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Artificial Intelligence Road Surveys (AIRS)

Providing accurate traffic data for ALL road users



Providing accurate traffic data for decision makers

Accurate data on the movement, flow and direction of road users can have significant impact on urban and transport planning.

Cities around the world are using all types of data to actively monitor infrastructure improvements, enhance user experience, improve traffic flow and support effective policies.

Technological advancements in counting software is strengthening the ability of policy makers, traffic engineers and active travel experts to monitor and evaluate interventions and make decisions backed by evidence.

Artificial Intelligence (AI) software expands our capacity to track, collect and collate data on all types of road users. It builds a body of relevant, local data that is responsive, accurate, comparable and cost effective.

What is AIRS?

Bicycle Network is offering Artificial Intelligence Road Surveys (AIRS) as part of our suite of complimentary Super Count services.

AIRS is an artificial intelligence-based survey service which autonomously detects and classifies roads users and how they interact with road environments using cameras, sensors and smart software.

Developed by Vivacity Labs, the technology uses cameras or sensors and machine learning to detect and classify up to nine road user types (shown in graphic below) in any camera frame or field of view.

From active travel volumes to motor traffic congestion and movements, AIRS can be uniquely tailored to meet transport planning, monitoring and evaluation objectives.

The nine road user types identified using AI-based software



Pedestrian



Cyclist



Motorbike



Car



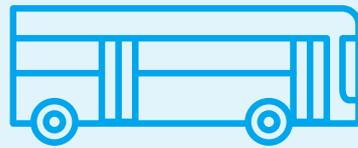
Taxi



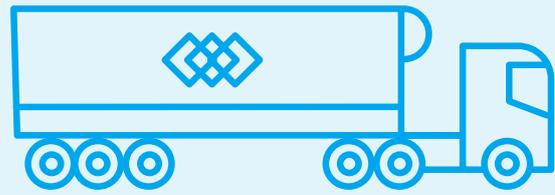
Van



Truck



Bus



Articulate

What data can AIRS provide?

AIRS can provide decision makers with the traffic and active travel data they need to make evidence-based decisions.

Once the AI-technology has identified and classified all users in the field of vision of the sensor or camera, Bicycle Network’s analysts can provide reports on three key areas:

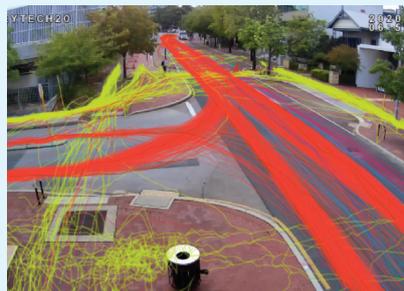
1. Road user counts

We can count all road users entering a camera’s field of view and break this data down by time increment and user type.



2. Road user path tracing

We can track the paths of movement made by users ('path tracing'), which offers insights into traffic flow and directionality.



3. Road user speed analysis

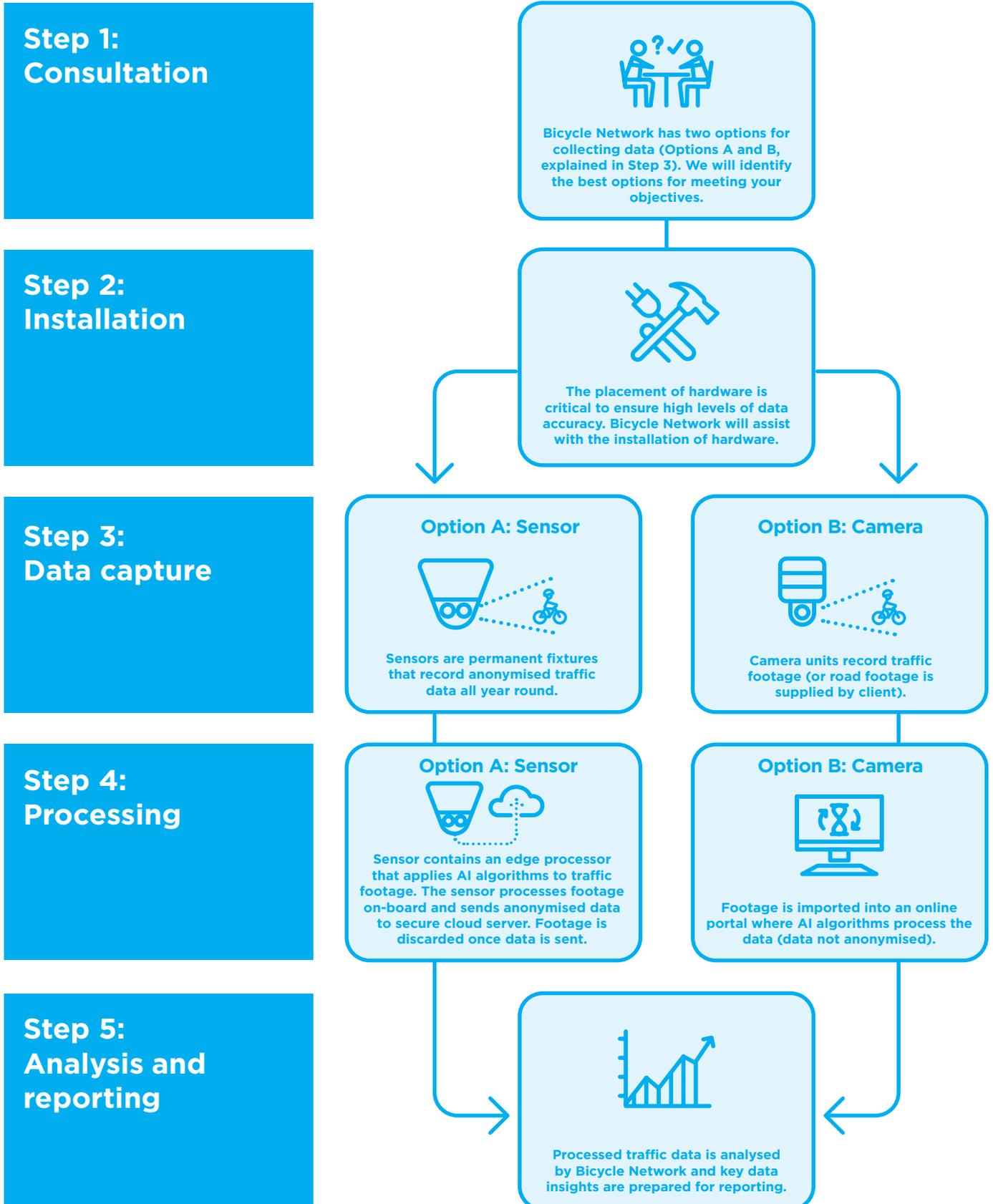
We can measure user speeds, which is useful for congestion detection and shared path safety measures.



How does AIRS work?

AIRS offers clients precise insights into the different types of road users and their behaviours in any given road environment.

When implementing Bicycle Network's AIRS program, there are five key steps:



Step 1: Consultation

Through an initial consultation with Bicycle Network, one of two data collection options will be recommended for collecting and analysing traffic data.

Suitable data collecting options are determined by the needs and objective of the survey - including data needs, limitations, and privacy policies.

Option A: Sensor

A permanently installed device captures and processes traffic data.

Option B: Camera

A temporary camera is installed to capture data, which is subsequently processed via an online portal containing AI algorithms.

| |  Option A: Sensor |  Option B: Camera |
|----------------------------|---|--|
| How it is installed | Sensors must be hardwired to an existing power source. | Bicycle Network installs temporary, battery-powered HD cameras. Alternatively, pre-recorded footage can be supplied by the client. |
| Survey length | Continuous, real-time data all year round | Hourly to weekly options |
| Road user privacy | Privacy is a priority for this option. Sensors contain an edge processor that applies AI algorithms to traffic footage. The sensor processes footage on-board and sends anonymised data to secure cloud server. Footage is discarded once data is sent. | Traffic footage is recorded and imported into an online portal for AI processing. Footage is not anonymised. |
| Network planning | Sensors can communicate with each other to provide network planning capabilities. | Not available with this option |
| Billing | Monthly | Per hour |

Step 2: Installation

The placement of AIRS devices is important for obtaining high levels of data accuracy. Bicycle Network will work with external providers to manage the installation of devices.

We ensure that our devices capture the best field of view and are securely mounted through testing and trial.

Step 3: Data capture

Once installed and tested, our devices will start capturing traffic data.



Option A

Sensors capture data 24 hours a day, 365 days a year.



Option B

Cameras record footage for the period nominated by the client.

Step 4: Processing and storage

Once footage is collected, we use AI algorithms to identify and classify all road users moving within the devices' field of view, and then securely store the processed data for subsequent analysis.

Data capture differs slightly depending on which option is pursued:



Option A: Sensor

The sensor contains an edge processor, which applies AI algorithms to traffic footage. The sensor processes footage on-board and converts it into anonymised traffic data (road user classification, time stamp and x-y coordinates) and deletes footage. Data is then sent to a secure cloud server and footage is discarded.

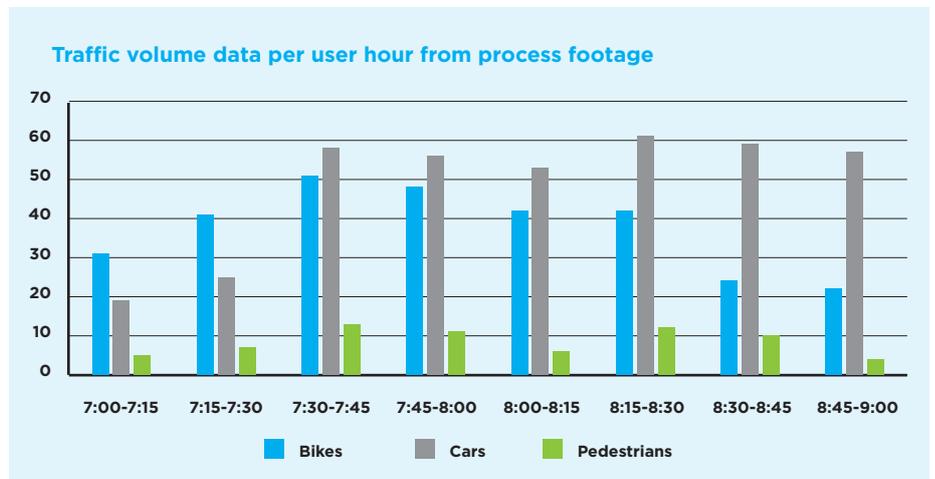


Option B: Camera

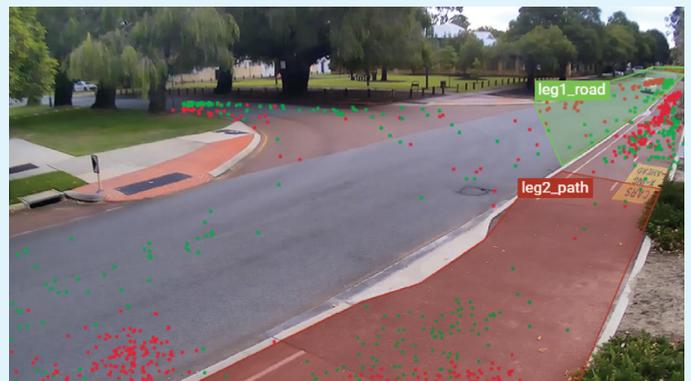
Camera footage is imported into an online portal containing AI algorithms. Object detection algorithms are applied to the raw footage and processed into traffic data. Please note that the traffic footage is not anonymised with this option.

Step 5: Analysis and reporting

Bicycle Network will undertake a detailed analysis of the processed data (road user counts, path tracing analysis, speed analysis, etc.) and present tailored insights that inform your project objectives.



Path tracing. In this graphic pedestrian paths (yellow lines) reveal their interaction with the streetscape.



Detailed road user counts: Spatially focused analysis allows us to undertake detailed investigations of road use. Here, we analyse the number of users 'gutter-hopping' (shifting from bike lane to road).

What option is best for you?

| Feature | Option A: Sensor | Option B: Camera |
|-------------------------------------|--------------------------------|--|
| Road user detection | ✓ | ✓ |
| Road user classification and volume | ✓ | ✓ |
| Live data feed | ✓ | |
| Data privacy | Anonymised data | Not anonymised data |
| Survey duration | Permanent (annually) | Temporary (hourly, weekly) |
| Installation/power source | On-site power source required. | Internal battery, no on-site power required. |
| Billing | Monthly | Per hour |
| Traffic counts | ✓ | ✓ |
| Path tracing | ✓ | ✓ |
| Speed analysis | ✓ | ✓ |

Costing

| Description | Total (ex GST) |
|--|--------------------------|
| Option A: Sensor | |
| Supply of one Vivacity Sensor w/ 5 year warranty | \$5,600 per sensor |
| Installation of Sensor | \$600 per sensor |
| Data dashboard setup and data validation | \$600 per sensor |
| Ongoing yearly fee to access to data dashboard | \$1,000 per sensor |
| Option B: Camera | |
| Hourly fee to process footage collected by Bicycle Network (setup fees included for surveys of 48 hours or more) | \$75 per hour/per camera |
| Setup fee (only charged if entire survey project is less than 48 hours) | \$300 |
| Hourly fee to process footage supplied by client (no setup fees or survey duration minimums) | \$25 per hour |

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