FAQs for SmartCycle®

1. Is SmartCycle a new product offering from Iteris?

2. What exactly is the feature provided by the SmartCycle?

3. I already use Iteris Vantage Video detection; how much does the SmartCycle upgrade cost?

4. What exactly is the California law regarding bicycle detection?

5. Can't I just install the specially-designed detector loops (for example, angled quadrupoles or quadrucircles) to achieve robust bicycle detection?

6. Do I have to draw separate detector zones for bicycles?

7. What is the recommended layout for SmartCycle's BIKE detector zones?

8. Hypothetically, a bike is approaching the intersection and is to be served by the phase 6 movement; how do I give it 4 seconds more passage time?

9. Hypothetically, a bike is waiting at the stopline and is to be served by the phase 6 movement; how do I give it a longer Minimum Green time?

10. Can SmartCycle detect bicycles that are completely carbon-fiber construction?

11. How does SmartCycle differentiate between motorcycles and bicycles?

12. Can SmartCycle count bicycles?

13. How robust is SmartCycle's detection? Will bicycles be missed by the detector?

14. I'm dubious. Can you prove it?

15. Are there environmental advantages to using Iteris Vantage Video for bicycle detection?

16. How can I be sure that Iteris SmartCycle video detection is the ideal solution to my bicycle detection needs?

1. Is SmartCycle a new product offering from Iteris?

A. No. SmartCycle was officially release in 2012, and Iteris released its 3rd generation of the bike differentiation algorithm in May 2015. SmartCycle is included on the entire Vantage detection family of video detection processor products, including: VantageNext, Edge2, SmartSpan, Vector, and VersiCam.

2. What exactly is the feature provided by the SmartCycle?

A. A detector zone drawn by the user on the field of view can be designated as a "BIKE detector zone". That zone will 'see' bicycles, but will be blind to larger vehicles. When that zone is outputting a call, you can be sure that it is a bicycle, and only a bicycle. This allows the traffic engineer to use the call for special or different traffic signal controller phase timing that is appropriate for bicycles.

3. I already use Iteris Vantage Video detection; how much does the SmartCycle upgrade cost?

A. Not a cent! Bicycle detection capability itself is not a new feature in the Iteris Vantage detector system family; our Vantage processors have been capable of robustly detecting bicycles for many years. The SmartCycle algorithm, however, is new and will need to be installed in your Vantage units as a firmware upgrade. Like all of our earlier algorithm improvements, it is provided to existing owners of our products at no cost. In most cases, existing Vantage processors can be upgraded by the customer (in the field, or on your shop bench) with new firmware that incorporates the SmartCycle algorithm. Request yours today through your Iteris Vantage dealer or factory sales rep.

4. What exactly is the California law regarding bicycle detection?

A. The California legislature passed AB 1581, which was signed by Governor Arnold Schwarzenegger on October 8, 2007, and it became state law as California Vehicle Code section 21450.5 on January 1, 2008 with a 10-year sunset provision. Caltrans subsequently issued Policy Directive 09-06 on August 27, 2009 as guidance for complying with AB 1581, with an effective date of September 10, 2009, following a development process that included public hearings at its CTCDC (California Traffic Control Devices Committee) and the formation of a 9-person AB 1581 Subcommittee to draft the comprehensive and technology-neutral directive. In the simplest terms, the law requires that when traffic-actuated signals are first installed or are replaced that they be capable of detecting bicycles and motorcycles as well as motor vehicles. It is a logical complement to CVC section 21202 enacted years earlier, which clarifies bicycles' full authority to operate on California roadways. The provisions included in the policy directive were also incorporated as additions and changes to several sections of California's MUTCD (Manual on Uniform Traffic Control Devices), the Caltrans-adopted state manual that prescribes uniform standards and specifications for all official traffic control devices in California.

5. Can't I just install the specially-designed detector loops (for example, angled quadrupoles or quadrucircles) to achieve robust bicycle detection?

A. Well, yes, those loop configurations are good at detecting the vast majority of bicycles that ride over the loop detector. But, what about bicyclists who lawfully move over into the left turn lane at a signal? Are you going to cut these bicycle-sensitive loops in all lanes at the stopline? If you do, those loops will also detect regular motor vehicles. Also, what about the new, high-tech bicycles that contain almost no metal which can interact with a loop detector? It can't be OK to just detect *most* of the bicycles, can it? Video- and/or infrared-based bicycle detection is the only way to robustly detect all bicycles traveling anywhere on the approach to the intersection.

6. Do I have to draw separate detector zones for bicycles?

A. Yes, precisely! That is the extra effort required to robustly and separately detect bicycles approaching a signalized intersection. The Vantage Edge2 processor has the capacity to monitor up to 24 user-drawn zones on any one video feed, so you won't be sacrificing or compromising the detection of motor vehicles when you use SmartCycle. The detector zones for bicycles (which, by the way, are just 'regular' zones with the "BIKE" attribute toggled on) can be drawn exactly on top of a non-bicycle zone. However, that isn't recommended, because it makes it more difficult to grab one or the other later, for tweaking of the zone's location or parameters. They can and often do occupy the same area, but with distinctly different edgeline locations. The zones are entirely independent of each other, and can be drawn to occupy overlapping areas.

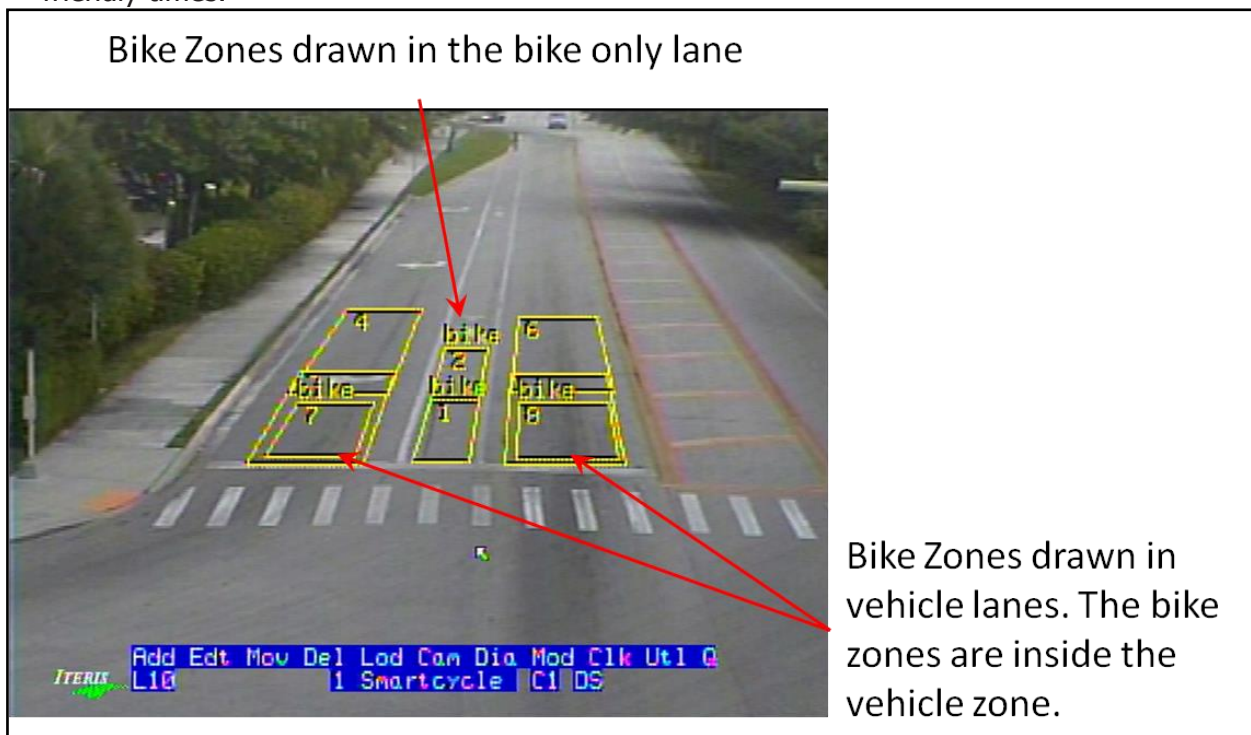## 7. What is the recommended layout for SmartCycle's BIKE detector zones?

A. If the approach contains a bike lane, draw two zones in it – one ending at the stop bar, and one directly behind it (shown below as zones 1 and 2). Don't overlap these two zones, but they can be touching each other. If bikes are to be detected in general purpose lanes, draw one zone just inside the borders of the regular stopline vehicle zone (shown below as zones 7 and 8). Each zone should be long enough to fully contain the 'design' bicyclist waiting at the stop bar. Those are the basics. There are a few more nuances in setting up BIKE detector zones, and those are covered in detail in the SmartCycle User Guide and in Iteris' online training module.

8. Hypothetically, a bike is approaching the intersection and is to be served by the phase 6 movement; how do I give it 4 seconds more passage time?

A. Simple! Just program that bike detector zone output to have four seconds of call extension. As soon as the bicycle exits the BIKE detector zone, the SmartCycle processor will start an internal timer and keep the output call for that movement active (i.e., logical TRUE) for four more seconds. At the expiration of the internal four second timer, the call will be dropped. By this time, the bicyclist will be far enough across the intersection to safely gap out the phase and commence its YELLOW change interval. This call extension time, of course, is a user-settable parameter for each BIKE detector zone. Alternatively, you may have an ultra-modern, feature-rich traffic signal controller in place that can be commanded to use an alternate timing table that is activated by a "special" detector call. No need in that case to extend the call within the SmartCycle processor - - instead, just connect the BIKE detector zone's output to the activation trigger for that alternate timing table.

9. **Hypothetically, a bike is waiting at the stopline and is to be served by the phase 6 movement; how do I give it a longer Minimum Green time?**

A. This one is a little more difficult, but easy once you know the trick. Program a spare phase in the controller (Note: it needs to be compatible with phase 6, so that they can be active together) with the safe-for-bikes minimum green time. Program the BIKE detector zone to output to this spare phase. Program an Overlap phase as being the spare phase plus phase 6, and connect the signal heads' field wires to this Overlap's load switch. When a bicycle is present, the spare phase will be called and served, and the longer Min Green time will be used. When no bicycle is present, only phase 6 will be called and served, with its associated shorter Min Green time. Or, as mentioned in the previous answer, you may have a modern signal controller which has an alternate timing table for a phase that can be called up based on a special detection. In that case, program phase 6's alternate timing table with the bicycle-friendly times.

Bike Zones drawn in the bike only lane

Bike Zones drawn in vehicle lanes. The bike zones are inside the vehicle zone.

10. **Can SmartCycle detect bicycles that are completely carbon-fiber construction?**

A. Yes. Metal is unnecessary for Iteris Vantage video detection of bicycles.

11. **How does SmartCycle differentiate between motorcycles and bicycles?**

A. The honest answer is that sometimes it cannot. However, many motorcycles are larger than bicycles, and that size difference can allow for that discrimination. Also, motorcycles are often traveling far faster than bicycles can, and the SmartCycle algorithm does utilize vehicle speed as one of the criteria in recognizing a bicycle.

12. Can SmartCycle count bicycles?

A. Yes. 6 separate count zones can be created for bicycles, in addition to the 6 count zones for vehicles.

13. How robust is SmartCycle's detection? Will bicycles be missed by the detector?

A. Iteris Vantage has been successfully detecting bicycles since 2007 – almost 6 years before SmartCycle. Earlier studies undertaken for Caltrans by Kimley-Horn demonstrated a 100% accuracy by the pre-SmartCycle version of Vantage Edge2 processors. (Note: Iteris was the only vendor product tested that achieved 100% accuracy for both day and night performance – no missed calls and no false calls!) The detection algorithms in Vantage are continually improved by the Iteris software team, and Iteris' latest camera offering paired with SmartCycle (RZ-4 Advanced WDR) provides an image that is optimized for Vantage video detection systems. The enhancement of also providing bicycle ***differentiation*** (i.e., the SmartCycle algorithm) cannot backtrack on the robust and accurate bicycle detection performance achieved by its predecessor.

14. I'm dubious. Can you prove it?

A. Take a look at our YouTube video: *www.youtube.com/watch?v=9vp4c-xUBqQ*.

15. Are there environmental advantages to using Iteris Vantage Video for bicycle detection?

A. All video detection has measurable environmental advantages over in-ground detection methods. There are no hazards such as noise, dust, silica bearing effluent, or VOCs produced during installation. Compared to loops, the installation of video is quick and requires minimal lane closures, associated vehicle delays, and emissions. Video detection, categorically, also minimizes environmental impacts if and when it becomes necessary to modify detection zone placements or parameters. Once installed, no further lane closures are necessary, and the ease of modifying zones makes it more likely that short-term changes (such as, for construction detours) will be implemented. Doing so is guaranteed to eliminate unnecessary false and missed calls that significantly degrade intersection operation, increase delays and increase emissions.

16. How can I be sure that SmartCycle video detection is the ideal solution to my bicycle detection needs?

A. Why not try a demonstration installation? Contact Iteris Roadway Sensors to make arrangements and see for yourself that SmartCycle can solve your bicycle detection issues at lowest cost with maximum flexibility. SmartCycle is the only detection solution available that gives the customer the ability to differentially detect bicycles anywhere on the approach without any additional equipment. Why pay another detector vendor for bicycle detection, when it is available as an integrated feature across the entire family of Vantage video detection products?