ARCOS combines AGV and AMR

Cooperative navigation

Plannable autonomy

Our transport vehicles master both technologies Either or is history – As well as is the new approach

With the ARCOS vehicle software, DS AUTOMOTION enables its transport vehicles to act not only as Automated Guided Vehicles (AGV), but also as Autonomous Mobile Robots (AMR), thereby setting an example in the world of intralogistics.

The customer has a transport system that can either use its autonomous functions or follow predefined tracks. For the first time, maximum flexibility and efficiency from the two fields of AMR and AGV can be realized in just one transport system.

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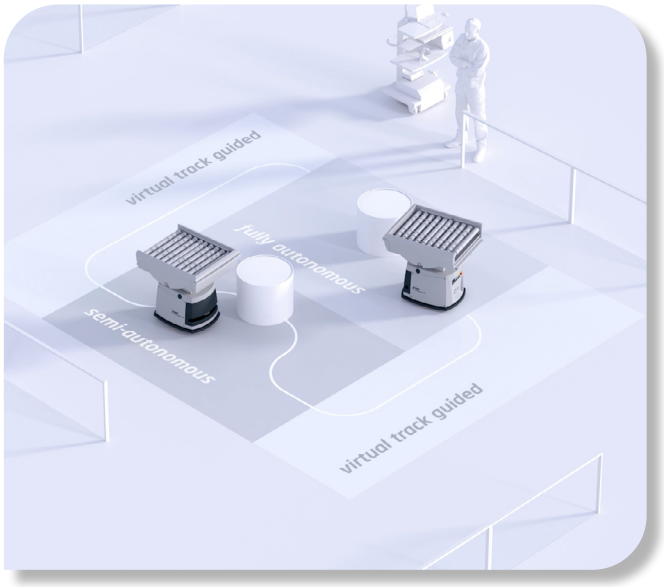
Plannable autonomy

Plannable autonomy is a term defined by DS AUTOMOTION. It's the possibility of being able to navigate vehicles, that are both (virtually) track- as well as autonomously guided. The basic building blocks for this are so-called autonomous zones in which the vehicles are allowed to move autonomously. Many AGV manufacturers navigate exclusively lane-guided, most AMR manufacturers navigate fully autonomously. Our approach is to combine the benefits from the AGV with those from the AMR market, to offer the advantages of both approaches.

Plannable autonomy enables autonomous functions to be used specifically where their advantages outweigh their disadvantages. Conversely, autonomous functions can be deliberately prevented where they have disadvantages - A unique development by the engineers at DS AUTOMOTION, as it relieves the customer of an elementary decision.



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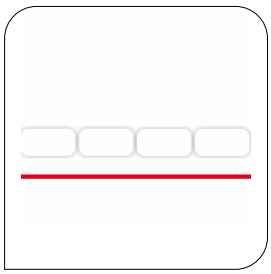
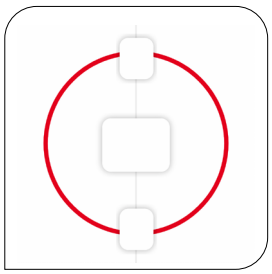


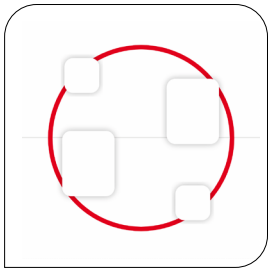
Plannability

Vehicle autonomy must be plannable and controllable to allow manual planning as needed. From centralized control with predefined lanes and traffic control to full autonomy in different areas of a facility.



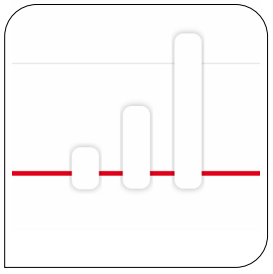
Central Fleet Manager

Our vehicles not only make their decisions based on their own sensor data, but also communicate with the central fleet manager and other vehicles to always factor all current events into route planning.



Flexibility

Autonomous functions such as free path planning, to avoid obstacles increase flexibility regarding an dynamically changing work environment and the people with their equipment in it.



Efficiency

Firmly planned processes, such as drivable virtual lanes and a detailed traffic control system, make order processing guaranteed collision-free, congestion-free and as predictable as possible. In this way, maximum efficiency can be achieved.

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ARCOS

integrated VDA 5050 interface

To enable the individual vehicles to communicate with their master controller, ARCOS uses the standardized VDA 5050 interface. This not only allows communication with the VDA 5050-compatible NAVIOS master controller, but also vehicles to be connected to an existing VDA 5050 master control system.

The intelligence in the vehicle through the vehicle software ARCOS

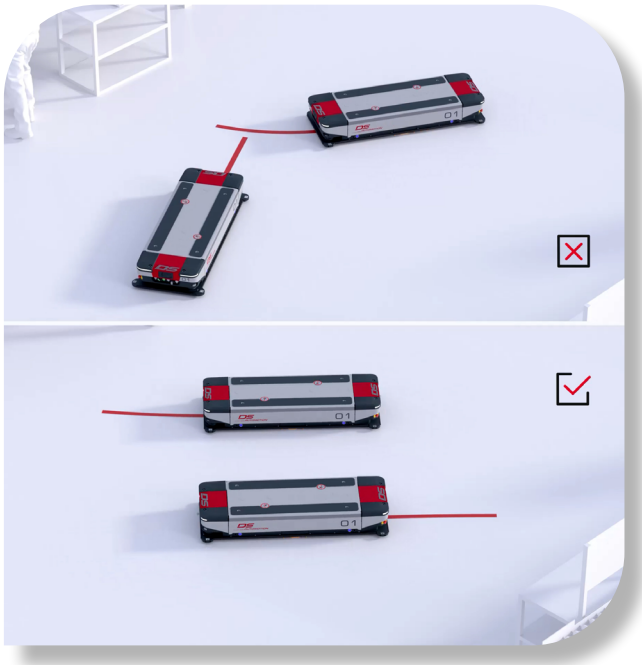
To enable vehicles to make their own decisions in certain situations, we equip them with our innovative ARCOS vehicle software. This not only ensures that a destination is reached in good time, but also offers a high level of safety for the system and your employees. Obstacles can be avoided efficiently and people are protected as the vehicle recognizes them and stops immediately.

Autonomy, flexibility and efficiency

Autonomously navigating vehicles allow greater flexibility in the face of disruptions or obstructions in the work environment. If, for example, the cleaning staff leaves a cleaning trolley on the route, the autonomous vehicle can drive round it, provided there is enough space. Obstacles and disturbances always lower the efficiency of a system and therefore the transport performance of the overall system decreases. In highly automated production disruptions are prevented in the best possible way. If an obstacle nevertheless occurs, it can be solved by autonomy. In order to achieve the highest possible efficiency with a high level of flexibility, the autonomy must be manageable. Therefore, the concept of plannable autonomy was developed by DS AUTOMOTION.

Reactive and cooperative navigation

Dynamic objects located on the travel path are detected by sensors. These objects include, for example, people or manually guided machines (forklifts, lift trucks, transport carts, etc.) that are moving in the same work area. By using reactive navigation, these can be perceived as obstacles and bypassed. To prevent collisions between autonomous vehicles at intersections, the vehicles must have cooperative navigation.
This means that they clarify the right of way independently without having to rely on a central traffic control system.
In conjunction with the NAVIOS fleet manager, mutual blocking is also prevented.



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ARCOS

ARCOS User interface

ARCOS offers a simple user interface that can be used to check the status of individual vehicles at any time and to update system parameters during runtime. To optimally support maintenance, it is compatible with all common, web-enabled end devices.

- Web-based user interface
- Responsive Design
- Commissioning and Trouble-Shooting Wizards
- Multilingual output
- User and rights management

Navigation and localization

Depending on the area of application, a wide variety of navigation and localization methods can be used and combined with the ARCOS vehicle software:

- Navigation
  - Virtually tracked
  - Semi autonomous
  - Autonomous
- Localization
  - Contour-based
  - Laser
  - Magnetic Grid

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Frequently asked questions

What does plannable autonomy mean?

Autonomy does not bring advantages at every point in a system. At narrow points or places with high traffic volumes, better solutions can be achieved with fixed lanes and fixed traffic rules. With plannable autonomy, autonomous functions can be switched on and off. This means that the desired behavior of an AMR can already be defined in the planning stage.

What are the autonomy zones and how are they defined?

The zone system of ARCOS distinguishes three different zone types. These are virtual lane guided, partially autonomous and fully autonomous. In virtual lane guided zone, the vehicle is not allowed to leave the predefined lane and stops when obstacles are detected. In partially autonomous mode, the vehicle also follows the virtual lane, but is allowed to leave, if obstacles are encountered in order to drive around them. In fully autonomous mode, the vehicle uses its sensor data to independently plan its lane within the detected environment.

The zones are defined in the web-based environment of the NAVIOS fleet manager. The system layout and the zone definition can also be subsequently changed by the system operator in a user-friendly manner.

How is the avoidance of obstacles solved?

The vehicle's sensors detect the surroundings. Reactive navigation can be used to react to the sensor data and adjust the planned lane and speed at any time.

How are collisions prevented?

In path planning, cooperative navigation means taking into account the movements of other vehicles. This means that vehicles cannot travel to the same place at the same time and collisions can be safely prevented.

As a company, how do I achieve the highest flexibility for my production?

With complete autonomy, you get the highest flexibility, but you pretty much always lose efficiency. If, for example, there are constant disturbances in the form of obstacles on the route, an AMR must constantly take evasive action and the processing of a job becomes inefficient. It should therefore be carefully considered which autonomous functions are needed in an AMR and where one wants to use this autonomy in order to get the necessary flexibility.

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