ORIGINAL

SOLICITATION 16TW690
SOFTWARE
Facial Recognition &
Real Time Video Feed Facial Recognition
1/9/2017 at 9:00AM

DataWorks Plus Contact:
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FACE Plus

FACE Watch Plus Real Time Screening

January 5, 2017

Torie Woods
313-224-4612
WoodsTo@detroitmi.gov

RE: Solicitation 16TW690: Software

Dear Torie Woods,

DataWorks Plus is pleased to submit this formal proposal in response to your requirements for a facial recognition software solution for the City of Detroit and Detroit Police Department.

DataWorks Plus is highly confident in our ability to meet and exceed the specifications detailed in your RFP. With over 1,500 total successful customer implementations and over 30 large scale facial recognition projects and numerous other small to medium-sized installations, including the statewide Michigan Central Data, Image Repository and facial recognition system, DataWorks Plus has the knowledge, products and experience to successfully implement the system we have proposed.

DataWorks Plus has a successful history of implementing large complex systems very quickly. A lot of this success is based on the fact DataWorks Plus is a privately held, medium size company that is extremely nimble, flexible and customer-centric. Our employees have an extensive history in biometric identification systems, offering substantial expertise in equipment, software and services. DataWorks Plus' team provides proven solutions, technical support, and a cooperative attitude in working together to solve your needs.

DataWorks Plus is prepared to demonstrate the features and functions of the proposed system at your convenience. We look forward to providing you technology and support for many years to come. Please feel free to contact me if I can help in any way. Thank you again for the opportunity to submit the proposal and for your consideration of FACE Plus as your facial recognition system.

Sincerely,

Randy Hall
Senior Account Executive
610-322-9559
rhall@dataworksplus

Table of Contents

1 Proposed Solution

For the City of Detroit, DataWorks Plus is proposing our FACE Watch Plus real-time video surveillance facial recognition and FACE Plus facial recognition solutions. DataWorks Plus will work with the City of Detroit to fine-tune the specifications and create a customized solution that meets your exact needs. DataWorks Plus will provide a turnkey facial recognition system including all the required interfaces to Motorola Command Central Aware Console and ID Networks. We have implemented over 500 interfaces and have the tools and the experience to implement interfaces very quickly. The proposed solution can be executed in a VMWare environment.

FACE Watch Plus tracks face images from live video surveillance, processes the images, then searches your database and alerts you when a match/hit has been made. It detects faces within surveillance footage in real-time, then uses cutting-edge facial searching algorithms to rapidly search through your agency's mugshot or watchlist database for positive matches. For additional information about FACE Watch Plus, see page 15. We've also provided a link to a video description of FACE Watch Plus.

FACE Plus provides accurate, reliable identification using the latest facial recognition matching technology and tools to manipulate and compare images. DataWorks Plus has provided the proposed FACE Plus facial recognition system to a wide array of government agencies nationwide, and we are confident that we can meet the specific functionality, capacity, and ongoing support requirements being sought in this request for proposal. For additional information about FACE Plus, see page 18.

Industry-Leading Dual-Engine Searching → We are proposing the ROC and NEC facial matching engines, for dual engine searching which increases system accuracy.

Right Corporate Strategy → DataWorks Plus reacts quickly to customer needs.

Interface Proficiency → DataWorks Plus has created & installed numerous complex interfaces at multiple agencies.

Extensive Facial Recognition Experience → DataWorks Plus has provided the proposed FACE Plus facial recognition system to a wide array of government agencies nationwide.

Algorithm Agnostic Solution → The City of Detroit can easily upgrade to another algorithm in the future, if a better one becomes available.

Special Features → Lineups; Search separate systems through single interface; Integration with other large regional systems and/or Integration with FBI Interstate Facial Recognition Pilot.

1.1 Industry-Leading Dual-Engine Searching

DataWorks Plus developed the first multiple vendor facial recognition algorithm search and user interface in the industry. It allows a user to submit one image and search two or more algorithms simultaneously, then receive rows of facial results unique to each algorithm. Our real world experience proves two algorithms increase the system's accuracy. This multiple-algorithm approach has been well-received and adopted by our customers, including JNET (PA), Michigan State Police, San Bernardino County, Chicago Police Department, and Riverside County. JNET won a Computerworld award because of the unique implementation. Watch the Computerworld video on our website: http://www.dataworksplus.com/faceplus.html.

Award-Winning Implementation of DataWorks Plus' Facial Recognition Solution at JNET (PA) – Highlight video on our website:
http://www.dataworksplus.com/faceplus.html

For the City of Detroit, DataWorks Plus is proposing the ROC (DaVinci) and NEC algorithms. The ROC algorithm is among the most accurate and fastest on the market. The NEC algorithm –has been ranked number #1 for the third consecutive time in the FRVT 2013 test results.

ROC (DaVinci) outperforms PP5 government algorithm in accuracy.
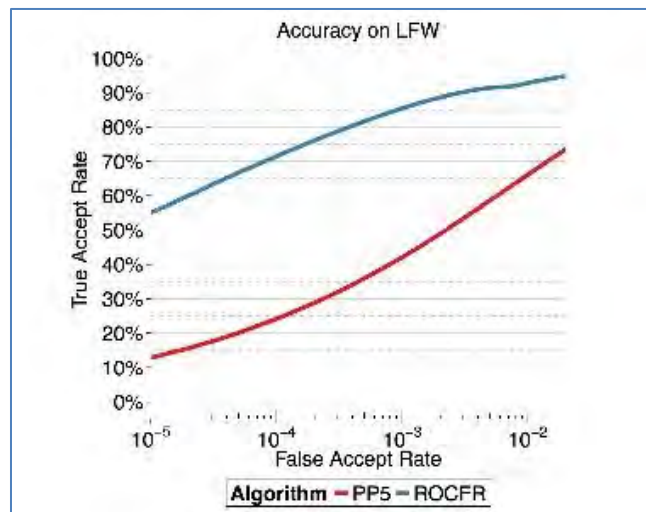
NEC remains strong in accuracy and speed since 2010
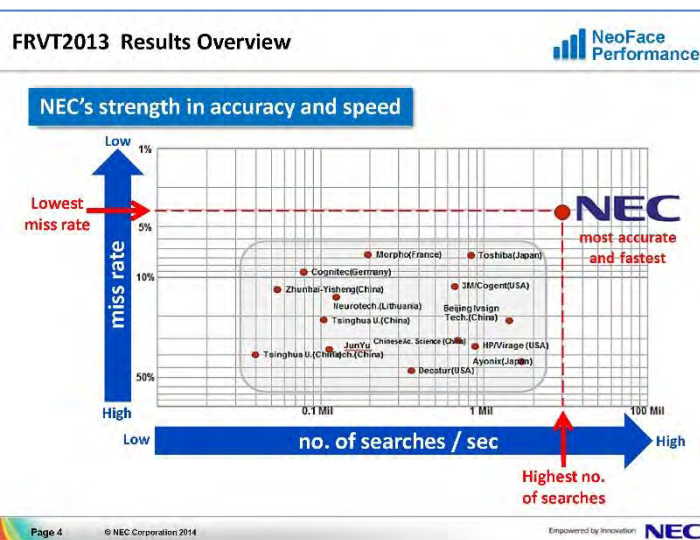
NEC is more accurate than other vendors using poor quality images

1.2 Right Corporate Strategy

DataWorks Plus is a privately-owned, nimble company that reacts very quickly to customer needs. From quick implementation, to support issues, to changing our products to meet specific customer needs, to custom-designed applications, DataWorks Plus will do what it takes to make our customers happy. We believe DataWorks Plus provides more options and more flexibility than any other vendor. And, as a privately-held company, DataWorks Plus makes day-to-day decisions based on what is right for the customer.

1.2.1 Nimble and Low Risk

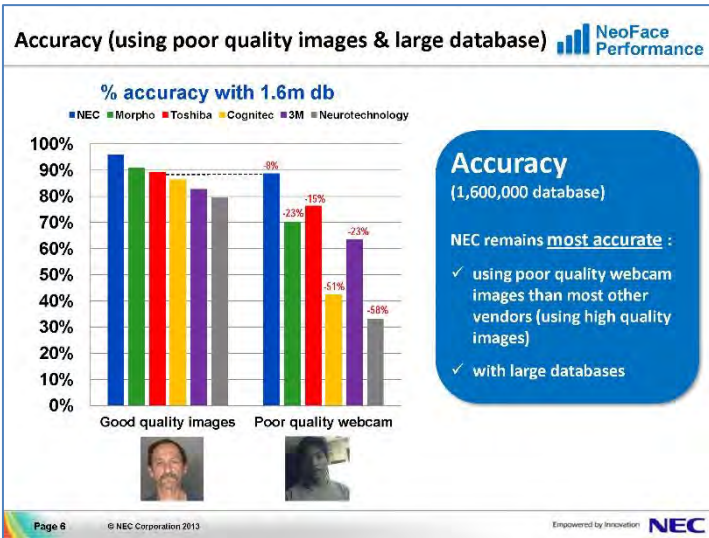DataWorks Plus understands that the long-term stability of a product requires long-term stability of the company providing it. By maintaining a vision of stability and growth, we have seen the scope of the projects undertaken by DataWorks Plus steadily increase from single standalone systems in small agencies, to multi-agency networked regional solutions, to statewide contracts containing hundreds of agencies with actively-used DataWorks Plus products. As a result, our Support Center technicians, development, and engineering staff have grown in both number and expertise to ensure optimal long-term functionality of all systems we install. We are aware of the critical need for any potential vendor's financial stability and ongoing support capability to be thoroughly evaluated by your agency. As such, we are confident that we can develop, install, and maintain our proposed products to the City of Detroit.

1.2.2 Project Deployment and Solution Delivery

DataWorks Plus currently has a database, system administration for role-based access control and activity tracking, facial recognition matching, and web-based client facial recognition investigative software that meets your requirements. The hardware recommendations are designed to accommodate all speeds and specifications for throughput required by the City of Detroit.

DataWorks Plus has implemented hundreds of customized and turnkey systems in its corporate lifetime. DataWorks Plus delivered the Michigan State Police Facial Recognition system, which had 33 million photos, in less than 4 months after receiving the Purchase Order. We also delivered the SC DMV Facial Recognition system in 2 months. We converted 7.7 million images in less than 3 weeks and enrolled images in 8 days. **This was four months ahead of the required schedule.**

Quick Deployment

4 Months

Delivered Michigan State Police Facial Recognition System

33 Million Photos

2 Months

Delivered SC DMV Facial Recognition System

Converted 7.7 Million Images in Less Than 3 Weeks

Enrolled Images in 8 Days
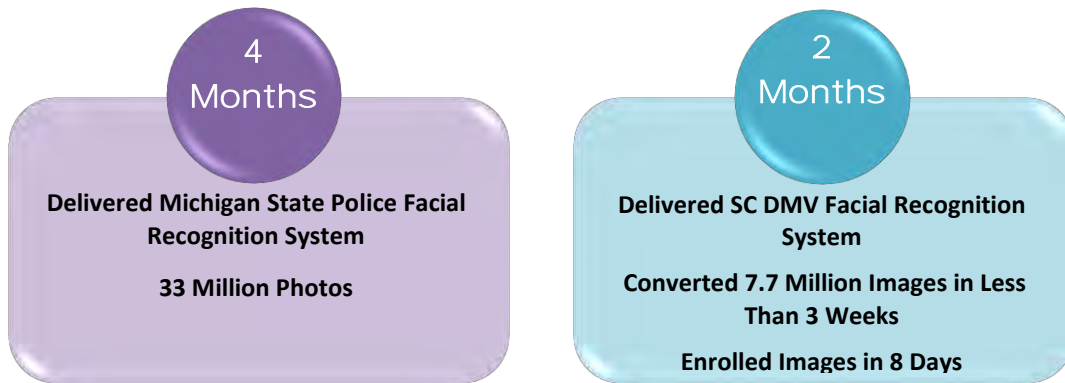
1.2.3 Exceptional Support & Ongoing Training

DataWorks Plus is prepared to meet the City of Detroit maintenance requirements with our technical support staff, all based in the U.S., which currently supports over 1,500 government agency systems that require 7 day x 24 hour support. DataWorks Plus' staff members have passed all government and customer-required background checks.

1.3 Interface Proficiency

DataWorks Plus' solution will include all the required interfaces to Motorola Command Central Aware Console and ID Networks. DataWorks Plus already processes ID Networks' Livescan NISTpaks in both Michigan and Virginia to populate the mugshot repository. Our system has an open architecture based on SQL technology and no proprietary software is necessary for setting up or modifying interfaces. We pride ourselves in working with customers to determine their interface needs and incorporating new ideas and technologies into the interfaces available for our customers.

The system uses a SQL database with a customizable data table. Stored procedures are also used to allow complex application functions to be performed without having to re-code the application itself. This not only makes it easy to configure or modify data fields and screen layouts, but it makes the data easily interpretable for third-party applications that need to be interfaced with FACE Plus. For additional information on the types of interfaces we have created, please refer to the "Types of Interfaces" section, on page 32.

1.4 Extensive Facial Recognition Experience

With a customer base of over 1,500 customers, DataWorks Plus will leverage this experience to guarantee success when implementing and providing on-going support and training for the City of Detroit. DataWorks Plus has provided fully-integrated facial recognition and Digital PhotoManager solutions for small to medium-sized installations, and many large agencies, including the following:

24 Statewide Systems

1 Countrywide System

1,500 Customers

9 of 16 Top Cities

18 of 36 Top Counties

1. Michigan State Police/DMV

2. NY/NJ Hidta-NYPD (NY, NY)
3. Maryland Department of Public Safety/DMV
4. Virginia State Police
5. Chicago Police Department (IL)
6. SC Department of Motor Vehicles (SC)
7. SC Law Enforcement Division (SLED)
8. Charleston County Sheriff's Office (SC)
9. Wake County CCBI and Raleigh PD (NC)
10. Country of New Zealand
11. Los Angeles County Sheriff's Department (Face and Tattoo Matching)
12. JNET (PA)
13. Pennsylvania State Police
14. Pennsylvania Department Corrections
15. Pennsylvania Probation and Parole
16. Miami Dade Police Department (Mobile Gang Application)
17. Collier County Sheriff's Office (Naples FL)
18. Federal Agency: HIDTA (NY, NJ) Multi State Implementation
19. Philadelphia Police Department (PA)
20. Columbus Police Department (OH)
21. Irving Police Department (TX)
22. San Diego County Sheriff's Department (CA)
23. Sacramento County Sheriff's Department (CA)
24. San Bernardino County Sheriff's Office (CA)
25. San Mateo County Sheriff's Office (CA)
26. Riverside County Sheriff's Department (CA)
27. San Joaquin County Sheriff's Department (CA)

Large Facial Recognition Customers

Statewide / Countrywide	Large Agencies
Michigan State Police	**Los Angeles Sheriff's Department (CA)**
DMV & SLED (SC)	**San Diego Sheriff's Office (CA)**
Pennsylvania JNET	**Miami Dade Police Department (FL)**
Maryland DPS	**NY/NJ Hidta-NYPD (NY)**
NY/NJ HIDTA	**Collier County Sheriff's Office (FL)**
Virginia State Police	**Chicago Police Department (IL)**
New Zealand	**Charleston County Sheriff's Office (SC)**

1.4.1   Proven System Integrator

Founded in 2000, DataWorks Plus has developed many different biometric-based identity systems each with unique workflows. At DataWorks Plus, we view ourselves not only as application developers, but also as solid system integrator, using a combination of best-of-breed solutions

from third-party providers, our own commercial-off-the-shelf software, and some custom development to provide the best available working environment for our customers. Our approach to this project in particular involves the integration of the best facial recognition software available today. This knowledge gives us a competitive edge for us to say that we are bringing the City of Detroit the best facial recognition software for the best value. Value is based on speed, cost, and matching quality of the engines.

1.4.2   Unmatched Flexibility and Accuracy

The systems integrator approach has provided DataWorks Plus with experience very few vendors can claim. DataWorks Plus has the ability to test and evaluate different software and devices and inherently learn which systems perform the best and for the best value. This has led us to selling over five thousand mobile fingerprint devices in the State of Florida and integrating major livescan fingerprint devices across the country. Likewise, we have also tested and evaluated major facial recognition algorithms on the market. DataWorks Plus' approach allows us to be open and objective when recommending algorithms. As algorithms improve in the future, the City of Detroit will have total flexibility to select and implement the best.

1.5   Solution is Algorithm Agnostic

Because our solution is algorithm-agnostic, City of Detroit can easily update to another algorithm in the future, if a better one becomes available. We provide a seamless user interface, which is independent of the algorithm, so additional training won't be necessary in the event of an algorithm change. In addition, our solution supports the use of multiple facial matching algorithms at the same time for even better accuracy.

DataWorks Plus' solution supports algorithms from numerous vendors – the City of Detroit will not be tied to a specific algorithm vendor.

1.6   Special Features

1.6.1   Lineups

Our proposed system **exceeds the RFP specifications** and provides the ability to generate a photo lineup. Lineup capability will be seamlessly integrated with the proposed facial recognition case management system. This feature-rich system would include all functionality of the full Digital PhotoManager system, including investigative search capability, and customized reports.
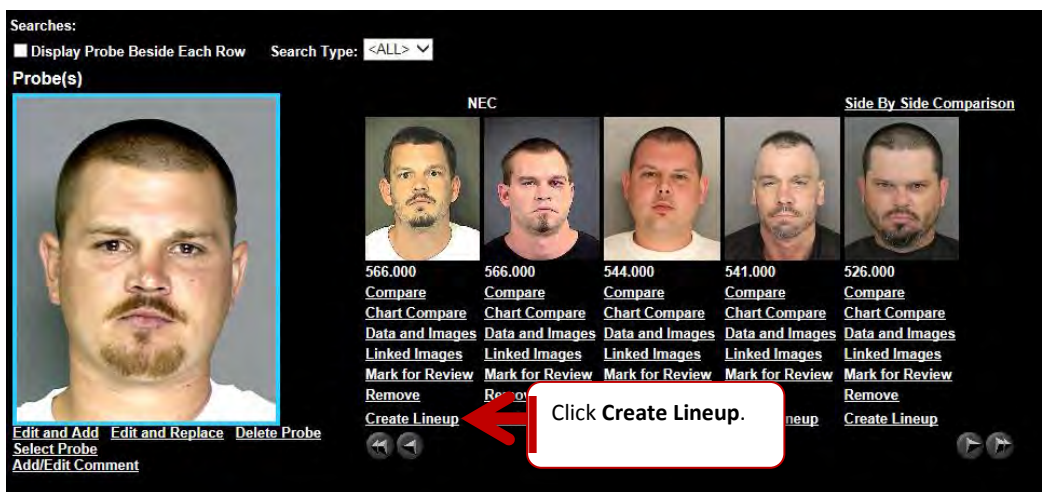
Continue adding images until the lineup panel is full.

1.6.2   Search Different Systems via Single Interface

If allowed by MSP, DataWorks Plus is can provide dual search capability – analysts will be able to select a probe and search Detroit and MSP databases **from a single application**. DataWorks Plus is providing MSP's facial recognition system. In a single transaction, our proposed solution will enable analysts to identify the individual by performing a one-to-many (1:N) search of <u>both</u> the Detroit and MSP databases to find if any positive matches exist. DataWorks Plus has currently implemented a similar approach at Michigan State Police, Maryland Department of Public Safety, South Carolina SLED and DMV, and JNET (Pennsylvania.) This combined search approach greatly improves productivity and decision making for analysts.

1.6.3   Integration with Other Large Regional Systems

DataWorks Plus maintains numerous large facial recognition databases and provides an opportunity through mutual interest to access those databases such as Chicago, Pennsylvania, New York including NYPD, Northern Jersey, Columbus OH, Virginia and Maryland.

1.6.4   Integration with FBI Interstate Photo System Facial Recognition Pilot (IPSFRP)

DataWorks Plus participated in the original FBI Interstate Photo System Facial Recognition Pilot with the Michigan State Police and has subsequently interfaced the FBI submission to its statewide facial recognition solution for the Maryland Department of Public Safety. Results may be displayed in multiple ways – single row with both arrest and DMV matches, separate rows for each database, separate rows if using multiple search engines, searching FBI, etc. The following screenshot shows an example of a combined search with DMV, multiple engine, and FBI.

The first row of candidates is from the adult database; the second row is from the driver's license database and the third is from the FBI NGI database.
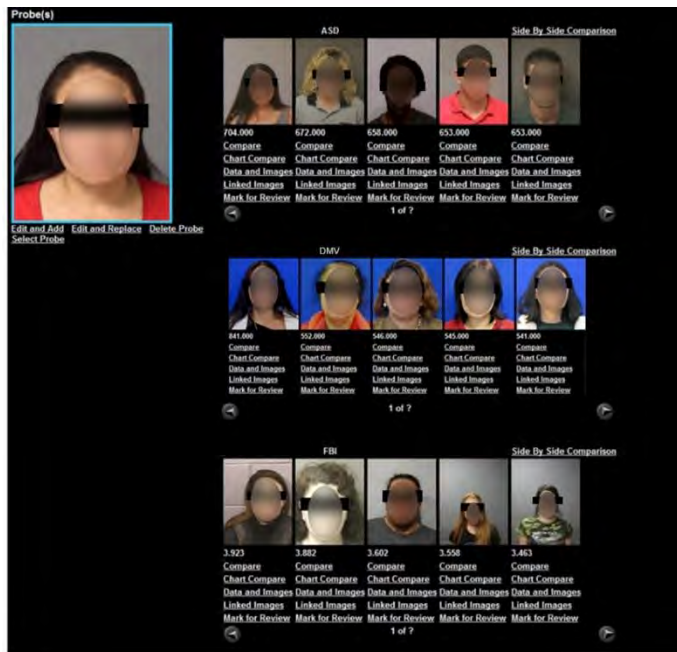
1.7 Optional Items

In addition to the proposed system, DataWorks Plus is offering the following options:

- Evolution Mobile Facial Recognition Device with Client Licenses
- RAPID-ID Mobile Fingerprint Client (used with Evolution)

Pricing has been provided in the Pricing section, starting on page 43.

1.7.1 Evolution for Mobile Facial Recognition and Fingerprint Identification

DataWorks Plus is offering the optional Evolution multimodal identification device. This all-in-one device will provide the City of Detroit unmatched flexibility and functionality, at an exceptionally affordable price. The "All-in-One" Evolution scans fingerprints and captures photos, then displays detailed hit results on the actual device. It is equipped with all industry-standard wireless communication methods, including call capability, 4G LTE Internet, Wi-Fi, Bluetooth and GPS capabilities. If preferred, cellular capability may be disabled, allowing it to be paired to an MDC/MDT, using Bluetooth or Wi-Fi.

Mobile Identification has Evolved...

EVOLUTION

FBI FAP-30 Certified
Multimodal Fingerprint & Photo Capture
Galaxy Android Smartphone
Cellular or Wi-Fi/Bluetooth
Secure Mobile Data Service for CJIS Compliance
Wireless Charging Option

Secure Mobile Data Service (SMDS) from DataWorks Plus provides Mobile Device Management software, two factor authentication, and a customizable shell with advanced features to ensure that your agency complies with the FBI CJIS Security Policy. The FBI CJIS Security Policy defines a minimum set of security standards to ensure the protection of Criminal Justice Information. Agencies must comply with the standards in order to have access to CJIS information and data. DataWorks Plus' SMDS provides the security your agency needs to comply with policy. SMDS also delivers unparalleled customer service and support since our technical support team can remote into the device.

1.8 FACE Watch Plus for Real-Time Video Feed Facial Recognition

DataWorks Plus has worked with the market's leading facial biometric identification providers to develop a fast, reliable, and fully customizable facial recognition system for live surveillance monitoring. FACE Watch Plus tracks face images from live video surveillance, processes the images, then searches your database and alerts you when a match/hit has been made.

FACE Watch Plus detects faces within surveillance footage in real-time, then uses cutting-edge facial searching algorithms to rapidly search through your agency's mugshot or watchlist database for positive matches. We've also provided a link to a video description of FACE Watch Plus.
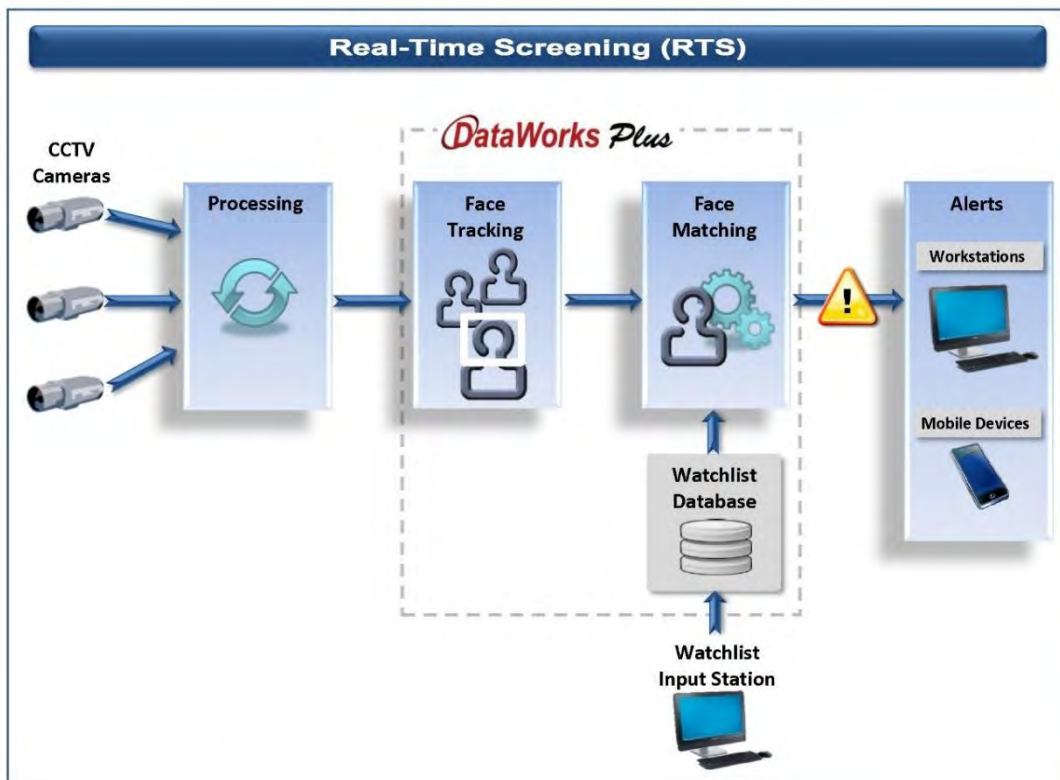
The system will give immediate detailed alerts to authorized users whenever a hit is found on an individual of special concern, and all positive hits are time-stamped so that they can be reviewed by administrators.

ALEX BYLENGA

HIT
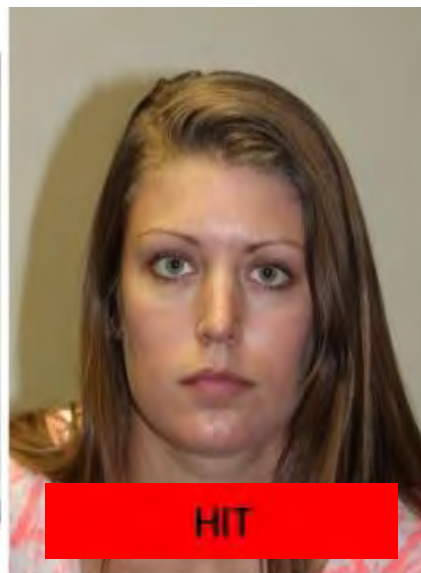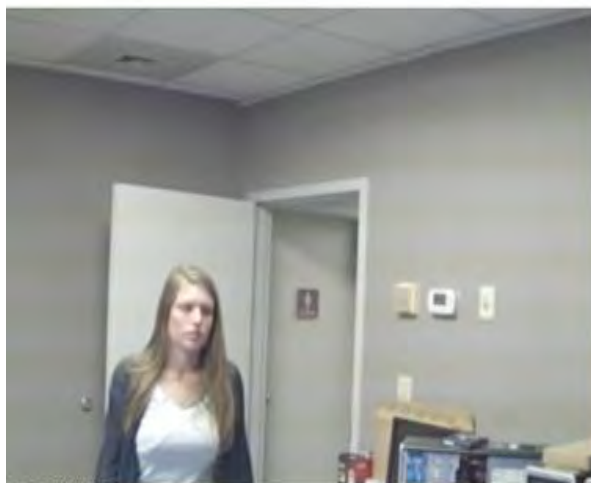
1.8.1 Continuous Screening and Monitoring – Detection in Live Video Streams
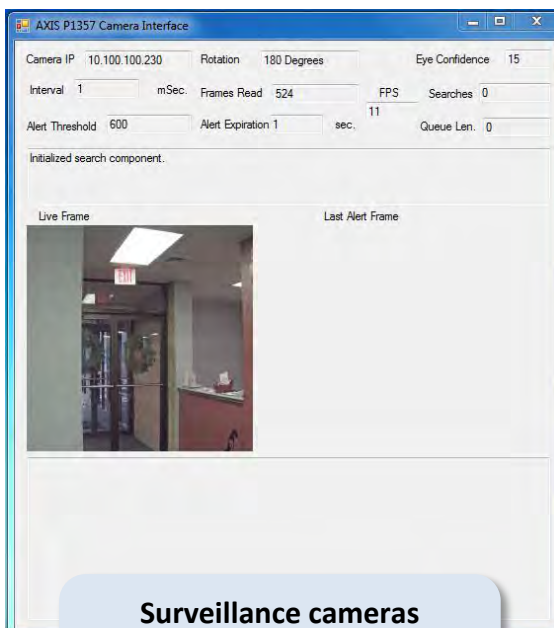
Surveillance cameras continuously capture and monitor video.
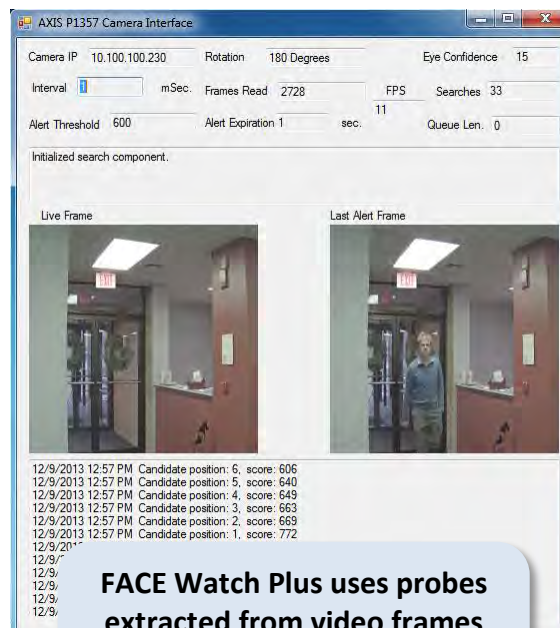
FACE Watch Plus uses probes extracted from video frames to search the database for potential matches/hits.

1.8.2   Multiple Cameras for Multiple Locations and Angles

FACE Watch Plus provides an efficient system to screen every individual, face on, or even at a side angle. In the event that an individual with a warrant passes by, the system immediately flashes a hit, alerting your agency of a potentially dangerous criminal. Alerts are shown on desired workstations and any associated mobile devices.
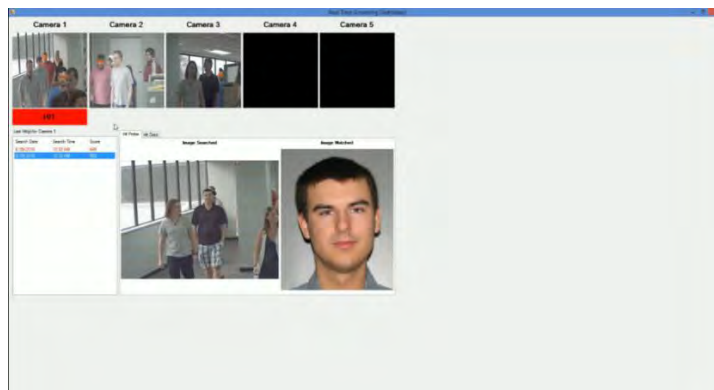
1.8.3   Analyzing Hits

In the event of a Hit, Real-Time Screening allows you to organize and view all previous hits in a simple and easy to use manner. Arrange and sort hits by Search Date, Search Time, or Score. Real-Time Screening offers detailed warrant information on any Hit that occurs in order to provide valuable information on the individual screened by the application.

1.8.4   Side-by-Side Viewing of Probe and Hit

Users may view the probe image at the same time as the match.

1.8.5   Watchlist Applications

Your agency can create a watchlist database that includes images and information about persons of interest or wanted individuals. Records can be added manually, or added from an existing database. Real-time facial recognition searches can be run against this database. As images are captured by the surveillance camera(s), the system will automatically search for matches against the watchlist database. If a facial match exceeds a system defined threshold match, then the image or images are returned.

1.8.6   Customizable Hit Data

The information contained in alerts is customizable to include not only the name or image of the person identified, but any data contained within the individual's booking record.
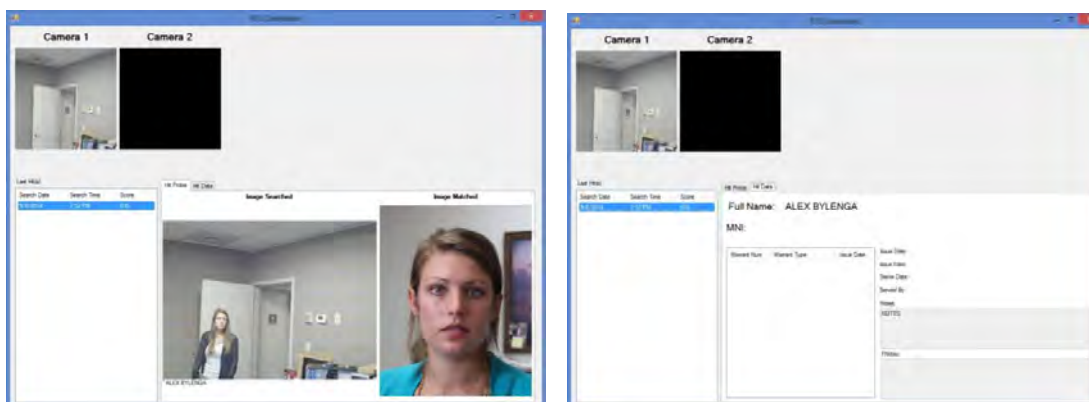
1.9 FACE Plus for Facial Recognition through Still Images

DataWorks Plus' FACE Plus provides accurate, reliable identification using the latest facial recognition matching technology and tools to manipulate and compare images. FACE Plus is scalable and is ideal for a multi-agency environment. Many agencies have implemented the DataWorks Plus' FACE Plus facial recognition solution for, investigations, identification at booking, identification on mobile devices, as well as watchlist applications.

FACE Plus Case Management provides the ability to create and link case files, and allows analysts to enroll adhoc images for comparison and search. Analysts may track and store multiple search scenarios in a case. Analysts may upload and manage multiple views of adhoc images taken from single image files as well as video files. Analysts will be able to create a variety of searches with different probe images and data field selections for filtering. The system supports over 40 different fields for data filtering. Each search will be saved as a separate session. Analysts may select a combination of searches to review a blended result based on match scores. Advanced pose correction provides the ability to turn a probe into a 3D model and rotate so the image is facing forward.

Supports multiple algorithms	One-to-one and one-to-many searches	Advanced Case Management	User-customized image display
Search against any size database	Ignores features such as hair color, eyeglasses, and background	Image editing tools	Side by Side Facial Comparison
Video and photo input support	Probe and result facial comparison	Pose Correction (add-on module)	Charting

1.9.1 Multiple Search Scenarios

Track and store multiple search scenarios in a case. You may upload and manage multiple views of probe images taken from single image files as well as video files. Then you will be able to create a variety of searches with different probe images and data field selections for filtering. The system supports over 40 different fields for data filtering. Each search will be saved as a separate session. Select a combination of searches to review a blended result based on match scores.

The system will show matching scores for each search result image and allow for composite searches.
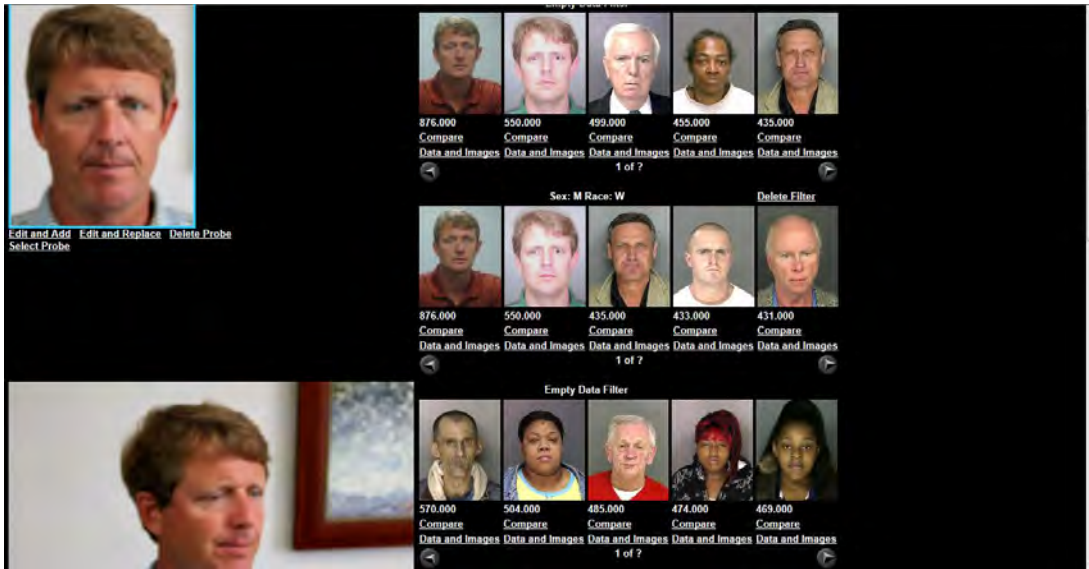
1.9.2 Image Enhancement

Images can be edited to provide even more accurate results by marking the eye locations, cropping the images to be similar, correcting image brightness, and other basic editing functions. Pose correction and lighting normalization is also available, allowing you to search facial images that were once unsearchable.

Image Editing Tools

1.9.3 Add Comments to a Probe

Users may add a comment or description to the probe image. Comments may be added to identify what type of editing was performed on the probe, when the probe was added, etc. This will be helpful in identifying the history of the probe and what was done to the probe.

The comment will be displayed beneath the probe image.
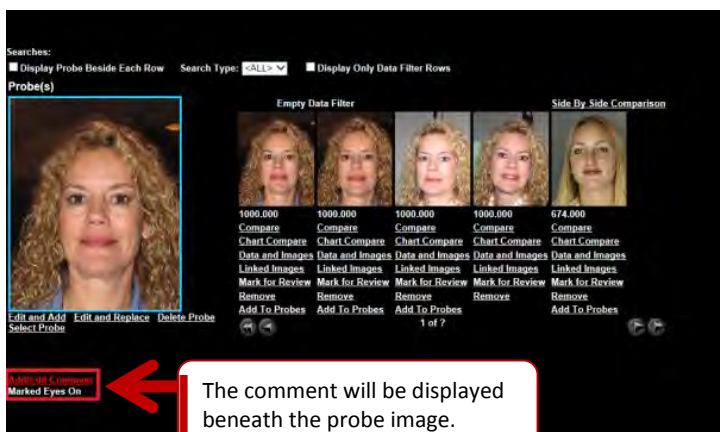
1.9.4 Sessions May be Shared with Another User

Users may share a read-only session with another authorized user. When a session is shared, the user it is shared with will only be able to view and print the session. Only the user that created the session will have the ability to make changes to the session. The option to create a super user is available. A super user can search and view all sessions created in that system.

1.9.5 Pose Correction & Light Normalization

The multiple views from video or single image files can be loaded into the Pose Correction and Light Normalization tool to create a 3D model of the face. From the 3D model, the best possible pose corrected and light corrected image for search will be created.

Pose Correction/Light Normalization

3D model can be created and manipulated to the view you need.

3D Image set to "Neutral Pose."

Light Normalization Options.
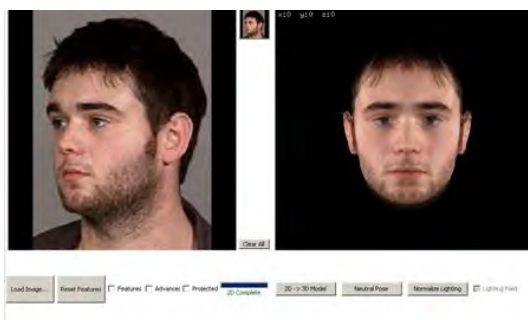
Set Right & Left Eye, and/or do additional editing, and then use to find matching records.

1.9.6   Facial Comparison

Compare images side-by-side or edit copies of images for easier viewing or to clarify certain details. You can overlay two images (composite), or view a "curtain" image, which displays a portion of one image and a portion of the other image (left/right or top/bottom portions).

Facial Comparison

Compare images side by side.

Composite (Overlay)

Curtain
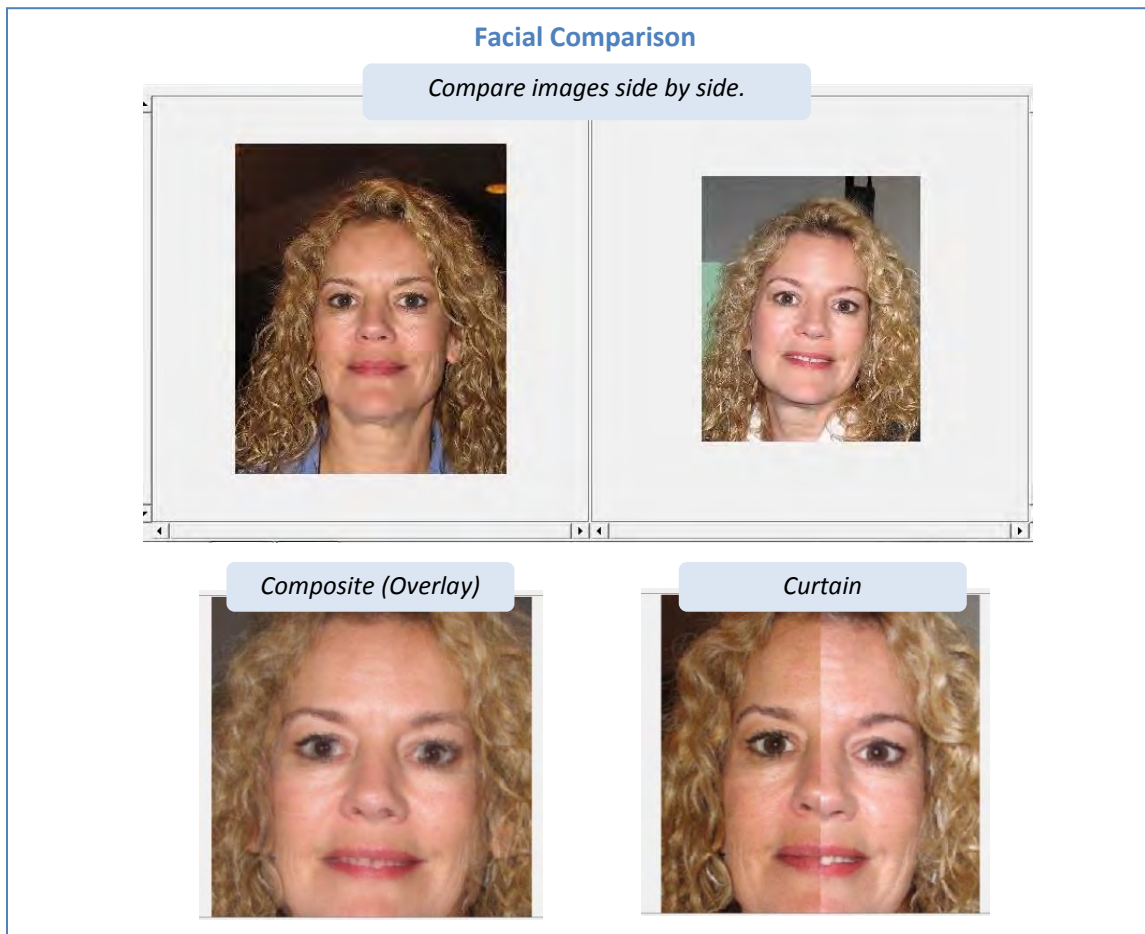
1.9.7   Remove Images from Result Set

After analyzing search results, if users feel confident that a recurring image is not a match to the probe in question, he or she has the ability to remove that image from all result sets.

Click **Remove** to remove the image from the result set.

The image will no longer be displayed in the result set.
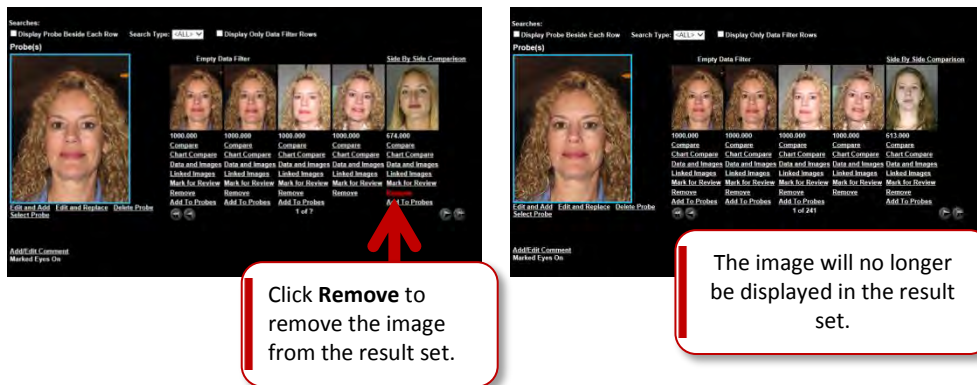
1.9.8 Charting – Adding Annotations and Measurements

FACE Plus allows you to make annotations and measurements on the probe image and the result image. You may chart the similarities of the images including facial landmarks (moles, scars, etc.) and distances between landmarks (eye socket lengths, distance between facial features, etc.) for court and more accurate identifications.
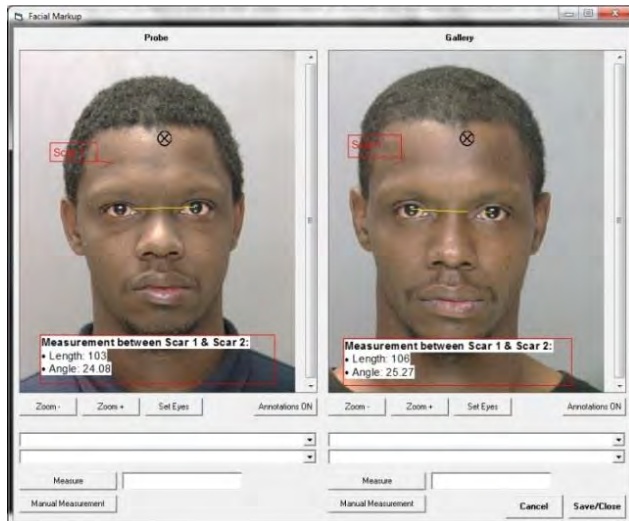
1.9.9 Full-Featured Photo Imaging Lineup Creation

FACE Plus can also provide the ability to generate a photo lineup using result images as a basis. The lineup creation tools are based upon our Digital PhotoManager photo imaging system for generating photo lineups, which can be obtained as an option by your agency. Users will have an option beneath result images to create a lineup from the specified image.

Figure 1 - Starting a Lineup

The Digital PhotoManager lineup creation interface will then be launched and the facial recognition result image will automatically be added as a candidate image. Users can then manually find and add additional lineup images using the demographic search tools provided.

Figure 2 - Lineup Creation Interface
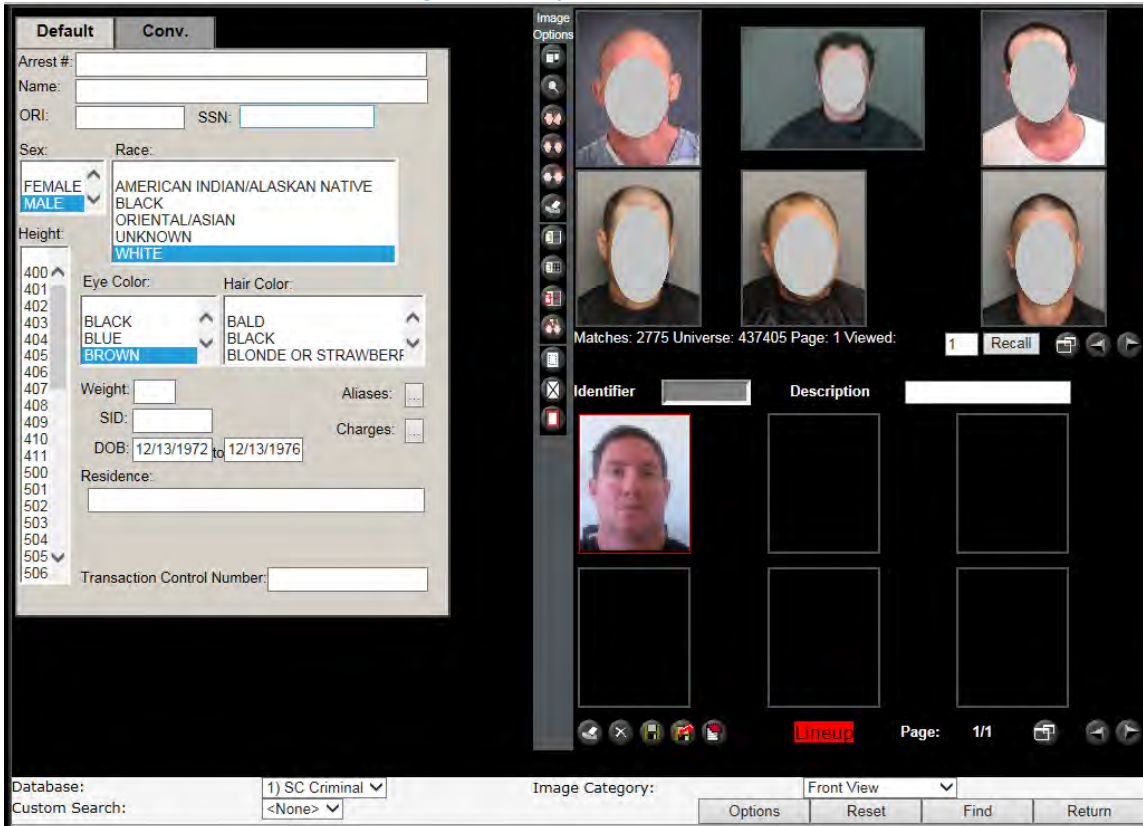
1.9.10 Mobile Apps

FACE Plus Mobile will allow immediate transaction creation from any location. The application is capable of taking an image captured by the mobile device's built-in camera and immediately using it as a probe image in a facial recognition search. The system provides multiple transaction types which users can select from prior to performing the search. This helps organize and manage investigational workflow.
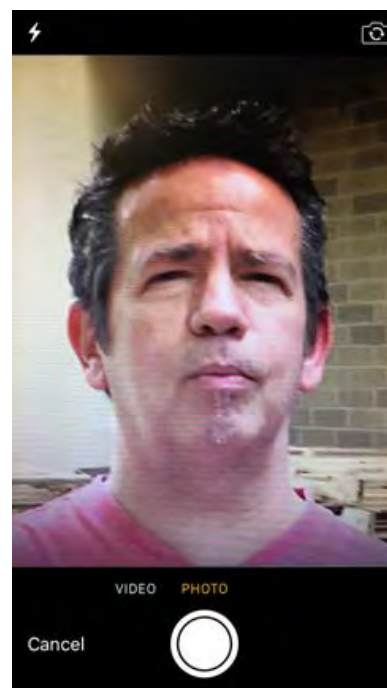
1.9.10.1 Mobile Facial Recognition Transaction Viewing

As with the use of FACE Plus on full workstations, users will be walked through the transaction process step-by-step from selecting transaction types, adding probe images, and viewing search results. Once the user logs into the application, a list of all recent transactions performed will be displayed on the main menu. All transactions are timestamped by time of submission. The data columns displayed to the user include:

1. **Transaction Status (Quantity of Results)**
2. **Original Probe Image Thumbnail**
3. **Date and Time of Transaction Creation**

Users can simply tap on any transaction from the list to bring up detailed record results on their mobile device. If there are multiple results, then the record with the highest matching score will be shown first. Users can then navigate through results using the left and right blue arrow buttons. Each record result will provide information to the user from the system's database, including:

1. **Mugshot or Facial Image from Record**
2. **Matching Quality Score**
3. **Demographic Data**
4. **Notes or Narrative Regarding Individual**

Users can also retrieve a copy of the original probe image used for comparison purposes, if desired.
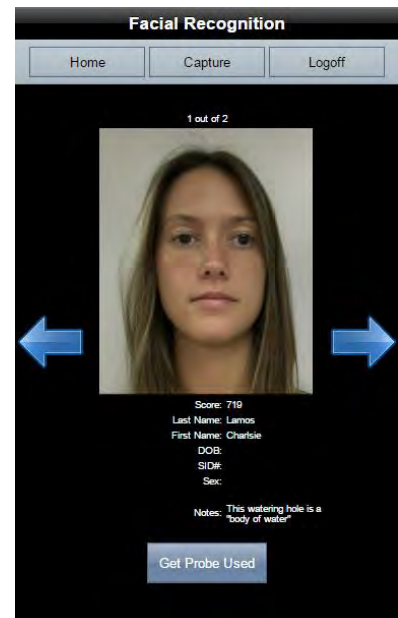
2   References

DataWorks Plus has provided the proposed FACE Plus facial recognition system to a wide array of government agencies nationwide, and we are confident that we can meet the specific functionality, capacity, and ongoing support requirements being sought in this solicitation. DataWorks Plus completed the References form online on BidSync. We have included the Michigan State Reference information again in Section 2.1 as well as information about additional facial recognition projects.

2.1 Michigan DMV/State Police

Name of Reference: Michigan State Police
Contact Person: Pete Langenfeld
Title: Section Manager
Phone No.: 517-898-0286
E-mail address: langenfeldp@michigan.gov
Dates of Service: 2001 to present
Description of Services Provided: Under this contract, DataWorks Plus provides a statewide Central Data, Image Repository and facial recognition for Criminal and DMV Photos integrated into the State Records and ID process. After being competitively selected for the contract from a field of 10 companies, DataWorks Plus was responsible for conversion of databases, interface to the Michigan State live scan station booking and AFIS process via EFTS NIST record, integration to the Oracle based Criminal History Record (CHR) System and an interface to receive records from the DMV system. DataWorks Plus has also created an NLETS interface to share correction data and images from the Michigan SNAP System Department of Corrections records and other NLETS Corrections customers.

As part of the facial recognition solution, DataWorks Plus participated in the original FBI Interstate Photo System Facial Recognition Pilot with the Michigan State Police and has subsequently interfaced the FBI submission to its statewide facial recognition solution for the Maryland Department of Public Safety. Our Michigan and Maryland facial recognition systems were able to integrate both with the pilot version of the ISPFRP as well as the production version. This solution allows for a single probe to search the criminal database, DMV database and the FBI and return all three result sets on a single screen.

The original delivered system utilized the Cognitec algorithm and was later upgraded to include both the Cognitec and NEC algorithm. The system currently consists of a Central Image Repository (CIR) for approximately 40,000,000 image records (8,000,000 criminal and 32,000,000 DMV), backup repository, client workstation software, client web browser access, DMV photo record cleansing, and facial recognition search capabilities for biometric identification. In addition, DataWorks Plus provide a mobile facial recognition application for use in the field.

The technology provided automates state-wide capture, storage, and search of the booking photos with affiliated data and integrates the information to automated fingerprint ID's and data. It provides local law enforcement agencies a means to automate capture processes while having immediate access to the state repository of mugshot photos with data from any browser based client workstation on the state network.

Automated functions provide inclusion of images and image data into the electronic (EFTS / NIST) fingerprint record transmitted to the State NEC Automated Fingerprint Identification System (AFIS) and onto the FBI IAFIS. Facial recognition capability provides the ability to submit photo images to the central system for search against the entire state image database file, returning ID photos and information of those matched against the database. Advanced imaging tools are also available such as pose correction to increase the accuracy of poor probes.

ADDITIONAL INFORMATION:
- There are currently over 1,000 web users, over 25 capture stations, and over 25 different agencies
- Provided a statewide repository for mugshot images that is accessible to law enforcement agencies throughout the state. Provided bandwidth usage statistics, including amount of data passed over the network during a typical user session. Met customer's up-time requirements for first 30 days of productive use.
- Interface to Michigan Dept. of Corrections to import MDOC photos.
- Integration with Michigan State Web Portal and LDAP Directory services.
- Interface with updated Criminal History (MQSeries integration).
- Interface to serve images to external applications.
- Implemented daily statistical reports sent to management via email including number of records added for the day.
- Automatic warning messages sent to management via email in the event of system problems (e.g. Low disk space)

2.2 Chicago Police Department

DataWorks Plus partnered with Motorola to provide the Chicago Police Department and the Chicago Transit Authority with a Real Time Screening System (RTS) and a Facial Recognition System (FRS). The project objective included Real Time Screening using Facial Recognition on Chicago's vast camera monitoring system which includes nearly 20,000 street, transit and other video cameras located throughout the city. DataWorks Plus integrated its RTS system with Chicago's Genetec Omincast camera video streams to allow Chicago to select any number of cameras to monitor using facial recognition and a special persons of interest Watchlist mugshot database.   The RTS systems generated possible hit transactions for review through a web user interface.   Additionally, Chicago has approximately 7 million criminal photos in its facial recognition system and uses the system primarily to solve crimes using probes generated from street cameras, Facebook, and other sources. For this project, our company and created an enrollment database that seamlessly interfaced with the agency's existing Motorola booking systems. This allowed images to automatically be enrolled into the facial recognition database as routine bookings are performed, which is then immediately made available for facial recognition searches using our FACE Plus system. DataWorks Plus provided a web-based facial recognition user interface throughout the agency facilities. The system is equipped with multi-algorithm searching capability utilizing both the NEC and Cognitec searching engines, giving users a much more comprehensive set of results to work with in their investigations.

In addition to standard facial recognition searches, the FACE Plus Case Management system allows Chicago users to perform advanced image comparison, editing, and 3D pose correction. This has enabled investigators to use poorly captured probe images that would otherwise be unusable. Images can be annotated and compared via both side-by-side and overlay views. Several customizations were made to the user interface to meet the specific data field types and

naming conventions of the Chicago Police Department. DataWorks Plus provided full video training to help demonstrate the workflow to new users.

2.3 SC DMV

DataWorks Plus was selected through a competitive bidding process to provide its FACE Plus facial recognition system to the South Carolina Department of Motor Vehicles. Our FACE Plus Case Management facial recognition system is being implemented to serve as a statewide biometric identification system which integrates with DMV locations throughout the state. As individuals are photographed for the creation of an ID card or License within a DMV branch, the image is immediately submitted to the state for matching and identification. The system's facial template enrollment is accomplished through a data scrub and migration of SC DMV's existing facial image database of over 8.5 million images. As new images are generated through ongoing DMV operations, they will also be enrolled in the SC DMV facial recognition system.

With our SC DMV FACE Plus implementation, whenever any positive hits are found from facial probe submissions, the user submitting the image within the DMV will be notified. Additionally, SLED is notified manually if DMV investigators determine there was intentional fraud. The timestamped transaction results can be reviewed by authorized users as needed. Information regarding the location of the submission, the probe image captured, and any positive matches that were found within the state database are all retained within system case files. Investigators can pull up the record info, print or email reports, and save custom narrative or image annotations to the system's database for the ongoing management of investigations. The system's user client is web-based, which allows authorized users from both SC DMV and SLED to access any transaction records within a standard web-browser.

2.4 Maryland Department of Public Safety

Under this contract, DataWorks Plus provides a statewide Central Data and Image Repository for Criminal and DMV Photos integrated into the state records and ID process. DataWorks Plus was responsible for conversion of databases and interfaces to DMV and Criminal Photo Database systems. We also provide an image to the DMV from our capture station through an interface so that when an inmate is released, they have a state-issued ID waiting for them if they did not have one already.

The delivered system consists of a Central Image Repository (CIR) for approximately 9,000,000 image records (2,000,000 criminal and 7,000,000 DMV), client web browser access, data/image record cleansing, and facial recognition search capabilities for biometric identification. It provides local law enforcement agencies a means to access to the state repository of mugshot and DMV records with integrated facial recognition for investigative purposes from any browser-based client workstation on the state network. We are also hitting the FBI Facial Recognition system and the return is displayed on the same graphical interface as is the Adult Criminal Database and the MD Driver's License database (DMV).

2.5 JNET (PA)

The Pennsylvania JNET Facial Recognition System (JFRS) was provided with two search engines, using the Cognitec algorithms and the NEC algorithms. As the algorithms differ, the results differ. The system displays each search engine result set separately and also shows a combined result set with the results common to both result sets. Our real world experience proves two algorithms increase the system's accuracy. JNET won a Computerworld award because of the unique implementation. Watch the Computerworld video on our website: http://www.dataworksplus.com/faceplus.html.

Award-Winning Implementation of DataWorks Plus' Facial Recognition Solution at JNET (PA) – Highlight video on our website:
http://www.dataworksplus.com/faceplus.html

DataWorks Plus also built a customized Case Management client that incorporates pose correction and light normalization of off-posed or poorly lighted images. It also includes additional edit options, such as contrast and brightness and allows for curtained side-by-side viewing of the probe and result photo. The JFRS system supports interfaces to external systems, including submission of probe photo to the PENN DOT driver's license database that is provided by MorphoTrust. PENN DOT results are displayed within the facial recognition Case Management application. The system also accepts a probe photo from the PENN DOT system and sends back result images.

JFRS is linked to the Commonwealth Photo Imaging System (CPIN) and supports a watchlist, whereby images obtained of suspects wanted for any number of reasons can be placed on the watchlist by an investigator. Each new arrest processing image captured in CPIN, the statewide mugshot system, is run against the watchlist for a possible match. If a possible match is found, the system sends an email notification to the person submitting the photo image with the current location information. The watchlist monitor function also notifies the booking station that there is a possible match and that an investigator may be contacting the booking center for more information. The system is set up so that the submitting investigator views and evaluates the new arrest photo and the submitted photo for match possibilities. The booking station personnel do not have judgment responsibility. The facial recognition system also supports image submission from mobile devices for field investigations, returning results to a secure web page accessible from the device.

2.6 South Carolina Law Enforcement Division (SLED)

DataWorks Plus was selected through a competitive bidding process to provide its Digital PhotoManager and FACE Plus systems to the South Carolina Law Enforcement Division (SLED) for facial recognition and investigative searching purposes. Under this contract, DataWorks Plus has provided a central server and created a new database to enroll millions of facial booking images from SLED's statewide booking repository. Authorized users throughout the state can now securely upload probe images for rapid facial recognition searches via a web-based client within a standard web browser. The system's industry-leading search algorithms ensure the highest accuracy possible with query results.

The FACE Plus system also provides SLED with many investigative tools which maximize the effectiveness of facial recognition searches. Match results can be printed, saved, and emailed as necessary to help with ongoing investigations. Our Digital PhotoManager software also allows digital lineups of individuals to be created directly from facial recognition search results. These

lineups can also be saved and printed, or used for secure witness viewings to positively identify suspects.

Additionally, as the provider of the South Carolina Department of Motor Vehicles (SC DMV) driver's anti -fraud facial recognition system, which is also based on the FACE Plus system, DataWorks Plus has been able to seamlessly integrate driver's license fraud case management and SLED's internal criminal case management into a unified interface for SLED investigators. SLED will receive notifications for any driver's license fraud reports, and investigators can then pull up the record info, print or email reports, and save custom narrative or image annotations to the system's database for the ongoing management of investigations. Since both agencies' systems utilize the same web-based FACE Plus product from DataWorks Plus, authorized users from both SC DMV and SLED can access any transaction records as needed through the same application interface.

2.7 Los Angeles County Sheriff's Department

DataWorks Plus has implemented a digital mugshot system with software and services for the County of Los Angeles, California. The system includes Digital PhotoManager investigative booking system, NIST Manager Plus fingerprint archive and retrieval system, FACE Plus facial recognition, tattoo matching, Cal-Photo consolidation, and composite drawing software. The Digital PhotoManager and NIST Manager Plus application servers store the existing 7 million booking images (from 4.3 million records) and 3 million new NIST records with mugshot photos, data, ten-prints, and palm prints. The Storage Area Network (SAN) provided accommodates this with 30 Terabytes of usable storage. Los Angeles County staff can retrieve mugshot records and create line-ups from any networked PC using the WebWorks web application. In addition, fingerprint records can also be retrieved and viewed from any networked PC using the web-enabled NISTWorks application.

The FACE Plus and Tattoo Matching server is scaled to perform facial recognition searches on 7 million facial templates and return a response in less than 15 seconds. A mugshot or other facial image can be used to search against existing records. Any matches will be returned and displayed in order of the highest facial match score. The server also includes 2 million templates for the registration of tattoos. Agency staff members are able to use the tattoo matching to locate any matching tattoo images already in the system. This is especially helpful to locate a specific suspect with a unique tattoo or to locate gang members who have the same tattoo.

DataWorks Plus has delivered a customized data cleansing program where each time a new arrest photo is enrolled into the system, the photo is 1:R compared using Facial Recognition. Records that have exceptions are flagged as Facial Recognition exception within the record. The analyst can search for all records that have Facial Recognition exceptions, resolve as needed, and unflag the record.

3   Requirements Response

DataWorks Plus has responded to each requirement listed in the RFP.

The vendor is responsible to work closely with City of Detroit, Detroit Police and Motorola Inc., the vendor for the Command Central Aware Console, in the deployment of all technology. Each type of Facial Recognition solution has specific needs. In all cases vendor will work closely with City of Detroit and Detroit Police Staff and Motorola Representatives to ensure functionality and to ensure' that the technology meets the needs of the City of Detroit and the Detroit Police Department Real Time Crime Center.

RESPONSE: DataWorks Plus understands and fully complies

3.1 Real Time Video Feed Facial Recognition

- **Client software to be integrated with the Motorola Command Central Aware Console**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus has extensive experience with integrating its solutions with third-party data systems. For your agency, DataWorks Plus can create software interfaces which allow the proposed FACE Watch Plus application to push and pull data between itself with the existing Motorola Command Central Aware Console. Our system has an open architecture based on SQL technology and no proprietary software is necessary for setting up or modifying interfaces. We pride ourselves in working with customers to determine their interface needs and incorporating new ideas and technologies into the interfaces available for our customers.

DataWorks Plus integrated its RTS system with Chicago's Genetec Omincast camera video streams to allow Chicago to select any number of cameras to monitor using facial recognition and a special persons of interest Watchlist mugshot database. The RTS systems generated possible hit transactions for review through a web user interface. Additionally, Chicago has approximately 7 million criminal photos in its facial recognition system and uses the system primarily to solve crimes using probes generated from street cameras, Facebook, and other sources. For this project, our company and created an enrollment database that seamlessly interfaced with the agency's existing Motorola booking systems. This allowed images to automatically be enrolled into the facial recognition database as routine bookings are performed, which is then immediately made available for facial recognition searches using our FACE Plus system.

- **Client licensing**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus is providing an enterprise site license.

- **Interface with Motorola Command Central Aware Console**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus will create software interfaces that allow FACE Watch Plus to push and pull data as needed between itself and the Motorola Command Central Aware Console. Our system has an open architecture based on SQL technology and no proprietary software is necessary for setting up or modifying

interfaces. We pride ourselves in working with customers to determine their interface needs and incorporating new ideas and technologies into the interfaces available for our customers.

The system uses a SQL database with a customizable data table. Stored procedures are also used to allow complex application functions to be performed without having to re-code the application itself. This not only makes it easy to configure or modify data fields and screen layouts, but it makes the data easily interpretable for third-party applications that need to be interfaced with FACE Plus. For additional information on the types of interfaces we have created, please refer to the "Types of Interfaces" section below.

Types of Interfaces

We have developed many techniques for interfacing to other systems, including the use of ODBC/Stored Procedures, Share File, Web Services, and others. We have implemented a number of different triggers and methodologies to ensure data synchronization, including timers, state based and missing data. We have integrated with many vendors' databases, including Oracle, SQL Server, and many others on different platforms, including AS400, IBM Mainframe, UNIX, VMS, Burroughs/Unisys Mainframe OS, Novell and Windows.

Listed below are some of the types of interfaces we use with our customers to send or receive data and/or images within our application. For your convenience, these are broken into the following categories:

- **Interfaces used to retrieve data from another application**
- **Interfaces used to share images with another application**
- **Interfaces used to send data to another application**

Interfaces used to retrieve data from another application
- Web Service: If a Web Service is available, it can be used to pull data and/or Images.
- Shared File: In this process, data is sent to a shared directory. Data is then sent to the directory from the external application and our processes pull the data. The format for this type of interface can vary, based on customer needs. Dasync (a common format used by DataWorks Plus for sending/receiving files) and NIST files are formats that can be used with this format.
- SQL/ODBC Connection: This process will pull data via an ODBC connection from Oracle, an AS400, other SQL databases, or MYSQL.
- Data Post: This process allows customers to run an insert into an SQL Table for hosting of data or updates.
- Stored Procedure: This will pull information via an SQL stored procedure and insert the information into our database.
- XML Request: This will issue an XML request and receive data and/or images back to the DataWorks Plus application.
- FTP Link: This process will pull data and/or images into the DataWorks Plus application via an FTP link.
- Image and/or data send via NIST File: This process will receive data and/or images via a live scan input station. The information is then sent to the DataWorks Plus application via a standard NIST Packet.

Interfaces used to share images with another application

- Web Service: Data and images can be made available to other applications via a Web Service. This will provide a common interface that can be accessed from a variety of platforms.
- ASP image source: This interface is used to allow external applications to view an image from the DataWorks Plus application. If the external application is a web application, then simple HTML can be included in a web page to display the images from the application.
- File Request: An external application can request an image via a file request.
- Stored Procedure: An external application can request an image via a SQL Server stored procedure. The name and the parameters of the stored procedure are custom. The image returns in the result set.
- Read Only Access: An external application can query the DataWorks Plus SQL Server directly and retrieve images.
- SQL Export: The DataWorks Plus application can export images to another relational database.
- File Export: The DataWorks Plus application can export images and data to a file system so that an external system can import them.
- ASP XML: With some development, DataWorks Plus can build an ASP page that will send an XML response containing data and/or image data.

Interfaces used to send data to another application

- Web Service: Data and images can be made available to other applications via a Web Service. This will provide a common interface that can be accessed from a variety of platforms.
- Extracting Data and/or Images: Data and images can be extracted in a variety of ways. This process will batch send data and images to an external system. Currently, Pinellas County, Florida, uses this process, which allows them to transmit data and images nightly from a Digital PhotoManager server in Manatee, Orlando and Miami to a server at Pinellas County. A data record can be exported to an XML file and the associated jpeg images can be embedded in the XML (Base64 encoded). XML files can be formatted, according to NEIM/Global Justice standards or customized to an agreed upon format. Data can be exported to a delimited text file with associated images exported to a folder. Data and images can be extracted real-time as new data arrives or a periodic extract can be defined so that each night the previous day's data is extracted. Once the data is extracted, it can be forwarded to another system via a portable storage device, such as a USB drive, FTP or SFTP, Network File Share, Message Queue, etc. The XML extract mentioned above is in use at NYPD. As new records are added to the NYPD mugshot database, the data and images are extracted to XML files and forwarded to NY State via a Message Queue.
- Shared File Interface: This process will place a file containing images and/or data on a shared directory for retrieval by an external application. This type of interface is commonly used for sending of data to a live scan system. Dasync (a common format used by DataWorks Plus for sending/receiving files) and NIST files are formats that can be used with this format.
- Linked Images: Customers with multiple DataWorks Plus applications on one server may elect to use this interface to preview images from one within the other.
- Extract to Zipped File: This process downloads a zipped file of data and images for use on another system or as a backup.
- File Request (defined earlier)

- ASP (defined earlier)
- SQL Stored Procedure (defined earlier)

- **Facial recognition software capable of performing facial recognition searches on images obtained from video streams against the Detroit Police Department repository of over 500,000 images**

RESPONSE: DataWorks Plus understands and fully complies. The proposed FACE Watch Plus system is scalable to handle rapid facial search queries against any sized agency repository. For example, our facial recognition software searches a repository of approximately 40,000,000 images for Michigan State Police, 9 million for Maryland Department of Public Safety, and over 8.5 million images for SC DMV. Since each agency is different in size and throughput, DataWorks Plus can provide a custom hardware and software configuration which is optimized for performing video stream image facial recognition your agency's repository, as specified. For additional information about FACE Watch Plus, see Section 1.8: FACE Watch Plus for Real-Time Video Feed Facial Recognition, starting on page 15.

- **Vendor solution must be capable of facial recognition on not less than 100 concurrent video feeds**

RESPONSE: DataWorks Plus understands and fully complies. Our FACE Watch Plus system is scalable to meet this throughput requirement for video feed facial recognition. We are proposing a hardware and software configuration which can perform searches at the rate necessary for managing 100 concurrent video feeds, as specified.

- **Vendor must have a proven track record with biometric/image data stored using the Detroit Police Department's current ID Networks data sources**

RESPONSE: DataWorks Plus understands and fully complies. We will be able to integrate our FACE Watch Plus application with your existing ID Networks data system, as specified. DataWorks Plus already processes ID Networks' Livescan NISTpaks in both Michigan and Virginia to populate the mugshot repository. DataWorks Plus has developed many different biometric/image-based identity systems, each with unique workflows. We have an extensive history in biometric identification systems and interfacing with multiple data sources. Additional details about our vast interface expertise has been provided in a previous response, starting on page 31. We have also provided information about several facial recognition projects in Section 2, starting on page 26. DataWorks Plus has more experience with multiple facial matching algorithms than any other company. Our system is designed to integrate with all of the major vendor's facial matching algorithms. Because we support facial matching systems from several vendors, DataWorks Plus can take an open and independent approach to recommend the best algorithms for each customer.

DataWorks Plus developed the first multiple vendor facial recognition algorithm search and user interface in the industry. It allows a user to submit one image and search two or more algorithms simultaneously, then receive rows of facial results unique to each algorithm. Our real world experience proves two algorithms increase the system's accuracy. This multiple-algorithm approach has been well-received and adopted by our customers, including JNET (PA), San Bernardino County, Chicago Police Department, and Riverside County. JNET won a Computerworld award because of the unique implementation. Watch the Computerworld video on our website: http://www.dataworksplus.com/faceplus.html.

Award-Winning Implementation of DataWorks Plus' Facial Recognition Solution at JNET (PA) – Highlight video on our website:
http://www.dataworksplus.com/faceplus.html

For the City of Detroit, DataWorks Plus is proposing the ROC (DaVinci) and NEC algorithms. The ROC algorithm is among the most accurate on the market. Our real-world experience and NIST testing has shown NEC algorithm to be the number one algorithm - ranked number #1 for the third consecutive time in the FRVT 2013 test results.

- **Server software must be compatible with the Detroit Police Department's Microsoft Windows Server and Microsoft SQL Server versioning**

RESPONSE: DataWorks Plus understands and fully complies.

- **Client software must be compatible with the Detroit Police Department's Microsoft Windows 7 or above workstation environment**

RESPONSE: DataWorks Plus understands and fully complies.

- **Vendor must provide professional services that include project management, installation, setup and training**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus will provide each of these listed professional services for this project, if awarded. We will assign a dedicated Project Manager who will coordinate all contractual labor and services performed in a mutually-agreeable timeline. He will serve as the primary point-of-contact throughout the project. Once DataWorks Plus has completed installation and setup, we will provide both Administrator and User training. Administrator training covers all managerial tasks related to system supervision, and User training covers all day-to-day workflow and functionality of the system. Written documentation will also be provided.

DataWorks Plus uses a "Train the Trainer" method in which agency supervisors are trained so that they can, in turn, train future staff. This helps reduce or eliminate future training costs to the agency. Trainers will be prepared to provide user orientations with lectures as well as hands-on practice with the applications.

System Overview	

Basic	Launching Application
	Camera Setup
	Using Dashboard
	Hits
	    • Viewing hits for a particular camera
	    • Clearing hit data
	Analyzing Results
	    • Hit Probe Tab
	    • Hit Data Tab
	Interface with cameras
	Email Notifications
	Text Notifications

Advanced	Customizing Hit/View Data Watchlist Applications System Design Customizing Voice Alerts

3.2 Facial Recognition through Still Images

- **Client software to be utilized by Detroit Police Department investigative personnel**

RESPONSE: DataWorks Plus understands and fully complies. The proposed FACE Plus system uses web-based client software which can be accessed from any PC connected to the agency's network within a standard web browser. They system is protected with username and password security so only authorized users or investigative personnel can access the system.

- **Client licensing for not less than 100 concurrent users**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus is providing an enterprise site license, so 100 concurrent users are easily supported.

- **Facial recognition software capable of performing facial recognition searches on images obtain from physical and digital data formats against the Detroit Police Department repository of over 500,000 images**

RESPONSE: DataWorks Plus understands and fully complies. The proposed FACE Plus system is scalable to handle rapid facial search queries against any sized agency repository. For example, our facial recognition software searches a repository of approximately 40,000,000 images for Michigan State Police, 9 million for Maryland Department of Public Safety, and over 8.5 million images for SC DMV. Since each agency is different in size and throughput, DataWorks Plus can provide a custom hardware and software configuration which is optimized for performing physical and digital data format image facial recognition your agency's repository, as specified.

- **Vendor solution must support multiple digital image formats**

RESPONSE: DataWorks Plus understands and fully complies. The proposed system can accept probe images for facial recognition searches from multiple industry-standard image file formats, including JPEG, GIF, PNG, and BMP images. For enrollment of images into the systems database, the system will convert any image type into a standard JPEG format. The system does not support probe images which require proprietary readers or conversion software.

- **Vendor solution must be capable of facial recognition on not less than 100 concurrent workstations**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus is providing an enterprise site license, so 100 concurrent users are easily supported.

- **Vendor must have a proven track record with biometric/image data stored using the Detroit Police Department's current ID Networks data sources**

RESPONSE: DataWorks Plus understands and fully complies. We will be able to integrate our FACE Plus application with your existing ID Networks data system, as specified. DataWorks Plus already processes ID Networks' Livescan NISTpaks in both Michigan and Virginia to populate the mugshot repository. DataWorks Plus has developed many different biometric/image-based identity systems, each with unique workflows. We have an extensive history in biometric identification systems and interfacing with multiple data sources. Our system has an open architecture based on SQL technology and no proprietary software is necessary for setting up or modifying interfaces. We pride ourselves in working with customers to determine their interface needs and incorporating new ideas and technologies into the interfaces available for our customers.

The system uses a SQL database with a customizable data table. Stored procedures are also used to allow complex application functions to be performed without having to re-code the application itself. This not only makes it easy to configure or modify data fields and screen layouts, but it makes the data easily interpretable for third-party applications that need to be interfaced with FACE Plus. For additional information on the types of interfaces we have created, please refer to the "Types of Interfaces" section provided in a previous response, starting on page 31. DataWorks Plus has provided its FACE Plus facial recognition system to over 30 agencies nationwide. These agencies span from single-site systems up to multi-site statewide or regional systems which use a wide array of data sources from various vendors.

- **Server software must be compatible with the Detroit Police Department's Microsoft Windows Server and Microsoft SQL Server versioning**

RESPONSE: DataWorks Plus understands and fully complies. The proposed FACE Plus system is based on standard Microsoft SQL Server and Windows Server databasing. This will ensure compatibility of our solution with the Detroit Police Department's server configuration.

- **Client software must be compatible with the Detroit Police Department's Microsoft Windows 7 or above workstation environment**

RESPONSE: DataWorks Plus understands and fully complies.

- **Vendor must provide professional services that include project management, installation, setup and training**

RESPONSE: DataWorks Plus understands and fully complies. DataWorks Plus will provide each of these listed professional services for this project, if awarded. We will assign a dedicated Project Manager who will coordinate all contractual labor and services performed in a mutually-agreeable timeline. He will serve as the primary point-of-contact throughout the project.

Once DataWorks Plus has completed installation and setup, we will provide both Administrator and User training. Administrator training covers all managerial tasks related to system supervision, and User training covers all day-to-day workflow and functionality of the system. Written documentation will also be provided.

DataWorks Plus uses a "Train the Trainer" method in which agency supervisors are trained so that they can, in turn, train future staff. This helps reduce or eliminate future training costs to the agency. Trainers will be prepared to provide user orientations with lectures as well as hands-on practice with the applications

User Training Outline
The User Training provided is a hands-on orientation training, which introduces the users to the features of the application itself. The following tables contain general outlines of the primary topics that will be covered during the user training sessions.

Subject	Topics
System Overview	- log-in and user options - change password - sessions screen overview - side-by-side comparisons - chart compare - data and images - linked images - working with images
Creating a New Session	- sessions screen overview - create a new session - load probe image from external source - load probe image from video - edit probe image

Subject	Topics
Enhancing or Editing Probe Images	• cropping images • sharpening images • adjusting image contrast • adjusting image brightness • adjusting saturation • adjusting hue • rotating images • adding noise
Searching for a Session	• search databases • add data filters
Viewing Results	• results screen overview • multiple engine results • combined results
Side-By-Side Comparisons	• side-by-side comparison • mark or flag images
Comparing Images	• zoom • composites • curtain
Chart Compare	• annotations overview • set eye locations for probe image • set eye locations for result image • how to add annotations (line, rectangle, ellipse, etc.) • assign points • make measurements • measure distance between points • manual measurements/no assigned points
Print Reports	• print probe and result reports
Data and Images & Linked Images	• view data and images associated to an image • link images

Administrator Training

The administrator training instructs the administrators on managerial tasks, such routine backup procedures, the use of filters in order to narrow the scope of the search function, the procedure for creating filters, preventative maintenance procedures, and troubleshooting. Certification can be provided upon completion of user and administrator training.

System Administrator Training
• System Administration Training is provided on site using the installed system. The training explains routine backup procedures, the use of filters to narrow the scope of a search, the procedure for creating a search filter, preventive maintenance procedures, and troubleshooting.

Agency Administration Training
• Agency Administration Training is provided on site using the installed system. This training is similar to System Administration Training, but is customized for the agency administrator.

Table 2: System Administration Training

Subject	Topics
System Overview - Administrator	• cover all user training topics • log-in and user options • capture overview • retrieve overview • lineup overview
Databases – Administrator	• databases • fields • add • update • enable/Disable Databases • delete
Fields – Administrator	• fields: add, update, enable, disable • key fields and linked fields • make the Link • add a Field • update a Field • enable/disable Field • required fields • selecting similar fields for similar image search • field level security
Codes – Administrator	• database codes • site codes • editing codes
Screens – Administrator	• creating /editing user screens • export screens • Capture Wizard screens • screen conversion
Security – Administrator	• add/modify users • group security • actions per users and groups • database access • field security • replication • integrated security
Workstations – Administrator	• configuring workstations • updating workstations • enable/disable workstations • deleting a workstation
Configuration - Administrator	• workstation configuration • set up import and export locations • digital certificate design • print activity • lineup modes

Subject	Topics
	• user default options • image field configuration • document types and storage
Logging – Administrator	• activity logging • activity reports • consolidation
Reports – Administrator	• report writer wizard overview • general report settings • report layout • generate completed report
Searching – Administrator	• custom search usage and creation

Help Desk Training
•Help Desk Training is provided on site using the installed system. This training explains basic troubleshooting techniques for FACE Plus. Training also reviews how to contact a DataWorks Plus support team member and how to enter support ticket via the web.

Additional Training
•Additional training is available either at DataWorks Plus' headquarters in Greenville, SC, or via live web classes, which can be requested.

4   Pricing

Description	Unit Cost	QTY	Total Cost
PhotoManager Face Plus Database Application Server License		1	Included
* 500,000 Enrolled Records (Dual Engine NEC and ROC)		1	Included
One time batch enrollment and on-going ID Networks interface		1	Included
Real Time Screening Application Server Software * monitors 100 concurrent video feeds		1	Included
Interface with Motorola Command Central Aware Console		1	Included
Real Time Screening Client License (Enterprise Edition)		1	Included
Facial Recognition Case Management Server Application		1	Included
Case Management With Pose Correction (Enterprise Edition)		1	Included
Project Management		1	Included
Installation		1	Included
Training		1	Included
Includes One Year Warranty			Included
Server Hardware			Included
DB/Application Server		1	Included
FRCM Matching Server		1	Included
Microsoft SQL Standard Edition (4 Cores)		1	Included
Web Server		2	Included
Preprocessing Server		8	Included
RTS Matching Server		1	Included
Final Total			**$787,690.00**
24/7 Maintenance Year Two			$116,276.60
24/7 Maintenance Year Three			$116,276.60
24/7 Maintenance Year Four			$116,276.60
24/7 Maintenance Year Five			$116,276.60
Total with Five Year Warranty			**$1,252,796.40**
Options			
Evolution Mobile Facial Recognition Device with Client Licenses	$2,950.00	1	$2,950.00
RAPID-ID Mobile Fingerprint Client (used with Evolution)	$900.00	1	$900.00
Portable RTS Jump Kit	$4,500.00	1	$4,500.00
Notes:			
The proposed DataWorks Plus solution can be executed in a VMWare environment.			

Facial Recognition Software Response
Bid #: 16TW690

Prepared by Flyball Labs (A subsidiary of Flyball Technical Solutions)

Flyball Labs
4160 Cass Ave, Suite B
Detroit, MI 48201
Mack Hendricks
mack@goflyball.com

City of Detroit
Torie Woods

Dear Torie Woods,

Enclosed is a copy of the "Facial Recognition Software Response" bid response based on solicitation 16TW690.

If you have any questions and/or comments regarding the interpretation of this bid response please feel free to contact me at the addresses, phone number or email address above. Thank you for opportunity to respond to this.

Sincerely,

Mack Hendricks

Mack Hendricks

Table of Contents

Executive Summary

The proposed solution is very powerful, easy to use, open and flexible. We are looking to provide a solution that covers all of your technical needs & more. In a nutshell, as we tell all of our customers, we are a small company that understands how to implement large solutions that meets the business's objectives. The proposed solution will meet today's business objectives and has an open architecture that allows you to expand & meet long-term business objectives.

Company Background

Flyball Labs is a subsidiary of Flyball. Flyball was started in 2005 by a Computer Scientist that graduated from Oakland University in Rochester Hills, MI with a Bachelors and Masters in Computer Science. In the last twelve (12) years, Flyball have had tremendous success even through the rough economic conditions. We have staff in Detroit, MI and Southern California. We have four main divisions, which are depicted below:

Flyball Labs develops threat management software that help organizations to identify cyber attacks, place a building in lockdown due to an active shooter and analyze surveillance camera video to look for suspicious behavior or to perform facial recognition. Also, this division is responsible for building software and solutions for the other Flyball brands/divisions.

The **Mac & PC Services** division is focused on education and business computer support. We have a number of customers that we provide onsite, remote support and managed services. One of the major services provided by this division is Managed Services. This pillar provides business customers with custom technical support solutions that work for both a company's technical needs & budget. Our managed services team works with customers to supply maintenance and support for various systems & software packages.

The **dOpenSource** (http://dOpenSource.com) division is our fastest growing division and now accounts for 30% of the company's revenue. This division is focused on providing remote support for Open Source software such as Linux, Asterisk, Kamailio, OpenStack and many other Open Source software packages.

The **detroitPBX** division is focused on delivering an Enterprise Grade Phone System in the Cloud without having to purchase expensive hardware. Our cloud platform was built from the ground up with a focus on voice quality and reliability.

Capability Summary

In this section we will provide information that will substantiate our stability.

Locations

Our main office location is:

4160 Cass Ave, Suite B
Detroit, MI 48201

Methods of Charges/Payments

We accept the following forms of payments:

- Checks
- Wire Transfers
- Credit Card
- Money Order
- Cashiers Check

FCC SPIN Number

Our FCC SPIN number is 143046765

Proof of Insurance

Our insurance is proved by Hiscox Inc. Please see Appendix A.

Reference Customers

This is a new offering that was developed for Detroit K-12 schools and to work with an initiative that we are working on called Project Orange. Project Orange is similar to Project Greenlight, but it's focus on installing surveillance cameras in neighborhoods. We currently have 5 locations deployed and we are using this solution as the underlying technology. More information about Project Orange can be found at http://flyballlabs.com/projectorange/

Solution Architecture

Our solution is capable of taking an image from the Motorola Command Central Aware console and leveraging the Flyball Labs Threat Management Platform (TMP). We use machine learning / artificial intelligence algorithms to perform facial recognition. In this case, we would use the existing Detroit Police Department 500,000 image repository to search for matches. We currently do not have a widget / plug-in for the Command Central Aware Console, but it can be integrated since the TMP has an Application Programming Interface (API), which would allow us to create a tight integration. Moreover, our API enables one to switch out the facial recognition core engine so that you aren't locked into using one. For example, if you you don't want to use the facial recognition engine that ships with our product then you could use the Microsoft, Kairos and other facial recognition engines. The following diagram depicts our architecture.
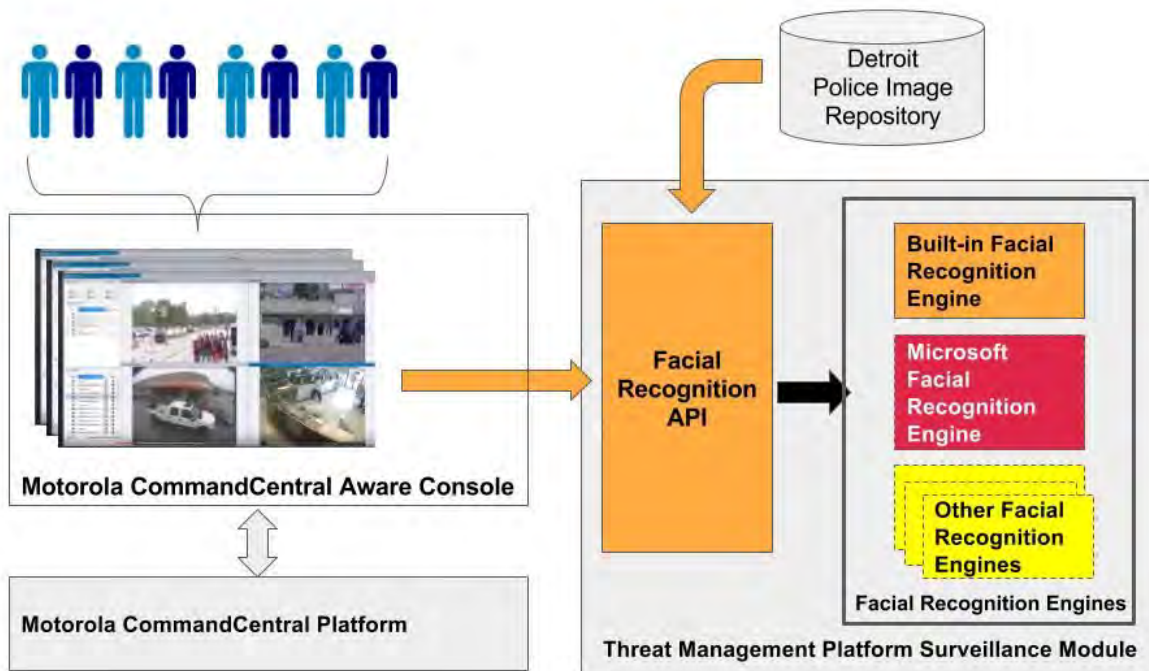
In the above diagram, the Detroit Police Department Image Repository is fed into our Facial Recognition API. Based on your configuration, the image repository can be fed to one or more backend Facial Recognition Engines. Some pre-processing would be done to turn the images into mathematical representations. We would configure the system so that new images would be added to the system when new images are added to the Detroit Image Repository in real time.

An image or video stream can be processed using our Facial Recognition API. The API will use algorithms within the facial recognition engines to search for a match. The API can work in synchronous mode or asynchronous mode. In synchronous mode the Motorola CommandCentral Platform or any application calling the API will block waiting for the search to complete. In asynchronous mode, the system will notify the user when the search is complete and will return a list of matching images if any are found.

Solution Cost

The solution cost is based on the system being deployed using a cloud deployment strategy. The software can be deployed onsite, but the recommended approach is to deploy in the cloud, which enables continuous upgrades.

Component	Cost
Threat Management Platform Surveillance Module (contains facial recognition)	$12,500/per month ($150,000 annually) - Includes unlimited facial recognition searches for 100 concurrent users, product maintenance and support.
Initial integration of Command Central Aware with the Threat Management Platform. This includes setting up a data feed that ingest the Detroit Police Department Image Repository	$300,000 - Includes 2 engineers, part time software architect and project manager

Year One Cost: $12,500/per month ($150,000 annual support cost) + $300,000 (Initial integration) = $450,000
Year 2 and beyond: $150,000

The **City of Detroit** can cancel the contract 30 days before the annual contract renewal date.

Time Table Projection/Implementation Plan

This section contains a high level project plan with estimated start and completion dates.

Task	Start Date	Finish Date	Owner
Planning Phase			
Validate Solution Architecture - this is where we review the proposed solution architecture with the City of Detroit, Motorola and any other parties to ensure the solution is inline with the current deployment of the CommandCentral Aware Console	February 1st	February 5th	Flyball Project Manager
Create Detailed Project Plan	February 6th	February 21st	Flyball Project Manager + Software Architect
Implementation Phase			
Spin up a cloud instance of TMP for development and testing	February 22nd	March 3rd	Software Engineer + Software Architect
Build out the hooks between the CommandCentral Aware Console and TMP.	March 4th	April 4th	2 Software Engineers
Build a framework that will ingest the Detroit Police Department Image Repository into TMP for facial comparison	April 5th	April 19th	2 Software Engineers
Functional and Load Testing to ensure the system is trained and returning valid results	April 20th	May 1th	1 Software Engineer
Spin up a cloud instance of TMP for production and copy over the entire configuration	May 2nd	May 15	1 Software Engineers

The TMP Facial Recognition Software goes into production at the Detroit Police Department	June 1st	June 1st	2 Software Engineers and Project Manager

Appendix A: Insurance Certificates

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
05/06/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Hiscox Inc.	PHONE (A/C, No, Ext): (888) 202-3007	FAX (A/C, No):
520 Madison Avenue	E-MAIL ADDRESS: contact@hiscox.com	
32nd Floor	INSURER(S) AFFORDING COVERAGE	NAIC #
New York, NY 10022	INSURER A : Hiscox Insurance Company Inc	10200

INSURED	INSURER B :
Flyball Technical Solutions dba Canvas Corks and Graffiti	INSURER C :
4160 Cass Ave	INSURER D :
Suite B	INSURER E :
Detroit MI 48201	INSURER F :

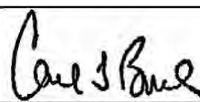## COVERAGES   CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY	Y		UDC-1287049-CGL-15	07/23/2016	07/23/2017	EACH OCCURRENCE	$ 1,000,000
	☐ CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
							MED EXP (Any one person)	$ 5,000
							PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	X POLICY ☐ PROJECT ☐ LOC						PRODUCTS - COMP/OP AGG	$ S/T Gen. Agg.
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						☐ PER STATUTE ☐ OTHER	
	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER	CANCELLATION
Venn Parking LLC 4142 Cass Ave Apt 202 Detroit, MI 48201	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

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ID Networks

ID Networks Response to:

Request for Quote

"Facial Recognition"
(Bid 16TW690)

City of Detroit
Office of Contracting and Procurement
Police Department: Office of the Chief Investigator
65 Cadillac Square, Suite 4000
Cadillac Tower
Detroit, MI 48226

Bid End Date: January 9th 2017, 9:00 AM

![IDNetworks logo]

January 6, 2017

City of Detroit
Office of Contracting and Procurement
Police Department: Office of the Chief Investigator
65 Cadillac Square, Suite 4000
Cadillac Tower
Detroit, MI 48226

To Whom It May Concern:

ID Networks (IDN) is pleased to submit our response to your Request for Quotation for "Facial Recognition". IDN's commitment to re-investments and research into new technologies and strategic industry partner relationships makes it a premier provider of public safety software. The attached proposal and quote is for an efficient Facial Recognition software solution tailored specifically to meet the unique needs of the Detroit Police Department.

Facial Recognition compliments the foundational biometric science of Fingerprint Identification, an area of IDN expertise for the past 18 years. Our state and federal contracts, expanded customer base of over 900 agencies in 17 states, State and Federal certifications in biometric products and strategic industry partners makes us a qualified vendor for this expanded biometric project.

IDN has been honored to provide the Livescan systems and Integrated Justice Information Sharing System (IJIS) for the city of Detroit for over 10 years. During this time IDN has developed specialized interfaces and software components that have increased biometric workflow efficiencies within DPD. Our proposed Facial Recognition solution will enhance the existing biometric workflow within DPD and seamlessly integrate with existing public safety products in use.

IDN's staff of developers and industry experts have designed and integrated software solutions with over 70 different vendors in the Public Safety marketplace. All IDN software complies with all state and federal requirements and meets and/or exceeds industry best practice standards. We look forward to providing a technologically advanced Facial Recognition Software Solution that will serve DPD well into the future.

Thank you for your consideration.
Sincerely,

ID Networks, Inc.

For questions, clarifications or additional information regarding our response, please contact me using the following.
Phone: (440) 992-0062 EXT 4563 Fax: (440) 992-1109 Email: pfoster@idnetworks.com .

Patrick Foster
Biometrics Project Manager

Introduction

When facial recognition systems are being utilized in a criminal justice environment, the most likely source for reference facial images are the mugshots that are taken at the time of booking. The quality of these mugshots will greatly affect the ability of a facial recognition algorithm to match it with probe images captured from other sources such as video streams, cell phone cameras etc.

During a recent biometric upgrade at DPD, IDN used facial recognition software as a secondary biometric tool to isolate unique sets of fingerprints. The prints and mugshots were then linked together using a unique number (DID number). Listed below is some of the information that was obtained as a result of that process:

- 40% of the mugshot images analyzed had a quality score suggesting that they were appropriate to be used as reference images in a facial recognition system.
- 49% of the mugshot images would require further analysis to determine their usability in the facial recognition project described in the RFQ issued by DPD.
- 11% of the mugshot images were unusable or missing from the dataset.

IDN was also able to evaluate over 12 hours of recorded video captured from a camera mounted at a Project Greenlight location. This location was identified by DPD as one of the locations where they felt the cameras were placed in a manner that would capture facial images within its field of view.

IDN analyzed portions of the video from various times during the 12-hour period (morning, noon, evening, night) using facial recognition software designed for use with real time video feeds. The video failed to satisfy many minimum requirements that facial recognition software designed for video use needs. IDN was not able to extract and/or use any usable facial templates from this video. IDN feels some of the factors listed below may have contributed to this:

- The angle between the axis of the camera and the plane of the front of the face appeared to be greater than 45 degrees.
- Changing lighting conditions outside were clearly evident in the video, resulting in image artifacts, blurring, and distortion.
- The lighting conditions were not uniform and multiple, intermittent light sources would come and go throughout the monitored area.
- The lighting conditions would frequently over expose the face due to reflections in the glass and headlights from cars in the parking lot.
- The video obtained from the cameras appeared to be compressed using H.264 format.

Conclusions

The mugshots at DPD will serve as the backbone of the facial recognition project. Further testing and evaluation is needed to determine if 49% of those mugshots are suitable for Facial Recognition use. Having a process in place that continually updates the quality of the mugshots contained in the database and associates those mugshots with the DID number is imperative for the success of this project.

The video footage received by IDN is typical of what would be expected from a system intended for general surveillance, not facial recognition. The facial recognition software could not recognize and track the faces of everyone that passed through the field of view of the camera.

Based upon the analysis of the video obtained from a Project Green Light location, IDN has many concerns related to the video portion of this project. There are many other parameters of a camera's optics that may impact the ability of the Facial Recognition Software to detect subjects, track faces, and identify them when appearing in video. At a minimum, IDN feels that many of the below listed conditions would need to be further analyzed/tested and/or addressed in order for DPD to achieve satisfaction with this portion of the project:

- Lighting conditions at Project Green Light Locations need to be uniform in the region being monitored by the camera being used for Facial Recognition.
- The monitored area should not be too large and the focus of the camera being used for Facial Recognition should be in an area where faces are expected to appeared within the frame.
- The angle between the camera axis and the plane of the front of the faces needs to be less than 45 degrees. This would typically mean a camera designated for use for Facial Recognition be installed and used. A camera installed for surveillance will yield poor results.
- The camera being used needs to be able to focus in a manner that maximizes the sharpness of the faces that appear in its field of view.
- Faces that appear in the cameras field of view need to appear long enough so they can be tracked and the software can build a facial template.
- Cameras being used for Facial Recognition need to be positioned in a manner that reduces the amount of motion in the frame (To reduce blur and pixilation).
- The resolution of the camera needs to be such that it can preferably capture more than 40 pixels of inter-ocular distance.
- Uncompressed video or alternative encodings are preferred for Facial Recognition Software designed for video use. Pausing or trying to grab a still frame from a video that is compressed with H.264 typically result in fuzziness and distortion.
- Cameras being used for Facial Recognition should have a wide dynamic range and have the ability to define auto-exposure regions to help equalize the dynamic rage of the region where the subject's face is expected within the frame.

Recommendations - General

Facial Recognition is another form of biometric science. Therefore, IDN is recommending that DPD consider this project as an expansion of its FingerID project. Facial Recognition matches are not as conclusive as a fingerprint match. Therefore, Facial Recognition software should be considered a strong investigative tool that supplements fingerprint technology. Having mugshots and fingerprints associated with the DID number is extremely efficient and advantageous when using Facial Recognition Technologies to develop investigative leads.

The fingerprint matcher provided to DPD can be upgraded to include Facial ID as well. The fingerprint matcher is used to create a DID number that biometrically ties all historical arrest data together in the Integrated Justice Information System (IJIS). This provides officers and investigators with an easy to use investigative tool to review historical arrest records.

Upgrading the fingerprint matcher to include a facial matcher would not only enable the use of mugshots to search for a DID number, it would provide a biometric process that could be used to continually update existing mugshots with updated (higher quality) mugshots (in cases where a person is arrested again).

Given the complexity of this project, especially with regards to obtaining facial images from video feeds, IDN is proposing that DPD take an incremental approach to this project. This will ensure that IDN and DPD can collectively address the many technological and procedural complexities a project of this scope will entail. As a proven vendor that has provided DPD with crucial software, IDN is in a position that it is able to approach this project as a partnership with DPD to ensure the needs of the department are met at every step.

IDN is recommending that this project be broken down into and implemented in two parts. Part 1: Facial Recognition for Still Images and Part 2: Facial Recognition using Video feeds. IDN's response includes budgetary quotes for both Part 1 and Part 2 of the project.

Recommendations- Facial Recognition Using Still Images – Part 1

While one might believe that obtaining mugshots from multiple police agencies to compile a very large mugshot database would lead to success in a facial recognition project, that is not necessarily the case. Because agencies have no way of controlling the quality of the mugshot images receive from 3rd parties, they typically must attend specialized training and use latent facial editing when performing their search.

IDN has assumed that DPD does not intend to create a specialized division of officers trained in performing latent facial editing. Further, IDN believes DPD would rather deploy a Facial Recognition Software system that uses its mugshot database in order to develop investigative leads.

IDN is recommending that the system deployed provide a response of either a "hit" or "no hit" to a Facial Recognition search done by a member of DPD. IDN also recommends that any "hit" response includes the DID number.

In order to achieve success in a system such as this, the agency must take measures to control the quality of reference photos (mugshots) used for facial recognition and relate those photos with a DID number. Therefore, IDN has responded with a budgetary quote for Part 1 that includes updating the mugshot photo capture systems, analyzing mugshots for use in facial recognition, and inclusion of mugshots into the fingerprint matcher (For DID Number association).

Recommendations- Facial Recognition Using Video Images – Part 2

IDN believes that there are an abundant amount of technical questions and considerations relevant to Part 2 that cannot be answered without in-depth reviews, analysis and technical considerations.

IDN is proposing that Part 2 of the project be broken down into the incremental steps of: Proof of Concept, Testing/Evaluation, and Production. During the Proof of Concept phase, DPD and

IDN will mutually identify camera feeds from up to four Project Green Light Locations that will provide video footage to be used for testing and analyzation purposes. During the Proof of Concept phase IDN and DPD can collectively identify and address many technical issues related to camera placement, optics, resolution, compression and data transmission.

IDN recommends that DPD and IDN utilize information obtained during the proof of concept phase to mutually define technical requirements/specifications and procedural processes necessary to enter into a testing phase. IDN recommends that up to 40 additional camera feeds from mutually defined locations be added during the testing phase.   During this phase, many additional technical items will be discussed and analyzed.

During either phase, IDN will have access too, and may utilize 3rd party consultants to help isolate, identify and evaluate many of the technical issues a project of this scope may encounter. After careful analysis of information obtained during the Proof of Concept and Testing/Evaluation Phases, DPD and IDN could then enter into a production phase for this project. This may include the inclusion of additional camera feeds that meet the mutually defined criteria established/defined by both parties.

This approach may result in a variance from the minimum number of concurrent video streams required in the DPD RFQ and/or the "standard" equipment/cameras authorized for use at Project Green Light locations. IDN is not taking exception to the goals of DPD, but rather recommending that given the identified risks of obtaining usable facial templates from video feeds, that a "walk before you run" approach would be in the best interest of all parties concerned.

Exhibit A Scope of Services

Project Description

IDN will implement a Facial Recognition Software Solution utilized by DPD. IDN facial recognition software will extract facial templates from both still images and video feeds that contain usable facial images.   These templates will be used to compare/match against facial images contained in the DPD Mugshot system and/or a DPD Watch List (containing mugshots from DPD). These capabilities shall become known as "The DPD FR Project" and be broken down into two parts.

Part 1 - Summary

IDN will update the cameras used to obtained mugshots as well as update the mugshot photo capture software. The updated hardware and software will help ensure mugshot photos taken meet the National Institute of Standards and Technology's (NIST) best practice recommendations for photos used in Facial Recognition programs. Mugshots will be linked to the DID number and the face matcher will be continually updated with the highest quality mugshot. The mugshots contained in the matcher will become the reference images used in facial recognition searches. Facial Recognition software workstations will then be deployed throughout DPD. DPD officers and investigators will have access to these workstations where they will be able to perform facial recognition searches against the DPD mugshot database.

Part 2 - Summary

Part 2 of the project will involve analysis of facial images captured using cameras deployed at Project Green Light locations. Using live video feeds from existing Project Green Light Locations, IDN will work with DPD to define a production plan for deploying facial recognition software designed to capture facial images from video feeds so they can be searched against a watch list.

Part 2 of the project will include many man hours of testing and evaluations. An initial Proof of Concept deployment will concentrate on camera placement, focal points of the camera, defined field of views, Compression methods etc. During this phase IDN will complete a watch list containing images of test subjects (DPD and IDN employees). These subjects will enter Project Green Light locations at various times of day and/or night and under various environmental conditions in order to test various components of this complex project.

Once DPD and IDN are mutually satisfied that complex technical and procedural issues are identified and addressed, more camera feeds (up to 40) will be added for a testing phase where more analysis will be completed.   The results of the Testing phase will drive the requirements and/or additional budget for the final production phase of Part 2.

Project Objective Part 1: Facial Recognition through Still Images

- Update current mugshot capture system with HD cameras capable of capturing facial images that comply with NIST best practice guidelines.

- Upgrade the existing DPD Fingerprint Matcher to include Facial Matching software.
- Provide DPD personnel with the ability to import still facial images that have been saved in multiple formats to be searched against the mugshot repository.
- Provide 100 concurrent client licenses for Facial Recognition (still images) workstations.
- Provide 100 workstations designed to perform Facial Recognition Searches.
- Configure Livescan systems to submit mugshots to the fingerprint/facial ID matcher.
- Configure facial ID matcher to continually update unique arrest records with the mugshot that is most suitable for facial recognition use (in cases where individuals have multiple arrest records).

Project Schedule Part 1: Facial Recognition through Still Images

Step 1:

- Upgrade cameras used to take mugshots to HD models capable of complying with NIST Subject Acquisition Profile level 40 image requirements
- Install and configure a software module to automatically adjust mugshot image to SAP 40 pose requirements
- Review current mugshot images for quality and suitability for use in Facial Recognition software, remove duplicate mugshot images and load a facial recognition matcher with the best mugshot (in cases where duplicates exist).

Step 2:

Configure 100 workstations (loaded with facial recognition client licenses) as Facial Recognition workstations and deliver them to DPD for installation (Installation, including network connections, power outlets etc.to be done by DPD IT staff). Once installed, each workstations will be able to immediately perform facial recognition searches using still images. Every workstation could also be upgraded so it could perform both finger identification searches and facial recognition/matching searches.

Project Objective Part 2: Facial Recognition through Real Time Video Feed – Analysis.

Implement a Facial Recognition application capable of extracting facial templates from video feeds from Project Green Light Locations so they can be used to search the DPD Watch List.

- Analyze video feeds from Project Green Light locations for the ability of facial recognition software to track faces, create templates and detect hits using test subjects.
- Continually monitor, test, evaluate and adjust technical aspects related to the collection, compression and transmission of video feeds during a proof of concept and testing period until a mutually agreed upon production project plan is developed. The Plan may include minimum requirements for data collections methods, video transmission policies and/or a combination of technical components and requirements that will help ensure

that Part 2 of the DPD FR Project meets the needs and expectations of the Detroit City Police Department.

- Create a watch list capable of holding up to 5,000 images from which automated Facial Recognition searches will be performed using facial images captured from video feeds.
- Create an interface with the Motorola Command Central that will transmit an alert/message informing users that a "hit" on a facial image contained within the watch list was received. This message will include the date/time and location of the hit as well as the DID number associated with the subjects' record from the watch list.
- Create an integration/Watch List management application which designated users can use to add and remove images into the database. This may include images not created by DPD mugshot software.
- Proceed to a production phase that is mutually agreeable to both parties.

.

Project Schedule Part 2: Facial Recognition through Real Time Video Feeds – Analysis

1. After receiving authorization to proceed and any applicable down payment, DPD and IDN will:

   a. Mutually select 4 different Project Green Light locations to be used during a proof of concept testing. Camera feeds will be incrementally increased to a maximum of 40 feeds during an evaluation/testing phase of Facial Recognition Through Real Time Video Feeds (FR-V). Due considerations will be given to best case and worst case environmental conditions in the selection of camera feeds during the proof of concept and evaluation phases.

   b. IDN and DPD staff will enroll individuals (Both IDN staff and DPD staff) into the matcher and have those individuals enter these locations in order to isolate and evaluate external environmental factors that may affect the quality and quantity of usable candidate images captured by the video cameras in place.

      i. It is expected that a sworn member of DPD accompany IDN staff at any and all times when site visits to Project Green Light Locations are necessary.

      ii. IDN will not be responsible for any compensation to any DPD personnel during any off site work.

   c. IDN will analyze (for facial recognition quality threshold standards) the facial images captured from the video feeds for a mutually defined set of time and work collectively with DPD staff to ensure that the best camera placement and video collection / transmission process is identified and implemented.

      i. This may involve camera relocations and/or the installation of additional cameras (recommended and placed by IDN) and/or FRTVI software loaded onto a local computer.

2. IDN will create a watch list capable of containing 5,000 facial images that can be searched using facial images (and resulting templates) obtained from video feeds. This is a variance from the 500,000 image requested in the RFQ.

   a. Integration software will allow appropriate users the ability to maintain the Watch list database. This integration will occur after a mutually agreeable integration specifications are defined by both parties.

3. IDN will Interface with Motorola Central Aware Console to send any "hit" notification messages to it.

4. It is assumed that a full project plan with a detailed scope of work would be created by all parties involved after the completion of the testing/evaluation phase prior to entering a production phase of this project.

Project Materials:

To be mutually agreed upon based on project discussion and mutual agreements.

Project Coordination:

This project will be coordinated through a defined DPD Project Manager and IDN Project Manager.

Project Location:

The primary project location will be at various Detroit Police Department buildings. Offsite project locations will be within the confines of the City of Detroit and commonly referred to as Project Green Light locations.

Project Deliverables:

Deliverables for this project are to be determined based upon mutual decisions and as recommended by IDNetworks herein.

Company Overview

ID Networks, Inc.
7720 Jefferson Road
Ashtabula, OH 44004
Phone: (440) 992-0062
Fax: (440) 992-1109
Email: sales@idnetworks.com
Website: www.idnetworks.com

ID Networks is a privately held public safety software company that consists of a cross section of industry talent and experience. We have administrative leadership, technical leadership, and sales leadership with both civilian based employees and experienced law enforcement personnel. The blend of industry personnel continues to have a significant impact on public safety product quality within our company.

IDN utilizes outside accounting firms to assist with business planning and to ensure financial discipline. It is a financially stable company with little or no long-term debt that has enjoyed a strong conservative growth since 1984.

To remain competitive in the market place, IDN routinely embeds 3rd parties cutting edge technology within its software solutions. Developers have access to the latest tools and have seamlessly integrated technologies provided from over 70 different vendors. This has enabled IDN to set industry standards with its affordable software solutions yet remain flexible enough so it can still develop and provide specialized software solutions that meet agencies unique needs.

Commitment to customer support and field service is the heart of the IDN success story. Dedication to customer service and support has produced a very high customer satisfaction rating. IDN does not employ a sales force. Most new sales have resulted from referrals from our existing customer base. To ensure high levels of customer satisfaction account managers are assigned to large accounts and customer service supervisors proactively monitor our help desk system.

Authorized IDN Personnel for Agreements:

Douglas Blenman, Sr. – Owner and President
Bonnie Blenman – CFO and Contracts Administrator

Key Project Personnel

The team of IDN professionals that may be involved with the Facial Recognition project for the city of Detroit are:

Patrick Foster – Project Manager & Installation/Training
Derek Tapper – Biometrics Product Manager
John Wheelock – Biometrics Sales Manager

Exhibit B Fee Schedule

I General:

(a) We assume the customer will acknowledge the total amount of services for this contract upon the award to IDN.

(b) We acknowledge the payment expectations as described within this section.

II. Project Fees – IDN Facial Recognition-Still Images

Facial Recognition Through Still Images - Software					
Item	Reference	FaceID - Software	Qty	Unit Price	Extended Price
1	NIST BPC Software Add-on	Photo Capture Software that meets NIST best practice recommendations. Includes automatic face centering, cropping, background and lighting correction, and pose orientation.	5	$595	$2,975
2	Camera Capture Kit PTZ	Camera Capture Kit PTZ (Includes: Compass PTZ USB Camera, USB Serial Adapter, Visca Ext., USB Cable, Wall Mount).	5	$1,495	$7,475
3	Face Enrollment	FaceID Enrollment Client software to enroll images into the facial image matcher (5 Livescan).	5	$624	$3,120
4	FaceID Matcher-Software-Server Side	Facial Recognition Server side software used for still images.	1	$50,000	$50,000
5	FaceID-Client	Facail Recogntion Client Software for Facial Recogntion workstations.	100	$1,950	$195,000
Facial Recognition Through Still Images - Hardware					
6	Facial Recognition Workstion	Universal facial recognition workstation configured for facial recognition software, includes Computer, Keyboard and mouse	100	$995	$99,500
Facial Recognition Through Still Images - Services					
Item	Reference	FaceID - Software	Qty	Unit Price	Extended Price
7	Loading Matcher-Facial Images	Evaluate historical DPD Mugshot images for Facial Recognition threshold recommendations and remove duplicate images. Load matcher with best images and configure matcher.	1	$44,000	$44,000
8	Project Management	Project Management	20	$1,800	$36,000
9	Professional Services	Professional services: Workstation configuration, onsite installation, setup, training, evaluaition	30	$1,800	$54,000
				Total	$492,070

II Project Fees – IDN Facial Recognition Through Video Images - Evaluation

The below listed quote contains budgetary items necessary to complete the proof of concept and evaluation phase of the Facial Recognition Through Video Images portion of the project. After a mutually agreed upon technical plan is developed, IDN would provide an additional quote, relevant to that mutually agreed upon production phase of the plan.

Facial Recognition Through Real Time Video Feed - Software/Hardware					
Item	**Reference**	**Hardware and Software**	**Qty**	**Unit Price**	**Extended Price**
1	Facial Recognition - Video	Servers and Server Side software used to extract and process facial images from video feeds. (Configured to allow up to 40 camera feeds during the evaluation phase)*	1	$195,000	$195,000
2	Facial Recognition - Watch List	Watch List Server and Software - Used to create and maintain a Watch List of up to 5,000 facial images that are automatically searched using templates created/received from video feeds. Includes messaging software that will allert users of any hits within the watch list that occur.	1	$75,000	$75,000
3	Custom Development	Custom development to support 3rd party interfaces.	2	$75,000	$150,000
Facial Recognition Through Video Feed - Services					
Item	**Reference**	**Services**	**Qty**	**Unit Price**	**Extended Price**
4	Professional Services	Onsite installations, setup, monitoring and anlayization of Facial Recogntion from Video feeds	40	$1,800	$72,000
5	Project Management	Project Management	25	$1,800	$45,000
6	Config/Training	Configuration / Training On Site	10	$1,800	$18,000
7	Consultative service	Consultative services with 3rd party	1	$30,000	$30,000
				Total	**$585,000**

NOTE:

Item 1 is a maximum budgetary estimate for a system utilizing feeds from up to 40 cameras. A decentralized server configuration will be utilized for appropriate load distributions during the proof of concept phase and subsequent incremental testing phase. The incremental steps within the testing phase will include adding additional servers to distribute the load the additional cameras will add. The number of cameras added and at what steps they are added are dependent upon information received/obtained during each phase and will be mutually agreed upon. This may require that item 1 be broken down into incremental billings relevant to the progression of the project through each phase.

Good Faith Budgetary Estimate for Production Phase

Budgetary Estimate - Production Phase					
Item	Reference	Hardware and Software	Qty	Unit Price	Extended Price
1	Facial Recognition - Video	Servers and serverside software to accommodate 60 additional camera feeds.	1	$240,000	$240,000
Facial Recognition Through Video Feed - Services					
Item	Reference	Services	Qty	Unit Price	Extended Price
2	Professional Services	Onsite installations, setup, monitoring	20	$1,800	$36,000
3	Project Management	Project Management	20	$1,800	$36,000
				Total	$312,000

DPD FR Project Fees – Summary

Description	Cost
Facial Recognition Using Still Images – Part 1	$492,070
Facial Recognition Using Video Feeds – Part 2 (Proof of Concept/Testing and Evaluation)	$585,000
Production Phase – Facial Recognition Using Video Feeds – Good Faith Estimate	$312,000
Total	$1,389,070

III Project Billing

1. It is our intent to work within the boundaries of DPD budgetary constraints based upon a mutually created project plan.

2. A mutually agreed upon payment schedule will be developed based on the agreed upon project plan.

3. Maintenance and support items are to be prepaid annually at an agreed upon rate based upon the project plan.

4. First year's maintenance and support may be billed separately for various portions of the project and due upon "Go-Live" of that portion of the product.

Project Assumptions – Customer supplied items, unless otherwise noted	
Hardware	Pricing for Facial Recognition sever for Part 1 (Still images) is based upon an upgrade to the existing DPD server used for FingerID. Network wiring, and any required firewalls are the responsibility of the customer. DPD may elect (at their discretion) to provide workstations that can be used for Facial Recognition for still images. IDN will be providing servers and will not support the use of virtual servers. Pricing for servers and workstations are included in the quote.
Database/Server Software	The cost for databases and server software are included in the quote.
Network Protocol	ID Networks solutions require the use of TCP/IP.
Interfaces	Pricing for custom interfaces does not include any work from other 3rd party software providers as required by the customer.

Wiring	All premise wiring for electrical and computer network connections are the responsibility of the customer prior to the installation of the system.
Additional IT Services	All additional IT services shall be the responsibility of the customer and shall be performed by qualified IT professional, either an employee or outside contractor.
Backups	All backups are the responsibility of the customer. ID Networks will assist with the configuration and scheduling of backups, but it is the customer's responsibility to ensure that any backups that are put to any additional media such as tape and that are to be taken offsite are handled and monitored by the customer.

Project Assumptions – Implementation	
Timeframe	This project will begin upon the receipt of a purchase order or signed contract. The expected implementation time is estimated to be a continuous implementation over a 6 month to 2 year period based upon a mutually agreed upon project plan.
Agency Personnel	The customer shall provide a daytime project liaison for the duration of the project, one that would coordinate all IDN activities that require cooperative efforts, to include system administration for security and configuration. Uniformed DPD Officers are to accompany any IDN personnel during any on site visit/work at any Project Green Light Locations.
Delivery & Installation	Delivery will be scheduled after the receipt of a written purchase order or signed contract and down payment. The customer is responsible for facility preparation including electrical service, furniture, equipment mounting, networking, etc. The scheduling of our installation is subject to the customer facility preparation being completed. Delivery and Installation shall occur on normal business days (M-F) and hours (8 AM to 5 PM).
Training	IDN will conduct onsite training as part of this project. It is expected that the customer will coordinate the scheduling of personnel in order to attend all appropriate sessions. It is assumed that the customer will supply the necessary facilities for such training. Unless mutually agreed upon, Training hours shall occur on normal business days within normal business hours.
Remote Access & Support	We expect the customer to provide high speed internet access in order to enable remote support capability. Access will be controlled through an ID Networks provided system and will be auditable by the customer whenever they would like. ID Networks will also supply the customer with access to our helpdesk system so that they may track any or all open tickets for their agency at any time.

Disclaimer	
Hardware	Should DPD elect to provide any hardware, it must meet all specifications provided by IDN. IDN cannot be held responsible in any way for the performance of hardware provided by DPD.
Network	IDN is not responsible for any network connections and cannot be held responsible for any software performance issues contributed to poor network connections.
Interfaces	Pricing for custom interfaces does not include any work from other 3rd party software providers as required by the customer.
Cameras	All premise wiring for electrical, video and computer network connections are the responsibility of the customer prior to the installation of the system.
Candidate Images	IDN will provide updated software to help ensure quality candidate (mugshot) images are obtained at the time of arrest. The ultimate responsibility of obtaining quality mugshots rest in the hands of the employee capturing the image. IDN will not be held responsible for the failure of an employee to review mugshots prior to submitting them. IDN will also not be held liable for the use of facial images obtained from other 3rd parties.

Terms & Conditions of Sale	
Warranty & Maintenance	Warranty and maintenance terms and conditions to be defined upon signature of contract or purchase order.
Special Items & Software Interfaces	Special items or software interfaces which may need IDN development, or the development or cooperation of a third party, will require separate planning with the customer and any third parties. ID Networks cannot be responsible for the delays of the customer or third parties and likewise, payments by the customer to ID Networks shall not be held up due to non-ID Networks delays.
Cost Estimates	All cost estimates are provided in good faith. 3rd party costs for interfaces are not calculated and may affect the overall project cost.
Contract	An agreement may be drafted and approved by both parties at the discretion of the buyer in advance of any work being done. Otherwise, standard purchase order may apply.