

NASA GODDARD SPACE FLIGHT CENTER

DAN MANDL, PATRICE G. CAPPELAERE, STUART W. FRYE, ROBERT A. SOHLBERG, STEVE A. CHIEN

“SENSOR WEB 2.0”

Sensor Web 2.0 is a Web services–based software architecture that gathers and assimilates data from a network of space-based, airborne, and ground-based sensors, enabling them to operate as a cohesive whole. Sensor Web 2.0 allows users who are not particularly “software savvy” or skilled in Web components to set up custom sensor webs (to monitor wildfires, seismic activity, hurricane strength and direction, and other natural disasters, etc.), through easy point-and-click interfaces. As an example of the benefits achieved through transfer of this technology, Sensor Web 2.0 was run in a test mode in parallel with traditional fire-fighting efforts for the Southern California wildfires, resulting in guidance to emergency workers on how best to deploy resources.

Sensor Web 2.0 melds complex information technology (IT) and sensory systems into a single system that is extraordinarily user-friendly. Average users can accomplish complicated tasks, such as directing a satellite to focus on a particular location or reassigning resources and analyzing data. This frees up highly skilled programmers and engineers to attend to more technically demanding tasks resulting in more efficient allocation of resources. Experts from a dozen research and educational institutions collaborated to create Sensor Web 2.0, although the effort was spearheaded by NASA Goddard Space Flight Center.

Because Sensor Web 2.0 is open-source technology, the software is not meant to be licensed but shared. Instead of the economic benefit that comes from licensing a technology, the open architecture establishes sensor interconnection standards and provides users more direct access to and control of sensors that could provide key data for a variety of applications. In much the same way that browsers have transformed the Internet to provide access to millions of Web sites, Sensor Web 2.0 provides easy access to the world’s sensors via the Internet and through the use of “mash-up” techniques. Transferring this technology to the public rather than the private sector benefits mankind by lowering the cost of accessing and controlling sensor data by an order of magnitude and by providing faster access. As a result, there is great potential to save lives by providing expensive sensor data to many communities of users previously unable to afford it, such as disaster-management workers.

The software system will grow more useful and effective as the user base grows to critical mass. As more data are calibrated to fit Sensor Web 2.0 standards, more resources will become accessible to the public. Other users may add their tools or workflows that NASA can use in its missions. NASA has begun to share some of its satellite images with the public via Sensor Web 2.0 technology and NASA has begun to access images from satellites launched by other organizations using Sensor Web 2.0 standards.