



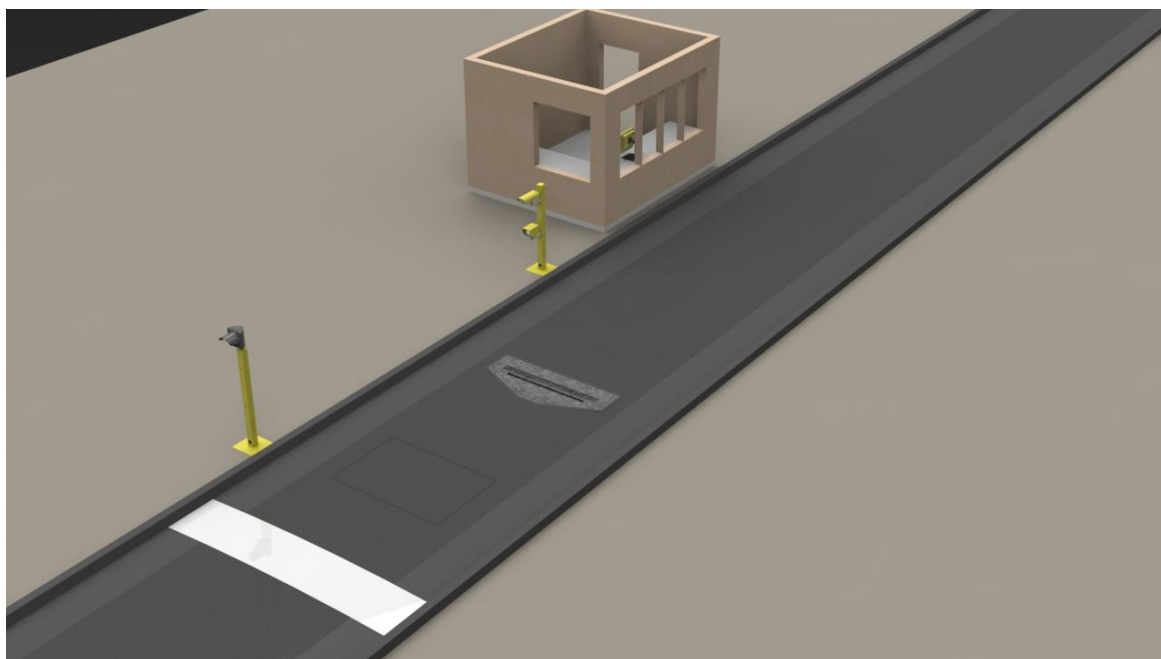
GKH-3011 Vault Automatic Under Vehicle Inspection System

Product Summary:

The GKH-3011 Automatic Under Vehicle Inspection Systems (AUVIS) is the economical, embedded solution for the fully automatic identification of foreign objects or modifications to a vehicle's undercarriage. Vehicles drive over the environmentally sealed scanner while Gatekeeper's system scan and compile a high-resolution image of a vehicle's undercarriage to create the vehicle's digital "fingerprint". An overview/driver camera captures the normal view of the vehicle/driver and displays this on the high-resolution touch screen.

After the vehicle has cleared the scanner, it will take 2 – 3 seconds for Gatekeeper's Automatic Foreign Object Detection software to automatically compare the subject vehicle's undercarriage to a safe vehicle (stored in the database) and display both on the screen. The system then immediately identifies any foreign object or modifications to the undercarriage by circling them with a red ring see below AND activating an audio and/or visual alarm.

The system can be integrated with other access control technologies such as automatic license plate reader (LPR) & RFID reader, bollards and barriers of many types along with additional CCTV cameras etc. The GKH-3011 has such standard features as a system traffic light, Watch List, automatic verification of license plate against vehicle undercarriage (providing LPR is integrated), vehicle make and model identification, activity reports and all GKH-3011's are network enabled requiring only to connect the systems to a common network. In addition the GKH-3011 has an optional Autowash feature that allows the system to wash away dust and dirt automatically when installed.



A typical GKH-3011 layout.

Overview of Technology.

Below are the primary features & capabilities that separate Gatekeeper from all other under vehicle inspection systems. In combination with these is the actual performance record of the Gatekeeper systems gained from deployment worldwide from the cold of Northern Russia to the heat of the Middle East.

Core Technology – Gatekeeper’s technology uses Area Scan Image Processing technology which allows vehicle images to be normalized regardless of the speed of the vehicle as it crosses the scanning platform. Image capture and processing technologies such as recorded video streams, or line scanning processing are not capable of automatic identification and searching because they require the human operator to view/compare the images and decide if there is any object or modifications that could pose a threat. Live/recorded video and line scanning systems have been proven to be unreliable as an inspection technology due to poor performance and that they rely heavily on human knowledge, attention span and intervention.

Vehicle Finger Print – Gatekeeper’s systems compiles a high resolution digital image of a vehicle under carriage to create a virtual “finger print” of the vehicle.

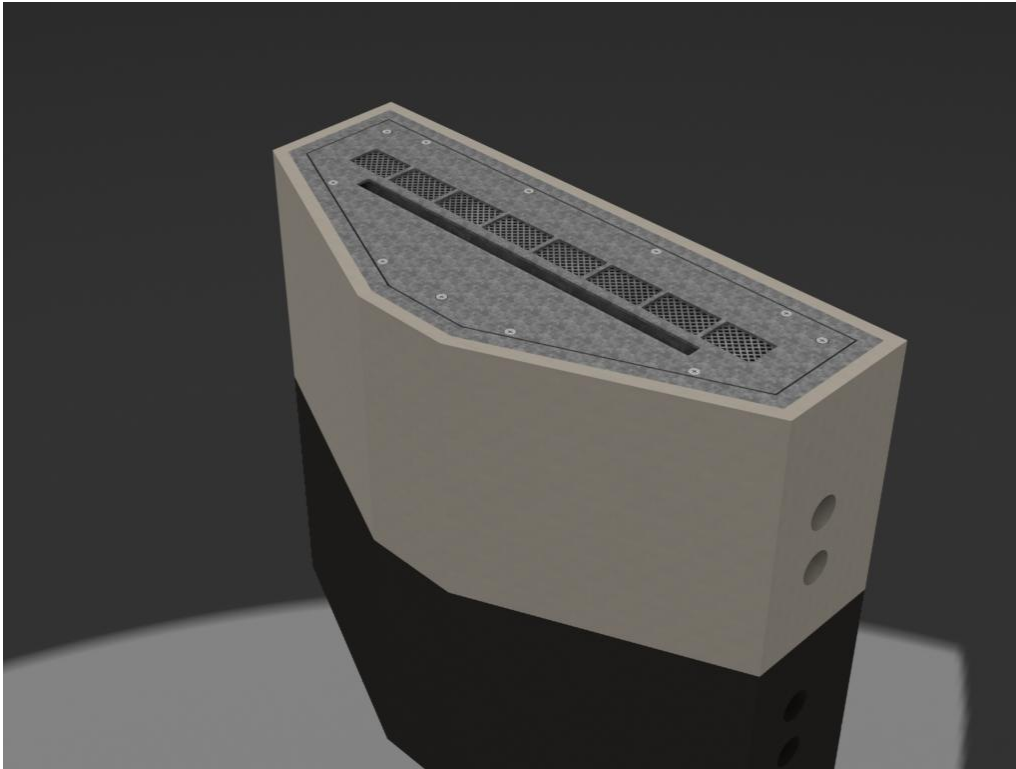
Automatic Vehicle Identification – Gatekeeper’s system uses the vehicle finger print to automatically identify the vehicle by matching the image against a data base of vehicle finger prints. The system does not rely on license plates etc to recall the vehicle from the database it is done via Gatekeeper’s patented pattern recognition algorithms. The stitched image is converted into a digital computer file and stored in a SQL data base where it can be matched against the entire data base. When a match is found the identity of the vehicle make & model can be (user defined) displayed on the operator terminal.

Automatic Foreign Object Detection – Gatekeeper’s system use Area Scan Digital Image Processing technology to convert vehicle under carriage digital images into computer files that are matched against a data base of known safe vehicle images. The Gatekeeper software automatically compares the subject vehicle to a safe vehicle and immediately identifies any foreign objects or modifications to the under carriage that may pose a threat. When a difference between the reference image and new scanned image is identified by the system it automatically places a red ring around the difference i.e. explosive or change to undercarriage etc and activates an audio and/or visual alarm to alert the operator of the threat.

System Performance Requirements

- Maximum Vehicle Speed – 40 Kilometers per hour
- Vehicle length: cars to very large/long trucks
- Vehicle weight: > 30 ton axel weight – approximately 60 ton gross vehicle weight.
- Decision Response Time – (the length of time from when the vehicle clears the scanning platform until the system automatically identifies the vehicle, automatically searches the under carriage and displays the decision results on the operator terminal)
 - 2 – 3 seconds

Gatekeeper GKH-3011 Specifications



Operating Environment

All outdoor equipment has been designed for installation in harsh climate conditions and has been designed to comply with the following standards:

- High Temperature: MIL-STD-810E, Method 505.3 Proc. I.
- Low Temperature: MIL-STD-810E, Method 502.3, -40 °C storage; -20 °C operating
- Altitude MIL-STD-810E, Method 500.3 Proc. I: 15,000'; Method 500.3 Proc. II: 6,000'
- Sun Radiation: MIL-STD-810E, Method 505.3 Proc. II
- Fungus: MIL-STD-810E, Method 508.4 materials only
- Winds: Constant winds of 30 m/sec
- Rain: MIL-STD-810E, Method 506.3 Proc. I
- Sand and Dust: MIL-STD-810E, Method 510.3, Proc. I and II
- Humidity: MIL-STD-810E, Method 507.3, Proc. I, 95%
- Salt Spray: MIL-STD-810E, Method 509.3 materials only

SOFTWARE OPERATING SYSTEM

Automatic Foreign Object Detection System (AFODS)

- Patent pending digital “stitching” of continuous motion vehicle image to create high resolution digital image regardless of vehicle speed up to 40 KPH
- Patent pending digital image algorithms automatically match scanned vehicle “fingerprint” with vehicle database, detect foreign objects and provide visual alerts on the operator terminal
- . *Operating System:* Windows XPE
- . *Database:* Windows SQL (250,000 vehicle records) - standard configuration
- . *System Architecture:* Open
- . *Online Assistance:* Global Reach ™
- . *Features:* Identification of Vehicle makes and models, Watch List for wanted vehicles, Single Inspection View, Vehicle Verification vs. License Plate

Language: English or Arabic GUI

SYSTEM PHYSICAL PROPERTIES

Permanent Embedded Frame (single view)

Top Plate Dimensions: 76.2cm long x 178cm wide at widest point tapering to 60.96cm at the narrowest point in one piece.

Weight: 54.5 Kilo (approx)

Environmental: Galvanized 1” steel Diamond Plate.

Mounting

Poured concrete frame and steel bar supports the Top Plate

Scanner

Dimensions - Basic Unit: 25.4cm square by 30.32cm high containing an Area Scan Monochrome Camera.

Power Source: The scanner system is powered by 24 VDC power supply. The input is 110 – 240VAC, 50 – 60 Htz (auto sensing power supply).

Environmental: Sealed unit to protect against heat/cold, moisture, sand, dust, oil etc, humidity and vibration.

Temperature range: -10°C to 70°C

Humidity range: 0 to 95% relative, non-condensing

Viewing Angle: A single 90° view of a vehicle undercarriage.

Lighting: One light rail consisting of five individual blocks of high output arrays of advanced red LEDs controlled by microprocessors:

Junction Box: A junction box is affixed to a pole/wall above ground that allows for easy access to the systems switching, power and communication devices. The junction box contains:

Power supplies

Ethernet based DIO

Ground Loop detector

Ethernet Switch

AC transformer

Wiring Terminal Strips

The Junction box has a 6cm diameter conduit flange at the bottom that allows for coupling to the conduit run for the various system devices (ground loop, overview camera, ALPR camera, scanner, light rails, traffic light and Operating Terminal).

Scanning Camera

Type: Area Scan – monochrome

Frame Rate: 300 FPS

Connection: GigE

Filters: Band-pass

Operator Terminal

Indoor Operator Terminal:

Dimensions: 48.26cm Active Display Area Screen

Screen Type: Flat, Color, touch Screen

Resolution: 1280 x 1024

Weight: 3.62 Kilo (approx)

Environmental: Suitable for indoor air conditioned / heated area use only

Temperature range: 0°C to 40°C

Humidity range: 0 to 90% relative, non-condensing.

Processor Unit: i5 Dual core 2.4 GHz processor with 4.0 GB of SDRAM and 250 GB HD. 2 Gigabit Ethernet and 6 USB connectors plus DVI and printer ports.

Overview Camera

Type: IP camera - Color

Sensor: Sony CCD Image Sensor

Auto Iris, 5/50mm lens

Video Compression: MJPEG

Resolution: 720 x 480 NTSC

Frame Rate: 30 at 720 x 480

Protocol: TCP/IP

Environmental Case: Doubled Skinned

Traffic Light

Type: Green Arrow and Red Cross

Power: 24 VDC

Control: Automatic via Ground Loop and Operator Terminal GUI

System Trigger

Type: Conductive Ground Loop

Cabling

Communication between:

Operator Terminal and Junction Box: CAT6.

Scanner and Junctions Box: combination CAT6 and two conductor power cable

Light Rail and Junction Box: combination two conductor power and two conductor signal cable.

Overview Camera and Junction Box: CAT6

ALPR Camera and Junction Box: CAT5 and POE

Ground Loop and Junction Box: Two conductor and ground wire cable

Traffic Light and Junction Box: Three conductor cable

AC inlet and Junction Box: Three conductor cable.

Sump Pump, automatic switch and Junction Box: Two conductor cable

SYSTEM PERFORMANCE PROPERTIES

Max Proposed Vehicle Length: 25 meters – longer vehicles can be scanned requires setup.

Max Vehicle Width: 2.75 meters standard – wider vehicles can be scanned requires setup.

Max Vehicle Speed: 40 KPH

Lighting: High output LED arrays

Scan Viewing Angle: 90° providing one high resolution image of a vehicle undercarriage

Front View Camera: Provides picture of driver and/or a view of the vehicle. Image is presented on screen along with under vehicle image.

Operator Terminal: Flat touch screen with image zooming down to 5mm details and coordinated zoom feature with database image. Additional Vehicle data input via keyboard. Achieve retrieval and search function based on several input criteria.

Networking: Operational mode; stand alone. Communication is via; standard CAT6 cable or optional Multi-Mode fiber optic cable. *Automatic Alerts:* visual alert on the operator terminal when system detects foreign object or change to undercarriage. Watch List can be created to automatically alert the operator when a vehicle of interest image is detected. Networking functionality and *Distributed Database* is available but not included in price.

System Maintenance: The system is designed for fast, simple replacement of components and remote diagnostics via internet connection to facilitate a low level of down time.

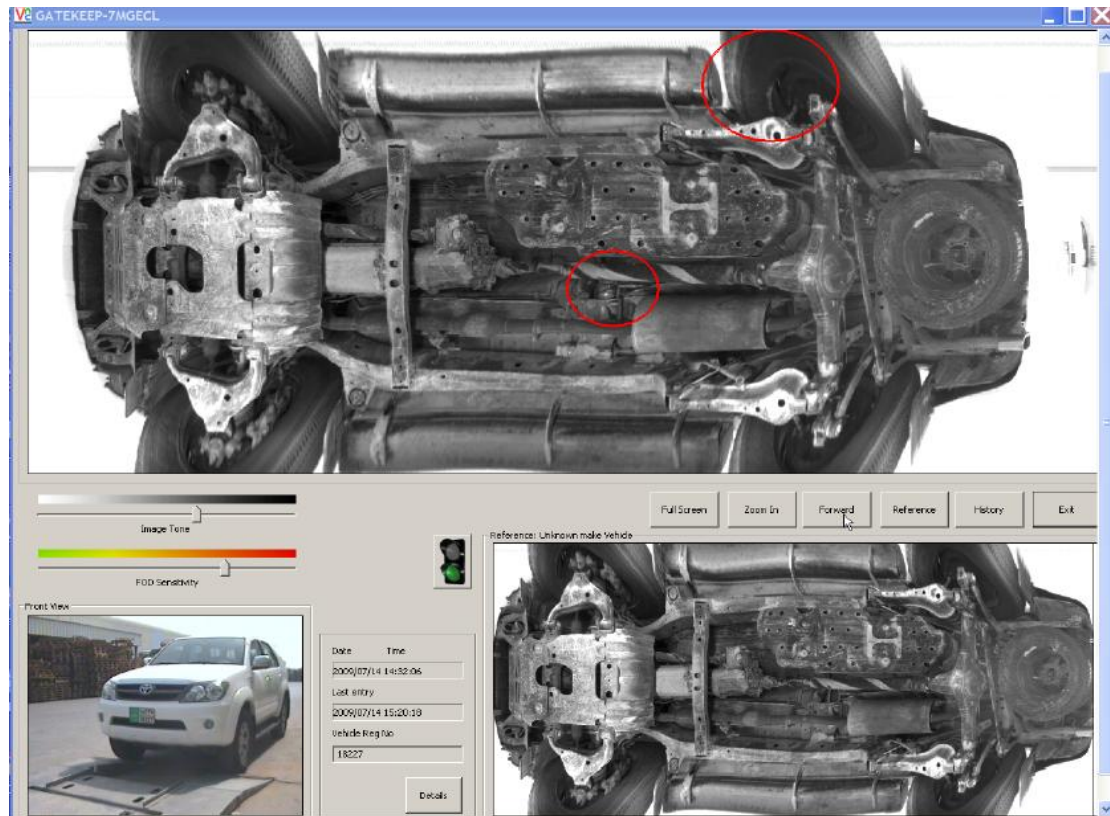
System Manuals: The system comes complete with assembly/installation and operating manuals.

Training: Full training is available to all staff operating the equipment.

Warranty: 1 year warranty on all system electronics.



Operator Screen (note automatic change detection in red)

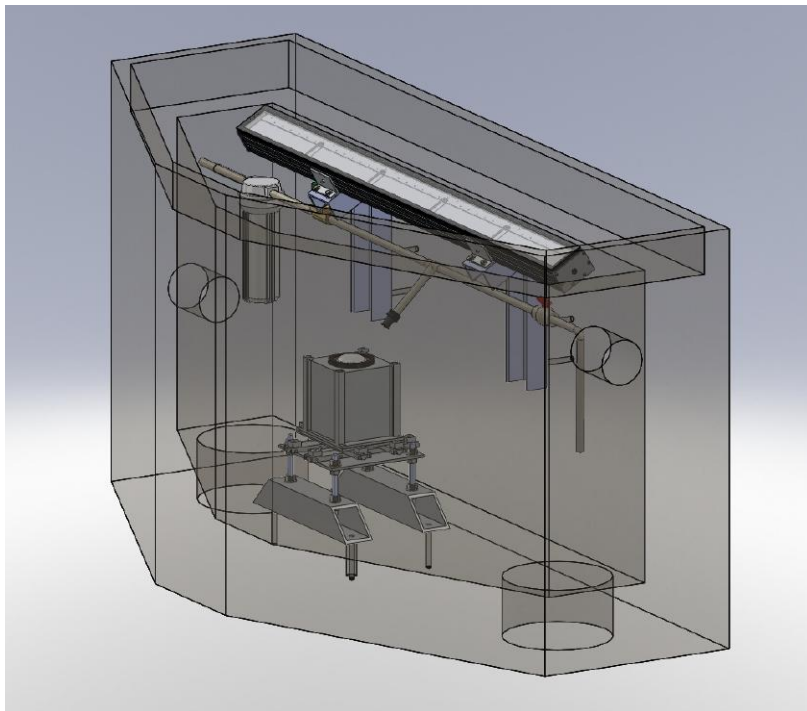


System automatically identifies any change to the undercarriage and places a red ring around any change detected.

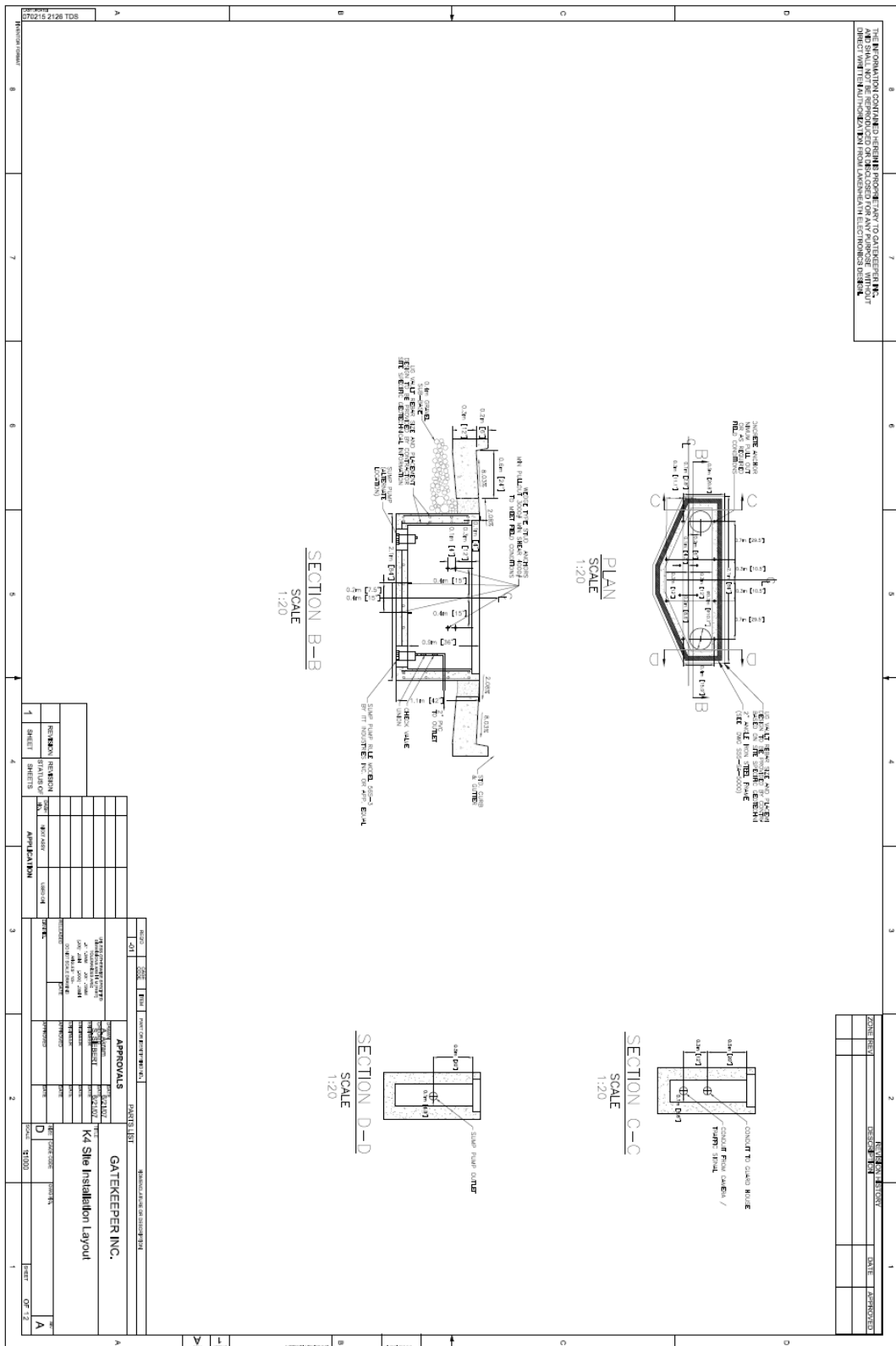
The 3011 systems can handle vehicles including trucks and buses of all sizes and weights due to the systems unique configuration.



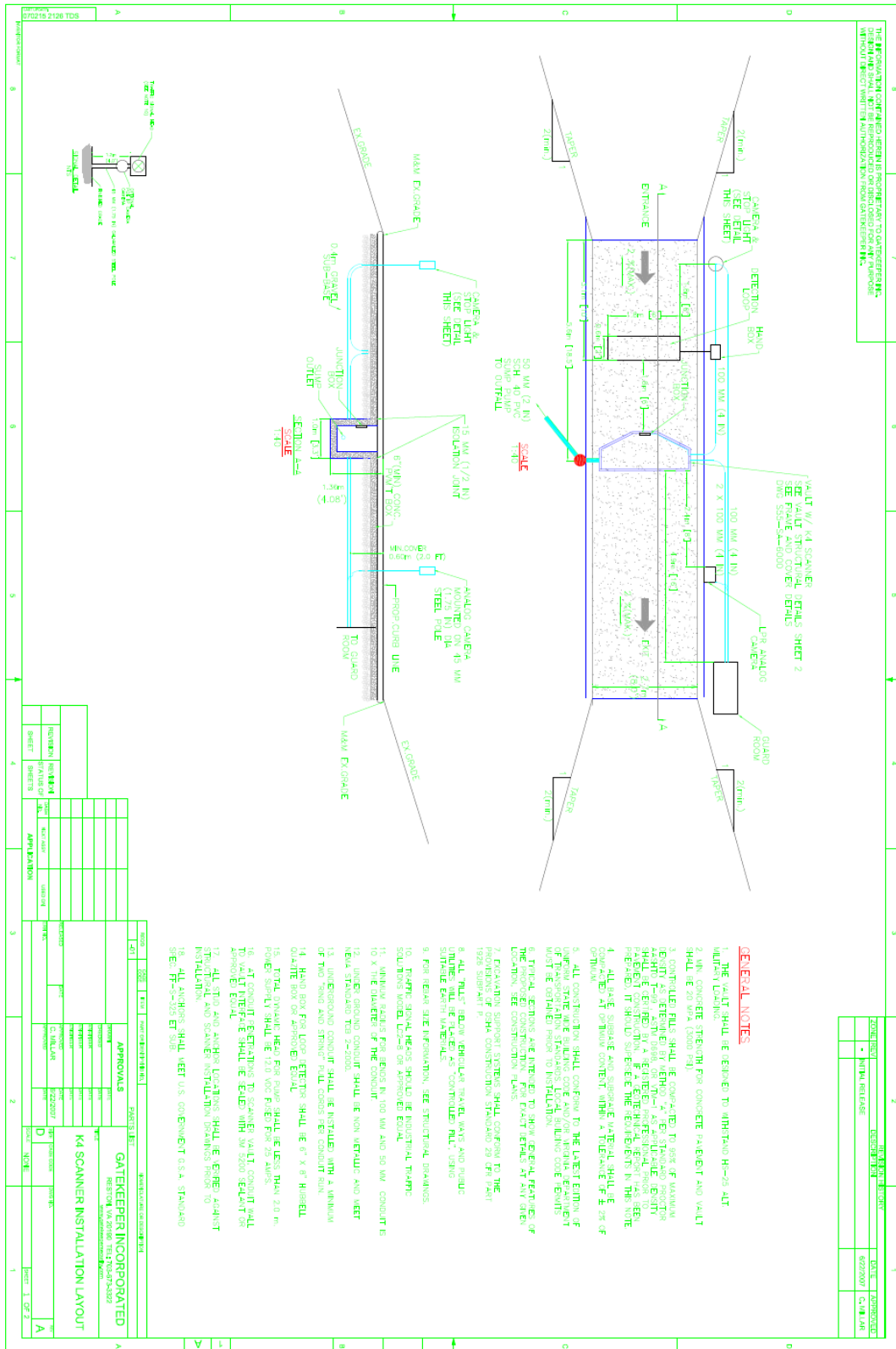
Optional Autowash System



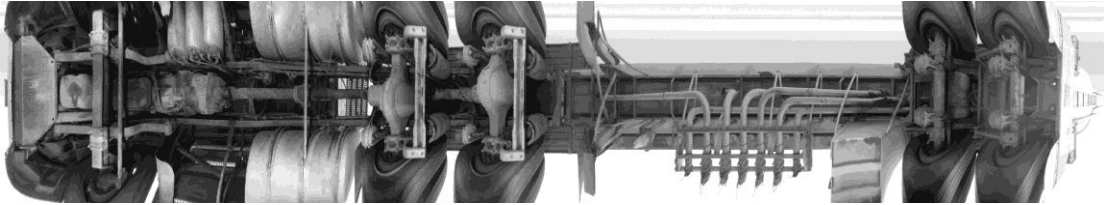
The system vaults are ~90cm deep and have the following other characteristics: Shallow version is also available.



The system is laid out as follows:

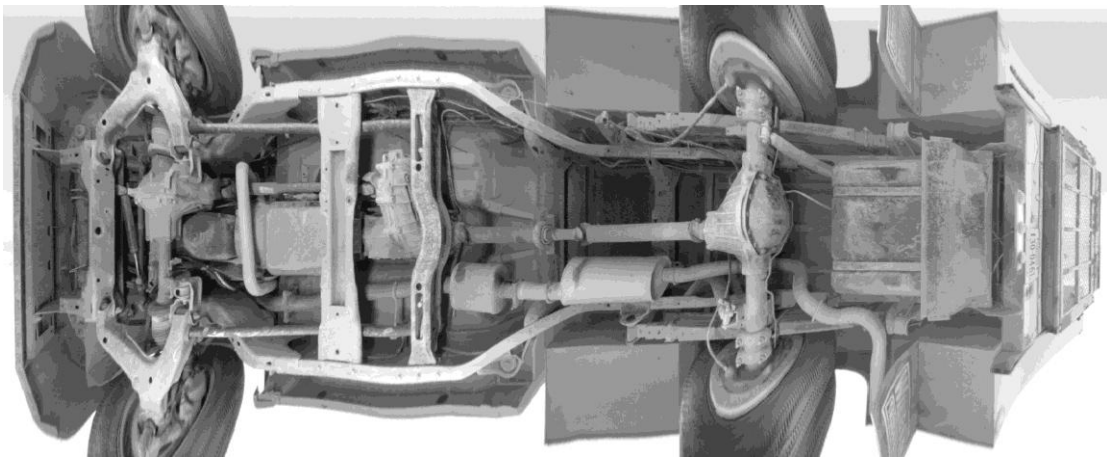


Vehicle Images

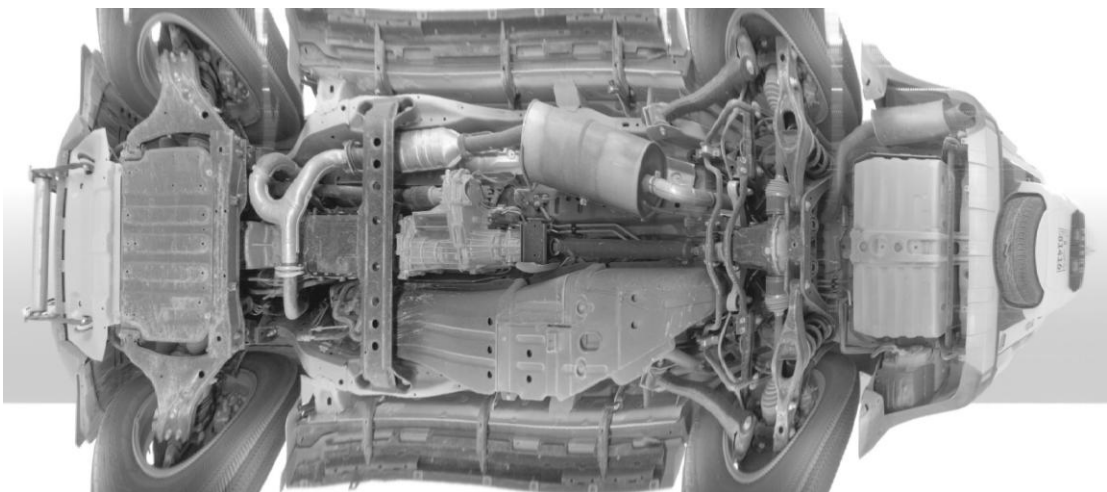


LARGE TRUCK

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SMALL TRUCK



CAR