



AUTOMATED  
REGIONAL JUSTICE  
INFORMATION SYSTEM

***NATIONAL INSTITUTE OF JUSTICE  
FY07 FINAL PROPOSAL  
INFORMATION-LED POLICING***

---

**TACTICAL IDENTIFICATION SYSTEM (TACIDS)**  
***Automating Positive Identification in a Tactical  
Environment***

---

## **TABLE OF CONTENTS**

<b>PROPSAL ABSTRACT</b>	<b>- 2 -</b>
<b>PROGRAM NARRATIVE</b>	<b>- 3 -</b>
<b>Purpose</b>	<b>- 3 -</b>
<b>Goals and Objectives</b>	<b>- 4 -</b>
<b>Review of Relevant Literature</b>	<b>- 5 -</b>
<b>Research Design and Methods</b>	<b>- 6 -</b>
<b>Implications for Policy and Practice</b>	<b>- 8 -</b>
<b>Management Plan and Organization</b>	<b>- 10 -</b>
<b>Dissemination Strategy</b>	<b>- 11 -</b>

## **I. PROPOSAL ABSTRACT**

ARJIS, the Automated Regional Justice Information System, a consortium of 71 local, state, and federal law enforcement agencies proposes to develop an automated tactical identification and query system based on facial recognition for use by law enforcement officers and investigators.

ARJIS will add a web services component in its existing suite of law enforcement tools which will allow a user in the field to take a photo and upload it to a server-side component which will match it against the over 800,000 booking photos in the San Diego County node. Positive matches will then be processed on the server side and a proposed photo lineup will be sent back to the law enforcement agent for comparison and ability to run additional queries based on a name and date of birth standard search.

ARJIS has shown the capability to query several databases using tools such as Global Query with great success. This component will add a web service in front of the query agent that will attempt to match a photograph taken in the field, with an existing ARJIS PDA, against the current database of local booking photos. Upon positive match, a photo lineup would be returned to the agent. If the agent identifies a positive match from the photo lineup, a query would then be initiated against ARJIS ONS (Officer Notification System), County Warrants, NCIC, DMV and CLETS. All data returned from the query along with the positive match would then be sent back out to the agent in the field.

This solution allows agents in the field to positively identify and query for relevant data on individuals who have been stopped or arrested, and can't be positively identified based on information given by the subject. It will leverage the existing base of more than 300 ARJIS PDA users in the San Diego region, each equipped with a digital camera and EVDO broadband connection, and the San Diego booking photos housed and maintained by ARJIS. The ARJIS PDA Program has shown great success at getting information to law enforcement entities working in the field quickly, securely and reliably, and this project will give them another tool to expand their capabilities.

## **II. PROGRAM NARRATIVE**

### **A. PURPOSE**

Often as law enforcement entities work in a tactical environment they encounter individuals unwilling to cooperate and give accurate information. Sometimes, this lack of cooperation renders it impossible to positively identify the individual. With limited cause agents may be unable to detain these persons long enough to confirm their identity and thus miss an opportunity to detain a wanted person.

To conduct a thorough investigation into an individual's true identity, a law enforcement agent needs to utilize information from multiple sources. Officers are willing to accept information from credible sources, but may not know where the needed information is stored or how to access it. Unfortunately, officers often must use "silo" systems that were designed to contain and store specific kinds of law enforcement information, with each having completely different rules for access and use.

Historically, access to and exchange of law enforcement information has occurred using rigid data formats, access and exchange rules. Queries were made and returned on a single system. This structure was dictated by the technology at the time and the lack of information sharing. ARJIS has extensive experience in building tools which pull data from multiple credible data sources, packaging it in a manner which gives the agent the information in a useful format.

ARJIS and its member agencies have had tremendous success with its wireless PDA program. ARJIS law enforcement users can utilize their PDA through a secure, private, wireless network to access information which can help positively identify wanted individuals. The program currently supports more than 300 users and has helped detain numerous people who would have otherwise been released based on lack of probable cause. A facial recognition platform used on a case-by-case query will add to the existing tools which law enforcement agents use in the positive identification process.

## **B. GOALS AND OBJECTIVES**

ARJIS proposes to develop a Tactical Identification System (TACIDS) that can assist with positive identification and querying on subjects. This will be accomplished in a two phase, six step process. First a user will make a request by way of a photograph submission to the system. The photo will be matched against a facial recognition system which will return a photo lineup of potential matches. If the law enforcement agent identifies a positive match from the photo line up, a query will be initiated on name and DOB information associated with selected booking photo match. Query results are returned to the web server where they are packaged with the photo and returned to the requester.

Specifically, the ARJIS team will:

### I) PHASE I

- 1) Conduct a market research and assessment of commercially available facial recognition products as well as successful research projects completed by universities to determine the best products to use in the development of the facial recognition platform.
- 2) Develop a facial recognition platform with a database of existing booking photos.
- 3) Develop a web service component for interaction between the users and the server-side identity matching component and query agent.
- 4) Conduct a test on the facial recognition platform with current ARJIS PDA users.

### II) Phase II

- 1) Integrate facial recognition component into query based system such as Global Query.
- 2) Provide an operational assessment of the Tactical Identification System by performing field test with existing ARJIS PDA users.

### III) Future uses – Phase III – Suspicious Activity Reporting

- 1) Incorporate photo into the ARJIS Suspicious Activity Reporting System (SARS), currently known as Field Interviewing (FI).
- 2) Photographs which are used in TACIDS can be attached to automatic SARS incident
- 3) When SARS incidents are queried, agents will receive copy of photograph previously uploaded into system.

Consistent with the NIJ Information-Led Policing initiatives, these software components will be developed using open source standards and will be made available as part of a repeatable national model.

### **C. REVIEW OF RELEVANT LITERATURE**

ARJIS has incorporated the standards, guidelines, and best practices established through the Global Justice Information Sharing Initiative including compliance with the GJXDM standard. ARJIS is adopting a Service Oriented Architecture (SOA) and supports GJXDM based exchanges today.

The ARJIS team has performed considerable research concerning the concepts of Service Oriented Architecture and Enterprise Service Bus. There is a substantial volume of relevant literature on these subjects. Our review is consistent with the Global recommendation to adopt SOA principles. This project will be incorporated as a tool within ARJIS' developing ESB.

In addition ARJIS has conducted evaluations of relevant biometric and facial recognition usages today. This proposed model seeks to find new methods within this realm based on a case by case query in a tactical/operational environment. TACIDS seeks to add new tools to the already existing set used by law enforcement agents in these environments.

There are several methods in use for facial recognition today. Some include 2D model sets and 3D model sets both of which can use algorithms to create "facial fingerprints" or hashable/indexable values for future lookup. ARJIS seeks to conduct market research in the beginning phase of this project to identify

the appropriate method which will produce probable value sets. These probable value sets will be used in the photo lineup presented to the agent in the tactical situation.

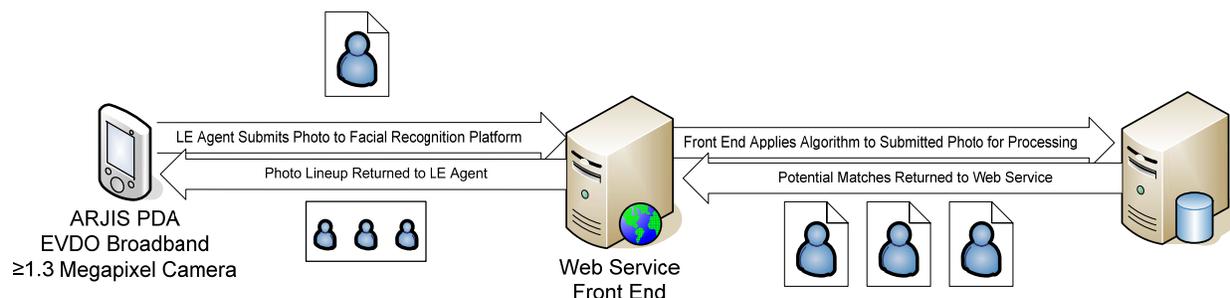
### D. RESEARCH DESIGN AND METHODS

The technical design of this proposal has two major components: The facial recognition platform and the web-service front end. The facial recognition will be developed using current established algorithms that are selected as a result of the market research of established off the shelf products, and the current database of local booking photos which ARJIS maintains. The web-service front end will handle photo submissions from the agents, and prepare a photo line up. The photo lineups returned to the agent will be without name, DOB or other identifying data. Agents will be required to positive ID subject based on the photo alone. It will then initiate new queries in an existing query system (i.e. Global Query) based on positive IDs the law enforcement agent makes, and collect results from both systems (Query and TACIDS) to return to the agent. All transactions between services will be GJXML/NEIM and/or NEIM compliant.

Through the first two phases of the project, no photos taken and or submitted to the TACIDS system will be warehoused or stored in any manner. Once a photo has been vetted through the TACIDS system, it will be discarded.

The following diagram outlines the process:

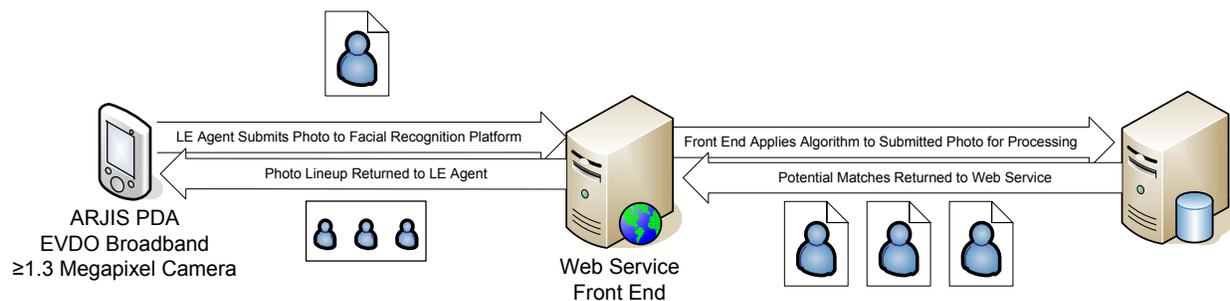
#### PHASE I – Initial Development of Platform



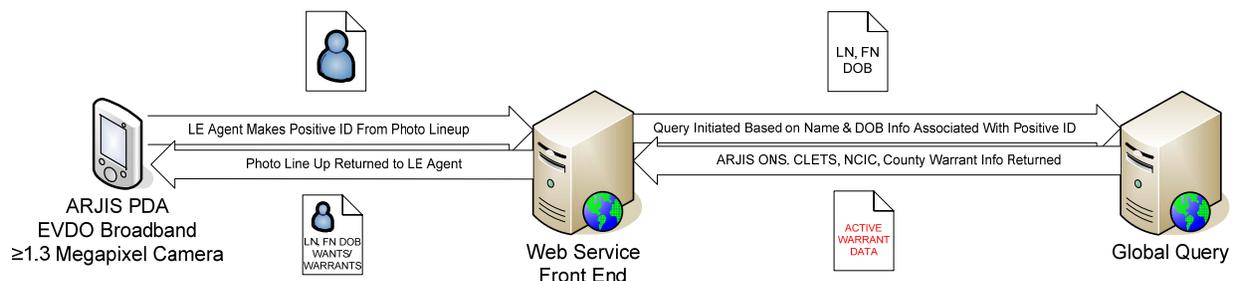
After successfully developing and testing the facial recognition platform in a tactical environment, integration with a query tool, such as ARJIS' Global Query would be developed and implemented to provide users additional information including: ARJIS Officer Notification System (ONS) Alerts, County Warrants, CLETS and NCIC Wanted, Warrants, Temporary Restraining Orders (TRO), Supervised Release, and Parole information. Queries will be initiated based on name and date of birth (DOB) info associated with agent selected positive ID.

**PHASE II – Integration of Query Platform**

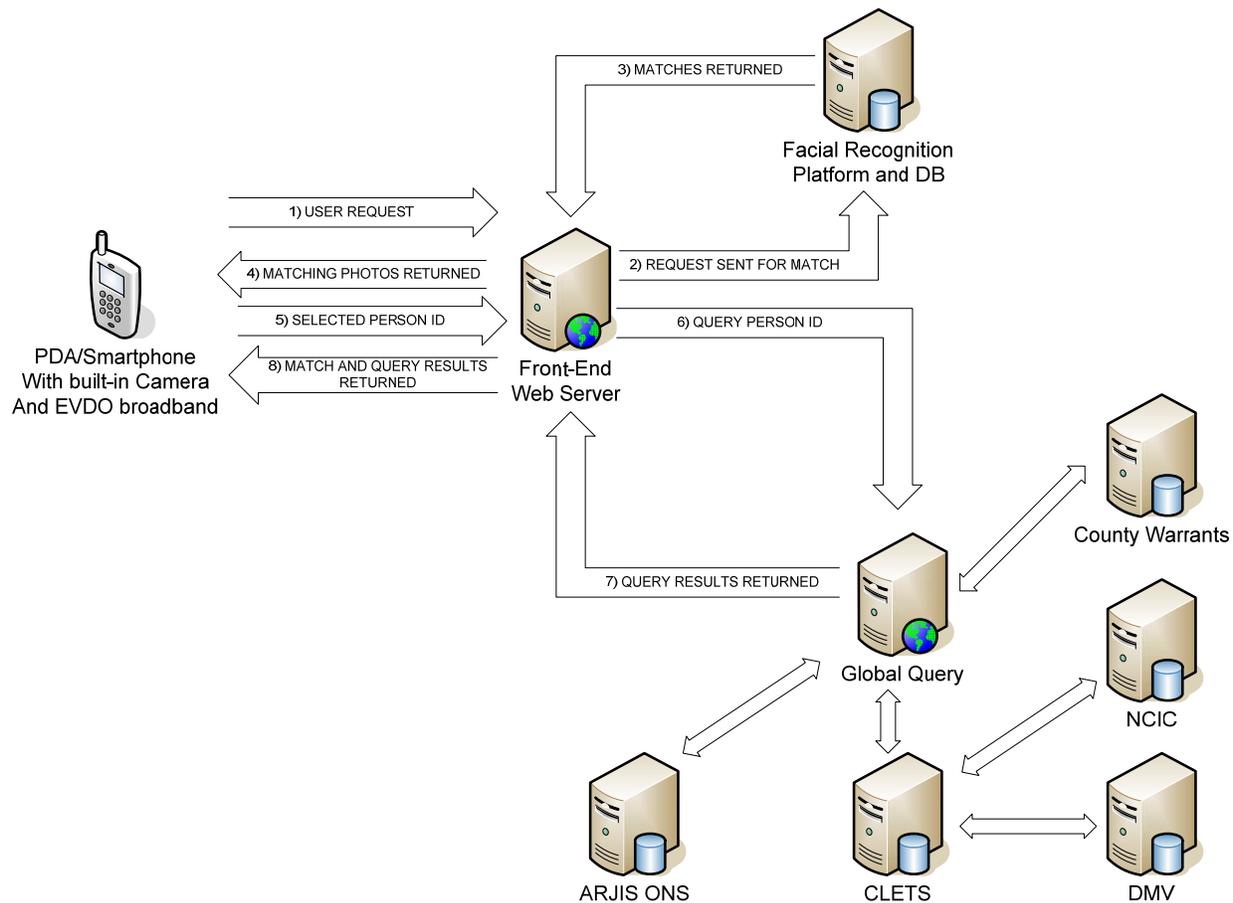
**STEP 1 – Same Process as PHASE I implementation**



**STEP 2**



OVERALL PROCESS - 8 Step Process



- Accept user request in form of photograph from ARJIS PDA User.
- Process submitted photograph with Facial Recognition Pattern Algorithms, and match against current booking photo database.
- A list of matching photos is returned to the user with their associated identities.
- The user selects the photo that matches the suspect and the ID of that person is submitted as the input to the existing search system.
- Search results are returned to the user.

**E. IMPLICATIONS FOR POLICY AND PRACTICE**

The potential benefits for an automated positive ID system for use by law enforcement agents in a tactical environment are great. This platform will assist agents with identifying potential wanted persons they may otherwise not detain because of inability to establish probable cause.

ARJIS has a proven record of delivering reliable, timely and accurate information services to 71 law enforcement agencies in southern California for more than 25 years, and has made significant contributions to the body of knowledge driving criminal justice information sharing efforts. The following outcomes affecting the policy and practice of law enforcement agencies are anticipated in this project:

- Development of GJXDM/NEIM compliant image search, IEPD and associated code to biometrically query person photo databases.
- Provide visual identification of unknown persons of interest to law enforcement officers in near real time, and with a single device they carry while deployed in field operations.
- ARJIS will develop metrics to gauge the effectiveness of the TACIDS system. Specifically ARJIS will collect success specific success stories attributed to the TACIDS system and provide tangible, measurable results. This can be accomplished with the following:
  - Record the number of transactions/requests for match sent to the facial recognition platform.
  - Record the number of potential photo lineups sent back to the user from the facial recognition platform.
  - Record the number positive identifications made based on requests to Global Query from law enforcement agents within TACIDS.

This auditing method will give a tangible result of the systems effectiveness based on actual numbers of the systems usage. This rudimentary data will assist in the establishment of statistical basis upon which modifications will ultimately be evaluated. Iterations of data collection, system modification, and comparative analysis will guide this development process. Specific successes along with this statistical analysis will contribute to the programs direction and will assist in guiding the dissemination strategy.

## F. MANAGEMENT PLAN AND ORGANIZATION

### I. MANAGEMENT PLAN

ARJIS will initiate the project upon award. ARJIS will be responsible for developing the TACIDS platform. ARJIS, member agencies and users will jointly test the adequacy of the platform to ensure the effective and desired operation. ARJIS expects the project will be completed one year following award. A high level work breakdown structure is referenced in the figure below and more detailed breakdown is provided in the appendix.

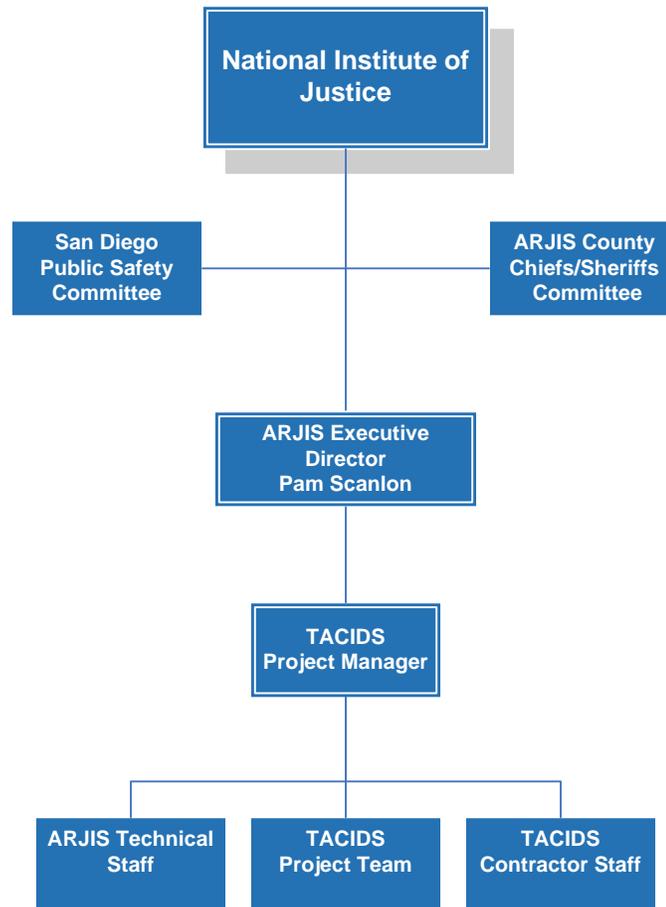
WBS	TASK DESCRIPTION	DURATION
1	Research/Identify Suitable Facial Recognition Platforms	30 days
2	Develop TACIDS Facial Recognition Platform	120 days
3	Develop TACIDS Database	
4	Controlled Environment Test of TACIDS	30 days
5	Operational/Tactical Test of TACIDS	30 days
6	Development of TACIDS - Global Query Interface	60 days
7	Controlled Environment Test of TACIDS - Global Query Interface	
8	Operational/Tactical Test of TACIDS - Global Query	30 days
9	Provide TACIDS Toolkit	30 days

ARJIS will deliver a final report providing a comprehensive overview of the project and a detailed description of the project design, data, and methods; a full presentation of scientific findings; and a thorough discussion of the implications of the project findings for criminal justice practice and policy as well as quarterly financial reports and semi-annual progress reports.

### II. ORGANIZATION

Oversight, policy, strategy and guidance will come from the National Institute of Justice and the ARJIS Executive Board. Leadership and overall project management direction will come from Pam Scanlon, Executive Director of ARJIS, who will function as Principal Investigator.

ARJIS will be responsible for the development of the Tactical Identification System. ARJIS will also provide support for the operational testing. Existing member agencies and users will provide a test bed for field deployment.



## **G. DISSEMINATION STRATEGY**

ARJIS will announce and provide periodic updates on this project to their respective memberships and stakeholder organizations through internal communication mechanisms and web sites. Test and production versions of appropriate applications will be rolled out to our existing test bed of more than 300 officers and investigators carrying ARJIS PDA devices. ARJIS will seek the oversight and approval of their respective governing bodies. The Project Team will be comprised of officers and investigators representing the 71 ARJIS Member agencies. These officers will be actively involved in the design, development,

impellent, and testing of the application. ARJIS will provide a mid-point and summary report to NIJ for circulation throughout the criminal justice community.