Wavetronix Tech Paper

Wavetronix is the proprietary radar detection system that is approved for use by the Office of Traffic Operations. The system uses two different types of detectors to identify traffic at an intersection: **SmartSensor Advance** and **SmartSensor Matrix**.

**SmartSensor Advance** is used to constantly detect and track vehicles arriving to the traffic signal. Its dynamic ETA tracking algorithm senses the speed and position of the vehicle allowing the traffic signal to give the vehicle safe passage through the dilemma zone. The extended range detector can identify cars up to 900 feet from the installed unit. These sensors detect moving vehicles only and the distance constraints are shown below.

![SmartSensor Advance Diagram](image1)

**SmartSensor Matrix** is used to detect stop bar traffic at a traffic signal. It uses a multi-beam radar in conjunction with a proprietary imaging process to provide pinpoint accuracy. It has a 90 degree field of view that extends up to 140 feet and can detect both moving and stopped vehicles.

![SmartSensor Matrix Diagram](image2)
Which Detector to Use on an Approach

High speed recall approaches with no separate required left turn phase detection, only requires one advanced dilemma zone detector unit.

High speed recall approaches that require separate left turn phase detection, also require a matrix stop bar detector to call the left turn phase in addition to a dilemma zone detector.

All high speed, non-recall approaches (typically side streets) require a matrix stop bar detector and dilemma zone detector. This example shows an approach without an exclusive left turn phase.
This example includes a separate left turn phase.

Low speed approaches do not require advanced dilemma zone detection. One matrix stop bar detector per approach is sufficient.
Detector Unit Placement

Advanced Dilemma Zone Detection: The preferred location is on the near RIGHT signal support/strain pole (example 1). The desired offset from the detector unit should not be more than 50’ from the center of the lanes being detected. When the offset is greater than 50’, the detector unit needs to be extended out into the intersection to reach the 50’ requirement.

- If the traffic signal is using span wire, then a luminaire arm will have to be mounted on the strain pole nearest the approach to extend detector into the intersection (example 2).

- If the traffic signal is using mast arms, then the detector will have to be mounted on the back of the mast arm nearest the approach (example 3).

Matrix Stop Bar Detection: The preferred location near LEFT signal support/strain pole (example 2). The detector shall be mounted no farther than 140’ from the outside edge line of the farthest lane being detected. When the distance to the outside edge line is greater than 140’, then the detector must be moved to meet the range requirement.

- If the traffic signal is using span wire, then the detector will have to be mounted on the pole adjacent to the traffic it is detecting (example 3).

- If the traffic signal is using mast arms, then the detector will have to be mounted on the back of the mast arm nearest the approach (example 1).
Design Notes and Sample Plans

Design Notes

- For stop bar detection zones, (not dilemma zone) the location should be shown on the plan sheets (placement and length). Their location will also be reflected in the Detector Chart.

- Detection zones for dilemma zone protection typically extend from 50’-900’ in advance of the stop bar. Show a generic detection zone on the approach – the actual limits will be shown in the detector chart. Do not show the entire 850’ detection zone on the plans.

- Dilemma zone protection is not used for approaches less than 45mph or on the stub of a “T” intersection.

- Dilemma zone passage time for dilemma zone only approaches shall be set to 1 second or less

- All delay and extension values shall be programmed in the controller, not the wavetronix unit itself.

The following is an example of how radar detection should be shown in the plans. The detector chart gives the Fields denoted with (*) are designer decisions. Values related to the dilemma zones are the typical values that should be used. They may be adjusted when detector placement changes or to accommodate site specific situations. Don’t show (*) in the plans. (The sample plan is for informational purposes only and represents a hypothetical situation, each chart will need to be uniquely created for each set of plans).