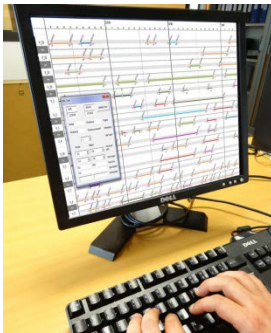# SNCF - DPF SOLUTIONS

OpenGOV™ – TRACK OCCUPANCY GRAPH OPTIMIZATION SOLUTION

Aims:

- to develop a decision-making tool for building track occupancy graphs (GOV)
- to gauge the risks posed by different scenarios

Solution:

development of the OpenGOV™ optimization solution

Results:

- automatic creation of optimized GOVs, that are robust and easy to analyse
- time saved in the design phase
- fewer train conflicts offer enhanced service regularity

"Eurodecision's optimization experts shared their valuable advice with us throughout the development of OpenGOV™. Their capacity to understand our business and their responsiveness were really vital in ensuring that the project was finalized on time." Nadia El Haouidag, Operations Design Manager, DPF SOLUTIONS

"The very rewarding work carried out with Eurodecision produced innovative solutions and new tools through intense joint teamwork." Bertrand Houzel, DPF SOLUTIONS Unit Manager

The Direction des Projets Franciliens (DPF), created in 2013, is the SNCF division primarily responsible for development and railway network expansion projects in the Paris Region. The division's DPF SOLUTIONS division offers support to projects from their inception and conducts appraisals to ascertain the technical feasibility of any planned works. DPF SOLUTIONS facilitates project launching and orientations by reporting its view of the consequences for operations.

Since January 2015 the DPF Solutions team has been examining the major rail terminals of Paris, with particular emphasis on track occupancy graphs (GOV). These graphs are crucial to traffic flow in the stations as they determine when the trains come and go, the tracks used, the intervals and any connections between them. A solution that can accelerate optimized

GOV building, in anticipation of sharp rises in traffic and passenger numbers using the capital's stations, makes the operations employees' task much simpler than the current manual solution.

After DPF Solutions' first in-house developments using Excel, the division called in Eurodecision to guide it in this venture. Its optimization experts seemed ideally qualified to partner them for a mathematical programming project of this ilk as they are specialists in railway operating issues and conversant with the issues faced by the SNCF's Engineering Division. The latter has been a Eurodecision client for a decade[1].

After four months of DPF Solutions and Eurodecision working together and many discussions on the ground with the relevant departments (primarily focussing on the constraints to be factored in… train characteristics, passenger volumes, commercial considerations, and so on), an initial configured release of the optimization solution was launched, named OpenGOV™[2].

"OpenGOV™ is a decision support tool. It does not replace the expert eyes in the local traffic management offices (BHL) but pinpoints various scenarios and alternatives that the BHL may or may not decide to adopt, depending on its in-depth knowledge of the station. There is no doubt about the time saved during the study phases." Nathalie DAMOURAN, Escale Transilien engineering office manager, Paris Saint-Lazare Station

Paris-Saint Lazare Station, which deals with 1500 train movements every day, had already shown interest in acquiring a tool of this kind. Tests were conducted to compare the 2015 GOV version that was already up and running for the station with the version created through OpenGOV™. The combination of results that spoke for themselves, fast calculations (a few minutes' compared to several months' work previously) and the GUI that displayed the GOV and characteristics of each train, persuaded DPF SOLUTIONS to take matters further. OpenGOV™ was thus fleshed out with features to recalculate a GOV in the context of track works and view the changes required.

The Paris-Saint Lazare employees were bowled

over by how simple OpenGOV™ was to use and decided to apply it to generating their GOV 2016 version automatically. Thanks to the valuable time saved by using this tool, they were free to focus on tasks that used their business skills such as analysing the GOV to make it more robust or examining different scenarios with a view to forestalling the consequences of track works or dealing with contingencies.

Several stations in the Paris Region and the provinces expressed their interest within the space of a few months. DPF Solutions will soon be called on to carry out new studies to support the new OpenGOV™ users and call on Eurodecision's aid on some of these projects.

[1] *Démiurge Project: development and maintenance of a tool to perform timetable capacity studies and assess the robustness on railway lines*
[2] *OpenGOV™: the OpenGOV™ tool that optimizes constraints in stations is the property of SNCF. Contact: bertrand.houzel@sncf.fr*