Science On a Sphere iPad and AMX User Manual

Manual Adapted from The Wild Center May 2015

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Introduction: Science On a Sphere® (SOS) is a room sized global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA (National Oceanic and Atmospheric Administration) developed Science On a Sphere® as an educational tool to help illustrate Earth System science to people of all ages. Animated images based on scientific data from a variety of disciplines (geoscience, social science, space science, and more) can be shown on the sphere in a way that is simultaneously intuitive and captivating. It was designed in the mid-1990's at NOAA's lab in Boulder, CO driven in large part by Dr. Sandy E. MacDonald as part of his work in the former NOAA Forecast Systems Laboratory.

As of May 2015, there were over 100 SOS systems installed worldwide. The DMNS SOS was installed in 2009 thanks to a five-year, one million dollar grant from NASA. The DMNS SOS is one of the few systems on the SOS network that is facilitated most of the time by volunteers and staff.

This manual is designed to help you understand how to use the NOAA SOS iPad app as well as the column-mounted AMX panel near the SOS, with the SOS system. Additional information about the SOS system can be found on NOAA's SOS website: http://sos.noaa.gov/What_is_SOS/index.html. We hope you enjoy using the DMNS SOS, it's an amazing tool to use with guests to help them understand complex scientific concepts. If you have any feedback for us about this manual or the SOS system, please let us know. Thanks for all you do for DMNS!

Getting Started with the iPad: The iPad, with the NOAA SOS remote app, allows you to find and utilize SOS datasets/playlists, find related content information and build new playlists.

- The NOAA SOS remote app (see picture of app at right) has four main modes: **Presentation**, **Data Catalog**, **Playlist Builder**, and **Settings**. Main modes are switched via four corresponding buttons at the bottom of the app screen, see illustration on the next page.
- Space Odyssey is equipped with several different iPads that can be used on the SOS, but only one iPad should be used with the SOS while facilitating.
- When removing the iPad from its stand, gently remove the charging cable by grasping the small plug attached to the iPad. Please plug it back in when you're done facilitating.
- Click on the little circular "Home" button on the edge of the iPad to "wake" up the iPad.
- Tap and slide the arrow across the "slide to unlock" label, enter the unlock code if prompted. Ask a fellow team member for the unlock code if you don't know it.
- If not already opened, tap the SOS app icon on the bottom of the iPad home screen.
- The following pages will explain in detail how to use the SOS iPad app.
- If you have questions about how to use the SOS iPad app or if you're having issues with its operation, please don't hesitate to ask a member of your team or a staff member.

Presentation Mode: Allows you to see your whole playlist and use several other features such as **Annotate**, **Zoom**, and **Overlays** as well as manipulate the sphere's position, rotation, and animation. Use the following illustration as a reference to learn how to use this mode.

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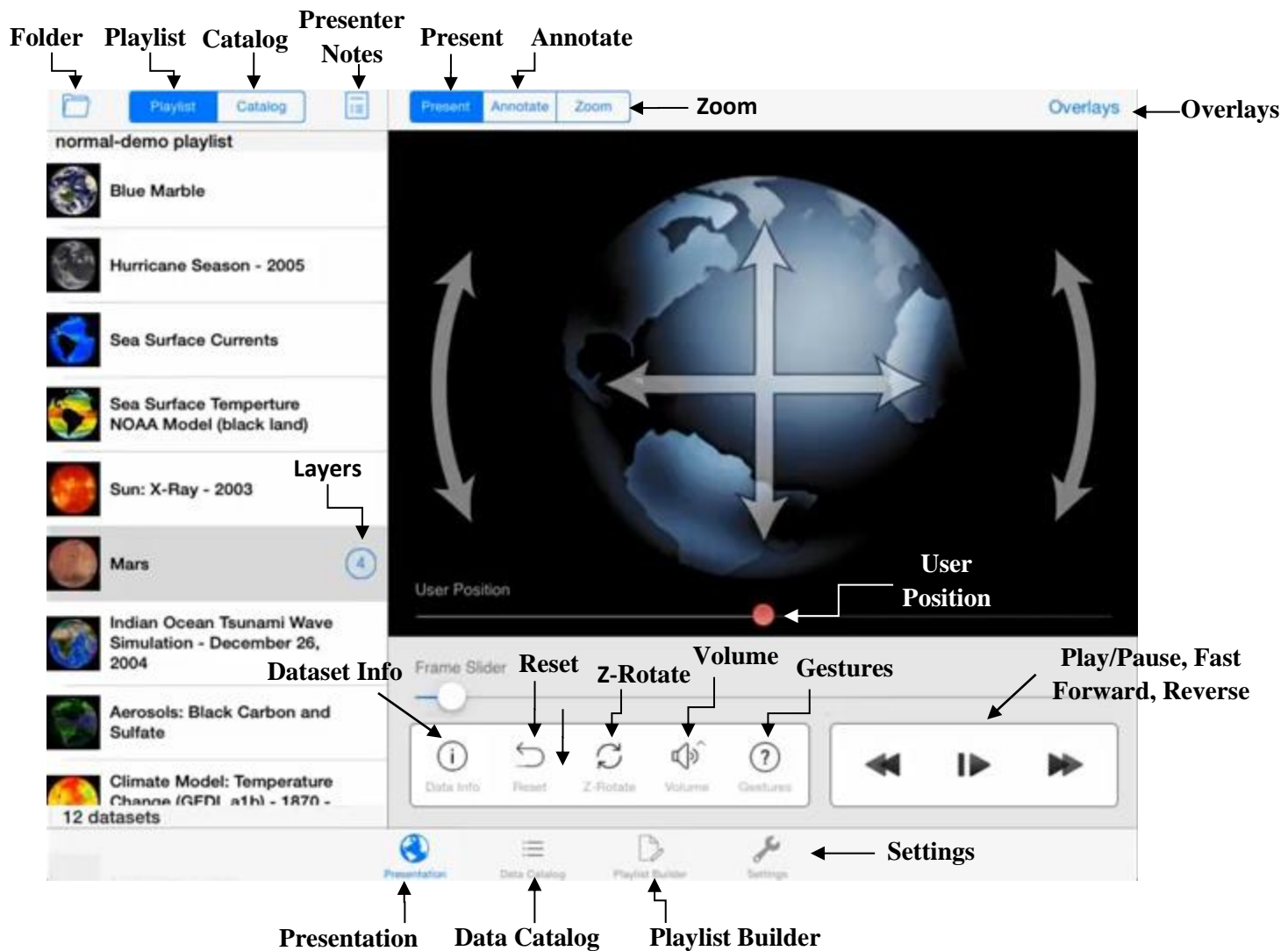
- Tap the **Presentation** icon located at the bottom of the screen, as shown above. Then tap the **Present** button at the top of the Presentation page to open the SOS Presentation page. The screen should look similar to the image above.

- **User Position:** Use this to orient the sphere to your position. You should use this feature before any other.
    - Slide the red **User Position** dot (shown above) along its line until you see a corresponding red dot positioned directly in front of you on the sphere.
    - The dataset on the SOS will now move in a predictable way from where you are.

- **Dataset Info:** Loads NOAA's information and notable features for each dataset.

- **Reset:** Resets the dataset to its original position.

<u>**Presentation Mode (cont.)**</u>

- **Z-Rotate:** Turns the rotation of the sphere on its z-axis (the axis that passes through the north and south poles) on and off. This is particularly useful if you want to keep an animation running, such as the weather, and prevent the whole globe from rotating. On static datasets this function increases the speed of rotation along the z-axis.

- **Volume:** Controls the volume of any sounds associated with the dataset.
  - Tap the **Volume** button to bring up the Volume dialog.
  - Drag the white circle along the line to increase or decrease the volume.
  - Tap anywhere else to exit the Volume dialog box.

- **Gestures:** Brings up a quick help guide for presentation gestures or controls.

Playlists:

1. **Loading**
   - To load a playlist, tap the **Folder** button at the upper left hand corner when in **Presentation** mode. You'll then see an index of all the playlists available. Please do not use "WIP" (Works in Progress) playlists unless you're familiar with them.
   - Tap on your desired playlist to open it.
   - The datasets will appear in the left hand column. You can move through datasets by tapping on their names. If you don't see the desired datasets, tap the **Playlist** button at the top left of the screen.
2. **Browsing the Catalog**
   - To view the most recent dataset catalog search results, without navigating away from your playlist, tap on the **Catalog** button next to the **Playlist** button. This will open the dataset catalog in the left hand column and you can tap on a dataset from the **Catalog** column to display it on the sphere. You can toggle between **Catalog** and **Playlist** and stay on the Presentation page. If you want to initiate a new dataset search, see the **Data Catalog** section of this manual to learn how to do so.
3. **Presenter Notes**
   - To access your presenter notes, tap on the **Presenter Notes** button to the right of the **Catalog** button. This will bring up any notes you have entered for the dataset you are currently on. Note that DMNS hasn't added any presenter notes as yet.
   - Tap anywhere else to exit the presenter notes.
   - To add presenter notes, see **Playlist Builder.**

Presentation Mode (cont.)
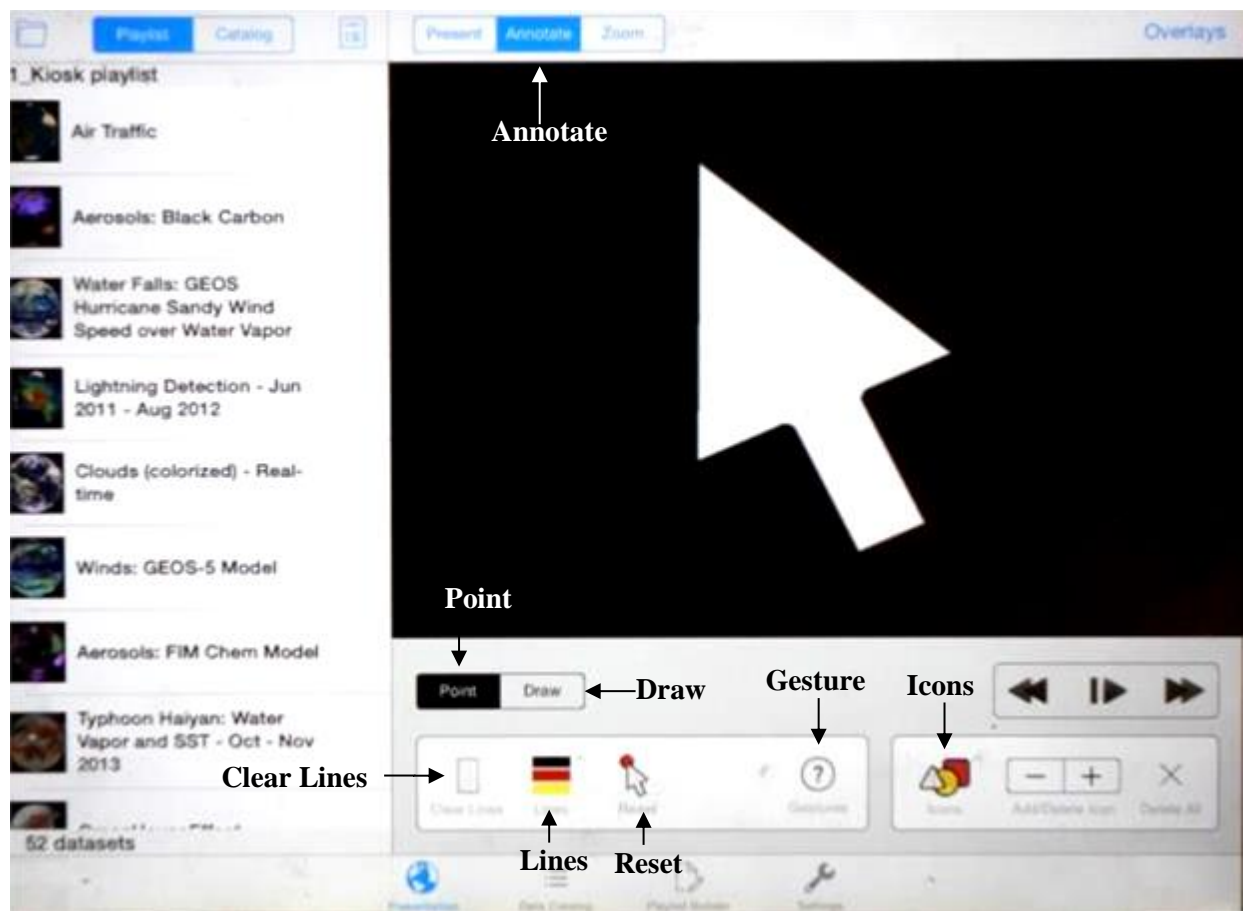
- **Annotate:** Allows pointing and drawing onto the sphere dataset to highlight areas of interest during a presentation—see illustration above for reference.
    - While on the **Presentation** page, tap on the **Annotate** button at the top.
    - A white cursor appears on the sphere. The cursor will be located at either the last set **User Position** (the red dot) or at the last recorded position of the cursor.
    - In addition, icons related to datasets can be dropped onto the sphere, see below.
    - **Point** mode: Projects a cursor onto the sphere.
        - The **pointer** can be used to draw attention to certain areas instead of using a laser pointer.
        - Tap the **Point** button.
   - Drag one finger over the large cursor icon in the window to move the cursor on the sphere.

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Presentation Mode (cont.)

- **Draw Mode**: Draws on the sphere.
  - In **Point** mode, position the cursor on the sphere where you would like to draw.
  - Tap on the **Draw** button.
  - A marker will appear on the trackpad and on the sphere. Drag one finger over the track pad to draw onto the sphere.
  - The marker will draw continuously as long as you are in Draw mode.
  - To draw at another location, you must first get back into Point Mode by tapping the **Point** button, position the white cursor at the new location, and then get back into Draw Mode to draw by tapping the **Draw** button. This avoids drawing a line between the two locations.
  - **Clear Lines:** Tapping this button will clear all drawings in either **Point** or **Draw** mode.

- **Lines:** Selects line color and width.
  - Tap on the **Lines** button. The **Lines** dialog will appear.
  - Select your desired color by tapping on the color square you would like to use.
  - Select your desired width by dragging the dot along the line.
  - Tap anywhere else to exit the **Lines** dialog.

- **Reset:** Brings the cursor or marker to the last set User Position on the sphere.

- **Gestures:** Brings up a quick help guide for **Annotate** gestures.

- **Icons:** Drops icons onto the sphere or uses an icon as the cursor.
  - To drop icons, position the arrow cursor where you want the icon to appear.
    - Tap the **Icons** button. The **Icons** dialog will appear.
    - Select an icon from the list.
    - Adjust the size of the icons by sliding the dot along the line in the **Icons** dialog.
    - Tap anywhere else to exit the **Icons** dialog.
    - Tap and hold the trackpad (large cursor) with one finger to drop an icon onto the sphere.
    - Tapping the **"plus" button** adds icons and the **"minus" button** removes them.
  - To use an icon as the cursor instead of an arrow, tap the **Icons** button.
    - Select an icon from the list.
    - Tap the **Use Icon** button.
    - Tap anywhere else to exit the **Icons** dialog.

- The selected icon will now appear as the cursor. You can also drop copies of this icon as you normally would by tapping and holding.

o **Add/Delete Icons "+"**: Drops an icon.

o **Add/Delete Icons "-"**: Removes the last added icon.

o **Delete All:** Deletes all icons from the sphere.

Note: Drawings and icons cannot be saved and are erased as soon as you go to another dataset.
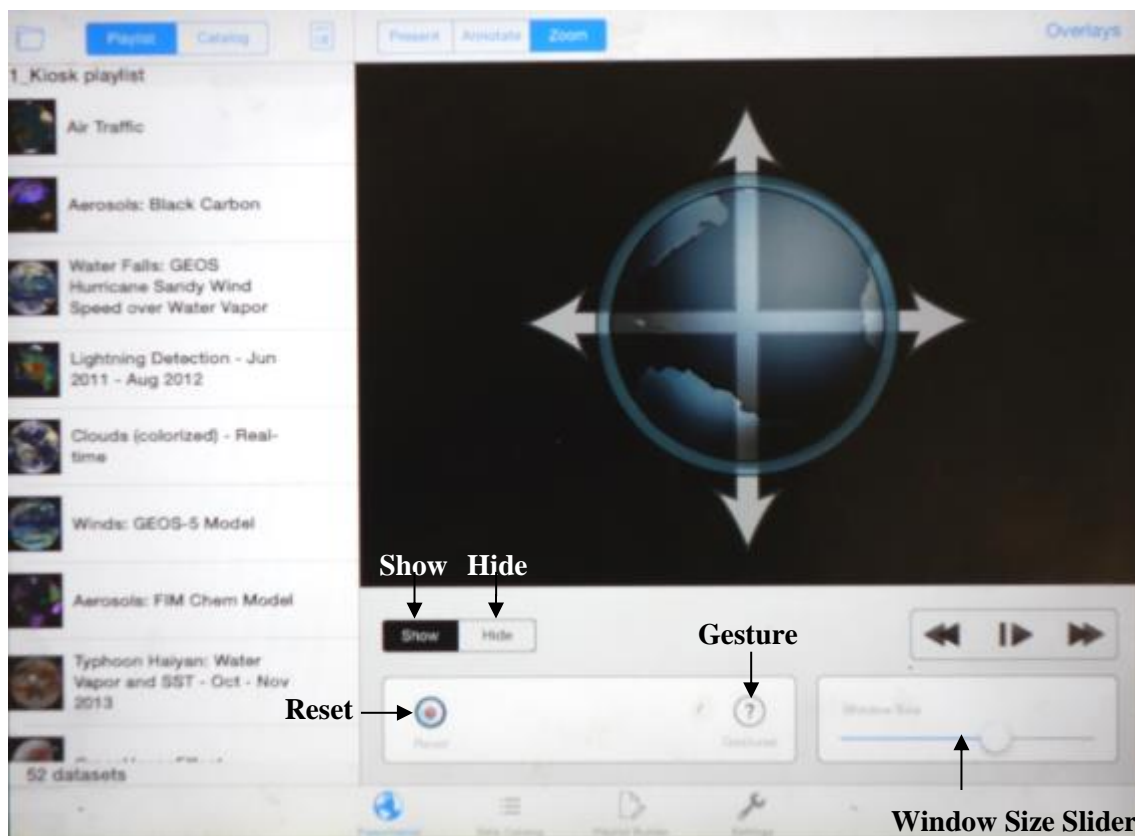
- **Zoom Mode:** Allows you to zoom in on certain areas of the sphere. The zooming is done via a virtual magnifying glass that appears on the sphere.
  o While on the Presentation page, tap the **Zoom** button at the top.
  o Drag the circle that appears on the sphere to the area you wish to zoom in on.
  o Change the size of the magnifying glass by using the **Window Size** slider in the lower right hand corner.
 o Zoom in and out by pinching fingers in and out.

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Presentation Mode (cont.)

Note: The zoom feature doesn't work on PIPs and does not increase the clarity of your image, in other words this is not like Google Earth

- o **Show:** Shows the magnifying glass on the sphere.

- o **Hide:** Hides the magnifying glass on the sphere.

- o **Reset:** Brings the magnifying glass to the last set User Position on the sphere.

- o **Gestures:** Brings up a quick help guide for Annotation gestures.

Note: When a new clip is selected from the playlist, the magnifying glass is automatically cleared and the Presentation mode is reset to display the **Present** page.
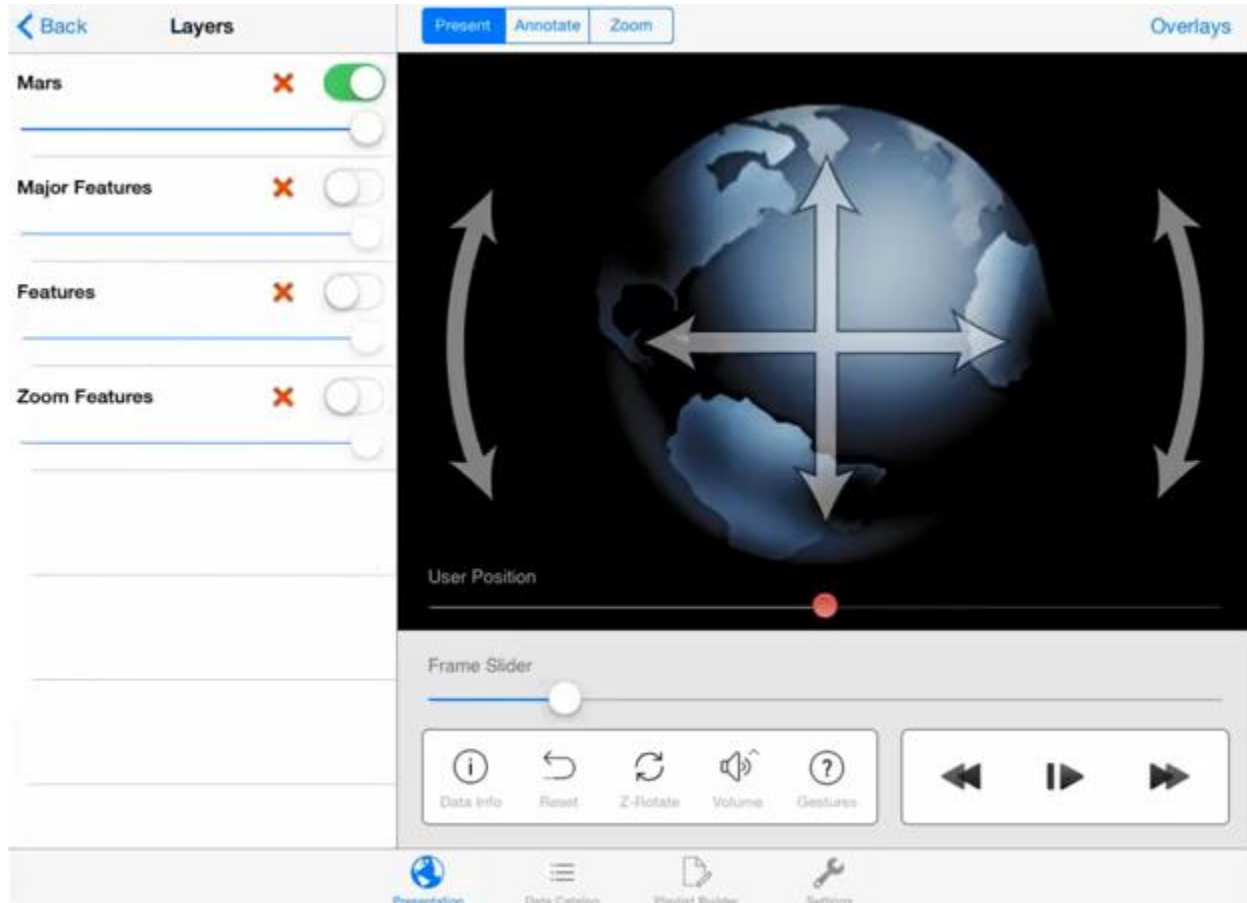
Layers Mode: Allows you to manipulate overlays and PIPs on a dataset.

- Layers for a dataset are displayed as a number set in a blue circle to the right of the dataset name. The number represents how many layers are associated with the dataset.

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Presentation Mode (cont.)

- To display the layers, tap on the numbered circle next to the dataset name. All the associated layers will appear in the left hand column.
- To remove a layer, tap the red **"X"**.
- To turn a layer off, tap the green toggle. It will change to white.
- To turn a layer back on, tap the white toggle. It will change to green.
- To change the transparency of a layer, slide the circle along the blue line.

Note: To layer one dataset on top of another on the fly:

- Tap your background dataset (dataset A) so that it loads onto the sphere.
- Find the dataset that you wish to layer on top of dataset A (dataset B).
- Press and hold down dataset B until it appears on the sphere.
- Go into the "Layers" tab and adjust the transparency of dataset B to your liking.
- **Overlays:** A special library of useful earth-related transparent layers (ex. Country borders)
  - Tap the **Overlay** button at the top of the screen and select an overlay.
  - Once you have selected an overlay it becomes a layer (a dataset on top of a dataset) and can be manipulated by tapping on the dataset name.

Note: Overlays DO NOT save to datasets and will be erased as soon as you move to another dataset.

Data Catalog Mode: Used to browse datasets. Use illustration below for reference.
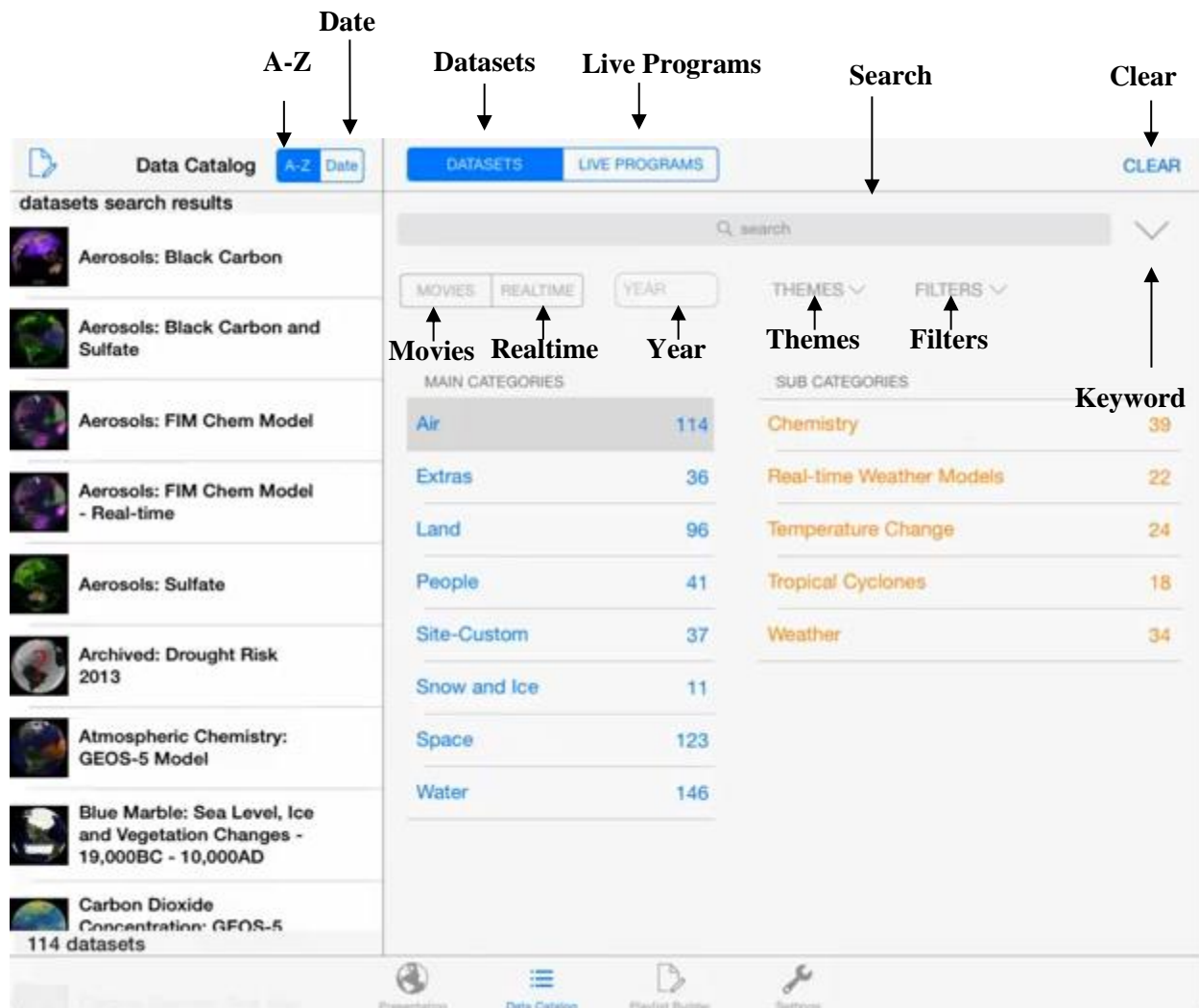
- To search the **Data Catalog**, tap the **Data Catalog** icon on the bottom of the screen. This will bring you to the main categories screen. From here you can browse through datasets according to their main and sub categories.
- If you tap on a dataset in the Data Catalog mode it will appear on the sphere. You can tap to the **Presentation** icon to manipulate it in the Presentation mode.

Note: Tapping on datasets in the Data Catalog mode will not navigate away from an already opened playlist. If you return to **Presentation Mode**, you can view your catalog results by tapping the **Catalog** button. You can still access your playlist by tapping the **Playlist** button.

- **A-Z:** Orders datasets alphabetically by name.

- **Date:** Orders datasets newest to oldest by release date.

Data Catalog Mode (cont.)

- **Datasets: Browses datasets**.
    - o To browse through datasets by categories, tap on the **main category** you are interested in. All of the associated datasets will appear in the left hand column.
    - o You can also browse by more specific sub categories. Tap on the **sub category** you are interested in. All of the associated datasets will appear in the left hand column.

- **Live Programs:** Browses NOAA's pre-made, available programs. May have associated program outlines in the presenter notes.
- **Clear:** Clears your search parameters--always tap the **Clear** button when beginning a new search.
- **Search:** Type in keywords etc. here to search through datasets.
- If you have selected a **Main** or **Sub Category**, the search will only look through datasets in that category.
- To search all datasets, tap the **Clear** button in the upper right corner before searching.
- Type any words you want to search by into the **Search** bar.
    - o The app automatically searches through titles.
    - o You can also search by **Keywords**, descriptions, or creators, or any combination of the four.
        - ▪ Tap the **Keyword** search arrow next to the search bar. The **Search** dialog will appear.
        - ▪ Select any or all of the four keywords categories by tapping them.
        - ▪ Tap anywhere else on the screen to exit the **Search** dialog box.
- **Movies:** Selects movie, or narrated production datasets.

- **Realtime**: Selects realtime datasets.

- **Year:** Selects datasets that include a specific year.

- **Themes:** Selects datasets that fit a preset theme.

- **Filters:** Selects datasets with specific options, e.g. 'Audio: Movie Only'.

    Note: To clear any selections you have made and return to the complete dataset catalog, tap the **Clear** button in the upper right hand corner.

Playlist Builder: Mode for creating a new playlist, editing an existing playlist, and adding presenter notes for datasets. Use illustration below as a reference for this mode.
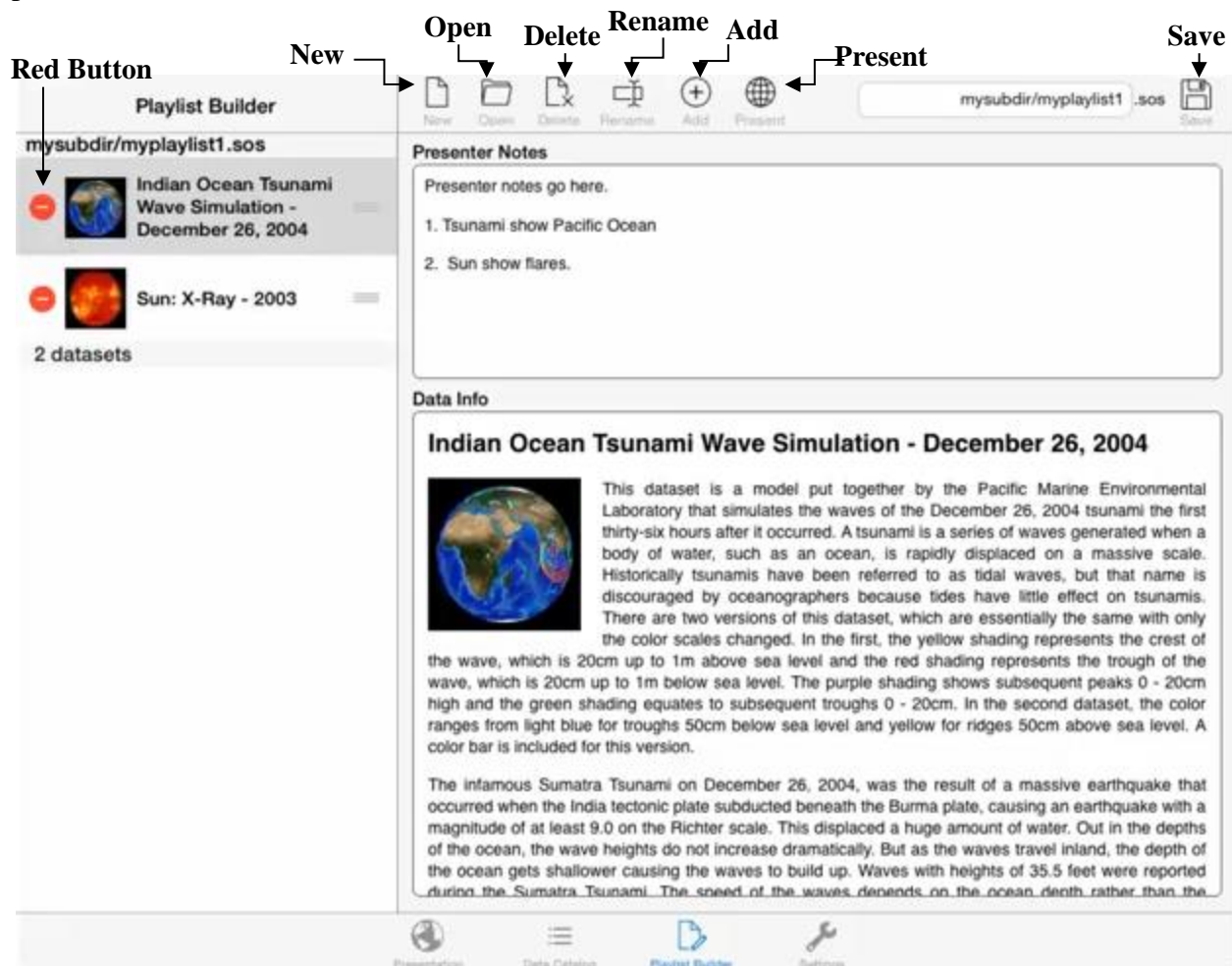
- **NOTE: Please do not modify DMNS-created playlists without permission from staff.**

- **New:** Builds a new playlist.

- **Open:** Opens an existing playlist.

- **Delete:** Deletes a playlist.

- **Rename:** Renames a playlist--name your playlist in a way that makes it easy to find.
- SOS will not accept spaces in playlist names. You can use underscores (_) instead.

- **Add:** Adds new datasets to a playlist. This will take you to the **Data Catalog** mode. Datasets will now have green plus signs next to their names. Tap the **Add** button (green plus sign) next to the dataset you would like to add.

<u>**Playlist Builder Mode (cont.)**</u>

- To finish adding these datasets and return to the playlist builder, tap the **Done** button in the upper left hand corner.
- You can also add a dataset directly from the **Data Catalog** mode. The datasets will not have the green plus signs. Instead, tap on the **pen/paper** button in the upper left hand corner. Now click the **green plus sign** button for the dataset you want to add. Once you are done, tap the **Done** button. It will bring you back to the Playlist Builder.
- **Save:** Saves the playlist and any changes.
  - This will bring up a dialog informing you where the playlist has been saved to on the SOS computer, and asking if you would like to continue working on the playlist or clear the builder. Select whichever is appropriate.
- **Present:** Goes directly to **Presentation Mode** and opens the playlist you have been editing.
- If you are creating a new playlist, you will need to save the playlist first.

Note: If you have opened a playlist in **Presentation mode** and then made changes to the playlist in **Playlist Builder**, these changes will only be reflected in **Presentation mode** if you use the **Present** button or reopen the playlist.

- **.sos bar** (at top left of screen in **Playlist** builder mode)**:** Shows the name of the playlist.
- **Deleting** datasets from a playlist**:** To delete a dataset from a playlist, tap the **Red** button to the left of the dataset name. Then tap on the **Remove** button that appears.
- To change the order of the datasets, press and hold on the **gray handle** to the right of the dataset name. Drag the dataset to the place you want it to be and let go.
- **Adding Presenter Notes:** To add presenter notes, tap in the **Presenter Notes** box. Any notes entered here will be accessible for the entire playlist in Presentation mode.
  - You can also copy and paste information from the **Data Info** by tapping and highlighting any sections you wish to copy. Tapping on the highlighted block brings up a **Copy** button. Tap the **Copy** button. Then double tap in the **Presenter Notes** box. Several options will appear. Tap the **Paste** button. The highlighted block of information you copied will be pasted into the notes.

Note: Any changes you make through the iPad will be stored on the SOS computers.

Auto Run Mode: Used to run Science on a Sphere in automatic presentation mode. Use this mode when the SOS will be left unattended. See illustration below for reference.

- Tap on the **Settings** icon located at the bottom right of the screen
- Set the **ON/OFF** toggle in the **Auto Run** section to **ON**, or **green**.
- An Auto Run message box will pop up that will block all controls on the app until the **Stop** button is pressed on the message box.
- Please use the numbered DMNS-created playlists as they have a more coherent narrative.
- Please do not use playlists with "WIP" in their title as they are still in the "draft" stage.
- To shut off **Auto Run** for a presentation press the **Stop** button in the dialog box and then go to **Presentation** mode.

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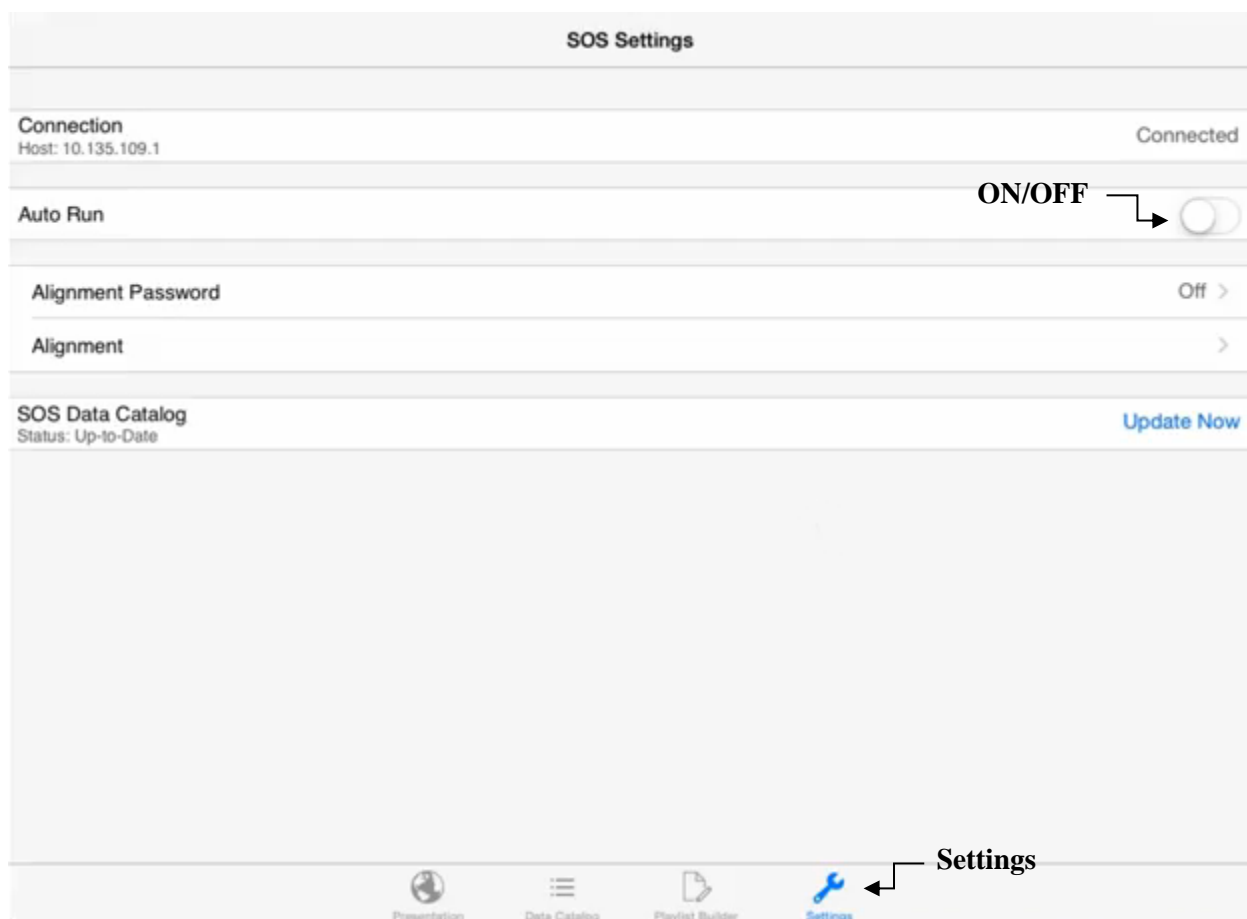
Using the AMX panel at SOS: Allows you to change the SOS area lighting and what is displayed on the three screens behind the SOS via a laptop or iPad. To change datasets on the SOS, one must use the iPad app.

- **Default AMX operation:** The default operation of the SOS space has the lighting on a low level and two of the background screens showing content slides related to the SOS datasets. Where applicable, default operation usually has the left-most screen dedicated to showing an index of datasets in the currently running playlist. This only works on a couple of the DMNS-created playlists. If there aren't any content/index slides available for a particular dataset/playlist, you will see a "Science On a Sphere" slide (note that sometimes this is due to a computer malfunction, so feel free to call the Tech Helpdesk if you see these slides repeatedly on different datasets).
- **Changing SOS lighting:** To change lighting, login to the AMX panel using the same code for the Space Odyssey storage room door. Then select Lighting>SOS. Then pick a lighting level. The lights are mounted in a circle on the ceiling around the SOS.
- **Using a laptop to display information or listen to audio:** This function allows you to show/hear relevant web-based content that pertains to a particular dataset or playlist. For example, you might show a USGS website when showing the Plate Tectonics playlist. To use the function, follow the instructions below and use the images on the following pages for reference.
  - Pull out a laptop from the storage room.
  - Pick which floorbox in front of the SOS you want to use.
  - Lift the access door on the floorbox.
  - Plug in the power to one of the sockets.
  - Plug in the DVI connector carefully to the corresponding plug, note that the plug pins are easily bent.
  - Plug in the audio cable from the laptop to the RCA plugs if needed.
  - Login to the AMX panel using the storage room code.
  - Select "SOS"
  - Select which screen(s) you want to show the information on by selecting Right or Left Floorbox in the related row to that particular screen, as shown below.
  - The labels for the screens and floorboxes relate to how you are looking at the SOS. So, when you're standing in front of the SOS, with the Space Screen to your left, the Left floorbox is to your left and the Right floor box is to your right, same with the screens.
  - When you are finished using the laptop:
    - Login to the AMX panel on the column next to the SOS.
    - Tap the SOS button.
    - Then tap the Return Space to Normal button on the lower right.
    - Unplug the laptop from the floorbox and put it back in the storage room.

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- **Using an iPad to display information on SOS screens:** This function allows you to show web-based content that pertains to a particular dataset or playlist. For example, you might show a USGS website when showing the Plate Tectonics playlist. To use the function, follow the instructions below and use the following illustrations for reference. NOTE: Only use the iPad mini or the large iPad with the same plug as the iPad mini. See the illustrations on the following pages for reference.
  - Pick up the adapter with DVI cable from the plastic box near the iPads on the shelf in the Space Odyssey storage room.
  - Pull out a laptop from the storage room—you'll use this to rest the iPad on when facilitating.
  - Pick which floorbox in front of the SOS you want to use.
  - Lift the access door on the floorbox.
  - Plug in the DVI connector to one of the sockets, note that the plug pins are easily bent.
  - Plug in the iPad plug on the adaptor into the iPad.
  - Login to the AMX panel using the storage room code.
  - Select "SOS"
  - Select which screen(s) you want to show the information on by selecting Right or Left Floorbox in the related row to that particular screen, as shown below.
  - The labels for the screens and floorboxes relate to how you are looking at the SOS. So, when you're standing in front of the SOS, with the Space Screen to your left, the Left floorbox is to your left and the Right floor box is to your right, same with the screens.
  - When you are finished using the laptop:
    - Login to the AMX panel on the column next to the SOS.
    - Tap the SOS button.
    - Then tap the Return Space to Normal button on the lower right.
    - Unplug the iPad from the floorbox and put it and the laptop back in the storage room.

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Figure 1 shows SOS with back screens plus left floor box near the lower left section of the guardrail and right floor box at the base of the column. The AMX panel is on the column on the right and is mounted on the side facing the SOS.

Figure 2 showing laptop cords and plugs. From left, you'll see the power plug, then audio plugs and DVI plug.

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Figure 3 : Shows the power plug and audio plugs inserted into the outlets in the floor box.

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Figure 4 shows how to connect the DVI plug. Please be careful when inserting this plug that you have it oriented correctly—match the pin pattern with the hole pattern and match the shape of the plug with the shape of the outlet. Then screw it into the outlet to make it secure.

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Figure 5 shows the home screen for the AMX panel on the column near the SOS—simply tap the screen if it's dark to wake it up.

Figure 6 shows the login screen that appears after tapping the screen. Then type in the code to access the controls. Ask a team member for the code if you don't know it.

Figure 7 showing the main menu for the AMX panel. Select which item you need by tapping the selection.

Figure 8 shows the "SOS" menu which allows you to send the image from a laptop/iPad to any of the three screens around the SOS. Note the "Return Space to Normal" button at the bottom right which, when tapped, will let you reset the space once you're done using it.

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Figure 9 showing the "Sci Stunts" screen on the AMX panel which allows you to send the laptop/iPad image to the drop-down screen adjacent to the SOS. Note the "Return Space to Normal" button at the bottom right which, when tapped, will let you reset the space once you're done using it.

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Figure 10 shows the "Lighting" menu selection which allows you to adjust the lighting around the SOS and other areas near the SOS as well as by the Cratering machine. Note that you have to go back to the "Sci Stunts" or "SOS" sections of the menu to "reset space to normal."

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Glossary

Below are basic terms and abbreviations you should be familiar with when discussing Science on a Sphere amongst other users and with visitors:

NOAA: National Oceanic and Atmospheric Administration

SOS: Science on a Sphere

Dataset: Any image or animation that is shown on the sphere

Playlist: A collection of datasets

GUI (pronounced gooey): Science On a Sphere interface

fps: Frames Per Second

PIP: Picture in Picture

Kiosk: Interactive screen that allows visitors to choose and manipulative the sphere themselves

Annotate: Feature of the iPad which allows the user to draw on the sphere

Zoom: Feature of the iPad which allows the user to zoom in and out of locations on the sphere

Library: Compilation of all datasets that can be used on the sphere

Autorun: Feature that allows a playlist to automatically continue to play without a user

Layers: Datasets and features that have been placed on top of other datasets

Overlay: Features such as continental boundary lines, country names, etc. which can be placed on top of any earth related dataset