

## The Interoperability Imperative

Return on Investment for AVL requires a flexible program

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### What Is AVL? The Five Elements

Managing mobile assets in the field — it is called many things: Mobile Resource Management, M2M, Fleet Tracking — or Automatic Vehicle Location (AVL). AVL is a combination of hardware, software and GPS technology, working together, to track, control and manage fleets of vehicles or any asset in the field — everything from fleets of snowplows or delivery vans, to ruggedized laptops, to very heavy mobile assets like backhoes or drilling rigs.

In order to work, AVL requires all of these technical elements to work together:

#### — Hardware

The vehicle (or whatever the asset is) is wired with a GPS tracker — a "black box." This piece of hardware is usually about the size of a deck of cards. Besides the built-in GPS capability, this equipment contains the monitors that, once wired into the vehicle, allow remote fleet managers to know if the vehicle is running (moving or idling), tracks the mileage, the turns made, the speed of movement, and often tracks specialized information, such as if a snowplow is up or down; sirens are on or off; chemicals or herbicide is being sprayed/how much is used; etc.

- GPS capable hardware is now available from several manufacturers; each is slightly different.
- Some vehicles/heavy assets come with GPS trackers already installed
- As the technology becomes more widespread, the price for GPS. hardware is dropping significantly, bringing even more manufacturers into the market as well as more confusion to the effort of standardization.

#### — Connectivity

Wireless carriers such as AT&T, Verizon and Sprint are the most recognizable names; the wireless signal programmed into the hardware is what "pings" the GPS so that the

vehicle's location can be constantly monitored and the other information wired to the hardware (such as whether the engine is idling) can be forwarded to the fleet manager.

However, any technology that can access the hardware's GPS capabilities may be used for this element:

- 2-way radio
- Wi-Fi
- Satellite
- Standard Wireless Carrier

#### — Data interoperability server

The data from the hardware and GPS locator (wireless or other connective technology) are gathered into a server and compiled into useful data. This server should be able to compile data from all inputs simultaneously — that is, no matter how many assets are in the field, moving around, at any given moment, the server can track all of them at once. The server will compile the data into a database format, usually SQL or Oracle.

- Depending on your fleet tracking needs and the servers' capacities, information may be compiled as often as every five seconds, for a truly real-time view of all fleet movement. This is a tremendous asset for emergency response management.
- Some assets may only need to be "pinged" once per day or every few hours, to ensure they have not been removed from a geo-coded area. (We don't want that \$100,000 rig in a remote location being driven away, do we?)

#### — GIS Data

When the information is received and compiled by the server, it is visually transmitted, almost instantly, to a map - usually a map seen on a computer desktop, although it can also be a mobile device. This matches the latitude and longitude data being transmitted from the GPS technology to a GIS Data map showing addresses, street routes and geographical locators.

- The most commonly used GIS mapping data comes from Esri's ArcGIS platform. However, other mapping data that allows the GPS information to come through on a visual map is available.

#### — Decision-making software tool

Tying everything together is the software that tells the server what to compile and how to do so, and then pulls the GIS Data into the mix and sets the picture into the desktops of all the managers, supervisors and dispatch personnel who need it — both in real-time viewing and through historical displays and reporting.

The software for AVL has to be scalable — no matter how many field assets are being tracked, they must all be tracked simultaneously. And as new assets are added, they must be added in a seamless way.

A good AVL program should offer a variety of GIS —related benefits. For instance, besides real-time tracking of vehicles, your AVL software package should allow you to "Geocode" and "Geo-Fence" assets. When a vehicle or expensive asset leaves its assigned

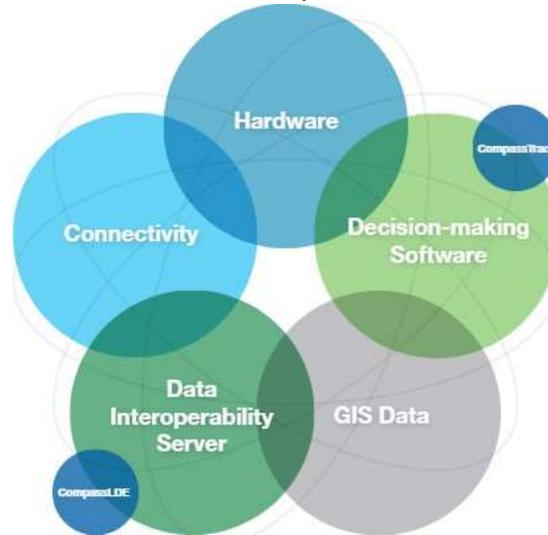
route or assigned geographical area, a manager gets an immediate alert. This is just one of many benefits of AVC, providing worker safety capabilities, preventing theft and meeting compliance requirements.

A complete AVL program should offer incident command and control capabilities — providing real-time viewing and communication benefits such as simultaneous on-site

and off-site incident management. Field and remote supervisors can assess and control a situation, simultaneously, working together.

AVL software must be able to provide standard and customized reports of archive data for analysis of fleet information such as fuel usage, mileage, route planning, aggressive driving incidents such as speeding, use of chemicals/materials such as sand or herbicide.

AVL proves its worth through the reports that allow fleet management to know exactly who did what, when, how and why. Assessing that data and then acting on it lets managers save money on fuel as well as personnel costs from less overtime, better route planning and knowing when training is necessary due to incidents like speeding. (We know it's frustrating to drive the street sweeper no faster than eight miles per hour. But faster than that, it's not efficient. Your AVL will tell you which drivers need a reminder of this.)



## The 5 Fundamentals of AVL

### Why is AVL important for Fleet Management?

Bottom line: AVL saves money on fleet costs, paying for its implementation several times over across the life cycle of your fleet. As a bonus, it also provides a level of customer service and accountability impossible prior to implementation. Worker safety and asset control is improved.

A 2007 Aberdeen group study: "Service on the Move: Driving Profitability via Fleet Management" found the following from companies that had invested in a fleet management solution:

- \$1 , 100 per vehicle annual savings in operating costs\* and 12% increase in service profitability
- 11 % reduction in maintenance costs and 15 % decrease in vehicle downtime
- 28 % increase in operator compliance; 26% improvement in regulatory compliance
- 13 % improvement in vehicle utilization and 10 % decrease in overtime pay
- 15 % reduction in average travel time per job

\*This is based on 2006-level fuel costs; the price of gasoline has since jumped into the \$4 per gallon range, making the annual savings from AVL's built-in improved fuel-efficiencies significantly higher.

The financial impact from the reduction in insurance costs, accident costs, depreciation costs and increase in worker productivity make investments such as AVL an obvious choice in smart money management.

In the same study, Aberdeen recommended the following strategies to meet profitability and productivity metrics:

- Do not underestimate the financial impact of operator behavior on profitability
- Base fleet preventative maintenance programs on fleet utilization, not time elapsed
- Align fleet management initiatives with company/organization goals and needs before technology adoption — then choose a flexible technology that works best for your needs

### Why Interoperability Matters in AVL

For one example, consider the vehicles owned by an average-sized municipality or county-level government (across departments) :

- Public Works vehicles: o Street Sweepers o Snow Plows o Garbage Trucks o Storm water (vacuum trucks, etc) o Water utility o Road & Bridge o Insect & Weed control /mowers
- Public Safety vehicles: o Police cars o Fire engines o Ambulances
- Supervisor/standard model vehicles: o Public Works field cars o Building inspection/Code enforcement officer cars
- Special Departments o Parks, Recreation and Open Space o Forestry

It's rare that, over the years as these departments have grown within the municipalities they serve, that they have all coordinated their wireless carrier contracts (if they all even have such contracts — many police departments are using two-way radio instead of cellular providers); the vehicles are often maintained/housed at different locations and managed separately.

An AVL program should be able to accommodate all these different departments, using the GPS hardware that may already be installed on some vehicles, the slightly different hardware that is installed on some others, and be able to arrange for the installation of new hardware on vehicles that are without, while providing a consultative approach so that the new hardware will be the best choice for that particular client. It should be able to work with the combinations of wireless carrier contracts that crisscross the entity like a puzzle: the Public Works department uses Verizon and the fire department uses AT&T and the police department has a two-way radio system that it is not about to abandon, for instance.

The city may well have purchased Esri ArcGIS - an expensive investment that is not fully leveraged if AVL has not been implemented. But it may have postponed thinking about AVL just because the challenges of coordinating all those disparate contracts and elements is too much of a project to take on. Some AVL providers are only able to work with one kind of hardware supplier, or one brand of wireless carrier, and in order to implement their solution everyone must be coordinated. Even if everyone agrees that the cost savings of an AVL would make it worth it, there's the added expense of breaking a contract with one carrier in order to align with the chosen one . . . or the cost of pulling pre-installed hardware from some vehicles in order to wire up the approved type.

It becomes clear pretty fast that an AVL program that is unable to work with whatever is already on the ground is going to be more expensive, complicated and just plain difficult to implement than a flexible solution that provides interoperability.

### Flexibility —Interoperability

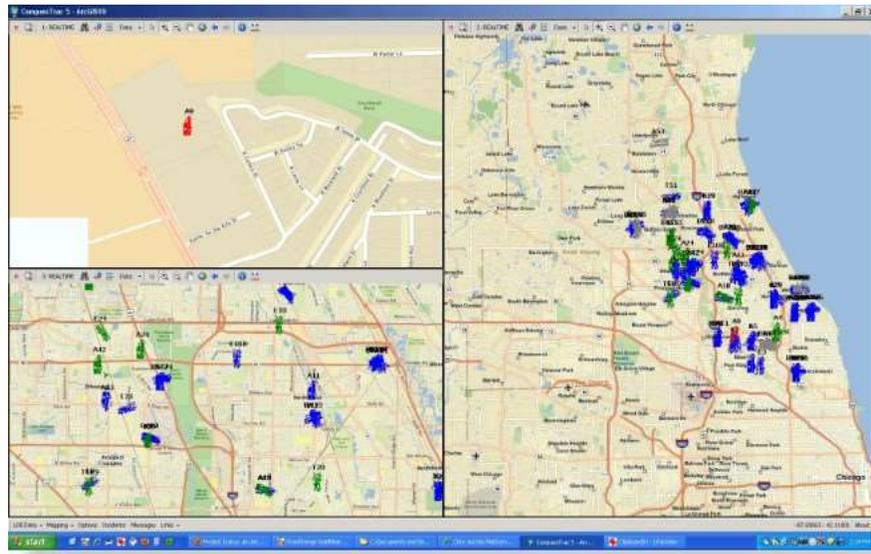
The reality is that departments need to work together to best leverage any investment in AVC. Therefore, an AVL provider must be flexible in working with all five elements in order to provide interoperability.

If an AVL provider is not flexible enough to deal with all the various elements, it will not be able to scale with you as new departments come on board for the cost savings — thus potentially negating the very benefit it was brought on to provide.

### Real-world examples

When it comes to public safety, interoperability has become a must. When emergencies happen, often more than one agency responds — fire, police, EMTs, even volunteer brigades. Coordination is crucial both at the incident location and back at command and control. An interoperable AVL program ensures that the right resource gets to the right spot at the right time.

Consider the Regional Emergency Dispatch (RED) Center, in the north Chicago area. Multiple agencies share a dispatch center, which coordinates emergency response across more than a dozen municipalities and districts. The AVL program they use - CompassCom — allows all of them to know where each other are so emergency response can be fast, accurate and efficient.



Emergency Command and Control at the RED Center in north Chicago is facilitated with realtime Computer Aided Dispatch monitoring of their AVL program, coordinating more than a dozen different agencies.

Another example is the City of Aurora, Colorado, a large suburb east of Denver, with more than half a million residents. Aurora's interoperability requirements across departments are such that it uses four different "parsers" or different kinds of inputs, into the server that compiles the AVL information for fleet managers in Public Works, Code Enforcement, Forestry, and the city's Parks, Recreation and Open Space department.

"The interoperability [of AVL] is also an element in worker safety, and we really appreciate-

ate that. Especially the code enforcement division, they feel safer with this program."  
 — William Keever, GIS Coordinator, City of Aurora, CO

## ROI - The Worth of AVL

The reality is that departments need to work together to best leverage any investment in AVC. Therefore, an AVL provider must be flexible in working with all five elements in order to provide interoperability and good Return on Investment.

Consider these examples of what AVL can show you:

### Idle time reduction

Idling vehicles can burn as much as 1/2 gallon of gas per hour

A vehicle that idles 1 hour a day will pay an additional \$360.00 or 16% of its annual fuel cost.'

Reducing idle time by only 33% will save approximately \$119.00 in fuel costs annually per vehicle. \*

If your fleet contains 1 ,000 vehicles (an average tier-two city size) that 33% reduction translates to

1,000 vehicles X \$119 per vehicle = \$119,000 fuel savings

•Based on the following assumptions: fuel cost@\$3.00/gallon; vehicles driven 15,000 miles a year, average fuel economy 20 MPG; vehicles driven 5 days per week, 48 weeks per year.

### Aggressive Driving

Driving aggressively (speeding, rapid acceleration, and hard-braking) can lower gas mileage by 33% at highway speeds and by 5% in town

Speeding alone can increase fuel cost by as much as 6.5% for every 5 MPH the vehicle is driven over 60 MPH.'

As an example, a vehicle driven 50% of the time at a speed of 65 MPH can expect to pay an additional \$208.00 in annual fuel cost per vehicle.'

However, by noting the drivers that need training and reminding them of fuel cost concerns, a fleet manager that can reduce speeding by 75% will save approximately \$156.00 in fuel costs annually per vehicle.'

For a fleet of 1000 standard-sized vehicles:

1,000 vehicles X \$156 per vehicle = \$156,000 fuel savings (at \$3 per gallon fuel cost)

•Based on the following assumptions: fuel costs \$3.00/gallon; standard-size (SUV or Delivery Van) vehicles driven 15,000 miles a year; average fuel economy 14 MPG; vehicles driven 5 days a week, 40 weeks a year.

•www.fueleconomygov/feg/drjvenabits.shtml

### Another way to view AVL Return on Investment:

Consider a fleet of only 10 standard-size vehicles (snow plows, street sweepers and boom trucks, for instance, would be more expensive in use and maintenance)

Monthly Expense Description*	Expense Amount	Expense Savings
Monthly Personnel Salaries	\$26,000	4.2% or \$1092.00
Monthly Overtime	\$675	10% or \$67.50
Monthly Vehicle Expense	\$4,000	2.5% or \$100.00
Monthly Fuel	\$3,614	10% or \$361.40
Monthly Maintenance	\$1,000	9.5% or \$95.00
<b>Total Monthly Savings</b>		<b>\$1,715.90</b>

### Expense Assumptions

- Monthly Salary - assumes \$15.00 / hour @ 40 hrs / week X 10 drivers
- Monthly Overtime - assumes 3 hours per driver per week @ \$15 X 1.5
- Monthly Vehicle Expense - assumes \$400 per month per vehicle

- Monthly Fuel Expense - assumes \$325 per month per vehicle
- - 500 miles/wk @ 18mpg = 27.8gal @ 3.00 per/gallon
- Monthly Maintenance - assumes \$100 per month per vehicle

Estimates are based on industry and government statistics

- The 4.2 % reduction in monthly salary expense is based on increasing employee productivity by only 20 minutes per day
- Any un-authorized fueling of non-company vehicles will be eliminated

## Fleet Management At Your Fingertips - The CompassCom Solution

CompassCom provides the most flexible, most reliable, smartest AVL solution in the market today.

Because we have been in the business since the very beginning of the technology — the early 1990s — we have experience working with almost every GPS hardware provider, wireless or 2-way carrier, and mapping data technology available. Our patented technology has been folded into CompassLDE, the connectivity server that can compile all the data, simultaneously, regardless of source, into a single usable database. CompassCom then provides the viewing, reporting and incident command pieces to give our customers a complete AVL solution — or, we are so flexible, we can and do work with third party software so that our server can be used through an API with products such as Cityworks' AMS Server so users can access their AVL program on the Cityworks' viewer.

CompassCom is happy to work with you to create a customized AVL solution just for you. We can recommend solutions for each of the five elements, or we can work with what you have in place.

'CompassCom is a full-service organization. They have the expertise to combine all sorts of solutions together for the customer. They are certainly the best-of-breed, based on my research. They continue to push the boundaries of the technology around AVL. They are the leaders in the space as far as I can see. Other AVL providers are vertically or horizontally challenged. CompassCom is diverse and can handle anything. "

— William Keever, GIS Coordinator, City of Aurora, CO.

Let us know your needs. We are here to bring your fleet management under control. Save money through AVC. We can show you how.

For more information, check out our website at [www.CompassCom.com](http://www.CompassCom.com), or contact us at 800-787-0651 or at [solutions@compasscom.com](mailto:solutions@compasscom.com).

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