→ Project Insights

FP2 - R2DATO

Rail to digital automated up to autonomous train operation

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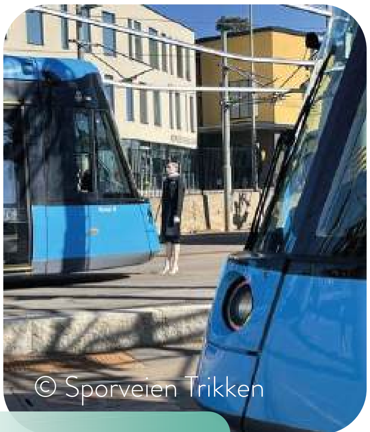
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Purpose of this Insight

This project insight provides an overview of what the FP-2R2DATO project means for tram and light rail operations, what has been tested, what can be learnt, and which questions still need to be solved before commencing the wider deployment of automation.

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Foreword

The rail sector is entering a new phase of digitalisation and automation. For public transport, this transition is not only about technology. It is about improving safety, reliability, resilience, and efficiency while keeping passengers and operating staff at the centre of the system.

For tram and light rail operators, the question is particularly important. These systems are rail-based, but they operate in the city, often in direct interaction with pedestrians, cyclists, road traffic, other actors and obstacles in the public space more generally. The path to automation for trams and light rail cannot simply copy the model of mainline rail or fully segregated metro systems.

FP2-R2DATO provides a practical and timely contribution to this discussion. This project combines Europe-wide research with operational use cases and demonstrators, helping first clarify where automation can bring value, where the deployment challenges remain, and how public transport authorities and operators can prepare for the next steps.

UITP's involvement reflects its mission to advance public transport by connecting innovation with operational practice and by ensuring that the specific needs of the sector are heard. This project insight shares the knowledge generated through FP2-R2DATO with UITP members via a dedicated FP2-R2DATO working group, as well as with a wider audience, focusing on tram and light rail.

Paolo Carbone
Chair of the UITP Light Rail Committee

Introduction

Public transport operators and authorities face a shared challenge as demand for sustainable mobility continues to increase, while new infrastructure can be costly, space-intensive, and slow to deliver. Digitalisation and automation can help make better use of existing assets, improve operational robustness, and support the transition towards more attractive and sustainable public transport.

Within Europe's Rail Joint Undertaking, FP2-R2DATO developed scalable digital automated and all the way up to Autonomous Train Operation (DATO) capabilities. The wider project addressed several rail environments, including mainline, regional, freight as well as urban rail. Its objectives included increasing capacity, punctuality, and reliability, while supporting faster and more cost-effective deployment of digital and automated rail technologies across Europe.

This publication focuses on the tram and light rail activities most relevant for UITP members: the operational use cases, a framework for step-by-step deployment, the enabling technologies, the Oslo demonstrator, as well as the lessons that can already support operators and authorities in their own strategic planning.

Key message:
For tram and light rail, automation should be understood as a progressive deployment, not as a single jump to fully driverless operation in urban traffic. The most realistic first applications are in controlled environments such as depots, maintenance areas, and selected segregated sections.

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R2DATO at a glance

Project	FP2-R2DATO – Flagship Project 2 - Rail to Digital Automated up to Autonomous Train Operation
Programme	Europe's Rail Joint Undertaking / Horizon Europe
Coordinator	SNCF
Duration	1 December 2022 - 30 September 2026 (46 months)
Call	HORIZON-ER-JU-2022-01
Total project cost	EUR 160.8 million
EU contribution	EUR 53.9 million
Urban rail focus	Progressive automation for tram and light rail, with early deployment in depots and other controlled environments
UITP role	Bringing the tram and light rail operator perspective into use cases, operational requirements, deployment considerations, and knowledge transfer to members

FP2- R2DATO, is one of the flagship projects of Europe's Rail. It has contributed to the wider European objective of increasing rail capacity and performance through digitalisation, automation, and harmonised deployment approaches. For UITP, the central added value was the possibility to translate these developments into realistic tram and light rail use cases.

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Key concepts in tram and light rail automation

Term	Meaning for tram and light rail automation
ADAS	Advanced Driver Assistance Systems, technologies that assist the driver with tasks such as obstacle detection, collision warning, speed supervision, emergency braking, or situational awareness. ADAS supports safer and more efficient operations while the driver remains responsible for the vehicle.
ATO	Automated Train Operation. Technology that automates parts of the driving task, such as acceleration, braking or speed control, depending on the operational context and grade of automation.
DATO	Digital and Automated up to Autonomous Train Operation. In FP2-R2DATO, this covers a progressive path from automated functions to higher levels of autonomy.
Digital twin	A virtual environment used to test, validate, and prepare automated functions before or alongside physical tests.
GoA2+	Grade of Automation 2+. A transitional concept for trams where automated functions support the driver or operator, while human supervision and intervention remain central.
GoA4	Grade of Automation 4. Unattended train operation in a defined operational domain. For tram and light rail, this is first being explored in controlled areas such as depots.
SAE Levels	Society of Automotive Engineers (SAE) Levels of Driving Automation. A six-level framework (Level 0–5) used primarily for road vehicles to describe increasing degrees of driving automation. While rail automation is typically classified using Grades of Automation (GoA), SAE levels are increasingly referenced in tram and light rail discussions because many systems operate in mixed traffic environments alongside road vehicles, pedestrians, and cyclists.
V2X	Vehicle-to-everything communication, allowing the tram to exchange information with infrastructure, other vehicles, operational systems, and potentially roadside equipment.

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Why tram and light rail need a specific approach ?

Tram and light rail systems sit between the railway and the urban road environment. They follow a fixed rail guideway and operate as part of a public transport network, while also sharing space with other road users in many cities. This creates a very different automation challenge from fully segregated metro systems or mainline railways.

The project work showed that the diversity of tram and light rail networks is a key deployment issue. Operational rules, depot layouts, street-running conditions, signalling, interaction with road traffic, and regulatory frameworks differ widely between cities and countries. A fully customised solution for each network would be slow and expensive. A harmonised approach, based on common use cases and modular functions, is therefore essential to standardise wherever possible.

This work was carried out in close collaboration with the UITP R2DATO Working Group, bringing together operators to collect use cases, validate operational needs and agree on common approaches. For this reason, the tram and light rail work in FP2-R2DATO started from operational needs. The project asked operators where automation could meaningfully support daily operations, how automated trams should behave in response to environmental cues, and which rules and responsibilities need to be clarified before deployment.

A comparison of operating environments

Metro
Closed environment

- Fully segregated infrastructure
- Predictable operating conditions
- No direct interaction with road traffic
- Automation can advance to high Grade of Automation (GoA) more easily

Mainline rail
Signalled / interoperable

- Structured railway environment
- Strong signalling and traffic management systems
- Interoperability and network-wide rules are essential
- Automation depends on harmonised systems and standards

Tram / light rail
Open urban context

- Mixed interaction with pedestrians, cyclists, and road traffic
- Highly variable urban conditions
- Safety, perception, and regulation are more complex
- Requires a progressive, tram-specific automation pathway

Key message:
Tram and light rail cannot simply follow the automation pathway of metro or mainline rail. The open urban operating context of street-running systems requires a step by step approach, starting with controlled environments such as depots and segregated sections.

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UITP contribution:
Bringing the urban rail perspective

UITP's contribution was to bring the perspective of tram and light rail operators to the project. It helped to structure operational use cases, supported the identification of common requirements, and ensured that the practical realities of urban rail deployment were considered alongside those of mainline railway automation.

This contribution was important because automation will only succeed if it can solve real operational problems as automation is valuable where it helps operators provide better, safer, more reliable, and more resource-efficient services. For tram and light rail operators, these specific aspects include depot efficiency, fleet readiness, maintenance procedures, staff availability, safety in complex environments, service resilience, not forgetting the human aspect of passengers and the need to preserve public trust more generally.

The UITP perspective also helped connect the project with the broader objective of strengthening public transport as the backbone of sustainable mobility.

From use cases to deployment: a step-by-step approach

The tram and light rail approach follows the logic of progressive deployment. Today, ADAS represent the state-of-the-art in tram automation. These systems support the driver through functions such as alerts, obstacle or signal awareness, speed support and decision assistance, while the driver remains responsible for safe operation.

FP2-R2DATO builds on this existing level of assistance and looks at how automation can move further, step by step, towards more advanced operational applications. Rather than moving directly towards fully autonomous tram operations in mixed city traffic, the project focuses first on use cases that can be tested and validated in controlled operational environments. This reduces complexity while still delivering practical operational value.

Step		What it means	Why it matters
1	**ADAS/driver assistance**	Assistance systems support the driver in passenger service through alerts, detection, signal or obstacle awareness, speed support and decision assistance.	It reflects the current state-of-the-art and provides an important bridge between conventional driving and higher levels of automation.
2	**Remote tram driving in depots**	An operator can move or command a tram from a remote operation centre, avoiding the need to physically reach the vehicle for every movement.	It reduces time losses and creates a first operational bridge between manual and automated depot processes.
3	**Autonomous driving in depots**	The tram performs defined movements in a controlled area, supported by perception, localisation, connectivity, and automated decision-making functions.	It provides a realistic environment for testing higher automation with lower exposure to open urban traffic.
4	**Highly assisted driving in service**	Automated functions support the driver in passenger service under more complex operating conditions, building on ADAS and other validated automation functions.	It points towards future passenger-facing applications, but requires more validation, regulation, and public acceptance work.

Depots are the natural starting point for higher levels of automation because they are operationally critical yet more controllable than open street environments. They include repetitive movements, shunting, washing, inspections, and vehicle preparation tasks. These are areas where automation can improve productivity and consistency while allowing safety concepts to be tested progressively.

From use case to deployment: A step-by-step approach

From driver support to progressively automated operations

State of the art today

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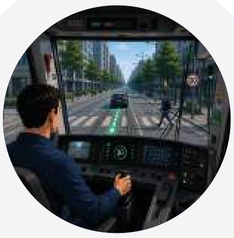

ADAS / Driver assistance

Assistance systems support the driver through alerts, obstacle or signal awareness, speed support, and decision assistance.

Benefit: *Enhances driver awareness*

1

Remote tram driving in depots

An operator can move or command a tram from a remote operation centre within controlled depot areas.

Benefit: *Improves depot efficiency*

2

Autonomous driving in depots

The tram performs defined movements in a controlled area using perception, localisation, connectivity, and automated control.

Benefit: *Reduces repetitive manual tasks*

3

Highly assisted driving in commercial service

Automated functions support the driver in passenger service under more complex operating conditions.

Benefit: *Supports safer, more reliable operations*

Key message:

Automation is introduced gradually, beginning in controlled environments like depots before expanding to more complex, real-world service conditions.

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Priority use cases for tram and light rail

The project identified a set of priority use cases that are relevant for tram and light rail operators. They do not only demonstrate developed technologies; they respond to daily operational needs that many networks share. The table below consolidates the main use cases and highlights why they matter for operators.

Use case	Operational meaning	Value for operators
Remote shunting and parking	Moving trams between tracks, parking positions, maintenance areas or exits without requiring staff to be physically present in the cab for each movement.	Reduced walking and shunting time, more efficient depot operations, and better use of staff resources.
Remote washing procedures	Remotely supervising or automating movements through washing facilities and related cleaning routines.	More consistent maintenance procedures and reduction of repetitive tasks for staff.
Pre-departure readiness	Automating or remotely supporting selected checks before a tram enters service, including vehicle status, doors, HVAC, acoustic signals or other tram sub-systems.	Faster preparation, improved fleet readiness, and more reliable start-of-service procedures.
Autonomous depot movements	Defined autonomous movements within controlled depot areas, supported by perception, safe localisation, and automated route or movement control.	A realistic first step towards higher levels of automation
Vehicle replacement and multi-vehicle shunting	Coordinating several vehicle movements, potentially using V2X communication between trams and infrastructure.	Improved depot traffic management, vehicle allocation, and response to service changes.
Automated inspection as part of maintenance procedures	Using automation to support inspection and measurement tasks, with the tram moving to or through inspection equipment.	More efficient maintenance processes and improved consistency of technical checks.
Highly assisted commercial service (as the next step for ADAS)	Longer-term support to drivers in passenger service using perception technologies, signal recognition, obstacle detection, and operational decision support.	Potential improvements in safety, comfort, punctuality, and operational resilience. Deployment will depend on further validation and on the local and national rules that define how automated or assisted tram functions may operate.

Main lesson from the use cases

Given the complexity of autonomous driving in non-segregated zones, having a 'driverless tram in the city' is not the most feasible short-term solution. Rather, it is the automation of specific functions that remove friction from daily operations and create a safe learning path towards higher automation.

Technology development and integration

The project shows that tram automation cannot be delivered through one individual system. It requires a combination of perception, localisation, communication, automated driving functions, remote supervision, and validation tools. These elements must work together as part of a safe operational concept. The following table provides an overview of the areas of technology that are involved in the automation of trams/light rail.

Technology area	Purpose in tram and light rail automation
ATO functions	Automate driving-related actions such as traction, braking, and speed control within a defined operational domain.
Remote operation centre	Allow staff to monitor, support or command tram movements from a centralised environment.
Environment perception	Detect and classify obstacles, road users, signs, signals, landmarks, and other relevant elements around the tram.
Safe and infrastructure-independent train localisation	Provide accurate positioning and speed information, including where traditional fixed beacons or GNSS are limited.
Connectivity and V2X	Support reliable real-time data exchange between the tram, the infrastructure, operational systems, and potentially other road users.
Modular automated functions	Allow functions to be validated individually and then combined into more complex operational scenarios.
Digital twin and virtual testing	Support simulation, testing, validation, and future certification by virtually reproducing tram behaviour, operating conditions and infrastructure interactions before or alongside physical trials.
Cybersecurity and data governance	Protect real-time data exchange, operational integrity, passenger privacy, and public trust.

For operators and authorities, the integration challenge is equally as important as the performance of each component. A perception system, for example, only becomes operationally useful when it is connected to safe decision rules, communication systems, staff procedures and clear fallback scenarios.

Oslo tram demonstrator

The main urban rail demonstrator in FP2-R2DATO is being implemented in Oslo by Sporveien Trikken and CAF, using the CAF's platform for the SL18 Urbos trams. The demonstrator supports the progressive integration and validation of several enabling technologies for automated tram operations. They include ATO, environmental perception, V2X communication, safe train localisation, remote driving, modular automated functions, and digital twin support. While some of these technologies have been developed and tested within the scope of the current project, others form part of the longer-term research and development roadmap and are planned for integration and validation in subsequent research activities. Consequently, not all components have been demonstrated at the same maturity level or in the same operational scenarios.

The Oslo testing approach provides valuable feedback because it combines controlled depot testing with realistic operating conditions. The Holtet and Grefsen depots are complementary test environments: Holtet is open-air and exposed to weather conditions, while Grefsen is covered, meaning different constraints for positioning and connectivity. This helps test whether the enabling technologies remain robust across different conditions.

The demonstrator also underlines the importance of data. Cameras, sensors, and onboard systems are used to collect information on the tram environment, support object and signal recognition as well as develop simulations and 3D models. This is essential for perception systems and for future virtual validation, but it also requires clear data protection, cybersecurity, and public communication measures.

Why the Oslo demonstrator matters

The demonstrator is not only showcasing technology; it is a practical example of how an operator can start with controlled areas, involve operational staff, define safety and data governance measures, along with building experience before moving towards automation functions in passenger service.

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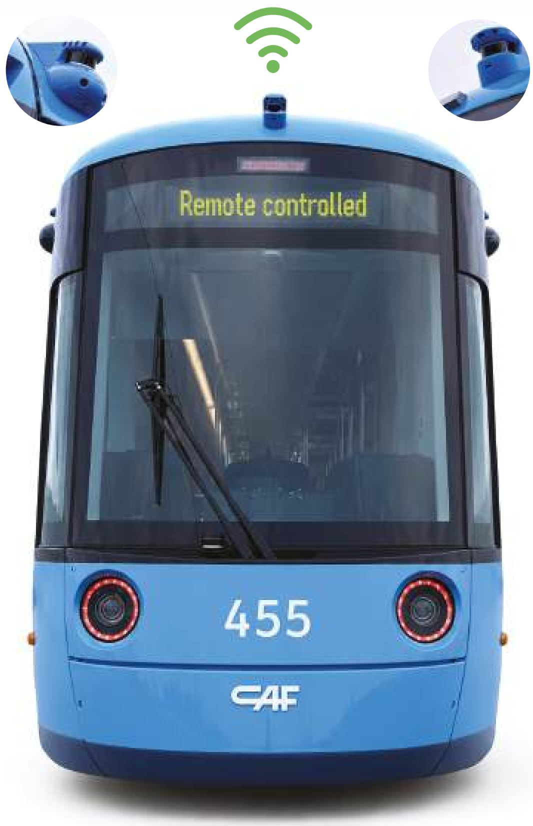
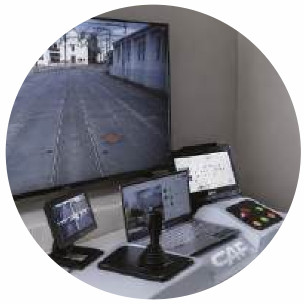
OSLO TRAM **DEMONSTRATOR**





Connectivity (T2G-G2T & V2X)

Train-to-Ground; Ground-to-Train; Vehicle-to-Everything

Digital twin tram

(Virtual testing, validation and certification)

Autonomous functions

(Modular and scalable)

ATO Automatic Train Operation

(SAE 2+ in normal operation, SAE 5 in controlled areas)

Perception Technology

(Camera, Lidar, Radar)

Operational centre

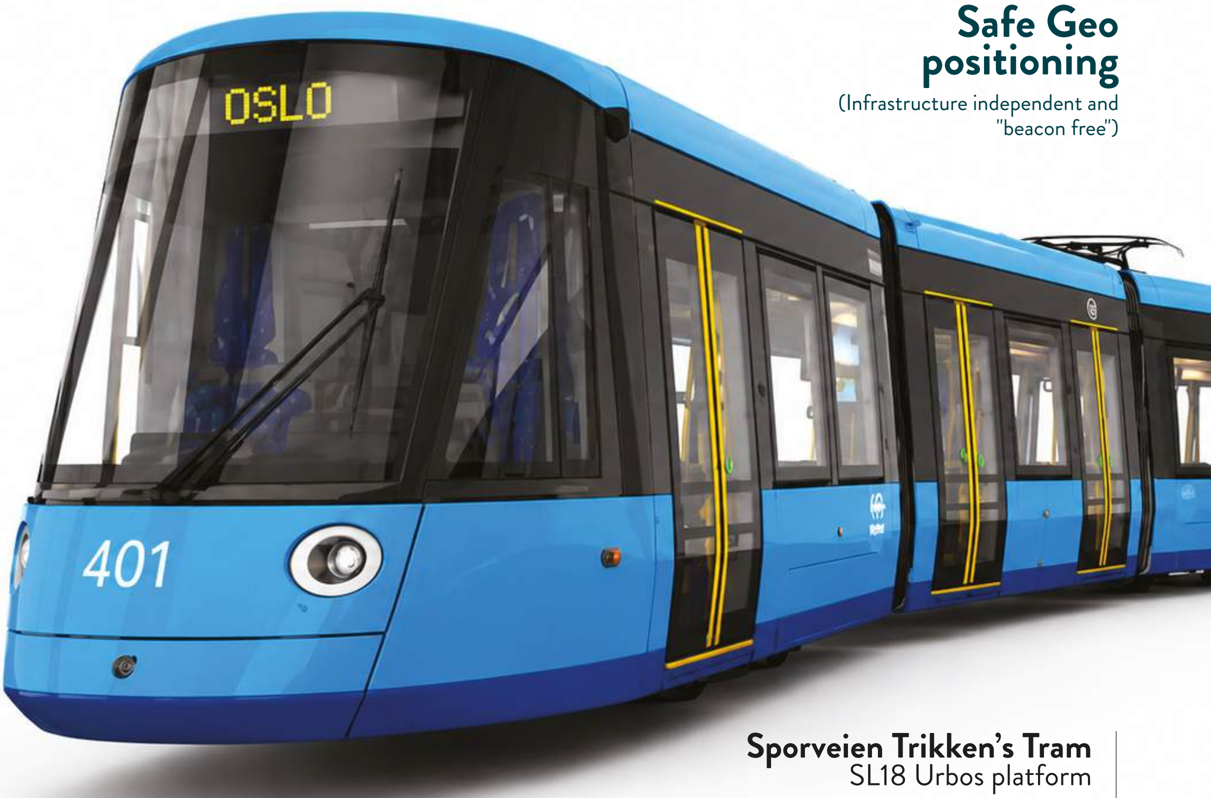
(Remote control and autonomous operations)

Remote control

(Remote driving and control centre)

Safe Geo positioning

(Infrastructure independent and "beacon free")



Sporveien Trikken's Tram
SL18 Urbos platform

Sporveien Trikken is the operator of Oslo's tram network and provides the operational environment for the urban rail demonstrator, including access to the SL18 tram platform and depot conditions. CAF is the manufacturer of the SL18 Urbos tram platform used in Oslo and contributes the vehicle and automation-related technical expertise for the demonstrator.

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Validation and operational learning

With validation in the project focussing on realistic operational scenarios, not only laboratory performance, however testing activities were also able to examine how automated functions behave during normal operation, degraded situations, in addition to failure paths. This is particularly important for tram and light rail, where the operating environment is less predictable than a fully segregated system.

Validation question	Why it matters
Operational feasibility	Can the automated or remote function perform the required movement or task in a replicable way?
Safety and fallback scenarios	What happens when the system detects an unknown obstacle, loses communication, faces a positioning issue or reaches the limits of its operational domain?
Human-machine interaction	How do drivers, remote operators, depot staff, and control centre staff understand, supervise, and intervene in automated functions?
System robustness	Can the combined system work under different lighting, weather, connectivity and depot layout conditions?
Business and operational value	Does the function reduce time, increase productivity, improve service readiness or support staff allocation?

Validation turns automated functions into operationally usable solutions. For tram and light rail, it helps operators understand not only whether a function works, but when it works, where its limits are, who must intervene, and what procedures need to change before deployment can be considered.

Regulatory readiness and approval process for automated tram operations

The deployment of automated tram and light rail systems depends not only on technological maturity but also on regulatory readiness. The Oslo demonstrator showed that talking to safety authorities, infrastructure managers, and public transport authorities early in the project is essential, backed by clear operational procedures, robust safety assessments, and a well-defined approval strategy. The project also highlighted that approval frameworks for automated tramways remain underdeveloped. In Norway, testing in closed depot environments could be conducted under the existing regulatory framework because automated functions were not used in passenger service or on the public tram network. However, future deployment of such automated functions in passenger service, or of ATO, is likely to require more specific legislation and approval procedures. FP2-R2DATO demonstrates that approval planning should be integrated from the outset, with operators, manufacturers, and authorities working together throughout development and testing to establish safety evidence, manage risks, and enable the consistent, scalable deployment of automated functions across Europe.

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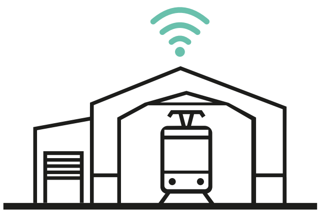
Lessons learnt from the project

The following lessons are applicable to a wide range of stakeholders, but are particularly relevant for operators and authorities considering automation in their tram and light rail systems:

- Start with operational use cases, not with the technology catalogue. Automation should answer a clearly defined operational need.
- Begin where the ratio of positive impact to risk is favourable. Depots, maintenance areas, and segregated sections offer practical first opportunities.
- Harmonise what can be harmonised. Common use cases and modular functions can reduce the cost and complexity of bespoke solutions.
- Keep human supervision central. Automation changes tasks and responsibilities; it does not remove the need for operational expertise.
- Involve drivers, depot staff, control centres, and safety teams early. Their knowledge is essential to identify edge cases and realistic procedures.
- Understand how data from automation technologies will be used from the very beginning. Treat cybersecurity, data governance, and privacy as deployment requirements from the start, not as late additions.
- Complement real-life testing with digital tools. Use digital twins and virtual testing to support validation but keep real life testing in realistic conditions as a core part of the process.
- Collaborate with other stakeholders. Prepare regulators and public authorities early, especially where tram operations interact with road traffic and public space. Define the approval strategy, safety assessment activities and operational procedures alongside technical development.
- Benefits should have practical indicators. Measure benefits such as shunting time, fleet readiness, staff allocation, energy use, safety performance and service resilience.



The following operator readiness checklist is designed to support operators in taking the first steps towards depot automation.

This checklist helps operators and authorities identify key readiness factors for introducing automation in tram and light rail depots and controlled areas.
Use it as a starting point for discussions, assessments, and planning.

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OPERATORS READINESS CHECKLIST

Preparing your tram or light rail depot for automation

1 WHICH DEPOT PROCESSES ARE MOST REPETITIVE?

Identify depot activities that follow the same sequence regularly and could benefit from automation

Examples may include:

- ☐ Shunting / train movements
- ☐ Train washing
- ☐ Train stabling / retrieval
- ☐ Cleaning / interior activities
- ☐ Coupling / uncoupling

Additional / Other:

- ☐ ....
- ☐ ....

2 WHICH MOVEMENTS CREATE STAFF TIME LOSSES?

Focus on activities that consume time, limit productivity or expose staff to unnecessary risks.

Examples may include:

- ☐ Long or complex shunting moves
- ☐ Waiting for vehicles / access
- ☐ Manual repositioning
- ☐ Low-value, high-frequency tasks
- ☐ Night-time operations

Additional / Other:

- ☐ ....
- ☐ ....

3 WHAT DATA IS NEEDED?

Identify the data required to enable, operate and continuously improve automated functions.

Examples may include:

- ☐ Infrastructure layout / track data
- ☐ Vehicle position and status
- ☐ Signals / points / interlockings
- ☐ Schedule / movements
- ☐ Sensor data (environment, obstacles)
- ☐ Maintenance / asset data

Additional / Other:

- ☐ ....
- ☐ ....

How to use this checklist

Review each question with your team, identify priority areas, note first actions and plan next steps.

Automation is a journey. Start small, build confidence, and scale safely.

Lessons from FP2-R2DATO show that depots are the best place to begin...

4 WHICH SAFETY AUTHORITY MUST BE INVOLVED?

Engage early with the right safety and regulatory bodies to agree on expectations and approval pathways.

Examples may include:

- ☐ National Safety Authority (NSA)
- ☐ Notified Body / Assessment Body
- ☐ Railway / Urban Rail Regulator
- ☐ Local transport authority
- ☐ Cybersecurity authority (if required)

Additional / Other:

- ☐ ....
- ☐ ....

5 WHICH STAFF ROLES WILL CHANGE?

Anticipate how roles, responsibilities and skills will evolve as automation is introduced.

Examples may include:

- ☐ Drivers —> Supervision / remote control
- ☐ Shunters —> System monitoring
- ☐ Maintenance staff —> Data-informed tasks
- ☐ Control room staff —> Automation supervision
- ☐ New digital / technical roles

Additional / Other:

- ☐ ....
- ☐ ....

6 WHICH KPI WILL PROVE THE VALUE?

Define measurable indicators that show the impact of automation on safety, efficiency and service quality.

Examples may include:

- ☐ Staff time saved
- ☐ On-time readiness of trains
- ☐ Number of incidents / near misses
- ☐ Depot throughput / movements per hour
- ☐ Energy consumption
- ☐ Cost per movement

Additional / Other:

- ☐ ....
- ☐ ....

Next steps:

- Prioritise 1–2 high-value use cases
- Start a pilot in a controlled area
- Learn, adapt and scale progressively

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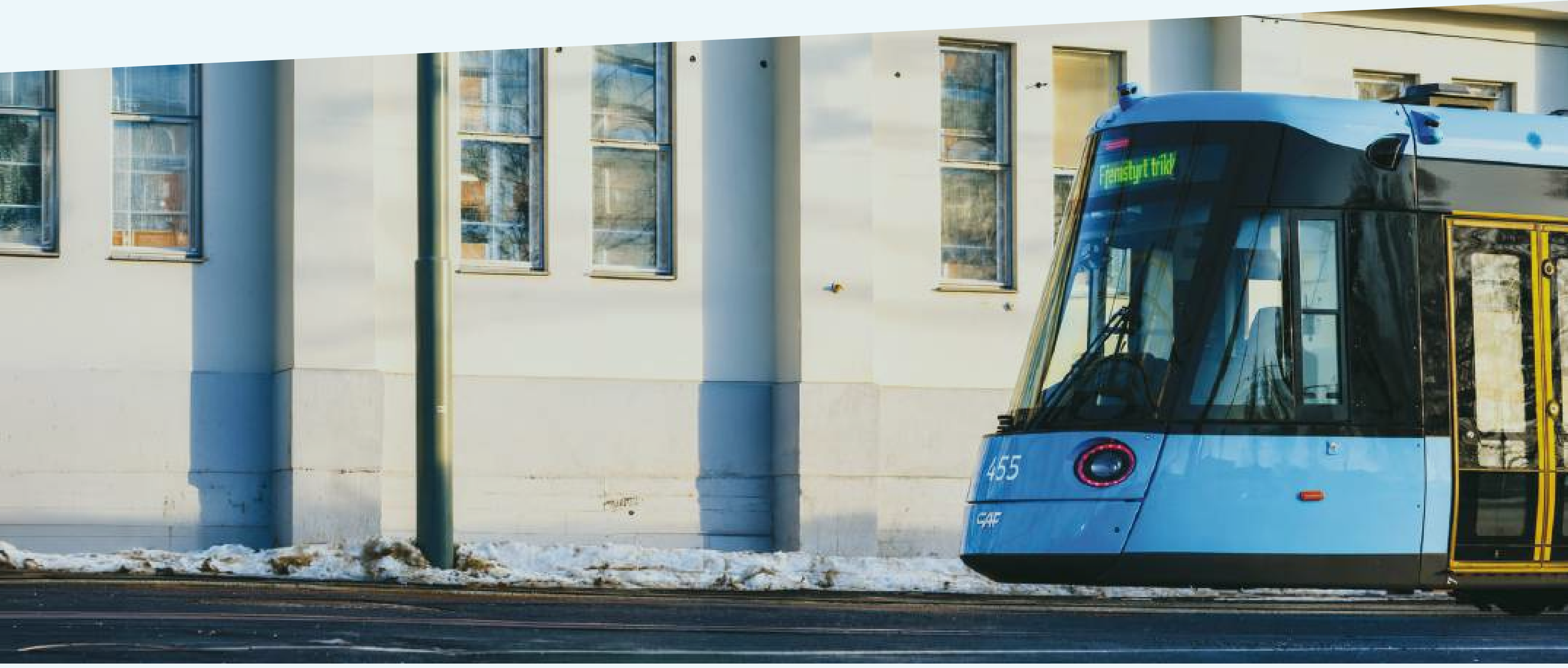

For tram and light rail, **automation** starts where **operational value** and **safety validation** can be combined.

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The way forward

FP2-R2DATO demonstrates that tram and light rail automation is moving from a futuristic concept to something that can soon be an operational reality, but the path to deployment must follow a gradual and carefully phased approach.

The next steps will require further validation of safety cases, stronger interoperability and regulatory frameworks, as well as continued work on how automated functions interact with pedestrians, road users, and public space. Moving from demonstration to operational deployment will also require evidence that automated functions deliver clear operational and economic benefits alongside technical feasibility.

For UITP and its members, the project serves as a foundation for informed decision-making. The project helps operators and authorities move from a general interest in automation to a more practical discussion about which functions are useful, where they can be deployed first, as well as what organisational preparation is required.

The work carried out in FP2-R2DATO also opens the way for a deeper focus on commercial operating environments. While controlled areas such as depots remain essential for first validation and learning, the next phase of research and innovation is expected to examine passenger service use cases in more detail, including the operational, safety, regulatory and human factors that will shape future deployment.

UITP will continue to support this transition by sharing lessons from the project and future activities, convening tram and light rail operators around common requirements, connecting research with deployment experience, and ensuring that innovation remains aligned with the wider objective of making public transport more attractive, efficient, safe, and sustainable.

Suggested action for members

Use the FP-2R2DATO use cases as a starting point for an internal screening of depot and maintenance operations. Identify one or two controlled-area processes where remote or automated support could bring operational value, then assess the safety, data, staff, and regulatory implications before considering wider deployment.

Conclusions

FP2-R2DATO shows that automation in tram and light rail is no longer just a long-term vision. It is beginning to follow a structured pathway for the progressive deployment of automated functions, starting in controlled environments and building towards more complex operational contexts.

The most important conclusion is that automation should be incremental, operationally grounded, and people-centric. The first benefits are likely to arise from automating specific functions that improve depot efficiency, fleet readiness, maintenance, safety support, and operational resilience. Automation of these functions can create the experience and trust, in addition to the evidence needed for future deployment in passenger service. Wider deployment will depend on demonstrating operational and economic benefits, supported by appropriate safety, regulatory and organisational frameworks.

By bringing the urban rail perspective into Europe's Rail, UITP helps ensure that tram and light rail systems are not left behind in the automation agenda. The project's results support members as they prepare for a future where digital and automated functions strengthen the role of public transport in sustainable urban mobility.

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Main references and further reading

Source	Links	Relevant material
CORDIS / European Commission	→ https://cordis.europa.eu/project/id/101102001	FP2-R2DATO project fact sheet; grant agreement and funding information.
Europe's Rail Joint Undertaking	→ https://rail-research.europa.eu/rail-projects/fp2-r2dato/	FP2-R2DATO project page.
UITP	→ https://www.uitp.org/projects/r2dato/ → https://www.uitp.org/news/interview-with-dusan-klago-on-the-goals-and-achievements-of-the-r2dato-project/	UITP R2DATO project material and interview on the goals and achievements of the project.
Springer / TRA 2024	→ https://link.springer.com/chapter/10.1007/978-3-032-06763-0_76	FP2-R2DATO: Stepwise Approach for the Autonomous Tram.
Sporveien	→ https://www.sporveien.no/prosjekter-og-arbeid/trikken-samler-inn-data-om-trafikkbildet-i-oslo/	Information about filming and data collection on Sporveien's trams for the Oslo demonstrator.

Project stakeholders and funding acknowledgement

FP2-R2DATO is coordinated by SNCF and brings together infrastructure managers, railway undertakings, manufacturers, suppliers, research organisations, and public transport stakeholders. UITP contributes by connecting the work with the needs of the public transport sector, in particular the tram and light rail community.

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