iTHEIA™ Portable AI Traffic Data System

The iTHEIA™ Artificial Intelligence (AI) Traffic Data System uses video and machine learning to collect vehicle data for counts and classification. This non-intrusive system utilizes high performance edge AI hardware to generate accurate traffic data in several formats at the roadside.

SPECIFICATIONS

System Features

Number of Traffic Lanes	Counts and classifies up to 4 lanes of bidirectional traffic at site in real time with automatic lane boundary and flow determination
Number of Cameras	Portable System includes 1 IP camera Live view available in user interface
Classification Scheme	FHWA 13 Class
Accuracy	Detection > 95%, Classification > 90%
Speed Range	Vehicles traveling 1-120 mph (1-195 km/h)
Operating System	Hardened embedded Linux
Camera Lens	Varifocal lens with zoom and focus
Camera Connection	Integrated PoE+
Vehicle Image History	Vehicle thumbnail and overview images stored for 7 days
Per Vehicle Datafile Storage	Up to 60 Days for 2 cameras on 250,000 ADT sites with 8 lanes
Data Storage	Solid State Drive
Surge Protection	Ethernet surge protection
Security	Secure HTTPS web interface and file downloading
Internal Illumination (Portable)	Built-In Infrared up to 60 ft (18 meters)
Battery (Portable)	Lithium battery; 4000 cycle rating; UN 38.3, UL 1642, & CE Certifications; 5 hour charge time; 50 hour run time.

© 2024 Quarterhill Inc. and all subsidiaries. All rights reserved.
Quarterhill reserves the right to make changes or updates at any time without prior notice.

Hardware Specifications – Portable

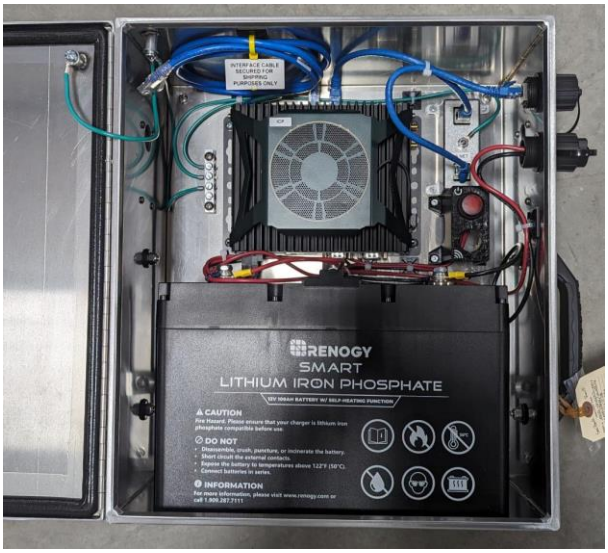
Parameter	Min	Max	Unit
Battery Charging Adaptor	100	240 (120 *Nominal*)	VAC
Battery Life	50		h
Battery Rating	100		Ah
Maximum power consumption	25		W
Telescopic Pole Length	1.7 (5’7”)	6 (20’)	m (feet)
Operating ambient temperature (combined)	-20	+50	ºC
Enclosure protection rating	NEMA 4 / IP65		
Camera protection rating	NEMA 4 / IP66		

Hardware Component Size and Weight

Component	Height	Width	Depth	Weight
Portable System Electronics Enclosure	16 in (41 cm)	14 in (36 cm)	8.75 in (22 cm)	39 lb. (17.7 kg)

Portable Hardware





© 2024 Quarterhill Inc. and all subsidiaries. All rights reserved.
Quarterhill reserves the right to make changes or updates at any time without prior notice.

SITE SELECTION

General Location Guidance

The camera needs a clear view of traffic on the roadway. Ideally, the view will have the whole side of vehicles, including long trucks, travelling horizontally in the camera view. Areas with obstructions such as trees, shrubs, barriers, signs, gantries, overhead lines or poles should be avoided if possible.

Selecting a pole location with street lighting beside or behind the camera is recommended as this increases performance of the system at night by augmenting the supplied illumination.

The following conditions should be avoided as performance may be reduced or impacted by these items:

- Roadways with median barriers, curves, merging lanes, or construction causing lane pattern changes.
- Camera views with bright light sources such as the sun, headlights, building lights, or parking lot lighting in the background.
- Placing iTHEIA systems directly across the road from each other on divided highways where the illuminator from one side would be visible in the camera view from the other side.
- Backgrounds with reflective surfaces such as lakes, rivers or glass/shiny buildings.
- Areas with adverse weather conditions like nearby water bodies where fog may develop frequently or hills where it may be very windy.
- Active backgrounds with moving objects not of interest – especially vehicles or equipment.
- Dusty areas like fields or construction sites.

Preferred Camera View

To optimize system performance, striving to achieve a good camera view as shown is best practice. The center of the vertical viewing angle should be between 20° to 40° with respect to the roadway.



Correct View

- Vehicles are travelling perpendicular to the camera view.
- All lanes are visible.
- Lane lines are horizontal.

© 2024 Quarterhill Inc. and all subsidiaries. All rights reserved.
Quarterhill reserves the right to make changes or updates at any time without prior notice.

Site Guidelines

The iTHEIA Portable system comes with the electronics enclosure, which mounts to a 20 ft (6 m) tall telescoping camera pole. The system operates on battery, so no AC power is needed unless operation for longer is desired or during charging. The data is downloaded via an Ethernet connection, typically during charging when the unit is back in the office.

For the Portable system, mounting to a street light pole or selecting a sturdy pole with lighting beside or behind the camera is recommended, as this increases performance of the system at night by augmenting the system illumination.

To optimize the accuracy of classification, we recommend the iTHEIA Portable system be installed a minimum of 30 ft (9 m) from the edge of the closest lane. This distance provides the best balance of field-of-view and image quality.

With no additional lighting, the maximum operating distance of the iTHEIA Portable system will be limited to about 60 ft (18 m). With existing supplement lighting, the maximum recommended operating distance of the iTHEIA Portable system is 100 ft (30 m). Beyond this distance, reduction of image quality may result in degraded classification and the shallow viewing angle will hinder lane discrimination, leaving the system more susceptible to occlusion.

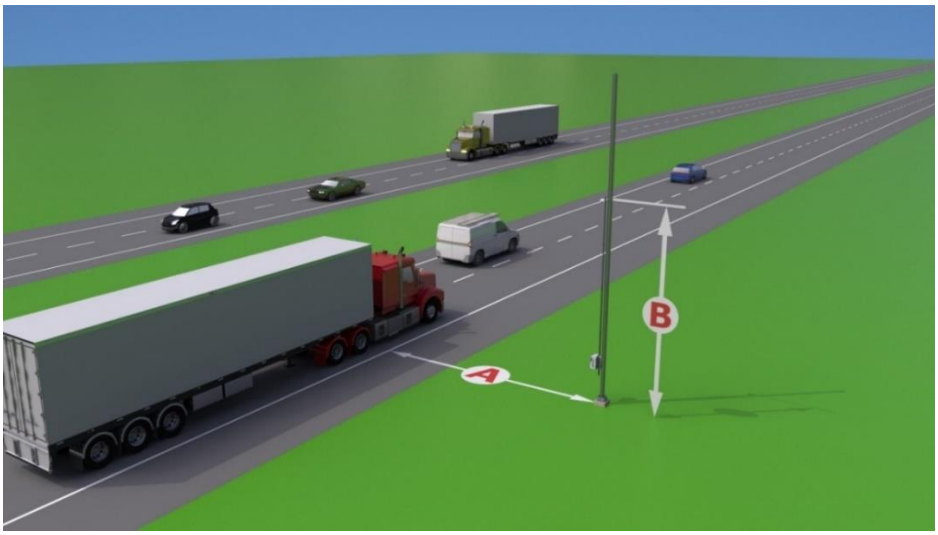


Figure 1 Portable iTHEIA Geometry

A) Pole Offset Distance - from the painted edge of lane of interest to pole
30 ft (9 m) for nearest lane to 60 ft (18 m) for furthest lane or with supplemental street lighting up to 100 ft (30 m) for the furthest lane.
B) Camera Height – usually fixed at 20 ft (6 m) with provided telescoping pole
Can be affected by ditch and roadside slope. Higher is generally better when possible.

© 2024 Quarterhill Inc. and all subsidiaries. All rights reserved.
Quarterhill reserves the right to make changes or updates at any time without prior notice.