ORIGINAL

AGREEMENT FOR SERVICES #778-S0711

THIS AGREEMENT made and entered by and between the County of El Dorado, a political subdivision of the State of California (hereinafter referred to as "County") and Location Technologies, Inc., a Missouri Corporation, duly qualified to conduct business in the State of California, whose principal place of business is 5207 NW Crooked Road, Kansas City, MO, 64152, (hereinafter referred to as "Contractor");

W I T N E S S E T H

WHEREAS, County has determined that it is necessary to obtain a Contractor to provide a global positioning based fleet management system for the Sheriff's Office; and

WHEREAS, Contractor has represented to County that it is specially trained, experienced, expert and competent to perform the special services required hereunder and County has determined to rely upon such representations; and

WHEREAS, it is the intent of the parties hereto that such services be in conformity with all applicable federal, state and local laws; and

WHEREAS, County has determined that the provision of these services provided by Contractor is in the public's best interest, and that these services are more economically and feasibly performed by outside independent Contractors as well as authorized by El Dorado County Charter, Section 210 (b) (6) and/or Government Code 31000;

NOW, THEREFORE, County and Contractor mutually agree as follows:

ARTICLE I

Scope of Services: Contractor agrees to furnish the personnel, equipment, and services necessary to provide a global positioning based fleet management system for the Sheriff's Office. Services shall be in accordance with Exhibit "A', marked "System Proposal", incorporated herein and made part by reference hereof.

ARTICLE II

Term: This Agreement shall become effective upon final execution by both parties hereto and shall expire three (3) years from the date thereof.

ARTICLE III

Compensation for Services: For services provided herein, County agrees to pay Contractor monthly in arrears and within thirty (30) days following the County's receipt and approval of itemized invoice(s) identifying services rendered. For the purposes of this Agreement, the billing rate shall be in accordance with Exhibit "A". The total amount of this Agreement shall not exceed $172,478.38.

ARTILCE IV

Confidentiality of Data: All data and information relative to the County operations, which is designated confidential by the County and made available to the Contractor in order to carry out this Agreement shall be protected by the Contractor from unauthorized use and disclosure.

Permission, granted by the County, to disclose information on one occasion or at public hearing held by the County relating to the Agreement shall not authorize the Contractor to further disclose such information or disseminate the same on any other occasions.

The Contractor shall not comment publicly to the press or any media regarding this Agreement or the County's actions on the same, except to the County's staff, Contractor's own personnel involved in the performance of this Agreement, at public hearings or in response to questions from the Board of Supervisors.

The Contractor shall not issue any news release or public relations item of any nature whatsoever regarding services performed or to be performed under this Agreement without prior review of the contents thereof by the County and receipt of the County's written permission.

ARTICLE V

Changes to Agreement: This Agreement may be amended by mutual consent of the parties hereto. Said amendments shall become effective only when in writing and fully executed by duly authorized officers of the parties hereto.

ARTICLE VI

Contractor to County: It is understood that the services provided under this Agreement shall be prepared in and with cooperation from County and its staff. It is further agreed that in all matters pertaining to this Agreement, Contractor shall act as Contractor only to County and shall not act as Contractor to any other individual or entity affected by this Agreement nor provide information in any manner to any party outside of this Agreement that would conflict with Contractor's responsibilities to County during term hereof.

ARTICLE VII

Assignment and Delegation: Contractor is engaged by County for its unique qualifications and skills as well as those of its personnel. Contractor shall not subcontract, delegate or assign services to be provided, in whole or in part, to any other person or entity without prior written consent of County.

ARTICLE VIII

Independent Contractor/Liability: Contractor is, and shall be at all times, deemed independent and shall be wholly responsible for the manner in which it performs services required by terms of this Agreement. Contractor exclusively assumes responsibility for acts of its employees, associates, and subcontractors, if any are authorized herein, as they relate to services to be provided under this Agreement during the course and scope of their employment.

Contractor shall be responsible for performing the work under this Agreement in a safe, professional, skillful and workmanlike manner and shall be liable for its own negligence and negligent acts of its employees. County shall have no right of control over the manner in which work is to be done and shall, therefore, not be charged with responsibility of preventing risk to Contractor or its employees.

ARTICLE IX

Fiscal Considerations: The parties to this Agreement recognize and acknowledge that County is a political subdivision of the State of California. As such, El Dorado County is subject to the provisions of Article XVI, Section 18 of the California Constitution and other similar fiscal and procurement laws and regulations and may not expend funds for products, equipment or services not budgeted in a given fiscal year. It is further understood that in the normal course of County business, County will adopt a proposed budget prior to a given fiscal year, but that the final adoption of a budget does not occur until after the beginning of the fiscal year.

Notwithstanding any other provision of this Agreement to the contrary, County shall give notice of cancellation of this Agreement in the event of adoption of a proposed budget that does not provide for funds for the services, products or equipment subject herein. Such notice shall become effective upon the adoption of a final budget which does not provide funding for this Agreement. Upon the effective date of such notice, this Agreement shall be automatically terminated and County released from any further liability hereunder.

In addition to the above, should the Board of Supervisors during the course of a given year for financial reasons reduce, or order a reduction, in the budget for any County department for which services were contracted to be performed, pursuant to this paragraph in the sole discretion of the County, this Agreement may be deemed to be canceled in its entirety subject to payment for services performed prior to cancellation.

ARTICLE X
Default, Termination, and Cancellation:

A. Default: Upon the occurrence of any default of the provisions of this Agreement, a party shall give written notice of said default to the party in default (notice). If the party in default does not cure the default within ten (10) days of the date of notice (time to cure), then such party shall be in default. The time to cure may be extended at the discretion of the party giving notice. Any extension of time to cure must be in writing, prepared by the party in default for signature by the party giving notice and must specify the reason(s) for the extension and the date on which the extension of time to cure expires.

Notice given under this section shall specify the alleged default and the applicable Agreement provision and shall demand that the party in default perform the provisions of this Agreement within the applicable period of time. No such notice shall be deemed a termination of this Agreement unless the party giving notice so elects in this notice, or the party giving notice so elects in a subsequent written notice after the time to cure has expired. In the event of termination for default, County reserves the right to take over and complete the work by contract or by any other means.

B. Bankruptcy: This Agreement, at the option of the County, shall be terminable in the case of bankruptcy, voluntary or involuntary, or insolvency of Contractor.

C. Ceasing Performance: County may terminate this Agreement in the event Contractor ceases to operate as a business, or otherwise becomes unable to substantially perform any term or condition of this Agreement.

D. Termination or Cancellation without Cause: County may terminate this Agreement in whole or in part upon seven (7) calendar days written notice by County without cause. If such prior termination is effected, County will pay for satisfactory services rendered prior to the effective dates as set forth in the Notice of Termination provided to Contractor, and for such other services, which County may agree to in writing as necessary for contract resolution. In no event, however, shall County be obligated to pay more than the total amount of the contract. Upon receipt of a Notice of Termination, Contractor shall promptly discontinue all services affected, as of the effective date of termination set forth in such Notice of Termination, unless the notice directs otherwise.

ARTICLE XI

Notice to Parties: All notices to be given by the parties hereto shall be in writing and served by depositing same in the United States Post Office, postage prepaid and return receipt requested.

Notices to County shall be addressed as follows:

COUNTY OF EL DORADO
SHERIFF'S OFFICE
300 FAIR LANE
PLACERVILLE, CA 95667
ATTN: MARY PIERCE, FISCAL ADMINISTRATION MANAGER

or to such other location as the County directs.

Notices to Contractor shall be addressed as follows:

LOCATION TECHNOLOGIES, INC
5207 NW CROOKED ROAD
KANSAS CITY, MO 64152
ATTN: ERIC COWGER, PRINCIPLE

or to such other location as the Contractor directs.

ARTICLE XI

Indemnity: Contractor agrees to indemnify, defend and save harmless County, its officers, agents and employees, from all claims and losses whatsoever, including attorney's fees occurring or resulting to any and all persons, and from any and all claims and losses resulting to any person, firm, or corporation for damages, injury, or death directly arising out of, or connected with Contractor's performance of this Agreement.

County agrees to indemnify, defend and save harmless Contractor, its officers, agents, and employees from all claims and losses whatsoever, including attorney's fees occurring or resulting to any and all persons, and from any and all claims and losses resulting to any person, firm or corporation for damages, injury, or death directly arising out of, or connected with County's performance of this Agreement.

ARTICLE XII

Insurance: Contractor shall provide proof of a policy of insurance satisfactory to the El Dorado County Risk Manager and documentation evidencing that Contractor maintains insurance that meets the following requirements:

A. Full Workers' Compensation and Employers' Liability Insurance covering all employees of Contractor as required by law in the State of California.

B. Commercial General Liability Insurance of not less than $1,000,000.00 combined single limit per occurrence for bodily injury and property damage.

C. Automobile Liability Insurance of not less than $1,000,000.00 is required in the event motor vehicles are used by the Contractor in the performance of the Agreement.

D. In the event Contractor is a licensed professional, and is performing professional services under this Agreement, professional liability (for example, malpractice insurance) is required with a limit of liability of not less than $1,000,000.00 per occurrence.

E. Contractor shall furnish a certificate of insurance satisfactory to the El Dorado County Risk Manager as evidence that the insurance required above is being maintained.

F. The insurance will be issued by an insurance company acceptable to Risk Management, or be provided through partial or total self-insurance likewise acceptable to Risk Management.

G. Contractor agrees that the insurance required above shall be in effect at all times during the term of this Agreement. In the event said insurance coverage expires at any time or times during the term of this Agreement, Contractor agrees to provide at least thirty (30) days prior to said expiration date, a new certificate of insurance evidencing insurance coverage as provided for herein for not less than the remainder of the term of the Agreement, or for a period of not less than one (1) year. New certificates of insurance are subject to the approval of Risk Management and Contractor agrees that no work or services shall be performed prior to the giving of such approval. In the event the Contractor fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Agreement upon the occurrence of such event.

H. The certificate of insurance must include the following provisions stating that:

1. The insurer will not cancel the insured's coverage without thirty (30) days prior written notice to County, and;

2. The County of El Dorado, its officers, officials, employees, and volunteers are included as additional insured, but only insofar as the operations under this Agreement are concerned. This provision shall apply to the general liability policy.

I. The Contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

J. Any deductibles or self-insured retentions must be declared to and approved by the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees, and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

K. Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

L. The insurance companies shall have no recourse against the County of El Dorado, its officers and employees or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

M. Contractor's obligations shall not be limited by the foregoing insurance requirements and shall survive expiration of this Agreement.

N. In the event Contractor cannot provide an occurrence policy, Contractor shall provide insurance covering claims made as a result of performance of this Agreement for not less than three (3) years following completion of performance of this Agreement.

O. Certificate of insurance shall meet such additional standards as may be determined by the contracting County Department either independently or in consultation with Risk Management, as essential for the protection of the County.

ARTICLE XIII

Interest of Public Official: No official or employee of County who exercises any functions or responsibilities in review or approval of services to be provided by Contractor under this Agreement shall participate in or attempt to influence any decision relating to this Agreement which affects personal interest or interest of any corporation, partnership, or association in which he/she is directly or indirectly interested; nor shall any such official or employee of County have any interest, direct or indirect, in this Agreement or the proceeds thereof.

ARTICLE XIV

Interest of Contractor: Contractor covenants that Contractor presently has no personal interest or financial interest, and shall not acquire same in any manner or degree in either: 1) any other contract connected with or directly affected by the services to be performed by this Agreement; or, 2) any other entities connected with or directly affected by the services to be performed by this Agreement. Contractor further covenants that in the performance of this Agreement no person having any such interest shall be employed by Contractor.

ARTICLE XV

California Residency (Form 590): All independent Contractors providing services to the County must file a State of California Form 590, certifying their California residency or, in the case of a corporation, certifying that they have a permanent place of business in California. The Contractor will be required to submit a Form 590 prior to execution of an Agreement or County shall withhold seven (7) percent of each payment made to the Contractor during term of the Agreement. This requirement applies to any agreement/contract exceeding $1,500.00.

ARTICLE XVI

Taxpayer Identification Number (Form W-9): All independent Contractors or corporations providing services to the County must file a Department of the Treasury Internal Revenue Service Form W-9, certifying their Taxpayer Identification Number.

ARTICLE XVII

County Business License: It is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Code Section 5.08.070.

ARTICLE XVIII

Administrator: The County Officer or employee with responsibility for administering this Agreement is Phil Dold, Information Technologies Manager, Sheriff's Office, or successor.

ARTICLE XIX

Authorized Signatures: The parties to this Agreement represent that the undersigned individuals executing this Agreement on their respective behalf are fully authorized to do so by law or other appropriate instrument and to bind upon said parties to the obligations set forth herein.

ARTICLE XX

Partial Invalidity: If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

ARTICLE XXI

Venue: Any dispute resolution action arising out of this Agreement, including, but not limited to, litigation, mediation, or arbitration, shall be brought in El Dorado County, California, and shall be resolved in accordance with the laws of the State of California.

ARTICLE XXII

Entire Agreement: This document and the documents referred to herein or exhibits hereto are the entire Agreement between the parties and they incorporate or supersede all prior written or oral Agreements or understandings.

REQUESTING CONTRACT ADMINISTRATOR CONCURRENCE:

By: _____ Dated: 10/23/07

Phil Dold
Information Technologies Manager
Sheriff's Office

REQUESTING DEPARTMENT HEAD CONCURRENCE:

By: _____ Dated: 10-29-07

Jeff Neves
Sheriff

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the dates indicated below, the latest of which shall be deemed to be the effective date of this Agreement.

--COUNTY OF EL DORADO--

Dated: _____

By: _____
Chair
Board of Supervisors
"County"

ATTEST: Cindy Keck, Clerk
Of the Board of Supervisors

By:_____Dated:_____
Deputy Clerk

--CONTRACTOR--

Dated: _____

LOCATION TECHNOLOGIES, INC.
A MISSOURI CORPORATION

By: _____
Eric Cowger
President
"Contractor"

By: _____
Corporate Secretary

Dated: _____

Exhibit "A"
System Proposal

County of El Dorado, CA
Sheriff's Department

GPS Based Fleet Management System

Submitted By

Location Technologies, Inc.

Table of Contents

Proposer's Capabilities

1. System Overview and Company Background

Location Technologies is proposing a radio based fleet management program utilizing our LT line of GPS Radio Modems. Each vehicle will be installed with an LT GPS Radio Modem attached to the customer supplied Mobile Radio. This will enable each vehicle to send position update messages, at a period of time determined by the limitations of the radio network, to the base station.

The system will utilize the customer supplied GE Master 3 base stations. There will be an LT Base/Repeat Modem at all repeater sites to handle the repeated position messages.

The base station will be comprised of an LT Base Modem connected to a GE Master 3 base station radio. The LT Base Modem will be attached to a designated AVL Server Computer on the El Dorado County Sheriff's Network via a supplied RS232 Cable or data network depending on the availability of a data circuit at the repeater site. The AVL Server Software will time tag and log the incoming data packets and distribute them to Map Software clients on workstations throughout the county LAN.

Automatic Vehicle Location Systems based on the GPS satellite constellation (GPS/AVL) provide fleet managers with unprecedented levels of managerial control and security over the vehicles in their care. All GPS/AVL systems, regardless of the vendor, are comprised of three elements, the mobile equipment (in each vehicle), the communication channel, and the fixed-end (e.g. dispatch center). Variations in the functionality, performance, and cost of these three areas are what discriminates one vendor's AVL system from another. The system offered in this proposal incorporates state of the art GPS, signal processing, and wireless communications equipment and software from Location Technologies, Inc. (LTI).

Location Technologies, Inc. (LTI) has provided Fleet Management hardware, software, and systems since 1992. We are proud to have installed the first county-wide AVL system in the Midwest at Coffee County, KS before the GPS satellite constellation was complete.

Our GPS and Wireless Data products include our LT4 and LT5 GPS based vehicle tracking systems, LT5R Radio Modem Line, LT-Status head for simple push button status updates, the Navigo(c) MDT9000 Graphic Display Terminal, a line of low cost high accuracy GPS products, and a family of remote data collection and monitoring equipment and software. Our flagship is the LT5 family of data radio products featuring over the air data rates up to 19.2 kbps, with optional interfaces to cellular, GPRS, CDPD, PCS, and satellite data communications. We also provide specialized GPS products based on our high accuracy Real Time Kinematic (RTK) system.

Our Fleet Management Products include Equipment Management and Tracking Systems, Public Works Management Software, RFID tags, Telecommunication Company Operations Systems.

We have successfully implemented systems in a wide range of industries including positive train control systems, precision agriculture, ground based NAVAIDS, real estate, heavy construction, transportation, public works, utilities, telecommunications, and numerous public safety projects.

1. a. Data Network Operation and System Overview

A new position calculation is performed once each second in the vehicle. On the time slot assigned to a given vehicle the LT Modem will broadcast the current position along with velocity, heading, and status of any monitored digital and analog inputs. Emergency inputs, status head inputs, and text message inputs are sent immediately on detection of a clear radio channel without regard to time slotting. Time slot assignments and update rates may be modified by the emergency mode input, by the vehicle slowing to a stop, or by command from the dispatch center. Please refer to the Mobile Equipment and Software Section for a more detailed description of the operation of this software.

Radio packets are sent to the existing data repeater where they are received and decoded by our Base/Repeat Modem. If the repeater site has a separate data circuit then we will strip the data and send it via the supplied data circuit. Otherwise a control station and base modem is used. Please see the two system diagrams for comparison of the two approaches. Since radio traffic is broadcast by nature any receiver located within the coverage area may receive the signal without penalty to other receivers in the area. Of course an LTModem is also required to correctly decode and receive the transmitted data packet. A control station is essentially a mobile two-way radio with connected LT Base Modem all powered by a 12 vdc power supply. In the proposed system we are placing control stations at the El Dorado County Sheriff's Department for each repeater without a data circuit. The output of the LT Base Modem is serial RS-232 data connected to the PC running the LTConsole Server software via its serial port. This PC is designated as the AVL Server.

Incoming messages are received by the LT AVL Server and are time tagged and logged before being rebroadcast on the local area network for display in the Navigo LTMap6 Map Console Program. The AVL Server also tracks which repeater the vehicle is communicating on to route any outbound traffic correctly. Once data is received by the Map Console, each position message is used to update the position of the appropriate vehicle symbol. If the message also contains status information the shape and/or color of the symbol may also be changed.

The Map Console software is initialized by sending a startup message to the AVL Server program on power up. The Server will respond with an update message that is used by the Map to initialize the vehicle symbols to their current position. Although the Map Console programs may be ran on demand, it is important that the Console Server Program be allowed to run without interruption.

Lead-Time and General Information

In general, there is a four-week lead-time to shipment and installation ARO for hardware.

On the quotation we have priced one primary copy and five additional copies of our Map Software. This number may change according to the number of map stations you require.

2. Functional Specification Form:

	Must provide a generic radio interface that will allow for connection to most commercially available two-way radios and operate over all topologies.		C	
	Must operate over conventional simplex audio radio system.		C	
	Provide a Mute output that is adjustable in polarity and duration.		C	
	Provide full functional compatibility with GE Master 3 base station radios.		C	
	Provide a channel steering output that is adjustable in polarity and duration.		C	
	Provide full user adjustment for audio levels and radio control I/O.		C	
	Provide 8 or more digital (Switch Closure) Inputs		C	
	Provide 6 analog inputs		C	
	Provide 4 remote controlled outputs.		C	
	Physical cable connections must be compatible with the Motorola MW800 computer		C	
	Physical cable connections and functionality must be compatible with the Motorola CM200 VHF mobile radio.		C	
	Must be functional on 12 volt +/- 3 volt vehicle power system		C	
	Must be able to operate between 0-140 F and have safeguards against system damage if temperature ranges is exceeded		C	
	Must be sealed from environmental dust and suitable for operations in vehicle trunk.		C	
	Mounting and cable connections are secure for reliable		C	

	operations			
	Compatible with external trunk mounted GPS antenna with standard cable connection. GPS antenna may be shared with other application such as mobile video systems.		C	
	Internal 12 channel GPS		C	
	Vendor offers a high speed data option >4800kb		C	
	Modem will automatically negotiate baud rate based on signal to noise ratio		C	
AVL modem specifications: SW				
	Provide for a variety of output message formats containing combinations of position, velocity, heading, digital inputs status, analog inputs, or delta position information.		C	
	Must have user programmable for position updates using the following schemes, timed, polled, on driver command, on status change, on distance traveled, on Geofence activity, on speed.		C	
	Allow for the internal storage of a minimum of 6 geofence positions. An arrival and departure message should be generated automatically on each event.		C	
	Provide for message time-slotting down at sub-second intervals (70 msec or less).		C	
	Message time slotting should be user programmable.		C	
	Provide a means for drastically reducing vehicle position outputs when they are stationary or increasing them during emergency operations		C	
	Detect when unit is out of radio range and store_____ position locations automatically.		C	
	Automatically detect wireless TCP/IP network (GPRS,GSM, EDGE, ethernet) on the MDC and		C	

	transmit stored positions to the server via GPRS on the MDC to avoid flooding normal low speed radio network.			
	Must have tamper detection codes automatically transmitted. (Alerts such as GPS antenna short, disconnect, poor coverage)		C	
	Interface with MDC network and radio network dynamically		C	
	Downloadable firmware upgrades		C	
	Provide windows based modem configuration software with access to all radio control parameters.		C	
	Error detection and correction		C	
Digital Repeater, Base Station Specifications				
	Preferred 12 volt operation		C	
	Must work with GE Master 3		C	
	Operate between 150-20 degrees F		C	
	Must run on Windows XP		C	
	Must run well with 256MB of ram		C	
	Must provide documented API for Microsoft programming environment. Including those necessary to import address points from text file on the MDC generated by Mobile CAD		C	
	User interface must be intuitive and can be effectively utilized on an MDC including touch screen features.		C	
	Use the Client Server computing model and be able to communicate over TCP/IP network as well as radio based system.		C	
	Historic AVL data automatically archived without user intervention.		C	
	Map Software must be capable of using GIS data from all major suppliers in its native format and projection without		C	

	translation.			
	Modem commands such as poll, message, output on, or shut down should be integrated with-in the mobile software		C	
	Provide ability for user selected points of interest and the ability to share those between other mobile stations and server		C	
	Zoom and Pan control		C	
	View vehicle track forward and backward controls		C	
	Find vehicle locating map center on vehicle		C	
	Follow vehicle keeping map center on vehicle		C	
	Track (Breadcrumb) vehicle movement		C	
	Vehicle symbols should be fully user adaptable and shall have the ability to change color or shape based on control inputs or operating mode		C	
	The software should be access protected via user name and password.		C	
	Software shall allow vehicles to be configured with a "class" or group that dictates its visibility to other tracked classes of vehicles. This configuration option shall be controlled by password		C	
	The map software must have point-to-point routing.		C	
	Full data replay and reports of the archived data must be available and integrated into the map software.		C	
	Minimum built-in reports should be General Activity, Activity at an Address, Time and/or distance in a region, speed report, Idle or stop time report, digital or analog input report.		C	
	Additional reports can be created by minimally trained administrators.		C	

	Reports should be selectable for individual or groups of vehicles		C	
	The software must have the capability of reverse geocoding GPS supplied Lat/Longs to approximate addresses		C	
	All map layer display parameters including zoom layering, labeling, and color and size must be user configurable and storable in a project file so that these settings are applied each time the map powers up.		C	
	Map must be able to accept and display user defined GIS shape files such as Zone boundary maps as a layer on the regularly displayed map.		C	
	The map must be capable of automatically plotting E911 calls including Phase 1 and Phase 2 Cellular Phone Calls.		C	
	Shall be able to highlight user selected point of interest while laying out track and guide vehicle back to that point.		C	
	AVL Server Software must be capable of sending live data packets over any tcp/ip LAN or WAN configuration		C	
	Server software must be able to accept data off the radio network via tcp/ip or serial port.		C	
	Server must track the last known positions for each vehicle and route outbound data accordingly		C	
	Server shall implement a voting system using actual radio positions to determine the correct packet to accept in cases where identical p-ackets are received through overlapping base stations.		C	
	Packet routing should be transparent to the map software or connected third party systems.		C	
	Server software should provide for automatic rate and slot allocations to maximize the use of radio bandwidth based on the actual number of vehicles operating on the network at any given time.		C	
	Facilitate basic messaging between client workstations including MDCs		C	

	Shall include documented APIs for import and export of data to third party systems like CAD or Mappoint.		C	

3. VEHICLE HARDWARE

The cornerstone of LTI's line up of mobile equipment is the LT AVL Modem. The LT is comprised of a microprocessor-controlled device with an integrated 20 channel GPS receiver, and communication channel controller. The LT comes standard with a built-in radio modem and generic radio interface. When equipped with the appropriate communication module the LT can work over a variety of different medium including GPRS, CDMA, GSM, CDPD, cellular control channel, and satellite based systems.

Since the El Dorado County Sheriff's Department radio network is comprised of a conventional repeated radio network we are proposing a system based on radio modems utilizing our generic radio interface integrated into the LT. The overall system diagram is shown on figure 1 and 2. Please refer to the figures throughout this discussion.

Each vehicle that contains a mobile radio will utilize an LT AVL Radio Modem device. The LT connects to the radio via a supplied interface cable. The proposed GPS antenna is a weather-sealed trunk lip mount antenna and must be mounted on the exterior of the vehicle with an unobstructed view of the sky. The radio antenna may be mounted as required for the particular vehicle.

The LT is capable of monitoring and reporting a variety of analog and digital inputs. There are also up to two analog outputs available for remote control. This generic I/O capability is fully software configurable. Although there are no specific monitor requirements for this project, examples might include door lock control, ignition circuit defeat, light and emergency switch monitor, temperature, shock, and humidity.

The LT also hosts an RS-232 port for connection to external peripherals such as laptop computers, text messaging terminals, and simple push button status heads. LTI offers laptop software for mobile data messaging, mobile mapping, and remote database operation, the Navigo© MDT900 Mobile Data Terminal, and the LTStatII Status Head.

The integrated 20 channel GPS receiver provides once per second vehicle positions with quick time to first fix and excellent performance in areas of limited satellite coverage. A variety of position reporting protocols and update schemes are available and are discussed more completely in the next section of the proposal. .

As mentioned earlier, LTI is proposing the use of radio modems for this project. The obvious benefit of the integrated radio based system is the minimization and elimination of any recurring operational costs such that are incurred with cellular or satellite based systems.

Using our generic radio interface, the LT is able to interface to virtually any two-way radio available today. The same interface is used for connection to Base Radios and Repeaters. All radio I/O signals are software configurable including all system timing parameters. This allows the LT to be used over any VHF/UHF/800Mhz/900Mhz system in either conventional or trunked modes. Once a modem is configured correctly for the specific radio and network the configuration may be 'cloned' across the remaining modems. At any point in the communication chain the data may be bridged to traditional data networks for distribution over LAN or WAN's.

When integrating new systems over existing infrastructure, experience counts. LTI has decades of experience in wireless data communication. LTI engineers and technicians have integrated our systems into a wide variety of radio equipment types and network topologies.

Update Schemes

Several additional position message update schemes are available as alternatives to the fixed time slot scheme. Each method is described below.

Push to Talk Mode: In this scheme the LT continually monitors the radio PTT line. After each PTT event the LT holds open the channel and sends a small data burst containing the vehicle position and ID. This is the least obtrusive method for sending data on shared voice and data systems where the LT modem radio is also used for voice traffic.

On Distance Traveled: In this mode the modem will only queue a position message for broadcast after the vehicle has traversed a preset distance.

Polled Mode: In Poll mode the LT will only output a position message in response to a poll message sent from the Fixed-end. Poll messages may be sent manually or automatically.

Velocity Mode: This mode is used in conjunction with the standard fixed time slot mode and causes the LT5 to skip update slots if the vehicle is stationary.

Command Mode: Either a momentary switch or a button on the LTStat2 Status Head may be configured to causes the LT to transmit a current position message each time the button is depressed.

Each of these modes may be combined with others. New positions are available once per second from the GPS receiver. The controller also logs the past several hundred

positions in a rotating buffer and are available in the event the vehicle traveling in and out of communication coverage or on command.

Several standard output message types are available and may contain any combination of the following basic information types: position, velocity, heading, vehicle ID, Received-on Channel, digital input states, analog input measurements. For more information on the individual message types please see the LTI Modem Message Format document.

Our open message standard allows third party software to utilize data from any LTI data network.

Hardware Specifications:
LT GPS Radio Modem Specifications:

HW Size: 5.5" x 6" x 1.5"
Mounting Options: Under dash/seat or trunk mount.
Power requirements: 300mA @ 9-16Vdc.
Antenna Requirements: Trunk or roof mount GPS antenna typically 2"x 2" x .5" shipped with either BNC or SMA connector and 15 Ft cable.
Communication Interface: Generic mobile radio interface (Trunked or Conventional),
Push to Talk: Active high or low, 0 to 10 V input range.
Channel Active: Active high or low, 0 to 10 V input range.
Audio In: Discriminator audio at minimum level for detection – 75 mV peak to peak.
Audio Out: Output Range 0 – 5 V peak to peak.
Channel Grant: Active high or low, 0 to 10 V input range.
6 Generic Analog Input: Measurement range or 0 to 10 V. Resolution of 40 mV. Sampling rate of 1 second.
8 Generic Digital Input: Active high or low. Standard logic levels. Sampling rate of 1 second.
8 Digital Output: 8 Open Collector outputs. Sink max of 100 mA.
2 Generic RS232 I/O: Standard RS232 levels, Rx, Tx, Ground only.
High Speed Option Radio Requirements: Typical - Audio Band Pass 5hz – 5khz flat to +/- 2db.
GPS: Internal 20 channel GPS receiver.

- Auto-status with position, at-departure and arrival-at-point, or region capabilities. Position output on activation of designated digital input.
- Fast time to first fix option. (Within 30 seconds of unit power on).

Mobile Data Option Buffer Size: 32 KByte split between input and output.

- Operates on Conventional UHF 155 MHz Channels

4. REPEATER HARDWARE

Repeater Data Modem

LT Base Station Radio Data Modem Specifications:

Size: 5.5" x 6" x 1.5"
Communication Interface: Same as Mobile with added WAN TCP/IP port.
Power requirements: 150mA@ 9-16Vdc.
Radio Modem Base Unit: Same as Mobile Unit without GPS features.

- Operates on Conventional or trunked systems

5. BASE STATION HARDWARE

The Radio Data Modem is the data interface between the Base Radio and the Designated AVL Server.

LT Base Station Radio Data Modem Specifications:

Size: 5.5" x 6" x 1.5"
Communication Interface: Same as Mobile with added WAN TCP/IP port.
Power requirements: 150mA@ 9-16Vdc.
Radio Modem Base Unit: Same as Mobile Unit without GPS features.

6. BASE STATION SOFTWARE

In the proposed system data on the radio network is typically received at the Base Station through a radio control station. This is nothing more then a two-way radio mounted to a 12-volt power supply. Data may also be sent via traditional data modems connected to remote base or repeater sites in cases where a dedicated wire line between the fixed-end and radio site exists. The data is received via an RS-232 connection between the LT5 Base Modem and the designated AVL Server.

The server side software that we are proposing is our LT AVL Server Software. The Client Side Mapping Software that we are proposing is our Navigo(c) LTMap 6 Software.

AVL Server Software

The AVL Server Software time tags and logs all incoming data packets and routes them to the appropriate location. For example all position related messages are routed to the map display. The log database generated by the Console Server is continually monitored for size and is automatically archived and replaced after it exceeds a pre-set size limit. The received channel of all data packets are recorded for each vehicle. This allows the AVL Server to route outbound messages to the correct repeater.

Navigo LTMap6 Map Console

Our Navigo LTMap6 Map Console provides all of the standard map features one would expect from a desktop mapping program including map display control tools (zoom, pan, etc.) along with vehicle display and reporting functionality.

The total quantity of required Operator and Supervisor Vehicle Workstation Software Licenses is five (5). The Operator's Workstation Software shall provide the following capabilities:

All position related messages are routed to the map display. The log database generated by the Map Software is continually monitored for size and is automatically archived and replaced after it exceeds a pre-set size limit.

Map Data/Software Specifications:

- We will use existing El Dorado CO GIS Data in native format and project GPS data on a vehicle position layer.
- Other map data may be included.

Reporting Options

The Navigo(c) LTMap6 Client Side Software provides many Built-in reporting options. Custom reports are available as part of the 1 year warranty and service agreement.

Built-in reports include but are not limited to the following:

Time and Distance Traveled in Region Report: This report will calculate the total time spent and distance traveled within in the specified region. If for example the user selects State as the region type then the program will compute the time and distance the a vehicle has traveled in each state the vehicle has entered for the specified time period.

General Activity Report: This option will report all activity for the selected vehicle over the specified time period.

Activity at an Address Report: This report will calculate and display the amount of time a given vehicle spends within a specified radius of the entered address. For example the user could find how long a specific unit spent within 0.25 miles of 100 Main St two days ago.

Time Between Status Changes: This report option will calculate and display the time between successive status changes over the specified time period for fleets.

Error or Fault Messages Report: Reports all fault messages received over the specified time period.

Excessive Speed Report: Reports all occurrences of exceeding the given speed. This is shown for each position update.

Distance Traveled Report: This report will calculate the total distance traveled over the specified time period.

Qualifications of Staff

LTI is organized in a traditional functional matrix fashion where individual project and product managers may pull on resources from the functional groups.

As the El Dorado Co Project will require minimal engineering and utilize off-the-shelf hardware our normal order processing procedures as described in the next section will apply.

The primary staff for the El Dorado Co project and their estimated percentage of time required over the duration of the project are Project Manager: Eric Cowger (15%) and Project Engineer: Glenn Courtney (10%). Resumes for project staff and key LTI personnel are given below.

Our organization is staffed as follows.

President: Eric Cowger

Engineering: 5 Full time Engineer, 1 Part time Engineer

Software/Firmware: 3 Full time Software Engineer, 1 Part time Software Engineer

Production/Support: 1 Full time Production Engineer/Mgr, 2 Full time Technicians, 15 Contract/Part time production/assemblers (Circuit assembly Contract Staff)

Marketing/Sales/Dealer Management: 1 Full Time

Accounting/Administration: 1 Full time, 1 Part time

Eric Cowger
President

Mr. Cowger has over 20 years of experience in the electronics industry. He has served in a variety of management and lead technical positions at several companies. These include Vice President of Engineering for Information Technologies, Inc., Design Engineering Manager at Thomson-Wilcox (now Thales), and senior engineer at Rockwell Collins Avionics.

Education: BS Electrical Engineering, Kansas State University,1984
MS Electrical Engineering, University of Iowa, 1986

Glenn Courtney
Principal Engineer

Mr. Courtney has over 25 years of varied experience in the navigation and radio communications industry. He has served on numerous national standards committees and is recognized nationally as an expert in the field of navigation. Mr. Courtney has been involved in the successful design and implementation of several large-scale data communication systems in a variety of industries including Rail, Public Safety, Construction, Avionics, ground based Nav-Aids, and Fleet Management.

Education: Electrical Engineering, University of Missouri, 1981

Adam Koontz
Production Manager

Mr. Koontz is in charge of Production and Technical Services.

Education: BS Electrical Engineering, DeVry, 2002

Fern Tsukada
Lead Software and Firmware Engineer

Ms Tsukada is our lead Software Engineer. She has broad experience in the development and implementation of large database related applications, data communications applications, and embedded software.

Education: BS Computer Science, Park University, 1995
BS Electrical Engineering, California State University, Long Beach, 2000

Proposed Initial Purchase

60	LT AVL Modems or current model	$695.00	$41,700.00
7	LT AVL Modems BASE with Cable or current model	$405.00	$2,835.00
7	LT AVL Modems Base repeater or current model	$405.00	$2,835.00
7	LT BASE Ethernet adapters w/ cable	$145.00	$1,015.00
1	LT AVL Server SW	$1,470.00	$1,470.00
1	LT Mavigo Map SW Primary Copy	$1,470.00	$1,470.00
60	LT Navigo Map for MDC	$560.00	$33,600.00
40	LT navigo map for Office PC	$560.00	$22,400.00
1	Installation and training	$2,600.00	$2,600.00
5	Per year Software Maintenance and Support years 2-6	$840.00	$4,200.00
5	Per year hardward support for list above years 2-6	$2,000.00	$10,000.00

	$124,125.00
	$9,309.38
Total	$133,434.38

	Proposed Second Purchase		
15	LT AVL Modems or current model	$695.00	$10,425.00
1	LT AVL Modems BASE with Cable or current model	$405.00	$405.00
1	LT AVL Modems Base repeater or current model	$405.00	$405.00
1	LT BASE Ethernet adapters w/ cable	$145.00	$145.00
1	LT AVL Server SW	$1,470.00	$1,470.00
1	LT Mavigo Map SW Primary Copy	$1,470.00	$1,470.00
15	LT Navigo Map for MDC	$560.00	$8,400.00
15	LT navigo map for Office PC	$560.00	$8,400.00
2	Installation and training	$2,600.00	$5,200.00
		Sub total	$36,320.00
		Tax	$2,724.000
		Total	$39,044.00

Reference List

Buffalo Co Sheriff's Office
Kearney, NE
Contact: Neil Miller 308-390-2866
A large multi-agency system comprised of public safety and public works vehicles.

RACOM Corp
Phil Gould
Data Network Manager
888-752-1053
Multiple Agency AVL Customers using our equipment

Pierce County Public Works
Bruce Campbell
Road Operations Division Manager
253-798-6051
Large Metro-area County (Tacoma, Seattle)
Multiple Vehicle types

Johnson Co KS Public Works
Bob Swanson
Maintenance Supervisor
816-806-8707
Large Metro Area County (Kansas City)

Location Technologies, Inc. 12 Month Limited Warranty and Disclaimer

Limited Warranty

Location Technologies, Inc. (LTI) warrants all hardware products to be free from defective material and workmanship for a period of one (1) year from the original ship date from our factory. LTI agrees to repair or replace, at our sole discretion, a defective device that has been returned to LTI within the warranty period and has a proper RMA. Warranty service will generally be completed within 90 days.

The optional Hardware Maintenance Plan extends the included first year warranty by one year for each year purchased.

The optional Software Maintenance Plan extends the included first year technical support by one year for each year purchased. It also includes annual upgrade to the latest software version. It does not include new related software products.

If service is required under this warranty:

1. Call 816-741-3169 or email service@loctech.com to receive an RMA number. This number must be prominently displayed on the return box and on any shipping documents.

2. Send the device postage prepaid to the address listed below.

Note: All returned devices must be shipped in a static free container. This may be a static free bag within a regular cardboard box. The warranty may be immediately voided if the device is not protected from static discharge during shipping.

3. Location Technologies, Inc is not responsible for shipping damage.

This warranty does not extend to any LTI products that have been subject to misuse, neglect, accident, incorrect wiring, improper use, violation of instructions or operating parameters, damage caused by connected equipment, nor does the warranty extend to any units that have been altered or repaired by anyone other than LTI.

Limitation of Liability and Disclaimer

In no way shall LTI be liable for any loss, damage, fire, explosion, injury, including any incidental or consequential damages, or death as a result of operating and/or installing any LTI products.

For further information regarding product warranties and return procedures please contact us at -

Location Technologies, Inc
Service Dept.
5207 NW Crooked Rd
Parkville, MO 64152
1-816-741-3169
support@loctech.com

Location Technologies, Inc.

Standard Terms and Conditions

Hardware and Network Requirements:

Please note the following minimum PC hardware requirements for our Software Products. LTI products will work over Windows NT or Novell networks running TCP/IP.

PC's must be a Pentium class machine with a minimum of 400 MHz processor speed, 128 Mb (256Meg recommended) RAM, at least one open serial port and a minimum of 1 Gb free space on a fixed disk drive. The operating system should be Windows '9X, Windows 2000 or Windows NT Workstation version 4.0.

Payment Terms:

Software Purchases

Payment terms from LTI are net 30 days from date of shipment subject to credit approval. Purchases made from licensed distributors of LTI's products are subject to the distributors payment terms.

On-site Installation / Engineering / Training

Payment for services must be made net 30 days from the date of service. Expenses, including travel, lodging and meals will be billed.

Past Due Accounts

Past due accounts are subject to a surcharge of 1.5% per month. Past due services invoices will result in technical support services being suspended.

Acceptance of Products:

Opened software cannot be returned. Hardware products may not be returned except for repair. **You must request an RMA from LTI prior to returning any item** for restock or repair. A 15% restocking fee is required and no returns will be accepted after 30 days from date of shipment. Product acceptance is indicated by accepting delivery from your requested shipper unless otherwise provided for in a separate written agreement.

Training:

LTI will provide training as arranged per each individual contract. We follow a "train the trainer" format and require that all personnel receiving training have a familiarity with the Windows operating system.

Licensing:

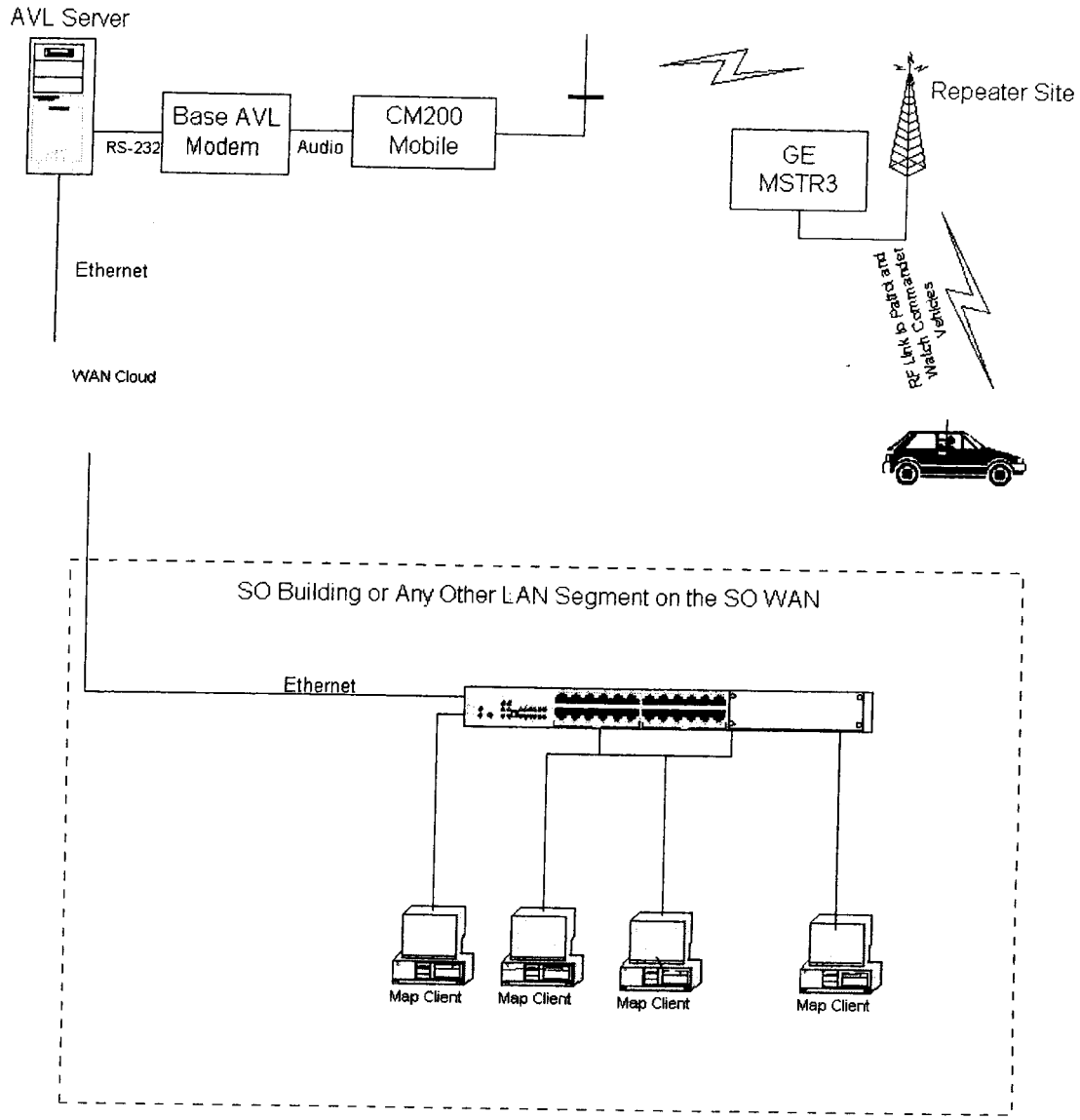
All software products are licensed for use on a single machine only unless otherwise specified by written agreement.

Our Liability:

Location Technologies, Inc. is only responsible for the repair or replacement of our hardware products under the terms of the attached warranty document. Specifically, LTI is not responsible and shall be held harmless for the consequential damage or injury of any attached or associated equipment, property, or persons which may be associated with the use of our products.

System Diagram 1

El Dorado Co, CA Sheriff's Dept AVL System



System Diagram 2

El Dorado Co, CA Sheriff's Dept System Diagram