Digitization of maintenance management as part of the commissioning of the Niedersachsen Mitte network

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New requirements need new solutions. If a rail transport company receives a new transport contract in which it is also responsible for ECM (Entity in Charge of Maintenance) for the first time, the path to digitization can turn out to be an opportunity. Regionalverkehre Start Deutschland GmbH is taking on this challenge and launching digital maintenance.

Initial situation // Challenge

With the timetable change in 2021, Regionalverkehre Start Deutschland GmbH (start) will take over operation of the Lower Saxony Central network, which consists of the Heidekreuz and Weser/Lammetalbahn networks.

As the future operator of this regional local rail passenger network, start is also responsible for rail vehicles and their maintenance for the first time as ECM. The fleet comprises 36 vehicles of type LINT 41. In this context, start was faced with the challenge of looking for a partner who could support the digitalization of the monitoring and maintenance processes of vehicles and infrastructure. The goal was to acquire software that would enable vehicle maintenance and management in projects involving the company's own vehicles. Thanks to

IT support from start, the necessary maintenance services should be able to be coordinated, monitored and evaluated independently. Within the scope of a selection process, start decided in favor of the provider ZEDAS.

Fig.: Lower Saxony Central Network

Objective // Project requirement

The management of rail vehicles is to be optimized from various points of view, such as maintenance costs or downtimes, and complete ECM-compliant documentation for the vehicles is to be mapped. Workflows such as incident recording, maintenance planning, and asset and fleet management will be digitized.

Requirements for vehicle management and maintenance software	Details
Mapping vehicles & equipment	• Vehicle structure • Maintenance and installation history • Meter readings
Structure Maintenance plans	• Mapping of the set of rules from start • Mapping of dependencies of the maintenance levels among each other • Different maintenance schedules for vehicles of the same series • Deadline calculation for a defined time horizon
Integration operation through app	• Fault detection incl. integration of images • Integration of predefined malicious codes • Mapping of the processing state

Vehicle status/ fleet traffic light	• Condition and operational capability of vehicles
Interfaces	• Transfer of wheelset measurement data from the measuring device and the underfloor lathe • Data exchange of planning and disposition data
Integration workshop	• Maintenance planning and assignment • Support in the processing of maintenance orders
Spare parts management	• Component change • Recording material consumption
Gewährleistungsabwicklung	• Warranty monitoring • Analysis of serial damage
User groups	• Vehicle manager • ECM III control center • Operations • ECM IV (work preparation, craftsmen) • Cleaning service provider • Operational employees of the client
Administration	• Multi-client capability • Independent user administration • Reporting
Scalability	• Reading of measurement data • Able to act, e.g. in the case of new transport contracts

Table: Professional requirements

The core requirements placed on the software to be provided are the comprehensive mapping of the vehicles and equipment in the system. Vehicle structure, maintenance and installation history, counters for mileage and operating times - to name just a few data - can be seen at a glance for the objects and can be related.

Mobile solution (app)

The operating personnel can easily record faults as well as cleanliness deficiencies via the mobile solution (app) and by integrating images. The defects and faults are recorded directly for the vehicle or components and the operating personnel can view the status of the processing of the reported operations at any time. Fault recording is also possible offline.

Furthermore, the software supports the workshop processes: Orders and work instructions can be viewed and processed online and offline via the app, checklists can be filled out, and time and material expenditures can be reported back.
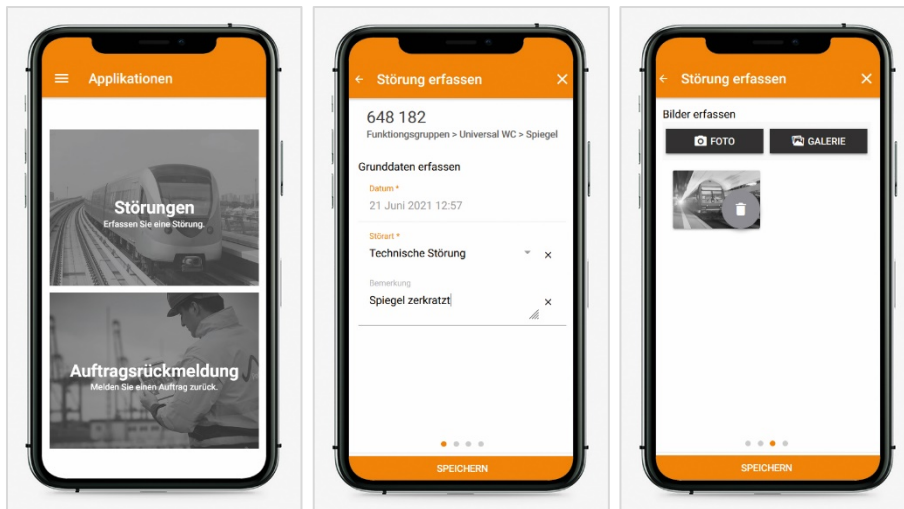
Fig: Mobile application on smartphone

Project implementation // Practical application

Contactless project run

October 2020 marked the kick-off of the project to digitize maintenance management at start. Due to the pandemic, project implementation has so far taken place digitally throughout, without face-to-face meetings. Throughout the project, all coordination between ZEDAS and start, as well as training and presentations, were implemented using modern collaboration tools.

At start, dynamic, efficient and distributed working is part of the identity: the rail specialists were already working from the office in Frankfurt am Main, from home or from the train before the pandemic.

Digital project management is not new territory for the IT company ZEDAS either: "We have already had good experience with purely digital project implementations in international projects. In German-speaking countries, however, it has been unusual so far due to the geographical proximity and is solely due to the pandemic. You have to design consultations differently digitally in order to give enough space to the interpersonal." Franziska Jäcklin, ZEDAS.

In addition to the project management, the software was also provided remotely: Via cloud solution, the start administrators have been accessing the Berlin data center of the software provider since the beginning of December 2020. This meant that configuration of the standard system could begin just one month after the start of the project. Important adjustments and the process recordings took place in advance in structured, digital workshops.

Reliable project management

In general, and especially under these special conditions, careful and reliable project management is indispensable to ensure the economic success of the project: from the initial planning through the implementation to the conclusion of a project, the project partners identify, question and rethink processes, communication channels, organisation, resource management and monitoring.

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But collaborative work should not be underestimated either: Experienced project managers on the part of both partners are needed to define and evaluate the business processes. This project has always been characterised by good, collaborative work at every stage of the project and is therefore progressing according to plan.

Thanks to regular jour-fix appointments and short communication channels, decisions could be made quickly and project implementation made more efficient. This leaves more time and resources for other project-critical steps.

Knowledge transfer through training

After 3 months, the project entered the next phase with the implementation of software training in January 2021: Based on the train-the-trainer concept, both project managers and administrators were qualified to independently implement changes to the configuration of the software as well as extensions to the master data.

A uniform level of knowledge in the project team is an important pre-condition for optimal project management.

Efficient data management

At the same time, the coordination and workshops for the necessary interfaces began as planned. In addition, the validation of the vehicle structures and the installation of the vehicle status system took place.

Once all the major basics and installations were completed, the focus in the second quarter of 2021 was on vehicle installations and implementation of the vehicle status system as well as users, roles, and rights.

The next step is to set up, test and approve the interfaces. The software implementation project will be completed by the end of August 2021. In the 3rd and 4th quarters of 2021, the main task of the project team will then be to maintain the master data and prepare for the transfer of the transport contract in December 2021.

Providing the necessary data is a challenge for many companies in software projects. The software provider can support the EVU in this task by implementing a standard import process, which significantly minimizes the effort for the EVU. Import modules are also available to the customer after the project to import mass data, e.g. when new contracts (vehicle types and series) are concluded. Thus, the requirement of scalability, which was set for this project, can be fulfilled. The strong involvement of the EVU during the configuration of the software and the corresponding trainings facilitate the processes after project completion.

Graphic: Key factors in the project

Outlook

With the launch of the Lower Saxony Central transport contract from December 2021, the introduction of the ZEDAS software will enable start to independently coordinate, monitor and evaluate the maintenance services required for ECM on the basis of a digital solution.

The digital mapping of processes in an EVU also enables a view into the future, in which data from various sources (e.g. measuring devices) flow into the system via interfaces and enable forecasts through advanced analytics. For example, deadlines are mapped in the software and can be used for a predictive maintenance concept. Big Data applications will gain in importance - whether wheel set wear forecasts, personnel capacity forecasts or a digitalised and automated ordering system - and make maintenance more effective.

SUMMARY

At the time of going to press, Regionalverkehre Start Deutschland GmbH can look back on a digitization project that is on schedule despite the pandemic-related challenge of remote project management. The successful cooperation to date indicates that the system can be launched on time in December 2021.

About Regionalverkehre Start Deutschland GmbH

The best of both worlds: Regionalverkehre Start Deutschland GmbH was founded in 2016 as a wholly owned subsidiary of DB Regio AG and has its headquarters in Frankfurt am Main. In a start-up atmosphere, the team of experts for the entire value chain in local rail passenger transport (SPNV) develops innovative solutions for public transport authorities. The goal is to use the resources of the mother company to successfully acquire and optimally operate regional passenger rail transport services for customers. In doing so, start relies on regional business models individually tailored to the respective transport contract and flexible concepts for the regional rail transport of the future.