January 21, 2014

LOS ANGELES FIRE DEPARTMENT

JAMES G. FEATHERSTONE
INTERIM FIRE CHIEF

January 3, 2014

BOARD OF FIRE COMMISSIONERS
FILE NO. **14-005**

TO: Board of Fire Commissioners

FROM: James G. Featherstone, Interim Fire Chief

SUBJECT: TIMELINE AND PROJECT PLAN FOR THE AUTOMATED VEHICLE LOCATION PROJECT

FINAL ACTION:	——— Approved	——— Approved w/Corrections	——— Withdrawn
	——— Denied	——— Received & Filed	——— Other

SUMMARY

As directed by the Board of Fire Commissioners, the department is providing a status timeline and project plan for the Automated Vehicle Location (AVL) project that is currently under way at Metro Fire Communications (MFC). The AVL project officially began June 2013 and is currently on schedule to fulfill the completion date of March 2015. In its present format, the AVL project is a linear program that is broken down into six project phases, each of which indicates significant upgrades in the overall project. Each phase of the project benchmarks an implementation or integration of a particular piece of technology that enhances the overall project. It must be noted that the AVL project is a highly complex venture requiring the integration of multiple City departments to come together on a common project planning platform and work through difficult technology issues. The Los Angeles City Information Technology Agency (ITA) plays a significant role in the overall implementation of AVL and has been working side by side with the department's Dispatch Support Services Section (DSSS). As with any complex project, the department must remain flexible and willing to adapt to changing organizational conditions. Using the conceptual and prescriptive methodology of the Systems Development Life Cycle (SDLC)[1] will strategically position the project into a continuous maintenance and evaluative loop that will assist in keeping the technology current and properly maintained.

RECOMMENDATION

That the Board:
Receive and file.

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[1] The Systems Development Life Cycle (SDLC) is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. Additional information can be found at: http://searchsoftwarequality.techtarget.com/definition/systems-development-life-cycle

FINDINGS

In practice, AVL is a location technology that will enhance the department's ability to dispatch the closest resource based on physical location and not fire station location. This technology will have many features that will operate on both the call taker end and the emergency resource end. By replacing existing maps, call takers at MFC will possess intuitive tools that will assist in locating 911 callers and the resources will have information that will improve situational awareness.

The project plan for AVL is broken down into the following six projects:

1. Emergency Vehicle GPS Location Reporting
2. Dispatch Floor Map Replacement
3. Mobile Field Mapping
4. Incident Location "Quick Find"
5. GIS Based Address Validation
6. AVL Based Emergency Vehicle Dispatching

1. Emergency Vehicle Global Positioning Service (GPS) Location Reporting

The objectives of Phase I of this project are to deploy ADASHI's[2] AVL capabilities to all field units. The City of Los Angeles Fire Department (LAFD) operates approximately 630 emergency vehicles. Of the 630 it is estimated that about 200 of these vehicles are still utilizing Panasonic's Toughbook CF28 (CF28). The CF28's early editions run on a Pentium III processor at 600MHz, 128Mb RAM, and a 30GB hard drive. Although there are plans to replace these laptops within the next year, achieving the Phase I objectives requires the deployment of software capable of running on the early CF28's. ADASHI's field hardware requirements are much higher than the CF28's. As part of Phase I the ADASHI team will develop and deploy a version of its software that retains ADASHI's robust tracking, logging, and communication abilities but does not include the memory and processor intensive mapping interface. In the plan's third project, the Without a Map Interface (WAMI) deployment will be replaced by ADASHI's Geographic Information Systems (GIS) compliant software on all higher functioning hardware, however, the ability to track every vehicle in the fleet will be retained throughout the projects duration regardless of hardware status.

2. Dispatch Floor Map Replacement

The current Computer Aided Dispatch (CAD) floor call taker and dispatch terminals employ a map to assist with identifying caller locations and dispatch targets. The map system utilizes an unsupported version of ESRI's ArcObjects[3] technology and is past the end of its technological lifetime. Several GIS layer types maintained by Management Information Systems (MIS) are incompatible with this technology. In addition, the map is manually controlled and has limited access to essential map layers.

The dispatch floor map replacement design retains the local mapping engine for optimal load balancing but utilizes ESRI's latest Runtime technology as the engine. The new display is capable of creating multiple maps, including various raster and vector map

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[2] ADASHI is the vendor hired by the City to provide AVL to the fire department.
[3] ESRI ArcObjects is a vendor provided service. Additional information can be found at: http://resources.esri.com/help/9.3/arcgisengine/java/doc/b0a96bd8-fc78-4573-9a70-e108cf6a4580.htm

combinations and Pictometry[4] oblique imagery. The map will be wired to the command line interface and the ANIALI[5] feed so that the displayed content will be chosen with as much automation as possible. In addition, a variety of intuitive tools will be available to perform analytical functions within the map.

Goals of the Dispatch Floor Map Replacement:

Phase I will replace the LAFD CADs map interface with ADASHI's Next Generation Call Taker (NGCT) software. The replacement provides dispatchers an ergonomic, modern map interface that maximizes call location intelligence with decreased effort. Phase II ANIALI rebids are automatically zoomed to for each call without additional mouse clicks by the dispatcher. The map display includes the class of service, caller's location, cell-tower, uncertainty factor, confidence factor, and the other call taker terminal call locations that surround it. The map display auto-zooms into multiple Pictometry, aerial photography, and Google/Bing map street views of the caller's location that can be browsed by the dispatcher to assist in visualizing the caller's environment.

The Next-Gen Call Taker map interface includes controls that allow the call taker to provide better feedback to the individual on the other side of the phone. In addition to visualizing fleet positions on the map, the dispatcher can click on a responding unit and follow-them (map moves to keep them centered) helping the call taker provide the caller with real-time responder status and projected driving time.

Completion of AVL Deployment Phase 2 will transform the department's ability to visualize, assess and publish measured results of these optimized processes. Using VCR/DVD-like controls, dispatch floor personnel will be able to playback AVL history for one vehicle or the entire fleet. Plus, incident and fleet status/locations can be published to the City's Arc Server[6] that has Flex/Silverlight integration allowing internal and public visualizations of LAFD's real-time status.

3. Mobile Field Mapping

This project will deploy ADASHI's full AVL capabilities on all field units that have computers purchased within the last six years. The AVL deployment will not only cover every fleet vehicle, but also provide a redundant AVL signal for a large majority of units so that AVL field reporting will continue to be available during CAD black-outs. A key benefit of this phase will be increased incident awareness by the fields units. The in-vehicle display provides a superior dispatch page and a clear incident destination map view including GIS information relevant to the incident and type (closest fire-hydrants, helipads, hospitals, swift-water rescue points, etc.) and caller location. In addition, response vehicles are each provided an optimized navigation route and audible turn-by-turn directions to the incident site. Automatic presentation of the shortest driving route and quick in-vehicle recalculation of the route in the case of a wrong turn ensures the shortest response time possible.

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[4] Pictometry is the name of a patented aerial image capture process that produces imagery showing the fronts and sides of buildings and locations on the ground.

[5] ANIALI is Automatic Number Identification and Automatic Location Identification. This technology allows the call taker at MFC to see the telephone number and location of the person calling 911. This feature along with the Master Street Address Guide (MSAG) is part of the Enhanced 911 framework.

[6] Arc server in a network used to store backup copies of data files.

Additionally, the system will enable the deployment of a radio aliasing management system. Radio aliasing management is designed to solve two major issues for the City:

- Implement a robust radio ID management system that provides sufficient error checking and validation to insure accurate radio assignment and eliminate safety concerns.

- Provide access to radio alias information from anywhere in the City.

4. Incident Location "Quick Find"

The proposed locations user interface is a tool to facilitate resolving dispatch locations with multiple pieces of information provided by a caller or callers. The user interface for the call taker will be augmented with a 'location assist' interface that (in conjunction with ADASHI's mapping capabilities) will optimize operator interaction with calls, improve accuracy, and ultimately provide a better destination target for dispatched responders. Graphical displays and imagery will be used with all current call's (from other call taker terminals) cell-tower/call information to identify the incident's location. The location assist interface accepts text entries; these are instantly geocoded and displayed on the map in list form. All MIS managed maps in addition to commercial data sets are accessible through this interface. In addition to addresses, the user can enter restaurants, stores, businesses, landmarks, mile markers, natural resources, high rise floors, LAX signs or any mapped descriptor. The interface can accept descriptive information such as 'near' and many others to assist the operator in determining the location. The location assist interface quickly narrows the potential scope of a location even with only vague references by the caller. At any point, the dispatcher can alternately select the dispatch location by clicking on any one of ADASHI's maps.

The locations user interface aims to increase the number of dispatch locations that can be determined and decrease the amount of time it takes to find all dispatch locations except for when a single exact location can already be determined from the information a caller (or technology such as ANI/ALI) provides.

The locations user interface tool achieves this by providing superior and faster search tools while providing all tools necessary to create the geographic picture of what the caller is describing.

5. GIS Based Address Validation

The fifth project of the AVL development plan is to replace CAD's underlying address validation system that supports the locations user interface on the MFC Operations floor and any geo-location requesting process that supports CAD. CAD's autonomously built tabular dataset will be replaced by a citywide common dataset managed by MIS. This change will reduce the cost of maintaining multiple datasets as well as move all systems, including the field deployments, to an ESRI-compatible common coordinate system that will improve house point accuracy and emergency response times.

The current CAD uses a tabular street level table as the primary database to determine location. Once a location is entered into the CAD, the system does a lookup on the address and name or the street intersection and returns a validated location. In addition, the CAD system uses the tabular location to determine the Dispatch Point or Z Point, the fire grid

response area, the assign codes for that location, mutual aid comments, and general comments. The CAD then uses this information to determine the distance from the Dispatch Point to the fire stations and to determine what units to recommend based upon the location, incident type, assign code, and degraded mode.

6. AVL Based Emergency Vehicle Dispatching

The sixth and final project of the AVL development plan is to completely replace CAD's resource assignment algorithms. One immediate result will be the significant reduction in emergency response times. Closest available resources will be selected using street driving time in sharp contrast to current CAD operations which utilize only station assignments to make recommendations. Utilizing real-time resource positions will decrease the need to overcompensate with additional resources for certain types of calls such as those requiring the closest paramedic often resulting in an assessment light force or engine being added in addition to a paramedic ambulance. ADASHI's resource recommendation algorithms will be used to efficiently choose and automatically dispatch resources based on criteria currently employed by the CAD system but extensible to handle future requirements.

The resource recommendation algorithms utilize a visual rules engine that is configurable with a graphical drag-and-drop interface. Within this graphical interface the user can set up conditions that relate to the incident type, geographic areas, weather, date/time calendar ranges (events), or user operating modes. Sophisticated resource recommendation rules can be established and modified quickly without programming, thus permitting algorithmic changes to be performed in minutes rather than days and weeks. This rapid algorithm modification cycle engenders a superior dispatch process and promotes the optimal selection of vehicles sent for each incident type.

FISCAL IMPACT

The total budget for the AVL project is $2,348,283. The budget covers computer hardware and software, training, installations and integration services. Expenditures to date total $804,833. During the month of January we anticipate spending $198,000 for server hardware and software leaving a balance of $1,345,450.

CONCLUSION

In conclusion, Metro Fire Communications is confident that the AVL project will be completed on time and within budget. With the continued support and efforts of ITA and the department MIS staff, this project will have a significant impact on the overall response efforts of the Los Angeles Fire Department.

Board Report prepared by Assistant Chief Trevor Richmond and
Captain Xenophon A. Gikas Jr., Metro Fire Communications.

Attachment
AVL Project Timeline

AVL Project Timeline