Test Protocol

PWC Operation Study using the Virtual Jet Ski Driving Simulator
Last Update: 10/18/06 by KPB

1. Welcome and Introduction

Give subject Consent Form, ask subject to read and sign
Explain: Consent Form required by UofM for any human subject study

If subject ask about off-throttle-steering-loss (mentioned in Consent Form), tell subject this will be explained later (after the test).

Create ID for subject (format Sxx starting with S01)
Collect and record data on prepared sheet as follows
- Date
- Subject ID (Sxx)
- Age (must be 18 years or older)
- Gender (M/F)
- Jet Ski Driving Experience
    - None
    - Once (how long)
    - Occasional (number of hours)
    - More (owns or has frequent access to a Jet Ski)
- Boating Safety Course (yes/no)
- Snowmobile Experience
- CAVE Experience

Set up Free-Ride in CAVE

Introduce subject to CAVE
Explain purpose: to protocol and study driving behavior and reactions
Mention sponsor: US Coast Guard
Explain briefly CAVE and Simulator, handlebar and throttle use
(Do not mention off-throttle-steering-loss)

2. Free-Ride

Purpose: familiarize subject with simulator and Jet Ski operation
Start simulator with Jet Ski at home dock

Ask subject to drive Jet Ski out on lake and through channel on other side
Point out: channel is on the right of the lighthouse
Ask subject two times to stop and get a feeling for run-out behavior
This includes: Ask subject to try stopping under bridge; encourage repeated use of throttle

- Log File not needed; will be overwritten by "5. Collision"

3. Straight-Line

Set up Straight-Line Course in CAVE

3.1 Explore Straight-Line Course

Ask subject to explore course and drive to finish line at his/her own pace
(this will load all required textures)

- First Straight-Line log file not needed

3.2 First Straight-Line Test (data under **Straight 1**)

Reset (place Jet Ski in start position)

Ask subject to drive as fast as possible to finish line, but stop as close as possible in front of finish line

Encourage subject to use full throttle from start

Wait until Jet Ski comes to a complete stop   Take notes:
Subject stays within buoys: y/n
Stops before/behind finish line

- Second Straight-Line log file: Save as S0xx_Straight1.log

3.3 Second Straight-Line Test (data under **Straight 2**)

    Reset (place Jet Ski in start position)

    Ask subject to repeat the above

    Wait until Jet Ski comes to a complete stop   Take notes:
                                                                      Subject stays within buoys: y/n
                                                                     Stops before/behind finish line

    - Third Straight-Line log file: Save as S0xx_Straight2.log

4. Curved-Course

Set up Curved-Course in CAVE

4.1 Explore Curved-Course

    Ask subject to explore course and drive to finish line at his/her own pace
    (this will load all required textures)

    - First Curved-Course log file not needed

4.2 Curved-Course Test (data under **Curved**)

    Reset (place Jet Ski in start position)

    Ask subject to drive as fast as possible to finish line, but stop as close as
    possible in front of finish line

    DO NOT encourage subject to use full throttle from start (leave it up to subject)

    Wait until Jet Ski comes to a complete stop   Take notes:
                                                                      Subject stays within buoys: y/n
                                                                     Stops before/behind finish line

    - Second Curved-Course log file: Save as S0xx_Curved1.log

(No repeat of Curved Course)

5. Collision

Set up Free-Ride in CAVE

Ask subject to drive out on lake and turn left

Tell subject that an object will appear and that subject should try to avoid object

Ask subject to always go in the direction of far away bridge (to have sufficient space)

5.1 Collision at full speed (data under <u>Collision 40mph</u>)

    Ask subject to go full speed (40 mph) and on a straight line

    Wait for full-speed straight line driving
    Pop up log at 25 m   Take notes:
                                          Crash = full crash with log
                                          Avoid = avoided log, no crash

    Allow subject to recover

5.2 Collision at 30 mph (data under <u>Collision 30mph</u>)

    Ask subject to go 30 mph on a straight line

    Wait for 30 mph (approx.) straight line driving
    Pop up log at 25 m   Take notes:
                                          Crash = full crash with log
                                          Avoid = avoided log, no crash

    Allow subject to recover

5.3 Collision at 35 mph (data under <u>Collision 35mph</u>)

    Ask subject to go 35 mph on a straight line

    Wait for 35 mph (approx.) straight line driving
    Pop up log at 25 m   Take notes:
                                          Crash = full crash with log
                                          Avoid = avoided log, no crash

    End of Test, ask subject to leave CAVE

- Free-Ride log file (contains 5.1, 5.2, and 5.3 events): Save as S0xx_Free1.log

6. Closing

Provide subject with copy of Consent Form

Answer any remaining questions subject may have, explain off-throttle-steering-loss if asked

Thank subject for cooperation and send subject on his/her way

7. Data Processing

Create Directory called S0xx for the subject-specific files listed below.

Save all relevant log files (save 4 files out of 6) with the following filenames:

for Straight 1:	S0xx_Straight1.log
for Straight 2:	S0xx_Straight2.log
for Curved:	S0xx_Curved1.log
for Collision 40mph/30mph/35mph:	S0xx_Free1.log

Derive additional subject-specific files from the above:

Compressed log files:
S0xx_Straight1.txt
S0xx_Straight2.txt
S0xx_Curved1.txt
S0xx_Free1.txt

Spreadsheet combining all txt files and graphs:
S0xx_Graphs.xls

VRML representation (lake map, path, graph; speed, handlebar, throttle; event and collision markers):
S0xx_Straight1.wrl
S0xx_Straight2.wrl
S0xx_Curved1.wrl
S0xx_Free1.wrl

Note that the above VRML files call on other files that need to be present in directory S0xx (for each of the four log files the individual history of speed (sp), handlebar (hb), and throttle (th), the lake map geometry, the slider, and other auxiliary files). When Data Processing for a subject is completed, the subject's directory S0xx should contain a total of 34 files.