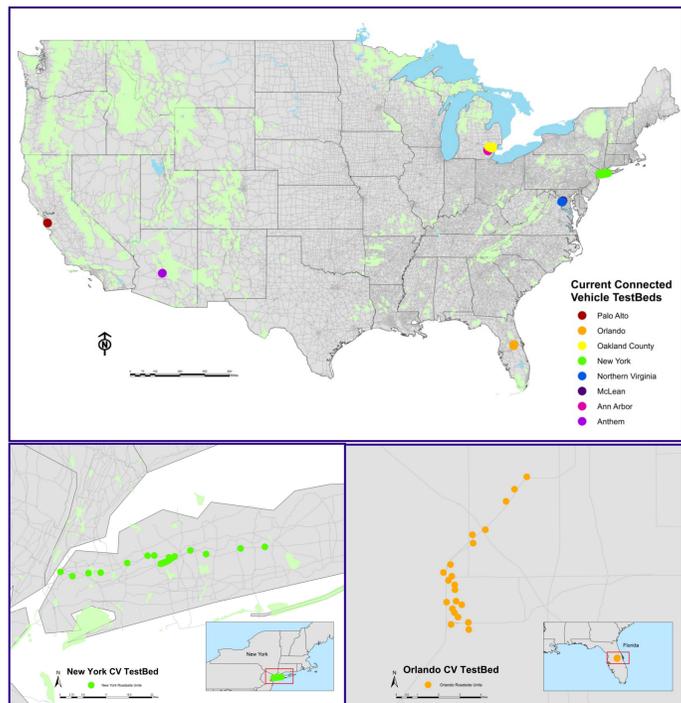


Site Suitability Analysis for an AERIS TestBed



Background

Applications for the Environment: Real-Time Information Synthesis (AERIS) is one of three Connected Vehicle (CV) programs within the USDOT. These programs examine the mitigation possibilities of the safety, mobility, and environmental impacts caused by surface transportation. The AERIS program was the focus of this research as it is the only program without a designated demonstration site (testbed). The CV programs examine the use of microwave technology to transport important messages to and from vehicles (V2V) and to and from vehicles and infrastructure (V2I). To accomplish this, the wireless technology uses as dedicated short-range communication band frequency: 5.9 GHz.

Methodology

The purpose of this research was to determine the most suitable sites for an AERIS testbed by analyzing the existing user acceptance demographics and analyzing the suitability of individual states and interstates. The first steps to accomplish this goal was to plot the existing CV testbeds as shown in the upper left hand set of maps. By plotting the existing roadside infrastructure individual areas could be examined further. The next step was to determine a base of demographic information (e.g., median age, average education level, average housing information, average income) that may have contributed to the general user acceptance among the existing testbeds. This process resulted in the second map down on the left hand side of this poster. To further determine suitable locations each state was researched for characteristics (e.g., amount of electric vehicles, average growth in vehicles per year, policies that would promote technology, average congestion reported, average environmental impacts caused by surface transportation) that would be most suitable for political acceptance and need for environmental mitigation techniques. Once each of these characteristics were examined individually a final map was created combining all of the affects, as seen in the final analysis map below. The final step was to determine the most suitable interstates that are in need of environmental mitigation techniques and could be helped by CV technologies, specifically the applications developed through the AERIS program. Characteristics were examined (e.g., average congestion, average environmental impacts, average usage, most unreliable for commuters) and helped form a ranking scheme to determine the most suitable interstates to connect the existing and potential testing sites. The resulting map can be found in the bottom left hand corner. The final step was to aggregate and overlay all of the information researched and collected to determine the most suitable sites, as found below.

Conclusions

The map to the right shows the final analysis once all the information was collected and aggregated. It was found that there are currently potentially 15 suitable sites in eight states that would not only be in need of environmental mitigation techniques but would also accept the technology. As one can see from the map, these sites can also be connected via major interstates allowing for a fully connected network. It might be assumed that once these sites establish Connected Vehicle technologies the researched and examined characteristics will change determining more potential suitable sites. Further research will need to be done to fully vet the sites found by this research; thus, this research may be established as a high-level analysis of potential sites.

