



Moduls
Methods
Mobile Systems



Operations Management with GS-Service



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1. GreenGate AG Company Portrait

The Company

GreenGate AG was founded in 2000. Headquartered in Windeck/Sieg, the company develops highly adaptive and innovative software solutions for strategic maintenance of facilities and infrastructures.

The independent joint-stock company is entirely privately owned with the majority of stocks being owned by their employees. GreenGate AG is represented by their subsidiary company GreenGate GmbH in Seengen, Switzerland.

GreenGate AG has established about 300 customer tailored solutions all over Europe with 3.500 clients in different branches of employment. Currently, GreenGate employs 30 professionals, many of which having finished their education or dual studies in concert with the company.

Our Partners

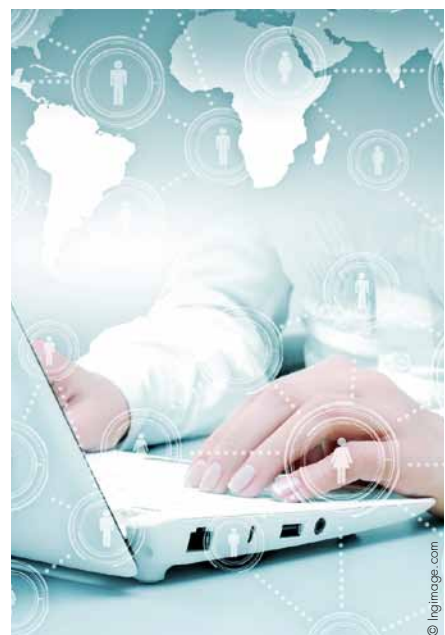
Being embedded in a functional network of partners, GreenGate is able to rely on more than 15 companies which either assist with distribution

or implementation. Among our best known partners contributing their trade know-how are EnergieSystemeNord, SMS-Meer, NIS AG, Remondis, Rittmeyer and FRG Software. About 50 employees are successfully active for GreenGate within this environment.

Distinguished Performance

GreenGate has received numerous awards in past years: a comparative study run by the RWTH Aachen concluded GreenGate to be the best provider of maintenance systems. On March 6, 2018, GreenGate AG was honored by the NRW Minister of Economics and Digital, Prof. Dr. Andreas Pinkwart, as part of the "Innovation Award" competition.

In 2015, GreenGate AG received the industry award for their workforce-management solution, as well as the innovation award by the Initiative Mittelstand (initiative for small and medium sized companies) and has also been awarded as a TOP 100-Innovator and received the Ludwig award 2015 for their regional commitment.



1.1 Network

GreenGate AG works closely together with branch partners, scientific institutions and consortia.

A SELECTION >



German Society of Gas and Water Departments

Having more than 13.500 members, the German Society of Gas and Water Departments is a techno—scientific society, setting technical standards for a secure and reliable gas and water provision for over 150 years now, as well as kicking off and accompanying information and thought exchange.



Network Family Aware Businesses Bonn/Rhein-Sieg

Founded in 2013, the center networks businesses which are seeking information exchanges concerning family-aware personnel politics with the goal of forcing compatibility between family and job as well as strengthening businesses locations.



Federal Association for the IT Middle Class

The Federal Association for the IT Middle Class is the interest representation of the IT middle class in Germany. Members are software and hardware manufacturers, as well as IT service providers and consultancies. The federation aims to enforce middle-sized IT businesses.

BITMi is accredited to the German Bundestag.



Network ZENIT e.V.

The ZENIT e.V. network represents around 175 primarily medium-sized, technology-oriented companies with around 50,000 jobs in North Rhine-Westphalia. It offers its members comprehensive information on new funding programmes, support for internationalisation projects and close contacts to colleagues in business and the banking industry.



Hochschule
Zittau/Görlitz
UNIVERSITY OF APPLIED SCIENCES

Academy Zittau/Görlitz

The academy of Zittau/Görlitz offers best conditions for research and teaching by more than 3.800 students, 130 professors and over 100 researchers.





Forum Vision Maintenance

Knowledge transfer, networking and highlighting future trends in the area of maintenance are FVI's concern, actively pushing sensitization of users and management personnel to realize maintenance as a competition factor and part of the value chain. FVI is currently carried by more than 490 members from middle-class businesses, large-scale industry, science and politics.



German coalition for water resources management, sewage and waste disposal

Being a techno-scientific trade association, the DWA strives for clear concepts for a clean environment. The politically and economically independent coalition supports promoting research and development. Among their roughly 14.000 members are municipalities, academies, engineering offices, public authorities and businesses as well as their professionals and management.



Research Institute for Rationalization

The Research Institute for Rationalization is a non-profit, branch-crossing research facility at the RWTH Aachen in the area of business organization and development. The institute researches, qualifies, teaches, and accompanies in the areas of service provision management, information management and production management.



Campus-Cluster Logistics

The Cluster aims at making correlations between logistics, production and service provision researchable and tangible. Close co-working between research and industry enables looking at complex value-chains from a holistic perspective.

2. Easy Start with GS-Service

The GS-Service software is an instrument for controlling ever-increasing administrative and performative processes in a fast, secure and efficient manner. GS-Service offers you an innovative solution with which you can solve the diverse tasks in your business effortlessly, utilizing just one single working platform. Profit from the modular, multi-user capable structure of the software and the high user-friendliness of an open and flexible system.



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GS-Service – Advantages at a Glance

- > Update-capable standard software
- > Modular, scalable, flexibly extendable
- > User friendly
- > Adapts to changes of company structures and respective tasks and processes
- > Customer friendly licensing model
- > Competent and easy to reach customer support
- > Direct and competent point of contact without lengthy procedures
- > Continual development, updates provided during software maintenance
- > Regular user meetings, seminars and workshops

GS-Service – When Results*) Matter

- | | |
|---|-----|
| > Reduction of maintenance-related facility downtimes by | 8% |
| > Savings in technological purchases, investments, repairs by | 12% |
| > Reduction of spare-parts stock by | 15% |
| > Reduction of overtime related to maintenance by | 10% |
| > Increased availability of facilities by | 8% |

*) Ø-average results of customer surveys

GS-Service – When You Have Goals

- > Improvements in organization and efficiency of operational and maintenance processes
- > Increase in facility availability through systematic analysis of malfunctions, defects and weaknesses
- > Decrease in capital commitment by reduction of spare-parts stock
- > Shortening of reaction times by central data storage
- > Cost decrease by minimizing down-times
- > Ensuring operational security of facilities
- > Reduction of maintenance costs
- > Shortening reaction times in case of defects by Incident Management
- > Cost-transparency: maintenance efforts are assigned in causal relation to facilities and assembly units
- > Extension of facility life spans
- > Up to date, consistent data inventory – an integral prerequisite for the realization of Total Productive Maintenance (TPM)
- > Optimal dispatching of spare-part orders and deliveries as well as operations by third-party service providers
- > Compliance with legal regulations concerning environmental protection, occupational safety and supply and disposal technology with respective documentation



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3. GS-Service

Thanks to its intelligent architecture, GS-Service can be integrated into existing IT systems in a fast and effortless way. Also, GreenGate adapts GS-Service individually to your versatile requirements.

Borders with other IT systems are fluid. With GS-Service it is possible to build a centralized information/data system. For organizational purposes of maintenance,

administration or project management, GS-Service enables you to collect data for your mercantile applications or even organize your entire stock.



3.1 Object-/Inventory Management

Object management is the center piece of operational management. The entire business including inventory is recreated here. All separate assets are compiled into objects (e.g. buildings, boilers, bottling plants, etc.). The complete structure of maintenance objects can be created hierarchically in any desired depth.

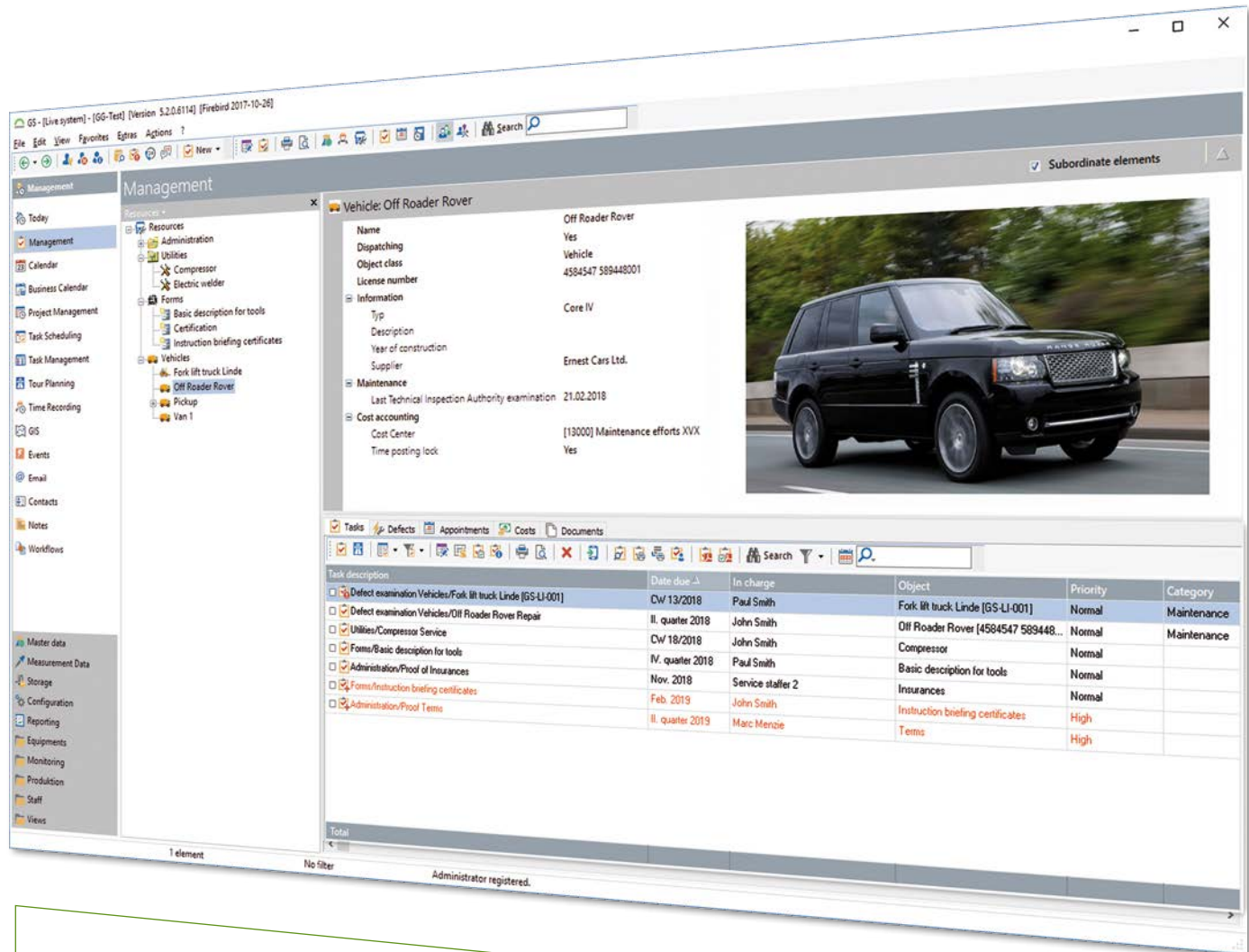
Task description	Date due	In charge	Object	Priority	Category
✓ Spare part purchasing QM department [P11]/Laminator L01 [L001]	II. quarter 2018	Technic, Paul	Laminator L01 [L001]	Normal	Service
✓ Spare part purchasing Line 1/Press XT 1020	II. quarter 2018	Technic, Paul	Press XT 1020	High	Service
✓ Yearly security check Line 1/ST11-AK331 [1ST001]	CW 18/2018	Jack King	ST11-AK331 [1ST001]	Normal	Safety
✓ Yearly security check Line 1/KP2-X10550 [1KP001]	CW 18/2018	Technic, Paul	KP2-X10550 [1KP001]	Normal	PM
✓ Yearly PM Line 1/KP5-X10605 [1KP002]	CW 18/2018	Administrator	KP5-X10605 [1KP002]	Normal	Service
✓ Purchasing equipment Line 2/Press HP S 40 [2PR001]	III. quarter 2018	Trainee, Tom	Press HP S 40 [2PR001]	Normal	Service
✓ Line 2/Smoke detector ABT 2 [DIAB2]	Aut. 2018	Technic, Paul	Smoke detector ABT 2 [DIAB2]	Normal	Service
✓ Line 2/Service Lifting unit ramp 1	IV. quarter 2018	John Smith	Lifting unit ramp 1	Normal	Service
✓ Facility management/Service FE Gate IV [FLEin]	Dec. 2018	Technic, Paul	FE Gate IV [FLEin]	High	Service
✓ Line 2/Service FE stove 1 [F01]	Jan. 2019	Technic, Paul	FE stove 1 [F01]	Normal	Service
✓ Facility management/Service FE coffee spender	Apr. 2019	Jack King	FE coffee spender	Normal	Service
✓ Facility management/Service Lifting ramp IV [HRIV]	Apr. 2019	Technic, Paul	Lifting ramp IV [HRIV]	Normal	Service
✓ Line 2/Service FE Pellet stove	May 2019	Trainee, Tom	FE Pellet stove	Normal	Service

Any Object Can Be Assigned With

- > Freely definable object properties including cost center
- > Documents
- > Maintenance plans
- > Appointments
- > Material and spare-part listings

3.2 Tool Dispatching

Resource management allows for a consequent and gap-less management of any equipment for which you are responsible. You will always know where any given device is located, who the receiver was, when required checks were performed, when the last check before equipment guarantee is void needs to be done, schedule of future check and maintenance appointments, equipment specific weaknesses, costs connected to the facility, overview of costs connected to specific types of equipment, what personnel has received operational training... in short: you're in the driver's seat!



Functions Overview

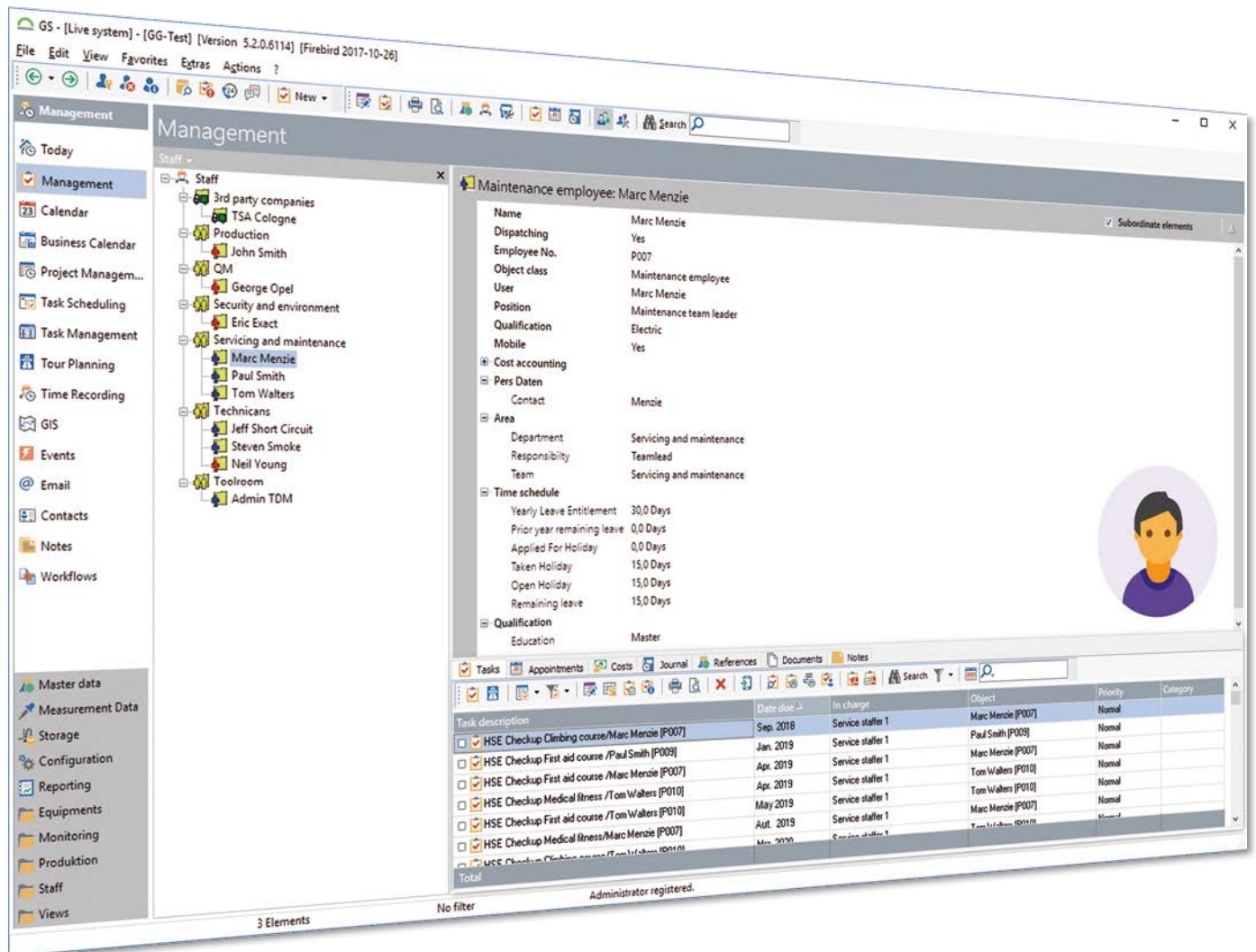
- > Components of equipment can be recorded in any required detail
- > Cost management (e.g. invoice cost allocation)
- > Administration of all specific equipment properties (e.g. type, manufacturer, measurements, class, serial number)
- > Use of type-catalogues to simplify data recording
- > Search for any or pre-adjustable/selectable criteria, display functions, reports (e.g. equipment lists, acquisition cost lists per year)

Documentation and Administration of the Entire Hardware

- > Technical and mercantile data (e.g. class, code and text, purchase date)
- > Persons in charge and agents
- > Contracts, appointments, events, tasks, orders, invoices
- > Document storage for equipment (e.g. maintenance contracts, protocols, manuals)
- > Malfunctions/maintenance/cleaning

3.3 Personnel Management

Personnel Management enables you to administrate and manage each and everyone of your employees regarding their qualifications and abilities. You can find a fitting professional for any scheduled or unscheduled task immediately.



Documentation and Management of All Employee Resources

- > Qualifications and certificates
- > Work hours
- > Appointments
- > Costs
- > Document storage for each employee

4. Modules – 4.1 Task Management

Task Management provides an overview of your orders, employees and appointments status as well as resource loads.

Feedback Triggered By

- > Orders
- > Process steps
- > Results
- > Malfunctions
- > Material
- > Personnel work hours

The screenshot displays a software window titled 'Yearly security check Line 1/ST11-AK331 [1ST001]'. The interface includes a menu bar with options like 'File', 'Edit', 'View', 'Insert', 'Format', 'Extras', and 'Actions'. Below the menu is a toolbar with icons for saving, printing, and other functions. The main area contains a form for task details, including fields for 'Task number' (WO180450323), 'Start' (25.05.2018 08:00), 'End' (25.05.2018 10:30), 'Duration' (2.50 h), and 'Downtime' (0.00 h). It also shows 'Due date' (In CW 18/2018), 'Process status' (Expecting spare part delivery), 'In charge' (Marc Menzle), and 'Responsible' (Tom Walters [P010]). Below the form is a list of tasks with columns for 'Completed', 'OK', and 'Yes/No' status. The tasks include 'Functional check safety door', 'Functional check emergency switch', 'Optical check of electric connections', 'Functional inspection thickness measuring', 'Record operating hours', and 'Result of the inspection'. At the bottom, there are fields for 'Current total operating hours' (5874 h) and 'Approval passed?' (well passed, scrape passed, not passed).

Editing Orders With Interval and Fixed Appointments

- > Error messages, repairs, scheduled maintenance tasks are recorded centrally in the Task Management module
- > Further suggestions can either be scheduled, released, reset or declined
- > Option to create serial tasks
- > Every order triggers creation of order forms as well as feedback
- > A complete overview of order status and progress, accumulated costs, including budget comparison, is given at any time
- > Fast post-registration of operationally processed maintenances

How Does Feedback Work?

- > Feedback data enters post calculation
- > Feedback can also be recorded by scanner (barcode, RFID) or MDE-devices
- > Copying results into object properties
- > Recording of additional information by allowing commentary
- > Extended fault description by associating photos (requires digital camera in mobile device) with the option to highlight parts of the photo with a drawing tool
- > Booking to annual contract
- > Confirmation with digital signature

4.2 Event Management

Event Management is an easy to use module to optimize your fault management: all relevant data regarding an error message are recorded including “who, how, when, where?”. All necessary steps for further processing are already initiated during recording.

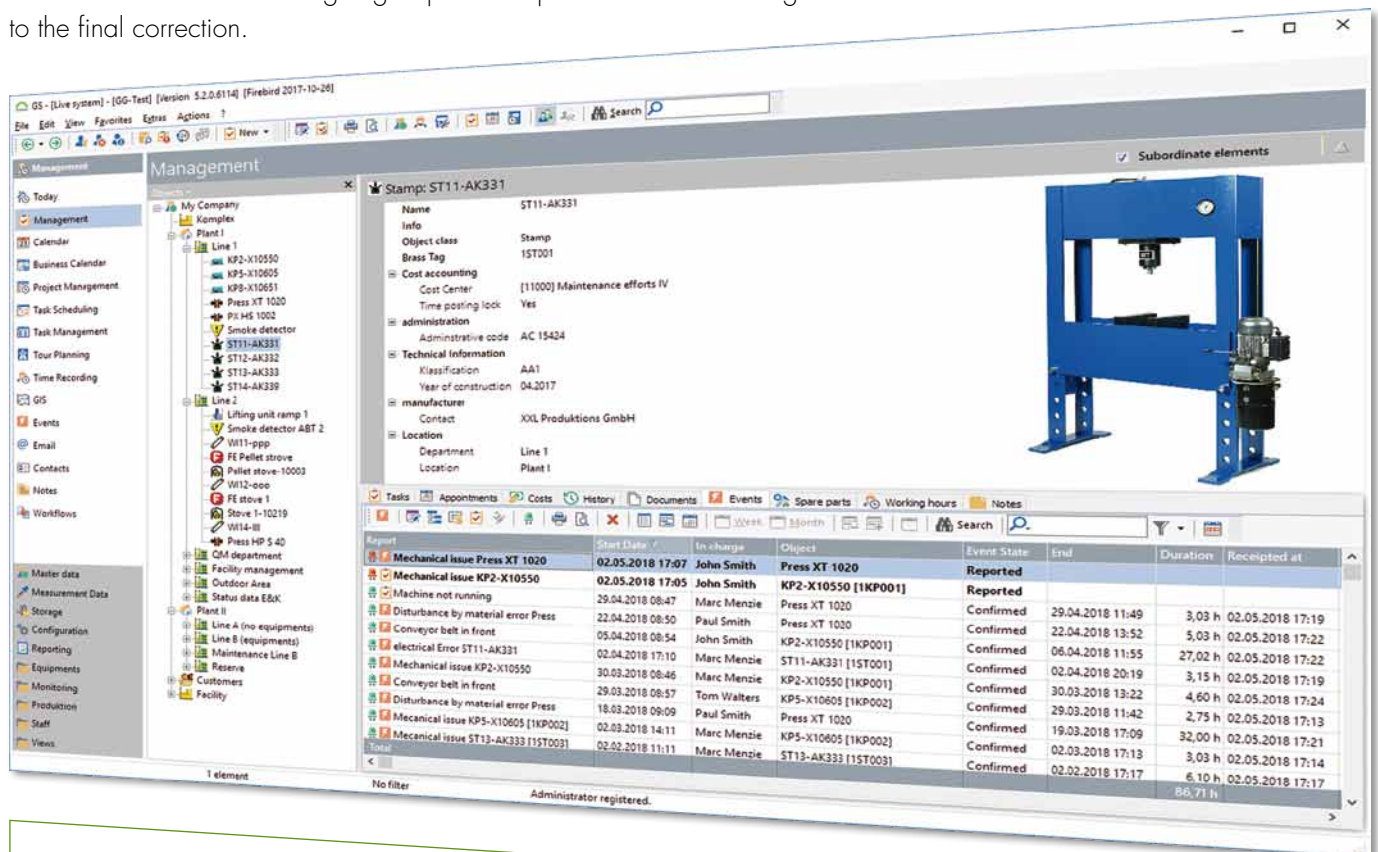
- > Who is responsible?
- > Which qualification is required?
- > What needs to be done?

Additionally, data is collected regarding time of occurrence, forwarding of information and time of error correction, so the entire fault process can be documented from the initial message right up to the final correction.

You can define fixed workflows for fault corrections using templates, automatically considering necessary work steps and which personnel to use in respect to their qualifications. Completion of the error solution will be automatically confirmed.

GS-Service Event Management can also process event messages of at-

tached process control systems. For example, using the extensive reporting abilities of GS-Service you can create detailed reports concerning error frequency and down-times or define classification numbers like MTBF (Mean Time Between Failures) or MTTR (Mean Time To Repair).



Functions Overview

- > Recording of all relevant data concerning a fault message (Who, what, where, etc.)
- > Capturing of multiple downtimes per fault
- > Symbolic display of different processing statuses
- > Integrated feature for planning and realizing fault resolving
- > Coupling of process control systems via OPC
- > Option to automate workflows for fault resolving
- > Automatic confirmation in the event of a fault resolving order
- > Extensive evaluation and reporting tools
- > Creation of MTBF and MTTR reports possible

4.3 Defect Management

Defects are not to be considered equivalent to faults or malfunctions, since in most cases they do not mean an interruption or impairment of working processes.

Defects are better to be considered as damages that can impair a production process in the long run, but do not necessarily require immediate action. Therefore, it is not worth it to generate a work order for every defect. For example, the flaking off of anti-corrosion

paint on a pump is a defect which does not affect functionality of the equipment but it can lead to serious damages in the future.

GS-Service provides the possibility to record and collect those kinds of damages for an object and work them off systematically.

The screenshot displays two overlapping windows from the GS-Service software. The 'Edit defect' window on the left contains the following fields:

- Description:** Corrosion at the thread head
- Definition:** Corrosion
- Category:** Weather Climate
- Object:** KP2-X10550 [1KP001]
- Object details:** Grinder Plant I Line 1 KP2-X10550
- Task:** (empty)
- Status:** Recorded
- Classification:** medium deficiency
- To be fixed by:** 31.08.2018 10:00
- Fixed on:** (empty)
- Fixed by:** (empty)
- Notes:** Sanding and re-priming before applying n

The 'Record defect' window on the right features a photograph of a metal component with a green arrow pointing to a defect. The interface includes tabs for 'Defect' and 'Damage', and a toolbar with icons for saving, closing, and other actions.

Functions Overview

- > Recording of defects for all operating objects
- > Definitions of defects and associated solving strategies
- > Systematic processing of recorded defects with the push of a button via GS-Task Management
- > Comprehensive analysis and report options
- > Recording and processing using mobile devices (requires GS-Mobile)
- > Supporting information by implementation of digital photos using suitable mobile devices

4.4 Document Management

GS-Service impresses by its diverse functionalities for a secure and efficient document management. Documents can be saved into a central electronic archive via mouse-click which saves time and money. Individual search criteria can be added as soon as the documents are saved using a keyword tagging feature.

Opening and editing of files is integrated with the works management by application linking, regardless of the file type being a technical drawing, an image file or a simple text document.

Integrated check-in/-out functionality prevents documents which are currently in editing to be accessed by other system users. Change- and access-logs can be documented with time stamps within the journal function of GS-Ser-

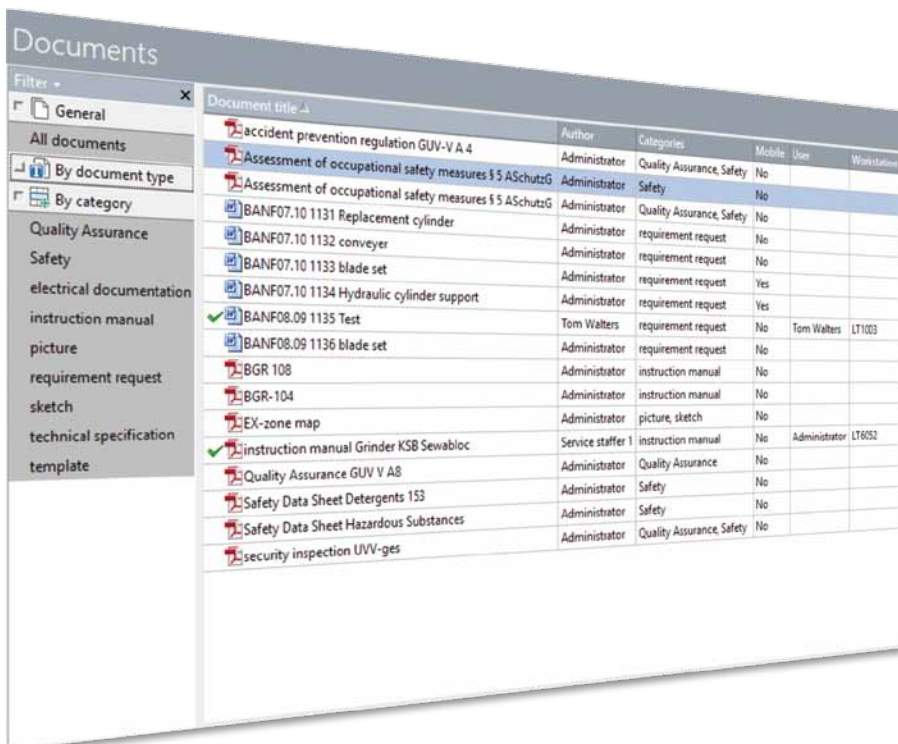
vice, if necessary. The type of access can be managed for each user, or groups of users, by assigning individual user credentials.

By directly linking a document with one or several objects/assembly groups/machines, all relevant information is always where it is really needed.

Since it is possible to create tasks on deposited documents, you can easily embed them in your workflows in an uncomplicated manner.

Documents can be created directly on an object using the serial printing feature based on individually styled Microsoft Word templates.

GS-Service Document Management allows for efficient and secure administration of your documents and significantly decreases search times.



Document title	Author	Categories	Mobile	User	Workstation
accident prevention regulation GUV-V A 4	Administrator	Quality Assurance, Safety	No		
Assessment of occupational safety measures § 5 ASchutzG	Administrator	Safety	No		
Assessment of occupational safety measures § 5 ASchutzG	Administrator	Quality Assurance, Safety	No		
BANF07.10 1131 Replacement cylinder	Administrator	requirement request	No		
BANF07.10 1132 conveyer	Administrator	requirement request	No		
BANF07.10 1133 blade set	Administrator	requirement request	Yes		
BANF07.10 1134 Hydraulic cylinder support	Administrator	requirement request	Yes		
BANF08.09 1135 Test	Tom Walters	requirement request	No	Tom Walters	LT1033
BANF08.09 1136 blade set	Administrator	requirement request	No		
BGR 108	Administrator	instruction manual	No		
BGR-104	Administrator	instruction manual	No		
EX-zone map	Administrator	picture, sketch	No		
instruction manual Grinder KSB Sewabloc	Service staffer 1	instruction manual	No	Administrator	LT6032
Quality Assurance GUV V A8	Administrator	Quality Assurance	No		
Safety Data Sheet Detergents 153	Administrator	Safety	No		
Safety Data Sheet Hazardous Substances	Administrator	Safety	No		
security inspection UVV-ges	Administrator	Quality Assurance, Safety	No		

Functions Overview

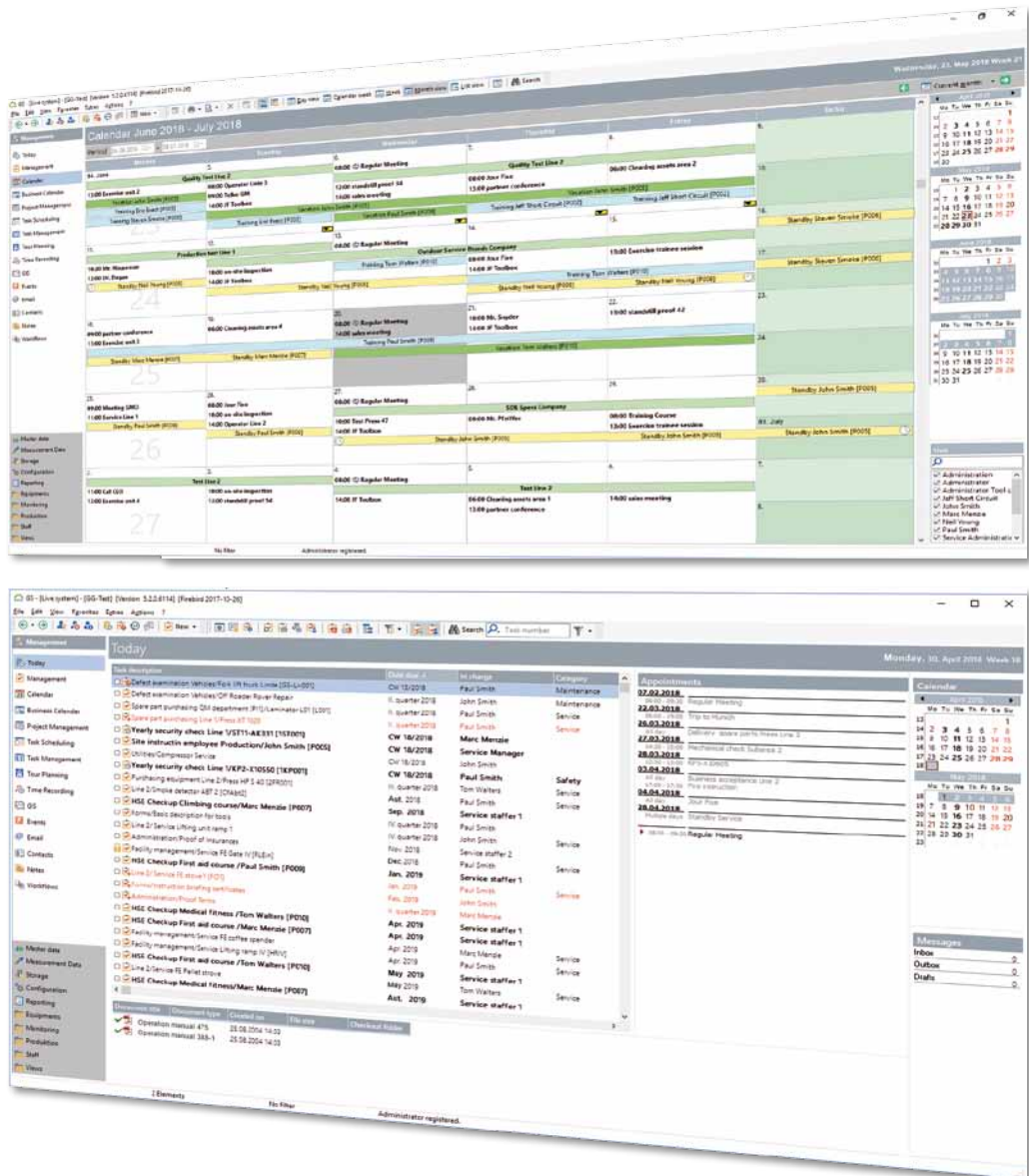
- > Management of documents and files of any type
- > Opening and editing directly from works management (requires applications to handle respective file types)
- > Linking of documents with one or any number of economic goods (facilities, operating objects)
- > Check-in/-out function
- > Individual keyword tagging and categorization
- > TWAIN interface
- > Logging of access and changes if needed
- > Individual assignment of user credentials per document
- > Task creation on documents
- > Generate serial documents using Microsoft Word templates
- > Check in documents via drag & drop

4.5 Office Communication

Consistent communication turns out to be an enormous factor of success for businesses. Disruptions in communication in turn mean frequent interruptions of business processes and are often a cause for mistakes.

GS-Service offers you several instruments for optimization and structuring of communication in your business:

- > Manage your contacts using the integrated contact management. Contact data of callers is already accessible before picking up the receiver via an interface with the phone switchboard (TAPI).
- > All system users are also able to communicate via messenger if an employee is not at his or her work place momentarily.
- > All functions are interconnected to ensure a smooth flow of information and system-overlapping communication.
- > Furthermore, an interface for Microsoft Outlook is provided to synchronize contact data and appointments.
- > Generating contact reports and analyses can be realized using the individual evaluation and reporting tools.



Functions Overview

- > Comprehensive contact management
- > Integrated e-mail client
- > Convenient appointment calendar
- > System integrated messenger
- > Interface to telephone switchboard (TAPI)

4.6 Reporting

GS-Service provides a very powerful reporting tool enabling you to generate up to date statements about every relevant area, such as facility history, order status, cost structures, etc.

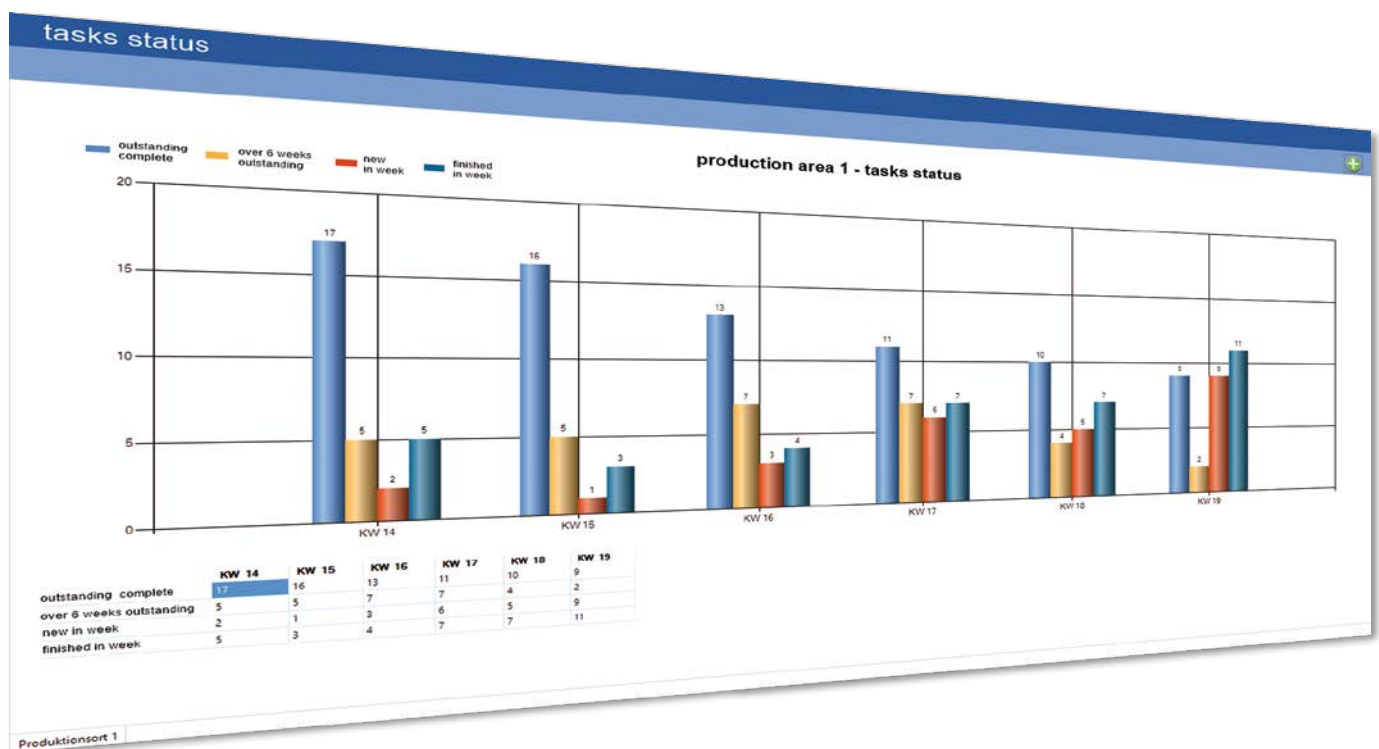
A number of reports and evaluations are pre-defined by default and are instantly accessible, providing management with reliable reports on daily, monthly or yearly reports at the push of

a button. Ad hoc evaluations can be adjusted and printed instantly as well, using integrated templates.

Alternatively, list views can be exported directly to Microsoft Excel as a base for further processing.

It is also possible to automatically generate customer specific reports using templates via the COM-interface.

To support you with the complex matter of "Compiling of Evaluations and Reports With GS-Service" we provide a separate practice seminar.



Functions Overview

- > Standard reports instantly accessible
- > Adjustment of standard reports possible
- > Generating individual reports using VB-script
- > Transfer of master and operational data to external reporting tools or other software applications for evaluation (e. g. Microsoft Excel)
- > Integrated report generator
- > ODBC-data source for linkage with external applications
- > Time controlled generation of reports using the internal report generator

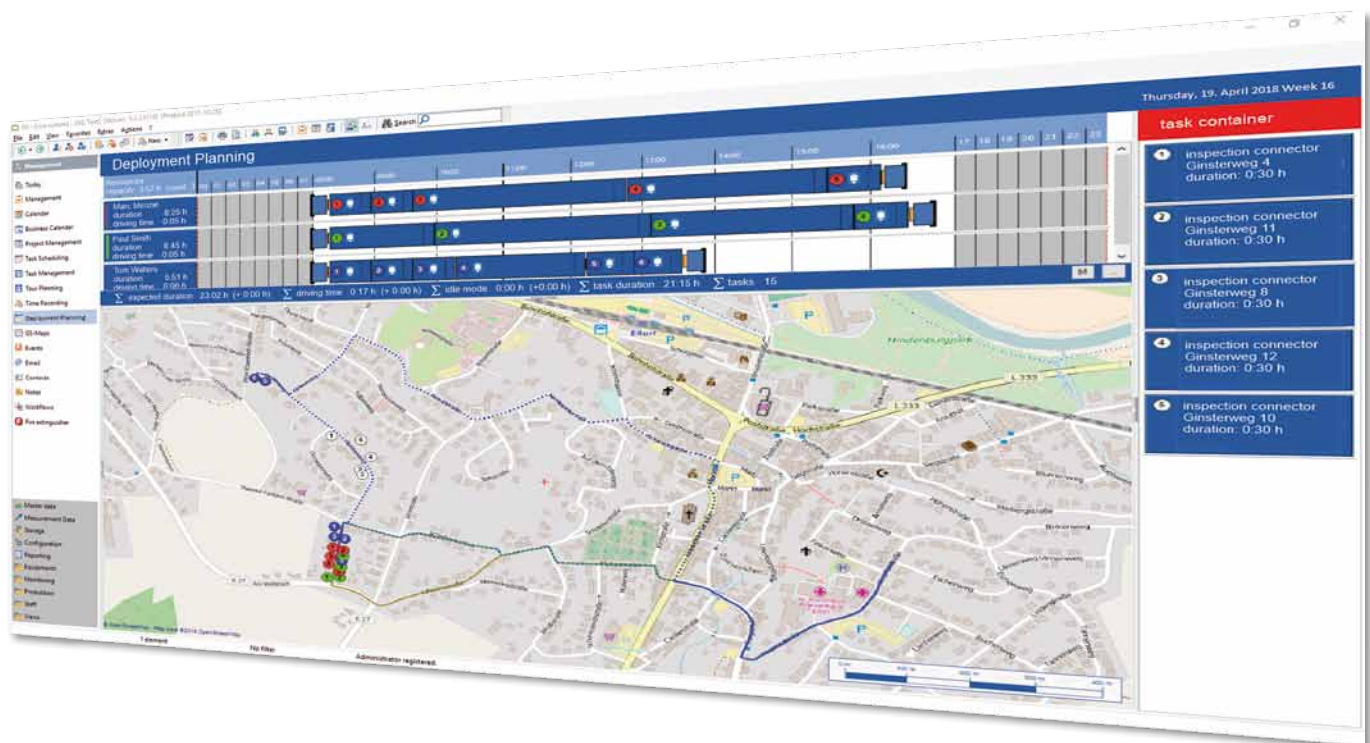
4.7 Resource Planning

The GS-module Resource Planning supports dispatching of spatially dispersed tasks, taking into account resources, qualifications and appointments. Dispatching takes place interactively and dynamically reacts to new requirements such as error events. The dispatcher can create ad hoc tasks and add them to resource planning. All assignment locations and routes are available at a glance via the overlay map.

Tasks which are due and have not been planned, yet, are being stored within the task tray. Those tasks may require different qualifications or contain fixed appointments. Based on these conditions the software will create schedule suggestions, which

- > will represent an optimum of balanced employee workload and short driving routes
- > will place every already previously fixed order
- > with respect to all required qualifications.

Calculated suggestions can be edited manually and saved as additional variant. The variant eventually chosen by the dispatcher can be assigned to the employee responsible as a tour on a mobile device.



Functions Overview

- > Graphic display of tours, locations and tasks
- > Calculation of planning suggestions optimized by route and employee load
- > Supports manual dispatching

Fields of Application

- > Regional suppliers for gas, water, power, district heating
- > Controlling/checking of disposal (sewage)
- > Meter read-off
- > Home port checks
- > Massive industrial plants
- > Public lighting
- > Error report management

Planning Parameters for Dispatchers

- > Location determines the place for employee engagement beginning and ending
- > Setup time specifies the duration necessary for loading and unloading vehicles
- > Buffer time specifies additional time needed for task completion (e.g. walking into a basement to get to the meters or the waiting period until a door is opened)
- > Locations freely selectable (Business or different location)

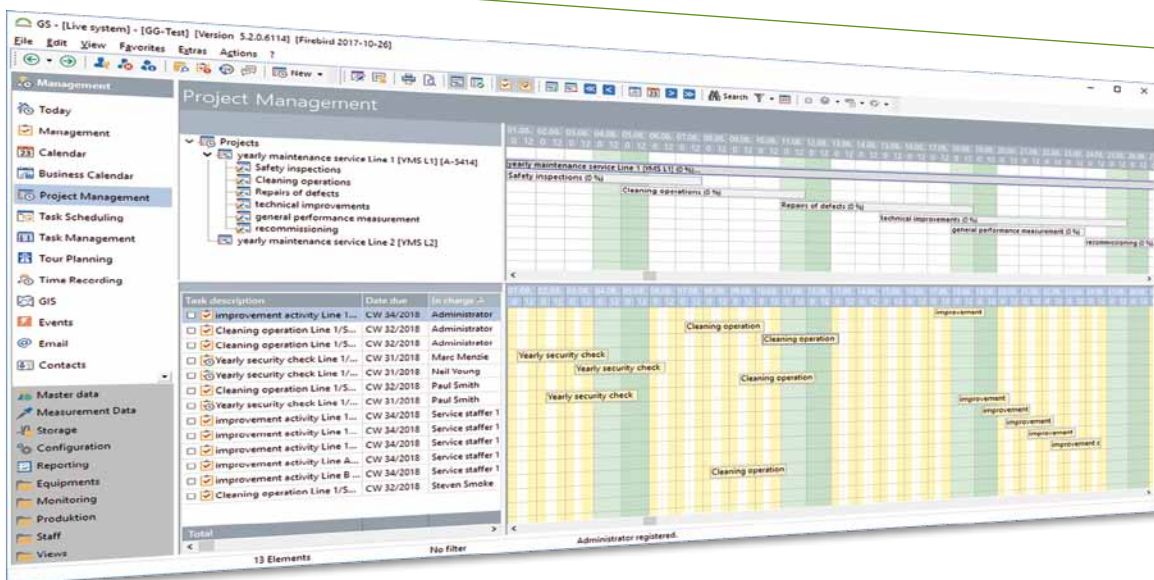
4.8 Project Planning

Using the Project Planning module, several measures can be combined into one project vis-à-vis planning costs and actual cost. A series of tasks is allocated to each measure, costs will be analyzed via the measure.

Aside from planning single projects like new buildings or revision measures, it is also possible to create and analyze cyclical maintenance measures as a project. Milestones can be defined for every project to inform about current project progress. Projects can be linked in logical progressions to allow for planning of complex measures.

Functions Overview

- > Determination of requirements for upstream processes/operations
- > Requisitioning and planning of resources
- > Scheduling of orders considering priority or logical succession
- > Effort and cost assessment
- > Budget assessment and monitoring
- > Transition from planning to dispatching
- > Dispatch overview with workload display
- > Completion of project with target and actual cost



4.9 Warehouse Management

The Warehouse module manages your material masters.

Management of spare-parts, repaired parts, non-productive materials, etc. is done with the material masters list. This is the basis for the bill of materials and the

assignment of materials to orders, respectively. Warehousing and purchasing are also based on the articles managed by the material masters.

Special Features

- > Batch management with consistent proof
- > Serial number management including history function for every serial number
- > Stock processing with storage assignment
- > Assignment of external documents of any format (e.g. CAD drawings, assembly manuals, certificates)
- > Inventory stock and movement data, statistics
- > Acquisition data (manufacturer, supplier, purchase costs, discounts)
- > Proof of use

Functions Overview

- > Management of stock lists for material, spare-parts, non-productive materials
- > Freely definable, multi-level storage yard hierarchy
- > Overlapping storage stock information (management of pseudo storages)
- > Freely definable ways of booking
- > Automatic booking, e.g. delivery to stock receipt (access or delivery?)
- > Disposal on notice of finished order
- > Booking to cost center/object/project/order
- > Convenient manual booking possibilities (deliveries, disposals, relocation)
- > Management and documentation of material batches
- > Gap-less booking statistics
- > Inventory registration, processing and evaluation
- > Management and analysis of minimum stock and re-order levels
- > Various stock and evaluation lists
- > Proof of installation and usage of inventory
- > Transfer frequency
- > Spare part management
- > Booking via handheld scanner

The screenshot displays the GS-Service software interface. The top section shows a 'Stock' list with columns for Stock, Article, Article number, Article match code, Amount, Value, Min stock level, and Max stock level. The bottom section shows a 'Batch overview' table for 'Merkur white oil Pharma 70 Fa. DEA' with columns for Batch number, Quantity, Price per unit, Total price, Date of delivery, Date of storage, Date of inventory, Removal, Best before date, Material status, Warranty until, and Reserved for.

Stock	Article	Article number	Article match code	Amount	Value	Min stock level	Max stock level
Oil Stock	Adhesion lubricant S.K.D.3400 25 kg	OE SKD3400		4,000 kg	960,00 €		
Main Stock	Cable cable 12 conductors	E-INST-90001		28 pcs	900,00 €		
Main Stock	Conveyor ribbon linen	10000		6 pcs	1.332,00 €		
Main Stock	Distance meter	SEK20004		12 pcs	156,00 €		
Main Stock	Filling-level meter	GTR-10000		7 pcs	0,00 €		
Main Stock	Gear drive 1	GTR-10001		9 pcs	6.172,00 €		
Main Stock	Gear drive 2	OE DEA70		22 pcs	990,00 €		
Main Stock	Merkur white oil Pharma 70 Fa. DEA	OE DEA70		470,00 l	2.664,50 €		
Main Stock	MID DIN 100	SEK20002		50,00 l	312,50 €		
Main Stock	MID DIN 150	SEK20003		7 pcs	0,00 €		
Main Stock	SAE W10	OE SAEW10		6 pcs	0,00 €		
Main Stock	SAE W20	OE SAEW20		1110,00 l	1.320,00 €		
Main Stock	SAE W40	OE SAEW40		20,00 l	360,00 €		
Main Stock	SAE W60	OE SAEW60		100,00 l	1.400,00 €		
Main Stock	Sealing compound SQ 31 paintable	MAR70001		500,00 l	0,00 €		
Main Stock	Sealing compound SQ 31 paintable	ETK 30001		213 pcs	4.000,00 €		
Total				12 pcs	35.603,00 €		

Batch number	Quantity	Price per unit	Total price	Date of delivery	Date of storage	Date of inventory	Removal	Best before date	Material status	Warranty until	Reserved for
OE DEA70-7	400,00 l	113,00 €/l	2.260,00 €						-unlimited-		
OE DEA70-6	35,00 l	113,00 €/l	197,75 €		13.10.2007				-unlimited-		
OE DEA70-5	0,00 l	113,00 €/l	0,00 €		15.11.2004				-unlimited-		
OE DEA70-4	20,00 l	113,00 €/l	113,00 €		15.11.2004				-unlimited-		
OE DEA70-1	15,00 l	125,00 €/l	93,75 €		11.11.2004				-unlimited-		
Total	470,00 l		2.664,50 €								

The entire acquisition chain can be visualized using the **purchasing management**.

Functions Overview

- > Creation, editing and triggering of supply orders
- > Convenient creation and processing of supplier inquiries
- > Assignment of cost centers/objects/projects/orders
- > Generation of order suggestions, e.g. lower deviation of minimum stock or reorder level
- > Booking of stock-receipt in storage
- > Extensive statistics

4.10 Cost Module with Time Registration

Time is money, which is also true for all activities organized with GS. This is the reason why recorded work hours, machine hours and used materials generate expense ratios which are assigned to the individual object. These expenses are of course also booked in the cost center which can influence current budgets invested in one or several cost centers.

The screenshot shows a software window titled "Working hours [Staff]". It contains several input fields and calculated values:

- Date:** 22.05.2018 (with a calendar icon), **Dienstag**
- Staff:** Marc Menzie [P007]
- Hourly rate:** 45,00 €
- Object:** ST12-AK332
- Object details:** 3542302
- Cost center:** [11000] Maintenance efforts IV
- External:** 010
- Manufacturer Ltd.:** (dropdown menu)
- Activity:** ST12-AK332 Functional check signals
- Task:** (empty field)
- Info:** Working with electrical testing - Addition 2
- Project:** (empty field)
- Duration [h]:** 4,00
- Pl. hours[h]:** 8,00
- Resulting costs:** 180,00 €
- Booked [h]:** 4,00

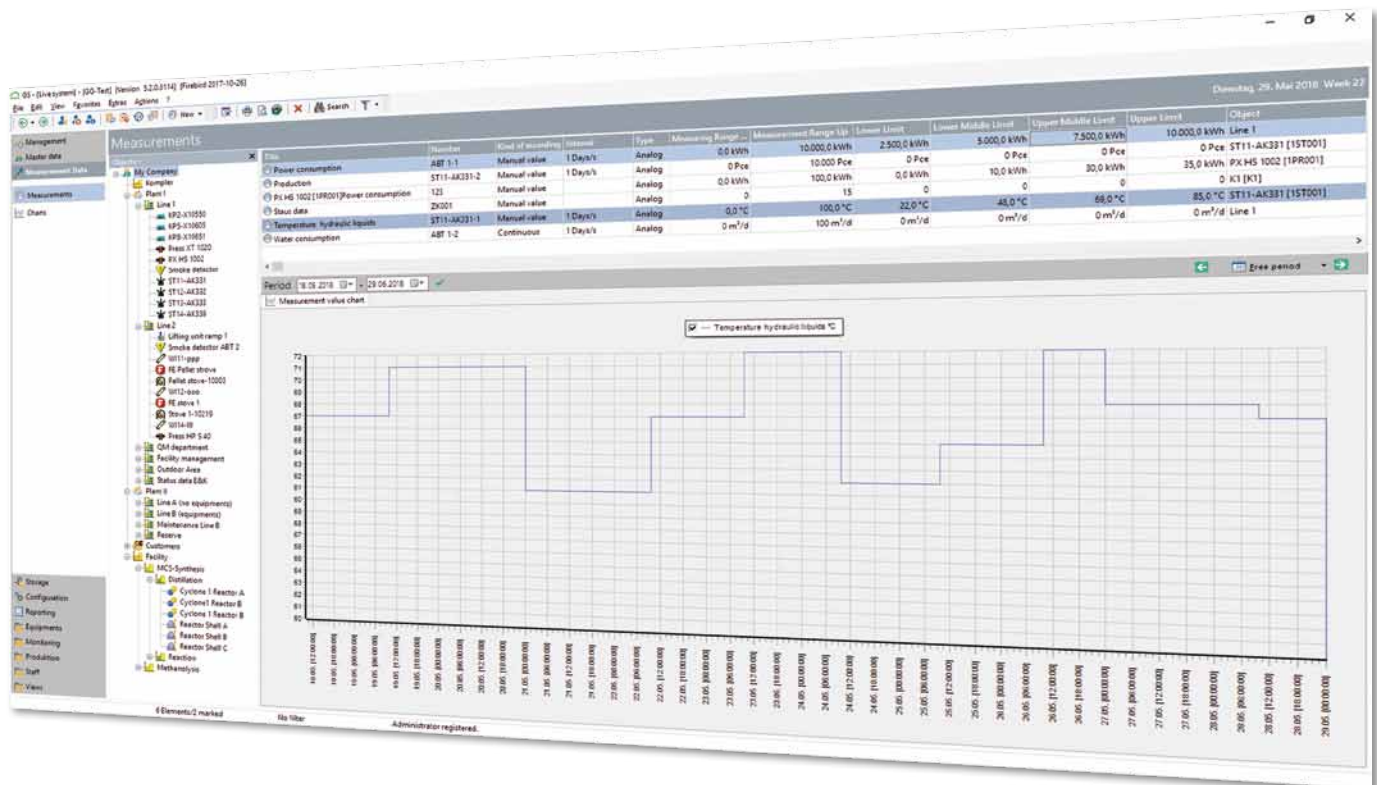
"Budget Management" is the ideal assistance to keep a swift financial overview.

An evaluation of budgets and costs can be done up-to-the minute at any time. Accrued costs can be sorted for any time period by cost center, object or other criteria with minimal effort.

GS offers the possibility to gear your budget management individually and flexibly towards your business.

4.11 Measurement Data Management

By using electronic counting systems, consumption data from central building control systems can be registered and transmitted. This presents you with the option of a central consumption data measurement without having to actually go to the respective areas.

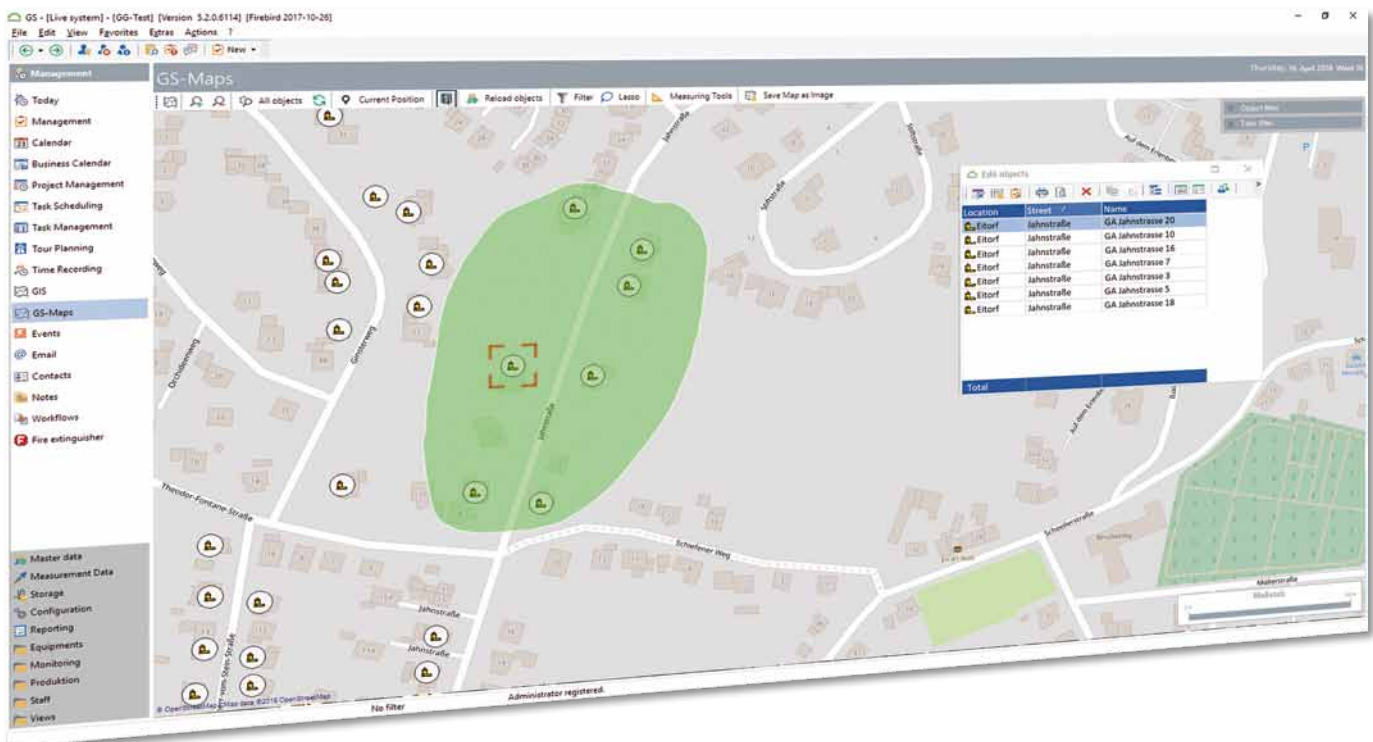
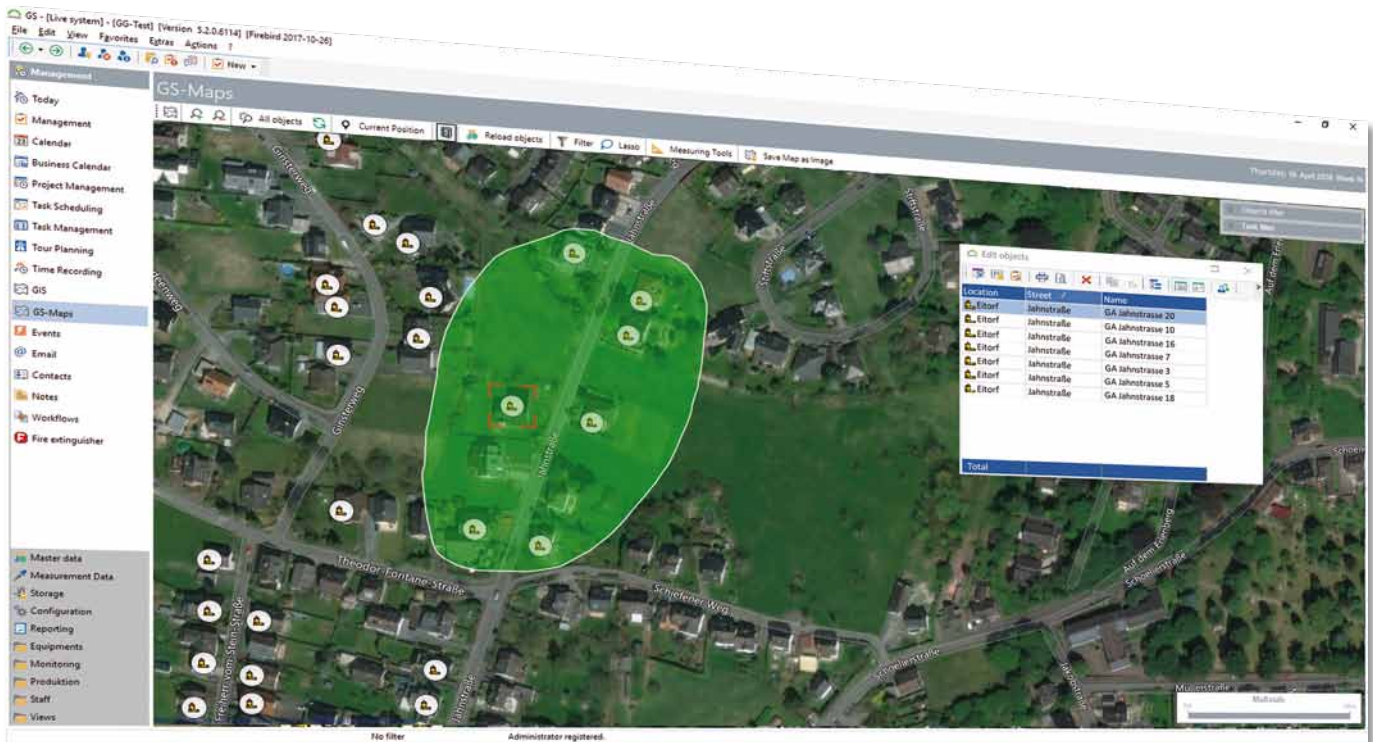


Elaborate appointment coordinations between read-off service and users are dispensed with. You will gain optimal raw data for energy management by short recording intervals.

The 'Edit measurement' dialog box is shown, allowing configuration of a measurement. The 'Description' is 'Temperature hydraulic liquids'. The 'Number' is 'ST11-AK331-1' and the 'Object' is 'ST11-AK331 (1ST001)'. The 'Recording type' is 'Manual measurement/value' and the 'Recurrence' is '1 Days/s'. The 'Type' is 'Analog measurement value' and the 'Unit' is '°C Degree'. The 'Measurement range from' is '0,0' and the 'Measurement range to' is '100,0'. The 'Replacement value (in case of)' is '0,0'. The 'Upper threshold values' are '85,0', '69,0', '48,0', and '22,0'. The 'Available online' checkbox is unchecked.

4.12 GS-Maps

GS-Maps opens up new possibilities for easy and intuitive dispatching using a map display for mobile as well as stationary use. Several different map providers, like OpenStreetMap, Google, Bing, DXF, or implementation of your own GIS-data via WebMapServices (WMS), can be provided on- as well as offline. Dispatchers are supported in their daily routine by extensive filtering options and object status visualization on the map. Open tasks, activities and faults are directly displayed on the map and can be processed from there.



4.13 GS-PDFSyncService

GS-PDFSyncService enables you to generate orders as a PDF form which can be edited on any terminal. GS-PDFSyncService automatically controls the entire process from generating the PDF order form to reading it in with automatic feedback of results into GS-Service.

Sharing and automatic read-in of the forms can be realized by using a "Dropbox". Dropbox is available for several different platforms (Apple, Microsoft, etc.) and enables a secure sharing of data.

Functionality of GS-PDFSyncServices:

- > A PDF form is produced with a task assigned to the PDF device which is saved into a pre-defined folder (e.g. Dropbox). The form is now ready to be filled in.
- > Import after editing is performed automatically including recording of the results and confirmation of the order.

Yearly security check Line 1/ST11-AK331 [1ST00]

Task description	Yearly security check Line 1/ST11-AK331 [1ST001]		
Task number	WO180450323	Category	Safety
Date due	CW 18/2018	In charge	Marc Menzie
Start date	25.05.2018 08:00	Responsible	Tom Walters [P010]
Frequency	every 52. week on Monday (after execution)		

Name: ST11-AK331

Personal	Staff	Reservations
Maintenance P010	Tom Walters	25.05.2018 08:00-25.05.2018 10:30

[Stamp] Line 1/ST11-AK331 [1ST001]

- ☒ Corrosion
- ☐ Screw loose
- ☐ Weathering
- ☐ abnormal noises
- ☒ paint damages

Functional check safety door on: 23.05.2018
OK Yes ☒ / No ☐

Functional check emergency switch on: 23.05.2018
OK Yes ☒ / No ☐

Optical check of electric connections on: 23.05.2018
OK Yes ☒ / No ☐

Functional inspection thickness measuring on: 23.05.2018

Record operating hours Completed: Yes ☒ / No ☐
Current total operating hours 5874 h

Result of the inspection Completed: Yes ☒ / No ☐
Approval passed?
well passed
scrape passed
not passed

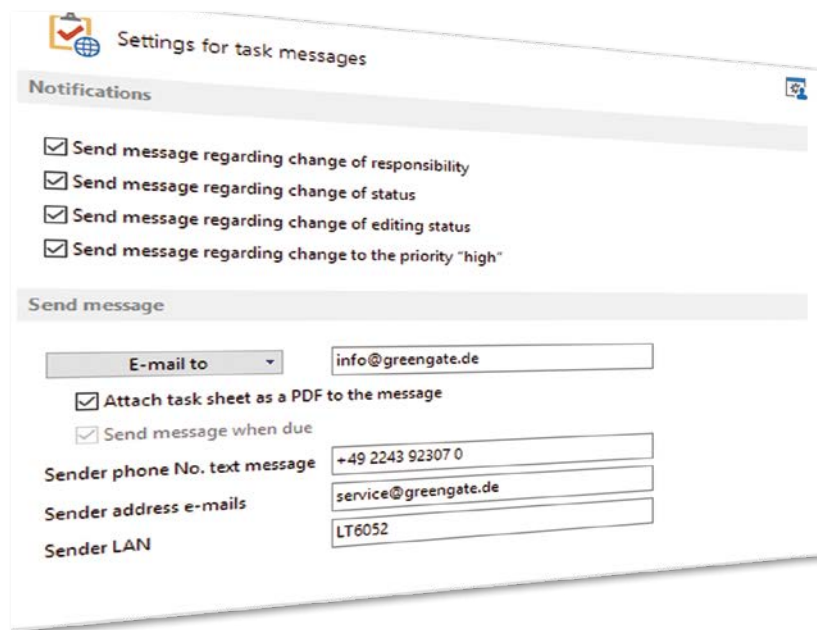
Date: Edited by: Total duration: h [2,50 h]

Advantages at a Glance

- > Easy handling
- > Ready for use in bulk business
- > Easy transmission to the GS-System via internet from anywhere (Dropbox)
- > Cross-platform feedback possible (Apple/iOS, Android, Windows)
- > No additional manual input required, therefore up to date data

4.14 GS-Notification Service

Using the Notification Service enables GS-Service to send messages/notifications automatically via e-mail, text-messaging or the local network.



Settings for task messages

Notifications

- ☒ Send message regarding change of responsibility
- ☒ Send message regarding change of status
- ☒ Send message regarding change of editing status
- ☒ Send message regarding change to the priority "high"

Send message

E-mail to: info@greengate.de

☒ Attach task sheet as a PDF to the message

☒ Send message when due

Sender phone No. text message: +49 2243 92307 0

Sender address e-mails: service@greengate.de

Sender LAN: LT6052

Notifications can be triggered by different events, such as changes in responsibility, status, processing or priority. Additionally, a PDF order form can be attached to an e-mail, if tasks have been previously specified for the event.

A notification for lower deviation in storage, for example, is triggered by lower deviation of the reorder level or the minimum stock of items in store.

Optionally, an item report for the article in question can be attached as a PDF document to an email notification.

Applications of GS-Notification Service

- > Notifications for tasks
- > Notifications in case of events
- > Notifications for lower deviations in storage

5. Mobile Systems – 5.1 GS-Mobile

GS-Mobile by GreenGate is a milestone of mobile order acquisition. As a mobile system for order documentation and feedback, GS-Mobile offers you access to required asset master data as well as optional consistent order feedback at any time. Being developed for use on Windows-based tablet computers, especially the Motion F5, renders GS-Mobile flexibly, efficiently and safely deployable anywhere, anytime.

Service Spectrum of GS-Mobile

- > Mobile processing of tasks, activities, results, object properties
- > Confirmation assistant for comfortable order processing
- > Registration of work hours in respect to tasks or activities
- > Creation of ad hoc orders
- > Filtered display of tasks based on logged in user profiles
- > Defect registration for objects
- > Option to allocate photographs to objects, tasks or defects with an integrated digital camera
- > Put markers on photographs
- > Digital signatures for order confirmation
- > Supports barcode scanning and RFID

New Functions for GS-Mobile on PC's

- > Documents of any kind are available from the main system or can be created when mobile
- > Work hours can be recorded per employee or team, relative to orders
- > Display of operating objects in Google Maps using deposited geo-coordinates
- > Direct connectivity of mobile GIS-systems to GS-Mobile supported
- > Embedding of ID methods in GS-Mobile supported, such as barcodes or RFID
- > Automatic updating of mobile devices by synchronizing decreases administrative effort

Using GS-Mobile you can

- > Complete orders without using paper
- > Ensure a gap-less order feedback including expended working time
- > Provide and update all necessary master data on location if required and
- > Record and document defects and faults relative to order processing as well as identify the operating object or commodity in question using RFID, GPS or barcodes.

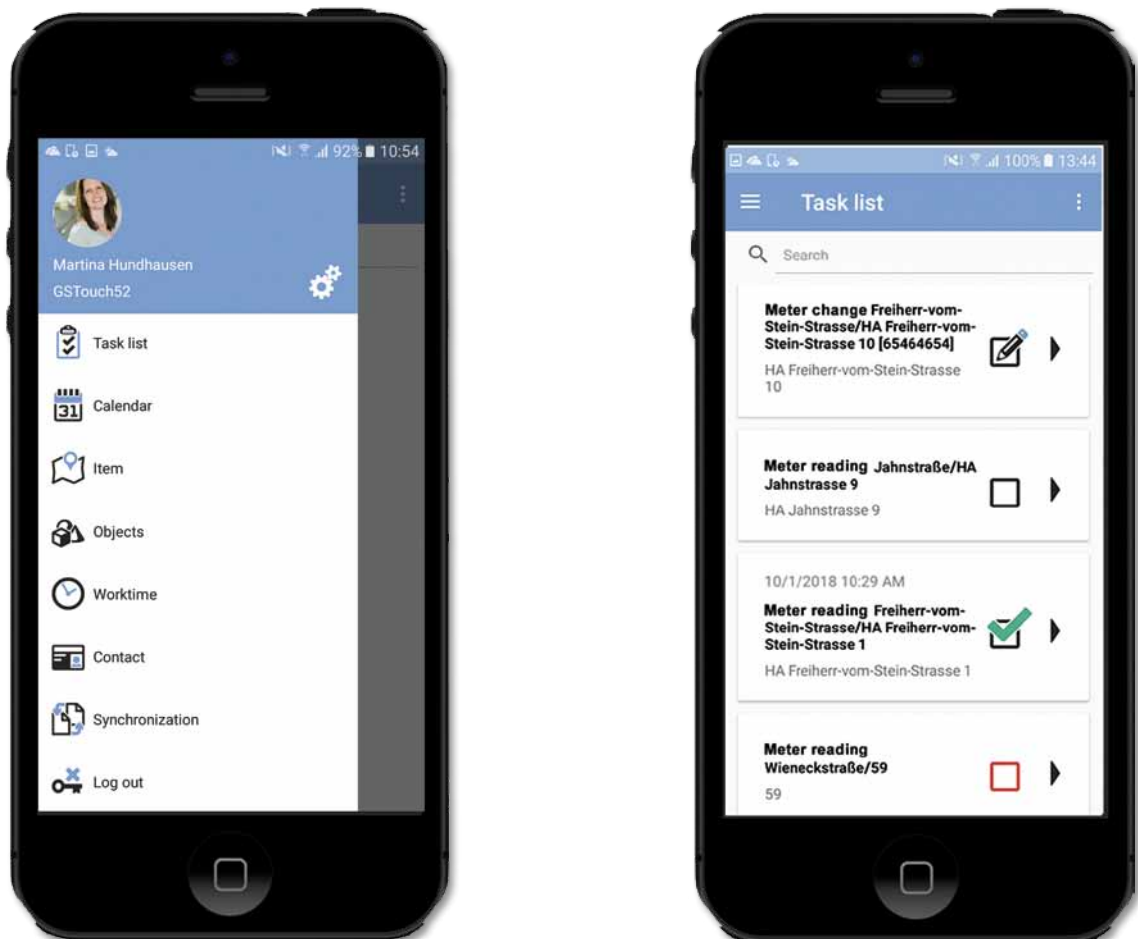


Functions of GS-Mobile

- > Mobile provision of all types of documents
- > Displays operating objects in Google Maps or OpenGIS by means of deposited geo-coordinates
- > Automatically updates mobile devices via synchronization, thereby decreasing administrative effort significantly
- > Automatic software update

5.2 GS-Touch

GS-Touch was expressly developed with the possibility in mind to integrate individual customer processes next to common functions (e.g. meter exchange, fault recording, etc.). Nearly every use case can be covered using this architecture. The goal is to adapt a very easy procedure for every device platform. GS-Touch runs on Android smartphones and tablets as well as on iPhones, iPads and Windows 10 mobile devices.



GS-Touch – What is it Capable of?

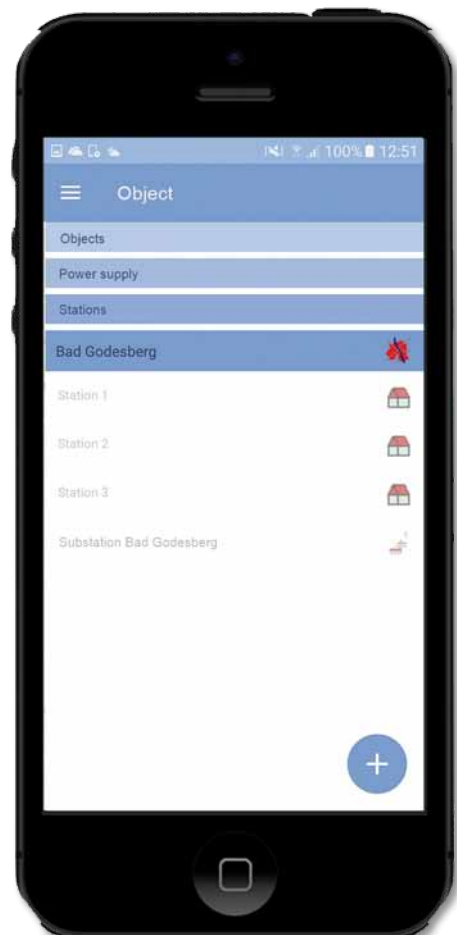
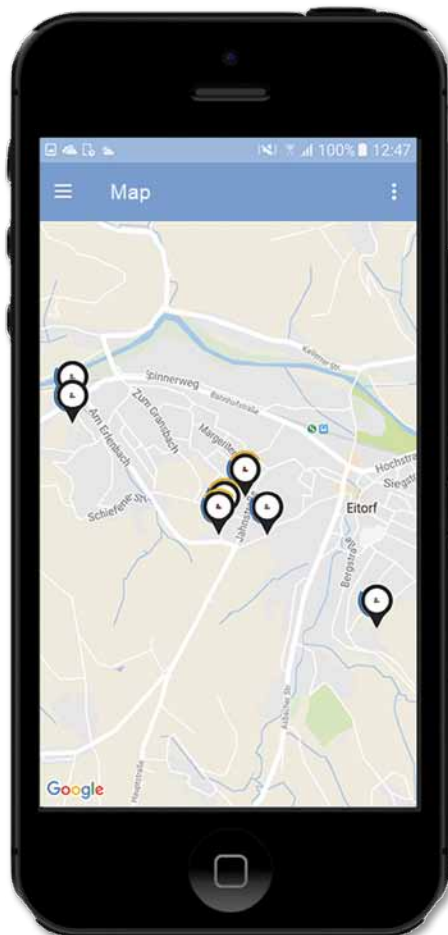
- > Order processing in well arranged checklists, including works in progress, results and details regarding objects
- > Mobile registration (inspection) and processing (maintenance) of defects
- > Mobile time registration for individual employees and groups
- > Mobile documents like photographs of defects and repair instructions
- > Map display for objects, tasks and defects
- > Objects within the object-tree
- > Required mobile contacts

Your Advantages

- > Up-to-the-minute overview of tasks
- > Offhand defect registration without tasks
- > Autonomous rescheduling of appointments in the calendar
- > Direct work-hour booking en route
- > Timely feedback of completed tasks en route
- > Fill idle time with unscheduled tasks from the vicinity
- > Navigate to contact data or contact directly

Functions Overview

- > Ergonomic touch-input with gesture control
- > Android, iOS and Windows Phone support
- > Supports GPS, barcodes, camera, RFID
- > Data registration and image recognition via smartphone camera (pixolus)
- > Scheduling
- > Time registration
- > Mobile documents
- > Standard workflow for tasks, activities and events
- > Fault registration
- > Parallel use with GS-Mobile



Application examples

- > Procurements to external companies
- > Counter reading
- > Counter change
- > Recording and reporting faults
- > Record defects
- > Maintenance processes

6. Performance Overview

Standard – Professional – Enterprise

GS-Service	Standard	Professional	Enterprise
> Database Interface	Firebird	Firebird, MS-SQL	Firebird, MS-SQL
> Task Management/Operations Calendar	✓	✓	✓
> Reporting	✓	✓	✓
> Document Management	✓	✓	✓
> Configuration/Master Data	✓	✓	✓
> Contacts- and Appointment Scheduling	✓	✓	✓
> Event Management/Defect Management	✓	✓	✓
> Event Client		✓	✓
> Resource Planning		✓	✓
> Cost Module with Time Registration		✓	✓
> Warehouse Management		✓	✓
> Project Planning		✓	✓
> Client Management		✓	✓
> Measurement Data Management		✓	✓
> MS-Outlook Connectivity		✓	✓
> CTI Interface (TAPI)		✓	✓
> Scanner Interface (TWAIN)		✓	✓
> GS-Maps			✓
> GS-Notification Service			✓
> GS-PDFSyncService			✓
> GS-LogViewer			✓
> GS-DataSync			✓
> GS-Eventserver (OPC)			✓

GS-Mobile	Standard	Professional	Enterprise
> Operating Systems	Windows 7,8,10	Windows 7,8,10	Windows 7,8,10
> Task Management	✓	✓	✓
> Document Management	✓	✓	✓
> Defect Registration	✓	✓	✓
> Warehouse Management		✓	✓
> Time Registration		✓	✓
> GS-Maps			✓
> Meter Read-off via Camera			✓

GS-Touch	Standard	Professional	Enterprise
> Operating Systems	Android, iOS	Android, iOS	Android, iOS
> Task Management	✓	✓	✓
> Document Management	✓	✓	✓
> Defect Registration	✓	✓	✓
> Time Registration		✓	✓
> GS-Maps			✓
> Meter Read-off via Camera			✓

Support	Standard	Professional*	Enterprise**
> GS-Service, GS-Mobile, GS-Touch		+ 1,5 %	+ 3 %

Licensed separately:

- > GS-Editor
- > GS-Designer
- > Oracle connectivity

* including annual GS-user meeting

** including GS-user meeting and yearly appointment on location

7. Maturity Level Evaluation

Maturity Level Maintenance Check (MLM-check): a maturity level analysis for targeted evaluation of maintenance. Do you know these questions: "How well-placed is our maintenance organization?", "What potential for improvement is there?", "What areas will profit most from further development?"

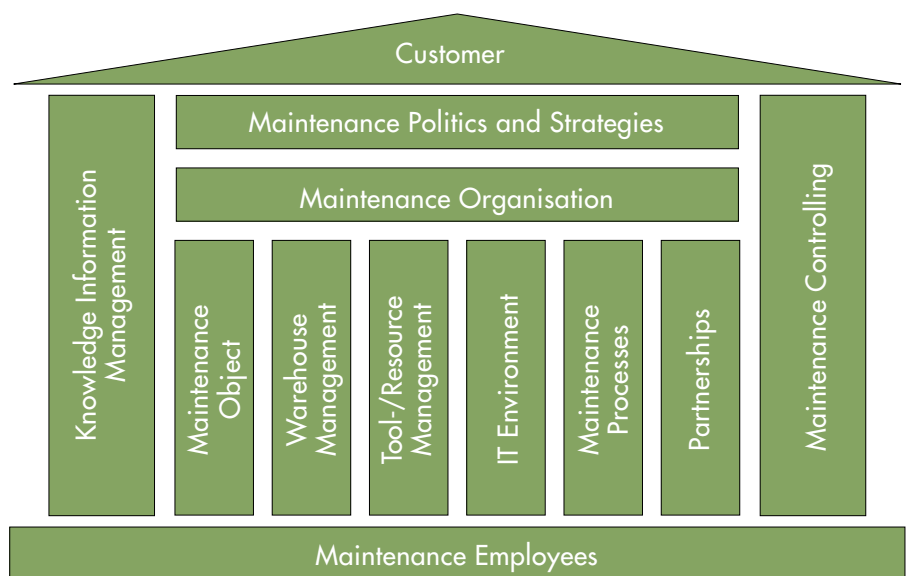
Answers to these questions will only be available for those who intensely address pushing for maintenance. But how to get valid results? Specialists with practical experience and scientists (FIR/RWTH Aachen) deliver a newly developed order- and analysis scheme by introducing the novel Maturity Level Evaluation Check, producing answers to the most important questions of maintenance organization with little effort: using the Maturity Level Evaluation Check, the actual state of any maintenance organization can be registered and evaluated. The result: registering the present maturity level of maintenance within defined schemes and flagging development potentials for targeted optimization.

How does the MLM-Check work in detail?

MLM-Check is a diagnostic instrument enabling individual locality analyses.

The "House of Maintenance" is the

basis for the MLM-Check. Every maintenance organization is broken down to their core areas using 12 different schemes/design-fields. These will then be analyzed and evaluated in detail.



Definitions of the 12 Design-Fields

1. **Maintenance Employees**
Embedding employees into the organization and designing of work environments
2. **Maintenance Object**
Facility structure, usage and load factor
3. **Maintenance Process**
Processing in maintenance and technical IT support
4. **Maintenance Politics and Strategies**
Maintenance Organization management and development of long-term goals
5. **Maintenance Organization**
Structure and design of Maintenance Organization and each organizational unit
6. **Partnerships**
Maintenance Organization handling of external partners (3rd-party companies) and management of those partnerships
7. **Knowledge/Information Management**
Conserving, structuring and distribution of IH-specific knowledge within Maintenance Organization
8. **Maintenance Controlling**
Mechanics and auxiliary means for management and control of Maintenance Organization
9. **IT Environment**
Designing of IT systems and interfaces between different systems in Maintenance Organization
10. **Customer**
Structuring of relations between production department as a customer and Maintenance Organization
11. **Warehouse Management**
Structuring of spare-parts procurement, storage, deployment and classification
12. **Tool/Resource Management**
Structuring of activities to optimally deploy tools, operational and technical resources to perform maintenance operations

Emphasis of Design-Fields

Individual design-fields are emphasized depending on their importance in relation to corporate strategies and targets. Especially important fields of maintenance organization will be emphasized more accordingly.

Determination of Maturity Levels

During the Maturity Level Maintenance Check, each design-field within the

House of Maintenance is gradually analyzed to determine respective maturity levels.

To this end, a focused analysis of every design-field is conducted, using criteria describing typical characteristics and processes of an organization. Representative questions with five possible answers are assigned to each criterion, thus mirroring the maturity levels.

Design-field maturity levels are determined by aggregation of every criterion based on the evaluation of said criteria.

Overall maturity levels of organizations are determined by aggregation of maturity levels of all design-fields.

A complete status determination employing MLM-Check necessitates evaluation of each of the 12 design-fields.

Results of Completed MLM-Checks are

- > Objective determination of the status quo of a maintenance organization
- > Specific analysis of individual strengths and weaknesses
- > Systematic identification of improvement potentials
- > Aimed determination of action emphasis and priority measures for efficient improvement of identified weaknesses
- > Provision of an easy classification number system for surveillance of achieved successes and comparison to previously performed assessments



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8. Agile Project Management

IT projects for maintenance management, technical industrial management and workforce management present everyone involved with huge tasks. Currently, a clear trend towards Agile Project Management can be observed when introducing new or modifying already existing IT systems within the stress field of financial, legal and functional challenges.

The idea of Agile Project Management is to

- develop a project step by step
- using a self-organizing, interdisciplinary team
- periodically (sprints)

with the result of

- keeping orders lean by prioritizing
- quickly realizing customer concerns
- being able to flexibly react to changes in later project phases.

The agile methodology corresponds with the dynamics of IT projects because often times requirements and

problems only crystallize during progression of the project. If planning and policy are not flexible, later modifications can only be realized with significant financial and time-consuming efforts. GreenGate AG has successfully realized quite a few projects utilizing Agile Project Management with great user acceptance.

Waterfall or Agile Methods?

How does Agile Project Management differ from classical methods like the waterfall approach?

The so-called waterfall approach is a linear project development approach: concept phase, product requirements and functional specifica-

tions documents, introduction and start of operations.

Strikingly, with this approach project results are pre-defined without regard to imponderables during project progression while precise time and cost efforts are usually only accounted for with reservations. Agile Project Management is different: time and cost efforts are precisely accounted for, project targets defined and project results are only roughly outlined as a general rule. Project development progresses periodically in a flexible succession of planning and development phases, so-called Sprints, which are understood as project steps with partial software engineering.



Documentation

In Agile Project Management, GreenGate documents meeting results, occurring events and opinions together with its customers directly in the central project document, the project status report. Therefore, time-consuming changes to the protocol in the aftermath are completely eliminated.

This simple tool enables high transparency and renders project progression comprehensively for everyone, not only those directly involved.

Legal Certainty

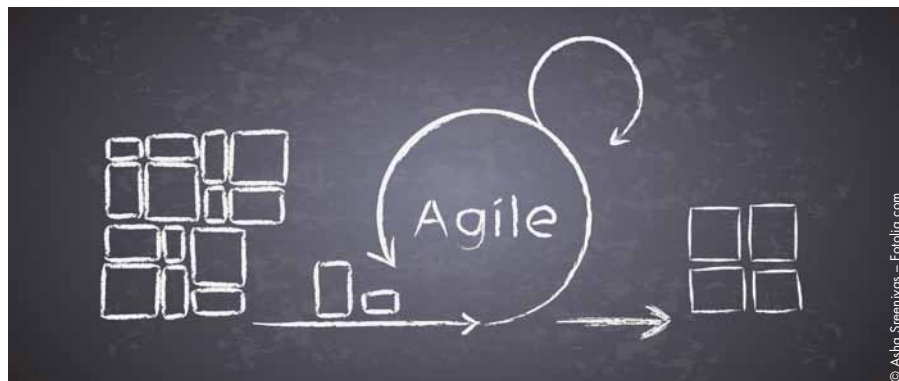
The legal working base for Agile Project Management between customer and GreenGate AG is usually provided by the contractor's contract. This is to bind GreenGate AG as a contractor to an agreement to produce a certain good in exchange for a preset payment.

A clear echelon of offers and orders per project step (Sprint) is advisable not only from a financial perspective, but also to achieve maximal transparency with minimal risks for everyone involved.

Conclusion

Agile project methods require a paradigm shift, a fundamental rethinking by management as well as by the project team. Only active involvement of personnel and management and the courage and the will for continual changes of processes lead to acceptance by end customers and therefore to project success. An open and continuous dialogue between customer and contractor is essential in any case.

GreenGate AG recognizes modifications which automatically result from each project stage as an integral part of projects and therefore as an opportunity to be able to react to changes ahead of time.



Advantages of Agile Project Management

- > Fast project initiation
- > Easy to introduce because of transparency
- > Easy to handle (low administrative efforts)
- > Easy to control (meetings, project status report)
- > Customers co-coordinate from the beginning and are able to prioritize specific tasks analogue to project progression (Scope-Management)
- > Detailed specifications only when actually necessary
- > Use of learning effects from prior iterations (project stages)
- > Highly transparent and clear project progression (quick design of functions)
- > Solution scale and quality increase with every iteration
- > Regular retrospectives provide motivational effects

Requirements of Agile Project Management

- > Subdivision of IT projects into manageable steps as far as possible
- > Assignment of responsibilities
- > Securing integration, participation and autonomy of all employees
- > Courage to learn from mistakes and for constant changes
- > Resolve to improve processes

9. References

9.1 Water Resources Management/Municipal Services (Excerpt)



Ammersee Wasser- und
Abwasserbetriebe



Dahme-Nuthe Wasser-, Abwasser-
betriebsgesellschaft GmbH



envia AQUA GmbH



HEAG Süd Hessische Energie AG



Institut für Siedlungswasserbau
Uni Stuttgart



Isener Gruppe



Landestalsperrenverwaltung
des Freistaates Sachsen



Regionalgas Euskirchen



Stadt Bad Honnef



Stadt Betrieb Bornheim



Stadt Bonn



Stadt Siegburg



Stadtentwässerung Hildesheim



Stadtentwässerung Koblenz



Stadtwerke Velbert



Stadtwerke Wesseling GmbH



Wasserverband Lausitz



Wasserverband Mittleres
Burgenland



Wupperverband



Zweckverband zur Abwasser-
beseitigung in Schlierachtal

9.2 Public Utilities/Energy Suppliers (Excerpt)



Aschaffburger Versorgungs
GmbH



Celler-Uelzen Netz GmbH



Centralschweizerische
Kraftwerke AG



Elektrizitätswerke des Kantons
Zürich



Energienetze Mittelrhein
GmbH & Co. KG



EWE Offshore
Service & Solutions GmbH



Gevag GmbH



Regio Energie Solothurn



rhenag Rheinische Energie AG



Stadt St. Gallen



Stadtwerke Heidelberg GmbH



Stadtwerke Hürth



Stadtwerke Jena Gruppe



Stadtwerke Lemgo GmbH



Stadtwerke Lübbecke GmbH



Stadtwerke Rinteln GmbH



Stadtwerke Troisdorf GmbH



uniper Kraftwerke GmbH



WindMW GmbH



Würzburger Versorgungs- und Verkehrs GmbH

9.3 Industries/Service Providers (Excerpt)



Armacell



Bilstein Gruppe



Caparol



Energie Systeme Nord



GETRAG FORD Transmissions GmbH



Henkell & Co. Gruppe



Iwan Budnikowsky GmbH & Co. KG



Karl Simon GmbH & Co. KG



LCP Leuna Carboxylation Plant GmbH



MCI Miritz Citrus Ingredients GmbH



Niederösterreichisches Pressehaus Druck und Verlagsgesellschaft mbG



Nürnberg Gummi Babyartikel GmbH & Co. KG



OXEA Deutschland GmbH



PLANETA-Hebetechnik GmbH



proFagus GmbH



RAMPF Holding GmbH & Co. KG



riha WeserGold Getränke GmbH & Co. KG



Schlachtbetrieb Zürich AG



SMS MEER GmbH



Swarovski



Thurn Produkte GmbH



TOPAS Advanced Polymers GmbH



TWE Dierdorf



Worlée



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