



Fault Navigator – User Manual

V1.1

Introduction

Fault Navigator is a mobile app that runs on your iPad or iPhone, it navigates you to Ultrasonic suspects that are picked up from the UTU fleet. It works using your device camera to recognise the track and guides you to your suspect using Augmented Reality. A virtual pin will show you the location of the suspect when you get close to it.

The image below is a screenshot of a suspect being tested at the location that Fault Navigator has indicated.



Figure 1: Suspect verification



This guide is designed to help new users understand the Fault Navigator app's features and how to begin using it effectively.

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 - Use the provided light on maximum brightness to illuminate the 4-foot
 - Make sure to scan the 4-foot
 - Hold the iPad/iPhone in the correct orientation, i.e., landscape



Figure 2: portrait orientation

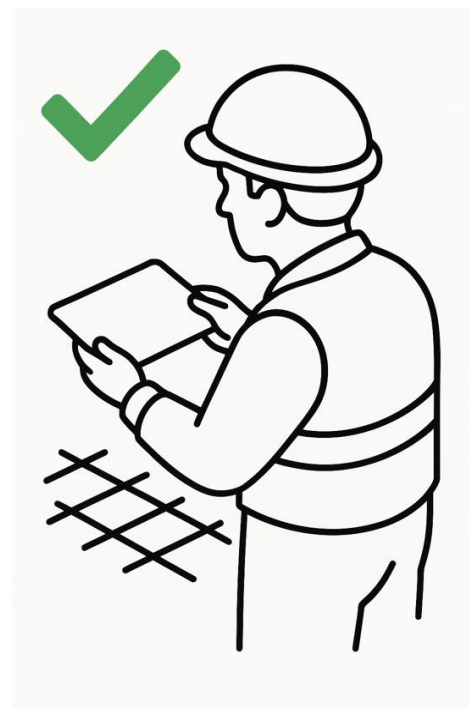


Figure 3: landscape orientation



Downloading Fault Navigator

Fault Navigator is now available via the App store. You can find it through a search, or this link if you use <https://apps.apple.com/app/fault-navigator/id6670562163> on your iPad. You must be running IOS17 and above and use an iPad 9th edition and above (or iPhone 11 or SE2020 – but the iPad gives a much better experience).

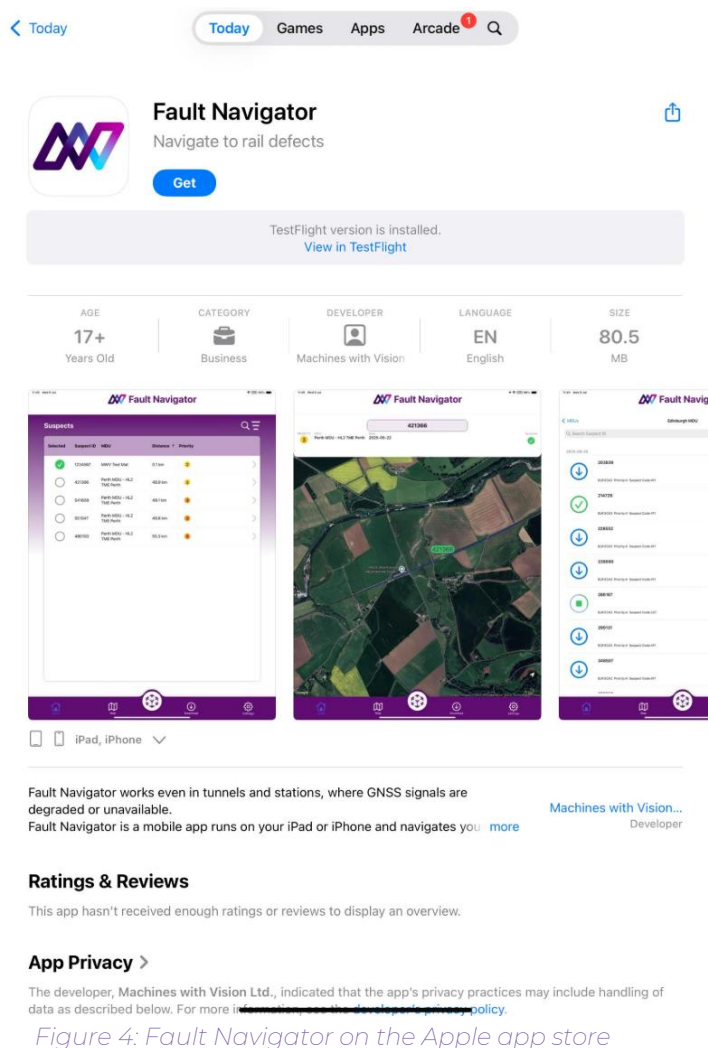


Figure 4: Fault Navigator on the Apple app store

Login

To log into Fault Navigator, your email address needs to be associated with a Fault Navigator licence. If you (or your employer) purchased a licence, then you can log in with your email address and your password. For first logins, Machines With Vision will have sent you a one-time password.



When opening the Fault Navigator app, you will be greeted with the login screen:

The screenshot shows the login screen of the Fault Navigator app. At the top, the status bar displays '07:09 Fri 4 Jul', signal strength, 'VPN', and '30%' battery. The app's header features the 'Fault Navigator' title and logo. The main content area is a white card with a purple border. It starts with a 'Welcome to Fault Navigator' heading, followed by the instruction 'Access your organization's fault data with secure authentication.' Below this are two input fields: 'Email' (containing 'jan.wessnitzer@machineswithvision.com') and 'Password' (with a toggle for visibility). A toggle switch for 'Enable Touch ID' is also present, with the subtext 'Log in quickly and securely'. A large purple 'Log In' button is at the bottom of the card. Below the button is a link for 'Forgot Password?' and a footer note: 'Please contact your administrator if you need access.'

Figure 5: login screen



TIP: to log in quickly and securely, enable TouchID or FaceID, before entering your password.

On your first login attempt, enter your email address and the one-password you were sent.

You will then be prompted to set your own password:

A screenshot of a mobile application interface. At the top, the status bar shows '15:45 Tue 3 Jun' and '39%' battery. The app's header features a purple gradient background with the 'Fault Navigator' logo and title. The main content is a white card titled 'Change Your Password'. It contains a message: 'For security, please set a new password to replace your temporary one.' Below this are two input fields: 'New Password' and 'Confirm New Password', each with a toggle icon. A purple 'Change Password' button is positioned below the fields. At the bottom of the card is a link: '← Back to Login'. A small note at the very bottom states: 'Your new password must be at least 8 characters long, have uppercase, lowercase, and numeric characters.'

Figure 6: change your password screen

Once you set your new password, you can enable biometric (TouchID or FaceID) login, you can also log in using your fingerprint sensor on your iPhone or iPad.



If you have forgotten your password, tap “Forgot password?”, enter your email address and a password reset link is sent to your email address.

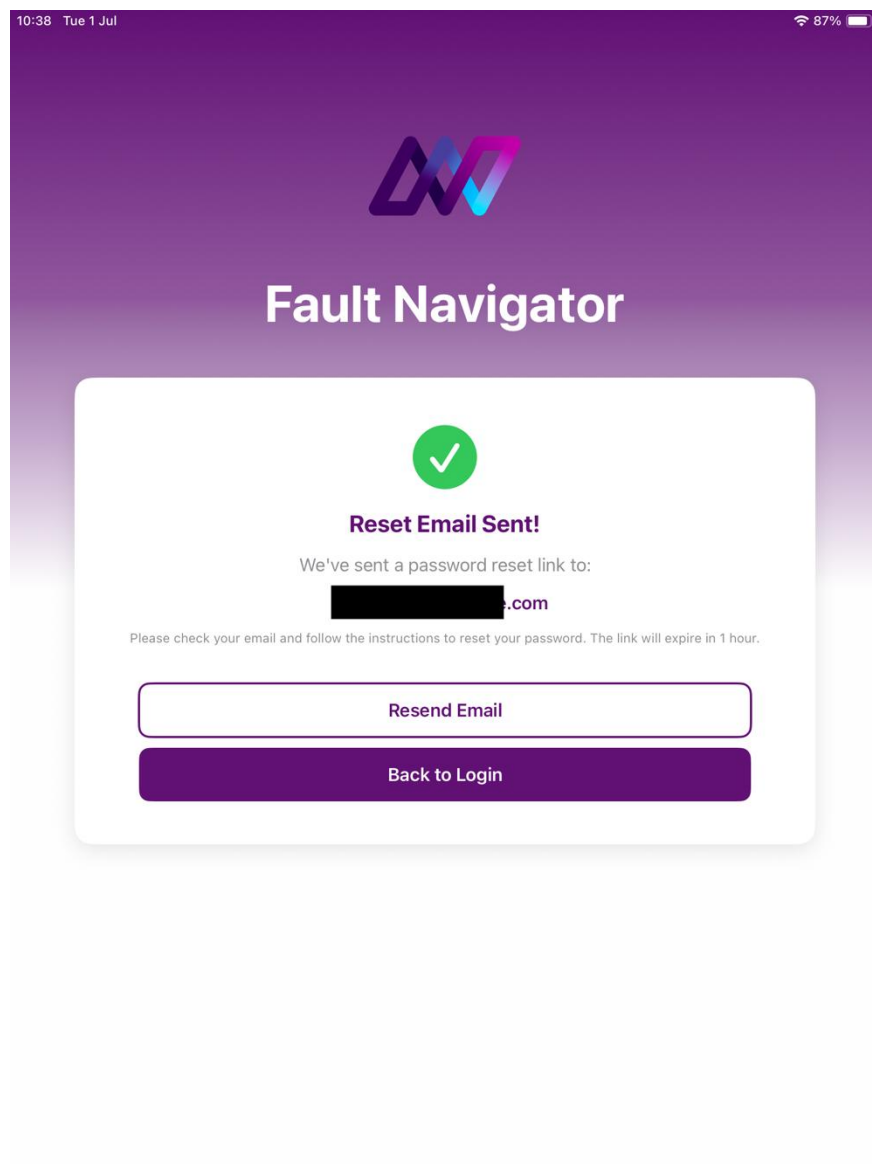


Figure 7: resetting your password



Downloading suspect data

First Launch Prompt

When opening the app for the first time, you'll be prompted to download required data.

Tap "Download Suspects" to fetch the data necessary for the Fault Navigator app to function.

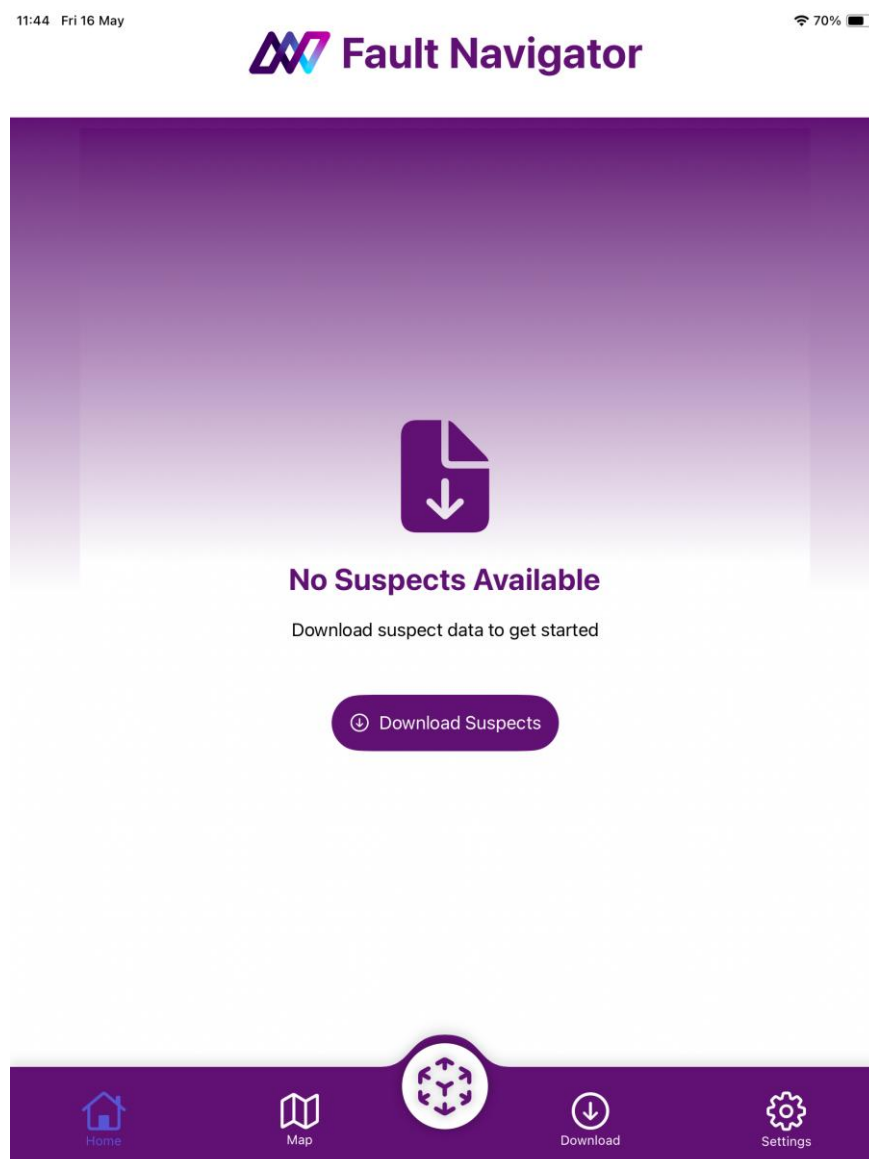


Figure 8: download suspects



This will open a list of MDUs. Scroll through the list and select yours.

By selecting an MDU, a list of available suspects will be visible (in order of date recorded/published) and these suspects are allocated the same suspect UID as provided by Sperry.

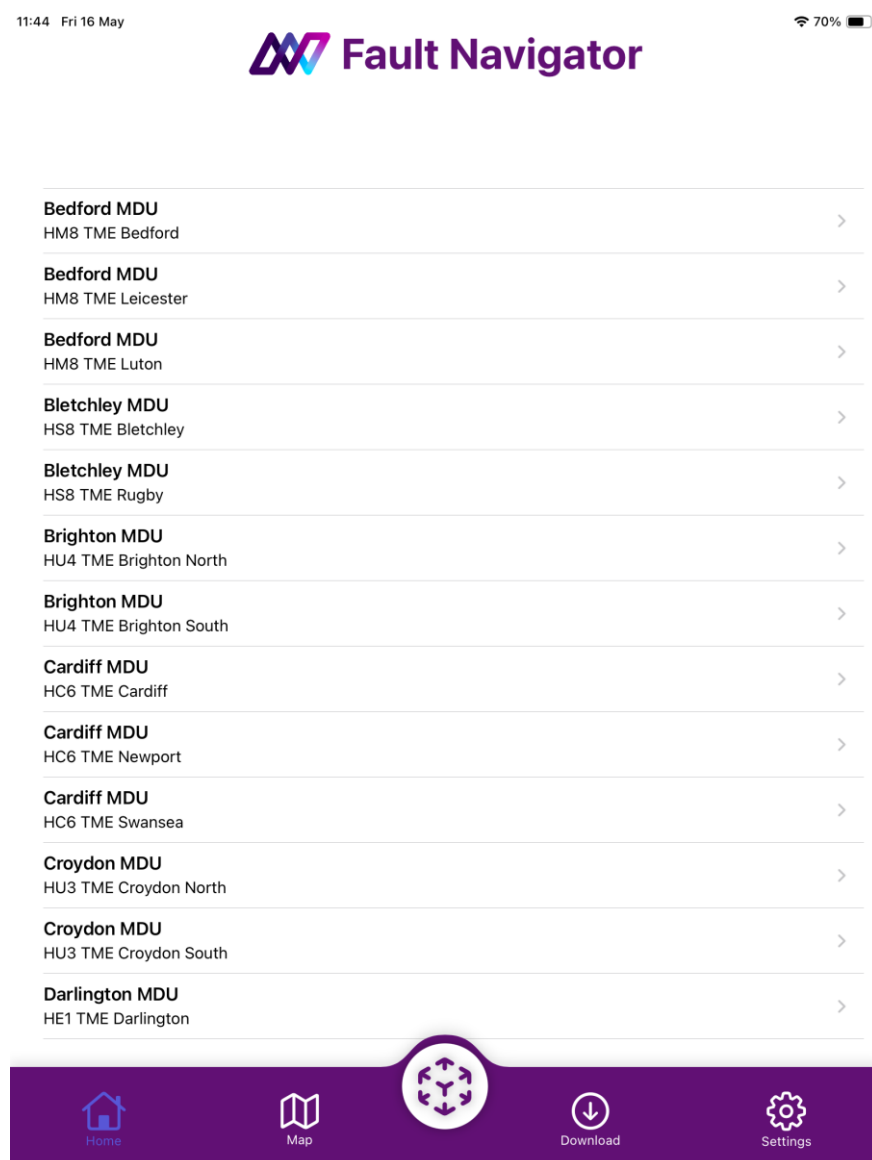


Figure 9: list of MDUs



A list of suspect UIDs will be displayed; press on the download button (blue arrow pointing downwards) next to suspects of interest.

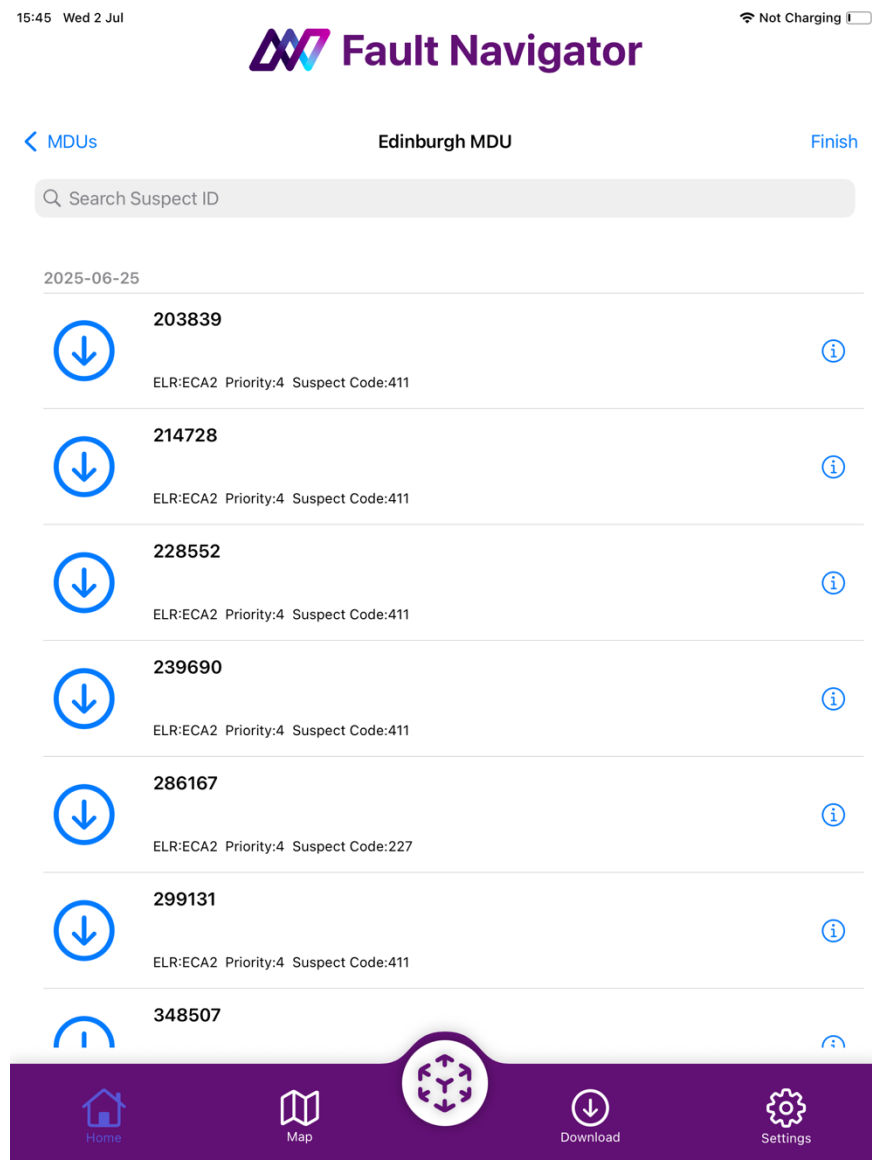


Figure 10: download screen for individual suspects



The suspects can be downloaded by selecting the download arrow (i.e., blue arrow) next to the suspect. Once downloaded, a green check mark is displayed.

NOTE: any suspects requiring verification must be downloaded prior to using the application on site as connectivity on site cannot be guaranteed.

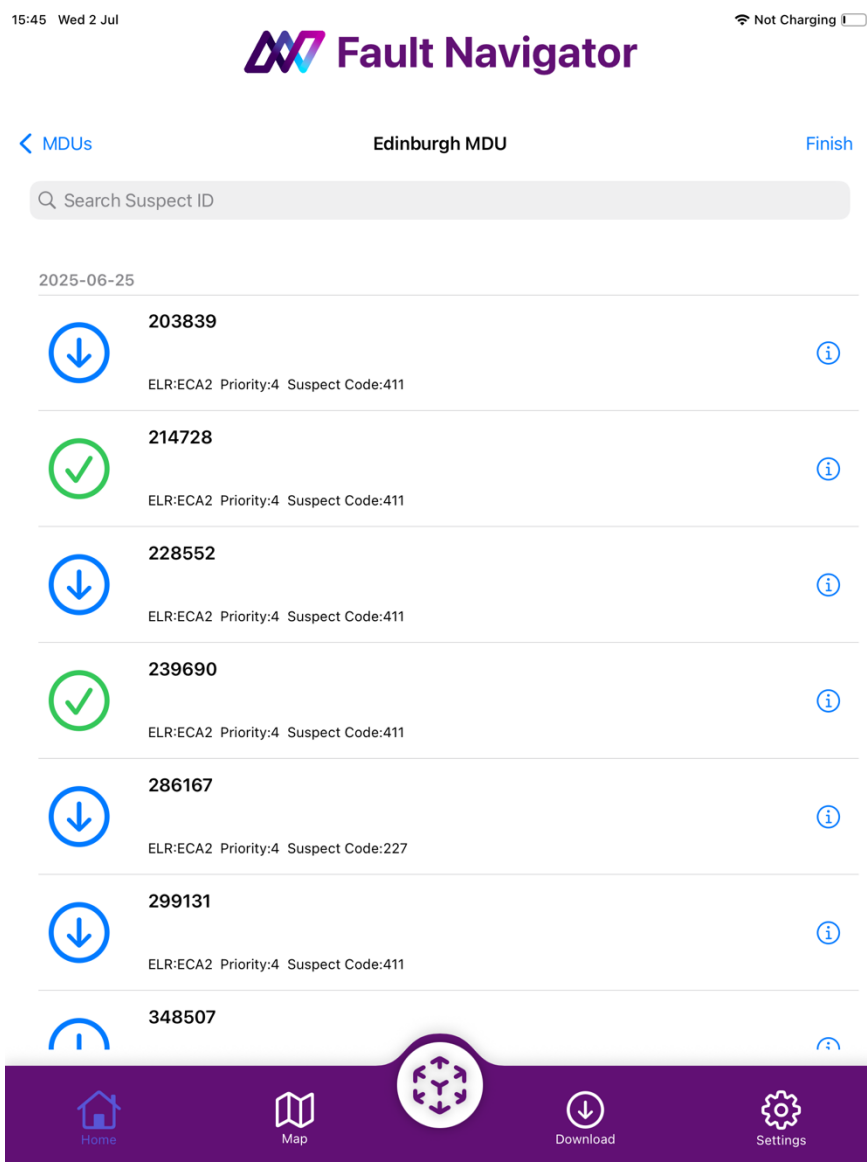


Figure 11: downloaded suspect data indicated by green check mark



Press or tap the “i” icon to see further information about this suspect. Information, such as MDU, date, ELR, track ID, priority, suspect code, together with a suspect comment will be displayed.

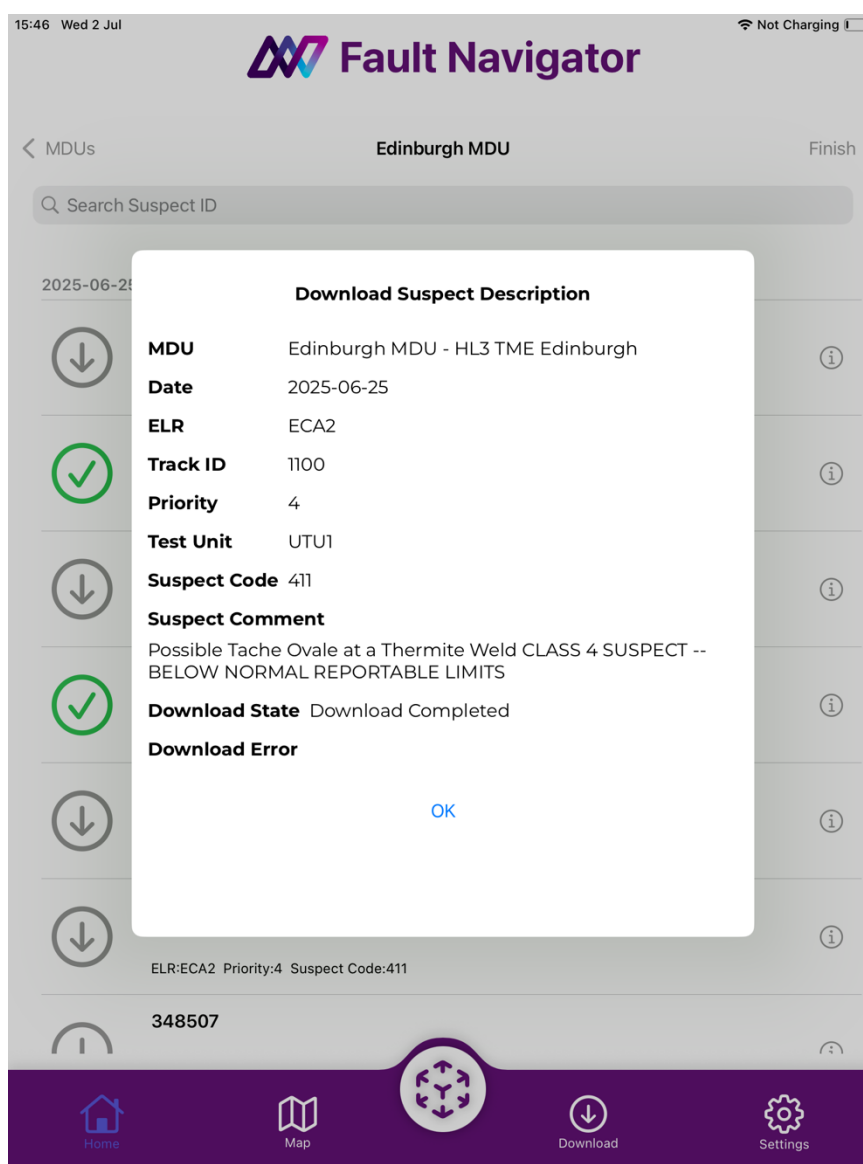


Figure 12: suspect information



Returning Users

If you've already downloaded the data, the app will skip this step and show your data directly in a table view.

Here, the user can select a suspect.

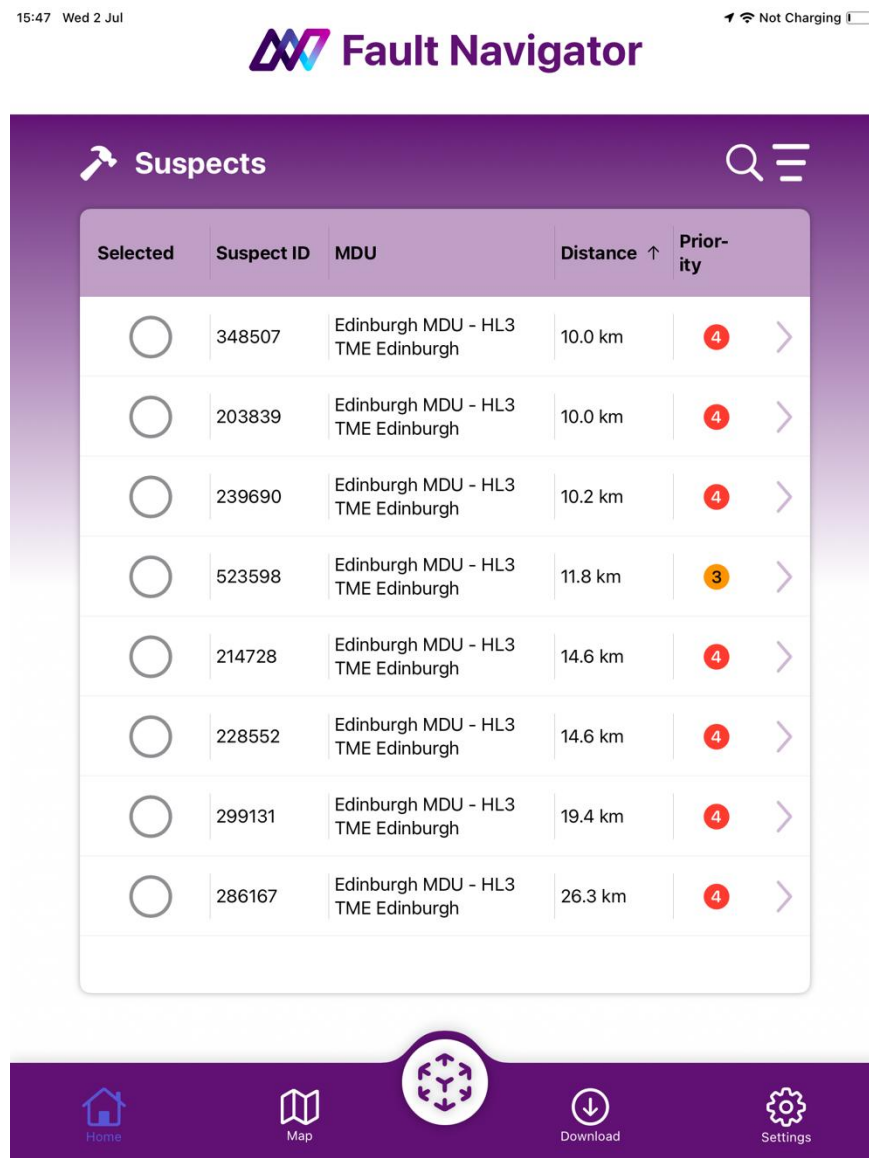


Figure 13: suspect table



Exploring the suspect data

Table View (“Suspects”)

In the Table View (“Suspects”), a list of all downloaded data entries are displayed in a table format.

Tap on an entry to select it for map or AR viewing. A green check mark will appear next to the selected suspect.

Press the “>” to the right of the selected suspect, or press the Map button in the Tab bar at the bottom of the screen, to view the suspect location on the map view.

15:47 Wed 2 Jul Fault Navigator Not Charging

Selected	Suspect ID	MDU	Distance ↑	Prior-ity	
☐	348507	Edinburgh MDU - HL3 TME Edinburgh	10.0 km	4	>
☐	203839	Edinburgh MDU - HL3 TME Edinburgh	10.0 km	4	>
☐	239690	Edinburgh MDU - HL3 TME Edinburgh	10.2 km	4	>
☒	523598	Edinburgh MDU - HL3 TME Edinburgh	11.8 km	3	>
☐	214728	Edinburgh MDU - HL3 TME Edinburgh	14.6 km	4	>
☐	228552	Edinburgh MDU - HL3 TME Edinburgh	14.6 km	4	>
☐	299131	Edinburgh MDU - HL3 TME Edinburgh	19.4 km	4	>
☐	286167	Edinburgh MDU - HL3 TME Edinburgh	26.3 km	4	>

Home Map Download Settings

Figure 14: selected suspect



This opens the map view. The GPS position of the suspect is shown by the green pin on the map, with the suspect UID displayed directly above it.

The green line represents the extent of the map image downloaded for the suspect. The user now needs to navigate towards the suspect location. In the map view, the user's device is represented by a blue dot. Once the blue dot (the user's position) is near the green pin (the suspect's position) and well on the green line, the user can enter the Augmented Reality view to locate the suspect.

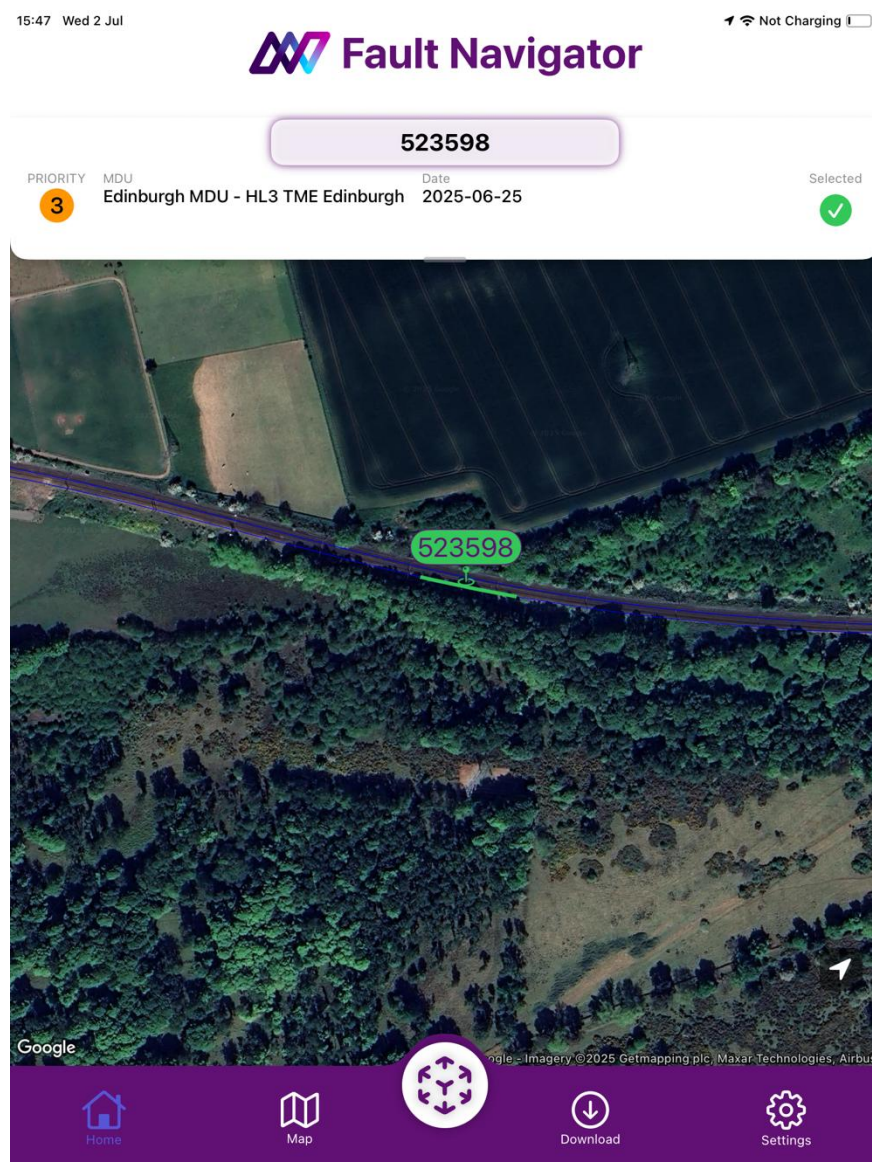


Figure 15: suspect location in map view

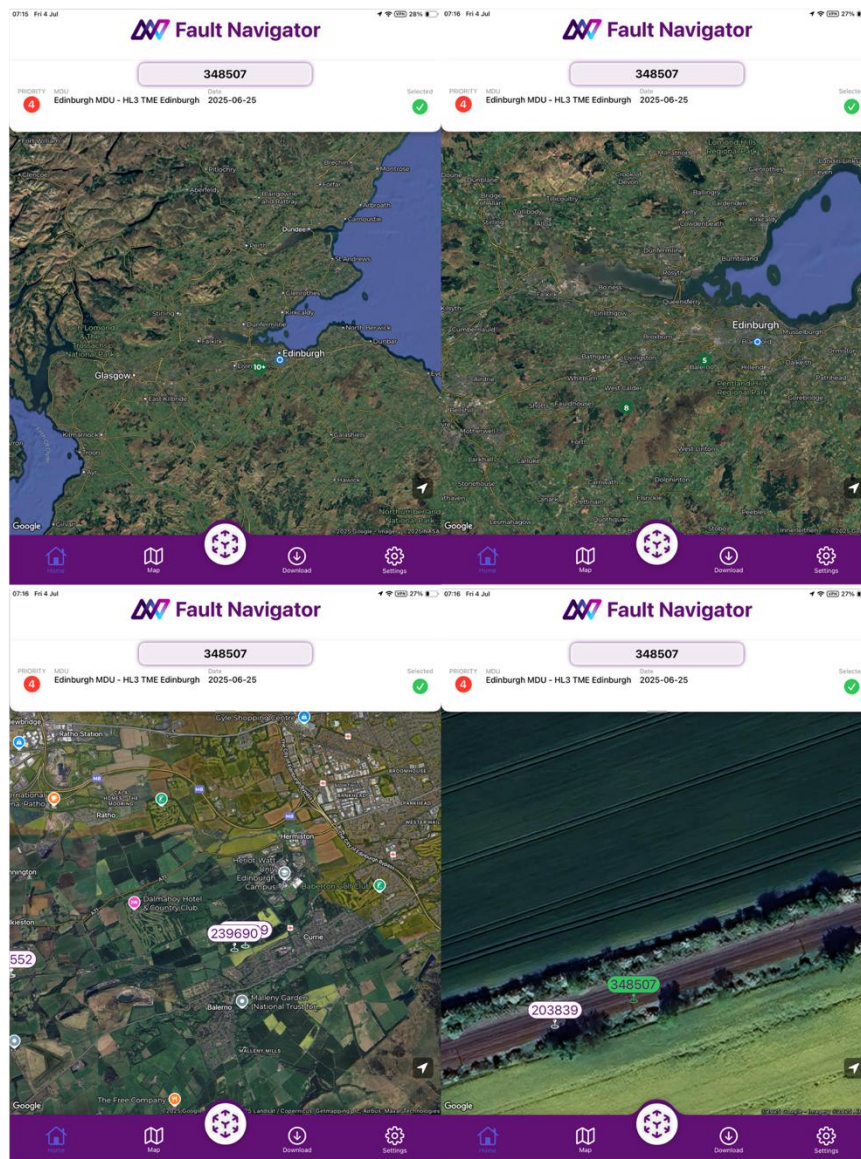


Figure 16: Zooming in on clusters of suspect locations on the map view

Suspect locations can be clustered together on the map view. In the top left of the image above, a cluster of 10+ suspects is shown. In the top right part, after zooming in on that first cluster, two smaller clusters of 8 and 5 suspects are displayed. Zooming in even further reveals the individual suspect locations with their UIDs (bottom right). Zoomed in even further shows the selected suspect.



Info Panel

Drag the lower panel down (shown by the arrow) to see more detailed information about the selected suspect.

Information, such as MDU, date, ELR, track ID, priority, suspect code, together with a suspect comment will be displayed.

An image of the railhead is also provided. By sliding the double arrow (“<->”) between the railhead image and the information panel to the right, the railhead image is displayed.

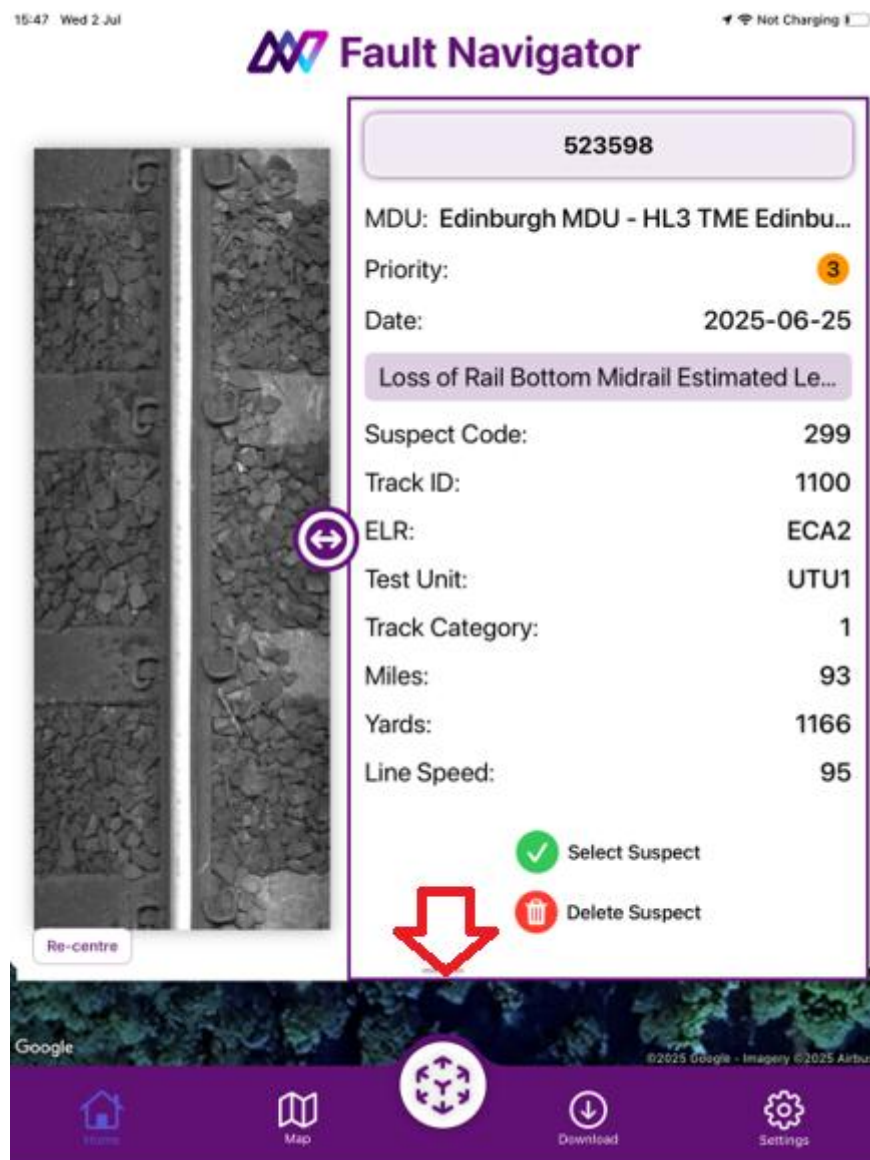


Figure 17: railhead image and suspect information



Slide to the right to see a full view of the rail head image. Pinch to zoom in or out of the image to inspect any visible defects.

Two arrows are displayed, indicating the suspect location. These positions are provided by the Sperry system, which has two probes on the measurement train. The information about which probe was used during the run of the measurement train is not available to the Fault Navigator app. For this reason, Fault Navigator places two pins.

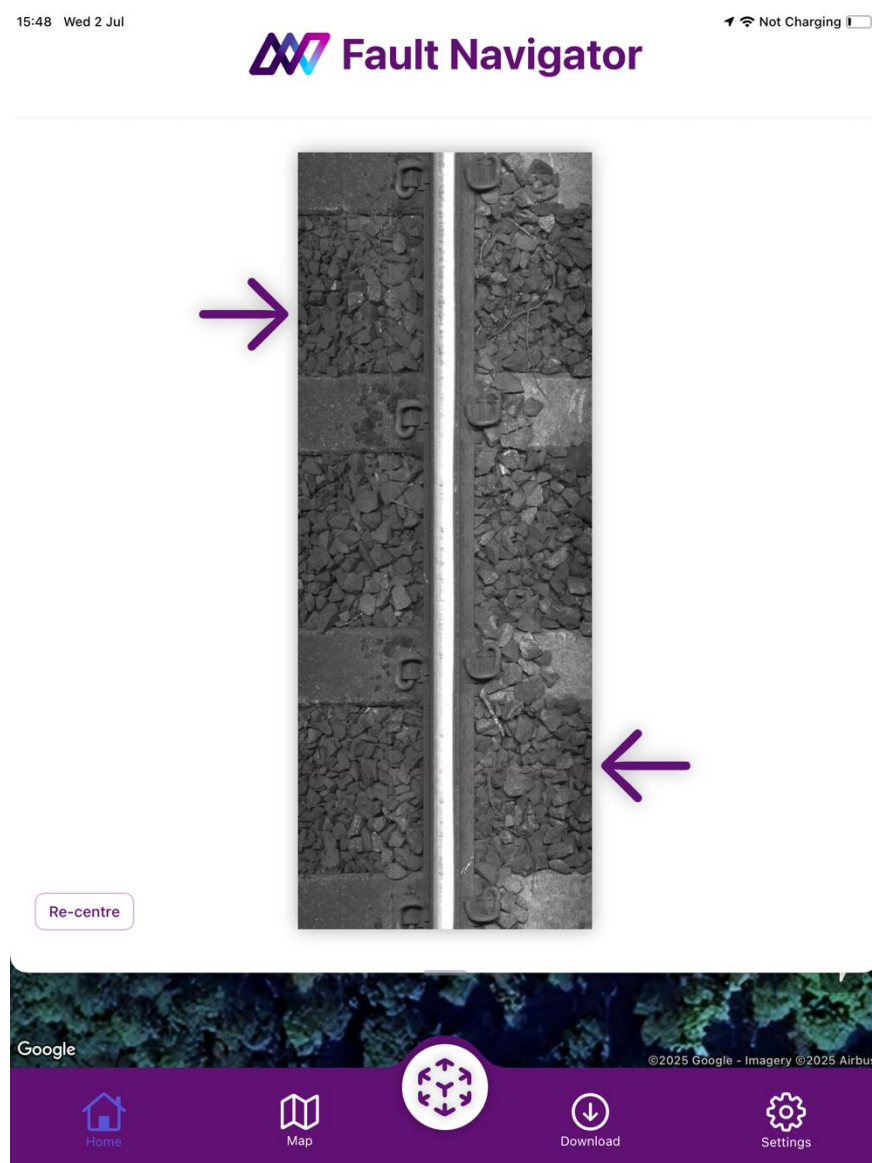


Figure 18: railhead image

Settings

AR notifications

AR notifications are hints that are being displayed when using the Fault Navigator Augmented Reality view. For example, notifications to hold the device still or notifications notifying the user that the device is tilted too much, i.e., the device's camera is not directly pointed at the 4-foot. These notifications are provided to help the user, but the user has the option to turn these notifications on or off.

For example:

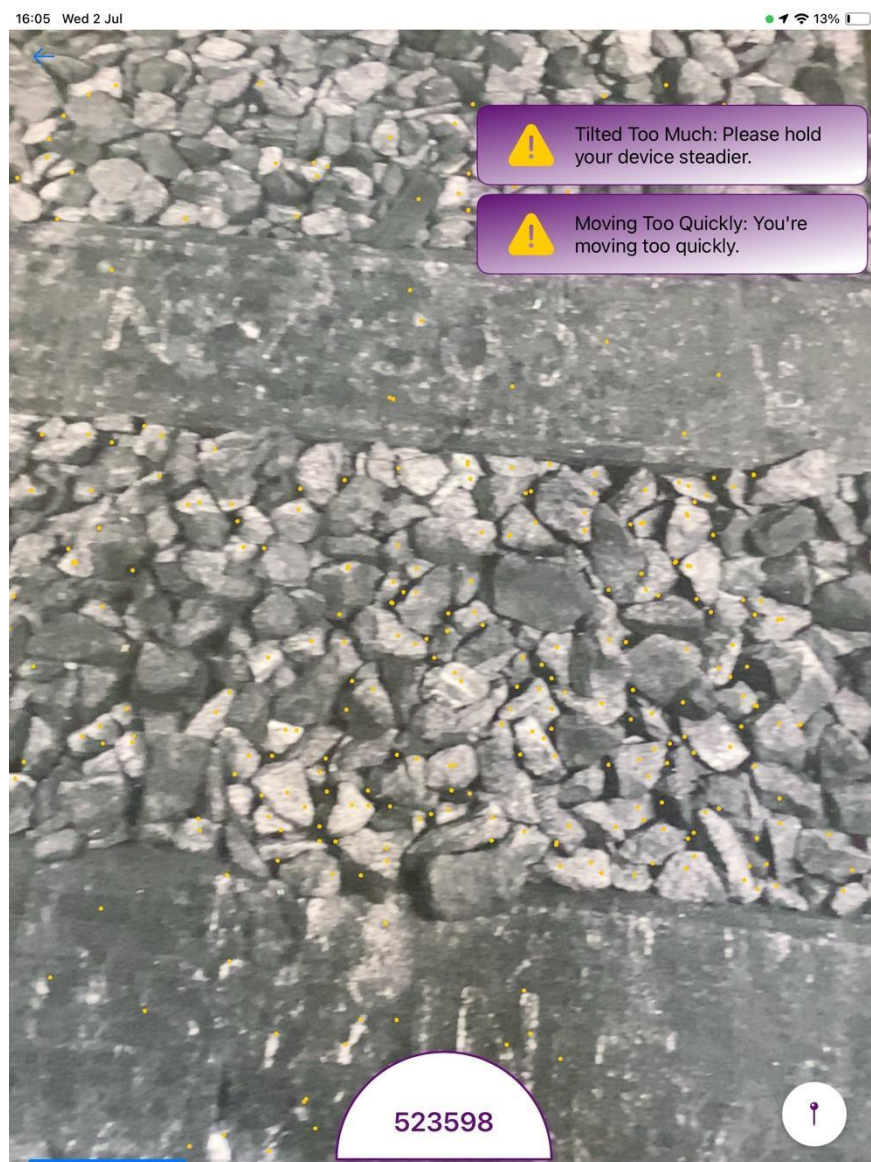


Figure 19: AR notifications



Turn notifications ON or OFF, then tap “Apply”.

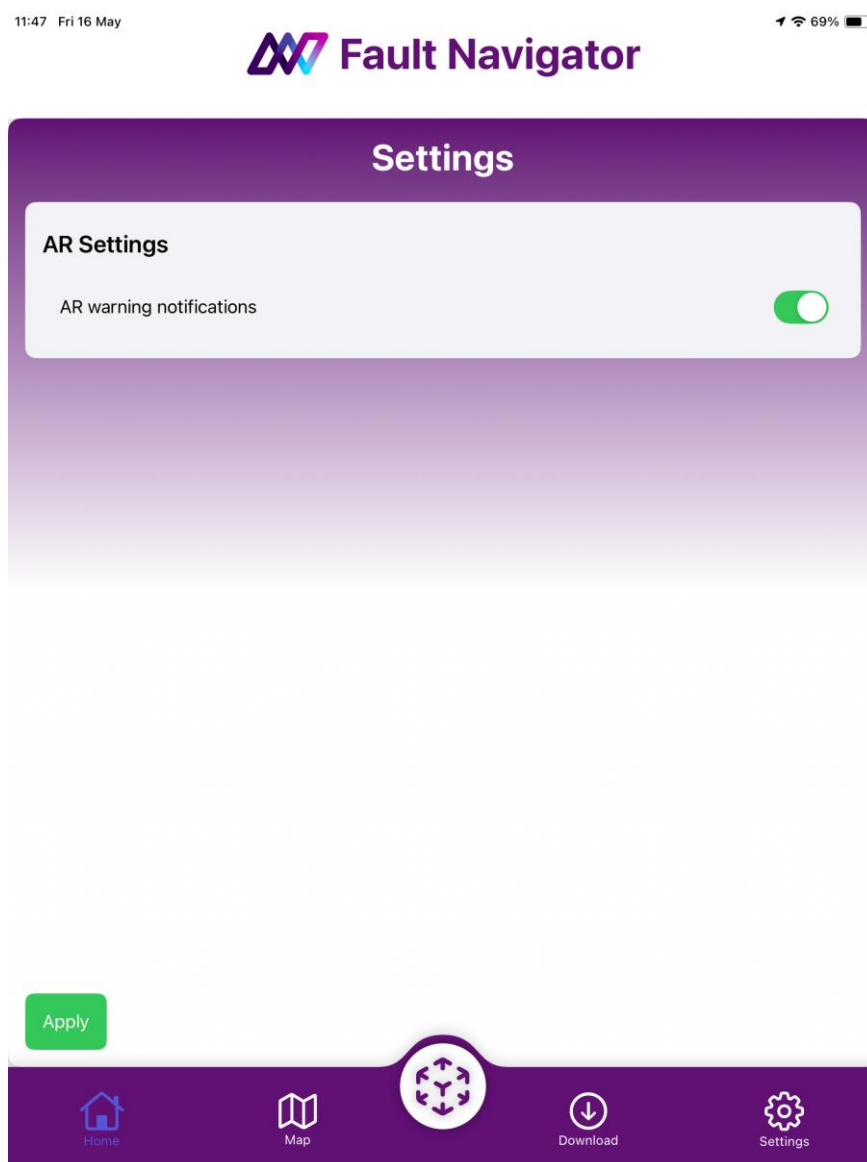


Figure 20: toggling warning notifications in AR settings



Maintaining suspects

There are a few ways that a user can delete suspects from the device after they have been used. This ensures that the device doesn't fill up and the screen remains clear and only the suspects of interest are shown.

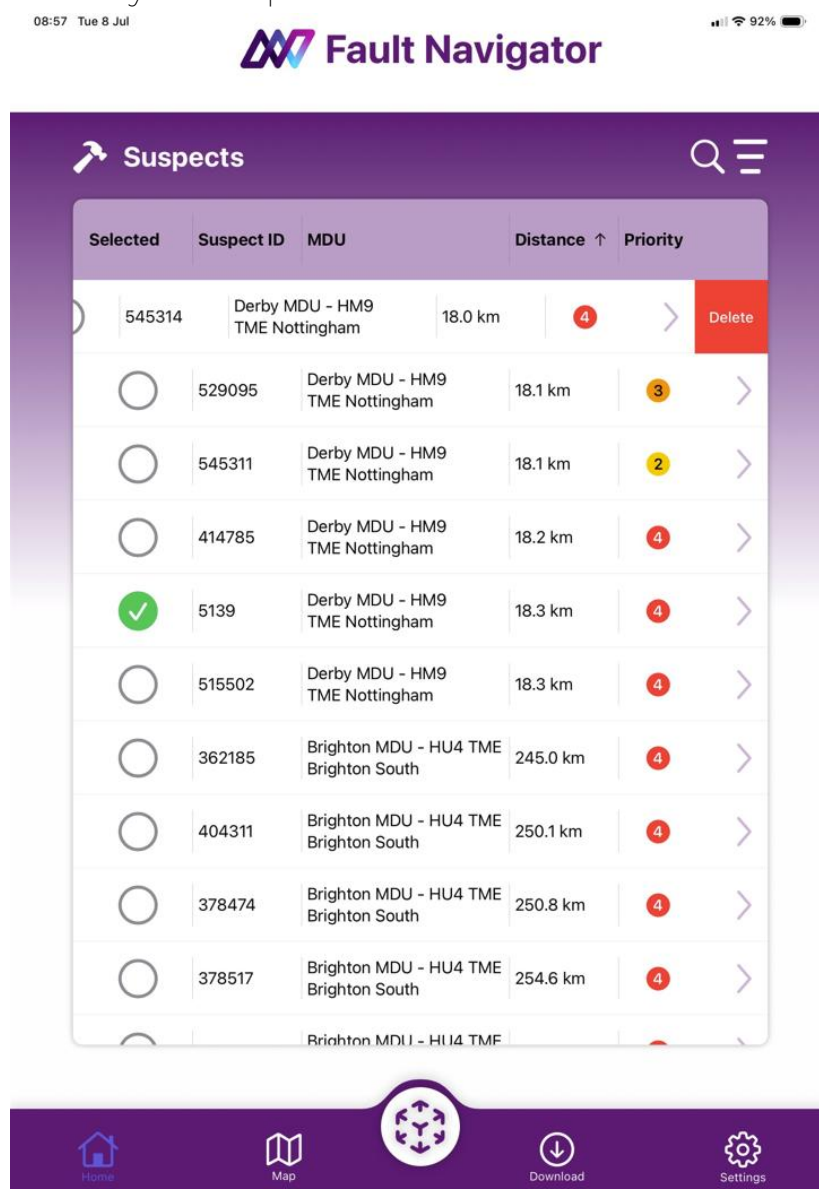


Figure 21: deleting a suspect from the tab view

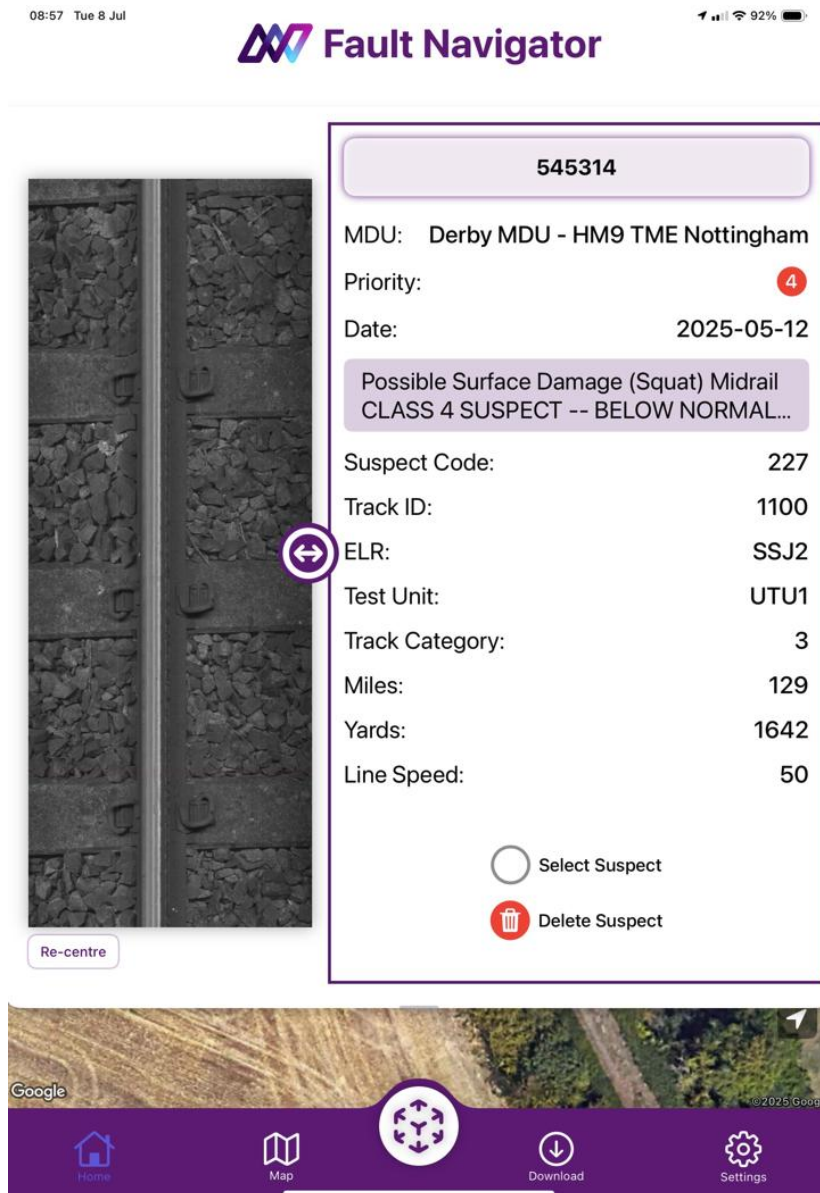


Figure 22: deleting a suspect using the map & pull down

To delete a suspect from main tabular view, swipe left on the entry in the table, this will show the option to delete (**Figure 21**), click this to delete the suspect.

To delete a suspect from the map view, pull down the information pane from the top of the window, a button to delete the suspect (**Figure 22**) is shown beneath the suspect metadata.

If you delete a suspect by accident, it can always be downloaded again using the download button.

Auto delete

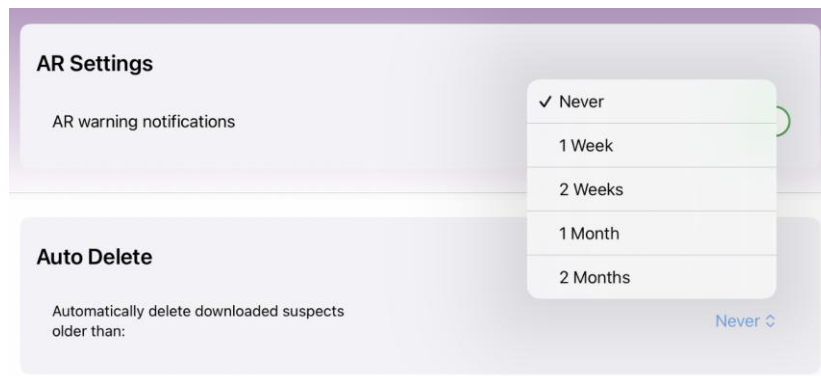


Figure 23: Auto Delete options in Settings

In Settings, the user can set whether suspect data should be automatically deleted after a certain amount of time has elapsed (after download).

By default, this setting is set to “Never”. The user has the options to set this to:

- 1 Week
- 2 Weeks
- 1 Month
- 2 Months

The user can still delete suspects manually in addition to this.



Navigating to a suspect

On the map view, make sure the device's GPS position (blue dot) is near the suspect location (green pin) and well on the green line.

Tap the AR icon  to enter Augmented Reality View and use your camera to locate suspects in the real world based on your current location and selected data.

Once a suspect has been selected and the AR button is tapped, the AR session starts.

11:47 Fri 16 May

68%



Initialising AR Session for suspect ID: 1234567,
please wait...

Figure 24: initialising the AR session



Point the iPad or iPhone down at the 4-foot, in landscape orientation (aligned with the direction of the 4-foot) and wait (a progress bar at the bottom of the screen indicates that camera images are being processed and compared with suspect map images).

If the progress bar finishes and starts again several times, then image matching is not working and the user is advised to move to a different location and to scan again.



Figure 25: AR View

If there is a successful match, chevrons will indicate the direction towards the suspect location and a marker is placed at the suspect location itself and there will be an audible 'bong'.



Figure 26: successful match and navigation instructions displayed

The device can then be used to locate the white “Machines With Vision” pin. The user is advised to walk to the pin location and scan the 4-foot again for a more precise suspect localisation.



Figure 27: a pin is displayed on the suspect location

The white pin in the Fault Navigator app will appear on the suspect position provided by the Sperry system. For example, in the image below, the pin sits above a weld.

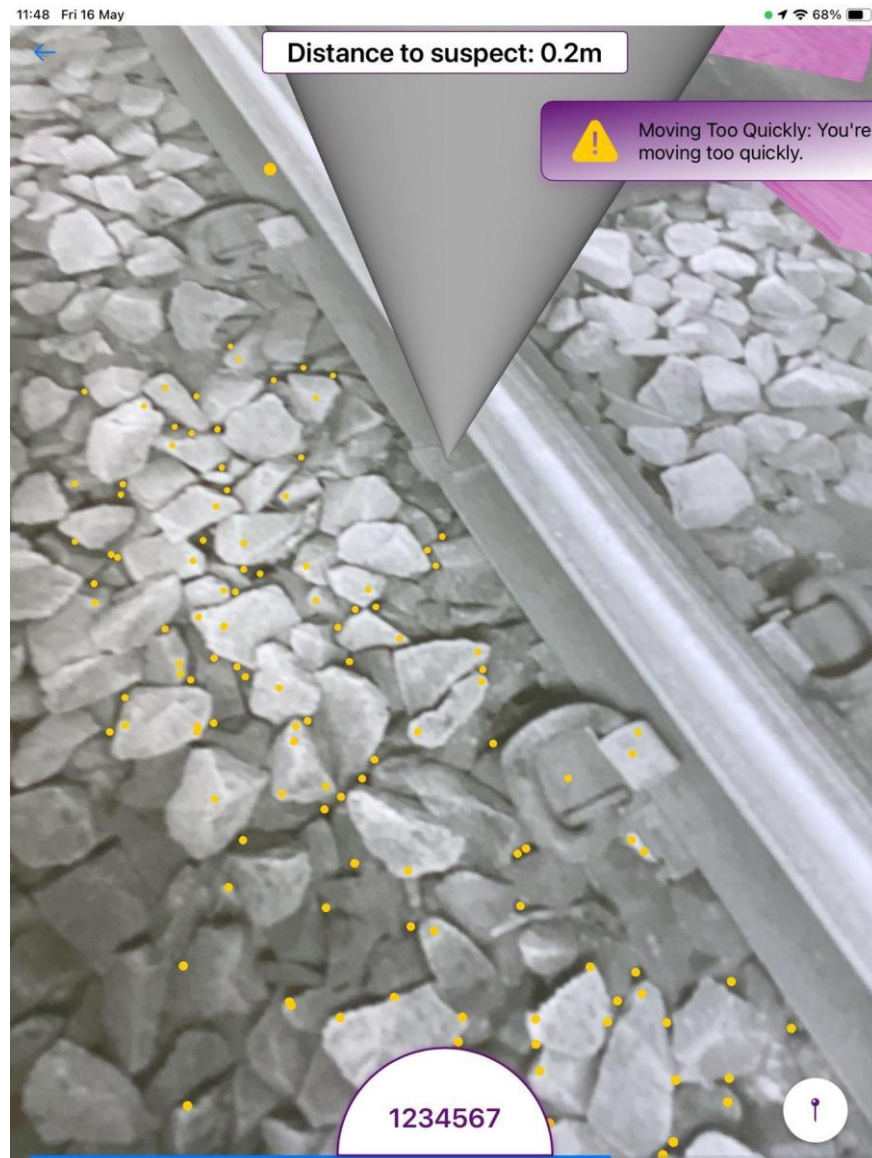


Figure 28: the pin is displayed on the suspect location

Light

For Fault Navigator to work, the 4-foot needs to be adequately illuminated. Machines With Vision have provided a light which can be easily attached to an iPad.

The provided light has a rechargeable battery, so please make sure that the battery is fully charged before any track visit.

To achieve the best Fault Navigator results, attach the light to your device and set the provided light to its maximum brightness setting by **pressing the power button four times (4x)**.



Figure 29: the recommended light to be used with Fault Navigator



Figure 30: back of light with charging cable attached



Figure 31: scanning the 4-foot



Help and support

If you require any help with Fault Navigator, please email us:

fnsupport@machineswithvision.com

Tips

- Use the provided light on maximum brightness to illuminate the 4-foot.
- Make sure you scan the 4-foot.



Figure 32: not scanning the 4-foot

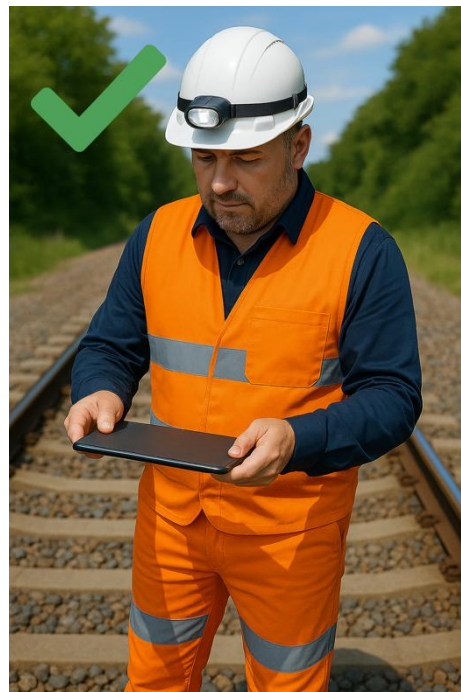


Figure 33: scanning the 4-foot

- Hold the iPad or iPhone in the correct orientation with respect to the 4-foot.



Figure 35: portrait orientation

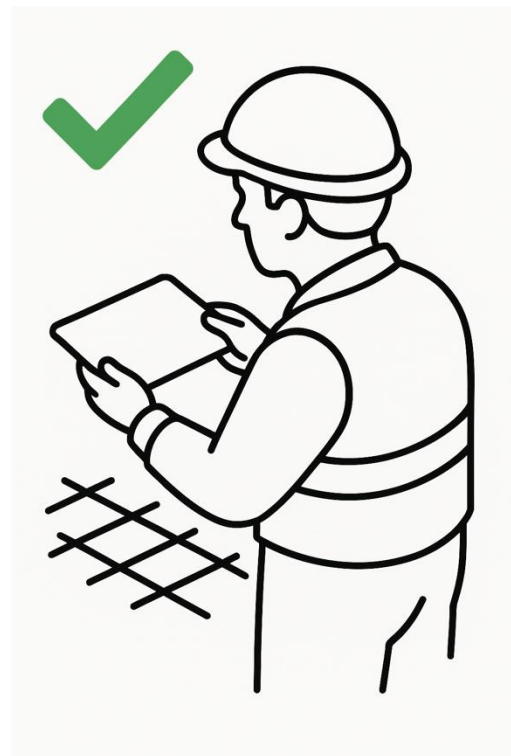


Figure 34: landscape orientation

FAQ

- I can't find the suspect I'm interested in? Firstly check it's in the correct MDU, then check it was captured by a supported vehicle. All suspects captured by UTU1 are available, as other vehicles are fitted and go live, we will send updates out via email. UTU3 will be installed in August 2025 with the other 3 vehicles complete by October 2025
- The pin doesn't appear where I expect it to? Whilst this is very unlikely, come out of AR mode and re-scan the track. If you are sure it is not right then contact us with the details and revert to the existing GPS based process for that suspect
- Why are there two pins? With the current ultrasonic system installed on the UTU trains, there are two RSUs that report suspects. The information as to which one isn't passed through the process, so the pins indicate the locations of both. Sperry and NR are currently upgrading the system, after



this Fault Navigator will be updated to just show the single location as the new Sperry system supports this functionality

- I would like some help or support? Please contact us and we will be happy to have a call and/or support you on track during one of your tests
- It's raining, should I do anything special? Moisture might affect the iPads auto focus, before you scan the track, please wipe the camera lens so that it's dry, you should also wipe the screen to avoid unwanted touches caused by the rain. Doing this once at each suspect should suffice

Revisions

Version	Description	Primary Authors	Date
V1	First Issue	MWV	9 th July 2025
V1.1	Changes to reflect Fault Navigator being in the app store	MWV	10 th July