



TEXAS TECHNOLOGY TASK FORCE

Meeting: Texas Technology Task Force, Phase III, Meeting I

Date: Monday, May 11, 2015 | 9:00am – 5:00pm

Location: TxDOT 125 E 11th Street, Ric Williams Room

In Attendance: Darran Anderson, TxDOT; Kent Marquardt, TxDOT; Stacey Strittmatter, TxDOT; Thomas Bamonte, NTTA; Mike Heiligenstein, CTRMA; Michael Morris, NCTCOG; Shelley Row, Shelley Row Associates LLC; JD Stanley, Cisco; Srimat Chakradhar, NEC Labs; Skip Yeakel, Volvo; Brad McDonald, Stratasys Direct Manufacturing; Eric Jackson, Stratasys Direct Manufacturing; Alvin Brunner, FAA; Karen Ulferts, AUVSI; Josh Johnson, SwRI; Josph Kopser, RiseScout; Eric Hoel, ESRI; C. Michael Walton, UT-Austin, Andrea Gold, UT-Austin; Kristie Chin, UT-Austin

Project Overview – *Andrea Gold & Kristie Chin, UT-Austin*

- The Texas Technology Task Force (TTTF) started Phase I in 2013. The group is currently working on Phase III.
- Accelerate Texas was a product of Phase I of TTTF which included the Strategic Planning Initiative. The group paused for the Texas Department of Transportation (TxDOT) Sunset Review. It started again in September 2014.
- The UT research team plans to schedule the next meeting for August 2015 with a follow up meeting in the fall of 2015.
- During Phase I, the TTTF focused on four main groups:
 - Connected Vehicles
 - Several different kinds of Connected Vehicle programs were studied.
 - Automated Vehicles
 - Automated Vehicles from Level 0 – Level 4 were reviewed.
 - Electric Vehicles and Systems
 - This includes projects like one studying whether electric cars can be charged as they are being driven down certain kinds of roads. They also studied alternative methods of powering vehicles.
 - Cloud Computing
 - This area covers big data, cloud computing, crowd sourcing.
- The research group also studied combining these new technologies to see which produced the synergistic benefits. The top level would be fully automated and connected vehicles, which they dubbed, the “Automated Highway System.”
- During Phase II, TTTF developed the vision, mission, and goals for the task force. They also prepared an outline for the business plan.
- During Phase III, they will be updating the Emerging Technology Portfolio to encompass multimodal applications. This includes next generation vehicles, infrastructure and construction, materials and additive manufacturing, information and communications, service-based platforms, and other technologies.
- The critical technologies to be studied during the first meeting include:
 - Automated Freight
 - Connected Vehicles
 - 3-D Printing
 - Unmanned Aviation Vehicles (UAVs) and
 - Big Data
- The goals for the meeting included determining priorities and providing new topics for white papers.

Updates on Strategic Initiatives – Kent Marquardt

- The mission for the newly formed Office of Strategic Planning (OSP) includes finding more cost effective, efficient, and sustainable transportation opportunities. These could potentially include initiatives like fuel-efficient vehicles and ways to reduce the number of vehicle miles traveled.
- OSP will be working with the Commission to develop the future focus of the office this summer.
- After Kent's discussion, it was asked if these technology solutions are serving the customer. The response was that the market would decide.

Transformative Topic: Revolutionizing the Global Logistics Industry – Skip Yeakel, Volvo

- Mr. Yeakel represents Volvo and pointed out that Volvo is an American made trucking company. They are very focused on customer needs.
- The latest technology they are pursuing is a connected vehicle strategy. This strategy breaks down into three parts:
 - Connected to Support: Remote diagnostics allows the trucks with maintenance issues to be repaired as quickly as possible. This has reduced the average uptime by one day per event.
 - Connected Vehicles to the Road: The vehicle remembers frequent routes to use fuel in the most efficient way possible. The vehicles can also use kinetic energy from the trip to help power the vehicle. These innovations save 5% of fuel costs.
 - Connected to Each Other: This includes Volvo's Vision 2020 plan to have semi-automated trucks on the road by 2020.
- The improved service professional will fix Volvo trucks much faster than in the past.
- The trucking industry uses the same technical language that was decided in the 1980s. This allows new innovations like current safety features to be adopted across many companies very quickly.
- A question from the group asked, "What is the likelihood of transferring platooning tech to personal motor vehicles?" The response was that it could become a reality because of the work being done at Trusted Truck Technology (TRB) in Knoxville, TN.
- It was pointed out that Federal regulations may be behind technologies. The distance required between trucks and vehicles is no longer necessary. Mirrors on trucks are really no longer needed due to the cameras on trucks.

Transformative Topic: Revolutionizing the Global Logistics Industry – Brad McDonald & Eric Jackson, Stratasys Direct Manufacturing

- Chuck Hall of 3-D Systems started making 3-D printers in the mid-1980s.
- All of the technologies used at Stratasys are available to see at the Belton, TX facility.
- The company mainly focuses on additive manufacturing. This includes adding one material at a time to make the product. They use this process to make production grade materials and supplemental materials.
- They focus on prototype pieces that are early in the development cycle.
- They have between 55-100 FOM machines. These machines can lay materials to 10,000th of an inch. The amount of time it takes to create an object depends on the complexity and size.
- They can also make items with support materials that are water-soluble. This means that once the piece is complete the support materials can be removed by placing the piece in water.
- 3-D printing will be a \$20 Billion industry by 2020.
- The objects are mostly used in product development. The aerospace industry buys a lot of 3-D printed items.
- 3-D printing also allows you to specialize any item.

Transformative Topic: Understanding the Opportunities & Challenges of Drones – Karen Ulferts, AUVSI

- This session began with a TED Talk on drones as a weapon. The TED Talk called for an international treaty for robotics weapon control and a ban on killer robots. There is a U.S. directive that every kill decision must be made by a human, but it is not a permanent directive. The speaker still wanted the U.S. to use drones and automated vehicles but he would like them to be unarmed and all contain serial numbers that can be tracked by all American citizens.
- Ronald George wants a safety warning for the UAVs in our airspace but he would also like to push the technology.
- He believes they can be used in the following areas:
 - Natural Disaster Assessment
 - Construction Monitoring
 - Accident Reconstruction and
 - Design & Asset Management
- The consensus was that TxDOT should support UAV research as long as transparency is the main priority.

Transformative Topic: Understanding the Opportunities & Challenges of Drones – *Alvin Brunner, FAA*

- He pointed out that this is another area where the regulations cannot keep up with the technology. He also explained that economics has pushed these technologies to the forefront. Safety has not always been the top concern.
- A UAV must meet the following criteria:
 - Unmanned
 - Aircraft Control System and
 - Command & Control Links
- The operations of UAVs are good for dangerous and dull tasks. Humans are not at risk. UAV operations cost less than manned aircrafts.
- U.S. air space is public space. UAVs are subject to regulations.
- He explained that the FAA knows a lot about airplanes but does not currently track information on drones. The FAA wants them to all be registered.
- FAA does not regulate model aircrafts.
- The following website was recommended for further information www.knowbeforeyoufly.org
- The FAA is currently in a rulemaking process that would require all drones to be registered and would not all drones to fly over people.

Transformative Topic: Using Big Data as a Tool for Managing Customer Relationships – *Josh Johnson, SwRI*

- With connected cars we could collect 1TB of data in 10 seconds. One month's worth of data could be stored in the world's largest database. Even if we do not save the data, we should be analyzing the data.
- As systems advance, we will be able to take the weather, events, and things like school closings into consideration to better predict traffic.
- Josh suggested an article on A.I. in the Economist.

Transformative Topic: Using Big Data as a Tool for Managing Customer Relationships – *Joseph Kopser, RideScout*

- Ridescout was launched in 2013 in Washington, DC and was recently bought by Daimler. The app compares all available modes of transportation, takes traffic and the cost of the transportation into account, and then provides the best mode of travel at that specific time and place.
- His objective includes three parts:
 - Seamless Experience – Make it as easy as possible to see all available modes at once.
 - Lifestyle Integration – Use all available data about a person.
 - Single Sign-on – Make the app easy to use.
- He is very concerned about information security. The app is PCI compliant through Braintree. The user data is anonymized to the public and the data is hosted on google cloud.

Transformative Topic: Using Big Data as a Tool for Managing Customer Relationships – *Eric Hoel, ESRI*

- Disk space is cheap, Hadoop is free, and extra commodity hardware is abundant. Though lots of data is being collected, there is not a lot of analysis.
- Most companies are waiting on finding undetected patterns in the data.
- Automated vehicles are driven by video data.
- A question was asked about RideScout using public and private data. Joseph explained that start-ups are processing public data faster than the State Government can regulate. He was surprised to find that Government camera footage is not stored because they do not want the footage to be used in a court case. They also do not want to provide this information to private companies because of the privacy loss.

Forum: Building a Strong Foundation – *Mike Heiligenstein, CTRMA*

- Mobility Authority – We will never have enough infrastructure capacity to serve the growing population in Texas.
- They are focused on
 - Cashless Tolling
 - Dynamic Tolling
 - Smart Roads and
 - Developing user-based applications to maximize capacity and change behavior.
- Metropia is a traffic management and navigation app. It reduces congestion, saves time, reduces CO₂ and GHG emissions, rewards behavior change, and provides safety feedback.
- Carma is similar to the slugging practice in DC. It will reduce or eliminate tolls for those who carpool.
- Mike H. is interested in how human behavior plays into these transportation choices. How can we influence people to make certain travel choices?

- It was suggested that instead of toll lanes we could have technology lanes to motivate people to be early adapters of connected or automated vehicles.
- It was pointed out that car turnover is between 5-7% each year so it would be a long time before there were a lot of automated vehicles on the road. It was also suggested that this new technology might influence more people to change faster similar to how quickly smart phones took over the cell phone market.
- When is the Texas state legislature going to allow automated vehicles on the road? They would like to test them on State and National holidays when there are fewer people on the road. So far the test of the cars in parking lots and test sites has gone well.
- It was asked if there are opportunities to work with other state DOTs so we are not all running the same tests.
- It was asked how we can predict what kinds of cars will be on the road in 5 years or 10 years.
- Someone suggested that connected vehicles are being pushed by regulation but that the market is pushing for automated vehicles.

Forum: Developing a Common Vision – Darran Anderson, TxDOT

- Darran explained that we have formed the TTTF so we do not wander blindly into the future. They are hoping to have a finalized KPM document by the end of the summer.
- Darran provided a list of 10 things he would like to see come out of this meeting:
 - The TTTF members to identify the leading technologies for the future.
 - He called for a research agenda and a long range strategy.
 - TxDOT has to work with the DDOs, MPOs, and local authorities to get buy in into these new initiatives.
 - He asked the industry partners to help us identify industry forums.
 - He also asked them for ideas for our communication plan. What will shape hearts and minds?
 - He asked them to identify policy areas that TxDOT can implement.
 - Establish standards for business operations / regulatory suggestions.
 - He asked if there are any environmental sustainability initiatives we should explore. Are there any infrastructure issues?
 - What kinds of training / certifications should we explore?
 - He asked for a list of potential projects. For example, one project could be what kinds of communication elements (like Google Fiber) should we incorporate in infrastructure maintenance?
 - He would like all future projects to have technology gates tied to the project gates.

Closing Remarks – C. Michael Walton

- He asked all of the team members for their thoughts and thanked everyone for participating in the meeting.