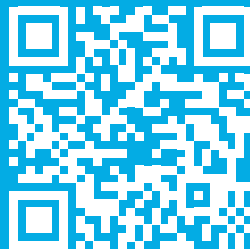


ASSECO CEIT

PRODUCTS



ONE-STOP SHOP



ABOUT ASSECO CEIT

Asseco CEIT, a.s. is an innovative technology company providing complete solutions for technical and process innovations, industrial automatization, digitalisation and optimisation, as well as smart internal logistics. Asseco CEIT is thus a one-stop shop offering complete industry solutions for production and logistics companies using Industry 4.0 tools.

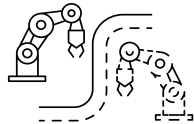
Our company's mission is to support productivity and efficiency and to increase the competitiveness of industrial businesses thanks to our own research and development centre. Asseco CEIT is active and successful throughout Europe, counting among its clients important industrial companies, mainly from the automotive, mechanical engineering, chemical and electro-technical branches of industry.

The company has been part of the international Asseco group since 2017.

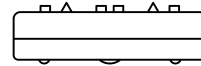
PRODUCT PORTFOLIO

Asseco CEIT's mission is to connect the physical world of industrial systems with smart digital tools to increase productivity and competitiveness. Asseco CEIT thus offers a wide range of products and smart solutions:

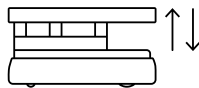
CEIT Digital Twin Platform



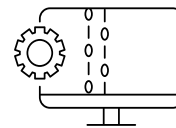
Smart autonomous mobile robots (AMR)



Peripherals for AMR equipment



MCS Management System (Fleet manager)



ISO 9001

BUREAU VERITAS
Certification



ISO 14001

BUREAU VERITAS
Certification





CEIT

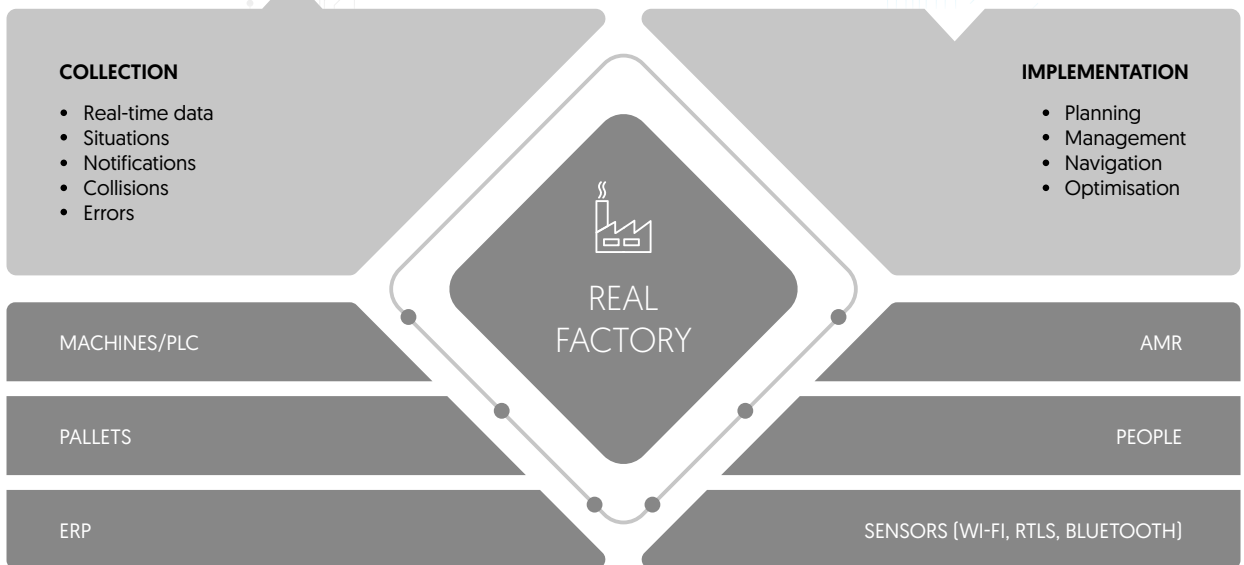
DIGITAL TWIN PLATFORM

The CEIT Digital Twin Platform is the best reflection of Asseco CEIT's comprehensive solutions and added value, namely the space for the continuous improvement of production and logistics processes.

The CEIT Digital Twin Platform is a unique and comprehensive software tool for designing, monitoring, planning, managing and optimising production and logistics systems. This tool builds the holistic ecosystem of a digital twin and is a step on the journey to Industry 4.0 digital transformation with the required effect of optimising resources, increasing quality, reducing costs, detecting anomalies and making processes more effective.

The CEIT Digital Twin Platform consists of a:

- COMMUNICATIONS INTERFACE
- PROCESS DESIGN AND PRODUCTION CAPACITY PLANNING MODULE
- MONITORING MODULE
- MANAGEMENT AND NAVIGATION MODULE
- VIRTUAL TRAINING MODULE



COMMUNICATIONS INTERFACE

The integration module is a set of connectors which connect layers of physical elements with layers of virtual reality. The layer of physical elements consists of production machines and equipment, logistics means, MRP/ERP system as well as operators with their skills and experience. It provides information on the physical layer that can be processed by a computer either actively or passively.

PROCESS DESIGN AND PRODUCTION CAPACITY PLANNING MODULE

The module is made up of a parametric model which represents a digital copy of the system in question. It is divided into several hierarchical layers, with each level containing images of physical and non-physical objects, elements such as production machines and equipment, logistics equipment, employees and first and foremost processes with their data. The virtual process connections (technological steps, logistics processes, logistics operation, material flows) are located on their own level. This model enables the user to plan effectively and to adjust the capacity of each process in the production and logistics chain. The purpose of the created digital copy is to define the optimal processes using a set of tools for visualisation, simulation and prediction. The dynamic simulation can check various versions of scenarios and solutions before they are put into practice.

MONITORING MODULE

Using software modules in AMR equipment and a smart sensors network based on UWB technology, it monitors all the elements of production and logistics technology. The data is collected in real time to provide information on the current operational status in the production process and to record them as “digital shadows” in the database for subsequent analysis, evaluation, prediction and primarily operational management.

MANAGEMENT AND NAVIGATION MODULE

Based on the information collected on the status of each piece of equipment and requests from the production and logistics process, the system ensures the decision-making and subsequent management of each part of the processes. It manages the transfer of each AMR equipment automatically without the need for human intervention. Since the system communicates with the production plan, it can efficiently use the free capacity of the production staff and handling equipment by automatically assigning them to tasks, as well as sending maintenance staff to maintenance interventions.

VIRTUAL TRAINING MODULE

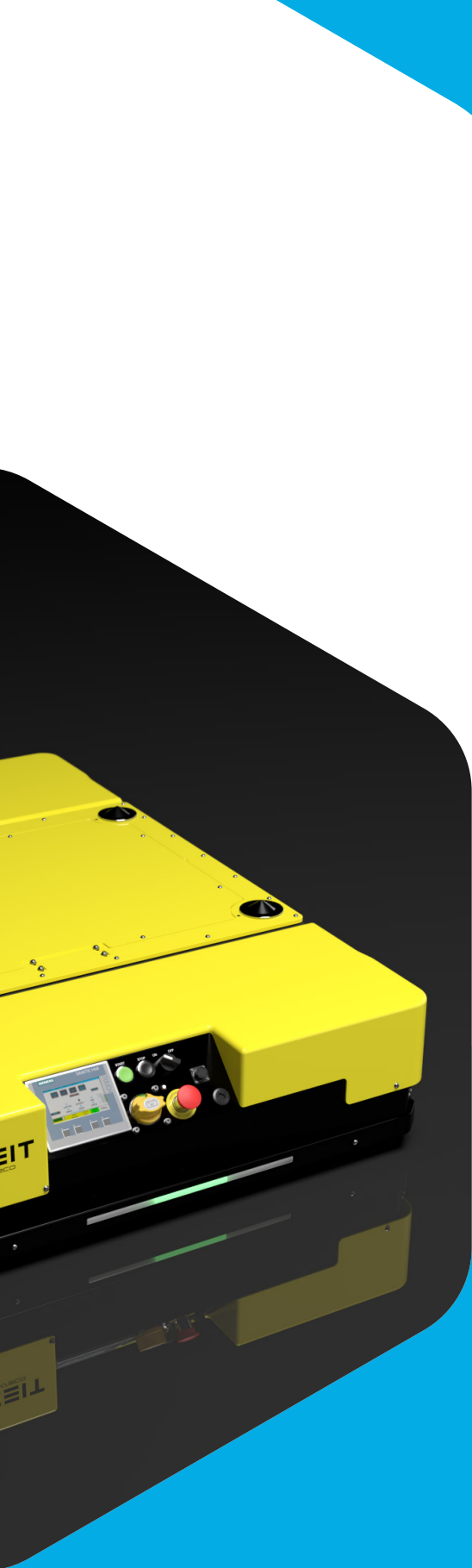
This is the module of a virtual world which physically represents a 3D reproduction of the real world in real time with real data from processes. The training runs in the regime of a POV (Point Of View) camera where the system takes the employee in training through a group of tasks in a virtual reproduction of the given world without any damages or losses being incurred by the company.





IMPLEMENTING THE CEIT DIGITAL PLATFORM GIVES CLIENTS:

- ✓ Detailed overviews of what is happening in the company through monitoring
- ✓ Advanced planning and management of production and logistics processes
- ✓ Advanced autonomous timetabling of operator tasks in real time
- ✓ Advanced autonomous management of logistics technology
- ✓ Connection between planning and management
- ✓ Optimisation of processes by analysing company data
- ✓ Reduction in the decision-making process through the availability of relevant company data
- ✓ Prediction and operative planning of machine and equipment maintenance
- ✓ Continuous improvement of logistics processes



AMR

AUTONOMOUS MOBILE ROBOTS

Asseco CEIT offers a complete fleet of autonomous mobile robots (known as AMRs) which are easy to integrate into the client's logistics and production processes. They are available with contour, laser or magnetic navigation. All of Asseco CEIT's AMR technology is controlled by its own MCS management and monitoring system [VDA 5050]; it is CE certified and ready for 5G technology.

FORKLIFT AMR

UNDER-RUN AMR

TRACTORS

SEMI-OUTDOOR SOLUTIONS

CUSTOM AMR SOLUTIONS

FORKLIFT AMR

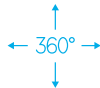
Suitable for transporting pallets placed on forks over varying distances in industrial halls or warehouses. Their versatility makes the forklift autonomous mobile robots an easy-to-integrate lifting equipment designed to be operated non-stop without stopping time. Asseco CEIT's forklift technology offers a high level of modularity and customisable forks, making it a compatible and stable tool for internal logistics.



FLEXIBILITY



SCALABILITY



360° SAFETY



INDUCTIVE CHARGING



CE CERTIFIED



5G READY

1500FCB

DIRECTION OF DRIVE	BI-DIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	4,000 MM
MAX LOAD	1,500 KG
TURNING RADIUS	1,820 MM
NAVIGATION	CONTOUR, LASER
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 3,645 MM, W: 1,220 MM, H: 3,254 MM



1500FSP

DIRECTION OF DRIVE	BI-DIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	300 MM
MAX LOAD	1,500 KG
TURNING RADIUS	1,800 MM
NAVIGATION	CONTOUR, LASER
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 2,438 MM, W: 900 MM, H: 920 MM



UNDER-RUN AMR

Ideal for logistics automation and transporting material placed directly on the autonomous mobile robot for an efficient use of space in production plants. They are compatible with internal logistics as well as with complete production lines.



FLEXIBILITY



SCALABILITY



360° SAFETY



INDUCTIVE CHARGING



CE CERTIFIED

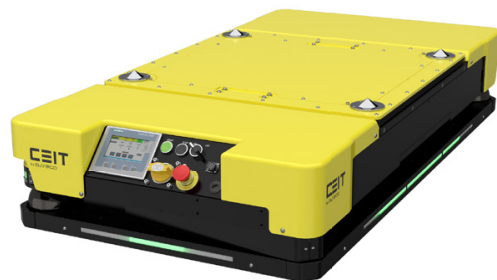


5G READY

1500UDS



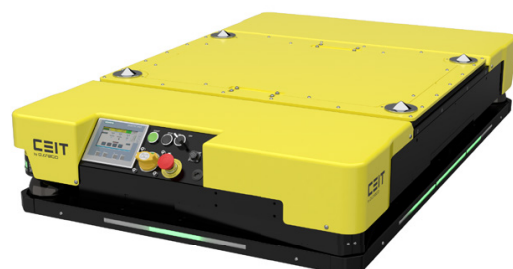
DIRECTION OF DRIVE	OMNIDIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	130 MM
MAX LOAD	1,500 KG
TURNING RADIUS	800 MM
NAVIGATION	CONTOUR
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 1,442 MM, W: 752 MM, H: 280 MM



1500UDE



DIRECTION OF DRIVE	OMNIDIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	130 MM
MAX LOAD	1,500 KG
TURNING RADIUS	850 MM
NAVIGATION	CONTOUR
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 1,442 MM, W: 912 MM, H: 280 MM



3200F



DIRECTION OF DRIVE	BI-DIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	60 MM
MAX LOAD	3,200 KG
TURNING RADIUS	900 MM
NAVIGATION	CONTOUR
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 1,700 MM, W: 1,300 MM, H: 600 MM



1200F



DIRECTION OF DRIVE	BI-DIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	130 MM
MAX LOAD	1,200 KG
TURNING RADIUS	700 MM
NAVIGATION	CONTOUR
SAFETY	360°
CHARGING	INDUCTIVE/AUTOMATIC
DIMENSIONS	L: 1,220 MM, W: 690 MM, H: 340 MM



1000LC-F 600LC-F



DIRECTION OF DRIVE	BI-DIRECTIONAL, ON THE SPOT ROTATION
LIFTING HEIGHT	50 MM
MAX LOAD	1,000 KG/600 KG
TURNING RADIUS	700 MM
NAVIGATION	CONTOUR, MAGNETIC
SAFETY	2X 180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,214 MM, W: 917 MM, H: 280 MM



2000AF 800AF



DIRECTION OF DRIVE	FORWARD/WITH THE CONDITIONAL REVERSING MODULE ALSO BACKWARD
MAX LOAD	2,000 KG/800 KG
TURNING RADIUS	1,600 MM
NAVIGATION	CONTOUR, MAGNETIC
SAFETY	180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,996 MM, W: 900 MM, H: 371 MM



2000AF-BD



DIRECTION OF DRIVE	BI-DIRECTIONAL
MAX LOAD	2,000 KG
TURNING RADIUS	1,500 MM
NAVIGATION	CONTOUR, MAGNETIC
SAFETY	2X 180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 2,643 MM, W: 900 MM, H: 462 MM



1300L-AF



DIRECTION OF DRIVE	FORWARD/WITH THE CONDITIONAL REVERSING MODULE ALSO BACKWARD
MAX LOAD	1,300 KG
TURNING RADIUS	1,300 MM
NAVIGATION	CONTOUR, MAGNETIC
SAFETY	180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,565 MM, W: 607 MM, H: 457 MM



TRACTOR AMR

The tow tractor types of AMR are mobile robots intended for the transport of goods. Their many combinations and customisation options make them ideal for use in different internal logistics processes in the industrial environment. The system of tow tractor AMRs can be connected to the clients' internal information and thus provide a fully autonomous process. They can thus achieve a higher level of automation, automated supply to the production line or the transport of finished products to the warehouse. The advantage of these tow tractors is that they can carry several pallets at the same time, thus making the flow of material more efficient and reducing the cycle time.



FLEXIBILITY



SCALABILITY



AUTOMATIC CHARGING



CE CERTIFIED



5G READY

1300L-A

DIRECTION OF DRIVE	FORWARD
MAX LOAD	1,300 KG
TURNING RADIUS	1,100 MM
NAVIGATION	CONTOUR, LASER, MAGNETIC
SAFETY	180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,170 MM, W: 670 MM, H: 1,270 MM



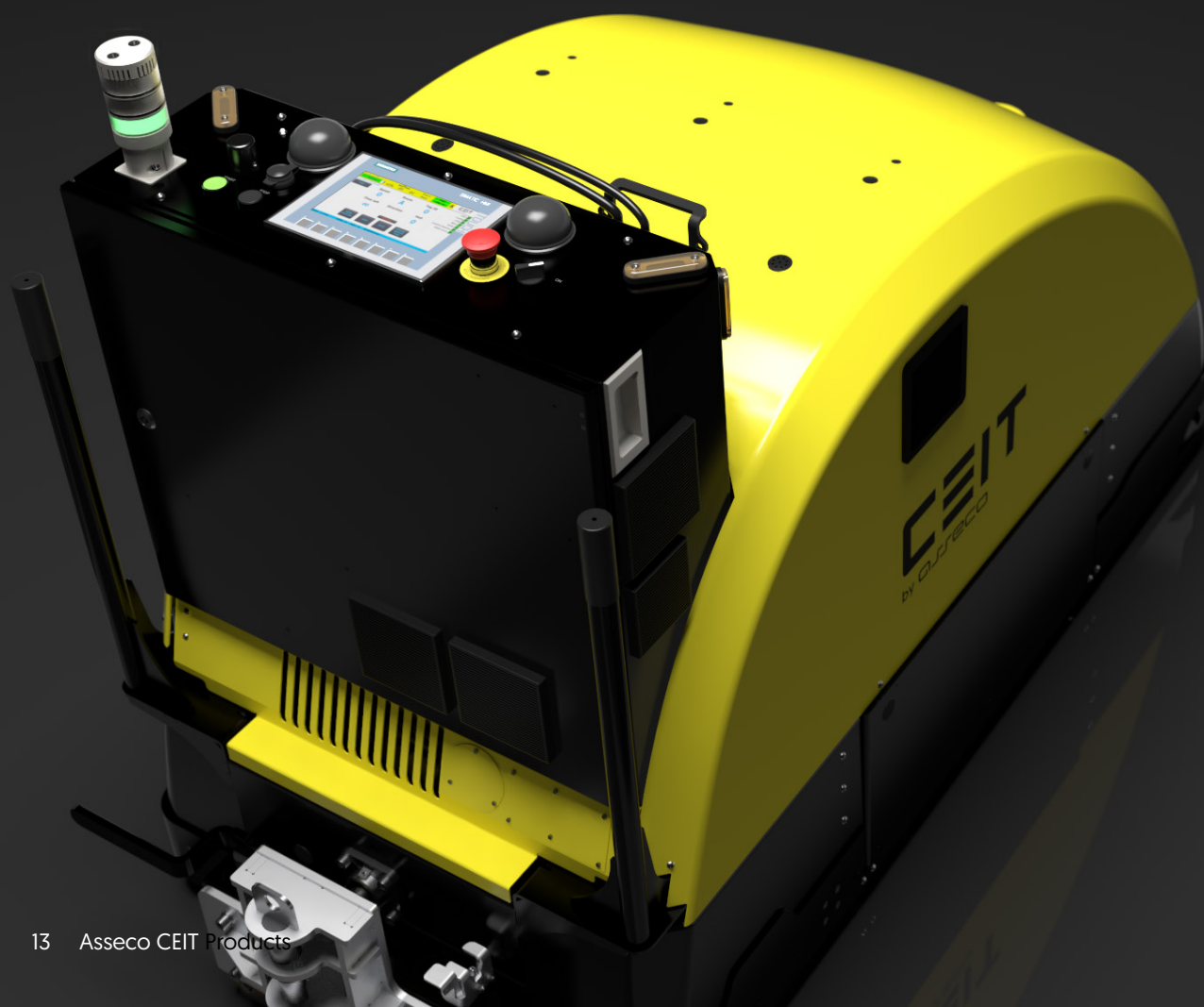
3000A 1300A

DIRECTION OF DRIVE	FORWARD
MAX LOAD	3,000 KG/1,300 KG
TURNING RADIUS	1,100 MM
NAVIGATION	CONTOUR, LASER, MAGNETIC
SAFETY	180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,410 MM, W: 900 MM, H: 1,155 MM



8000A
6000A

DIRECTION OF DRIVE	FORWARD
MAX LOAD	8,000 KG/6,000 KG
TURNING RADIUS	1,800 MM
NAVIGATION	CONTOUR, LASER, MAGNETIC
SAFETY	180°
CHARGING	AUTOMATIC
DIMENSIONS	L: 1,780 MM, W: 840 MM, H: 1,267 MM





SEMI-OUTDOOR AMR

Asseco CEIT offers a solution which does not limit the operations of AMR equipment to logistics operations or ensuring a supply chain to indoor premises only.

The semi-outdoor versions of autonomous mobile robots expand the possibility for the use of our AMR fleet, since

IN ADDITION TO STANDARD INDOOR OPERATIONS, THEY CAN ALSO WORK IN MORE DEMANDING OUTDOOR CONDITIONS.

They can be operated in environments with a temperature range of -10°C to 40°C while still meeting the strictest safety standards and guaranteeing smart security. The latter can identify real obstacles and filter out environmental factors which are not a real risk. The semi-outdoor module thus helps ensure a consistent and reliable materials flow, for example across a covered corridor between two halls, or under a covered outdoor part of a hall in changing weather conditions which can be affected by rain, snow, sunlight or fog.

THANKS TO THE MODULARITY OF OUR AMRS, AN INCLINED PLANE MODULE CAN BE ADDED TO THE SEMI-OUTDOOR MODULE, WHICH RESOLVES ANOTHER CHALLENGE IN MOVING OUTSIDE INDOOR PREMISES WITH A NON-STANDARD FLOOR INCLINE OF OVER 2%.



CUSTOM AMR SOLUTIONS

Our standard solutions are not always suitable for the automation of internal logistics or production. With its own research and development centre, Asseco CEIT can also offer custom solutions for individual needs, adapted to the client's current situation. These can be a combination of different types of AMR, peripherals or a complete automated unit with its own control system.



AMR WITH LATERAL MOVEMENT OF MATERIAL

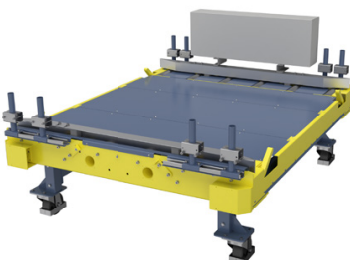
Ideal for the automation of logistics and for transporting materials placed on shelves or in warehouses with narrow lanes. Thanks to their lateral movement, the space in production premises is used more efficiently. They are compatible with internal logistics as well as complete production lines.

PERIPHERALS

Asseco CEIT also offers its own peripherals for its autonomous mobile robots. These are used to add to AMR functionality, or to adapt the workplace to make it fully automated using AMR technology.

E-FRAME

The electric, hydraulic or pneumatic E-frame carries material to defined places on the production line. It is available in manual or fully automatic versions. Its advantage is that its static part requires no connection to electricity. It is available in different sizes in our product portfolio.



ROLLER CONVEYORS

Dynamic or static roller conveyors enable a two-sided, fully automatic handling of the client's pallets. It is available in our product portfolio in different sizes with varying load capacities. Peripherals used by the client can also be implemented.



LIFTING PLATFORMS

This equipment lifts material or pallets if the position is not ergonomic for the operator. It is available in a fully automatic version. It is available in our product portfolio in different sizes with varying load capacities and lifting heights.

UNIVERSAL KLT CONVEYOR

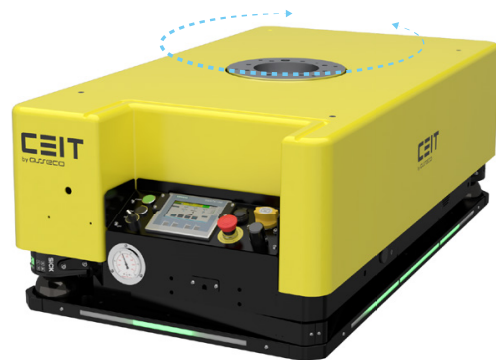
The KLT conveyor moves material (small parts) in KLT boxes to defined places or shelves on the production lines. It is available in a fully automatic version. Its advantage is that its static part requires no connection to a source of energy, for example a gravity conveyor. It can be customised to different KLT box sizes with varying load capacities.



CUSTOMISED PERIPHERALS

TURNING MECHANISM FOR UNDER-RUN AMRS

TURNING MECHANISM FOR LOW-LIFT EQUIPMENT



The equipment turns the material, pallets or rolls on the autonomous mobile robot itself. It is suited to situations where the transported material is too long and it is not safe to drive with it in the production hall. With a forklift AMR, the material can be lifted to a certain height and placed, for example, on a shelf. With an under-run AMR, the material can be stored in static storage positions or robotic cells.

MONITOR & CONTROL SYSTEM WITH VDA 5050 STANDARD

The Monitor & Control System [MCS] is Asseco CEIT's own comprehensive fleet manager developed for monitoring and controlling logistics means, which matches the VDA 5050 standard interface for AMR equipment communication. It consists of three main parts:

CONTROL SYSTEM
AMR MONITOR
TRACK & TRACE

CONTROL SYSTEM

The Control System is the basic control unit of the whole system, providing the autonomous logistics equipment known as AMR with information on its status, actions performed, problematic situations and positions in the defined space, while also using this information to make decisions and then control individual parts of the logistics process. Its task is to control the movement of each AMR device, for example across cross-roads, traffic lights, service points, charging stations and so on, automatically and without the need for human intervention. The added value of the Control System is the automatic control of the logistics process.



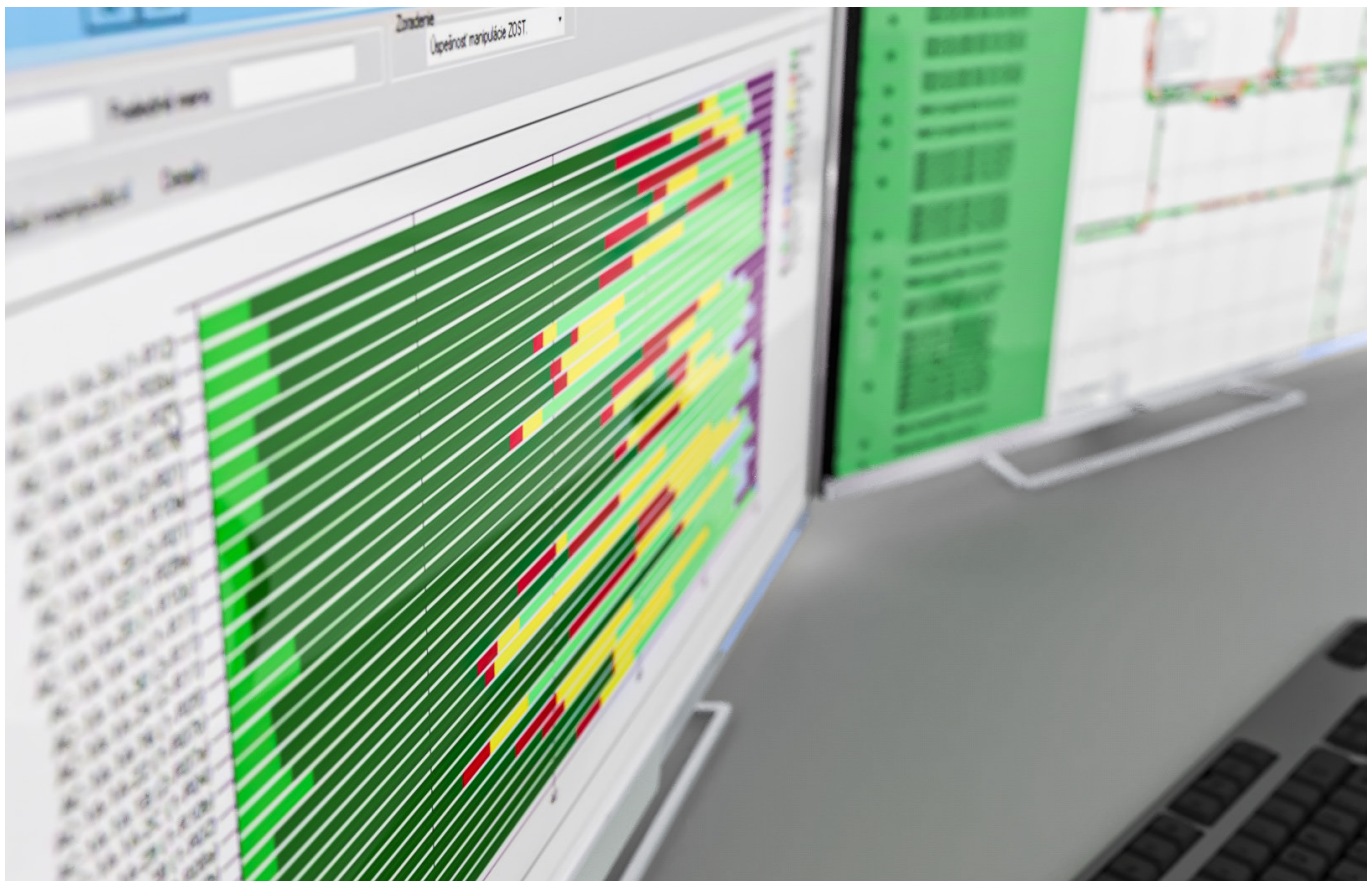
AMR MONITOR

AMR Monitor is a software solution used to monitor autonomous mobile robots and other elements of the system active in the production process. The task of the AMR Monitor is to give employees in the production hall the opportunity to monitor the position, activity and operational statuses of each mobile robot and other elements in the system, and to have an overall view and control of them.

An added value is the monitoring of AMR devices in the production process in real time, with the processed information displayed in a user-friendly manner, mainly via a graphic visualisation of the status, or as text output as defined by the user. The user can influence each decision-making element in real time, for example by activating or deactivating them. The system records and collects all the information to use as documentation for later analysis or the subsequent optimisation of logistics processes.

STATISTICAL TRACK & TRACE SOFTWARE

Track & Trace is a software solution offering a review of the history of the production and logistics processes carried out in halls in various industry branches. The program records, statistically evaluates and displays the operational activity of each AMR device, providing a regular report of their overall movement, transfer of material, communications, correct RFID tag readings etc. Based on the statistical data, it can find narrow places, exclude the factor of unreliable technology or a human factor, analyse errors, look for the causes of problems and thus optimise the production and logistics processes. The programme offers a retroactive check of these processes, thus providing a comprehensive view of all that is happening in the industrial plant.



FORKLIFT AMR/TECHNICAL SPECIFICATIONS

FORKLIFT AMR				
Name	1500FCB	1500FS	1500FSP	1500FES
Type	forklift with counterbalance	low lift with support	low lift with Europallet support	straddle low lift
Navigation	contour/laser	contour/laser	contour/laser	contour/laser
Movement	forward/backward	forward/backward	forward/backward	forward/backward
Minimal turning radius (m)	depending on the pallet	depending on the pallet	1.8	depending on the pallet
Speed (m/s)	forward: 2.0/backward: 0.5	forward: 2.0/backward: 0.5	forward: 2.0/backward: 0.5	forward: 2.0/backward: 0.5
Load capacity (kg)	1,500	1,500	1,500	1,500
Lift	hydraulic	hydraulic	hydraulic	hydraulic
Lift (mm)	4,000/6,000	1,500	300	1,500
Dimensions (L, W, H in mm)	3,645x1,220x3,254	2,386x937x2,554	2,438x900x920	2,968x1,598x2,555
Forks	forged	welded/forged	welded	welded/forged
Max. pallet size (L, W, H in mm)	length 1,500	Width up to 1,400/length up to 1,500	1,200x800	1,800x2,300x1,500
Manipulation	via static part/from the ground	via static part/from the ground	via static part/from the ground	via static part/from the ground
Batteries	Li-FePO4	Li-FePO4	Li-FePO4	Li-FePO4
Charging	inductive/automatic	inductive/automatic	inductive/automatic	inductive/automatic
Control	manual control, touchscreen, steering handle	manual control, touchscreen, steering handle	manual control, touchscreen, steering handle	manual control, touchscreen, steering handle
Safety scanners	safety PLC, safety laser	safety PLC, safety laser	safety PLC, safety laser	safety PLC, safety laser

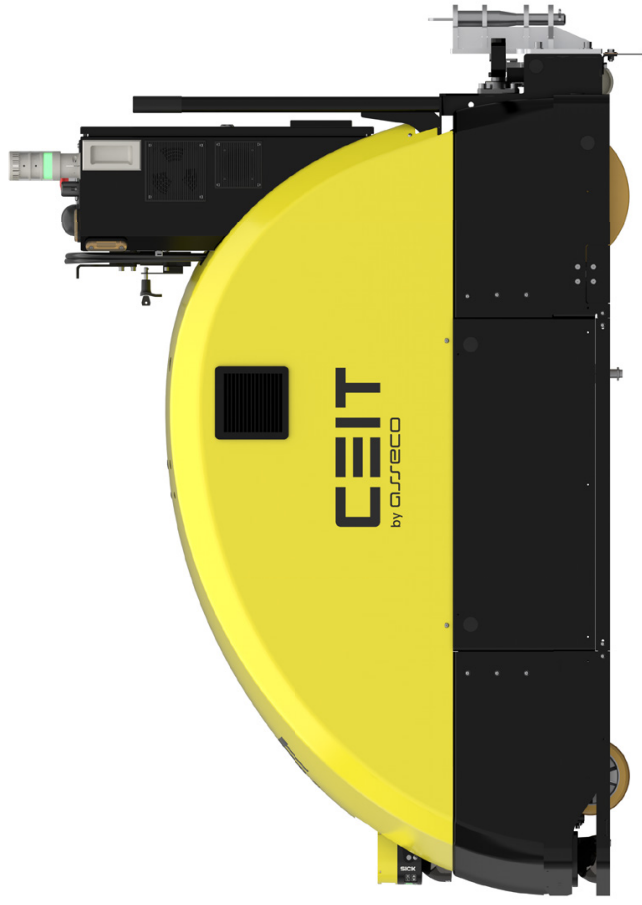


UNDER-RUN AMR/TECHNICAL SPECIFICATIONS

UNDER-RUN AMR										
Name										
Type	under-run	under-run	under-run	under-run	under-run	under-run	under-run	under-run	under-run	under-run
Navigation	contour	contour	contour	contour	contour/magnetic	contour/magnetic	contour/magnetic	contour/magnetic	contour/magnetic	contour/magnetic
Movement	omnidirectional/ on the spot rotation	omnidirectional/ on the spot rotation	forward/ backward/on the spot rotation	forward/ backward/on the spot rotation	forward/ backward/on the spot rotation	forward/ backward/on the spot rotation	forward/with the conditional reversing module also backward	forward/with the conditional reversing module also backward	forward/backward	forward/with the conditional reversing module also backward
Minimal turning radius (m)	0.8	0.85	0.9	0.7	0.7	0.7	1.6	1.6	1.5	1.3
Speed (m/s)	1.6	1.6	1	1.3	0.7	1.2	1	2	1	1
Load capacity (kg)	1,500	1,500	3,200	1,200	1,000	600	500/2,000	500/800	1,000/2,000	1,300
Lift	electric	electric	electric	hydraulic	electric	electric	-	-	-	-
Lift (mm)	130	130	60	130	50	50	-	-	-	-
Dimensions (L, W, H in mm)	1,442x752x280	1,442x912x280	1,700x1,300x600	1,220x690x340	1,214x917x280	1,214x917x280	1,996x900x371	1,996x900x371	2,643x900x462	1,565x607x457
Batteries	Li-FePO4	Li-FePO4	Li-FePO4	Li-FePO4	Li-FePO4	Li-FePO4	traction gel	traction gel	traction gel	traction gel
Charging	inductive/automatic	inductive/automatic	inductive/automatic	inductive/automatic	automatic	automatic	automatic	automatic	automatic	automatic
Control	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen	manual control, optional remote control	manual control, optional remote control	manual control, optional remote control	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen
Safety scanners	SICK 2x 270° (optional 2D scanner and 3D camera)	SICK 2x 270° (optional 2D scanner and 3D camera)	SICK 2x 270° (optional 2D scanner and 3D camera)	SICK 2x 270° (optional 2D scanner and 3D camera)	SICK 2x 180° (optional 2D scanner)	SICK 2x 180° (optional 2D scanner)	SICK microScan 180° (optional 2D scanner and 3D camera)	SICK microScan 180° (optional 2D scanner and 3D camera)	SICK microScan 2x180° (optional 2D scanner and 3D camera)	SICK microScan 180°, SICK S300 180° (optional 2D scanner and 3D camera)

TRACTOR AMR/TECHNICAL SPECIFICATIONS

TRACTOR AMR					
Name	1300L-A	3000A	1300A	8000A	6000A
Type	tow tractor	tow tractor	tow tractor	tow tractor	tow tractor
Navigation	contour/ laser/magnetic	contour/ laser/magnetic	contour/ laser/magnetic	contour/ laser/magnetic	contour/ laser/magnetic
Movement	forward	forward	forward	forward	forward
Minimal turning radius [m]	1.1	1.1	1.1	1.8	1.8
Speed [m/s]	1.3	1.0	2.0	1.0	1.0
Load capacity [kg]	1,300	3,000	1,300	8,000	6,000
Lift	-	-	-	-	-
Lift [mm]	-	-	-	-	-
Dimensions [L, W, H in mm]	1,170x670x1,270	1,410x900x1,155	1,410x900x1,155	1,780x840x1,267	1,780x840x1,267
Batteries	traction gel	traction gel	traction gel	traction gel	traction gel
Charging	automatic	automatic	automatic	automatic	automatic
Control	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen	manual control, touchscreen
Safety scanners	SICK microScan 180° SICK S300 180° (optional 2D scanner and 3D camera)	SICK microScan 180° SICK S300 180° (optional 2D scanner and 3D camera)	SICK microScan 180° SICK S300 180° (optional 2D scanner and 3D camera)	SICK microScan 180° SICK S300 180° (optional 2D scanner and 3D camera)	SICK microScan 180° SICK S300 180° (optional 2D scanner and 3D camera)



REFERENCES



ŠKODA





**Future
accelerated**

Tel.: +421 905 342 770

E-mail: sales@asseco-ceit.com

asseco-ceit.com