



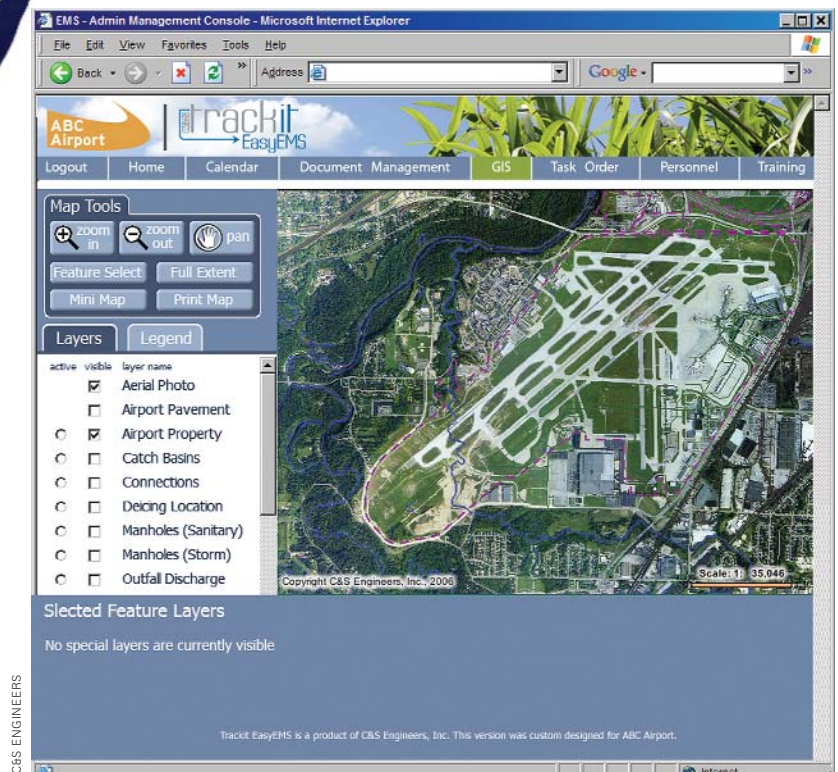
# CHECKING IN ON GIS

*In the past few years, Airport Magazine has done several articles on Geographic Information Systems (GIS) touching on popular and/or emerging applications, including security (AM, 2005 Annual Conference issue, p.20), operations tasks like tracking pavement defects and helping with wildlife management (AM, April/May 2006, p. 32) and developing information management systems that are useful to an entire airport staff (AM, 2006 Annual Conference issue, p. 26). As a follow-on, we asked several GIS companies to discuss one current trend they are seeing among their clients and/or among airports—U.S. or international—in general. Following are their responses.*

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As epitomized by very large-scale GIS projects at Phoenix Sky Harbor International and the Metropolitan Washington Airports Authority, airport GIS has begun to truly enter the phase of becoming a full-fledged enterprise IT solution. Such systems are now being seen as critical to the operational success of the airport and are being developed with greater sophistication and more comprehensive detail than ever before. Characteristics of these enterprise airport GIS systems include:

- Sophisticated hardware/software architecture, including separate production, query and testing environments, often with redundant hardware components. These systems are now being

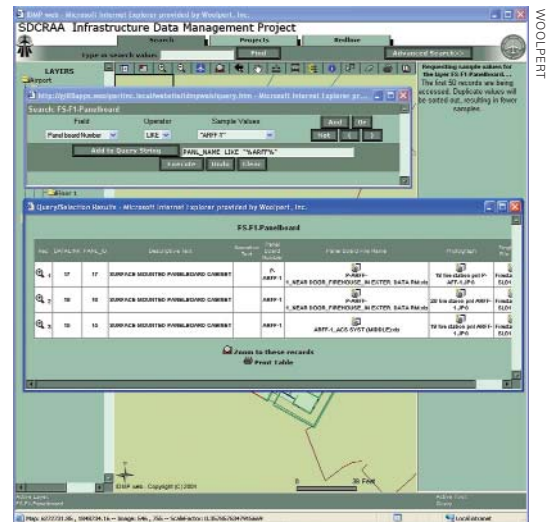
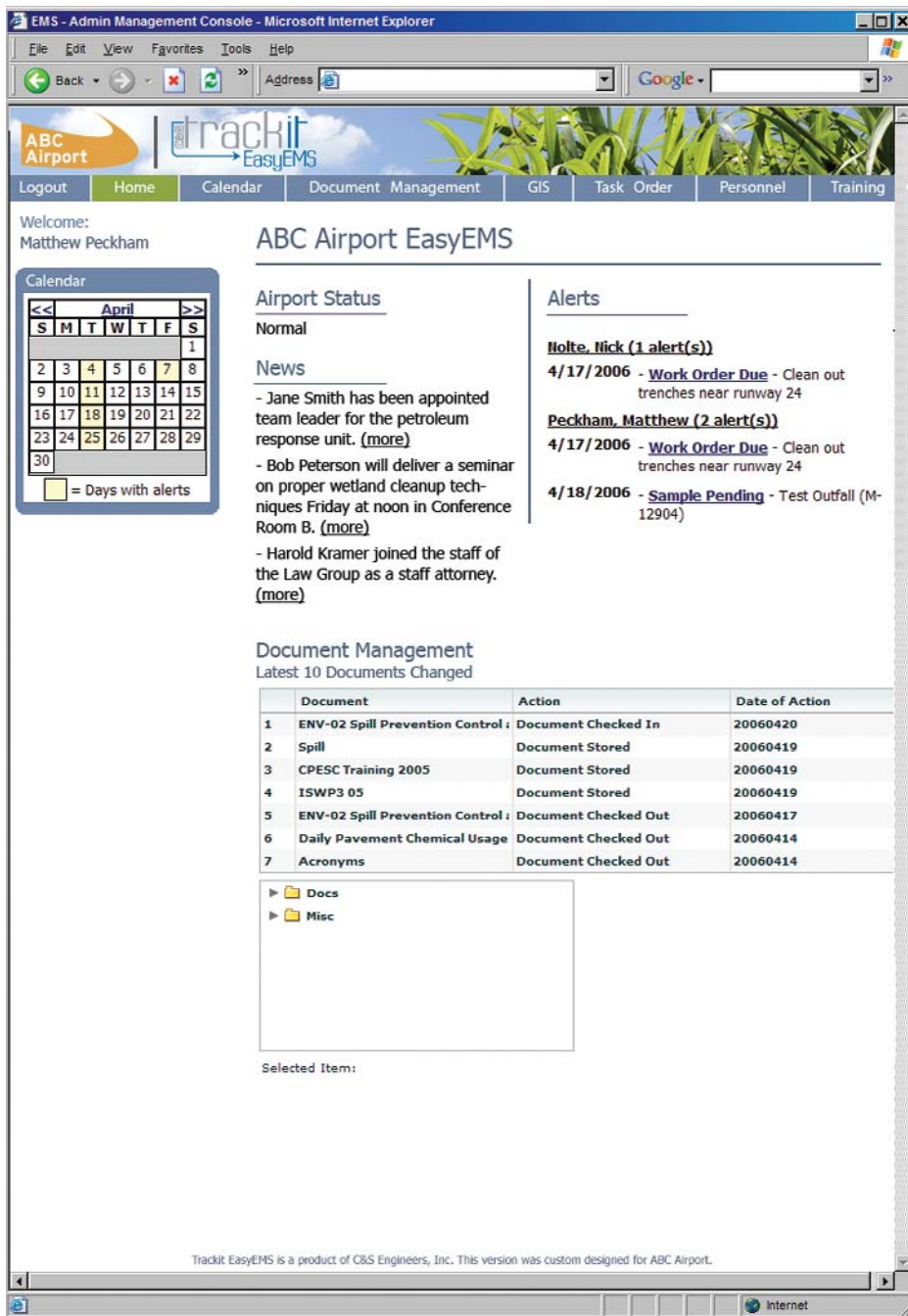


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seen as needing to match the high availability requirements of other mission-critical information systems.

- Enterprise-level database designs, which incorporate all of the operational and functional needs of the airport in a holistic manner. For a large modern airport upwards of 300-400 separate GIS feature classes will be required to encompass the range of data requirements. With today's GIS technology, these feature classes can be designed to abstract the behavior of the real-world features they describe.

- Comprehensive development of accurate data, incorporating all of the infrastructure and space information on, under and above the ground, inside all the facilities, and surrounding the airport to at least the extent of the noise contours. By incorporating all of this data into a single, spatially consistent database, the organization can use



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Airport GIS systems have certainly evolved over the last few years and have matured in many fields. We have noticed an interesting GIS trend at airports that we are involved with. Airport GIS is more and more playing a multi-purpose role at airports, but more so on a level of system and data integration that is only now realizing itself.

the GIS to answer virtually any question that involves location.

- Sophisticated security models that define, on a layer-by-layer basis, who among airport staff can see and edit each specific dataset. This type of security environment is required for the deployment of enterprise GIS to potentially hundreds of users.
- Positioning the GIS as a web-based portal that can view multiple spatial datasets from multiple sources. This will almost always include using the GIS as a spatial window into scanned drawings that are stored in an electronic document management system.
- Tightly coupled integration into multiple other airport information systems, including those for operations, maintenance management, leasing, dispatching, facilities management, land acquisition, pavement management and others.

This trend is shifting GIS from a back-room system used by a few experts to one of the most important and most widely used applications in an airport today. It provides huge opportunities for GIS to excel, but also comes with huge responsibilities that GIS must fulfill.

There have been two distinct trends in airport GIS development. The departmental GIS focused on one specific aspect such as pavement management or security. The second trend was based on the holistic airport approach with generalized infrastructure and management information linked to the GIS, often with one or two applications such as noise management or obstacle management.

As airports mature in their GIS thinking, the development of GIS systems is following the trend of "multi-purpose development for multi-purpose application." This trend is not merely the coincident result of good system design or database development, but a conscious decision to develop both GIS applications and spatial datasets with multiple applications.

Consider for instance the fast-developing trend of vehicle tracking on airports. Imagine ground handling service providers tracking their vehicles so that they are able to re-route critical resources, respond to a tug breakdown on an aircraft ready for departure or withdraw a vehicle from service due to engine overheating. Consider the security provider tracking his vehicles to ensure that patrols are taking place, or the airport operator tracking technical vehicles to alert airport control of runway incursions.

Turn the GIS switch on for all of them, provide one base map common to all users, combine the spatial location information of all the vehicles and equipment and provide this holistic picture to all those concerned. The sudden multiplier effect means that more vehicles are now

being tracked on the airport for safety and security reasons, while each department or user group has access to its specific needs. It is now the trend to consciously apply the design and development of GIS systems and applications to address multiple applications and data requirements at the same time.


ing for an airport of any size. Many airports envision expensive assessments, studies and implementation plans as an overwhelming hurdle to purchasing and using a GIS. The new trend for airports looking to acquire a GIS is to start small with a niche or area-specific system and build from there as time goes on.

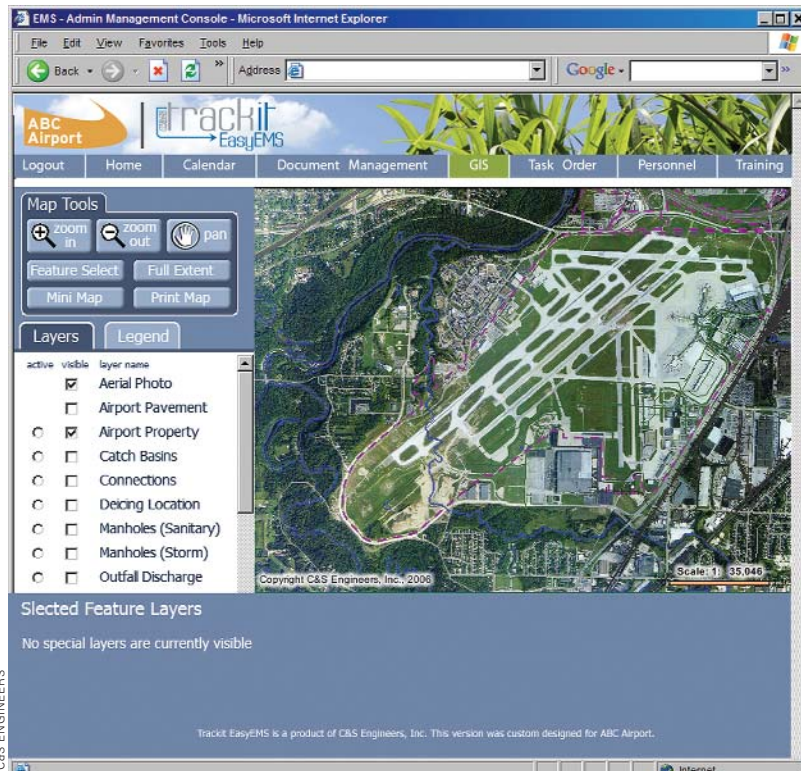
A needs assessment doesn't have to be expensive or labor-intensive. A simple study can help the airport decide which area makes the most sense for an initial GIS implementation and also figure out how the system might be expanded for future needs.

The key to starting small with a GIS is to make sure that the GIS you implement—whether a custom-designed system or an off-the-shelf product—is scalable and expandable. For example, Cleveland Hopkins International Airport started its GIS with a custom system that managed and tracked

homes in its residential sound insulation program. With that system already in place, it was much less expensive and time-consuming to add a module to manage land acquisition projects a few years down the road.

Most recently, Cleveland implemented an environmental management system, which also integrated with the existing sound program/land acquisition modules that their staff was familiar with. Plans for the future at Cleveland include a possible pavement management system component.

In the end, the system will integrate data from all existing modules so that users can see information about airport systems as they relate to many different areas. 



As with any complicated network of systems and data, this trend brings new challenges to airport GIS professionals who have to rethink the way they design systems and databases to incorporate multipurpose datasets and applications from the onset of the project. Fortunately, many database and software development trends including standards on spatial features and data exchange have made more of these developments possible.

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Implementing a complete, airport-wide GIS from scratch can be daunt-