Ford Studies Space Robots for Connected Vehicle Communications

- Ford begins three-year research project with St. Petersburg Polytechnic University in Russia to observe the communication models of robots in space, with potential for connected vehicle communications applications

- By studying communication between robots on the International Space Station and with Earth, the project aims to improve the reliability of connected vehicle communications and aid in the advancement of emergency vehicle communication methods

- Ford is analyzing the most robust and reliable global telematics networks to help reduce traffic accidents; ease congestion; and provide faster, more accurate EMS response through vehicle-to-cloud, vehicle-to-infrastructure, vehicle-to-vehicle and other communications

Ford is studying communications between space robots and Earth to enhance future applications of the connected car communications protocol. The research furthers the company’s commitment to industry leadership in the development of connected vehicle communications to help reduce traffic congestion and aid in the advancement of emergency vehicle communication methods.

Just one way Ford is making good on this commitment is through the launch of a three-year research partnership with the telematics department of St. Petersburg Polytechnic University in Russia in its association with that country's space industry. The goal of Ford’s relationship with the university is to analyze space-based robotic communications systems for vehicle mesh networks to aid in mobility solutions.

The development of connected vehicle communications has the potential to reduce traffic accidents and ease congestion by enabling vehicles to communicate with each other, and to communicate with buildings, traffic lights, the cloud and other systems to deliver a message or detect and respond to imminent collision warnings.
“Ford has been committed to the research and development of connected vehicle communications for more than a decade,” said Paul Mascarenas, chief technical officer and vice president, Ford research and innovation. “Our participation in this research can aid in the development of next-generation Ford driver-assist technologies. These technologies will globally benefit Ford customers, other road users and the environment.”

**Emergency situations**

One promising development from Ford’s research project with St. Petersburg Polytechnic University is the advancement in emergency vehicle communication methods. Ford is analyzing how emergency messages should be sent to ensure delivery if network failures were to occur, identifying the systems and methods that provide redundancy in case of primary delivery failure.

For example, if an accident were to cause vehicle-to-cloud communications (V2C) to be broken, a vehicle may still have access to a vehicle-to-vehicle (V2V) communications network. An emergency signal message could potentially be sent through V2V to a vehicle nearby, and then between vehicles and infrastructures until it reached EMS.

“The research of fallback options and robust message networks is important,” said Oleg Gusikhin, technical leader in systems analytics for Ford. “If one network is down, alternatives need to be identified and strengthened to reliably propagate messages between networks.”

**Space telematics**

Telematics – the long-distance transmission of digital information – developed for use on space stations provide excellent potential for improving the reliability of future vehicle-to-cloud, vehicle-to-infrastructure, vehicle-to-vehicle and other forms of communication (V2X). The communications blend multiple networking technologies including dedicated short-range communication (DSRC), cellular LTE wireless broadband and mesh networking to ensure robust and reliable connectivity for optimum signal strength for critical messages.

Using the knowledge accrued from analyzing the space robots, Ford engineers could then develop an algorithm that is integrated into the V2X system resulting in a message that would route through the appropriate network depending on the level of its importance. An emergency message, for example, may be communicated through the faster mesh network, whereas an entertainment-related message would route through a vehicle-to-infrastructure application, an embedded device or a brought-in device network.

“We are analyzing the data to research which networks are the most robust and reliable for certain types of messages, as well as
fallback options if networks were to fail in a particular scenario,” said Gusikhin. “In a crash, for example, a vehicle could have the option to communicate an emergency through a DSRC, LTE or a mesh network based on the type of signal, speed and robustness required to reach emergency responders as quickly as possible.”

The specific space robots leveraged for Ford’s telematics analysis include the JUSTIN Humanoid, EUROBOT Ground Prototype and NASA Robonaut R2.

Click here for a video on how Ford is studying space robot communications.

**Blueprint for Mobility**

Findings from this work could potentially enhance Ford’s wireless communication technologies and Blueprint for Mobility. Ford’s Blueprint for Mobility details the company’s vision on how to tackle the issues of mobility in an increasingly crowded and urbanized planet between now and 2025.

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**About Ford Motor Company**

Ford Motor Company is a global automotive and mobility company based in Dearborn, Mich. With about 199,000 employees and 67 plants worldwide, the company’s core business includes designing, manufacturing, marketing, financing and servicing a full line of Ford cars, trucks, SUVs and electrified vehicles, as well as Lincoln luxury vehicles. At the same time, Ford is aggressively pursuing emerging opportunities through Ford Smart Mobility, the company’s plan to be a leader in connectivity, mobility, autonomous vehicles, the customer experience and data and analytics. For more information regarding Ford, its products worldwide or Ford Motor Credit Company, visit [www.corporate.ford.com](http://www.corporate.ford.com).