iTHEIA – AI-Powered Traffic Counts & Classification

Safely and quickly access high-quality traffic data for insight, planning, and reporting requirements.

Real-Time, Video-Based Traffic Counter/Classifier

IRD's Artificial Intelligence (AI) Traffic Data System uses video and machine learning to collect data for vehicle traffic counting and classification. iTHEIA™ relies entirely on AI to perform vehicle counting and classification without uploading video for third-party processing.

iTHEIA can process up to 8 lanes of bidirectional traffic with a detection accuracy of 95% or greater and a classification accuracy of 90% or greater. Data includes volume, classification, lane, speed, images, and per-vehicle timestamps.

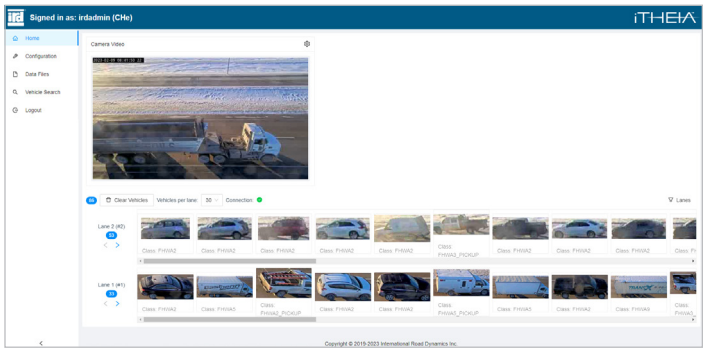
There are portable and permanent iTHEIA options. The Portable Installation of the iTHEIA system is intended for short-term installation, providing simple and quick setup as well as the ability to set up and acquire data at multiple locations. The Permanent Installation of the iTHEIA system is intended for long-term installation, providing rugged, high-performance components that will operate in a wide range of environments.

Features

- Counts and classifies up to 8 lanes of bidirectional traffic with support for up to 2 independent cameras
- Counts and classifies accurately from 1-120 mph (1-160 km/h)
- Non-intrusive roadside installation
- On-site real-time classification
- Saved images for counting and classification verification

Data Export and Review

Users can select the FHWA 13 Classes (Scheme F) or a subset of vehicle classes from the FHWA 13 Classes to be included in data exports. Data is delivered via reporting software, a real-time data stream, or in standard spreadsheet formats. Data is verifiable through a review of thumbnail images from the video stream. It is easy to audit output by analyzing the images. Each vehicle is separately captured and placed in order with the class and lane identified.



Video/Thumbnail Image Review – 2 Lanes, 13 Classes

iTHEIA is extremely easy to set up compared with other data collection devices. A side view camera and electronics are installed at the roadside, and it is often possible to use an existing roadside pole to mount the camera. Both the portable and permanent systems are managed using a remote interface and may be easily configured at a site using a laptop. The user enters the station description (number of lanes), reviews the camera position, and iTHEIA starts counting right away.

iTHEIA Portable may be easily installed on existing roadside poles

iTHEIA Real-Time, Video-Based Traffic Counting and Classifying

Technical Specifications

Permanent System Specifications

- IP outdoor camera with mounting kit and pole top surge arrestor
- Shielded outdoor PoE+ cable for power and communication between camera and electronics
- External high-powered illuminator with mounting kit
- Back panel with industrial AI edge computing hardware, integrated router, PoE+ switch, camera surge arrestor and optional cellular modem
- Optional outdoor cabinet
- iTHEIA system software

Power	MIN 100, MAX 240 VAC, MAX 200 W power consumption
Ambient Operating Temperature	System: -25 to + 60°C (-13 to +140°F) Illuminator: -50 to + 50°C (-58 to +122°F)
Speed Range	Counts and classifies vehicles traveling 1-120 mph (1-160 km/h)
Back Panel Size	36 x 36 x 20 cm (14.2 x 14.2 x 8 in)
Cabinet (optional) Size	114 cm x 62 cm x 41 cm (45 x 25 x 16 in)
Enclosure (optional) Size	41 cm x 41 cm x 20 cm (16 x 16 x 8 in)
Data Storage	SSD (30-day+ image and data storage for 2 cameras)
Classification Scheme	FHWA 13-Classes; custom classification schemes available at additional development cost

Portable System Specifications

- IP outdoor camera with internal illuminator and mounting assembly
- Shielded outdoor PoE+ cable for power and communication between camera and electronics enclosure with a single connection
- Telescopic pole and quick mount brackets for ease and speed of installation
- Rugged outdoor aluminum enclosure with AI edge computing hardware and integrated long-life certified lithium-ion battery
- 20A fast battery charger
- Cable lock for securing enclosure

Battery Life	50 hours
Battery Voltage	12.8 V
Battery Charge Time	5 hours
Ambient Operating Temperature	-20 to + 50°C (-4 to +122°F)
Speed Range	Counts and classifies vehicles traveling 1-120 mph (1-160 km/h)
Enclosure Size	41 x 36 x 22 cm (16 x 14 x 9 in)
Telescopic Pole Length	2 - 6 m (6.6 - 20 ft)
Enclosure (optional) Size	41 cm x 41 cm x 20 cm (16 x 16 x 8 in)
Data Storage	SSD (30-day+ image and data storage for 2 cameras)
Classification Scheme	FHWA 13-Classes; custom classification schemes available at additional development cost