. Pressing the button 'on' does not necessarily turn the magnets 'on'. The magnets will only turn 'on' prior to scan for safety reasons.
Thumb button(s)		Either button interacts with software as an 'accept' button to reduce touch screen interaction and increase inspection efficiency and ease of use.
Motion throttle		Pulling the lever controls speed of the scanner during the inspection. The maximum speed is set in SIMS GO data acquisition software.
Steering		Turn the steering knob to alter the steering angle of the front wheels. The SIMS GO displays the steering angle. Press down the steering knob to return to a straight line.

Tablet

The FloormapX tablet is a quick release, detachable module that is secured in the docking station of the mainframe and contains the SIMS GO data acquisition software. On the right-hand side of the tablet is the scanner connector and on the left-hand side is a door covering various connectors.

The tablet offers 4 hours independent battery life and will charge from the FloormapX main battery when docked and connected.

> IMPORTANT
>
> During an inspection, the left side tablet door must be closed.

The tablet product and serial number label is located at the rear of the unit behind the stand and is only visible when the tablet is not docked to the system and the stand is opened.
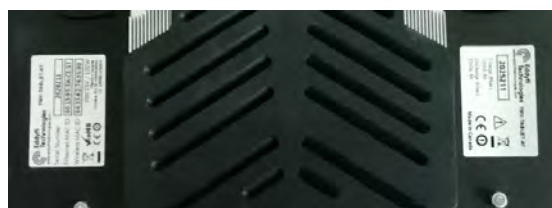

Figure 12: Tablet product and serial label

The front panel of the FloormapX tablet has hard buttons that can be used to interact with the SIMS GO software to simplify operation and increase efficiency during an inspection. The location of each button and actions are provided below.

Figure 13: FloormapX tablet overview

Name	Button	Description
Power button		Use this button to turn on the tablet. The power indication at the center of the button behaves as follows: Green: tablet is on. Flashing yellow / orange: tablet is in standby mode. Unlit: tablet is off.
Battery indicator		This displays the state of the tablet battery: Green: tablet is on. Flashing green: tablet is on and battery is charging. Red: battery error, no charge.
Wi-Fi indicator		This displays the Wi-Fi status of the tablet: Green: Wi-Fi enabled. Unlit: Wi-Fi disabled.
Indication list		Short press to open indication list. Long press to open full indication list.
Move to indication		The view moves back to the show the indication selected in the list.
Change indication status		Short press to reject the selected indication. Long press to accept the selected indication.
Add indication		Allows a manual indication to be added when in plate view.
Select active view		Selects the active view within the calibration and scan page. The active view is indicated by the purple boarder.
Full extent		Returns the zoom level to see the entirety of the plate in plate view page or the entirety of the scan in scan page.
No function		This button has no function.
Data view		Changes the data view for the selected active view. Cycle through the STARS, MFLA and sizing views.

Tablet battery and charging

The FloormapX tablet has an internal 10.8VDC lithium-ion battery. The battery has a discharge voltage of 10.8VDC and maximum discharge current of 8A. When the tablet is docked and connected to the FloormapX the tablet battery is charged from the FloormapX nickel metal hydride battery. When the tablet is undocked, it is powered by its internal lithium-ion battery. A desktop charger is supplied and can be used to charge the tablet battery when the tablet is not connected to the system. The charging port for the tablet is located behind the left-hand door. When charging the battery has a charging voltage of 12.6VDC and a maximum charge current of 4A.

Figure 14: FloormapX tablet label

FloormapX Battery

A 28.8V DC 9Ah nickel metal hydride (NIMH) battery powers the FloormapX including the drive motors, magnet motors and steering motors, and on-board lighting. The FloormapX is supplied with three batteries and two chargers as standard, to allow continuous operation. Battery life is dependent upon the inspection environment. The battery has a discharge voltage of 36VDC and maximum discharge current of 15A.

Figure 15: FloormapX battery label

Figure 16: FloormapX mainframe label
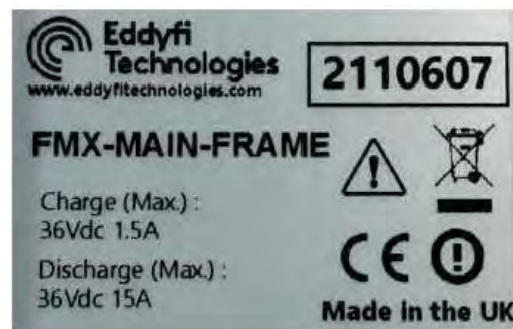
In the front of the mainframe behind the removable cover is the battery compartment where two battery slots are located. When viewing the system from the front the right-hand active battery slot is active one that allows the battery to power the FloormapX. The left-hand battery slot is used only for battery storage. The batteries are secured in place by using the battery locking cam.

Figure 17: FloormapX battery

Figure 18: FloormapX battery compartment

REMOVE BATTERY

When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

Fitting a FloormapX Battery

To fit a battery in the FloormapX:

1. Remove the battery cover by unscrewing the two thumbscrews.
2. Insert battery into the right-hand active battery slot with the battery connector.
3. Turn battery locking cam clockwise at the top of the battery to secure the battery in position.
4. Reattach the battery cover.

WARNING

A battery that is incorrectly fitted, connected and / or secured can result in serious harm to the operator and FloormapX.

IMPORTANT

It is important that the FloormapX is operated with the battery correctly fitted, secured and with the battery cover always fitted. Failure to do so will invalidate the warranty.

Removing a FloormapX Battery

To remove a battery from the FloormapX:

1. Power off the system by press and hold the power button for 2 seconds then selecting Turn off.
2. Remove the battery front cover by unscrewing the two thumbscrews.
3. Release the battery locking cam by turning counterclockwise.
4. Using the carry handle, remove battery from the FloormapX.

Charging a FloormapX Battery

The FloormapX is supplied with 2 battery chargers. A flat battery typically requires approximately 6-7 hours of charge time. When charging the battery has a charging voltage of 36VDC and a maximum charge current of 1.5A.

WARNING

Use of any other charger unit will invalidate the warranty and may result in battery malfunction, damage and or may result in fire.

Figure 19: FloormapX battery charger information

To charge a battery:

1. Remove the battery from the FloormapX.

2. Correctly connect the charger cable to the FloormapX battery. To connect the charger cable ensure the flat edge is facing up.

3. Begin the charge process by connect the battery charger to a suitable mains power supply and power on. During the charging process check the LED indicator on the charger to determine the charging mode.

   ### IMPORTANT

   If the charger LED displays an error, please power off the charger.

4. Charging is complete once a green LED is displayed on the battery charger. If the LED indicates a different color, please refer to the table below, or the information on the charger to identify the mode.

5. Switch off the battery charger power at the mains supply, then disconnect from the mains supply.

   ### IMPORTANT

   Nickel Metal hydride batteries require a regular charge and discharge cycle to maintain optimal performance. It is important that the battery is allowed to be fully charged between discharge cycles during this period. Failure to do so will invalidate the warranty.

Battery Charger LED Indications

The color of the LED indicator on the charger correlates to the charging mode, which can be identified from the table below:

LED Color	Mode
Yellow	Battery not connected
Yellow	Battery initialization & analysis
Orange	Fast charge
Green with intermittent Yellow flash	Top-off charge
Green	Trickle charge
Alternating Orange - Green	Error

Battery Safety Information

- The FloormapX batteries should be fully charged at **least every 4 months**, otherwise the batteries will reduce capacity or become dead.

- The FloormapX batteries must be fully charged before use. Allow 3-5 cycles of charging and

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discharging for full battery capacity to be recovered.

- The FloormapX battery charger is only designed for indoor use and should not encounter water or dust. To avoid overheating, the charger and battery should not be covered when it is in use.

- When the FloormapX system is not being used the battery must be removed from the right-hand active battery slot of the scanner and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not being used.

- Only use the charger provided to charge the FloormapX battery. Charging the battery with another charger or without any attention may cause the battery to explode.

- The charger is turned on by connecting it to the mains power socket. Disconnecting it from the main power socket turns the charger off. The mains power socket should be easily accessible. If an operational error occurs, the plug should be immediately removed from the socket.

- If the charger is equipped with a mains cord, verify that the cord has not been damaged. If the cord is damaged, the charger must not be used.

- The charger contains dangerous voltages, so the cover should not be removed. Avoid the plastic casing encountering any chemicals or solvents such as oil, greases, etc. as most types of plastic can be broken down then. If the casing or covers are damaged, the charger must not be used.

2.3 Assembling the FloormapX

The FloormapX is supplied and shipped in separate modules amongst two transit cases. In the on-line learning package, a video is available in Module 7 details how to assemble the FloormapX. To unpack and assemble the FloormapX:

1. Remove the scanner head from the transit case and place onto the ground, wheel touching.

2. Loosen the brass rear attach bolts on the rear of the scanner head and unscrew all the way, remove, and then replace so that they are supported by the spring-loaded bearing.

3. Whilst still in the transit case lift the Mainframe up to vertical whilst the reposition wheels remain resting in the transit case.

4. Attach the user control to the mainframe by sliding it down onto the guide rail and ensure the locking plunger engages correctly.

5. Attach the user control cable from the mainframe to the user control.

6. Lift the mainframe out of the transit case and place the reposition wheels on the floor.

7. Wheel the mainframe to the scanner head rear attach mechanism.

Figure 20: Offering the mainframe to the scanning head

8. With a foot placed in front of the scanner head to stop it rolling, engage the Mainframe rear attach mechanism into the scanner head rear attach mechanism. Press down on the brass rear attach bolts to engage them then screw down fully before letting go of the mainframe. Please note it is likely that some 'wobble' of the Mainframe will be required to fully engage the gold locking screws.

Figure 21: Engaging the mainframe with the scanning head

9. Attach the sensor cable with blue identifying rings to the matching color-coded ports on the scanner head and mainframe.

IMPORTANT
Ensure cable connectors are correctly mated to avoid damage to connector pins.

10. Attach the motorization cable with orange identifying rings to the matching color-coded ports on the scanner head and mainframe.

IMPORTANT
Ensure cable connectors are correctly mated to avoid damage to connector pins.

11. Loosen the docking angle adjustor knob and set the angle of the tablet to the desired position and retighten the locking knob.

NOTE
The docking angle adjustor knob only needs to be turned a few times to disengage the locking teeth. It is not necessary to remove it from the system completely. When adjusting the knob keep hold of the tablet to ensure it does not fall.

12. Attach the tablet connector from the mainframe to the scanner connector on the tablet.

Figure 22: FloormapX tablet connector

13. Remove the battery compartment cover and fit a battery into the right-hand active battery slot. If required insert a spare fully charged battery into the left-hand slot. Replace the battery compartment cover.

Figure 23: FloormapX battery compartment

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14. Power the system on by pressing the tablet power button or the user control power button.

15. The system is ready to use once the software has loaded and the system has completed is power on sequence of flashing headlights.

REMOVE BATTERY

When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

2.4 Recommended Scanning Bridge Height

To account for varying levels of imparted magnetism the following table contains recommended operating conditions when performing a calibration and subsequent inspection. **The low setting will provide the optimal detection capability**. The high setting can be used on thinner plates (where undulations may be present) or to provide better ground clearance.

Metric

Coating Thickness (mm)							
		0mm	1mm	2mm	3mm	4mm	5mm	6mm
Plate Thickness (mm)	6mm	High or Low	High or Low	High or Low	High or Low	Low	Low	Low
	8mm	High or Low	High or Low	High or Low	Low	Low	Low	Low
	10mm	High or Low	Low	Low	Low	Low	Low	Low
	12mm	Low	Low	Low	Low	Low	Low	Low
	14mm+	Low	Low	Low	Low	Low	Low	Low

Imperial

Coating Thickness (mils)							
		0mils	40mils	80mils	120mils	160 mils	200mils	240mils
Plate Thickness (inch)	1/4in	High or Low	High or Low	High or Low	High or Low	Low	Low	Low
	5/16in	High or Low	High or Low	High or Low	Low	Low	Low	Low
	3/8in	High or Low	Low	Low	Low	Low	Low	Low
	1/2in	Low	Low	Low	Low	Low	Low	Low
	9/16in +	Low	Low	Low	Low	Low	Low	Low

IMPORTANT

Operation outside the recommended specifications is possible, for example operating the FloormapX on 16mm (5/8in) in the high position, but detection and consistency criteria maybe adversely affected. Investigation of performance is recommended prior to inspection to understand performance.

All calibrations, especially those that are performed on plate thicknesses of greater than 12mm (1/2in) should be verified and performance understood prior to inspection as detection and repeatability, due to saturation considerations, may be affected.

It is recommended to include a scan overlap for inspections that are to be performed on plate

thicknesses of greater than 12mm (1/2in).

2.5 MFL Technique

To detect a leaking field, the FloormapX uses hall effect sensors mounted between the poles of a magnetic bridge. The magnetic bridges include strong permanent magnets comprised of neodymium iron boride grade N52 that induce a magnetic field into an inspection specimen. The presence of a defect in the inspection specimen causes the induced magnetic field to leak and it is this leaking magnetic field that the suitably placed hall effect sensors detect, where severity is implied by volume and nature of leaking field..

MFL systems are heavily reliant on the inspection surface, upon which they operate. It is important to understand that as the condition of the inspection surface deteriorates, so can the effectiveness of any MFL system. All MFL systems interpret a leaking field and any influencing factors that affect this leaking field must be understood and factored into the inspection process.

As MFL can, in part, be considered as a volumetric detection technique, it is important to understand the relationship between the calibration defects and defect depth. In cases where accurate remaining wall thickness is required, any defect indications reported with the FloormapX system should be cross-checked with an alternative method (such as UT or a pit gauge).

2.6 Specifications

FloormapX PERFORMANCE	
Principle of operation	Array Magnetic Flux Leakage & Magnetic Field Reluctance (STARS)
Numbers of sensors / channels	256 Hall Effect sensors, 64 channels
Top and bottom discrimination	Yes, using STARS technology
Detection capability	As small as 20% plate thickness, ø 2 mm (ø 0.080 in) **
Test through coatings	Yes, up to 10mm (400mils) if non-magnetic and depending upon plate thickness
Max recommended Plate thickness	Up to and including 16mm (0.63 in) *
Speed	Variable from 0 mm/s to 1 m/s (0 in/s to 3.28 ft/s)
Scan width	300 mm (12 in)
Scan coverage	Up to 263 m² / h (2831 ft²/h)
Plate thickness range	4-20 mm (0.157 in to 3/4 in)
Positional accuracy	± 0.04% (± 3 mm over 8 meters) (± 3/32 in over 26 ft)
Method of propulsion	- High-efficiency brushless DC motor, drive wheels - Manual push pull

	- Combination of motorized and manual is possible to optimize coverage
Dimensions (W × H × D)	458×1075×973 mm (18×42×38 in), shipped in 2 transit cases
Shipped weight	Box 1: 45kg (99lbs) || Box 2: 55kg (121lbs)
Shipped dimensions	Box 1: 510mm x 650mm x 370mm || Box 2: 1220mm x 490mm x 420mm (20 x 25.6 x 14.6 in) || (48 x 19.3 x 16.5 in)
Assembled weight	63 kg (139 lbs.)
Minimum man-way size	500 mm (20 in)
Batteries	Supplied with 3 batteries and 2 chargers for continuous use (spares available)
Typical battery operational time	Motorized operation provides up to 4 hours. Manually operated up to 10 hours.
Operating temperature	-10°C to 45°C (14°F to 113°F)
Storage temperature	-10°C to 55°C (14°F to 131°F)
Usage environment	Industrial storage tank floors
Ingress protection rating	IP53***
Maximum operating altitude	2000m****
Maximum relative humidity	80% non-condensing

* It must further be noted that reduced detection capability is possible on thicker inspection surfaces.

** These results are based on artificial defects. Detection capabilities may vary depending on different inspection factors, for further information please contact Eddyfi.

*** The system is rain shower resistant. Do not leave in rain for prolonged periods, wipe system dry after wetting, do not spray with a hose or immerse in water/ drive through standing water.

****The system is air shippable whilst packed in its transit cases

Chapter 3

Inspection Preparation, Setup and Operation

1. *Inspection Process*

This section gives an example of the typical main processes involved when performing an inspection with the FloormapX system.

3.1 Pre-Inspection preparation

- Ensure the FloormapX is using the latest version of SIMS GO data acquisition software.
- Check that no component is damaged.
- Check that the unit is functional and powers on correctly.
- Check that user control mechanism works as designed.
- Check that high/low mechanism on the scanning head works.
- Check that the magnets move freely.
- Check that the drive and steering motors work.
- Fully charge all FloormapX batteries and ensure batteries have been correctly stored and cycled when not used.
- Ensure the FloormapX and accessories are packaged properly for transit.

3.2 Onsite FloormapX setup preparation

Before beginning a tank floor inspection using the FloormapX, we advise operators to follow the recommended checklist:

1. Unpack and assemble the FloormapX system.
2. Check all the FloormapX cables are connected and secure before powering on the system.
3. Check all cables are free and not pinched.
4. Ensure the cover plate is attached and fixed in place.
5. Ensure the scanning bridge high / low mechanism is free moving and locks in both the high and the low position.
6. Ensure all FloormapX batteries are fully charged before inspection begins.
7. Always ensure the drive system is clean and maintained.
8. Power on the FloormapX.
9. Ensure the motorization emergency stop is disengaged.

3.3 FloormapX calibration preparation

Calibration Checklist

1. Determine the thickness of the tank bottom plates and coating using ultrasonic testing (UT) or other reliable and accurate method.
2. Identify a suitable reference plate thickness to use for calibration.
3. If the tank bottom has a coating or lining and the thickness is more than 0.5mm (20mils) it must be simulated on the reference plate during calibration and entered into the SIMS GO data acquisition software calibration routine.

Calibration Considerations

Please refer to section 4.5 Create Calibration of this user manual for calibration procedure on how to correctly calibrate the FloormapX using the SIMS GO for a particular plate and coating thickness.

During the calibration procedure please be aware the following important points:

- For safety reasons, when performing a calibration, the FloormapX should be set at the slowest speed setting.

- The leakage field from non-calibration defects will vary dependent upon diameter, shape, and volume as well as depth. It is essential that a range of defects detected in the inspection surface are cross checked with ultrasonic testing or pit depth measurement. This ensures the calibration is suitable for the type of corrosion present in the inspection surface.

- All calibration procedures must be carried out on a MFL reference plate manufactured in accordance with the appropriate Eddyfi drawing, of the same thickness as the floor plates to be tested. The standard MFL reference plate thicknesses are 6mm, 8mm, 10mm, 12mm, 1/4in, 5/16in, 3/8in and 1/2in.

- Once calibrated, the FloormapX calibration is only valid for that configuration. Therefore, if on any single track there exists any variation in the inspection surface, plate, or coating thickness, or if the scanner bridge height has changed then this must be considered. Another calibration is required to inspect that variation.

> NOTE
>
> In some cases, the true thickness of the tank floor plates being inspected may not be the identical thickness as the standard MFL reference plates.

Inspection Surface Thicknesses

Knowing the inspection surface thickness and selecting the correct reference plate for calibration is vital to obtaining optimal results when using the FloormapX system. When the inspection surface is:

- The same thickness as the reference plate used in calibration, then optimal results can be achieved by the system. This is the ideal case.

- Thicker than the reference plate used in calibration, the system will likely be under sensitive. This reduces the detection capabilities of the system, and defects would likely be undersized. This is worst case.

- Thinner than the reference plate used in calibration, the system will likely be oversensitive. This increases the chance of spurious defects, and defects would likely be oversized.

> IMPORTANT
>
> The reference plate must not be in contact with any other ferromagnetic material while the calibration is being carried out.

When the coating is more than 0.5mm (20mils) on the tank floor, this must be simulated during the calibration procedure – for both top surface and bottom surface calibration scans – by placing a piece of non-magnetic material, which maintains the same thickness as the coating on the floor, between the scanner and the reference plate.

> IMPORTANT
>
> For EPL sizing it is important that the reference plate matches the inspection surface as closely as possible in terms of material composition, thickness, and coating.

3.4 In Tank Inspection Setup

1. Erect suitable lighting within the storage tank. This can aid the FloormapX operator to identify markings and hazards.

2. Investigate the tank environment and find details on the condition and history of the storage tank to be inspected. Details such as:

   - The external conditioning (e.g., location of the tank, soil, and altitude).

   - The age of the storage tank and its inspection history.

   - Identify the history of the product stored in the storage tank and the condition of any plate coating.

   - Tank Diameter: required to calculate the annular ring. The tank diameter measurement **must be** accurate as it is essential for reporting purposes.

3. Check the cleanliness of the inspection surface. In poor conditions the scanning bridge can attract loose ferrous material, which can sometimes interfere with the accuracy of MFL indications. Please contact Eddyfi if tank preparation and tank cleaning information is required.

   ### IMPORTANT

   It is recommended that the scanning bridge is regularly cleaned at intervals during inspection if this is the case. To aid scanning head cleaning it is recommended to set the magnet position to zero before cleaning as most magnetic debris will fall away from the scanner without further action since there is no magnetic attracting force.

4. Locate the tank datum position. When viewing a tank floor from above, the plates can be seen to align in both the vertical and horizontal plane as illustrated below.
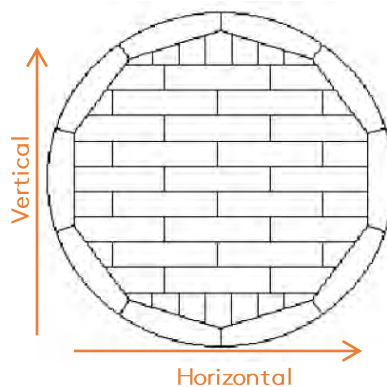
Figure 24: Tank floor aligning for horizontal and vertical plane

Identifying a tank datum is important as the plate numbering system, the plate reference and the plate orientation are all referenced to the tank datum. The tank datum position is established within a tank by:

5. Looking at the tank floor from above.

6. Establishing the plate rows that run parallel.

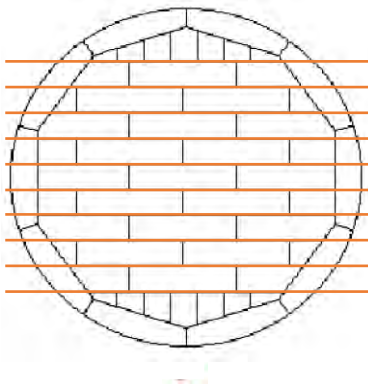7. Orientating yourself to look perpendicular to the plate rows.

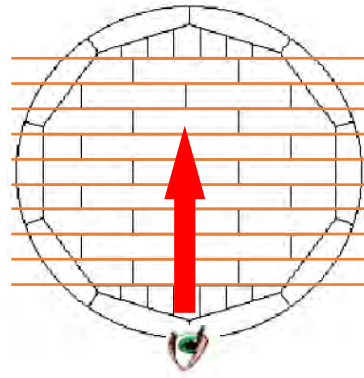Figure 25: Identifying parallel plate rows

Figure 26: Orientating to be perpendicular to plate rows

8. Positioning the tank datum point in the bottom-left hand corner.
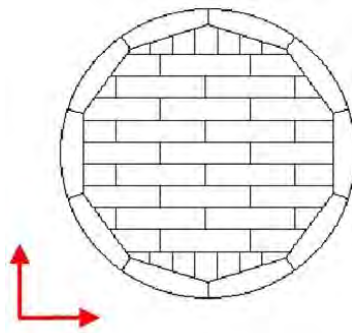

Figure 27: Position of tank datum into the bottom left-hand corner

9. The row and plate numbering system set the position of the plate relative to the other plates in the tank and must be used with the SIMS GO data acquisition software. The numbering system begins in the top left-hand corner with the row number increases downwards and the plate number increases from left to right (the plate number resets on each new row).

   NOTE

   It is possible to select an alternative plate numbering system for report generation in the SIMS PRO software.
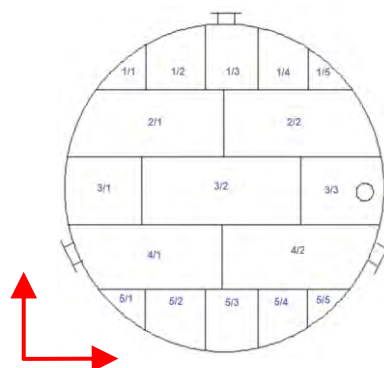
Figure 28: Plate numbering system with bottom-left tank datum position

10. For annular numbers set the position of the annular plate relative to the other annular plates in the ring. The software counts annular plates in a clockwise direction beginning at 1. It is recommended to keep the position of annular 1 close to the top left-hand corner.

    NOTE

    The annular ring can be rotated to the required position in the SIMS PRO software.

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11. Verify the plate thickness and coating if applicable for each plate by performing at least 3 UT plate thickness readings (refer to work procedure). We minimally advise the checks are performed by checking the thickness of:

- One corner of the plate.

- The center of the plate.

- The opposite diagonal corner of the plate.

12. Identify on plates any weldments, obstructions and any weld spatter that can potentially damage the undercarriage of the FloormapX. We advise to grinding down any weld spatters if possible.

   IMPORTANT

   During an inspection if the scanning bridge position is changed, ensure the correct calibration is used. A separate calibration is required at a low and a high scanning bridge position for the same plate thickness.

13. Select a plate reference for each plate, knowing their relative position to the tank datum, for the inspection.

14. Identify the correct orientation for each plate.

15. Measure the width and length for each plate. Mark out the chosen track width for the plate.
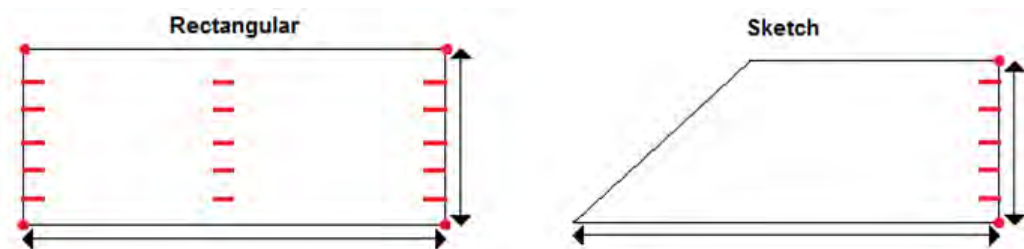
Figure 29: Rectangle and sketch plate markings for scan width

   IMPORTANT

   Marking out the plate tracks before or during inspection can increase inspection efficiency when scanning tank floors.

   NOTE

   It is advised to mark out track width intervals at the beginning and end of a plate. If the plate length is longer than 4 meters or has obsticles it is advised to mark the beginning, middle and end of the plates to ensure the FloormapX does not deviate from its intended scanning path.

16. Enter the plate details into SIMS GO and begin scanning.

3.5 Scanning checklist

1. During the inspection it is advised to periodically check the FloormapX by performing verification scans on an applicable reference plate to ensure scans are consistent throughout the entire inspection.

2. Previous or current scanned plates can be viewed in the FloormapX SIMS GO data acquisition software using specialized features such as STARS and MFLArray.

   IMPORTANT

   When analyzing MFL findings during an inspection, operators must use the specialized software features and other tools available to them to verify the correct sizing and surface origin of identified defects.

3.6 Plate scanning coverage

1. The active scanning width of the FloormapX system is 300mm (12in). If required, scans can be overlapped by a value of between 0mm to 100mm and set in the SIMS GO data acquisition software. To calculate the number of scans required per plate, simply divide the plate width by 300mm minus the scan overlap. Round up to the nearest whole number.

   Number of scans = plate width / (300 – scan overlap)

   NOTE

   The SIMS GO data acquisition software automatically calculates the number of scans required per plate, based on the overlap selected in the software.

2. Achieving full plate scanning coverage with the FloormapX scanner is **not** possible. Typically, on rectangular plates non-inspected dead zone areas exist in each plate corner and around the plate edge. For annular and sketch plates this non-inspected dead zone depends upon the size and shape of the plate. Any obstructions on a plate also cause a reduction in the scan coverage area for that plate.

3. The data captured by the FloormapX relies upon the MFL and rear STARS sensor heads passing the same point of the inspection surface, however due to a positional offset between these two sensors head, at the start of a scan data captured begins at the MFL sensor head location, while at the end of a scan data captured finishes at the rear STARS sensor head location. This results in the following scan dead zone distances:

   - When the scanner is positioned with its back wheels against a weld, due to the gap between the back wheels and MFL sensor head, a dead zone of 174mm (6.8in) exists at the start of each scan.

   - When the scanner reaches the end of a plate and stops with its front wheels against the weld, due to the gap between the front wheels and rear STARS sensor head, a dead zone of 259mm (10.1in) exists at the end of the scan.

   - When the scanner stops in front of a vertical obstruction with its front handle against it, due to the gap between the front handle and rear STARS sensor head, a dead zone of 338mm (13.3in) exists at the end of the scan.
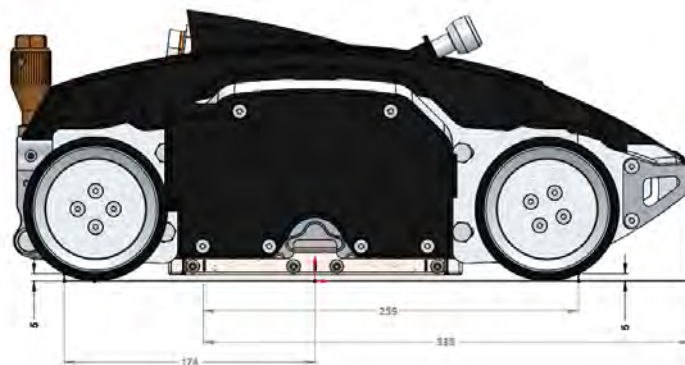

Figure 30: FloormapX sensor head mechanical constraints

4. Due to the mechanical constraints, it is also not possible to get closer than 10mm to the lap weld around the edge of the plate.

   IMPORTANT

Ensure all non-scanned areas on a plate such as in each plate corner, around the plate edges and around any obstructions are inspected by complementary equipment.

3.7 Post-inspection checklist

Out of Tank

1. A final calibration verification scan, via Freescan tool, should be performed before completing an inspection using the FloormapX to ensure the validity of the findings and the system set up.

2. Back-up all the gathered inspection data stored on the tablet to a USB memory stick.

3. Store the FloormapX and all other equipment safely during transit to avoid damage to components. Taking care to remove cables when packing system into transit case. Ensure batteries are removed from the FloormapX when not being used.

   ### IMPORTANT

   Ensure the magnets are turned off before packing into the transit case for shipping.

   ### REMOVE BATTERY

   When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

In Office

1. After completion of an inspection, we advise the following:

2. Clean the system. Ensure all components are free from tank residue and that magnet bridge and scanner heads of free from unwanted ferrous material.

3. All FloormapX batteries are placed on charge and fully charged for the next inspection. If the next inspection is several weeks, cycle the batteries to ensure optimal performance.

4. The FloormapX and related equipment are stored in a safe place within advised storing temperatures.

5. The MFL information gathered during an inspection is transferred onto a desktop / laptop and processed using SIMS PRO to generate the report.

Chapter 4

SIMS GO

Data Acquisition

Software

SIMS GO data acquisition Software

SIMS GO is the data acquisition software embedded on the FloormapX tablet. Below, information is provided on the layout features encountered during operation.

4.1 Introduction

FloormapX is operated using Eddyfi's SIMS GO software which allows full indication visibility and simple reporting while scanning. SIMS GO is split into the frontstage and backstage. The frontstage offers all the required tools to edit inspection and asset details, perform calibrations and collect and view scanned data. The backstage allows you to create or load inspections, system setup and licensing, software display preferences and system help. To switch between the frontstage and backstage of the software press the home button in the upper left corner. Alternatively, return to the desired frontstage window by selecting from the ribbon tab.

4.2 Backstage

An icon toolbar across the top of the backstage window allow access to the general, documentation, system, display, software license and help pages. The backstage shows generic information about the system and shows buttons to quickly access common menus for managing inspections and producing reports.
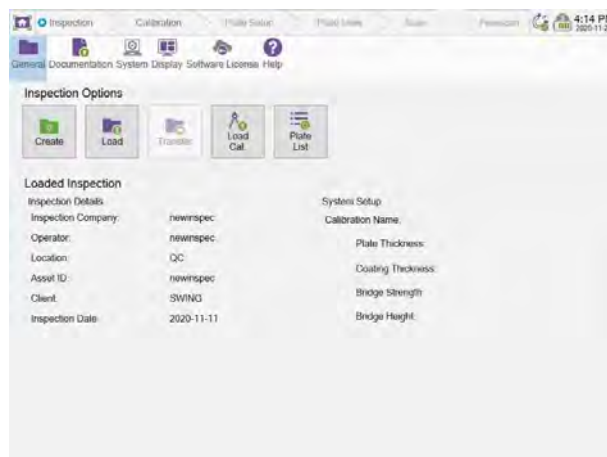
Figure 31: SIMS GO backstage - general

At any point navigating to the front stage is allowed by pressing on the frontstage ribbons at the top of the SIMS GO window.

Status Icons

The status items found at the top right of the screen provide information relating to:

- Magnet Engagement

This icon ![magnet icon] informs the user if the SMARTmagnet button on the user control has been activated. Please note that the SMARTmagnet button will not automatically rotate the magnets to the 'on' position. As a safety feature, the SMART magnet will only turn 'on' when the FloormapX is about to acquire data i.e. prior to a calibration, Freescan and/or standard data acquisition.

- Scanner Battery Power Indicator

This icon ![battery icon] displays the remaining battery life for FloormapX battery. Please note a software waring will appear when 10% battery life remains. It is recommended to replace the batter when the 10% battery life warning appears.

- Tablet Battery Power Indicator

This icon ![icon] displays the remaining battery life for the FloormapX tablet. The tablet itself has approximately 4 hours independent battery life. When the tablet is docked and connected to the FloormapX mainframe the tablet utilizes the battery from the FloormapX, if the battery in the tablet has depleted then a charge status ![icon] will be displayed to indicate that the tablet is now charging its internal battery via the FloormapX battery

General

Here the main inspection option parameters are available:

- Create.
- Load.
- Transfer.
- Load cal.
- Plate list.

The loaded inspection area displays the inspection details as well as system setup information. Inspection details are populated once an inspection is loaded, while the system setup information shows the specific calibration information once it is loaded.

Create

The create button allows a new inspection to be setup by entering information into inspection details, asset details and threshold areas.

In the inspection details area, the inspection company, operator, location, asset ID and client information is entered. Inspection date will be assigned to the current date by default and can be edited. If any of the inspection details are empty the inspection cannot be created. This information will be included in the report automatically so full operator name should be used.

Figure 32: Create inspection

In the asset details area, all the physical parameters of the inspections are entered, like the tank's diameter, number of annular plates, bottom plate thickness, annular plate thickness, coating thickness and scan overlap values. These values assist you during an inspection. For example, if the annular plate thickness does not match the reference plate thickness, it prevents you from inspecting that plate, thus ensuring the correct calibration is used. Note Asset Details should be confirmed prior to acquiring inspection data.

The correct tank diameter value must be entered to correctly create the annular plates. The tank diameter calculator tool can be used to compute the tank diameter, providing the tank consists of identical size annular plates.
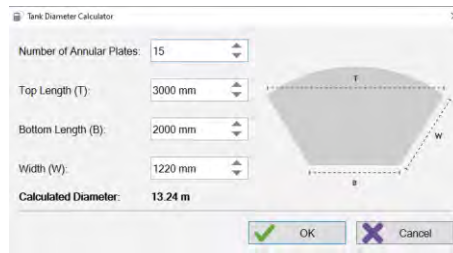
Figure 33: Tank diameter calculator

The thresholds area allows setting EPL values for default display purposes in the scans as well as for reporting purposes. Thresholds are set to 20% by default and can be edited in the plate view, scan and Freescan pages through a dedicated threshold menu.

Load

A list is displayed of all created inspections which are available to load and contains details relating to the asset ID, client name and inspection date for each inspection. These details can be used to sort the list of inspections. At the bottom of the menu the user can choose to delete, load an inspection, or cancel out of the menu.
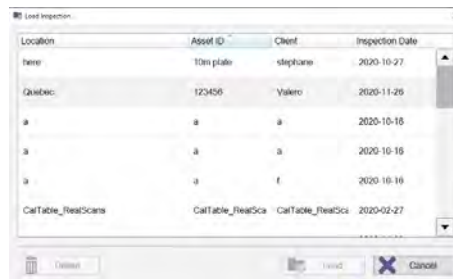
Figure 34: Load inspection

> **NOTE**
>
> In the image above, as a safety precaution, the delete option is not available for a currently loaded inspection.

Transfer

This tool is used to copy an inspection from the tablet to an external USB stick through the export function, or from a USB stick onto the tablet through the import function. The inspection data is located on the USB stick in the following folder *SIMS GO\Inspections\client_assetID_date* and consists of many different files and folders.

Figure 35: Inspection transfer menu

The inspections are copied in their current state, so for example during an export a mirror copy of the existing inspection with deleted or empty plates is transferred to the USB stick. If an inspection already exists on the USB stick, either as export to the USB stick or as an import onto the tablet, a warning message appears informing that the inspection with the same name will be replaced. Click **Yes** to replace the inspection or click **No** to cancel.

Multiple inspections can be selected and either exported or imported at the same time and the warning messages options update for overwriting of the selected inspections. Click **Yes** to copy an individual inspection, click **No** to ignore copying that individual inspection before the prompt question returns for the next selected inspection. Click **Yes to all** to copy all the selected inspections. Click **No to all** to cancel the transfer operation. In the inspection transfer menu, you can also delete inspections using the trash can / bin icon at the right of the inspection's row. The select all button allows for quick selection of the inspections by setting a checkmark in the checkbox next to the inspection's location. Clear all deselects all the inspections from the list.

IMPORTANT

The inspection data consists of many different files and folders, all of which are required to view the inspection data. Do not attempt to rename or delete individual files on the USB stick or alter the folder structure. Note that the tablet can be removed from the FloormapX and inspections transferred in an office environment.

Load cal.

The load calibration menu lists all calibration associated with the current inspection.
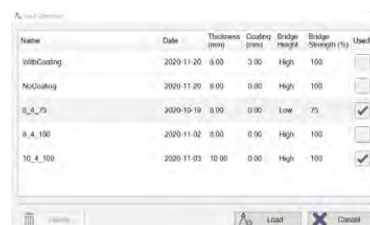
Figure 36: Load calibration

This list can be sorted by column values including name, date, thickness, coating, bridge height or bridge strength. The used checkbox on the right-hand-side indicates if that calibration has been used to scan a plate in the current inspection. Once a calibration has been selected it can be loaded, or if required deleted. To exit out of the load calibration window and return to the backstage click **Cancel.**

NOTE

Used calibrations cannot be deleted.

Plate List

The plate list option opens the plate list menu and lists every plate created within that inspection.
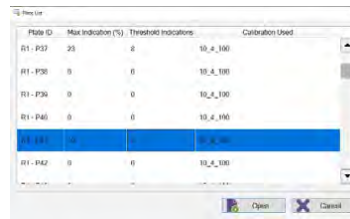

Figure 37: Plate list

The list also shows related information for each plate:

- Max. Indication (%): the EPL value of the maximum depth indication.
- Threshold indications: the number of indications on the plate with an EPL value above the display threshold.
- Calibration Used: calibration loaded when plate was scanned.

These values can be used to sort the list by selecting the column title. To view a plate in the plate view page, select a plate in the list and click **Open**. The cancel button closes the plate list and returns to inspection.

Documentation

In this section the documentation about third-party licenses is available to view. Each document can be opened and navigated through using the built-in document browser.
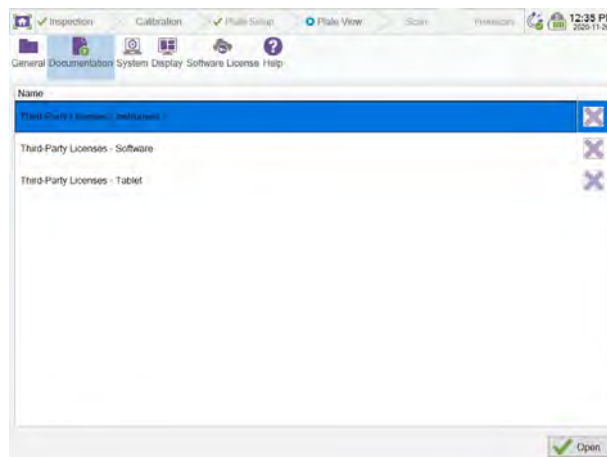
Figure 38: Backstage, documentation

System

This section contains main preferences to handle parameters specific to the system.
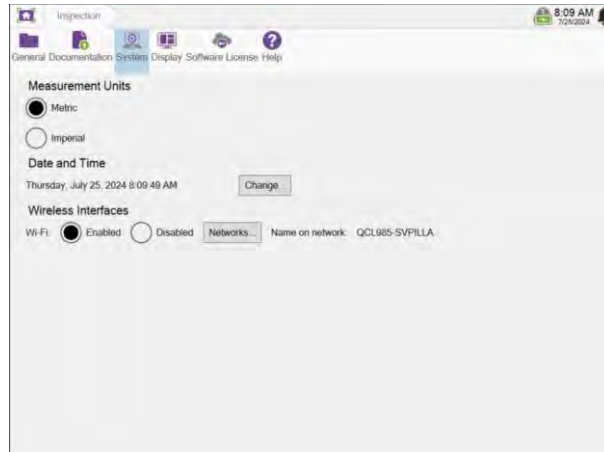
Figure 39: Backstage, system

The software can be set to either metric or imperial in the measurement units. This modifies all position and dimension fields in the info-fields, the indication lists, and the report.

The date and time area displays the system's current date and time. To alter click **Change...** to access the menu.
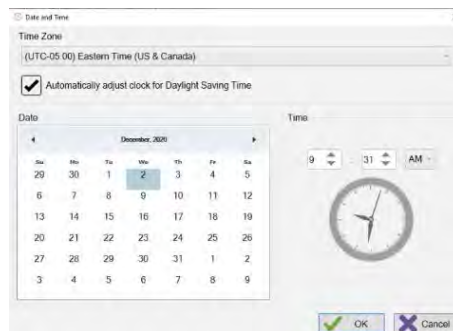
Figure 40: Date and time menu

Wireless interface allows access to a local Wi-Fi network, the radio buttons provide the user to enable or disable Wi-Fi connections on the system. When Wi-Fi is enabled click **Networks...** button to select and connect to the available Wi-Fi networks.

Scanner battery displays the current level of total charge, and the battery icon status can be interpreted as follows:

Battery Icon	Battery Status	Total Battery Charge
Flashing red battery	Empty	20% and lower
1 Red bar	Very low	20% to 35%
2 Yellow bars	Low	36% to 51%
3 Green bars	Medium	52% to 67%
4 Green bars	High	68% to 84%
5 Green bars	Full	84% and higher
Charging icon	Charging	Charging

Display Preferences

This section contains the management of the tablet's display parameters.
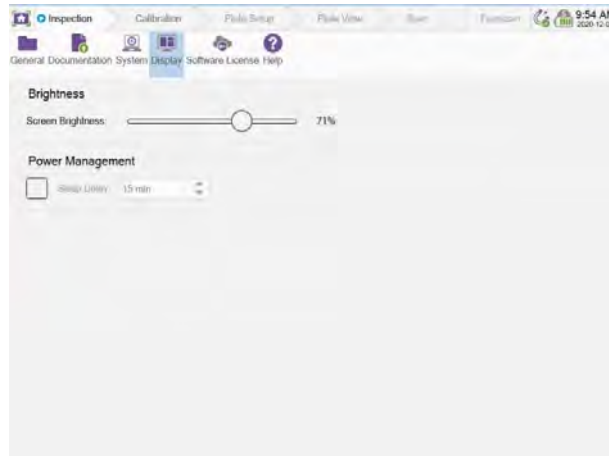
Figure 41: Backstage, display

The screen brightness level of the tablet can be adjusted by using the horizontal bar. It is recommended to reduce the brightness if operating in dark environments.

Power management sets a sleep delay for the tablet's display after a period of inactivity. In sleep mode the screen turns off and the tablet's power button LED starts flashing with an orange color. This mode alleviates power demand on the batteries allowing for the charge to last longer. By default, the delay is set to 15 minutes. Swipe a finger across the screen to exit sleep mode.

Software License Page

The section contains the status and parameters of the software license.
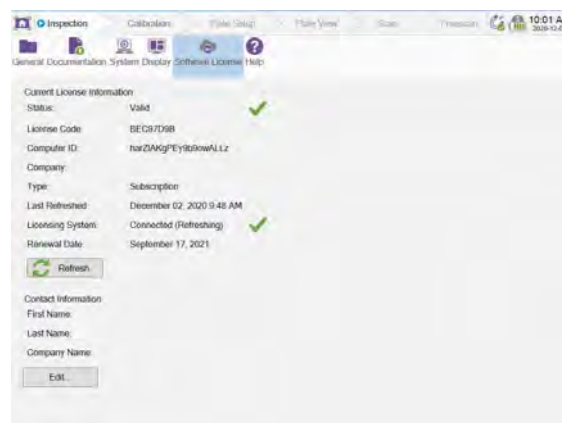
Figure 42: Backstage, software license

The refresh button gathers all the information from the license server and updates the current license information fields.

NOTE

A valid internet connection is required to connect to the licensing server.

Click **Edit…** allows modification to the contact information for the contact person to reach in the company for support or licensing questions.

Figure 43: Edit contact information

Help Page

This section contains information regarding the instrument, software versions, contact details and *Get Assistance* tool.

Figure 44: Backstage, help

System displays information pertaining to the software version and various packages installed on the system. Click **Check for Updates…** to see if an updated version of software is available for download.

> NOTE
>
> A valid internet connection is required to update software.

Get Assistance

The Get Assistance tool allows you to send information about an issue you encounter to an expert.

Selecting *Get Assistance* will review the wizard below

Here you can either **Ask for help** or **Export files**.

- **Ask for help**: requires internet connection and allows you to describe the issue and via e-mail contact the relevant resource.

- **Export Files**: Here inspection data, including calibrations and acquired data, can now be easily directed to an expert for review.

Log

In Log click **Copy logs to USB** to copy the current *.log file from the tablet onto a USB stick. These can be sent to the support personnel at Eddyfi to investigate any issues faced with the system.

The privacy options contain two checkboxes, the first one allows adhering to or opting out of the Eddyfi Technologies Product Improvement Program while the other indicates if you allow receiving notifications from Eddyfi. Click **Show Program Details** for further information. When toggled on data from the system is collected while the software is being used, analysis can later be done to improve user experience and the overall quality of the product. Participation in this program is strictly voluntary and anonymous.

4.3 Frontstage Layout

The frontstage is accessed by selecting one of the tabs above the ribbon at the top of the window.
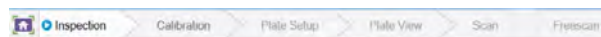
Figure 45: Frontstage ribbon

The first tab is the inspection tab and when no inspection is loaded or created then it is the only tab visible in the front stage. Once an inspection is created or loaded, the other tabs are displayed. The availability of the following **Calibration, Plate Setup, Plate View, Scan** and **Freescan** tabs depend on various conditions that must be met.

4.4 Inspection

At the top of the inspection page are two buttons which allow quick access to the plate list and the full indication list for the inspection.
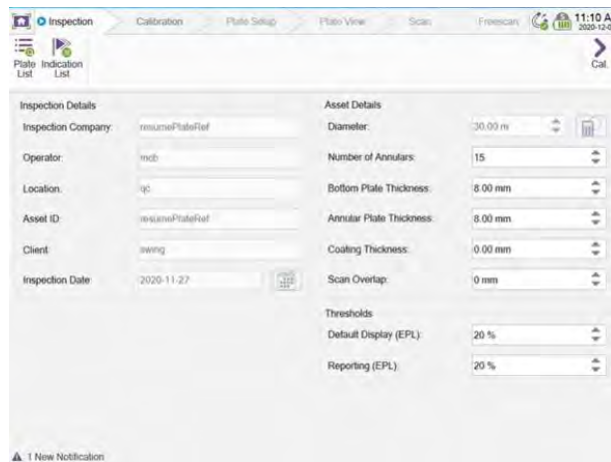
Figure 46: Inspection page

Once an inspection is created or loaded, the inspection details section becomes greyed out as these values cannot be edited. Also, in the asset details section, the diameter field becomes greyed out once an **annular** plate has been created in the inspection. This is due to calculations using the diameter value, number of annular plates and the entered annular plate dimensions for the width, bottom length, and top length.

All other fields in the asset details section and the threshold section remain editable throughout the inspection. This allows the bottom and annular plate thickness, coating thickness and overlap values and thresholds to be changed throughout the inspection if required.

Plate List

The plate list option opens the plate list menu and lists every plate created within that inspection.

Figure 47: Plate list

The list also shows related information for each plate:

- Max. Indication (%): the EPL value of the maximum depth indication.
- Threshold indications: the number of indications on that plate with an EPL value equal to or above the display threshold.
- Calibration used: calibration employed when that plate was created and/or scanned.

These values can be used to sort the list by selecting the column title. To view a plate in the plate view page, select a plate in the list and click **Open**. The cancel button closes the plate list and returns to inspection.

Indication List

The indication list button opens the full indication list menu which lists of all the indications found on every plate in the inspection.
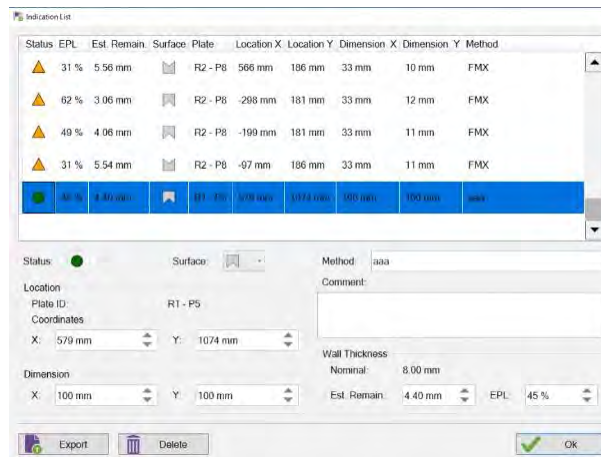
Figure 48: Full indication list

The top portion of this menu contains the list of each indication with the related information for status, EPL value, Est. Remain, surface, plate, location X, location Y, dimension X, dimension Y and method. The list can be sorted by these values in ascending or descending order if required. In the bottom portion of this menu the details of a selected indication in the list are displayed. The indication list can be exported using the export button onto a USB key in a *.CSV file format.

Two types of indications appear in the indication list:

1. **Automatic detection indication.** Once an indication has been scanned on a plate, it gets added into the indication list with an MFLA / unknown status represented by a yellow rectangle. The indication status can be changed to either accepted (long press) or rejected (short press) using the software dropdown option or the dedicated FloormapX tablet button.

Figure 49: Tablet button to change indication status

For accepted indications, the following indication details are editable:

- Surface.
- Method.
- Comment.
- EPL value and Est. Remain.

For rejected indications, or indication that remain as MFLA / unknown status, their details remain greyed out and non-editable.

> NOTE
>
> For all automatically detected indications, location and dimension values cannot be edited.

2. **Manual indication.** These can be placed anywhere in the plate view by using the add indication tool. When adding a manual indication its status is only set to accepted and greyed out, all other fields are editable. Once the values are entered the indication can be added by applying them in the indication list or to cancel out of the add indication menu. Once in the full indications list, manual indication values will remain editable.

4.5 Calibration

In the calibration page the correct calibration must be selected for plate scanning. The options are to create a calibration, to load an existing one from the inspection or to import a calibration from another inspection.
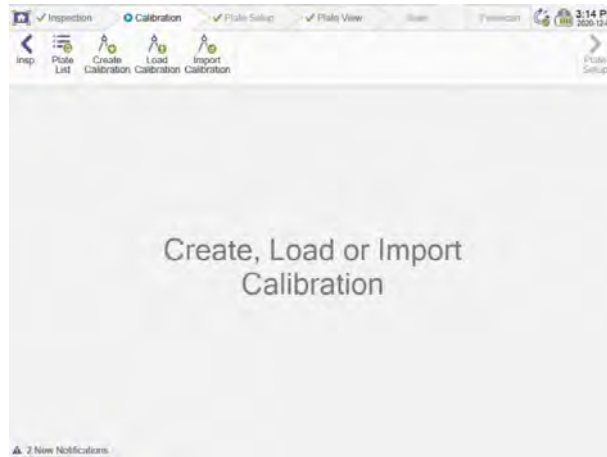

Figure 50: Calibration page

NOTE

When the text Create, Load or Import Calibration is displayed then no calibration is selected. Please create or load a calibration to continue.

Create Calibration

To create a new calibration, click **Create Calibration** then follow the wizard steps.

1. Enter the name of the calibration, plate thickness, coating thickness, scanner's bridge height and scan speed into the create calibration menu then click **Next**.
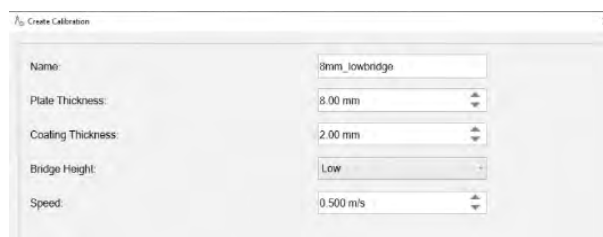
Figure 51: Create calibration

IMPORTANT

Ensure the correct thickness reference plate and if required coating simulation sheet thickness is used. These must match the floor conditions to be inspected.

Ensure the bridge height of the scanner has been correctly set. Refer to the recommended scanning bridge height section.

2. Prepare the reference plate for a top surface scan then follow the scan sequence. Apply a coating simulation sheet if required.
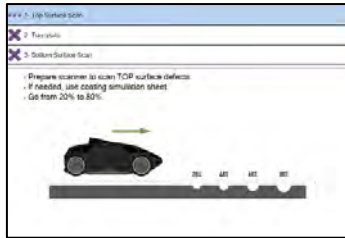
Figure 52: Step 1 - top surface scan   Figure 53: Step 2 - top surface scan   Figure 54: Step 3 - top surface scan
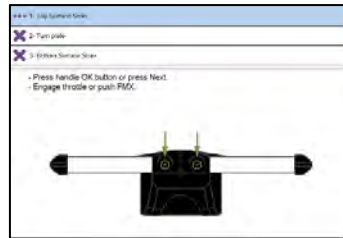
3. Turn the reference plate over in preparation for the bottom surface scan. Reapply a coating simulation sheet if required.
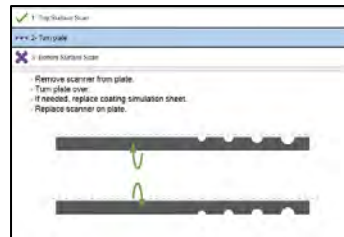

Figure 55: Turning the reference plate

4. Follow the scan sequence for the bottom surface scan.
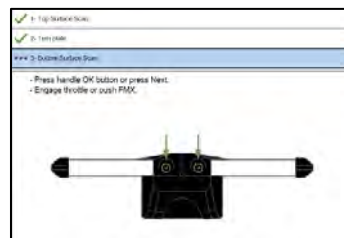

Figure 56: Step 1 - bottom surface scan   Figure 57: Step 2 - bottom surface scan   Figure 58: Step 3 - bottom surface scan

5. The top, bottom and STARS trace for the created calibration must be viewed before saving. Click **Save** to store the calibration and proceed to plate setup.

> NOTE
>
> Every plate that gets created from then on is associated to this calibration file.
>
> IMPORTANT
>
> When steps are performed in the incorrect sequence, or the plate is not turned, or scans performed in the wrong direction then a failed calibration message is displayed at the end. Failed calibration cannot be saved.
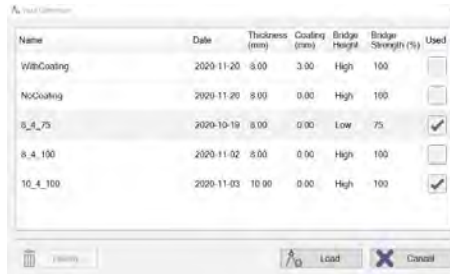
Please refer to section 3.3 FloormapX calibration preparation of this user manual for important preparation information and inspection considerations.

Load Calibration

The load calibration menu lists all the calibrations associated with that inspection.

Figure 59: Load calibration

The list can be sorted by column values including name, date, thickness, coating, bridge height or bridge strength. The used checkbox on the right-hand-side indicates if that calibration has been used to scan a plate in the current inspection. The buttons allow for deleting a selected calibration, loading, or cancelling out of the load calibration list.

> NOTE
>
> Used calibrations cannot be deleted.

Import Calibration

Calibrations from other inspections can be imported into the current inspection using the import calibration menu.

Figure 60: Importing calibration from another inspection

The import calibration menu lists all the inspections on the system, together with a list of calibrations associated per inspection. Once a calibration has been imported, the imported check box is toggled on. Once imported into the current inspection the calibration name appears in the load calibration menu.

> NOTE
>
> A calibration cannot be imported if the current inspection contains a calibration with the same name. All imported calibrations must be verified.

4.6 Plate Setup Ribbon

In the plate setup page, a graphical representation of the plate being created is displayed. From this page the plate list can also be accessed, and the option to delete a created plate, upon confirmation, is available at the top of the page.

Once a calibration is loaded, the next step is to open the plate setup page to create plates which correspond to the plate thickness and coating thickness of the loaded calibration.
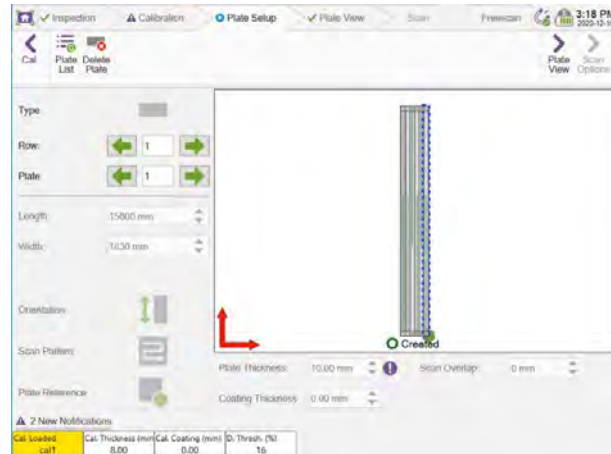
Figure 61: Plate setup page

NOTE

If a loaded plate was not scanned using the current loaded calibration, the cal. loaded info-field displays with a yellow background and the calibration tab in the ribbon displays a purple exclamation mark. Once the expected calibration is loaded the cal. loaded info-field background turns to white and a green checkmark displays at the left of the calibration ribbon.
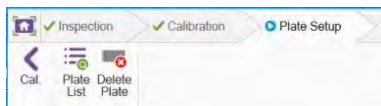

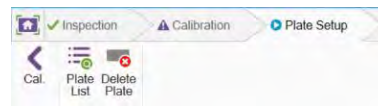Figure 62: Green tick on calibration ribbon

Figure 63: Purple exclamation mark on calibration ribbon

Plate Type

The plate's type can be set to one of these options:

  Rectangular.

  Sketch.

  Annular with straight bottom.

  Annular with curved bottom.

Note Rectangular and Sketch plates are similar with the difference being Sketch plates only have one transverse pre-planed track.

Row and Plate Number

The row and plate numbers set the position of the plate relative to the other plates in the tank. The software uses the row / plate numbering system during the inspection which is taken in relation to the tank datum. The numbering system begins in the top left-hand corner of the tank with the row number increases downwards and the plate number increases from left to right and resets on each new row.

NOTE

It is possible to select an alternative plate numbering system for report generation in the SIMS PRO software.

Annular Plate Number

The annular plate numbers set the position of the annular plate relative to the other annular plates in the ring. The software counts annular plates in a clockwise direction beginning at 1. It is recommended to keep the position of annular plate 1 close to the top left-hand corner.

> NOTE
>
> The annular ring can be rotated to the required position in the SIMS PRO software.

Plate Dimensions

The maximum dimensions for the plate length and width are entered into the relevant boxes. The plate length dimension range is from 450mm to 15500mm (17.7in to 610in), and the plate width dimension range is from 320mm to 15500mm (12.6in to 610in).

> NOTE
>
> The longest dimension must be the length and the shortest must be the width and is determined by the orientation of the plate.

Plate Orientation

The orientation of a plate can be set to either horizontal or vertical in reference to the tank datum. This determines if the plate's length position is along the X or the Y axis for track, scan, and indication positioning:
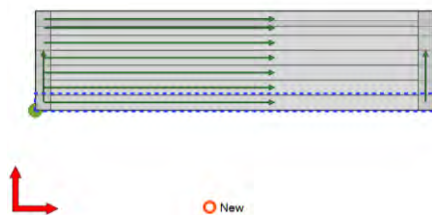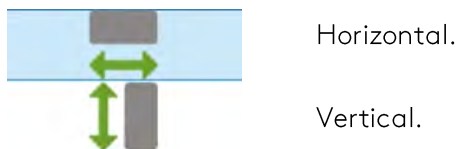
Horizontal.
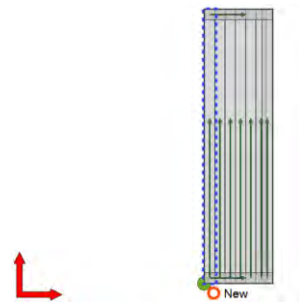
Vertical.

Figure 64: Example of horizontal plate

Figure 65: Example of a vertical plate

Scan Pattern

The scan pattern of a plate can be set to parallel or raster. The scan pattern represents the 'plan' for scanning the plate. At any time the user can vary from the pre-plan via the Scan Options button found in Plate View.

A parallel scan pattern is where all scans are performed in the same direction, while a raster scan pattern is where each scan is made in alternating directions.
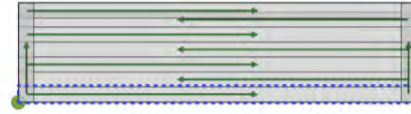
Parallel.

Raster.
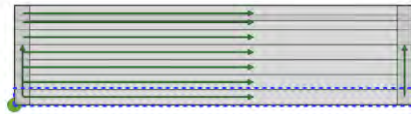
Figure 66: Example of parallel scan pattern

Figure 67: Example of a raster scan pattern

Plate Reference

The plate reference for each plate must be set correctly by selecting the correct corner knowing its relative position to tank datum. Once set, it becomes the (x,y) origin for that plate to which all positions are be measured to. It also determines where the first scan is located.

The number and position of the possible plate reference locations available relate to the geometry of that plate:

- For rectangular and sketch plates, all 4 origins are available.
- For annular plates, only bottom left and bottom right origins are available.

Bottom Left.

Bottom Right.

Top Left.

Top Right.

Plate Thickness and Coating Thickness

When creating a plate, the plate thickness and coating thickness must match the thickness entered for the plate and coating thickness of the loaded calibration. If they do not match a purple circle with an exclamation mark is shown and the plate cannot be created. The loaded calibration details are identified at the bottom of the screen in the cal. loaded, cal. thickness and cal. coating info-fields.
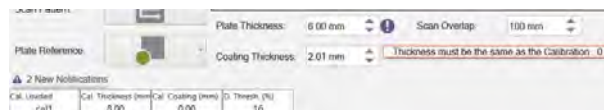
Figure 68: Discrepancy between the plate thickness and calibration thickness

Note: the Plate Thickness and / or the Coating Thickness can be changed per plate if required.

Scan Overlap

The scan overlap field shows how much overlap between each track is applied on the plate. The overlap values range from 0mm to 100mm. Altering this value realigns the tracks on the plate to reflect the new overlap value. This also affect the number of tracks used to cover the plate.
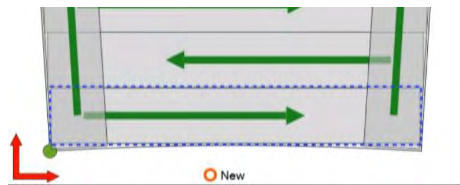
Figure 69: Overlap value of 0mm

Figure 70: Overlap value of 50mm

Shell Offset

The shell offset field is available when scanning Annular plates and refers to the inward distance of the curved scan from the tank shell wall. The angle of the curve is maintained.

Measuring Shell Offset

Position the scanner on the annular plate for the desired curved scan. Measure the perpendicular distance from the notch indicating MFL sensor location on the side black casing surface of the scanning head to the shell wall. If the scanner is against the shell wall the shell offset is zero.
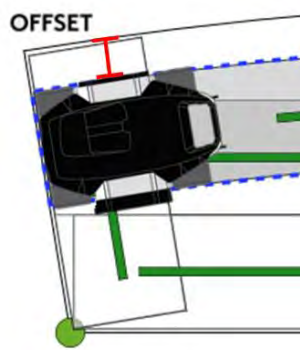

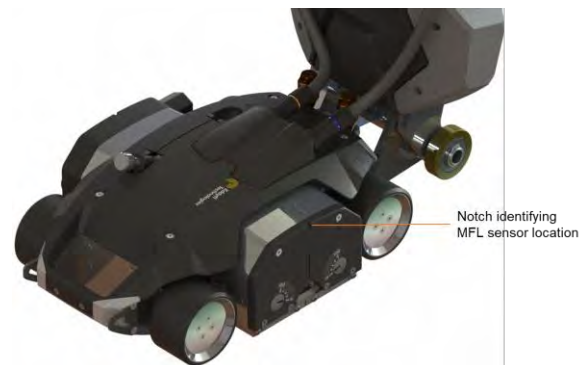
Figure 71: Shell offset measurement

Figure 72: Scanning head side black casing notch

Creating a Plate

When all the plate set up information has been entered and the calibration matches the plate and coating thickness you can *create* the plate. Progressing to plate view automatically creates the plate in the inspection.

When returning to plate setup a created plate can be identified by a green circle with created status appears below the plate image. For plates that have not yet been created an orange circle with new status appears below the plate image.
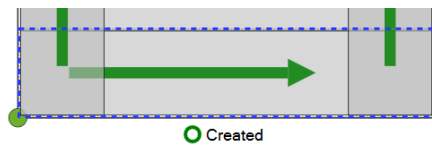

Figure 73: Created plate status with green circle

Figure 74: New plate status with orange circle

If the plate shows a new status, all the parameters can be edited. As soon as the plate is created the parameters become greyed out, and only deleting the plate will allow modifying the plate with new parameters.

4.7 Plate View Ribbon

Under this ribbon many menus and functions can be activated, along with the quick plate list access button we also have the possibility to delete scan, fit the plate to full extent in the plate view area, manually add indications to the plate as well as edit the display threshold to determine the minimum EPL value from which indications should start displaying on the plates.
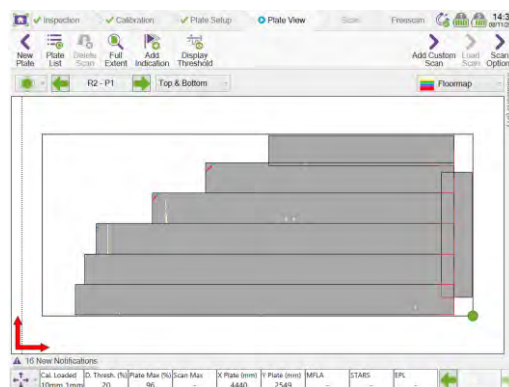

Figure 75: Plate view

Plate List

The plate list option opens the plate list menu and lists every plate created within that inspection.

Figure 76: Plate list

The list also shows related information for each plate:

- Max. indication (%): the EPL value of the maximum depth indication.
- Threshold indications: the number of indications on the plate with an EPL value on and above the Display threshold.
- Calibration used: calibration loaded when plate was scanned.

These values can be used to sort the list by selecting the column title. To view a plate in the plate view page, select a plate in the list and click **Open**. The cancel button closes the plate list and returns to inspection.

Delete Scan

The delete scan button removes the scan data for any selected scan in plate view.

Full Extent

The full extent button returns the view to see the entirety of the plate.

Add Indication

The add indication button allows a manual indication to be added onto the plate. All added indications are automatically included into the indication list.

Display Threshold

The display threshold button allows the minimum estimated percentage level value from which indications should be displayed from in plate view and scan view to be set.

Add Custom Scan

The add custom scan button allows a new scan to be added to any part of the plate and made in any direction or angle on the plate. Once add custom scan is selected an option tab for the scan setup becomes available on the right-hand side of the screen.
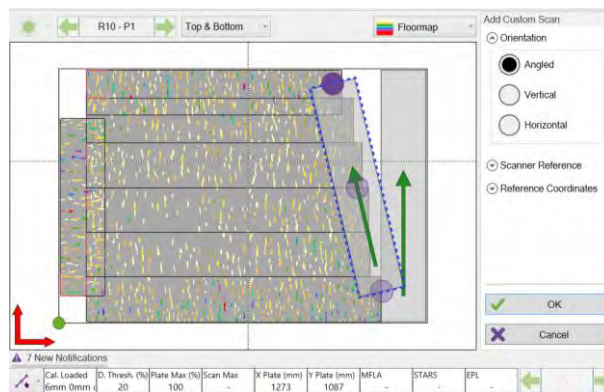
Figure 77: Plate view update for add custom scan

The orientation for an added scan on a plate can be one set to one of the following:

- Angled.
- Vertical.
- Horizontal.

A start (x,y) and end (x,y) reference co-ordinates for the added scan are determined by measuring from the reference corner of the plate to the chosen reference point of the scanner, either the left-hand or right-hand side of the scanning bridge.

To add a custom scan:

1. Position the scanner on the plate in preparation for the scan, then click **Add Custom Scan**.
2. Select the required scan orientation.
3. Place a finger or stylus on the screen and draw the scan on the plate.

   NOTE

   Use the circular anchors to alter the scans position on the plate.

4. Select the required scanner reference side, either Left of Right of the scanning bridge (considered when standing behind the FloormapX), to measurements to from the plate reference.

5. Edit the start (x,y) and end (x,y) reference coordinates of the scan to match the measurements from the plate reference.

> NOTE
>
> For vertical and horizontal scans, the end coordinates are not a requirement as the scan direction is set and the length of the scan is determined by the distance travelled by the scanner.

6. Click **OK** then perform the scan.

> NOTE
>
> Once data acquisition has been performed the position of the scan on the plate cannot be altered.

Load Scan

The load scan button allows captured scans to be viewed in the Scan View section of the software. Scans can be loaded by either selecting a scan from the plate view then clicking **Load Scan** or by cycling through each scans using the arrows in the bottom right-hand side of the plate view screen.
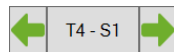
Figure 78: Selected scan number

Scan Options

The scan options button allows the user to deviate from a pre-planned scanning pattern by selecting a different track to scan, changing the scan direction, or by altering the start scan offset value.
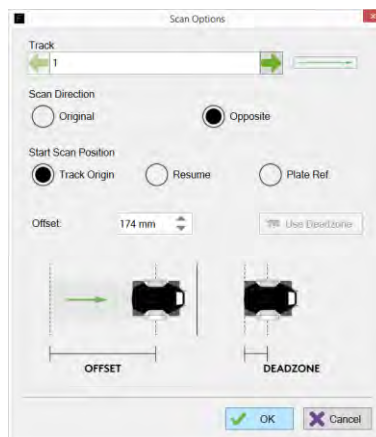
Figure 79: Scan options

Track

Track selection: allows track number selection. An icon to the right indicates track type.

Scan Direction

Scan Direction: allows the scan direction to be specified. The original direction refers to the direction determined by the pre-planned scanning.

> NOTE
>
> When the scan direction is altered the option is retained for consecutive scans.

Start Scan Position

The user can specify one of the following start positions:

- Track Origin: an offset value based on the distance from the plate edge to the track origin. By default, the offset value is the dead zone of the scanner.


Figure 80: Start scan position - track origin

NOTE

A dead zone of 174mm (6.85in) accounts for the area at the start of any scan not accessible to the FloormapX MFL sensor head due to its physical position within the system.

- Resume: this allows a new scan to continue from the previous scan on the same track but include an offset gap between the scans due to obstacles. A track can be resumed as many times as required. When selected the offset value is calculated by measuring the distance between the laser line.
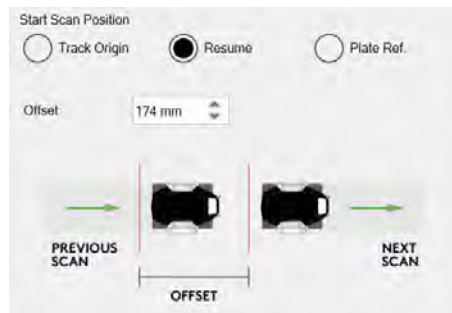
Figure 81: Start scan position - resume

IMPORTANT

Mark the laser line on the floor before repositioning the scanner to the next scan.

NOTE

As an alternative to the resume a new scan could be continued by selecting Track Origin and entering an offset measurement from the start of the plate.

- Plate Ref.: an coordinate offset value based on the (x,y) location from plate reference to the left hand side of the scanning bridge. This is particularly useful for annular plates where the track origin may be unknown.

Figure 82: Start scan position - plate ref

Viewing Plates

The navigation bar at the top of the plate view allows you to cycle through created plates for further analysis.

Allows to choose whether to load inner plates or annular plates in the view.

- Inner plates consist of rectangular and sketch plates.
- Annular plates consist of straight bottom and curved bottom plates.

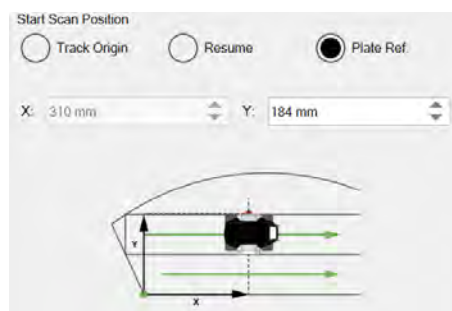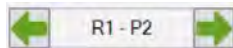Loads the previous or next created plate in the view.

Data Views

In the navigation bar at the top of plate view the data views for a plate can be switched between the available options:
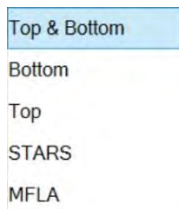
Top & Bottom: show top and bottom indications from the scans.

Top: show only the top indications from the scans.

Bottom: show only the bottom indications from the scans.

STARS: show data collected from the STARS sensor.

MFLA: show data collected from the MFL array sensor.

Color Palette

In the navigation bar at the top of the plate view the color palette for the selected data views can be selected. Different palettes are available depending on the data views:
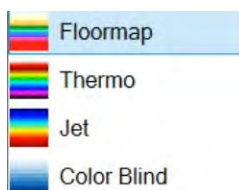
For Top & Bottom, Top and Bottom channels:
- Floormap.
- Thermo.
- Jet.
- Color blind.

For STARS channel:
- Gray.
- Jet.
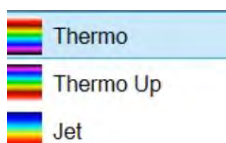
For MFLA channel:
- Thermo.
- Thermo up.
- Jet.

Indication list tab

Located on the right-hand side of the screen is an expandable indications tab. When closed it displays the number of indications identified above the display threshold. When expanded it lists all indications for that plate.
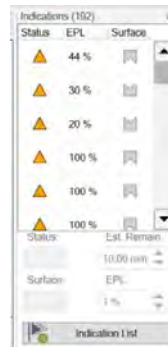
Figure 83: Full indication list

When an indication is selected from the list it is highlighted on the scan by the cursor position.

When an indication is selected in the C-Scan it will be highlighted in the indication list.

The indication status can be changed to either accepted or rejected using the software dropdown option or using the dedicated FloormapX tablet button. A short press of the button sets the indication status to reject, and a long press of the button sets the indication status to accept.

- Accepted indications can be altered by their surface origin, EPL value or Est. Remain value.
- Rejected indications are hidden from the scan view but still shown in the list.

Figure 84: Tablet button to change indication status

The indication list button opens the indication list menu which list of all the indications found on every plate in the inspection.

4.8 Scan Ribbon

In the scan page a graphical representation of the scan captured during acquisition is displayed. The raw MFL array data is viewed on the left-hand C-Scan and the raw STARS (top surface) data is viewed on the right-hand C-Scan. Displayed on the far left-hand side is the *Endscan* which provides a graphical response from the entire sensor head as the scan is performed. Located on the right-hand side of the screen is an expandable indications tab. When closed it displays the number of indications identified above the display threshold. When expanded it lists all indications for that plate.
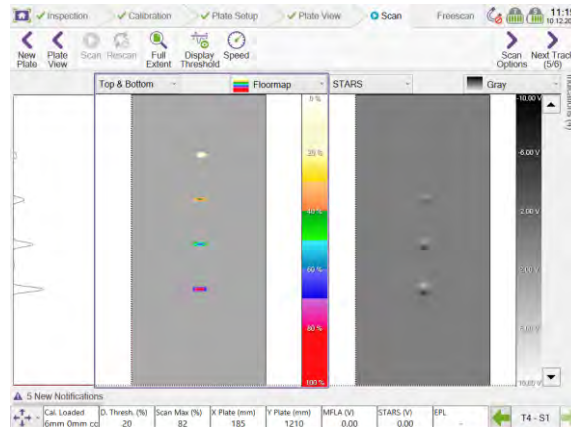
Figure 85: Scan window during data acquisition

Scan

The scan button is used to begin data acquisition. Click **Start** then pull back the throttle on the user control to drive the scanner forward and collect data. A live view of the scan progresses onscreen for the respective views. Release the throttle to stop the scanner drive.

> NOTE
>
> The scanner can also be manually pushed forward to collect data during data acquisition.

Stop

Once the data acquisition has begun a stop button appears in place of the start button. Click **Stop** to end data acquisition.

Rescan

The rescan button allows a scan to be repeated by clearing any collected data and enabling the Scan button again.

Full Extent

The full extent button returns the view to see the entirety of the scan.

Display Threshold

The display threshold button allows the minimum estimated percentage level value from which indications should be displayed from in plate view and scan view to be set.

Speed

The speed button allows the maximum speed of the scanner to be set.

> NOTE
>
> The throttle lever is used to modulate the speed of the scanner and the maximum speed is set when the throttle level is pulled fully backwards.
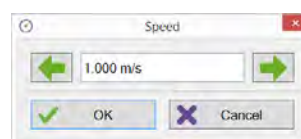
Figure 86: Scanner speed window

Scan Markings

During data acquisition an on-screen red and purple horizontal line markers are available assist in rapidly identifying areas of interest on the inspection surface. These lines can also be seen in the Endscan view on the left of the screen.

- The red horizontal line represents the FloormapX interactive laser line.
- The purple horizontal line represents the back of the rear rollers.
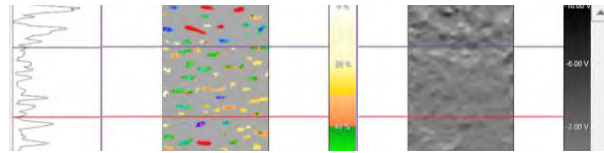
Figure 87: Scan markings during acquisition

Scan Options

The scan options button allows the user to deviate from a pre-planned scanning pattern by selecting a different track to scan, changing the scan direction, or by altering the start scan offset value.

Next Track

The next track button progresses to the next pre-planned track in the scanning pattern. Displayed in brackets is the next track number and the total track available.

4.9 Freescan Ribbon

Freescan represents a scan that can be performed in any direction and at any location on the tank floor. No plate number, track number or starting offset information is required prior to scanning. All positional information of a Freescan is referenced to its scan origin.
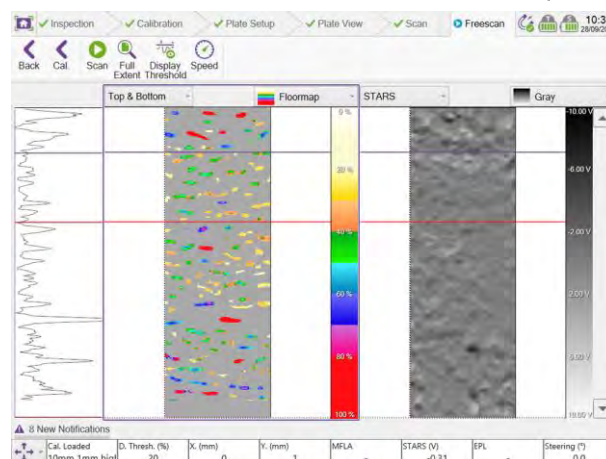
Figure 88: Freescan page

The Freescan option is perfect for:

- Multi-directional scanning when an indication is detected and needs to be confirmed.

- Rapidly finding indications, via the laser line, for additional prove-up
- Calibration verification.
- Investigating areas of interest during a mapping mode inspection, such as around an obstacle.
- Investigating areas at different bridge heights during a mapping mode inspection. Ensure the correct calibration for the bridge height is used.

Any indications found during a Freescan are not added to the indication list. To include indications in a mapping mode inspection, they must be added in plate view using the add indication feature.

NOTE
- The scan data captured during a Freescan cannot be saved.

4.10 Workflows and Operation

Depending upon the inspection workflow adopted and the inspection requirements the SIMS GO software can be adapted to meet your inspection needs. Below are suggested SIMS GO screening or mapping workflows.

Screening Inspection Workflow

Below is a typical workflow of the software menus required to perform a screening inspection using the Freescan.

Figure 89: Screening inspection workflow

Mapping Inspection Workflow

Below is a typical workflow of the software menus required to perform a mapping inspection.

Figure 90: Mapping inspection workflow

Chapter 6

Troubleshooting and Maintenance

Maintenance

5.1 FloormapX system precautions

- Avoid water contact.
- Immediately wipe system dry if FloormapX is exposed to water.
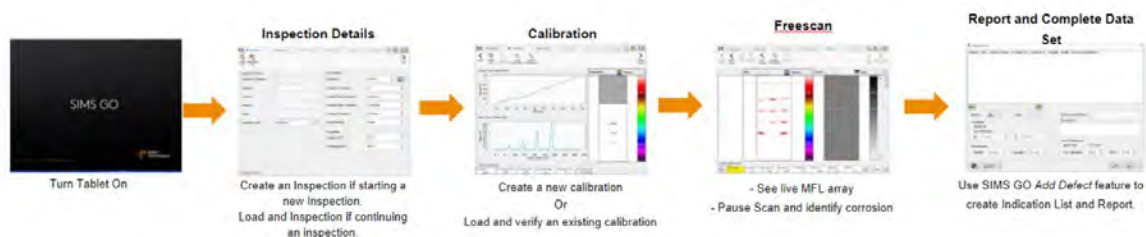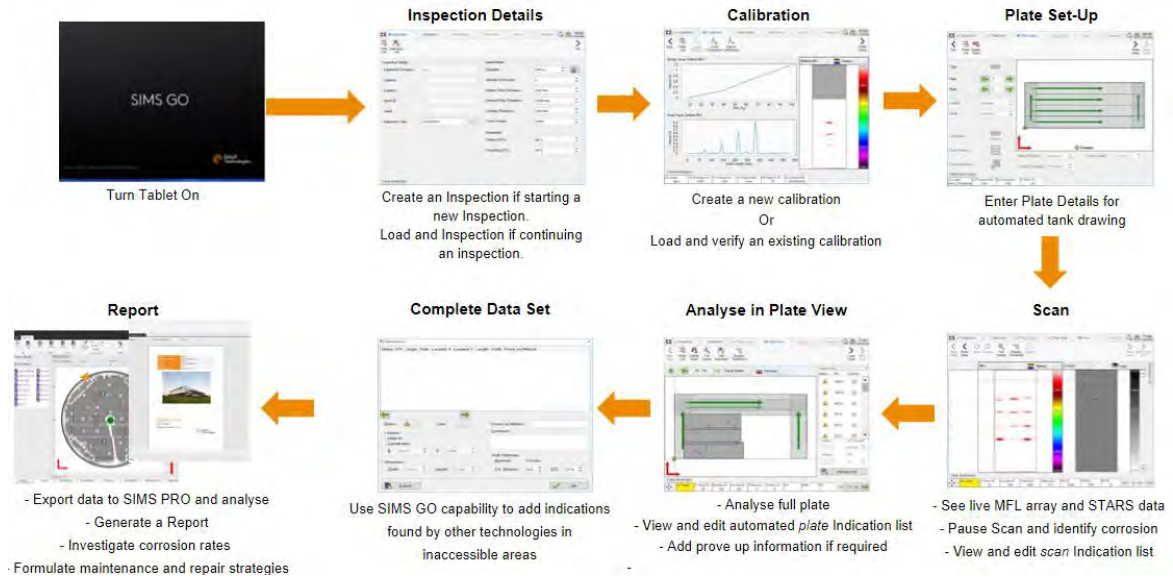- Do not spray with a hose or immerse in water.
- All water should be avoided by sweeping standing water away with a suitable brush.
- Always follow general precautions and safety precautions during maintenance of the system.
- Keep all connectors free from dirt and moisture.

5.2 Transportation and Storage

Receiving and Inspection

For transport purposes the FloormapX system is delivered within 2 black transit cases strapped to a pallet. Any transport work may only be carried out by appropriately trained personnel.

On receipt of the system, carefully check it for any damage that may have occurred during shipping. The transport company is responsible for damage that occurs during transport. If there appears to be damage, carefully inspect the system components for any further damage and check that all components correspond to the packing list. In the event of damage, notify the transport company immediately and keep the packaging as evidence. A full report describing the damage in detail must be submitted to the transport company and serves as the basis for the damage claim.

Damage or loss of goods delivered must be reported immediately to Eddyfi and confirmed by a copy of the above-mentioned report. If the operating manual is removed, do not lose, or misplace it.

Unpacking

The FloormapX system is packaged in two transit cases. Care should be taken when unpacking the FloormapX system, any markings or warnings shown on the packaging should be observed prior to opening. The following steps should then be taken:

- Unpack the FloormapX system in a dry area.
- During the unpacking process care should be taken not to damage the FloormapX system or cables.
- Check the contents of the FloormapX system against the packing list supplied and any missing items are to be reported immediately.
- The package and contents of the FloormapX system should be checked for signs of damage during transport and any problems reported immediately.
- Eddyfi accepts no responsibility for damage or injury caused during the unpacking of the system supplied.

Packing for transportation

Before packing the FloormapX system into the transit cases ensure:

- Each component of the system is clean and dry.
- Components are packed correctly in the designated transit cases provided to ensure safe and code compliant transit.
- Ensure the scanning head magnets are in the 'off' position to ensure the magnetic field is

controlled and is within the allowable limits for air shipment.

Each component of the FloormapX system must be correctly packed into the correct transit case. Refer to the supplied packing lists.

If the FloormapX system is to be shipped elsewhere, the original packaging and transport protection inserts **MUST** be used.

Packing the FloormapX scanning head

Before packing the FloormapX scanning head, first it must be disassembled from the system. To disassemble and pack:

1. Ensure the magnets are turned off.

2. Power down the system.

3. Remove the battery from the active slot on the mainframe, and place into the mainframe transit case and replace the battery panel.

> ### REMOVE BATTERY
> When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

4. Remove the motorization and sensor cables between the mainframe and scanner head. Place these into the mainframe case.

5. Whilst supporting the mainframe and stopping the scanner head from rolling, unscrew and remove the two brass rear attach bolts located at the rear of the scanning head.

6. Lay the mainframe down on the floor, so that it rests on its back. The mainframe and scanning head are now free of each other.

7. Replace the brass rear attach bolts into the scanner head rear attach mechanism, screwing them fully in, so that they do not rattle loose in transit.

8. Lift the scanner head by the front handle so that it rests on its back on the rear attach mechanism.

9. Lift the scanner head by the front handle into the case so that the rear wheels contact the foam.

> ### NOTE
> The scanner head will only fit on one orientation into the transit case.

10. Holding the front handle roll the scanner head back into the foam and lower the front end down till it is flat.

Figure 91: Scanner Head transit case packing

11. Close the lid of the transit case and engage the transit case clasps.

Packing the FloormapX mainframe

Before packing the FloormapX mainframe, first the scanning head must be disassembled from the system. Refer to the previous section Packing the FloormapX scanning head before packing the mainframe. To continue system disassembly and packing:

1. Pack the spare batteries and accessories into their respective slots in the transit case foam of the mainframe transit case.

2. With the mainframe disconnected from the scanner head and batteries removed, lift the mainframe into the transit case resting the repositioning wheels on the foam.

3. Roll the mainframe to the far end of the case so that the reposition wheels butt into the corner of the foam.

4. Rest the mainframe down on the user control.

5. Disconnect the mainframe to docking connector for the tablet.

6. Loosen the tablet docking angle adjustor knob and fold the docking with tablet flat against the front of the mainframe.

   ### NOTE

   The docking angle adjustor knob only needs to be turned a few times to disengage the locking teeth. It is not necessary to remove it from the system completely.

7. Retighten the docking angle adjustor knob.

8. Disconnect the user control cable.

9. Whilst supporting the top of the mainframe, remove the user control from the mainframe and set aside.

10. Lower the mainframe into the transit case.

11. Fasten the buckles around the mainframe and tighten so it cannot move in transit.

12. Insert the user control into the lid recess and fasten the Velcro buckle.

13. Ensuring that all component and documentation are in the case, close the lid.

Figure 92 Mainframe transit case packing

14. Fasten each of the external case clasps.

Packing for Storage

If storage of the FloormapX system is required, then all components must be packed correctly. The FloormapX should be stored:

- In a clean, dry, and secure location.
- Away from water and harsh environment conditions.
- In such a way as to avoid damage to the system.
- Case should be laid flat rather than stood upright.

REMOVE BATTERY

When the FloormapX system is powered off the battery must be removed from the right-hand active battery slot and placed into the left-hand storage slot. The battery capacity has a potential of discharging if left in the active slot when the system is not powered on.

5.3 Tablet

Cleaning

The tablet may be cleaned using a damp cloth. The screen can be cleaned using a dry microfiber cloth.

The tablet should not require disassembly for any maintenance. If any issues are encountered with the tablet functions, contact Eddyfi for fault finding information and troubleshooting.

5.4 User control

Cleaning

The user control can be cleaned with a damp cloth.

It is important that the height adjust plunger can fully engage in the receiving holes on the mainframe. Before installing the user control, check the guide rails and index plunger is free from dirt and debris, cleaning with a cloth if necessary. Whenever the user control is installed, check that the indexing plunger has fully engaged before relying on the user control being fixed to the mainframe.

5.5 Mainframe

Cleaning

The mainframe can be cleaned with a damp cloth. Care must be made to ensure the battery compartment is protected from moisture. The battery panel should always be fitted whenever the system is in use.

Consumables/Spares

Repositioning wheels

The repositioning wheels may be replaced by the user. To replace the repositioning wheels, remove the circlip, remove the wheel, replace with a new wheel, and replace the circlip. Contact an Eddyfi service center for spare parts and an instructional video.

Laser angle adjustment

The laser angle can be adjusted if it has been knocked from the correct offset position for indicating the position of defects in the software.

To correct:

1. Turn on the laser.
2. Perform a Freescan on a reference plate with the indication on the top side.
3. Stop the scan and then pull the system back, whilst it is still in contact with the plate, until the software shows the laser position line over the 20% defect.
4. Using the two adjustment screws on the laser module set the pitch and yaw of the laser line to be adjusted so that it is parallel to the back wheels and is at the correct position over the defect to match the position displayed on the tablet.

WARNING LASER

Do not deliberately look or stare into the laser beam. Avoid accidental exposure to eyes.

5.6 Scanning Head

Cleaning

To avoid deterioration in the detection capability, the scanner head should be kept reasonably free from accumulations of ferromagnetic debris. The best way to clean the scanner head is to switch the magnets to the off position. Most magnetic debris will fall away when the magnets are switched off. If necessary, a scraper or cloth may be used to further clean the head.

The system should be wiped cleaned before returning to the transit cases. If the system is to be stored, moisture and dirt should be wiped away from the system. A vacuum cleaner is also an excellent option for removing ferrous material.

The system may be cleaned in general with a damp cloth. The wheels should be cleaned with a damp cloth after an inspection to avoid residual tank product attacking the rubber whilst the system is left in storage.

Consumables/Spares

Main Wheels

The main wheels on the scanner head will wear and accumulate debris over time, with use. Large pieces of engrained debris can be removed using a scraper, being careful to avoid damage to the tire. Replacement wheels and fixing screws can be ordered and installed by users. Each wheel may be replaced by removing the four fixing screws. When a new wheel is installed a new set of fixing screws with pre applied thread locking should be used to ensure they do not come loose with vibration. Contact an Eddyfi service center for spare parts and an instructional video of how to replace the wheels.

Cover plate

The cover or wear plate on the underside of the scanning head bridge must be always installed when the system is being used. Should the wear plate become worn or suffer an impact that causes a significant indentation, it may be replaced. The wear plate can be replaced by removing the fixing screws, removing the wear plate, then replacing with a new wear plate and new thread locking screws. Care should be taken when reinstalling the fixing screws so that they are not overtightened. Overtightening can bend the wear plate reducing the obstacle clearance capability of the system.

Contact an Eddyfi service center for spare wear plates with fixing screws and an instructional video detailing how to replace.

Manual override of magnet

If the magnet drive motor fails, it is possible to manually adjust the magnet position so that the system may be safely shipped in a demagnetized state. The procedure requires removing the gearbox side gear cover and turning the adjustment nut with a 17mm socket until the magnet indicator reaches the zero or off position. An instruction video can be obtained by contacting an Eddyfi service center.

Manual override of steering

It is possible to manually override the steering system should the steering motor fail. Please contact an Eddyfi service center for advice and instruction on this matter before attempting to do so.

5.7 Service

After Sales and Technical Support

Eddyfi provides after sales and technical support. Please contact us by e-mail: support@eddyfi.com and provide the following information:

- Your name and your company name.
- The technical point of contact (name, phone number, email).
- System serial number, equipment type and any software versions.
- A detailed description of the issue.

After completion of maintenance work test all functions and all safety devices.

The specified calibration and maintenance work should be performed promptly according to the maintenance schedule.

Troubleshooting

6.1 System won't power on

If the system will not power on, check for the following:

- Check battery is installed into the right-hand active battery slot (when looking at battery compartment).
- Check battery has sufficient charge (replace with a fully charged battery).
- Ensure power button is pressed for the required number of seconds (approx. 3 seconds).

If the system still cannot be turned on, contact an Eddyfi service center for guidance.

6.2 Motorization not functioning

If the system is powered on but the motors are not working, check the following:

- The emergency stop is disengaged (rotate red knob).
- All cables are correctly connected (check with system power off).

    NOTE

    The magnets will not turn on unless in the scan environment i.e., in Freescan or mapping modes.

If the motors will still not operate after performing these checks, contact an Eddyfi service center for assistance.

6.3 Firmware version error message

If the system presents an error message at startup saying, the scanner firmware version is not detected, this indicates:

- A system module is not connected (i.e., check all cables are connected).
- The battery power is very low (replace battery with a fully charged unit).
- A system module has failed.
- A new system module has been installed with an incompatible firmware version (contact Eddyfi for a firmware update).

After ensuring the system modules are correctly connected, please contact and Eddyfi service center for assistance.

Eddyfi Technologies

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