Local 911 emergency response systems are relying on positioning derived from GPS and NOAA's National Spatial Reference System. Using geodetic coordinates in a GIS, dispatchers can quickly guide vehicles to their destination. GPS receivers connected to map displays mounted on the dashboards of emergency vehicles can guide drivers to a specific address. Centralized routing GIS displays depict evacuation routes and show emergency response managers how their resources are deployed.

One of several imaginative uses of GPS positioning technologies is in an automobile accident-alert system. When the system senses the vehicle's impact with an object, it automatically calls for help and transmits the vehicle's precise coordinates to emergency service providers.

Mayors, city planners, and community leaders can consult information fed into a GIS – for example, to determine what areas are prone to fires and whether several fires in an area might signal arson. A GIS can tell police where a high number of accidents occur, suggesting potential problems with the roads, lights, signs, or speed limits.

Measuring water vapor is essential for accurately forecasting storms. GPS provides the measurements needed for updating forecasts, works continuously under all weather conditions, doesn't require calibration, and is inexpensive when compared to other monitoring systems.

Flooding is by far the costliest of U.S. natural disasters. The National Spatial Reference System provides reliable elevation information for Flood Insurance Rate Maps, which cover about 9 million flood-prone buildings across the nation. GPS surveys enable models to accurately predict future flood damages in or near a community's designated flood hazard area.

"Reason can answer questions, but imagination has to ask them."
– Ralph Gerard, American Physiologist

LEFT: Firefighters have traditionally relied on street addresses and landmarks to report their positions. But in a major disaster, these landmarks may be destroyed or obscured by smoke. Real-time geodetic data can guide emergency crews to disaster areas quickly, accurately, and efficiently.

LEFT: The extensive resurveying necessitated by the 1994 earthquake in Northridge, California, cost over $1 million. NOAA is working with other federal agencies to replace traditional labor-intensive, high-cost line-of-sight survey procedures with new cost-efficient GPS technology. *(Photo: U.S. Geological Survey)*

BELOW: GPS is a reliable, low-cost technology for measuring water vapor, which is essential to predicting storms.