

# Metro automation

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*The theme chosen for the second international metro conference, which took place recently in Nuremberg, was: “Converting conventional metro lines over to automated operation”. The conference brought together no fewer than 270 participants representing some thirty countries. The main conference findings are outlined below.*

Staged in the German city of Nuremberg, which is home to the world’s first network to be converting from a conventional operating set-up over to automated driverless operation, the conference raised a number of questions on an innovative topic about which public transport professionals lack the necessary wealth of experience in order to define common positions. Nevertheless, the conference did reveal a consensus as regards the advantages and value added of automated metro systems.

Automation improves rail safety by limiting instances of people or objects intruding onto tracks, by using either platform screen doors or electronic systems for detecting obstacles. The lack of any human intervention eliminates the risk of human error and thus constitutes a factor in improving safety. Of course, this means ensuring that the software programs running the system are secure.

Automation makes it possible to increase train speeds by optimising headway between them. This then reduces delays for passengers. Shorter headways imply greater operating efficiency. For instance, research conducted by Dresden’s technical university has shown roughly a 20% increase in the passenger km/seat km ratio and one of 30% in the revenue/operating cost ratio with automated systems. This efficiency is reflected in increased energy efficiency as well as in reduced mechanical loading on tracks, and thus in lower maintenance costs.



VAG, Nuremberg, is the first to be automating its conventional metro network

Automation brings flexibility to operations by optimising capacities offered and tailoring them to suit demand. This makes it possible to reduce rolling stock requirements by having better rotation of smaller-sized vehicles, resulting in an optimised investment. In Nuremberg, the RUBIN project has involved end-of-life rolling stock, which means twice the benefit.

Demand responsiveness is made possible due to the absence of drivers and, therefore, of any constraints linked to the management of driving time. Lower staff needs therefore represent another very important consequence of automation. The Nuremberg network is envisaging a 40% drop in its staff costs upon completion of the RUBIN project (con-

verting conventional metro over to automated metro). Of course, the opportunity should be used to redeploy staff closer to the passenger by assigning them to customer reception and orientation duties.

Aside from the consensus reached on the advantages of automation, a number of questions remain. One of the most important of these concerns the acceptability of automation:

- Politically, by the public authorities
- Industrially, by staff, particularly drivers
- Economically and financially, by shareholders and managers
- Technical acceptability necessary in order to ensure conversion and com-

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- patibility with existing systems
- Last but not least, acceptability on the part of customers, who must clearly see the value added which automation offers.

This acceptability will be pivotal in influencing the behaviour of members of the public, staff, and politicians during the work phase. It is vital therefore to prepare public opinion and provide the right type of ongoing communication while, at the same time, minimising disruption during work. Relations with the press and media are very important on this account.

Another delicate issue is linked to the human presence on board automated trains. As the mayor of Nuremberg reiterated: "Automation does not mean job losses." Is it necessary to retain staff on board an automated metro? Such a person could control the opening and closing of the doors, intervene in the event of defects, and look after passengers in the event of an operating incident. Keeping operating staff on board trains averts equipment redundancy since it allows human intervention in the event of breakdown. Conversely, should we place our trust in integral automation, as we do each time we take an elevator, from which attendants have

long since disappeared? Perhaps the answer needs to be taken shape gradually: by ensuring a human presence at the start of the service, followed by the gradual withdrawal of the human presence once operations become stabilised and have been brought under control. Clearly, however, the ultimate aim is to have integral automated operation without any operating staff on board while, at the same time, consolidating the presence of commercial staff in order to improve subjective safety.

Finally, a question which divides experts and operators: is the installation of platform screen doors necessary? Or are electronic systems for detecting track intrusions sufficient? Clearly, although no actual decision can be taken based on factors other than financial criteria, there should be room here for aspects linked to passenger safety and the way in which incidents are managed. In Lyon, the investment cost of a station whose platforms are fitted with screen doors has been estimated at four times that of a conventional station. Screen doors not only rule out any possibility of people getting onto the track, but minimise faults caused by the opening and closing of doors.

Account must also be taken of the situation at the outset, i.e. the rate of trespassing (accidental or criminal) onto tracks prior to automation. A network recording a high level for this will have more reason to install platform screen doors in order to ensure that the tracks remain inaccessible. Once again, there is no magic recipe. An automated network, like the one in Copenhagen, has both underground stations with platform screen doors and elevated stations without any. In Nuremberg, the choice made has been not to install platform screen doors on automated lines, whereas Hong Kong has installed them within its conventional network. Each network has its own justifications, and there should be no attempt made to define a general rule.

All these questions and many more besides will continue to be at the heart of work by the UITP Metro Division. For instance, a working group on automated metro is due to be set up in the near future. Its objective will be two-fold: to meet the relevant information needs of UITP members; and to become fully conversant with the issue of automation.

*Translated from the original French text*

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[www.tramsa.gr](http://www.tramsa.gr)

