

RAIL



TagMaster

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**Automatic Vehicle
Location (AVL)**

Tram and Light Rail Safety System

The challenge

As cities expand and traffic density rises, the need for advanced solutions to optimize tram and light rail transit locations has never been more critical. Unlike conventional rail systems, trams and LRVs operate within the open street traffic environment, sharing space with pedestrians, bicycles, cars, and buses. These modes of transport are essential to urban mobility, coexisting amidst the bustling cityscape.

Ensuring passengers can reliably track their journey progress is vital. Additionally, new eco-friendly battery-powered trains require precise and intricate location solutions for charging at specific points along the line, ensuring seamless and safe urban mobility.

In light of the growing train network traffic, it is crucial to maintain high fleet availability through efficient and timely curative and preventive maintenance services in depots. Our AVL solution excels in managing these services by providing seamless identification of each train, optimizing the overall management of all trains entering the depot. This ensures continuous and reliable urban transport for all.

Automatic Vehicle Location (AVL)

At the core of this challenge is the Automatic Vehicle Location Solution, which among others, integrates four critical functions

- **Line Station Train Location:**
Safeguarding the arrival & departure of the train in station and allowing visual and audible on board announcement launched by the tram PIS "Passenger Information System"
- **Local Information Control Centre "LICC":**
To ensure accurate passenger information at the station, including train arrivals and departures, it is crucial that the Local Information Control Centre receives reliable, real-time information from the PIS Train system and our AVL subsystem.



- **Depot Management Identification:**
Ensuring tram identification in the depot to efficiently manage all maintenance and logistics service processes. This also includes managing the flow and parking of trains, as well as their entrances and exits.
- **Triggering of onboard tram action:**
Ensuring reliable location identification at specific points along the line, the onboard Train Control Monitoring System (TCMS) or Select Door Opening (SDO) System can trigger several operational actions. These include mounting the pantograph at designated station power-up points, activating a blue light in the driver's cabin to enable final braking, and automatically opening the wheelchair zone doors for smooth bridge device operation. Additionally, wheel lubrication and trackside sanding can be monitored.



These functionalities operate in real time with high availability and are essential for smooth and secure operation of trams in the bustling urban landscape.

The solution

The AVL System is designed to enhance the operations of the onboard train PIS, TCMS Systems or the management of the Train Depot System. It involves two key components: the **MOL 81 1350 Reader**, an Identification based Location RFID Reader installed on the train or on trackside, and the Passive tag **OMR 201**, positioned along the track or underneath the train.



MOL81 1350
Reader on Board

Dual Frequency System: The MOL81 incorporates a 125 kHz transmitter for passive beacon remote power and a 6.78 MHz receiver for data received from the beacon. A static code is programmed into the passive beacon OMR 201 and stored. As the MOL81 Reader passes over the beacon at speeds up to 300 km/h, the code is read on the fly and transmitted to the controller.

The MOL81 1350 has a self-test system that can be activated by a request through its serial link. It also provides two digital outputs: one ensures that the 125 kHz transmitter is functioning correctly, and the other indicates the presence of a beacon. Various real-time protocols can be implemented between the MOL81 Reader and the host, depending on its functional architecture.



OMR 201
Passive Beacon

The Beacons OMR 201 are completely passive: no power supply is needed, and they are very reliable. The data content can be up to 512 bits. Depending on the application, the reader and beacon can be arranged accordingly.

Solution benefits

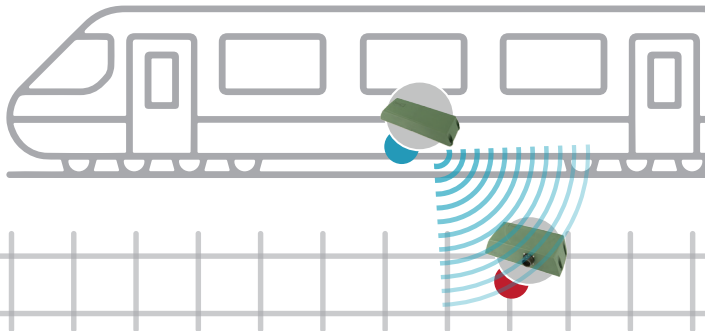
This TM RFID technology is reliable, stable over time, sustainable, and cost-efficient. It's important to consider the total cost of ownership for any technology, which includes the product's cost over its entire lifetime, not just the initial purchase price. The total cost of ownership encompasses direct purchase costs, installation costs, and the costs of corrective and preventive services throughout the solution's operational life.

The AVL System is designed to enhance the operations of onboard train PIS, TCMS systems, and the management of the Train Depot System. It involves two key components: the MOL 81 1350 Reader, an identification-based location RFID reader installed on the train or trackside, and the passive tag OMR 201, positioned along the track or underneath the train.

This RFID solution can support numerous supervision, monitoring, and logistics applications. It has been in use worldwide for approximately 25 years, providing a solid return on experience (REX). Additionally, the solution is completely reversible, supporting both installation scenarios related to various addressable applications.

Beacon Data Content Flow
Tag on board and reader on sleeper

OMR201 tag
on Board



MOL81 1350 reader
on sleeper

Beacon Data Content Flow
Tag on sleeper and reader on board

MOL81 1350 reader
on Board



OMR201 tag
on sleeper

Key Benefits

Universal Compatibility:

Seamlessly adaptable to any vehicle or trackside infrastructure, ensuring versatile application across diverse civil work designs.

Effortless Integration:

Designed for straightforward installation, the system requires no configuration, enabling a hassle-free setup process.

All-Weather Reliability:

Engineered to perform consistently in various weather conditions, ensuring dependable operation when it matters most.

Compliance Excellence:

Fully compliant with European and SNCF STME 001 Operator Standards, meeting rigorous industry requirements for safety system and performance.

Advanced HF Technology:

Utilizes magnetic field inductive coupling for selective protection, ensuring precise and targeted safety measures. This technology's rapid attenuation over distance guarantees the protection is focused on the correct train, enhancing operational accuracy and security.

TagMaster

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TagMaster, an application-driven technology company founded in 1994, specializes in designing and marketing advanced sensor systems and solutions. Our expertise lies in utilizing radio, radar, vision, and wireless magnetic technology to cater to demanding environments. Our business is segmented into Traffic Solutions and Rail Solutions, offering innovative mobility solutions under the renowned brands TagMaster, Sensys Networks, and Citilog. Our aim is to enhance efficiency, security, and convenience while reducing the environmental impact within Smart Cities.

Headquartered in Stockholm, Sweden, with additional offices in the UK, France, and the USA, and dedicated agencies in the US and China, TagMaster has established a strong global presence. We primarily export to Europe, the Middle East, Asia, and North America, leveraging a vast network of partners, systems integrators, and distributors.

Our journey began in the RFID sector in 1994, where we quickly became pioneers in RFID technology. We expanded into the RAIL Activity, focusing on the AVLS Application 'Location' for trams and metros in outdoor environments. This expansion was a pivotal moment, demonstrating our adaptability and commitment to innovation.

In 2003, we undertook a significant project in collaboration with a prominent safety partner, designing our RFID ATP Solution. This project marked a major milestone, catering to prominent tram lines in France and Belgium and solidifying our market presence.

Our global clientele includes Metro, Light Train, and Tram Operators. We strategically target main rail integrators to ensure a broad and impactful reach. Our RFID solutions are globally recognized, with successful operations in regions including APAC and China.

To date, TagMaster has installed approximately 200 Tram and LRV lines worldwide, a clear indication of our expertise and the trust our clients have in us. These installations are meticulously detailed in our joint project reference table, showcasing our extensive experience and success in this domain.

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