Technical Description

ALPR System

for

WIM Station Implementation

TDS
TRANSPORT DATA SYSTEMS

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1.0 OVERVIEW

Transport Data Systems (TDS) is pleased to provide information in response to the IDOT RFI. TDS understands that the purpose of the pilot is to determine the feasibility and potential effectiveness of ALPR screening to support a decision on expanding the pilot program to include other weigh stations in the state of Illinois.

In recent years TDS has delivered their ALPR systems to the Florida Department of Transportation for installation at a number of weigh stations in the State of Florida. These systems work in concert with the Mettler supplied WIM equipment to capture front license plate images and to automatically extract the license numbers from these vehicles. The information is forwarded to the weigh station where it is available for display on each vehicle. The FDOT central processing suite uses this information to query state and federal databases.

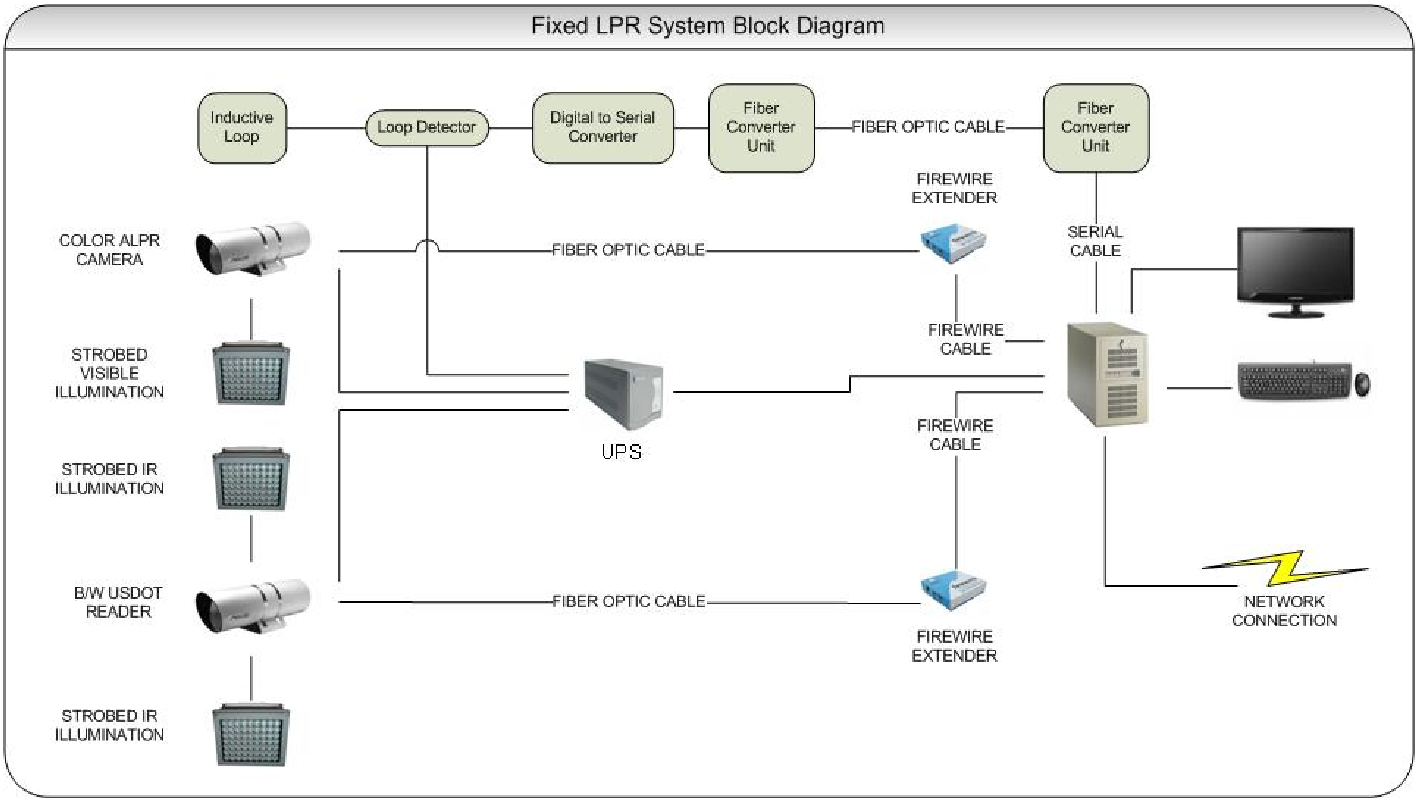
TDS has supplied similar equipment to the Florida Department of Agriculture and Consumer Services, Law Enforcement Division for installation at 13 agricultural inspection stations in Northern Florida. In addition to capturing license plate images, these systems also capture images of the driver and the rear of the container as the vehicle stops at the inspection station. TDS supplied software extracts the license plate number and the container number at these sites. TDS also provided a central server located in Tallahassee there the information is forwarded from the various sites. At the central server location this information is used to query local (BOLO), state (SCIC) and national (NCIC) databases to search for vehicles of interest. Search results are sent to the site where they are displayed in near real time for the officers.

For years TDS and others have been working on developing a real time USDOT number reader system. TDS first started development of such a system five years ago. Recent developments in processors (Dual and Quad Core), cameras (high resolution at high frame rate) and illumination (high power pulsed LED illuminators) have made this system available at a reasonable cost. TDS has been developing its latest USDOT number capture system for the last several years. It involves the use of a high speed processor, a high frame rate camera with very high intensity strobed LED illumination to capture a number of images of the side of the truck and extract the USDOT license number. TDS is presently working with the Florida DOT to install and test their latest system at the FDOT WIM station in Flagler Florida. At some point the IDOT personnel may choose to travel to Florida to view the installations and discuss the results with the FDOT CVISN personnel. TDS can provide contact information for both FDOT and FDACS personnel.

The TDS responses to the RFI request reflect the results of these projects and developments.

2.0 RFI RESPONSE

The requirement is to recognize a truck when the truck is entering the WIM station. The system must recognize the license plate of the truck and the associated USDOT number. After capture of the front license plate image and the USDOT number image, the system will perform OCR on both of these images and provide the license plate number and the USDOT number to the user data system. The present TDS design implements a system to capture images of the front license plate and the USDOT number. The license number and USDOT number are extracted from the images and stored into a local database along with the time and station identification information. A web site is provided for viewing of the images and associated text information. The image and text data will be available for transfer via the Ethernet to a central server. The system design is shown in the figure below.



2.1 ALPR Hardware - Acquisition:

TDS would supply acquisition hardware components include all of the cameras, lighting, equipment cabinets, housings, poles etc. that would be positioned beside the ramp to capture license plate numbers and USDOT numbers.

2.1.1. License Plate Capture Components

The following equipment provides the ability to read license plates on the front bumper area of a truck on the sort lane of a weigh station at speeds up to 45 mph.

- Camera – Medium Resolution Digital (1200 x 1600 pixels)
- Lens and Lens Mount with Camera Interface
- Camera Enclosure
- Outdoor Camera Mount
- Firewire/Fiber Converter
- Strobed LED Illuminator
- Outdoor Illuminator Mount
- Loop Interface Junction Box
- Fiber Modem

2.1.2. USDOT Capture Components

The following equipment provides the ability to read USDOT numbers on the side area of the cab of a truck on the sort lane of a weigh station at speeds up to 45 mph. The USDOT system would use the loop interface equipment mentioned above to trigger the USDOT image capture process.

- Camera – High Resolution Digital (2000 by 2400 pixels)
- Lens
- Camera Enclosure
- Outdoor Camera Mount
- Firewire/Fiber Converter
- Strobed LED Illuminators (2)
- Outdoor Illuminator Mount (2)

2.1.3. Sensor Component Placement

The license plate camera and illuminator will be located downstream 34 feet from the trigger point and can be no more than 15 feet offset from the center of the roadway. It should be closer if at all possible.

The USDOT camera and illuminators will be located upstream about 10 feet from the trigger point. The camera and illuminators will be located at 15 to 18 feet from the side of the truck, with 18 feet being preferable. An 18 foot setback results in 10 feet of horizontal coverage. The locations are shown in the figure below. This is not drawn to scale.

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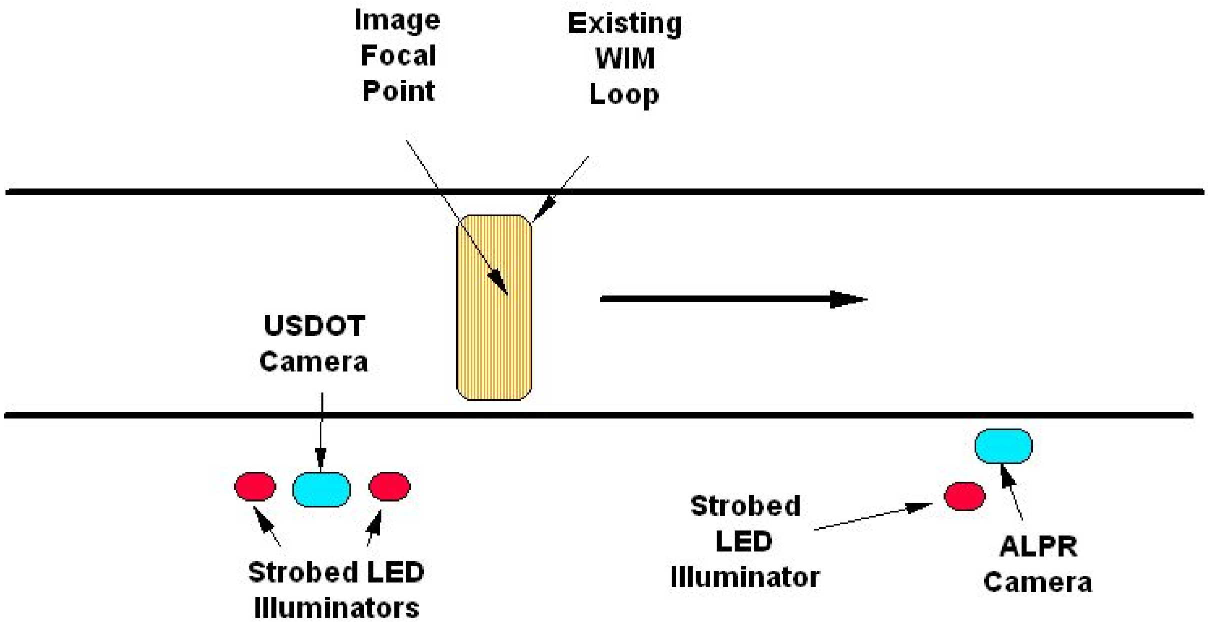

2.1.4. Physical Space Requirements

There will be a requirement to mount the loop interface box somewhere near the loop detector. The interface box is approximately 15 inches square and 8 inches deep. It can readily be mounted on a pole.

The cameras and illuminators mount using standard Pelco mounting structures. They can be mounted free standing on pads or onto posts inserted into the ground.

Conduits will be required to run the fiber cables from the cameras and the loop detector interface box to the location of the TDS supplied server.

2.1.5. Triggering Methods

In a previous WIM station implementation TDS interfaced with the loop associated with the WIM system. This implementation worked well.

Light curtains and overhead laser scanners provide a more accurate trigger but bring considerable additional cost to the system. The light curtain will require an under road bore or an overhead gantry to get the cable to the second curtain element. The overhead scanner will require the construction of a gantry along with the mounting of the equipment on the gantry. As such they are cost prohibitive. However TDS can work with whatever triggering sensors exist at the site.

2.1.6. ALPR Process Limitations

The key design issue is the mounting location for the license plate capture camera. The accuracy of the OCR process is very dependent on the offset angle. If the offset angle exceeds 20 degrees the skew of the letters will affect the OCR process. If the offset angle exceeds 25 degrees the OCR process will no longer be usable. This is influenced by the distance that the IDOT may require the camera and illuminator to be from the roadway. If this is the case, then a barrier may be required to allow the camera to be close enough to the roadway to capture images that can be accurately processed by the OCR engine. There is also the option to mount the camera overhead on a gantry. This method is obviously more expensive but does eliminate the problem.

The next issue is illumination. It is important that sufficient illumination be available to allow for good performance 24 hours a day. Secondly the illumination must not be on axis. We have learned from experience that on axis illumination can have significant negative effects at certain times of the day as the ambient sunlight situation changes. Furthermore offsetting the illumination also overcomes the effects of the blocking “sprays” such as “Phantom Plate” and “Photo blocker spray” that are now available on the market.

2.1.7. Camera Specification Metrics

The metric inputs for the USDOT number extraction include:

- Maximum speed of the vehicle.
- Location of the license plate
- Location of the USDOT number
- Size of the license plate number
- Size of the USDOT number
- 24 four hour operational requirement

From these initial values we can calculate the shutter speed required to reduce smear down to a value which is consistent with the requirements of the USDOT OCR process. The shutter speed coupled with the camera sensitivity, the angle of coverage and the distance to the vehicle allow us to calculate the amount of illumination that is required to achieve the necessary overall system gain.

2.1.8. Environmental Factors

The key to good overall capture performance lies in the ability of the camera control module to cope with various lighting conditions in the lane. The TDS camera control module uses a set of adaptive algorithms that examine image data over a series of time periods to eliminate the need for extensive setup and tuning. When the system is turned on, the automatic tuning process begins. The correct camera settings are determined within a few images after startup. The algorithm then learns the correct camera settings over time with the initial training process being completed within 24 hours. The system is capable of providing better than 98% usable images over an extended period of operations with no further tuning required. The OCR will provide an 85% capture percentage on the readable images.

2.1.9. Precautions

There are no precautions that need to be taken to minimize adverse effects on the truck driver.

2.1.10. Power Requirements

Each of the two camera assemblies draws a maximum of 3 amps at 115VAC. Each of the three illuminators draws a maximum of 1 amp at 115 vac. The loop interface box drawings a maximum of 0.3 amps at 115 vac.

2.1.11. Durability

TDS VES systems are based on the latest technology that is commercially available in off the shelf products from manufacturers that have a proven field record in previous TDS designs. This system is designed using components that are the same or similar to the components used in TDS systems that are in service from environmental extremes of within 100 miles of the Arctic Circle (Iceland) to across the state of Florida. There has not been a single camera system failure at any of these locations since the equipment was originally installed. For the 64 lanes of VES equipment currently installed at BATA this equates to over 250,000 hours of operation system wide without a failure.

2.1.12. Failure Detection and Error Sensing

The lane status monitor process is built into the lane software. It will monitor the health of the Lane Image Processor and store any equipment status changes in a status table in the database. The status table is available for viewing via the web site on the lane processor. The lane processor is able to generate error messages and send them to the appropriate maintenance personnel.

2.2 ALPR Software:

The ALPR system can screen vehicles for credential compliance and safety ratings using character/pattern recognition software to identify license plate numbers and state of registration and USDOT numbers and pose queries to local or remote databases using those numbers to determine whether the truck should be routed to the bypass lane or scale lane at the weigh station. The system will also display summary and detailed screening information locally at the scale house and possibly remotely via the internet or state communication network.

The software on the Lane Processor has been designed and developed to perform as a high performance and robust automated application and includes an array of flexible components that allows for the functionality and interfaces to be aligned with specific deployment requirements. The software is responsible for the following functions:

- Camera control and vehicle image capture.
- Illuminator control and exposure adaptation.
- Camera trigger generation for image capture sequences.
- Plate location and plate string determination (OCR).
- USDOT number location and number string determination (OCR).

- Transaction storage in a local SQL database and local file system.
- Data transmission to Central Server (Provided by others).
- System status monitoring and reporting

The TDS Camera Surveillance System will capture images of the license plate and the USDOT number of all vehicles passing through the capture zone. The license plate image and USDOT image will be compressed and stored along with the transaction data.

2.2.1. License Plate Image Capture Process

Upon the indication that a vehicle has reached the trigger point the camera process will request an image from the license plate camera. The camera process will receive the image and store it along with capture time and a unique vehicle sequence number. The camera process will also examine the image to determine if the camera settings need adjustment. The camera process will call the OCR process and upon completion of the OCR process will compress the image and store it. The capture time along with the OCR result will be stored in the local database. A sequence number is also assigned.

2.2.1.1 Plate Location and Number Determination (OCR)

Upon initiation of the plate location and number detection process, the OCR process will locate the license plate in the image and extract the plate number and character string. The plate string is then stored into the corresponding image record in the database. At this time the raw image is JPEG compressed and stored back into the corresponding image record resulting in a reduction in the size of the image file from 2.0 megabytes to less than 100 kilobytes.

2.2.2. State of Registration

TDS provides state recognition for various customers. Our method for determining jurisdiction is based on the string pattern. This method of state identification results in a minimal performance impact. This technique works well for the majority of the jurisdictions that issue IRP plates. For plates from states that do not have unique patterns, the plate string is reported with the jurisdiction being reported as unknown. This technique provides a method for identifying unknown plate jurisdiction for further post processing such as manual review.

2.2.3. License Plate Read Accuracy

The accuracy of the successful read of the license plate is 85% of the human readable images. This has been demonstrated in a number of different environments.

It is impossible to predict the accuracy of the state of jurisdiction because of the variations in the vehicle jurisdiction mix. For instance in California where we have a particular format (NAAANNN) for many vehicles and very specific formats for many trucks the ability to identify trucks from California is quite high. This has been proven on 65 lanes of image capture equipment on the bridges in the San Francisco Bay area. So for many California plates the system automatically processes violations without human intervention.

2.2.4. USDOT Number Image Capture Process

The software on the image processor is responsible for the following functions:

- USDOT image capture (multiple images)
- USDOT registration number detection and string determination (OCR)

The process is as follows:

The camera and illuminator will be located at 15 to 18 feet from the side of the truck, with 18 being preferable. This 18 foot setback results in 10 feet of horizontal coverage. The system will use the WIM loop as a trigger. Three additional frames will be captured at fixed intervals. A TDS developed algorithm will search the frames to find the USDOT number. Once the number has been located, the OCR process is initiated.

2.2.5. USDOT Number Determination (OCR)

After the USDOT image has been stored in the image table the OCR process will locate the registration in the image and extract the registration number as a character string. The registration string is then stored back into the corresponding image record. At this time the raw image is JPEG compressed and stored back into the corresponding image record resulting in a reduction in the size of the image file from 1.8 megabytes to less than 125 kilobytes.

2.2.6. USDOT Number - Optical Character Recognition Software

Transport Data Systems will provide an optical character recognition package to extract ASCII representations from the USDOT registration numbers that appear on the sides of trucks. This Optical Character Recognition system (OCR) will be implemented in the Lane Processor. The OCR process works best with uncompressed images. This system will perform the OCR process on the uncompressed images and then compress the images for storage and transmission to the next higher level. The extraction of the registration number at the station will also enhance the ability of the station to select and examine specific transactions and to provide this selection capability externally through the station web interface.

As each transaction is generated, it will be processed and entered into the database. The associated image will be processed by the OCR software and then compressed. The compressed image will be stored. The extracted information will be inserted into the database along with quality data developed during the OCR process.

2.2.7. USDOT Placement and Font Issues

A single high-speed camera is used for capturing USDOT numbers and is configured to capture a succession of images including the cab and side of the trailer as the truck passes by the capture point. A series of algorithms is used in order to locate the numbers and recognize each of the characters (OCR). The locator algorithm processes the images for USDOT string region candidates that represent possible USDOT number sequences.

These candidate regions are then passed to the OCR algorithm in order to determine each individual character. The OCR algorithm has been designed to consider variant letter styles, fonts, and sizes and is based on adaptive learning primitives that allow it to be accurate across a broad range of character variation. Each stage of the image processing includes a confidence value for the respective output and is used to compose the final USDOT number.

2.2.8. USDOT Number Read Accuracy

The system will provide an accuracy of greater than 70% on the USDOT number reading process. This is being confirmed during testing at the Flagler weigh station in Florida in April/May of 2010.

2.2.9. License Plate Number/USDOT Number Integration

The penetration of the vehicle through the trigger point causes the initiation of a transaction record in the database. Initially the record contains the date and time as well as a site number. This transaction will eventually include pointers to the compressed license plate image and to the compressed USDOT image. The outputs from the OCR engines (both license plate and USDOT number) will be stored in the transaction record along with information from the OCR processes indicating a figure of merit for each.

If either process is unable to locate a satisfactory result, the field in the database will remain blank.

Once the transaction is complete, it and the associated images are immediately viewable from the web site

2.2.10. Scale House Presentation

The information presented to the scale house operator for a truck that does not have any credential or safety issues is similar to the information shown below in the section on remote access. The three images in the figure below will be replaced by two images, one of the front of the vehicle and one of the side.

In the event the unit has a credential or safety issue, this data will be added to the record and an alarm will be sounded.

In Florida at the agricultural inspection stations, the detection of a vehicle of interest results in an immediate alarm on the display in front of the officer (Ag Law). It includes the state of registration of the vehicle that is included in the query result. This allows the officer to be sure that the vehicle in question is in fact the same vehicle as the one found in the query (local, state or federal).

2.2.11. Remote Access

An Apache web server is included in the Lane Processor software. A website is included to allow for viewing of the transactions and the images. An example of such a web page is shown below.

2.2.12. Information Storage

A MYSQL database will be installed on each lane image processor. Transaction data will be stored in this database for all violators. A table in this database will include a pointer to each image associated with a given transaction. An Apache web server will be installed on the Lane Image Processor. A web page will allow for viewing of the violations that are stored locally. This is particularly useful as a maintenance aid.

It is up to the jurisdiction to decide when to upload/abandon/delete transactions and their associated images.

2.3 ALPR Hardware – Scale House:

TDS will provide Scale house hardware to include all of the computers, equipment housings, control panels, printers and communications equipment necessary for the operation of the ALPR system that will be installed in the scale house at the weigh station.

2.3.1. Scale House - Components

The following equipment would be installed at the Scale House.

- Quad Core server
- Intel 80GB Solid State Drive
- Firewire Board – PCI (2)
- Firewire/Fiber converter (2) and Power Supply (2)
- Monitor - 19 Inch
- Keyboard
- Mouse
- 232/422/485 Fiber Modem
- FOSTC Wall Transformer
- UPS - 1500 VA

- 6' PS-2 Keyboard Extension Cable
- 10' SVGA Extension Cable
- Cat 5 Cable - 10BaseT

2.3.2. Scale House - Physical Space Requirements

The equipment space requirements are as follows:

- Server – This is the same size as a standard tower PC, rack mounting is optional.
- Monitor – This is usually a 19 inch LCD display.
- Keyboard/Mouse – Standard issue.
- Firewire Interface Modules (2) – These are approximately 4 inches square by 1 inch deep. They draw power from the Firewire connection to the PC.
- Fiber Interface Module (1) – This unit is approximately 2 inches by 1 inch. A small power supply is included (1 inch square plug in socket unit).
- UPS – This unit is approximately 1 foot by 8 inches by 8 inches.

2.3.3. Scale House – Power Requirements

A 1500 watt UPS will be provided for installation with the server in the scale house. This will supply power to all of the TDS supplied equipment in the scale house.

2.3.4. Scale House Component Durability

The computer equipment and the fiber interface equipment have very high reliabilities. Typically the only item that fails on any kind of regular basis is the power supply in the PC. The MTBF of the quad core pc's we are currently using is 100000 MTBF for the entire unit.

The other piece of equipment that has a significant failure rate is the UPS due to the battery losing the ability to hold significant charge. We have no MTBF data but again we expect an MTBF in excess of 10,000 hours.

2.3.5. Scale House/Ramp Connectivity

The physical connectivity between the ramp components and the scale house components consists of 3 fiber optic pairs. This will be a single cable.

2.3.6. Unique Requirements – Signal and Power Connections

The power connections are not unique. The signal connections require the attachment of fiber connectors. This will require a special device or a subcontractor who specializes in fiber terminations.

2.4 ALPR Integration – WIM:

The ALPR system will integrate with the existing WIM system at the station.

Many WIM stations have a WIM sorting system for detecting and selecting vehicles, automatically or manually, for routing onto the bypass lane or scale lane. Under automatic control, the WIM compliance system will automatically direct a suspected violator (weight) to the static scales and trigger a console alarm. The scale house *computer displays WIM information for use by the scale operator and enforcement personnel. The scale operator can direct trucks to the bypass lane when congestion at the scale might cause trucks to backup onto the mainline and may need to turn-off credential and safety screening via the ALPR system.*

2.4.1. ALPR/WIM Integration

The ALPR system will use the first WIM loop to initiate the image capture and analysis sequence. The ALPR would expect to receive a vehicle identifier from the IRD WIM system. The ALPR would then do the required OCR operations and interrogate local databases for the credential and safety screening. In the event an alarm is generated because of a credential or safety issue, the ALPR system would send a message to the IRD WIM system indicating the vehicle identifier and the fact that this vehicle should be routed to the scale lane. At the same time the ALPR system will display the credential/safety issue on the display at the scale office. The display will include the front and side images of the vehicle.

2.4.2. ALPR/WIM Integration Opportunities

The ALPR system will require fiber cable back to the scale office. In the event there are conduits with appropriate pull boxes, the fiber can be routed through them. Otherwise a new conduit will be required. The ALPR system will also require AC power. This can come through any means available including the new fiber conduit if one is required to be installed.

2.5 ALPR Operation:

The ALPR system is designed to operate without human intervention. Every violation is stored in a database on the ALPR server. This information can be uploaded on a daily basis if required. It is also available to be communicated to a patrol officer located downstream in the event this is to be the method of enforcement.

2.5.1. ALPR - Accuracy Impact Parameters

The primary parameters that impact the accuracy of the license number identification process are plate condition (bent, plate mounting angle, font, number obliteration and number contrast.

2.5.2. USDOT - Accuracy Impact Parameters

The primary parameters that impact the accuracy of the USDOT number identification process are letter size, font and angle of script, number obliteration and number contrast.

2.5.3. ALPR Component Critical Specifications

The critical issue for both the ALPR and USDOT processes is pixel density. Without sufficient resolution the OCR process is not effective. Both of the cameras used by TDS are off-the-shelf high resolution digital cameras with sufficient resolution to support the OCR process.

The other critical issue for the USDOT process is image smear. This is controlled by the

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shutter speed. A very high shutter speed is required. This in turn requires more illumination. The system includes two high intensity strobed illuminators to provide this illumination. The present design is capable of handling speeds up to 45 miles per hour.

2.5.4. Behavioral Configuration Features

The TDS system as presently configured does not allow for operator behavior control. The system is based on alarms that result from various database reads. When an alarm occurs it is displayed.

However because of the nature of the selection process the ability to change the screening criteria can be easily incorporated.

2.5.5. Identification Process Timing

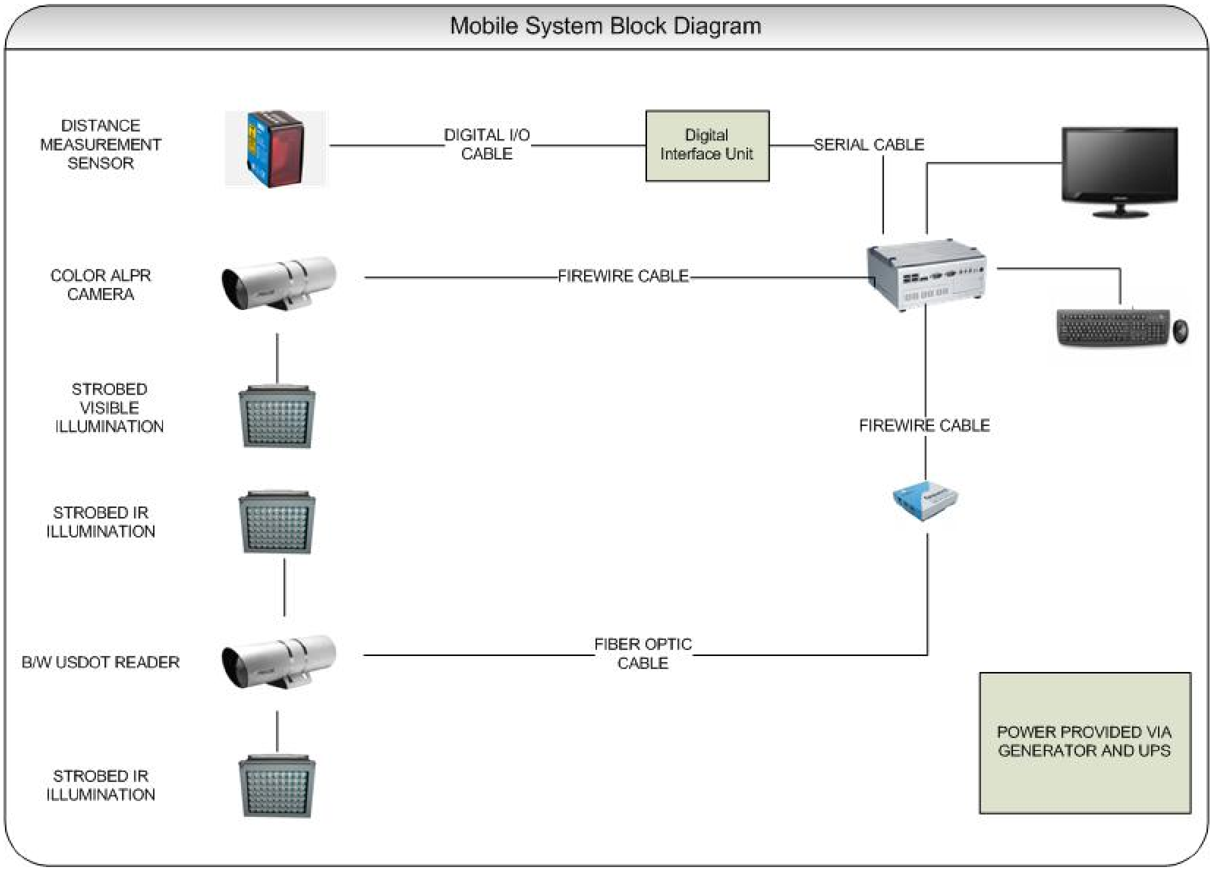
The standard TDS system provides for the completion of the OCR process for both the front license plate and the USDOT number in less than 6 seconds. Because of the nature of the vehicle query on the Florida (Daily download), the query is very fast. Thus we will have a total time to alarm of less than 9 seconds. In our implementation at the WIM station in Florida, this time is sufficient to automatically reroute the truck onto the scale lane. This data is used by the WIM station to override the decision based on weight. The manual process is controlled by the scale system and we have no effect on that process.

2.6 Mobile ALPR:

Many users would like the ability to use ALPR capabilities for credential and safety screening based on license plates and USDOT numbers in a mobile environment. Trucks can avoid fixed sites by using alternate routes or passing the fixed site after it is closed. The TDS supplied mobile ALPR would be positioned as necessary to provide credential and safety screening at selected locations, perhaps in conjunction with portable scales, or for data logging at these selected sites, to determine whether a more focused enforcement effort is warranted. ALPR equipment would be installed in a dedicated van or utility vehicle that could be used vy various agencies for credential and safety screening.

2.6.1. Mobile ALPR/USDOT Components

The components used for the Mobile ALPR/USDOT will be nearly identical to the components used for the fixed site installation. Portable mounting structures will be provided for quick and easy setup of the system.



2.6.2. Mobile ALPR/USDOT Component Differences

There is only 1 difference. Since there is not a loop available TDS must supply a triggering device.

For the mobile implementation TDS has chosen as laser distance measuring device to provide the triggering for this system. Specifically we use the Sick DT-50. This device is capable of providing a very accurate trigger (4 inches) and will not vary with the speed of the approaching vehicle. It will be collocated with the license plate camera and will provide the trigger for both the license plate camera and the USDOT camera. Since it is a range measuring device it can be used to provide additional range information to allow for multiple image capture by the USDOT camera.

Eventually TDS expects to be able to autotrigger based on license plate detection on the front camera. This is being tested. Once this development is complete and the process has been field proven, the need for the hardware trigger will disappear.

2.6.3. Special Mobile Placement/Environmental Requirements

The equipment will be mounted on special structures which will:

1. Set the distance between the illuminators and the USDOT camera.
2. Set the relationship between the illuminator, license plate camera and laser DME.

The equipment should be placed at the same distances from the trigger point as shown in the layout diagram for the fixed site. TDS has an off-the-shelf software programs that provides a real time view of the system for use during the alignment of the cameras.

2.6.4. Mobile Communications Needs

TDS would recommend the use of a 3G cellular data network to achieve access to the carrier and vehicle data. The cellular interface would be handled inside the van with a USB plug in module. A 3G cellular amplifier would be mounted in the van with a rooftop antenna to increase the range of the unit from the 3G tower.

Speeds are steadily increasing for these units. Select of a particular supplier would depend on the coverage availability in your area.

2.6.5. Remote Access to Mobile Information

The web site built into the server coupled with the 3G network would provide a method for viewing data directly from the site.

2.6.6. Mobile Configuration Capabilities

Please see Section 2.5.4 above. The mobile system will initially operate in a similar method. Of course changes can be implemented during the design process.

2.6.7. Mobile Computer Hardware and Software

The computer equipment will be identical to the equipment supplied for installation in the fixed site scale station. The monitor and the PC will be permanent affixed to the van. The keyboard and mouse will be placed on a tray that is permanently affixed to the van.

2.6.8. Mobile Power Requirements

Power for the mobile environment will be supplied by combination of a gas powered portable generator and a UPS.

2.6.9. Mobile System Space Requirements

Describe the space requirements and mounting options for the ALPR components

a. *Internal components including computer hardware and software*
b. *External components including cameras, lighting, mounting brackets etc*.

The mounting and location of equipment in the mobile solution can be configured a variety of ways. It ultimately depends on how the customer envisions or requires the system to operate. We can accommodate various scenarios of locating equipment and mounting hardware.

2.6.10. Attendance Requirements

Must the equipment be attended to while in operation?

The system can be attended or unattended.

2.7 ALPR Screening Data:

2.7.1. Alerting Processes

The processes for querying credential and safety data would be the same for fixed and mobile installations. We anticipate downloading credential and safety data and storing it in the ALPR processor. The data would be queried locally for each vehicle. Alerts would be generated based on a set of rules that is agreed to with the user and then entered into the software system. These criteria along with the requirements for modifications to the criteria by the users will be dealt with during the 60 day design process.

2.7.2. Credential and Safety Information Alternative

The TDS system at the agricultural stations (FDACS) in Florida uses a real time lookup through the FDLE (Florida Department of Law Enforcement) system. A central server was provided by TDS to handle the central storage of data in Tallahassee. A local BOLO table is maintained on the TDS central server. Initially the TDS system at the station queries the local BOLO table. If a hit occurs, the alarm is immediately presented to the AgLaw station attendant. In any event all transactions are sent to the central server. From there a query is sent to the FDLE server where queries are instigated into both the federal and state databases. If a hit occurs, the alert is transmitted down to the station processor where it is displayed to the station attendant.

In the FDOT implementation at the WIM sites, the database is downloaded from FDLE on a daily basis and the FDOT queries the downloaded database. This is done to reduce the query load on the FDLE system. Recently FDACS has made the decision to follow the same methodology. It is envisioned that these changes will be made during the next calendar year.

For any new agency, it is envisioned that the data from the their existing system would be downloaded daily and used for the query process. This could also be loaded onto the mobile system prior to taking it to the field.

2.7.3. Follow-On Services

TDS warrants the software for up to three years as part of the initial contract. After the equipment has been installed, TDS will provide software maintenance under a separate maintenance contract for software assistance to user maintenance personnel. TDS will also contract to do hardware maintenance if the customer so desires. TDS would expect to have internet connectivity to the TDS server to allow for fine tuning and maintenance support during the first year of operations.