Toyota IP Solutions and IUPUI Issue First Commercial License for Automatic Emergency Braking Safety Testing

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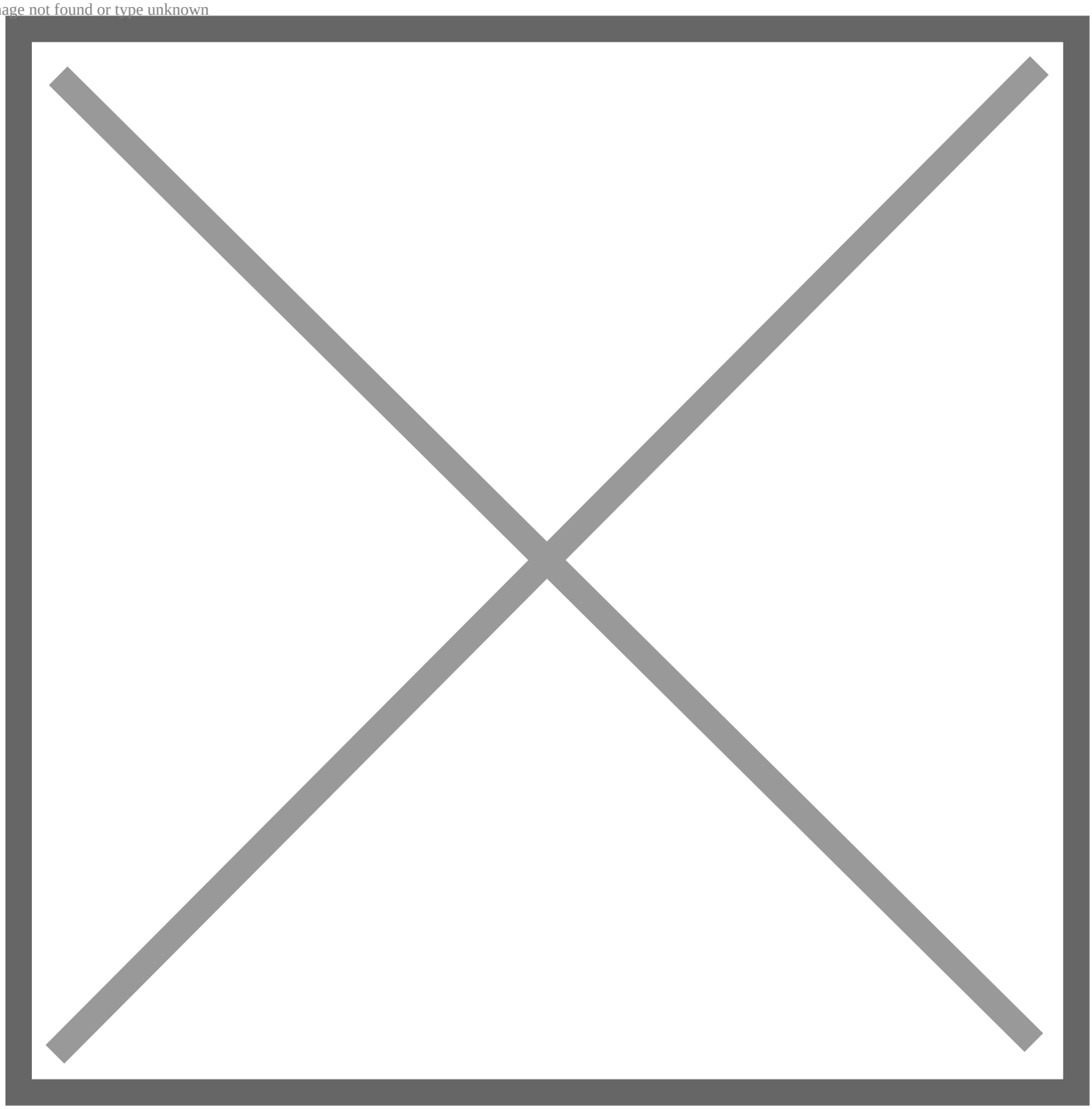

INDIANAPOLIS (July 22, 2020) – Toyota and Hebei Pride today announced a new license agreement to commercialize standardized safety testing systems for the development and validation of automotive automatic emergency braking (AEB) systems. The agreement is the first license from Toyota IP Solutions, which launched in late 2019 to broaden access to Toyota's world leading patent portfolio.

The testing technology, which was also utilized by SAE International as the baseline to develop overall standards for pedestrian and bicyclist AEB testing, represents an industry breakthrough that will help drive greater innovation in a key area for automotive safety. It covers the design and standard testing methods behind pedestrian and bicyclist mannequins of different shapes and sizes, surrogate concrete dividers, guardrails and grass that can be used as impact targets to test AEB systems. The technology was developed and patented through a partnership between the Toyota Collaborative Safety Research Center (CSRC) and Indiana University-Purdue University-Indianapolis Transportation Active Safety Institute (IUPUI-TASI).

"Highly advanced systems are radically reshaping the transportation landscape, making drivers, occupants and vehicles into teammates – all working together safely and conveniently," said Frederick Mau, Intellectual Property Counsel and Director of Patent Licensing for Toyota Motor North America. "We are excited to partner with institutions such as IUPUI-TASI to license these safety protocols with Hebei Pride to continue our safety mission by helping to support a safe evolution to a broader mobility future."

Toyota is one of many companies that offers AEB systems that can help vehicles slow down or stop when they are in danger of hitting a vehicle, pedestrian or bicyclist in front of them. Because different systems from different manufacturers utilize a range of technologies, including radar or lidar cameras, to detect vehicles, pedestrian or bicyclists on the road ahead, it is important for testing equipment and protocols to be compatible with a wide range of detection systems.

In addition, advanced driver-assistance systems, such as road departure warning and lane keeping assistance, are designed to detect lane markings and/or road edges to help address road departure, which data from the U.S. Department of Transportation links to over half of fatal vehicle crashes. However, while these systems can be developed to recognize concrete dividers and guardrails, which follow nationwide standards, some systems cannot test against the most common type of road edge – grass – for which there is no standard.

"This new testing technology addresses gaps in evaluating and testing emerging safety technologies," said Rini Sherony, Sr. Principal Engineer. "CSRC is proud to lead this effort and our hope is that these protocols will enhance the safety of mobility and, ultimately, help the entire industry improve safety systems."

Yaobin Chen, director of TASI and Chancellor's Professor of Electrical and Computer Engineering at IUPUI, said the institute's primary goal is to conduct world-class research in connected and automated vehicles technology and intelligent transportation. He said a multidisciplinary approach has benefited its partnerships with global leaders in industry, government, academia and research.

"TASI's multidisciplinary faculty team is composed of more than 20 core and affiliated faculty members from engineering, computer science, medicine, public policy and business," Chen said. "Our faculty team has expertise across the spectrum of connected and automated vehicles, vehicle active safety and intelligent transportation."

Toyota IP Solutions Division launched in December 2019 to help companies and organizations explore its patent portfolios that range from manufacturing unique cleaning solutions to crafting custom pigments currently available for licensing. "As one of the world's leading patent providers, our intellectual property spans a wide range of technologies. We're excited that the various technologies now being offered via the Toyota IP Solutions program are not limited to the automotive industry and many can be applied to other products. There is tremendous value in our portfolio, and for Toyota, it is fitting that our first license agreement will drive safety

innovation," said Mau.

Hebei Pride signed a nonexclusive license through the Indiana University Innovation and Commercialization Office and Toyota IP Solutions to commercialize the mannequins and surrogates, becoming the first license executed for any products developed through the Toyota IP Solutions platform. "Toyota revealed this new IP solutions program to license its Intellectual Property to interested parties. It is intended to help promote and serve as an access point for the licensing of patents to US and global companies."