SmarTek Acoustic Sensor - Version 1 (SAS-1)

Installation and Setup Guide

Part-K
SAS-1 Based Truck Roll Over Warning System

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Note: In all cases, do not work or position equipment over an active traffic lane. Working over active lanes presents a hazard to the installer and to travelers using the highway. Follow local authorized procedures when installing the SAS-1 unit and any associated components or subsystems.

Sensing and System Integration Solutions

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Automatic Truck Roll Over Warning System

The SAS-1 based Truck Roll Over Warning System (**ATRWS**) uses the SAS-1 to monitor the approach to a curve or a curved ramp (Figure 1). Trucks that are traveling fast enough to present a possible roll over hazard are detected and alerted via a flashing sign. The SAS-1 is oriented so that all five detection zones are in the same lane and setup so that they make up a five zone "speed trap" for the purpose of measuring vehicle speed and length. The **SAS-1** and the **USI** (Universal Sensor Interface) are the primary real time components for detection and processing of vehicle signals and for setting the state of the **Warning Sign**. The **T-BOX** collects vehicle detection event information from the USI and maintains an Event Archive in it's non-volatile
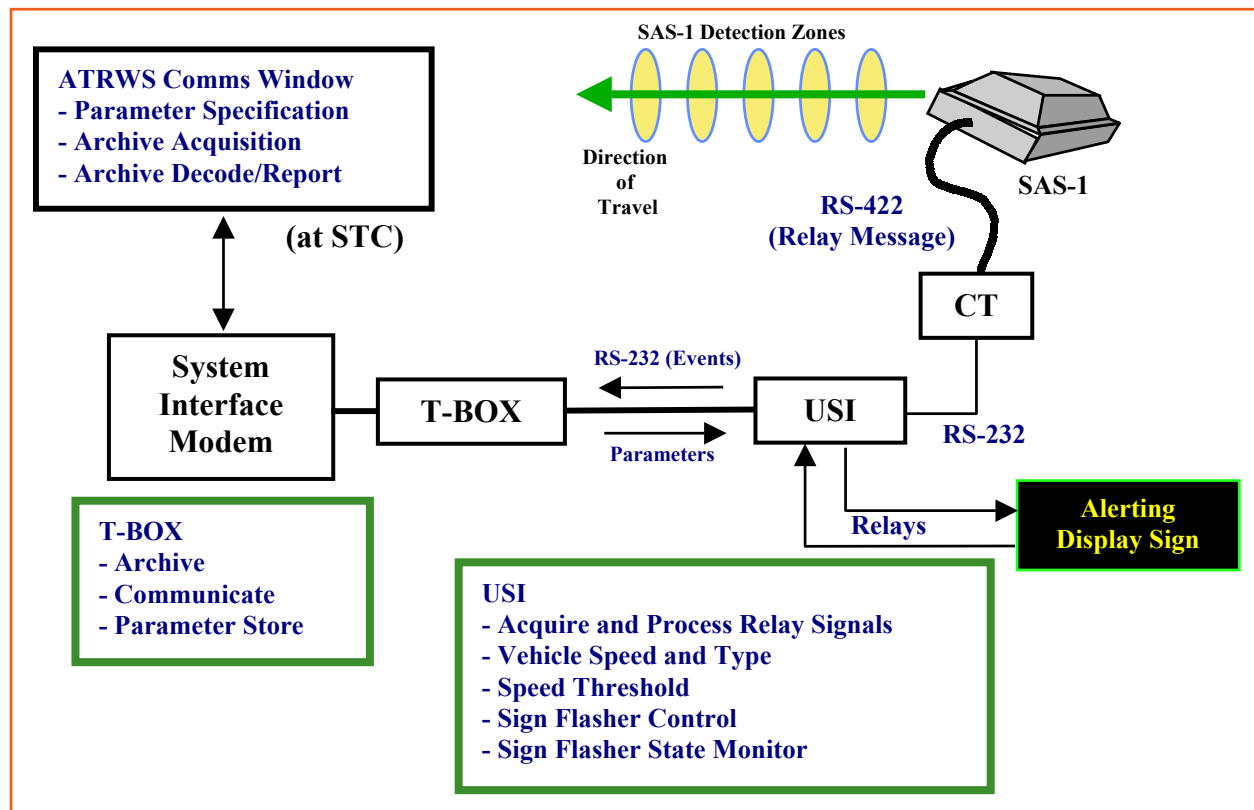
Figure 1 Automatic Truck Roll Over Warning System Components

memory. This Event Archive is set up in a rotating buffer format (drop the oldest event data and add the newest event data). The size or duration of the archive is selectable and is intended to be at least several hours. The **T-BOX** also maintains system parameter settings in it's non-volatile memory. The **T-BOX** communicates with staff at the **Traffic Center** via the ATRWS Communication Window in SAS Monitor and Setup Software. The purpose of the ATRWS Communication Window is to facilitate limited operating parameter changes from staff at the control center and to retrieve the Event Archive from the T-BOX upon staff request.

The interface between the T-BOX and the ATRWS Communication Window is not a continuous real time event monitoring interface.

ATRWS Operating Parameters

After installation of the ATRWS hardware components by SmarTek Systems or a qualified installer, a limited number of parameters are adjusted to setup and calibrate the system for operation. Operational parameters for the system fall into either Zone Parameters or Alert Parameters as indicated in the **ATRWS Communication Window** shown in Figure 2 . The ATRWS Communication Window is opened from the main display in SAS Monitor and Setup by clicking the **Settings/Communication Truck Roll Over T-BOX (Checked)** menu item.
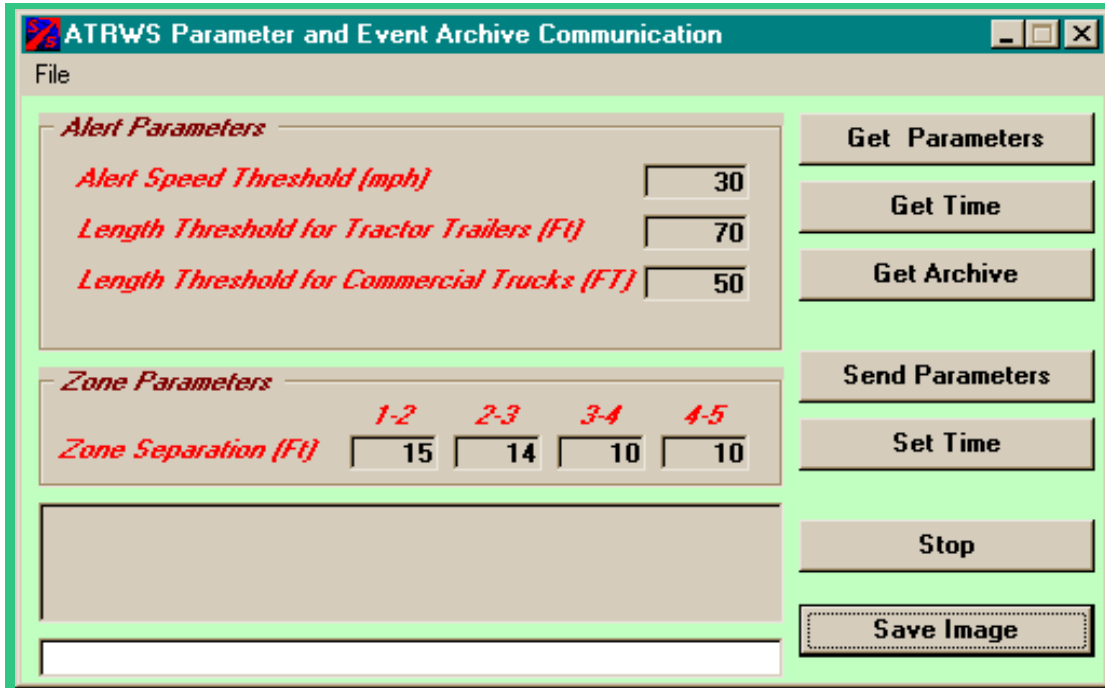

Figure 2 ATRWS Communication Window

Zone Parameters are set by SmarTek Systems or a qualified installer to calibrate the system for optimal performance. Zone Parameters include the **Detection Zone Separation in Feet**. These parameters are adjusted to calibrate the measured speed for each pair of detection zones. *Once these values are set by SmarTek Systems or a qualified installer, they must not be changed.*

Alert Parameters are set by SmarTek Systems or the end user to adjust the system alert sensitivity for vehicle speed and length.   Alert Parameters include:

Alert Speed Threshold (in mph) – This parameter is adjusted to set the vehicle speed threshold which will cause the warning sign to turn on or flash.

Length Threshold for Tractor Trailer in Feet – This parameter is adjusted to set the vehicle length threshold for tractor trailers. *Only tractor trailers with a speed above the Alert Speed Threshold will cause the warning sign to turn on or flash.*

Length Threshold for Commercial Trucks in Feet – This parameter is adjusted to set the vehicle length threshold for commercial trucks. *Only tractor trailers with a speed above the Alert Speed Threshold will cause the warning sign to turn on or flash, however, commercial trucks and all other smaller vehicles are also logged in the Event Archive.*

Using the ATRWS Communication Window to Get and Set Parameters

The end user may change the **ATRWS Alert Parameters** using the ATRWS Communication Window. Care must be taken however, to not unintentionally change the **ATRWS Zone Parameters**. *Once connected to a specific ATRWS site cabinet (T-BOX) via direct RS-232, dial up modem, or some other link it is extremely important to first issue a Get Parameters command to the T-BOX.* This ensures that the ATRWS Communication Window (in SAS Monitor) is updated with current parameters from that site. Changing any of the ATRWS parameters will impact the operation and performance of the system. Particularly, changing the Zone Separation will change the speed estimation performance. To change any of the Alert Parameters:

> **1)** Left click the **Get Parameters** Button.
> **2)** Modify one or more Alert Parameters by left clicking in the upper/lower parameter value field to increment/decrement the value.
> **3)** After changing the alert parameters, left click the **Send Parameters** Button.
> **4)** T-BOX Time may be retrieved or set by left clicking the **Get Time** or **Set Time** Button. *Note that setting T-BOX Time (Set Time Button) will reset the Event Archive in the T-BOX. Any event data previously logged will be lost.*

Using the ATRWS Communication Window to Get and Decode the Event Archive File

The T-BOX at the site cabinet always maintains an **Event Archive**. To retrive the Event Archive from the T-BOX, left click the **Get Archive Button** in the ATRWS Communication Window. The status of the retrival process is shown in the **SAS Monitor Status Line** in the lower left part of the SAS Monitor Main Display window. The retrival process may take several minutes depending on the link baud rate.

One the Event Archive File has been retrieved, it is placed in the "arch_data" sub-folder under the SAS Monitor and Setup application folder. The ATRWS Event Archive file (**.ahx**) is prefixed with a date and time stamp before it is placed in the "arch_data" sub-folder. The naming format has the following form:

yyyymmdd_hhmmss_filename.ahx

Where "filename" has up to 8 characters and is setup in the T-BOX for a specific site.

To select and decode one or more Event Archive files (**.ahx**), click on the **Decode Event Archive File** option in the **File** menu. Highlight a file or files in the standard Windows File Open Dialog Window and click the **OK** Button. The decode processing status is shown in the

ATRWS Communication Window status area just below the Zone Parameters frame. Once the decode processing is complete, each **spread sheet ready text file (.atx)** is placed in the "arch_data" sub-folder using the same naming format as the input file (**.ahx**).

The various system operating parameters and descriptive text is placed ahead of the event data in the file followed by a column label line, followed by each event line.

Each "space" delimited Event Line contains the following:
> Event Date and Time
> Event Counter (resets each month)
> Vehicle Speed in mph
> Vehicle Length in inches
> Vehicle Type (1-car, 2-commercial truck, 3-tractor trailer)
> Sign Activation Relay State (1-on, 0-off).