



Mühlbauer

High Tech International

Mühlbauer ID Services GmbH

VEHICLE REGISTRATION & TRACKING

Vehicle Ownership & Road Safety Management

WHITE PAPER



1	Requirements	3
	Need for Tracking	3
	Benefits	3
2	Key Elements	4
	Vehicle Registration	4
	Mandatory Technical Inspection	4
	Random Vehicle Control	4
3	Solution Concept	5
	Vehicle Life Cycle	5
	Deployment	6
	Traffic Checks	7
4	Certificate Verification	8
	Windshield Stickers	8
	RFID Readers	8
5	System Extensions & Variations	9
	Applicant Web Portal	9
	Other eGovernment Services	9
	Driver's License System	9
	Automated Parking Fee Collection	9

1 Requirements

Need for Tracking

For comprehensive nationwide road safety management, it is necessary to manage and track the entire life cycle of motor vehicles:



Approve vehicles for road service



Register and manage ownership of vehicles



Monitor technical condition of vehicles



Identify vehicles during random checks

Benefits

The data from vehicle registration and tracking can also be used in order to

- Identify vehicles during border control
- Identify stolen vehicles
- Collect vehicle taxes
- Collect customs duties on imported vehicles
- Collect traffic statistics
- Monitor national development

2 Key Elements



Vehicle Registration

Enrollment and management of vehicle-related information

- Register vehicle and owner data
- Verify vehicle and ownership
- Store data in central database
- Issue license plate and vehicle documents



Mandatory Technical Inspection

Regular vehicle examination at an authorized inspection station

- Check vehicle for operating safety
- Personalize inspection certificate
- Update central database
- Inform owner about next routine check



Random Vehicle Control

Automated or manual checks at decentralized control points

- Verify validity of the inspection certificate
- Verify technical condition of the vehicle
- Check against central database

3 Solution Concept

Vehicle Life Cycle

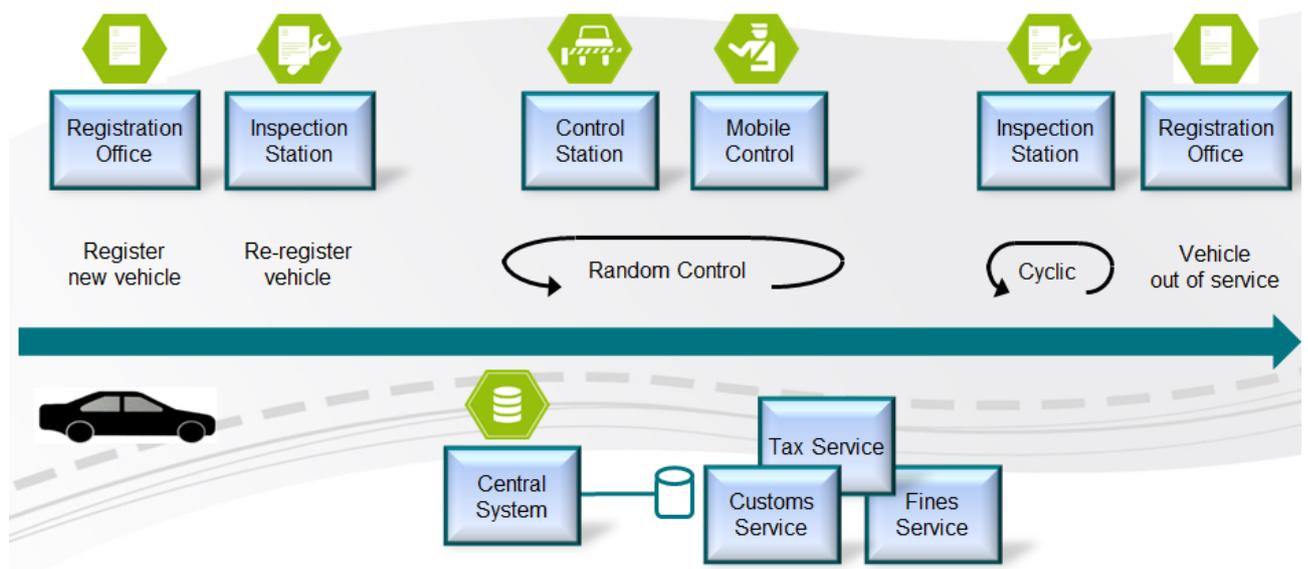
For monitoring all registered vehicles, including their ownership and technical condition, it is necessary to track the entire life cycle of each vehicle, from the first registration until the vehicle is put out of service.

Registration & Data Management

Vehicle details and ownership data must be registered in a central database. A vehicle registration card is issued to the owner. Whenever a vehicle is inspected, re-registered by a new owner or put out of service, the central database is immediately updated.

Routine Inspection & Random Checks

Regular inspection by an officially authorized institution is mandatory. During traffic controls on the road, the police can check the validity of the inspection certificate, either via automated vehicle identification or by using handheld verification devices.



Deployment

The system design must allow decentralized vehicle enrollment and inspection as well as instant personalization and issuance of inspection certificates all over the country. Registration Offices, Inspection Stations and Police Systems must be connected online to the central database for immediate checks and updates.



Registration Offices

Registration Offices must be equipped for enrollment of vehicle and ownership data. For more information, please refer to our **DATA ENROLLMENT** whitepaper.

Inspection Stations

Inspection Stations are officially authorized institutions for technical vehicle inspection, which is mandatory after a certain predefined interval. They must be equipped for personalizing windshield stickers which serve as inspection certificates (see chapter 4).

Police Systems

Police stations, fixed traffic control stations and police vehicles must be equipped for RFID verification of inspection certificates, for manual vehicle checks as well as for database checks and updates.

Traffic Checks

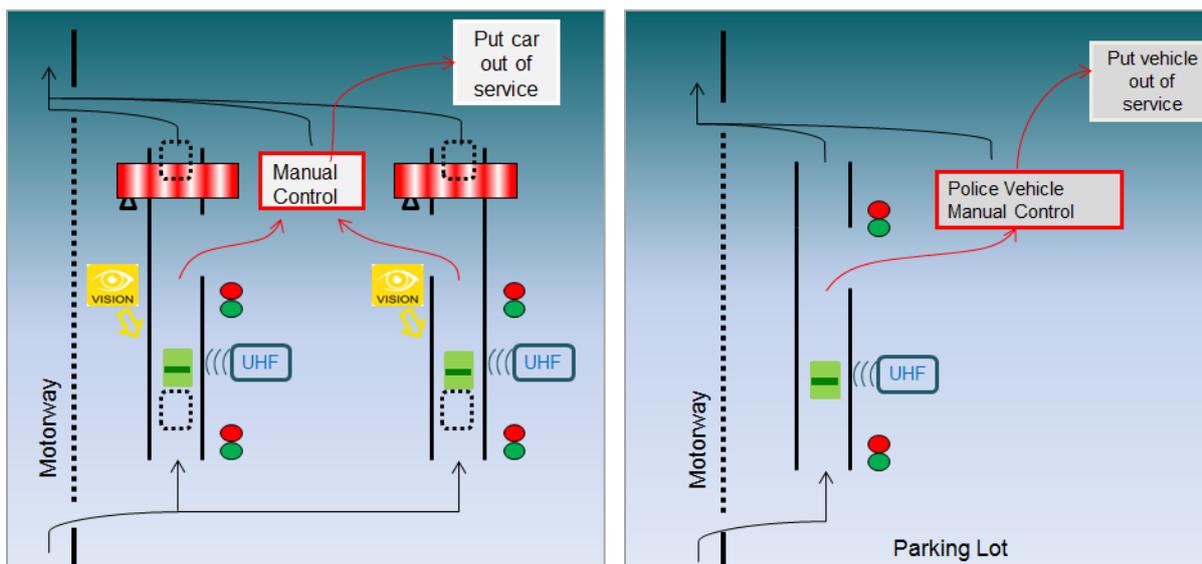
Process automation contributes to more efficient traffic checks, since no human interaction is required for the primary check. Police forces can therefore entirely focus on vehicles which did not pass the automated check. The workflows can be as follows.

Automated Control

Fixed control stations are integrated into the road infrastructure, whereas mobile control stations are made for transport in police vehicles and can be set up at the roadside. In both cases vehicles must pass a stop light before approaching the automated control point, where the validity of the inspection certificate is checked. If the verification is successful, the vehicle may continue, if it fails, the vehicle must be manually checked.

Manual Control

During manual control an officer checks the inspection certificate using a handheld device. If the certificate is damaged or not available, the officer manually consults the vehicle database via the handheld device. After successful verification the officer enters the command to set the second stop light to green. If the verification fails, the officer manually checks the technical condition of the vehicle and decides whether to impose a fine or to put the vehicle out of service.



4 Certificate Verification

Windshield Stickers

A personalized windshield sticker proves that a vehicle is technically approved for road service and has successfully passed the periodic inspection procedure. Vehicle license number, serial number and expiry date are printed on the windshield sticker.

A sophisticated sticker design offers protection against abuse and counterfeiting:

- Multi-layer carrier substrate with integrated RFID tag
- Security design elements, e.g. holographic, metalized, transparent
- Printed security features, e.g. guilloche, microtext, unique patterns
- Removal causes destruction of optical appearance and transponder

RFID Readers

The RFID windshield sticker can be read and verified via a fixed or mobile RFID reader device. A handheld application provides additional functionality for manual control.

RFID Reader Gate

The fixed control station automatically reads the information from the RFID tag in the windshield sticker and compares it to the national vehicle database. An integrated vision camera can take a photo of the vehicle and extract the license number. Depending on the verification result, the connected stop lights and barriers allow the vehicle to continue or they redirect it to manual control.

Handheld RFID Reader

Police officers can use a handheld device to read the RFID tag of a windshield sticker. The software application on this device compares the RFID data to the national database and instantly shows all the available information about the vehicle. If the windshield sticker is damaged or not available, officers can search the vehicle register manually, based on the license number, and check for a valid certificate in the database.

5 System Extensions & Variations

Extensions

A Vehicle Registration and Tracking Solution can be connected to a Civil Register, ID Card or Driver's License system and can be extended by further eGovernment services. All of these options can contribute to road safety and national development.



Applicant Web Portal

Vehicle owners can enter their vehicle data and personal data on an eGovernment website, thus reducing processing times and queues in Registration Offices. Moreover, vehicle owners can check the status of their application online at any time.



Other eGovernment Services

Other government systems can be connected to the vehicle register and use ownership information as a basis for vehicle taxes or law enforcement, for instance. Customized interfaces and web portals ensure secure and limited access to the central database.



Driver's License System

Vehicle Registration and Tracking can be combined with a Driver's License System, which includes enrollment, tests, document personalization, issuance and verification. Driver's Licenses should be compliant with ISO 18013, including all standardized vehicle classes. Document-specific prerequisites must be taken into account, e.g. minimum age, previous licenses/experience as well as theoretical, practical and medical examinations.

Variation

Automated Parking Fee Collection

A parking access-control solution can be established based on an RFID windshield sticker. This solution is suitable for the vision of a Smart City where people can use their personalized Smart City Card to buy temporary access to parking areas. Access control and fee collection can be fully automated.



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