

International Collaboration on Vehicle Safety and Automation



Technological advancements are increasing at an exponential rate through both public and private research and development, which is typically stimulated by governmental strategic initiatives that address industry-wide target objectives. However, artificial barriers based on political and financial considerations can hinder the ability of engineers, scientists and researchers to work together to advance the state of the art through international collaboration.

Intelligent Vehicle Systems (IVS)

Intelligent Vehicle Systems (IVS) is a global industry with many stakeholders conducting R&D to make vehicle platforms safer, more mobile, greener and more economical. IVS research is being conducted in the following areas:

- Automotive
- Heavy Equipment
- Transit
- Agriculture
- Construction
- Mining/Demining
- Manufacturing
- Space
- Entertainment
- Law Enforcement
- Homeland Security
- Military

Government-sponsored IVS R&D is typically designed to address specific regional problems; however, some work has broad application and is being conducted simultaneously in many locations around the globe. To consolidate and focus these efforts, an international team of experts could be assembled to work together on solving the common problem. If programmatic and financial issues can be resolved, the science could be advanced further in less time and with less overall funding.

Existing International Collaboration

In September 2007, Southwest Research Institute® (SwRI®) in the United States and the Institut National de Recherche en Informatique et en Automatique (INRIA) in France signed an international collaboration agreement to advance vehicle automation technologies, focusing on the following areas:

- Perception
- Intelligence
- Communications
- Command and Control
- Platforms
- Vehicle Safety

SwRI is one of the oldest and largest nonprofit applied R&D organizations in the United States, and INRIA is a French national institute that conducts fundamental and applied research in information and communication science and technology.

SwRI and ARMINES (specifically, the CAOR Robotics Lab, a research center of ARMINES and Mines ParisTech) signed a similar collaboration agreement in February 2008.

Through the open exchange of ideas, intellectual property and staff, these collaborations have already advanced the state of the art in vehicle safety and automation technology. An example of these joint R&D efforts is described below and in the illustration.

Cooperative Sensor Sharing

The joint SwRI-INRIA system increases a vehicle's situational awareness by allowing it to use another vehicle's sensors as if it were its own to detect a pedestrian soon to be in the vehicle's path, using low-latency communications. This system was demonstrated in 2008 in Versailles using INRIA's CyCabs platform and a Wi-Fi communications channel, and in New York City using SwRI's full-size autonomous vehicle and a 5.9-GHz dedicated short-range communications (DSRC) channel.

These activities demonstrate that multinational collaboration on IVS R&D is possible and advantageous to government and industry.

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Joint SwRI-INRIA Cooperative Sensor Sharing System Scenario



New York City, USA

Versailles, France

- Pedestrian is crossing street in crosswalk in front of stopped vehicle with traffic moving through intersection in other lanes.
- Oncoming vehicle detects motion of pedestrian and communicates pedestrian's location, speed and heading to other vehicles in area.
- Second vehicle (which cannot detect pedestrian) receives message and determines if there is a threat of collision with pedestrian.
- If there is a possibility of collision, vehicle will slow down and eventually stop at crosswalk.



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