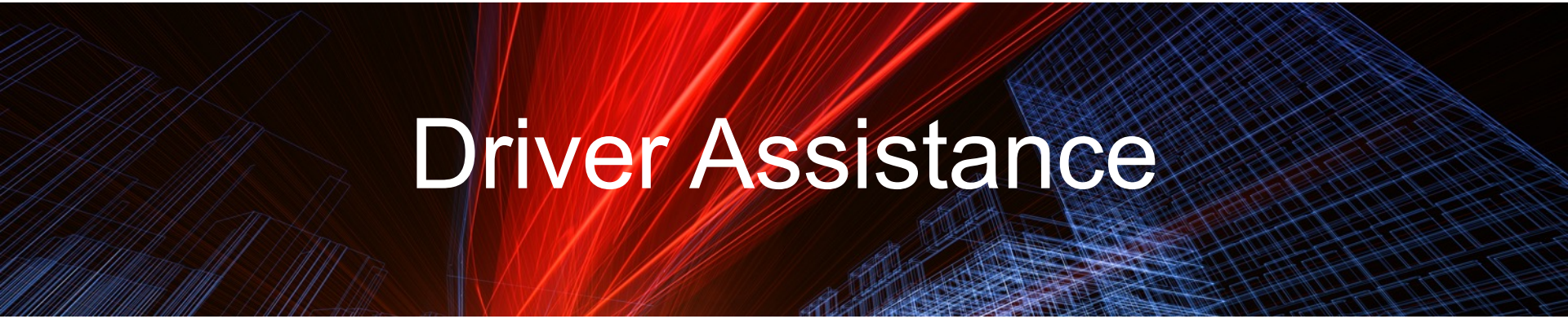

MAGNA
IAA MOBILITY 2021
Munich, Germany


Driver Assistance

Index

Autonomous Valet

The industry's only autonomous valet parking system that doesn't require any infrastructure changes or lidar sensors. Simply drive up to the door, get out of the car, and let the car park itself.

Smarter
Safer
Autonomy
New Mobility

Competitive advantage/differentiators

- Implementing the functionality using low-cost sensors for volume production - does not require lidar or other infrastructure support
- Customized user experience with smart phone app
- Clean vehicle styling integration
- With fast market introduction of L4 features, Magna's full Autonomous Valet offers convenience, with priority on capability, performance and low cost

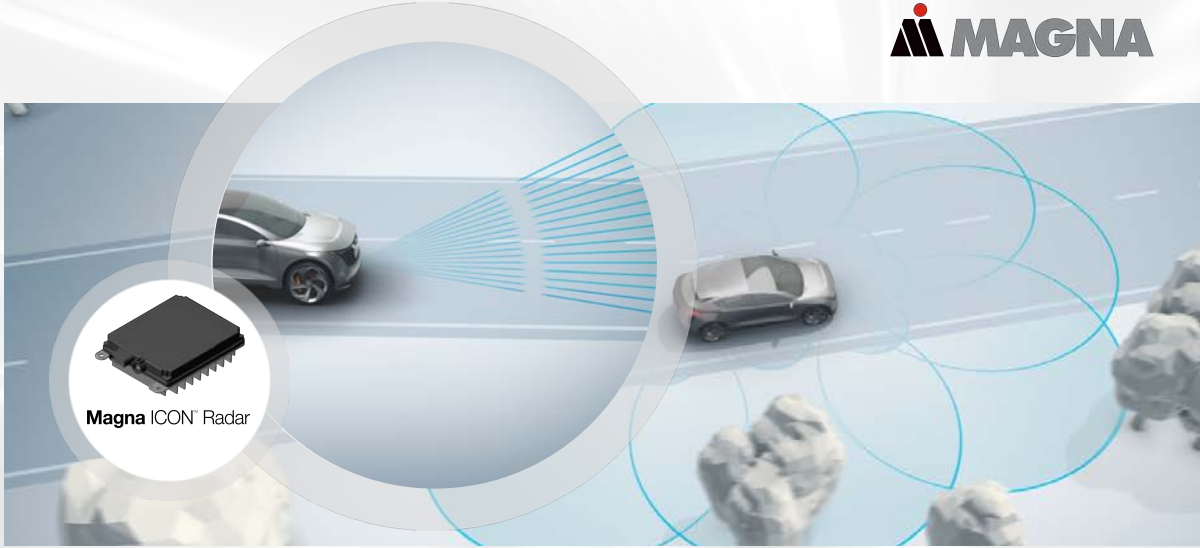
Features

- Targeted markets: office, mall, sporting venues, airport parking lots where far away parking is ample, and close parking is at a premium
- Indoor and Outdoor parking
- Current sensors: cameras, radars, ultrasonics, cost-effective compute system

Contact: Nikhil Gupta / Nikhil.Gupta@magna.com

ICON™ Radar Long-Range

The industry's first to market digital code modulation 4D imaging radar. Best-in-class range & resolution, safety through enhanced perception.



Smarter
Safer
Autonomy
New Mobility
First to Market Opportunity

Competitive advantage/differentiators

- Digital encoded Phase Modulated Continuous Wave (PMCW) Radar technology
- 4D sensing enhances perception with object separation in range, velocity, azimuth & elevation
- High dynamic range – detects small objects relative to a larger object
- High vehicle detection range of >300m
- Detection of pedestrians of >150m

Features

- Full Speed Range ACC with VRU AEB
- Traffic Jam Assist
- Debris on road AEB/AES
- L2+ highway driving support
- Localization & mapping

SOP

Ideation | Discovery | Concept | Development | Series Preparation | in Production

Contact: Helmut Wodrich / Helmut.Wodrich@magna.com

ICON™ Radar Mid-Range

The industry's first-to-market digital code modulation 4D imaging radar. Our Mid-Range ICON Radar offers a 360° cocoon encompassing >160m, supporting L2+ features.

Smarter
Safer
Autonomy
New Mobility
First to Market Opportunity

Competitive advantage/differentiators

- Digital encoded Phase Modulated Continuous Wave (PMCW) Radar technology
- Superior pedestrian detection – VRU regulation
- Common sensor for all mid-range applications with expanded features
- Angular separation – discrimination of pedestrians and small objects

Features

- Enhanced Rear and Front Cross Traffic
- Blind Spot / Lane Change Assist
- Lateral Collision Mitigation
- Intersection (Crossing) Protection
- ACC Stop & Go
- Small object detection

SOP

Ideation | Discovery | Concept | Development | Series Preparation | in Production

Contact: Helmut Wodrich / Helmut.Wodrich@magna.com

ICON™ Radar Ultra Short-Range

Seamless integration by Magna. This USRR allows integration options in existing design elements, including in the door handle, liftgate or interior.

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Safer
Autonomy
New Mobility
First to Market Opportunity

Competitive advantage/differentiators

- UWB FCMW scalable for 60 GHz or 79 GHz implementation
- Improved occupant safety through biometric sensing
- ADAS sensor – 20m range
- Enhances vehicle access solutions by mapping and classification
- Gesture recognition for feature control

Features

- Automated & Controlled Door Opening
- ADAS Support & Fusion
  - Blind Spot
  - Park Spot
  - Automated Lane Change
  - Side Clearance
- Interior Sensing – Occupant Monitoring

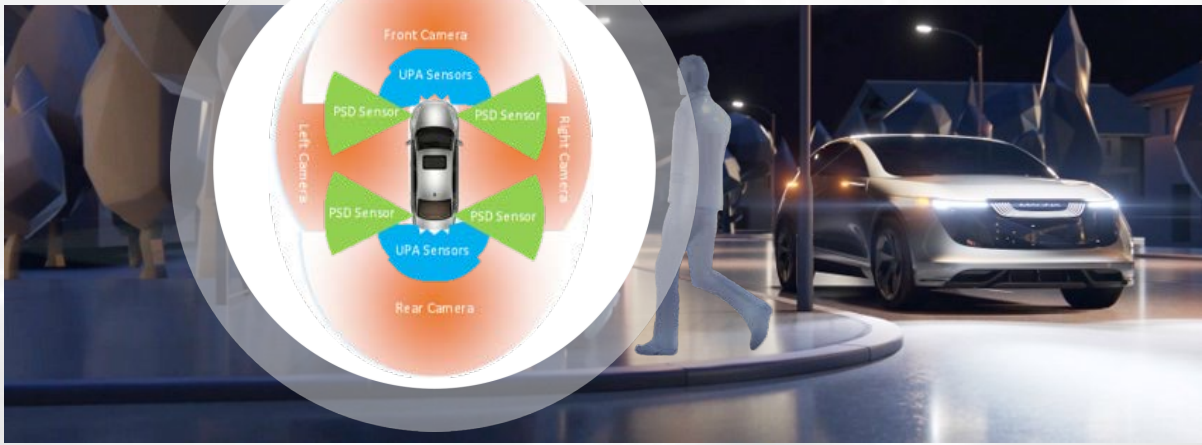
SOP

Ideation | Discovery | Concept | Development | Series Preparation | in Production

Contact: Helmut Wodrich / Helmut.Wodrich@magna.com

Ultrasonics

Magna's ultrasonic sensing sensors are for more than just parking. Our highly precise and cost-effective sensors provide near range detection, environment mapping and localization to support the industry shift to autonomous mobility.



Smarter Safer Autonomy New Mobility

Competitive advantage / differentiators

- Network based communication yielding
  - Simplified wiring
  - Weight reduction
  - Cost reduction
- Extended range capabilities up to 5.5m coverage, near field object detection as low as 10cm
- ASIL B FuSa rated sensor
- DSI3 communication to DC

Features

- Fully Automated Parking
- Environment mapping
- Rear AEB, Trailering functions
- Supports Autonomous Valet Parking and Remote Parking
- Signal and Event coding for interference and spoofing mitigation

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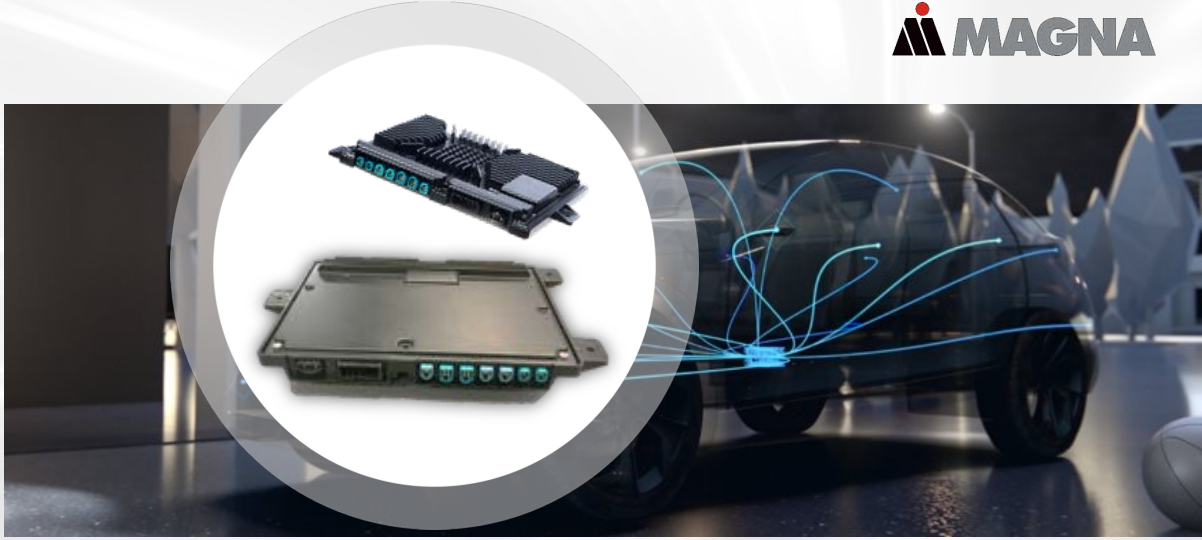
Domain Controller

Our uniquely scalable domain controller solution enables synergies between base and premium OEM platform performance to reduce development cost, time to market, and OEM resource needs.



Smarter

Safer

Autonomy

New Mobility

Competitive advantage/differentiators

- Scalable: From L0 to L3 through EuroNCAP 2025+ support
- Ensure base platforms cost competitiveness while protecting for premium platforms performance
- Host Magna / Tier-1 / OEM algorithms & sensors
- Developed for L2-L3+ capabilities
- Possible to integrate Mobileye EyeQ5/6

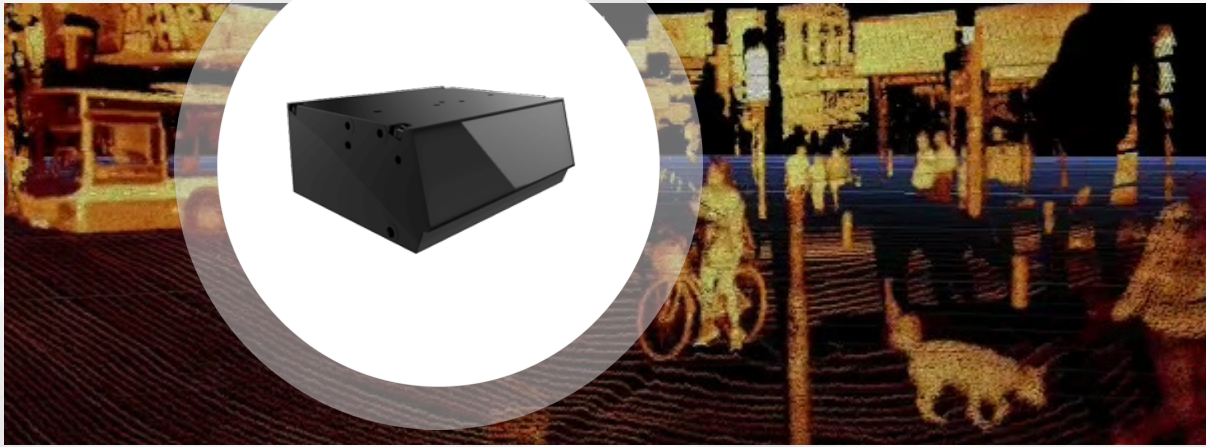
Features

- Valet Parking / Personal parking
- Highway Assist
- Traffic Jam Assist
- Automatic Emergency Steering
- Advanced trailer features
- Advanced 3D surround view

Contact: Pierre Gompertz / Pierre.Gompertz@magna.com

LiDAR

Magna has the 1st solid state high-resolution LiDAR. An essential part of ADAS sensor suite to supports L3 hands off highway scenarios and L4/L5.



Smarter Safer Autonomy New Mobility

Competitive advantage/differentiators

- Solid state for increase reliability
- Dense point cloud for detections and contouring
- Environment imaging and localization
- Dynamically adjustable field of view, range and resolution at run time

Features

- Object Detection (including small objects like tires) to support hands free driving
- Supports Highly Automated Driving and Fully Automated Driving use cases
- Long range detection capability for low reflectivity targets
- L2+/L3 Supporting Features

Contact: Pierre Gompertz / Pierre.Gompertz@magna.com

Front Camera Gen. 5

Magna's industry first smart camera with 8 MP provides unique new capabilities to ensure premium safety for all - in one box. With best range, resolution and accuracy on the market we take ADAS features to the next level.

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Autonomy
New Mobility
Magna Exclusive
Industry First
First to Market Opportunity

Competitive advantage/differentiators

- Complete scalable front camera one box solution
- 1st smart camera 8MP EyeQ5 based
- Behind windshield or connected to computing ECU
- Scalable MCU for fusion up to 5 radars
- Full color capability (green light/emergency vehicle)
- Production experience with L2+ and L3 project
- Extensive experience with multi-region launch

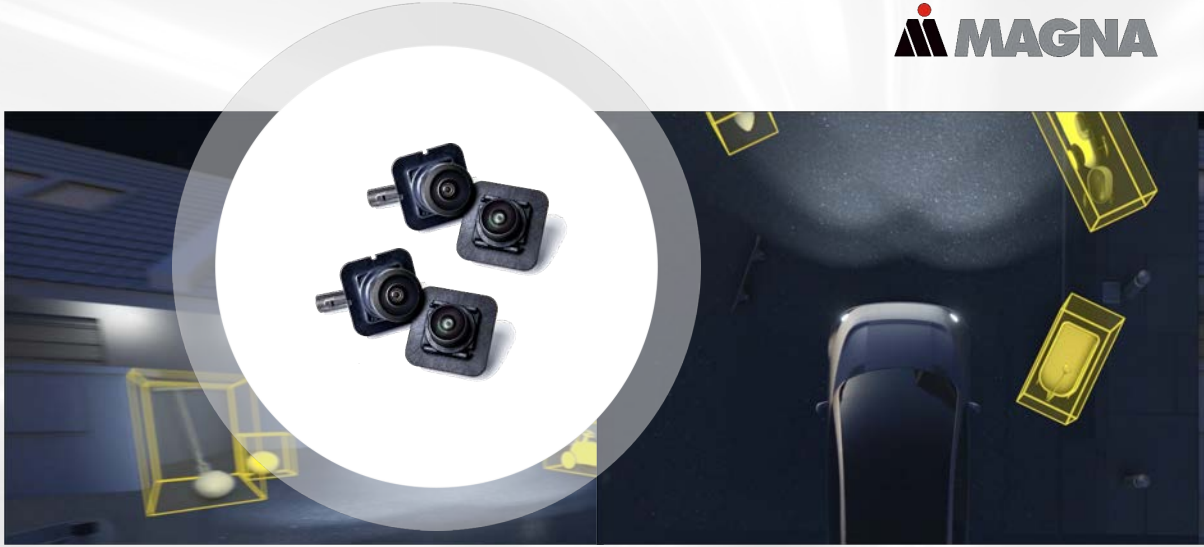
Features

- Highway Pilot & Magna's Highway Chauffeur
- Paired with wide FOV - support 3D vehicle detection, low speed turning scenarios for crossing vehicles, cyclists or pedestrians
- NCAP 2025+
- Optical character recognition
- Road Experience Management (REM)

Contact: Pierre Gompertz / Pierre.Gompertz@magna.com

Surround View Camera

Magna's SVS cameras provide best-in-class image quality to help you drive safer. With best range, resolution and accuracy on the market we take ADAS features to the next level.



Smarter Safer

Autonomy New Mobility

Competitive advantage/differentiators

- Supports a scalable SoC
- Four or more VGA to 8MP cameras
- Best in class image quality, range, resolution and accuracy
- Flexible multiple view transformation to a realistic visual projection
- Viewpoints from anywhere around the vehicle can be chosen freely in 3D
- Adaptive 3D view based on detected objects distance – avoid objects lost in blind zone

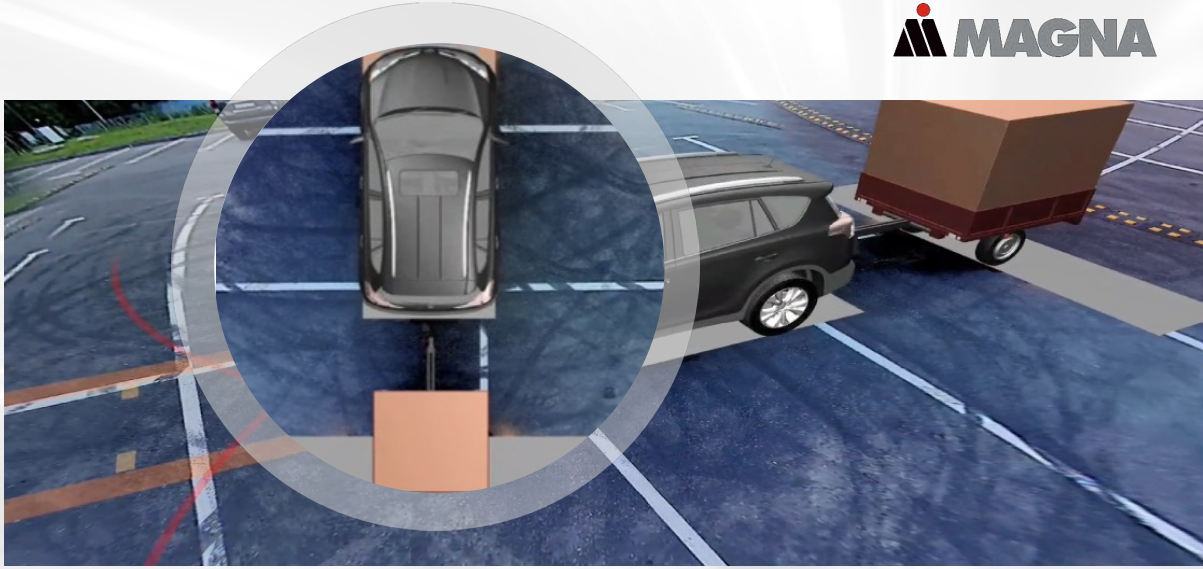
Features

- 2 or 3-dimensional adaptive 360° view around vehicle
- Multi layer dynamic 2 and 3-dimensional overlays
- Glass-bottom view, multiple viewpoints
- Trailer 360° view
- Low speed or parking maneuvers

Contact: Kevin Lu / Kevin.Lu@Magna.com

Trailer 360° Views

Magna's patented trailer reverse control technology provides a seamless 360° view around trailer and towing vehicle with a 2-dimensional bird's eye view or a 3-dimensional bowl view; applicable for all trailer types.



Smarter Safer Autonomy New Mobility

Competitive advantage/differentiators

- Applicable for all trailer types
- Real-life 3D and 2D 360° views
- Advanced multiple view angles deliver convenience to driver
- Online calibration for seamless stitching of all cameras
- Supports one or multiple trailer cameras

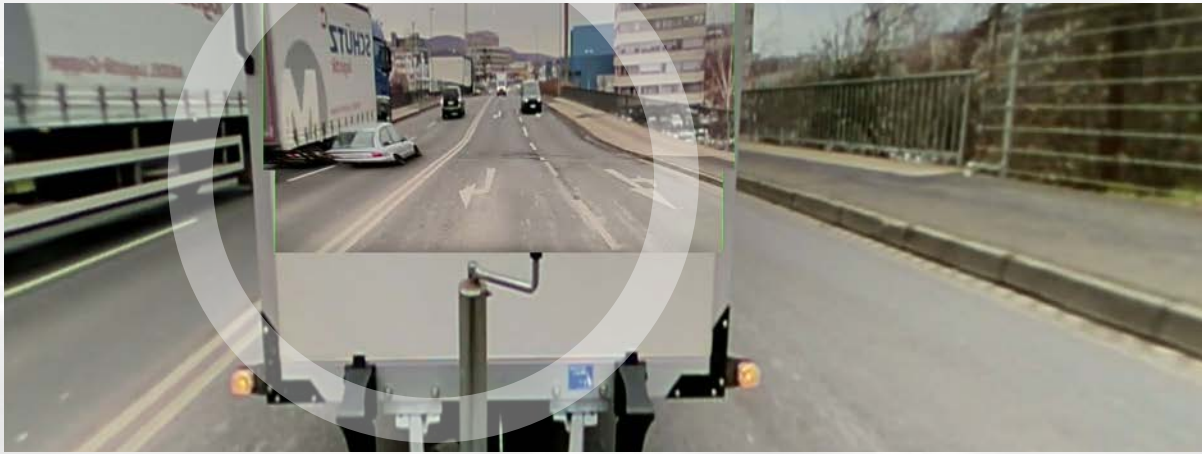
Features

- 360° Surround View around trailer and vehicle
- Multiple 2D or 3D views
- Powerful graphical processor
- Object and Pedestrian Detection
- Advanced Trailer Views

Contact: Kevin Lu / Kevin.Lu@magna.com

Trailer See Through

With Magna's transparent trailer technology we provide the driver with a seamless view of what is behind and around trailers. Increases safety by removing blind spots using images from trailer cameras and vehicle's surround view cameras.



Smarter Safer Autonomy New Mobility

Competitive advantage/differentiators

- Seamlessly stitches tailgate and trailer satellite camera views to enable a transparent trailer view
- Detects trailer angle and dimensions automatically without target and user measurement
- Short and seamless calibration of trailer camera(s) by robust online calibration algorithms

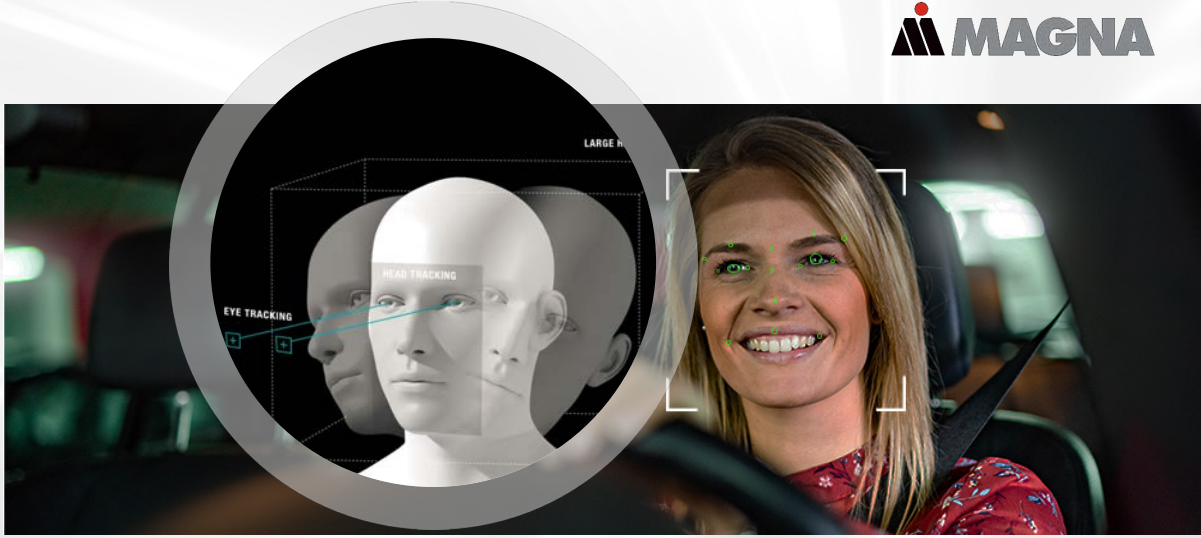
Features

- Blind Spot removal with Transparent Trailer Views
- Trailer Angle Detection
- Trailer Dimensions Detection
- Trailer Reverse Trajectory Overlays
- Auto Distortion correction based on trailer position

Contact: Kevin Lu / Kevin.Lu@magna.com

Driver Monitoring

Reducing the number of accidents by detecting the driver's attentiveness and drowsiness. Magna's mirror-based DMS system is a natural extension of our leadership expertise in cameras and mirror technologies that delivers component and assembly cost savings.



Smarter
Safer
Autonomy
New Mobility

Competitive advantage/differentiators

- Flexible camera mounting positions (steering column, instrument cluster, center console, interior mirror, or A-pillar)
- Cost savings by integrating with existing ADAS systems
- Common core designs (camera and algorithm) fit multiple system configurations
- By design, the interior mirror integrated DMS provides the best unobstructed view to the driver

Features

- Drowsiness detection
- Engagement level detection
- Precision Gaze detection
- Head pose detection
- Face identification
- Auto calibration

Contact: Kevin Lu / Kevin.Lu@magna.com

DMS Camera

Distracted driving related incidents are on the rise emphasizing the need for tech-based solutions. Magna offers a unique technology solution by combining its expertise in cameras and mirrors to help automakers make roads safer.

Smarter Safer Autonomy New Mobility

Competitive advantage/differentiators

- Unique interior mirror camera integration with or without ECU
- Additional flexible camera mounting positions (interior mirror, steering column, instrument cluster, center console, or A-pillar)
- Support 2MP to 5MP resolution as well as narrow and wide FoV depending on applications
- IR and RGB-IR available
- Capable of color video (multi spectral sensor) and monochrome with system capability for dark/low light and ultra-bright sunlight scenarios
- Standalone or ADAS ECU integrated version
- Common core designs (camera and algorithm) fit multiple system configurations

Features

- Drowsiness detection
- Engagement level detection
- Precision Gaze detection
- Head pose detection
- Face identification
- Gesture recognition
- Auto calibration
- Driver Monitoring System
- Occupant Monitoring System

Contact: Kevin Lu / Kevin.Lu@magna.com

Occupant Monitoring

Combining Magna's camera and radar technologies provides increased safety, including obstructed view and health monitoring as well as detecting and locating children / pets / objects. Meets future NCAP and government regulations.

Smarter

Safer

Autonomy

New Mobility

Competitive advantage/differentiators

- Complementary camera and radar sensors providing full vehicle cabin monitoring without blind spot
- Overhead console integration with embedded camera and radar. Multi sensor fusion within Magna's domain controller
- Integrated solution adding occupant monitoring within rearview mirror provides hidden camera

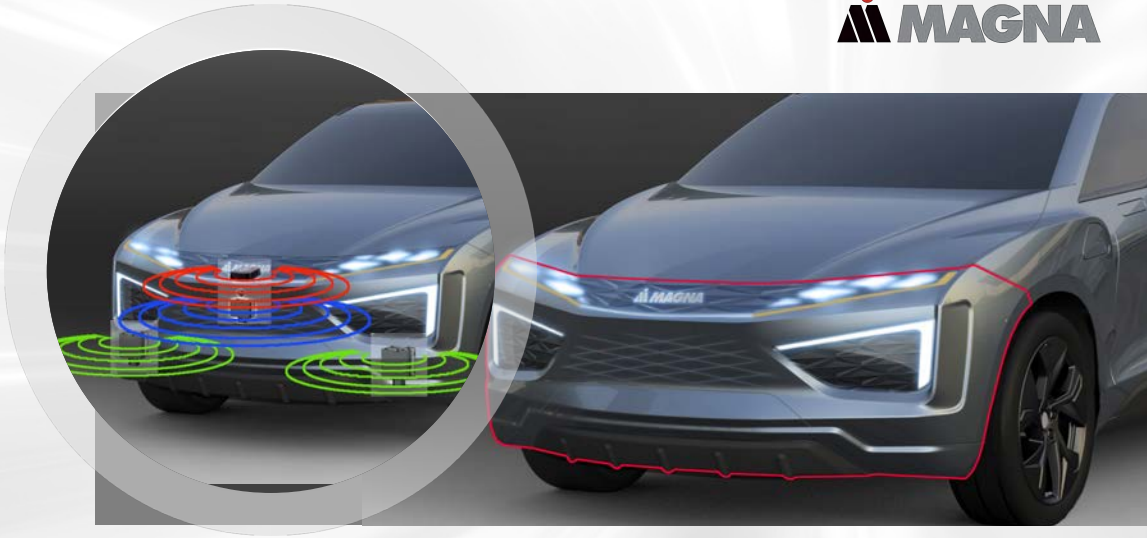
Features

- Monitor passenger occupancy
- Detect child presence in rear facing car seat and covered under blanket
- Driver/passenger identification
- Passenger position for airbag deployment
- Forgotten object detection
- Seat belt reminder

Contact: Kevin Lu / Kevin.Lu@magna.com

Magna Vision™ Panel

Full front end with functional and decorative elements integrated into one seamless module. Integrating state-of-the-art sensors, cameras, lighting and aerodynamic technologies. Magna's Vision™ Panel enables ADAS capabilities, aerodynamic functionality and allows OEM's unique brand distinction.



Smarter
Safer
Lighter
Magna Exclusive
Design
First to Market Opportunity
Co-Development Opportunity
Patent Pending
Electrification
Autonomy
New Mobility

Competitive advantage/differentiators

- Lit surface decoration possibilities including Chrome, Paint and Film effects
- Thin molded panel with large-format in-mold film technology
- Hidden-until-lit lighting features
- Animated lighting capability
- State-of-art radar sensor functional integration
- Integrated forward lighting
- Integrated Class A Active Aerodynamics

Applications

- Electric vehicles
- Internal combustion vehicles
- ADAS integrated panel modules

Magna Mezzo™ Panel

First-to-market, large-format decorated front panel using in-mold film. Integrating state-of-the-art sensors, cameras and light technologies to enable unique OEM brand distinction. Combining innovative materials and process technologies to achieve a high-quality lit surface and seamlessly integrate radar.

Smarter
Safer
Lighter
Magna Exclusive
Design
First to Market Opportunity
Co-Development Opportunity
Patent Pending
Electrification
Autonomy
New Mobility

Competitive advantage/differentiators

- Lit surface decoration possibilities including: Chrome, Paint and Film effects
- Thin molded panel with large-format in-mold film technology
- Hidden-until-lit lighting features
- Animated lighting capability
- State-of-art radar sensor functional integration
- Materials and process development supported by Covestro

Applications

- Electric vehicles
- Internal combustion vehicles
- ADAS integrated panel modules

Invision™ ADB

Adaptive Driving Beam that removes glare from oncoming drivers while supplying additional illumination. Features include glare free high beam, speed dependent lighting, virtual dynamic bending, hazard/pedestrian detection and tourist conversion.

Smarter | Safer | Cleaner

Electrification | Driving Dynamics | Patented | Design | Co-Development Opportunity

Competitive advantage/differentiators

- 11 segment high beam and Bi-Matrix projectors for entry level
- 24 and 60 segment ADB projectors for high performance and added features
- LED array creates segmented beam pattern
- Extremely uniform beam with full high beam
- High lumen output achieves 0 demerits for IIHS
- Up to 1000 lm of additional High Beam light
- Supports SAE, ECE and CCC markets
- RFQ ready with night drive vehicles available

Ideation → Discovery → Concept → Development

Contact: Ingo Schneider / ingo.schneider1@magna.com

ClearView™ Inside mirror

The ClearView™ inside mirror switches between a traditional reflective surface and a full-size display showing an unobstructed view from the rear facing cameras. All while improving styling and adding new safety features.

Smarter
Safer
Electrification
Autonomy
New Mobility
Design
Co-Development Opportunity
Patented

Competitive advantage/differentiators

- Larger field of view which is customizable to user preference
- Increased safety
  - Able to overcome obstructions caused by passengers, headrests, C/D pillars, cargo, trailer, convertible top, etc.
- Views available include: one camera (rear) and three camera (rear and outside mirrors)
- Display settings customized using capacitive touch buttons on glass surface
- Electric actuator automatically tilts glass for video mode, reducing glare
- Improved styling with Automotive News PACE award winning Infinity™ inside mirror
- Trailer view option available

Ideation → Discovery → Concept → Development → Serial Preparation

Contact: Peter Spencley / peter.spencley@magna.com

ClearView™ Camera Wing

The ClearView™ camera wing integrates a camera into lightweight, aerodynamic housing. Features include a larger field of view, intuitive dynamic overlays and reduced drag.

Smarter
Safer
Cleaner
Electrification
New Mobility
Patented
Design
Co-Development Opportunity
Driving Dynamics

Competitive advantage/differentiators

- Video display is located inside the vehicle in close proximity to the A-pillar reducing driver distraction
- Camera is mounted beyond widest point of the vehicle to achieve necessary field of view
- Traditional outside mirror features remain:
  - Turn signals, powerfold, projection logo and ground illumination, surround view cameras
- Dynamic overlays provide intuitive depth perception for blindzone detection - customizable to user preference
- Camera allows for digital aiming during vehicle reversing and turning
- Improved rear vision during low light conditions

Ideation → Discovery → Concept → Development → Series Production

Contact: Peter Spencley / peter.spencley@magna.com

ClearView™ Outside Mirror

The ClearView™ outside mirror integrates a camera into a traditional mirror which is regulatory compliant. Features include a larger field of view, intuitive dynamic overlays and reduced drag.

Smarter
Safer
Cleaner
Electrification
New Mobility
Patented
Design
Co-Development Opportunity
Driving Dynamics

Competitive advantage/differentiators

- Video display is located inside the vehicle in close proximity to the exterior mirror reducing driver distraction
- Camera is mounted beyond widest point of the vehicle to achieve necessary field of view
- Traditional outside mirror features remain:
  - Turn signals, powerfold, projection logo and ground illumination, surround view cameras
- Compliant with FMVSS111 and ISO16505
- Dynamic overlays provide intuitive depth perception for blindzone detection - customizable to user preference
- Camera allows for digital aiming during vehicle reversing
- Improved rear vision during low light conditions

Ideation → Discovery → Concept → Development → Series Production

Contact: Peter Spencley / peter.spencley@magna.com

Integration and Validation of ADAS systems

Holistic competence to describe, test and validate the complete vehicle

Autonomy

Smarter

Competitive advantage

- Full-service provider from requirement definition to road testing
- Seamless toolchain from virtual- to physical validation
- Full-scale in-house test equipment available
- Comprehensive test hardware and software for NCAP testing
- Execution of reproducible tests and analysis of specific traffic situations

Applications

- Virtual validation in very early project phases, coverage of all available NCAP protocols
- Static testing of ADAS functions with available hardware (HIL)
- Subjective assessment with driving simulators
- Physical testing on test tracks & public roads

NCAP Testing on test tracks

Comprehensive test hardware and software for NCAP testing

Autonomy

Smarter

Competitive advantage

- Dummies & equipment available
- Evaluation-Software available
- Definition of additional test scenarios
- Definition of appraisal criteria & objective targets
- In-house test track and cooperation with external facilities

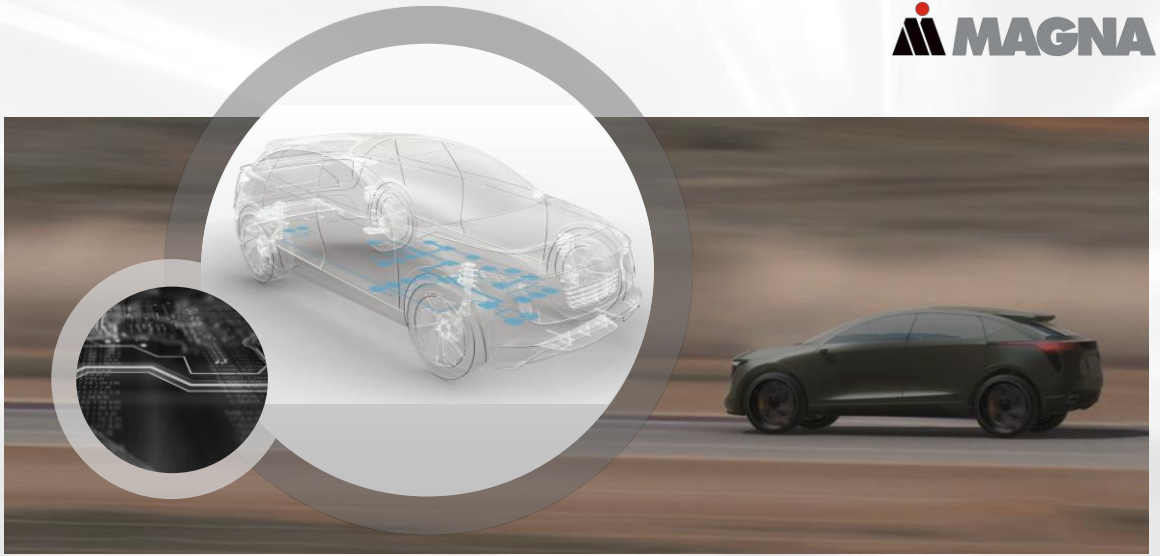
Applications

- Conduction of ADAS tests according to NCAP protocols
- Planning and conduction of customer specific scenarios
- Evaluation & Post Processing of test data
- Public road validation of ADAS functions

Customer success stories

- ADAS objective benchmark testing
- Euro NCAP validation sessions
- Run-in training data for camera

EE Architecture Development



The car of the future is a software defined vehicle with a level of features and constant upgrades. The resulting complexity must be organized by a suitable architecture for the electric and electronic (EE) systems.

Smarter | Co-Development Opportunity | Electrification | Autonomy | New Mobility

Competitive advantage/differentiators

- We define, develop and deliver full EE Architectures or specific elements
- Cross-OEM use for lower development cost, reduced time to market and risks
- Targeted support in areas such as Functional Safety, Energy Management, Cybersecurity

Applications

- Translation of customers' desires into vehicle functions and later into specifications
- Well-balanced turnkey solutions
- Thorough testing for seamless and reliable operation of all functions
- Solutions beyond Magna components available, according to the customers' wishes

Sensor Integration Tool

Finding the best sensor setup meeting functional requirements at minimum costs within a traditional packaging/styling process

Autonomy

Smarter

Competitive advantage

- Visualization of ADAS sensor setups
- Comparison of sensor setups based on KPIs
- Support engineers with optimization algorithms to meet vehicle design and technical requirements
- Direct interface to CAD tool available
- Reduces time and development loops caused by changes in packaging and styling significantly

Applications

- Visualization and introduction of objective measures to quantify sensor setups
- Utilize optimization approaches to specify optimal sensor placement

Build-up and Management of ADAS Test Fleets

Supporting customers and test fleets worldwide

Autonomy Smarter

Competitive advantage

- Experienced partner in electrics and electronics as well as prototyping
- Retrofit of test vehicles with radars, lidars, cameras, computers and data logging
- Design, manufacturing and adjustment of sensor brackets
- Configuration and calibration of test equipment
- Continous improvements throughout the project
- Universal measuring equipment rack available
- Operation of test drives, data collection

Applications / Customer success stories

- Over 150 vehicles equipped for various OEMs and Tier1 suppliers
- Logistics and support worldwide


MAGNA
Forward. For all.