

TrafficRadar Guide

How to set up a TagMaster TrafficRadar



TagItalia è una divisione di *GeneraleSistemi S.r.l.* distributore TagMaster per l'Italia.
<https://tagitalia.com/> | info@tagitalia.com | +39 0574 81 64 34

Nr: 1122-159

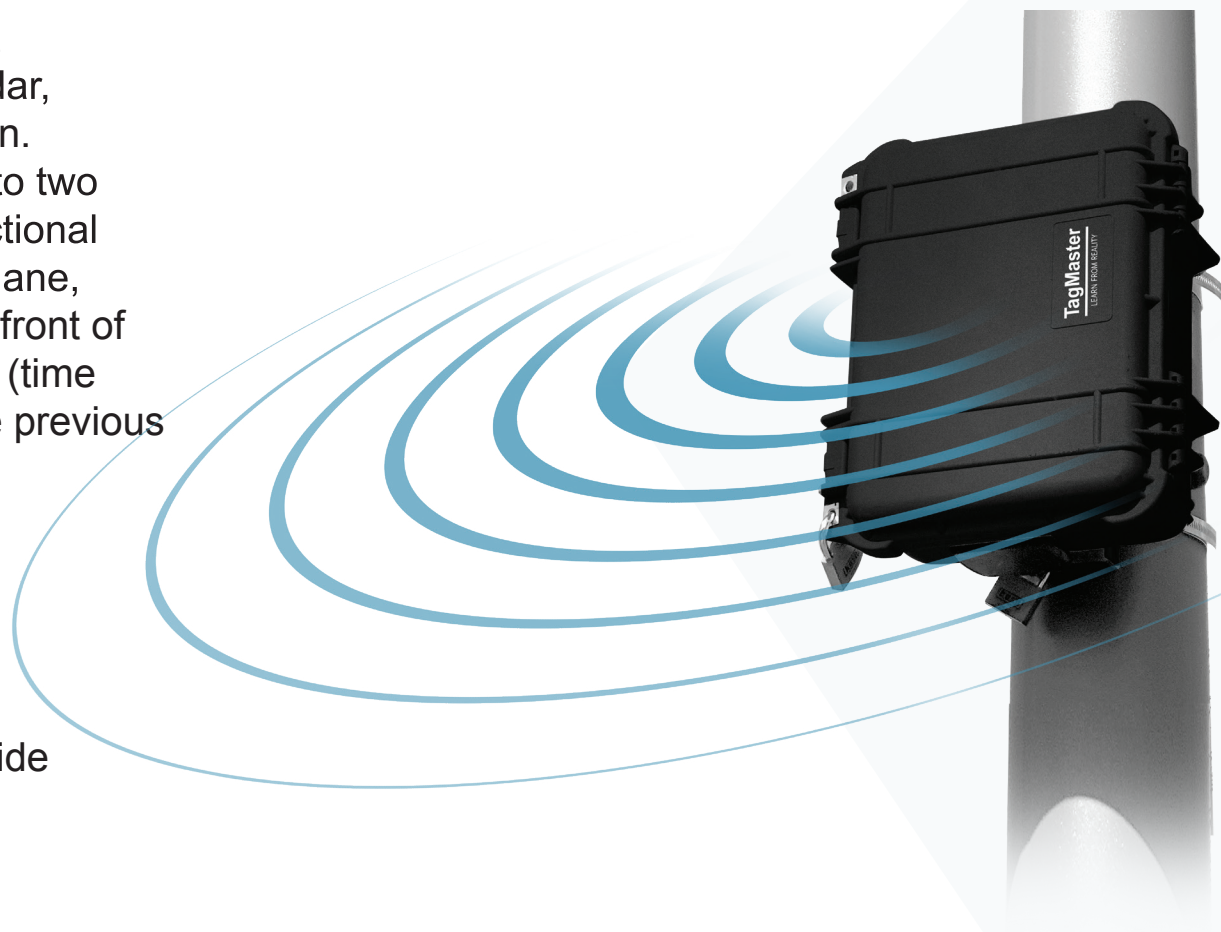

TAGITALIA
RFID System & Technologies

TagMaster
LEARN FROM REALITY

About this guide

This guide gives advice and best practice about how to set up and use the TagMaster TrafficRadar, ensuring maximum performance and satisfaction. The TrafficRadar is designed for monitoring up to two lanes of road traffic. It can handle both uni-directional and bi-directional traffic flows. It can determine lane, direction, speed, headway (time measurement, front of vehicle to the front of the previous vehicle), gap (time measurement, front of vehicle to the back of the previous vehicle) and length of each vehicle passing.

Please note that TrafficRadar performance vary depending on the mounting, set up and power consumption. For more information than this guide covers, please consult the product manual.



How a TrafficRadar works



The TrafficRadar contains a radio transmitter and receiver combined into a single unit.

The unit emits a low power radio wave and listens for any echo. If there is a vehicle in the path of the radio wave, a part of the radio wave will bounce back. Radio waves move through the air at a constant speed. The radar device calculates how far away the object is, based on how long it takes for the radio signal to return.

Reach and reflectivity

The strength of radio wave diminishes with the distance. The further the signal must travel, the less energy it'll have when it gets there. The radio wave also must have enough strength to bounce back to the TrafficRadar, if not, the vehicle is out of range. For vehicles, radar reflectivity is mostly a matter of size and shape. Most of the signal doesn't come back. For the signal to reflect to the radar, it requires a surface at the correct angle.

Range Finding

With Range Finding abilities the TrafficRadar is able to track the actual position of all targets and enables **true lane detection**. The TrafficRadar has a unique, built-in algorithm that joins split vehicles back together which mitigates over count and improves length classification readings.

The Range Finding abilities also allows for the configuration of prime lane directions. Vehicles travelling in the opposing direction for the lane are flagged as a reverse direction vehicle in the data records, which allows clients to understand road user discipline in more detail.

The TrafficRadar's Range Finding ability **sets it apart from all similar radar detection products** on today's market.

Power and battery

Built in Power saving

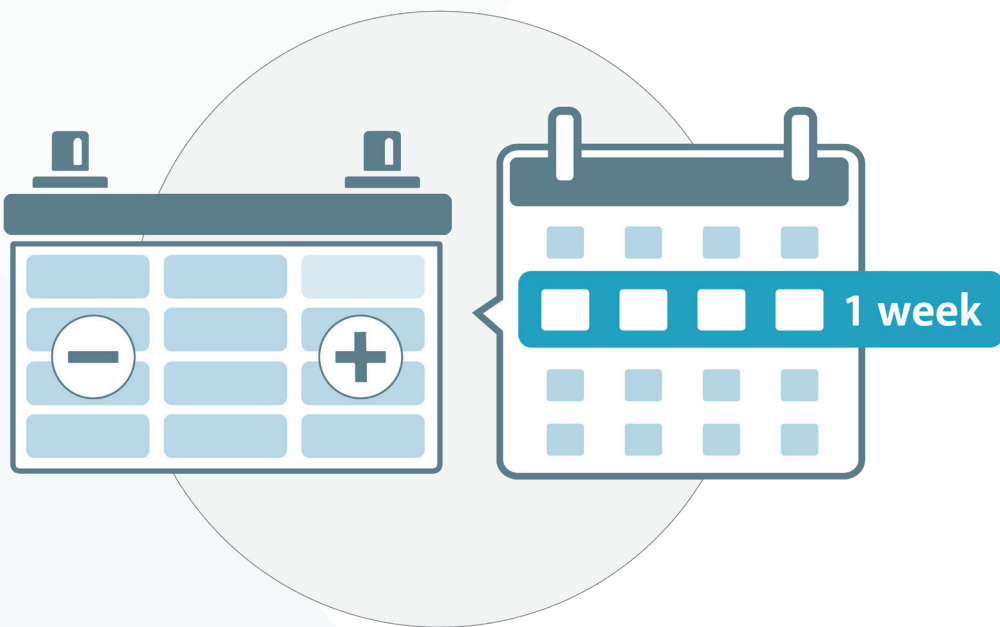
The TrafficRadar has built-in power saving. When the Radar stops detecting moving objects, the unit reduces the scan rate of the Radar head to reduce power consumption. As soon as the Radar detects something moving it wakes up and starts to scan the Radar at full speed.

Battery

The unit can be operated on mains (24V DC supply), battery, PoE or solar power. It is recommended to always include a battery in the configuration, even if it isn't going to be the primarily power source.

In case of short-term power failure, the battery will take over and will allow the unit to continue to operate until power is returned. If the power failure is long term, the unit will detect that the battery power is failing and perform a controlled shut down.

Important: Always make sure to use a battery in good condition and that the battery is fully charged before mounting the radar unit. Batteries lose capacity over time and number of recharges. A typical battery life is about 3 years.



Energy consumption and Operating time

The TrafficRadar's operating time depend on several factors, such as traffic volume, type of battery, nominal and actual battery capacity, age, temperature, etc.

Please, also note that some sim-cards can increase power consumption, as they communicate more frequently with the network, which will affect survey time. TagMaster recommends testing before implementing on a large scale.

Below you will find a typical use case that outlines the expected operating time:

Type of survey: Temporary Survey with **local data recording**

- A typical road with approximately 15,000 vehicles a day, Bluetooth enabled, and the modem turned off.
 - Battery: 12v, 18Ah lead-acid.
 - Energy consumption: 55 mAh
 - Effective battery capacity: 75%
-
- $18\text{Ah} / 0.055\text{A} * 0,75 = 245\text{h}$

—→ **Operating time is approximately 10 days**

When doing surveys with real time server data upload over 3G/4G, set the data reporting intervals to once per hour. For example, setting the reporting interval to every 5 minutes, risk decreasing the survey length by several days.

Note: The expected operating times above are based on TagMaster's tests under normal conditions and user experience. TagMaster cannot guarantee any specific operating time. Contact TagMaster for more information and/or advice.

Easy Set Up App

Configuration made easy

The TrafficRadar is configured with the EasySetup App. The App makes it easy to set up your survey hardware from your Android Smartphone or mobile device using Bluetooth.

With the EasySetup App you can configure the site layout. You can set the above ground height, traffic direction, number of monitored lanes as well as enter additional information about the specific survey and set the server communications. The App also allows for retrieval of data files when local surveys are being performed. Basically, you can fully configure the unit for the desired operation.

Survey validation on site

Once the survey configuration is defined and uploaded to the radar, it is possible to validate the settings and make sure the radar is collecting data according to your specifications. The App will in real time display detected vehicles for visual validation on your device before activating the survey.

Free of charge

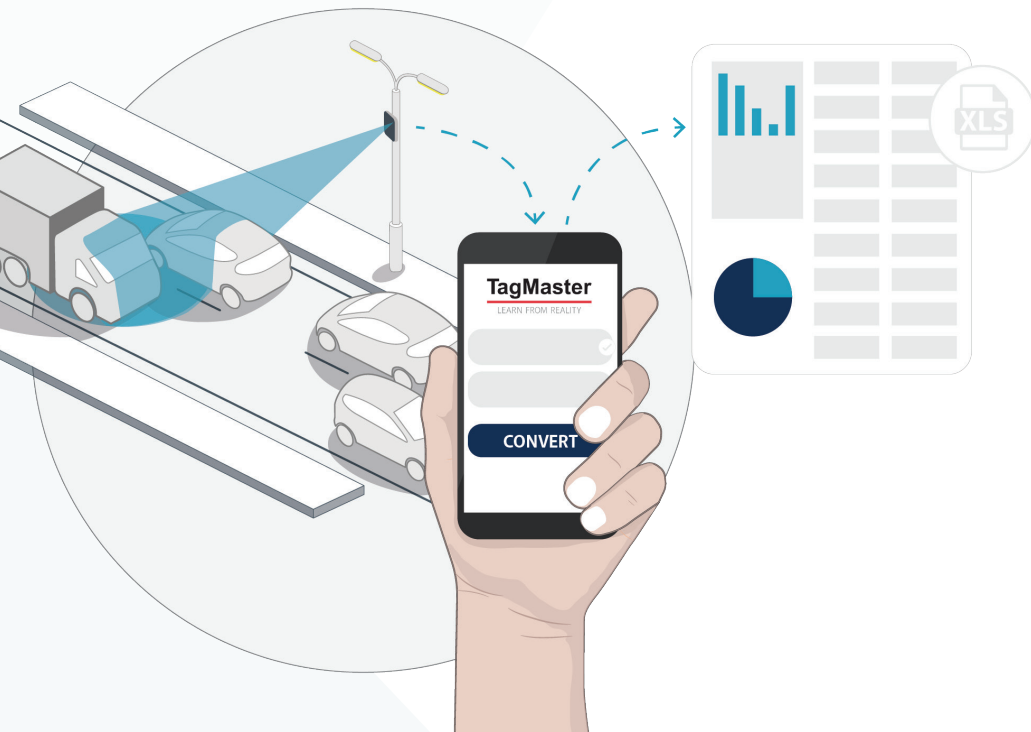
The EasySetup App is free of charge for all TagMaster's customers, and the App is available for download on Google Play Store. Search for "TagMaster EasySetup".

Come prepared

It is a good practice to download the app, make sure it is installed properly and enter as much information about the survey as possible before going out to the site. Don't forget to bring a bracket, banding straps of various diameters and the right tools.



Data and Survey



Data collection

The primary purpose of TrafficRadar is to collect traffic data and together with EasySetup App, the radar supports vehicle by vehicle analysis (VBV Surveys).

The data generated from TrafficRadar: individual vehicle Speed, Direction, Length, Lane, Gap (time in seconds between vehicles) and Headway. It is recommended to log all data using the highest resolution for maximum flexibility when analysing the data. EasySetup configures Headway and Gap measured to 0.1S resolution, Speed to 0.1KPH resolution and Length in cm.

Survey selection

There are two primarily modes of operation of the device, Real-time data collection and Historical data collection.

1. Real-time and periodic VBV / Server upload with EasyData

The Real-time data collection is a common application for this product, as it is designed for permanent sites with communications back to a central server over 3G/4G or Ethernet. In this mode data is collected for periods (typically 5 minutes) and automatically sent to a central server. In real-time mode it is possible to select the reporting period as 1, 5, 10, 15-, 30- and 60-minutes intervals. Real-time VBV is labelled "Server Upload" in the Easy Setup App. Server upload requires a third party, compatible server application.

Data and Survey

TagMaster has developed a special software, EasyData, a free of charge and purpose built middleware to integrate traffic monitoring data (VBV) to 3rd party solutions and systems.

2. Historical VBV /Local Recording and EasyAnalysis

The historical data collection mode is typically used for temporary surveys with manual data collection. The survey data files are easily retrieved via Bluetooth by using the EasySetup App.

Each retrieved data file contains information about the site, such as site and device ID, location, and GPS position. For later reference, it is possible to click on the GPS coordinates and Google Maps will very accurately pinpoint the position of the survey and show the street view. Historical VBV is labelled “Local Recording” in the Easy Setup App.

EasyAnalysis

The retrieved data can easily be converted to an Excel report by using the free of charge, TagMaster web service, EasyAnalysis. The service is designed for VBV and aggregate data by vehicle length and speed for any selectable period. The web service has a number of built-in options and settings with embedded tables and graphs.

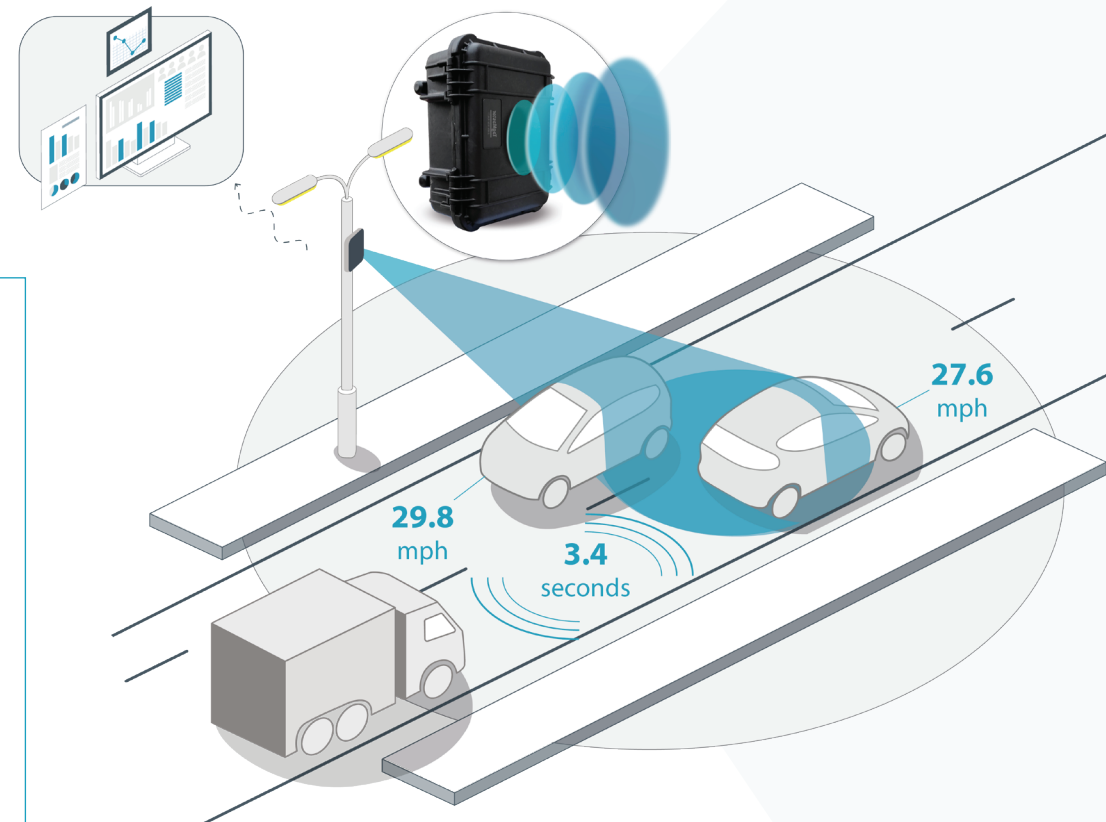
Survey Data Example

High Granularity Data Insights

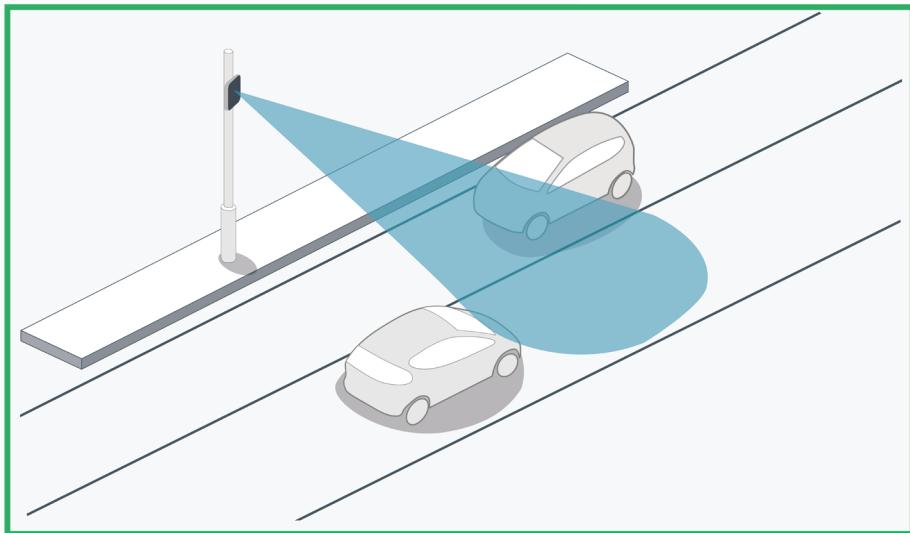
The TrafficRadar can provide a number of high granularity data insights such as:

- Speed vs. Vehicle classification
- Educational vs. Enforcement Speed Violations
- Unsafe Gap vs. High Speed
- Lane Discipline vs. Peak Traffic Flows

Time Stamp	Speed (Mph)	Length (Meters)	Gap (Sec.)	Reverse
2022-05-14 12:42:44	41.2	4.60	3.0	False
2022-05-14 12:42:45	41.2	4.50	1.2	False
2022-05-14 12:42:58	48.9	4.50	12.9	False
2022-05-14 12:43:12	39.0	4.50	54.0	False
2022-05-14 12:43:14	34.3	4.90	2.0	False
2022-05-14 12:43:27	41.1	4.60	13.0	False
2022-05-14 12:43:27	45.5	1.60	29.0	True
2022-05-14 12:43:31	37.8	4.30	3.6	False
2022-05-14 12:43:31	39.5	4.50	8.2	False
2022-05-14 12:43:40	37.8	5.00	4.3	False



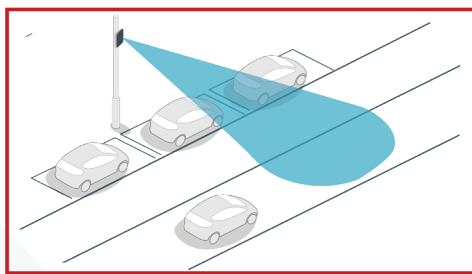
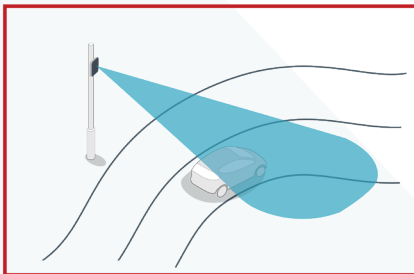
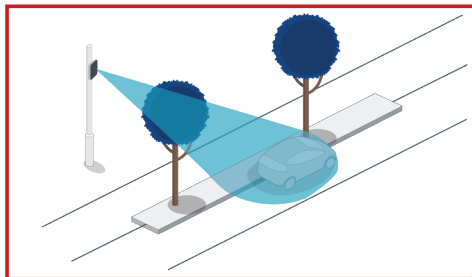
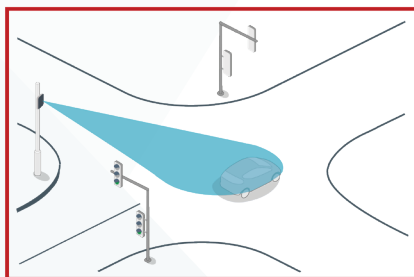
How to find the best location



Ideal location

At any given location, there may be sources of interference that can affect the TrafficRadars' sensitivity which in turn affects the performance.

The ideal position for the radar is beside a flat, straight road as the radar algorithm assumes that the vehicle travels parallel to the radar. Consideration should also be taken to what other objects and movements the radar has in its "view".

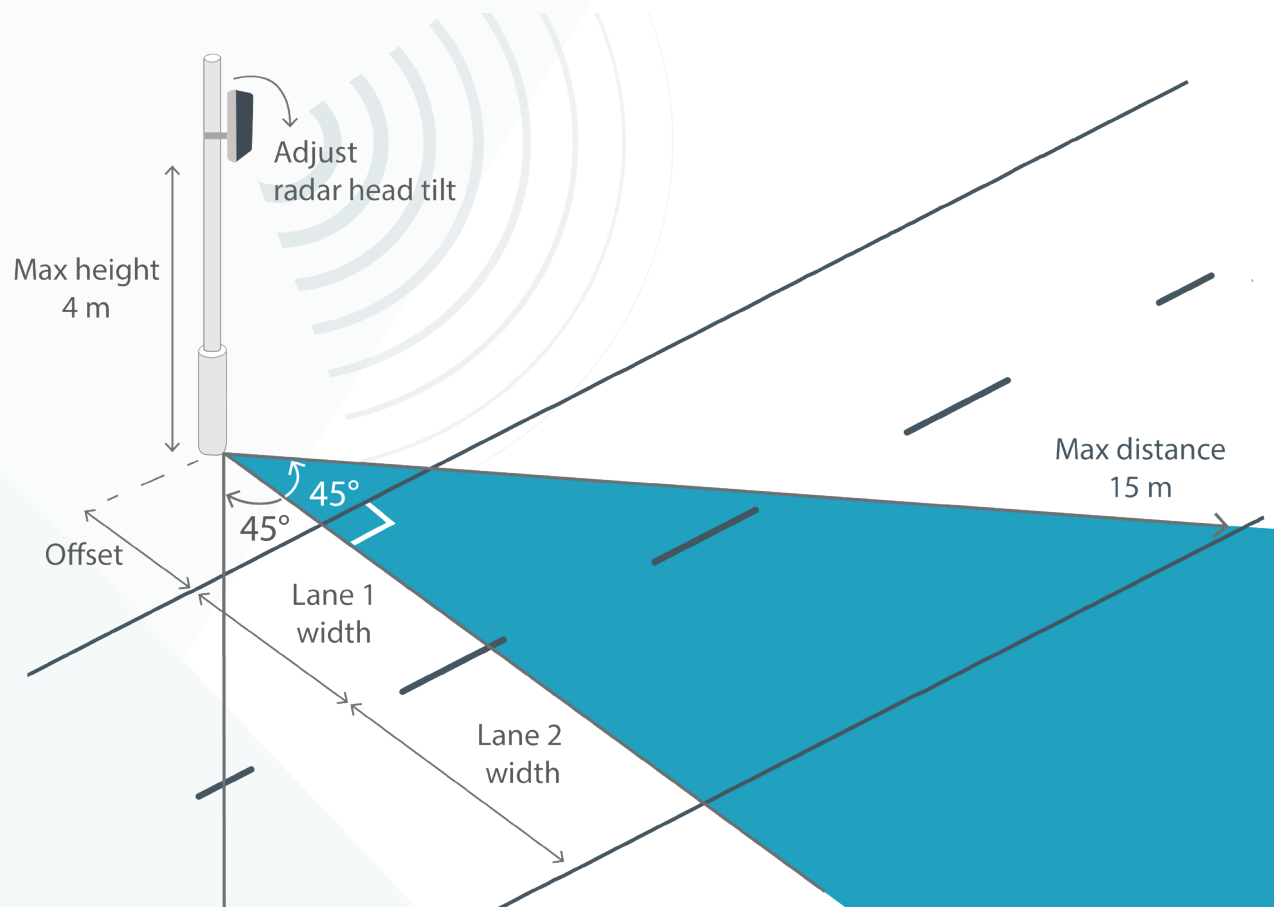


Unwanted locations

Avoid junctions and places where vehicles may turn. Also avoid places where trees or bushes keep the radar "awake", meaning that the Radar detects the movement and process data, which in turn when running on battery power will affect power consumption and decrease operational time. Locations where cars may be parked or roads with poor lane discipline should also be avoided, and another location should be selected.

Furthermore, the Radar is designed for free-flowing conditions and has a minimum speed requirement for detection about 10KPH. Stop-Start or queuing traffic should be avoided. Ideally vehicles should travel at a constant speed, avoiding areas where vehicles are likely to be accelerating or decelerating.

Set up and Positioning



This is a basic description of how to set up and position the TrafficRadar. For more in-depth information, please refer to the product manual.

Number of Lanes

The TrafficRadar distinguishes up to 2 lanes of Traffic. The lanes can be in opposite or in the same direction. The ideal lane width is 4 meters.

If the lane width is less than 3.5m it may perform better if the survey is configured as one single wide lane. In this mode, the data should be split into lanes based on direction.

Mounting height

The optimum height of the TrafficRadar (from the road surface to the bottom of the case) is 2m. The TrafficRadar can be mounted on a pole, or any other street furniture on the side of the road at a height between 1.5 and 4 metres. If the height is above 2m, the offset may need to be greater than 2m to ensure that the nearside of the road can be monitored. Between 3 and 4 meters of height, maximum radar head down tilt is required.

Set up and Positioning

Offset and distance covered

The unit has a maximum/total range of 15m. The offset (distance from the radar to the edge of the road) should ideally be 1.5-2m. The width of the monitored lanes plus the offset distance should not exceed 15 meters. Note: increased down tilt may decrease radar signal reach.

Horizontal orientation

Important: The TrafficRadar shall be oriented at 45° in relation to the direction of moving vehicles, either to the left or to the right. The radar accepts a margin of error +/- 5 degrees. Deviation exceeding this level may affect the accuracy of the data. TagMaster provides a special 45 degree bracket to ensure the correct angle.

Vertical orientation

The radar head must be tilted to aim at the centre of the lane or lanes to be monitored. This must be done manually after fastening the device on the road furniture. With insufficient radar head down tilt, the near side vehicles risk not being measured properly.

Validation

Always make sure the radar is collecting data according to your specifications. The Setup App will in real time display detected vehicles for visual validation on your device before activating the survey.

Test procedure

Check that the vehicle is detected in the right lane and in the right direction. Then do a basic check on vehicle speed and length to make sure it is sensible. Monitor the captured data for approximately 20 vehicles in each direction to make sure the counting is accurate. When you are satisfied with the setup and data collection, select Start.

Note: Because the radar is side mounted, vehicles travelling in the near side lane can affect the detection of vehicles in the far lane. For example: In a road with dual carriageways, when two vehicles travelling in the same direction, the near side vehicle might partly hide the far side and depending on speed difference between the vehicles, the far side vehicle might not be detected.

Why use TagMaster TrafficRadar

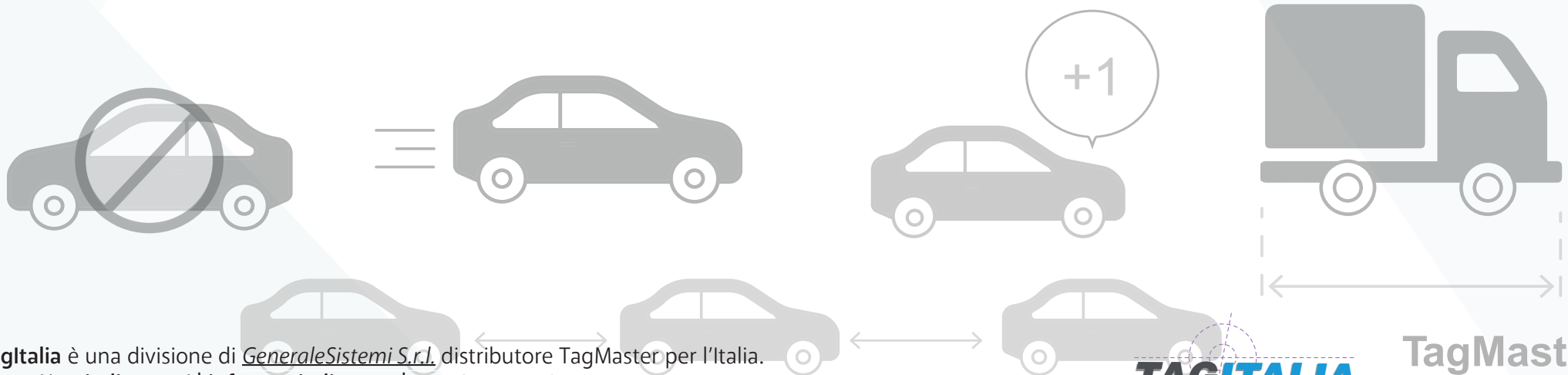
This is why TagMaster TrafficRadar is the best choice for you and your organisation:

Data Capture Capabilities

- Accurate measurement with VBV Classification
- Monitors speed, length classification and gap analysis
- Lane designation, direction of travel, reverse vehicle flags
- Real time or historic survey (file download)
- Unique range finding algorithm tracks the actual position of all targets and mitigates over count
- Manages two lanes of traffic, same or opposite direction
- Monitors each lane separately

Installation and Technology

- Very easy to install
- Non-intrusive technology
- No work in live carriageways
- No in-ground sensors
- Free Android, Bluetooth Setup App
- Robust and weatherproof design
- Built in 3G/4G modem
- Mains, battery or solar powered



For more information and contact

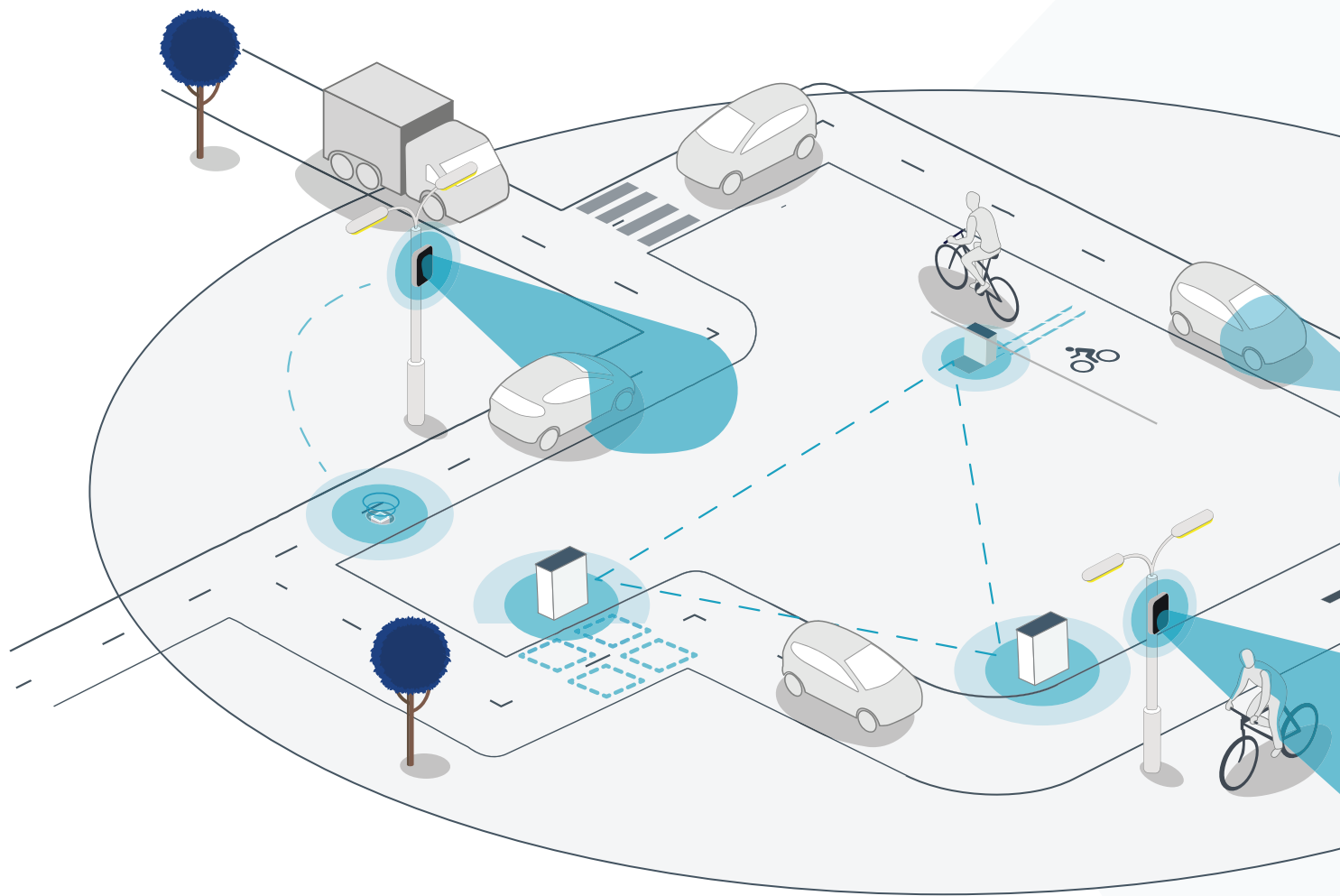
TagMaster

LEARN FROM REALITY

TAGITALIA
RFID System & Technologies

Web: <https://tagitalia.com>
@: info@tagitalia.com

TagItalia è una divisione di
GeneraleSistemi S.r.l
distributore TagMaster per l'Italia
Sede centrale
Via fra i Campi 13/C
Prato, PO, 59100
Italia



TagMaster
LEARN FROM REALITY