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Final Report

Development of Support Systems,
Instructional Modules, and a Case
Study for the Enhanced Driving
Simulator at the Gator Tech Smart
House

(Project # 2016-006)



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TABLE OF CONTENTS

U.S. DOT DISCLAIMER.....	i
ACKNOWLEDGMENT OF SPONSORSHIP.....	i
Chapter 1. INTRODUCTION.....	1
Chapter 2. WEB SITE AND ADMINISTRATIVE PROTOCOLS	2
The Websites.....	2
The Administrative Protocols	3
Chapter 3. TRAINING MATERIAL.....	5
Procedure for Running an Experiment	5
Other Training Material	8
Appendix A. REVIEW OF WEB SITES.....	10
Appendix B. QUESTIONNAIRE.....	15
Appendix C. SYNTHESIS OF RESPONSES	16

ABSTRACT

The Driving Simulator Lab was founded in early 2005 was upgraded in Fall 2016 with a new system from Realtime Technologies Inc. (RTI). The upgrades to the lab was made with the vision of serving as a critical tool to enhancing our understanding of the human-vehicle interactions. The lab will provide for a safe and flexible environment in which alternate technologies can be tested using a variety of subjects (students, elderly, disabled, veterans, etc.). Further, the lab will be available for research purposes to the entire University of Florida. A critical component of enabling multi-disciplinary researchers to pursue these funding opportunities and successfully complete projects using the simulator will be the development of support systems for the lab and instructional modules to assist in training. Administrative procedures and protocols need to be established to ensure collaborative, shared, and safe use of the driving simulator lab. This project aimed at developing basic administrative protocols and training material and documenting these in a web site.

EXECUTIVE SUMMARY

The Driving Simulator Lab was founded in early 2005 and is located at the Smart House in the Oak Hammock community at the University of Florida. The Lab was upgraded in Fall 2016 with a new system from Realtime Technologies Inc. (RTI). The upgrades to the lab was made with the vision of serving as a critical tool to enhancing our understanding of the human-vehicle interactions. The lab will provide for a safe and flexible environment in which alternate technologies can be tested using a variety of subjects (students, elderly, disabled, veterans, etc.).

Further, the lab will be available for research purposes to the entire University of Florida. A critical component of enabling multi-disciplinary researchers to pursue these funding opportunities and successfully complete projects using the simulator will be the development of support systems for the lab and instructional modules to assist in training. Administrative procedures and protocols need to be established to ensure collaborative, shared, and safe use of the driving simulator lab. This project aimed at developing basic administrative protocols and training material and documenting these in a web site.

As a first step in the study, the web sites of several labs that have the RTI simulator were reviewed. Next, we approached managers or labs with the RTI with a questionnaire on administrative protocols. The questionnaire was e-mailed ahead of time and the managers were given the option of either providing written responses or scheduling a conference call to provide the responses orally. The team also had meetings with appropriate administrators at UF to discuss financial, legal, and safety protocols.

The Driving Simulator Lab will have two primary website resources. A Public Internet Site housing content related to the lab targeting stakeholders and the general public and a Private Access-Controlled Site housing content such as training material for UF faculty researchers, staff, and students.

Starting with the “train the trainer” training provided by RTI, the team developed several small self-learning modules (power-point presentations) available on-demand from the web site. The RTI material was customized using images and details specific to our lab. These are available on the private, access-controlled site. The fundamentals are covered first. More training material will be added to the web site (on additional topics) over time.

Chapter 1. INTRODUCTION

The Driving Simulator Lab was founded in early 2005 and is located at the Smart House in the Oak Hammock community at the University of Florida. The Lab was upgraded in Fall 2016 with a new system from Realtime Technologies Inc. (RTI). The upgrades to the lab was made with the vision of serving as a critical tool to enhancing our understanding of the human-vehicle interactions. The lab will provide for a safe and flexible environment in which alternate technologies can be tested using a variety of subjects (students, elderly, disabled, veterans, etc.).

Further, the lab will be available for research purposes to the entire University of Florida. A critical component of enabling multi-disciplinary researchers to pursue these funding opportunities and successfully complete projects using the simulator will be the development of support systems for the lab and instructional modules to assist in training. Administrative procedures and protocols need to be established to ensure collaborative, shared, and safe use of the driving simulator lab. This project aimed at developing basic administrative protocols and training material and documenting these in a web site.

As a first step in the study, the web sites of several labs that have the RTI simulator were reviewed. These are synthesized in Appendix A. Next, we approached managers or labs with the RTI with a questionnaire on administrative protocols (Appendix B). The questionnaire was e-mailed ahead of time and the managers were given the option of either providing written responses or scheduling a conference call to provide the responses orally. A synthesis of the responses obtained is presented in Appendix C. The team also had meetings with appropriate administrators at UF to discuss financial, legal, and safety protocols. A web site was created and all necessary information added to it. Starting with the “train the trainer” training provided by RTI, the team developed several small self-learning modules (power-point presentations) available on-demand from the web site. The RTI material was customized using images and details specific to our lab.

Chapter 2 of this report provides an overview of the website and the overall administrative protocols. Chapter 3 provides an overview of training material. The fundamentals are covered first. More training material will be added to the web site (on additional topics) over time.

Chapter 2. WEB SITE AND ADMINISTRATIVE PROTOCOLS

The Websites

The Driving Simulator Lab will have two primary website resources. A **Public Internet Site** housing content related to the lab targeting stakeholders and the general public and a **Private Access-Controlled Site** housing content such as training material for UF faculty researchers, staff, and students.

Public Internet Site: <http://drivingsim.php.ufl.edu/>

The public site contains content appropriate for the general public and anyone interested in the activities of the lab. It will also act as a portal to the private site.

The **About** pages will provide a brief description of the driving simulator, and acknowledge institutional support for the lab as well as other partners. This section will also provide personnel profiles.

For UF faculty interested in using the lab for research, training, or assessment, a **Getting Started** form will collect basic information from the faculty and will serve as an initial point of contact with the lab.

The **Projects** pages will list and describe all current and past projects using the lab. This will showcase the breadth and multi-disciplinary use of the lab as well as the research interest areas.

The **Publications** pages will be a listing of all publications resulting from research done in the lab.

A **Photo Gallery** and various **Videos** will be provided in Media section. Currently, some photos of the lab and a professional promotional video describing the lab is available.

A **Resources** link will be the portal to the private site only accessible to UF personnel.

The **Contact** pages will provide a simple form for the general public to contact the lab about any questions they might have. Also in this section is the address of the lab, descriptive directions, and a map.

Private Access-Controlled Site: <https://bridge.ufhealth.org/php-driving-sim/>

The private site will be accessed controlled and will be limited to only UF faculty, staff, and students who will be using the lab. It will contain operational and other sensitive content related to the use of the lab.

The **Trainings** pages contain short training modules related to safety in the lab, use of the driving simulator equipment, and development of driving scenarios.

The lab is expected to be a shared resource to the UF community. As such, there are various **Protocols** that must be followed to ensure fair and robust use of the lab. These pages will provide the protocols for use of the driving simulator equipment, protocols related to the IRB and Informed Consent, and those related to the Smart House space where the lab is housed, in particular access to the house, climate control, internet access, and scheduling.

The **Fees** page will enumerate the various pricing structures for use of the lab in research, training, assessment, etc. For research, the pricing information will be used to determine grant budgets and the will be allowance for short pilot projects. The driving simulator is a complex machine combining electronics hardware, distributed computer systems, audio/visual systems, and human interfaces. This equipment will require maintenance, repairs, and upgrades. In addition, the lab will require other supporting equipment. Other costs involved in operating the lab include leasing fees, utilities, internet connectivity, and other supplies. Personnel to manage, develop, maintain, and support the lab are also a significant cost.

Support pages will be crucial for UF personnel when they encounter a problem in the lab. Submission of request for support tickets will document the problems experienced and provide the quickest resolution. A knowledgebase will be searchable and allow for independent resolution of common issues when using the lab.

Development of other online resources are planned for the lab, such as code repositories, request for support ticketing system, and knowledgebase.

The Administrative Protocols

Given that the simulator equipment is fairly new and the target audience is very diverse (with largely varying levels of familiarity with the technology and the human-interaction protocols), it was decided that the lab manager will personally meet with interested researchers to provide an overview, go over fees and protocols, and address other project specific questions.

University of Florida researchers interested in using the Driving Simulator Lab should make initial contact via the web form, <http://drivingsim.php.ufl.edu/getting-started/>. The lab manager will respond to schedule an initial meeting to discuss the interest and needs. Initial questions can also be answered briefly in the response.

During the initial meeting, the type of project will be determined, either *Full Project* or *Pilot Project*. At a minimum, a full project will be expected to achieve full funding and will have a customized budget based on established lab fees and project needs. For a full project, help with study design and protocols is also available from experienced UF researchers as needed. This will be calculated into the budget. All other projects will be considered pilot projects and will be charged a weekly usage fee. Pilot projects can be used to learn about the operation of the driving simulator, demonstrations, or to collect some initial data to determine the feasibility of a full project. It is recommended that all new users begin with a pilot project.

After the initial meeting, access will be granted to the researcher and collaborators to the Driving Simulator Lab Resources intranet site, <https://bridge.ufhealth.org/phhp-drivingsim/>. Here the researcher can access training materials, details of the protocols in using the lab and running a project, view lab fees, and access support. A demonstration of the simulator can be requested if desired.

When the researcher is ready to start the project (either full or pilot), an initial payment of fees will be required. The UF researcher and collaborators will also be required to complete the safety training module found on the intranet site. For full projects, a Memorandum of Understanding (MOU) will be created between the lab and research project.

A second meeting will be scheduled with the lab manager at the Smart House to give a basic overview training on using the driving simulator. Additional configurations of the simulator will be setup by the lab manager to support the project.

Chapter 3. TRAINING MATERIAL

Procedure for Running an Experiment

The purpose of this section is to provide an outline of the process of running a simulation experiment (one subject) at UF Smart House located at Oak Hammock, an assisted living facility in Gainesville, Florida. The outline is divided in three sections: before simulation, during simulation and after simulation. The structure of the outline was designed to facilitate the understanding process of conduction simulation studies from the perspective of the researcher.

I. Before Simulation

A. Preparation of the study area:

This subsection describes how the researcher will prepare the study area before participants arrive to the UF Smart House.

1. Arrive 30 minutes before every study to prepare the study area.
2. Provide to the security guard a list with the names of the participants of the study to facilitate their access to the smart house.
3. Inside the UF Smart House, turn on the air conditioner (controller located in front of the bathroom door) in 70-75 degrees to cool down the temperature at the study room.
4. Turn on the RTI equipment as indicated in the instructional module 1 (see module at <https://bridge.ufhealth.org/phhp-drivingsim/>)

***Note: To help maintain an ideal room temperature we recommend turning on the projectors at the end after finishing setting up all the equipment to avoid the heat produced by the equipment. ***

5. In the computer identified as central console, create a new folder to storage the data off the participants, for every participant create a new folder. The name of the file should be unique for each participant and should not contain any personal information such as name, gender, age, among others. Some examples of appropriate file names include: driver 1, participant 1, dummy 1, etc. For this outline we will name the new folder Driver 1. Additional files like notepads files with research questions, work documents, excel spreadsheet related to the participant and/or that will be used during the simulation should also be added to this folder.

***Note: We recommend including a number at the participant's file name to keep track of the number of volunteers. ***

6. Inside the folder named "Driver 1" create another new folder called "Plot". This new folder will storage all the data collected during the simulation (hidden data collected by the simulation programs, sensor, cameras,etc.).
7. Open the app of SimCreator located at the desktop identified as center console and indicate the following information:
 - Run Length: In the space provided indicated the length of the simulation in seconds.

- Experiment name: In the space provided you will enter a unique name for the experiment. Some examples include: PR – Practice, FR – Free drive, FO- Following, WL- Workload, SA – Situation awareness, etc.
- Participant ID: In the space provided you will enter a unique ID number for each participant.
**Note: We recommend that the Participant ID should match with the number assigned to the participant’s file Considering our example the participant file name is “Driver 1”, the participant ID will be 1.
- Drive ID: In the space provided indicate the type of drive, or scenario used in the study. This number is important in studies with multiple scenarios to identified each simulation scenario with a unique number.
- Store Data: Select the created “Plot” folder (located under the “Driver 1” file) as the storage location. The path of the folder will appear in the space provided.
- All other information (SimCreator Model (.cmp) and SimCreator Datafile (.in)) remains unchanged.

The following figure shows the SimCreator window with the location of each of the information described above.



8. Run a trial simulation (by clicking the “Run Simulator” button) to assure that all the equipment is working correctly and according to the case study.
9. Open the application “OBS Studio” located at the desktop of the center console. This application records the screen of the computer (center console only) during the simulation study. This HD video can later be used to conduct further analysis.
10. The simulation equipment is now ready to be used.
11. Prepare the paper work to be delivered to participant before the simulation. This includes the consent document that represent the contract within the participant and UF.

B. Study process when the participant arrives to the study area:

1. Receive the participants at the front door with a positive attitude, making them feel welcome and appreciated for their contribution to the study.
**Note: It is important to thank them for their time and collaboration with the research.
**

2. Allocate the participant inside the study area and explain to him the rules of the experiments.
***Note: It is important to let them know that they are not forced to do anything they do not want to do. If they feel uncomfortable at some point of the simulation or with some of the research question, they have the freedom to leave or not respond the questions. ***
3. Provide to participant the consent form and ask them if they would like a copy of the document. If the participant say “yes” a copy of the consent should be provided immediately.
4. Ask the participant if the room temperature is adequate (comfortable) for him/her. Adjust the room temperature according to the participant request.
5. If the participant has no further questions, escort the participant inside the vehicle to explain to him/her how the vehicle works including button and specific equipment to be used during the simulation.
6. Administer the pre-simulation “simulation sickness” questionnaire. This is available in an electronic format on the ipad. The survey provides a baseline measure their level of sweatiness, dizziness, nauseous, etc.
7. The participant is ready to start the simulation if the questionnaire did not indicate otherwise.

II. During Simulation

1. Using the remote control of the three projectors, freeze the background of the central console by pressing the freeze button. This action will prevent participants from watching all the process of getting started with the simulation (avoiding distractions or uncomfortable screen movements that can affect the participant).
2. After freezing the projectors screen active the screen recorder located at the “OBS Studio” application to record the simulation.
3. Open the SimCreator window and run the program considering the appropriate input information discussed in Part I, step 7B. (Run Length, Experiment Name, Participant ID, Drive ID, Store Data).
4. After running the program, the projectors will immediately unfreeze and the participant will start the simulation.
5. During simulation, observe the participant for possible symptoms of simulation sickness.
6. Administer the “simulation sickness” questionnaire as needed to track the participant’s performance against the pre-simulation baseline.
7. In case of the participant needing a break, snacks and drinks will be provided to make him/her feel better. After 1-5 min break (determine by the researcher) the participant will return to the vehicle and the researcher will repeat all the steps described in Part II (During Simulation).
8. Administer the “simulation sickness” questionnaire as needed to track the participant’s performance.
9. Prepare the survey question to be asked after completing the simulation

III. After Simulation

A. Preparation to evacuate the participant:

1. After completing the simulation study, press the “Stop” button (located at the Host Computer) to finalize the simulation.
2. Use the remote control to freeze the projectors screens and finalize all the applications related to the simulation.
3. Stop the screen recorder located at the “OBS Studio” application. Save the recording inside the participant’s folder (Driver 1) with a name that identifies the participant.
4. Administer the “simulation sickness” questionnaire as needed to track the participant’s performance after the experiment against the pre-simulation baseline.
5. If the study is finalized, the participant will be informed that the simulation study was successfully completed. Drinks and snacks will be offer to participant to help them feel comfortable and appreciated for their contribution.
6. The researcher will escort the participants to a desk to complete the driver behavioral questioner.
7. While the participant completes the questioner, the researcher will prepare the participant’s reward (gift card, gifts, certificates, etc.)
8. After the participant completes the questioner, the researcher will provide the reward and will answer any question the participant may have about the study.
9. Before the participant leave, the researcher will ask if he/she feels good to drive, bike or walk. If the participant is not feeling good, the researcher will escort him/her to the living room and provide snacks and drinks to the participant to help him feel better. If necessary, the researcher will escort the participant to the bedroom to rest until he or she feels good to go.
10. If the participant is ready to go, the researcher will express his/her gratitude to the participant and encourage him to participate in future studies.
11. The participant will be escorted to the exit door.

B. Protocol after the participant leave the study area:

1. Open the participant’s file (Driver 1) to verify that all the information was storage and saved properly under the “Plot” folder.
2. Verify that the simulation screen recording is safe inside the participant folder (Driver 1).
3. Extract the appropriate data to a USB, hard disk, cloud, or any other storage preferred by the researcher.
4. Turn off all the equipment by following the step shown in module 1 (see module at <https://bridge.ufhealth.org/phhp-drivingsim/>).
5. Turn off the air conditioner.
6. Clean the study area. Dispose any water bottles, cans, snack bags or papers left by the participant in the garbage disposal outside the UF Smart House.
7. Close the UF Smart House.
8. Exit Oak Hammock through the main entrance and notify the security guard that the simulation study has being finalize and no more participants are expected.

Other Training Material

Other instructional modules have been built to guide users during the process of learning how to use the RTI technology. Our goal is to provide the tools they need to complete their individual studies. The modules are located on the UF Driving Simulator website under the tab identified as “Resources” (login required) and is accessible to all UF faculty, staff, and students who will be using the simulator. The following list in contain all the modules provided in our website:

1. How to startup the equipment? – This short module provides a step by step process of how to strat up all the simulation technology.
2. How to run an existing model? – This module provides a specific step by step method to teach users how to run and existing model in SimCreator.
3. How to build a generic world? – The objective of this module is to teach users what Internet Scene Assembler (ISA) is and how to create a generic world using ISA.
4. How to save and publish new projects? – This module provides simple explanation of how to save and publish you new projects so that can be compatible with SimCreator.
5. How to use scenario controls? – The goal of this module is to provide a brief explanation of the scenario control objects to familiarize users with the operations of SimVista.
6. How to create paths and proximity sensors? – This module provides simple step by steps of how to create vehicles and pedestrian’s paths, and proximity sensors in SimCreator to enable new simulations features.
7. How to configure simulations? – The objective of this module is to provide a guidance of how to modify simulations in SimCreator to meet the requirements of their specific studies.
8. How to access the collected data? – The purpose of this modules it to teach users how to retrieve the data collected during simulation in order to be use for further analysis (Statistics, survey, etc.).
9. How to use JavaScript? – The purpose of this module is to teach user basic concepts and codes of JavaScript for SimCreator and SimVista.

Appendix A. REVIEW OF WEB SITES

UNIVERSITY OF MICHIGAN

- Model of the car
- Brief description of the simulator system
- Photos of the simulator in action and a driver using it
- Eye tracking tech brief info
- Define what Virtual world is in a brief paragraph
- Desktop Driving Simulator brief description
- Data collected (type of information that can be collected by the simulator)
- Completed Research Projects
- Upcoming Research Project
- Contact

UNIVERSITY OF WISCONSIN

- Introduction of simulation in transportation engineering and how the technology has become more powerful
- Examples of how driving simulator research has been implemented in real life (Wisconsin Traffic Operations and Safety Laboratory - TOPS)
- Objectives (goals) of the TOPS Driving simulator
- Brief description of the simulator system
- How the software works and how to create scenarios
- Photos of the simulator

UNIVERSITY OF MINNESOTA

- Brief description of Driving Simulation
- Description of Immersive Driving Simulator
- Brief description of the simulator system
- Description of Portable Driving Environment Simulator
- Photo of the simulator

MONTANA STATE UNIVERSITY

- Objectives (goals) of the Western Transportation Institute (WTI) Driving simulator
- Brief description of the simulator system
- Completed Research Projects
- Partners
- Contacts

OREGON STATE UNIVERSITY

- Model of the car
- Brief description of the simulator system

- Photo of the simulators (Bicycle and Vehicle)
- Description Bicycling Simulator
- Research Focus

OHIO STATE UNIVERSITY

- Facility description
- Brief description of the simulator system
- Photo of the simulator
- Partners
- Promo Video
- Study Sign-up form
- Contact
- Brochure

MINNESOTA VALLEY TRANSIT AUTHORITY

- Description of the Bus Simulator
- Brief description of the simulator system
- Photo of the simulator
- Description of Realtime Technologies
- Brief info about Arotech's training simulation division
- About Arotech Corporation
- Contact

STANFORD UNIVERSITY

- Testimonies of users' experiences in the simulator
- Promo Video
- Photo of the simulator

TEXAS TRANSPORTATION INSTITUTE

- Brochure with basic information of Simulator and RTI technology

LOUISIANA STATE UNIVERSITY

- Model of the Car
- Brief info of the Simulator
- Completed Research Projects
- Photo of the simulator

VIRGINIA TECH TRANSPORTATION INSTITUTE

- Brief info of the Simulator and hardware
- Mainly focused on truck training
- Photo of the simulator

UNIVERSITY OF MASSACHUSETTS

- Brief info on the Simulator and hardware information
- Summaries of research direction
- Provides information of research partners
- Provides information about the Faculty personnel without bio sketch
- Provides a list of publications and conference proceedings attended.

UNIVERSITY OF MISSISSIPPI

- No dedicated website
- Brief information about the simulator

GEORGE MASON UNIVERSITY

- No dedicated website
- Brief information about the simulator

WEST MICHIGAN UNIVERSITY

- No dedicated website
- Brief information about the simulator from RTI website
- Not vehicle based simulator

Basic simulation information provided by RTI Universities and Institutes in USA

Basic Information	Universities and Institutes									
	University of Michigan	University of Wisconsin	University of Minnesota	Montana State University	Oregon State University	Ohio State University	Minnesota Valley Transit Authority	Stanford University	Texas Transportation Institute	Louisiana State University
<i>Car Model</i>	✓				✓					✓
<i>Description of the simulator system</i>	✓	✓	✓	✓	✓			✓	✓	✓
<i>Objectives (goals)</i>		✓		✓						
<i>Research Achieved</i>	✓			✓						✓
<i>Upcoming Research</i>	✓									
<i>Brochure</i>						✓			✓	
<i>Photos</i>	✓	✓	✓		✓	✓		✓	✓	✓
<i>Promo Video</i>						✓				
<i>Partners</i>				✓		✓				
<i>Contacts</i>	✓			✓		✓		✓		
<i>Study Sign Up Sheet</i>						✓				
<i>Dedicated website</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Basic information	Universities and Institutes				
	VTTI	University of Massachusetts	Mississippi State University	George Mason University	West Michigan university
<i>Car Model</i>		✓		✓	
<i>Description of the simulator system</i>		✓	✓	✓	✓
<i>Objectives (goals)</i>		✓			
<i>Research Achieved</i>		✓			
<i>Upcoming Research</i>					
<i>Brochure</i>					
<i>Photos</i>	✓	✓	✓	✓	✓
<i>Promo Video</i>					
<i>Partners</i>	✓				
<i>Contacts</i>	✓	✓			
<i>Study Sign Up Sheet</i>		✓			
<i>Dedicated website</i>		✓			

Appendix B. QUESTIONNAIRE

Dear [University Name]:

Recently, the University of Florida acquired Realtime Technologies' (RTI) driving simulation platform. We understand that [Name of the University] has a simulation lab with similar technology. As we go about establishing our lab, we were hoping that you will be able to help us by providing details about your own lab. Specifically, we have the following questions:

- Do you have full-time / part-time programmers on staff to code scenarios / provide software and hardware technical support for researchers?
- How many other full-time / part-time staff do you have in the lab? What are their roles?
- What protocols should a new researcher in your university follow to use the simulator for his/her research proposal?
- What is your financial model? How do you charge researchers for the use of the facility?
- Do you offer any training on the use of the simulator for new researchers wanting to use it?
- Is there a lab manual with standardized protocols for conducting experiments in a safe and efficient manner?
- Any other advice you have for us?

We look forward to hearing from you either via e-mail or the phone. If you would prefer to talk to us, we will be happy to call you and a mutually convenient time.

Your assistance is most appreciated.

Sincerely,

[Name]

University of Florida Transportation Institute

Appendix C. SYNTHESIS OF RESPONSES

UNIVERSITY OF WISCONSIN, TOPS LAB

Do you have full-time / part-time programmers on staff to code scenarios / provide software and hardware technical support for researchers?

Response: No full timers at the moment, but highly recommended. Recommend dedicated personnel to simulator. They have students trained on developing scenarios.

How many other full-time / part-time staff do you have in the lab? What are their roles?

Response: The lab is mainly run by a lab manager. Students come in as when there are projects.

What is your financial model? How do you charge researchers for the use of the facility?

Response:

- 1. There is a revenue generator account that goes towards upgrades, servicing or support fees. On project basis, project participants are billed \$150/hour. This revenue goes directly into the revenue generator account.*
- 2. Lab manager is paid from the project account (project line item)*

Do you offer any training on the use of the simulator for new researchers wanting to use it?

Response:

- 1. Lab manager offers informal training to students.*
- 2. Students share knowledge as well.*

Is there a lab manual with standardized protocols for conducting experiments in a safe and efficient manner?

Response:

- 1. Tried a lab manual in the past, but was discontinued.*
- 2. Once a student decides to use the simulator he/she is required to adhere to the dos and don'ts of the lab.*

Any other advice you have for us?

Response:

- 1. Very import to hire a full lab manager (preferably someone with 3D modelling background)*
- 2. The RTI driving simulator's driving steering wheel is delicate. They broke a belt in the feedback motor due to excessive steering input from someone driving crazily during a demo.*
- 3. Upgrades are in the upwards of \$5000 – \$10,000*
- 4. After every experiment, output data files should be copied for avoidance of over-write.*
- 5. Work station may need a password to regulate unwarranted use (file disruption)*
- 6. Backup of sim creator files is a must.*
- 7. Partnerships are encouraged, TOPS lab partners with Oregon State University, University of Puerto Rico, UMASS, university of Iowa.*
- 8. Scenarios are sometimes shared between groups*
- 9. TOPS lab builds its own tiles (relies on tile maintenance manual)*

OREGON STATE UNIVERSITY

Do you have full-time / part-time programmers on staff to code scenarios / provide software and hardware technical support for researchers?

Response:

No. Today I have a team of 7 graduate students (5 phd, 2 ms) and 3 undergrads that work in the lab. We do all the work ourselves. I am in the process of hiring a post-doc for the first time this year.

How many other full-time / part-time staff do you have in the lab? What are their roles?

Response:

The team is myself and my students. I collaborate with other faculty at OSU and at many other universities on my research projects.

What protocols should a new researcher in your university follow to use the simulator for his/her research proposal?

Response:

I direct our lab, and to date, I'm the only faculty member who does work in the simulator.

What is your financial model? How do you charge researchers for the use of the facility?

Response:

This is an important question and one I have not resolved, although I am familiar with a wide variety of models. I am the only faculty member doing externally funded work in the lab, so I fund everything with proposal writing.

Do you offer any training on the use of the simulator for new researchers wanting to use it?

Response:

I train all of the students in my lab. I have used RTI to do periodic training, but my students teach themselves and each other.

Is there a lab manual with standardized protocols for conducting experiments in a safe and efficient manner?

Response:

To some extent I am the manual. We follow IRB requirements for all of our experiments. I use best practices from other labs around the country as well as references like the Handbook of Driving Simulation.

Any other advice you have for us?

Response

Work hard and have fun! More importantly, do not hesitate to reach out to me if I can ever be of any help to you.

Texas A&M

Do you have full-time / part-time programmers on staff to code scenarios / provide software and hardware technical support for researchers?

Response:

1. *No full-time employees at the moment. Computer programmer is hired on part-time basis (3days/month)*
2. *Recommends the services of a full- time programmer. Hiring a full- time programmer comes with the advantage of building more interesting scenarios that are appealing funding agencies.*
3. *Recommends UF hire or make someone full in-charge of the simulator, for scheduling projects, financials, managing tours, scheduling maintenance activities etc.*

How many other full-time / part-time staff do you have in the lab? What are their roles?

Response:

Only a computer programmer is hired on Part-time basis.

What is your financial model? How do you charge researchers for the use of the facility?

Response:

1. *Build up a cost sheet for all perceivable cost.*
2. *Devise a mechanism to track all cost.*
3. *Deduce from the cost sheet which way is most appropriate to recovering the initial capital outlay and future maintenance cost.*
4. *Breakdown cost into long and short term costs (schedule plans to handle each)*
5. *TTI tried different models in the past, daily/hourly/per participant charges, but currently uses hourly. (currently charges \$130/hr of simulator use)*
6. *TTI receives partial monitory commitment from the University; the remaining cost is paid for through projects.*
7. *At TTI researchers pay to use the simulator.*
8. *Programmers are paid through projects, but and additional cost, say per hours is added to the budget to handle maintenance fees.*
9. *Goal is to remain in the black at the end of each fiscal year.*

Do you offer any training on the use of the simulator for new researchers wanting to use it?

Response:

Part-time programmer trains simulator users to run scenarios.

Is there a lab manual with standardized protocols for conducting experiments in a safe and efficient manner?

Response:

1. *Recommends a strategic plan (long and short term) to guide research direction. Plan also helps with staffing.*
2. *Plan will help make decisions regarding touring.*
3. *Recommends a MANDATORY training module to introduce researchers to the simulator, what they need to know before research, why they need they know and how to operate the simulator.*
4. *Recommends a LAB SAFETY manual (Regulate and manage exposure to Simulator Sickness.*

Any other advice you have for us?

Response:

1. *TTI collaborates with other institutions and shares scenarios, tiles.*
2. *TTI sometimes contacts RTI when they want to build complex scenarios, cost is manageable.*
3. *A plan should be in place to store data for the long term.*

University of Minnesota

Do you have full-time / part-time programmers on staff to code scenarios / provide software and hardware technical support for researchers?

Response

The lab has full-time programming/technical staff to support the simulator and develop scenarios for researchers.

How many other full-time / part-time staff do you have in the lab? What are their roles?

Response

The lab currently employs two full-time researchers and several graduate students.

What protocols should a new researcher in your university follow to use the simulator for his/her research proposal?

Response

Lab staff, both technical and research, are a part of all projects that use the simulator.

What is your financial model? How do you charge researchers for the use of the facility?

Response

A daily rate is charged for the use of the simulator in accordance with the University's internal sales policy. Staff time, including scenario programming, is charged directly based on salary.

Is there a lab manual with standardized protocols for conducting experiments in a safe and efficient manner?

Response

The University requires extensive training on safe research and human subjects practices for all research employees. Specific training on lab equipment is performed as needed for new hires.

Any other advice you have for us?

Response

I would advise a careful 5-10 year operations plan. Simulators require on-going maintenance and many facilities encounter trouble without a good plan on how to cover maintenance (both in financial terms and in allocating time).