

Bulletin – September 2020

Passenger Monitoring

Eye tracking, in-cabin sensing and health monitoring

What's inside ?

- Major developments in Passenger Monitoring in September 2020
- Spotlight on:
 - Bosch's tailored solution for the CV segment showcases an "attention and activity assistant"



FutureBridge

THEMES AND KEY TAKEAWAYS IN Bulletin

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Major developments in Passenger Monitoring

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Spotlight of the month



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Technology Roadmaps for Passenger Monitoring, Wellness & Safety, 29th Oct 2020

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- [Radiant presents near-infrared sensing systems for vehicle interiors](#)
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- [Seeing Machines announces embedded product strategy for Automotive DMS market](#)



Spotlights on:

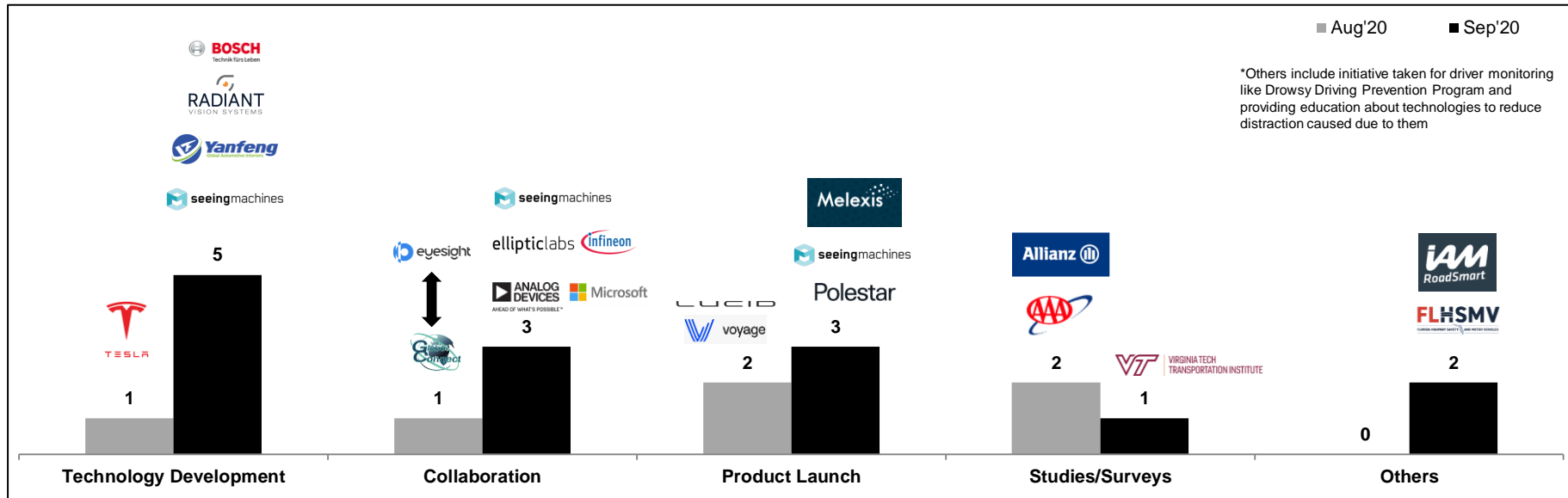
- Bosch's tailored solution for the CV segment showcases an "attention and activity assistant"

Key Takeaways

- Polestar's HMI systems like interactive voice assistants, gesture control, and displays with situational awareness may help mitigate the effect of a distraction even before occurring
- The near infrared light can be used to unobtrusively monitor driver and could be used for personalization. However, mandates are pushing the implementation of sensing technologies in vehicle
- The addition of health monitoring has a strong potential to mitigate accidents related to medical conditions and prevent incapacitated driver scenarios
- The company is reportedly marketing and addressing the growing integration challenges for driver monitoring technology faced by OEM and Tier 1 customers
- The problem addressed in the research project has focused on the individual needs of truck drivers. The aim of the project is a prototype implementation of the overall system and integration of the HMI and cockpit concept for the attention and activity assistant in a truck. The findings from such studies could help in the design and implementation of HMI systems which are considered to be causing distraction

Comparative analysis of activities – August vs September

Technology developments for driver, in-cabin and health monitoring dominated the developments in September 2020



KEY TAKEAWAYS

- The key developments we captured in September are double compared to August. The rapid increase may be due to players collaborating, launching and developing technology for Driver and in-cabin monitoring
- Traction was observed from Seeing Machines with the company signing an MOU with a semiconductor company, launched DMS kit on Qualcomm Snapdragon platform and gathered 5 Bn kilometre of driving data through its Guardian technology
- Players like AnalogDevices-Microsoft, Ellipticlabs-Infineon were seen coming together not only for driver distraction and drowsiness monitoring but also for integrating health monitoring and in-cabin sensing capabilities to their solution
- Study conducted by Virginia Tech Transportation Institute suggested that monitoring plus coaching can cut risky driving in half
- Florida Highway Safety and Motor-Vehicle remind motorists about Drowsy Driving Prevention Program on the other hand IAM RoadSmart calls for government and vehicle manufacturers to enforce greater education and familiarisation of new in-car technology from car dealers

Appendix

List of all 14 developments captured in September 2020

Sr.No.	Date	Title	URL
1	16-Sep-2020	Seeing Machines gathers 5bn kilometres of naturalist driving data through Guardian technology	Link
2	29-Sep-2020	Study Shows Monitoring Plus Coaching Can Cut Risky Driving in Half	Link
3	26-Sep-2020	Polestar Announces the Stunning Precept EV Concept Is Going Into Production	Link
4	22-Sep-2020	Analog Devices Collaborates with Microsoft to Mass Produce State-of-the-Art 3D Imaging Products and Solutions	Link
5	22-Sep-2020	Yanfeng unveils its XiM21 interior concept in Europe	Link
6	17-Sep-2020	Radiant presents near-infrared sensing systems for vehicle interiors	Link
7	18-Sep-2020	Melexis unveils new QVGA resolution time-of-flight sensor to complete its Gen 3 portfolio	Link
8	18-Sep-2020	Bosch leads project for attention and activity assistant for automated driving	Link
9	14-Sep-2020	Seeing Machines to launch DMS Kit on Qualcomm Snapdragon Automotive Platform	Link
10	14-Sep-2020	Elliptic Labs and Infineon Partner to deliver new capabilities for Automotive Markets	Link
11	8-Sep-2020	Seeing Machines signs MOU with a Semiconductor Company	Link
12	2-Sep-2020	Seeing Machines announces embedded product strategy for Automotive DMS market	Link
13	1-Sep-2020	Florida Highway Safety and Motor-Vehicle Remind Motorists About Drowsy Driving Prevention Program	Link
14	1-Sep-2020	IAM RoadSmart calls for Government and vehicle manufacturers to enforce greater education and familiarisation of new in-car technology from car dealers	Link

01

Major developments in Passenger Monitoring

Major Developments



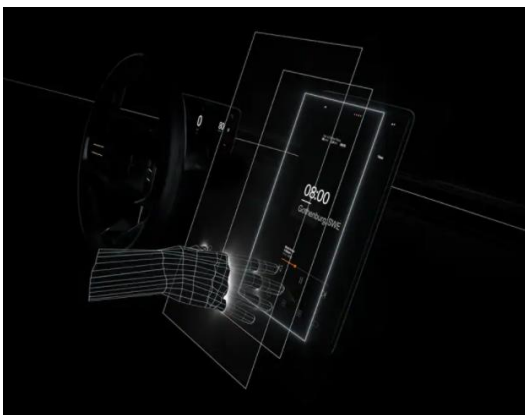
Key Takeaways

- Polestar's HMI systems like interactive voice assistants, gesture control, and displays with situational awareness may help mitigate the effect of a distraction even before occurring
- The near infrared light from Radiant can be used to unobtrusively monitor driver and could be used for personalization. However, mandates are pushing the implementation of sensing technologies in vehicle
- The addition of health monitoring in Elliptic-Infineon solution has a strong potential to mitigate accidents related to medical conditions and prevent incapacitated driver scenarios
- Seeing Machines is reportedly marketing and addressing the growing integration challenges for driver monitoring technology faced by OEM and Tier 1 customers

Geely's EV brand Polestar announces plans for Precept EV to enter production

We expect that advanced HMI systems like interactive voice assistants, gesture control and displays with situational awareness will help mitigate the effect of distraction even before occurring

Polestar



26-Sep-2020

Read this story

- Polestar has confirmed it will put the Precept into production soon but no tentative reveal date has been offered
- The vehicle has eye tracking which helps HMI knows where the driver is looking at any given time and adjusts the different in-car displays accordingly
- Also, when the screen senses that a hand is coming towards it, the screen shows more information, buttons and sliders enlarge for easier manipulation, and the screen becomes brighter. The Precept will feature Polestar's Google-powered Human Machine Interface. This system will work as a co-pilot with advanced speech technology to understand local accents. It will allow video streaming and app functions while
- Polestar has confirmed that it will produce Precept electric vehicle in China, where the company is ready to establish a new production facility

Parameters	FutureBridge Analysis
Type of Development	Technology Development Ready to put in production
Disruptiveness	High: Tried to mitigate the issue of driver distraction due to HMI systems
Timeframe	No tentative reveal date has been offered
Technology Focus	Eye Tracking

"With product development under way, Polestar confirms it will produce Precept in China, where a new production facility will be established. The aim is to ensure the facility will be carbon neutral and one of the most intelligent and connected automotive production facilities in the world. China is a home market for Polestar and we recognise the increasingly important drive for greater sustainability here. With this new factory, we will again raise the bar, aiming to produce the most advanced and premium electric car in China with the lowest carbon footprint."
 - Thomas Ingenlath, Polestar CEO



Analyst Comment

- As screens keep getting bigger, as their resolution improves, and as more and more functions are integrated to improve the in-car experience, displays in cars are less about important information and more about how colourful, interactive which could lead to distraction
- According to Polestar, it understands that as screens in vehicles become more popular, so does the potential risk of being distracted by them
- We expect that advanced HMI systems like interactive voice assistants, gesture control and displays with situational awareness will help mitigate the effect of distraction even before occurring

Radiant presents near-infrared sensing systems for vehicle interiors

The near infrared light can be used to unobtrusively monitor driver and could be used for personalization. However, mandates are pushing the implementation of sensing technologies in vehicle



23-Sep-2020

Read this story



- Radiant Vision Systems, a leading provider of test and measurement solutions for lighting and displays, announces that it will present at Intelligent Lighting Online
- Automotive Business Leader at Radiant, Matt Scholz, will give the company's presentation "Near-Infrared Light for In-Cabin Sensing and Driver Monitoring Systems (DMS)" during a live web broadcast
- The presentation includes a discussion of the market, forthcoming regulations, and performance considerations for near-infrared (NIR) sensing systems used in vehicle interiors
- In-vehicle sensing systems that rely on NIR LED or laser light sources function by projecting invisible light into areas of the cabin. Reflections of this light are captured by NIR sensors to map the vehicle interior as well as calculate the presence, depth, shape, and other 3D information about all occupants and objects inside

Parameters	FutureBridge Analysis
Type of Development	Product Launch Prototype
Disruptiveness	High: Mandates pushing the implementation of sensing technologies in vehicle
Timeframe	Near Future
Technology Focus	In-cabin sensing and driver monitoring



Analyst Comment

- In DMS, NIR light can be used to unobtrusively monitor driver alertness, gaze, presence, and position to prevent accidents due to distraction or drowsiness behind the wheel. In the future, such systems could be leveraged for facial recognition to enable vehicle personalization, automatically adjusting settings like seat and mirror position for each driver's personal preferences
- The European Union mandated that DMS and other safety systems be integrated into all new vehicles by 2022, and the United States is soon to follow, initiating the "Stay Aware for Everyone" (SAFE) Act of 2020
- Additionally, the European New Car Assessment Programme (Euro NCAP) has announced that it will reward manufacturers that offer Child Presence Detection as a standard feature in new vehicles beginning in 2022, (e.g., sensing systems to monitor the safety of children left unattended in cars)
- Automakers and suppliers are under pressure to implement sensing technologies quickly and effectively, with the role and performance of NIR light sources gaining new significance within the vehicle

Elliptic Labs and Infineon Partner to deliver new capabilities for Automotive

Health Monitoring has a strong potential to mitigate accidents related to medical conditions and prevent incapacitated driver scenarios



14-Sep-2020

Read this story



- Elliptic Labs announced the extension of the partnership with Infineon adding support for Infineon's mmWave Radar sensor to Elliptic Labs' Virtual Smart Sensor Hub™
- This collaboration delivers new capabilities such as breathing and heartbeat detection, in addition to Elliptic Labs' already established presence and gesture detection capacities
- Elliptic Labs' Virtual Smart Sensor Hub uses patented algorithms, proprietary machine learning tools, and sensor fusion to aggregate data output from any single-function hardware sensor, making them more intelligent
- Using these smarter sensors, Elliptic Labs-powered devices offer wellness monitoring, reduced power consumption, improved device security, and data communications, giving users devices that improve their lives with convenience, safety, and sustainability

Parameters	FutureBridge Analysis
Type of Development	Collaboration Prototype
Disruptiveness	High: Health monitoring capabilities providing safety along with wellbeing
Timeframe	Near Future
Technology Focus	Heartbeat detection, breathing, and presence detection



Analyst Comment

- Health Monitoring has a strong potential to mitigate accidents related to medical conditions and prevent incapacitated driver scenarios. In addition, the pandemic's impact will lead to a paradigm shift towards health monitoring becoming a catalyst for accelerated deployment roadmaps. However, to unleash the critical UX of driver wellbeing, cockpit hardware needs to evolve beyond driver health monitoring to prognosis
- We expect personalized health prognosis inside the car to be a core dimension of passenger wellbeing in future mobility. This reflects the shift of Unique Selling Points from vehicle ownership to personalized vehicle experiences. COVID-19 is another opportunity for companies to demonstrate their detection capabilities
- To capitalize on the paradigm shift towards health monitoring, players should invest in development of non-intrusive, highly accurate solutions which can be integrated with functionalities for safety and convenience
- Such collaborative business models to leverage expertise could shorten the time-to-market creating a USP in driver UX

Seeing Machines announces embedded product strategy for Automotive DMS market

The company is reportedly marketing and addressing the growing integration challenges for driver monitoring technology faced by OEM and Tier 1 customers



Parameters	FutureBridge Analysis
Type of Development	Technology Development Commercialized
Disruptiveness	High: Striving to address integration challenges for DMS by OEMs
Timeframe	Near Future
Technology Focus	AI-powered operator monitoring



Analyst Comment

- Seeing machines has [signed](#) a memorandum of understanding (MOU) with Occula Neural Processing Unit and the collaboration represents the third pillar of its strategy
- The company is reportedly collaborating with automotive semiconductor companies, creating new channels to market and addressing the growing integration challenges for driver monitoring technology faced by OEM and Tier 1 customers
- Further, the company is targeting to provide a complete DMS solution with software and the standalone DMS to provide better options for OEMs to choose from in case of complexity and implementation of DMS and their OTA updates
- The technology applied to the company's FOVIO chip implementations means the existing FOVIO chip customers can benefit as the processing headroom provided allows for new features to be added off the same hardware

2-Sep-2020

Read this story

- Representing a step-change in its delivery of Driver Monitoring System (DMS) technology to automotive Tier 1 supplier and OEMs, Seeing Machines has unveiled an expanded strategy and product portfolio incorporating its next-generation embedded processing pipeline technology
- The enhanced "three pillar" offering targets the rapidly growing camera-based interior monitoring market, extending cost, scalability and integration benefits for carmakers
 - 1. FOVIO Chip, newly advanced with the introduction of Seeing Machines' OcculaTM Neural Processing Unit
 - A low-friction integration pathway into any vehicle integration point, including smart-mirrors, instrument clusters, infotainment ECUs or centralized ADAS processing systems
 - OcculaTM is available for license, in ASIC form, to semiconductor companies for integration with any automotive computing platform

02

Spotlight of the month

Bosch's tailored solution for the CV segment showcases an "attention and activity assistant"



Key Takeaways

- The problem addressed in the research project has focused on the individual needs of truck drivers. The aim of the project is a prototype implementation of the overall system and integration of the HMI and cockpit concept for the attention and activity assistant in a truck. The findings from such studies could help in the design and implementation of HMI systems which are considered to be causing distraction

SPOTLIGHT

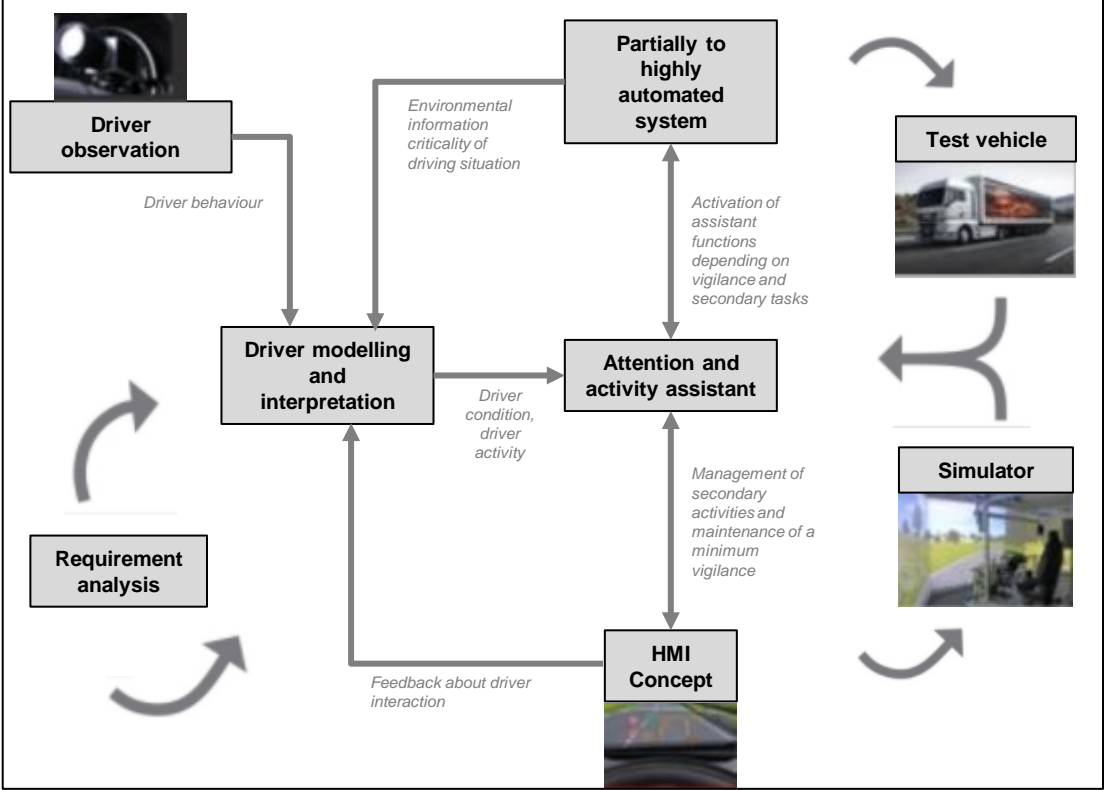
Bosch's tailored solution for the CV segment showcases an "attention and activity assistant" (1/2)

The name TANGO stands for "technology for automated driving that is optimized in a user-friendly way"

 <p>BOSCH Technik fürs Leben Project Manager</p>		
 <p>VOLKSWAGEN ARTIENGESELLSCHAFT Project Partner</p>	 <p>Universität Stuttgart KTO Project Partner</p>	 <p>MAN Project Partner</p>
 <p>HOCHSCHULE DER MEDIEN Project Partner</p>	 <p>spiegelinstitut Consumer Research & User Experience Consulting Associated Project Partner</p>	 <p>CanControls THE ART OF TRUCK UNDERSTANDING Associated Project Partner</p>

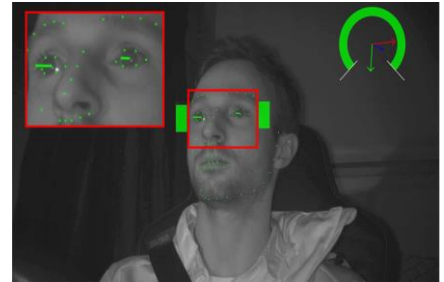
- Bosch announced that it is a consortium leader for the publicly funded project - TANGO, with partners Volkswagen, MAN Truck & Bus, University of Stuttgart, Hochschule der Medien, Spiegel Institut, and CanControls. The project focused on partially and conditionally automated driving (SAE Levels 2 and 3)
- It produced a prototype for an "attention and activity assistant", a virtual companion that keeps the driver alert and counteracts fatigue
- In addition, the research project installed sensors to monitor the interior and combined them with artificial intelligence methods. Cameras detect if the driver's eyes are closing, if they are blinking frequently, are losing sight of the road, or even if their head is drooping to the side with fatigue. Intelligent algorithms evaluate the images, interpret them, and launch countermeasures. These might be a warning, an offer to perform a secondary activity, or an active intervention such as braking

Overview of the Tango project with the "attention and activity assistant" as the central element of the overall system



SPOTLIGHT

Bosch's tailored solution for the CV segment showcases an "attention and activity assistant" (2/2)



Parameters	FutureBridge Analysis
Type of announcement	Technology development Prototype
Disruptiveness	High: Regulation is pushing the installation of DMS in trucks and cars.
Timeframe	Near Future
Technology Focus	HMI systems like voice control and displays

Analyst Comment

- The focus of the TANGO project reportedly is the development of an "attention and activity assistant" which provides the driver with various secondary tasks, taking into account the current driver status, the driving situation, the level of assistance, and the interaction channel used
- The project combines environment sensors with interior sensors and HMI concepts. The problem addressed in the research project has focused on the individual needs of truck drivers. The aim of the project is a prototype implementation of the overall system and integration of the HMI and cockpit concept for the attention and activity assistant in a truck. The findings from such studies could help in the design and implementation of HMI systems which are considered to be causing distraction
- Considering driver monitoring in commercial vehicles, we expect the use of aftermarket Driver monitoring systems in commercial vehicles may be fastened as regulation is pushing the installation of DMS in trucks and cars. Asia Pacific is expected to have substantial demand owing to China and Japan enforcing the use of DMS in commercial trucks. Europe is also likely to experience the same due to legislation that will make DMS a standard feature in new trucks, vans, and buses from 2022. DMS software suppliers that are operating in commercial vehicle such as Seeing Machines, Eyesight, Xperi maybe be beneficial to meet the basic regulatory requirements at a lower price

“ In partially automated driving as per SAE Level 2, the driver must be prepared to intervene at any time; in conditionally automated driving as per SAE Level 3, only when necessary. The objective is to keep the demands placed on the driver at the optimum level so that they are always capable of taking control. In the future, a vehicle will have to interact with the driver and serve as a partner. Perfect interaction between vehicle and driver requires operation to be simple, intuitive, and inviting
 - Bosch project manager Michael Schulz. ”



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