# 4-D Weather Visualization

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## 1. Introduction

With the advent of NextGen, the new air traffic management program under development by the FAA, NOAA, and other partners, the amount of data available for use in storm reconstruction, weather forecasting and other meteorological issues will greatly increase. At this time, there are no plans to develop an official visualizer to utilize the full 4-D characteristics of this data. So, despite the rapid updating and high resolution, the expected visualization will still be the typical 2-D plots. At ITT VIS, we have begun looking at this issue and have come up with a few ideas. As we are still in the proto-type stage, we would like your feedback on our solution, things you expect from a 4-D weather visualizer and the abilities you would like to see forth-coming for use with the NextGen data and data from other sources as well.

## 2. Who are we and why do we think we can do this

ITT Visual Information Solutions (ITT VIS) creates superior software products that help professionals across industries access, analyze, and share all types of data and imagery.

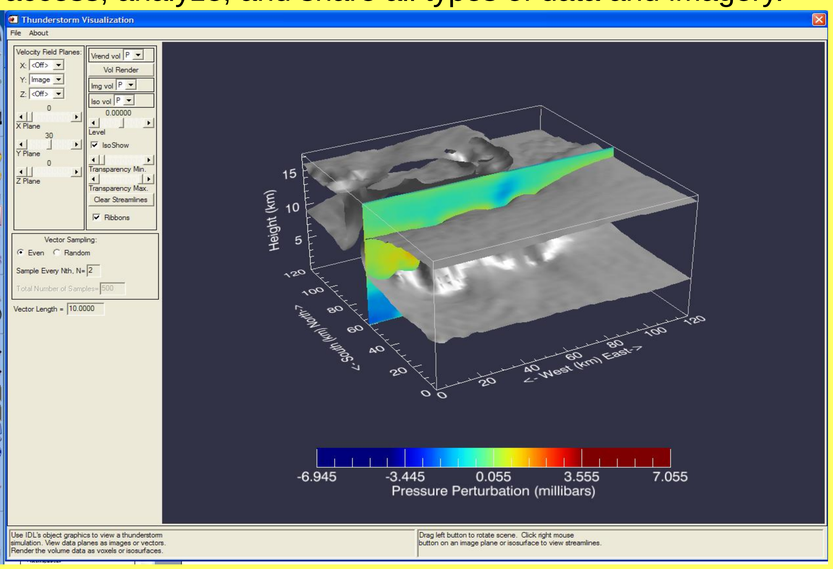


**Figure 1:** Previous work.

## 3. Our Purpose

We would like your input. We would like any comments you might have as far as look, capabilities and anything else you might come up with for this project and our prototype. Please keep all criticism constructive, but please tell us if you don't like the concept. Also, we would like some contact information from you so that we might contact you for comment in the future or to better understand the comments that you have given.

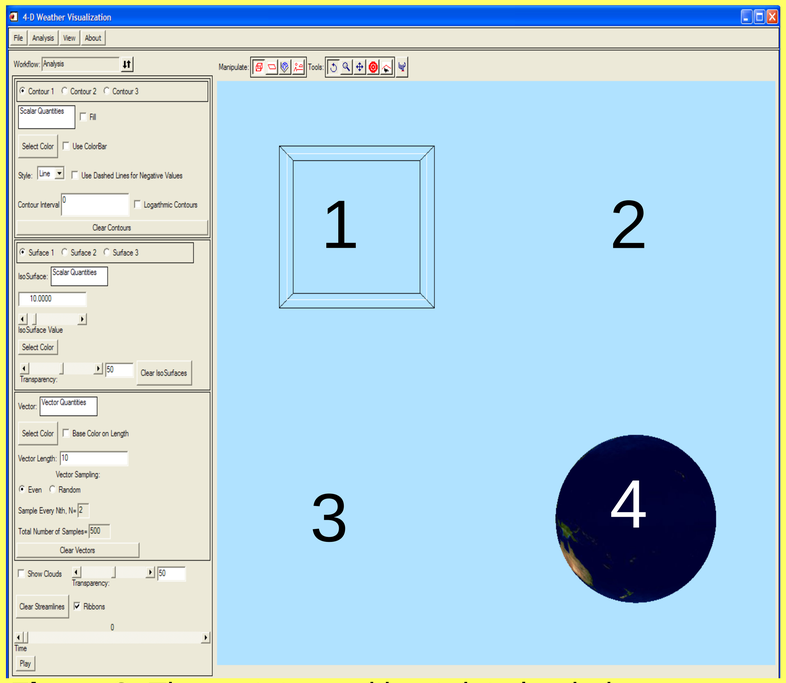


**Figure 2:** The prototype without data loaded.

## 4. Our ideas on Capabilities

Here is a list of things we feel any 4-D visualizer should do:

1. Absorb any 4-D data set regardless of the type
   - -Easily done with IDL. If a reader is not already written for the data set type, it is relatively simple to incorporate a new reader into the system. At present, our prototype works with netCDF datasets. Other datasets are planned such as ascii, and binary,.
2. Absorb any 4-D dataset regardless of the size
   - -This one is tougher. We are working on this ability
3. Be easily expandable by the user
   - -Easily done through writing new code in IDL. Our prototype is setup such that any new user defined variables, vectors, algorithms and visualizations are seamlessly incorporated into the code and the available variables/vectors lists for display
4. Update Rapidly
   - -Retrieves the most up-to-date model data seamlessly to the user
   - -As user choices are made, the visualization reacts immediately

## 5. The Prototype

We decided to implement a working prototype for testing the viability of the concepts above and for starting to find out what the user experience might look like.

-Four Window Configuration (Figure 2 & Figure 3).
- 1) view the cube from the outside with associated surface features (if any)
- 2) slice through the cube as defined by the slice tool associated with view 1
- 3) view the surface without the cube (if available)
- 4) view the cube from inside at any point given by view 3 including surface and atmosphere features (if available)

-Print windows individually or as a group

-Maximized any single window to fill the entire viewing window for closer inspection (planned)

-User designated variables for isosurfaces, contours and vectors independently for viewing in the cube view or the slice view

-Situational Immersion in View 4 (planned)

-Streamlines

-Independent or simultaneous movement within each view

-Contour view is dictated through the use of the slice tool

-Shows relation in space with other variables

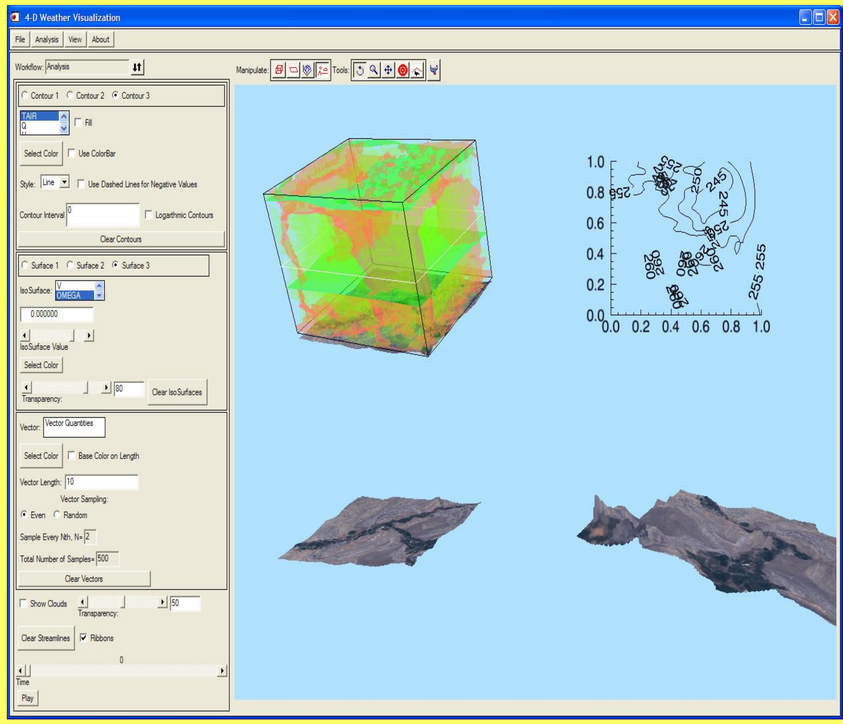


**Figure 3:** The prototype with data loaded.

ENVI IDL