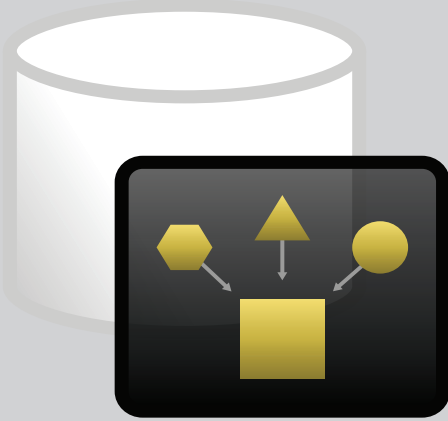


## Software suite for collecting data and monitoring traffic devices

The Command Suite provides robust data collection and monitoring for traffic detection devices—from a single device up to a large network of traffic sensors. Through a Web-based interface, this software system allows users to collect and monitor data, manage devices, and receive alerts.



- Per-sensor pricing allows organizations to scale collection and monitoring from one sensor to large networks of devices cost-effectively
- Automatically gathers data from a variety of traffic detection devices and monitors for missing and invalid data
- Web-based interface allows users to manage sensor status, configuration, and alert details through any Web browser
- Instantly notifies operators of device failure, traffic congestion, or other incidents
- Gap-free data collection ensures all available data intervals are retrieved.
- Exports data as user-defined sets viewable as grid, graph, XML,v or text formats

Command COLLECTOR										WAVETRONIX		
Sensors Data System Help										Welcome administrator (Logout) 1/16/2013 4:22:50 PM		
View Sensors and Data Collector: Sensors										Sensors Overview (Filtered)		
										Total: 56 (56)	Collecting: 42 (42)	Valid Data: 41 (41)
										Failing: 1 (1)	Succeeding: 41 (41)	Missing Data: 1,0 (1,0)
Add Sensors Remove Sensors View Errors Config Collection Intervals Commands Networks Data Search Help												
Display Settings Showing Sensors In Networks: All Of Type: All With com status: Any With data status: Any By Data: Any												
Com	Data	Sensor	Network(s)	Location	Description	Custom	Intrvl	Fq	Errors	S	V	O
		68.182.144.18:4660 (2005)	BC Ministry			2005	30	60	100%	--	--	--
		94.234.189.98:49998 (11290)	AMPARO	Hono	SS125 ITS Radar		300	600	100%	--	--	--
		94.234.189.98:49999 (1)					30	3000	100%	--	--	--
		cloud9.wavetronix.com:5000 (1)	Demo/AMPARO	32.307569; -86.386697	Airport		45	60	2%	54	59	13.7%
		cloud9.wavetronix.com:5001 (1)	Demo/AMPARO	32.30904; -86.375999	Lamar Rd.		30	60	0%	51	63	17.2%
		cloud9.wavetronix.com:5002 (1)	Demo/AMPARO	32.31057; -86.362797	Newcomb Ave.		30	60	7%	48	68	20.2%
		cloud9.wavetronix.com:5003 (1)	Demo	32.322296; -86.352363	Mobile Hwy.		30	60	1%	50	59	17.6%
		cloud9.wavetronix.com:5004 (1)	I-65/Demo	32.312131; -86.340208	I-65		30	60	0%	57	56	12.8%
		cloud9.wavetronix.com:5005 (1)	I-65/Demo	32.268769; -86.353184	Jct. SR 3		30	60	0%	58	57	11.8%
		cloud9.wavetronix.com:5006 (1)	I-65/Demo	32.27804; -86.346586	Hyundai Rd		30	60	0%	54	58	15.7%
		cloud9.wavetronix.com:5007 (1)	I-65/Demo	32.237491; -86.34149	Carter Lane		30	60	1%	56	56	11.6%
		cloud9.wavetronix.com:5008 (1)	I-65/Demo	32.297358; -86.338346	Coca cola Lane		30	60	1%	57	62	14.7%
		cloud9.wavetronix.com:5009 (1)	I-65/Demo	32.307316; -86.337053	Southlawn Dr.		30	60	1%	52	60	17.9%
		cloud9.wavetronix.com:5010 (1)	I-65/Demo	32.317471; -86.336184	Catoma Creek		30	60	0%	52	62	16.0%
		cloud9.wavetronix.com:5011 (1)	I-65/Demo	32.329022; -86.333727	South Blvd.		30	60	1%	57	56	12.8%
		cloud9.wavetronix.com:5012 (1)	I-65/Demo	32.338721; -86.328889	Bowman St.		60	60	1%	48	73	18.3%
		cloud9.wavetronix.com:5013 (1)	I-65/Demo	32.347586; -86.32221	Doris Circle		30	60	1%	60	55	11.5%
		cloud9.wavetronix.com:5014 (1)	I-65/Demo	32.356623; -86.321175	Stephens St.		30	60	1%	59	57	16.0%
		cloud9.wavetronix.com:5015 (1)	I-65/Demo	32.365663; -86.321749	Jct. I-85		30	60	0%	53	64	14.4%
		cloud9.wavetronix.com:5016 (1)	I-65/Demo	32.37583; -86.321647	Herron St.		30	60	1%	53	56	14.1%
		cloud9.wavetronix.com:5017 (1)	I-65/Demo	32.386865; -86.321958	North Blvd.		30	60	1%	56	58	13.9%
		cloud9.wavetronix.com:5018 (1)	I-65/Demo	32.395635; -86.330123	MM 174		30	60	0%	49	63	17.4%
		cloud9.wavetronix.com:5019 (1)	I-65/Demo	32.403322; -86.339379	MM 174.8		30	60	0%	59	54	11.8%
		cloud9.wavetronix.com:5020 (1)	I-65/Demo	32.41046; -86.347812	MM 175.5		30	60	7%	51	56	17.0%

## Technical specifications

### Traffic data collection

- Supports Wavetronix SmartSensor HD, SmartSensor V, and SmartSensor 105
- Collects from sensors as often as every 20 seconds
- Automatic retries in case of communication errors
- Gap-free data collection keeps track of missing intervals and fills in data gaps on subsequent connection attempts
- Supports TCP/IP communication as well as direct serial connections and dial-up
- Supports multidrop collection for multiple devices with a common communication channel
- Non-Wavetronix supported devices include:
  - Autoscope SoloPro / Terra cameras
  - RTMS
  - 3M Canoga Microloops
  - Diamond Traffic Counters
  - Mikros Data Loggers
  - Sensys

### Data storage

- Minimum 7 days of real-time data in sensor interval
- Minimum 90 days for aggregated 5-, 15-, and 60-minute data
- Stored data values per lane:
  - Volume
  - Occupancy
  - Vehicle Classification—up to 13 classes
  - Average speed
  - 85th percentile speed
  - Gap
  - Headway
  - Speed bin
  - Direction bin
- Sensor configuration history to retain data integrity after lane or other configuration changes

### Sensor management

- View current data status and communication history for each sensor
- Start and stop collection from individual sensors through Web interface
- Maintains separate configuration settings for each individual sensor, including collection frequency and time zone
- Run commands or change settings on multiple sensors through Web interface

### Updating sensor configuration

- Automated timer system retrieves configuration information from all sensors to keep configuration information up-to-date
- Manual option retrieves configuration information from one or more sensors at any time

## Ordering information

Command Suite (1 sensor license)

**CMD-COLL**

Command Suite (50 sensor licenses)

**CMD-COLL50**

Command Suite (100 sensor licenses)

**CMD-COLL100**

### Accessories

**CMD-TRANS** – Command Translator

**CMD-TRAVEL** – Command Travel Time System

**CMD-REPORT** – Command DataView

**CMD-MAP** – Command ViewPoint

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[www.wavetronix.com](http://www.wavetronix.com)

### Time synchronization

- Automatically synchronizes time of each sensor to server time at user-defined intervals or when time discrepancies are detected
- Manual option synchronizes one or more sensors to server time at any time
- Dynamic time system manages networks of sensors in different time zones

### Data monitoring

- Checks data for values above or below user-defined thresholds (speed, volume, occupancy, or vehicle class)
- Compares current data with historical data from comparable time period and reports percentage differences greater than user-defined threshold
- Checks for traffic incidents and congestion based on user-defined thresholds of low speeds or high occupancy
- Checks for missing data; either percentage missing over period of time or contiguous intervals missing, based on user-defined parameters
- Checks linear sequences of sensors for route congestion using user-defined parameters

### Alert notification

- Automatic notification of alerts through email or desktop pop-

up widget on local workstation

- Alert subscriptions can be adjusted per user according to alert severity level and/or time of day
- Automatic XML output for exporting alert data to Command Viewpoint module or other applications

### Camera management

- Assign camera location to specific sensors, along with a defined camera action
- Links to assigned camera(s) will pop up automatically in desktop widget when alerts are triggered, allowing instant access to video feed
- Camera actions can be created, modified, and deleted through the Web interface

### Database/file monitoring

- Automatically checks values in a database at regular intervals
- Checks file timestamps and attributes for modification
- Parses delimited text and XML files for data values

### Data reports

- Creates graph images for any data value for any sensor
- Creates reports in XML, text, or SmartSensor Manager HD format
- Formats traffic data in table form that can be customized and then saved in Excel, XML, or text format
- Automated export formats: TMDD, XML

### Alert reports

- Creates custom reports for one or more monitors
- Reports can run automatically on user-defined schedule, covering time range from one hour to one month
- Interface allows users to manually run alert reports at any time
- User subscriptions allow reports to be sent automatically to users through email when generated
- Web interface allows access to previously archived reports

### Web-based interface

- User interface accessible through any networked Web browser
- Login system allows different users with specialized permissions access to system functionality
- Interface allows access to sensor information and functionality such as:
  - Sensor status
  - Sensor configuration
  - Lane configuration
  - Data queries
  - Manual operations such as update configuration and sync time
  - Add or remove sensors
  - Arrange sensors into "networks," which can be managed as a group and assigned to different users

- Interface allows access to monitoring functionality such as:
  - Manage alert monitors, with run time and current status
  - View recent traffic alerts with alert severity rated from 1 to 100
  - Run monitors manually
  - Add new monitors with user-defined parameters and schedule
  - Modify or delete existing monitors
  - Adjust or create user subscriptions to one or more monitors
  - Configure and view alert reports
  - Add or remove users and modify user privileges

### Minimum hardware specifications

- Processor: Two Intel Xeon processors or better
- Operating System: Windows Server 2008 R2 or newer
- Database: SQL Server 2005 or newer
- Memory: 4GB SDRAM or more
- Hard drive: 250 GB or larger
- Networking: 1000 Mbps Ethernet network card or better

### Recommended hardware specifications

- Processor: Quad-core Intel Xeon processor or better
- Operating system: Windows Server 2008 R2 64-bit or newer
- Database: SQL Server 2008 or newer
- Memory: 16GB SDRAM or more
- Hard drive: Three or more hard drives of 500 GB or more with RAID 5
- Dual power supplies
- Networking: dual 1000 Mbps Ethernet network card or better

## Bid specifications

**1.0 General.** This item shall govern the purchase and installation of a traffic data collection and monitoring subsystem (TDCM), equivalent to the Wavetronix Command Suite, that is used to collect data from a vehicle sensing device (VSD) equivalent to the Wavetronix SmartSensor™ HD, SmartSensor V, or SmartSensor 105 and monitor that data as detailed in the special specifications and as directed by the engineer. Test results and other documentation demonstrating TDCM performance and capabilities shall be provided.

**2.0 Product description.** The TDCM shall be a server-based data collection and monitoring subsystem equivalent to the Wavetronix Command Suite. This system shall be a commercially available off-the-shelf ATMS subsystem that streamlines the collection, management, and dissemination of traffic detector data. The TDCM collects real-time data from advanced traffic detectors and stores this data in an SQL database. Distribution of this data is achieved using standard open XML data sharing messages, Web service APIs, and direct access to the database if necessary.

The TDCM shall be a software module that streamlines the monitoring, management, and dissemination of notifications regarding the current status of traffic data and equipment. The TDCM monitors real-time data from advanced traffic detectors stored in a relational database. Distribution of notifications is achieved using standard email or through a desktop information client application, and is published within the TDCM Web interface.

**3.0 Traffic data collection.** The TDCM shall collect data from VSDs using a 20-second time interval or greater.

Robust collection ensures that all available data is retrieved. This is done by tracking all missing time intervals and retrieving those intervals once communication to a VSD is available. The TDCM will retry up to five times to get data from the VSD before reporting a communication error. The TDCM shall continue to attempt to collect from a VSD that has failed to communicate unless the collection process is manually turned off. The TDCM shall disconnect from the VSD after retrieving data from it.

The TDCM shall support TCP/IP communication as well as direct serial connections and dial-up.

The TDCM shall support multidrop collection for multiple devices with a common communication channel.

The TDCM shall support the following devices:

- Autoscope SoloPro / Terra cameras
- RTMS
- 3M Canoga Microloops
- Diamond Traffic Counters
- Mikros Data Loggers
- Sensys

**4.0 Data storage.** The TDCM shall store data for a minimum of 7 days for real-time data, and for a minimum 90 days for aggregated 5-, 15-, and 60-minute data.

The TDCM shall store the following data values per lane:

- Volume
- Occupancy
- Vehicle Classification—up to 13 classes
- Average speed
- 85th percentile speed
- Gap
- Headway
- Speed bin
- Direction bin

The TDCM shall have a sensor configuration history that retains data integrity after lane or other configuration changes.

**5.0 Sensor management.** The TDCM shall allow the user to view current data status and communication history for each sensor.

The TDCM shall allow the user to use the Web interface to stop and start data collection from any of the VSDs.

The TDCM shall maintain separate configuration settings for each individual sensor, including collection frequency and time zone.

The TDCM shall allow the user to run commands or change settings on one or more sensors through the Web interface.

**6.0 Updating sensor configuration.** The TDCM shall have an automated timer system that retrieves configuration information from all sensors to keep configuration information up-to-date. The timer system shall be dynamic and manage networks of sensors in different time zones.

**7.0 Time synchronization.** The TDCM's timer system shall automatically synchronize the time of each sensor to server time at user-defined intervals or when time discrepancies are detected. The TDCM shall have an auto-time correction feature that will adjust the time on the sensor when it is more than five minutes out of sync.

The TDCM shall allow for manual synchronization of one or more sensors to server time at any time.

The TDCM shall have a dynamic time system that manages networks of sensors in different time zones.

**8.0 Data monitoring.** The TDCM shall check data for values above or below user-defined thresholds (speed, volume, occupancy, or vehicle class). The TDCM shall compare this current data with historical data from a comparable time period and report percentage differences greater than user-defined threshold.

The TDCM shall check for traffic incidents and congestion based on user-defined thresholds of low speeds or high occupancy.

The TDCM shall check for missing data; either percentage missing over period of time based on user-defined parameters, or contiguous packets missing based on user-defined parameters.

The TDCM shall use user-defined parameters to check linear sequences of sensors for route congestion.

**9.0 Alert notification.** The TDCM shall provide automatic notification of alerts through email or desktop pop-up widget on local workstation.

The TDCM shall provide alert subscriptions that can be adjusted per user according to alert severity level and/or time of day.

The TDCM shall provide automatic XML output for exporting alert data to traffic video applications such as Command Viewpoint or other applications.

**10.0 Camera management.** The TDCM shall assign camera locations to specific sensors, along with a defined camera action.

The TDCM shall provide links to assigned camera(s) that will pop up automatically in desktop widget when alerts are triggered. The links shall allow instant access to video feed.

The TDCM shall allow for camera actions that can be created, modified, and deleted through the Web interface.

**11.0 Database/file monitoring.** The TDCM shall automatically check values in a database at regular intervals.

The TDCM shall check file timestamps and attributes for modification.

The TDCM shall parse delimited text and XML files for data values.

**12.0 Data reports.** The TDCM shall create graph images for any data value for any sensor.

The TDCM shall create reports in XML, text, or SmartSensor Manager HD format.

The TDCM shall format traffic data in table form that can be customized and then saved in Excel, XML, or text format.

The TDCM shall provide automated exports in TMDD and XML formats.

**13.0 Alert reports.** The TDCM shall create custom alert reports for one or more monitors. These reports shall be able to run automatically

on a user-defined schedule, covering time ranges from one hour to one month.

The TDCM report system shall include a manual interface that allows users to run alert reports at any time.

The TDCM shall have user subscriptions that allow reports to automatically be sent to users through email.

The Web interface for TDCM shall allow access to previously archived reports.

**14.0 Web-based interface.** The TDCM shall provide a Web-based interface accessible for any user with a networked Web browser.

The Web interface shall have a user-management system that allows for multiple users. Each user shall have personalized login information and specialized permissions.

The Web interface shall allow access to the following sensor information and functionality:

- Sensor status
- Sensor configuration
- Lane configuration
- Data queries
- Manual operations such as update configuration and sync time
- Add or remove sensors
- Arrange sensors into “networks” which can be managed as a group and assigned to different users

The Web interface shall allow access to monitoring the following functionality:

- Manage alert monitors, with run time and current status
- View recent traffic alerts with alert severity rated from 1 to 100
- Run monitors manually
- Add new monitors with user-defined parameters and schedule
- Modify or delete existing monitors
- Adjust or create user subscriptions to one or more monitors
- Configure and view alert reports
- Add or remove users and modify user privileges

**15.0 Minimum hardware specifications.** The TDRS hardware shall consist of a server with two Intel Xeon processors (or better), Windows Server 2008 R2 operating system (or newer), SQL Server 2005 or newer, a minimum of 4 GB of SDRAM memory, a hard drive of 250 GB or larger, and a 1000 Mbps Ethernet network card or better.