Asset Vision

AUTOPILOT + AI

TECHNICAL CATALOGUE

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Executive Summary

Asset Vision AutoPilot + AI sets the benchmark for how asset owners and maintainers capture, understand, and manage the condition of their road and pathway networks.

By automatically generating a detailed digital twin of every inspection route, AutoPilot gives teams a clearer, richer and more accurate understanding of network condition than ever before. Using a forward-facing, in-vehicle iPhone, the system captures high-resolution images every 10 metres, uploads them to the cloud, and applies AI models to identify potential defects within minutes.

AutoPilot empowers asset owners and maintainers to make faster, better-informed maintenance decisions, improve safety outcomes for field staff, enhance customer service response times, and create a transparent evidence base for compliance and disaster recovery. It also supports long-term asset planning through precise visual history and network-wide insights.

Integrated seamlessly within the Asset Vision platform, or deployed as a standalone solution, AutoPilot modernises inspection workflows, strengthens organisational capability, and gives teams confidence through timely, objective data.

AUTOPILOT BENEFITS

- **Efficiency:** Automated image capture and AI analysis eliminate manual photo-taking and reduce inspection times, enabling teams to cover more network with fewer resources.
- **Better Customer Service:** Access the latest imagery instantly to verify customer requests and respond with accurate, evidence-based information.
- **Stronger Asset Management:** Build a long-term visual history of your network to support planning, deterioration modelling, funding submissions, and transparent decision-making.
- **Evidence for Claims & Compliance:** Use timestamped imagery to defend third-party claims and provide pre/post-event evidence for DRFA and insurance processes.
- **Validate Public Works:** Confirm completed works and contractor performance with objective photographic evidence linked to location and time.
- **Rapid Disaster Recovery:** Capture network condition automatically after storm or flood events, speeding up assessments and maximising recoverable funding.

FROM FIELD TO OFFICE TO RESOLUTION

AutoPilot automatically captures high-resolution images every 10 metres as you drive, creating a complete visual record of the road or pathway corridor. Images are uploaded to the cloud, analysed by AI for potential defects, and linked directly to the inspection for easy review. Inspectors can also log their own observations safely using the Bluetooth CoPilot button and speech-to-text.

In the office, inspections can be reviewed through an intuitive web interface with interactive maps, timelines, and playback controls. Users can view inspection footage like a virtual video, jump to any location, see AI-detected defects, and create jobs directly from images with full metadata, including GPS and timestamps.

All inspections are stored persistently, building a comprehensive digital history of the network. This supports a wide range of operational needs, including desktop inspections, quality reviews, network scoping, deterioration monitoring, customer request validation, and pre/post-event evidence for disaster recovery.

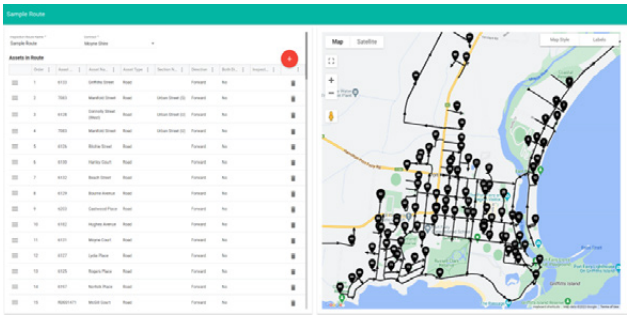
Figure 1 - AI detected potential defects with approximate LiDaR based measurements

HOW DOES AUTOPILOT WORK?

AutoPilot automatically captures high-resolution images every 10 metres as the inspector drives the road or pathway network. Each image includes GPS location and metadata, and is uploaded to the cloud in real time or saved offline until coverage returns. This creates a precise digital twin of the corridor, providing consistent, repeatable condition data for every inspection.

Inspectors can also use the CoPilot Bluetooth button to safely log points of interest or additional defects without taking their hands off the wheel. These entries automatically capture location, direction, images, and speech-to-text notes.

Once back in the office, inspections can be reviewed through the Asset Vision web portal using an interactive map and timeline. Users can replay the entire inspection like a virtual video, step through images one by one, view AI-detected defects, and create jobs directly from any image with full metadata.



Inspection Routes

ROUTE SCHEDULING

Inspectors can plan inspection routes manually or use pre-defined routes assigned according to user roles or resource plans. After selecting an inspection record or pre-defined route, the user enables location tracking and the device's GPS monitors progress along the route. AutoPilot automatically starts, pauses, and resumes the inspection record as the inspector moves on or off the planned route.

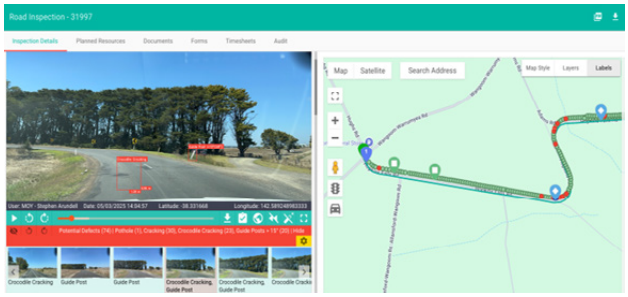
AutoPilot also provides inspection compliance support by displaying any road sections that remain uninspected. Once the full route has been driven, the system automatically completes the inspection record. Date, time, and location evidence is captured throughout the process to support audit and compliance requirements.

Inspection routes define the roads to be inspected, including direction and any requirement to inspect both directions. Field crews can follow these routes and record findings using configured digital forms.

Asset Vision is designed to support preventative maintenance workflows. Users specify the roads to be inspected and the required inspection frequency, based on hierarchy or criticality, and the system automatically assigns the inspection tasks to the relevant personnel.

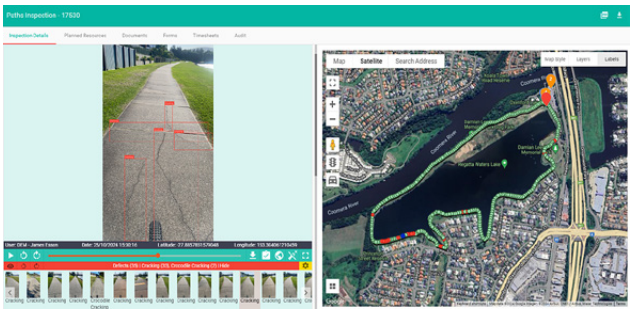
INSPECTION PLAYBACK

The AutoPilot web interface provides two complementary playback modes designed to support both detailed analysis and network-level assessment. Users can review a single inspection in sequential order, accessing each captured image and associated metadata, or switch to an aggregate map-based view that consolidates multiple inspections and all AI-detected potential defects across the network.



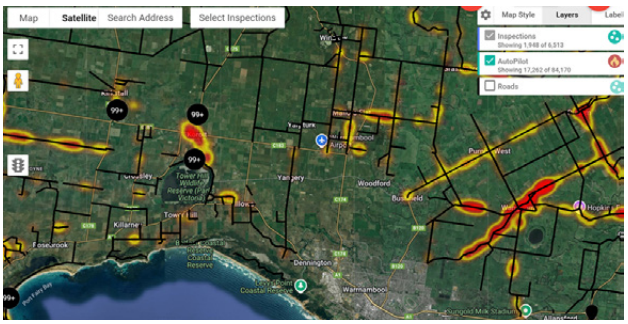
Top: Reviewing individual inspection

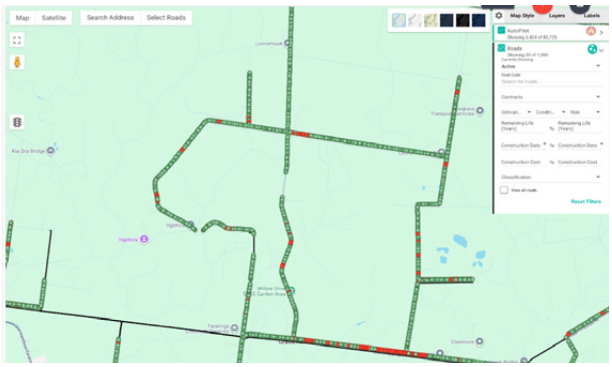
Below: Example footpath inspection and detection



MAP VISUALISATIONS AND HEATMAPS

The platform includes advanced spatial visualisation tools, including a configurable heatmap engine that highlights concentrations of AI-detected potential defects. Heatmaps can be filtered by defect category, time period, or inspection source, enabling users to quickly identify corridors exhibiting elevated levels of deterioration or risk. These visual overlays support evidence-based prioritisation, targeted follow-up inspections, and optimised maintenance planning.





Top: Map view showing all available AutoPilot images

Below: View image with single click from the map

AutoPilot also provides location-based querying. Users can search for any road segment or asset (e.g., by street name) to determine whether recent AutoPilot imagery exists. With a single click, the most recent image is displayed, and users can navigate the full image sequence using the same controls available in the primary inspection playback view. This enables rapid validation of field conditions, customer enquiries, or event-specific assessments without requiring a site visit.

AI ENABLED TOP VIEW

Utilising advanced AI techniques to enhance AutoPilot's captured imagery by generating a top-down perspective — offering a new dimension of insight without requiring additional hardware or drone footage. It provides a secondary view of the image and the related defect.

AI DEFECT DETECTION CATEGORIES

Asset Vision's Autopilot AI module has been trained and configured to detect, classify, and prioritise defects in accordance with a range of defects including:

- potholes
- cracking
- crocodile cracking
- leaning guideposts
- edge defects
- bleeding/flushing
- with more in development

Example AI detected defects

SETTING UP AUTOPILOT ON THE DEVICE

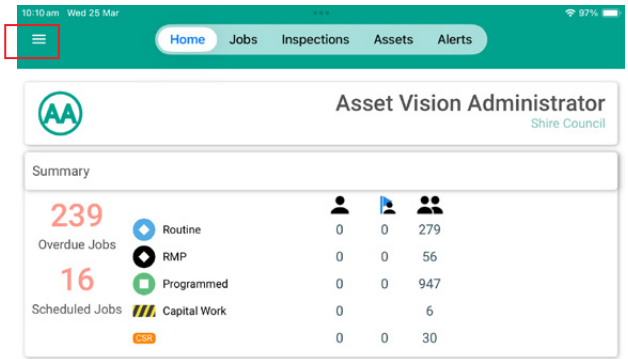
PERMISSIONS

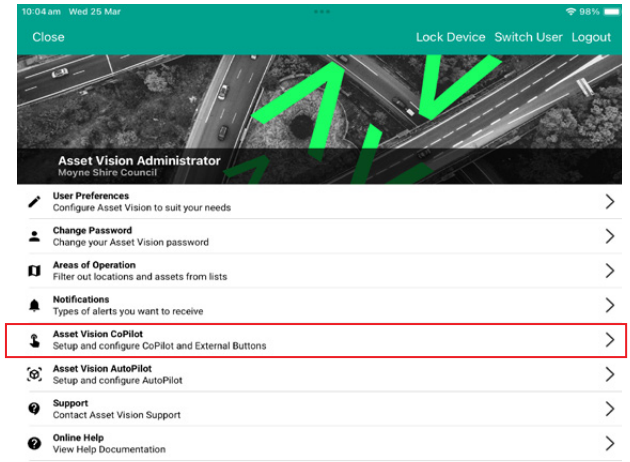
AutoPilot is a licensed, permission based feature, so ensure that your Administrator has granted you permission in the system to use it.

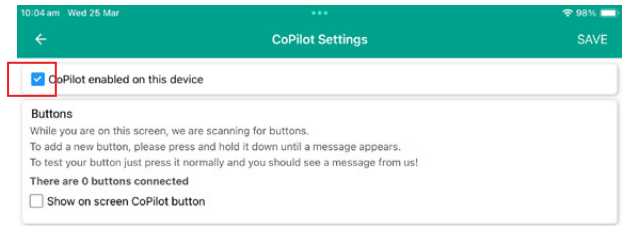
ENABLE COPILOT

AutoPilot utilises the Tracking capability available through CoPilot. You need to activate this first.

Go to User Preferences and activate the checkbox for "CoPilot enabled on this device".

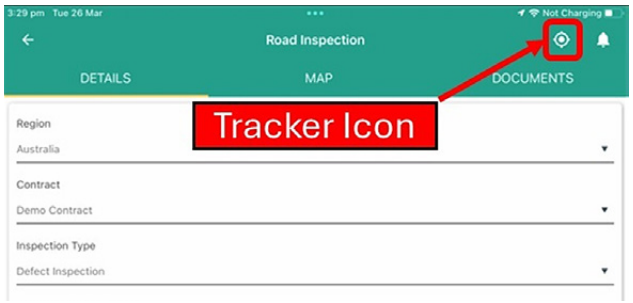






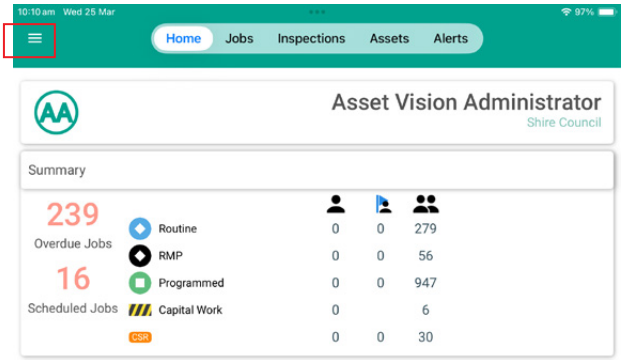
ACTIVATE TRACKER

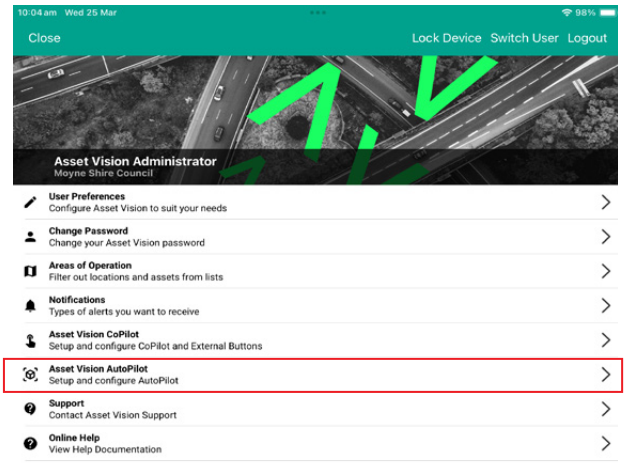
When you open a Road Inspection on the device you will see the Tracker icon in the top right hand corner of the device. Tap the icon to ensure it is activated.



ENABLE AUTOPILOT

To activate AutoPilot, go to User Preferences and activate the checkbox " Use AutoPilot for Inspections"





CAMERA SET UP

Ensure the device is securely mounted with a clear, unobstructed view of the road ahead. Confirm the app has permission to access the camera in the AV Mobile app settings.

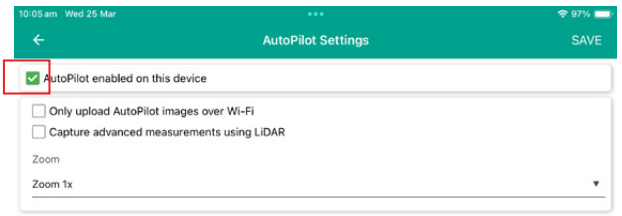
USING AUTOPILOT

To use AutoPilot, simply open the Inspection Route you want to conduct. AutoPilot will automatically recognise when you reach the beginning and commence recording as you drive along the route.

The application is designed to be hands-free so you do not have to touch the device as you conduct the inspection.

The images captured on the device by AutoPilot are automatically uploaded to the cloud while you are in mobile service range. When out of mobile service range, the images are stored on the device until you are within range again.

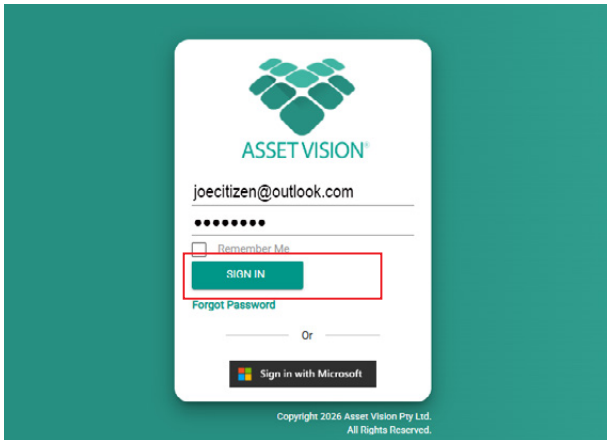
Verify the inspection images are being captured by setting the shutter sound to be audible.



HOW TO VIEW AN INSPECTION ON YOUR WEB BROWSER

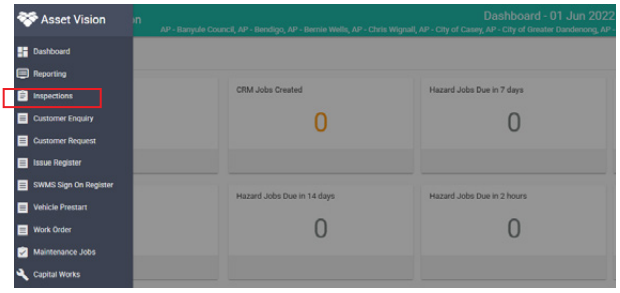
STEP 1 – LOG IN

Enter your email address and password, then click Sign In to access the platform. This is the starting point for the AutoPilot AI inspection workflow.



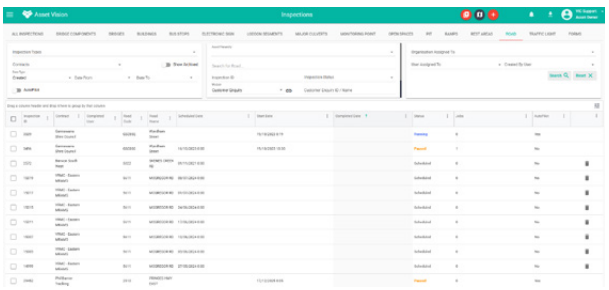
STEP 2 – OPEN INSPECTIONS

From the main navigation menu, select the Inspection module from the left-hand side. This takes you into the inspection management area.



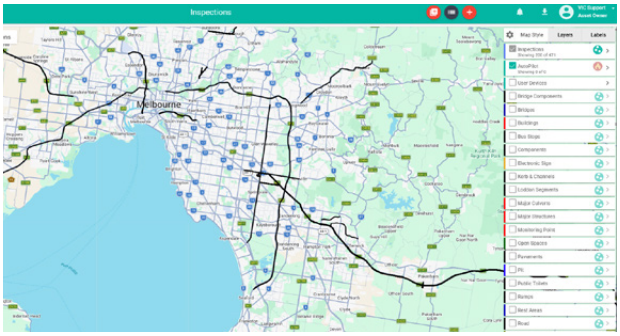
STEP 3 – VIEW INSPECTIONS IN LIST VIEW

The Inspections screen can be shown in a list view. This layout is useful when you want to scan records in a grid, review status, contract, road name, dates, jobs and AutoPilot usage.



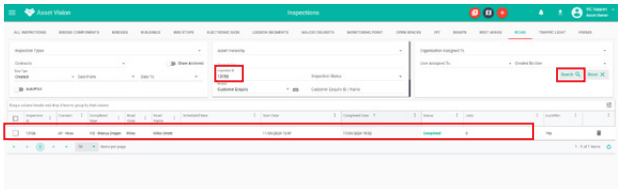
STEP 4 – SWITCH TO MAP VIEW

The same inspection data can also be viewed on a map. This gives a spatial view of inspection coverage and helps users understand where inspections have been completed.



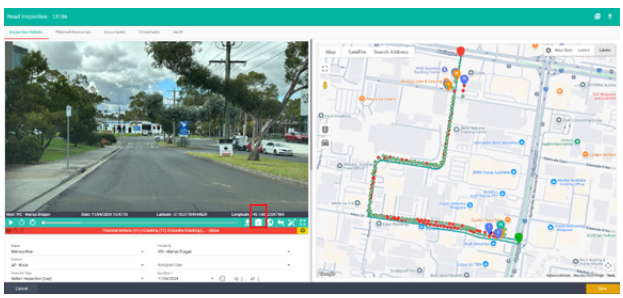
STEP 5 – SEARCH AND SELECT AN INSPECTION

Use the search panel to filter inspections. In this example, Inspection ID has been used, but the same process can be done by road name or other available search fields. After searching, select the returned inspection from the results list.



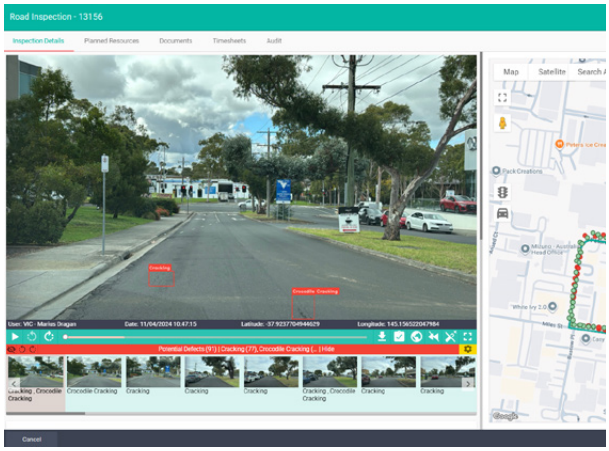
STEP 6 – OPEN THE INSPECTION PLAYBACK WITH AI DEFECTS OFF

After opening the inspection, playback is shown with the route map and image viewer. At this stage, AI defects are not being displayed. The red bar shows the defect summary, and selecting the red banner will display the potential defect images. The clipboard tick icon is the control used to create a Maintenance job from the inspection.



STEP 7 – TURN AI DEFECTS ON

Once defects are turned on, the AI-detected issues are shown directly on the inspection image, along with the image strip below. This lets the user visually review cracking and other detected defects while staying aligned to the mapped inspection path.

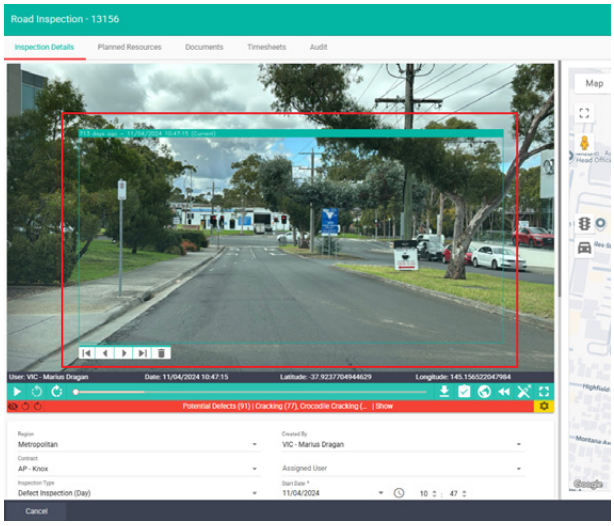


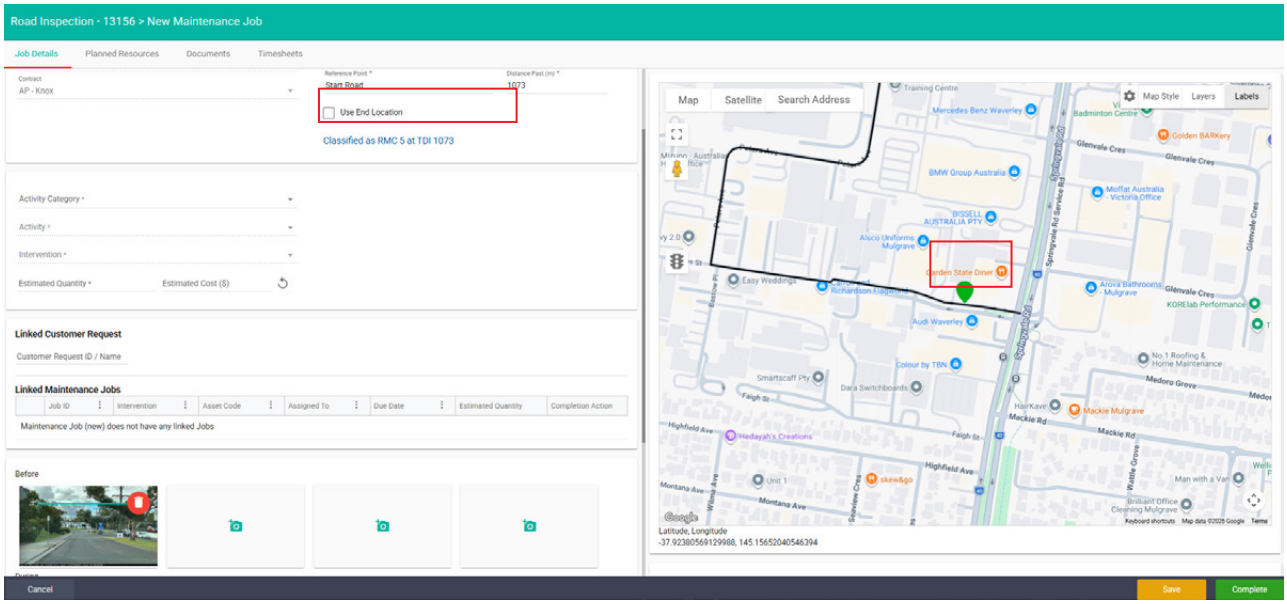
STEP 8 – CREATE A MAINTENANCE JOB

Clicking the clipboard tick icon opens a new Maintenance Job linked to the inspection. From here, the job can be reviewed, classified and completed. Based on the screenshot, the defect appears to have been automatically classified, and the location is carried through onto the map.

STEP 9 – USE REWIND TO REVIEW HISTORICAL IMAGES

Clicking the rewind button allows the user to draw a rectangle on the image and review matching images from past inspections for that area. This is useful for comparing the current condition against past captured images and checking how a defect may have changed over time.





CO-PILOT BUTTON FEATURE

AV AutoPilot enables inspectors to capture job records without removing their hands from the steering wheel or stopping the vehicle. The workflow requires the inspector's iPhone to be mounted to the dashboard or windscreen with the camera facing the road, and a battery-powered Bluetooth smart button (supplied by Asset Vision) attached to the steering wheel. AutoPilot can operate on inspections linked to a single road or footpath asset, or across a predefined inspection route containing multiple assets.

During an AutoPilot inspection, the inspector can press the physical CoPilot button to initiate a new job record. This action automatically captures the asset being inspected, current location, direction of travel, chainage, and a sequence of four photos. The inspector may also provide an audio description of the observed issue. Once processed, the audio is converted to text, added to the comments field and used to identify keywords for classification.

After the inspection, and once stationary in a safe location or back in the office, inspectors can review the generated job records or points of interest. They can recategorise, reassign, or add further information as required. Some organisations elect to use two devices, one mounted for AutoPilot image capture and another for supplementary data entry.

REWIND FEATURE

During inspection playback, users can select a location within the road corridor and AutoPilot will retrieve historical inspection data for that segment. Using AI-based image processing, the system adjusts previously captured photos and enables users to step backwards and forwards through time to view corridor conditions from previous weeks, months or years.

This capability provides valuable evidence for compliance, supports more accurate maintenance planning, and enables objective comparison of condition changes over time.

This functionality supports activities such as reviewing pre-event conditions for claims, verifying historical evidence or analysing the progression and rate of asset degradation.

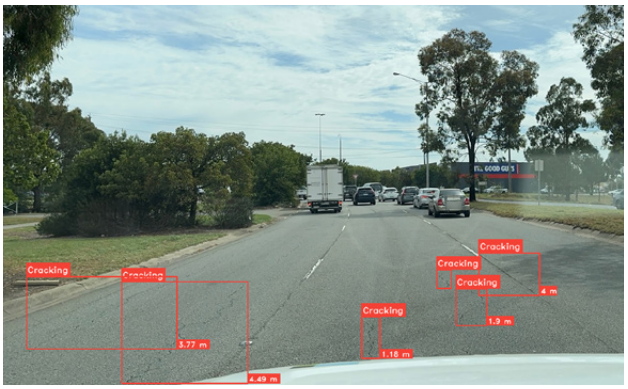
1. Mount smart phone with a clear forward view of the road.
2. Press the CoPilot button when a defect needs to be recorded
3. Speak clearly to describe the defect while continuing to drive safely

That's it! CoPilot automatically creates the defect with images, comments and GPS details

DEFECT AND WORKS PRIORITISATION

The AutoPilot web interface is pre-configured to support the management of detected defects. It provides tools that allow users to sort, filter, prioritise and dispatch work efficiently. Inspections can be reviewed in the office using the built-in GIS map view, where AI-identified potential defects and user-recorded defects are displayed. Users can then determine whether a defect or job should be created and assigned to a works team.

This workflow prevents the creation of large volumes of automatic defects, a behaviour common in some AI tools, and avoids overwhelming maintenance teams. For example, if a corridor section contains seven potential defects, AutoPilot allows the user to create a single defect or job rather than generating seven separate items.



INTEGRATION WITH OTHER MAINTENANCE SOLUTIONS

The AutoPilot+AI module can operate as a standalone solution or integrate with modern works management systems. A common approach is to use Asset Vision to collect, triage and prioritise defects, then dispatch confirmed items using one of the following methods:

- Dispatch work directly through the Asset Vision jobs module to Asset Vision mobile.
- Export confirmed defects as a batch XLS file for import into external systems.

Use API integration to push confirmed defects into the connected works management system.

Asset Vision provides full Swagger (OpenAPI) documentation, including all endpoints, authentication requirements, response schemas, payload formats and integration patterns.

The API supports:

- Pull and push data flows
- Defect retrieval
- Access to evidence imagery
- Work order creation (optional)
- Synchronisation of defect status and updates

The Swagger is available here:

MODEL LEVELS OF ACCURACY AND QUALITY CONTROL PROCESSES

Asset Vision applies a multi-layer quality control framework designed to maintain consistent model accuracy and reliability.

Model accuracy protocols include:

- Ongoing optimisation as new data is introduced.
- Continuously refined confidence thresholds.
- Periodic re-training and calibration using Australian datasets.
- User feedback mechanisms, allowing clients to mark false positives for model improvement.

Quality control processes include:

- Spatial clustering and visualisation tools to assess defect patterns.
- Human-in-the-loop validation where required.
- Continuous monitoring of false positives and false negatives.
- Six-monthly reviews of model accuracy and confidence metrics.

These processes ensure clients receive reliable, decision-ready defect data aligned with expected accuracy standards.

MOBILE APP DATA CAPTURE

IPHONE REQUIREMENTS

AutoPilot + AI leverages the advanced sensor capabilities of iPhone 16 Pro, iPhone 17 Pro and Pro Max models. Specifically the integrated LiDAR system, which enables depth estimation and supports the measurement and spatial positioning of detected defects within captured imagery. These devices provide the required processing performance, camera quality, and positional accuracy needed for reliable, high-frequency image capture during corridor inspections.

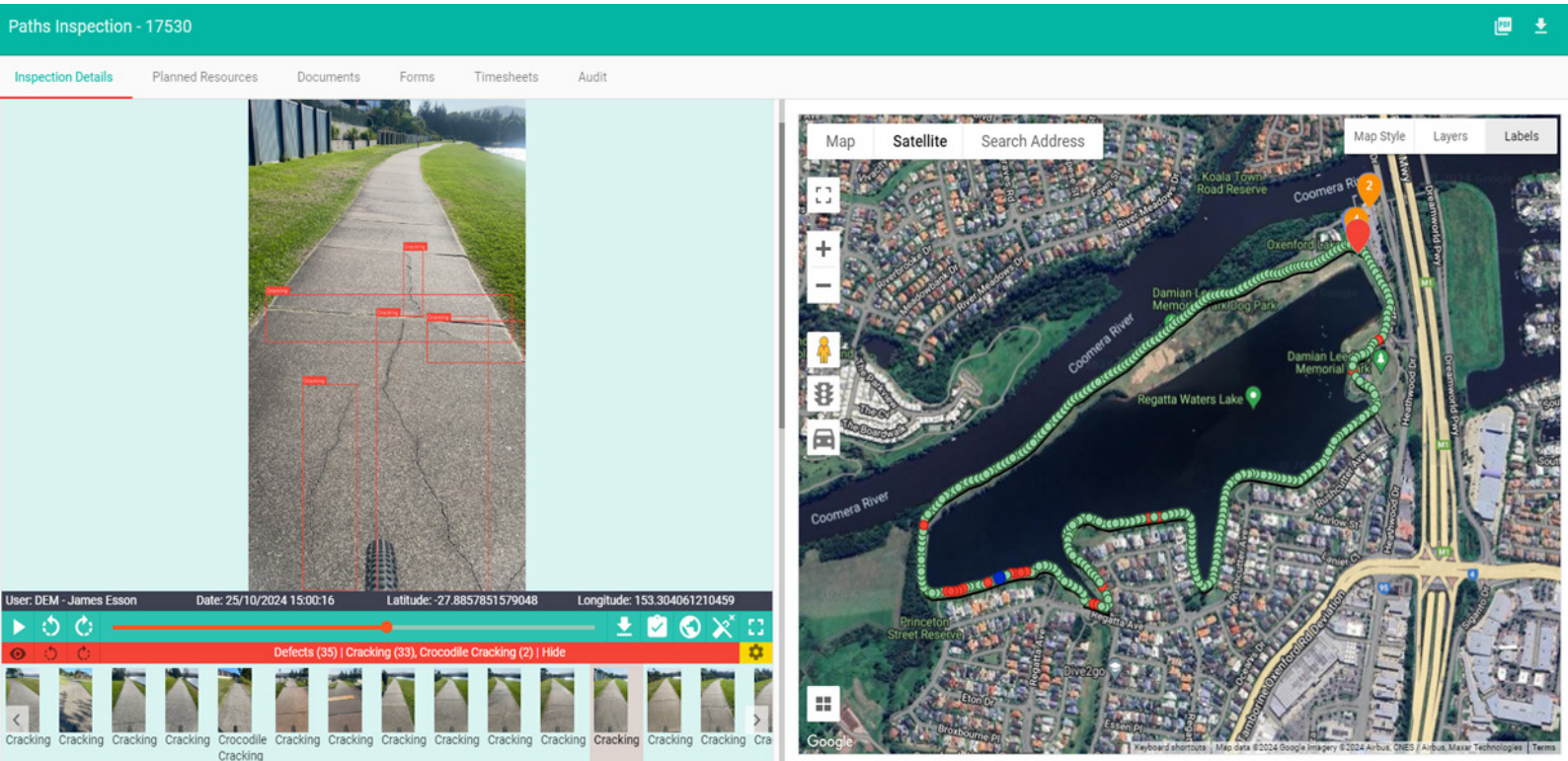
INFORMATION PRIVACY AND SECURITY

Asset Vision complies with the relevant state and local government privacy and security requirements.

Key privacy and security safeguards include:

- Compliance with ISO27001:2022
- Secure, encrypted data storage (Microsoft Azure in Australia)
- Encryption of data in transit and at rest
- Strict access controls and audit logging
- No recording of personal information beyond what is legally required for road asset condition assessment
- Blurring or redaction of identifiable individuals (e.g. pedestrians, vehicle plates) as part of AI-driven privacy protection

Asset Vision ensures that all data including images and metadata captured by AutoPilot is protected and secure.



MOUNTING AND HARDWARE CONFIGURATION

Asset Vision has extensively evaluated a range of in-vehicle mounting and power solutions to ensure stable, safe, and thermally controlled device operation. The required installation kit provides a robust, field-tested configuration that maintains optimal camera alignment and device performance throughout the inspection process.

The complete installation package includes:

- Purpose-built cradles and high-strength suction mounts
- Integrated cooling fans to manage device temperature
- Power adapters and cabling for continuous operation
- Cable management clips and accessories

This hardware solution enables consistent image capture, minimises vibration, and ensures the LiDAR and camera sensors operate with maximum accuracy under real-world conditions.

Follow the installation steps shown in the video

TIPS TO USING THE DEVICE IN THE VEHICLE:

- Always start with the phone fully charged and don't plug it in to a charger when in use, unless you absolutely need to.
- Don't use an iPhone case on the device as it may lead to it overheating.
- Clean the windscreen of the vehicle on both sides.
- Ensure there are no scratches or cracks within the field of view of the camera. If the image from AutoPilot is blurred, check for an obstruction in front of the camera.
- Install the phone on the passenger side as high as possible and it is best to have the lens of the camera on the left.
- If you mount the Bluetooth button, keep it clear of the vehicle's airbags.
- Check the view ahead by taking a test photo with the device's regular camera.

HARDWARE PACK

The hardware pack you receive will include:

- Video Cage
- Phone Case
- Mounting hardware
- Cooling device
- USB Charger
- 2 x Allen keys
- 2 x Spare O-Rings.
- 2 x USB cables (not shown)

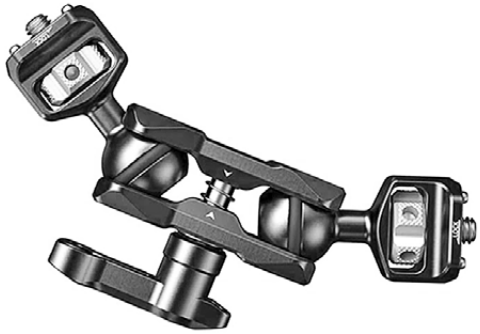
Description	Comments
SmallRig iPhone 16 Pro Professional Video Kit	Make sure you **DO NOT USE** the full phone cover that is provided - it will cause overheating. Use the plastic phone case within the video cage for the iPhone.
SmallRig 4inch Suction Cup	Use this to attach the phone to the windscreen. Use the pump button to create the suction when pressing the cup to the windscreen.
SmallRig Magic Arm	This is an articulated connector to allow the device to be positioned as required and fixed in place.
SmallRig quick release	This device allows you to secure the iPhone (whilst in the cage) to the mounting hardware and release it with the press of a button to remove the iPhone from the mounting hardware
Magsafe Cooler	AutoPilot and CoPilot require intense processing which generates heat in the device that requires cooling.
Magsafe Cooler	Alternative to above and will operate effectively.
Charger	Any dual, fast charging USBC charger with a cigarette lighter adaptor .
USBC Cable x 2	Any device compatible USB cable

MOUNTING HARDWARE

The Mobile Cage includes a plastic Case that surrounds the iPhone for mounting into the Cage.

Mounting the hardware high on the windscreen requires the use of a suction cup.

The Magic Arm articulated connector allows you to manoeuvre the position of the phone and lock it in place.

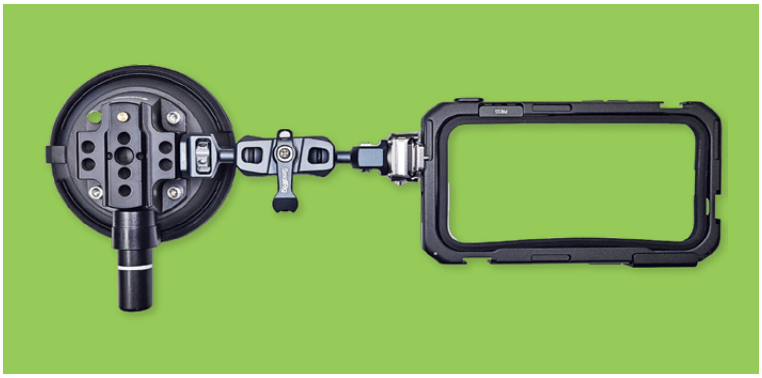


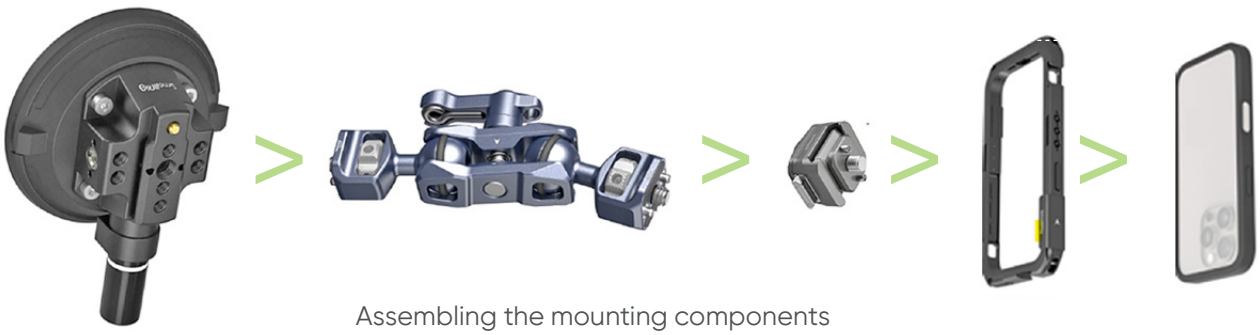
The video Cage is attached to the articulated arm via a Quick Release mount, which allows removal of the iPhone from the mounting hardware without removing it from the windscreen.

ASSEMBLING THE MOUNTING HARDWARE

The mounting hardware is made up of an integrated set of components that work together to provide a sturdy and adjustable platform for the iPhone when using CoPilot and AutoPilot.

The diagram below provides an overview of the mounting hardware. Some components may be pre-assembled when supplied.

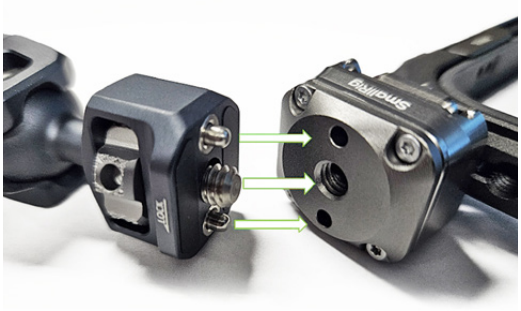




Assembling the mounting components

The Small Rig mounting components are assembled with joints made up of aligning pins and screw connections.

To join the components together, align the pins on one component with the holes on the other. Press the two together and use your fingers to turn the screw in a clockwise direction.



To tighten the ends of the articulated arm use the lever tool that is held by a magnet under the tightening arm. Pop it out using your finger.

Place the lever tool in the holes provided in the screw and tighten until firm.

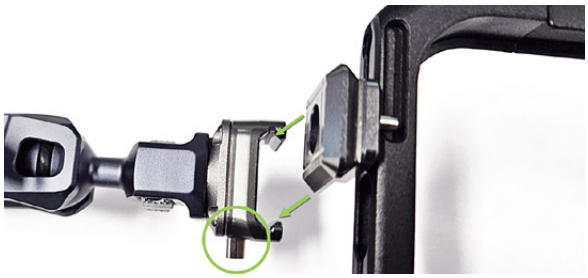
When you have finished tightening the screws, return the lever to its holder under the tightening arm.

The articulated arm attaches to the suction cup in the same manner.

To attach the quick release plate, separate the components using the quick release button.

Take the quick release plate and attach it to the video case using the black Allen key to tighten.

To attach or release the device from the mounting components, press the Quick release button and slide the mount on or off and then release the button.

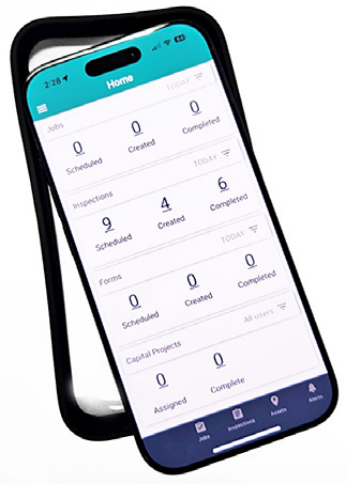


The Quick Release plate includes 2 small aligning pins. If required, these can be tightened using the silver Allen key.

INSTALLING AND REMOVING THE IPHONE FROM THE CAGE

The video cage for the iPhone is made up of 2 components, the plastic device Case and the metal Cage.

Start by slipping the iPhone into the plastic case.



Place the phone in the Case into the Cage, ensuring the buttons align.

To locate the iPhone in the Cage, place the right side of the phone into the Cage, slide the lock button down and press the phone into place.

Once correctly installed, the iPhone in the Cage is ready to attach the mounting hardware using the Quick Release mount.

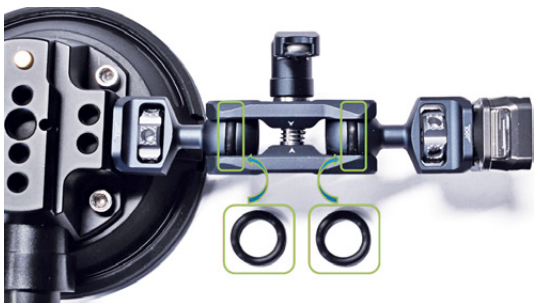
To remove the iPhone from the Cage, use the 'Press' button to unlock it and push the phone out from behind.

MAINTAINING THE MOUNTING COMPONENTS

Replacing the Articulated Connector O-Rings

If the O-Rings are worn and no longer support the connected components, you can replace them by unscrewing the articulated connector and removing the old O-rings and replacing them with the spares in the pack.

These are a tight fit, so you may need to use some silicone lubricant to slide them on.



DEVICE COOLING HARDWARE

The temperature of the mobile device affects its ability to function efficiently.

When mounted in a vehicle and exposed to the sun while operating Asset Vision, the device will be exposed to external heat and generate internal heat as a by-product of running the application.

AutoPilot performs intense processing, so the device should be externally cooled while in use.

iPhones and iPads are designed to be used where the ambient temperature is between 0° and 35° C.

If your device gets too warm or too cold, certain features might become temporarily disabled. In extreme conditions, your device might become temporarily disabled.

See the Apple Support page for the impacts of operating in hot and cold conditions.

https://support.apple.com/en-au/118431

ATTACHING THE COOLING DEVICE

AutoPilot places high processing demands on the device including managing GPS based map routing, photograph processing, data collection and uploading. This generates heat in the device that needs to be managed.

The cooling device is magnetic and simply attaches itself to the back of the iPhone when placed against it. Ensure that the USB cable is connected to it so that it is powered.

ATTACHING THE HARDWARE TO THE WINDSCREEN

Ensure the windscreen is clean.

Remove the cover from the suction cup.

Apply the suction cup to the windscreen and use the pump to create a vacuum to hold the cup to the windscreen.

To remove the suction cup from the windscreen, pull one of the lugs (circled) on the side of the cup to break the seal.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