Project Title: Investigating the roles of touchscreen and physical control interface characteristics on driver distraction and multitasking performance

Principal Investigator: Thomas K. Ferris
Department/Unit: Texas A&M Engineering Experiment Station (TEES); Texas A&M University Department of Industrial & Systems Engineering
Quarter Reporting and Dates: October-December, 2014

Please provide detailed answers to the following statements or questions. If there is nothing to report under a particular item, please state “Nothing to Report”.

1. Please provide a status of the project and its’ major activities that were completed this quarter.

Since the establishment of the project in October, bi-weekly progress meetings have been held among project team members:

- PI Thomas Ferris (Texas A&M Engineering Experiment Station (TEES); Texas A&M University Department of Industrial & Systems Engineering (ISE))
- Co-PI Christine Yager (Texas A&M Transportation Institute (TTI))
- PhD Student Youngbo Suh (TAMU ISE)
- Undergraduate Student Technician I Ko-Ching (“Katrina”) Wu, who was hired in November to work on this project as a computer programmer. She joined the regular meetings in mid-November.

To date, literature review – primarily conducted by PhD student Suh - has begun and relevant articles and methods have been tabulated in an evidence table. Literature review is ongoing.

Capabilities (e.g., the availability of the planned experimental site – TAMU’s Riverside campus -, fleet vehicles, and other data collection equipment) have changed somewhat since the time of submitting the proposal. As new capabilities were realized, multiple
iterations of experimental design were completed, with methodological details documented in a report written by PhD student Suh.

We have begun an application for approval for the experiment by TAMU’s Institutional Review Board (IRB). With the methodological details now more solidly defined, this application will be submitted by the end of January 2015.

Programmer Wu has begun initial development of software interface which will be used for data collection (a tablet-based GUI of a numerical interface, with adjustable types of visual, auditory, and tactile feedback, and adjustable button sizes). A non-functioning mockup of this interface was presented in early December to PI Ferris and PhD student Suh, and modifications are currently underway, with an expected functioning prototype ready by early February.

2. Please describe any problems or delays with the project and the efforts undertaken to address them.

Because the funding for the project was not installed until October, PhD student Suh was temporarily supported by the TAMU ISEN department and thus worked on different projects until transitioning to ATLAS. Recruiting and hiring the computer programmer (Wu) was also was delayed until the funding had been put in place.

3. Faculty, students, or other personnel working on the project. Were there any changes from last quarter report?

No changes other than the addition of Undergraduate Student Technician I (computer programmer) Ko-Ching (“Katrina”) Wu.

4. Please describe planned activities for next quarter.

In the next quarter, January – March 2015, the following activities will continue/commence/be completed, with due dates and the primary responsible parties:

1) IRB application submission (by January 31) – Suh and Ferris
2) Literature review completion (by January 31) – Suh
3) Completion of working prototype of software GUI for data collection (by January 31) – Wu
4) Testing and completing revisions of software GUI (by February 28) – Wu, Suh, and Ferris
5) Writeup of Introduction and Methods for a to-be-submitted-upon-completion manuscript for a major peer-reviewed journal, such as Human Factors (by February 28) – Suh, Ferris, and Yager
6) Reservation/acquisition of the necessary vehicle, data collection equipment, and experimental site (TAMU-Riverside), aiming for a 3rd-quarter conduction of the
experiment (May-June) (reservations/acquisitions completed by March 31) – Yager and Ferris

7) Experimental preparation: printing and organizing necessary forms, recruiting participants following TAMU IRB approval, begin initial scheduling of participants (by March 31) – Suh and Yager

5. If an IRB was required for the project, what is the status of the application (please attach approval letter if not provided earlier).

An application is in progress, with submission expected by the end of January 2015.

6. What is the status of your funds? What was spent? What is remaining?
Indicate High-level Expenditures (salaries, travel, research supplies, printing, etc.)

Support for PhD student Suh has been charged for the months of October – January. Student Technician I Wu is working an hourly position with pay of $10/hour and between 5 and 10 hours a week, with an official start date of 11/17. As financial information is not yet available for the month of December 2014, the spreadsheet below illustrates all expenditures through the end of November.

<table>
<thead>
<tr>
<th>602761-00012 Ferris/Yager</th>
<th>Approved Budget</th>
<th>Expenditures to Date</th>
<th>Balance Remaining</th>
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<tr>
<td>Center Director Salary</td>
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<td>Faculty Salaries</td>
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<tr>
<td>Other Staff Salaries</td>
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<td>$3,531.00</td>
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<tr>
<td>Student Salaries</td>
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<td><strong>TOTAL Sal. &amp; Ben.</strong></td>
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</table>
7. **List any products resulting from the program during this period. Describe the product(s) and how it/they is/are being shared. For example:**

- A working document of study methodology has been formalized. It can be made available for review.
- A mockup of the experimental data collection GUI has been created. A functional prototype will be available for review in January 2015.

8. **Describe ways in which your work, findings, and specific products have had an impact during this reporting period.**

The literature review and creation of the methodological document serve to formalize the required equipment, vehicle and space resources, and experimental procedure. These products are being used to inform the IRB application and software GUI interface.

Additionally, the work of PhD student Suh prior to beginning the ATLAS project in October involved writing up the results of a previous study with similar research questions (the previous study involved investigating the role of device feedback on visual awareness in a walking-and-texting task). This experience has informed and prepared him for taking a lead role in the study design efforts. Additionally, the results of the study can be used to justify methodological decisions in ongoing write-ups for manuscripts to be submitted to major peer-reviewed journals.

9. **What organizations have been involved as partners?**

1) Texas A&M Experiment Station (TEES) and Texas A&M University: financial and administrative support for PI Ferris; PhD student Suh; Undergraduate Student Technician I Wu

2) Texas A&M Transportation Institute: support for Co-PI Yager; as-needed support for technician Jeff Miles

10. **Have other collaborators or contacts been involved? For example, describe any significant:**

- Ko-Ching (“Katrina”) Wu is an undergraduate student in the TAMU Computer Science and Engineering department. Her collaboration with Industrial & Systems/Human Factors engineers can be considered interdisciplinary, as parties from both disciplines contribute specific skills and have already learned much from each other.
PI Ferris and Co-PI Yager are both involved in a separate long-term project (Toyota Economic Loss Settlement Project) that will likely involve in-vehicle interface design work in later phases. It is likely that the collaborative relationships built through that project, in particular with Research Scientist Shan Bao at the University of Michigan Transportation Institute (UMTRI), may be fruitful for later phases of the current ATLAS project.