RTMS installation to monitor the out-bound lanes on Sand Island Access Rd. in mid-December 2001. The installation included a solar panel and a cabinet. All equipment was installed on a single pole. Details of the cabinet and the solar panel are shown below.

3M Microloops were installed inside PVC tubes under two lanes on east-bound H-1 Freeway at the Paiwa Interchange near Waikiki in January 2002. The microloops work the same as regular loops. They can be suspended under superstructures or bored several inches under the pavement. They are accompanied by the 3M Canoga counter and software. A demonstrator unit is available at the UH Traffic and Transportation Laboratory.
ORADS portable laser sensor installed parallel to the travel lanes along out-bound lanes on Sand Island Access Rd. in mid-March 2002. The tire is used to calibrate the beams through the scope so that they are focused on the tire about two inches above ground. The calibration is tedious when multiple lanes are involved and the road surface is uneven and/or superelevated.

In late April 2002, a SAS sensor was added to the pole. Both sensors were oriented to monitor the in-bound lanes on Sand Island Access Rd. Heavy truck traffic is observed on this road (about 25% over the 24 hours of a typical weekday and much higher during midday.)
(Left) Final touches in the deployment of the SAS acoustic sensor which is the one higher up on the pole. SAS calibration was somewhat problematic due to the limited offset from the travel lanes but the loud noise from aircraft taking off (above) had no effect on its ability to detect traffic.

Installation of twin fiber optic sensors (long stripes) and twin piezoelectric sensors to monitor the out-bound lanes on Sand Island Access Rd. They were deployed inside protective tape with adhesive substance on the bottom side to adhere to pavement. The tapes were nailed to the pavement for good measure and were removed one week later to avoid destruction by heavy traffic.
A portable apparatus was deployed on August 15, 2002 along the WB H-1 Freeway about 250 ft. west of the McCully St. overpass. The orange "light plant" is a trailer-based diesel generator with a boom that extends to 30 ft. In our application, the lights of the light plant were removed. SAS and RTMS sensors were installed on the boom. PEEK counters were connected to under-pavement inductive loops to provide ground truth counts (bottom right).

Two batteries in parallel for the RTMS and one for the SAS were housed inside the generator housing. Also shown in the picture above are the memory units for the RTMS and the SAS. The RTC is the white box and is connected to the RTMS. The SAS termination is the green electronic board. Water damaged it after heavy rain (below left), but it was restored by Smartek Systems.
Installation, inspection and modifications to the sensors is easy with the boom down. This can be a one-person operation if the boom is properly maintained. Ours needed significant shaking and coordination of two people due to rust and aging.

Two more items were added to the cabinet in September 2002: TrafMate satellite modems for the RTMS and the SAS sensors. One at a time must be used because of antenna interference. The antenna can be seen at the top end of the boom (below).
A tow truck delivered the “light plant” to the front lawn of the engineering building (Holmes Hall) in mid-November 2002. Two hours later, the entire deployment was completed including the university-mandated fencing around it.

Surveying equipment was used to estimate the distance from the first lane and the height based on the crown of the road.

Preliminary observations show that the acoustic sensor is sensitive enough to detect all mopeds and most bicycles. Reduction of sensitivity will be explored to avoid wind effects. The microwave radar on the other hand, does not detect bicycles and mopeds with default sensitivity settings.

HDOT setup two volume and speed stations, one for each direction, using piezoelectric sensors.
The overhead utility cables shown on the previous page do not obstruct the “view” of the sensors which are installed 20 ft. above the crown of the road, but in days with strong winds they generate a buzz that is detected by the acoustic sensor. The dark blotches correspond to actual vehicles but magenta lines on lane 2 are due to wind noise amplified by the cables. Speed estimates on Dole Street were exaggerated at this initial setup, but were subsequently corrected by setting the AVL to 10.

The cabinet includes a TrafMate satellite modem connected to the RTMS detector. Its antenna is at the top of the mast.

The cabinet also includes a TrafMate satellite pager with an antenna mounted outside the cabinet.

A notebook PC is necessary for the setup of both detectors. A basic setup can be accomplished in 20 to 60 minutes depending on traffic conditions and the number of lanes. (A moderate amount of traffic is best for setup, e.g., one vehicle per lane every 5 to 10 seconds.)
The LCD displays of the satellite modem (left) and satellite pager (right) show the volume counts in 30 second intervals. Their software collects and stores these data in user specified intervals (i.e., 15 or 60 minutes). At midnight, they connect to a satellite and download the data which are deposited onto a server in Massachusetts within 12 hours. From there, the end user can retrieve the password protected data.

The computer screen capture above shows the interface for the connection to the data server (top right), the server’s display of files available for download – three files in this case (top left), the saved ASCII data files, separate for each day (bottom left), and a sample data file in hourly interval (bottom right).