CASE STUDY

SSA GIS & FMIS

National Institutes of Health…*Turning Discovery into Health*

GIS & FMIS IMPLEMENTATION & SUPPORT SERVICES

esri Partner Network Silver

Office of Research Facilities

SPATIAL OPERATIONS

SPATIAL SECURITY

The use of Esri's technology for NIH's missions for *Facilities Management* and *Mission Critical Responsibilities*

The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services (HHS), is the nation's medical research agency. NIH is made up of 27 institutes and centers spread across the country. NIH's main campus is in Bethesda, Maryland, just outside of Washington, D.C. Other NIH campuses exist in Frederick, Maryland; Baltimore, Maryland; Research Triangle Park, North Carolina; and Hamilton, Montana. In addition to the various institutes, NIH manages over 50,000 competitive grants to more than 300,000 researchers at more than 2,500 universities, medical schools, and other research organizations across the world that provide similar health research. In fact, NIH is the largest source of funding for medical research in the world. Overall, NIH invests over $30.9 billion annually in medical research for the people of the globe.

The Challenge

Like any similar organization, the various campuses of NIH function much like small cities. In the case of NIH, these are secure campuses due to the nature of the ongoing research. The main campus in Bethesda, Maryland covers over 310 acres and is sandwiched between two major arterial roads in suburban Maryland. With over 90 buildings containing over 30,000 spaces, the Bethesda campus welcomes over 25,000 employees and visitors each day. Responsibility for the security of the campus rests with the Office of Research Services (ORS). NIH provides its own police, fire, and personnel security services on campus along with occupational health and safety services through ORS.

NIH's recent Deputy Police Chief, Dan Fuller, decided in early 2012 that he wanted to integrate GIS technology with his Emergency Communications Center (ECC) and to facilitate the use of over 1,200 video surveillance cameras across the campus. He was asked to provide an accurate listing of the operational cameras, but according to Fuller, "That was not an easy task, because the information about camera locations had never been tracked in a comprehensive way." In fact, many of the cameras had been installed since 9-11-01 due to the demand for heightened security. Emergency coordination personnel often had difficulty identifying what cameras to access in order to view a particular event; consequently, there was little if any real time monitoring occurring.

Coordination, renovation, and maintenance of the physical infrastructure for NIH campuses rests with the Office of Research Facilities Development and Operations (ORF). ORF maintains both the campus "city" infrastructure and the physical building spaces occupied by the institutes and centers, and is responsible for new construction, renovations, compliance with environmental regulations, planning and space management, and operations/property management. Maintaining/operating the existing campus facilities while providing security and accommodating significant growth in new research space in a confined suburban environment is what was needed.

Bethesda, MD

Hamilton, MT

Research Triangle, NC

The Solution

The NIH ORF's Department of Environmental Protection (DEP) is charged with assuring that NIH complies with the variety of federal guidelines and regulations regarding both interior and exterior environmental programs. DEP began a program in 2005 of inventorying the Bethesda campus's assets. The entire campus was mapped using Esri's GIS technology under the guidance of a consultant whom NIH hired, Lonnie Darr. Mr. Darr had been a user of GIS technology in the surrounding counties for several decades before being hired by NIH. Lonnie led DEP through the process of envisioning how GIS could be used and mapping

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these resources utilizing Esri's GIS technology. Once the infrastructure was mapped, DEP sponsored the development of GIS datasets for the interior spaces of all buildings on campus.

This effort resulted in the establishment of over 50 layers of GIS infrastructure data for the Bethesda campus. Applications were developed by Spatial Systems Associates, Inc. (SSA) in Columbia, Maryland to use this GIS data to map the location and condition of materials that NIH is required to report, including lead, mercury, and asbestos to assist in tracking chemical waste, recyclable materials, bulk trash, construction staging on campus, a telephone inventory, and other need-specific applications, all utilizing the Esri base maps and a single system for storage and coordination. A building navigation tool was developed by SSA that has been used across several applications to link room-specific data with the GIS interface, as well as to provide information to the NIH community regarding campus facilities. Now, NIH maintains a multi-campus ArcSDE database utilizing ArcGIS that includes a depiction of all interior spaces along with attributes conforming to a standard room naming convention that allows linkage to a variety of facilities databases.

Following completion of the campus and building infrastructure databases, ORS decided to use the GIS information base to provide enhanced security campus-wide. Mr. Darr was called upon again to assist ORS in defining the functional requirements for integration of a variety of physical security components into the GIS, including campus-wide video surveillance, locations of all campus telephones, building physical security devices, and others. All CCTV cameras were field verified, and a location point, based on the floor plans, was placed in the appropriate GIS layer. A new camera naming and numbering convention was established and incorporated into an application developed by SSA, *SpatialSecurity*.

The SpatialSecurity application allows a non-GIS ECC operator to "lasso" a group of cameras from the GIS interface and send a command to the video recording system that causes those cameras to be displayed on the ECC video wall. The resulting integration of video surveillance technology with GIS has allowed police and fire personnel to improve their ability to understand, respond to and document security related events throughout the campus.

Incidents that occur on campus outside the buildings can be quickly viewed through an array of over 250 exterior fixed and pan-tilt-zoom (PTZ) cameras. Incidents that are reported inside buildings can be viewed by the dispatchers from over 1000 additional cameras at their fingertips. Using the building navigator tool gets a call taker to the correct building, floor, and room in a matter of seconds. In many cases, the dispatchers can view an ongoing incident before the police or first responders arrive. This allows the dispatchers to provide useful information to incident responders that was not previously available.

The Bethesda campus has approximately 300 "bluelight" emergency phones strategically placed that are available to report campus incidents. Each of these phones has been mapped in the GIS, and integrated into the ECC response center. When a call from one of these phones comes in, the operator is automatically notified of the location from which the call originates, and any video surveillance cameras in the vicinity are identified. Video feeds from those cameras are then displayed on the video wall within the ECC for response management.

The Division of Emergency Management (DEM) within ORS requested that SSA develop a Common Operating Picture (COP) functionality that provides a national level of understanding of NIH-owned and leased properties regarding the current operational status of those facilities. The now-deployed web-based system utilizes available GIS data to display weather data, regional traffic cameras and incidents, closed roads, gates, etc. along with locations of critical elements of the NIH infrastructure—freezers, experiments, high value equipment, etc. to alert emergency responders to potential personal safety concerns for response personnel and building occupants in the event of an incident, and to prioritize what elements need to be especially protected in the event of an incident. DEM personnel can use the system to better understand the current status of their facilities and, in the event of a problem, the priorities for response personnel.

As NIH's institutes increasingly come to understand the functional capabilities of GIS technology, our expectation is that Esri's technology will provide an increasing role in managing and reporting the results of NIH research activities, while continuing to assist in the management of the infrastructure that allows the research to be accomplished.