History of SOS

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Table of Contents

What is NOAA?

NOAA is a federal agency focused on the condition of the oceans and the atmosphere. It plays several distinct roles within the Department of Commerce with a broad mission. Some of NOAA's more widely-known divisions include the National Weather Service, The National Hurricane Center, and the National Marine Fisheries Service.

NOAA's vision is to create "...an informed society that uses a comprehensive understanding of the role of the oceans, coasts and atmosphere in the global ecosystem to make the best social and economic decisions." The mission of NOAA is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social and environmental needs.

History of SOS

Science On a Sphere® was invented by Dr. Alexander "Sandy" MacDonald, the director of the NOAA Earth System Research Laboratory in Boulder, CO and OAR Deputy Assistant Administrator for NOAA Research Laboratories and Cooperative Institutes. Dr. MacDonald came up with the concept for Science On a Sphere® in 1995 as an outgrowth of other visualization projects he was directing within the former Forecast Systems Laboratory.

An early prototype of Science On a Sphere® was built in 1995, followed by an earnest effort to develop a complete system beginning in the year 2000. David Himes was the original lead software engineer on the project, who along with others, engineered, developed, and integrated all of the software and hardware components used to create a Science On a Sphere® system. A patent was awarded to NOAA for Science On a Sphere® in August 2005, with Dr. MacDonald credited as the inventor.

SOS inventor Dr. MacDonald (Left)
Former Director, National Hurricane Center
Dr. Max Mayfield (Right)

Science On a Sphere® is a large visualization system that uses computers and video projectors to display animated data onto the outside of a sphere. Said another way, SOS is an animated globe that can show dynamic, animated images of the atmosphere, oceans, and land of a planet. NOAA primarily uses SOS as an education and outreach tool to describe the environmental processes of Earth.

Science On a Sphere® was initially developed as a way to explore environmental data using new visualization techniques. It became quickly obvious that when combined with the narration and supporting educational material, a well-crafted visualization provides a unique and powerful teaching tool. Over the past several years, NOAA has been using SOS to support educational initiatives, primarily in informal education venues, such as those found in science centers and museums. Visit NOAA's Office of Education website.

Science On a Sphere® is built from standard hardware components and at its very basics is composed of off the shelf PCs, video projectors, wires, and a sphere. The PCs run a version of Ubuntu Linux. When installed in a room, the sphere is generally suspended from above and surrounded at the corners of the room by four video projectors. Only one computer is required to operate the whole exhibit, with a second computer as a spare. Data is pulled from the disk, manipulated, re-projected and synchronized back onto the sphere.

While the interactions between all of the hardware pieces are complicated, using the system is easy and straightforward. The system comes pre-programmed with various data sets that show the Earth's land, oceans, and atmosphere, to name just a few. The data sets are organized into categories such as land, air, water, and

space and then further sorted into subcategories. Datasets can also be organized into presentation playlists. An SOS presentation playlist is analogous to the MP3 player concept of a playlist. The items in a playlist can be randomly selected or played in sequence. The system allows for an unattended (or automatic) mode of operation or it can be controlled via the SOS Remote App.

Enhancements and new features are continually added to SOS to ensure that it remains at the forefront educational visualization display. Recent enhancements include compatibility with 4K projectors, a selection of sphere sizes, the ability to use fewer projectors, the Visual Playlist Editor, and the SOS Public Kiosk. Check out the SOS Product Suite for full details on the software enhancements.

An article written in the early days of SOS about it's history and first steps is available here.

SOS Timeline

- 2004 – First Permanent SOS Installation
- 2005 – SOS Patent Awarded
- 2006 – 10th SOS installed
- 2007 – SOS Data Catalog Reorganized
- 2008 – 25th SOS installed
- 2008 – Wii remote introduced as a controller
- 2009 – SphereCasting Introduced
- 2010 – 50th SOS installed
- 2010 – SOS hardware requirements changed from five computers to one
- 2011 – 75th SOS installed
- 2011 – SOS Remote App introduced
- 2012 – Annotation, Zooming, and Layering introduced
- 2013 – 100th SOS Installed
- 2013 – Support for KML and WMS files introduced
- 2014 – Usage Statistics and Live Video PIPs introduced
- 2015 – 125th SOS installed
- 2015 - Auto-alignment, Translations, and Kiosk introduced
- 2016 – Fully featured Visual Playlist Editor introduced
- 2017 – Text PIPs introduced