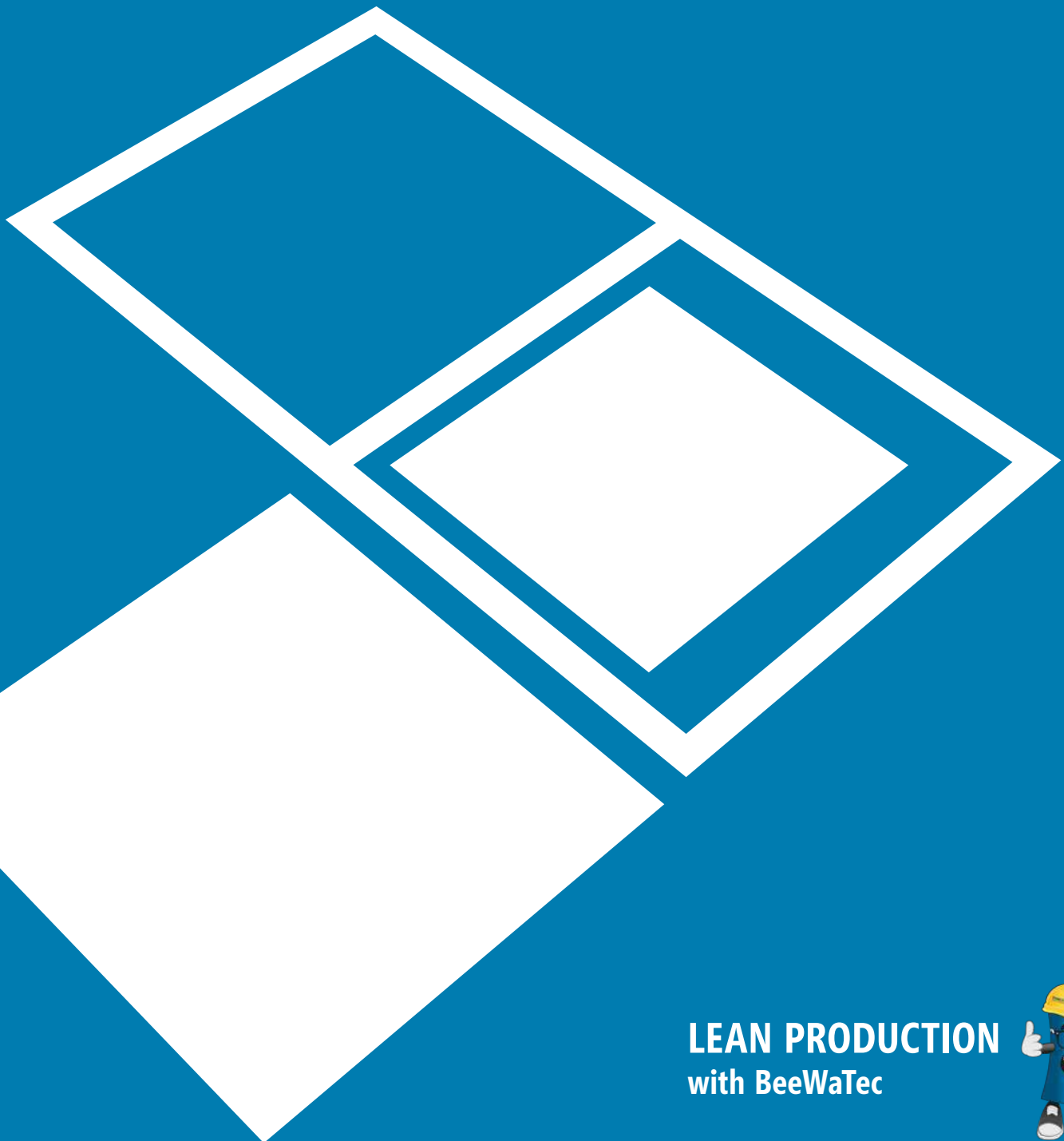




**BEEWATEC** Automation  
Dynamic and flexible solutions

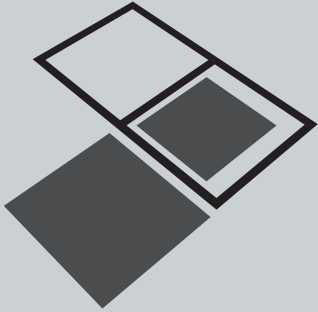
# BeeWaTec Automation Solutions

Welcome to the automation of the future!



**LEAN PRODUCTION**  
with BeeWaTec





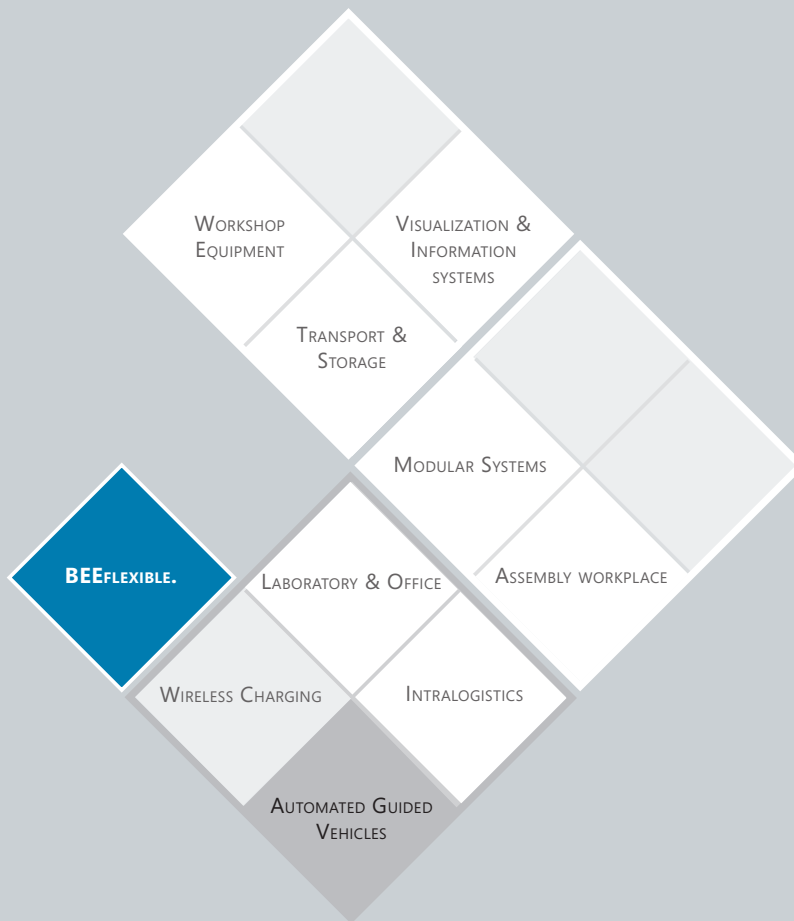
# **BEEWATEC** Automation

Dynamic and flexible solutions

S I M P L E .

F L E X I B L E .

I N D I V I D U A L .



## FOLLOW US INTO THE LOGISTICS AUTOMATION OF THE FUTURE.

The BeeWaTec Group, headquartered in Pfullingen, Swabia, is internationally networked with a flexible and innovative product portfolio centred around Lean Manufacturing, Agile Production and Industry 4.0 and has a decentralized presence through its own subsidiaries.

Every day we ensure that we remain one of the leading providers of Lean and material flow solutions and offer you stand-alone solutions and complete concepts with networked solutions as a system provider with our innovative modular system for lean manufacturing.

As a medium-sized company, we consistently focus on a continuously high quality standard – this applies to the manufacture of our products as well as to the application of these systems by our customers.

BeeWaTec is your perfect partner if you are looking for solutions for a flexible and economical working and production environment.



## THE BGV SYSTEM – NON-COMPROMISING TRANSPORT FOR YOUR INTRALOGISTICS

### WHAT DO YOU NEED?

Basically, the question is:

**How much intelligent mobile autonomy does your intralogistics and production need?**

**Autonomous mobile intelligent robots (AMRs) offer the highest degree of flexibility for your logistics structure. It is up to you what your processes require.**

You wonder which system (navigation, safety, loading concept) currently fits to your flexibility level of your intralogistics and production?

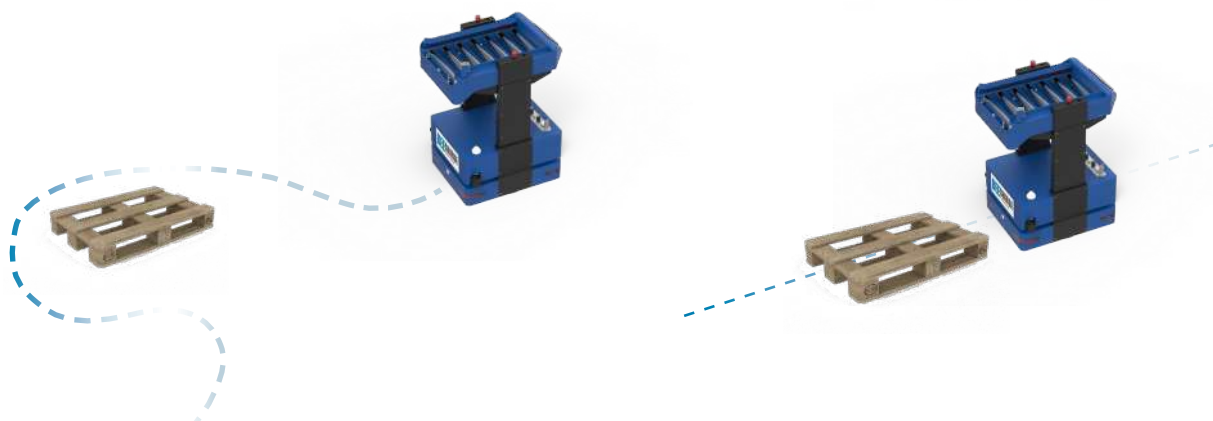
**BeeWaTec offers the perfect solution for every requirement!**

BeeWaTec's BGV system can be adapted easily and quickly to your current degree of flexibility – now and in future.

With the BGV solutions BeeWaTec automation now offers you the possibility to implement and shape the logistics automation of the future yourself. And all this without great effort, without unnecessary waste of manpower and without a great expenditure of energy.

## How do autonomous BGVs differ from conventional BGVs?

Autonomous BGVs	vs.	Conventional BGV's
Installation completed after simple teach-in process	<b>Installation</b>	Installation requires a slightly increased effort
Navigates without artificially placed landmarks	<b>Navigation</b>	Navigates using artificially placed landmarks
Avoids obstacles safely and avoids them if possible without stopping	<b>Obstacles</b>	Stops at obstacles and remains stationary until obstacles are removed
Scanning of environment	<b>Change of layouts</b>	Adaptation to infrastructure necessary
Defines new sources and sink positions in new basic environment map	<b>Change of targets</b>	Adaptation to infrastructure
Even easier	<b>Scalability</b>	Easy
High	<b>Flexibility</b>	Low/Middle



## BGV – BEEWATEC GUIDED VEHICLES

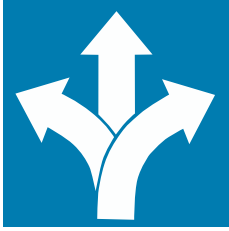
### DYNAMIC AND FLEXIBLE AUTOMATION.

With BeeWaTec's BGV systems you can realise highly dynamic and flexible solutions to optimise your intralogistics (production and distribution logistics).

### BEEWATEC OFFERS BOTH ROBOTER SYSTEMS AND MODULAR SYSTEMS

BeeWaTec designs and produces BeeWaTec BGV systems as well as different options and add on as, for example, superstructures for pipe rackings systems, trolleys, racks, transfer stations, milkrun systems and much more, and all of this is adapted to the respective application solution.

## What are the advantages of BeeWaTec's BGV system?



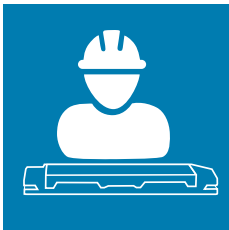
### FLEXIBLE AND SIMPLE

- Quick and easy installation via SLAM with contour-based navigation.
- Freely configurable, no pre-programming of routes required
- Dynamic re-routing
- Reduction of complexity



### SCALABLE AND MODULAR EXPANDABLE

- Can be retrofitted, no structural changes to infrastructure required
- Fast project implementation
- Commissioning of further BGVs without additional installation effort



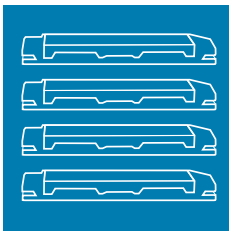
### COLLABORATIVE AND COOPERATIVE

- Safety-certified for use in mixed operation with man and machine
- Employees gain time for value-adding activities
- Manual processes



### PROCESS RELIABILITY AND EFFICIENCY INCREASING

- High economic efficiency due to adaptation to current BGV situations
- No standstill between process steps
- Increased efficiency with BGV securing



### FLEET AND ORDER MANAGEMENT

- Monitoring and coordination also of larger fleets possible
- Central configuration management
- Simple generation of transport orders



### COMPATIBLE

- Easy integration into existing systems
- Simple connection to peripheral devices

## Who is the system designed for?

If you join the BeeWaTec automation technologies partner program, you will become part of a partner network that jointly realises the autonomous / mobile / intelligent digital transformation as well as the transformation of intra logistics and production logistics, working methods and security for companies – every single day. A most robust portfolio, from BGVs to add-ons and software, is supported by the BeeWaTec technologies partner program, which corresponds to our motto: Simple. Flexible. Individual.

## Become a BeeWaTec Automation Technologies Partner!

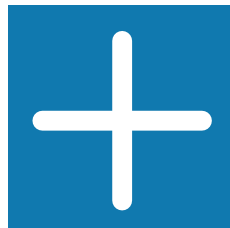
The BeeWaTec Automation Technologies partner program has several options for different partner types:

- **Solution provider**  
Logistics experts who resell products and services on the market expand their unique service and technical skills.
- **Dealers**
- **System integrators**  
Companies that influence or jointly sell products, services and support as part of a solution – including consulting, simulation, testing, installation and maintenance.
- **Service providers**  
Companies that purchase hardware and software from BeeWaTec in order to establish a service platform for their end customers.
- **End customers**  
With the help of standard packages, you as a end customer can start up the system independently and adapt it to your specific needs.

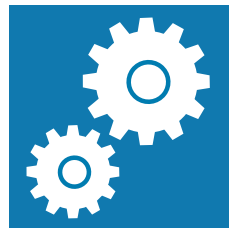
## For which industry are the systems suitable?



Automotive &  
Aviation



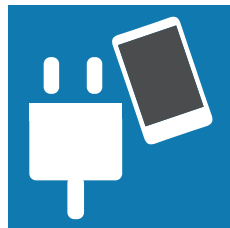
Health &  
Pharmacy



Metal & Plastics



Fashion & Design



Electronics &  
Technology



Food

Your industry is not among them?  
Contact us!

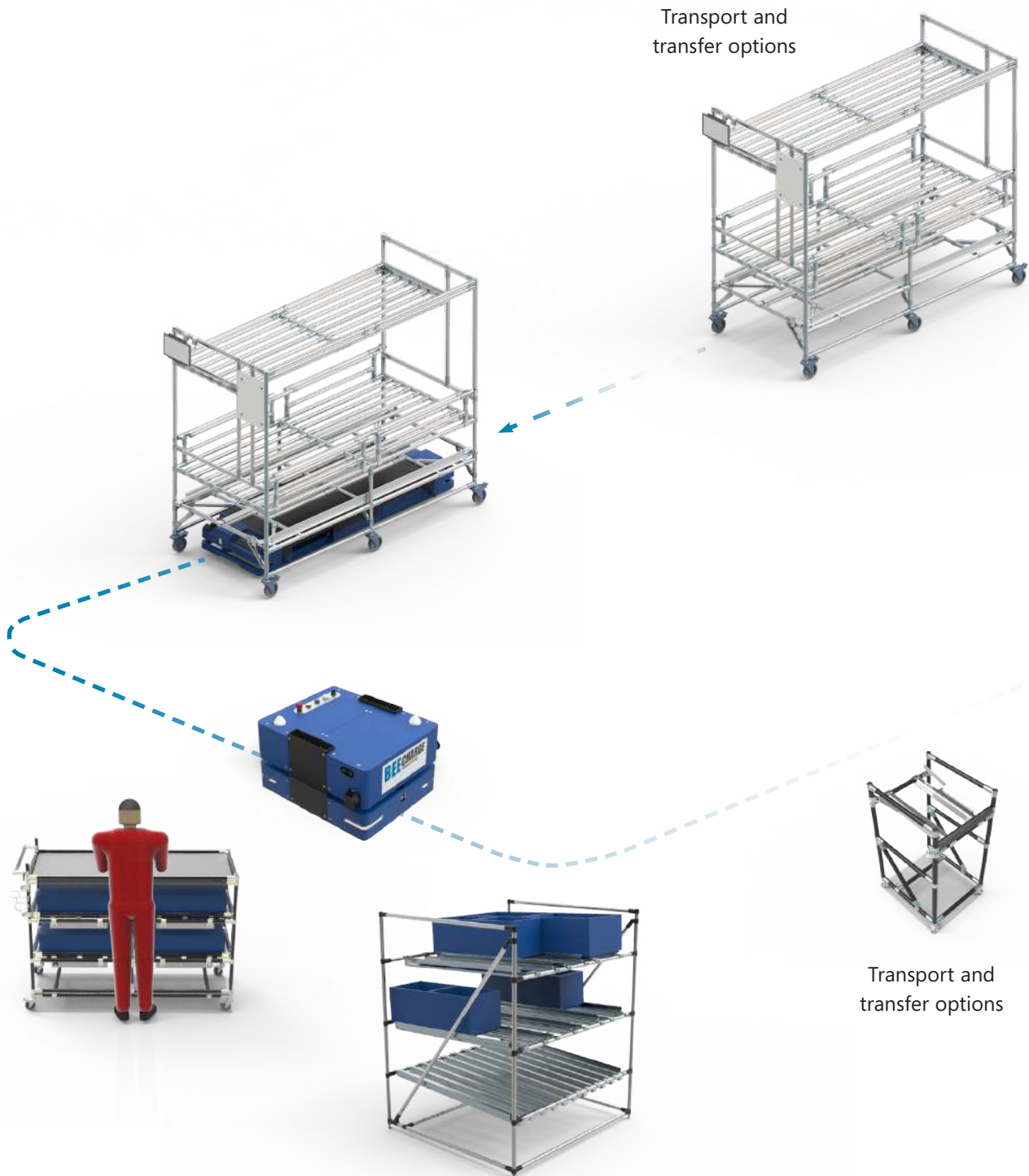


### Possible workflow

With our solutions you effectively increase productivity in manufacturing and logistics. Your employees can concentrate on tasks that require complex human skills. BGV solutions provide higher throughput, eliminate errors and enable improved material tracking.

### Your advantage?

You can combine your production with our pipe racking system by G. S. ACE and our BGV solutions. We can also design suitable transport and transfer options for your requirements. Here you can see a few examples of what is possible.





Transport and transfer options



Transport and transfer options



Transport and transfer options



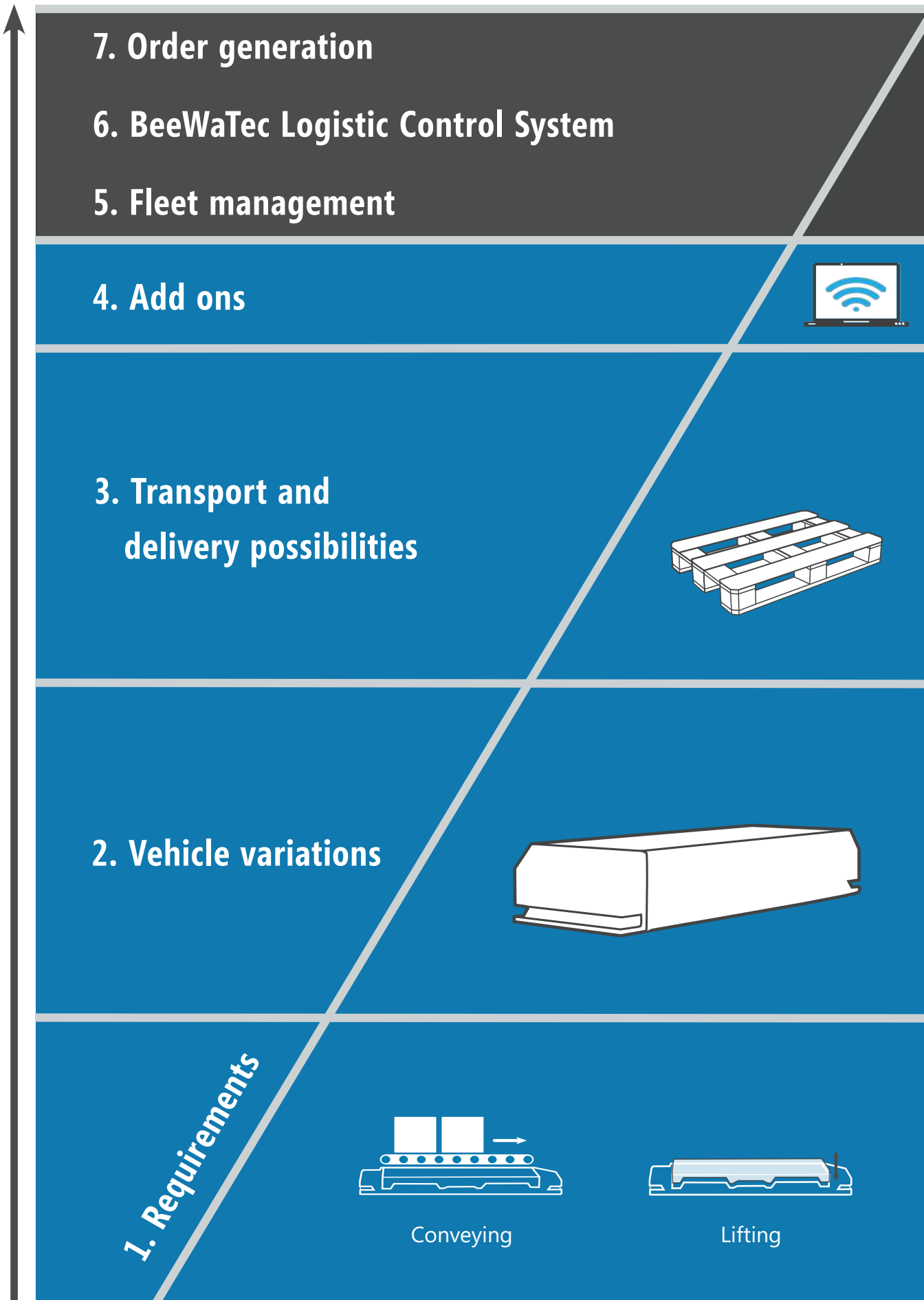
Discover our product video?

Please scan the QR code.



Build your own logistics imperium

System overview

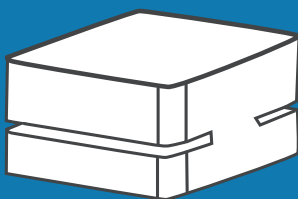
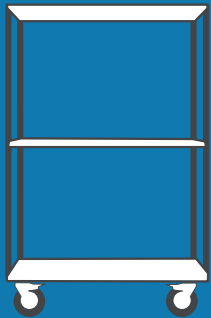


**Your requirements. Your logistics idea. Our solution.**

With the BGV solutions you can create your own logistics solution and experience first-hand how easy it is to implement from the idea to the finished solution. Set an example with the continuous development of your intra- and production logistics and create the optimal logistics solution for you that is second to none.



**CUSTOMERS**



Underriding



Superstructure

## Configure your solutions yourself!

The following pages will guide you step by step through the various system components we offer - explore the diversity of our modular system and the individual technologies in order to set up and continuously develop your logistics solution of the future today.

With our step-by-step instructions you are able to set up the optimal intra- and production logistics.

Ask yourself the following questions and answer them for yourself:

**1) Requirements**

Which requirements should the vehicle meet?

**2) Vehicle variant**

Which vehicle variant do you need?

**3) Transport and transfer options**

Which means of transport should be handed over?

**4) Add ons**

What additional functions should the vehicle be equipped with?

**5) Fleet management**

Which fleet management meets your requirements?

**6) BeeWaTec Logistic Control System**

Do you need a BEELOC Core Interface Framework?

**7) Order generation**

Which order generation systems are suitable for you?

**Configure now!**



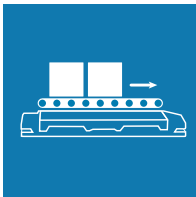
Configure, order, build, implement and put into operation.

1

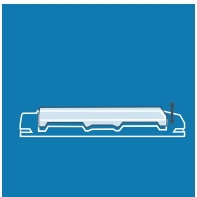
Requirements

You start with your requirements and it is your task to build and implement your logistics empire and to continuously adapt it to the constantly changing demands.

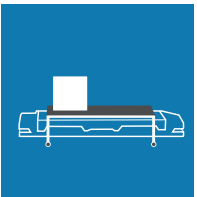
- What requirements do you have for the overall system?



Conveying



Lifting



Underriding



Superstructure

Transport of pallet	X	X	X	X
Transport of SLC (small load carrier)	X	X	X	X



## BGV-A-S-100



2

Vehicle versions

## Technical data

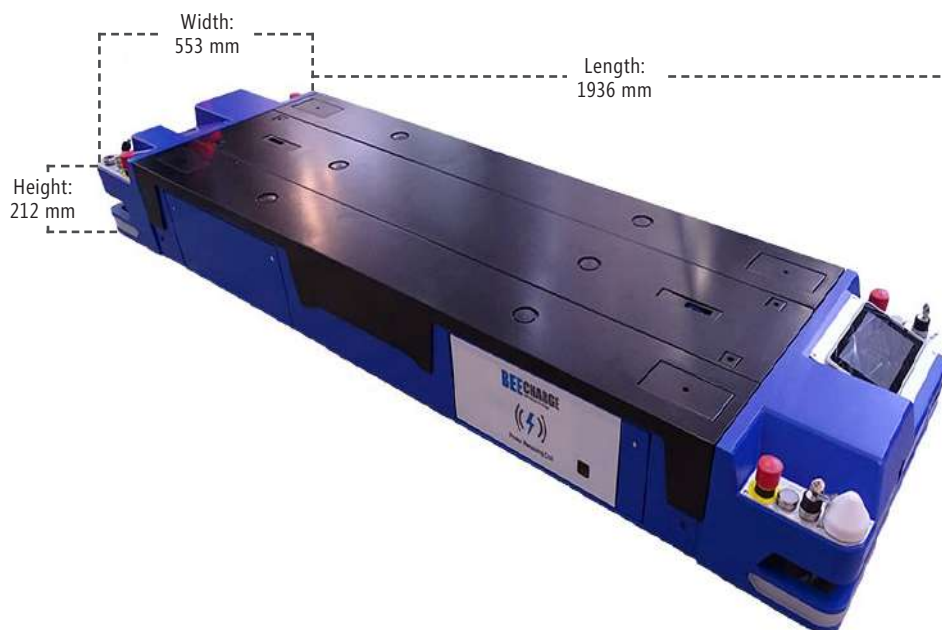
- Load capacity: 100 kg
- Transfer capacity:  $\pm 10$ mm
- Functional options:



## BGV-C-M-100

Conveyor system structure for SLCs/boxes, transport of cartons and so on.

- 840x580 (LxW)
- Lifting height: adjustable between 640 - 900 mm

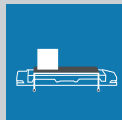
**BGV-A-XS-500****2**

Vehicle versions

Vehicle versions

**Technical data**

- Load capacity: 500 kg
- Transfer capacity:  $\pm 10$ mm
- Functional options:

**BGV-P-XS-500**

Equipped with an integrated lifting system for lifting loads.

Which transport and transfer options do you work with?



Single transfer station from steel pipe racking system



Individual transfer station from pipe racking system



Picking rack from steel pipe racking system



Material transport trolley made of flexible pipe coupling



SLC lifter made of aluminium pipe racking system



Which additional elements are you interested in?

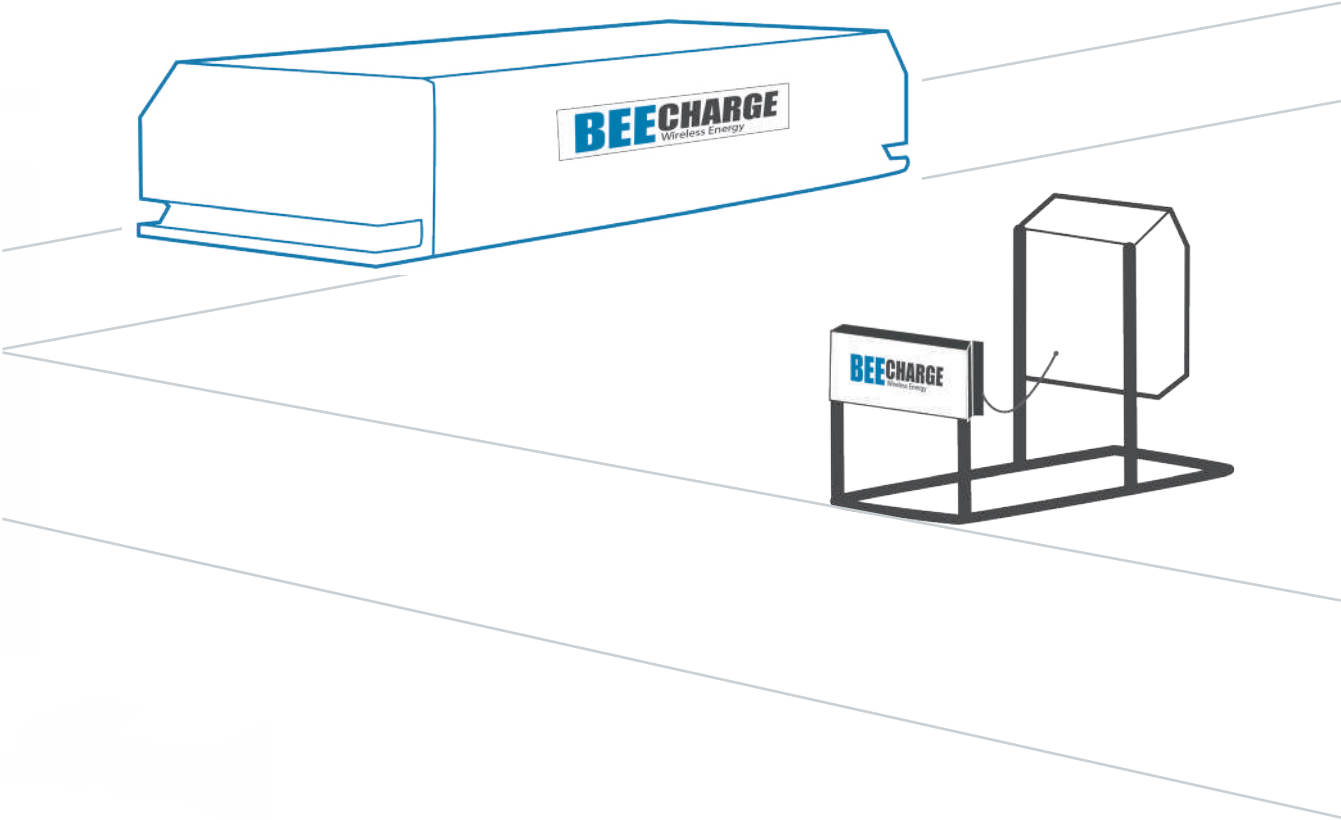
4  
Add ons

Add ons

# BEECHARGE

Wireless Energy

BEECHARGE offers an enormous radius of action for the field of energy supply systems. It enables contactless loading at a distance of up to 40 mm - ideal for driverless transport systems and mobile robotic solutions.



**Communication via WLAN**

## The FLEET MANAGEMENT brings the desired delivery.

### The BGVs work without fleet management for simple applications.

The BeeWaTec fleet management is an intelligent system that monitors the location of the BGVs, traffic control as well as order requests and thus ensures that the BGV fleet in your plant works with the highest efficiency.

By means of automation with our BGVs in combination with our **BEELOC CORE INTERFACE FRAMEWORK**, we can significantly reduce the programming effort in your Manufacturing Execution System (MES) or Enterprise Resource Planning (ERP) system and we offer you a simple solution to connect these systems to the BGV world.

5

Fleet management



### Key facts:

- Manages fleets of up to 150 BGVs in each configuration
- Shows the position / status of the BGVs
- Ensures that the battery status of the BGVs is always in an optimal range
- Displays the job queue
- Prioritizes important orders
- Selects the fastest routes based on passenger and vehicle traffic
- Identifies blocked paths and creates alternative routes
- Optimizes the assignment of orders and the charging of the BGV battery
- Framework and Cloud Hostings

## BeeWaTec Logistics Control System – the communication centre



### Networking, visualization, administration, notification, analysis and process control with the BEELOC CORE INTERFACE FRAMEWORK

For this purpose, **BEELOC CORE INTERFACE FRAMEWORK** networks directly or via additional hardware with the machines, systems, MES, ERP systems in your company.

By means of connection with the most diverse data sources, the data management is centralized and facilitates the data and information sharing / evaluation as well as the clear and transparent representation of the entire process.

As you can see, the **BEELOC CORE INTERFACE FRAMEWORK** allows the BGV system to interact with its environment in the simplest possible way and offers even more possibilities, such as monitoring, visualization, notifications, alarms, machines and production data acquisition, data management as well as a multitude of interfaces and reporting, if required.

Use the continuous development of the BEELOC CORE INTERFACE FRAMEWORK for your success and a future-proof investment.

ID	Auftragsfach	Von	Aktion	Nach	Aktion	Status	Fahrzeug-Id	Fehler	Priorität
2016-09-15T15:55:31000	NaN	51	Holen	4	Bringen	Geholt	AGV00001	-1	-
2016-09-15T19:37:61000	NaN	11	Holen	31	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:41:27000	NaN	1	Holen	11	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:45:24000	NaN	21	Holen	1	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:51:08000	NaN	12	Holen	21	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:55:24000	NaN	2	Holen	12	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:00:02000	NaN	22	Holen	41	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:03:13000	NaN	14	Holen	22	Bringen	Fertig	AGV00001	0	-
2016-09-15T19:06:01000	NaN	3	Holen	14	Bringen	In-Zustellung	AGV00001	0	-

### Key facts:

- Easy expandability
- Quick and easy integration of customer-specific requirements
- Many standard interfaces available for different types of applications
- Extensively tested communication with PLC's/IPC's from well-known manufacturers
- Easy integration with MES, ERP and WMS
- Extendable by scripts and can be used for different tasks in automation technology
- „Industry 4.0“ - and „Internet of Things“ - ready.

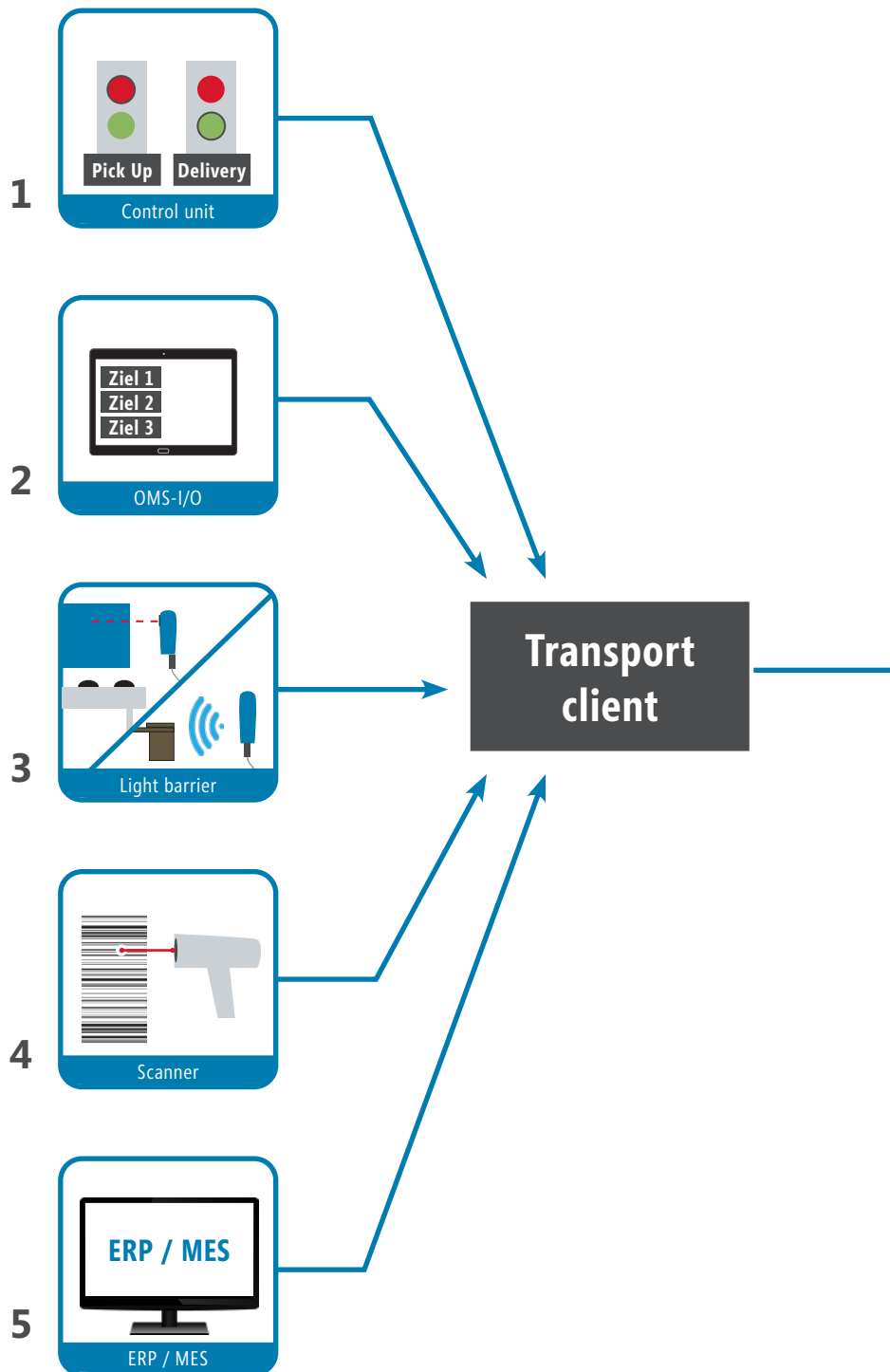
More flexibility with the BeeWaTec system landscape!

The BGV system interacts with your environment as well as peripheral equipment via the BEELOC CORE INTERFACE FRAMEWORK. For the interaction between man and machine, we work with appropriate command devices such as request buttons or the OMS-I/O from BeeWaTec as standard.

With the help of the standardised interfaces of the BeeWaTec OMS-I/O, we also offer you a simple, fast and standardised possibility to communicate with machines, conveyor systems, gates, lifts or fire alarm systems as well as with a superior host system without the need for the BEELOC CORE INTERFACE FRAMEWORK.



CUSTOMER



7  
Order generation



## BeeWaTec control devices for your continuous material flow

With BeeWaTec's command devices you can quickly and easily extend the interaction radius between man and machine.

### Request buttons / call buttons

BeeWaTec's request buttons help you to streamline the material flow in intralogistics. Order information can be transferred internally to the BEELOC Core Interface Framework or the BeeWaTec OMS-I/O at the push of a button.

With the request buttons you can optimise your processes at the assembly workstations, packaging workstations and dispatch workstations.

We can offer you the following variants.



### Key facts:

- Request button can be attached to any workstation
- Very robust and many technical designs
- Simple operation

7

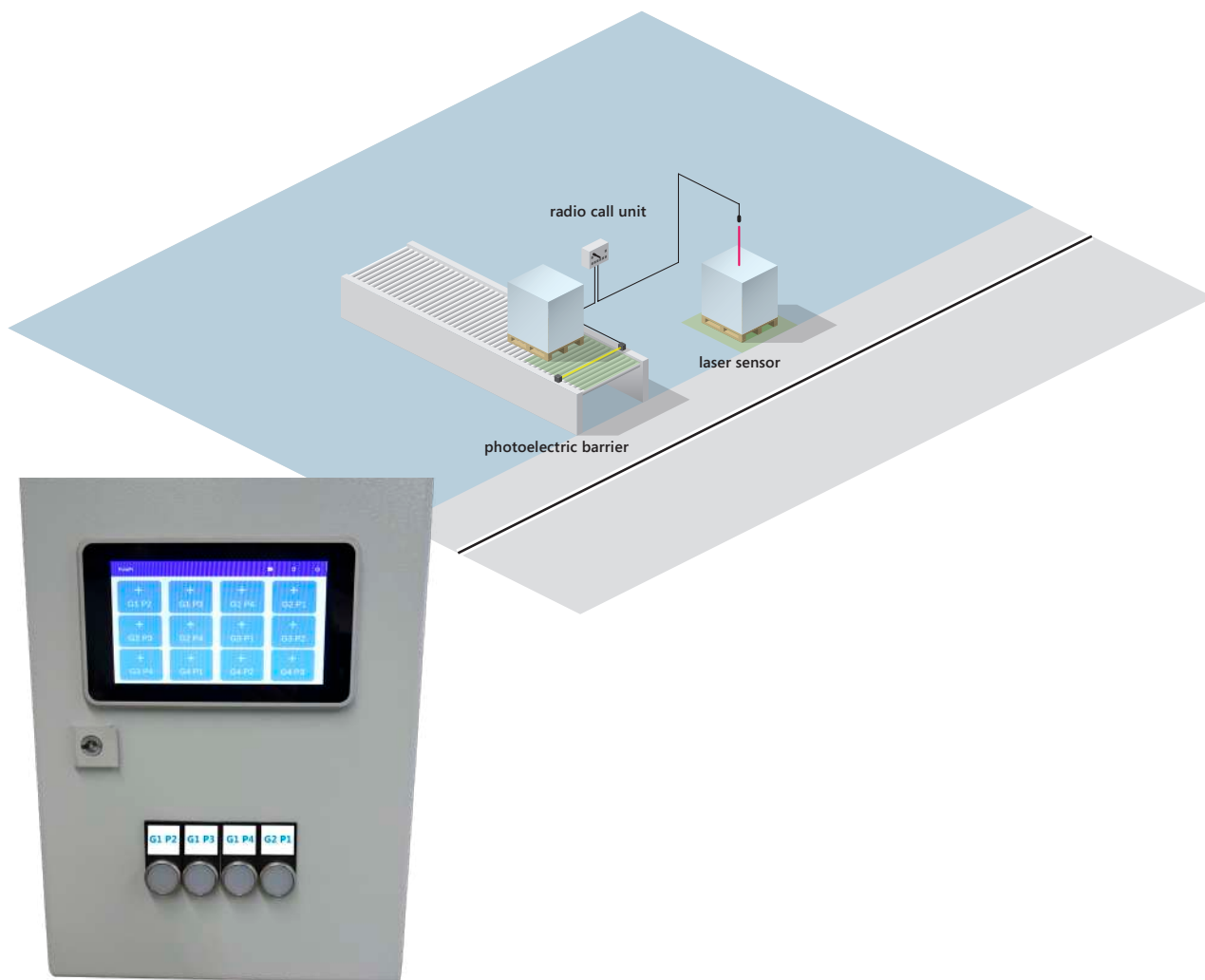
Auftragserzeugung

## BeeWaTec Order Management System I/O for your continuous material flow

### OMS-I/O

With the help of the intelligent OMS I/O, you can streamline your intralogistics material flow. The OMS-I/O enables you to quickly and easily establish an interaction between the BeeWaTec OMS-I/O and peripheral equipment, such as high-speed gates, fire alarm systems, traffic light systems or conveyor systems. However, the BeeWaTec OMS-I/O is also used to establish an interaction between man and machine quickly and easily. For this purpose, workers can interact with the transport system via the optional touch display or via additional command devices that can be connected to the OMS-I/O.

Whether hard-wired or via radio/WIFI is up to you.



### Key facts:

- Easy integration / interaction with existing infrastructure
- Proven and practice-oriented technology
- Modular, combinable and scalable
- Low planning effort and installation effort
- Robust and industry-compatible designs
- Quick and easy installation and operation

## Do it Yourself → PLUG & Drive

„Order the BGVs from BeeWaTec and put them into operation yourself!

„Do it Yourself“ is our motto when it comes to system architecture. The only requirements are an efficient WLAN environment and a 3-phase/ 1-phase connection for the chargers. For the first device we recommend and offer on-site commissioning and training by our technicians.

The integration of further BGVs as well as extensions or modifications can then be carried out independently. No previous knowledge of programming is required for installation and commissioning.

### Key facts:

- No construction required
- Improved security for compatibility with IT systems
- Autonomous navigation does not require rigid routes, changes to the infrastructure or positioning signals

### Five steps to success:

# 1

#### Starter Kit

The Starter Box contains a complete BGV solution which you need for a first, quick setup of a system.

# 2

#### Instruction/ Tutorial

After a short briefing and reading the user manual you are ready to start!

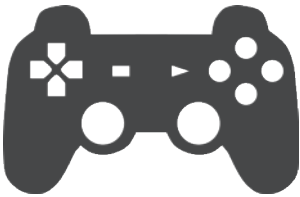
# 3

#### Mapping

For installation, a tour of the building is made once with the BGV. During this tour the BGV scans its environment and creates a basic environment map.

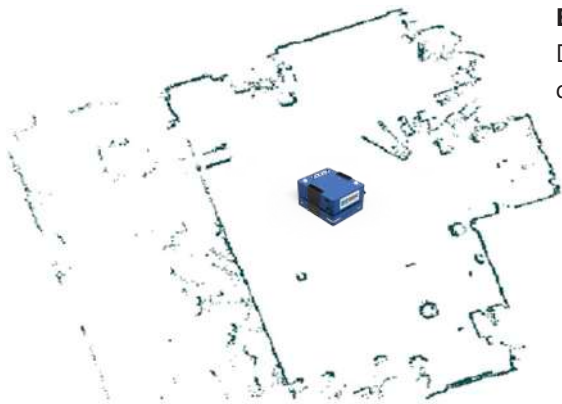


Map creation with the autonomous BGV designer



**Map creation via joystick:**

The autonomous BGV „learns“ about the environment independently.



**Environment:**  
Destinations, zones and driving jobs on the PC.



**4**

**Definition of positions**

Use drag and drop to define the sources, sinks, charging station and area positions in the recorded base map.

**5**

**Transport orders / order scheduling**

Easy integration between the BGV system and your MES/WMS system via the BeeWaTec terminals or via our BEELOC CORE INTERFACE FRAMEWORK.

## BeeWaTec navigation solution

### Most logistics processes are still carried out by people.

Most logistics processes are still carried out by people. Until now, conventional driverless transport systems have hardly been able to break through this dominance. Mostly they are introduced in the course of special projects, which on the one hand leads to high project costs and on the other hand change requests are difficult to implement.

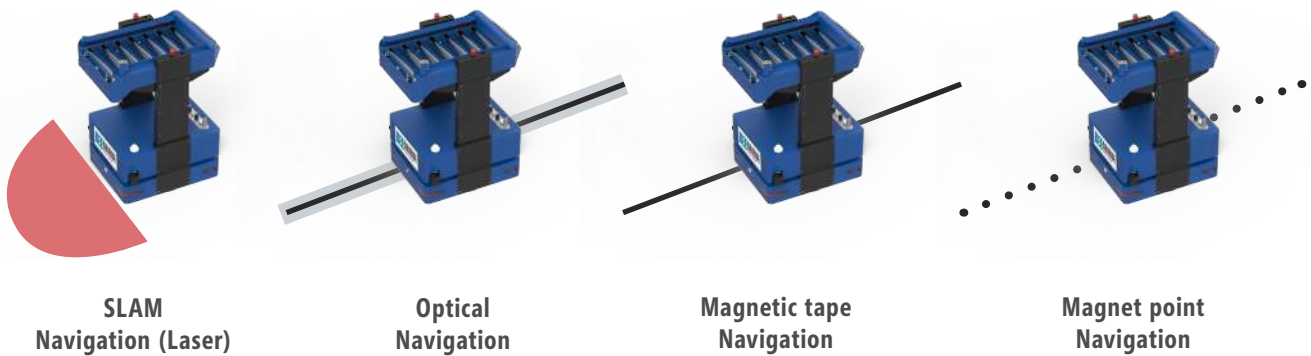
And there are the AMR (Autonomous Mobile Robots). Compared to conventional FTF systems, these offer an increased degree of flexibility, which greatly reduces project planning and commissioning costs and allows change requests to be implemented quickly and easily. However, the AMRs do not always achieve the required positioning accuracy.

### ALL FOR ONE with the highest performance.

For this reason BeeWaTec offers you an all-in -one solution with its BGVs.

All BeeWaTec BGVs are equipped with several navigation and sensor systems as a standard in order to be able to act even more flexibly and efficiently if they are set up correctly.

**This way you always have the right technology for your current degree of flexibility for your distribution and production logistics.**



### Key facts:

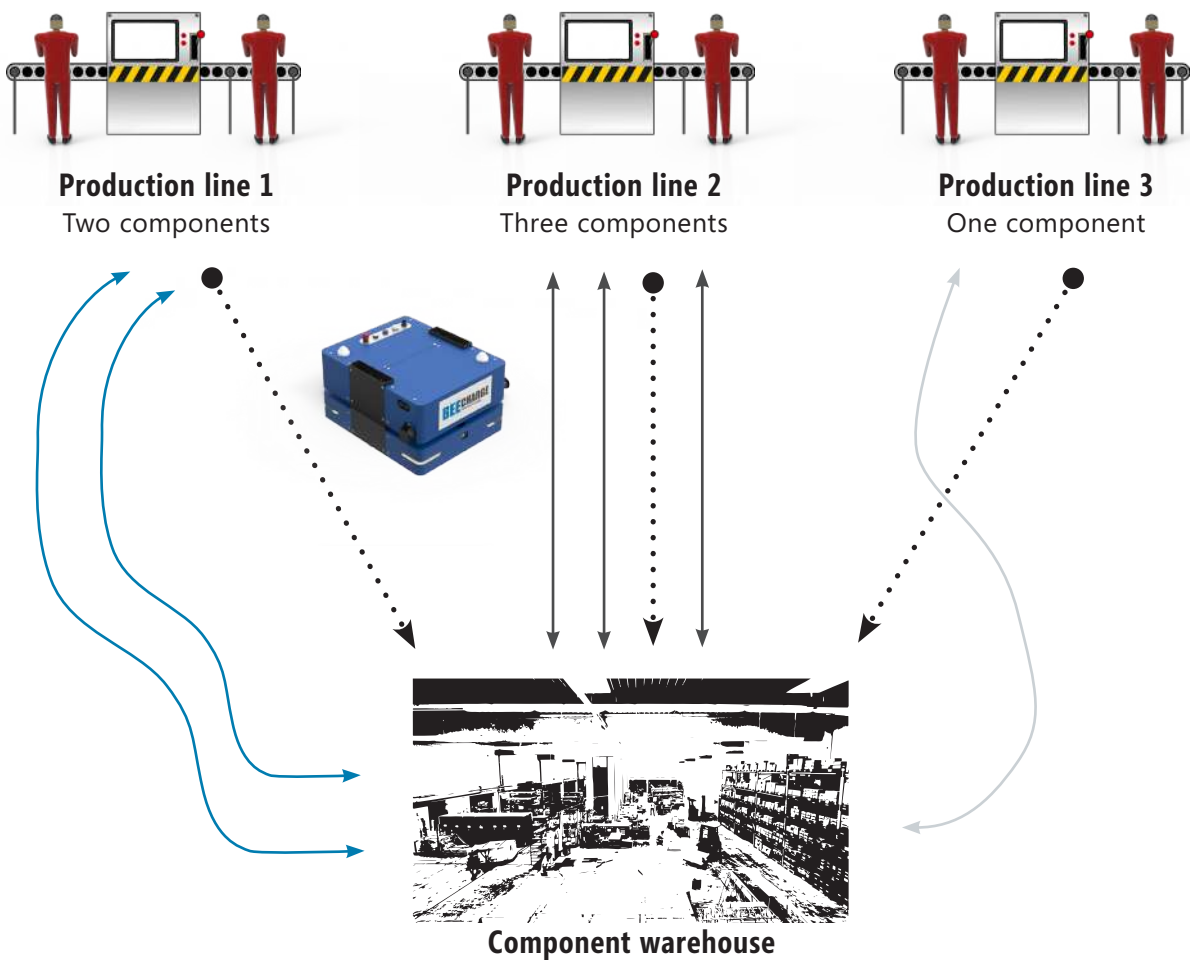
- **Simple and fast:** Integration of new models with minimum configuration effort
- **Combination** of different models and different types of vehicles within one fleet possible
- **Industry-wide** one of the smoothest and fastest obstacle avoidance system with dynamic re-routing
- **Highest positioning accuracy** if required

## Simulation – See and understand

Ever-shorter product life cycles or constantly changing product ranges in warehouses mean an enormous burden for those responsible for logistics. No sooner has a new logistics concept been implemented and the initial difficulties are eliminated, the requirements change and you are at the beginning of planning again.

The simulation focuses on the visualization, planning and adaptation of logistics concepts. It uses the same software stack that is used for real vehicles. This allows deviations between simulation and reality to be kept to a minimum.

Seeing a warehouse in action makes it much easier to understand the effects of different decisions. This can save resources and, above all, time. Logistics can thus keep pace with the demands placed on it.



### Key facts:

- Reduce installation time (on site)
- Component warehouse
- Develop and test traffic concepts in advance
- Interface tests with host systems as early as possible
- End customer can test and optimize processes in advance
- Conceptual proof of calculated throughput

## Would you like to find out more about training?

Which kind of training is the best for me? What do I really need to know?

Contact us – we will be glad to help you to find the best solution.



### User course BGV's:

- Programming, handling and operation of a BGV
- Configuring, viewing and editing map files
- Planning of navigable routes
- Using the graphical user interface to communicate with the BGVs
- Control of activities



### User course FLEET MANAGEMENT:

- Basic information how to handle the FLEET MANAGEMENT
- Management of map and configuration updates
- Creation of a software interface to connect the BEELOC CORE INTERFACE FRAMEWORK

**BEELOC**  
BeeWaTec Logistic Control

**User course**  
BEELOC CORE  
INTERFACE FRAMEWORK

## What about service?

The best logistics infrastructure is of no use if you are left alone with it.

We at BeeWaTec are there for you and never leave you alone – you can rely on it.



### BeeWaTec managed services:

- BGV client sanity check
- Fleet and host-Server sanity check
- Support portal
- Onboarding with exclusive dispatching



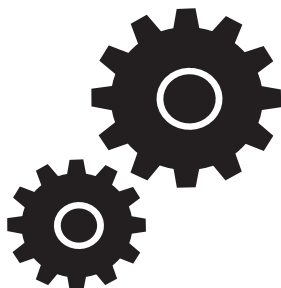
### BeeWaTec maintenance services:

- Maintenance of BGV clients
- UVV examination BGV clients
- Maintenance charging stations
- UVV check charging stations
- Maintenance documentation
- Ground system maintenance (if necessary)



### BeeWaTec after sales Services:

- Phone / Hotline
- Warranty extension



### BeeWaTec spare parts services:

- Ersatzteilbevorratung
- Ersatzteileservice

For the autonomous BeeWaTec BGV solutions we cooperate with the following strong partner:



**incubed IT** is one of the leading software manufacturers for autonomous, free-moving transport systems and offers complete system solutions in strong partnership with the **BeeWaTec Group**.

**Publisher and production:**

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**General notes:**

Technical changes, further developments, changes of products and modifications are reserved, even without previous notification. We assume no guarantee for mistakes in printing, writing and translation. In either case the German catalogue version has precedence. All information is not binding and subject to change.

Please refer to the BeeWaTec user manual for the information relevant to the holding and tightening forces.



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**All important addresses at a glance!**

BeeWaTec Website  
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