SUBJECT: Product/Service Standardization of the Grey Island Systems International Inc.’s “InterFleet” Product as the GPS/AVL Program for Road Operations & Maintenance (PW09080) - (City Wide)

RECOMMENDATION:

(a) That Grey Island Systems International Inc. Global Positioning Services/Automatic Vehicle Location/ (GPS/AVL) “InterFleet” program be confirmed as the standardized product in providing GPS/AVL service to the City of Hamilton’s Public Works, Road Operations & Maintenance for the fall of 2009 through to the end of 2015;

(b) That Public Works staff be authorized to negotiate pricing and a new contract with Grey Island Systems International Inc. in a form satisfactory to the City Solicitor;

(c) That the appropriate account/dollar amounts be created to fund the GPS/AVL program or be included into the annual winter maintenance budget.
the newest in-house plows and all the contracted plowing equipment under contract C11-121-07 provided by Integrated Maintenance & Operations Services Inc. (IMOS). The pilot project to date has demonstrated significant benefits in the areas of:

- Program Management
- Program Accountability
- Risk Management

and a complete AVL implementation in the Winter Control Program fleet would fully optimize the realization of these benefits. In proceeding with a full GPS/AVL implementation in the Winter Control Program, it would be advantageous to standardize the “InterFleet” product provided by Grey Island Systems International Inc. The standardization would extend the value of existing monitoring equipment, maintain current level of service, and provide a seamless transition in system operation and management. As a result of the standardization of the “InterFleet” program there will not be a competitive bid process required as Grey Island Systems International Inc. is the single source provider of this program. As the original RFP has expired, and in order to move forward with the GPS/AVL monitoring program it would be beneficial to identify Grey Island Systems International Inc.’s “InterFleet” program as the standard GPS/AVL service to Road Operations & Maintenance until the end 2015. The purpose of this report is to request approval for the expansion of the GPS/AVL program and for a standardized product in the Grey Island System International Inc.

**BACKGROUND:**

The information/recommendations contained within this report have City wide implications.

In the fall of 2004 Road Operations & Maintenance issued a Request for Proposal for an Automatic Vehicle Location/Monitoring Service to monitor, record and refine the performance of the City’s winter maintenance program. Grey Island Systems International Inc. was the successful bidder and has been providing the Road Operations & Maintenance GPS/AVL services since the spring of 2005. The Grey Island Systems International Inc. “InterFleet” program is a GPS/AVL network that incorporates a cellular based system that uses web-based browser services to provide real-time information to the user.

With this information the City can monitor, record and track the snow plowing/winter maintenance program in real time. The information is also stored by the “InterFleet” program for later reference. With this information we are able to verify such things as; hours of activation, history of activity within a particular area, record of deployment and confirm adherence to schedules, policies and regulation as they relate to the City’s Salt Management plan and the City’s Level of Service requirements.

The chart below illustrates the units presently equipped with the Grey Island System International Inc “InterFleet” program. The use of GPS/AVL is primarily focused on the winter control program. Contracted IMOS equipment and City Anti-icing units are monitored during winter operations months, while the in-house patrol trucks, plow trucks and Street Sweepers are monitored 12 months of the year:
Subject: Product/Service Standardization of the Grey Island Systems International Inc.'s “InterFleet” Product as the GPS/AVL Program for Road Operations & Maintenance (PW09080) - (City Wide) - Page 3 of 10

Present In-house and contracted equipment equipped with InterFleet

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Winter Maintenance Fleet Inventory</th>
<th>Present Inventory equipped with</th>
<th>Percentage of existing Fleet equipped with GPS/AVL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present Inventory Plow Sensors</td>
<td>Material Sensors</td>
<td>InterFleet GPS/AVL units</td>
</tr>
<tr>
<td>In-house</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrol Trucks</td>
<td>7</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Street Sweepers</td>
<td>17</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Plow Trucks</td>
<td>105</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Anti-icing Trucks</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>IMOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrol Trucks</td>
<td>2</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Plow Trucks</td>
<td>44</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Anti-icing Trucks</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Reports from the “InterFleet” system are presently providing the following information to program management staff:

- **Vehicle Status**- checks the present status of any vehicle at any given time.
- **Activity Summary**- the ability to check any given vehicle by date and time or location.
- **Stops Report**- monitors how long a vehicle has been stopped and when it last reported in.
- **Exception Report**- presently monitoring excessive idling over ½ hour and speeds over 90 Km an hour.
- **Query Reports**- track actions past or present. by vehicle number, date, time, location

Benefits to the program expansion although difficult to associate the potential dollars now maybe found as the program develops in such areas as:

- **Program Management**
  - Improved compliance with the City’s Winter Level of Service Policy and Salt Management Plan.
Improved effectiveness in monitoring the application of material and plowing operations in accordance with the approved level of service.
Program enhancement and review in such areas material applications rates, route optimization and post-event analysis.

- **Program Accountability**
  - Records Management
- **Risk Management**
  - Claims reduction
  - Cost avoidance through claim deferrals

**ANALYSIS/RATIONALE:**

Staff and Grey Island Systems International Inc. have developed a winter operations report verifying:

- start and completion times,
- exit and re-enter times into the yards,
- vehicle speed, vehicle location
- ploughing and spreading distances (on those units equipped with the appropriate sensors)

The development of this report has helped to verify start and completion times in comparison to IMOS driver logs. In the past the City would have relied on the IMOS driver logs to identify start/end times as well as routes maintained. The GPS/AVL winter operations report verifies IMOS driver logs as additional backup. Through introduction of “InterFleet” program in monitoring winter maintenance operations, IMOS has also embraced the use of the GPS/AVL tracking system in overseeing its winter operations.

As Grey Island Systems International Inc.’s “InterFleet” program is the International leader in providing this type of service to Municipalities particularly to the winter operations spectrum and it would be beneficial to continue to use their services.

Other departments within the City have recently decided to move forward with a GPS/AVL system provided through Intergraph Canada called “Trackforce”. As the monitoring equipment (control boxes) are not transferable between vendors, it will therefore be necessary to remove all existing Grey Island System International Inc.’s “InterFleet” GPS/AVL hardware from the existing fleet and replace with new “Trackforce” equipment from Intergraph Canada.

The proposed GPS.AVL program expansion shall include the installation of 70 new GPS/AVL hardware boxes and antenna on all remaining City in-house sweepers, plowing sand/salt trucks, as well as the installation of 139 plow blade sensors and 155 material/application sensors on all remaining City in-house and IMOS plow and Anti-icing trucks. The inclusion of these sensors will provide more detailed information on actual plowing operations including plow up/down, time and actual plowing distances by route. Additional sensors will be installed to the material spinners, this will help to determine and verify that the material applied is being distributed at the appropriate application rate in accordance with route design as well as verifying adherence to the
City of Hamilton’s Salt Management Plan. The InterFleet GPS/AVL units, plow blade and material sensors installed on the IMOS units will be removed upon completion of contract C11-121-07 in the spring of 2012. These units will be transferred to the successful bidder on the next winter road maintenance contract.

### Proposed InterFleet program expansion

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Winter Maintenance Fleet Inventory</th>
<th>Present Inventory equipped with</th>
<th>Proposed Program Expansion</th>
<th>Percentage equipped with GPS/AVL and sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Plow Sensors</td>
<td>Material Sensors</td>
<td>InterFleet GPS/AVL units</td>
</tr>
<tr>
<td>In-house</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrol Trucks</td>
<td>7</td>
<td>n/a</td>
<td>n/a</td>
<td>7</td>
</tr>
<tr>
<td>Street Sweepers</td>
<td>17</td>
<td>n/a</td>
<td>n/a</td>
<td>15</td>
</tr>
<tr>
<td>Plow Trucks</td>
<td>105</td>
<td>10</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Anti-icing Trucks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>IMOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrol Trucks</td>
<td>2</td>
<td>n/a</td>
<td>n/a</td>
<td>2</td>
</tr>
<tr>
<td>Plow Trucks</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>Anti-icing Trucks</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The City of Hamilton is a member of the GPS sub-committee within the Ontario Road Salt Management Group (ORSMG). This committee comprises of other ORSMG Municipalities members presently using GPS/AVL tracking programs. The committee was created to assist in developing an industry standard for GPS/AVL programming to help Municipalities monitor their snow plowing operations and material usage. Grey Island Systems International Inc is the predominate supplier of GPS/AVL in North America as well as the predominate supplier to other members of the ORSMG committee. The sub-committee is investigating program expansion in conjunction with Grey Island Systems International Inc. in such areas as direct billing/invoicing of winter maintenance contractor’s equipment through road segment completion, route optimization by analyzing the information provided through GPS/AVL and designing routes based upon time, material usage, yard location and vehicle type.

Given the investment to date in the GPS/AVL hardware and the satisfaction with the “InterFleet” program meeting Road Operations & Maintenance winter monitoring needs it would be beneficial to continue using the Grey Island Systems International Inc.’s “InterFleet” program. Further expansion of the GPS/AVL program could lead into opportunities to increase the effectiveness of our current resources in areas of: street...
sweeping and the loose top program also. Other possible avenues of the GPS/AVL program in the future could lead into areas of actual event costing and route optimization analysis.

In the future a possible expansion of the program may include various Operation & Maintenance equipment such as Superintendent and Supervisor vehicles, staff crew cabs, backhoes, traffic line painters etc. Further expansion of the program into areas of contracted equipment maybe used to monitor the rural roadside mowing program. Any further program expansion or increase in the number GPS/AVL equipped units will require an FTE to monitor and report on the existing program performance and possible program enhancements. Any further program development/enhancement will be addressed in a report to the Public Works Committee at a later date.

**ALTERNATIVES FOR CONSIDERATION:**

A number of avenues can be considered regarding the future of the GPS/AVL program for Road Operations & Maintenance and the Winter Control program:

1. Standardize the “InterFleet” product provided by Grey Island Systems International Inc. with no program expansion. The program would thereby be limited to the transfer of GPS/AVL units into new winter maintenance plow sander/salter vehicles as older plow units are replaced. This approach is not recommended by staff as this limits our ability to move forward in the future with program development in such areas revised material application rates, plowing and street sweeping route optimization and post-event analysis.

2. a) Standardizes and convert the present GPS/AVL equipped fleet to the Intergraph Canada “Trackforce” program hardware at an estimated cost of $260,000. This cost does not include any associated annual air-time or licensing agreements.

   b) Standardizes and convert the entire winter operations fleet as proposed in the expansion program to the Intergraph Canada “Trackforce” program hardware at an estimated cost of $430,500. This cost does not include any associated annual air-time or licensing agreements.

   This approach is not recommended by staff as the ‘Trackforce” program does not meet the needs of the Road Operations & Maintenance winter control program and would increase the winter control budget when air-time and licensing costs are taken into consideration.

3. Operations & Maintenance tenders through the competitive bid process for a possible new GPS/AVL program supplier. This approach is not recommended by staff given the infrastructure dollars invested and program enhancements and satisfaction already achieved with the Grey Island Systems International Inc “InterFleet” program.

4. Operations & Maintenance abandons the use of GPS/AVL program entirely. This approach is not recommended by staff as this would hinder the ability to monitor and record plowing and material applications for the winter control program in such areas as program management, program accountability and risk management.
FINANCIAL/STAFFING/LEGAL IMPLICATIONS:

In order to advance the program to provide full coverage of all in-house and IMOS plowing equipment for the 2009/2010 winter season approximately $120,000 will be required to supply, install and maintain the new and existing GPS/AVL units, plow and material sensors. In addition the increase in GPS/AVL equipped inventory will also increase the cost for the yearly monitoring, equipment maintenance and web access service charges of approximately $115,000 annually. Enhancing the remaining City in-house plow, sanders/salter now, using the present inventory numbers including the infrastructure monies already spent of $130,000 will provide the City with the ability to monitor all in-house plows, anti-icing units, patrol trucks, sweepers and IMOS contracted equipment.

The current annual cost to monitor and maintain the present “InterFleet” system is approximately $68,000. The proposed expansion of the program which includes the installation of the “InterFleet” hardware and plow and material sensors in all remaining in-house and IMOS plow equipment will cost an additional $47,000 in air-time costs annually. With the program expansion Road Operations & Maintenance will now be able to monitor and record actual vehicle locations, plowing times, plowing distances and material application type and the associated applications rates on all City and IMOS plows, Anti-icing units and winter patrol vehicles. The estimated $115,000 annual cost to monitor and maintain the present inventory and the proposed expansion of the “InterFleet” GPS/AVL program will assist in monitoring and recording approximately 70% of the present activities under the winter control budget.

The following chart may better illustrate the cost associated with the exiting program vs. the proposed expansion in monitoring and recording winter activity.

Associated costs comparison of existing program vs. the expanded program

<table>
<thead>
<tr>
<th>Items</th>
<th>Existing Inventory</th>
<th>Expanded Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>InterFleet Units</td>
<td>111</td>
<td>181</td>
</tr>
<tr>
<td>Plow Sensors</td>
<td>10</td>
<td>139</td>
</tr>
<tr>
<td>Material Sensors</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Infrastructure dollars already invested</td>
<td>$136,000</td>
<td>$136,000</td>
</tr>
<tr>
<td>Proposed expansion costs</td>
<td>0</td>
<td>$120,000</td>
</tr>
<tr>
<td>Estimated Yearly Air-time and maintenance costs</td>
<td>$68,000</td>
<td>$115,000</td>
</tr>
</tbody>
</table>

The proposed program increase in GPS/AVL monitoring to the in-house plowing sand/salt trucks, patrol trucks, sweepers and IMOS contracted equipment will generate an estimated annual air time cost to be approximately $105,000. It will be necessary to
fund the GPS/AVL program annually either through the creation of an account or the dollar value being added to the annual winter maintenance budget in the amount of $115,000. This annual dollar amount would include the associated annual airtime costs as well as any unit repairs, replacements and unit transfers as newer plows are introduced into the fleet. In order to move forward the proposed program expansion it will be necessary for this coming winter season to include an additional estimated $120,000 into the annual winter maintenance budget in order to supply the remaining in-house and IMOS plowing equipment with the necessary GPS/AVL hardware, plowing and material sensors.

As Road Operations & Maintenance as already invested 5 years of time and infrastructure dollars on the existing equipment inventory at an estimated costs of $130,000. It would be beneficial from both a cost benefit and program advancement perspective to continue and expand the program through the Grey Island Systems International Inc.’s “InterFleet” program.

**POLICIES AFFECTING PROPOSAL:**

**Purchasing Policy #14** - Policy for Standardization requires that approval from the Manager of Purchasing and Council be obtained before a standard is established. Where the establishment of a standard will result in a single source purchase, that purchase shall be approved by the Manager of Purchasing and Council.

**Corporate Strategic Plan** - The use of GPS/AVL in monitoring material application rates will aid in the environmental stewardship by ensuring the appropriate application rates are being implemented. This will help to reduce the impact of the City’s winter operations on the environment.

**Public Works “Innovate Now”** - The ability to provide GPS/AVL technology for the winter maintenance program through both real time and historical GPS/AVL information helps the District Superintendents, Supervisors and front line staff increases performance through post event analysis and program review.

**RELEVANT CONSULTATION:**

Risk Management was asked to comment on the use of GPS/AVL and has provided the following comment:

Risk Management endorses the use of GPS/AVL in the maintenance of the City’s road network.

The primary value of GPS/AVL to Risk Management is in the compilation of evidence for the defence of liability claims stemming from motor vehicle accidents in the winter months. Motor vehicle accidents can present extremely large damage exposures to municipalities – not only in the form of severe injuries and fatalities, but also in the fact that under current legislation, as a “deep pocket” party to an accident, a municipality is vulnerable to paying damage shortfalls created by uninsured or underinsured motorists. Historically, some of the City’s largest claim payouts have been relative to winter vehicle accidents, largely due to an inability to establish a diligent winter maintenance effort on a given date, even though it may have existed. For these reasons it is paramount that
the City takes full advantage of the unique capabilities of GPS to qualify its winter roads maintenance program.

In past the City has had to rely on hard copy log book notes, diary notes, patrol sheets, payroll records, and the testimonies of Roads employees to illustrate patrolling, plowing, and sanding/salting activities. While the actual maintenance effort may have been satisfactory it can be very difficult to prove it forensically using only these evidentiary tools. From claim to claim defence material will vary in consistency depending on the abilities of staff involved and record storage efficacy.

The incorporation of GPS/AVL unquestionably leads to more uniform, consistent, and thorough defences for the City. Legibility of documents and records storage basically becomes non-issues. The testimony of staff, always a large variable, also becomes less of a factor to the defence effort.

Aside from claims defence, Risk Management supports any technology which will serve to improve the ability of the Road Operations & Maintenance Section to maintain the road network. Improvement in roads maintenance will naturally translate to fewer vehicle accidents, which of course benefits the community in numerous ways.

Public Works Information Technology Team (PWITT)

Due to the cost to convert the existing “InterFleet” program to the Intergraph Canada “Trackforce” program it was agreed upon that Road Operations & Maintenance should continue with using the Grey Island Systems International Inc. solution.

Purchasing

The Purchasing Section has requested that the ‘InterFleet” product from Grey Island International Inc be approved by Council as the standardized product in providing GPS/AVL service to the City of Hamilton’s Public Works, Road Operations & Maintenance Section as Pursuant to the Corporate Purchasing Policy, Section 4.14, “Policy for Standardization”. The Purchasing Department has reviewed the report for compliance with the City’s Purchasing Policy.

Purchasing has also noted that, as a result of the standardization of the “InterFleet” program, there will not be a competitive bid process required as Grey Island Systems International is the single source provider of this product/program.

CITY STRATEGIC COMMITMENT:

By evaluating the “Triple Bottom Line”, (community, environment, economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

Community Well-Being is enhanced. ☑ Yes ☐ No
Public services and programs are delivered in an equitable manner, coordinated, efficient, effective and easily accessible to all citizens.
The public are involved in the definition and development of local solutions.
Partnerships are promoted.

Environmental Well-Being is enhanced. ☑ Yes ☐ No
Human health and safety are protected.
Consumption of all natural resources is reduced.
Air quality and water quality and quantity are protected. Climate-related risks are managed; Greenhouse Gas emissions are reduced. Ecological function and the natural heritage system are protected.

**Economic Well-Being is enhanced.**  ☑ Yes  ☐ No
A skilled, innovative and diverse workforce is attracted and retained. Hamilton's high-quality environmental amenities are maintained and enhanced.

**Does the option you are recommending create value across all three bottom lines?**  
☑ Yes  ☐ No

**Do the options you are recommending make Hamilton a City of choice for high performance public servants?**  
☑ Yes  ☐ No
The creation of a respectful, desirable and supportive workplace. Life-long learning is supported.