

Proposal For

City of Rochester, NY
Navigo GPS/AVL Fleet Management System

Submitted By

Location Technologies, Inc.

8/1/2012

Parties Involved

Proposed

City of Rochester
Information Technology
Public Safety Building
185 Exchange Blvd., Suite 530
Rochester, New York 14614

Carol Schmitt
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Proposing Company

Location Technologies, Inc. (LTI)
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Kansas City, MO 64152

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To Whom it May Concern,

Location Technologies, Inc. (LTI) is pleased to provide the City of Rochester, New York with the attached response for the requested Automated Vehicle Locator (AVL) and Intelligent Transportation System (ITS) for the Department of Environmental Services Vehicle Fleet

LTI has manufactured and installed AVL and Wireless Data Systems around the world for nearly 20 years. We specialize in developing solutions for Public Works, Solid Waste, Public Safety, and Transportation. We have 100's of satisfied public sector clients across the country in addition to a number of commercial clients.

We are proposing our Navigo GPS/AVL Fleet Management Solution for this project. The equipment and software proposed herein is fully compliant with the specification of the RFP and we accept the terms and conditions listed.

LTI intends to continue our position as a leader in fleet management through a combination of participation in industry organizations, continued product improvement, and keeping abreast of current trends in all of the various technologies surrounding the industry. For example the LT6 GPS/AVL Modem is literally the 6th generation of our GPS/AVL Modem devices.

As systems integrators and experienced engineers our approach to all projects is to partner with the customer to provide the best system to meet the particular needs of a customer and not try to 'force fit' a canned solution. From start to finish you will find that we will not only be responsive to your stated requirements but will also be flexible and able to handle changes in scope and requirements.

We sincerely believe that we are offering the overall best proposal for the following reasons:

- Unparalleled experience in the industry.
- Proven, field tested equipment.
- Full support from company management for the successful completion of project.
- A modular equipment approach that offers the greatest flexibility and maintainability.
- A financially strong, stable, and debt-free company with nearly 20 years experience.
- We are a fully certified Sprint Business Partner.

In closing we would like to thank you again for the opportunity to provide a proposal for this important project and to ask you to please contact us should you require further information.

Sincerely,

Eric Cowger, President
(816) 741-3169 x110
ecowger@loctech.com

3.1 Executive Summary of Proposal

For the City of Rochester, New York we are proposing our Navigo GPS/AVL Fleet Management System. The proposed Navigo GPS/AVL Fleet Management System is a solution that provides vehicle performance data, location tracking, operations monitoring, and reporting via a user-friendly web interface. Location Technologies, Inc. is proposing and is prepared to supply all project management, installation, and implementation services necessary to deliver a working solution.

The Navigo GPS/AVL Fleet Management System is unlike other fleet management systems in that it is adaptable to many different fleet types from Snow Removal to Street Sweeping to Solid Waste Pick-Up. The flexibility of the Navigo system allows a large municipality such as Rochester to view all of their different fleet groups on one, centralized platform rather than having a different fleet management system for each of the City's departments.

The Proposed Navigo GPS/AVL Fleet Management System will provide the City with an automated real-time GPS/AVL system that is simple to operate and will reliably collect and disseminate data in a useable format based on information provided by on-vehicle sensors, monitors, and other sources (i.e., weather data, operator-generated data). This accumulated operations data can be used to plan maintenance activities and direct the maintenance vehicles to carry out their planned activities. The proposed system will give the City a holistic, department-wide view of its operations and allow it to streamline its maintenance and operations functions by using aggregated data to make informed decisions simply and efficiently.

The proposed NAVIGO GPS/AVL Fleet Management System is extremely beneficial in the management and daily operations of a statewide maintenance fleet program by providing:

- Tools to better monitor maintenance systems, including data necessary for managers and operators to make informed and timely operational decisions (e.g., understanding the necessary amount of de-icing chemicals to apply to particular stretches of road);
- Tools to better track the resources used to maintain specific roadway segments.
- Planning information to other stakeholders such as city and regional transportation agencies or metropolitan planning organizations with adjoining responsibilities;
- Useful traveler information for dissemination to the public (i.e., icy road alerts).

LTI is proposing, at the very high level, the following items:

In-Vehicle Hardware

- LT6 GPS/AVL CDMA Modem
- LT Vehicle Diagnostic Bus Interface Module
- LT Mobile Data Computer/Terminal (Optional)
- Interface assemblies for multiple vehicle types
 - Snow/Ice Control
 - Solid Waste
 - Street Sweepers/Flushers

Network Servers

- LT Wireless Data Server Software
- LT Events Engine
- .NET Web Services Platform (3rd Party Interface)

Management Software

- LT Navigo Explorer WebMap Platform
- Public Works Management Module
- Fleet Management Module
- 3rd Party Dispatch & Mgmt SW Interface Module

Field Communications

- CDMA or GPRS Wireless Data Communications

The proposed City GPS/AVL Fleet Management System will give the following functionality:

- Vehicle Tracking & Field Communications
- Work Order and Dispatch Management
- In-Vehicle Information Management
- Route Optimization and Completion %
- Maintenance Decision Making
- Inventory and Asset Management
- Data Archiving and Reports
- Web-based User Platform

In order to maximize the use of the equipment and the annual investment in communications the proposed Navigo GPS/AVL Fleet Management System will have the ability to move a device from vehicle to vehicle within the City fleet. This feature allows the same device to move from winter operations (plowing, sanding) to summer operations (mowing, weed, spraying and/or paint striping).

The GPS/AVL Fleet Management Systems offered by Location Technologies, Inc. help communities and agencies all across the United States to achieve many of their Environmental Protection Policy goals by minimizing vehicle emissions through reductions in fossil fuel use, reducing vehicle idle times, speeding, unauthorized use, and keeping vehicles in proper operating condition through automated vehicle diagnostic data reporting.

3.2 Company Background

3.2.1 Historical Summary

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

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. We have successfully implemented GPS/AVL Fleet Management Systems into a wide range of industries including public works, solid waste, utilities, public safety, transportation systems (including mass transit and taxis), positive train control systems, precision agriculture, ground based NAVAIDS, real estate, heavy construction, and various other telecommunications projects.

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 vehicle hardware (in each vehicle), the communication medium, and the fixed-end Fleet Management Software (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 GPS/AVL Systems offered by Location Technologies, Inc. (LTI) incorporate state of the art GPS, signal processing, and wireless communications equipment and software.

No one in the industry offers a wider line of fleet management products. Our GPS and Wireless Data products include our LT6 and LT5 GPS based vehicle tracking systems, LT6R Radio Modem Line, the LTMDL Mobile Data Computer, the LTMDT Mobile Data 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 LT6 family of data radio products featuring over the air data rates up to 19.2 kbps, with optional interfaces to cellular, GPRS, CDMA, and satellite data communications. We also provide specialized GPS products based on our high accuracy Real Time Kinematic (RTK) system.

By maintaining a common message protocol we are able to offer our customers flexibility in selecting the communication media best suited for their application. Radio based, cellular, or logging equipment can be utilized in the same fleet if required.

Location Technologies offers many Fleet Management Mapping/GIS Software package options including the LTMap6 Navigo Desktop Software Suite and our LT Navigo Explorer WebMap Platform specifically designed for fleet management and dispatch oriented applications. With the ability to utilize, in native format, map data files from virtually all of the major GIS packages including ESRI, Intergraph, Mapinfo, and AutoCad, the Navigo Fleet Management Mapping/GIS package options are the perfect solution for government use where there has been an existing investment made in GIS.

Our Fleet Management Products include Equipment Management and Tracking Systems, Public Works Management Software, RFID tags, Smart-card Reader and Printer interfaces. Remote point-of-sale (POS) systems, with credit card processing, are also available.

Financial Stability

LTI has enjoyed nearly 20 years of growth and financial stability. We are privately held and debt free. Our large and diverse customer base and market leading products will fuel our continued growth and stability for many years to come. Our Dunn and Bradstreet number is – 939545141

Locations and Staff

Location Technologies' office is located at 6214 NW Kelly Drive, Parkville, Missouri, just north of downtown Kansas City. LTI employs a staff of approximately twenty highly qualified individuals.

Eric Cowger, President

Mr. Cowger has over 25 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 30 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

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

Strategic Company Direction

LTI intends to continue our position as a leader in fleet management through a combination of participation in industry organizations, continued product improvement, and keeping abreast of current trends in all of the various technologies surrounding the industry. For example the LT6 GPS/AVL Modem is literally the 6th generation of our GPS/AVL Modem devices.

As systems integrators and experienced engineers our approach to all projects is to partner with the customer to provide the best system to meet the particular needs of a customer and not try to ‘force fit’ a canned solution. From start to finish you will find that we will not only be responsive to your stated requirements but will also be flexible and able to handle changes in scope and requirements.

Key Current Customers

Customer	Scope of Project	# of Units
The City of Kansas City, Missouri	Snow Removal, Public Utilities, Water Department, Public Works, Solid Waste, Health Department	450
Washington State Dept. of Transportation	Snow Removal, Summer Maintenance, Street Maintenance	150
Iowa State Dept. of Transportation	Snow Removal, Summer Maintenance, Street Maintenance	600
Pierce County, WA Public Works Dept.	Snow Removal, Summer Maintenance	265
Johnson County, MO	Snow Removal, Street Maintenance	100
Buffalo County, NE	Snow Removal, Public Works, Sheriff Dept., Fire Dept., Bus and Shuttle Fleet	115
Bethlehem, PA	Snow Removal, Street Maintenance	105

3.2.2 Vender Information

Official Name of Company	Location Technologies, Inc.
Headquarters' Address	6214 NW Kelly Dr., Parkville, MO 64152
Telephone Number	816-741-3169
Fax Number	816-741-3405
Federal Tax ID Number	43-1835768
Names under which the business has operated within the last 10 years.	Location Technologies, Inc.
Contact Name for questions concerning RFP response.	Ben Grayson
Contact's Telephone Number	816-741-3169 x117
Contact's e-mail address	bgrayson@loctech.com
Is company authorized and/or licensed to do business in the State of New York?	No, but will file with the State upon award of project.
Does your company have an office in the City of Rochester or County of Monroe?	No
Company Ownership	Private
If Private, list primary owners and their percentage ownership.	Eric Cowger, 100% ownership
If Public, list stock trading symbol and market which it is traded.	N/A

Has corporate ownership changed in the last 5 years? If so, provide details.	No
Has the company purchased any other companies or divisions of companies in the last 5 years? If so, provide details.	No
Has the company or any of its principals defaulted on any municipal contracts in the past 5 years? If so, provide details.	No
Please provide details on any lawsuits involving the company that are currently pending or occurred in the past 5 years.	N/A
Has your company ever been declared bankrupt or filed for protection from creditors under state or federal proceedings? If so, state the date, court, jurisdiction, amount of liabilities and amount of assets.	No
Is your Company currently on the approved NYS Contract list? If yes, identify contract services.	Yes

Best Approaches

Location Technologies, Inc. takes a unique operations-centric approach to GPS/AVL Fleet Management. We are pushing the boundaries of GPS/AVL fleet management systems past the vehicle and on to the entire operation. Managers of fleet-based operations have been limited by the dot-on-a-map mentality for too long. We are pioneering a next-generation GPS/AVL fleet management approach that envisions the role of our systems as great aggregators of whole operations data, and as such must openly accumulate, interface, and extend all the operations data that is relevant to the tasks being performed. Operations managers need information from numerous sectors of their operations in order to make the correct decisions. These areas include environmental data, traffic data, geographic data, Route data, vehicle data, fleet data, operations data, inventory/asset data, HR/personnel data, fiscal data, and others.

At Location Technologies our first approach to integrating a GPS/AVL Fleet Management System is to utilize an organizations existing telecommunications infrastructure. If an organization already has a radio network and hardware in place that is able to be used for data transfer then we will recommend the use of that system for a GPS/AVL Fleet Management System. Alternatively, it is becoming increasingly common for municipalities and organizations to negotiate contract terms for cellular data network packages with cellular network carriers such as Sprint. We will leverage these existing agreements and utilize the cellular carrier preference for an organization.

3.2.3 Vendor Customer References

Company/Organization Name	City of Kansas City, Missouri
Contact Name and Position	Kristin Collins
Address	Communications Center 1111 Locust, 3rd Floor Kansas City, Missouri 64106
Telephone	(816) 513-6645
Email	Kristin.Collins@kcmo.org
Web Site Address	kcmo.org
Company/Organization Size	5000+ employees, 800+ vehicles
Solutions/Systems Installed, in what timeframe and sequence	Navigo system installed and fully operational, integrating all County legacy software in 6 months in Snow Removal, Solid Waste, Health Department, Public Utilities, Water Department, Public Works vehicles.
Date Solutions/Systems Installed	Ongoing since 2010
Number of People Required on Implementation Team from Internal Staff v External Resources	Multiple Departments and staff involved.

Company/Organization Name **Iowa Department of Transportation**
 Contact Name and Position **Annette Dunn, Winter Operations Administrator**
 Address **800 Lincoln Way**
Ames, Iowa 50010
 Telephone **(515) 239-1355**
 Email **annette.dunn@dot.iowa.gov**
 Web Site Address **www.iowadot.gov**
 Company/Organization Size **3000+ employees, 900+ vehicles**
 Solutions/Systems Installed, in what timeframe and sequence **Navigo system installed and fully operational, integrating all County legacy software in 6 months in Snow Removal, Summer Maintenance and Road Maintenance vehicles.**
 Date Solutions/Systems Installed **Ongoing since 2010**
 Number of People Required on Implementation Team from Internal Staff v External Resources **Multiple locations and staff involved.**

Company/Organization Name **Pierce County, Washington Public Works**
 Contact Name and Position **Bruce Wagner, Road Operations Manager**
 Address **4812 196th St E**
Spanaway, WA 98387-6710
 Telephone **(253) 798-7690**
 Email **bwagner@co.pierce.wa.us**
 Web Site Address **www.co.pierce.wa.us**
 Company/Organization Size **500+ employees, 300+ vehicles**
 Solutions/Systems Installed, in what timeframe and sequence **Navigo system installed and fully operational, integrating all County legacy software in 6 months in Snow Removal, Summer Maintenance and Road Maintenance vehicles.**
 Date Solutions/Systems Installed **Ongoing since 2007**
 Number of People Required on Implementation Team from Internal Staff v External Resources **Multiple locations and staff involved.**

Company/Organization Name **Washington State Department of Transportation**
 Contact Name and Position **Debbi Achord**
 Address **1551 N Wenatchee Ave**
North Central Region
Wenatchee, WA 98801-1156
 Telephone **(509) 633-0629**
 Email **AchordD@wsdot.wa.gov**
 Web Site Address **www.wsdot.wa.gov**
 Company/Organization Size **3000+ employees, 600+ vehicles**
 Solutions/Systems Installed, in what timeframe and sequence **Navigo system installed and fully operational, integrating all County legacy software in 6 months**
 Date Solutions/Systems Installed **Ongoing since 2008**
 Number of People Required on Implementation Team from Internal Staff v External Resources **Multiple locations and staff involved.**

3.3 Project Approach

3.3.1 Assumptions

No assumptions about the City of Rochester's current environment or system visions have been made past the information that has been provided during the RFP process in preparation of this proposal.

3.3.2 Advantages of Proposed Solution

The Location Technologies Navigo GPS/AVL Fleet Management System offers the City of Rochester many advantages over traditional dot-on-a-map systems. Our engineering approach allows LTI to customize and scale a system to fit the needs of the City in many ways. First is the ability to monitor and report on a wide variety of City vehicle's operations on a centralized platform. Second is the ability for the platform to departmentalize each vehicle group (snow, solid waste, summer maintenance etc.) so that one department does not view unnecessary information

about other department vehicles. The Navigo Reporting Module works in a similar way. It is a credentials-based system that allows different department supervisors a different view state based on what level of viewership they are allowed.

The Navigo system is not a static, out-of-the-box system. It is a living system that will continue to evolve to fit the needs of the City of Rochester.

3.3.3 Project Costs and Pricing Options

LTI's pricing structure is divided into two segments: Initial Costs and Recurring Costs. Initial Costs include hardware, installation/training, engineering fees (if needed) and the first year of subscription/module fees. Recurring Costs include subscription/module fees, warranties, and wireless data charges. A breakdown of associated costs can be found below. *Wireless data rates have not been included and can be found in Section 8.0.* No specific vehicle quantities or specific operations that will be monitored for each vehicle were provided in the City's RFP. The costs below are itemized costs. Some vehicles may require more or less equipment (for example, some snow removal vehicles require two blow blade monitors while others require only one, meanwhile some have deicing equipment while others have none), so LTI has created an average estimated cost for each vehicle.

Initial Costs

<u>Qty</u>	<u>Hardware</u>	<u>Description</u>	<u>Unit</u>
1	LT6 GPS/AVL Modem	CDMA Bundle	365.00
1	Cabling/Antenna	HW Bundle	45.00
1	LT Snow Plow Blade Monitor	Tilt Sensor Assembly	35.00
1	LT Boom Sensor	Tilt Sensor Assembly	35.00
1	Spreader Controller Interface	Force America SSC5100 Interface	36.50
1	PTO Interface	Variable Type	
1	Panic Button	Manual Emergency Switch, Cabling	16.00
	<u>Navigo Explorer Web Map</u>		
1	Web Map Subscription	\$1.65/vehicle per month for 12 months	19.80
1	LT Hosting Services	\$200/fleet per month for 12 months	2400.00
1	Public Works Module	\$35/fleet per month for 12 months	420.00
1	Dispatch/Work Order Module	\$50/fleet per month for 12 months	600.00
	<u>Professional Services</u>		
1	Installation Training	On-site Training for Rochester Employees	1500.00
1	Navigo Explorer Training	On-site Training (optional)	1500.00
		Online Training, per session, unlimited attendance (optional)	400.00
		<i>Estimate Per Vehicle:</i>	480.80
		<i>Subscription/Module:</i>	4400.00
		<i>(480.80+19.80) * (# of vehicles) + (6420)=</i>	First Year Cost
	<i>Example:</i>	<i>(480.80+19.80) * (500 vehicles) + (6420)=</i>	\$256,720

Recurring Costs

<u>Qty</u>	<u>Item</u>	<u>Description</u>	<u>Unit</u>
1	Web Map Subscription	\$1.65/vehicle per month for 12 months	19.80
1	LT Hosting Services	\$200/fleet per month for 12 months	2400.00
1	Public Works Module	\$35/fleet per month for 12 months	420.00
1	Dispatch/Work Order Module	\$50/fleet per month for 12 months	600.00
1	Extended Warranty/Maintenance	\$25/vehicle per year	25.00
		<i>(25+19.80) * (# of vehicles) + (3420)=</i>	Recurring Cost
	<i>Example:</i>	<i>(25+19.80) * (500 vehicles) + (3420)=</i>	\$25,820/year

3.3.4 Degree of Fit

The Location Technologies system addresses all requirements fully and can deliver in a timely manner a system that completely meets all requested functionality.

3.3.5 On-Going Support

Location Technologies provides technical and information technology support by phone Monday – Saturday 8:00am – 5:00pm CST and 24/7 support by email. Response time and escalation procedures are variable dependent upon support necessities. Software updates and upgrades are released as they become available. Software updates are available for download with an internet connection or can be shipped in CD/DVD-ROM format via US Mail or

UPS/FedEx. The LT6 CDMA GPS/AVL Modem has many over-the-air programmable features as well as Ethernet/serial connectivity options for programming with our AVL Configuration software.

Reference #	REQUIREMENT	Response (Y,Z,N,T)	Xrf
3.3.5.1	Toll Free Support Phone Number	Y	
3.3.5.2	24x7 Support	Y	
3.3.5.3	Software/Application Support	Y	
3.3.5.4	Remote diagnostic support software	Y	
3.3.5.5	Remote diagnostic support hardware	Y	
3.3.5.6	Documented escalation procedures	Y	
3.3.5.7	Dedicated Tier 2 (Mid-Level expertise) support staff	Y	
3.3.5.8	Dedicated Tier 3 (Senior-Level expertise) support staff	Y	
3.3.5.9	Portal to exchange information and support	Y	

3.3.6 Internal Information Technology Production Environment Support

Given the vendor-hosted solution offered by Location Technologies, the City does not need day-to-day support staff on hand to manage the AVL system. Occasionally, and at the City's leisure, the City's GIS support staff may interact with Location Technologies' to upload new GIS data or alter existing data.

3.3.7 Written Documentation

LTI Project Managers will deliver a complete set of technical and end-user system documentation in electronic format to the City Operations Management and Fleet Management Teams.

3.3.8 Product Maintenance

The LT6 AVL/GPS Modem (the sixth generation of the LT modem) was first produced in 2007. On average, firmware upgrades are available to the LT6 every 6 months. Some firmware upgrades are transmitted through the wireless data network while others may require physically upgrading the system via onsite methods. Location Technologies currently supports previous versions including the LT3, LT4 and LT5. Currently, there are no plans to redesign or release new versions of the LT6.

3.3.9 Project Management Methodology and Implementation Plan

Upon award of contract LTI Project Managers will work closely with City Government Management on a jointly developed Project Plan Document. The LTI Project Manager will attend scheduled meetings during normal City business hours, Monday through Friday. LTI Project Managers are also available for online webinar meetings at the discretion of the City.

3.3.10 Strategic Direction

Location Technologies strives to deliver a GPS solution that provides vehicle performance data, location tracking, operations monitoring, and reporting via a user-friendly web interface. Location Technologies works towards creating forward thinking products with an intelligent, intuitive user interface.

The description of the City's AVL/ITS project falls directly in line with the solution that LTI has to offer. LTI's Navigo System creates a multi-functional platform that allows the City to eliminate the piecemealing of many different systems (asset management, AVL, two-way communication, work order management, route optimization).

3.3.11 Annual Reports

LTI has enjoyed nearly 20 years of growth and financial stability. We are privately held and debt free. Our large and diverse customer base and market leading products will fuel our continued growth and stability for many years to come. Dunn and Bradstreet number – 939545141

3.4 Terms and Conditions

Location Technologies accepts and acknowledges all terms and conditions put forth by the City of Rochester's RFP.

5.0 Legacy Systems Environment

All City legacy systems are compatible with the LTI Navigo System including Network Environment (5.1), Servers and Database Environment (5.2), Desktop Environment (5.3), GIS Environment (5.4) and System Integration (5.5). LTI has an extensive library of legacy systems that fit the needs of the City.

6.0 Process Automation Requirements

LTI fully complies with all project requirements. The matrix provided in the RFP has been completed below.

6.1 Vehicles-A vehicle is any equipment that is used to perform a city service-/activity. We have a myriad of vehicles starting from HHR's to Side load packers and similar heavy duty trucks.

6.1.1	PROCEDURE - Assign the vehicle to a route	Requirement Type	Response (Y,Z,T,N)	Xrf
6.1.1.1	Add a vehicle to a pre-determined group.	User Interface	Y	
6.1.1.2	Change the vehicle from one group to another.	User Interface	Y	
6.1.1.3	Change display icons for vehicles of the same group	User Interface	Y	
6.1.2	PROCEDURE— Retrieve the vehicle from lot			
6.1.2.1	Identify the location of vehicles within the parking area (e.g. CVMF parking lot).	User Interface	Y	
6.1.2.2	Transmit a specific signal from the vehicle indicating that the vehicle is parked for service.	User Interface	Y	
6.1.3	PROCEDURE - Drive the vehicle			
6.1.3.1	Perform engine kill after deeming it is safe to do so in lost or stolen equipment.	User Interface	Y	
6.1.3.2	Perform route playback.	User Interface	Y	
6.1.3.3	Provide a bread crumb trail for a specified time frame with no limitations on the different factors.	User Interface	Y	
6.1.3.4	Capture geo-fence based events.	User Interface	Y	
6.1.3.5	Auto email resources when a geofence event triggers. The City uses MS Exchange Server/Outlook for email applications and the vendor should be able to provide this service in the specified software environment.	Report	Y	
6.1.3.6	Have unlimited geo-fences on a map.	User Interface	Y	
6.1.3.7	Have overlapping geo-fences	User Interface	Y	
6.1.3.8	Activate or deactivate geo-fences based on the activity that we monitor.	User Interface	Y	
6.1.3.9	Locate vehicle or vehicle groups at any given time.	Report	Y	
6.1.3.10	Optimize the different routes to reduce vehicle miles travelled. The City uses RouteSmart Technologies' RouteSmart® for route optimization and the vendor must either integrate with RouteSmart® or provide an ancillary add-on to the AVL solution for route optimization.	User Interface	Y	
6.1.3.11	Set the ping rate based on vehicle type and/or use.	User Interface	Y	
6.1.3.12	Store data on the device and forward (session persistence) when it can communicate back to the base.	Other	Y	
6.1.3.13	Set what types of data are transmitted in real-time or near real-time (e.g. Location, Engine Trouble) and what types are stored for download (passive) at the end of the day (e.g. Time Between Service Stops) determined on a per vehicle basis	User Interface	Y	
6.1.3.14	Notify 911 or trigger emergency alarms from the device for certain vehicle (e.g. Panic button).	System Interface	Y	
6.1.3.15	Capture vehicle maintenance and emergency repair issues (e.g. Engine light). The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The vendor must be able to provide integration with FASTER.	Report	Y	
6.1.3.16	Recognize and flag dangerous maneuvers (e.g. U-turns).	Report	Z	
6.1.3.17	Notify (email, SMS) system administrator on alerts, alarms or flagged data. The City uses MS Exchange Server / Outlook for email applications and the vendor should be able to provide this service in the specified software environment.	Report	Y	
6.1.3.18	Configure the unit to provide turn by turn directions.	User Interface	Y	
6.1.3.19	Install modular AVL hardware to permit tracking a specific subset of vehicles through component removal and re-installation.	Other	Y	
6.1.3.20	Vehicle operators can "flag" specific locations, and annotate conditions for immediate alert and follow-up, specifically upon	Business Form	Y	

	encountering a potentially hazardous condition.			
6.1.3.21	Track vehicle speed	User Interface	Y	
6.1.3.22	Track and report on vehicle miles travelled. The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The vendor must be able to provide integration with FASTER.	Report	Y	
6.1.3.23	Initiate an alert if a vehicle becomes stationary for more than the designated period of time while the engine is running (i.e. Idle time).	Report	Y	
6.1.3.24	Set minimum speed levels for reports-based on activity.	Report	Y	
6.1.3.25	Utilize "geo-fences" to deter travel beyond approved geographic limits and identify potential abuses.	User Interface	Y	
6.1.3.26	Transmit alerts using data from the obd2 (on board diagnostic software) would be sent out over a communication network indicating when preventative maintenance is required. The City uses CCG Systems' FASTER Fleet Management for management of its fleet of vehicles and equipment. The vendor must be able to provide integration with FASTER.	System Interface	Y	
6.1.3.27	"Encrypt" wireless data streams.	Other	Y	
6.1.3.28	Notify the vehicle driver approaching hazardous/ road conditions (e.g. Speed bumps) with periodic refresh from a leading provider of maps, traffic and location data.	System Interface	Y	
6.1.3.29	Utilize AVL data as a remote/virtual inspection force.	Other	Y	
6.1.3.30	Notify system administrator that a vehicle needs regeneration.	Report	Y	
6.1.3.31	Vehicle operators can inform dispatch when the vehicle is idling for regeneration.	Decision Criteria	Y	
6.1.3.32	Run reports to validate vehicle regeneration calls.	Report	Y	
6.1.3.33	Differentiate (color code) vehicles that are regenerating.	User Interface	Y	
6.1.3.34	Track the status of a boom on boom trucks (e.g. Boom-up or Boom-down).	System Interface	Y	
6.1.4 PROCEDURE - Dump the vehicle				
6.1.4.1	Notify when the load limits have been exceeded on dump trucks.	System Interface	Y	
6.1.5 PROCEDURE - Fuel the vehicle				
6.1.5.1	Integrate with a fuel system. The City uses OPW Petro Vend's K800™ Fuel Control System for centralized control of our fueling operations. We use OPW's Phoenix™ software to import and update fuel data from Petro Vend.	System Interface	Y	
6.1.5.2	Validate that the vehicle is authorized to fuel at a specific facility. The City uses OPW Petro Vend's K800™ Fuel Control System for centralized control of our fueling operations. We use OPW's Phoenix™ software to import and update fuel data from Petro Vend.	User Interface	Y	
6.1.6 PROCEDURE - Set salt application rate on the vehicle				
6.1.6.1	Monitor salting rate and determine amount left. The City uses FORCE® America's SSC5100 salt spreader controls to manage the distribution and application of anti-icing materials during winter operations. The Vendor must integrate their solution with FORCE® America.	System Interface	Y	
6.1.6.2	Monitor salt spreader gate status (open/closed). The City uses FORCE® America's SSC5100 salt spreader controls to manage the distribution and application of anti-icing materials during winter operations. The Vendor must integrate their solution with FORCE® America.	System Interface	Y	
6.1.6.3	Flag the system with an empty salt truck. The City uses FORCE® America's SSC5100 salt spreader controls to manage the distribution and application of anti-icing materials during winter operations. The Vendor must integrate their	User Interface	Y	

	solution with FORCE® America.			
6.1.7	PROCEDURE - Plow and/or salt streets with the vehicle			
6.1.7.1	Capture the percentage of a given route completed.	User Interface	Y	
6.1.7.2	Track the status of a plow (e.g. Plow-up or plow-down). The City uses FORCE® America's vehicle equipment to control and manage roadway plowing during winter operations. The Vendor must be able to integrate their solution with FORCE® America.	System Interface	Y	
6.1.8	PROCEDURE - Sweep streets with the vehicle			
6.1.8.1	Track and report the level of water in the water tank of sweepers. The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Y	
6.1.8.2	Track the status of the water flow on sweepers (e.g. water flow on or water flow off). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Y	
6.1.8.3	Track the filter status on sweepers (check if filter is clogged or needs replacement). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind® 4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Y	
6.1.8.4	Track the status of the debris hopper on sweepers (check if hopper is full). The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind®4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment.	System Interface	Y	
6.1.8.5	Track the status of a broom on sweepers (e.g. Broom-up or Broom-down) independently for curb-side and street-side brooms. The City uses Elgin Pelican® Three-Wheel Broom Sweepers (mix of mechanical and hydraulic) and Elgin Crosswind®4 Wheel Regenerative Air Sweepers. The vendor must be able to integrate their solution with Elgin vehicle equipment	System Interface	Y	
6.1.9	PROCEDURE - Park the vehicle			
6.1.9.1	Transmit a specific signal from the vehicle indicating that the vehicle is parked for service.	User Interface	Y	
6.1.10	PROCEDURE - Dispatch City vehicles for contractor routes with breakdowns			
6.1.10.1	Add a vehicle to a different group (e.g. add an arterial vehicle under contracted snow plowing).	User Interface	Y	
6.1.10.2	Differentiate this route from all other normal routes under this group/activity.	User Interface	Y	
6.1.10.3	Track the status of a plow (e.g. Plow-up or plow-down). The City uses FORCE® America's vehicle equipment to control and manage roadway plowing during winter operations. The Vendor must be able to integrate their solution with FORCE® America.	System Interface	Y	

6.2 Maps-The map object can be any physical or electronic maps used by equipment operators to reference their route, route sequence or a single location.

6.2.1	PROCEDURE - Review the map to determine route sequence			
6.2.1.1	Display a map interface on the on-board dashboard. We require ArcGIS 10 or a comparable map interface using the City's existing map layers and or routes for the different services/operations so we can track	User Interface	Y	

	operations in a route centric or service centric format			
6.2.1.2	Resolve address on work request and plot on map. The address could come from our work order system, so we require that the AVL solution be able to resolve address information and geo reference the address provided by the work order system, in various possible address formats.	Other	Y	
6.2.1.3	Display route to work location. Possible use of turn by turn navigation with spoken and visual instructions.	System Interface	Y	
6.2.1.4	Update route to accommodate dynamic work request changes. Routesmart® or use of the in-built routing software	System Interface	Y	
6.2.1.5	Plot work locations on the map when on route. If the driver observes a situation needing attention, they can mark the location of work on a map available on the on-board display which then gets delivered to dispatch at regular intervals for further research and assignment.	User Interface	Y	
6.2.1.6	Switch between weather maps and geo-fences to help make decisions.	User Interface	Y	
6.2.1.7	Configure the unit to provide turn by turn directions with a map display.	User Interface	Y	
6.2.2	PROCEDURE - Monitor the contractor vehicle location for compliance			
6.2.2.1	Determine all vehicles are at their respective start points.	Report	Y	
6.2.2.2	Verify that a contract vehicle is within the geo-fenced area when the activity is in progress.	User Interface	Y	

6.3 Work Requests-A work request is a record / form / document describing the work to be done and furnishes information about the work location, route etc. as well. This can be generated from several different systems in the city including LAGAN, Maintain-IT, Mainframe etc.

6.3.1	PROCEDURE -Review the work request to determine work to be completed			
6.3.1.1	Access work request from an onboard display.	User Interface	Y	
6.3.1.2	Make modifications to work request and track changes.	User Interface	Y	
6.3.1.3	Dynamically add work request to existing work queues.	User Interface	Y	
6.3.1.4	Integrate a work order/complaint management system within, or as a complement to, an AVL solution.	System Interface	Y	
6.3.2	PROCEDURE - Create the work request			
6.3.2.1	Set up an activity in the AVL system to reflect the crew performing work requests for the day.	Other	Y	
6.3.3	PROCEDURE - Notify on the work request status			
6.3.3.1	Readily integrate spatial and, where applicable, vehicle status data gathered through the AVL system into LAGAN, the customer relationship management software utilized by 311.	System Interface	Y	
6.3.4	PROCEDURE - Update the work request			
6.3.4.1	Readily integrate spatial and, where applicable, vehicle status data gathered through the AVL system into LAGAN, the customer relationship management software utilized by 311.	System Interface	Y	
6.3.4.2	Capture the percentage of a given route completed.	Decision Criteria	Y	

6.4 Dispatch Records-A dispatch record is an entry in the Dispatch System which is an MS Access based system. This system has the ability to track the progress in snow and ice related activities like plowing, salting, towing and more.

6.4.1	PROCEDURE -Dispatch the vehicle			
6.4.1.1	Interface with the data in the dispatch system.	System Interface	Y	
6.4.1.2	Track all the information currently stored in the dispatch system.	Other	Y	
6.4.1.3	Differentiate a dispatched vehicle from a vehicle in a lot.	User Interface	Y	
6.4.2	PROCEDURE - Update the dispatch information			
6.4.2.1	Equipment operator can update the dispatch system.	Business Form	Y	
6.4.3	PROCEDURE - Notify on the route status			

6.4.3.1	Have two way communications between the vehicles and dispatch (e.g. messaging, radio).	Other	Y	
6.4.4 PROCEDURE - Create the dispatch information				
6.4.4.1	Set up an activity in the AVL system to reflect the dispatch information.	Other	Y	

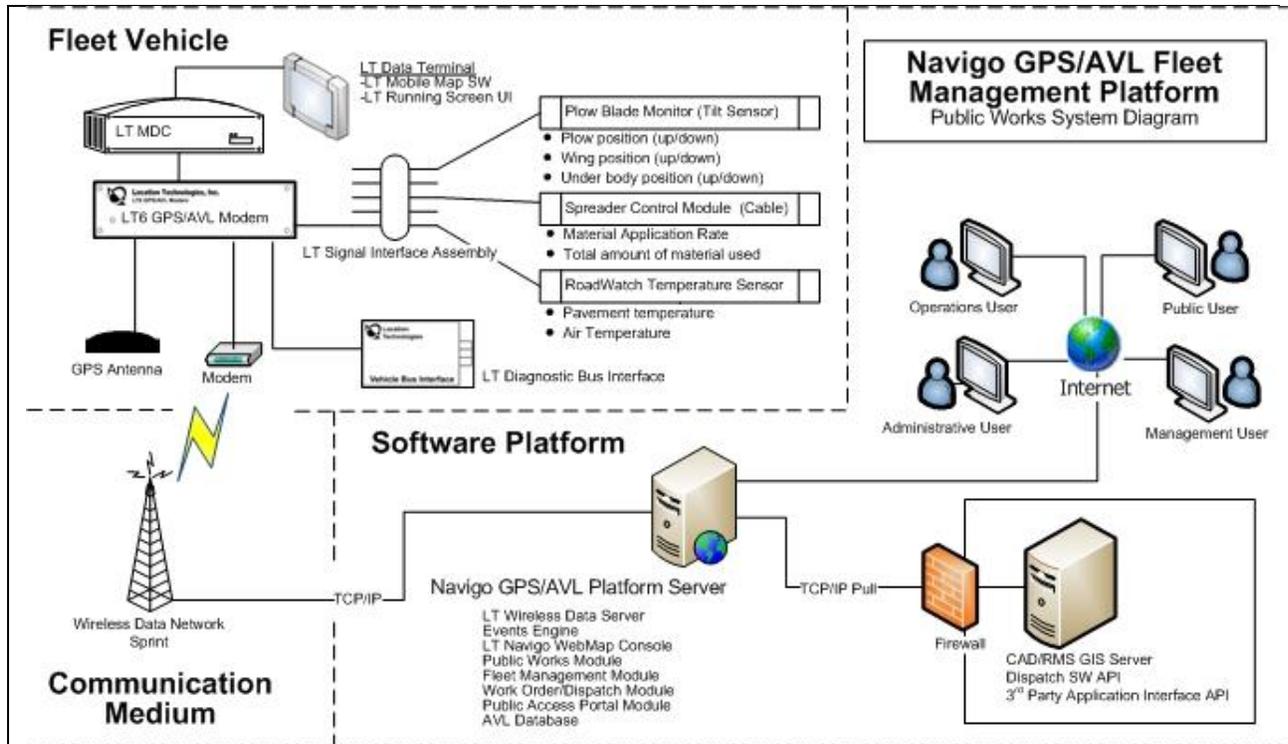
6.5 Geodatabases-A geodatabase is a data repository for spatial data storage and management.

6.5.1 PROCEDURE - Update the geodatabase with run information				
6.5.1.1	Export historic AVL data into a commercial GIS environment for subsequent analysis. The City of Rochester has a centralized GIS using software products from Environmental Systems Research Institute (ESRI). Currently, ESRI® ArcView9.x client software is installed on desktop workstations throughout the City of Rochester. Central data storage of geographic data files is housed using ArcSDE and ArcIMS v4.0.	System Interface	Y	

7.0 Technical Requirements-This section of the document defines the technical requirements for the proposed system which address architecture, data, security, and system interfaces.

7.1	Architecture	Response (Y,Z,N,T)	Xrf
7.1.1	Provide architecture that is modular, scalable, and extensible.	Y	
7.1.2	Reside on any standard hardware platform and operating system (not proprietary).	Y	
7.1.3	Host the solution for the City of Rochester.	Y	
7.1.4	Provide a detailed plan with costing and assist in implementing the same if the City of Rochester decides to host the solution.	Y	
7.1.5	Provide an always connected wireless data network.	Y	
7.1.6	Provide a satellite communication network for areas where ground-based wireless communications is weak.	Y	
7.1.7	Receive and forward position information from the vehicle's satellite transmitter.	Y	
7.1.8	Ability for two-way mobile messaging to allow email messaging to and from the driver over the Internet wireless communications link.	Y	
7.1.9	Send information via satellite, nationwide cellular network or radio frequency — or a combination thereof.	Y	
7.1.10	Provide data transmission without recurring or monthly costs.	N	
7.1.11	Demonstrate experience with integrated AVL/GPS systems.	Y	
7.1.12	Evolve with new technologies to meet future needs as they arise.	Y	
7.1.13	Perform a complete historic data recovery and reporting during an event of hardware failure or network failure emergencies.	Y	
7.1.14	Provide an open API to make integration processes.	Y	
7.1.15	Provide seamless integration to PC based MS® Office products.	Y	
7.1.16	Operate on most current version of Internet Explorer.	Y	
7.1.17	Use HTTPS and other secure means of data transmission including data encryption.	Y	
7.1.18	Interface with standard languages and protocols (not proprietary).	Y	
7.1.19	Configure software from an administrator point of view, with full audit of any configuration change captured.	Y	
7.1.20	Support full software change control process with check-in and check-outs.	Y	
7.1.21	Interface with Microsoft® SQL Server 2005 or higher.	Y	
7.1.22	Provide complete on line documentation including: Installation/Set-up & Configuration, Training/Tutorial, Application, Process Flow and Reference.	Y	
7.1.23	Define alerts at the user level to notify specified individuals or groups when triggered by an event.	Y	
7.1.24.	Set-up alerts across all modules	Y	
7.1.25	Set-up and receive administrative notification of specific activities that may not require user intervention (System Alerts).	Y	
7.1.26	Interface with the following to provide notifications: MS® Outlook Exchange email and PDAs.	Y	

7.1.27	Remotely manage the environment from a Vendor or City IT perspective using a web interface.	Y	
7.2	Data Requirements		
7.2.1	Display dates in the USA format.	Y	
7.2.2	Support the translation of views and instructions into multiple languages (e.g. English, Spanish).	Z	
7.2.3	Provide Entity Relationship Diagrams (ERD) showing layout of tables, fields and data entity relationships.	Y	
7.2.4	Provide data dictionary with ability to interface electronically to industry standard reporting environments (i.e. Microsoft® business intelligence).	Y	
7.2.5	Provide numerous user definable fields in every table that will be used by the application.	Y	
7.2.6	Automatically archive and purge data per retention periods.	Y	
7.3	System Administration, Security and Audits		
7.3.1	Authenticate a person's credentials through Windows Active Directory®.	Y	
7.3.2	Easily set-up and maintain users within functional groups that can be nested, taking on the parent's rights and restricting that further.	Y	
7.3.3	Effect Site/Group-level security (user can view site specific data or multi-site data based on security preferences assigned).	Y	
7.3.4	Effect Site/Group-Specific security configuration per user (user security access may differ from site to site).	Y	
7.3.5	Define read/select, insert, update, and delete in any combination or set for Module/Function/Field for any Group or Individual in an easy to maintain way.	Y	
7.3.6	Produce reports which identify who has access to run reports, audit trail log depicting report additions, deletions or changes noting the user who made, time and date stamp.	Y	
7.3.7	Capture a before and after snapshot of data (audit trails) that changes within a system in a text based, non-system specific, human readable format. This should not hinder system performance, and be configurable and user friendly.	Y	
7.3.8	Capture when reports are printed and noting the user, time and date stamp.	Y	
7.3.9	Capture when reports are viewed and noting the user, time and date stamp.	Y	
7.3.10	Limit access to information based on security level.	Y	
7.3.11	Display fields based on security level.	Y	
7.3.12	Limit editing capability to the record creator & security level.	Y	
7.3.13	Customize the software based on the end-user's role in the system.	Y	
7.3.14	Restrict the vehicle groups that a specific end user can see	Y	
7.3.15	Restrict vehicle routes that a specific end user can see.	Y	
7.4	System Interfaces		
Software Configuration			
Configuration of the Navigo GPS/AVL Platform for the City GPS/AVL Fleet Management System is comprised of the following interconnected tasks.			
<u>Load City GIS/Map data</u>			
LTI Project Managers will engage with the City Management Team and GIS Department to determine what Map Projections and Layers will be made available to the Navigo AVL System.			
<u>Load City vehicle and operations data</u>			
LTI Project Managers will engage with the City Operations and Fleet Management Team to acquire all necessary vehicle and operations data.			
<u>Configure City user/group credentials for Navigo AVL System access/functionality</u>			
LTI Project Managers will engage with the City Operations Management Team to determine the appropriate user/group credentials configurations for City staff.			
<u>System Report Configuration and Development</u>			
LTI Project Managers will engage with the City Operations Management and Fleet Management Team to set-up and configure system reports as identified in the mandatory requirements.			
<u>Legacy Management System API Configuration and Development</u>			
LTI Project Managers will engage with the City Operations Management to configure all existing management systems interfaces as identified in the mandatory requirements.			



7.4.1	Interface with other software products owned by the vendor but which are in another family to meet a need that does not exist in the standard product, regardless of what platform that product may reside on.	Y	
7.4.2	Provide plug-in designs that do not require special coding.	Y	
7.4.3	Interface with third party sources of information via a Web Service call.	Y	
7.4.4	Perform data imports and exports from and to both desktop and applications running on other processors.	Y	
7.4.5	Interface seamlessly with barcode and other data collection devices.	Y	
7.4.6	Interface with HID smart cards attached to user profiles.	Y	
7.4.7	Provide remote help desk support via telephone and live on-screen control.	Y	

8.0 Communication Platform

Location Technologies' LT6 Modem is "carrier agnostic". In other words, we can deliver the data that is gathered over a host of communication networks: radio, cellular, wifi, Zigbee module, and more. However, LTI has partnered with Sprint to offer low recurring data rates and unmatched cellular coverage. The LT6 Modem transfers data at the 1x level and Sprint offers free roaming on 1x networks nationwide, which means losing coverage is not an issue. LTI believes that the majority of the City of Rochester's vehicles will only require a 2MB data plan. Given LTI's extensive background in radio communication (where bandwidth is limited), the data packet size delivered through the communication medium is much smaller than what you will typically see from our competitors. This allows LTI to keep data plans on the low end of the pricing spectrum. LTI has teamed with Sprint to present the following data rates for the City of Rochester.

Plan Size	Sprint Data Access Plans for Business										
	1MB	2MB	5MB	10MB	25MB	50MB	100MB	500MB	1GB	2GB	5GB
Net MRC	\$4.00	\$5.00	\$6.00	\$8.50	\$10.00	\$15.00	\$18.00	\$22.00	\$25.00	\$32.00	\$54.00
Overage per KB	\$0.003	\$0.002	\$0.003	\$0.001	\$0.001	\$0.0003	\$0.0003	\$0.0003	\$0.0003	\$0.0003	\$0.0003
Data Sharing	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included