For a More Resilient Passenger Rail:

4 strategies for improving flexibility, responsiveness & efficiency

The world has changed significantly in the past 18 months. So has passenger rail. Operators have had to adapt to an ever-changing environment marked by volatile passenger demand, evolving comprehensive sanitary procedures, and frequent changes in timetables. Operators have also seen revenues plummet – forcing them to implement unprecedented cost-control measures.

For over 40 years, GIRO has been partnering with public transport and passenger rail operators and authorities worldwide. More than 300 public transport and rail operations of all modes, from urban services to long-distance railways, rely on its HASTUS software to support their planning, scheduling and operations.

GIRO's two chief rail experts, Alexandre Savard, Director of Business Development, and Jean-Marc Pennont, Product Manager, share 4 proven integrated planning and optimization strategies for building more resilience into a rail ecosystem even in the face of increasing challenges.

Strategy #1: Implementing dynamic timetabling to adapt & improve service

The pandemic has doubled or even tripled the frequency at which some railways have had to adjust their timetables. And that doesn't include all the last-minute changes that have been needed to keep up with evolving sanitary rules and rampant workforce unavailability.

One of the biggest barriers to dynamic timetable adjustments has long been crew shifts, which can't be significantly changed once they're agreed upon with staff and the union. This is especially true in bidding systems where crews pick their shift two or three times a year.

"HASTUS has powerful optimization capabilities that allow for dynamic shift adjustments while keeping them within the acceptable range – such as ensuring the new report time stays within 30 minutes of the original report time," says Jean-Marc Pennont. "It also takes into account up-to-date ridership data and projected demand as well as rolling-stock plans. Imagine a single environment where you can move a train and instantly visualize and resolve the impacts on rolling stock and work shifts."

Strategy #2: Leveraging integrated planning to improve processes, resource allocation & costs

Rail timetabling is just one piece of the complex scheduling puzzle. Annual scheduling, day of operations, timetables, track access, rolling stock, workforce…

everything has to be carefully synchronized to allocate resources in the most robust and cost-efficient way possible, without ever compromising on safety. Being able to publish changes to schedules quickly is also essential, as riders, on-board workforce and station staff need – and expect – to have access to the most up-to-date schedules.

Managing track access in a shared infrastructure network used by various operators is another complex process. It takes time, expertise, and resources to efficiently analyze new track-access requests and apply changes, especially on high-traffic corridors.

"HASTUS streamlines the back-and-forth process between the infrastructure manager or owner and train operators," says Alexandre Savard. "If a rail operator requests a new train path or changes to an existing path to better fit its new timetable, HASTUS can use custom or standard data interfaces such as RailML to analyze and process responses from the infrastructure manager. For instance, if track access is granted, but with a slight time variation, HASTUS would automatically inform the operator if this time variation violates any of its rolling-stock circulation rules or creates any discrepancies in workforce assignments. By improving integration and collaboration between stakeholders, HASTUS ensures that all resources required at a given time and location are available. This makes it easier for operators to adapt their services more efficiently while controlling access costs and planning more robust schedules."

Strategy #3: Optimizing rolling-stock & maintenance planning to make schedules more robust & cost-efficient

Creating and securing a viable rolling-stock plan is yet another complex matter. Operators naturally want to keep these plans as stable as possible, as any planned or unplanned changes to rolling stock are likely to impact timetables and assigned staff. With optimization technology, operators can generate, compare and put rolling-stock plans in service in record time.

"The rolling-stock optimization algorithms in HASTUS can consider variables such as passenger demand, infrastructure constraints, rolling-stock types, yard capacity, maintenance and servicing plans and overnight service," says Jean-Marc Pennont. "This ensures the most cost-efficient deployment of rolling stock to cover all services while meeting
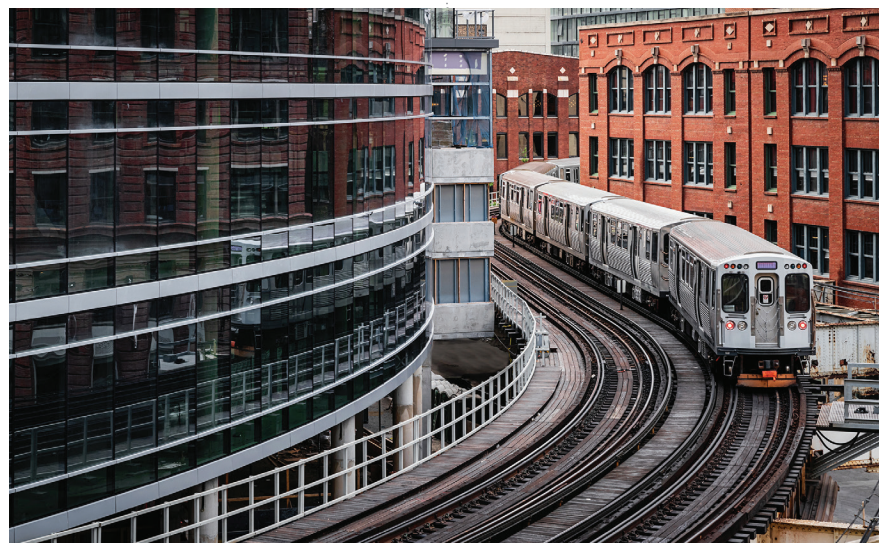
maintenance requirements."

By generating and optimizing rolling-stock plans, operators can increase network robustness and quality of service while adapting schedules more dynamically to meet changing passenger demand or cope with service adaptations such as track works. Rolling-stock optimization can also lead to potential cost savings by reducing mileage, improving maintenance schedules and accurately defining the required workforce.

"Experience shows that optimization is a multi-variable problem in which resources, quality of service and costs have to be carefully balanced," says Alexandre Savard. "Optimization technologies allow planners to produce better-adapted rolling-stock plans while ensuring they are robust, conflict-free, and ready to put in service with minimal adjustments."

Strategy #4: Embracing short-term workforce scheduling & optimization to adapt to changes & empower front-line staff

A growing number of rail operators are using technology to allow for more freedom in workforce assignments. Recently, GIRO collaborated with several operators on developing short-term optimization algorithms and personalized rostering features in HASTUS. Instead of bidding or assigning detailed workweeks several months in advance, operators now only publish days off and high-level duties to employees on a mobile portal. Employees then enter their work preferences for a given date or period using their smartphone.

"If a train driver who normally works day shifts needs to deal with some personal matters, they can indicate a preference for evening shifts for the next little while," explains Jean-Marc Pennont. "When the adjustments period is closed, HASTUS distributes work by taking into account all rules, regulations, qualifications, costs and personal preferences in the most efficient and fair manner possible."

Operators who adopt a more flexible and personalized short-term planning approach report a significant decrease in absenteeism, uncovered work and overtime costs. At the same time, employees unanimously say they have a better work-life balance and feel empowered because they are more involved in the planning process.

"We support rail operators across the globe, and nearly all of them are focused on improving robustness, flexibility and efficiency," says Alexandre Savard. "Everyone is looking to build enough resilience into their ecosystem so that it can handle whatever the future brings. Optimization technology is helping them get there."

GIRO

More than 100 rail operators around the world rely on GIRO's HASTUS software solution to adapt to changing situations, manage rolling stock and workforce, and improve service quality.

They include SNCF in France for urban, regional and long-distance; LA Metro in Los Angeles for subway and LRT services; Keolis in Greater Boston for commuter rail; RATP for the Paris Metro; and Yarra Trams in Australia for the world's largest urban tram network.

For over 40 years, we have been committed to contributing significantly, and with the highest standards of excellence and sense of shared purpose, to our clients' efficiency gains by deploying solutions and services adapted to their specific reality.