Dagik
DAta-showcase system for Geoscience In Kml

Dagik Earth: An affordable three-dimensional presentation of global geoscience data in classrooms and science museums

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Feb. 2009: National Museum of Science and Nature

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Objectives

We developed an easy 3-D Earth presentation system to show our data. It has following three "easy" features:

1. Easy to install

   It is simple and inexpensive to be used in classrooms and science museums.

2. Easy to turn around

   It is easy to turn the Earth around to see any portion of the Earth.
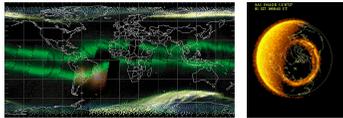
3. Easy to make contents

   It is easy to make contents using Geoscience data.

Background

Two-dimensional presentation of Geoscience data cannot reproduce its original shape. The distortion is significant especially for the global map.


Global map of aurora and airglow distribution (left) [Christensen et al., 2003] (right) [http://www.nasa.gov]

There are several systems to display 3-D Earth, such as Science on a Sphere (SOS) by NOAA, Geo-Cosmos by Mirai-kan, Japan. But their size of system is large, and hard to use in classrooms and local science centers.
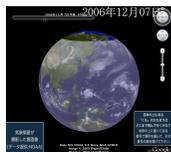

Geo-Cosmos of Mirai-kan, a national science museum, Japan. Diameter 6.5m, Weight 16t. [http://www.miraikan.jst.go.jp/]

Contents
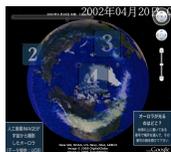
Aurora FUV image by IM-AGE satellite by UCB/SSL
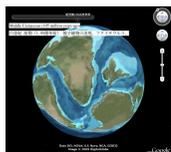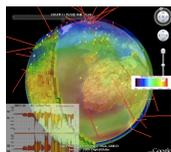

Global Cloud map by NOAA/NCDC

Plate motion by Ron Blakey of North Arizona University

Space Science data in Dagik (http://dagik.org)

Easy to turn around

It is important to select the view easily. Virtual globe softwares are easy to turn the Earth around.

For exhibition, Wii remote controller and Balance Wii board are used to turn the Earth easily even for kids.

July 2008: NICT Open Lab.
Wii remote

Oct. 2009: SGEPSS public outreach activity
Balance Wii board

Further developments

We will promote to present Geoscience data in 3-D with the Dagik Earth system.

- Provide information of hardware and software through WWW (http://dagik.org/dagik_earth/).

- Prepare several sets of the system for rent to public outreach programs and classes.

- Organize community to make educational programs using Dagik Earth.

Dec. 2009: Higashi-Fukai Junior High School

Easy to install

Only white hemisphere is the thing to buy for this system. PC projector is an ordinary one, and there are virtual globe softwares that are freely available.
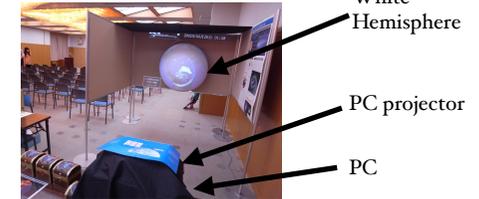
White Hemisphere

- Styrene foam

  Easy to setup but difficult to carry.
  60 cm diameter ∼$50
  90 cm diameter ∼$150

- Balloon
  Easy to carry. Attached on white/black board with magnet.
  100 cm diameter ∼$500
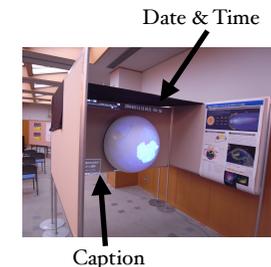

Easy to make contents

Google Earth displays KML, an XML file format. KML is an open format. To make KML files of Geoscience data is easy.

There are many KML files of Geoscience in Dagik (http://dagik.org) and others.

Summary

- Dagik Earth is an affordable 3-D presentation system of the Earth.

- Actually, it is not a special system. Only white hemisphere is necessary as a screen. Minimum cost is $50.

- It is easy to install, turn the Earth around and make contents.

- Sharing of information and contents is important. Dagik Earth web will serve for it.

System

Put a white hemisphere on the wall, and project virtual globe software, such as Google Earth and NASA World Wind, on it with a PC projector. Mapped texture of sphere is re-mapped on spherical surface, then it is re-constructed in its original shape.

White Hemisphere

PC projector

PC

It can display time and captions on the wall.

Date & Time

Caption

Exhibitions

March 2007: Dagik project commenced

May 2007: First Dagik earth in JPGU meeting

Open Campus: Kyoto University, The University of Electro-Communications, SGEPSS, NICT

Science museum: Kyoto University Museum (Apr.-Aug. 2008), National Museum of Nature and Science (Dec. 2008, Feb. Jul. and Aug. 2009), Sizuoka Science Center (Apr. 2009), Science Agora at Mirai-kan (Nov. 2009)

Class: KAGI international summer school (Aug. 2009), Higashi Fukai junior high school (Dec. 2009)

Nov. 2009: Science Agora at Mirai-kan

May 2007: Japan Geoscience Union Meeting