

Automated Driving Systems

Collision Avoidance

Advanced Driver Assistance Systems

Nighttime Emergency Braking

Magna's Thermal Sensing can classify pedestrians and animals well beyond the headlight range alerting the driver followed by automatic braking if necessary.



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Autonomy



New Mobility

Competitive advantage/differentiators

- Thermal Sensing can expand automatic braking capabilities to enable pedestrian protection at night.
- Object classifications can be performed more quickly than is possible with Radar or Lidar at 120+m ranges,
- Unlike visible wavelength cameras, Thermal sensing is unaffected by lighting conditions or complete darkness.

Features

- Nighttime Automatic Emergency Braking
- Classification of pedestrians, animals, cyclists, vehicles, motorcycles, 2-wheelers
- Advance object data from thermal sensing can also support collision avoidance strategies and help reduce or even prevent AEB events from occurring

Advanced Driver Assistance Systems

Rear Automated Emergency Braking

System to detect potential objects at the rear of the vehicle, warn and/or apply brakes when the vehicle is braking.



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New Mobility

Competitive advantage/differentiators

- Sensor fusion-based detection of objects located within the vehicle path and trigger warning and/or braking events to prevent a collision
- Intelligent decision-making logic and suppression of non-threat objects
- Define braking profiles for comfort braking

Features

- Dynamic Brake Support
- This feature covers the safe distance warning
- Meets NCAP/NHTSA Rear-AEB requirements
- Camera based pedestrian detection and fusion with ultrasonic

Advanced Driver Assistance Systems

Automated Emergency Braking

This Magna safety feature alerts the driver followed by automatic deceleration in case if a potential threat could lead to Car to Car collision.



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New Mobility

Competitive Advantage/Differentiators

- Driver distraction or dynamic event could lead to reduced reaction time by the driver. AEB could help prevent or mitigate collision in those conditions.
- Issues multi-stage visual, audible, haptic alerts. Pre-conditions brakes during last stage warning.
- If the driver fails to respond to those alerts, AEB applies brakes to mitigate the collision

Features

- Forward Collision Warning (FCW)
- Dynamic Brake Support (DBS)
- Operating range: 10 – 210 km/h
- AEB applies 2 stage brakes to prepare the driver of the sudden deceleration
- Driver may take over by steering/accelerating

Advanced Driver Assistance Systems

Emergency Steering Assist

ESA is a lateral safety feature that prevents front collisions where braking may not completely avoid collision. It alerts driver and supports driver action by providing steering assistance to guide Ego vehicle laterally away from threat.



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New Mobility

Competitive Advantage/Differentiators

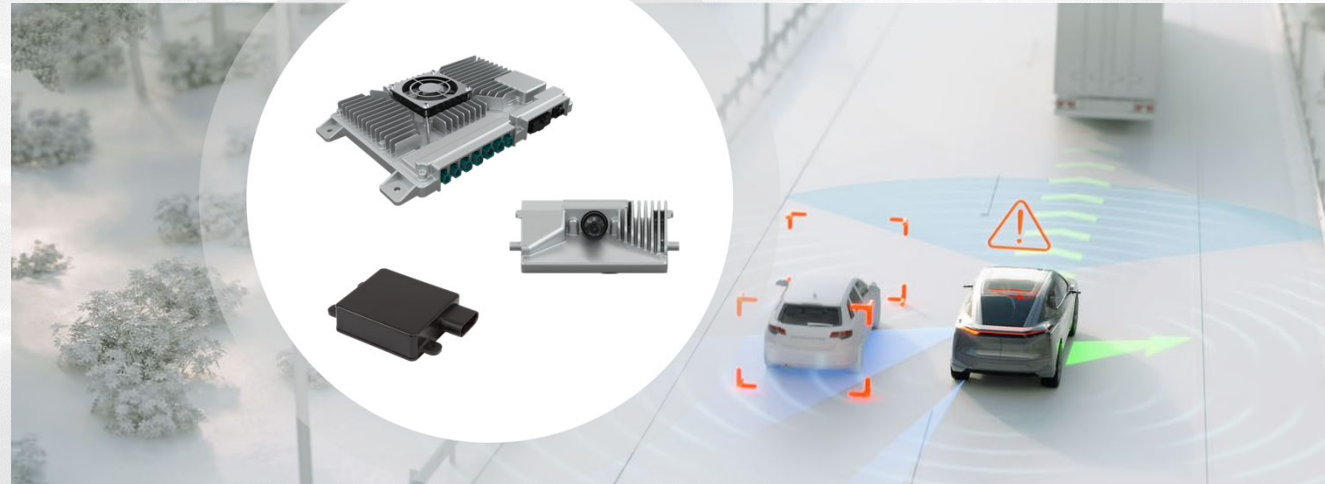
- Camera & Radar detect objects in front of Ego vehicle for potential collision above 30km/h
- ESA warns driver if detected objects TTC drops below threshold
- ESA guides vehicle laterally away from threat and helps straighten vehicle once past threat
- Available as driver initiated or automatic

Features

- Forward Collision Warning (FCW)
- Operating Range: 30 – 120 km/h
- Type of objects: Passenger cars, trucks, pedestrian (incl. child), bicyclist and motorcyclist
- Road conditions: Urban roads & rural highways with moderate road curvatures

Emergency Lane Keep Assist

This lateral safety feature is designed to prevent accidents from lane departures when a potential threat or road edge is present on the side of departure.



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New Mobility

Competitive Advantage/Differentiators

- Front camera and radars detect surrounding objects in adjacent lanes at blind spots, closing in from rear and oncoming vehicles
- Reduces chances of collision in cases of unintended lane departures or intended lane changes that could lead to car to car collision or car going out of road.
- Warns and then automatically turns steering wheel to bring vehicle back into the lane.

Features

- Lane Departure Warning (LDW)
- Operating Range: 65 – 160 km/h
- Objects of interest: Passenger cars, trucks, buses, motorcycles, special vehicles (ex. garbage trucks etc.)
- Road Surface: interstates/highways, single/dual carriage roads, well-marked country roads, zero to moderate road curvature

Left Turn Across Path

LTAP is a safety feature that detects potential collision with oncoming traffic when driver tries to make a left turn and provides alerts and automatic vehicle deceleration if situation becomes critical.



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New Mobility

Competitive Advantage/Differentiators

- Reduces chances of collision with oncoming traffic in situations where driver may not accurately judge traffic speed, or a hidden threat may result in collision
- Camera & Radar identify and track objects oncoming in the adjacent lane of the Ego vehicle
- Multi-stage alerts, pre-conditions brakes during last stage warning and applies single stage brakes to mitigate the collision

Features

- Forward Collision Warning (FCW)
- Operating Range: 0-35 km/h
- Road Surface: Intersection in City and Urban roads

Advanced Driver Assistance Systems

Cross Traffic Alert

Detection of cross traffic, including vehicles and pedestrians, for driver assistance, warning and collision avoidance.



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New Mobility

Competitive advantage/differentiators

- Detection of objects located within vehicle path (camera based object/ pedestrian detection and classification) not yet in driver field of view
- Feature monitors objects and triggers warning and braking to prevent or mitigate a collision.
- Best in class image quality

Features

- Object and Pedestrian Detection
- Detects objects in garages, narrow streets, tight junctions, and other difficult driving situations
- Feature meets US-NCAP Rear-AEB requirements

Blind Spot Detection

BSD is an alert feature that provides visual alert to driver if there is a vehicle in the blind spot of the Ego vehicle on either side or fast approaching vehicle about to overtake



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New Mobility

Competitive advantage/differentiators

- Warns driver during lane change by alerting for vehicles which may not be visible to driver in side /rear mirrors.
- Provides alerts for vehicles that are completing a fast overtaking in the adjacent lanes.
- Scans for objects, reported by rear-corner radars, in a fixed area and gives visual alert when threat is found in the BSD zone.

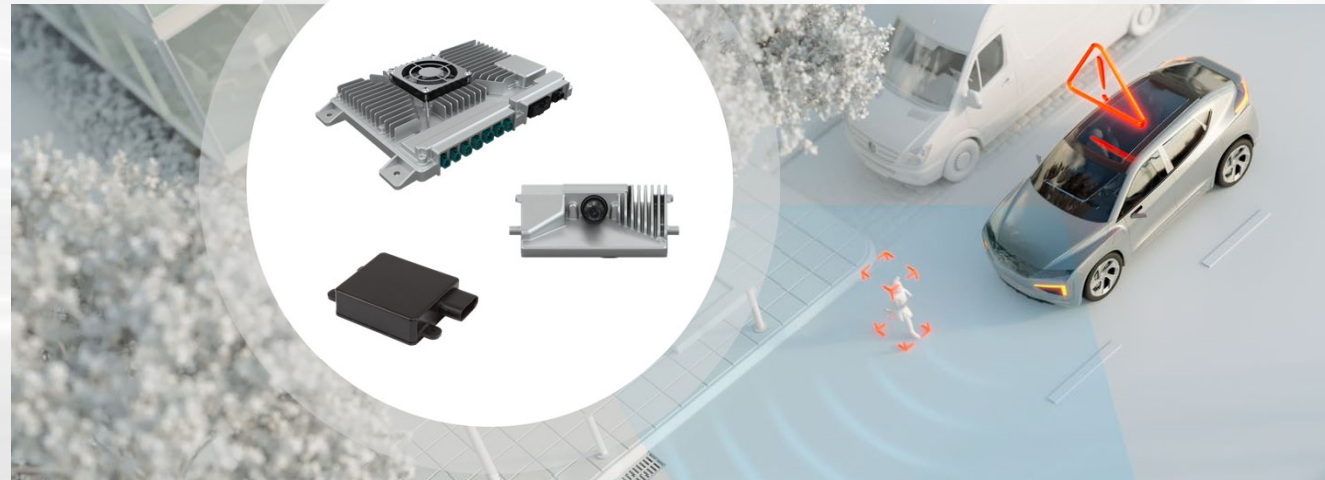
Features

- Driver enables feature using HMI
- Operating Range: 0 – 200 km/h

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Vulnerable Road User AEB

Driver distraction or dynamic event could lead to reduced reaction time by the driver. VRU AEB helps prevent or mitigate collision in those conditions.



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New Mobility

Competitive advantage/differentiators

- Front camera & radar identify and track VRUs in forward direction of the Ego vehicle
- VRU AEB applies 2 stage brakes to prepare the driver of the sudden deceleration
- Driver may take over by steering/accelerating

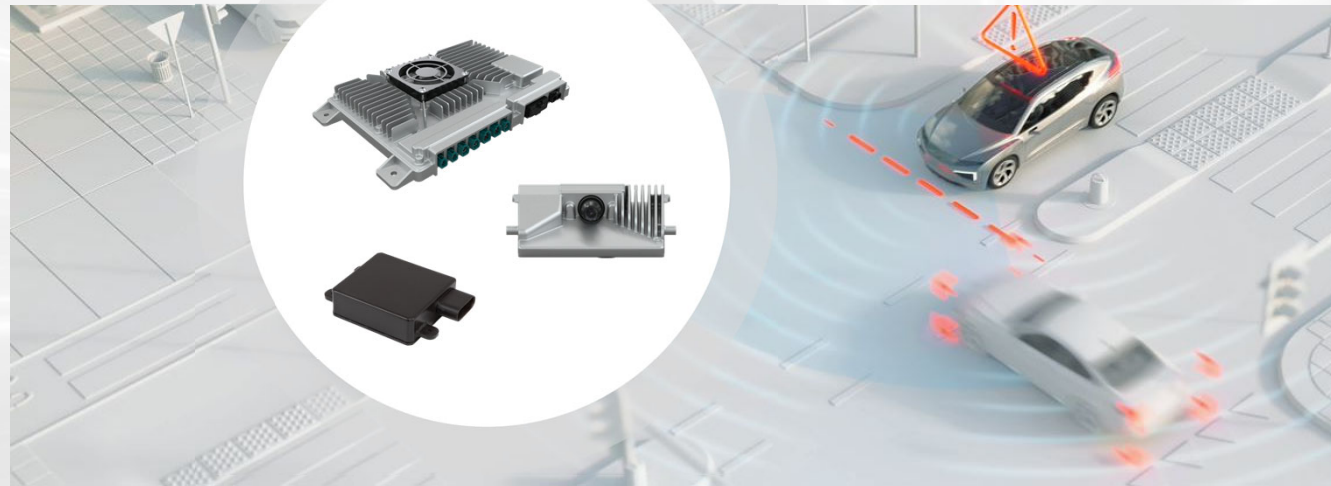
Features

- Forward Collision Warning (FCW)
- Dynamic Brake Support (DBS)
- Operating range: 10 – 85 km/h
- Objects of interest: Pedestrians (incl. child) & bicyclist

Advanced Driver Assistance Systems

Straight Cross Path AEB

Straight cross path AEB is a safety feature that detects potential collision with cross traffic in a junction and provides alerts and automatic vehicle deceleration.



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New Mobility

Competitive advantage/differentiators

- Front camera & corner radars identify and track objects moving in front cross path of the Ego vehicle
- Feature performs multi-object threat assessment
- Reduces chances of collision with cross traffic for delayed or failed driver reaction in situations which may result in collision.

Features

- Forward Collision Warning (FCW)
- Operating Range: 0 - 65km/h
- Road surface: Intersection in City and Urban roads

Advanced Driver Assistance Systems

Door Open Warning

This feature warns the driver/passenger to avoid a potential collision with a vehicle/VRU* approaching the host vehicle from rear left or rear right side when host vehicle comes to standstill.



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New Mobility

Competitive advantage/differentiators

- Helps avoid potential collision with vehicles, pedestrians, motorcyclist and bicyclist while stepping out of the Host vehicle
- At standstill with driver selected gear in Park/Neutral, feature begins to scan the area behind the vehicle for moving objects reported by corner radars

Features

- If an object is coming in way of vehicle door opening on either side, and it's Time To Collision drops below a threshold, an optical alert is provided to the driver
- Can prevent door from opening to protect user

*VRU: Vulnerable Road user such as pedestrian, motorcycles,...

Contact: Andrew Bates / andrew.bates@magna.com

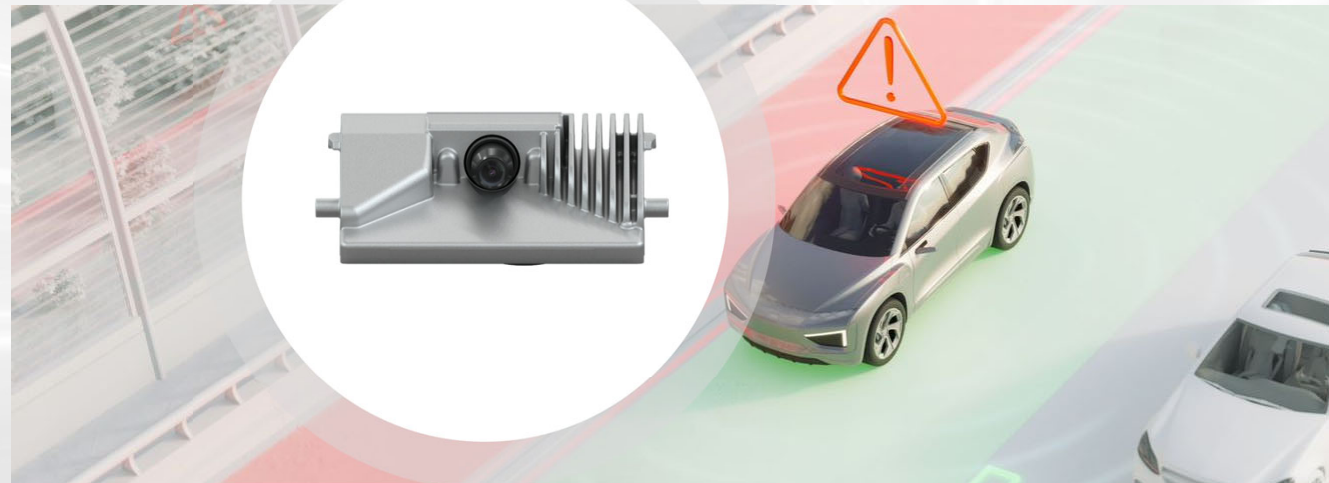
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Cruise

Advanced Driver Assistance Systems

Lane Detection/ Lane Departure

Lane detection can signal a warning to the driver in the event of lane departure or automatically intervene with lane keep assist or lane centering to mitigate the driver from departing the lane.



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New Mobility

Competitive advantage/differentiators

- The system reduces the chance of accidents due to unintended lane departure
- Camera continuously monitors the lane markers on the path
- Using a wide FOV camera to detect lanes
- Lane departure warning via the use of audible/visual/haptic cues

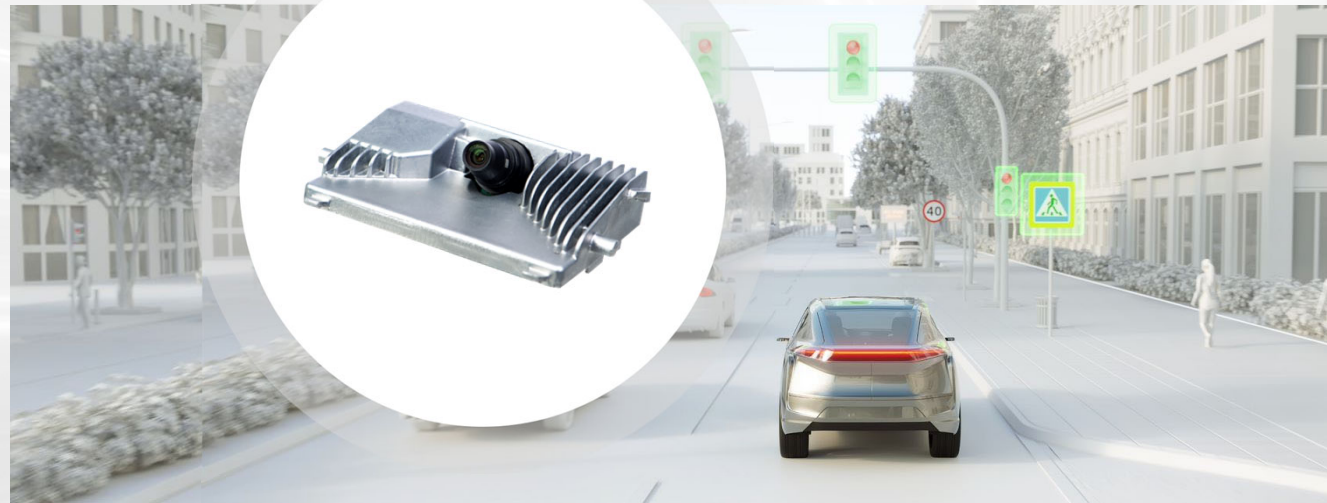
Features

- Lane Departure Warning

Advanced Driver Assistance Systems

Traffic Sign Recognition

Always be informed about current driving restrictions with Magna's solutions for Traffic Sign Recognition. Equipped with intelligent software it accurately recognizes all types of traffic signs including dynamic LED signs.



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New Mobility

Competitive advantage/differentiators

- Continuous reference for current driving restrictions
- Informs the driver when current restrictions are being exceeded
- Limits accident risks in urban areas associated with high-speed differentials
- Works as a camera-only solution or with navigation system

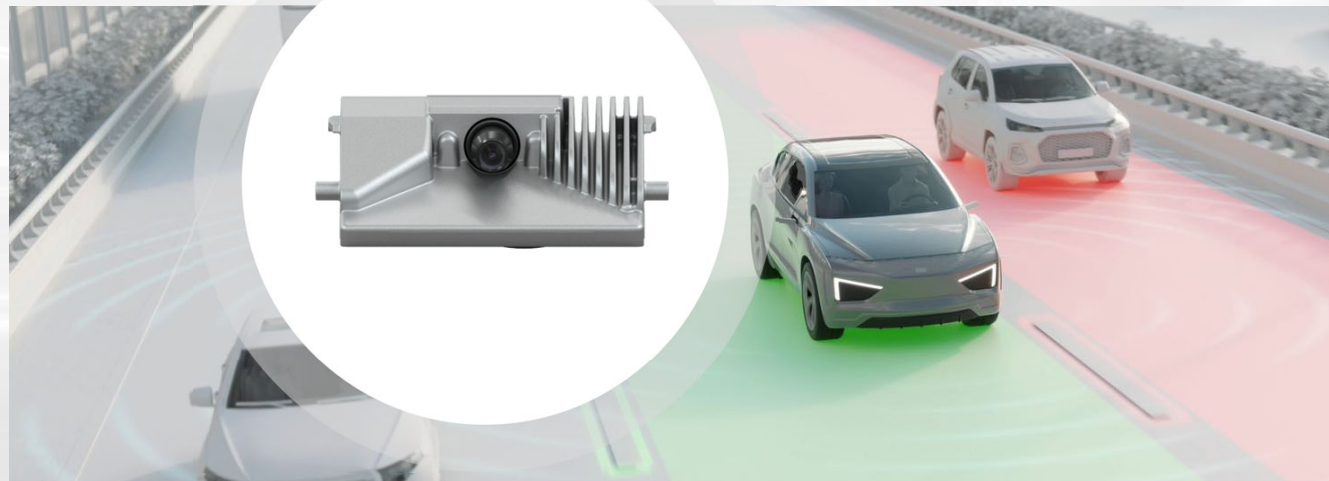
Features

- Traffic Sign Recognition (with or without map fusion)
- Red light status
- Speed Warning
- Speed Assist System/Intelligent Speed Adaptation
- Meets GSR regulation for ISA

Advanced Driver Assistance Systems

Lane Keeping Assist

This safety feature is designed to prevent accidents from unintended lane departures caused by driver distraction, drowsiness or impairment. The vehicle brings you back into lane by gently turning the steering wheel.



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New Mobility

Competitive advantage/differentiators

- LKA reduces the chance of accidents due to unintended lane departure by applying a corrective torque to the steering wheel to bring the vehicle back into lane
- Camera continuously monitors the lane markers on the path
- Monitors steering wheel torque to determine if driver is controlling the steering wheel

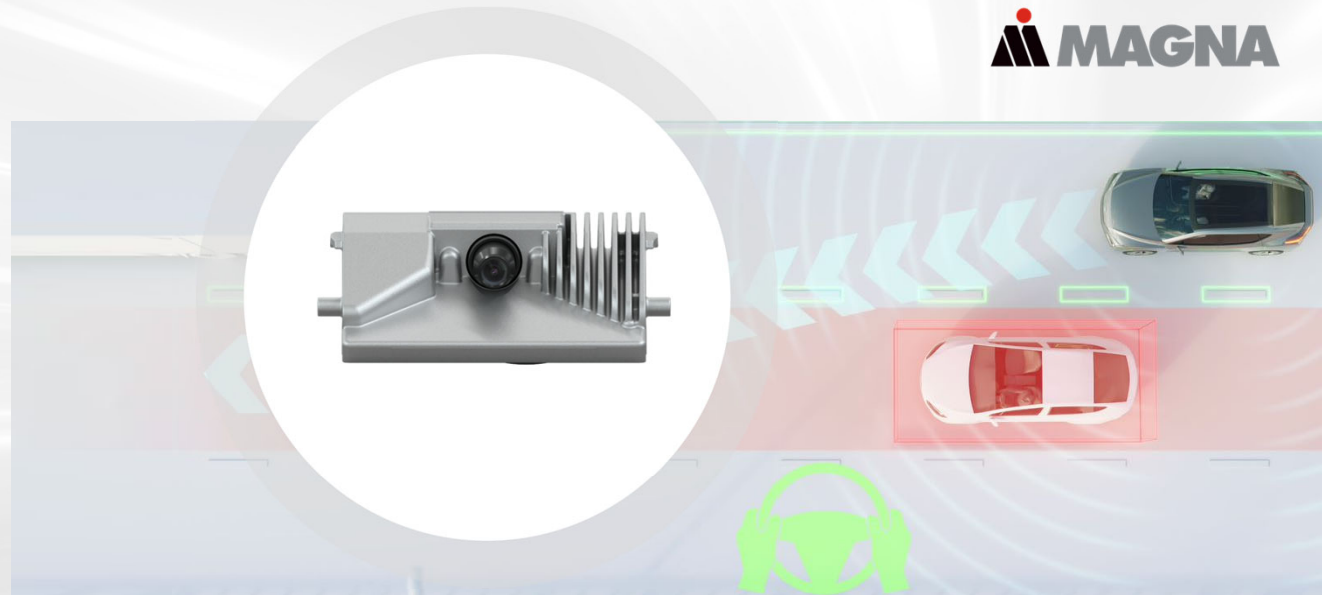
Features

- Lane Departure Warning
- The system is designed for vehicle speeds 60-200 kph, when one lane marker has been detected
- Activating turn signal, allows intentional lane change

Advanced Driver Assistance Systems

Lane Change Assist

This hands-on feature ensures that no vehicle is in adjacent lane as well as overtaking at high speed. It can also guides the vehicle laterally from host lane to target lane in the direction chosen by driver using turn indicator.



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New Mobility

Competitive advantage/differentiators

- Reduces driver efforts by providing steering support to change lanes. Checks for surrounding objects that may result in a potential collision.
- Camera detects target lane marks and fusion detects surrounding objects in host & target lanes
- Capacitive touch determines driver hands-on
- Prevent collision if another vehicle travels at high speed in targeted lane

Features

- Warning system starts when vehicles moves
- Driver drives forward above 60 kph with lane centering feature activated and driver gives turn indicator.
- Laterally controls the vehicle to go to target lane and hands over control to lane centering feature

Advanced Driver Assistance Systems

Automatic Lane Change

Complete lane change without driver intervention. The system takes the decision as part of higher autonomy features such as highway assist



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New Mobility

Competitive advantage/differentiators

- Reduces driver efforts by providing steering support to change lanes.
- Checks for surrounding objects that may result in a potential collision.
- Camera detects target lane marks and fusion detects surrounding objects in host & target lanes

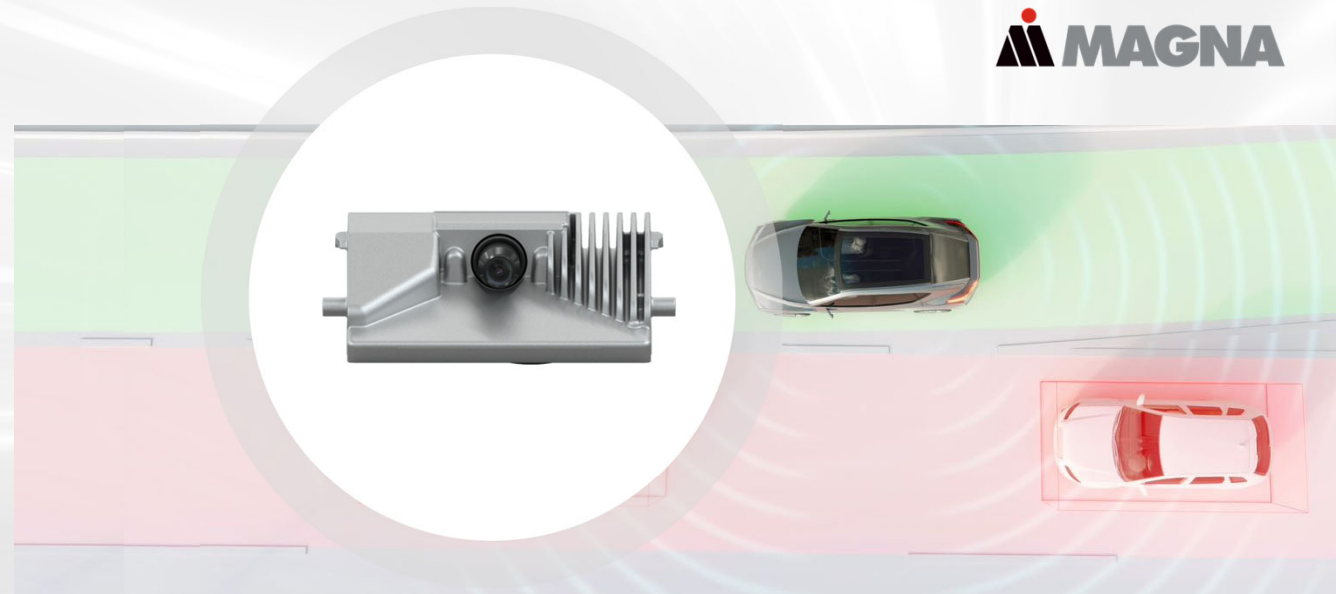
Features

- Driver drives forward above 60 kph with lane centering feature activated and system needs to change lane to maintain cruising speed
- Laterally controls the vehicle to go to target lane and hands over control to lane centering feature

Advanced Driver Assistance Systems

Lane Merge

Lane merge assists you by joining an existing lane of traffic or where two lanes become one.



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New Mobility

Competitive advantage/differentiators

- It's best practice to signal for at least 3 seconds before merging and to merge at the same speed as the traffic you are merging into
- Reduces driver efforts by providing steering support to change lanes. Checks for surrounding objects that may result in a potential collision.

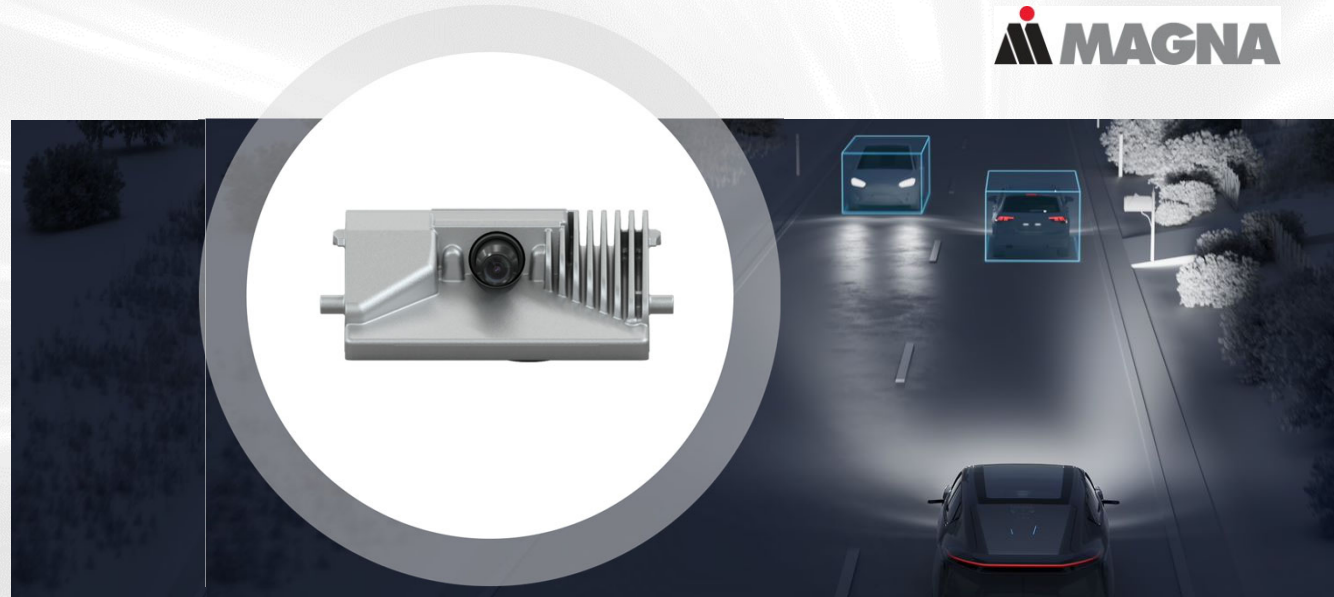
Features

- Automated/driver-initiated lane change
- Key building block for ramp to ramp highway assist

Advanced Driver Assistance Systems

Lighting Automation

Magna's intelligent solutions for lighting automation optimize the vehicle's headlamp illumination in dark and low light conditions. Feel safe, relax, and concentrate on the road.



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New Mobility

Competitive Advantage/Differentiators

- Camera based lighting automation increases safety by avoiding blinding of pedestrians / other drivers
- Predictive light based on camera data
- Reduces glare effect on wet road conditions and prevent blinding on reflective surfaces
- Paired with LED highlight, can maintain high beam with blinding other drivers

Features

- Automatic High Beam
- Intelligent Light Ranging
- Glare Free High Beam or Matrix Beam
- Spot Lighting

Advanced Driver Assistance Systems

Thermal Spotlight

Magna can also highlight vulnerable road users and animals beyond the range of the headlights. The spotlight provides immediate indication where to direct driver attention to improve safety.



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New Mobility

Competitive advantage/differentiators

- Uses a dynamic, directed beam of light on the ground in front of the vehicle to point the way to, or “spotlight,” the hazard.
- No need to take eyes off the road to view the Night Vision display; no cognitive delay as necessary to interpret a visual or audible warning.
- Now permitted on US roadways since Federal vehicle lighting standards were recently updated in 2022

Features

- Allows the driver extra time to react and adapt appropriately, reducing criticality compared to only seeing the object at the last moment when it comes into headlight range.
- Uses adaptive headlight system, (e. g. projector or matrix LED type) to control beams based on detected object data from the Thermal Sensing system.

Advanced Driver Assistance Systems

Intelligent Speed Adaptation

Driver assistance system designed to help drivers comply with the current speed limit on the section of the road they are currently driving on. Drivers will be alerted via feedback from the car if they exceed the speed limit.



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New Mobility

Competitive advantage/differentiators

- Compliant with European Union (EU) General Safety Regulation (GSR)
- Can be completed with SD/HD Map or REM
- Already in production

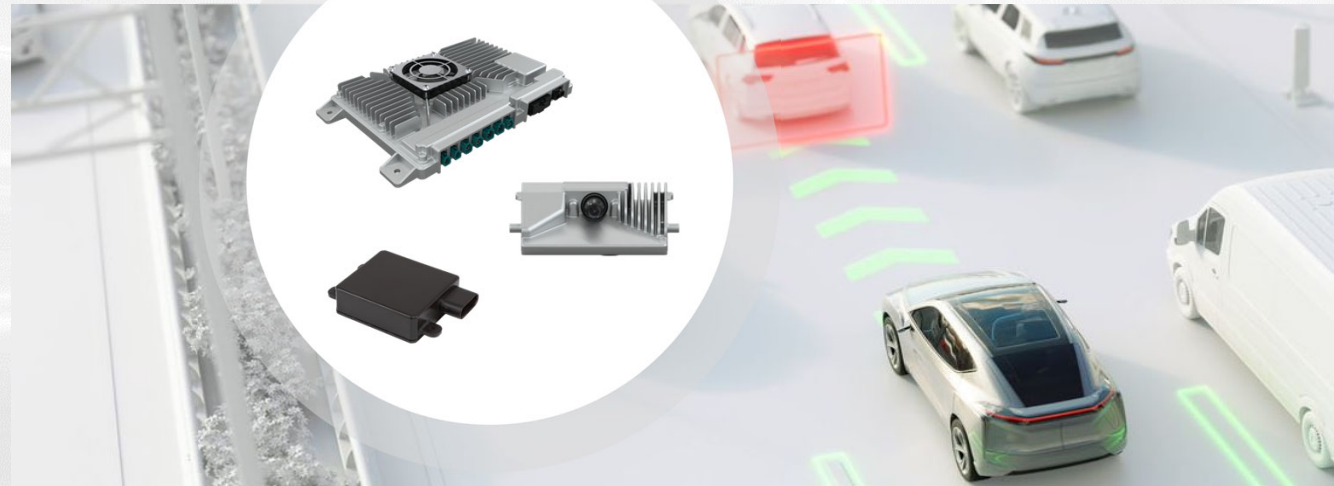
Features

- Passive or active feature
- Active: when the vehicle is driving above the speed limit, ISA will slow down the vehicle to bring it back to the speed limit
- Passive: visual, sound and/or haptic when the vehicle is driving above speed limit

Advanced Driver Assistance Systems

Adaptive Cruise Control

Driving easy, comfortably and more relaxed with Magna's ACC – our comfort feature supporting the driver by adjusting speed in response to traffic rhythm and maintaining the selected time gap to the lead vehicle while keeping vehicle in the center of the lane.



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New Mobility

Competitive Advantage/Differentiators

- ACC makes driving easy and comfortably by reducing driving workload and enhancing safety.
- ACC detects the distance and velocity of the closest in path vehicle with radar and camera and automatically adjusts speed to maintain safe distance to the preceding vehicle.
- Stop & Go as feature extension keeps ACC engaged while following another car to a complete stop
- ACC is maintaining vehicle in the center of the lane while driving

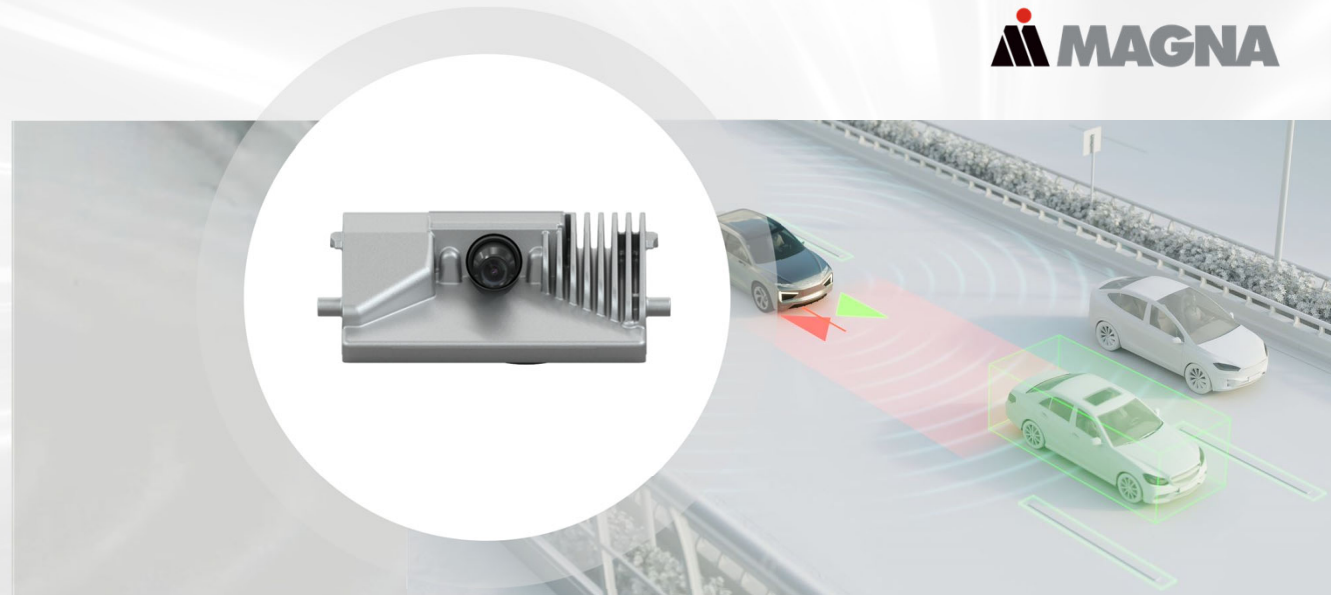
Features

- Camera & Radar based Target Gap control
- Speed based cruise control
- Auto-Resume aka Stop & Go
- Camera/Map based Auto-set speed (ISA)
- Curve Speed Adaptation

Advanced Driver Assistance Systems

Integrated Cruise Assist

The integrated cruise assist is a hands-on feature that guides the vehicle laterally between lane markings while maintaining a constant gap with the preceding target in range or set speed, in a highway cruising situation.



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New Mobility

Competitive advantage/differentiators

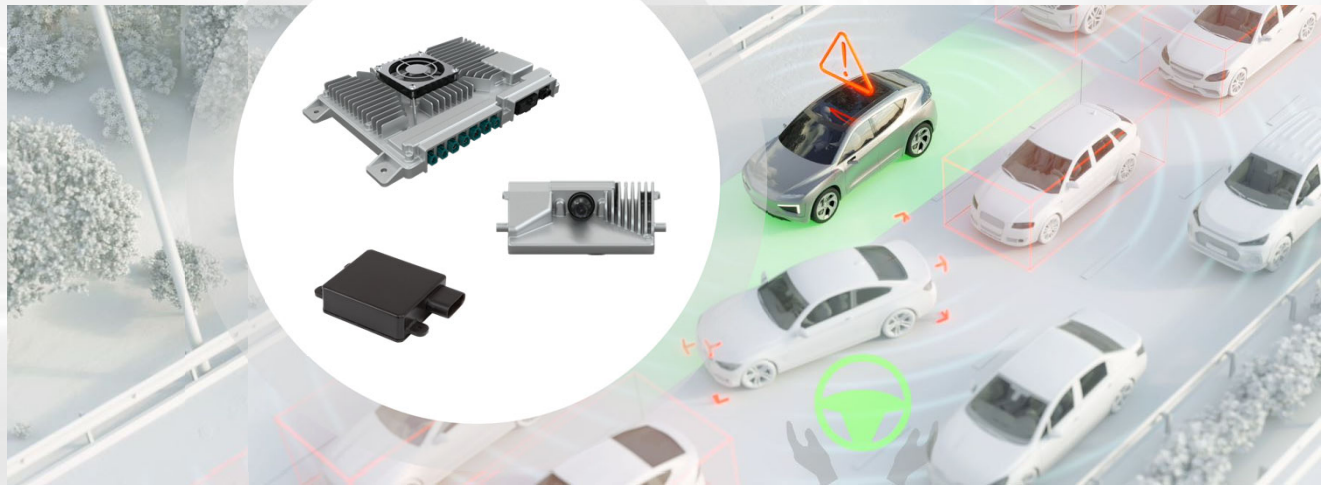
- Camera detects lane marks and camera/radar identifies the Closest In Path Vehicle (CIPV)
- Longitudinally maintains a constant speed, as set by the driver, if no target vehicle detected
- Longitudinally maintains a driver selected time gap and lane center
- Laterally maintain vehicle in lane, even in curve on highway/interstate

Features

- Camera based lane following
- Speed & Gap based cruise control
- Stopping Function: Extended Hands-off results in brake jerks & smooth braking
- Operating speed: 60-120 km/h
- Road surface: interstates, highways, urban roads & well-marked country roads

Traffic Jam Assist

Especially in traffic jam situations this hands-on feature guides the vehicle laterally between lane markings while maintaining a constant gap with the preceding target in range or a set speed.



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New Mobility

Competitive advantage/differentiators

- Camera detects lane marks and camera/radar fusion identifies the Closest In Path Vehicle (CIPV)
- Longitudinally maintains a constant speed, as set by the driver, a selected time gap and lane center
- Laterally maintains lane center (lane marks available) or follows target in front (if lanes not detected)

Features

- Camera based Lane Following
- Speed / Gap based cruise control
- Auto-Resume aka Stop & Go
- Maximum Hands-off duration less than 10sec
- Stopping Function: Extended Hands-off results in brake jerks & smooth braking
- Transitions to ICA above 60kph

Highway Pilot

Highway Pilot is a hands-off feature that guides the vehicle laterally between lane markings while maintaining a constant gap with the preceding target in range or set speed, in a highway cruising situation.



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New Mobility

Competitive advantage/differentiators

- Camera detects lane marks and camera/radar fusion identify Closest In Path Vehicle (CIPV)
- DMS captures driver's attention on the road and triggers alerts for long distraction periods followed by escalated alerts, brake jerks and smooth braking to grab driver's attention
- Automatic lane change is available as part of the hands-off system

Features

- Camera & HD Map based Lane Following
- Speed & Gap based cruise control
- Camera & Map based ISA with Auto Set Speed
- Driver Monitoring System (DMS) checks for Driver Attention on road
- Stopping Function: Extended driver distraction results in brake jerks and smooth braking

Driver & Occupant Monitoring

Advanced Driver Assistance Systems

Driver Monitoring System

Magna's mirror integrated DMS is a natural extension of our leadership position in camera and mirror technologies. Features a proven camera-based solution that actively monitors and reduces distracted driving through customizable alerts and notifications, all in one complete product system.



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Electrification



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New Mobility



Design



Co-Development Opportunity



Patented

Competitive advantage/differentiators

- Real time monitoring of driver head, eye and body movement to detect distracted behavior, drowsiness and fatigue
- Cost saving by integrating with existing ADAS systems
- Common core designs (camera and algorithm) fit multiple system configurations
- Seamless packaging into inside mirror and overhead console
 - By design, the interior mirror provides the best unobstructed view to the driver
 - Flexible camera mounting positions including steering column, instrument cluster, center console and A-pillar

Features

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

Advanced Driver Assistance Systems



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.



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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.
- Meets requirements such as child in the footwell
- Multi sensor fusion within Magna's domain controller
- Integrated solution adding occupant monitoring within rearview mirror provides hidden camera

Features

- Meets future NCAP and government regulations
- Monitor passenger occupancy, position for airbag deployment / seat belt reminder
- Detect child presence in rear facing car seat and covered under blanket
- Driver/passenger identification
- Forgotten object detection

Park

Ultrasonic Park Aid

This comfort feature is designed to offer a warning of surrounding obstacles and supports to handle the smallest parking spaces.



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New Mobility

Competitive Advantage/Differentiators

- Network based communication yielding
 - Simplified wiring
 - weight and cost reduction
- Extended range capabilities up to 5.5m coverage, near field object detection as low as 10cm
- ASIL B FuSa rated sensor
- DS13 communication to DC

Features

- Exterior Design Styling advantages
- Object & Freespace Detection
- Environment mapping
- Rear AEB, Trailing functions
- Signal and event coding for interference and spoofing mitigation

Automated Park Assist

Magna's automated parking system is combining parking lines detected from different sensors and track parking gap continuously for automated parking.



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New Mobility

Competitive advantage/differentiators

- Sensor fusion-based park gap detection with intelligent vehicle control and real-time obstacle detection
- Detect lines in different styles/color and in-path obstacles and perform safe parking maneuver
- Provision to auto adjust and maneuver vehicle to align with reference to available space
- Scalable from ultrasonic only to fusion with cameras

Features

- Fishbone / Parallel / Perpendicular Parking
- Park in, Park out, Horizontal Park Assist, Full Auto Park, Safe Distance warning
- Auto detection of parking lot type and supports a variety of road surface
- Fully integrated with Rear-AEB, Cross Traffic Alert, Traffic Jam Assist features

Automated Driving Systems



Personal Park Assist

Intelligent daily parking - The personal park assist system supports the driver by automating the repetitive tasks such as parking in/out of known (learned) parking spots.



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New Mobility

Competitive advantage/differentiators

- The PPA system will autonomously maneuver the vehicle onto a memorized parking spot. The desired spot and the associated approach are stored through a short learning/training session.
- The host vehicle driver can be either inside the vehicle or outside monitoring the process using the PPA smartphone app

Features

- Remote parking feature
- Obstacle detection: Ability to detect and avoid in-path obstacles
- Path planning & alignment: Provision to auto adjust and maneuver vehicle to align with stored reference path

Autonomous Driving Systems

Autonomous Valet

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



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New Mobility

Competitive advantage/differentiators

- Implementing the functionality using low cost sensors for volume production
- Customized user experience with smart phone app
- Clean styling vehicle integration
- With fast market introduction of L4 features, Magna's full Autonomous Valet offers convenience, with priority on capability, performance and low cost.

Features

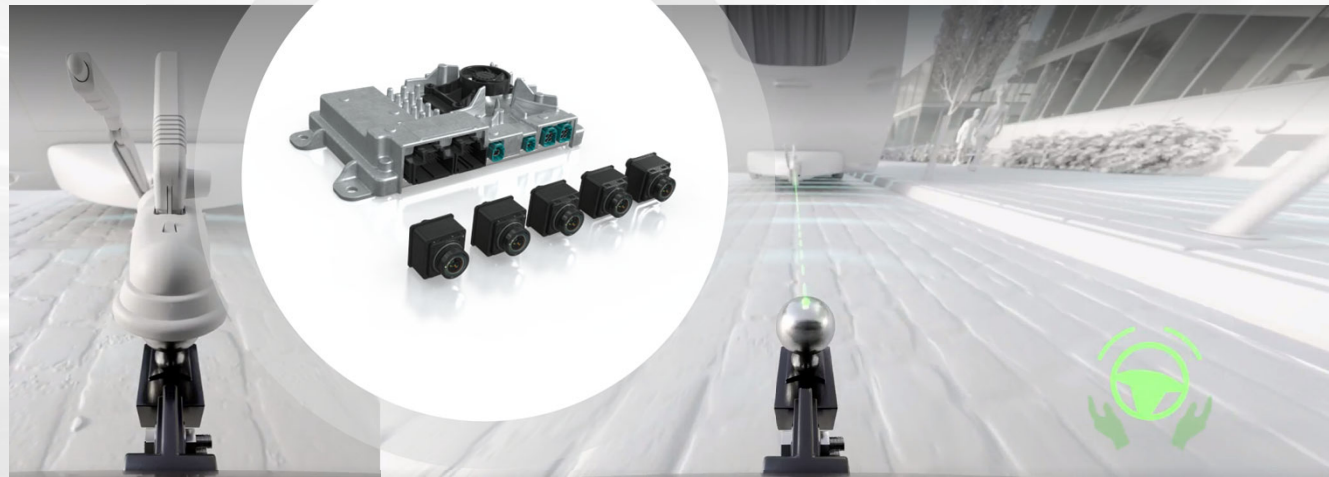
- Target markets: office, mall, sporting venues, airport parking lots where far away parking is ample, and close parking is at a premium
- Indoor and Outdoor parking spaces
- Current Sensors: cameras, radars, ultrasonics, cost-effective compute system

Trailer

Advanced Driver Assistance Systems

Trailer Hitch Assist

See more and drive easy towards your trailer. Magna provides automatic aligning of the towing vehicle to a trailer up to a point where the trailer coupler only needs to be lowered onto the hitch.



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New Mobility

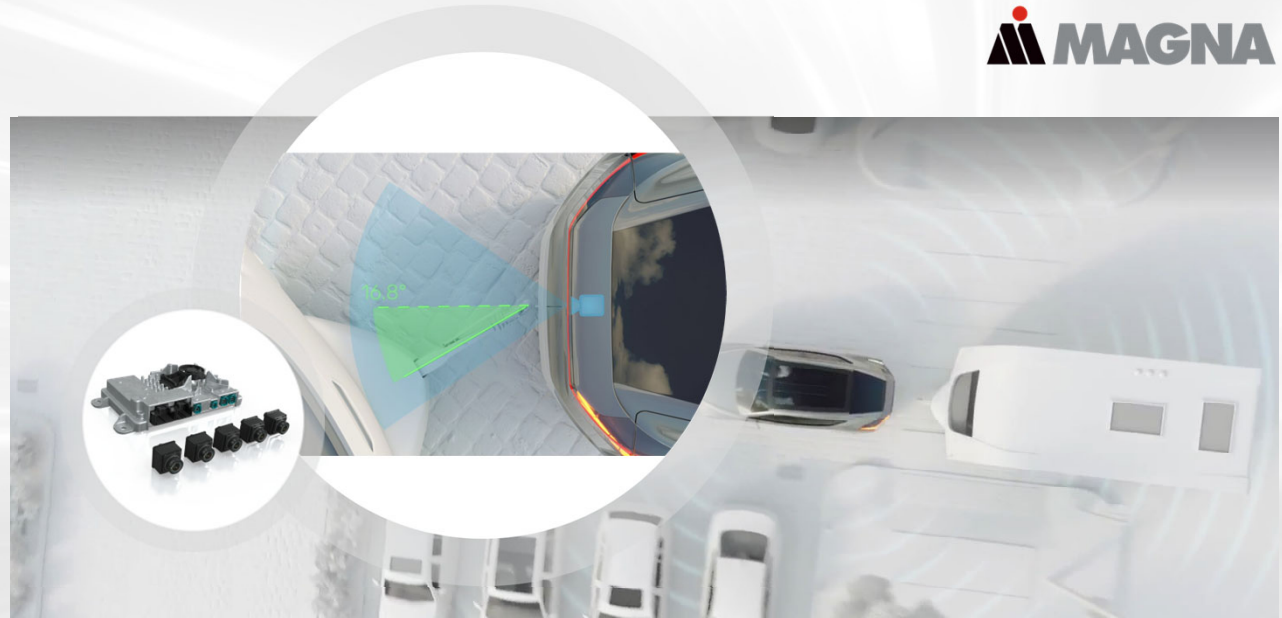
- Camera based or Fusion based system (camera + ultrasonic)
- Obstacle detection with automatic emergency braking during maneuvering towards a trailer
- Automatic Trailer Detection and Classification

Features

- Obstacle detection with automatic emergency braking
- Trailer recognition and pose estimation
- Hitch ball and trailer coupler physical position (XYZ) estimation
- Dynamic path planning

Trailer Angle Detection

The system utilizes the rear-view camera to measure the trailer angle between a tow vehicle and a trailer. Provides angle detection between towing vehicle and attached trailer with no user input or target necessary.



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New Mobility

Competitive advantage/differentiators

- One-time calibration for trailer to align the trailer with vehicle center line axis – using simple two step drive cycle
- Does not require user measurements like today's production system
- Instant output of trailer angle when calibrated trailer is re-attached to the tow vehicle
- Detects tow ball (point of rotation) automatically

Features

- Trailer Backup Assist
- Trailer Backup Guidance - provides automatic view changes, straight backup guidance and jackknife warning
- Hitch Length Detection and Trailer beam Length Estimation

Advanced Driver Assistance Systems

Trailer Guidance

The feature analyzes the angle between the vehicle and trailer, providing the driver with the most favorable perspective in terms of the trailer's movement and direction of travel. An additional view shows the steering wheel movements necessary to reverse in the optimal line.



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New Mobility

Competitive advantage/differentiators

- Calculates direction of steering and amount of steering wheel rotations required to have the current trailer angle (from TAD) corresponding to desired trailer angle (from User)
- Uses RVC and Target-less Trailer Angle Detection output
- Possible Trailer Guidance controllers: Slider, Dial, etc.

Features

- Trailer Steering Control while Backing up

Trailer See Through

SEE MORE – With Magna’s transparent trailer technology we provide excellent, full overview of what is behind and around trailers and increases safety by avoiding blind spots using images from trailer cameras and vehicle’s surround view cameras



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New Mobility

Competitive advantage/differentiators

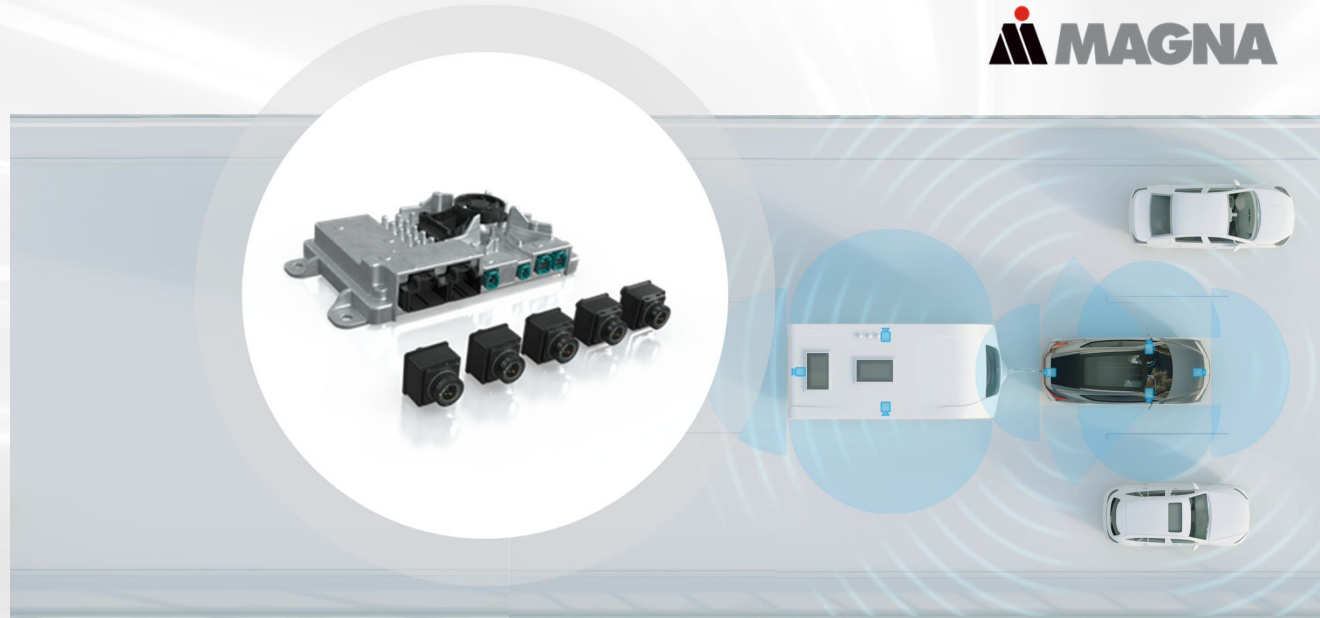
- Seamlessly stitches tailgate and trailer satellite camera views to enable a transparent trailer view
- Detect trailer angle and dimensions without target and user measurement
- Short and seamless calibration of trailer camera(s) by robust online calibration algorithms

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

Trailer 360° Views

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



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New Mobility

Competitive advantage/differentiators

- Applicable to 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

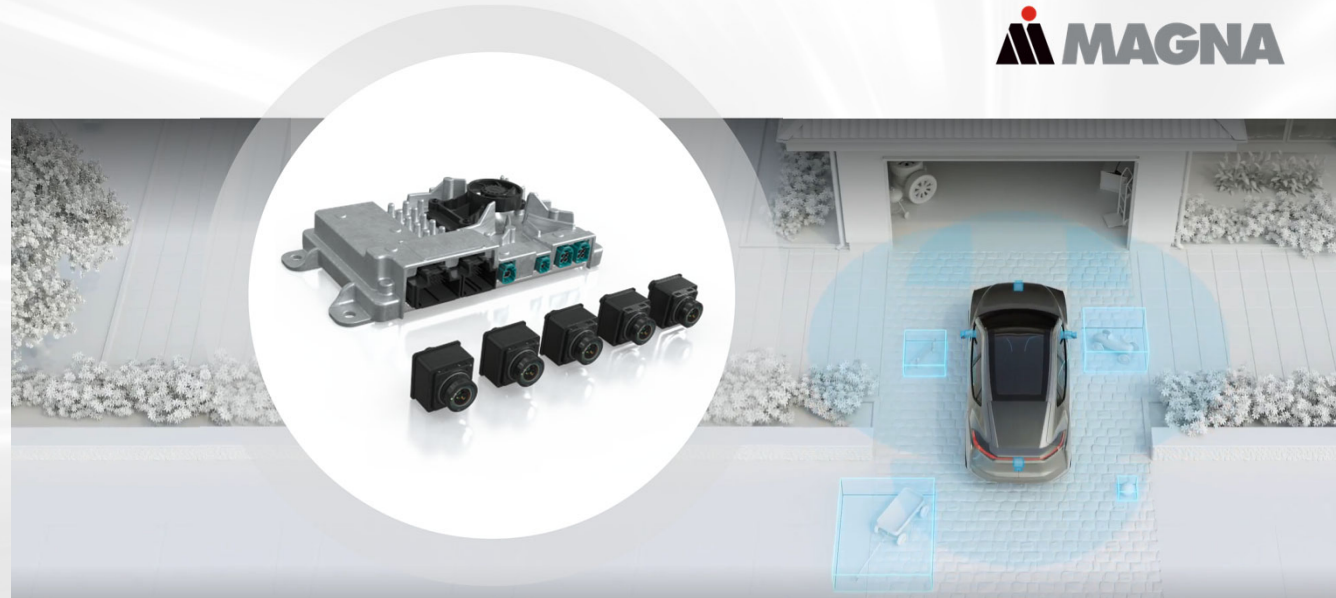
- 360° Surround View around trailer and vehicle
- Multiple 2D or 3D views
- Powerful graphical processor
- Object and Pedestrian Detection
- Advanced Trailer Views

View

Advanced Driver Assistance Systems

3D Surround View

Let Magna's best-in-class image quality help you drive safer with a 3-dimensional, adaptive 360° view around your vehicle from the driver seat - including glass bottom and trailing views.



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New Mobility

Competitive advantage/differentiators

- Flexible multiple view transformation to a realistic visual projection
- Viewpoints can be chosen freely in 3D anywhere around the vehicle
- Adaptive 3D view based on detected objects distance – avoid objects lost in blind zone
- Best in class image quality

Features

- 3-dimensional adaptive 360° view around vehicle
- Glass-bottom view, multiple viewpoints
- Trailer 360° view
- Four or more 1.0MP to 3.0MP digital cameras
- Low speed or parking maneuvers

Cross Traffic View

Driver sees an early overview of the situation displayed from front and rear, left and right views, and can react accordingly.



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New Mobility

Competitive advantage/differentiators

- Detection of objects located within vehicle path (camera based object/ pedestrian detection and classification).
- Feature monitors objects in order to prevent a collision.
- Best in class image quality

Features

- Object and Pedestrian Detection
- Detects objects in garages, narrow streets, tight junctions, and other difficult driving situations
- Feature meets US-NCAP Rear-AEB requirements

Advanced Driver Assistance Systems

Night Vision

Driver is delivered real-time video of the roadway environment based on temperature differences in the scene. This can greatly enhance awareness of certain hazards, particularly at night and under other adverse lighting conditions.



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New Mobility

Competitive advantage/differentiators

- Uses a thermal imaging camera discretely packaged into the front of the vehicle.
- Thermal video bases visualization on relative temperatures of objects in the roadway scene.
- Provides driver perception of roadway environment and potential hazards far beyond the reach of vehicle headlights (up to 4x the distance).
- Real-time video is presented to the driver on the instrument cluster or center stack display.

Features

- Allows much earlier awareness of Pedestrians, Animals, cyclists, vehicles, and other objects through darkness, fog, smoke, and snow.
- Can provide driver visibility through potentially blinding sun or headlight glare, since thermal imaging is insensitive to light.

ADAS Sensors

Automated Driving Systems



Mono Camera Modules

Magna's state-of-the-art smart cameras provide unique new capabilities to ensure premium safety - in one box. With best range, resolution and accuracy on the market we are supporting even NCAP2026 and take ADAS features to the next level.



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New Mobility



Industry First

Competitive advantage/differentiators

- Best in class detection of vehicles, pedestrians, two-wheelers, road boundaries and profiles, traffic signs, landmarks, etc.
- Indispensable solution to fulfill General Safety Regulations and to provide ADAS safety to emerging markets
- Magna first to market with an optical path of 120° Field of View (FoV) and 8 Megapixel resolution
- Scalable computing power to host driving functions and fusion with up to 5 radars

Features

- Enabling reliable and highly sophisticated features, driving policy and localization
- Empowering all systems up to L2+ and L3
- Full color capability supporting video output (e. g. Augmented Reality)
- Paired with narrow Field of View camera supporting road debris detection and classification at farer distances

Automated Driving Systems

Stereo Camera Modules

Our stereo vision systems are a leading technology in outputting reliable and accurate information of obstacles on the road and free space detection for automated driving systems.



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New Mobility

Competitive advantage/differentiators

- 4th Generation Stereo System is based on a pair of highly synchronized and precise aligned cameras that are capable of detecting objects accurately in the driver's view
- Stereo Vision supports in decision making, by enabling the detection of lanes, small and general objects in 3D and for high reliability free space detection.
- The stereo camera is contributing to the detection of emergency vehicles and construction warning trailers to support level 3 driving.

Features

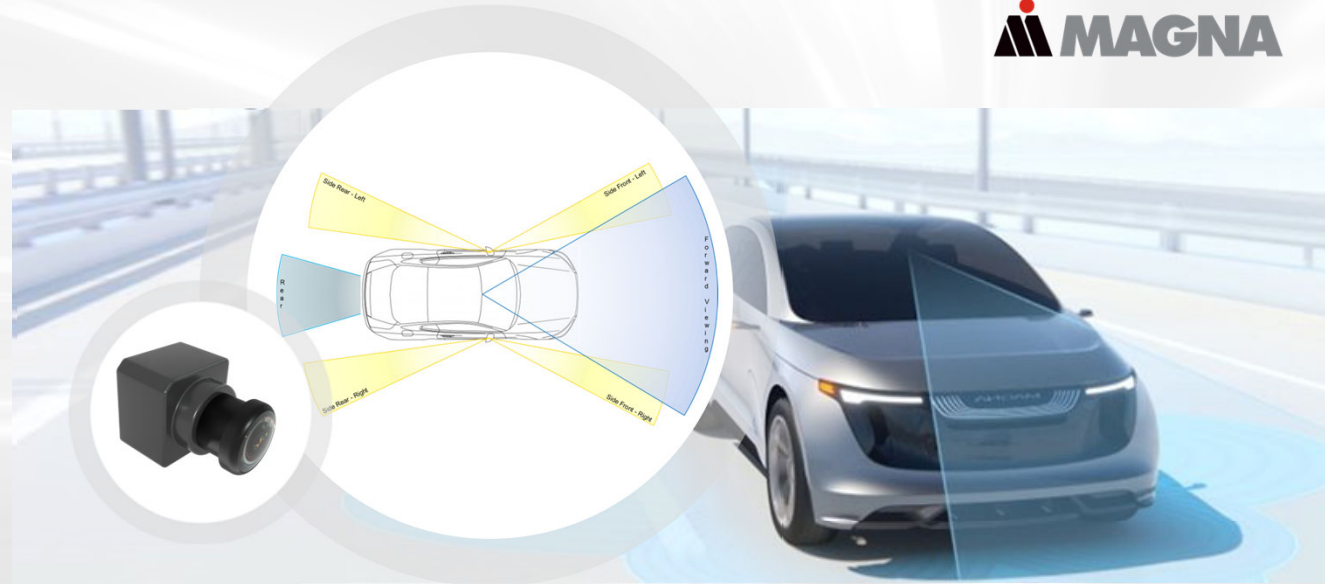
- Enabling reliable and highly sophisticated features, driving policy and localization
- Empowering L2+ and L3 systems
- Used as a redundant system for forward-looking radars and LiDARs in automated driving systems

Advanced Driver Assistance Systems

Remote Camera Head (Cruising)



Magna's high resolution remote camera heads provide best-in-class image quality to help you drive safer. Providing wide and narrow field of views to support ADAS and AD functions.



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New Mobility

Competitive advantage/differentiators

- Supports all SOC variant, applied in ADAS architectures
- Digital ADAS cameras ranging from 8MP up to 17MP resolution
- Best in class image quality, range, resolution and accuracy
- Available as interior and exterior camera (including heater function)
- Night mode enhanced variant with high resolution for better view in low light conditions

Features

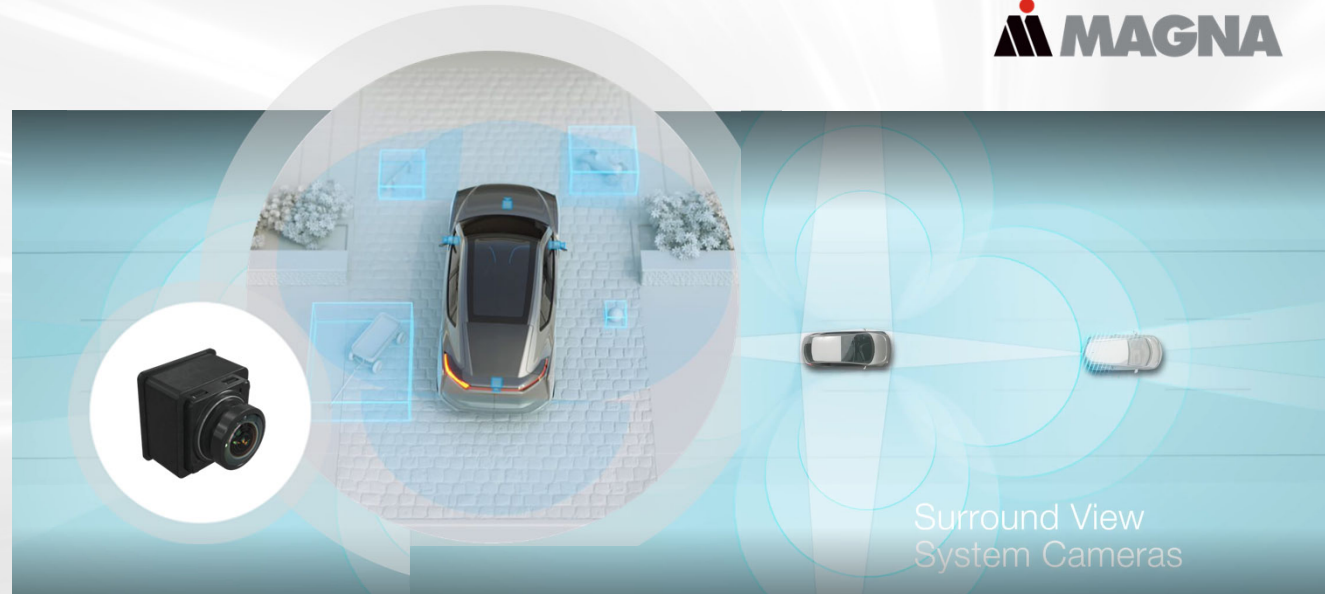
- Multiple Color Filter Arrays (RGGB/RCCB/RYY)
- With integrated ISP or ISP-less
- High speed LVDS interface
- Advanced thermal management
- Compensated aging effects in optical path (CTE, Life Shift)
- Lens options for wide and narrow FOV's

ISP: Image Signal Processing
LVDS: Low Voltage Differential Signaling
CTE: Coefficient of Thermal Expansion

Advanced Driver Assistance Systems

Remote Camera Head (Parking/Low Speed)

Magna's low resolution remote cameras provide best-in-class image quality to help you drive safer. New age digital cameras providing features supporting Surround View, Rear View and Clearview Mirror Systems.



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New Mobility

SVS: Surround View Systems
RVS: Rear View Systems

Competitive advantage/differentiators

- Supports all SOC variant, applied in ADAS architectures
- Digital cameras supporting SVS and RVS applications
- Best in class image quality, range, resolution and accuracy
- Flexible view transformation for realistic visual projection
- Viewpoints 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
- Low speed or parking maneuvers
- Trailer 360° view

Advanced Driver Assistance Systems

Thermal Sensing

Our world-leading thermal sensing system detects objects including pedestrians, animals, cyclists, cars and 2-wheeled vehicles. Real-time thermal video enables driver perception up to 4 times beyond headlight range, even in total darkness, fog, smog and smoke.



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New Mobility

Competitive advantage/differentiators

- Passive infrared camera 8-14 μ m wavelength – no active illumination required.
- Sensitive to temperature differences of less than 1/10th of a degree, to create a highly detailed thermal image of the roadway scene.
- System is not affected by the headlights of oncoming vehicles or glare from the sun.
- Faster VRU classification than Radar or Lidar, at 120m+ ranges.

Features

- Object Classification (Pedestrians, Animals, Vehicles, 2-Wheeled Vehicles, General Objects)
- Enhanced Automatic Emergency Braking
- Object/ VRU Spotlighting
- Improved Forward Collision Avoidance
- Exceeds Current NCAP Requirements
- Road Edge and Free Space Detection
- Day / Night Operation

Advanced Driver Assistance Systems

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.



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New Mobility

Competitive advantage/differentiators

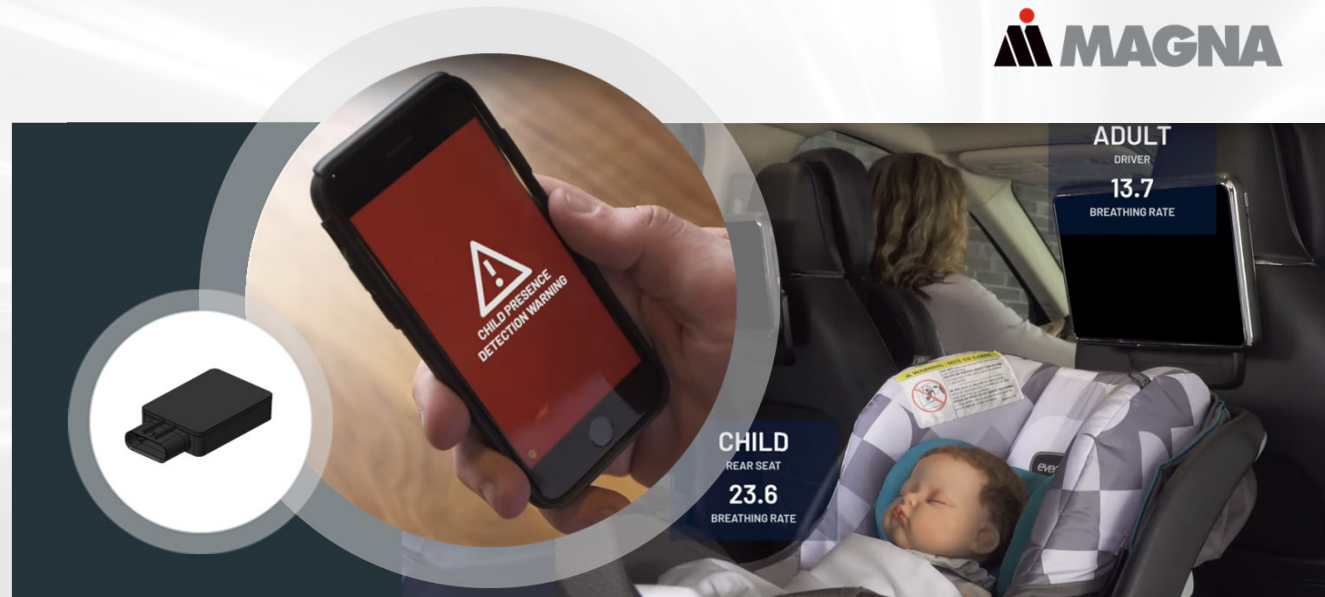
- Unique interior mirror camera integration with or without ECU
- Additional flexible camera mounting positions
- Support 2MP to 5MP resolution and narrow and wide FoV depending on applications, IR and RGB-IR available
- Capable of color video (multi spectral sensor) and monochrome with system capability for dark/low light and ultra-bright sunlight scenarios
- Common core designs fit multiple system configurations

Features

- Drowsiness/ Engagement level detection
- Fulfils EU GSR Regulation
- Head pose/ Precision Gaze detection
- Face identification
- Driver and Occupant Monitoring System
- Auto calibration

Interior Cabin Sensor

Interior Cabin Sensor is a holistic mindset change for automotive interior space monitoring for the future, with a keen focus on safety for all levels of autonomy.



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New Mobility

Competitive advantage/differentiators

- System is built on a long-standing radar development history
- Compact packaging allows for optimal sensor placement from headliner to pillar mount
- Monitors interior cabin to ensure passengers or animals are easily detected.
- Especially able to detect children or animals that may not be visible

Features

- Provide reliable occupant and object detection
- Determined life occupant or object on passenger seat
- Detects breathing rate of the life occupants
- Child presence detection warning
- Driver alert via smart phone

Advanced Driver Assistance Systems

Radar Belt

Pioneer corner radars and best-in-class medium range front radars



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New Mobility



First to Market
Opportunity

Competitive advantage/differentiators

- Full integration support with electromagnetic simulation and decision-making radar (Fire Command) for side impact system
- Small form factor (Radar Belt)
- Identical hardware for front and rear-corner radar
- ASIL B
- Best-in-class distance and Doppler resolutions
- Robust performance behind the bumper

Features

- Blind Spot Detection
- Rear Cross Traffic Alert
- Front Cross Traffic Alert
- Lane Keep Assist
- Side Object Detection
- Supplies raw data to enable central compute
- 360° sensor fusion

Advanced Driver Assistance Systems

Imaging Radar

Best in class performance long range radar that outperforms existing radar at levels never seen before. It helps solve industry-level challenges that support a path to autonomous driving.



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New Mobility



First to Market
Opportunity

Competitive advantage/differentiators

- LiDAR like image quality
- Small object Detection
- Enhanced Fusion
- Enhanced Elevation discrimination to accurately determine over/under drivable (box, fallen pedestrian, semi-trailer (lorry), etc)
- ASIL B

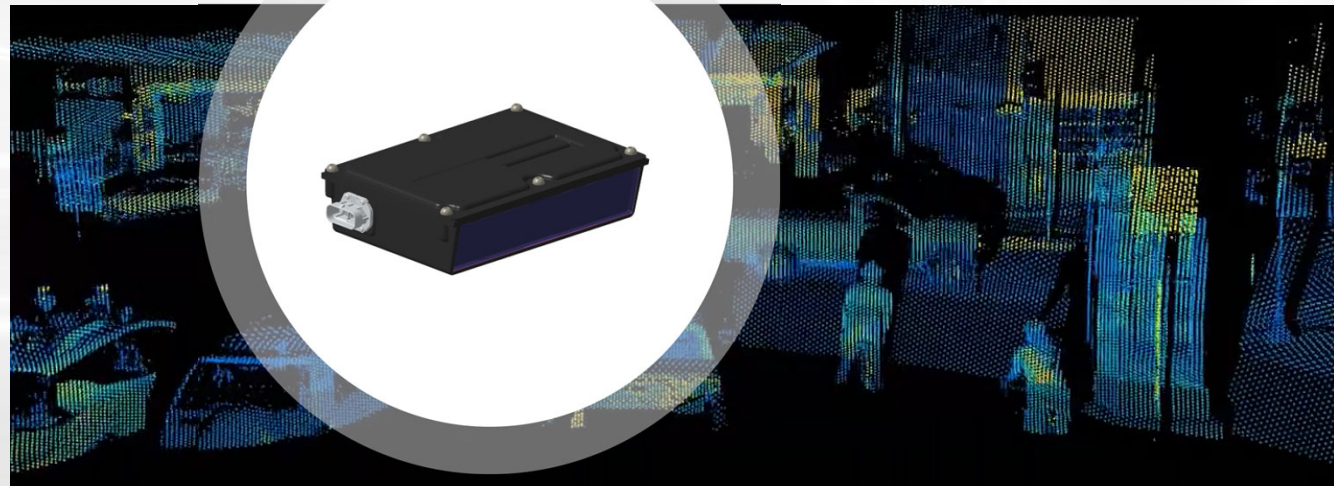
Features

- L4-L5 Feature Support
- Free Space Mapping
- Convoy Detection
- Lane Detection

Advanced Driver Assistance Systems

LiDAR

Next generation high-definition LiDAR leveraging optimized manufacturing concept and improved optical components to provide industry leading solid-state design



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New Mobility

Competitive advantage/differentiators

- High-resolution, long-range LiDAR for highly automated systems, designed to integrate seamlessly into the vehicle
- Modular concept leveraging common platform that can be optimized for OEM requirements

Features

- Long range detection capability for low reflectivity targets
- Industry leading vertical resolution to solve key small object detection and classification use case for Level 3+ Highway based systems

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.



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New Mobility

Competitive advantage / differentiators

- Network based communication yielding
 - Simplified wiring
 - Weight and cost reduction
- Extended range capabilities up to 5.5m coverage, near field object detection as low as 10cm
- ASIL B FuSa rated sensor
- DS13 communication to DC

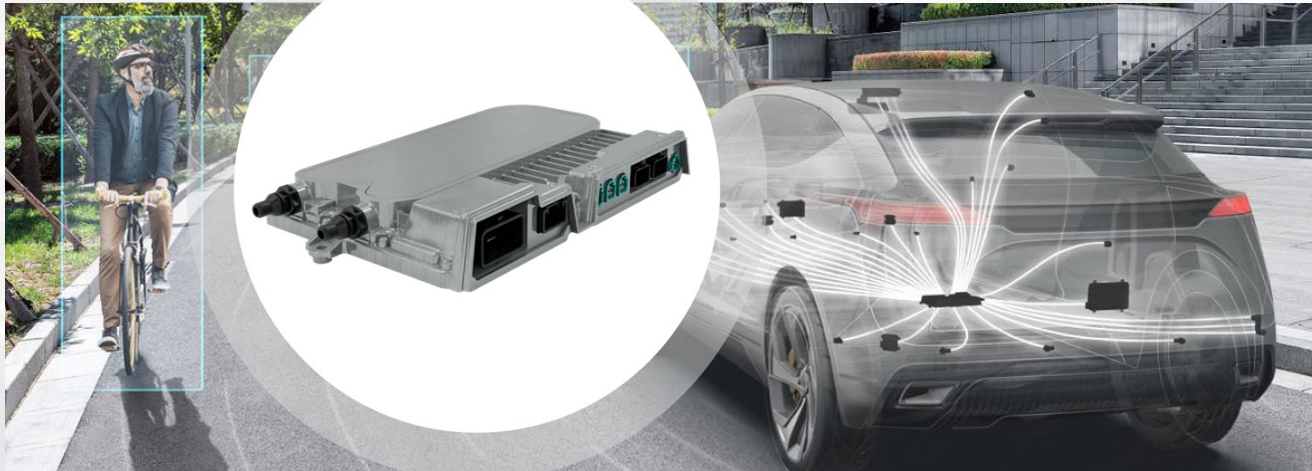
Features

- Fully Automated Parking
- Environment mapping
- Rear AEB, trilateration functions
- Supports autonomous valet parking and remote parking
- Signal and event coding for interference and spoofing mitigation

Advanced Driver Assistance Systems

Central Compute Unit

With our next generation of the CCU we will be able to offer an open and scalable compute architecture centralizing the processing in order to generate a comprehensive environmental model based on all sensor's fusion.



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New Mobility

Competitive advantage/differentiators

- Scalable: From GSR to EuroNCAP 2025+ and support from L0 to L3.
- Host Qualcomm technologies and computer vision algorithms
- Open platform for DMS/OMS & Parking partners Integration.
- Ready for next E/E architecture with SOA

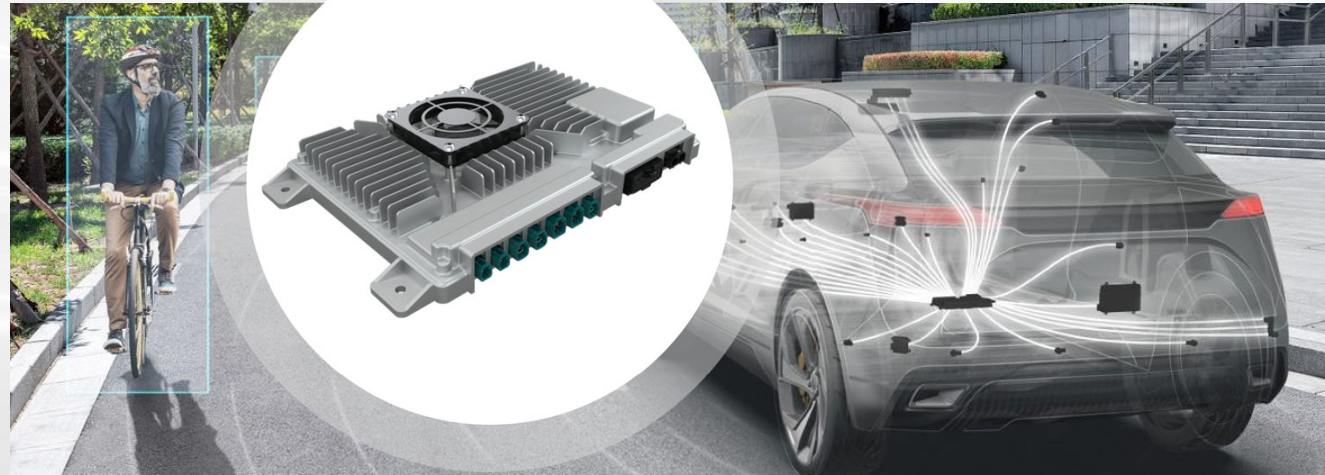
Features

- Low speed maneuvers: up to Valet Parking
- Driver and Occupant Monitoring System
- Highway Assist
- Traffic Jam Chauffeur
- Automatic Emergency Steering
- Advanced trailer features
- Advanced 3D surround view

Advanced Driver Assistance Systems

Domain Controller

Our uniquely scalable domain controller solution enables synergies between base and premium OEM platform performance to reduce development cost / time to market / OEM resources needed.



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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

Advanced Driver Assistance Systems

IVI* & ADAS

Assisted driving and automated driving are becoming more and more evolved and involved with the driver. Magna is developing a leading interface through infotainment to allow the driver understand at all time what the vehicle is doing and focus on what is important to him.



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New Mobility

Competitive advantage/differentiators

- Important savings by combining IVI and ADAS into one ECU, especially for entry and mid vehicles
- Optimized interface between ADAS and driver for easy understanding of ADAS visualization
- Unique visualization
- System complexity reduction

Features

- ADAS and AD dedicated visualization
- Possibility to create new interfaces for more complicated features such as Automated Evasive Steering, traffic light detection or emergency vehicle detection
- OEM can directly participate in the optimization of ADAS and AD visualization

*IVI: In-Vehicle Infotainment

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Forward. For all.