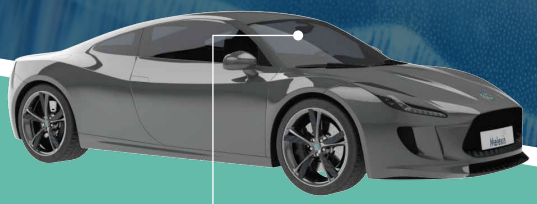
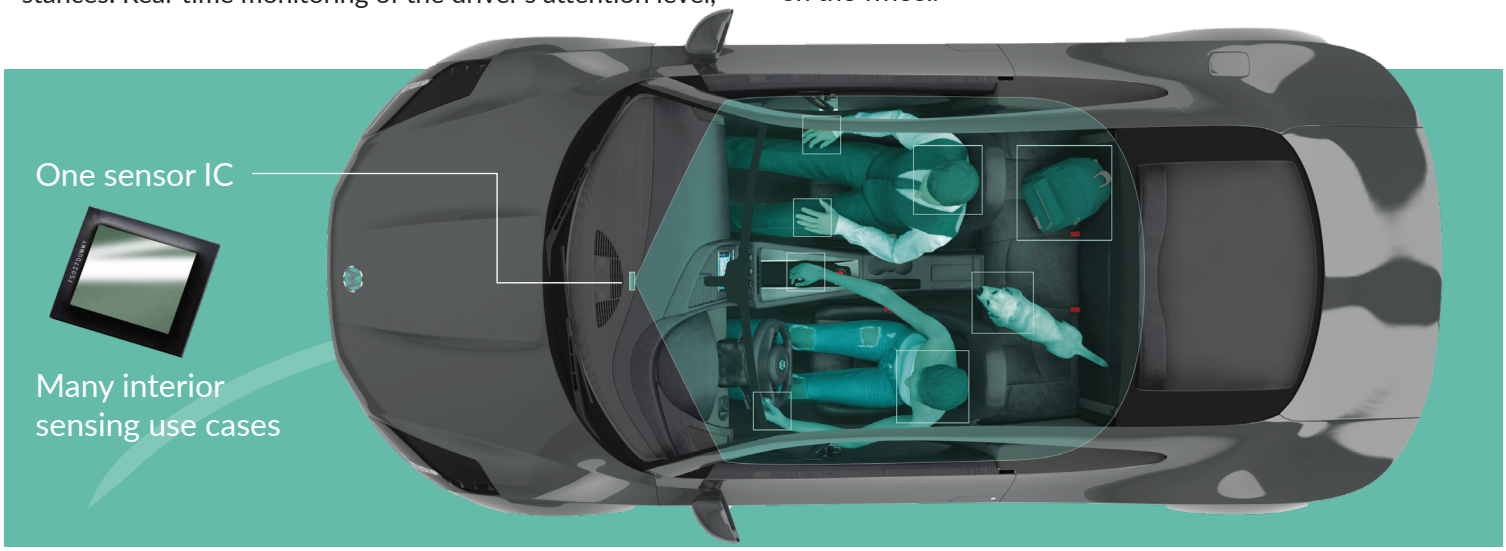


Melexis
INSPIRED ENGINEERING

DMS AND IN CABIN MONITORING WITH A 3D TIME-OF-FLIGHT CAMERA

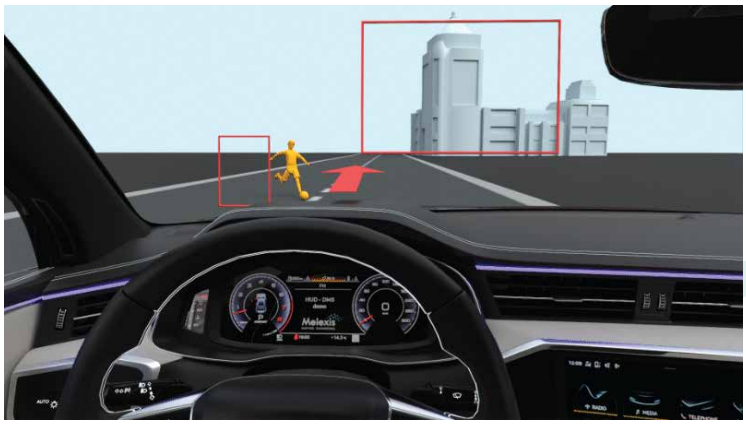
Nowadays cars are only partially autonomous. The NCAP safety organizations are mandating driver monitoring systems (DMS) to detect driver fatigue. Furthermore, the industry is advancing towards greater levels of automation in the coming years, but even with greater levels of automation, the driver will still need to be able to take control in certain circumstances. Real-time monitoring of the driver's attention level, position, and movements is therefore crucial. ToF technology is used today for gesture recognition. The potential scope of ToF, however, goes way beyond this use case: ToF cameras are able to map a driver's hands position, head position and upper body position in 3D, so that it can be ascertained if the driver is facing the road ahead and if their hands are placed on the wheel.



Emotion3D and Melexis have joined forces to create advanced driver monitoring system (DMS) demonstrator based on Melexis 3D ToF evaluation kit. The demonstrator shows Emotion3D's attention-monitoring technology using Melexis automotive qualified 3D ToF sensors. It enables robust head tracking, eye gaze and eye closure for in-cabin driver monitoring.
The DMS data is then used inside of an adaptive HUD application to align the 3D HUD elements with the real world objects.

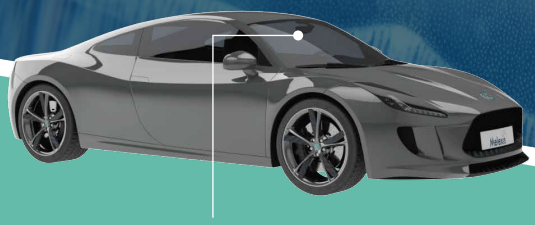
Solution benefits:

- 3D eye position tracking improves eye detection availability, eye state and eye gaze accuracy.
- Higher flexibility for different camera mounting positions (dashboard, rear view mirror, A-pillar...) and car types due to 3D head position detection.
- Extended head orientation range.
- Proven robustness versus sunlight (120 klux)



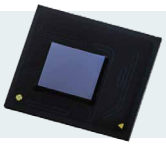
Without DMS alignment

With DMS alignment



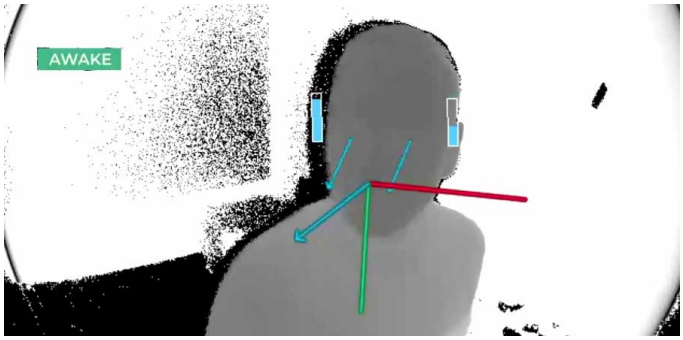
DRIVER MONITORING SYSTEM WITH 3D TIME-OF-FLIGHT SENSOR

Gen3 time-of-flight sensor

Feature	Gen 3 QVGA MLX75026	Gen3 VGA MLX75027
Resolution	320 x 240	640x480
Maximum modulation frequency	100 MHz	
Maximum FPS	180	120
Package		

Note: "Optional IRBP filter" & "Safety Manual available"

Head pose, eye gaze and eye closure overlay



EVK order codes

Feature	Part number	FOV	Wavelength	Illumination
Gen 3 QVGA	EVK75026-110-940-2	110°	940 nm	VCSELs
Gen 3 VGA	EVK75027-110-940-2	110°	940 nm	VCSELs

Contact Emotion3D for an eye-tracking software license (**office@emotion3d.ai**)

Key benefits

Time-of-flight sensors:

- Fast read-out time and high FPS
- Sunlight invariance and robustness
- Operating temperature up to 105 °C ambient temp.
- Automotive grade, reliable CMOS process
- Safety manual for ASIL rated applications

DMS software:

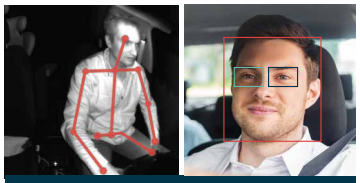
- Gaze tracking
- Wide head-movement range
- Free positioning of camera
- Real-time 3D gaze vector

Comfort & UX

- Hand position detect
- Hand gestures
- Intuitive HMI, pointing finger
- Object detection, parcel classification
- Face and body recognition

Safety L3/L4 Legal, NCAP

- Driver monitoring, eye gaze/open/close ...
- Driver activity detection
- Hand-on wheel
- Occupant classification, head & body pose
- Advanced seatbelt detection



Security

- Anti-spoof (2D+3D based) face and body recognition
  - access control
  - secure authentication

Autonomous vehicles

- Blindspot detection
- Collision avoidance
- Autonomous parking
- Vehicle exterior cocoon
- Smart access

More about our products and solutions

Europe, Middle East and Africa
sales_europe@melexis.com

Asia and Oceania
sales_asia@melexis.com

Americas
sales_usa@melexis.com

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