New sensor network protecting art in NY museum

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In this photo provided by the Metropolitan Museum of Art, Paolo Dionisi Vici, associate research scientist in the Department of Scientific Research at The Metropolitan Museum of Art, left, and Hendrik Hamann, Research Manager at IBM, discuss a new environmental sensor system that will be deployed at the Clositers Museum in New York, Tuesday, June 7, 2011. Hamann holds an example of one of the sensors that will monitor the climate in the museum and help preserve its walls. (AP Photo/Metropolitan Museum of Art)

(AP) -- It will take a good eye to spot them, but dozens of tiny, very modern works of art have been installed near the 15th-century unicorn tapestries and other medieval masterpieces at a New York City museum.

The Metropolitan Museum of Art is announcing Thursday that a network of wireless environmental sensors designed to prevent damage to the collection is being tested at its Cloisters branch.

The IBM sensors - each housed with a radio and a microcontroller in a case about the size of a pack of cigarettes - can measure temperature, humidity, air flow, light levels, contaminants and more. They are inexpensive and run on low power, and several can be positioned in a room, scientists said Wednesday.

The information collected goes into a three-dimensional "climate map" that can be accessed on a computer, and the data can then be analyzed to adjust the climate, spot trends and even make predictions.

"Nobody in the world at this moment has this kind of information, not at this level of detail," said Paolo Dionosi Vici, associate research scientist at the Metropolitan. "It's the analytics that will keep us one step ahead technologically."

The network now covers about a third of the Cloisters, which houses 3,000 medieval works in several ancient buildings that were disassembled in Europe and rebuilt in northern Manhattan. The Met expects to expand the network throughout the Cloisters and eventually to the main museum on Fifth Avenue.

The climate at museums like the Cloisters is already tightly controlled, with especially fragile items kept in sealed cases. Curators don't have to worry about the ravages that might happen to a fresco in an open Italian church, for example.

But the artwork is sensitive to small climate variations.

"A window in a museum, in summer, that can be a hot spot," Vici said. "And the light from the window on the floor can increase the temperature of the floor. Until now, that is a variation we might not know about because we were not taking so many measurements."

Another factor that can influence the climate in a museum is the number of visitors - and where the visitors have been.

"If it's raining outside the Cloisters and the tourists that come in are wet, that has an effect," Vici said.

The idea is to keep the effects from causing any

damage, even slow damage, to the art.

"Whenever we have to act on an object to repair it, it's a loss of memory of what it was in the past," Vici said. "Restoration can be very useful but if we can prevent (deterioration), it's better."

Hendrik Hamann, an IBM research manager working on the project, said the 100-year-old company has had a long relationship with the Met and found the art world a good test for its sensor technology, which can also be used in ordinary buildings to measure energy efficiency and other details.

"The conservation of art and our cultural heritage is obviously one of the grand challenges of our time," Hamann said.

Vici and Hamann both said the sensors - which they called low-power motes - could eventually be adapted to measure how a painting on wood, for example, reacts to minor climate fluctuations.

"We'd like to be able to monitor how much the wood swells, even a tiny amount," said Vici, who said he worked on the preservation of the Mona Lisa.

Hamann said that as data pours in, trends will appear, "and we can use those trends to understand what will happen in the future."

"We will know that certain things happen in the museum environment on certain days," he said. Those trends can then be correlated with information about the best way to protect a tapestry or a wooden statue, for example.

Hamann said the Cloisters was chosen for the test because "It is a historic building. It has high ceilings. It has famous glass windows. It has tapestries, wood paintings, stonework, it has indoors and outdoors sections. It's very interesting from a monitoring perspective."

The Cloisters had temperature and humidity monitors but lacked the analytic capabilities of the new program, he said.

About 100 of the new sensors have been spread through seven adjacent rooms, including the one housing the priceless tapestries that portray a unicorn hunt. They are inconspicuous, but not hidden entirely.

"If you know where the motes are you can see them," Hamann said.

But Vici said, "The visual impact of the sensors is so small compared to the quality of the information. ... For every object in the room we can know in real time how the climate evolves in that particular point."