BAHRAIN'S GEOGRAPHIC SECURITY SYSTEM USES GIS

GIS ENHANCES THE KINGDOM OF BAHRAIN'S SECURITY WITH THE GEOGRAPHIC SECURITY SYSTEM FROM ESRI NORTHEAST AFRICA AND CRIMEANALYST FROM ESRI (UK)

The Kingdom of Bahrain's strategic location in the Persian Gulf has allowed it to broaden its cultural perspective and increase its prosperity through trade and travel. Known as Dilmun to the ancient Sumerians, this island nation has interacted with a number of cultures throughout its five thousand-year history including the Babylonians, Assyrians, Greeks, Romans, Persians, Portuguese, and British.

Today, the kingdom benefits from the immense oil and natural gas fields located throughout the Gulf. Its economic success and religious and cultural ties to nearby neighbors has inspired the construction of the King Fahd Causeway, linking Bahrain with Saudi Arabia and the Qatar-Bahrain Friendship Bridge, which is currently under construction.

However, throughout the world today - and particularly in the Gulf region because of its enormous wealth and pockets of political unrest - the need for increased national security is at an all-time high. As a result of its proximity to other Gulf countries, the migration of hundreds of thousands of workers through the area, the hundreds of oil tankers and cargo ships that traverse the Persian Gulf each day, and various other factors that can affect its security, the need for increased vigilance is great.

Among its many duties, Bahrain's Ministry of the Interior (MOI) is responsible the country's homeland security, infrastructure, natural resources, and the maintenance of safe and secure passage in and around the kingdom.

In 2006, MOI decided to strengthen its defensive capabilities and expand the use of its existing geographic information system (GIS). The ministry selected the Geographic Security System (GSS) developed by ESRI Northeast Africa for this major expansion of its use of GIS technology.

Observes Brigadier Basim Al-Hamer of the MOI, "This GIS-based national security implementation is the first of its kind in the Gulf region. Applying GIS in Public Safety & Law Enforcement systems at the Bahrain MOI will optimize our emergency response efficiency and accuracy."

Major Waleed Al Hamdan, GSS Project Manager at MOI indicates, "The GSS system reflects the adaptation of modern and advanced technologies in the Ministry of Interior based on the vision and direction of H.E. the Minister of Interior, Sheikh Rashid bin Abdulla Al Khalifa and the continuous support from General Abdul Latif bin Rashid Al Zayani, Chief of Public Security and Brigadier Basim Al-Hamer."

Sohail El-Abd, professional services general manager at ESRI Northeast Africa, indicates, "The GSS system is built as a scalable geospatial backbone on which a variety of GIS-based command and control subsystems were developed in a highly integrated manner."

Ed-Abd adds that implementing ArcGIS Server technology, which uses Service Oriented Architecture [SOA], was critical in completing the extensive integration necessary to implement the GSS. Another important aspect of implementing the project was following the Joint Application Development (JAD) approach, which provided real knowledge transfer to the system users throughout all project phases.

The GSS is a comprehensive solution for safety and security built on state-of-the-art GIS technology. It is composed of a set of suites each of which includes several modules. The emergency management suite provides effective emergency response. Traffic management monitors traffic flow and control. The task force management suite is a comprehensive program that ranges from the initial task planning through fleet

A two dimensional view of a training exercise using the 2D Mission Planning module.

A three dimensional view of a training exercise using the 3D Mission Planning module.

The GSS E911 module details real-time information about ongoing emergency situations.

monitoring. Situational awareness provides a common operational picture. Surveillance manages the real-time surveillance cameras positioned throughout the country. Mission planning provides support in planning and developing operational drawings. The coastal surveillance suite provides effective monitoring of Bahrain's coasts and marine activities through surveillance cameras and/or tracking devices.

A crucial element of the GSS is the unified data model that hosts a variety of tabular and spatial data. Build on ArcGIS Server technology, the geodatabase stores hundreds of geospatial layers of data, such as the location of police stations, land use, and incident locations as well as related descriptive information, reports, and charts. The ArcGIS Server

The GSS Portable Mapper provides both route and written directions to reported incidents.

technology provides a means for easy integration and consolidation of disparate data and its subsequent distribution across the enterprise.

The development of the GSS required a number of products from ESRI's ArcGIS software suite. The required functionality included spatial data management; visualization; the storage and retrieval of file-based imagery; analysis for volumetric, surface, and network studies; and the distribution of maps and services over the Web.

Bahrain's GSS also includes CrimeAnalyst from ESRI (UK) Ltd. CrimeAnalyst makes use of the capabilities of ArcGIS software to allow a direct connection to many crime recording databases and corporate data warehouses. This direct connection facilitates greater access to information and reduces the errors, omissions, and time associated with transferring data from one file format and system to another.

Because integration with other systems is key to the success of the GSS, it is built on SOA and implemented through a set of Web services that use industry standards including XML and SOAP. This allows, for example, Bahrain's police and civil defense units to continue tracking vehicles with their existing automatic vehicle location (AVL) system, but it can now be done within the GSS environment so that the department can make use of other capabilities such as viewing surveillance system monitors and creating live situational maps. Other systems integrated into the GSS include the country's automatic fire alarm system; CCTV surveillance cameras; weather data from the Bahrain weather monitoring stations; and the Coast Guard's coastal radar, vessel tracking, and automatic identification systems (AIS).

Live information also comes from emergency operations using E911 and traffic, civil defense, Coast Guard, mission planning, and crime analysis departments, which provide MOI with a data-rich common operational picture (COP). Since the GSS is Web-based, it can be accessed from any location based on predefined access rights. For example, members of the police department can only view data related to its needs or activities, which may differ from the data available to other MOI departments. The GSS also supports various communication formats to expand its connectivity including Worldwide Interoperability for Microwave Access (WiMAX), Terrestrial Trunked Radio (TETRA), and General Packet Radio Service (GPRS).

Concludes General Abdul Latif bin Rashid Al Zayani, chief of public security at MOI, "With the implementation of our GSS, Bahrain now has an integrated security system that links and analyzes data between the various directorates and headquarters of the Ministry of the Interior. This facilitates the provision of services, develops ways of providing security for people and establishments, and increases efficiency in dealing with disasters and crises."

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