

## ARRK at a glance

International technology group

Founded 1948

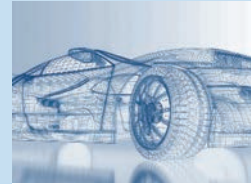
Turnover 418 Mio. €

Worldwide > 3,500 employees

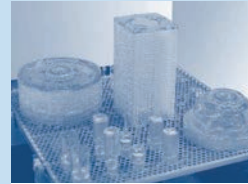
More than 20 companies in 15 countries

Listed on the Tokyo Stock Exchange

## ARRK areas of competence



ENGINEERING



PROTOTYPING



TOOLING



LOW VOLUME PRODUCTION

*Your global product development specialist*



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**We help your projects thrive.  
Get in touch!**

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# ARRK

Autonomous Driving & ADAS

Cockpit Electronics

HMI & Displays



**Engineering. Digital. Driven.**

## Engineering Portfolio

Interdisciplinary Topics	Modules	Entire Vehicle Systems
 ELECTRONICS & SOFTWARE	 CAR BODY	 PASSIVE SAFETY
 CAE	 POWERTRAIN	 THERMAL MANAGEMENT
 MATERIAL	 CHASSIS	 WORKSHOPS & TEST BENCHES
 ACOUSTICS	 INTERIOR & EXTERIOR	
 COMPOSITE	 OPTICAL SYSTEMS	

## Engineering. Digital. Driven.

ARRK Engineering is a member of the international ARRK Group. As a strategic development partner with 1,000 plus employees, we have provided independent support to international customers mainly in the Automotive and Aerospace industry for more than 50 years.

Our customers are taking advantage of a one-stop product development process that we implement in collaboration with our affiliated ARRK companies: from engineering services to prototypes and low volume production – you get everything from one source.

ARRK Engineering offers its renowned customers an end-to-end engineering support with a comprehensive range of services covering Electronics & Software, Design, CAE, Passive Safety and Test & Validation. We strive for the best and we assume extensive development responsibility for products and components. Thereby, we are able to draw on a broad network of partners.

As specialists in cockpit electronics and displays, autonomous driving and electronic control units, we are the best development partner of your choice on your way to digitalization and electrification. Thanks to our own innovation management coupled with full-fledged expertise and many years of experience throughout the entire product development chain, you can count on us.

We help your projects thrive – whether you need support in concept or series development, validation or system integration!

## Electronics, Software & Electric

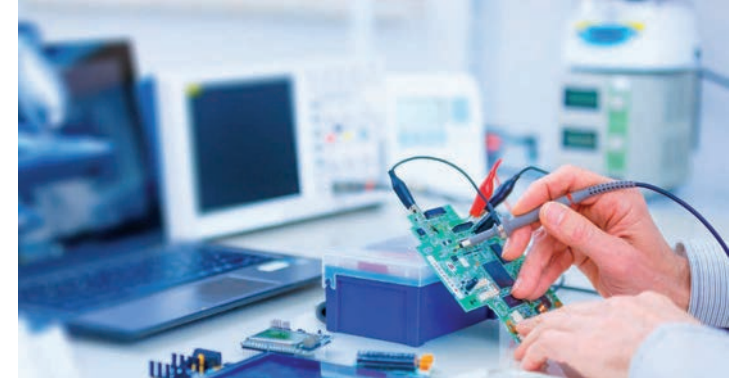
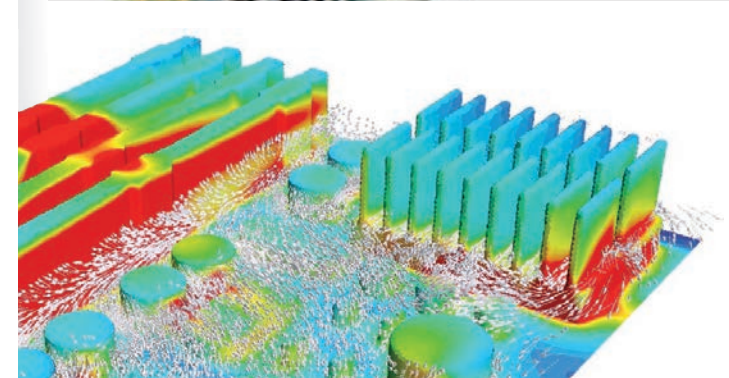
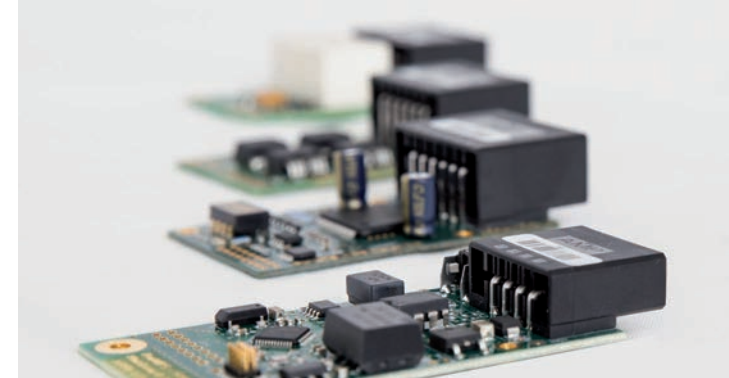
We offer an end-to-end engineering support throughout the entire product development chain – from concepts, advanced and series development through to validation and system integration.

### We primarily focus on:

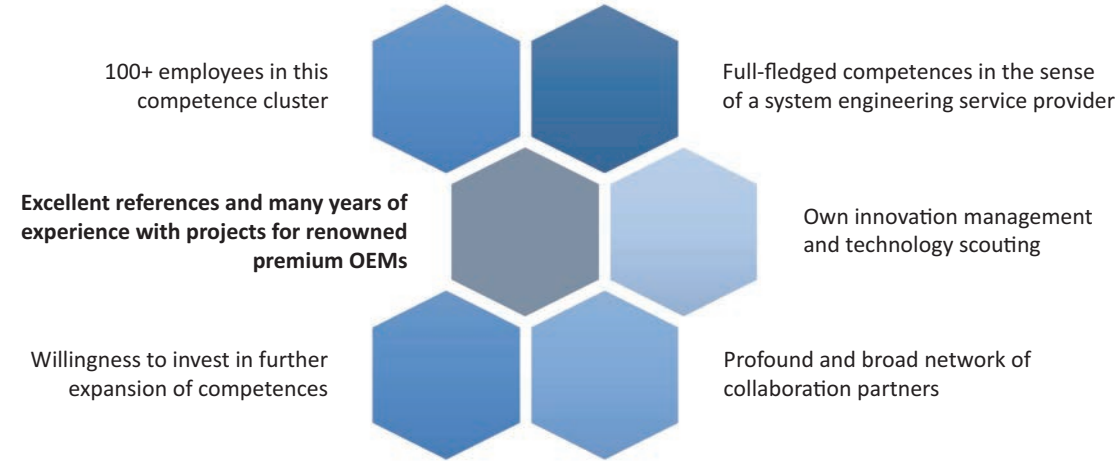
- Development and testing of electronic control units (Software, hardware, mechanics)
- Hardware, software and function development – e.g.:
  - Advanced and series development of displays and cockpit electronics (e.g. Instrument Clusters, Central Information Displays, Head-up Displays, Steering Wheels)
  - Human-machine interfaces (HMI) and graphical user interfaces
  - Graphics design, 2D/3D computer graphics and augmented/virtual reality
  - Camera systems, computer vision and image processing
  - Artificial intelligence and machine learning
  - Autonomous driving & advanced driver assistance systems (ADAS)
  - Connectivity, vehicle networks and diagnostics
  - Automotive security
  - Interior and exterior lighting systems
- Functional validation of software, hardware and electronic control units
- Electric vehicles and alternative drives
- Development and automation of hardware-in-the-loop simulations

### Interdisciplinary Engineering of Complete Products

- Development, testing, integration and production of software and electronics components (Testing center, shakers, climatic chambers, optic lab, acoustic lab, camera lab, HILs & test stands, car workshop, etc.).
- Close collaboration with other disciplines like Design, CAE, Test & Validation
- Prototype building and low volume production
- Strategic partnership with TÜV SÜD Product Service GmbH



# Specialists for Cockpit Electronics, Displays & HMI



## Full-scale Product Development

### Engineering Competences

- Project and quality management
- Specifications and requirements engineering
- Concept and advanced development
- Series development and integration
- Hardware and software development as well as integration
- Optical system engineering, simulation and specific sensor design
- Computer vision, image processing and machine learning
- Technology scouting and evaluation
- Mechanical design (construction, geometrical integration, package)
- Steering, supervision and support of tier 1 suppliers
- Full-scale system testing and validation as well as problem management
- Integration of components into test vehicles

### Components

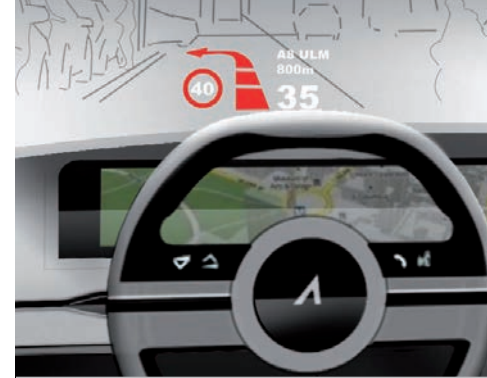
- Instrument Clusters
- Head-up Displays
- Central Information Displays
- Rear Seat Entertainment
- Camera and Driver Monitoring Systems
- Augmented & Virtual Reality Glasses
- HMI & Graphical User Interfaces
- Cockpit Electronics (Steering Wheels, etc.)
- Lighting Systems

Research and innovation

Concept development

Series development

Series supervision / ongoing development



# Reference Projects

## Head-up Displays

Series development of various Head-up Displays for German premium OEMs

- Project-, requirements- and quality management
- Optical system engineering, optical simulation, optical measurements and lab tasks
- Optomechanics (construction, integration, package)
- Hardware and software development
- HMI specification and development
- Full-scale system testing and validation

## Instrument Clusters

Advanced development & series support for Instrument Clusters for German premium OEMs

- Requirements engineering and concept development for Instrument Clusters
- Hardware architecture & system engineering (EMC, bus systems, display link, ...)
- Software architecture (AUTOSAR, RTOS, IPC, Remote Software Updates, ...)
- HMI prototyping of 3D graphical user interfaces
- Automotive security and functional safety (ISO26262)
- Function library for computations of the on-board computer

## Central Information Displays

Series development of various Central Information Displays for German premium OEMs

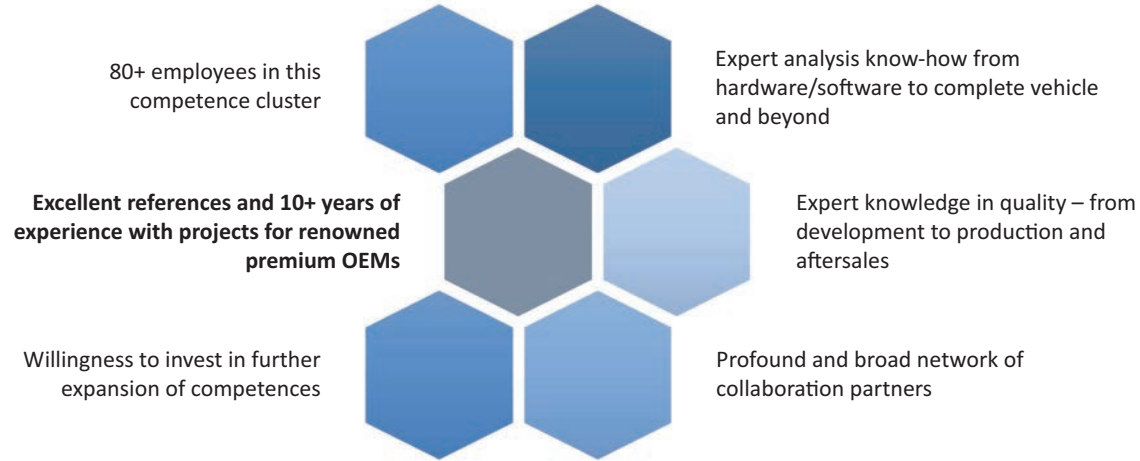
- Project management and steering of the tier 1 suppliers
- Specification and requirements management
- Hardware and software integration including touch functionalities
- Mechanical and geometrical integration
- Problem management, component test and quality assurance

## Augmented Reality Devices

Advanced development of Augmented Reality glasses and camera-based AR functions for German premium OEMs

- Project management and steering of the tier 1 suppliers
- Specification and requirements engineering
- Concept development
- Set-up and operation of a test system as well as a test vehicle

# Specialists for Autonomous Driving & ADAS



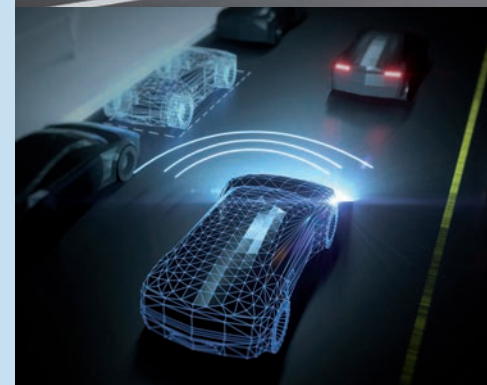
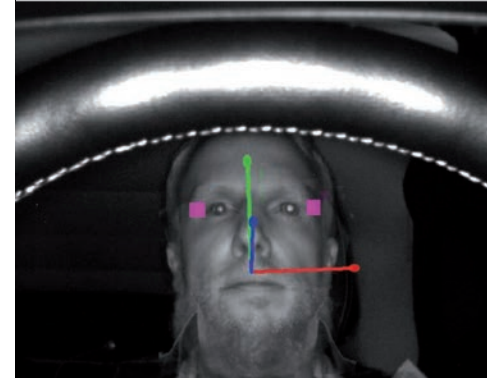
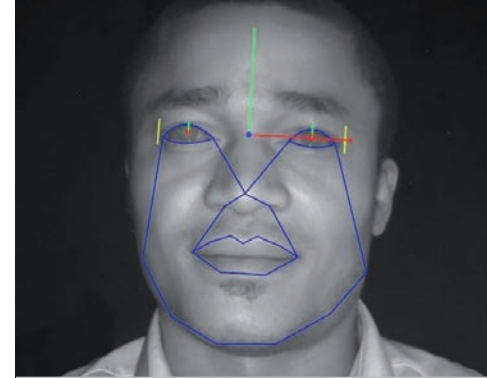
## Full-scale Product Development

### Engineering Competences

- Project management
- Requirements engineering and management
- Series development and integration
- Preventive and reactive quality management
- Technology scouting and evaluation
- Objectification and benchmarking
- Steering, supervision and support of tier 1 suppliers
- Hardware and software development as well as integration
- Computer vision and machine learning
- Deep analysis of ADAS components from hardware to active event chains
- Full-scale system testing and validation as well as problem management
- Integration of components into test vehicles

### Components

- ADAS platform ECUs
- Radar and Ultrasonic Sensors
- Camera Sensors
- Driver Monitoring Systems
- ADAS & Autonomous Driving specific HMIs



# Reference Projects

## Camera-based Driver Monitoring Systems

Advanced and series development of camera-based Driver Monitoring Systems for German premium OEMs with features like fatigue and distraction detection and driver identification as enabler for autonomous driving and future interaction design

- Project management, specifications and requirements engineering
- Concept and advanced development including studies with test persons
- Series development and integration of camera-based ADAS
- Technology scouting and evaluation
- Optical design and evaluation of cameras, specific sensor design (optics & camera integration)
- Image processing and computer vision including head- & eye-tracking for monitoring head pose and line of gaze
- Software integration of system and application functions
- Component test and validation as well as problem management
- Mounting and installation of the camera systems inside of test vehicles

## Test & Validation of ECUs and Sensors

Test and validation of electronic control units in the field of Driver Assistance and Autonomous Driving including integration platforms and radar sensors for all cars of a German premium OEM

- Requirements management
- Test coordination and test concepts
- Problem management, supplier supervision
- Functional hardware-in-the-loop tests
- Static vehicle tests and dynamic driving tests
- Measurement equipment support
- Error analysis (white box and black box)
- Vehicle diagnostics
- Quality management work (preventative and reactive)
- Resident support for tier 1

Research and innovation

Concept development

Series development

Series supervision / ongoing development