

Requirements

Monitoring Traffic in Work Zones: The iCone System

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Prepared for:

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INTRODUCTION

The following requirements were developed by the Mn/DOT iCone Project Team. The iCone system did not meet some of the requirements when the project was started, but changes were made to accommodate requests of the Project Team and to add additional useful functionality to the product.

Because this project is exploratory in nature, some requirements were created that are beyond the capabilities that the iCone system currently offers. The requirements that the iCone could not meet are noted below in italics.

PHYSICAL REQUIREMENTS

1. The system shall be self-contained in a traffic barrel.
2. The traffic barrel shall be indistinguishable from other traffic barrels to passing drivers.
3. The iCone shall meet crash safety standards for use on the National Highway System.

FUNCTIONAL REQUIREMENTS

1. The system shall detect speed of vehicles travelling towards the sensor.
2. The system shall detect the volume of vehicles travelling towards the sensor.
[Note: the iCone system approximates volume by counting the number of times a speed measurement is made.]
3. The system shall have a cellular modem for communication to iCone's central office when cellular access is available.
4. The system shall have a satellite modem for communication to iCone's central office when cellular access is not available.
5. The system shall report speeds within three miles per hour of actual speeds.
6. The system shall be configurable to report data every minute.
7. The system shall be configurable to operate in a continuous data collection mode.

SYSTEM REQUIREMENTS

1. Data Requirements
 - a. The system shall report data in real time.
 - b. Real time data shall be available from iCone's website.
 - c. The system shall report data to iCone's central office.
 - d. The system shall report adjustable binned historical data.
 - i. System shall report 85th percentile speed data.
 - ii. System shall report 50th percentile speed data.
 - iii. System shall provide a binned speed curve.
 - e. Binned historical data shall be downloadable from the iCone website.
 - i. Historical data shall be downloadable in Microsoft Excel format.
 - f. The system shall be capable of providing per vehicle speed records.
[Note: The iCone system provides average speeds in user-defined time bins. The shortest bin interval is one minute, which provides an approximation of per vehicle data.]

2. Website Requirements

- a. Data recorded by the iCone shall be available on the iCone website.
- b. Historical data on the website shall be password protected.
- c. The website shall provide a mapping function that pictorially illustrates the location of the iCones.
- d. The website shall provide a mapping function that pictorially displays speed data in a color-coded format.
- e. The website shall provide both graphed and tabular historical data.
- f. The website shall produce an XML feed that can be parsed by Mn/DOT's traffic management software.

MAINTENANCE REQUIREMENTS

1. System setup shall require only one person.
2. System shall be powered with a sealed 12-volt battery.
3. System shall function for a minimum of 14 days on a single battery charge.
4. System battery shall be replaceable in the field without losing data.
5. System shall be recharged within a 12-hour period when connected to 120 VAC power.