**Traffic Research Objectives 1.0\*\*\***

0. Modeling Program = Netlogo.

1. Construct a model of single lane traffic flow.

2. Expand this model to two-lane traffic flow.

3. Impose this model on a real highway (specifically US 36 between Denver and Boulder… I really want to solve those traffic jams).

4. Implement our own hypotheses at stages 2 and 3.

0. Other traffic modeling programs

A. There are a ton of traffic-specific programs, let’s see if we can get a look at those to better our own program.

1. The 1994 study at the Turner-Fairbank Highway Research Center in McLean, Virginia.

2. A follow up study at the University of Arizona

3. CORSIM

4. CONTRAM

5. CORFLO

6. PARAMICS

I. Constructing a model of single lane traffic flow

A. Build a Netlogo model with a line of cars travelling down a lane.

B. Expand this lane lengthwise so that thousands of cars can travel at once (this will be necessary to extend the model to a real highway).

1. If we run into problems with this, we should try Cybele 3.0. See <http://www.tfhrc.gov/advanc/agent.htm> for more information.

C. Begin to implement “Human Factors” that make traffic flow chaotic and give traffic its wave-like movement.

1. How closely does one car follow another car?

2. What causes a driver to slow down or speed up? Is it only the car directly in front? Is it how many brake lights a car sees?

a. Perhaps a good place to look would be the traffic flow when a stoplight turns from red to green. In a perfect world, the cars could all accelerate at the same time, but they don’t, WHY?

II. Expanding to two lanes.

1. When and why do drivers change lanes?

III. Expanding to a real highway

Does the curvature of the path itself affect the model? What about entrances and exit ramps? Accidents? Etc….

IV. Implementing Hypotheses

A. Hypothesis 1: If we change the human factors so that cars prefer to leave a greater buffer between themselves and the car in front of them, then the slowing effect of the traffic jam will be lessened because the main cause of slowing in a traffic jam is

1. Hypothesis 2: If we change the human factors so that a person responds to the vehicle two cars ahead instead of the car ahead, then the slowing effect of a traffic jam will be lessened because the delay of information (that traffic is moving again) is substantially decreased.

\*\*\* This outline is extremely unsophisticated. Once we begin to get a functioning model, this outline can be modified to achieve our goal of not sitting in terrible and pointless traffic on the way down to Denver for Shabbat dinner.