9A.4 A OneNOAA Concept Prototype for Data Viewing

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1. INTRODUCTION

NOAA has historically been a primary provider of environmental information since its inception. This information is available to users in a variety of formats, and variety of spatial and temporal scales. However, until recently, software and networking capabilities have not been available which would provide NOAA with the ability to easily view and interact with this wide variety of data using a common interface. With an emphasis on programs such as NOAA's Global Earth Observing Systems and the OneNOAA concept, having this capability readily available to all NOAA staff becomes more important for fulfilling NOAA's mission. For this early prototype work, our goal was to develop a seamless capability for display and interaction with data used by NOAA to perform its mission.

Several premises and assumptions were developed at the start of this investigation to help focus on possible development paths. First, NOAA has a continuum of user needs from short-fused mission-critical needs, to non-critical situational awareness interest, to exploratory and research needs. This system would not be developed to replace short-fused or mission-critical systems but would enhance data visualization capabilities in non-critical areas of interest. Second, there was sufficient similarity amongst datasets to support integration. Data sets could be geo-referenced and temporally identified. Third, data could be remotely-accessed using client/server data architecture.

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Lastly, the data would be available in commonly used formats.

2. VISUALIZATION PACKAGES

GSD investigated the feasibility of displaying a wide variety of NOAA data on a common user interface. Several software visualization packages were reviewed. A number of factors were considered when reviewing the software packages including portability, cost, web-connectivity, geo-referencing, user interface, display capabilities, and performance. Performance, while important, was not considered a top priority since short-fused mission-critical capabilities were not necessary for this system.

The Google Earth software, which is freely available for private use, proved to be the most capable in our review. With a modest amount of effort, we were able to navigate, display, and overlay sample data products from nearly every branch of NOAA including weather, oceans, coral reef, fisheries, satellite, and coastal services. Examples of these displays are shown in Figure 1.

3. NOAA DATA ACCESS

A parallel activity focused on accessing current data sources from all of NOAA's branches using existing NOAA web sites and commodity Internet services. This investigation revealed that a rich variety of data is already available, but not necessarily easily accessed or mapable to a common user interface. However, with some enhancements we were able to take an existing sample data set and incorporated it into Google Earth.

Conceptual Desk-Top Prototype

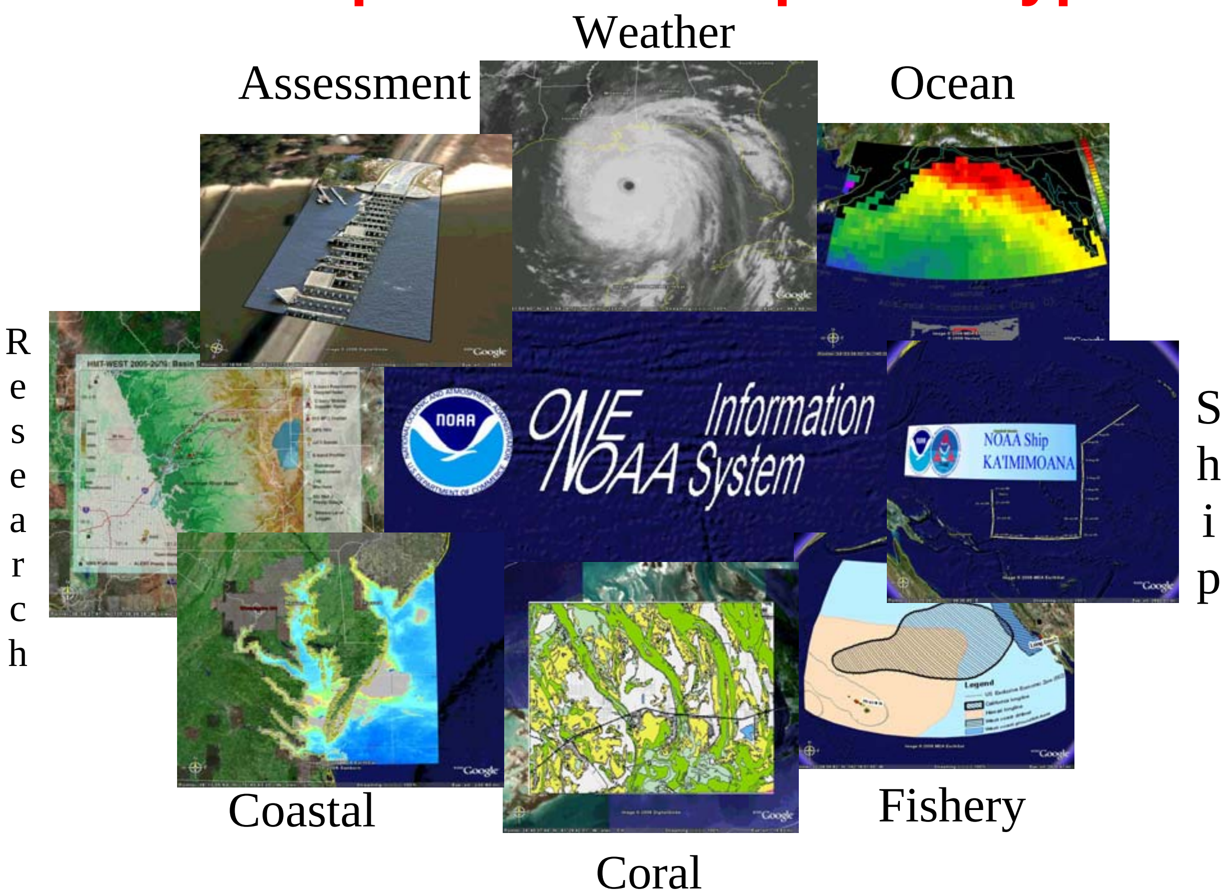

Figure 1. Example displays of NOAA data.

For this example a java program was written which pulls METAR and current weather data off the NOAA servers, parses and processes it, and uses the data to output placemarks for meteorological station plots. A network link was written which will eventually pull the data off NOAA servers every hour. For purposes of this demonstration data was manually accessed. Figure 2 shows an example of a current weather data display.

A new capability allows users to designate tags to a region and its children to provide a means for progressive disclosure, which is a very important feature. It allows one to plot a large number of points (e.g. there are as many as 2,500+ METARS reporting in a one-hour cycle) without cluttering up the large-scale map. As a user zooms in on a particular area, more and more information is plotted and displayed.

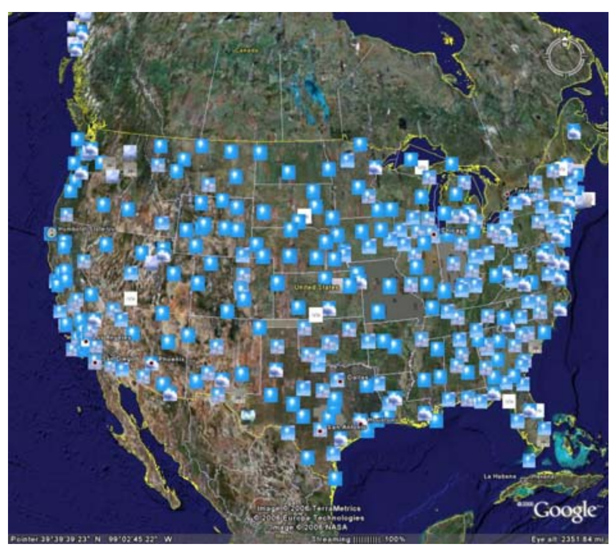

Figure 2. Example of a current weather plot.

Google Earth also has the powerful feature of description tags, which can make the information available within one overlay virtually limitless. When an individual placemark is selected, a description tag will pop up if one was programmed as part of the placemark, displaying any additional information and links to external resources. For the METAR Station Plot overlay, these tags were used to display more in-depth information such as update time, full station identification, and an assortment of meteorological variables such as cloud base height and relative humidity.

The Current Weather Icons overlay uses a Java transformer factory along with Extensible Stylesheet Language (XSL) processing instructions to convert the Extensible Markup Language (XML) information provided by NWS into the Keyhole Markup Language (KML) used by the Google Earth Software. The METAR Station Plots overlay uses Java parsing and processing techniques to convert a text file provided by NOAA and obtained via anonymous FTP into the KML data. An auxiliary text file predefined the "regions" which are used by Google Earth to provide the progressive disclosure capabilities. The output of running either Java program is a KML file. A network link that is set up and downloaded onto a user's computer then pulls the KML file off the NOAA server at a specified time each hour. This allows NOAA to keep the Java program and data secured in private folders, away from the publicly-assessable KML output file.

4. CONCLUSION

Our initial evaluation of readily-available visualization packages has produced some promising results. Examples of NOAA data were relatively easy to adapt to the interface. Other groups have also been successful generating real-time displays such as mosaics from the NWS Doppler Radar (Smith and Lakshmanan, 2006). These can be automatically refreshed when new data become available. Additionally, other non-NOAA data has also been adapted which further enhances the utility of a common user interface and readily-available visualization packages.

5. ACKNOWLEDGEMENT

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6. REFERENCES

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