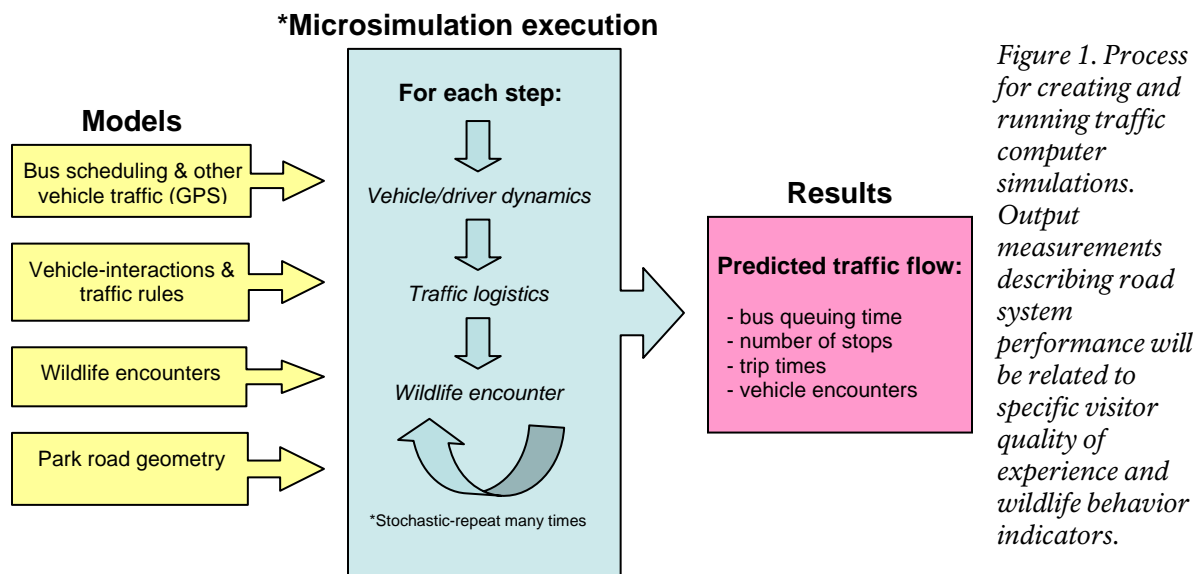




Traffic modeling update: February 2007

A study of logistical and physical constraints on traffic will examine vehicle behavior and determine factors that constrain traffic flow on the park road. In 2006, park staff with assistance from Doyon/ARAMARK Joint Venture (JV) installed 130 GPS units on vehicles using the park road on a regular basis. GPS units were installed on all JV tour, shuttle and camper buses. Approximately 40 NPS vehicles also had GPS units installed, including most heavy equipment, road crew vehicles and vehicles driving the park road on a regular basis. Park staff set up three base stations to remotely download vehicle data at the Denali Visitor Center, C-Camp and Toklat. Remote download of vehicle GPS data worked very well once all the equipment was in place.



The Denali Park road has very unique traffic patterns affected by a number of factors such as locations of wildlife sightings, numbers and behavior of buses on the road each day, weather, and road maintenance. To account for the affects of these various factors on traffic flow, researchers will use GPS and wildlife

sighting data collected from vehicles driving the park road in 2006/2007 to create a traffic model capable of simulating vehicle specific locations and driving behaviors. The model will enable researchers to vary bus schedule scenarios, wildlife encounter probabilities and road logistic rules to quantify and visually analyze predicted bunching, travel times, and following distances of buses and other vehicles along the road. The results can be used to predict and better study traffic related impacts on visitor experience and wildlife behavior (Fig. 1).

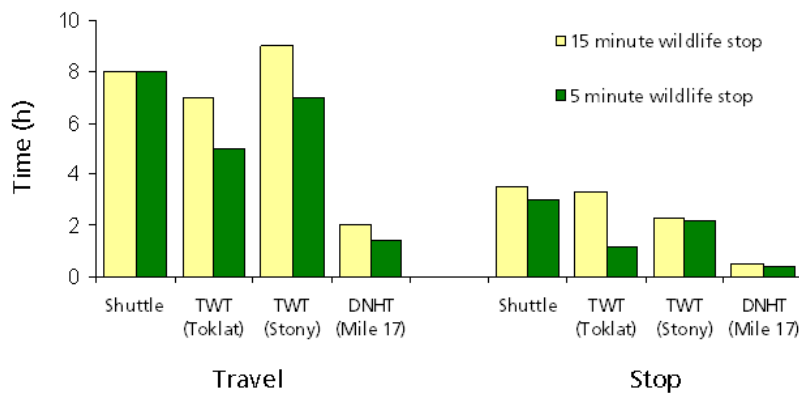


Figure 2. Simulated effects changes in wildlife encounter stop times on travel and stoptimes of Shuttle, Tundra Wildlife Tour (TWT) and Denali Natural History Tour (DNHT) buses driving the Denali Park Road. These are preliminary results based on a subset of vehicle GPS data collected in 2006.

Researchers conducted a simulation experiment during the winter of 2006/2007 with preliminary data to begin testing model parameters. The objective of this experiment was to evaluate how driver behavior rules and wildlife encounters may predict changes in travel and stop time of buses. The model included wildlife sightings near the road at predetermined locations and time intervals that were based on actual observations over a single day in 2006. The stop and speed characteristics for all bus routes - Visitor/Camper Shuttle Buses, Denali Natural History Tours (DNHT), Tundra Wildlife Tours (TWT) – were considered identical for this experiment. In 2006, 76 buses departed daily from the Wilderness Access Center. Management strategies were tested which were based on the 2006 daily bus schedule. One of management strategies tested allowed stop times at wildlife encounters to average either 5 or 15 minutes. Results of this preliminary experiment indicated that allowing 5 minute stops at wildlife sightings decreased the number of unintended stops made by all buses by 7% and

decreased overall travel time by more than an hour on average when compared to allowing only 15 minute stops (Fig. 3). This experiment demonstrates the influence management strategies could have on traffic patterns on the park road; however, park managers would need to consider the potential impacts of these strategies on visitors' enjoyment of the park road. It must be emphasized that the results of this modeling experiment are preliminary and that data collected in 2007 in combination with 2006 data will be used to more accurately model the variability in vehicle speed and wildlife encounter stops. For example, upon observation of a limited set of data in 2006, buses traveling the Denali Nature History Tour route may travel at significantly slower speeds and stop more often than other bus route types modeled in the simulation.

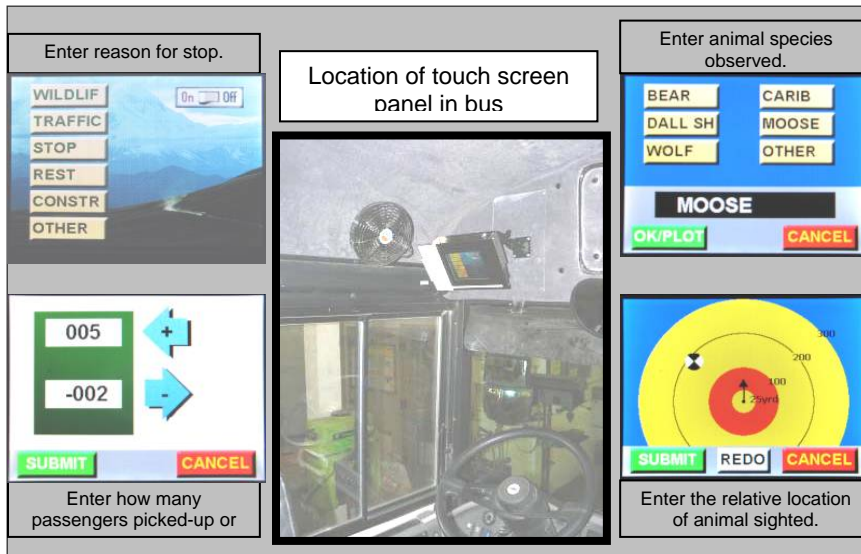


Figure 3. Touch panel data loggers will be installed on 20 buses in 2007 that will allow drivers to automatically geo-locate various reasons for stopping such as wildlife sighting or passenger pick-up locations.

In 2007, bus drivers will be recording information about the location of stops made along the road for wildlife sightings, passenger pick-up and drop-off, and road maintenance on LCD touch screen panels installed in 20 buses (Fig. 3). This location information will be automatically downloaded to base stations along with the vehicle's GPS location data. An improved model will be developed that will predict the probability of encountering wildlife within viewing distance of the roadway and associated vehicle stops using the data collected from the touch screen data logger panels over the 2007 tourist season.