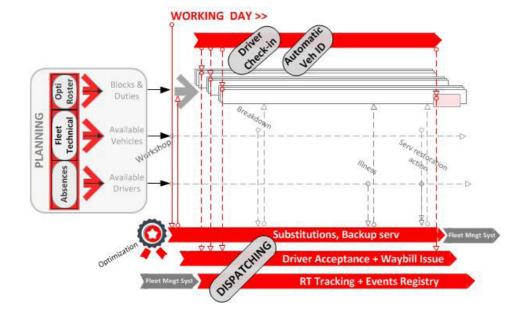# GP_ERP

DISPATCHING OF VEHICLES AND DRIVERS ALONG THE WORKING DAY

GP_dispatcher is a complete graphic, multi-station application that expedites common dispatching tasks during the working day. Decisions about **live changes** in the plan and **actions for restoring the service**, –as editing duties / trips, addition of backup services, substitutions or assignments of unscheduled duties–, are supported by an intelligent module **prompting automatically proposals** for dispositions, **ordered by optimization criteria**. Technical readiness of rolling stock is considered. Drivers incurred overtime and their forthcoming schedule is shown to facilitate decisions.

A module for **advanced identification of drivers & employees** makes possible a self-service log-in process for drivers with no dispatcher intervention. A breath-analyser system for sobriety control can be integrated there. After driver's acceptance the Waybill will be issued and printed automatically or electronically delivered to the driver's mobile device. Quick edition of waybills is provided, as well as registration of relevant events/failures that will be incorporated during waybill verification process in the accounting module. Customized views are enormously helpful in failure handling by showing conflicts, events, duties' status...

A system of **automated vehicle identification** operating on RFID card readers for their location (workshop, fuel station, parking place) can be also part of the system. Real time tracking can be available for dispatchers.

ACCOUNTING REPORTS AND STATISTICS. FUEL CONSUMPTION

Fast and precise verification of Waybills is provided in **GP_accounting** sub-module on multiple workstations, by trips, duties, line, operator...Parametrized verification and accounting of work time/overtime, driven distance, fuel consumption and used materials is possible through flexibly configurable timesheets. Automatic verification is based on data obtained from mobile systems installed in vehicles (mobile devices, Fleet Management System...) or driver's report. Checked/double checked status can be followed to control a complex chain of approvals.

GP_fuel sub-module includes a configurable fuel consumption balance algorithm, that provides reports and statistics as verification of loses and savings or bonus calculation based on savings.

GP_reports offers a complete set of ready default printout reports tailored to customer needs. It is possible to group by variables and share selected reports with user profiles. It can also provide a financial settlement amongst different operators under same transit Authority.

Dynamic and analytical reports are obtained in **GP_statistics** based on multidimensional OLAP cubes and shown by pivot tables.
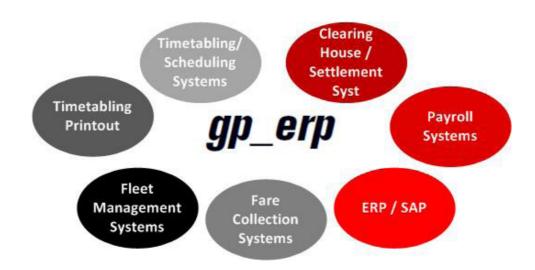
USER-FRIENDLINESS AND ERGONOMICS ENHANCING THE USER EXPERIENCE

Mobile and latest internet technologies support the operations. The **ergonomic and user-friendly graphical interface** is based on intuitive standards of Microsoft™ offering to the user configurable screens, stackable windows, the option to work on multiple monitors, customized representation of the information and pre-defined setting templates, multiple forms of presentation and graphical editing (tabular, jig-saw chart –route/time–, GIS, block charts...), advanced search filter, quick access to all program tools... The results provided are ready to be printed for all staff or for individual agents.

GP ERP IN SYNERGY WITH THE REST OF CORPORATE SYSTEMS

As a central element in the planning and management of the mass transit system **GP_ERP integrates with other corporate management modules** owned by the operator (payroll systems, tools for timetabling printout, ERP / SAP...) or by the agency (Settlement systems...). It also allows the integration with components like Fleet Management/Passenger Information Systems and Fare Collection Systems, provided by GMV or third parties.

ITS

The best solution for mass transit planning and operation

GMV Planner offers transit operators and authorities an amazingly powerful tool for **the complete lifecycle management of the public transport service planning and operation**.

Its module **GMV Planner ERP** [**GP_ERP**] has been designed and developed as dedicated solution supporting all areas of business administration in public transport companies.

GP_ERP generates optimal solutions for rostering and dispatching, according to business rules and existing restrictions. It reduces the operating costs and improves the public transport services offered, **increasing the Return of Investment (ROI)** in a very short time. It saves time-consuming tasks by working quickly and efficiently with a significant amount of data in an **integrated way** (**for instance: rostering time is reduced 20 to 25 times**).

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PLANNING SYSTEM ACTING AS A GLOBAL MANAGEMENT SYSTEM

GP_ERP is an enterprise resource planning system acting as a **global management system** composed of **highly configurable specialized sub-modules** that interact with each other consolidating operations in the centralized database that ensures **consistent, complete and common data** even in real time in all sub-modules.
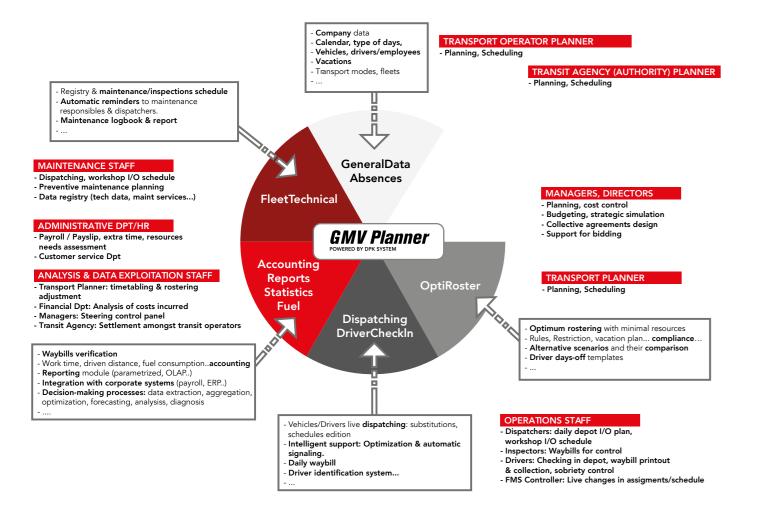
GP_ERP includes sub-modules to manage:
- Registry and configuration of company data (vehicles, employees, data types, groups, users and roles..)
- Registry and configuration of absences (vacation planning, leaves...)
- Rostering of Drivers and vehicles.
- Driver check-in and Dispatching
- Accounting, Reports, Statistics, Fuel consumption
- Technical data of the Fleet (maintenance plan, data registry...)

The engine of **artificial intelligence and algorithms with multi-criteria-based mathematical optimization techniques** is flexible and mighty as a result of the cooperation with the Polytechnic University Tadeusz Kościuszko of Krakow, and makes possible to plan multiple diverse scenarios with different parameters that can be compared to each other, as well as to obtain automatic suggestions of best alternative.

SPECIALIZED SUBMODULES IN gp_erp COMPOSE A GLOBAL MANAGEMENT SYSTEM FOR RESOURCES PLANNING
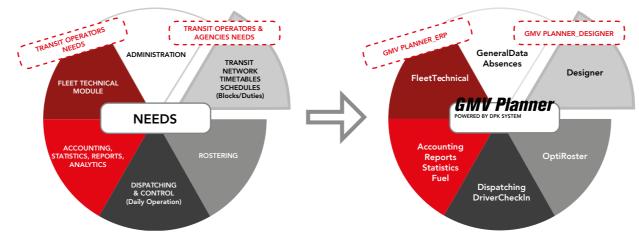
Comprehensive functionality includes **all areas of activity in the organizational structure**. The system makes it possible for the data to be accessible in real time to all the users in any module once they are entered in one place. Modern computing and communications technology as well as the designed architecture allow the work in multiple stations in a distributed network, live registration of events and activities and handling of all types of operations with integral data in parallel.

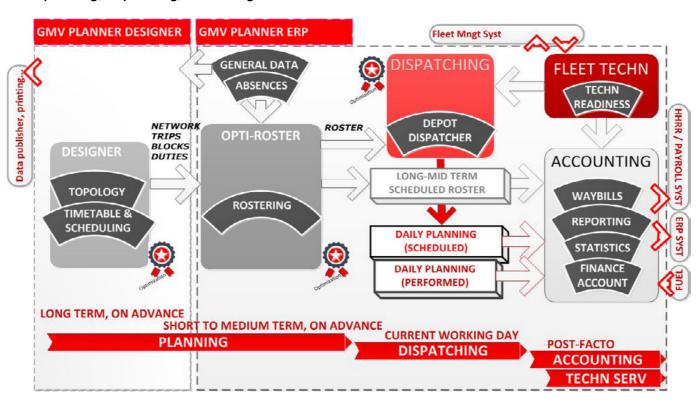## GP_ERP WITHIN GMV Planner ECOSYSTEM

GP_ERP can be augmented with the module **GMV planner designer**, also included in **GMV Planner** suite as a tool to design the **transit network** and the generation of **optimum / automatic timetables** and **schedules** for various calendars and types of day, **integrating different operators, transport types or administration units** in the same system. It is aimed at both transit authorities and operators .

GMV Planner is a world class set of software modules currently supporting the daily activities of approximately **30,000 vehicles and around 1,000 operators** (urban, intercity, rail and emergency services...).

AN INTEGRATED TOOL FOR EFFICIENT PLANNING AT EVERY MOMENT

GMV Planner enables public transport companies to manage the complete lifecycle of the transit service planning and operation in a continuous data flow along all the **integrated modules** supporting the **activities** that take place with **different time and periodicity**: **GP_ERP** provides support for all **long / medium / short term planning, dispatching, accounting and maintenance** activities.

COMPANY DATA AND ABSENCES PLANNING

GP_general data submodule is aimed at configuring basic data about the operating company and its activities such as calendar, type of days, company attributes, roles/profiles, authorizations, material, vehicles, vehicle types / groups; employees, employees types / groups, worktime...

GP_absences is a multi-station / multi-level submodule that manages employee's vacations and leaves (requested, scheduled, done, statistics...).
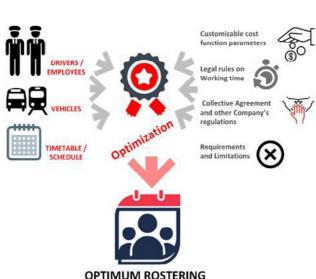
OPTIMAL ROSTERING

GP_opti roster is a unique program that automatically prepares **long term rosters** assigning employees / drivers to duties / carriage tasks.

GP_opti roster can precisely estimate labor and vehicle demands to execute duties and tasks **with minimal resources in any given accounting period**. The output is an **automatically generated** plan that meets all the **legal requirements** of driver work time, internal company restrictions and permissions while simultaneously minimizing cost.

It is based on its **Optimization Module** that allows **fully automated planning** with customizable parameters. The Optimization module uses multi-criteria mathematical optimization mechanisms and artificial intelligence that account for costs of: unassigned duties, drivers failing to meet the norm, deviation of regulations – rest, overtime, employee work limits, or other customer specific expectations. Automated generation of complete plan also takes into account vehicle assignments by optimization. The result is an intelligent solution that offers **optimal rosters with no human interference**, based just on program's knowledge.

User can define **customizable cost function parameters**, parametrized preferences and functions for groups of duties and **drivers**. A plan can be visualized in three views: by driver, by **vehicle**, by **duty**. The user can also select the scaling, types of data to be displayed, and type of **balances** (total duties not assigned, total of non-compliant cases in a day, ...) to be shown in the active view. It is also possible to display in the same way a plan's realization and a comparison between 2 projects. Printouts for the whole staff or for individual employee are also configurable.

The system offers **suggestions during manual corrections** searching for duties or employees with no tasks assigned. Duty and trip edition is possible with graphical support, even based upon duties from a plan.

Plans can be created for any given period and are consistent with previous and following planning periods; preview of multiple periods is possible. The planner has an option to **adjust the roster during the accounting period** and provoke the **synchronization and update** of duties after alterations to the driving schedule. The system makes a constant **automated verification** of the plan during the accounting period; any alteration is checked against legal or internal regulations, with the possibility to customize notifications

Vacations, rests and other driver absences are **considered** by the system. It is possible to plan templates of duties and templates of days off in alternative variants. Legal regulations pertaining to required days off are taken into account during planning.

Alternative rosters can be generated and saved using different parameters, as well as optimization scenarios for the whole company or chosen groups, with the possibility to compare various plan versions and to optimize the whole plan or its elements.

FLEET TECHNICAL SERVICE

The company may register technical daily data on vehicles, plan and manage periodical maintenance services and inspections (distance/time driven), keep a logbook about repairs and technical services performed and set automated reminders to maintenance staff (expiring permissions, oncoming services) and to dispatchers (vehicle withdrawal, returns to service) with **GP_fleet technical**.