

Interfaces Visualize Data for Airline Safety, Efficiency

NASA Technology

It was Henry Ford who said, “Anyone who stops learning is old, whether at 20 or 80. Anyone who keeps learning stays young.” Following such an adage, it’s safe to say that NASA will never grow old. From distant galaxies to Martian landscapes to Earthly atmospheres, the Agency never stops uncovering new information or learning about our universe.

Take the group of six Earth-observing satellites known as the A-Train Constellation, launched by NASA and its international partners over the last couple of decades. Each satellite orbits the Earth one after another (like a set of cars on a train) to simultaneously measure clouds, aerosols, atmospheric chemistry, and other components.

The data combine to paint a more complete picture of how the various atmospheric constituents interact with one another, and how the composition of the atmosphere affects Earth’s climate.

Near the middle of this group flies the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) satellite, a spacecraft that provides measurements of the altitude of aerosols and clouds in the atmosphere. Armed with new information from CALIPSO, scientists hope learn more about how clouds and aerosols regulate Earth’s weather, climate, and air quality.

As A-Train orbits and gathers data on what’s happening in the atmosphere, NASA scientists and Agency partners

work on the ground to learn how to visualize, analyze, and communicate the information obtained from space.

Technology Transfer

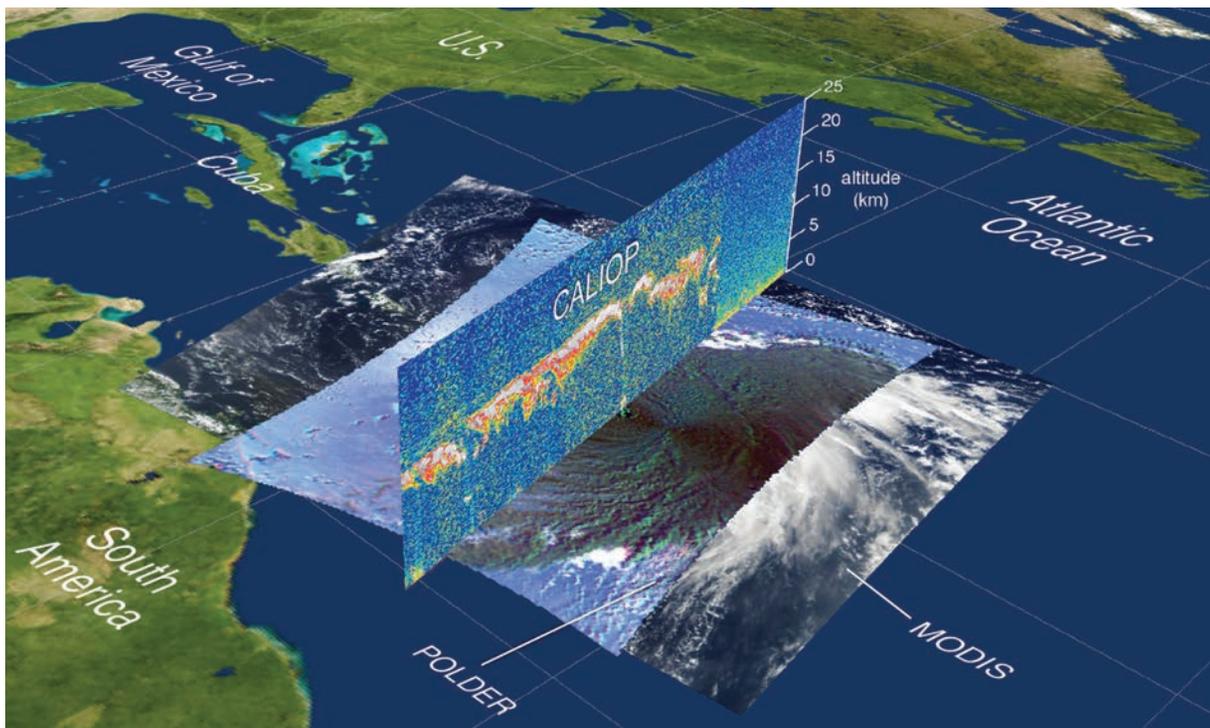
In 2008, NASA’s Langley Research Center awarded Small Business Innovation Research (SBIR) funding to Fairfax, Virginia-based WxAnalyst Ltd. to construct a transparent user interface for Google Earth, a virtual globe system, to visualize data like that from CALIPSO. The partners wanted to devise a new capability for an interactive display of geographical data on top of the virtual globe.

WxAnalyst had already developed a prototype tool called WxAzygy. As Scott Shipley, the director of WxAnalyst, describes, “We wanted to be able to see exactly what is in the atmosphere—in real time, height, latitude, and longitude. We also wanted to make it so if you click on something in the air, Google Earth doesn’t think you are clicking on Texas. Instead, it knows you are clicking on the hurricane above it.”

Kurt Severance, a senior computer engineer at Langley, says NASA saw potential for visualizing data sets, like CALIPSO’s, in this way. “The technology could add scientific value to Google Earth,” he says. “NASA saw promise in adding this functionality—and that there would be a capability that a number of projects might be able to leverage to see data more clearly.”

Through the partnership, the WxAzygy user interface was further refined so users could see and work with the data where it was over Earth. When a user clicks or touches selected features above the surface, WxAzygy interprets the request.

After its Langley work, WxAnalyst proceeded to obtain additional funding from Goddard Space Flight Center’s SBIR program to use WxAzygy with COLLADA, a technology for 3D imaging, and Google Earth. After that, the company further improved its technology with the National Oceanic and Atmospheric Administration (NOAA).



Data from various A-Train instruments provide a more complete picture of Hurricane Bill in 2009.