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North American Commercial Vehicle Show Bosch demonstrates future commercial vehicle technology

Automated, connected and electrified technologies empower the drive – today and tomorrow

- ▶ Bosch debuts largest freely programmable connectivity cluster that enables the connected cockpit of the future
- ▶ Powertrain solutions include innovative diesel hybrid system and DOE project evaluating commercially-viable, plug-in hybrid electric vehicle
- ▶ Demo truck showcases future technologies, including technologies on the path to automated driving

ATLANTA – Bosch is turning the truck into a technology showpiece. At the North American Commercial Vehicle Show (NACV), Sept. 25-28, in Atlanta, the supplier of mobility technology and services will feature its diverse portfolio of commercial vehicle solutions and showcase a demonstration truck highlighting a number of technologies. Automated, connected and electrified technologies enhance safety, increase comfort and improve efficiency on the road today and pave the way for even more technology breakthroughs in the future.

“The commercial transport sector is rapidly evolving and Bosch is paving the way for the future” said Jason Roycht, vice president of the Commercial Vehicle & Off-Road business unit in North America. “Our commercial vehicle systems include innovative technologies that make vehicles more electrified, efficient, connected and automated. This is made possible by features like real-time communication devices, advanced connectivity capabilities and sophisticated powertrain options.”

Connectivity solutions enable integrated and secure fleets

Digitalization is increasingly changing the driver’s cab. The tasks previously carried out by static display instruments are being increasingly handled by displays. At NACV, Bosch will debut its **15-inch freely programmable cluster**, the largest digital cluster available for the commercial vehicle industry. The optically-bonded screen creates stunning clarity for the safe display of relevant

information to drivers. The display enables future safety and automated solutions as it is easily integrated with advanced driver assistance technologies. Bosch's 15-inch monitor has two variants, one in landscape mode as a dashboard solution and another in portrait mode as part of a mirror camera system that can replace side mirrors and improve vehicle efficiency by reducing drag.

Due to connectivity the truck will become a 40-ton smart device. The **Bosch Central Gateway (CGW)** enables secure connectivity in commercial vehicles. It is the central communication node that acts as a router for in-vehicle communication and through the connectivity control unit (CCU) to the outside. It is the gate for all data coming into the vehicle and is secure through security functions such as firewall and intrusion detection. ETAS and ESCRYPT (both parts of the Bosch Group) provide the necessary transmission and encryption technologies that ensure functional safety and data security.

Powertrain systems for tomorrow – and for today

At NACV 2017, Bosch will showcase several future-focused powertrain concepts of tomorrow engineered to save fuel and money while extending the lives of fleets. The **eCity Truck** is an innovative diesel hybrid system that is a flexible and scalable solution allowing easy integration of an **electric axle (eAxle)** into light commercial vehicles to enable the easy conversion of a traditional diesel truck platform to a diesel-electric hybrid truck. The eAxle is a scalable, modular platform with the motor, power electronics, and transmission form one compact unit.

To further reduce fuel consumption, the eCity Truck platform can also seamlessly integrate **48-volt technology**. The Bosch boost recuperation system enables the provision of a 48V electrical accessories as well as energy recovery and smooth, efficient functions such as start-stop.

Bosch is also developing deeply integrated systems for the future that will offer even greater fuel savings. The U.S. Department of Energy (DOE) awarded a team led by Bosch up to \$5 million dedicated to the development and demonstration of a commercially-viable, plug-in hybrid electric vehicle (PHEV) powertrain for medium-duty vehicles typically used in delivery vehicle fleets as part of the **Medium-duty Urban Range Connected Extended Powertrain (MURECP)** project. At NACV, Bosch will present progress to-date on the project as part of a comprehensive view of the future of the commercial vehicle powertrain.

Progress on the MURECP project includes the **advanced dual-planetary gear transmission (e2PG)** featuring multiple clutches that reduces fuel consumption

by more than 50 percent on a real-world drive cycle. The design calls for a scalable battery that makes an all-electric driving range feasible, enabling zero local emissions driving in city centers. Targeting CV delivery trucks, the e2PG powersplit/multi-mode transmission architecture allows for an efficient downsizing of an internal combustion engine via deep integration of two electric motors, resulting in reduced fuel consumption while still maintaining or even improving the overall performance of the vehicle.

As Bosch develops the commercial powertrain system of the future, components in the Bosch portfolio are paving the way. The Bosch **vehicle control unit (VCU)** for Commercial Vehicle and Off-road vehicle application enables the development of future technologies, not only for powertrain diversification, but also for automated driving functionalities as well as connected functionalities. The VCU offers one scalable electric/electronic (E/E) architecture to handle the increased number of calculation-intensive and cross-domain functionalities within continuously evolving efficient, connected and autonomous vehicle.

Whether a traditional internal combustion engine, hybrid-electric or electric vehicle, **thermal management** has emerged as a key topic for managing vehicle efficiency. At NACV, Bosch will demonstrate technologies it has developed to manage heating and cooling vehicles. Bosch is working to efficiently manage the heat flow and avoid wasting energy, ultimately improving fuel efficiency of internal combustion engines or increasing the range of electric and hybrid-electric vehicles. The example thermal system will show Bosch fans, pumps and valves for optimizing energy management throughout the entire vehicle - including solutions for highly efficient heating and air conditioning that satisfies all comfort needs.

The innovative **Electronically Commutated Actuator (ECA)** is a Bosch brushless direct current (BLDC) electric motor platform designed specifically for actuation tasks in commercial vehicle applications and environments. Newly designed from the ground up, the ECA actuator performs very precise and high dynamic actuation tasks in the rough environments of engine compartments, chassis and powertrain applications.

Driver assistance systems help drivers stay safe; pave the way for automated driving

Bosch's driver assistance systems actively support the driver to enhance driving comfort and improve safety on the path to automated driving. Bosch has an expansive catalogue in this space, including ultrasonic, radar and video sensors as well as steering solutions. The latest generation of the Bosch **multi-purpose camera (MPC)** is a scalable, monocular camera platform for video-based driver

assistance systems that make driving safe and more comfortable. The MPC integrates a wide range of driver assistance functions into vehicles using only one sensor.

Another key enabler for driver assistance technology is the **Servotwin steering system**, a steering technology pre-requisite needed for automated driving. The Servotwin enables automatic steering for functions such as lane-keeping assistance and cross-wind compensation. The Bosch demonstration truck will feature how the Servotwin and multi-purpose camera work together in lane-keeping functions.

Bosch will be showcasing technologies for the commercial vehicle industry September 25 – 28 in booth 2410 located in Hall B, Level 4 at the Georgia World Congress Center.

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About Bosch

Having established a regional presence in 1906 in North America, the Bosch Group employs nearly 32,800 associates in more than 100 locations, as of December 31, 2016. In 2016 Bosch generated consolidated sales of \$13.7 billion in the U.S., Canada and Mexico. For more information, visit www.boschusa.com, www.bosch.com.mx and www.bosch.ca.

The Bosch Group is a leading global supplier of technology and services. The company employs roughly 390,000 associates worldwide (as of December 31, 2016) and generated sales of 73.1 billion euros (\$80.9 billion) in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected industry. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to create solutions for a connected life, and to improve quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs 59,000 associates in research and development.

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