

V. FLEET MANAGEMENT AT THE SMITHSONIAN: USING NEW TOOLS TO ADVANCE SUSTAINABILITY AND EFFICIENCY*

OVERVIEW

The Smithsonian Institution operates a widely diverse fleet of 1,500 vehicles to support its operations in more than 80 countries around the world. Through the use of a fleet management information system and telematics (which combines GPS tracking and information networking), the Smithsonian has been able to reduce the number of light-duty vehicles in its fleet by 18 percent. These measures, along with other actions such as a shift to alternative-fueled vehicles and biofuels, have reduced petroleum consumption by the Smithsonian fleet by 44 percent since 2005.¹ The Smithsonian has been leading by example in a government-wide effort to advance sustainability goals through improving the way it manages and utilizes its fleet.

A DRAMATIC TURN TO SMARTER FLEET MANAGEMENT

Established in 1846 by Congress with the mission of supporting the “increase and diffusion of knowledge,” the Smithsonian Institution is the world’s largest museum and research complex.² It includes 19 museums, nine research centers, and the National Zoological Park. The Smithsonian has permanent locations in eight states and in Washington D.C. and Panama, and is active in more than 80 countries across the world.

The Smithsonian has a somewhat unique place in the federal family of departments and agencies. Because it is directly funded by Congress, but also receives substantial funding from outside sources, it is considered a “quasi-federal” entity. Nevertheless, the federal government expects the Smithsonian to meet the same energy, efficiency, and sustainability requirements as all other federal agencies. In addition, the Smithsonian faces the same pressures as other government agencies when it comes to increasingly constrained budgets.

With a small and highly diverse vehicle fleet, the Smithsonian has dramatically altered how it manages its transportation needs and has quickly moved to the fore-

front of strategic fleet management within the federal government. Two key elements of this shift are the use of an enterprise-wide fleet management information system (FMIS) and the Smithsonian’s use of vehicle telematics (more below). By using innovative new tools to modernize the way it collects and monitors a wide range of fleet data, the Smithsonian has substantially improved the way it operates and maintains its motor vehicle pool.

This case study focuses on the Smithsonian’s use of the FMIS and telematics to accomplish the following goals: reducing the administrative burden of reporting requirements; right-sizing its fleet; enhancing maintenance; streamlining direct capital and staffing expenditures; reducing fuel consumption and fuel expenditures; and meeting energy and environmental goals. The Smithsonian’s experience serves as a model for other agencies seeking to better utilize and operate their fleets.

SUSTAINABILITY AND COST-SAVING CHALLENGES

With increased pressure to reduce costs, cut energy use and limit greenhouse gas emissions, federal agencies increasingly are taking a fresh look at ways they can better manage their fleets. While the Smithsonian manages its vehicle fleet on its own, most federal agencies have turned to the U.S. General Services Administration³ to supply and maintain their fleets.

Federal fleets are subject to several legislative and regulatory mandates to minimize their energy use and environmental impacts. For example, the Energy Independence and Security Act of 2007 (EISA) requires federal agencies to reduce annual petroleum consumption by 20 percent by 2015 from a 2005 baseline.⁴

As one of his first major environmental initiatives, President Obama issued Executive Order 13514 on October 5, 2009. Titled *Federal Leadership in Environmental, Energy and Economic Performance*, it requires agencies to prepare and implement a Strategic Sustainability Performance Plan, report on agency greenhouse gas emissions, and set a percentage reduction target for these emis-

FIGURE 1: Types of Smithsonian Fleet Vehicles



Source: Thi Dao, "Using Data as a Tool: How the Smithsonian's FMIS Helped Streamline Operations," *Government Fleet*, November 2011.

sions.⁵ The Executive Order also requires that agencies reduce consumption of petroleum products by 2 percent annually through 2020 compared to a 2005 baseline. In addition, it mandates that agencies use low greenhouse gas-emitting vehicles and that they optimize the number of vehicles in their fleets.

The Obama Administration followed up this Executive Order with more detailed guidance specific to federal fleets. On May 24, 2011, the Administration issued a Presidential Memorandum titled *Federal Fleet Performance*.⁶ It requires agencies to utilize a new tool from GSA—the vehicle allocation methodology (VAM)—to determine “the optimum inventory with emphasis placed on eliminating unnecessary or non-essential vehicles from an agency’s fleet inventory and ensuring lifecycle cost-effectiveness of maintaining such inventory.” Based on their use of the VAM, agencies are required to post targets for their optimal fleet inventory on their websites and to develop and implement a plan to meet these targets by the end of 2015. The memorandum also requires that by 2016, all new light-duty vehicles leased or purchased by agencies must be alternative-fueled vehicles.

CHANGING ROLE OF TECHNOLOGY

A range of new technologies provide federal agencies and other organizations with powerful new information and communication technology (ICT) tools to enhance fleet productivity. These technologies have the potential to fundamentally change how federal agencies operate

and manage their vehicle fleets. ICT-enabled solutions can allow agencies to:

- Reduce administrative time and costs associated with data entry and reporting, which frees up staff to work on other projects;
- Reduce the number of vehicles and deliveries between facilities by optimizing routing;
- Automatically track and schedule preventive maintenance so vehicles can be repaired before problems escalate;
- Gather information on driver behavior that can be used to promote more fuel-efficient driving and alert managers to safety concerns; and
- Collect detailed data about vehicle use and maintenance, allowing agencies to right-size their fleets.

The Smithsonian fully integrated these tools into a newly created fleet management department to better manage its vehicles.

An essential first step in streamlining fleet management and operations is the adoption of a fleet management information system (FMIS). A FMIS provides a comprehensive inventory of all fleet and equipment assets. The system also assists in the development of vehicle replacement plans; tracking and control of fuel use, costs, and vehicle utilization; production of fleet acquisition budget plans; and preparation of a range of other standard fleet management analyses. The Smithsonian’s FMIS replaced a manual system that had developed in an ad hoc manner over time. The prior system did not allow the Smithsonian to fully monitor fuel consumption, nor did it provide real-time information to inform operational decisions.

Telematics are an additional tool that can enhance tracking and management of vehicle fleets. Capitalizing on the increased availability and reduced costs of various wireless technologies, including GPS, telematics can be used to monitor location, operator performance, and engine diagnostics for each vehicle in the fleet. Among the key features of these technologies is that they can connect to a vehicle’s engine computer and send vehicle fault code notifications via email to a centralized location. This allows the fleet management team to take action before a problem escalates and helps limit unscheduled maintenance. Telematics also allow fleet managers to ensure that their vehicles are being operated in a safe and efficient manner (e.g., by tracking vehicle speed and location).

THE SMITHSONIAN'S FLEET MANAGEMENT EFFORTS

The Smithsonian operates a wide range of facilities, including museums, zoos, animal research and educational centers, and more traditional office space. The fleet required to support this sprawling operation is equally diverse and includes approximately 1,500 vehicles. Law enforcement vehicles used to ensure safety at Smithsonian facilities make up the majority of the fleet, which also includes vehicles for facility support, shuttle bus service, animal transport, construction and maintenance, and other purposes.

An independent review of the Smithsonian's fleet management practices in 2006 highlighted a number of critical shortcomings, including the lack of central control of fleet operations and an absence of data collection and reporting.⁷ The report recommended consolidating the Smithsonian's fleet services into one office, and creating a new position of fleet manager. The Smithsonian began implementing the report's recommendations by hiring its first fleet manager, who then proceeded to consolidate all fleet operations and introduce the use of the FMIS and vehicle telematics.

The Smithsonian's FMIS

The Smithsonian's fleet department motto is, "You can't manage what you don't measure." It's an expression that comes up frequently when discussing the Smithsonian's "Green Fleet" plan, which focuses on alternative fuels, fleet right-sizing, management and maintenance practices, and emission reductions.⁸ While no one tool will meet all of an agency's fleet management requirements, the Smithsonian has used its FMIS as an integral component of a broad effort to improve its fleet operations. **Table 1** shows the steps and timeline the Smithsonian used in moving forward with its FMIS over a five-year implementation plan.

The Smithsonian was able to procure and implement the first phase of the FMIS within a six-month window. Deployment of a new information system required a number of interrelated steps, from conducting detailed business process reviews to designing and testing a FMIS user interface to migrating data from stand-alone systems. After the fleet department successfully configured the software to meet the needs of the Smithsonian and performed initial staff training, it launched the first phase in March 2008. The focus of this phase of work was management of vehicle assets, maintenance, and schedules.

TABLE 1: Major FMIS Implementation Milestones

TASK/PRODUCTS	INITIAL PROJECTION	PROJECT STATUS
<i>Requirements review and market analysis</i>	09/2007	Completed
<i>Phase I, Fleet Management</i>	09/2007	Completed
<i>FMIS Production acquisition</i>	09/2007	Completed
<i>System design</i>	01/2008	Completed
<i>Training</i>	02/2008	Completed
<i>Operational (assets, maintenance schedules)</i>	03/2008	Completed
<i>Phase II, Fuel Management</i>	04/2009	Completed
<i>Phase III, Fleet Pool Reservation</i>	03/2010	Ongoing
<i>Expand use of Fleetwave to include telematics</i>	12/2011	Completed
<i>Phase IV, GPS Interface</i>	08/2010	Ongoing
<i>Phase V, Implement Mobile Technology</i>	12/2012	Ongoing
<i>Interface with Facility Center</i>	12/2010	Ongoing

Source: Smithsonian Institution, "Smithsonian Information Technology Plan FY 2012- FY 2016" (Washington, DC: Smithsonian Institution, 2012).

BOX 1: GSA's Telematics Offering

The U.S. General Services Administration (GSA) offers an assortment of vehicle telematics management and tracking solutions for use by federal agencies. Agencies can order telematics monitoring solutions ranging from GPS vehicle tracking to real-time vehicle diagnostics to video recording and instant driver feedback. All vehicle information is transmitted wirelessly either by cellular or satellite communication. Fleet managers within agencies can then access a customized website that displays vehicle tracking and monitoring information.⁹

The launch of the Smithsonian's FMIS meant it now had a state-of-the-art, web-based tool to help it manage more than 1,500 vehicle assets across the world. Each subsequent phase of the work expanded the functionality of the FMIS as follows:

- The second phase allowed the Smithsonian's fleet managers to track fuel usage. It was completed a month ahead of schedule in March 2009. Every vehicle was assigned an individualized federal fleet card, with vehicle fuel transactions loaded into the fleet system on a weekly basis.
- The third phase established an online fleet pool reservation system allowing for increased vehicle utilization and reduced administrative and staff costs.
- The fourth phase expanded the use of vehicle telematics and provides real-time telematics data back to the Smithsonian.
- The fifth and final phase will implement a mobile technology component and interface with the new Smithsonian Facility Center that recently opened in suburban Maryland.

Benefits of Using the FMIS and Telematics

The FMIS is simply a tool that collects detailed data from multiple sources. How this tool is used is what determines whether it can become a powerful force in managing vehicle fleets. For the Smithsonian, the FMIS facilitates the collection and aggregation of data in a central place, making it far easier to meet federal reporting requirements. The Smithsonian's use of its web-based FMIS allows fleet operators across the world to monitor real-time progress toward meeting federal mandates, and to make more informed decisions about managing their fleets. The FMIS also has made the financial cost of operating the Smithsonian's fleet more transparent, and helped identify opportunities to reduce costs. In addi-

tion, the phased rollout of the FMIS has benefited the fleet team at the Smithsonian, allowing them adequate time to fully understand the new metrics and to transition to new fleet management practices.

The use of the FMIS and telematics has played a critical role in the Smithsonian's efforts to meet the targets set forth in Executive Order 13514. Using these new tools, the Smithsonian has refined its strategy for right-sizing its fleet, redefined fleet utilization reviews, and incorporated and expanded the use of a basic Vehicle Allocation Methodology (VAM) that is now required of all federal agencies. Using vehicle telematics and data from fuel cards, fleet managers are able to monitor real-time vehicle usage as well as fuel consumption of all Smithsonian vehicles. (see **Box 1**). As a result, they have achieved important benefits in optimizing the size of their fleets and increasing vehicle utilization. These benefits include:

- Reducing the Smithsonian's light-duty vehicle fleet from 600 to 490 vehicles (an 18-percent reduction);¹⁰
- Optimizing routing and deliveries to achieve a reduction of 12 full-size vehicles;¹¹
- Ensuring vehicles are used in a safe manner and for authorized work purposes only;
- Reducing vehicle idle time by 40 percent through vehicle telematics;¹²
- Reducing fleet petroleum consumption by 44 percent (compared to 2005 baseline year) in 2011;¹³
- Reducing unscheduled maintenance by 15 percent through preventive maintenance;¹⁴ and
- Reducing the number of full-time staff needed to manually collect and enter fleet information from three employees to one.¹⁵

For the Smithsonian, the FMIS and use of telematics has been about more than dollars and cents. It's about having the ability to access a rich dataset that has better enabled the fleet department to increase the efficiency of

its operations. According to the Smithsonian's first fleet manager, "The system has enabled us to make genuine, fact-based decisions and to be able to see where our money is going."¹⁶ As a result, the Smithsonian is now able for the first time to make detailed justifications for its fleet vehicle procurements and department budget. The FMIS has allowed the Smithsonian to produce in-depth fiscal reports at the touch of a button, which not only saves the time and expense involved in data manipulation and manual analysis but also enables more informed, fact-based financial decisions. The time it takes for bi-annual mandatory fleet status reporting alone has been cut from months to days.

While this transformation has produced numerous cross-cutting benefits, the business case for the move to the FMIS and telematics is backed up by several critical measures, such as: reduction in fleet size; reductions in vehicle idle time; savings on maintenance and fuel consumption; and reduction in administrative costs associated with reporting requirements.

The costs of purchasing and implementing the Smithsonian's FMIS were relatively small. The system was funded through its information technology budget and cost about \$20,000 for the last two fiscal years.

BARRIERS TO ADAPTION OF FLEET MANAGEMENT TOOLS

The Smithsonian is on the cutting edge of improving fleet performance among federal agencies and provides a concrete case for the benefits of an enhanced fleet management system. While implementing the FMIS can deliver a host of benefits as described above, it is not an easy process. In adopting such a system, agencies could run up against a number of potential barriers and challenges.

For example, integrating vehicle data from multiple locations and across a wide range of vehicle types and ages proved a challenge for the Smithsonian. This problem was compounded by network security concerns. The Smithsonian spent considerable time resolving such issues as how the vehicle data would be sent and how that data could be accessed via the FMIS.

During the implementation stage, the Smithsonian's fleet management team quickly discovered that not all vehicles were equally able to pass along electronically the required vehicle information back to the FMIS. As a result, the fleet team has to be selective in deciding which existing vehicles can have the telematics system installed.

In addition, the Smithsonian has added fleet connectivity as a consideration when purchasing new vehicles.

Another potential barrier to the adoption of systems like this is the perceived adequacy of an agency's current vehicle management systems. In 2007, the Smithsonian was faced with a need to significantly revamp how it managed its fleet. This created an excellent opportunity for making substantial changes, including the implementation of the FMIS. Agencies with established fleet management practices may be resistant to adopting new systems that fundamentally reshape everything from how they collect and process data to how they maintain the vehicles in their fleets.

NEXT STEPS/TRANSFERABILITY

The Smithsonian has used its FMIS as a tool to right-size its vehicle fleet, reduce petroleum consumption and greenhouse gas emissions, and improve safety. The Smithsonian intends to continue to expand the functionality of its FMIS to further reduce costs and increase the energy savings and environmental benefits associated with using the system. One project currently in the testing phase is a shared motor pool system in Washington D.C., totaling about 80 vehicles. Vehicles in four pilot motor pools can be reserved online with key boxes at each pool location, accessible through radio frequency identification technology. If successful, this shared motor pool system represents another opportunity to make better use of vehicles and lower costs.

Agencies across the federal government are moving forward in their efforts to meet goals of reducing petroleum consumption, increasing the number of alternative-fueled vehicles, and right-sizing fleets using the vehicle allocation methodology from GSA. The Smithsonian's early efforts in these areas should prove instructive for others.

GSA has taken steps to require agencies to use fleet management information systems, and has established readily available contract mechanisms for their purchase. In order to comply with new requirements for agencies to implement a FMIS, GSA developed a Federal Fleet Management System (FedFMS).¹⁷ The goal of FedFMS is to create, at the lowest cost possible, a standard and reliable government-wide inventory management system for both GSA-leased vehicles and agency-owned vehicles.

The Smithsonian has exceeded the mandate in Executive Order 13514 that federal agencies achieve a 20-percent reduction in petroleum use from a 2005 baseline. The Smithsonian's actual numbers are impressive: a 36-percent reduction in 2009 and a 44-percent reduction in 2011.¹⁸ Using data from its FMIS, the Smithsonian's

fleet managers are constantly looking at how to further improve operations, productivity, reliability, fuel economy, and alternative fuel use—proof positive that better measurement and better management go hand in hand.