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Tomorrowland

In the city of the future, bridges will talk to engineers, roads will control cars, and parking spots will find you. In some places, it’s already here.

By *Daniel D. Castro*

SOURCE: INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION

UNTIL RECENTLY, humankind has had to rely principally on observation to collect information from a mostly passive world. If we wanted to find out whether a bridge was structurally sound, for example, someone had to go somewhere, measure something, and report back. But today, a convergence of technical successes—low-cost sensors, energy-efficient processors, and advanced wireless networking—is leading to the creation of an active world alive with information.

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As this illustration shows, governments around the world are starting to capitalize on these tools to keep us safer, increase mobility, and boost economic growth. Now, instead of engineers inspecting a bridge, the bridge inspects itself and reports continuously to engineers.

These examples are just the start: soon, biochemical detectors in subways and airports will help protect travelers; undersea microphones will warn about offshore hurricanes; and smoke sensors will give firefighters real-time information on the location and path of wildfires. Researchers at Georgia Tech have produced sensors that can differentiate among more than 100 chemicals in the water or air at just one-tenth the price of current models, and Intel has created self-contained, battery-powered computers about the size of a quarter that can form ad hoc wireless networks. Combined, these tools could monitor environmental conditions at hazardous work sites or detect leaks in water and gas pipelines. To handle the huge flow of information all of these systems will generate, computer scientists are developing complex algorithms to improve the efficiency of sensor networks, and innovative programs to analyze and manipulate large data sets.

In the future, a host of applications will give us a better understanding—and more control—of the world around us. And humans will be ever more intricately linked with their environment.

South Korea
The Korean Bridge Management System uses a network of wireless sensors to analyze hundreds of variables per bridge—including vibration, temperature, corrosion, and sounds such as creaks and popping cables—that could reveal structural problems. The data flows to a central computer, allowing officials to prioritize repairs and maintenance.

Japan
Japan's Smartway is starting to use sensors to generate data on traffic flow and road conditions and communicate wirelessly with vehicles. On Tokyo's winding Metrooolitan

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