

**PROPRIETARY-MATERIAL-USE
PUBLIC-INTEREST FINDING**

PROGRAMMATIC APPROVAL

PROGRAMMATIC APPROVAL PERIOD: July 1, 2012 – June 30, 2014

FHWA OVERSIGHT: YES NO

PROPRIETARY MATERIAL:

Sensys Networks, Inc.
VDS240 Wireless Vehicle Detection System

Product Selection

The Traffic Control Systems Division of the Indiana Department of Transportation is seeking approval to use the VDS240 Wireless Vehicle Detection System as an alternative to traditional vehicle detection in any of the following situations:

- An inductive loop design will not function well due to limitations such as right-of-way, geometrics, pavement conditions, obstructed conduit paths, etc.
- A full inductive loop design has been considered and there is a significant post-design lifecycle cost advantage to using a full wireless vehicle detection system.
- A hybrid design using inductive loops at the stop line and wireless detectors for the advance vehicle detection and the hybrid design is the most cost effective, based on post-design lifecycle cost.
- Temporary use at a temporary traffic signal or at a permanent traffic signal until such time as other vehicle detection methods can be installed.

Designers will have to submit a completed Wireless Vehicle Detection System Justification Form, when specifying wireless vehicle detection on a particular project. A copy of this Form is attached as Appendix A.

Product Components

The VDS240 Wireless Vehicle Detection System includes all of the components necessary for a complete installation, including:

- AP240 – Access Point Series
- APCC – Access Point Contact Closure Card
- Master (CC) and Expansion (EX) Cards
- RP240 – Repeater Series
- VSN240 – Sensor Series

Product History

The existing requirements for wireless vehicle detectors can be found in recurring special provision 805-T-173 and recurring plan detail 805-T-173d to the INDOT Standard Specifications as well as in Section 77-4 of the Indiana Design Manual. The desired system products are also listed on INDOT's Approved Materials List for Traffic Signal Control Equipment.

Project Compatibility.

The wireless vehicle detection system desired would be compatible with many traffic signal installation and traffic signal modernization projects throughout the State. The system would be intended for use at all traffic signal projects when its advantages outweigh its disadvantages.

Product Availability

The product desired is the only product of its type that is currently available in the United States. A Google search for "wireless vehicle detection" will turn up Sensys Networks as the only relevant product. There are two other manufacturers, Clearview Traffic Group, Ltd. based in the United Kingdom and Shockfish, S.A., based in Switzerland, but their products are only available in Europe. There are also other manufacturers that make a similar device that is intended only for home security use on driveways.

Product Cost

The most recent unit price summaries show an average unit price of \$780 for a wireless vehicle detector (pay item 805-10107) out of a total of 36 items. The conventional inductive loops may be more or less than this depending on the amount of conduit, saw cutting and signal cable necessary (to the nearest linear foot). For projects where the product's usage is based on lower post-design life cycle costs, the designer will include a cost comparison in the project file, a copy of the form is shown in Appendix A.

Maintenance

The product has some maintenance costs associated with it, as the batteries in the sensors must be replaced every ten years. However, the inductive loops also require periodic maintenance because the conductor wires are susceptible to being torn by the pavement. Therefore, depending on pavement condition, the maintenance work for wireless vehicle detectors is less expensive; it is also easier to schedule since it is known approximately when the batteries will need to be replaced.

Product Alternatives -- Summary Table

	Wireless Vehicle Detection Systems	Video Detection Systems	Traditional Inductive Loops	Microloop Detectors
Avoids using conduit to connect detectors with controller	Yes, the sensors are connected wirelessly	Yes, system installed on traffic signal cantilever	No, detectors connected with conduit	No, detectors connected with conduit
High Accuracy Rate	Yes, meets <u>ITM 934</u>	No, does not meet <u>ITM 934</u>	Yes, meets <u>ITM 934</u>	Yes, meets <u>ITM 934</u>
Acceptable if pavement is in poor condition	Yes, the sensor is sealed in a 4" pavement core	Yes, system installed on traffic signal cantilever	No, cables can be cut by deteriorating pavement	Yes, detectors bored underneath pavement
Capable of Providing Vehicle Counts	Yes, Type F Sensor	Yes	Yes	Yes, Canoga 702 Microloop
Proprietary Item	Yes, <u>VDS 240</u> by Sensys Networks	No, multiple manufacturers	No, multiple manufacturers	Yes, <u>Canoga</u> by GTT

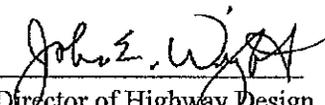
PREPARED BY:

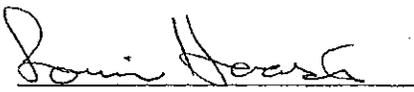
Date: 4/5/2012

Joseph E. Bruno
 Traffic Administration Engineer
 INDOT -- Traffic Support Division
 (317) 234-7949

Based upon the above finding, the use of the proprietary material listed is in the public interest and is hereby approved.

APPROVED:


 Director of Highway Design
 & Technical Support, INDOT


 For Division Administrator, FHWA
 (if FHWA oversight req'd)

Date: 5/16/12

Date: 5/16/2012

APPENDIX A

WIRELESS VEHICLE DETECTION SYSTEM – JUSTIFICATION FORM

Intersection: _____

Des No: _____ Contract No: _____

A wireless vehicle detection system is needed at the intersection listed above for the following reason(s):

Check all that apply

- An inductive loop design will not function due to physical limitations described below

Physical Limitations
 Right-of-Way or Intersection Geometrics (attach aerial photo or intersection diagram)
 Pavement Condition (attach pavement photos)
 Obstructed Conduit Paths (attach intersection diagram)
 Other: _____

- A full inductive loop design for vehicle detection has been evaluated and there is a post-design life cycle cost advantage, summarized below, to using a full wireless vehicle detection system

Post-Design Life Cycle Cost Estimate for Full Loop Install
Full Loop Installation Cost: _____
Signal Conduit Quantity: _____
Full Loop Maintenance Cost: _____
Full WVDS Installation Cost: _____
Full WVDS Maintenance Cost: _____

- A hybrid design using inductive loops at the stop line and wireless detectors for the advance vehicle detection is the most cost-effective vehicle detection method based post-design life cycle costs, as summarized below

Post-Design Life Cycle Cost Estimate for Hybrid Install
Full Loop Installation Cost: _____
Signal Conduit Quantity: _____
Full Loop Maintenance Cost: _____
Hybrid WVDS Installation Cost: _____
Hybrid WVDS Maintenance Cost: _____

- Temporary use

Reason for Temporary Use
 Temporary Traffic Signal
 Permanent Traffic Signal _____
(enter timeframe needed)

RECOMMENDED:

APPROVED:

Name: _____
Title: _____

Name: _____
District Traffic Engineer

Date _____

Copies To:
Project Manager
Highway Design & Tech Support Office

[BUY NOW](#)

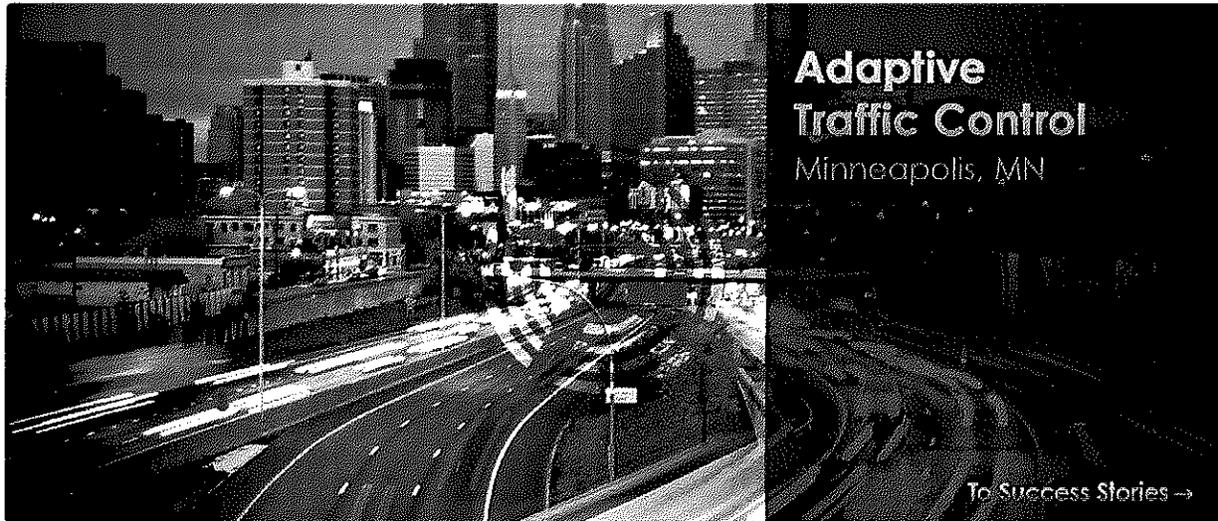
[Careers](#)

[Contact](#)

[Distributors](#)

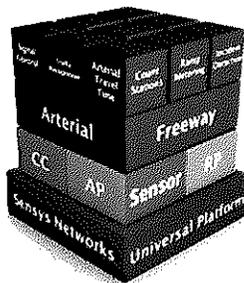


[Products](#) | [Applications](#) | [Technology](#) | [Services & Support](#) | [News & Events](#) | [Company](#)



1/17/2012 — Sensys Networks adds General Highway Products to their distribution network in Pennsylvania and Delaware

Data Infrastructure for Smarter Cities



If today's transportation infrastructure is all "bone" and "muscle," then Sensys Networks' wireless vehicle detection system is the "nervous" system, providing accurate, dependable, real-time data for region-wide roadway optimization.

[Read More >>](#)

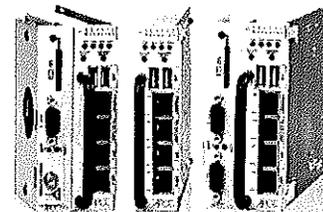
Game-Changing Technology



Stop deferring your maintenance – reduce it to near zero. Sensys Networks' rugged, in-ground sensor—with a 10-year battery life—is the core of our flexible, low-maintenance wireless vehicle detection system.

[Read More >>](#)

Access Point Contact Closure (APCC) Card



[Read More ->](#)

- [Register for Training](#)
- [Download Whitepapers](#)
- [You Tube / Join Us On YouTube](#)
- [Register for Technical Seminars](#)

Home	Products	Applications	Technology	Services & Support	News & Events	Company
Data Infrastructure	Access Point	Arterial	Sensors	FAQ	Press Releases	Management
Game Changing Technology	APCC	Freeway	Sensor Handling	Tech Docs and Resources	Events	Team
Success Stories	CC & EX Card	Intersection	Instructions			Careers
	MicroRadar™					Contact

BUY NOW

Careers

Contact

Distributors

Search

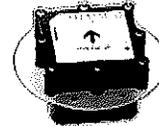


Products | Applications | Technology | Services & Support | News & Events | Company

Access Point APCC CC & EX Card MicroRadar™ Repeater Sensor SNAPS TrafficDOT

Sensor

Flexible, dependable, low-cost, the Sensys Networks VDS240 wireless vehicle detection system uses magneto-resistive wireless sensors to detect vehicle presence and movement. Virtually maintenance free, our sensors install in minutes, and deploy in a mater of hours, transmitting real-time data for a variety of traffic management applications.



Sensor

Features

- In-pavement installation with no wires or lead-in cabling
- 10-year battery life
- Impervious to weather
- Rapid installation and deployment reduces road closures and worker exposure
- Patented, ultra-low "NanoPower" communications protocol
- Superior accuracy, dependability, and extensibility
- Universal platform for all traffic detection applications
- Self-calibrating, self-tuning
- Re-usable and remotely upgradeable
- Easily deployed in complex configurations
- Capable of over 300 million detections

Functions

- 3-axis magnetometer for vehicle and motorcycle detection
- Sampling rate: 128Hz
- Reliable 2-way radio communications with Sensys Networks Access Points (AP)

Technical Documents

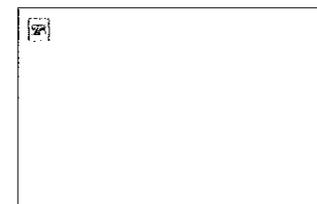
- VSN240 Wireless Flush Mount Sensor Data Sheet
- VSN240-F, VSN240-T Quick Start Guide
- Wireless Sensor Installation Guide
- Sensor Handling Instructions

White Papers

DOWNLOAD WHITE PAPERS

More Resources

- Sensor Product Photo
- SN YouTube Channel
- Training
- Beyond Ultra-Low Power
- Break the Loop of Broken Loops



Home	Products	Applications	Technology	Services & Support	News & Events	Company
Data Infrastructure	Access Point APCC	Arterial Freeway	Sensors Sensor Handling Instructions	FAQ Tech Docs and Resources	Press Releases Events	Management Team Careers Contact
Game Changing Technology Success Stories	CC & EX Card MicroRadar™	Intersection				

[BUY NOW](#)

[Careers](#)

[Contact](#)

[Distributors](#)

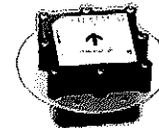


[Products](#) | [Applications](#) | [Technology](#) | [Services & Support](#) | [News & Events](#) | [Company](#)

[Access Point](#) [APCC](#) [CC & EX Card](#) [MicroRadar™](#) [Repeater](#) [Sensor](#) [SNAPS](#) [TrafficDOT](#)

Sensor

Flexible, dependable, low-cost, the Sensys Networks VDS240 wireless vehicle detection system uses magneto-resistive wireless sensors to detect vehicle presence and movement. Virtually maintenance free, our sensors install in minutes, and deploy in a matter of hours, transmitting real-time data for a variety of traffic management applications.



Sensor

Features

- In-pavement installation with no wires or lead-in cabling
- 10-year battery life
- Impervious to weather
- Rapid installation and deployment reduces road closures and worker exposure
- Patented, ultra-low "NanoPower" communications protocol
- Superior accuracy, dependability, and extensibility
- Universal platform for all traffic detection applications
- Self-calibrating, self-tuning
- Re-usable and remotely upgradeable
- Easily deployed in complex configurations
- Capable of over 300 million detections

Functions

- 3-axis magnetometer for vehicle and motorcycle detection
- Sampling rate: 128Hz
- Reliable 2-way radio communications with Sensys Networks Access Points (AP)

Technical Documents

- VSN240 Wireless Flush Mount Sensor Data Sheet
- VSN240-F, VSN240-T Quick Start Guide
- Wireless Sensor Installation Guide
- Sensor Handling Instructions

White Papers

[Download White Papers](#)

More Resources

- Sensor Product Photo
- SN YouTube Channel
- Training
- Beyond Ultra-Low Power
- Break the Loop of Broken Loops



Home	Products	Applications	Technology	Services & Support	News & Events	Company
Data Infrastructure	Access Point	Arterial	Sensors	FAQ	Press Releases	Management Team
Game Changing Technology	APCC	Freeway	Sensor Handling Instructions	Tech Docs and Resources	Events	Careers
Success Stories	CC & EX Card	Intersection				Contact
	MicroRadar™					

Sensor Installation

Quick Start
[See Im](#)

1 Assemble



Lay out Parts
Lay all parts on a flat surface.



Assemble Shell/Sensor
Place sensor in plastic shell.



Finished Sensor
Ensure sensor label is visible.

2 Install



Core
Core hole 4" diameter, 2 1/2" depth.



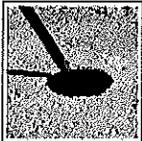
Clear
Vacuum or brush hole clear of debris. Ensure hole is dry.



Apply Epoxy
Fill EMPTY HOLE with epoxy to about 3/4 of hole depth.



Place Sensor
Ensure sensor is 1/2" - 3/4" below surface, level, label up, and away from edge of hole.



Apply Epoxy
Fill hole with epoxy.

© Sensys Networks, Inc • 2560 9th Street, Berkeley, CA 94710 • (510) 548-4820 • www.sensysnetworks.com ©

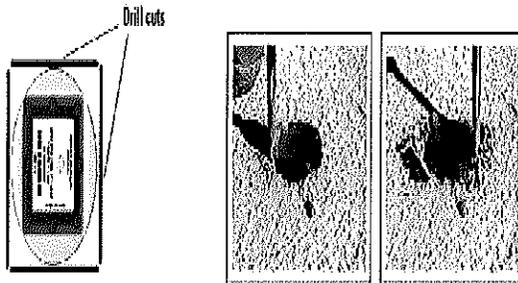
[Download](#) Page 1 of 2

VSN240-F, VSN240-T Quick Start Guide

Sensor Removal

Quick Start Guide: VSN240-F, VSN240-T

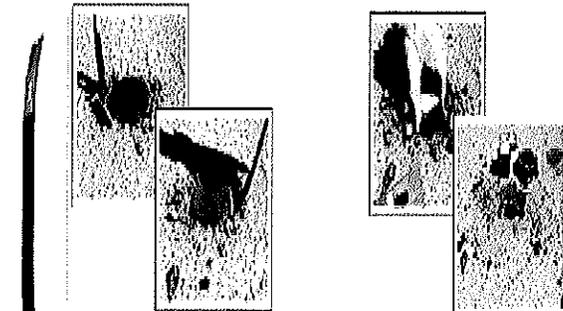
1 Chisel



Prepare
 For a sensor drilled with 1/4" Dia. Hole Mark Keys around sensor housing.

Chisel
 Chisel cuts 1" in depth. Chisel straight down. Observe all cautions (safety).

2 Remove



Pry Upward
 Insert pry bar. Pry upward and rotate bar. Rotate pry bar using sidebars.

Remove Sensor
 Push sensor out of hole. Use of bar and sidebars to ease out if need.

Warnings

When Using Chisel & Pry

Sevays Networks and their Field Chisel are not liability products.

- Sevays VSN240-F, VSN240-T, VSN240-E
- Keysca 88910 E, 88910 B, 88910 P, 88910 R, 88910 B, 88910 E

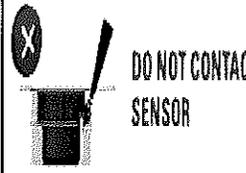
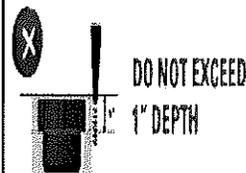
Do not attempt to modify and/or remove a sensor from its original mounting position. Any modification to the sensor housing or mounting position may void the warranty and/or cause damage to the sensor.

Following is the recommended order of the steps provided in this page and should be followed in the order provided in this document.

- DO NOT pry or remove the sensor from its original mounting position.
- DO NOT use the pry bar to pry the sensor out of the hole.
- DO NOT use the pry bar to pry the sensor out of the hole.
- DO NOT use the pry bar to pry the sensor out of the hole.
- DO NOT use the pry bar to pry the sensor out of the hole.
- DO NOT use the pry bar to pry the sensor out of the hole.

Sevays Networks sensors contain no serviceable parts and should never be disassembled. Installation and removal of sensors from pavement should only be done by trained personnel and care should be taken to insure that the sensor casing is not punctured or cracked.

Always follow the instructions in the Field Chisel manual. For more information, please contact Sevays Networks at 1-800-451-4444 or visit our website at www.sevaysnetworks.com.



971153-243 rev 003 Rev 0

Sevays Networks, Inc • 2500 9th Street, Berkeley, CA 94710 • (510) 540-4620 • www.sevaysnetworks.com

Installation, see reverse side

Download





VSN240 Wireless Flush-Mount Sensor

The Sensys Networks VSN240 Wireless Vehicle Detection System uses advanced magnetic resonance sensors to detect the presence and movement of vehicles. The sensors are installed on the surface of in-wall fixtures and in the roadway-mounted detector. They use advanced magnetic resonance technology to identify Sensys Networks access points. Vehicle detection can further extend the traffic signal cycle, reduce the time to green at a signal, or reduce the cycle time of a signal.

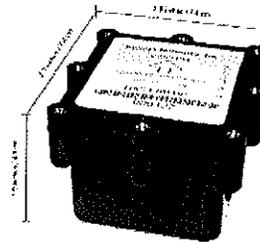
The Sensys Networks Wireless Flush-mount Sensor, Flush-mount sensors can be a part of the air management and a low-power radio in a small, hard-wired plastic case suitable for installation directly in the pavement.

In typical traffic management applications, a sensor is placed in the middle of a cross-street to detect the presence and passage of vehicles. Vehicle speed and length are measured by two sensors located in the same lane with the exact distance between them assigned to a vehicle. The recommended distance between sensors depends on the range of expected speeds to be measured. For typical freeway applications, a separation of 20 to 24 feet (6.1 to 7.3 meters) is recommended. For typical arterial applications, a separation of 10 to 12 feet (3.1 to 3.7 meters) is preferred.

Advanced Magnetic Resonance-Based Vehicle Detection. The sensors detect magnetic resonance signals from each vehicle as they pass over the sensors and create components of the Earth's magnetic field at a 128 Hz sampling rate. As vehicles cross within range, changes in the x, y, or z axis of the measured magnetic field become apparent. When no vehicles are present, sensors continually measure the background magnetic field to determine a reference. Each vehicle momentarily reduces the signal to the local measurement, and no long-term variations of the local magnetic field by causing the reference value to change over time.

Types of Wireless Sensors. Sensys Networks offers two types of flush-mount sensors:

- VSN240-F**
 - Flush-mount wireless sensor for highway or arterial
 - For all freeway, arterial, and signal control applications
- VSN240-T**
 - Flush-mount wireless sensor for highway or arterial
 - For general control applications only



Functions / Features

- 3-axis magnetic sensors for vehicle detection
- 128 Hz sampling rate
- Ground plane protection for roads
- Made for in-vehicle and roadway detector
- Superior accuracy
- Easy point-to-point
- Flush-mount for pavement installation with no wires or lead-in cabling
- Fast & simple installation
 - Install in less than 10 minutes in small hole using a hammer or core drill
 - 4" (101.6 mm) diameter, 2.4" (61 mm) cut depth
 - Cross-drill with fine-diameter pipe
 - Mount base directly into hole
 - No wires
- Extremely long battery life - average of 10 years
- Rugged mechanical design
- Accessible status
- Reliable 2-way radio communication with access point
 - Uniquely addressable and configurable
 - Easy-to-use cable up grade to wireless
- Can be readily deployed where other systems cannot be used
 - 5/8" cut depth
 - IP68 water tight
 - Damage resistant

	2140 North Street, Suite 219	tel: +1 (310) 945 4620	email: info@sensysnetworks.com
	Redondo, CA 90476	fax: +1 (310) 945 8761	Web: www.sensysnetworks.com

[Download](#)

Functional Specifications

detection technique	Staring Lidar
sampling rate	10Hz
programmable vehicle detection parameters (max 10 only)	<ul style="list-style-type: none"> • detection threshold • detection track length • detection track width • detection speed • detection acceleration
max detection protocol	ISO 15765-2 CAN FD (500kbps)
physical layer protocol	RS485 CAN
modulation	On-Chip, non-pulse position modulated, 250kbaud, 2500Vpp, 50% duty
transmission bitrate	250kbps
frequency band	240MHz to 248.5MHz
frequency channel	11
channel bandwidth	20MHz
antenna type	omni-directional
antenna field of view	360 degrees
nominal output power	10dBm
operating ambient	<ul style="list-style-type: none"> • 0-100°C < 10dBm • 0-100°C < 40dBm • 0-100°C < 20dBm • 0-100°C < 10dBm
typical relative humidity	5-95% RH
installation (max height)	2.0m

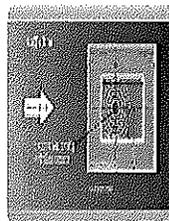
Sensor Modes

mode	application	description
0 (stop)	no detection	• no detection • no detection • no detection
1 (detect)	detect	• detection • detection • detection
2 (detect & delete)	detect & delete	• detection & delete • detection & delete • detection & delete

Power, Physical & Environmental

power supply	<ul style="list-style-type: none"> • 12VDC (typical) • 12VDC (typical) • 12VDC (typical)
dimensions	100mm x 100mm x 100mm
weight	1.0kg (typical)
environmental	<ul style="list-style-type: none"> • 0-100°C (typical) • 5-95% RH (typical) • 1000000 cycles (typical)
operating temp	0°C to 100°C

Vehicle Detection Zones



	F	P	D	T	S
frequency & channel applications (typical)	-10	-10	-10	-10	-10
frequency & channel applications (typical)	-10	-10	-10	-10	-10

Compliance

CE	<ul style="list-style-type: none"> • CE • CE • CE
EMC	<ul style="list-style-type: none"> • EMC • EMC • EMC



Local Distributor

Product of Sensys Networks, Inc. All rights reserved. © 2012 Sensys Networks, Inc. All rights reserved. All other trademarks are the property of their respective owners.

Download

