

Tech Note - 04

Surveillance Systems that Work!™



Capturing License Plate Data

Reducing Store Shrink

With the price of fuel skyrocketing, virtually every gas station – convenience store owner is presently seeking ways to "minimize their shrink" - no that doesn't mean make their therapist smaller – due to customer drive-off's (without paying for pumped fuel).

...prevailing
trend...

In the past, law enforcement was willing to work with a verbal description of a perpetrator's vehicle, however, in recent months, there is a **prevailing trend to not even bother to follow up on a report unless there is actual video evidence (including a vehicle license plate) of the crime.**

Guard-Dog Video has successfully implemented the following methods and, so far as we know, every drive-off attempt has been foiled as a **Guard-Dog Video** system has captured the culprit's license plate information.

Physics is Physics

Guard-Dog Video works with a good many Convenient Store – Gas Station customers. As such we've invested a good deal of time and effort understanding camera dynamics in these applications. One recent experiment provides some telling truths regarding the physics of the application.

Using our CB04A, 480 line, 380K pixel, day/night (with infrared) camera, equipped with a fixed focal length, 12mm lens, we captured video in 5-foot intervals from 50 feet down to 15 feet. Still photos of our results are included as Appendix to this article. We concluded the following:

1. The minimum screen width to ascertain the letters on a 12" wide vehicle license plate is between 6 and 8'. **NOTE:** 6' to 8' field of view is too narrow to capture two gas pump bays (two adjacent vehicles), therefore using "typical hi-resolution cameras, it is necessary to dedicate one camera to each vehicle bay,
2. The lens focal length necessary to capture discernable license plate data from 60-75 feet – the typical distance from a station building to a pump – is about 50mm. At 60 feet, a 50mm lens provides a 5.8-foot wide (horizontal) field of view (certainly narrow enough to adequately read the plate) and at 90 feet, an 8.6-foot wide field of view (just on the edge of the plate going blurry),
3. Some installations may provide the option of moving the camera closer to the pumps. If possible this is a good thing, however, the clarity of the plate numbers diminishes with the angle of incidence (i.e. clarity is best when viewing perpendicular to the plate).

OK – so how do we overcome physics?

There are a number of application solutions to solve the dilemma of not being able to render quality video at the pump. The following detail a few of the "tried and true" methods we've successfully employed in customer applications.

Locate Bullet Cameras on Fuel Pump Canopy Poles

Figure 1 at the right details a simple pump station. The two small squares are the canopy poles; the rectangle in between is a single fuel pump. **Note:** There are two cameras shown mounted on the canopy pole.

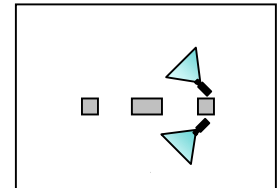


FIG. 1



The photo to the left shows the actual installation of the two cameras noted in Fig. 1. This was a diesel pump island consisting of 7 pumps designed for 8 semi trucks to fuel simultaneously. This station a truck could fuel on either side of the pole while on each subsequent station only one truck could fuel at each pump. Eight cameras were installed on this particular pump island.

The average gasoline drive-off is in the \$50 to \$75 range. A semi-truck fueling from empty can easily rack up a \$300-\$500 in a single fuel stop. As you might imagine, with that 8 or more trucks fueling – each blocking the fuel desk's view of what's happening when – it's rather simple to understand why the truck stop owner was so concerned with video of his diesel islands.

The photo on the right is a closer look at the camera mounting noted above. Rather than mount the cameras directly to the canopy pole, a readily available 5.5" square outdoor enclosure (NEMA 4X) was used.



Behind the box, a 1-1/8" dia. hole was drilled into the canopy pole. Siamese cable (coax and 18-2 DC power wire) was fished from the top of the canopy down through the hole. A similar sized hole was also drilled in the back of the plastic 4X enclosure.

To ensure a fluid tight enclosure, before the box was secured to the pole with 1/4 x 20 x 3/4" fasteners (drilled and tapped hole were made on opposing corners) a solid bead of silicone caulk was applied ~3/4" from the outer edge of the enclosure and a second bead of the same was applied ~1/2" surrounding the hole on the back side of the enclosure.

Prior to getting on the ladder to make the connections and attach the enclosure, the bullet camera (CB-01A) bases were secured to the cover. The video and power connections are all terminated inside the box and the cover secured with (4) fasteners. Finally, a 1/8" slot was made in a 3/4" plumbing plug (so the camera wires could just past through) and the plug dry fitted (so if necessary, it could be removed for future service) thereby completing the installation.

A slight variation of the above noted mounting configuration is detailed in Fig. 2. Often vehicles can drive into a pump from either direction and/or fuel pumps allow fueling on each side of the pump. In this case, two cameras mounted on each canopy pole can be used to capture vehicle license plate information from either the front or the rear of a vehicle. Additionally, depending upon the dimensions of the pump island, one camera can also cover both sides of the pump.

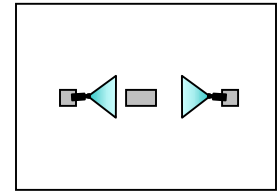
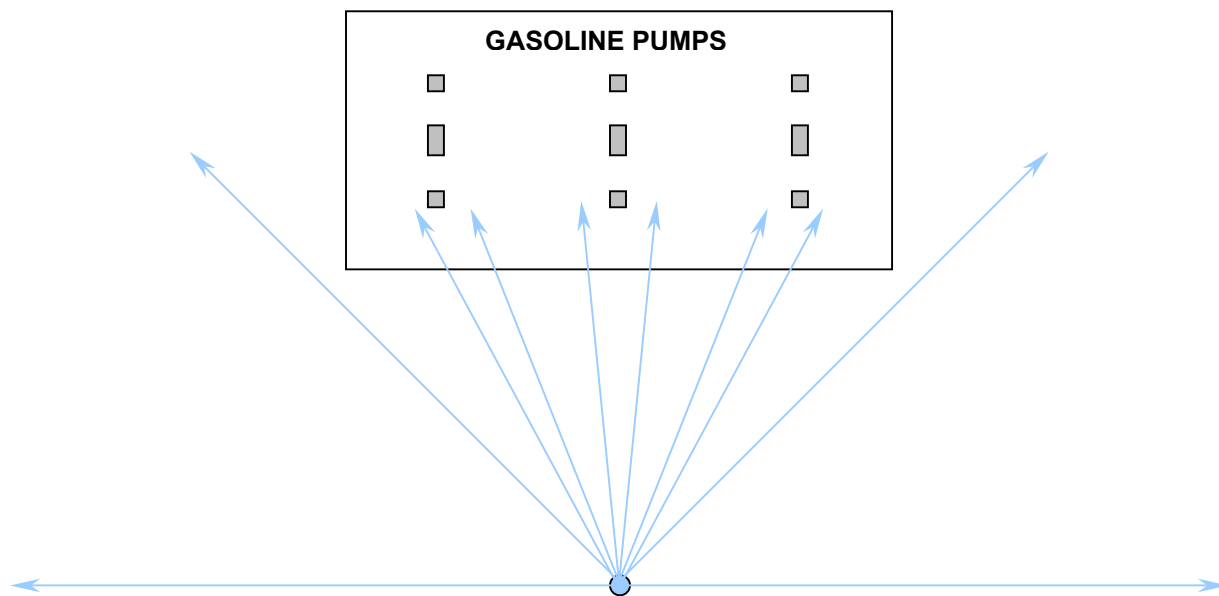


FIG. 2

PTZ (Pan-Tilt-Zoom) Cameras

PTZ cameras can be very useful in fuel station applications. A single PTZ camera (programmed to "tour" each pump) can often cover multiple pumps. **Guard-Dog Video's** extensive PTZ camera offering provides a solution for virtually every application.

A Pan-Tilt-Zoom camera is a specialized video camera that has (internal to the unit) separately controllable motors that allow the camera to be moved left to right (Pan), up and down (Tilt) and a mechanized variable focal length (Zoom) lens. In addition, when moved or zoomed, these cameras also have the ability to automatically adjust focus – thereby always providing a clear, sharp image.



In the above diagram, during a single 180° pan tour, the West side of the parking lot is viewed from two angles, all six pumps are recorded (both from a wide angle and a zoomed – license plate viewpoint) and the East side of the parking lot is surveyed from two perspectives. This tour encompasses 13 preset (programmed) positions and is completed in less than 90 seconds.

A stunning demonstration of a **Guard-Dog Video** installed PTZ camera's capabilities are shown on the following page.

Example pictures from recorded PTZ camera video



The following four (4) shots are rather interesting. One of our customer's employees took manual control of the installed PTZ camera. The first two shots detail the vehicle and its plate. The latter two shots show a side facial profile of the driver as well as detail the young lady's tongue ring.



These photos were taken from a distance of seventy-five (75) feet!

In conclusion, if you're a fuel station owner, concerned about protecting your investment, these are just a few of the many valuable tools available from your local Guard-Dog Video System Sales Representative and Professional Installer.

If you have any additional questions please feel free to contact us directly.

We welcome your business!

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APPENDIX

