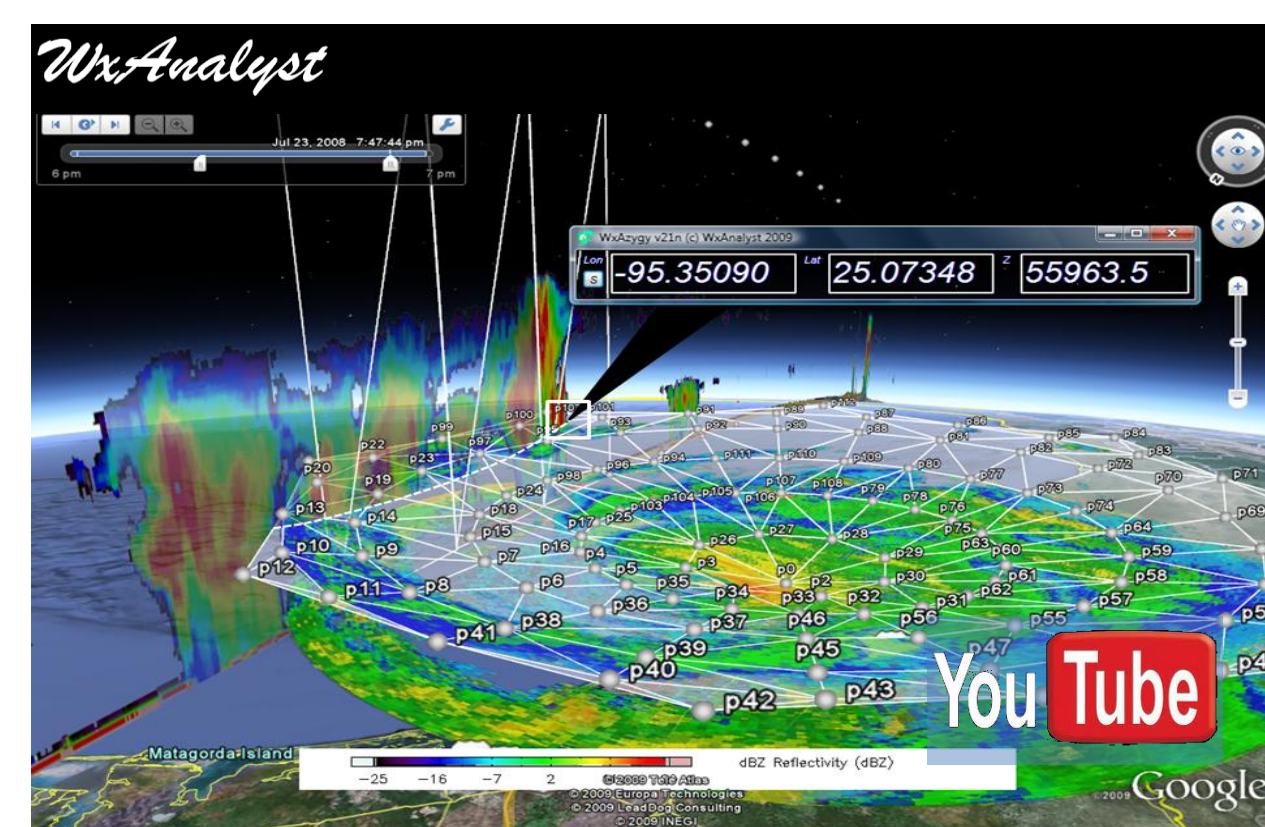# 4D KMZ Approach to Geophysical Analysis in Virtual Globes

Scott T. Shipley and Albert Peterlin, WxAnalyst, Ltd., Fairfax, VA

WxAnalyst
Applied Geography

*"Up in the air, way out in space,
deep down below, and all over the place."*

NASA SBIR 2008-1 S6.04.9159
GIS Function Coupling for Virtual Globes
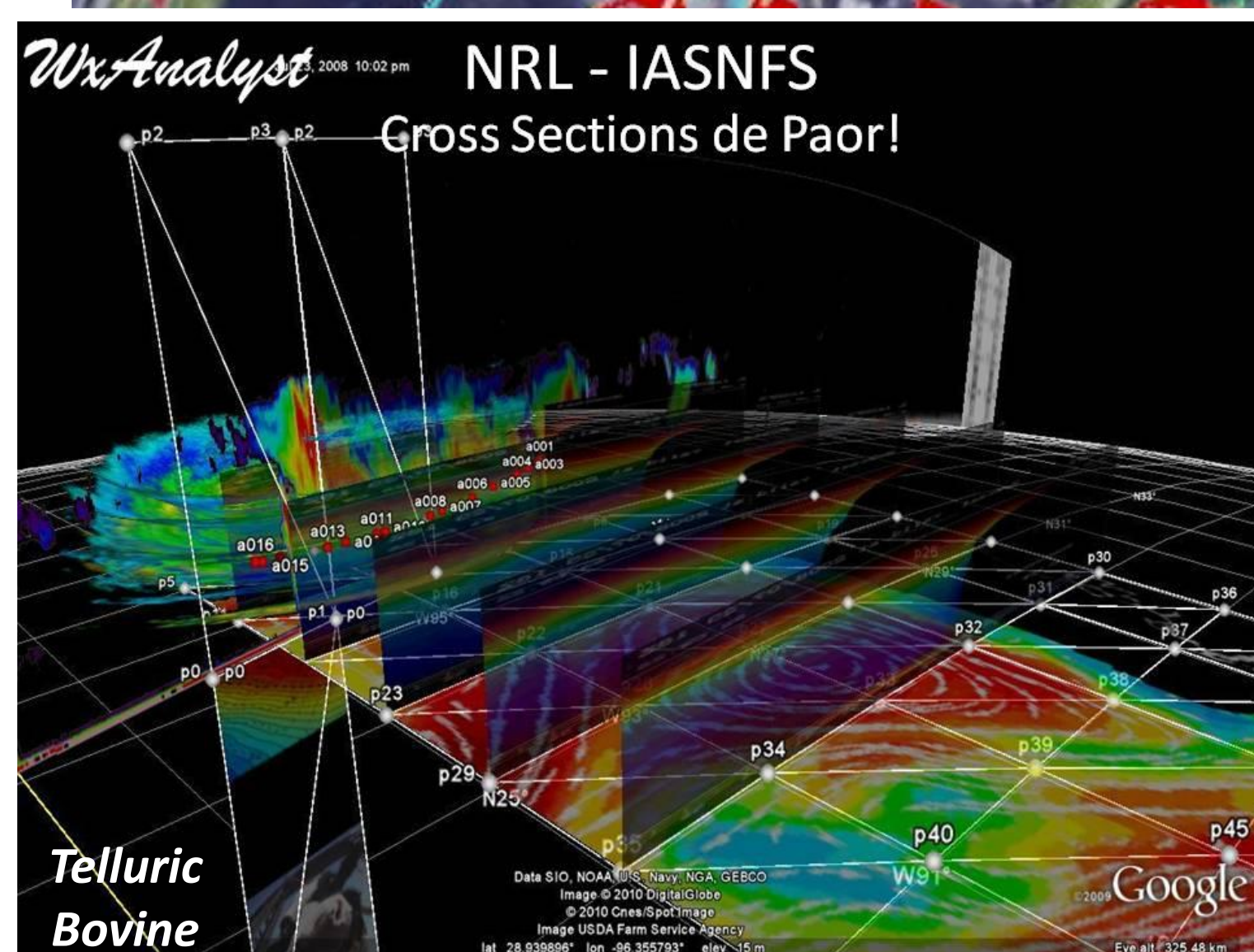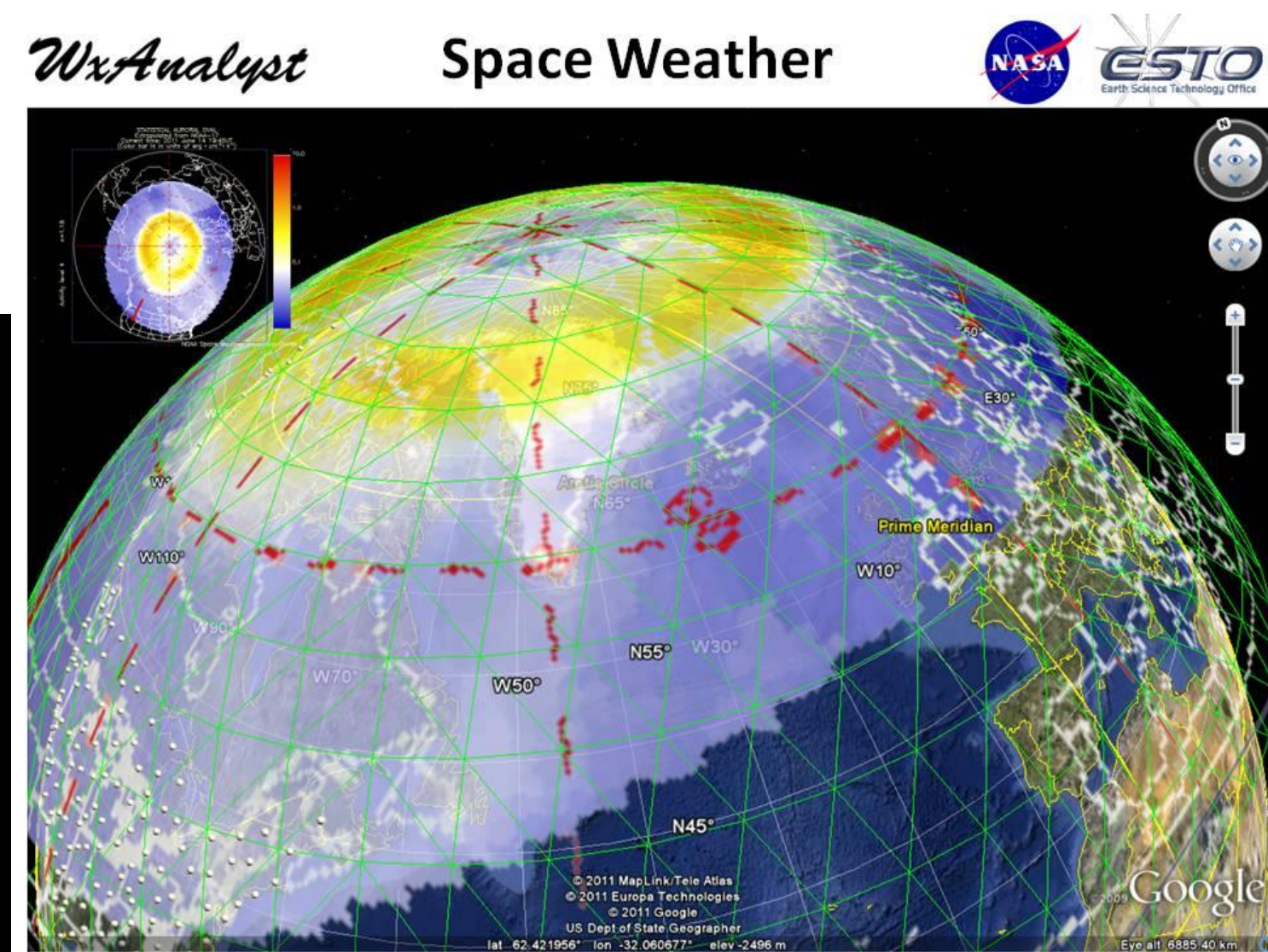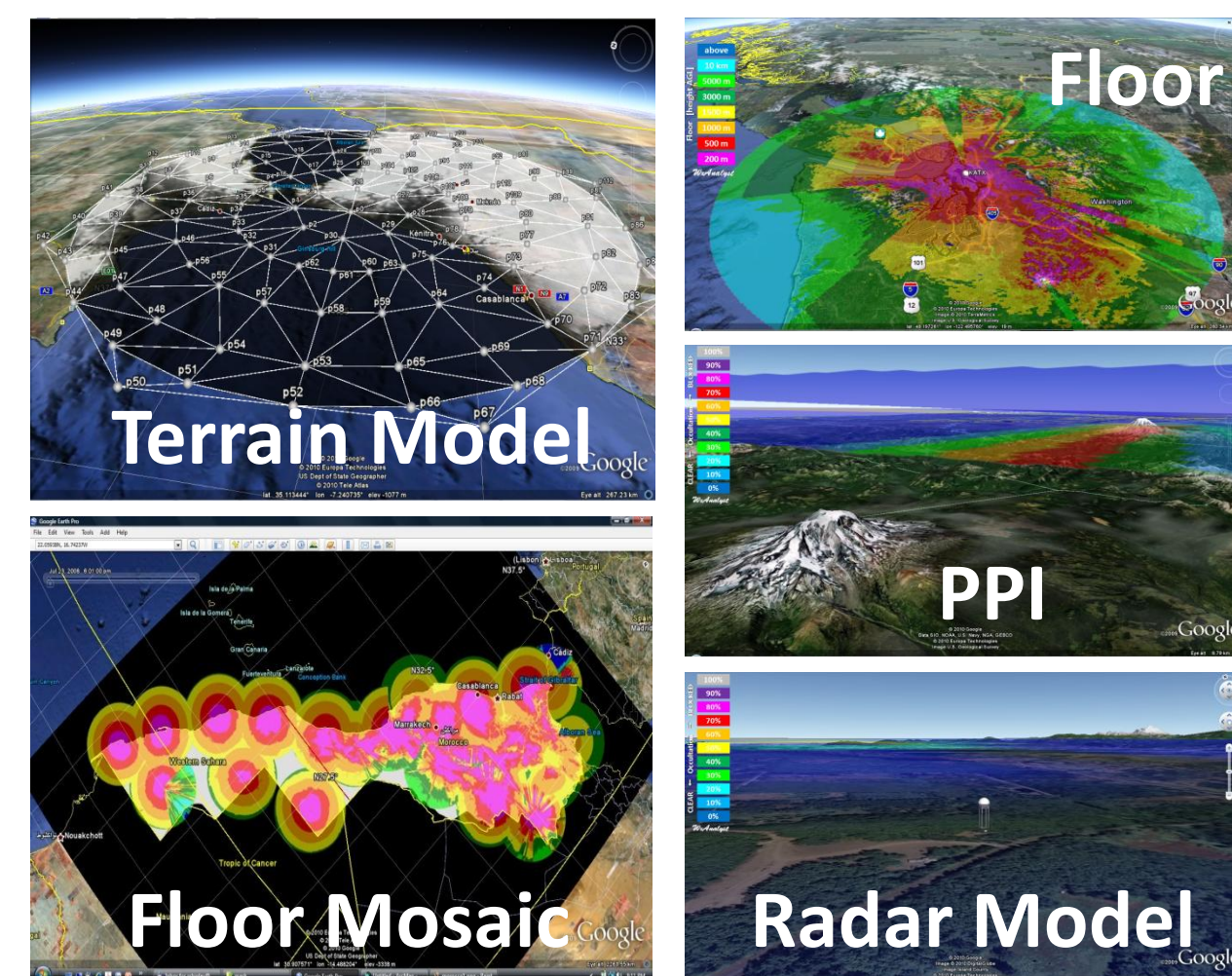NASA Langley Research Center

Enhances Virtual Globe (VG) functionality by enabling rudimentary operations on users' data through a light client "transparent interface" dubbed WxAzygy®. Technical goals include "point and click" identification of location and content of remote sensing information in a 4D VG visualization, and coupling with external applications. A Feasibility Prototype for Google Earth was demonstrated and delivered to NASA for test and evaluation in the Windows environment. The Feasibility Prototype functionality was then transferred to Mac OS using Google Earth web API to demonstrate internet application.
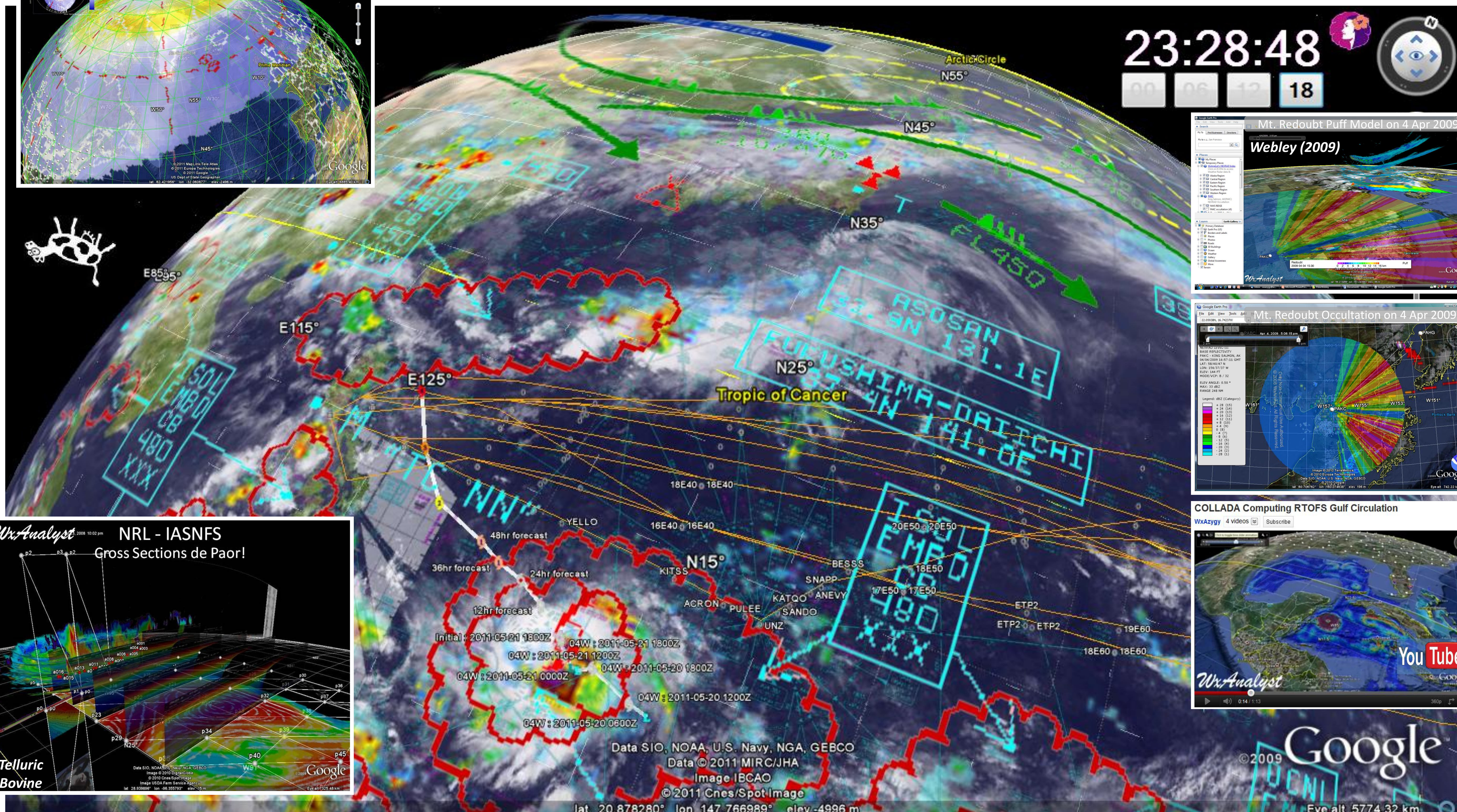
WxAzygy® Tools

The WxAzygy® Tools combines the results of both SBIR Projects to support rapid interactive user analysis of signal occultation within Google Earth anywhere. COLLADA Computing™ adds manmade structures to the mix. Users use a geoCursor to identify their site for radar or optical devices, then request an analysis which appears within seconds. The most requested product is the "occultation stack", which provides a rapid visualization of obstacles to beam propagation.

Current enhancements include anomalous propagation (with knowledge of hydro-thermodynamic environment), and calculation precision to 30 meters.
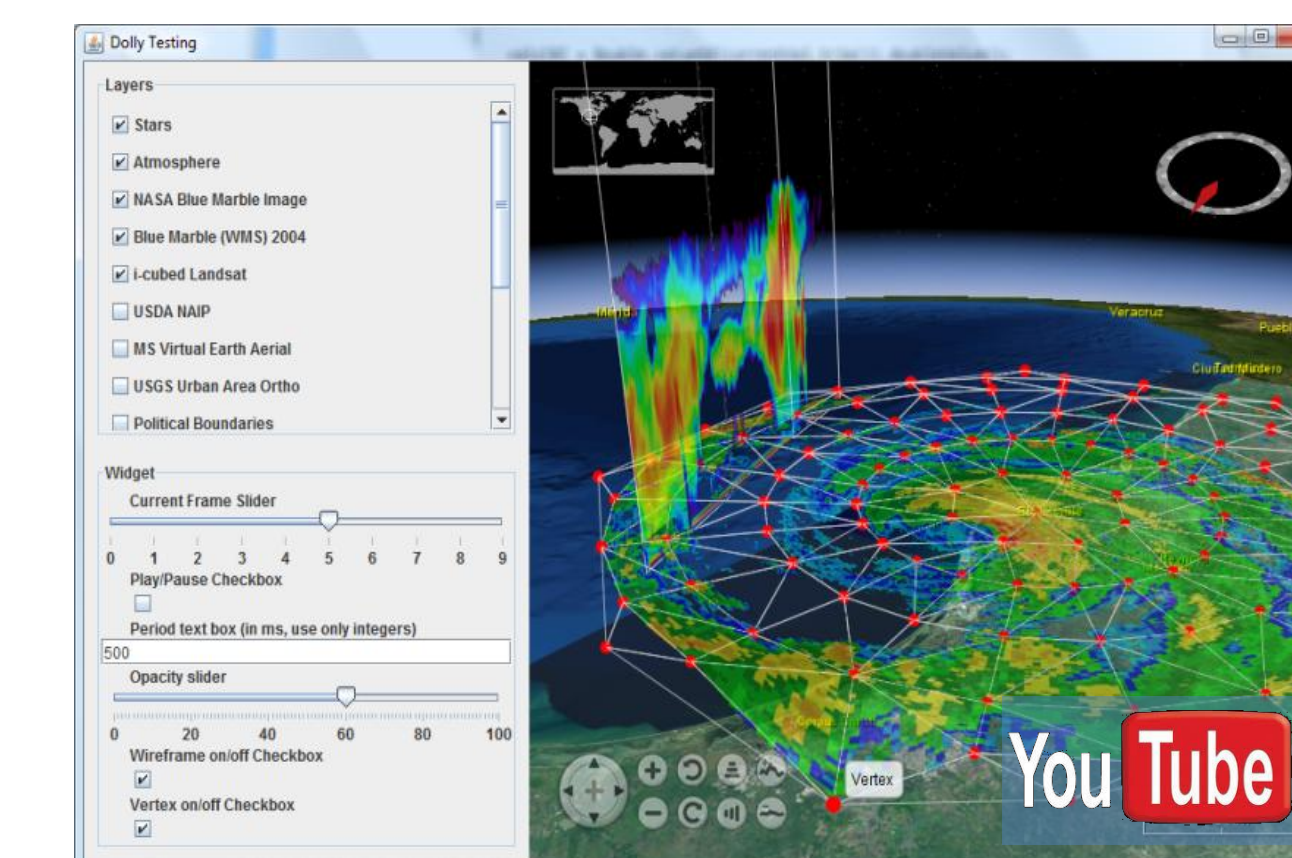
WxAzygy® is a registered trademark of WxAnalyst, Ltd.

Terrain Model · Floor · PPI · Floor Mosaic · Radar Model

NASA SBIR 2010-1 S6.03.9634
COLLADA Computing for Geophysical Applications
NASA Goddard Space Flight Center

COLLADA Computing provides a common linear framework for representing, associating, combining, differentiating and integrating geophysical data objects. Once translated into COLLADA, disparate data from the atmospheric, oceanic, geologic and space domains can be combined to create entirely new and innovative cross-domain products regardless of original coordinate system or data geometry. The resulting products can be viewed and manipulated within any Virtual Globe that supports the COLLADA industry standard, such as Google Earth and NASA World Wind Java. This effort enables analysis functions on geophysical datasets within the Virtual Globes, achieving gaming system speed and visual effects with real world data. WxAnalyst demonstrated COLLADA Computing proof of concept in Phase I, exploiting the Affine Transformation for math operations on geophysical datasets with linear topology.

COLLADA Computing™
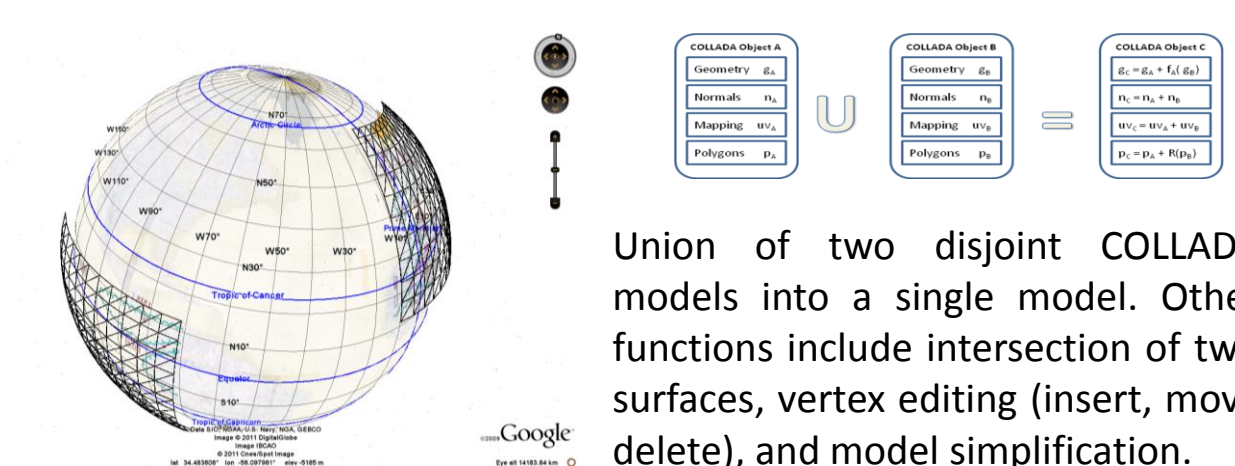
Union of two disjoint COLLADA models into a single model. Other functions include intersection of two surfaces, vertex editing (insert, move delete), and model simplification.
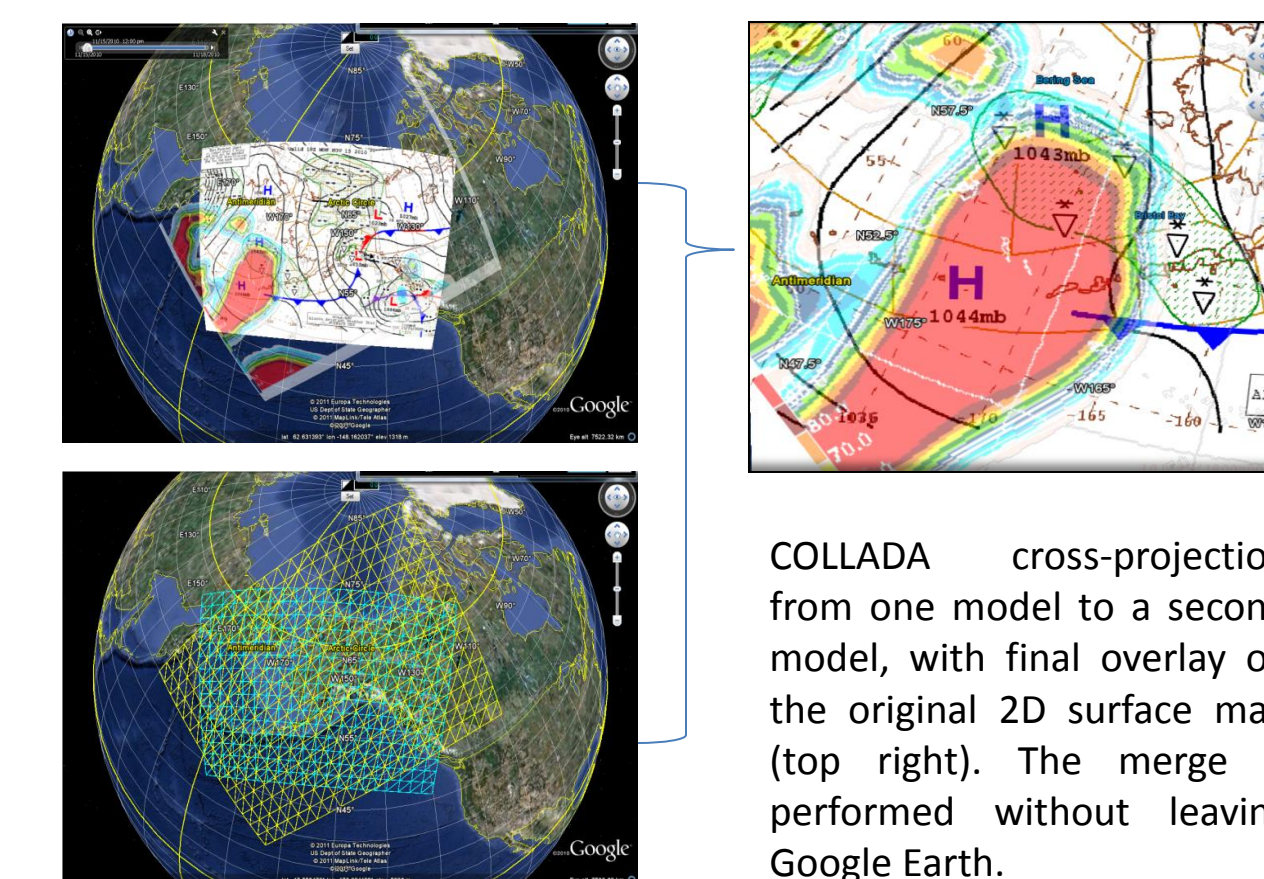
COLLADA cross-projection from one model to a second model, with final overlay on the original 2D surface map (top right). The merge is performed without leaving Google Earth.

WxAnalyst · Space Weather

Mt. Redoubt Puff Model on 4 Apr 2009 — Webley (2009)

Mt. Redoubt Occultation on 4 Apr 2009

COLLADA Computing RTOFS Gulf Circulation

NRL - IASNFS
Gross Sections de Paor!

Telluric Bovine