NOAA

Earth System Research Laboratory (ESRL)
Global Systems Division (GSD)
Putting tools in the hands of users
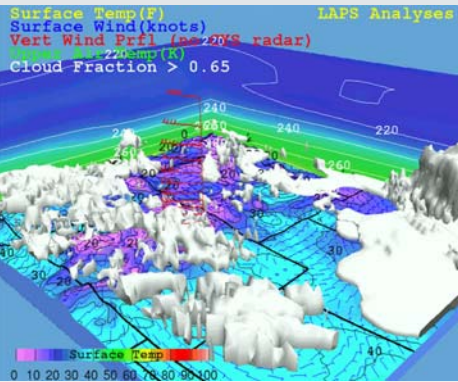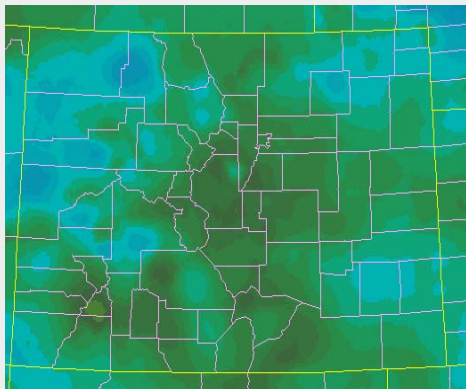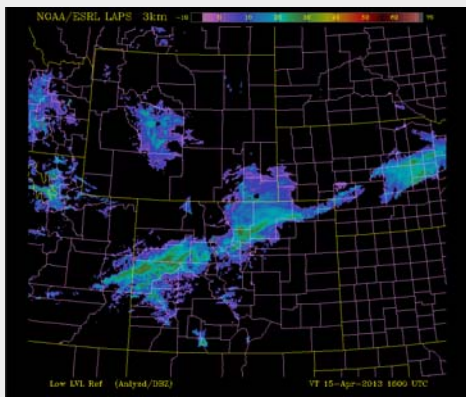## Local Analysis and Prediction System
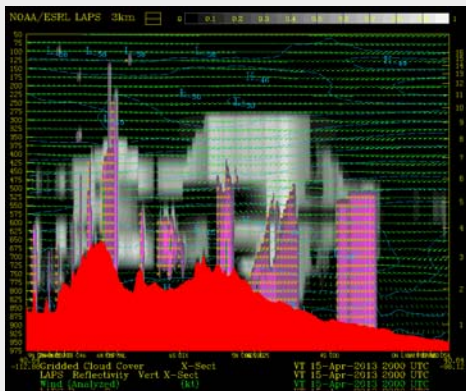
Data Displays from LAPS

3-Dimensional Multi-Parameter Display

Colorado Surface Equivalent Potential Temperature (Zoomed In)

Radar Reflectivity

Gridded Cloud Cover/Cross-Section/Winds

What is LAPS?

The Local Analysis and Prediction System (LAPS) is a Numerical Weather Prediction (NWP) tool that provides a detailed description of the current and imminent local high impact weather conditions. Using observations from local meso-networks of surface observing systems, Doppler radars, satellites (e.g., visible, IR, sounders, GPS, AMSU-A and -B), wind, temperature, and radiometric profilers, as well as aircraft, LAPS creates high-fidelity 3-dimensional digital snapshots of high impact weather variables at a very high spatial (1 km and below) and temporal (15 minutes or more frequent) resolution. Due to the efficiency of LAPS, these snapshots are available shortly after the observations become accessible.

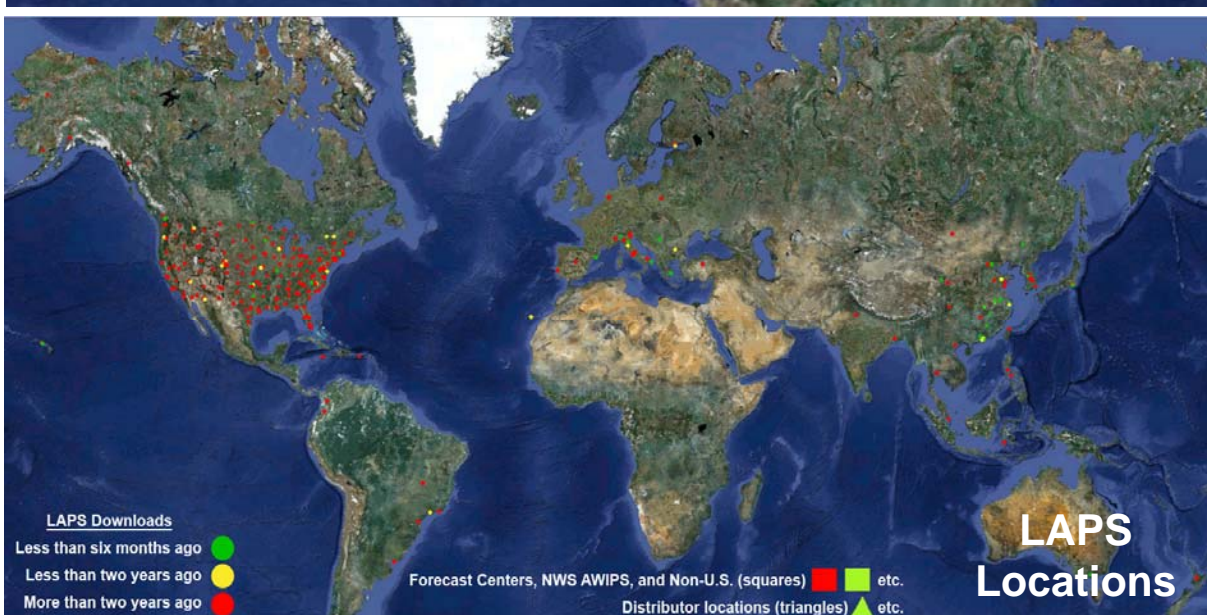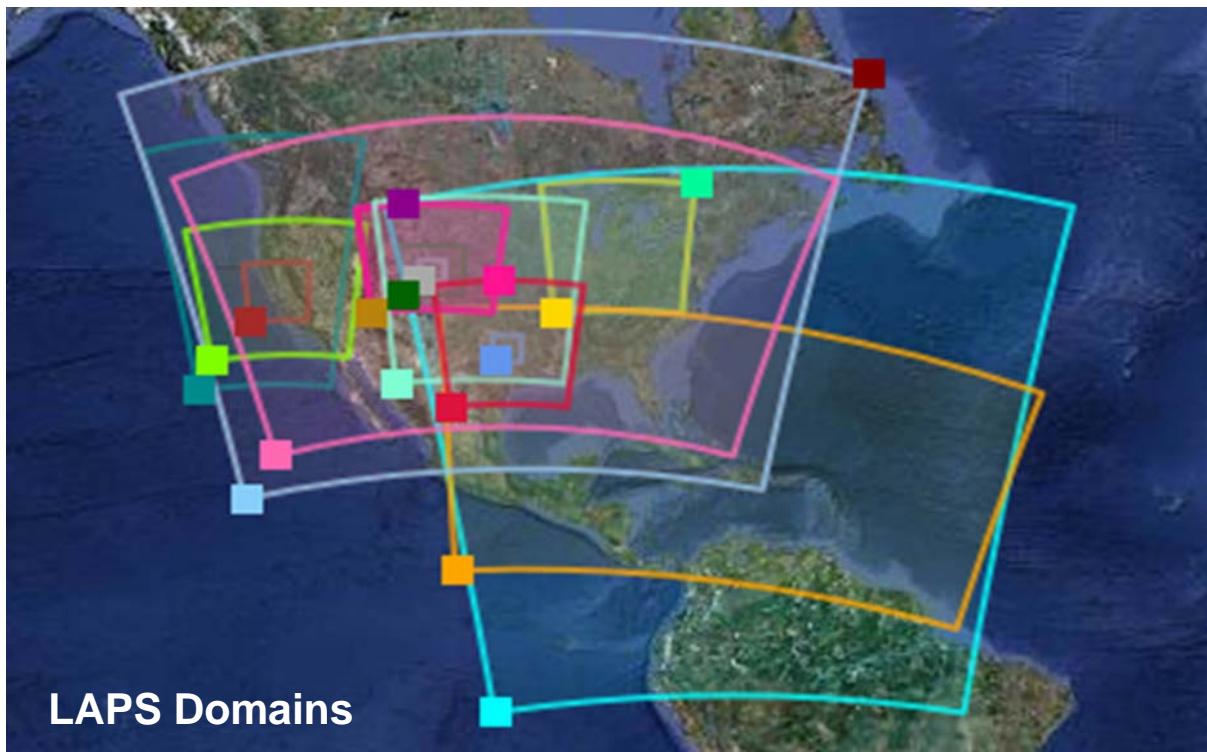## How are LAPS Products Used?

Beyond the standard meteorological variables of temperature, wind, humidity and pressure, LAPS creates 3-dimensional depictions of clouds, precipitation amount and types, and properties of the atmosphere related to high impact weather including wind gusts, visibility, icing conditions, and solar radiation. The prediction of severe weather events and tornados in particular is so challenging that it still relies on human forecasters. Weather forecasters use LAPS and other products to assess the current weather conditions and use expert rules and their subjective experience to prepare warnings for ensuing severe weather events.

What are the Severe Weather Forecast Applications with LAPS?

In the past decades, meteorology has made tremendous strides toward automating the weather forecast process via the introduction of numerical modeling of the atmosphere. Severe weather prediction in the 0-3 hour forecast time range is the last area where NWP has yet to demonstrate its value. To be successful, numerical forecasts must be initialized with a truthful 3-dimensional depiction of the current weather. Numerical forecasts initialized with the detailed information contained in LAPS products have shown value as an input to the traditional, expert rule-based severe weather forecast process. This give hope that one day the severe weather warning process can be based mostly on numerical forecasts (called "warn-on-forecasts").

Who are the Main Users of LAPS?

Within NOAA, LAPS is used operationally on AWIPS (Advanced Weather Interactive Processing System) platforms at the National Weather Service (NWS) Weather Forecast Offices (WFOs). LAPS is also ported to support other U.S. government agencies such as the Department of Defense, NASA, U.S. Forecast Service, and the California Department of Water Resources. LAPS is also used by various U.S. private companies in support of their weather forecast services. Other operational users of LAPS include an extensive set of international weather agencies, including the Finnish Meteorological Institute, weather agencies in Spain, Italy, and Greece, as well as the Central Weather Bureau of Taiwan, the Korean Meteorological Agency, and various institutes of the Chinese Meteorological Agency.

LAPS Domains

LAPS Downloads
Less than six months ago 🟢
Less than two years ago 🟡
More than two years ago 🔴

Forecast Centers, NWS AWIPS, and Non-U.S. (squares) 🟥 🟩 etc.
Distributor locations (triangles) 🔺 etc.

LAPS Locations

What are the Next Steps in LAPS Development?

The development of LAPS has been spearheaded by the Global Systems Division of NOAA, leveraging the efforts of the large national and international LAPS user base. One of the next frontiers' for LAPS is urban and incident-scale forecasting. LAPS will continue to increase the number and types of observations used in the vicinity of incidents. Emergency managers dealing with various weather and incident-related operations will receive actionable current and short-term, neighborhood-scale (less than 1 km) weather conditions. Weather forecast staff as well as firefighters and other local emergency personnel will have detailed LAPS-based weather information at their fingertips as they make their decisions to protect life and property on the ground.

For Further Information on LAPS, Contact:

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