Matt Barth

PRESIDENT'S MESSAGE

Connected and Automated Vehicles

If you are engaged in any kind of Intelligent Transportation System (ITS) activities these days, it is hard not to hear about the emergence of "connected" vehicles as well as the promise of future "automated" vehicles. These two hot topic areas are at the forefront of ITS research and it is reflected in many of our recent conferences.

This last October, the IEEE ITS Society held its annual ITS Conference in Qingdao, China (see http://www.itsc2014.org/). This conference was a huge success with over 820 submitted papers resulting in nearly 500 presentations over a four-day period. Attendees came from around the world, representing 40 different countries. In addition to the great paper presentations, the conference held two tutorials, nine workshops, and nine special sessions. I was amazed by the breadth of ITS research topics and the quality of all of the presentations. As expected, there was quite a bit of discussion on vehicle automation, vehicle communications, and similar topics.

More recently, I attended the IEEE International Conference on Connected Vehicles and Expo (ICCVE, see http://www.iccve.org/), another conference sponsored by our ITS society. In just a few years, this conference has emerged as one the key venues for learning about the latest in connected vehicles and automation. In addition to the technical presentations, there were also a number of plenary sessions and forums that took place where experts from around the world not only talked about technical issues, but also policy and social issues associated with clean, connected, and automated vehicles.

It is interesting to note that "automated" vehicle research and "connected" vehicle technology emerged somewhat separately, but are now often discussed as an *integrated* research area. First off, automated vehicle research has been going on for over three decades. Fully autonomous driving has been demonstrated in a variety of environments, some of the more visible demonstrations were the DARPA Grand Challenge and Urban Challenge that took place in the late 2000s where fully autonomous vehicles were able to traverse both an open-road course as well as in an urban environment. This was quickly followed by Google demonstrating their autonomous vehicles on roads in California and Nevada. Several vehicle manufacturers have now set timelines on producing autonomous vehicles within the next decade. It is important to note that these automated vehicle efforts rely mostly on on-board sensors and computing, allowing the vehicles to drive "autonomously", with little or no communication with other vehicles or the infrastructure.

On the other hand, "connected" vehicle research emerged in the last decade as an effort to improve vehicle safety, traffic mobility, and to reduce environmental impacts. By allowing vehicles to communicate with each other (i.e., V2V communication), with the infrastructure (i.e., V2I and I2V communication), and with other

entities (e.g., pedestrians as part of V2X communications), numerous applications are now emerging that show great promise in terms of safety, mobility, and environmental improvements. There are now sizable connected vehicle research and deployment efforts in Europe, Asia, and North America.

By themselves, autonomous vehicles are somewhat easier to deploy because they don't involve complicated interactions with other vehicles or the infrastructure; nonetheless, they probably won't lead to significant improvements in traffic mobility, safety, or environmental impacts. However, the *intersection* of automated vehicles and connected vehicles shows great promise of improving traffic efficiency, allow for greater safety benefits, and can reduce environmental impacts. Together, both connected and automated vehicle research will lead to significant changes in our transportation future. Stay tuned, the IEEE ITS Society will be at the forefront of this exciting area.

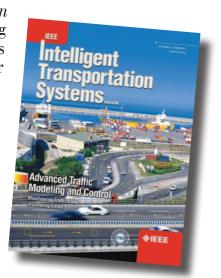*Matt Barth*
IEEE ITSS President, 2014–2015

ITS

Chess Puzzle Solution
Solution: 1. Rh8. No matter what Black tries after White's Rook takes h8, White will take victory. For example, if Black's King took the Rook on h6, the Queen would mate with Qg5#.

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