

**EXHIBIT "A"**  
**SCOPE OF SERVICES**

**EXHIBIT “A-1”  
SCOPE OF WORK**

1.0 INTRODUCTION / BACKGROUND

- 1.1 The City has decided to acquire an ALPR System to serve as another law enforcement tool to increase the effectiveness and productivity of the Houston Police Department (“HPD”) by allowing continuous passive scanning and interpretation of motor vehicle license plates through the use of mobile cameras mounted on patrol vehicles equipped with the ALPR system.
- 1.2 The City intends for the ALPR system to substantially enhance HPD’s capabilities with regard to Homeland Security by increasing the ability to detect vehicles associated with suspects and other persons of interest for purposes of terrorism investigations and by providing data for analysis of suspicious activities or post-event investigations.

2.0 SCOPE / OBJECTIVES

- 2.1 This Scope of Work (“SOW”) sets forth the requirements for the ALPR System, Equipment, Software, and Services that Contractor shall provide to the City. Contractor shall perform all tasks specified in this SOW, provide all services specified in this SOW, and be responsible for all such tasks and services unless otherwise expressly stated in this SOW. However, City acknowledges that Contractor may perform some or all such tasks and provide some or all such services through one or more subcontractors. All references to Contractor in this SOW shall mean and include Contractor and/or its agents, contractors, and subcontractors.
- 2.2 The services and expertise needed for this project include installation, configuration, training, analytical instrument interfacing, and integration with other software components, and deployment consulting and assistance. Ongoing maintenance and support, including product upgrade assistance is required, possibly with the commitment of a long-term service agreement.
- 2.3 Contractor shall be responsible for installation, implementation, configuration, and deployment of the ALPR System, Equipment, and Software. Contractor shall ensure that all components of the ALPR System (including all Equipment and the Software) are fully compatible with each other, perform in accordance with all manufacturer’s specifications, and otherwise fully functional and operational with a high degree of performance. Contractor shall ensure that the ALPR System, Equipment, and Software are fully compatible and integrated with the MDC systems and equipment currently utilized by HPD and installed in HPD patrol vehicles. Contractor shall assist in planning, analyzing, designing, implementing, evaluating, and testing the hardware and software with HPD technical team and end-users to ensure that all HPD requirements are fulfilled.

- 2.4 In addition, Contractor shall also ensure that the ALPR System provides police officers quick and almost effortless access to vital information about surrounding vehicles without requiring a manual license plate number database search. The ALPR System shall not require any direct action by a police officer, scan and interpret license plates, and automatically compare the deciphered plates against various databases containing vehicles of interest.
- 2.5 Contractor shall provide an ALPR System that encompasses all phases, using reliable, proven, and dedicated resources and/or sub-contractors. Contractor shall be responsible for all deliverables on this project.
- 2.6 The Contractor shall also assist in planning, analyzing, designing, implementing, evaluating, and testing the hardware and software with HPD technical team and end-users to ensure that all requirements are fulfilled.
- 2.7 Contractor shall ensure that the ALPR System is capable of both scanning databases statically loaded on the ALPR unit as well as databases that may be dynamically loaded via wireless or other type of broadcast communication. Contractor shall ensure that the ALPR System delivers all license plate matches to the police officer via the patrol vehicle's existing Mobile Data Computer ("MDC").
- 2.8 The Contractor shall ensure that the ALPR System stores all scanned information in an internal database for both current and future analysis and/or action. At a minimum, the following data shall be captured and stored in the ALPR Unit for all vehicles scanned:
  - 2.8.1 Vehicle license plate image.
  - 2.8.2 Interpreted license plate number.
  - 2.8.3 Color license plate image.
  - 2.8.4 Color overview of the identified vehicle.
  - 2.8.5 Date stamp and time stamp.
  - 2.8.6 GPS location of vehicle and type of offense.

3.0 ALPR REQUIREMENTS:

- 3.1 The following ALPR requirements are presented as five components (general requirements, camera, ALPR processor, software engine, and application software & database).
  - 3.1.1 General Requirements-ALPR - Camera Requirements (Illuminate and Capture)
  - 3.1.2 The ALPR System's cameras shall provide the ability to capture color images of license plates in all types of weather, lighting conditions and on various HPD vehicle types.

3.1.3 The ALPR System's cameras and processors shall meet the following Military Standard 810G requirements:

- 3.1.3.1 Method 501.5 for high temperature.
- 3.1.3.2 Method 502.5 for low temperature.
- 3.1.3.3 Method 506.5 for rain.
- 3.1.3.4 Method 507.5 for humidity.
- 3.1.3.5 Method 514.6 for vibration.
- 3.1.3.6 Method 516.6 for shock.

3.1.4 The ALPR System's cameras shall utilize a software camera controller to facilitate all settings and shall be automated.

3.1.5 If the ALPR System's cameras are attached to the patrol vehicle's emergency light-bar, they shall be small enough so not to obstruct or otherwise hinder visibility to the light-bar.

3.1.6 The ALPR System's cameras mounting bracket systems shall be fabricated specifically for the Contractor's cameras and shall be furnished by the Contractor for all HPD vehicles types. The Brackets shall be weather and corrosion resistant.

3.1.7 The ALPR System's cameras shall have no moving parts.

3.1.8 The ALPR System's cameras cabling and connectors shall be assembled by the Contractor that provides the ALPR system and all of the required components. Contractor shall provide a total comprehensive ALPR System.

3.1.9 In addition to the requirements of this SOW, Contractor shall also ensure that the ALPR System, Equipment, and Software comply with the specifications of Exhibits A-4 and A-5.

### 3.2 ALPR Processor Requirements (Detect the Plate)

3.2.1 The ALPR System's processor shall provide the capability to capture, store, display, and interpret the required images from any equipped patrol vehicle traveling at high/normal speeds, stationary or where the target or scanned vehicle is stationary or traveling at high/normal speeds of 70mph and 30mph.

3.2.2 The ALPR System's processor shall provide the capability to capture, store, display, process and interpret the required images of a vehicle either approaching, receding, on the left or right side of a patrol vehicle equipped with the appropriate camera configuration.

- 3.2.3 The ALPR System's processor shall provide HPD with the ability to integrate to their existing Mobile Data Computer (MDC).
  - 3.2.4 The ALPR System's processor shall be designed to be trunk mounted and shall incorporate a vehicle ignition safe start and shut-down feature.
  - 3.2.5 The ALPR System's processor shall utilize the latest Windows embedded operating system and if database is required it shall also include the latest MS SQL Server.
  - 3.2.6 The ALPR System's processor shall have a minimum of four (4) digital camera connections, and a dedicated Global Positioning System (GPS) input connection. Trunk processor shall connect via Ethernet cable or Ethernet to USB NIC switch. Garmin USB shall connect using additional USB port on vehicle MDT.
- 3.3 Software Engine Requirements (Read the Plate)
- 3.3.1 The ALPR System shall provide sufficient software capabilities to recognize and interpret a variety of plate styles, i.e. Canada, USA and Mexico, and shall be able to interpret plates that may be partially obscured by trailer hitches, dirt, etc. with a high degree of accuracy.
  - 3.3.2 System maintenance for software/hardware updates and/or revisions that address changes to the various state's license plates shall be provided by the Contractor at no additional cost.
  - 3.3.3 The ALPR System shall capture license plate images at night without an external light source.
- 3.4 Application Software Requirements (Patrol Vehicle)
- 3.4.1 The ALPR System shall provide the ability to continuously and automatically scan, capture, store, display, process, and interpret images of license plates within range without any action of the patrol officer. In other words, the ALPR System shall continue to operate in the background while the patrol officer is dealing with any alarm or other function of the system.
  - 3.4.2 The ALPR System shall provide the ability to process or match the captured license plate numbers against a variety of target databases.
  - 3.4.3 The ALPR System shall have an audible and visual alert when a match or hit occurs via the patrol vehicle's MDC system interface.

- 3.4.4 The ALPR System shall provide GPS capabilities so that geographical positioning data is available to be processed, read, and stored related to the license plate images.
- 3.4.5 The ALPR System shall provide all capabilities via on-board hardware and software completely contained within the patrol vehicle and not rely on remote communications.
- 3.4.6 The ALPR System shall provide the capability to add additional target databases containing vehicles of interest via wireless or radio communications. This ability to process or upload additional remote databases not stored on the on-board unit will enable the system to process against new or more current databases. Additional target database will include daily updates due to amber alerts, terrorist alerts, general broadcast, newly stolen, or other critical or spontaneous vehicles of interest.
- 3.4.7 The ALPR System shall provide the capability to remotely notify other law enforcement parties when matches or alerts occur via wireless or radio communications.
- 3.4.8 The ALPR System shall provide the capability to setup multiple layers of security and configurations so that certain matches (certain covert operations databases, etc.) will alert only those officers with the appropriate privileges.
- 3.4.9 The ALPR System shall provide the ability to download from external sources and store multiple large databases containing license plates of interest. This loading process shall be accomplished within a reasonably short period of time because some of the databases may be loaded daily into the system before the patrol vehicle is deployed.
- 3.4.10 The ALPR System shall provide the capability to interface with the patrol vehicle's MDC screen so it can be used as the display unit for the ALPR system. The ALPR System shall provide a user-friendly graphical user interface (GUI) capable of being interfaced and displayed with the MDC in the patrol vehicle. This interface shall be highly configurable and should be capable of automatically displaying pertinent data including at least the following information for scanned and/or matched vehicles of interest:
  - 3.4.10.1 Color image of the plate.
  - 3.4.10.2 Any color overview image of the associated vehicle.
  - 3.4.10.3 The type of offense triggering the match or alarm.
  - 3.4.10.4 GPS location of the scanned plate.
  - 3.4.10.5 Time stamp and Date stamp.

- 3.4.11 The ALPR System will shall provide the capability to conduct manual searches against recorded data, including the ability to search for partial plates.
- 3.4.12 The ALPR System shall provide the capability to interface, download, upload, and communicate with existing HPD MDC's that are currently configured with Windows 7 Enterprise 32 bit operating system.
- 3.4.13 The ALPR System shall provide the System Administrator with the ability to customize audible alerts to differentiate between unique events within the software application.
- 3.4.14 The ALPR System shall provide the ability to add notes to a hit record for permanent storage and subsequent retrieval.
- 3.4.15 The ALPR System's camera configuration shall be capable of switching from one monitoring mode to another via the software application by pressing a corresponding on-screen function button.
- 3.4.16 The ALPR System shall have the capability to capture a still image at the patrol officer's discretion using the color overview camera(s):
- 3.4.17 The ALPR System shall provide a touch screen feature that shall enlarge the captured color overview image.
- 3.4.18 The ALPR System shall provide touch screen navigation for the police application GUI.

#### 4.0 BACK OFFICE SOFTWARE REQUIREMENTS:

- 4.1 The Contractor shall provide a customized back office software system (BACK OFFICE) so that HPD can manage all of the data collected by the various ALPR deployments. In addition, the software shall provide HPD with the capability to manage the database functions and the user administration functions.
- 4.2 The ALPR System shall use the latest Microsoft SQL Server as its database engine. The Server shall reside on HPD property only.
- 4.3 The ALPR System shall capture, store and have the ability to query the following data:
  - 4.3.1 Vehicle license plate number and image.
  - 4.3.2 Interpreted license plate number.
  - 4.3.3 Color license plate image.
  - 4.3.4 Color overview of the identified vehicle.
  - 4.3.5 Date and Time stamp.

- 4.3.6 GPS location of the license plate scan.
- 4.3.7 Type of offense if a match occurs.
- 4.4 The ALPR System shall provide the ability to customize the client application screens and alarms based on system hits.
- 4.5 The ALPR System shall provide the System Administrator with the ability to import and export national and local databases from a website, FTP location, or network address.
- 4.6 The ALPR System shall automatically update all hotlist databases from the patrol vehicle(s) or other mobile devices.
- 4.7 The ALPR System shall allow for the definition of custom hotlist import formats that enables a standard text file in comma separated value (CSV) format to be easily imported and made useable by the system without the need of Contractor involvement.
- 4.8 The ALPR System shall provide application security that will allow HPD to assign users to a group(s) with a defined role.
- 4.9 The ALPR System shall allow an administrator to easily import users from their Active Directory, assign users to a group and establish a password.
- 4.10 The ALPR System shall allow the administrator to view users currently logged into the system and disconnect users as needed.
- 4.11 The ALPR System shall provide reporting system statistics (reads, hits, etc.) for a given timeframe, patrol vehicle, or officer login ID.
  - 4.11.1 The ALPR System shall perform a full or partial license plate query against all databases associated with the system.
  - 4.11.2 The ALPR System shall provide the ability to submit a query for a full or partial license plate based on a physical address and search radius.
  - 4.11.3 The ALPR System shall provide the ability to query for license plate data based upon time, date, location and the user.
  - 4.11.4 The ALPR System shall provide the ability to run a query, select a subset of that query for detail reporting, and/or for plotting on a single map for cluster or pattern analysis.
  - 4.11.5 The ALPR System shall allow for role-based access to individual reports.
- 4.12 The ALPR System shall provide the ability to utilize an advanced mapping function to plot (include street, satellite, and birds-eye views), identify the locations of a particular license plate, or identify all plates captured in a particular area during a particular time.

- 4.13 The ALPR System shall provide the capability to print specific stored data and/or images at the discretion of the System Administrator.
- 4.14 The ALPR System shall provide a customizable email alert notification template.
- 4.15 The ALPR System shall provide the system administrator with the capability to configure notification rules for specific hotlist and/or define associated user group roles.
- 4.16 The ALPR System shall allow real-time monitoring of reads and/or hits from various mobile systems, such as those used in a dispatch facility.

#### 5.0 PROJECT MANAGEMENT RESPONSIBILITIES:

- 5.1 The purpose of this activity is to establish a framework for project communications and reporting contractual activities. The Contractor shall perform the following functions in collaboration with the HPD Project Manager:
  - 5.1.1 Review the SOW and any associated documents.
  - 5.1.2 Establish and maintain project communications.
  - 5.1.3 Review and administer the Project Change Control Procedure.
  - 5.1.4 Develop a project schedule.
  - 5.1.5 Measure, track, and evaluate progress against the project schedule.
  - 5.1.6 Resolve deviations from the project schedule.
  - 5.1.7 Coordinate and manage the technical activities of its project personnel.
  - 5.1.8 Conduct regularly scheduled meetings with Contractor's project team to review project status and prepare status reports.

#### 6.0 IMPLEMENTATION SERVICES:

- 6.1 Contractor's responsibilities shall include all removal and installation activities for the new devices and related equipment including the following tasks:
  - 6.1.1 The Contractor shall include a pre-installation owner checklist that covers hardware, software, and staffing levels provided by HPD.
  - 6.1.2 The Contractor shall provide a list of corporate and technical references for project implementations that were completed within the past three years utilizing the same and/or similar proposed system. The HPD reserves the right to contact previous customers not specifically provided.
  - 6.1.3 The Contractor shall identify a primary point of contact for the implementation services.
  - 6.1.4 The Contractor shall provide all Professional Services through a project team consisting of personnel agreed and approved by the HPD project

manager. The Contractor shall not change such personnel for which a resume is submitted without the prior written consent of the HPD Project Manager.

6.1.5 The Contractor shall be responsible for removing and securely storing old ALPR equipment as directed by HPD.

6.1.6 In addition to the requirements of this SOW, Contractor shall also comply with the requirements of Exhibits A-6 and A-7 in performing the Professional Services and installing the ALPR System, Equipment, and Software.

6.1.7 If the Director, in his/her sole discretion, chooses to implement a pilot testing phase, Contractor shall conduct pilot testing as directed by the HPD Project Manager on a limited number of HPD vehicles to ensure that the ALPR System, Equipment, and Software function and perform as intended. In any such pilot testing phase, Contractor shall only remove prior ALPR systems and equipment from the number of vehicles specified by the HPD Project Manager and shall only install the ALPR System, Equipment, and Software on those vehicles as directed by the HPD Project Manager. The design and installation of the ALPR System, Equipment, and Software shall pass field testing as directed by the HPD Project Manager and shall be approved by the HPD Project Manager before installation on more vehicles.

7.0 HPD SECURITY: CRIMINAL JUSTICE INFORMATION SYSTEMS (CJIS) COMPLIANCE:

7.1 The Houston Police Department recognizes that by allowing physical or logical (electronic) access to HPD facilities or network resources, people may gain access to information or systems they are statutorily prohibited from accessing. To comply with state and federal regulations, the Houston Police Department is required to document and investigate access requests to be sure access is necessary and permitted. The Contractor shall review the Criminal Justice Information Systems (CJIS) process and related documents at located at <http://www.houstontx.gov/police/cjis/hpdvendorcertification.htm> and shall comply with the terms and requirements therein. All employees and other personnel of Contractor or Contractor's subcontractors performing any Services under this Agreement that require physical or logical (electronic) access to any facilities or network resources of HPD shall provide all forms and comply with all requirements as directed by the Chief of Police or his/her designee, including but not limited those specified or otherwise mentioned at:

<http://www.houstontx.gov/police/cjis/hpdvendorcertification.htm>.

7.2 Security is extremely important to keep HPD's information confidential and to ensure protection of the public that HPD serves. Certain processes and procedures will be implemented with any new systems, and the Software Vendor will follow defined processes when working near confidential information. The following will be adhered to:

7.2.1 Hard drives will have MS BitLocker encryption or a comparable method of encrypting the hard drive. All licensing, keys, or required items will be provided by the Vendor.

7.2.2 An Advanced Authentication solution approved by HPD will be used to support two factor authentications.

7.2.3 All hardware and software, encryption, and security of devices will meet or exceed the CJIS minimum requirements for a wireless device in a non-secured location.

#### 8.0 DOCUMENTATION:

8.1 The Contractor shall provide HPD with documentation that includes, but is not limited to, manuals, specifications, installation and troubleshooting guides, and user guides for the ALPR System, Equipment, and Software.

8.2 The Contractor shall provide the necessary documentation, through security documents and topology diagrams that will be required to maintain State and Federal CJIS approval.

#### 9.0 TRAINING:

9.1 HPD will identify staff that will need to be trained on the general use of the ALPR System, Equipment, and Software. Contractor shall provide initial training that includes the following:

9.1.1 An introduction to the new hardware and software.

9.1.2 Flexible individual training.

9.1.3 Training manuals and any course materials.

9.1.4 Trainees will be included in the installation activities to experience actual installation processes.

9.1.5 The Contractor shall train HPD Technology Services Command (TSC) personnel in the proper installation and troubleshooting.

9.1.6 The Contractor shall train all HPD officers on usage of the ALPR System.

9.2 The Contractor shall provide training will for approximately 100 end-users and 4 system administrators.

9.3 The Contractor shall make recommendations for on-site training and/or propose facilities for HPD personnel to configure, use, and maintain the ALPR System, Equipment, and Software based on the requirements stated in this the Agreement and this SOW.

10.0 WARRANTY AND LICENSING:

10.1 The Contractor shall provide ongoing hardware installation support for a minimum period of three years.

10.2 The Contractor warrants the ALPR System against deficiencies in functionality and defects in operation for a period of 3 years from the date of Final Acceptance.

11.0 MAINTENANCE AND SUPPORT:

11.1 The Contractor shall include various levels of maintenance including an option for on-site support within 24 hours of notification for the lifetime of the support contract. The Contractor shall provide upgrades, fixes, and patches at no additional charge to HPD during the period of support. Contractor shall provide remote 24/7 Tech Support to diagnose with spare parts at local subcontractor facility.

12.0 ACCEPTANCE TESTING:

12.1 The Contractor shall test the functionality of ALPR System, Equipment, and Software in all appropriate Divisions with HPD resources.

12.2 HPD resources will create and provide to the Contractor the Acceptance Test Plan and the Acceptance Testing document.

13.0 TRAVEL ARRANGEMENTS:

13.1 The City shall not be responsible for any travel and expenses incurred by the Contractor or any sub-contractor(s) related to onsite installation, on-site training and education activities, onsite engineering and integration services, or any other activities related to this project.

14.0 USE OF HPD'S FACILITIES OR PERSONNEL:

14.1 Unless directly related to this project and approved by the HPD project manager, employees and other personnel of Contractor or Contractor's subcontractors are prohibited from using HPD's facilities (such as office space or equipment) or HPD's clerical or technical personnel for the performance of any Services.

15.0 ASSUMPTIONS:

- 15.1 The following section specifies the assumptions that shall govern Contractor's performance under the Agreement and this SOW.
  - 15.1.1 HPD resources and/or staff shall be available for this project at the sole discretion and direction of the HPD project manager.
  - 15.1.2 The Contractor shall provide all necessary technical support during the project implementation.
  - 15.1.3 The Contractor shall provide software application installation, hardware requirements, and basic software troubleshooting procedures.
  - 15.1.4 HPD utilizes the latest Microsoft Windows environment using active directory with which Contractor shall ensure that the ALPR System is fully compatible.
  - 15.1.5 HPD utilizes the latest Microsoft Windows on desktop computers and laptops with which Contractor shall ensure that the ALPR System is fully compatible.
  - 15.1.6 HPD utilizes the latest Microsoft SQL Server for databases with which Contractor shall ensure that the ALPR System is fully compatible.
  - 15.1.7 HPD utilizes HP servers with which Contractor shall ensure that the ALPR System is fully compatible.
  - 15.1.8 HPD utilizes a Compellent SAN with which Contractor shall ensure that the ALPR System is fully compatible.

16.0 OWNERSHIP OF DELIVERABLES AND WORK PRODUCTS:

- 16.1 The Deliverables and Work Products shall be the sole property of the City free and clear, and may not be sold, given, or published in any manner without written authorization from the Director.

17.0 COMPLETENESS:

- 17.1 The Contractor is responsible for providing, installing, making operational, and maintaining any and all components required to make the ALPR System fully operational with a high degree of performance. Any and all software, hardware, cables, connectors, services, training documentation, or any other item that necessary to make the ALPR System fully functional and productive is the responsibility of Contractor unless specifically defined as a HPD responsibility.

Any oversights or omission on the part of Contractor shall be its responsibility to correct or provide at its sole cost.

- 17.2 Contractor shall be responsible for and will be held accountable for making sure all hardware, software, and service components are working together in the final delivered ALPR System.
- 17.3 It will be the HPD Project Manager's sole discretion to determine whether Contractor has met the obligations of this SOW and the Agreement.

**EXHIBIT "A-2"**  
**PRICING FOR SERVICES AND EQUIPMENT**

ITEM / DESCRIPTION	QUANTITY	TOTAL PRICE
MPH-900 MS2 Two camera Mobile Mini Split DIGITAL ALPR system Custom Whelen Liberty light bar bracket mount-TAHOE	30	INCLUDED
HIGH RESOLUTION DIGITAL FIXED ALPR CAMERA 35/50mm	1	INCLUDED
FCU-900 1-4 FIXED ALPR CAMERA Field Control Unit Wireless - manages power and comms to fixed cameras [NOTE: Fixed ALPR requires a City of Houston road side pole 110 power to the pole and a City owned cellular modem or wifi connectivity at the site if fiber is not available during fixed camera installation.]	1	INCLUDED
Fixed ALPR camera cable – 25’ (custom lengths available)	1	INCLUDED
ASM, Pole Mount : Fixed ALPR camera mount	1	INCLUDED
ELSAG Operation Center (EOC) license fee	30	INCLUDED
ELSAG Operation Center (EOC) back end server application initial configuration, networking with TCIC/NCIC	1	INCLUDED
Remote Car System mobile software installation	30	INCLUDED
Onsite Mobile ALPR Hardware installation, Tahoe Liberty light bar mount	30	INCLUDED
Onsite REMOVAL of existing ALPR systems	20	INCLUDED
Remote FIXED ALPR software installation	1	INCLUDED
ENGINEERING DAY - FIELD SUPPORT - Fixed camera installation	1	INCLUDED
TRAINING Per RFP Spec: Initial onsite MDT user training, train the trainer. Server based admin training and user training. Ongoing onsite and online training available. Free training manuals and Power Point tools.	Ongoing Per Exhibit A-1	INCLUDED

ITEM / DESCRIPTION	QUANTITY	TOTAL PRICE
THREE YEARS OF FULL WARRANTY: HARDWARE & SOFTWARE COVERED WITH REMOTE 24/7 TECH SUPPORT INITIAL RESPONSE, LOCAL REPLACEMENT PARTS	30	INCLUDED
<b>TOTAL</b>	—	\$411,377.00

**EXHIBIT "A-2.1"**  
**PRICING FOR ADDITIONAL SERVICES AND EQUIPMENT FOR**  
**COMPLETE MPH-900 MS2 ALPR SYSTEM**

ITEM / DESCRIPTION	QUANTITY	TOTAL PRICE
MPH-900 MS2 Two camera Mobile Mini Split DIGITAL ALPR system Custom Whelen Liberty light bar bracket mount-TAHOE	1	INCLUDED
ELSAG Operation Center (EOC) license fee	1	INCLUDED
ELSAG Operation Center (EOC) back end server application initial configuration, networking with TCIC/NCIC	1	INCLUDED
Remote Car System mobile software installation	1	INCLUDED
Onsite Mobile ALPR Hardware installation, Tahoe Liberty light bar mount	1	INCLUDED
Onsite REMOVAL of existing ALPR systems	1	INCLUDED
THREE YEARS OF FULL WARRANTY: HARDWARE & SOFTWARE COVERED WITH REMOTE 24/7 TECH SUPPORT INITIAL RESPONSE, LOCAL REPLACEMENT PARTS	1	INCLUDED
<b>TOTAL</b>		<b>\$13,712.57*</b>

\* The price of \$13,712.57 for each additional MPH-900 MS2 ALPR system requires a minimum purchase of at least 5 such systems.

**EXHIBIT "A-3"**  
**MAINTENANCE AND SUPPORT WARRANTY SERVICES**

Contractor shall provide to City maintenance and support warranty services for the ALPR System, Equipment, and Software as specified below during the Initial Warranty Term or any Renewal Warranty Term.

A. Equipment Maintenance and Support

If any Equipment fails to comply with any applicable warranty or any hardware defect otherwise arises, and City notifies Contractor of such failure or defect, within the Initial Warranty Term or any Renewal Warranty Term, at its option, Contractor shall immediately either: (1) correct the warranty failure or repair the hardware defect at no charge, using new or refurbished replacement parts, or (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product.

This warranty does not apply: (a) to errors or defects caused by persons or entities other than Contractor, its subcontractors, or their employees, agents, consultants, or other subcontractors, or other person authorized by Contractor or mutually agreed by Contractor and City to install, maintain, modify, or repair the Equipment (collectively, "Contractor Authorized Service Provider(s)"), including, without limitation, errors or defects in any third-party software or products and errors or defects caused by modifications to the Equipment (including upgrades and repairs) by someone other than Contractor or an Contractor Authorized Service Provider; (b) to any breach of the Equipment (camera and trunk box/processing unit) seal by someone other than Contractor or an Contractor Authorized Service Provider; (c) to pre-existing conditions in the installation environment or vehicle; (d) to damage from accident, abuse, misuse or introduction of foreign objects into the Equipment; (e) to Equipment repairs, modifications, or alterations unauthorized by City, Contractor, or an Contractor Authorized Service Provider; (f) to failure to follow the manufacturer's instructions; (g) to third party actions (i.e., fire, collision, vandalism, theft, etc.); (h) to elements of acts of war or acts of God; (i) to battery leakage or improper use of any electrical source; (j) to cosmetic or structural damage to case or frame of the Equipment or to any non-operating part including decorative parts; (k) to lack of preventative maintenance in accordance with specific written instructions relating to the Equipment's use provided by Contractor to City; (l) to any damage which is not reported during the Initial Warranty Term or any Renewal Warranty Term; and (m) to consumable parts, such as camera glass and batteries, unless damage has occurred due to a defect in materials or workmanship.

B. Software Maintenance and Support

Contractor shall provide to City all updates, upgrades, improvements, patches, error corrections, bug fixes, and any other enhancements for the Software, if any, at no charge during the Initial Warranty Term or any Renewal Warranty Term. Nothing herein shall be construed or interpreted as requiring Contractor to develop any such updates, upgrades, improvements, patches, error corrections, bug fixes, or any other enhancements.

(a) Contractor does not warrant that City's use of the Software will be uninterrupted or that the operation of the Software will be error-free.

(b) If any Software fails to comply with any applicable warranty, and City notifies Contractor of such failure or defect during the Initial Warranty Term or any Renewal Warranty Term, Contractor (at its sole option and as its entire liability and City's exclusive remedy) shall immediately:

(i) replace, repair, modify, or correct the Software to comply with the applicable warranty;

(ii) refund to City all amounts paid by City to Contractor under the Agreement upon return of the Equipment and Software to Contractor or its authorized distributor;

(c) Repaired, corrected, or replaced Software shall be covered by all applicable warranties for the period remaining under the Initial Warranty Term or any Renewal Warranty Term, or if longer, for thirty (30) days after the date of shipment to City of the repaired or replaced Software.

#### C. 24/7 Technical Support

Contractor shall provide remote technical support on a 24-hour per day and 7-day per week basis for both Software and Equipment issues. City can contact Contractor's Tech Support personnel via toll free phone or web site initiated tech support ticket. Once contacted, a CJIS Vender Certified technician shall remote into the Mobile Computing Devices ("MCDs") of the system in question via remote session for diagnosis.

If the issue is software related, it will be handled remotely by the technician at that time. If a hardware issue is detected, a replacement part will be ordered and sent, at City's option, to HPD or to Contractor's subcontractor for replacement as necessary. The replacement part shall be plug-and-play so shall be a quick swap and shall have an included Fed-Ex label in the box to return the replaced part to Contractor.

**EXHIBIT "A-4"**  
**ALPR SYSTEM AND EQUIPMENT SPECIFICATIONS**



**ELSAG**NorthAmerica  
A Finmeccanica Company



## MPH900™ Mini Split LPR System

License Plate Recognition

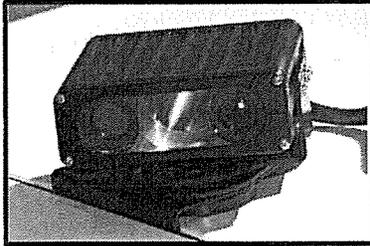


Figure 1: Trunk Mounted Mini Split



Figure 2: Roof Mounted Mini Split Camera

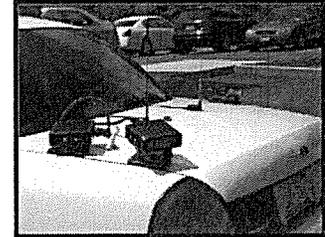


Figure 3: Trunk Mounted 3 Camera Mini Split

The Mini Split Camera can be deployed as a permanent or transportable plate reader system.

The product is suitable for:

- All vehicle makes and models.
- Compact design allows the ANPR to fit in light bars on top of patrol cars or as a standalone unit attached by magnetic clips. Unit is easily and rapidly transferable to a variety of police vehicles.
- Processor unit is the size of a small box for easy storage in trunk of a vehicle.
- The MPH-900 Mini Split License Plate Reader requires less than 60W of 12V DC to function.

The all-weather enclosure contains two cameras: a B/W camera (with one IR illuminator) and one color overview camera. The B/W camera connected with an IR illuminator is designed to tackle variations of lighting conditions, from night to full sunlight.

For each plate read, the color camera provides the overview image of the vehicle.



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MPH900™ MINI SPLIT SYSTEM CAMERA SPECIFICATIONS

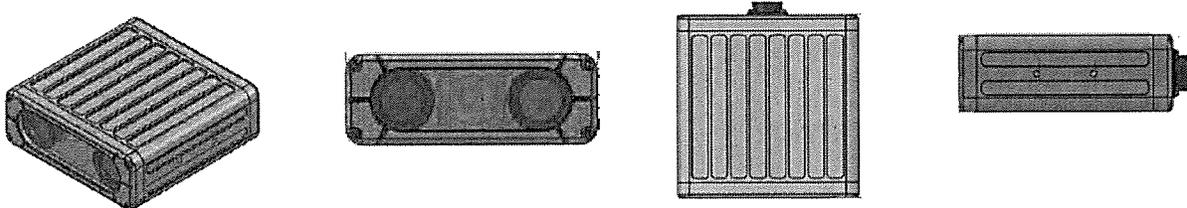


Figure 4: Mini Split Camera Views

MINI SPLIT CAMERA SYSTEM SPECIFICATIONS	
B/W CAMERA	Progressive Scan CCD (12-50 mm available)
Color Camera	Ex-View CCD Pal Video Format (6-25 mm available)
Optics Interface	C Mount
IR Illumination	Std. 735 nm discrete LED, driven w/ high current pulses synchronized with camera shutter (810 – 880 nm available)
Camera Interface	Proprietary 23 pin connector IP67 rated
Camera Communication Protocol	LVDS Digital Interface
Optics	50mm, 35mm, 25mm, 16mm (Black/White reading camera)
Operating Temperature	-40 – 55°C (-40 – 131°F)
Environmental	Internal Heater
Housing Protection	IP67
Operating Humidity	10-90% non condensing
Overall Size	50.80 mm x 142.88 mm x 154.45 mm (without base) 2.00" x 5.63" x 6.08" inches (without base)
Camera Weight	2.8 lbs/1.27 kg (without base)
Camera Base Options	Magnet Mount, Hedley Mount, Clicker Base Mount, Permanent Bulkhead Mount, Whelan Lightbar Interface Mount
Safety Feature	Class 1 Illuminator, EN60825-1



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MPH900™ MINI SPLIT PROCESSOR UNITS

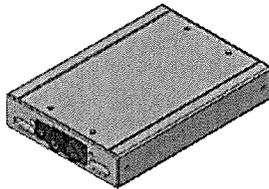


Figure 5: Single Camera Processor

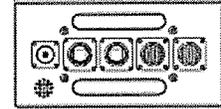
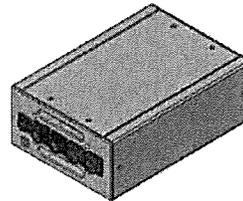


Figure 6: Two Camera Processor

MINI SPLIT PROCESSOR SPECIFICATONS	
Processing Board	Multi-processor unit including a DSP, a FPGA and a Linux-based microcontroller
IR Power Supply	2.5 A or 5 A pulsed current
Input Power	12 V from vehicle battery and ignition key 12 V signal
Interfaces	2 Mil-spec IP67
Housing Protection	IP65
Network Switch	100 Mbit fast Ethernet adapter
Data packet	For each Read system generates; <ul style="list-style-type: none"> <li>- Read License Plate String</li> <li>- Date-Time Stamp</li> <li>- Camera Identifier</li> <li>- JPEG compressed Grayscale and color overlay JPEG of the plate</li> </ul>
Optical Character Recognition Training	Regionalized OCR optimization
Operating Temperature	-40 - 55°C (-5 - 131°F)
Operating Humidity	10-90%
Processor Dimensions	20.32" x 27.94" x 10.16" cm 8" x 11" x 4" inches
Weight	2.4kg (5.3 lbs)
Vanity and Special Plates	A special algorithm allows reading non-structured vanity and special plates.
Non-reflective plates	An enhanced power illuminator and special low-contrast algorithms allow system to achieve



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	accurate results where non-reflective plates are in use.
Red ink character plates	IR illumination unique wavelength allows the system to have accurate results on red ink plates where higher wavelength IR cameras fail to get the necessary contrast.
Software Suite	CD ROM includes <ul style="list-style-type: none"> <li>1. Touch screen enabled on-board User Interface with live display of plate reads, alarms management, Hot List management, shift reporting, and data export.</li> <li>2. Fast bulk-loading hot list software (from USB thumb drive)</li> </ul>
Documentation	Software Installation Manuel and User Manual

MPH900™ GLOBAL POSITIONING SYSTEM ANTENNA

ANTENNAE SPECIFICATIONS	
Interface	USB
Datum	WGS-84
GPS protocol	NMEA or Garmin
Data Rate	4800 bps



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MPH900™ CARSYSTEM 6.0 SOFTWARE SUITE



CARSYSTEM SOFTWARE SPECIFICATONS	
Operating System Capability	All released versions of Microsoft Windows XP, Vista and 7 operating systems.
Connectivity	The system is capable downloading Hot-List data files and uploading LPR Detection and Hot records via the following methods: <ul style="list-style-type: none"> <li>• 802.11</li> <li>• Cellular</li> <li>• Broadband</li> <li>• Wi-Fi</li> </ul>
Buffering	All records are buffered if connectivity to the server is interrupted. Once connection is restored, all data transactions that occurred during the interruption are updated in the order of their priority.
Comprehensive Search Utility	Search mechanism enables the operator to search manually: all vehicle detection records, all Hot List records, and/or all Hit activities. Searches can be performed using partial license plate entries
Custom Note Capabilities	The system allows operators to add customized notes to all records and upload them to the server for use by all other operators
System Integrity and Change Tracking	Each record is dealt with as precious information that should never be lost under reasonable operating conditions. The database engine allows for data changes to be made as an atomic operation, which protects against any data corruption as a result of sudden power loss or temporary storage hardware failure. Protection for committed data will also be provided by the database page checksums.



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	<p>Changes are tracked via history tables in the database. This is done for replication to the server database, for auditing purposes, and for record integrity. Changes/audits are searchable on the server and maintain their own retention logic settings.</p>
Data Transmission	<p>The central server has a persistent connection to all in-car systems. Immediately on any change applicable to a particular system, the server transmits updates to Hot Lists and receives all new Reads and Alarm records generated by the in-car system. The communication uses history tables in the in-car system's database to determine what changes must be transmitted between the two systems.</p>
Alarm Notification	<p>While the in-car system is communicating with the server, it transmits all Alarms and Reads to the server. When the server receives an Alarm, and as it processes each Alarm, it checks to see if the Alarm is of a type that requires an email address for notification. If it is, it generates and transmits an email with the Alarm information to that email address.</p> <p>Additionally, whenever an alarm occurs, if the ELSAG Tactical Operations System is running in conjunction with CarSystem, it will send a simultaneous notification to the dispatcher and to other vehicles that are subscribed to that event.</p>
Filtering	<p>Hot lists can be filtered by location (geo-fencing) or by any other search parameter. Hit visibility is determined based on access levels to the particular agency containing that list and the user's current agency</p>
Data Queuing	<p>All data records in queue waiting for transmittal are prioritized by type. A hit's text data, followed shortly by its image data, is always sent before anything else, except confirmations of data received (when in full duplex operation).</p> <p>Additionally, large objects like images, are sent in chunks so that they can be interrupted immediately in case of very high priority data such as hits to be sent. Interrupted transfers will continue where they were left off once network connectivity returns and/or the critical priority data has completed transmission.</p>
Log-In Credentials/Authentication/Privileges	<p>The system allows any number of operators to log into the in-vehicle system. The system administrator controls login credentials. The</p>



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	<p>administrator can set a user's privileges in such a way that they may or may not customize the default settings of certain in-car system features.</p> <p>The system provides each user a unique account. Each account has a user-modifiable profile associated with it. The profile allows the operator to choose the default settings for things like type of alarms that will sound, display language, volume settings, etc.</p> <p>After completing operator authentication, the in-car system will communicate with the central server and synchronize the Hot Lists on the car so that the in-car database contains data only for those Hot Lists that the operator has access to.</p>
Collection and Retention of LPR Data	<p>The system currently captures the following information when a license plate is read:</p> <ul style="list-style-type: none"><li>• The date/time the image was taken;</li><li>• The date/time the read was recorded in the database;</li><li>• The ID of the user who was operating the vehicle;</li><li>• The ID of the organization that owns the record;</li><li>• The license plate as read by the camera;</li><li>• The state of the license plate, as determined by the camera;</li><li>• The country of the license plate, as determined by the camera;</li><li>• The camera's confidence in the read, on a scale of 1 to 100;</li><li>• The ID of any Alarm group that was generated from this read;</li><li>• The latitude of the car's position at the time the read was generated;</li><li>• The longitude of the car's position at the time the read was generated;</li><li>• The error radius associated with the car's position;</li><li>• The car's east to west speed;</li><li>• The car's north to south speed;</li><li>• The ID of the group associated with the data owner</li></ul>



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	<p>Each license plate read occupies up to 140 bytes, plus the images. A color overview image occupies about 40K bytes on average while a black and white plate image occupies about 12K on average. That gives a total of about 53K bytes on average per read.</p> <p>The individual read records are maintained in the in-car system's database for a period of time that is set by the system administrator. The retention period can be set to any length desired. Removal of data from the server takes place in the order of oldest records first.</p>
Connection Between CarSystem and Servers	<p>The in-car software periodically connects to the central server automatically and checks for updates to Hot Lists. The update frequency can be configured by the system administrator.</p> <p>The in-car system connection to the server is constantly being monitored and displayed to the user. It also allows the operator to send test messages to the server at any time to ensure proper communication.</p>
Alarm Stacking	<p>After receiving a read from one or more cameras, the in-car system checks for Hot List matches automatically, no matter what the operator is doing with the front-end software. Each match raises an Alarm; all alarms are "stacked" until the operator acknowledges them or they time-out.</p>
Camera Displays	<p>The in-car system can display up to four (4) camera views on the same screen at once. Each view can be toggled between color and IR images and will display a live stream of the reads and data coming from that particular camera.</p>
Alarm/Hit Screen Display	<p>The system Alarm or 'Hit' Screen includes:</p> <ul style="list-style-type: none"><li>• Hot-List alert name or type</li><li>• The Hot-List source name (i.e. US-NCIC, CA-DOJ, etc.)</li><li>• Includes date the Hot-List record was created or made active</li><li>• Two images – color overview of vehicle &amp; infrared of license plate</li><li>• Each image shall allow user to view in full screen via double click</li><li>• OCR interpretation of plate</li><li>• GPS coordinates for location</li><li>• Narrative comment text, Hot-List notes</li></ul>



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	<p>available</p> <ul style="list-style-type: none"> <li>• Registered Owner</li> <li>• Vehicle parameters (i.e. make, model, color, etc.)</li> <li>• Camera designated name that scanned matching vehicle</li> <li>• Detection rating to allow the User to:</li> <li>• Designate if read is correct/incorrect</li> <li>• Correct plate read if incorrect</li> </ul>
<p>GUI Operation Indicators</p>	<p>The system GUI provides the following operational status indicators to alert the operator when an error or failure has occurred within the system.</p> <ul style="list-style-type: none"> <li>• Wireless connectivity status between system and ALPR server is either connected or not connected with reason code</li> <li>• GPS satellite signal status indicating if properly receiving with live coordinate display or if not receiving signal with reason code</li> <li>• ALPR camera status of both color and infrared cameras indications if system is receiving video or not receiving video with reason code</li> <li>• ALPR processor status indicating if ALPR processor is properly functioning or if not functioning with reason code</li> </ul>
<p>Manual Hot-List Entry</p>	<p>Assuming the administrator has given the necessary permissions, an operator can enter a Hot List record that includes:</p> <ul style="list-style-type: none"> <li>• License plate number</li> <li>• State of registration</li> <li>• Alert Name w/ priority status</li> <li>• Up to three custom note fields with titles</li> <li>• Up to 255 character vehicle comment with subject</li> <li>• Set an expiration time period for the Hot-List record to remain active. Subsequent to the expiration date, the Hot-List record shall automatically be rendered as inactive</li> <li>• Distribution to all ALPR systems, server, recorded in the database (and made available to Users with appropriate</li> </ul>



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	<p>permissions) and then automatically redistributed through the ALPR network to allow all ALPR systems to receive the Hot-List record as an active target vehicle in which to alert upon.</p> <ul style="list-style-type: none"><li>• Notify (via an alert) the user who entered the record prior to the expiration date.</li></ul>
System Response Time	The system compares a captured plate against multiple large databases comprising of more than 3,000,000 records with a less than 2-second response time.
GUI Light Setting Modes	The system GUI is available in both a daytime and nighttime modes that is selectable by the operator if permission is granted by the system Administrator. Nighttime viewing mode decreases the light emitted from the screen during dark nighttime conditions.

## View of Camera

### Camera Size:

- Standard 16mm (covers 12 feet wide by 15 feet long) and 25mm (covers 12 feet wide by 24 feet long). Only one camera on the right is required to perform all plate reading missions including adjacent lanes or parked vehicles (90° or diagonal or parallel parked).
- We are only company that offers a 50mm camera for mobile use. Typically mounted on the left side of the vehicle, this third camera provides additional lane coverage on wide three or four lane roads.

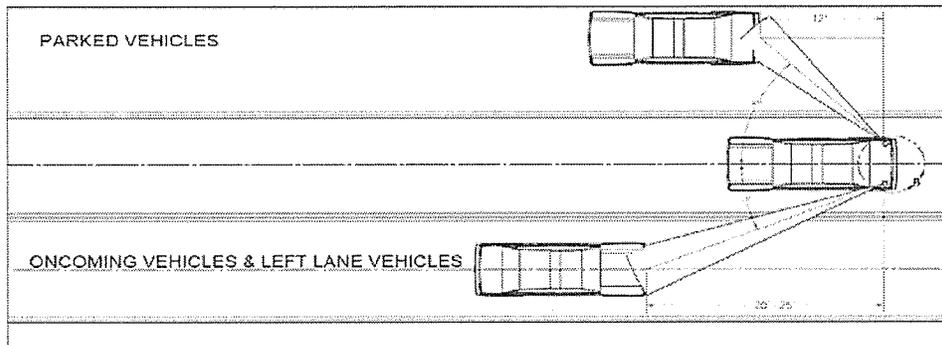


Figure 7 - Camera Range

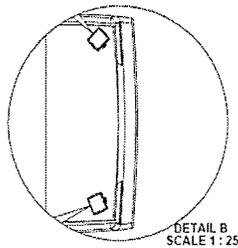


Figure 7- A two camera configuration with trunk mount



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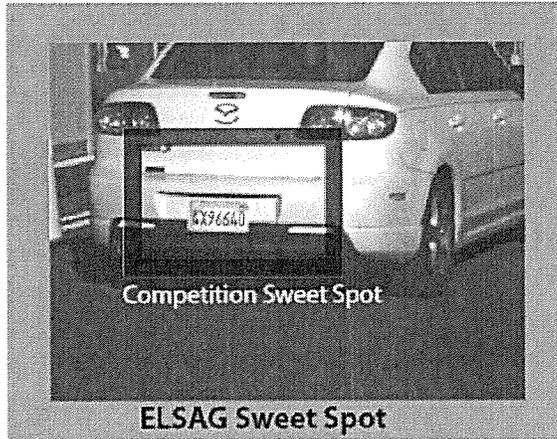


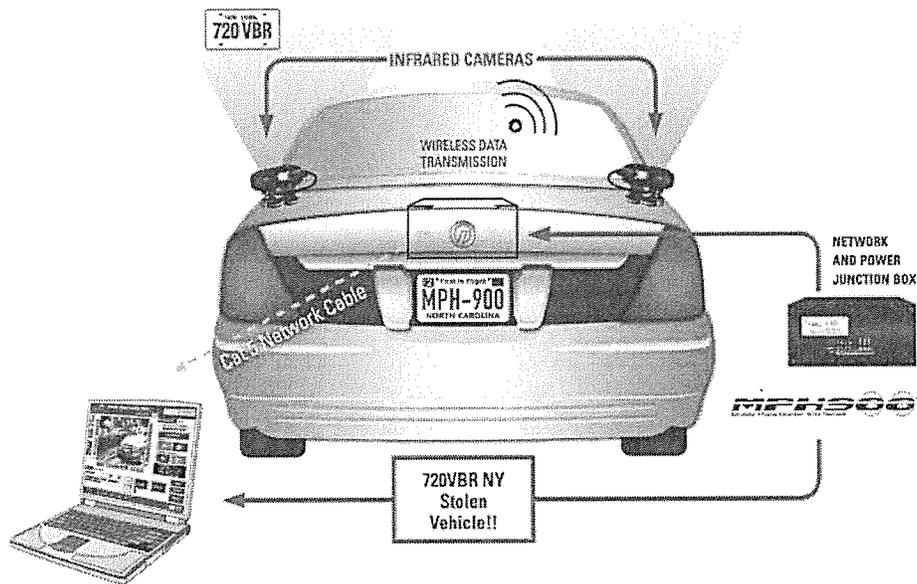
Figure 8 – Camera Snapshot comparable to competition.



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## HOW IT WORKS



- Infrared cameras read plates of parked and moving vehicles across 4 lanes of traffic.
- Processor Box compares data with Hot List records of suspect vehicles
- Wireless connectivity sends images to software uploaded on Mobile Data Terminal (MDT).
- Alarm sounds when suspect vehicle is passed.



MDT



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### Compatibility with on-board PC or Mobile Data Terminals

The LPR cameras need an on-board PC to host the user interface.

It is usually possible to utilize existing Mobile Data Terminals (MDT) if they comply with the following minimal requirements

- PIV 700 MHz with 512 MB
- 800X600 minimal display Resolution
- 5 GB hard disk space available
- LAN data port for connecting the PC to the Processing Unit (the Unit must have STATIC IP addresses); if an on-board LAN is already present, a switch port must be available and the IP address of the unit can be adapted for the existing IP class. If a firewall is present, UDP and TCP traffic shall be enabled between the PC and the Unit.
- USB 2.0 port
- XP Professional SP3 or Windows 2000 Professional SP4
- The Hot List is a standard TXT file and must be generated by the User. The hot list file is the database of the wanted plates and shall be downloaded onto the on-board PC by means of a USB memory stick. It is also possible to download the Hot List wirelessly by means of Wi-Fi or cellular broadband.
- The on-board MDT may be optionally touch screen enabled
- GPS devices, compliant with NMEA 0183 version 2.0 or later, can be installed on any serial (COM) or USB port; if available all the read license plate could be associated to a location for further analysis.



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### Operations Center Software Suite

(to be ordered as a separate item)

When a fleet of cars are equipped with MPH™900 or if it is preferable to have a separate workstation placed in an office environment for after action analysis, the optional Operation Center software is the right solution. Wireless communication capability allows automatic Hot List download and mission data upload. Every time a car moves within the operating range of the wireless device, an automatic data download session is initiated, including the most updated hot list.

OP-Center provides archiving of all the collected data (both alarms and normal reads) as well as database search functions. A mapping module allows the system to display alarms and reads on a map.

If a Wi-Fi infrastructure is not available, it is possible to utilize the Manual Data Download Module that allows moving statistics, data and images of every read plate from each car to a central server that provides data consolidation and overall statistics.

Cellular high-speed networks (such as ED-VO, Verizon Aircard) are also supported.

Wireless network deployment and installation is not included. The design of the wireless network can be provided as a separate service.

#### Not included:

OP-Center Server PC with the following minimal requirements.

This Server configuration is valid for less than 5 mobile units and data storage for up to 6 months.

If the requirements exceed these constraints the Server specification must be evaluated on a case by case basis.

- Pentium IV 2 GHz
- 2 GB RAM
- 120 GB Hard Disk

#### Software

- XP Professional Service Pack 3
- Windows 2000 Professional
- Windows 2003 Server

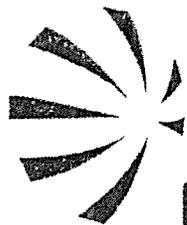
## MPH900 Hot List Input Format

Adaptation software will be provided to convert any kind of input text file into the proprietary system format.

## Maintenance and Support

Warranty Year 1	Included
On Site Training	Included
Phone Support	Included

**EXHIBIT "A-5"**  
**SOFTWARE SPECIFICATIONS**



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# EOC 4.1 Suite

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#### Ordering Information

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# Chapter 1 — EOC 4.1 Suite Features

## Introduction

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This chapter lists some of the technical features and benefits of the EOC 4.1 Suite.

## Components

---

The EOC 4.1 Suite contains these components:

- Fixed and/or mobile cameras to capture license plate read data.
- Car System application (for both fixed and mobile cameras) to allow real-time management of reads and alarms.
- The LPRCore framework and plug-ins which manages the data flow.
- A database for holding current LPR data.
- A database for storing and mining historical LPR data.
- A GUI for administering the EOC 4.1 Suite.
- A GUI for performing Data Mining.

### Fixed/Mobile Cameras

- Collects real-time LPR data.

### Car System

- Similar interfaces for fixed and mobile cameras for viewing live data, checking hot lists, and managing alarms.
- Alternate method to communicating directly to EOC via Web application.
- Self-diagnosing for network connectivity, database operation, and status for LPR cameras and other devices like GPS receivers.
- Reporting capabilities for: number of LPR reads, alarms and alarm handling, location information, etc.
- Compares data to hot lists.
- Raises alarms for reads found on hot lists.
- Manages local read and alarm data.
- Buffers data in the case of a slow or broken network connection to the aggregators.

### LPRCore

- Communication "heart" of EOC Suite.
- Specialized integration with LPR cameras.
- XMPP protocol provides authentication, security, and data encryption.
- Self-upgrading.

### Staging Database

- Provides real-time access to data for multiple subscribers.
- Distributed and load-balanced databases on multiple machines for redundancy and business continuity.
- Scales to hundreds of users for running queries and sharing data.
- Buffers data in the case of a slow or broken network connection to a subscriber.

### Transaction Database

- Provides fine-grained permissioning for data access, users, alarms, cameras, hot lists. Security architecture allows you to allow or deny access to hot lists, alarms and read data by individual user and/or group. Permissions are integrated with each record.
- Provides audit trail for data usage, users, alarms, and hot lists.
- Provides historical usage data – logs of data transactions, hot list updates, user access, etc.
- Transactions on application data are written here and can be rolled back.
- Performs heuristics on diagnostic logging information to generate alerts.

### Administrative User Interface

- User management system supports both Active Directory and internal SQL Server modes.
- Central management and distribution of: configuration updates, camera firmware and protocol updates, LPRCore software updates.
- Manages user and group security with respect to data, hot lists, and system features. (Multitenant architecture secures EOC at the data level as well as the feature level.)
- Configures and manages system elements: domains, cars, cameras.
- Sets up email notifications for alarms.
- Runs system maintenance tasks.
- Administrative GUI is an asp.net MVC application.

### Data Mining User Interface

- Searches and reports on historical alarm and LPR data, hot list data.
- Monitors statistics for system elements.
- Data Mining GUI is an asp.net MVC application.

### Authentication

- The EOC allows authentication using Active Directory or SQL Server authentication, which gives you flexibility in how you integrate EOC 4.1 into your network.
  - SQL Server Mode authenticates users through credentials associated with the SQL Server database. This has several benefits:
    - You can allow access to EOC from outside your Windows network.
    - It provides a second layer of authentication (after Windows authentication) before a user can access your EOC implementation.
    - Configurable parameters within SQL Server Mode, such as password reset, subscription to emails, password length, and character sets provide a higher level of security and one that you can tune to meet your organization's needs.

- One-way hashing of SQL Server passwords increases security against outside attempts to gain access.
- Active Directory Mode reuses the Windows authentication system. You create an analogous user within EOC, but authentication is performed by Active Directory. This means:
  - You limit access to EOC to people on your Windows network.
  - Each user has a single set of credentials to gain access to the EOC.
  - User configuration is controlled by Windows, for simpler administration.

## Security

The EOC includes a sophisticated and highly granular authorization scheme. The EOC allows you to restrict access to both system features and data. For example, you can create a user account within the EOC that has read-only access to some data, read and write access to other data and no access at all to other data. This powerful capability allows you to fine-tune your system to your organization's needs. It also means that it's possible to manage several agencies or groups on the EOC separately.

## Data Domains

Data domains are a basic concept of the EOC security scheme. Domains are collections of data – data "buckets." EOC 4.1 uses them to segregate different classes of data. For example, you could create separate domains in an EOC for Traffic data, Drug interdiction data, and Special investigations data.

Using the highly granular permission scheme within EOC, you could then restrict access to the individual domains. You could set up permissions so that people who do not need to see data in one of the domains could not see the domain at all. Or if you wished, you could give limited access to certain kinds of data and functionality within the domain to certain people.

This means, for example, that you could restrict access to certain hot list data and alarms associated with it to those with a need to know and have the data be invisible to others.

## Access to System Data and Features

All system data in EOC 4.1 is controlled by the security scheme. This includes metadata, images, resources (pdfs, e.g.), searches, and hot lists. System data is collected in domains, as described above.

Access to both system features and data is controlled by users and groups.

Groups are created to define a set of privileges across one or more data domains. Users are assigned to groups based on the access you want them to have.

The permission set for each domain can be tuned by the permissions you give to groups. For example, you can create a group whose users can see search results and alarms in one domain, and search results only in another domain. A different group might see only search results in the first domain and nothing in the second. A third group might not be able to see any data at all in a given domain.

The EOC 4.1 security scheme allows you to organize access to your data and the functionality to organize and present the data in the most efficient way for your organization.

## Other Features

- All communication has identity verification and transport-level encryption.
- Support for digitally signed and time stamped logging entries to make tamper proof.

- Security audit logging of all actions taken by any user or process in the system.
- Support for database encryption.
- The communication system uses the standardized XMPP protocol, which works cleanly with firewalls and supports the most advanced TLS/SSL encryption methods.
- User permissions are integrated into each record.
- All requests for data and content, such as images, undergo security checks.
- Version control of hotlists, whitelists, configurations, reads, and other plate lists ensures only changed data is transferred to other systems to make communication more efficient.
- Hot list changes or other changes can be distributed immediately or on a schedule.
- Supports the ability to investigate past versions of versioned database information or to revert a change.
- All records/plate list entries are assigned globally unique identifiers to avoid collisions.
- Automatic updates are managed and distributed centrally. Supports both optional and required updates with or without user intervention:
  - Configuration updates
  - Camera firmware and protocol updates
  - LPR Core software updates
- Group privileges includes granular permissions inside separate data domains.

### Data Mining

- Queries are efficient because the data is paged on the database. Slices of data are returned to the application.
- The SQL database is decoupled from application code using an application domain model and a repository pattern. This allows for a more maintainable, adaptable, and resilient application. You can also use other databases.
- Search and report on historical alarm and LPR data, hot list data.
- DateTimeOffset allows accurate time stamping of data with time zone awareness.
- Fast single query from home page.
- Showing reads and alarms on a map.
- Monitor statistics for system elements:
- In querying the data, you can filter results on time, date, plate number, state, location and the specific domain within which the data resides. You can view and magnify the images associated with a read and plot read data points on a map.
- Beyond the basic search capabilities, EOC also allows you to:
  - Save search parameter sets for reuse
  - Send a single URL for a completed search to another EOC user
  - Show both local time and the UTC offset for a particular plate read

- Data mining statistics
- Search filters allow fine-tuning of data mining queries:
- Retrieved alarms show details and map placement:

**Hot Lists**

- Hot list management features: manage hot list data and attributes, as well as upload existing hot list data through a simplified interface. Script files (XML) parse the incoming data into a correct format for the DB automatically.
- Create, update, and delete hot lists.
- Search hot lists.
- Add a plate to a hot list.
- Delete a plate from a hot list.
- Schedule hot list imports tool:

**Licensed and Integrated Mapping Engine**

EOC 4.1, unlike most competitive products, uses an integrated and licensed mapping engine to plot data points on a map and manipulate the image. This means that the EOC does not rely on an Internet connection or remote systems to map data and render it.

Here's a glimpse of the integrated map function in EOC 4.1:

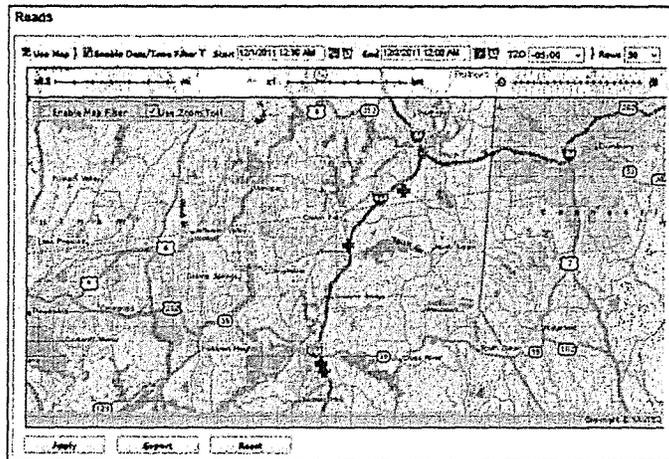


Figure 1 – EOC 4.1 Map Example

**EOC Web Application**

**Required Components:**

- IIS 6 or above (IIS 7 and up recommended)

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- .NET Framework 3.5 SP1 or .NET Framework 4.1
- SQL Server 2008
- ASP.NET MVC version 3

### Architectural Pattern – Model-View-Controller

The EOC Web UI was built using the Model-View-Controller (MVC) architecture. The main aim of the MVC architecture is to separate business logic and application data from the presentation data to the user. The following list outlines the features and benefits of using the MVC architectural approach.

- ASP.NET MVC – Enterprise Architecture
  - View (UI) -> Controller (Routing) -> Model that incorporates a service layer for business logic and data validation and a repository data access layer
  - Clean separation of concerns (SoC)
  - Resilient to change
  - Can easily change view (UI) technology in future
  - Enable Test Driven Development (TDD)
  - Code is unit testable– we can build a unit test suite and can execute it automatically to catch regressions introduced with the last set of changes
  - We are using the **Dependency Injection Pattern** that enables looser coupling between classes and their dependencies and provides better testability and plugability.
  - Easy integration with JavaScript frameworks like jQuery
  - Extensible and Pluggable framework
  - REST friendly URL
  - Entity Framework 4.1 ORM (not 1.0 which was not mature yet) to ease development - ADO.NET Entity Framework (EF) is an object-relational mapping (ORM) framework for the .NET Framework. In addition, any backend database can be more easily swapped (the Domain Model is database agnostic) and classic data access (using DAAB (Data Application Access Block or similar approaches)) is still possible.
  - Linq to Entities allowing querying of the database using IQueryable - especially elegant when working with search parameters
- User Interface
  - Telerik ASP.NET MVC Controls
  - Easy to develop with
  - Save development time
  - Fast AJAX and jQuery based
  - jQuery
    - Easy to develop with
    - Very lightweight
    - Abstracts browser differences

- Many plugins available to speed development time
  - Custom Paging – fast and scalable – database records are paged – only the records (slices) needed are queried on the back end
  - Consistent language and terms with support for globalization and localization
  - Robust Maps by Telogis GeoBase – high performance enterprise mapping functions with consistent, easy-to-use, and robust APIs for Stand-Alone, Server, Ajax and Silverlight. Fast display, reverse geo-coding, and geo-fencing with data included
  - Use of View Models (DTOs – Data Transfer Objects – used to transfer parameters to methods (MVC Actions) and as return types returned to Views) that map closely to the UI and are separate from the Domain Model
  - Use of User Controls (Partial Views) for re-use and greater modularity
  - Use of CSS encapsulated in external files for styling
  - Use of Master Pages - ASP.NET Master Pages create a consistent layout for the pages in the application
- Authentication/Authorization
  - Users belong to one or more groups. Each group contains a set of permissions.
  - Built on top of ASP.NET Membership and Roles Providers via custom providers to leverage APIs
  - Support for both SQL Server membership and Active Directory as the data store of users
  - Passwords can be hashed in multiple ways – we are using one way hash
  - Bookmarking is possible (if session times out, user will be redirected to appropriate page after login)
  - Session timeouts defined per User Groups
  - Besides application functions, actual data can be secured using Group IDs

## Other EOC 4.1 Features

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### Intuitive Interface

The user interface is equally simple and easy to use. Here's a quick glimpse of the user interface for querying the data inside the EOC:

