



# Automated Guided Vehicles

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## Automated Guided Vehicle (AGVs)



# Soft Design & Atab (MAXAGV)



## Soft Design

- Software side of MAXAGV
- Privately owned
- Product: Max & Sonix
- Over 35 years of experience

## Employees

- Software & Electronics Engineers
- Installation Engineers
- Project Managers
- System Sales
- Customer Support

## Atab

- Hardware side of MAXAGV
- Privately owned
- AGV Products: FX, CX & AX Range
- Rights to 12 000 AGVs
- Over 35 years of experience

## Employees

- Mechanical Design Engineers
- Electrical Design Engineers
- Test Engineers
- Workshop Assembly Engineers
- Spare parts and support

MAXAGV: 45 employees, turnover Euro >10, 000, 000  
Producing Over 15 to 20+ AGV Systems per year





# AGV production in Gothenburg, Sweden



# Selecting the right AGV

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**When deciding on AGVs for an application, which type should be considered?**

Choosing which type of AGV is right for the application is an extremely important first step for MAXAGV. We manufacture different types of vehicles to accomodate different types of applications.



# The FX Range

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Some of our forklift type AGVs.



FX40



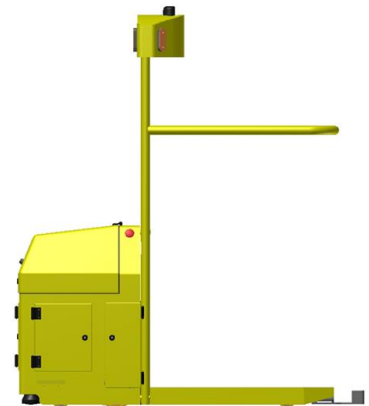
FX30



FX15



FX10



FX05



# The CX Range

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Some of our carrier type AGVs.



CX100



CX30



CX15



CX10



CX01



# The AX Range

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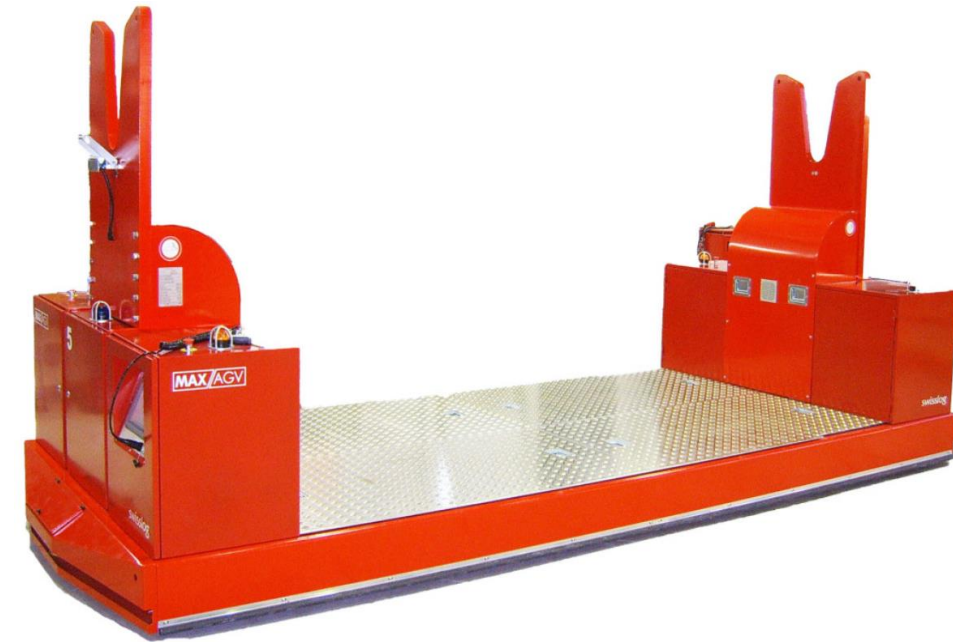
We can also make special bespoke AGV designs.



AGVs for engine assembly



Special AGV designs



Large Paper Roll Handling

# FLT Conversions

Converting manual forklifts into AGVs.



## AGV Design / Continuous Development

We are continuously reviewing our AGV markets and design AGVs to meet these demands... the following are recent examples of new products



VX VNA AGV

- VNA turret fork AGV
- Pallets (GKN/ Euro)
- 600kg
- 10m



FX20C AGV

- Compact Counterbalance
- Pallets (GKN/ Euro)
- 2000kg
- 2.5m



MX15 VNA AGV

- VNA AGV
- Pallets (GKN/ Euro)
- 1500kg
- 15m



AGV Shuttle Handling

- AGVs & Shuttle handling
- Pallets (GKN/ Euro)
- 1300kg
- 6.5m (plus)



## Battery Types

| <b><u>Batteries</u></b>              |                           |                           |                  |                      |                           |                  |
|--------------------------------------|---------------------------|---------------------------|------------------|----------------------|---------------------------|------------------|
| <b>Brand</b>                         | Hawker Perfect            | Hawker Waterless          | Hawker Evolution | NexSys               | Ironclad                  | Lithium          |
| <b>Technology</b>                    | Wet Lead Acid             | Wet Lead Acid             | Gel              | Thin Plate Pure Lead | Wet Lead Acid             | Lithium-ion      |
| <b>Maintenance</b>                   | Top Up interval 1-2 weeks | Top Up interval 4-8 weeks | Maintenance Free | Maintenance Free     | Top Up interval 1-2 weeks | Maintenance Free |
| <b>Charging Time (from Flat 80%)</b> | 6 – 12 hours              | 6 – 12 hours              | 6 - 10 hours     | 4 – 6 hours          | 6 – 12 hours              | 2 - 4 hours      |
| <b>Duty</b>                          | Heavy                     | Heavy                     | Normal           | Heavy                | Heavy                     | Heavy            |
| <b>Price</b>                         | 100%                      | 110%                      | 120%             | 160%                 | 120%                      | 300%             |



## Quality, Technology & Confidence

### “MAXAGV MAKES THE WORLD OF DIFFERENCE”

A "Declaration of Conformity" is issued for each AGV, specifying which directives this particular vehicle complies with and is in conformity with the provisions of the Machinery Directives 2006/42/EC and the EMC Directives EN 12895. The relevant parts of the following standards have been used for the design of the AGVs:

- Safety of machinery:

- EN ISO 12100-1,-2      Basic concepts, general principles for design.
- EN ISO 13849-1:2008      Safety-related parts of control systems - Part 1:

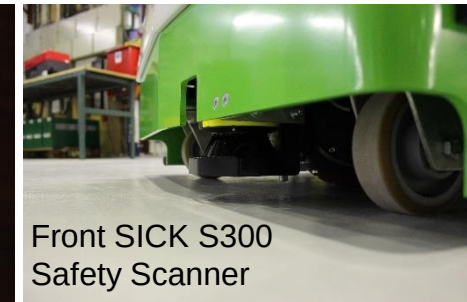
General principles for design.

- EN ISO 13850:2008      Emergency stop - Principles for design.
- EN 1525      Driver less trucks and their systems.
- EN 349+A1:2008      Minimum gaps to avoid crushing of parts of the human body.
- EN ISO 14121-1:2007      Risk assessment - Part 1: Principles.
- EN 60204-1      Electrical equipment of machines - Part 1: General requirements.
- IEC 60204-2      Electrical equipment of industrial machines. Part 2: Item designation and examples of drawings, diagrams, tables and instructions.

- Electromagnetic compatibility (EMC):

- EN 12895      Industrial trucks – Electromagnetic compatibility

## AGV Safety

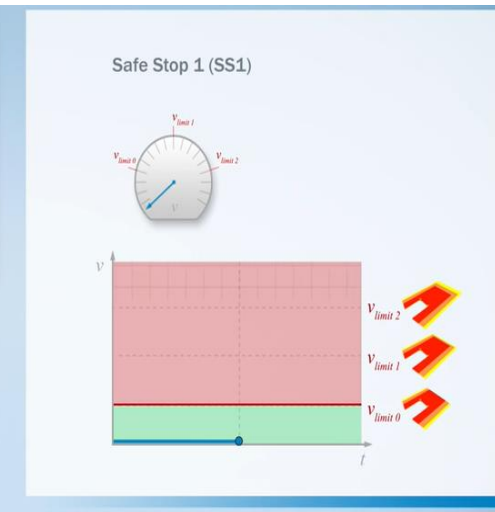
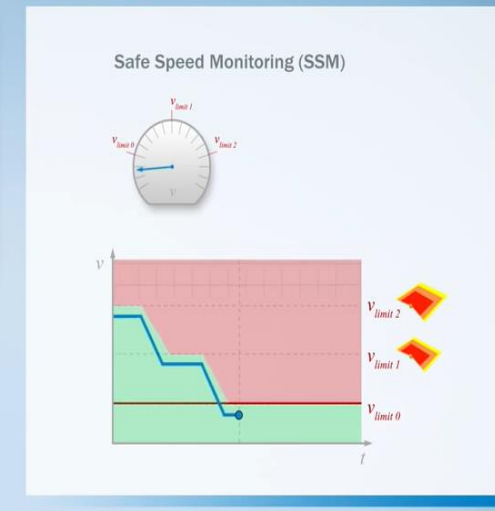
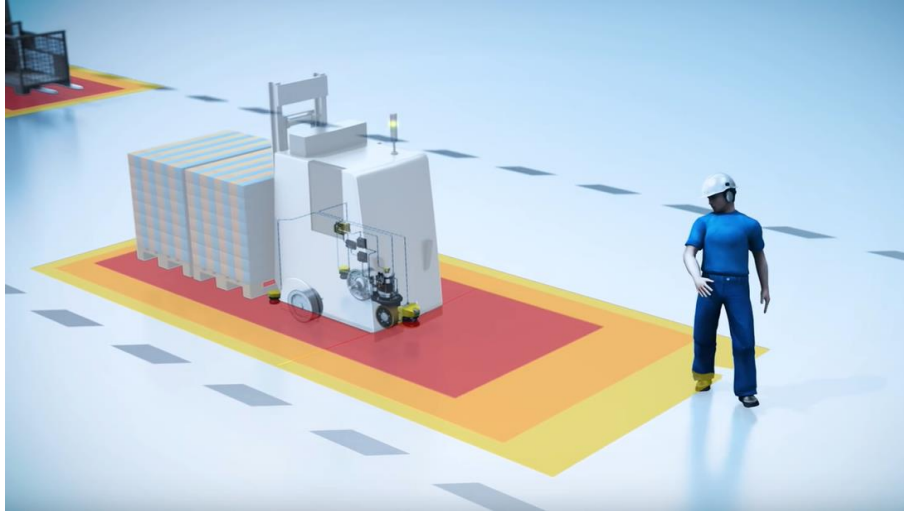


Each AGV will be equipped with the following safety features:

- A SICK S300 in front with a speed depended interface that slows the AGV down before coming to a stop.
- Photocells to detect pallets and for safety
- Side safety tape switches on both sides of the chassis.
- Two emergency stop buttons – one on each side of the machine house.
- Standard warning and turning indicator lamps on the mast unit.
- Audible alarm



## Safety Scanners

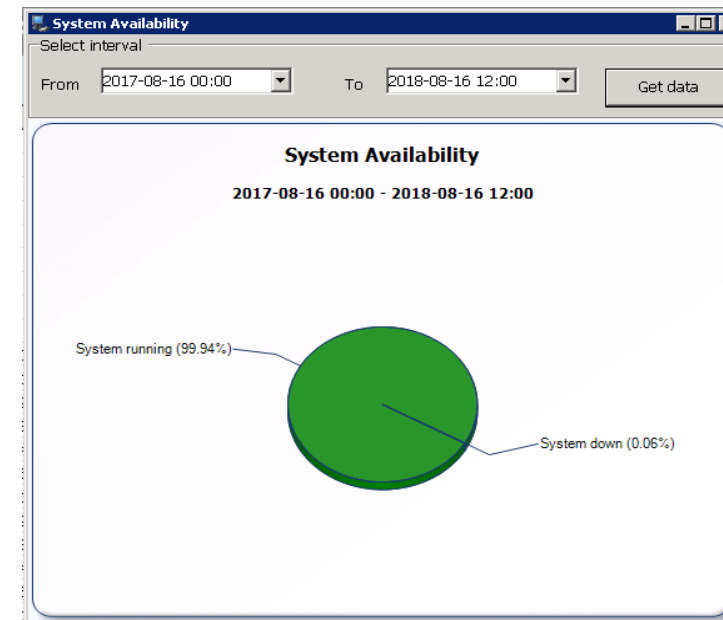
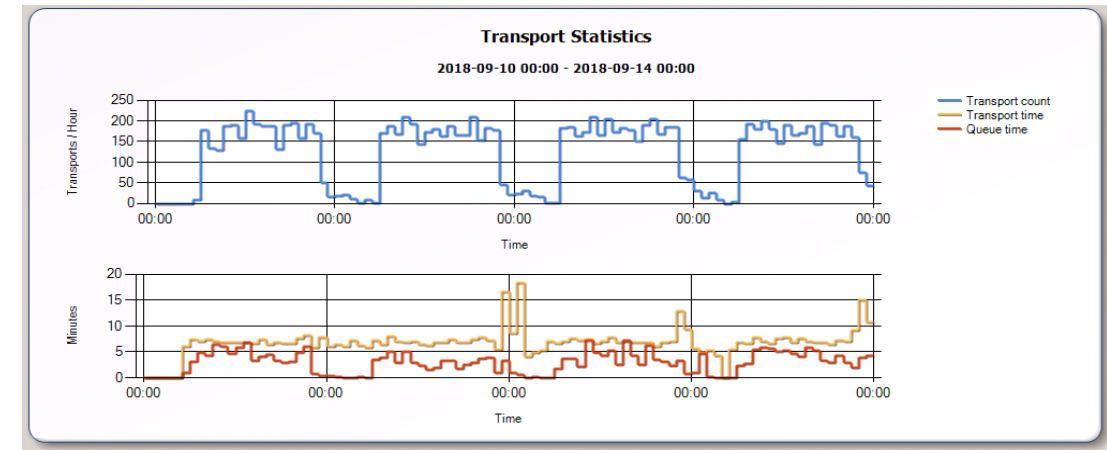
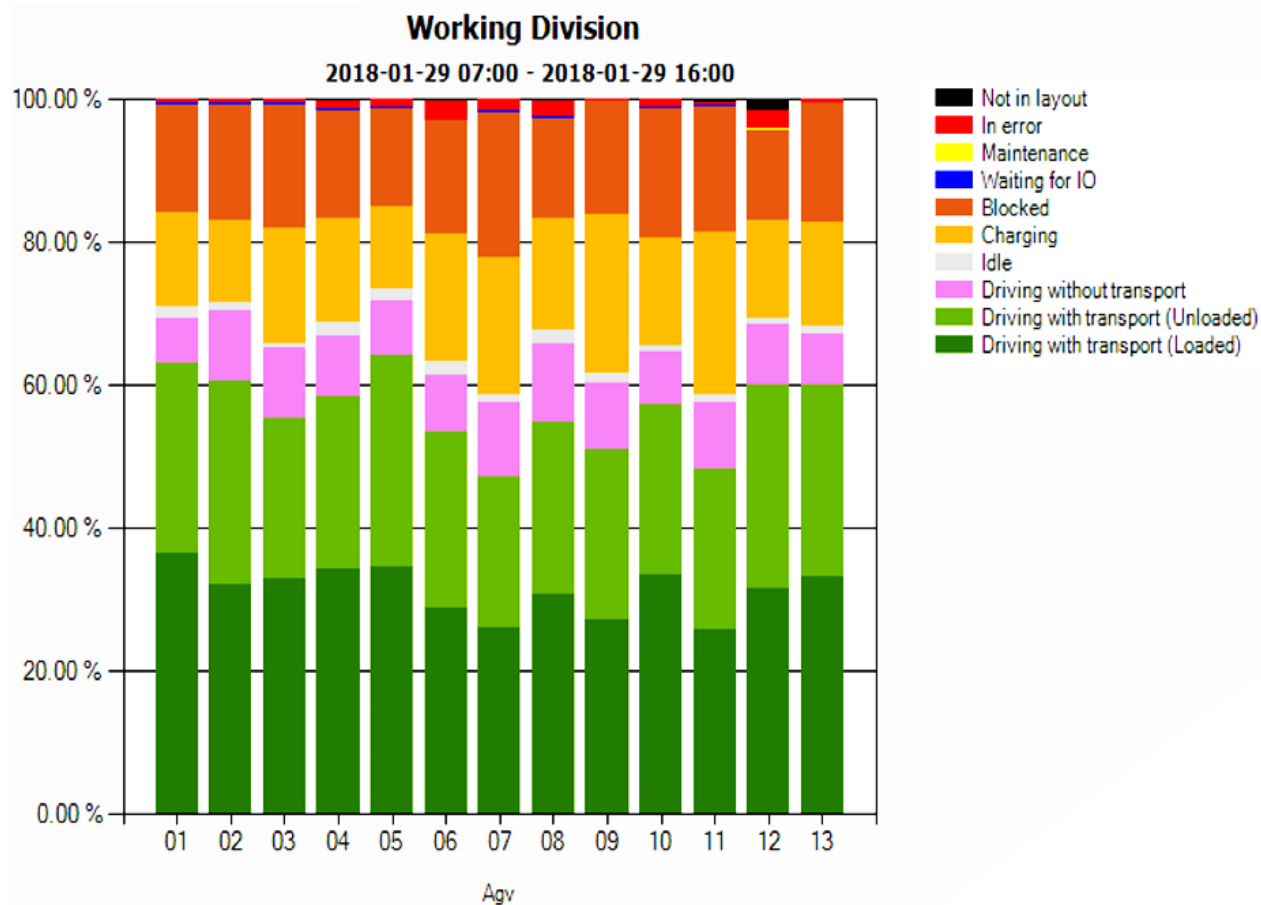


# Max: AGV Control System



## Max Statistics

- Reports and statistics
- Optimisation of traffics and orders

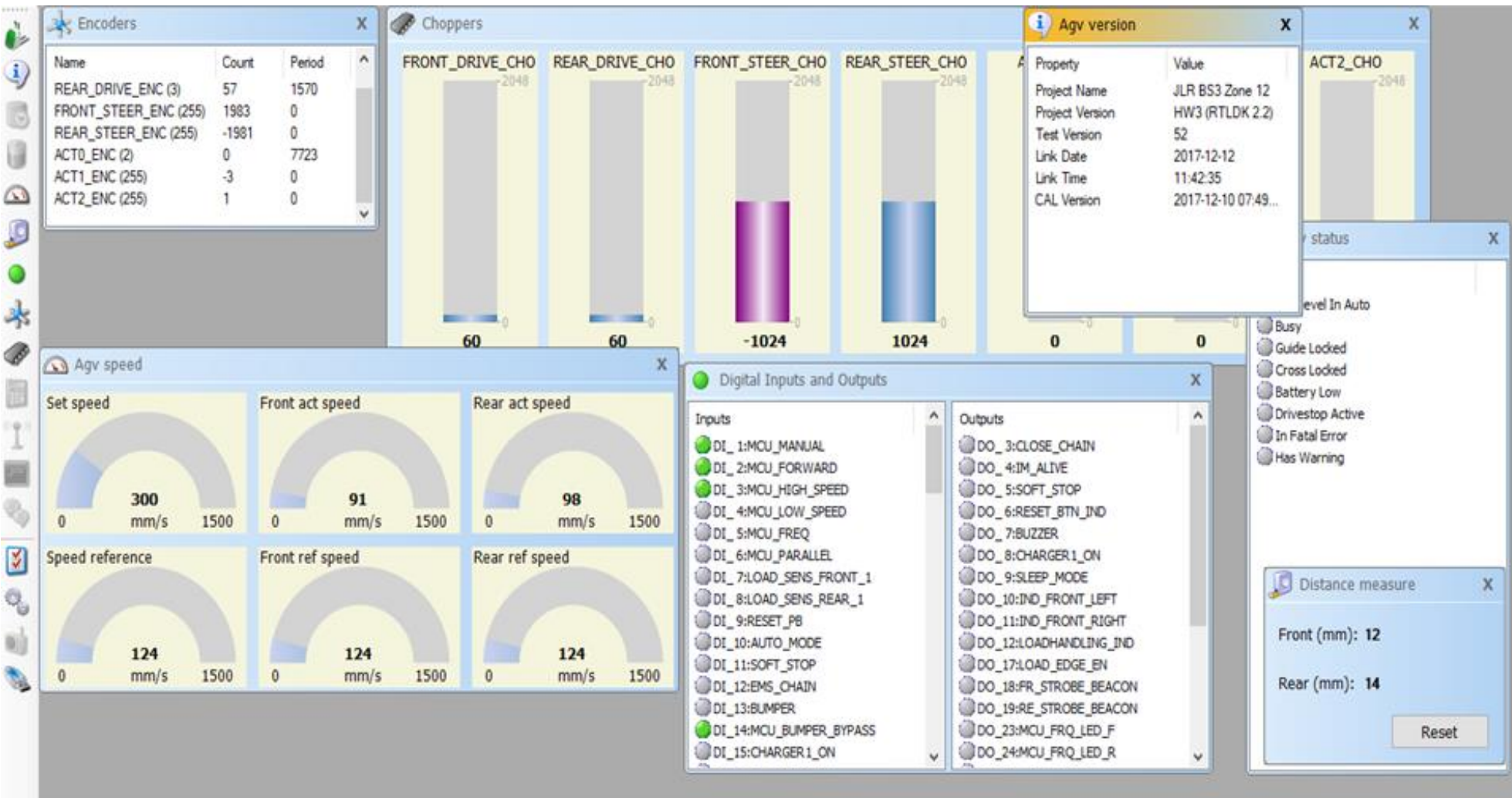


Max Control Systems availability for the past 12 months, from a system with 34 AGVs.

99.94 availability.



## AGV Diagnostics



Example:

- AGV Status.
- Encoder values.
- Drive, steer off set.
- Lift inverter values.
- Speed references.
- Digital inputs and outputs.
- Distance measurement values.
- Laser Scanner deviation.
- AGV Software version.

# Max is prepared for the future

## Customer Adaptions

- Max is easily expandable to match user needs

## Max standard components

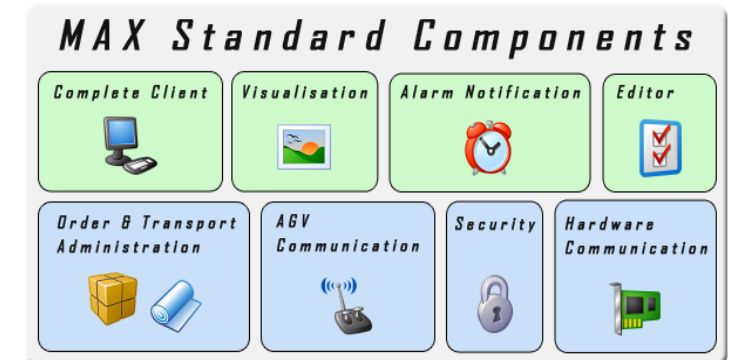
- Covers a wide range of applications
- Provides stability

## .NET, C# and XML

- Modern tools keep Max up-to-date
- C# with .NET is the obvious choice today
- XML provides configuration

## The Windows platform

- Easy integration to customer networks
- The best companion to .NET





## 3D Visualisation

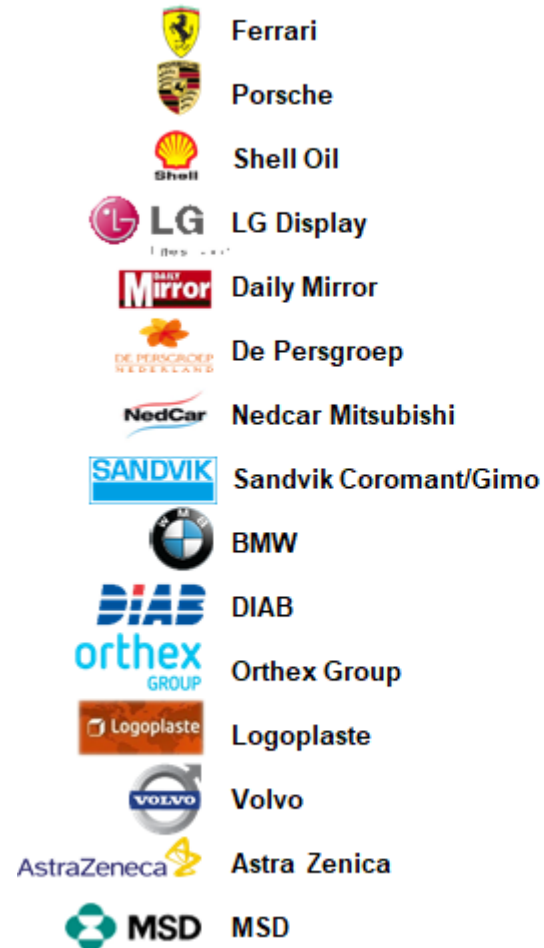
3D visualisation is continuously developed for production environments





## References

A small selection of reference applications:





For more info, please visit: [www.maxagv.com](http://www.maxagv.com)

