

metaio  
**Engineer**

metaio Engineer offers software and hardware solutions for Augmented Reality in the industrial field. Its modular structure provides you the custom tools and solutions for almost all technical assignments which makes metaio Engineer the most flexible and comprehensive Augmented Reality system on the market.





# Augmented Reality

## Simplifies and accelerates your process

Augmented Reality (AR) grew out of Virtual Reality and describes the enrichment and enhancement of the user's view of the real world by superimposing additional digital information that supports or is required for the fulfillment of a certain task. This content is made visible on a monitor, a tablet PC, within the field of view using a head-mounted display or projected onto the respective area.

The purpose of overlaying live and still pictures with virtual data is to provide information relevant for the user directly within the area of interest by merging actual and digital reality.

With Augmented Reality, content and information is delivered, processed and experienced in the most natural manner that is possible, right on the spot where you would expect or need it. Augmented Reality as a "new" user interface is in many areas one of the megatrends for the future.



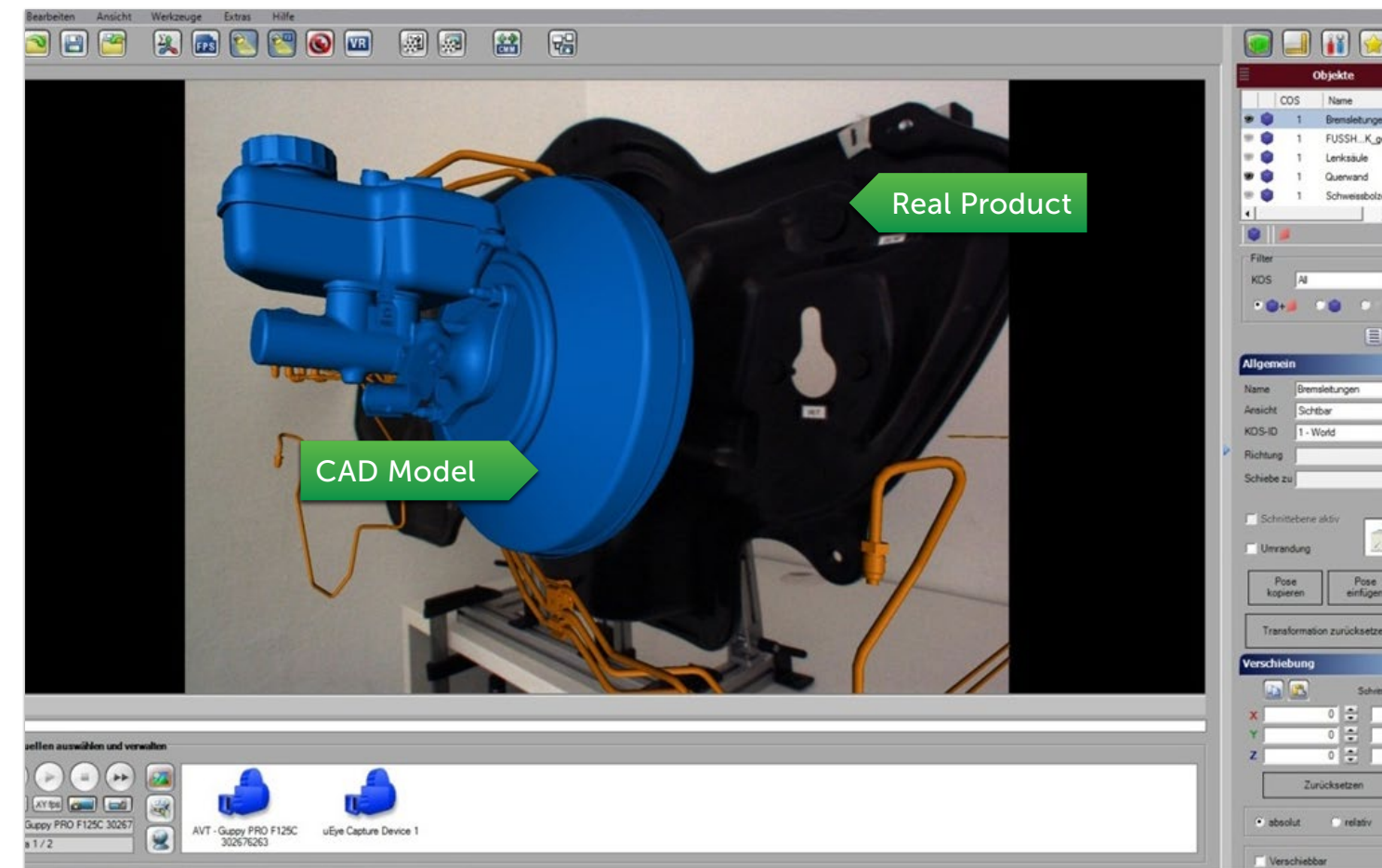
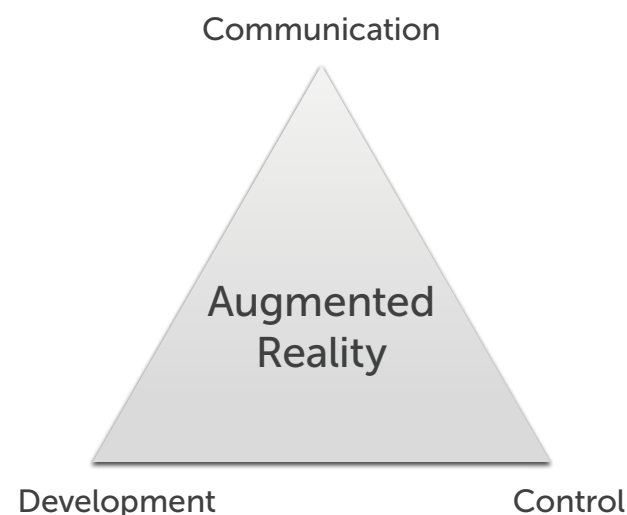
## "Making the digital a natural experience."

### Aspects of Augmented Reality

- Optimize & accelerate industrial processes
- Directly visualize and verify planning status
- Collision control
- Assess designs of new parts aligned to existing products
- Virtual instructions on the surface of the actual product
- Better understanding of complex products and processes
- Easier comparison of planned vs. actual state
- Improved communication

### Learn More!

Examples for the application areas of AR in industry can also be found on our YouTube channel. [Visit metaioAR on Youtube and learn more!](#)



## metaio Engineer

### The most flexible Augmented Reality System on the market

#### Higher efficiency and quality with AR

metaio Engineer is a powerful tool for productive Augmented Reality in technical assignments: from the visualization of future facilities within a current production environment and illustrating work and maintenance instructions directly onto a component to deviation measurement between a CAD model and the related assembly part.

#### High-Quality Alignments

The calibration and tracking technologies included with metaio Engineer allow for precise superimpositions, which satisfy the criteria for industrial measurement. Despite their compact size, the chosen cameras have excellent image up to HD-resolution. In combination with certified external tracking sensors such as measuring arms, infrared tracking systems and laser trackers, the overall accuracy of metaio Engineer based AR systems is well below +/- 1 millimeter.

#### Efficient Communication

The visualization of virtual products or production facilities in their "natural" environment creates a vivid communication platform. It allows for a conclusive demonstration of planning or development results, building layouts, measurement reports, etc., to other engineering stakeholders and management in real time. This increases early error detection, prevents extensive iteration loops, and increases the benefit to workers, thanks to precise operational guidelines.

#### Key Features

- Processes live and still images
- Built-in high-precision camera calibration
- Optical Tracking with and without markers
- Various interfaces for external measurement and tracking systems
- High definition rendering
- Supports multiple file formats
- Enables deviation measurements
- Assists collision control

# System setup for Augmented Reality

## Technology that matches your demand

metaio Engineer integrates various components to set up a high quality AR System. These systems usually consist of four different elements: tracking, real images, virtual content and visualization.

**Tracking** is the centerpiece and our core technology. The perspective and coordinates of a camera, the so-called "pose", are determined optically, with external or internal sensors.

Depending on the use case, a wide range of **virtual content** is applicable, from simple text or symbols to 3D models that originate from a CAD system. **Visualization** means that the actual scene and virtual content are aligned correctly regarding perspective, scale and position, while being displayed for the user.

Generally speaking, it is possible to process either freezed-frames or moving pictures from

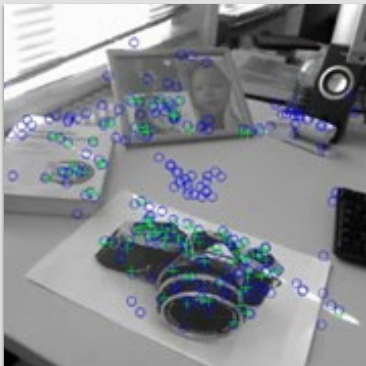
different kinds of cameras: webcams are a good compromise for simple and cost-efficient tasks, in which accuracy is of lower importance. Industrial cameras qualify for superimposing live pictures with medium-precision and may be combined with external sensors in addition, like e.g. a measuring arm. Photorealistic impressions and highly accurate results are best realized with a modern Single-Lens Reflex or Mirrorless System Camera.

metaio Engineer supports multiple file formats for virtual content: standards like VRML, JT, PLM XML, OSB as well as CSB. It also enables to display diverse file formats within the same Augmented Reality scene.

### Tracking Determines the Camera Pose



Optical Marker Tracking

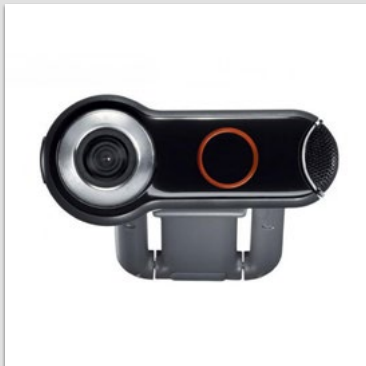


Optical Feature Tracking



External Sensor Tracking

### Real Images Image source of the actual scene



Webcam



Industrial Camera



Single-Lens Reflex Camera

### Visualization Displays the virtual superimposed content



PC, Laptops & Tablets



Projector



Head Mounted Display

### Virtual Content Information to be superimposed correctly with regards to perspective, scale and position



Simple



Animated



Complex



# Exemplary use cases

## Various possibilities: scenarios & benefits

### Comparison of States



#### Examples

- Determine deviations
- Detect collisions
- Analyze build quality

#### Benefits

- Faster visual verification of potential error sources
- Reduces or replaces need for physical prototypes
- Reliable basis for making decisions

### Design Check



- Evaluate design alternatives
- Visualize simulation results
- Get overall look-and-feel

- Analysis based on actual proportions, scaled in 1:1
- Early detection of design faults
- Simplifies discussion between stakeholders and deciders

### Factory & Facility Planning



- Plan machine layouts and operative spaces
- Plan working environment
- Compare planning alternatives

- Early detection of planning faults
- Reduces time and costs for planning
- Reliable basis for making decisions

### Assembly & Maintenance



- Visualize assembly & disassembly steps
- Show process information
- Live instructions for repair and service personnel

- Embeds quality control in the process
- Reduces training time in assembly and maintenance
- Intuitive and enriched product experience

### Education & Training



- Trainings
- Workshops
- Presentations

- Simplifies communication
- Better understanding of complex products and processes
- Possibility to display elements or procedures that are internal or not visible from outside

### Construction Site Planning



- Visualize the logistics on site
- Check building site preparation
- Align with circumjacent housing

- Gives you general impression regarding urban development
- Provides task-related information on the spot
- Cuts simulation costs



## Contact and expert support

Your questions, our experience: get in touch with metaio!

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