SMarT PANEL SENSOR

SMT Structure Monitoring Technology

PRICING GUIDE

TABLE OF CONTENTS

Date: 2018-08-14
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SMarT PANEL OVERVIEW & PRICING WORK SHEET

BRIEF OVERVIEW OF SMT MONITORING SYSTEM
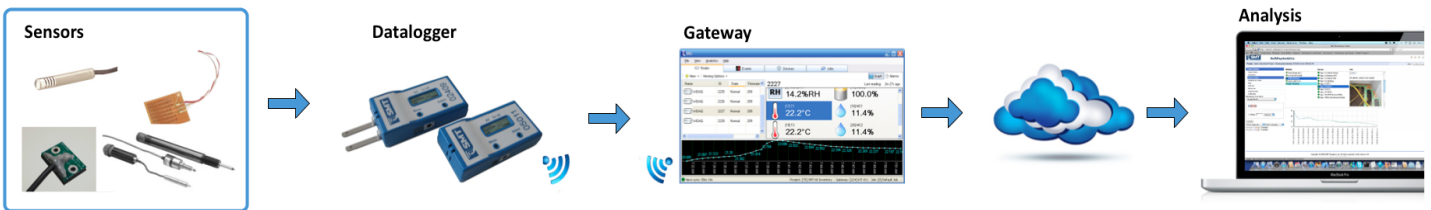
SPECIALIZED SENSORS

Moisture **Relative Humidity** **Differential Pressure** **Crack Movement** **Window Performance**

NOTES:

For a thorough overview of SMT's monitoring solutions, see **SMT Monitoring System Flowchart** in Appendix.

For additional information on all SMT sensor offerings, see **SMT Sensor Pricing Table** in Appendix.

PRICING WORK SHEET

Part 1 - Sensors Per Panel

                                          Price
Panel Type A
Panel Type B
Panel Type C

Part 2 - Panel Layout

Panel Type A   number of panels
Panel Type B   number of panels
Panel Type C   number of panels

Part 3 - Data Acquisition

Wired
Wireless
GSM

Part 4 - Monitoring and Analytics

Part 5 - Additional On-site Services

PART 1: SENSORS PER PANEL

SMT recommends that the following locations be monitored on-site and the proposed sensor selection. Individual buildings or wall profiles may have specific benefits from monitoring only certain areas of the panel. (Note: Please contact SMT for guidance and recommendations.)
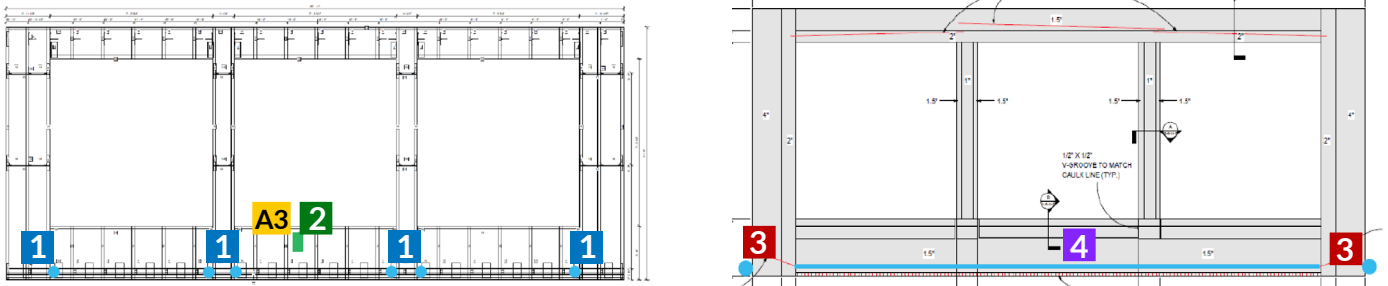
Sample Panel A

Figure 1: Proposed Sensor Locations in Panel System.

	Location	Building Parameter	SMT Sensor	Qty	Price	Total
1	Stud Track Under Windows	Moisture Level	MDS		$29.00	$
2	Cavity Space	Relative Humidity/Temperature	HTM2500		$120.00	$
3	Panel Joint	Point Moisture	PMM		$36.00	$
4	External Insulation	Moisture Level behind finish	MDS		$29.00	$
A3	Interior	Temperature/Rh	Internal Rh/T	1	(Included)	/
Total	--					$

Estimate Installation (0.5 hour): $60.00

Sample Panel B
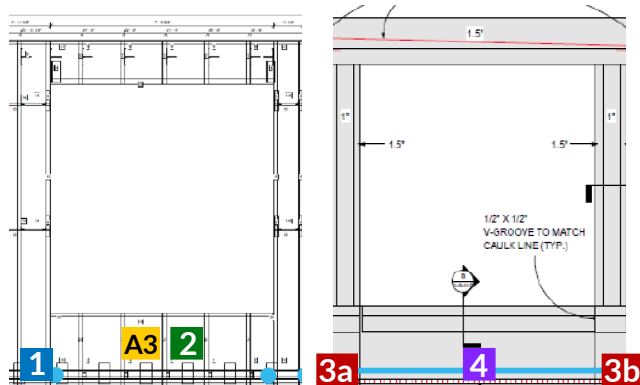
Figure 2: Proposed Sensor Locations in Panel System.

NOTES: Contact SMT for information on application and configuration of electronics.

	Location	Building Parameter	SMT Sensor	Qty	Price	Total
1	Stud Track Under Windows	Moisture Level	MDS		$29.00	$
2	Cavity Space	Relative Humidity/Temperature	HTM2500		$120.00	$
3	Panel Joint	Point Moisture	PMM		$36.00	$
4	External Insulation	Moisture Level behind finish	MDS		$29.00	$
A3	Interior	Temperature/Rh	Internal Rh/T	1	(Included)	/
Total	--					$

Estimate Installation (0.5 hour): $60.00

PART 2 : PANEL LAYOUT

The Number of Panels monitoring the building can be varied to change the coverage pattern.

100% COVERAGE
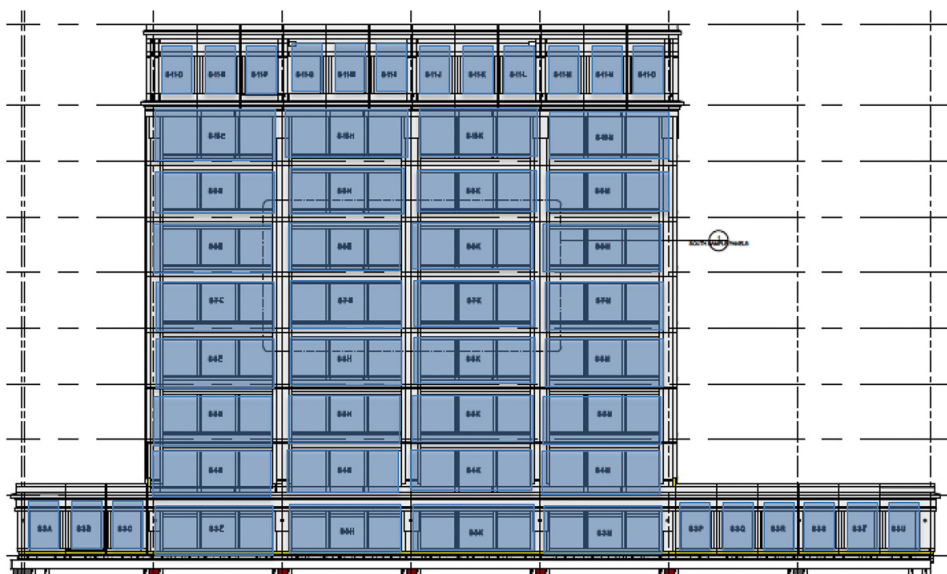
Each panel has similar sensor set and standard locations for 100% coverage.

50% COVERAGE

Number of Panels

Panel Type A

Panel Type B

Panel Type C

Each panel joint can be monitored for 50% coverage.

NOTE:
Other panel layouts available upon consultation.

PART 3 : DATA ACQUISITION HARDWARE OPTIONS

Factory installation of the SMT sensors in panels at the time of construction, in a controlled environment, is the most convenient and efficient solution. However, at which stage of construction to apply the electronics warrants further discussion.

SMT has various options for monitoring electronics upon complete installation of the final sensors within a building.

WIRED

Wired real-time communications within a building are typically completed with low-voltage cabling, routing back to a central location for final internet connectivity. SMT can supply the labor for the cabling or have an on-site low-voltage installer complete the work. SMT electronics minimize cabling runs by utilizing 8-channel or 48-channel WiDAQ's for the measurement of sensors. Wired sensors are best for long term monitoring.
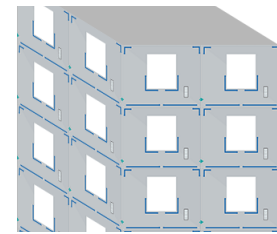

Internet
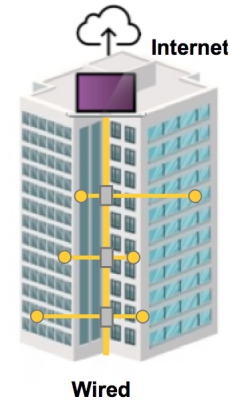
Wired
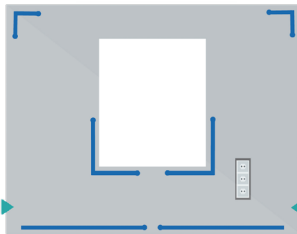
FACTORY	TRANSPORT	INSTALLED

No data logging during transport

— moisture tape   ∪∩ wired connection   ☁ internet
▶ point moisture sensor

∪∩

NOTE: SMT has provided pricing based on 10 to 100 unit quantities. We shall provide specific pricing based on building plans.

The wired system can be installed by local low-voltage, electrical, controls or alarm contractors.

We can assist with shop drawings for contractors to price our system. These budget numbers are for further consultation.
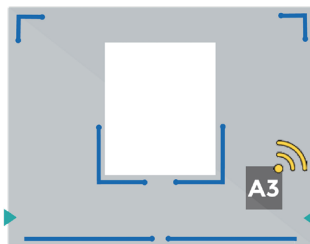
▌ **System Components**
- WiDAQ – 8r ch
- WiDAQ – MultiSCAN – 48r ch
- CANkey wired Interface
- Tactical Intelligence Gateway (TiG)

▌ **Wired System (As for Sample Panel A)**

Sensor Suite from Part 1	$
Each Panel - WiDAQ 8r Faceplate	$544.00
Installation WiDAQ Node (0.5 to 1 hour)	$65.00
Per Panel Total	$

▌ **Basic Building Infrastructure (5,000 to 50,000 sq.ft) BUDGET ONLY**

LV Cable to each panel ($150/panel)	$2500.00 to $30000.00
CanKey & TiG Gateway	$1000.00
Labor for install of TiG & Internet	$500.00 to $2500.00
System Programming	$1000.00 to $5000.00
Building Infrastructure Total	**$5000.00 to $38500.00**

PART 3 : DATA ACQUISITION- CONTINUED

WIRELESS

Each panel can communicate wirelessly to receiving devices placed internal to the building, such as in hallways or common areas, or at external locations, such as rooftops and plaza decks. The location selections of wireless receiving devices are specific to the building construction type, layout, and final sensor locations. SMT has wired and wireless repeaters to extend the range from sensors to a single point for internet connectivity. Wireless sensors allow flexibility in selecting the location of installation.
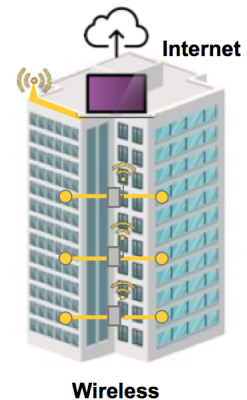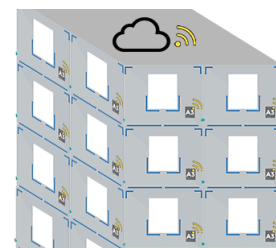
Internet

Wireless

FACTORY   **TRANSPORT**   **INSTALLED**

Data logging during transport

— moisture tape   ☁ internet
▶ point moisture sensor   ▣ 3-5 yrs battery life
🔊 wireless connection   ▣ 10 yrs battery life

▣ or ▣ 🔊

System Components
- A3 – 8r ch
- I3 Interface
- Tactical Intelligence Gateway (TiG)

Wireless System (As for Sample Panel A)

Sensor Suite from Part 1	$
Each Panel - A3 Node: 8r Faceplate	$544.00
Installation A3 Node (0.5 to 1 hour)	$65.00
Extended Battery Life option	$50.00
Per Panel Total	$

Basic Building Infrastructure (5000 sqft to 50,000 sqft) BUDGET ONLY

|	
I3 (number dependent on floor layout)	$250.00 to $2500.00
TiG Gateway to Internet Connection	$750.00
Cabling and labor for install of I3	$500.00 to $3500.00
System programming	$1000.00 to $5000.00
Building Infrastructure Total	**$2500.00 to $11750.00**

NOTE: SMT has provided pricing based on 10 to 100 unit quantities. We shall provide specific pricing based on building plans.

These budget numbers are for further consultation.

PART 3 : DATA ACQUISITION- CONTINUED

GSM - CELLULAR

SMT has the ability to transmit data directly to the cloud based on each panel's location via GSM cellular network. The continung development of lower powered GSM technology makes this option viable for building monitoring technologies. Data will be received directly from the C22 sensors to SMT's cloud-based Building Analytics on-line software. Each C22 sensor has a GSM SIM card and data charge for internet connection. The GSM cellular network is best for real-time data communication during transportation and immediately during construction. Each C22 sensor node shall have monthly internet connection and a corresponding fee.
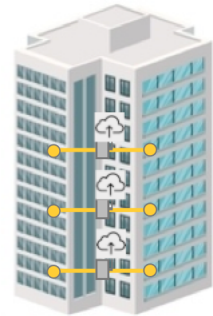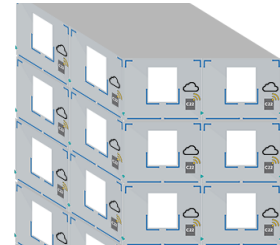
GSM/Cellular

FACTORY TRANSPORT INSTALLED
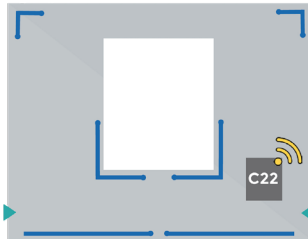
Live data during transport

C22

— moisture tape
▶ point moisture sensor
🔊 wireless connection
〰 wired connection
☁ internet
▪ 3 yrs battery life

▪ 🔊 〰 for long term power

GSM Cellular System (As for Sample Panel A)

Sensor Suite from Part 1	$
Each Panel C22 Node: 8r Faceplate	$750.00
Installation C22 Node in Factory (0.5 hour)	$65.00
System Programming	$50.00
Per Panel Total	**$**

GSM Internet Connector for each C22:

Monthly $4.00 to $12.00 / per panel / month

Total Yearly 200 Panels   **$9,600.00 to $28,800.00**

(Pricing dependent on GSM carrier & geographic location)

INTERNET CONNECTIONS

The real-time monitoring solutions are dependent on an internet connection to send the data back to the monitoring center for presentation and analysis.
The pricing does not include the cost of an internet connection.

PART 4 : BUILDING ANALYTICS AND MONITORING

SMT's **Building Analytics** is the web-based user interface that allows anyone associated with your project to have access to data and to perform data analysis from any web browser or smartphone. Users can be set up with different permissions for configuration privileges or view-only access.

For manufacturers, researchers and building science practitioners, the most value-added portion of our system is our cloud-based Building Analytics.

Please compare and select a package.

SMT FEATURES	STANDARD Package	SILVER Package	GOLD Package
	$49 / Month	$99 / Month	$199 / Month
Number of A3 / C22 / WIDAQ Nodes Per Project	50	100	200
Building Analytics Online Data Access	√	√	√
Dashboard	√	√	√
Sensor Browser	√	√	√
Sensor/Node Edit	√	√	√
Data Export	√	√	√
Graphing	√	√	√
SMT Email/Phone Support	√	√	√
Report Generation		√	√
Alarm/Event Notifications		√	√
Image Manager		√	√
Sensor Drawing Overlays		√	√
Integrated Weather Station Data		√	√

KEY FEATURES OF BUILDING ANALYTICS ONLINE SOFTWARE

▎DASHBOARD

At a glance, you can see the current status of all sensors in the system including the **Last Reading Time** so you know that everything is up-to-date, and so you can identify the sensors that may not be reporting correctly.

PART 4 : BUILDING ANALYTICS - CONTINUED

▌ GRAPHICAL OVERLAYS (DRAWINGS)

The location of sensors can be populated on an as-built drawing or schematic making it easy to locate and understand the implications of sensor data.

▌ SENSOR GROUPS AND GRAPHING FOR GROUPS

Groups may comprise any number of sensors. These groups can then be graphed or have their data downloaded for further processing.

One of the most important features is that this tool allows for data normalization. Data from different sensors may have different timestamps, making graph comparisons very difficult. However, the graphing software will perform averages so that data can be graphed to a single time, allowing for easy graph comparisons.
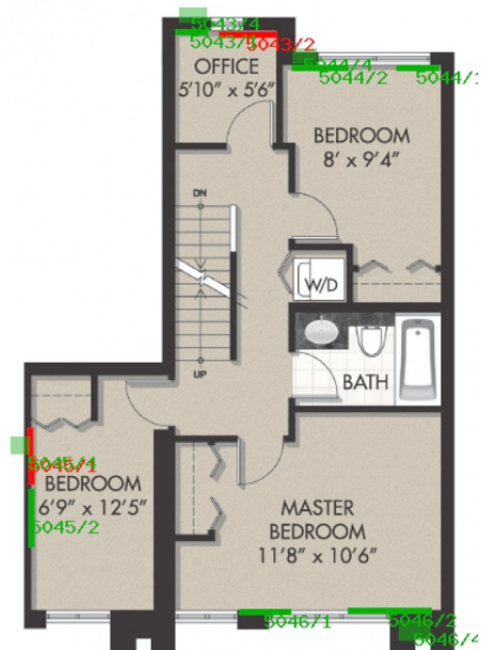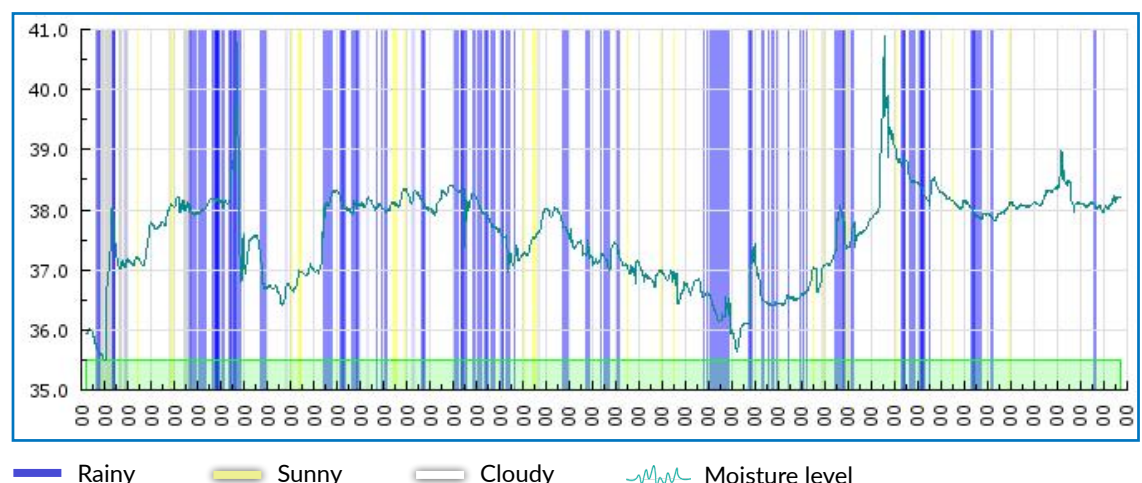
— Areas monitored
— Areas of concern

For example, at a glance you can see what areas (areas of concern) have taken on moisture.
You can then select triggered sensors to further troubleshoot them.

In this graph, moisture bands are populated on the graph to help determine if the water is due to external rain events.

▬ Rainy   ▬ Sunny   ▭ Cloudy   〰 Moisture level

PART 4 : BUILDING ANALYTICS - CONTINUED

WEATHER STATION

SMT can integrate any weather station with Building Analytics as long as it synchronizes its data with *Weatherunderground*. This feature allows us to incorporate local weather conditions at a low cost by using existing weather data streams. Weather data shows up in Building Analytics and can be graphed and/or normalized with all of the other heat flux data, temperature data, etc. SMT can also provide a weather station for your project.

Below is a screenshot of the Sensor Brower. Data from the Davis Weather Station displays in Building Analytics as if it were any other sensor.
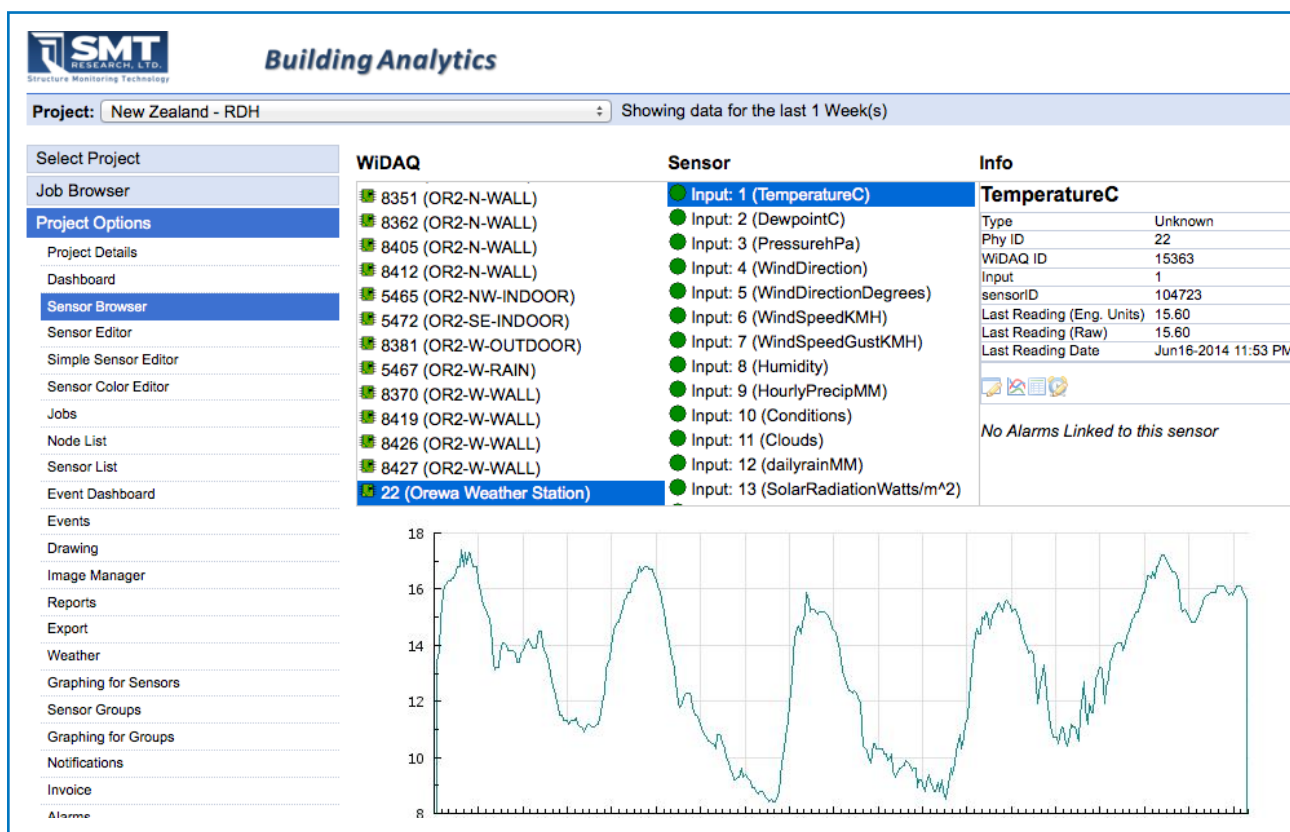
An example of a weather station installed with a Pan/Tilt/Zoom camera.

The Davis Vantage Pro2 weather station reports wirelessly to a receiver located next to the Building Intelligence Gateway.

PART 4 : BUILDING ANALYTICS - CONTINUED

ACCESSORIES AND ADVANCED TOOLS

If you wish to perform your own processing, API's are available to extract data from the SMT database into your own data management stream.

The Building Intelligence Gateway has the ability to create custom Monitors and Filters that you can program as plugins to the system.

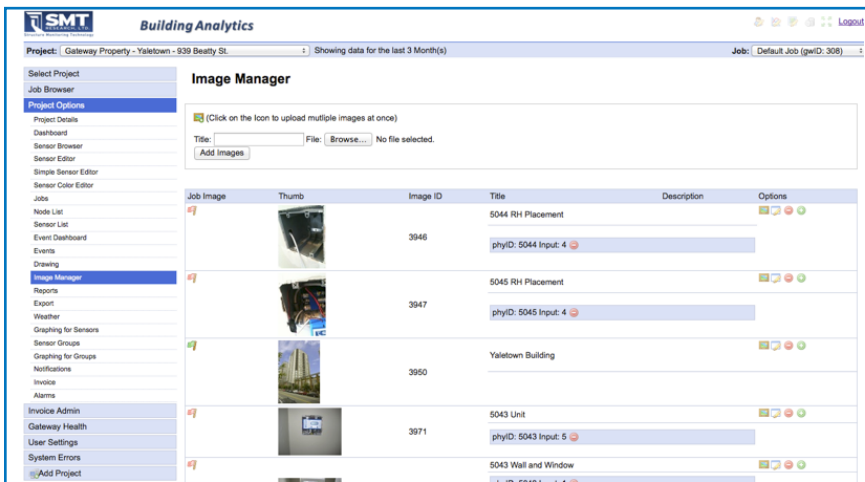SMT has a Building Management System BACnet module should you wish to communicate data to a BACnet control center.

Image repositories, alarm handling, and other features are provided through Building Analytics.

MORE INFORMATION

If you would like to login to see the various tools and links, you can access a dormant account at analytics.smtresearch.ca

Username: multi
**Password: access**

PART 5 : ADDITIONAL ON-SITE SERVICES

Technicians are available to come on-site to investigate the design or explain subsequent monitoring results. Typical technician rate is $175.00 per hour, which includes the use of all SMT electrical equipment and site reports provided at the end. All travel expenses shall be covered for site trips.

NOTES

- 1 year warranty on all electronics and software/firmware upgrades
- All prices in USD currency
- Equipment delivery: 2-4 weeks ARO (After Receipt of Order)
- Shipping FOB (Free on Board): Vancouver, BC
- Power and internet to be provided on-site for real-time monitoring solutions. SMT can provide a cell modem at $35.00/month during initial activation, allowing you to receive data and have remote access immediately after the equipment is installed.

APPENDIX

SMT MONITORING SYSTEM FLOWCHART
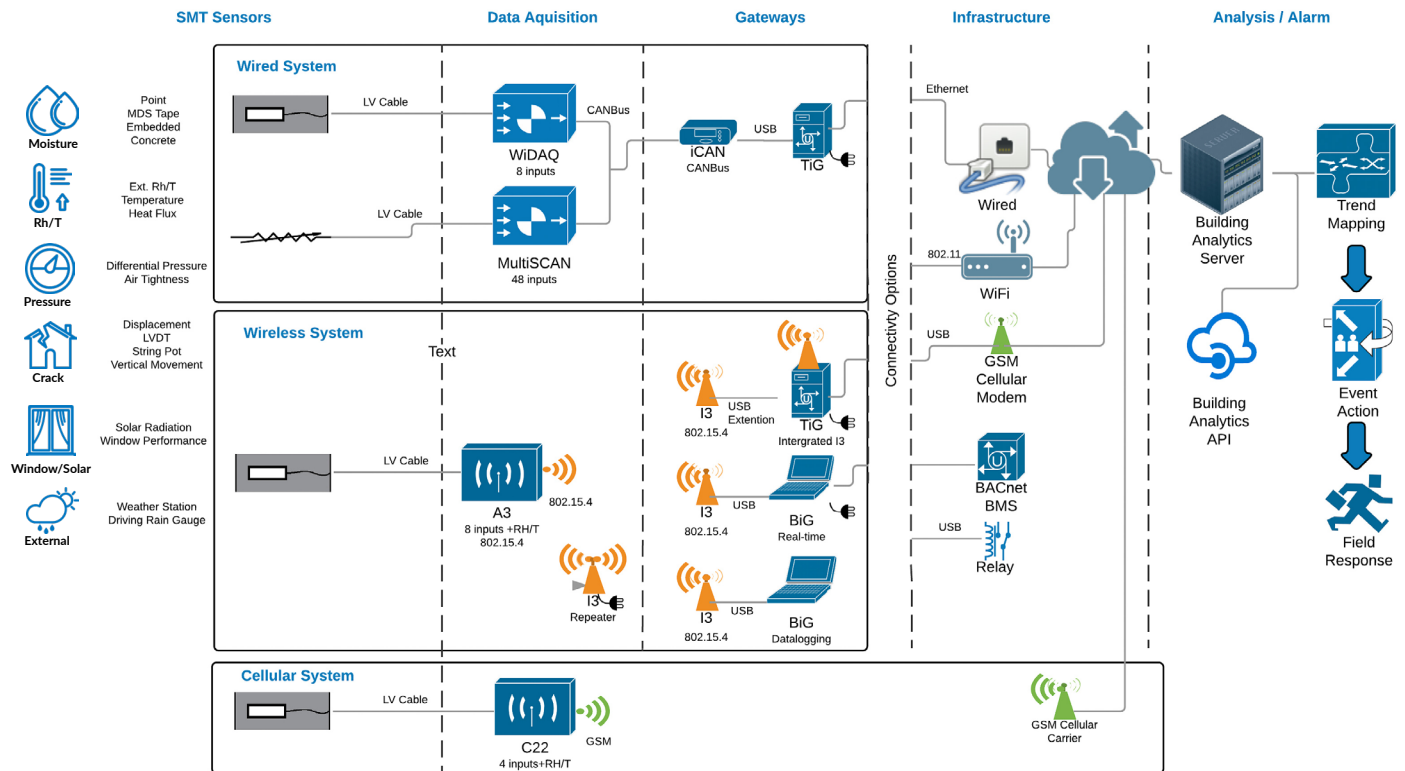
SMT SENSOR PRICING TABLE

MONITORED PARAMETERS	SENSOR	BUDGET PRICE
MOISTURE	Point Moisture Measurement (PMM)	$36.00 - $71.00
	Moisture Detection Sensor (MDS Tape)	$35.95 - $60.95
	Embedded Moisture Sensor (EMS)	$95.00 -$290.00
	Concrete Moisture Sensor	$350.00 - $375.00
RELATIVE HUMIDITY (Thermo Performance)	Ext. Temperature	$25.00 - $60.00
	Heat Flux Sensor	$640.00
DIFFERENTIAL PRESSURE	Differential Pressure Sensor (-0.25" to +0.25" H2O)	$250.00 - $285.00
	Differential Pressure Sensor (-1" to +1" H2O)	$250.00 - $285.00
CRACK MOVEMENT	Linear Displacement Sensor	$250.00 - $285.00
	LVDT (Crack Monitoring)	$975.00 - $1010.00
	String Pot (Vertical Monitoring)	$450.00
WINDOW PERFORMANCE	Solar Radiation	$285.00 - $320.00
	MDS Tape Under Window	$35.95 - $60.95
EXTERNAL CONDITIONS	Driving Rain Gauge	$995.00
	Weather Station*	
CO2 IAQ (Indoor Air Quality)	CO2 Sensor	$155.00 - $190.00

Budget Price is defined as unit price per sensor with cable assemblies included. Extra data aquisition channels may be required for a full workable system.