# Building Information Services and Control System (BISACS) Facility Service Description for NOVA Award, 2009

The operation of modern buildings can support a vast amount of static and real-time data; sensor devices can be used to monitor pertinent information for daily operation as well as emergency scenarios. To date, there are many sensor systems using proprietary monitoring methods and there is no "standards" framework available to do remote monitoring of different types of buildings and their related sensors. Having a standards framework would allow authorized personnel such as building managers and emergency first responders to remotely monitor alarms and to do limited remote control of building devices or processes. Having standard interfaces to communicate with buildings would encourage software vendors to create products to potentially monitor and control any building for operational and emergency purposes.

The National Institute of Standards and Technology (NIST) has been investigating alternative ways for communicating building information such as sensor data, alarm data and floor plans to building managers and to first responders' operations centers and mobile units. The Building Information Services and Control System (BISACS) was developed in 2005 and continues to be enhanced by NIST's Building and Fire Research Laboratory (BFRL) as a prototype standards system that focuses on resolving interoperability challenges in areas such as communication methodology, data security and data integrity, network scalability, data content and encapsulation standards, interface protocol standards, and presentation standards. The BISACS allows for monitoring building sensors and for managing various building resources; these capabilities allow first responders to look inside a building to gain better situational awareness during emergencies in order to save lives and properties.

The BISACS has demonstrated how buildings containing many types of sensors can be consolidated and monitored. Alarms are generated by sensor signals, these signals are converted to computer processable messages before being communicated to the first responder communities via web servers. The web servers that monitor buildings can be strategically configured to create a hierarchy that will monitor groups of buildings, to cities, to states and finally to the country level such as the Federal Emergency Management Agency (FEMA). Once the alarms are delivered to the first responder communities, the appropriate authority can connect back to the building to verify the problems, to gain better situational awareness and to dispatch the appropriate personnel to the emergencies. Since building sensors such as smoke detectors and temperature sensors initiated the alarms, alarms monitoring companies as well as first responders can connect back to the building to assess the emergency such as finding the exact location of a fire in a large building and what the floor plans look like. By verifying the emergencies, the cost for responding to emergencies with appropriate equipment and personnel can be reduced.

The BISACS is a major component of BFRL's Building Information Exchange with First Responders (BIEFR) project; the BIEFR project's objective is to enable secure real-time communication of building system information to emergency responders and to allow emergency control of building systems by developing an information exchange architecture, data taxonomy, standards, and performance measures. This complex objective will benefit public safety and requires BFRL to work with industry stakeholders and standards organizations to develop the appropriate mechanisms so that alarms can be communicated from buildings to alarm monitoring companies, through routing systems and through public safety networks in order to reach the first responders. This "facility service" innovation is of great importance to the future of public safety and should be considered for the 2009 NOVA Award.

## Building Information Services and Control System (BISACS)
## Facility Service Illustration for NOVA Award, 2009

External to Building

Internet

Outgoing alerts and incoming requests and commands

Firewall    Firewall

Building Server Side

BISACS Base Server (BBS) with alerts database

Sends alerts and runs commands

Services Interface (SI)    Services Interface (SI)

Building Network of Devices (1)    Building Network of Devices (N)

1) Sensor signals are converted to computer processable messages (alarms); alarms are sent to the BISACS Base Server (BBS) for propagation to first responders

2) Alarms from the BBS are propagated up the BISACS network hierarchy to BISACS Proxy Servers (BPS). BPS can monitor BBS as well as other BPS

BPS
Command Center, hierarchy level 3

Filtered Data Allowed

BPS
Command Center, hierarchy level 2

Filtered Data Allowed

BPS
Command Center, hierarchy level 1

BPS
Command Center, hierarchy level 1

BPS
Command Center, hierarchy level 1

Unfiltered Data

BBS Bldg 1    BBS Bldg 2    BBS Bldg 3    BBS Bldg 4    BBS Bldg 5    BBS Bldg 6    BBS Bldg N

3) The BPS sends its alarms to the Alarm Monitoring Companies

4, 7, 9)

**BISACS Client (Command)**
File Window Help
Address: 100 Bureau Drive, Building 225, Room A02, Gaithersburg, Maryland, 20899
Alerts | Alert Filters | Server Status | Occupancy Status | Building Use | Stories | Basements
Alert Info | Sprinklered | Preplan Info
Alert Silence | System Reset | Commands | Alert Acknowledge
This is the smoke detector in building 226, 2nd floor, hallway B, near room B255.

Operation Mode
Floor →
Floor Viewer

Building 226, 2nd Floor
100 Bureau Drive
Gaithersburg, Md. 20899

smokeDetector2

4) Alarm monitoring companies connect back to the building to verify the alarms

### Alarm Monitoring Companies
5) Once the alarms are verified by the alarm monitoring companies, they are forwarded to the NG9-1-1 system for routing

### NG9-1-1 Routing System
6) The NG9-1-1 routing system routes the alarms to the appropriate Public Safety Answering Point (PSAP) that is responsible for the building

8)

9) Dispatched personnel with mobile data computers can also connect back to the building to assess the emergencies

7)

8)

### Public Safety Answering Point
7) The PSAP connects back to the building to assess the scenario

8) The PSAP dispatches the appropriate personnel and equipment to the building

6)