Contact with questions and requests:

nee@skyskan.com

As of September 2025, all the NASA Educational sites appear to have been taken down; any google docs/drive files should still work, but if you're looking for something specific and the link is broken, please email.

This content is all designed for you to take and adapt to your own dome/system/classroom/programming. It offers suggested content, scripts, activities, and other ideas, with some system-specific content to help save you time and effort when creating your own planetarium shows.

Constellations Tonight! in Dark Matter

https://www.darkmatter.digitalskyacademy.com/forum/viewtopic.php?f=5&t=329
For Sky-Skan customers, updated 4/29/2025
Email questions to nee@skyskan.com

When I was at NASA, a) shows featuring missions took priority over general content like constellations. Also, b) I figured everyone does constellations in their own unique way with their own unique sky. So I never thought it was that pressing for me to attempt a generic control page of simply copying and pasting selections from the existing constellation pages.

However, a) I've always felt like constellations and sky stories are a great "gateway drug" for space science. At least it was for me. b) Several customers have independently requested this, including the Lawrence Hall, and c) as I was making it, I found that I now know enough to do some pretty intricate programming for a nice interface. While I could have just copied and pasted existing buttons and made a perfectly good show within a few days for the Lawerence Hall, or any given Latitude, I hope you'll see that the month or so I've been working on this has resulted in the development of some versatile techniques and tools that you can take for other shows.

At any rate, the forum link above contains the DMZ control page and the Content Folder. Per usual, for easier sharing, I avoided doing an Asset Manager export - all the assets and content are created/handled inside the buttons.

There's also a Documents folder which contains the Lawrence Hall of Science Script and Star Maps, as they shared publicly on the IPS website, courtesy of Alan Gould:
https://www.ips-planetarium.org/page/pass

As written, the script is worth a skim for suggested wording and other detailed info, but the basic outline is simple:

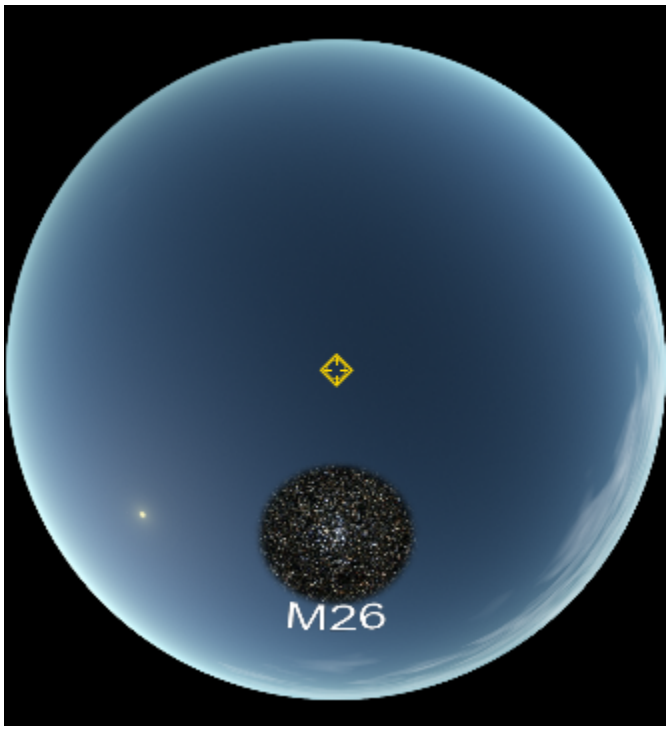
1. What have you heard/wondered about constellations?
2. Let’s find the Big Dipper and learn to find other constellations!
3. Free exploration - Try to find (or make) your own constellation(s) using the map!
4. What can you find in tonight's sky?
5. What do the constellations look like elsewhere in the universe?

I've done this show as a short, 15-minute program (just teaching how to use the map), all the way to an hour+ (including various constellation stories, and detailed universe fly-through). So I've programmed this to be very flexible.

For show developers, some highlights of the techniques (and for anyone searching for similar tasks in the future):

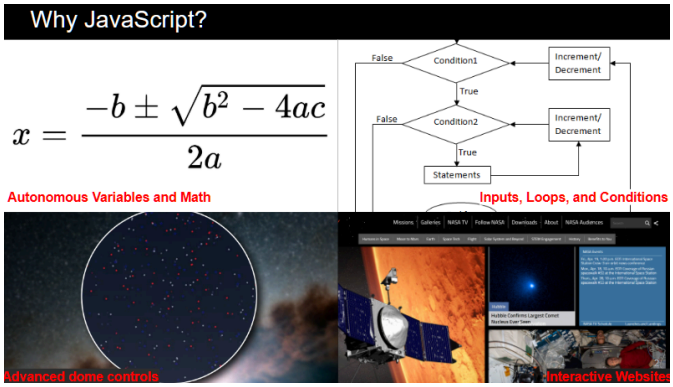
1. Automation
    a. Mass Button Text Changes
    b. Mass Timing/Value Changes
    c. Triggering Dataset Visibility
2. Custom Cardinal Directions
3. Pointing camera (or any asset) to RA and Dec
4. Better Solar System Marking
5. Better Log Flying

Slideshow in JavaScript!



https://www.darkmatter.digitalskyacademy.com/forum/viewtopic.php?f=5&t=299#p1617
For Sky-Skan customers, updated 2/13/2025
How to take a simple folder of images and quickly make them into an easy slideshow. Email questions to nee@skyskan.com

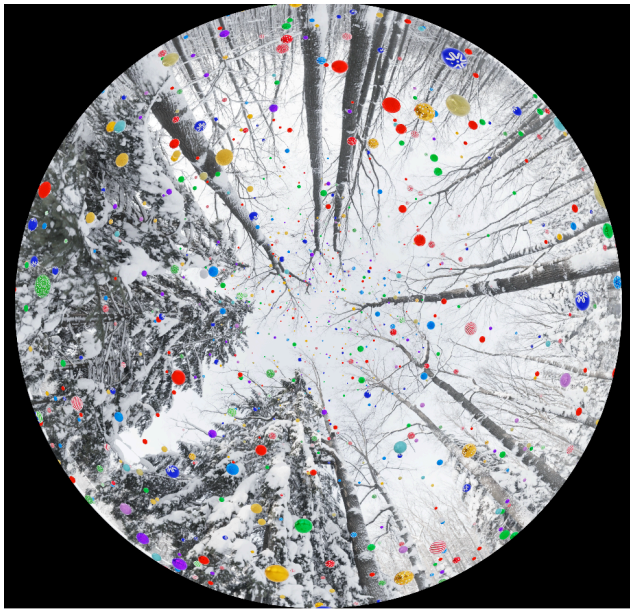
JavaScript Workshops



A primer workshop about general JavaScript for planetariums:
https://www.youtube.com/watch?v=bTaBmiCeeB0
With slides:
https://docs.google.com/presentation/d/1KTvvBHwIFyLfONFrekYUa42PceyMCXNWZ60O0GWg3dc/edit?usp=sharing
And example files are in the presenter notes

A more detailed Digital Sky Dark Matter workshop, slides, and example files:
https://drive.google.com/drive/folders/1TPTG9AjiULOQaaGenWxpIXA_5m3S5x_a?usp=drive_link
Recording is here (Sky-Skan customers only):
https://www.darkmatter.digitalskyacademy.com/forum/viewtopic.php?f=10&t=243#p1325

Holiday fulldome fun!



updated 1/31/2025

Jeff has moved to Sky-Skan! https://www.linkedin.com/feed/update/urn:li:activity:7284602444603408384/
For Sky-Skan Customers:
Just something fun for the holidays, a loopable 30 seconds of floating ornaments, mostly procedurally generated except for the Europa Clipper ornament (it already looks so much like a snowflake!):
https://www.darkmatter.digitalskyacademy.com/forum/viewtopic.php?f=5&t=81#p1566
Includes a Blender File for customization, as well as a compressed and lossless MP4 at 4k resolution, as well as a Short and a fully immersive 360 render at 8k resolution.
https://youtu.be/Y_Li92u4EzM

Also see this fun Exoplanet version!
https://youtube.com/shorts/13E299cYBr0

And a Valentines version:
https://www.darkmatter.digitalskyacademy.com/forum/viewtopic.php?f=5&t=295#p1607
https://www.youtube.com/shorts/ILmKx4bTjb4

Let me know if you have any questions or need help! nee@skyskan.com

Thanks to Royal Observatory Greenwich, Lund Planetarium, Franklin Institute, Polyhaven, and Ryan King Art.

EELS (Exobiology Extant Life Surveyor) 3D model

Last updated 10/24/24

Saturn's moon Enceladus is a wonderful opportunity to discuss with learners about the possibility for life out in space. With an icy crust and cracks that allow geysers of liquid water, EELS (Exobiology Extant Life Surveyor) is a mission concept designed to be snakelike to navigate narrow crevices, with screws to help it move.

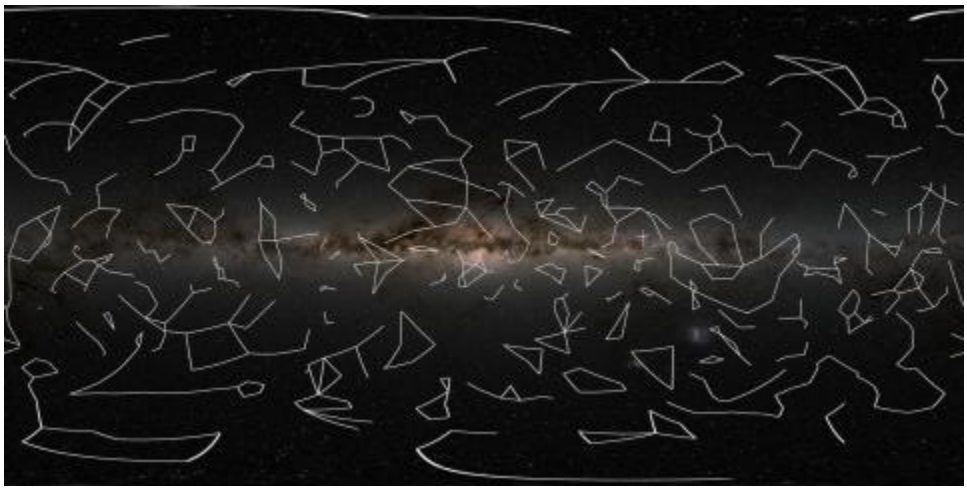
Here is a digital 3D model of the robot in various formats. The .BLEND file allows users to pose and animate the robot into any configuration needed for your exhibits, visualizations (such as VR, AR, and planetarium shows), 3D printing, and much more.

Downloadable Files:

- EELS Model BLEND (125.84 MB)
- EELS Model screenshot (631 KB)
- EELS Model GLB STL OBJ ZIP (122.43 MB

Learn more about EELS on their webpage.

OpenSpace - Constellations Tonight Control Page



Published June 2024

Update: created for OpenSpace version 0.19 - may contain bugs for later versions. Need help? Email nee@skyskan.com

Download here: OpenSpace Constellations Tonight Control Page - by default, extract to "C:\OpenSpace-ConstellationsTonight\" ZIP (36.35 MB)

Requested by the Lawrence Hall of Science in Berkeley, CA, this is an introductory example for beginners, both educators and their students, in learning about NASA co-funded software OpenSpace. It is a ZIP packet of example NASA media, a custom HTML control page, including JavaScript code. Note that this does require installing the OpenSpace program to function, however, any text editor can show the custom HTML and JavaScript code.

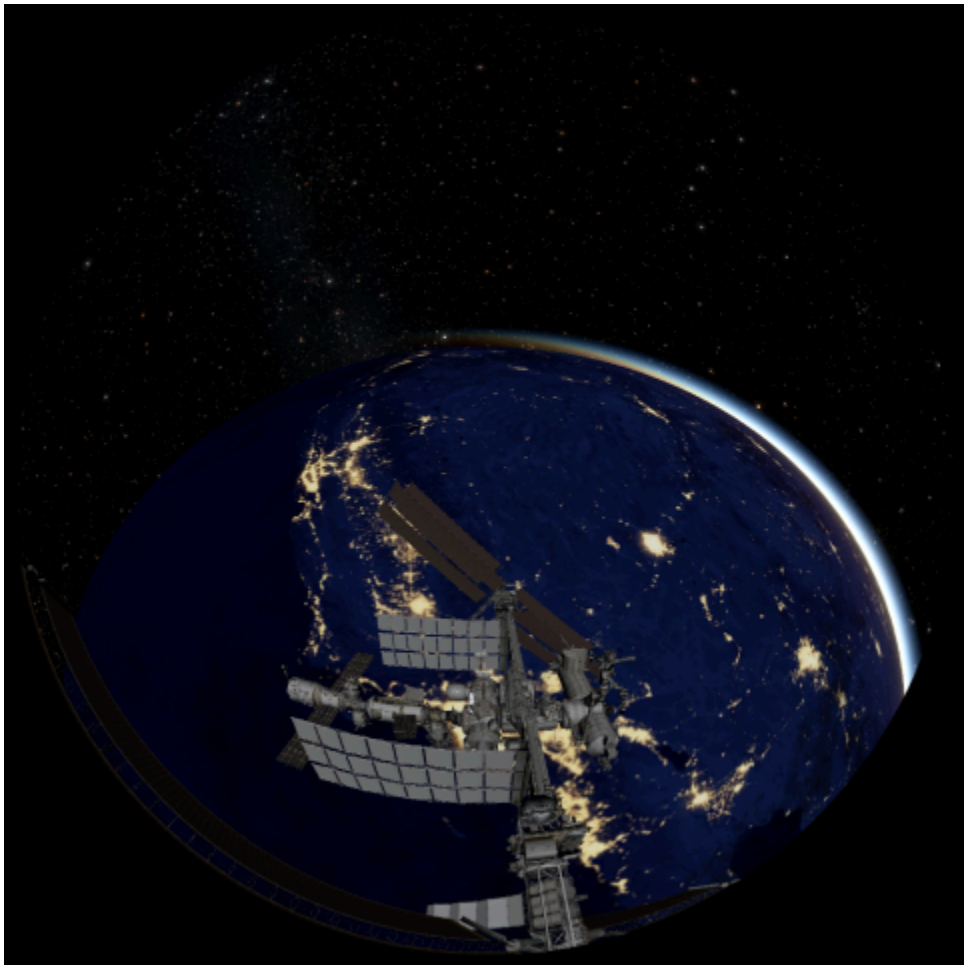
Based on the PASS, Planetarium Activities for Student Success (or Successful Shows), “Constellations Tonight” curriculum from the Lawrence Hall of Science. Search online for “International Planetarium Society Planetarium Activities for Successful Shows” to find the full write up and resources, such as ready-to-use star "map masters" designed for students and public audiences. However, the general outline of the lesson could be as simple as:

1. What have you heard/wondered about constellations?
2. How do you use a star/constellation map?
3. Let’s find the Big Dipper!
4. Free exploration - Try to find (or make) your own constellation(s) in the sky!
5. Why/how does NASA use constellations? To map deep sky objects!

In addition to the constellation content itself, the HTML control page can also be utilized as a tool for teaching JavaScript coding. Much more engaging than coding a basic website from scratch, OpenSpace allows any educator to teach JavaScript principles using space visualizations, allowing students to essentially control the entire universe with a few lines of code. Simply open the HTML and JS files in any Text Editor to see and explore the code. Some coding principles that this control page features:

1. Variables, constants, strings, arrays, objects, properties
2. Functions, loops, conditionals
3. JavaScript integration with CSS and HTML code
4. Handling and playing media
5. APIs and external JS files
6. Responsive web design

ISS with moveable Solar Panels



Updated August 2024 - added Move ISS function to demonstrate how to move the ISS from location to location.

Downloadable Files:

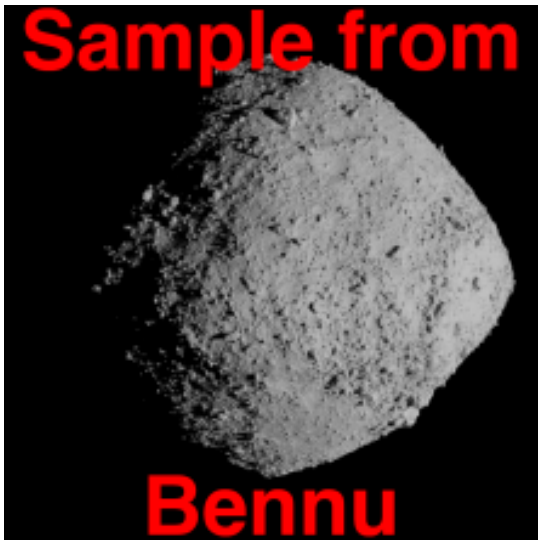
- Read Me TXT (2 KB)
- ISS Model with Moveable Solar Panels ZIP (49.4 MB)
- Button 1 Load ISS TXT (6 KB)
- Button 2 JavaScript ISS Solar Panels TXT (5 KB)
- Button 3 - Show ISS TXT (3 KB)
- Button 4 - Move ISS TXT (3 KB)

This parents the ISS to the Camera and the JavaScript moves the solar panels to always point towards the Sun, so will show up no matter where you go. It would certainly be possible to write code to move the panels manually, say using a slider.
This also creates a hemisphere for the ISS Cupola fulldome image, and places it where it would be in the real ISS, so you can fly into the real imagery from the station.
For Digital Sky Dark Matter users, copy the code into three buttons. Note you could try to combine it all into one button if desired. Extract the files to the desired filepath. Default is to simply extract the JPL folder into the DS2 ShowPath folder, typically E:\DigitalSky\Shows\
File structure is maintained from the "Defending the Planet" Show:
Note that if you change the filepath, you'll need to change it in the Load button.

1. Run “Load ISS”
2. Run “JS ISS Solar Panels”
3. Now you're ready for the “Show ISS” button

Note that the altitude of the ISS is around 400 km above the Earth, and orbits at around 0.067 degrees per second parented to the Earth. The path of the ISS changes all the time. For the most accurate positions at any given moment, here's the tracker:
https://spotthestation.nasa.gov/tracking_map.cfm
For semi-accurate positions, Horizons gives the PLANNED positions up to one month in advance:
https://ssd.jpl.nasa.gov/horizons/app.html#/
If using this, be sure to use Vector Table, International Space Station (spacecraft) (1998-067A), and Geocentric. Note this could change at any time, e.g. to avoid space debris or to achieve some mission objective.
We "fake" the position of the ISS here for convenience and because you might want to show your own location with the ISS flying over it for the audience. In reality, the ISS orbits the Earth about once every 90 minutes so it literally does fly all over the world all the time. If you're interested in exactly when it will fly over your location:
https://spotthestation.nasa.gov/home.cfm
And a widget to embed into your own website:
https://spotthestation.nasa.gov/widget/
Thank you to the NASA Eyes team for the base model of the ISS.
https://eyes.nasa.gov/apps/solar-system/#/sc_iss
You may note that they choose to have the opposite side of the panels tracking the Sun. Jeff currently has an inquiry into the ISS team about which is actually correct. Email nee@skyskan.com if you have questions or need help with this asset.

Sample from Bennu, Live and Interactive Planetarium Show



Promotional Tag: “Travel to Bennu, a primordial piece from the birth of our solar system, to explore this new world and, most importantly, return samples to learn more about our home and our humanity.”
Length: 30 - 45 minutes
Cost: Free
Last Updated: Aug 2023
Format: Live, interactive curriculum and Dark Matter Control Page
Software: Digital Sky Dark Matter, sample presenter script, and general media

One of NASA’s big questions is “How did we get here?” Asteroids are mostly rocky and metallic remnants from the early formation of the Solar System, so we need to get our hands on samples from these primordial time capsules to understand the origins of our home. Famously, the Apollo missions brought moon rocks back, and there have been a few robotic missions from NASA, JAXA (Japan), and others that have brought dust samples on the order of grams. However, the Moon isn’t old enough and we need more than dust to delve into these deep mysteries. Enter the Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer, or OSIRIS-REx, who is bringing more than 150 grams (about half a can of soda) of pristine samples from the asteroid Bennu which formed at the very beginning of the Solar System around 4.6 billion years ago.

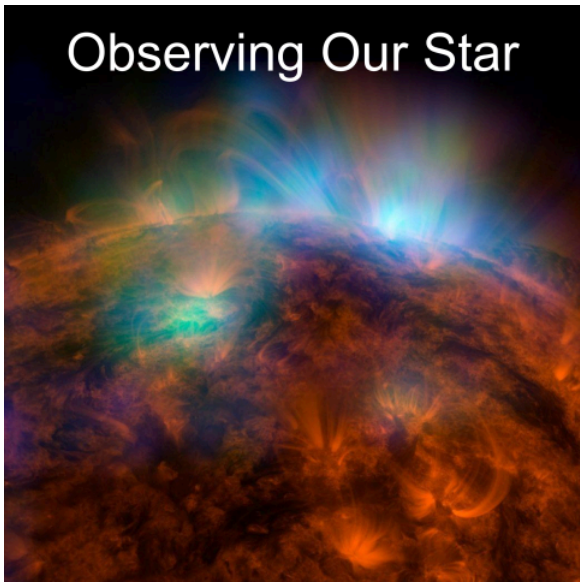
For Digital Sky Dark Matter users, default file path for the media: “<ContentPath>\Assets\JPL\SfB\”

Downloadable Files:

- Sample From Bennu - Rough Draft Dome Preview MP4 (404.22 MB)
- Sample From Bennu - Presenter Script
- Sample From Bennu - Media Sources
- Sample From Bennu - Media - part 1 of 6 - 3D models ZIP (520.48 MB)
- Sample From Bennu - Media - part 2 of 6 - Art, Instruments, Meteor Showers ZIP (418.32 MB)
- Sample From Bennu - Media - part 3 of 6 - Working Files, 2D Marker, Baby, Bennu, Conclusion, Intro, Meteorites, Meteors ZIP (767.46 MB)
- Sample From Bennu - Media - part 4 of 6 - Launch and Sampling ZIP (488.71 MB)
- Sample From Bennu - Media - part 5 of 6 - Spacecraft, Timeline, Bennu360 Captions ZIP (762.48 MB)
- Sample from Bennu - Media - part 6 of 6 - Bennu 360 ZIP (300.97 MB)
- Sample from Bennu - DM Control Page PNG (355 KB)
- Sample from Bennu - DM Control Page DMZ (right click to “save as”) (243 KB)
- Sample from Bennu Demo Webinar 2023-08-31 MP4 (580.06 MB)

- Sample from Bennu Demo Webinar Transcript 2023-08-31 SRT (70 KB)
- Bennu 3D model low poly OBJ and PNG texture ZIP (135.23 MB)
- Bennu flight path 360 4000x2000 MP4 (934.7 MB)
- Bennu flight path 360 captions SRT (6 KB)

Observing Our Star, Live and Interactive Planetarium Show



Promotional Tag: “Observe our very own star, the Sun, in ways you’ve never seen before! From our ancient ancestors to the latest NASA heliophysics, celebrate 100 years of planetariums by learning how humans view the Sun and its vital role in our world and our Solar System. The stars were just the beginning…“

Website:
Sample Presenter Script
Sample Media and Credits (coordinates of the spacecraft 3D models are in the presenter notes)
Downloadable Files
Demo Webinar Recording:
Video Recording MP4 (270.07 MB)
Dark Matter Addendum Recording MP4 (37.66 MB)
Transcript Files:
Transcript VTT (69 KB)
Dark Matter Addendum Transcript VTT (9 KB)
Chat TXT (13 KB)

Length: 60 minutes
Cost: Free
Last Updated: April 2023
Format: Live, interactive curriculum and Dark Matter Control Page
Software: Digital Sky Dark Matter, sample presenter script, and general media

This live and interactive planetarium curriculum is provided as an example of how you can engage with your dome audiences about the 2023 and 2024 eclipses, the planetarium centennial, NASA’s Heliophysics Big Year, and/or heliophysics in general, which is a topic that will only be more important as time goes on. How can you use this content? The short answer is any way you want. Whether you use it completely as written/programmed, or if you simply take bits and pieces to create your own program/lesson, we encourage everyone to simply do what works best for you and your audiences. You're the expert on your own system, programming style, timing, and your community. Even each presenter might have individual choices when presenting this content. We simply hope that collecting and providing these resources together will help save time for you and your team, as well as make it that much easier to

inspire the next generation of solar observers! Any questions, comments, suggestions, or requests for assistance adapting the current content or for future content, can go to nee@skyskan.com.

For those looking for shorter shows, this can easily be modularized (e.g. two 30 minute shows). Simply take the activities/visuals that you like.

In a paragraph, this show is about how the Sun has always held a special place in the pantheon of human observation, exploration, and knowledge, no matter which culture you explore on Earth. That the Sun is important to human life is an understatement punctuated only by how little the modern public seems to understand or even care about the source of almost all life on Earth. If anything, the Sun should be even MORE important in the digital, information, and technology age, where humanity is struggling with the need for clean energy and where electromagnetic devices/infrastructure function only by the grace of the Sun's capricious temperament. Certainly there are many mysteries left to uncover about the center of our Solar System, but long gone should be the days where people describe the singular light of our cosmic backyard as "a ball of fire in the sky." Reconnect your audiences with the Sun through observation activities, hands-on interactives, and different views of our very own star!

Below are 2k previews to see the visuals in action. There are also media packets containing all the content used, including working files such as XCF and BLEND, to help you customize the content for your own dome/application. There is also a Digital Sky Dark Matter Control Page Import (there is no Asset Manager Import; all the assets are handled in the control page code) for those with that system. Note that for the Dark matter content, the default filepath is using the old DS2 <ShowPath>\JPL\OOS\ so please check your filepaths as needed. Again, if you need any assistance importing or utilizing the content, please email nee@skyskan.com.

Please note the media packets include non-NASA, third-party content, such as the images of planetariums throughout history. See the Media credits above for sources, license information, and further details. NASA does not endorse third-party content. Any third-party content is provided purely as examples and references. Any opinions, findings, conclusions or recommendations expressed in third-party materials are those of the authors and do not necessarily reflect the views of NASA.

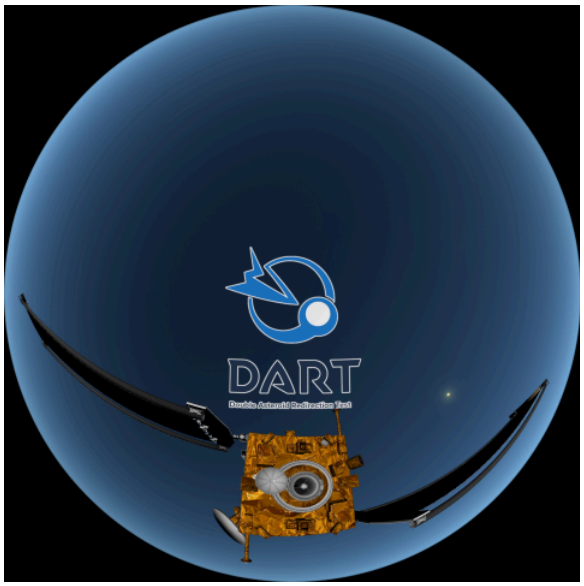
Search tag: domeactivity, hashtagBlender

Downloadable Files (total space needed is around 10GB):

- Digital Sky Dark Matter Control Page (no asset export) DMZ (right click to Save As) (250 KB)
- Digital Sky Dark Matter Control Page Screenshot PNG (289 KB)
- Digital Sky Dark Matter Control Page Screenshot Labeled PNG (293 KB)
- Fulldome 2k Preview part 1 of 3 MP4 (453.64 MB)
- Fulldome 2k Preview part 2 of 3 MP4 (955.8 MB)
- Fulldome 2k Preview part 3 of 3 MP4 (652.9 MB)
- Fulldome 2k Preview Credits MP4 (34.35 MB)
- Media Pack Read Me TXT (0 KB)
- Media pack part 1 of 9 ZIP (825.91 MB)
- Media pack part 2 of 9 ZIP (758.8 MB)
- Media pack part 3 of 9 ZIP (926.72 MB)
- Media pack part 4 of 9 ZIP: Centennial Fulldome MP4 (495.51 MB)
- Media pack part 5 of 9 ZIP: Sunspots March 2023 MP4 (690.34 MB)
- Media pack part 6 of 9 ZIP: SOHO MP4 (741.21 MB)
- Media pack part 7 of 9 ZIP: Sunspots February 2020 MP4 (815.03 MB)
- Media pack part 8 of 9 ZIP: SDO MP4 (844.44 MB)
- Media pack part 9 of 9 ZIP: SDO3 MP4 (915.98 MB)

- Working files for customization ZIP (850.68 MB)
- Solar Analemma fulldome preview MP4 (38.58 MB)

Defending the Planet - DART Planetarium Show



Website:
Sample Presenter Script
Sample Media and Credits

Length: 45 minutes
Cost: Free
Last updated: October 2022
Format: Live, interactive curriculum and Dark Matter Control Page
Software: Digital Sky, Dark Matter, sample presenter script, and general media

This live and interactive planetarium curriculum is provided as an example of how you can engage with your dome audiences about the DART mission as well as Planetary Defense in general, which is a topic that will only be more important as time goes on. How can you use this content? The short answer is any way you want. Whether you use it completely as written/programmed, or if you simply take bits and pieces to create your own program/lesson, we encourage everyone to simply do what works best for you and your audiences. You're the expert on your own system, programming style, timing, and your community. We simply hope that collecting and providing these resources together will help save you and your team time, and make it that much easier to inspire the next generation of planetary defenders! Any questions, comments, suggestions, or requests for assistance or future content, can go to nee@skyskan.com.

Promotional tagline: “Target: Earth. Defender: You! Explore the field of Planetary Defense in this live, interactive show. See what NASA and others are doing to test humanity’s defenses against potentially hazardous asteroids!”

In a paragraph, this show is about how from the very birth of the Solar System, impacts from planetoids, asteroids, comets, and more have literally shaped our planet. Earth being a target for these impacts was important, vital even, to the formation and development of the world we have today. Even devastating, extinction-level events played their role in allowing humans to have our place on the geologic timeline. However, now that humans are here, we want to stay, and future impacts pose a very real, though distant, threat to our civilization. While we have not discovered any threats in the foreseeable future, we know that our knowledge is limited and that the next big impact is not a matter of if, but simply when. We are in a position no other species has been before: we actually have the technology needed to theoretically prevent the next big impact. Now is the time to put those theories to the test, to design, experiment, and measure the capabilities of the human race to save ourselves before it’s too late. The Double Asteroid

Redirection Test, or DART, marks the very first test humanity has ever launched, and is just one of many steps on the road to defending the planet.

Sample Presenter Script

Sample Media and Credits

Below are 2k previews to see the visuals in action. There are also media packets containing all the content used, including working files, such as XCF and BLEND, to help you customize the content for your own dome. There is also a Digital Sky Dark Matter Control Page Import (there is no Asset Manager Import; all the assets are handled in the control page code) for those with that system. Note that for the Dark Matter content, the default filepath is the old DS2 <ShowPath>\JPL\Defending\ so please check your filepaths as needed. Again, if you need any assistance importing or utilizing the content, please email nee@skyskan.com.

Please note that the media packets include non-NASA, third-party content. For example, the 360 panorama of Meteor Crater is used with permission from the photographer, so if you like it and want to use it for your dome you should contact the photographer to get his permission as well. Details are in the media credits document above. In general, we did some work to clean up/reformat all the content in the media folder, such as the poles of the 360, which is why the fixed version is included in the packet. The “Sample Media and Credits” is provided should you want the original versions of any of the media, and should you need credit and contact information for third-party content. Those details are in the presenter notes of the Google Doc. *NASA does not endorse third-party content. Any third-party content is provided purely as examples and references. Any opinions, findings, conclusions, or recommendations expressed in third-party materials are those of the authors and do not necessarily reflect the views of NASA.*

You may also be interested in DART Spanish language slides from team member Gonzalo Tancredi.

Search tag: domeactivity, hashtagBlender

Downloadable Files:

- 2k Preview part 1 of 3 MP4 (796.49 MB)
- 2k Preview part 2 of 3 MP4 (665.84 MB)
- 2k Preview part 3 of 3 MP4 (307.93 MB)
- Media pack part 1 of 3 ZIP (929.32 MB)
- Media pack part 2 of 3 ZIP (923.72 MB)
- Media pack part 3 of 3 ZIP (835.25 MB)
- Digital Sky Dark Matter Control Page Screenshot PNG (237 KB)
- Digital Sky Dark Matter Control Page DMZ ZIP (No Asset Group) (91 KB)

Moons of the Solar System Planetarium Curriculum - Planetarium Activities for Student Success (PASS)

Website:
Sample presenter script - updated 8/4/22
Media Slideshow
Original Script and media for reference
Media Index and Sources
Length: 60 minutes

Cost: Free

Last updated: August 2022

Format: Live, interactive curriculum and Dark Matter Control Page

Software: Digital Sky Dark Matter, script, and general media

last updated 8/4/22 - added more detailed presenter script

Adapted, by request, from the Lawrence Hall of Science Moons of the Solar System PASS series. The original script and media is free to download at the site.

NGSS alignment: 1-ESS1-1, MS-ESS-1

Show Description: This program begins with observations of the Earth's Moon and a modeling activity that shows why the Moon goes through phases and eclipses. Then the students look at Jupiter's four major moons on a series of nights and figure out how long each one takes to circle Jupiter. Finally the students journey through the solar system to see many moons through the "eyes" of modern spacecraft.

Below is a Digital Sky Dark Matter Control Page (There is no Asset Manager set; everything is loaded in the control page code itself). There is also 2.5GB worth of relevant multimedia including relevant updated NASA resources not currently used in the show itself, including working files such as BLEND 3D models, and XCF image manipulation files. There is some third party content and graphics used; sources are cited in an included text file. Note the default file structure for use in Dark Matter: The Main "Moons" ZIP gets extracted into "ShowPath\JPL\Moons\" (This is the old DS2 showpath, NOT the new DM contentpath!) and subsequent folders go into the "Moons" folder. File paths can be customized as desired, of course. Finally, below is an 8k version of the 360 Lunar Flight video used in the show to fly from Apollo 11, through Apollo 16, Surveyor 7, Tycho crater, and LCROSS created in the OpenSpace Project.

Note that this is meant to be a template or a foundation from which you can custom build your own Lunar phases and Moons tour; for example, all the starting and landing locations are set to JPL, which you may want to keep to teach people about JPL, or you might want to change the flight paths to land at your city instead. Default locations of the multimedia may or may not work for your dome/seating, and you may want to customize the layouts, sizes, labels, etc. for each. Personal preferences, and even presentation style might warrant changes as well. We used Dark Matter 1.1 (build 123).

The whole show is around 60 minutes, but for ease of use, it has been split in half, with the first half about "Our Changing Moon" and the second half about "Jupiter's Moons and Beyond." Finally, there is a slideshow with most of the media used in the show. For the Artemis add-ons that are not part of the original "Moons of the Solar System" PASS curriculum, here is a possible presenter script (added 1/16/22).

Here is the 360 lunar flight that's used in the show:https://youtu.be/9fFMLyv9ZSI

Downloadable Files:

- DMZ Control Page and Content

The Art of Mars Planetarium Shows

Website:
[PD Session with the Pacific Planetarium Association]
[Flat Media Used, with Sources in Presenter Notes]
[Fulldome with Control Page Preview]
[The Art of Mars - Sample Show Script]
[Life on the Red Planet? - Sample Show Script]
[Potential worksheet for the art activities]

Length: 60 minutes
Cost: Free
Last updated: June 2024
Format: Live, interactive curriculum and Dark Matter Control Page
Software: Digital Sky Dark Matter, script, and general media

Updated June 2024: added Habitable Zone and Orbit buttons for Exoplanets;

Adapted, by request, from the Lawrence Hall of Science Red Planet Mars PASS series. Includes content from Art and the Cosmic Connection lesson plans from JPL. Updated 8/1/22 with feedback and suggestions from the 7/29 PPA training below.

There may be some third-party content in this resource. NASA does not endorse third-party content. Any third-party content is provided as examples of how NASA science can be used by others, and proper sources and credits are provided. Any opinions, findings, conclusions, or recommendations expressed in third-party materials are those of the authors and do not necessarily reflect the views of NASA.

This program comes in two parts which can be presented together or separately. "The Art of Mars" begins with observations of Mars, examining art and imagery from across the history of Mars exploration, then having the audience do a classic art activity - sketching - but on the surface of Mars, before ending with a myriad of examples and encouragement that space exploration needs artists of all kinds in addition to scientists and engineers. The show emphasizes how Art and Science are really one and the same, each parts of the human experience and human endeavor of exploring the universe.

"Life on the Red Planet?" is a related activity about astrobiology on Mars and beyond. It begins with examining Life on Earth and astrobiology questions, then a tour of different exoplanets and the possibilities of life there, ending with an activity having the audience imagine what life on Mars might have been like in the distant past. The show emphasizes the endless possibilities of what could be out there and how imagination and creativity are an important part of exploring the universe.

Below is a Digital Sky Dark Matter Control Page and Asset Group for those using that system. There is also ~2 GB worth of relevant multimedia including relevant updated NASA resources, working files such as BLEND 3D models, and XCF image manipulation files to help domes customize the show. There is some third party content and graphics used; sources are cited in the presenter notes of the Flat Media Slides. Note the default file structure for use in Dark Matter: the ZIP files get extracted into "ShowPath\JPL\RPM\" in order to make the control pages work.

Note that this is meant to be a template or a foundation from which you can custom build your own Art and Mars show; for example, all the starting and landing locations are set to JPL, which you may want to keep to teach people about JPL, or you might want to change the flightpaths to land at your city instead. Default locations of the multimedia may or may not work for your dome/seating, and you may want to customize the layouts, sizes, labels, etc. for each. Personal preferences, and even presentation style might warrant changes as well. We used Dark Matter 1.1 (build 123).

For setup, lighted clipboards and/or red light pens may help with the Art activity. From the Lawrence Hall of Science, see how you can make your own affordable, lighted clipboards: Design 1, and Design 2.

The whole show together is presented at around 60 minutes, with each half being about 30 minutes. As above, though, please customize the show to fit your desired times.

For help installing/using the content, for bug reporting, and requests for customization/adjustments, please email nee@skyskan.com.

Example professional development training on the show is here, thanks to the Pacific Planetarium Association. Please note that NASA does not endorse third-party content. Any third-party content is provided as examples of how NASA science can be used. Any opinions, findings, conclusions, or recommendations expressed in third-party materials are those of the authors and do not necessarily reflect the views of NASA.

Downloadable Files:

- Show Preview with Dark Matter Control Page MP4 (697.08 MB)
- Digital Sky Dark Matter Control Page Screenshot PNG (316 KB)
- ~~Digital Sky Dark Matter Control Page and Asset Group DMZ ZIP (version 1) (13.56 MB)~~
- Digital Sky Dark Matter Control Page and Asset Group DMZ ZIP (version 2) 2024-06-10 (13.57 MB)
- Media Part 1 of 3 ZIP - For DM users, extract to ShowPath\JPL\RPM\ - Original (860.19 MB)
- Media Part 2 of 3 ZIP - For DM users, extract to ShowPath\JPL\RPM\ (771.43 MB)
- Media Part 3 of 3 ZIP - For DM users, extract to ShowPath\JPL\RPM\ (524.18 MB)
- Lighted Clipboards Design 1 PDF (2.89 MB)
- Lighted Clipboards Design 2 PDF (1.32 MB)
- Fulldome Render 2160 Test MP4 (89.85 MB)

Return from Mars - Planetarium Show

Length: 30 - 45 minutes
Cost: Free
Last updated: Feb 2024
Format: Live, interactive
Software: Digital Sky Dark Matter Assets and Control Page, Sample Presenter Script, General Slideshow, and General Media

Updated 2/12/24 - added updated news to appendix in script.

Please note that this resource includes some non-NASA items from Alliance members and third parties. NASA does not endorse or verify third party content, and these are provided as examples of how NASA science can be used. Any opinions, findings, conclusions, or recommendations expressed in third-party materials are those of the authors and do not necessarily reflect the views of NASA.

Promotion: “NASA’s latest Perseverance Rover to Mars is the first step in returning the first sample from the Red Planet. Learn about the mission and explore the challenges of Mars sample return”

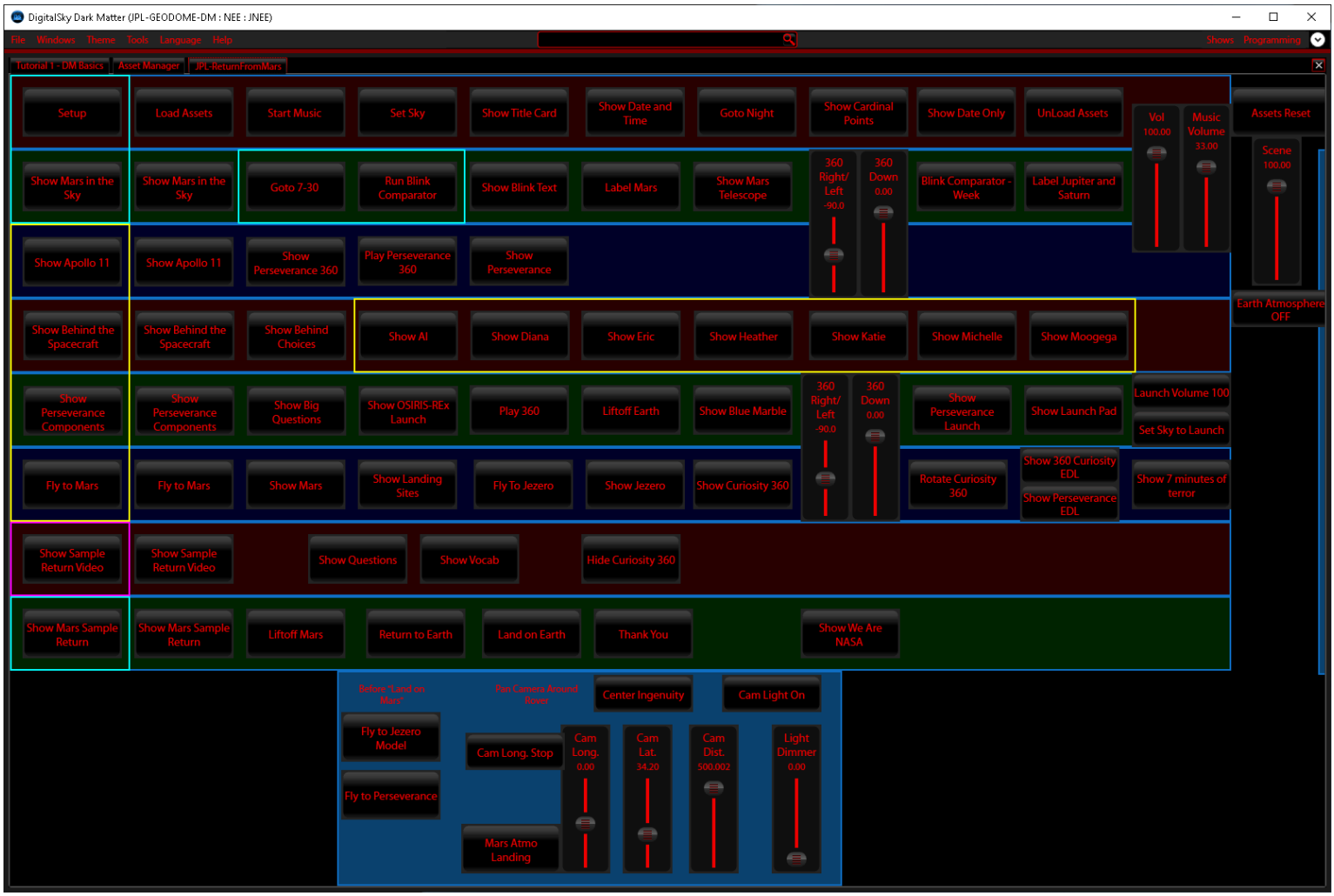
To celebrate the landing of the Perseverance rover in 2021, consider this live and interactive planetarium curriculum focusing on the sample return aspect to show audiences how challenging and complex Mars sample return is. Audience members will learn about the rover and the people behind the spacecraft, as well as play act at retrieving Mars "samples." See the full changelog for the 1/22 update.

Sample Show Script for Presenters

Sample Original Presentation Slides (to match script) - with updated presentation slides with the latest news from the rover, as of 6/11/21. You may also be interested in the latest Perseverance panorama.

Robeson Planetarium Edit

See below for Media files (total 4 GB) and a 2k Sample recording of how the media could be shown on a dome. The Media files also include XCF GIMP files for customizing your own images for your own dome. Corrections, feedback, suggestions, questions, etc. are welcome and encouraged.



Downloadable Files:

- Media Part 1 of 4 ZIP (976.88 MB)
- Media Part 2 of 4 ZIP (967.42 MB)
- Media Part 3 of 4 ZIP (973.07 MB)
- Media part 4 of 4 - Update Jan 2021 includes Jezero model ZIP (799 MB)
- Digital Sky Dark Matter Exports Ver2 Jan 2021 ZIP (245.42 MB)
- 2k Sample recording MP4 (older version) (287.15 MB)
- 2k Robeson Planetarium Edit Preview MP4 (212.04 MB)
- We Persevere Video MP4 (37.22 MB)
- Perseverance EDL models ver 2 ZIP (includes OBJ, BLEND, and DXF) (38.67 MB)
- Perseverance 3D model animation GIF (6.33 MB)

From the Moon to Mars - Apollo 50th and Artemis Planetarium Show

Website:
Script as a Google Doc
Google Slides for preview and media sources (in the presenter notes)
Dark Matter Control Page
Moon2Mars Media part 1 of 3 - general media ZIP - Extract to Showpath\JPL\Moon2Mars\
Moon2Mars Media part 2 of 3 - Apollo Content ZIP - Extract to Showpath\JPL\Moon2Mars\
Moon2Mars Media part 3 of 3 - Artemis ISS and Lunar Content ZIP - Extract to Showpath\JPL\Moon2Mars\
Dark Matter control Page preview
Length: 30 - 45 minutes

Cost: Free

Last updated: April 2022

Format: Live, interactive curriculum and Dark Matter Control Page

Software: Digital Sky Dark Matter, script, and general media (older Digital Sky 2 buttons and media packets available upon request)

Last updated 4/8/22 - Added the Lunar flight 4k version 2 and 8k version 2 360 video for download. Overhauled the Digital Sky Dark Matter show. fixed bugs, updated media, and added Artemis and Apollo content. Added previews of the Dark Matter control page, and of the render output (part 1 and part 2). This show is meant to be a live and interactive show, but If you need a proper render at your dome's resolution of any section, just ask.

Tagline: “The Next Giant Leap.”

Promotion: “Celebrate the Apollo missions and navigate to the Moon, Mars, and beyond.”

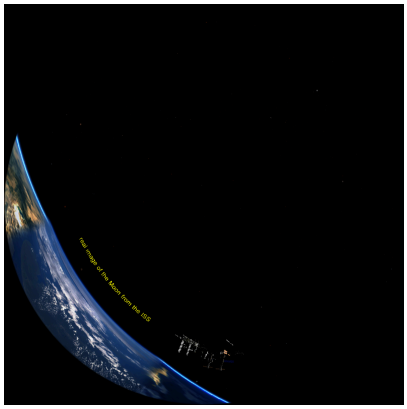
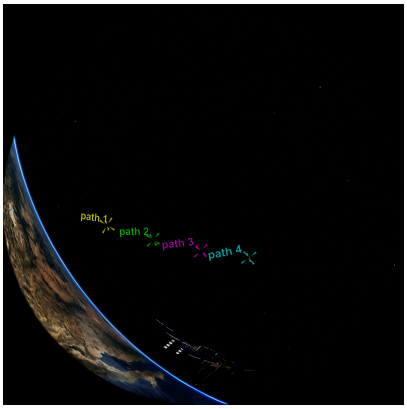
About this show in one word: Goals

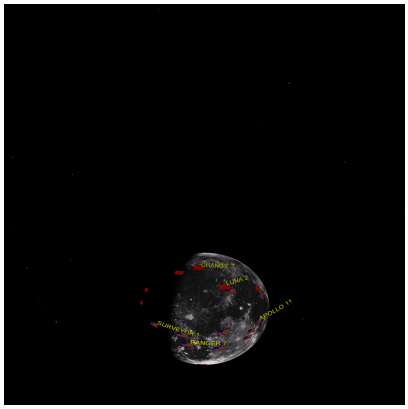
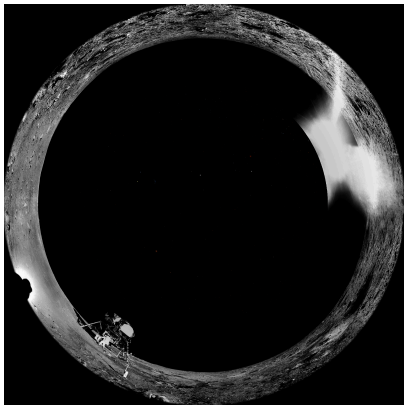
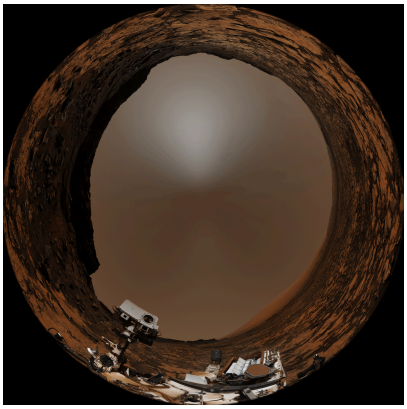
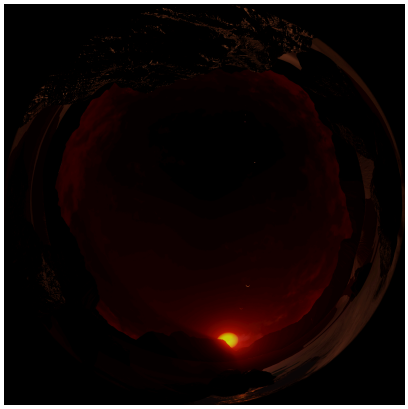
In one Sentence... NASA has achieved many amazing goals in the past, like sending humans to the Moon and back, robotically exploring every planet, including the surface of Mars, reaching interstellar space, and discovering exoplanets throughout the universe, but “this country of the United States was not built by those who waited, and rested, and wished to look behind them,” so we continue to make newer goals, tackle harder challenges, and “do the hard things” for the future advancement and benefit of all humankind.

See the updated presenter script as a Google Doc here.

See the media as a simple slideshow on Google Slides here.

To install the Digital Sky Dark Matter show, download the media packets below (in three parts total ~2.5GB). Extract to Showpath\JPL\Moon2Mars\ then download and import the Dark Matter Control Page. Note, there is no Asset Manager file; all the media is handled inside the code.


Downloadable Files:

- Moon from the ISS PNG (3.56 MB)

- Path choices to the Moon PNG (2.39 MB)
- Lunar Landings PNG (1.99 MB)
- Apollo 11 panorama PNG (4.29 MB)
- Curiosity Panorama PNG (7.86 MB)
- TRAPPIST1 surface PNG (4.56 MB)
- We Are NASA PNG (7.63 MB)
- Dark Matter Control Page (note, there is no Asset Manager Export) Ver 7 2022-04-01 DMZ (102 KB)
- Moon2Mars Media part 1 of 3 - general media ZIP - Extract to Showpath\JPL\Moon2Mars\ (815.04 MB)
- Moon2Mars Media part 2 of 3 - Apollo Content ZIP - Extract to Showpath\JPL\Moon2Mars\ (929.88 MB)
- Moon2Mars Media part 3 of 3 - Artemis ISS and Lunar Content ZIP - Extract to Showpath\JPL\Moon2Mars\ (548.09 MB)
- Moon2Mars Dark Matter Control Page Preview MP4 (633.08 MB)
- Moon2Mars Preview part 1 of 2 MP4 (936.8 MB)
- Moon2Mars Preview part 2 of 2 MP4 (536.01 MB)
- Moon2Mars Dark Matter Control Page Screenshot PNG (224 KB)
- 360 Lunar Flight 4k version 2 MP4 (627.84 MB)
- 360 Lunar Flight 8k version 2 MP4 (581.22 MB)

Expand the Frame - Perseverance on Mars and ocean example

updated 8/4/22 - added "injected" version, so it will work for those playing offline or those who wish to upload it online using compatible programs/sites. Also added a test ocean scene comparison.

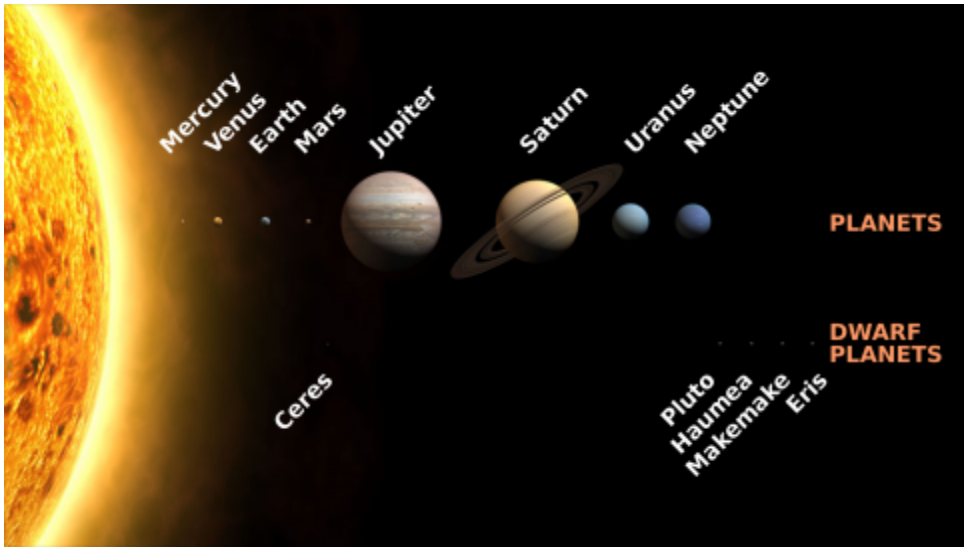
Inspired by a LIPS 2021 session from Mark Webb: https://youtu.be/hFWSlUqe9QI?t=772

This is a 360 video which starts at a simple 1920x1080 frame, but then expands to encompass the whole dome/sphere. Meant for planetariums as an introduction to what 360, immersive visualization actually means. Below are also working files, including alpha channeled PNG masks, and a BLEND file to create and customize your own "Expand the frame." If you have questions or need assistance, nee@skyskan.com.

View the 360 demo: https://www.youtube.com/watch?v=euP1dkamoOY

- Expand the Frame - Mars MP4 (221.33 MB)
- Expand the Frame - Mars - Working Files BLEND PNG ZIP (158.65 MB)
- Expand the Frame - Mars Injected MP4 (221.33 MB)
- test ocean scene 360 Injected MP4 (13.95 MB)
- test ocean scene flat PNG (1.61 MB)

JPL Simple Solar System Tour



Media Slides Example

Media - Export to Showpath ZIP (522.49 MB)

Audio only - example show recording MP3

Length: 25 - 40 minutes
Cost: Free
Last updated: May 2022
Format: Live, interactive, with some fully immersive VR experiences
Software: Digital Sky 2 buttons and general media

Tagline: “Travel the Solar System with NASA and JPL.”

Promotional Blurb: "You’re invited to a live, interactive, and immersive presentation about space science. Explore the night sky, the Solar System, and beyond. Ask your questions, and discover new wonders being studied right now in your own celestial backyard at NASA and the Jet Propulsion Laboratory."

This is a rough release of some Digital Sky 2 buttons and general media for a very simple Solar System Tour. It includes flying buttons to fly around the Solar System and the galaxy, sample NASA and JPL imagery, as well as some 360 images and video to engage your audiences. Generally speaking, the show goes along these lines:

1. What have you heard about NASA or JPL? I'd like to show you a just little bit of what NASA and JPL have been doing for the last few decades. Let's take a look at the night sky to start.
2. That's how people studied space for thousands of years. Of course, NASA doesn't just look into space these days, we can go to space. JPL, specifically, specializes in robotic deep space exploration of the Solar System and beyond. What do you think space would be like?
3. Let's start here at the Earth. Can you guess what is the most studied object in space? It's the Earth! Why do you think NASA and JPL spend the most time studying the Earth? Here are some of the missions studying the Earth.
4. Let's see the whole Solar System. Where else would you like to go? What have you heard about that destination? What makes you want to go there?
5. We're here! Make some observations and share them with the person next to you. What questions do you have now that you're here?

6. Has anyone heard about what missions have studied this object before? Here's some information/images from (some of) the mission(s).
7. Go back to step 4. Repeat as desired.
8. (Optional with more time) Let's leave the Solar System to look at our whole galaxy. NASA and JPL have even discovered that practically every star is its own solar system with its own set of exoplanets.
9. Let's go home. Any last minute questions? Thanks for coming!

As this is a pilot release, if you run into any issues/bugs, if you have any questions or feedback, and/or if you want to share your own show, feel free to ask: nee@skyskan.com.

Downloadable Files:

- Media - Export to Showpath ZIP (522.49 MB)
- Digital Sky 2 Buttonset - Export to buttonpath ZIP (276 KB)
- Audio only - example show recording MP3 (36.49 MB)

Our Home with NASA - Earth Science Curriculum and Planetarium Show

Length: 30 - 45 minute
Cost: Free
Last updated: March 2022
Format: Live, interactive
Software: Digital Sky 2 buttons, Script, General Slideshow, and General Media

2024 Note: the graph of the temperatures of the planets are older, and are likely out of date, especially for Earth. You can let audiences know that these are approximate temperatures, if you don't wish to remake the graphics yourself. For anyone who does wish to have updated graphics, please email nee@skyskan.com.

Last updated 3/29/22 - Updated analog slideshow with extra multimedia and links.

Promotion: "Explore what makes planet Earth so special with NASA data and see how NASA is exploring our home for the benefit of humankind."

To celebrate Earth Day, consider this live and interactive planetarium curriculum focusing on comparative planetology to show audiences how special and amazing our home planet Earth is. Both qualitatively and quantitatively compare aspects of the Earth and other planets and explore our Home with NASA imagery and data.

Show Script - please note the show script is meant as guidelines for a live and interactive show, and is not meant to be read verbatim.

Show Slideshow - for analog planetariums and classrooms

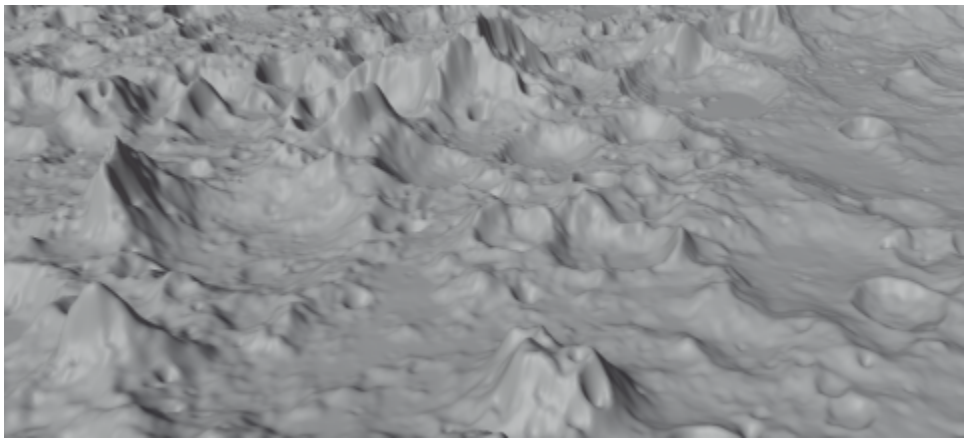
As always, feedback, suggestions, and bug reports are always welcome! nee@skyskan.com

Search tag: domeactivity

Downloadable Files:

- Show Multimedia ZIP (645.4 MB)
- DS2 buttonset ZIP (69 KB)

Lunar South Pole 3D model

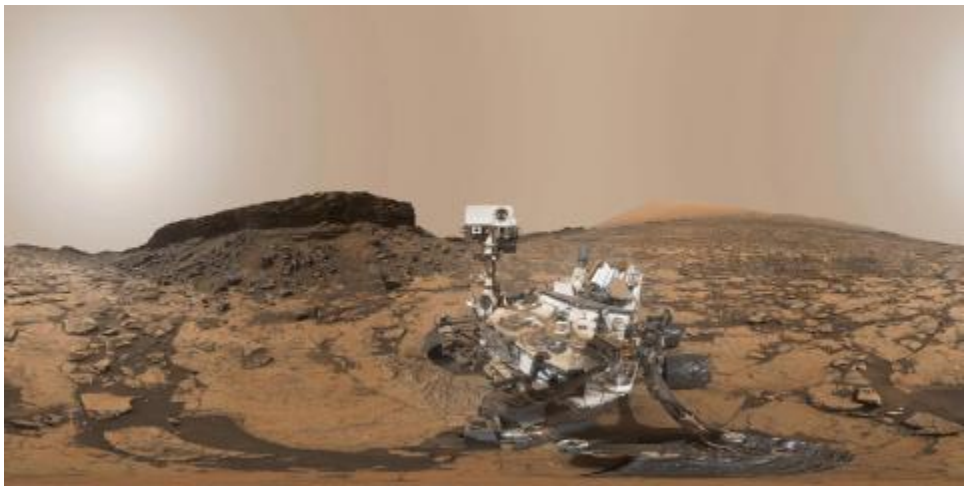


This is a 3D model of the Lunar South Pole, derived from this NASA resource, the CGI Moon Kit https://svs.gsfc.nasa.gov/4720, and this Lunar and Planetary Institute Resource https://www.lpi.usra.edu/lunar/lunar-south-pole-atlas/. Included below are BLEND, OBJ, and XCF working files. Great for planetarium domes, and VR explorations. 3D printing would need further work, so if you need help, just ask. Note this is model is set to full scale (about the size of Texas). It spans approximately a 500 km radius from the South pole, with each pixel representing about 500 m.

Downloadable Files:

- Lunar South Pole model BLEND ZIP (27.33 MB)
- Texture Working Files XCF ZIP (34.42 MB)
- DEM PNG (10 MB)
- LROC color PNG (37.58 MB)
- Labeled Topography PNG (9.9 MB)
- Lunar South Pole model OBJs ZIP (106.55 MB)

Step into NASA - Live and Interactive Planetarium VR Show



Website:
For the latest 360 content to add to your own show

Presenter Script Google Docs
Flat Screen Presentation Slides Google Slides
Curiosity self-portrait, Sol 1462 (September 2016) Credit: NASA / JPL / MSSS / Seán Doran (image above)
Length: 30 - 60 minutes
Cost: Free
Last updated: September 2021
Format: Live, interactive curriculum and Digital Sky 2.5 buttons
Software: Digital Sky, script, and general media
Latest updates: updated script and added flat screen/virtual presentation slides with some new 360 content.

Demo of a virtual professional development is here (thanks to LIPS and the PPA):
https://www.youtube.com/watch?v=IAMvEu1BEpU

Tagline: “Step inside NASA's shoes.”

Promotion: “Featuring official 360 content from the National Aeronautics and Space Administration, step into YOUR space agency, and explore the universe with us.”

About this show in one Word: Experience

In one Sentence: People all around the world know the name “NASA” as the premier space agency of the American people, and most have a general sense that NASA explores space, but very few know the breadth and depth of what the National Aeronautics and Space Administration really does to benefit humanity nor what working at NASA really means, so step inside to experience it for yourself.

To Install into Digital Sky 2: Download the zip file containing the button set below. Extract the buttons to your DigitalSky\Buttons folder. The media comes in a zip file below. Create a folder called "JPL" in your Shows folder, and extract the media folder there. Filepath for all the media should be Showpath\JPL\Step. Double check all your file paths if your media is not showing up. Contact us on Ryver if you're having issues. Remember to set the initial light pollution to your desired level (set to LA by default), in the "Goto

Night" button, and set your final landing coordinates to avoid a jump in the final "Land on Earth" button (set to JPL by default). Also, note that some of the media included may have higher resolution versions available for higher resolution projectors.

See the script as a Google Doc here. Media is split below into 5 parts:

As always, feedback, bug reports, suggestions, extensions, and imports into other planetarium software are welcome. Need updated Digital Sky 2 buttons and/or a Dark Matter conversion? Just ask.

For those who don't have Digital Sky 2, the concept is simple: Show people the "choice spheres" using the flat slides as a preview, then you "step into" the sphere that the audience chooses, and have that experience with them. This is a sample clip rendered from Digital Sky, this is a sample 360 clip rendered from Blender.

For those who need it, see the flat screen / virtual presentation slides here.

Downloadable Files:

- Digital Sky 2.5 Buttons ZIP (190 KB)
- Full Dome Preview of "Beyond" segment MP4 (10.39 MB)
- 360 injected Preview of "Backyard" segment MP4 (494.47 MB)
- Media packet part 1 of 5 ZIP (854.57 MB)
- Media packet part 2 of 5 ZIP (893.26 MB)
- Media packet part 3 of 5 ZIP (808.17 MB)
- Media packet part 4 of 5 ZIP (842.06 MB)
- Media packet part 5 of 5 ZIP (903.52 MB)

Moon Phases and navigation

A request from the Iziko Planetarium:

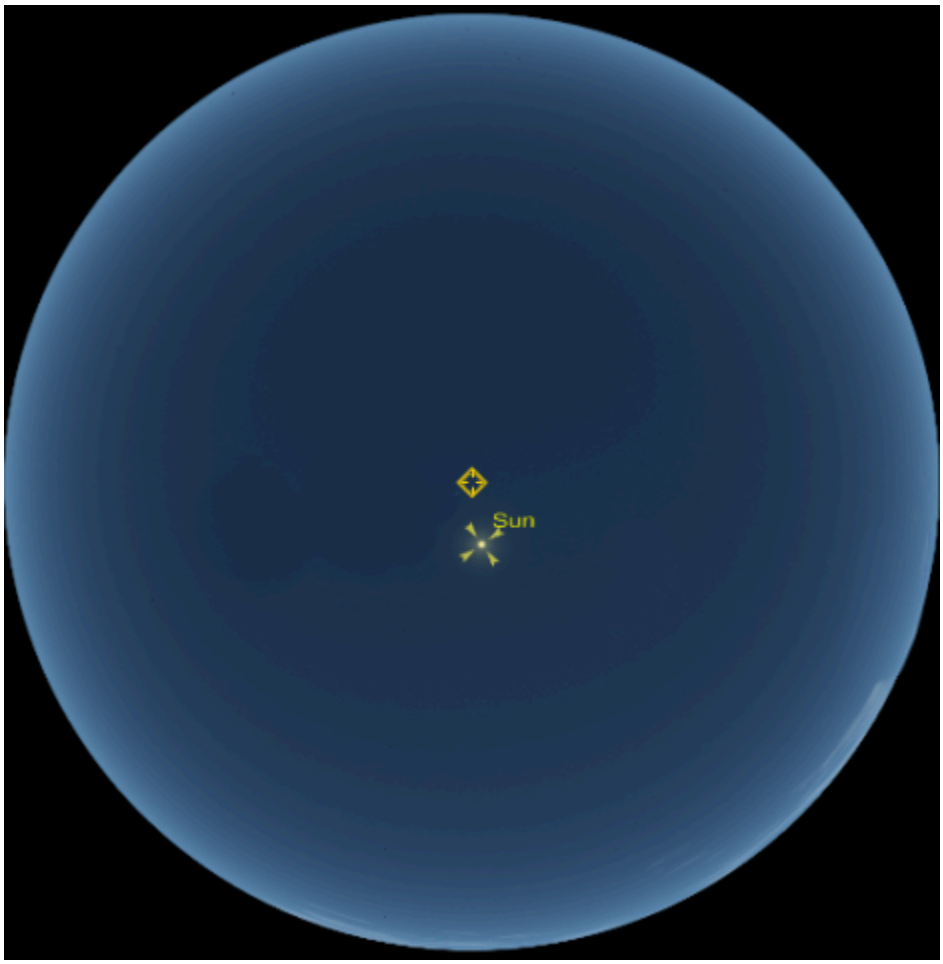
Here is Digital Sky Dark Matter code (copy and paste into a button) to view the Sun-Earth-Moon System, Scale up, show the Moon's orbit, Mark the Earth (Marker Model included, if needed), then fast forward and rewind through the phases. Have more questions or need more help? Just ask.

Also, to get the coordinates of a camera, for precise flying, click and drag from the “Camera” Icon in your viewport or in the Asset Manager > System folder > Camera > Base Properties, click and drag the Position and Rotation into your Scriptpad Button code, as below.

Downloadable Files:

- Dark Matter View Earth-Moon System Code and Marker Model ZIP (8 KB)

DS2 to DM - Today, Noon



Requested by De Anza College Planetarium:

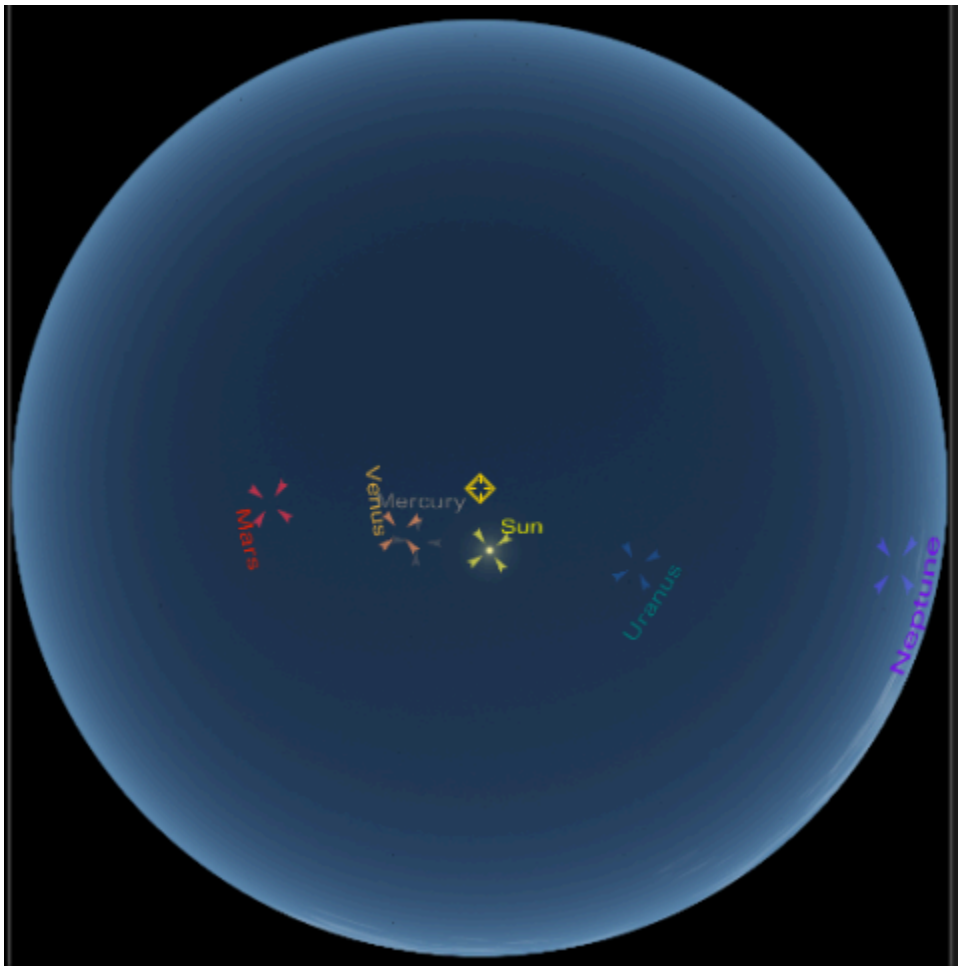
This is Digital Sky Dark Matter Javascript code to replace the Today, Noon commands from Digital Sky 2. It allows you to go to Today, at Noon, based on your system time. It also includes code to go to midnight.

Comments are in the code to help customize and edit.

Downloadable Files:

- Today Noon DM Javascript Code TXT ZIP (1 KB)

DS2 to DM - Azimuth and Elevation



updated 6/2/21 with Calculate Azimuth/Elevation code

Requested by Pamplona Planetarium:

This is Digital Sky Dark Matter Javascript code to replace the Text Azimuth and Text Elevation commands from Digital Sky 2. It allows you to put your own tracking marks and labels onto objects.

This code just does the Solar System, but, in theory, it should work for any named object. When making a Javascript Asset, the Load Call should be "ShowAllPlanets" and the Unload Call should be "RemoveMarkers" and then you just load and unload to turn the markers on and off.

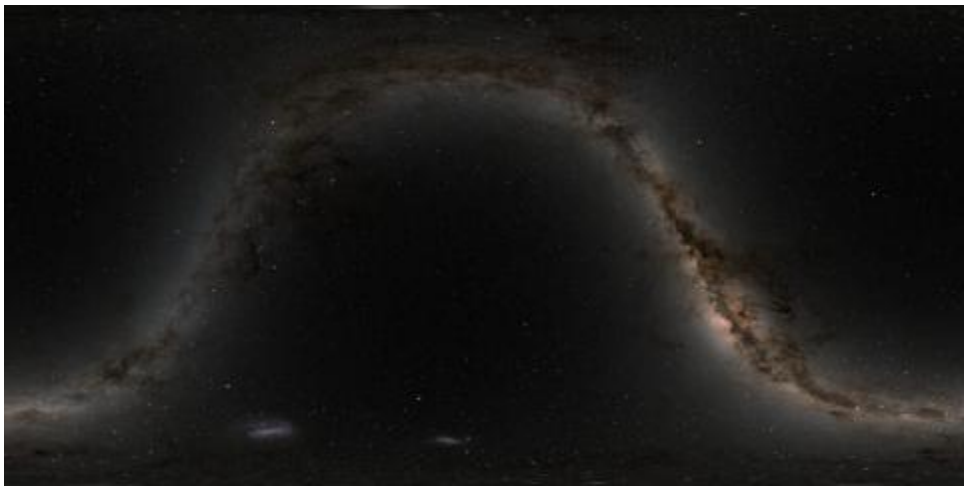
Below is also code to use a dummy point at an object, then ConvertInPlace to the Camera to get proper cartesian coordinates. This calculates the actual Azimuth and Elevation for you. The problem is that parenting back and forth in a continuous loop to track an object can cause lags and crashes. However, if you just need a one time, or periodic, calculation, then this should work fine for you.

Comments are in the code to help customize and edit.

Downloadable Files:

- Marker Solar System Javascript Code TXT ZIP (2 KB)
- Calculating Azimuth and Elevation DM Javascript Code TXT ZIP (1 KB)

Deep Star Maps and Constellations 3D model with Labels



Website:
https://svs.gsfc.nasa.gov/4851
Night Sky with Constellations, Labels, and Boundaries BLEND ZIP

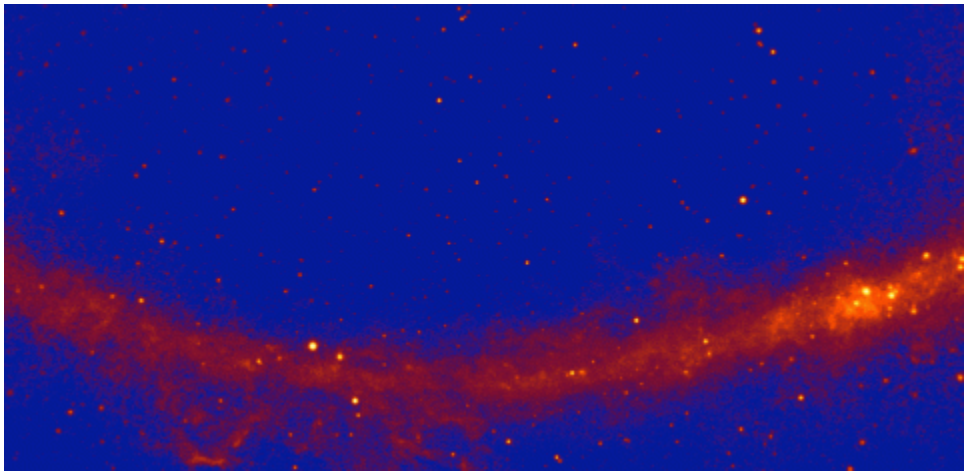
As a supplement to this resource from the NASA's Scientific Visualization Studio, here is a series of BLEND files (created in the free 3D modeling software Blender) for showing the night sky, constellations, labels, and IAU boundaries in VR applications. Demos:

North - https://www.youtube.com/watch?v=ngM4olFh--Q

South - https://www.youtube.com/watch?v=Uzj9C2oI0x4

Note for public artwork: https://universe-of-learning.org/contents/products/hevelius-images

Gamma Ray Constellations



Website:
https://fermi.gsfc.nasa.gov/science/constellations/
https://svs.gsfc.nasa.gov/13097

Scientists with NASA's Fermi Gamma-ray Space Telescope devised a set of constellations for the high-energy sky to highlight the mission's 10th year of operations. Characters from modern myths, like the Hulk and the time-warping TARDIS from "Doctor Who," represent one source of inspiration. Others include scientific concepts and tools, like the Fermi Satellite, and famous landmarks in countries contributing to the development and operation of Fermi. The mission has mapped about 3,000 gamma-ray sources -- 10 times the number known before its launch and comparable to the number of bright stars in the traditional constellations.

Here are the backgrounds and artwork for that resource to place in your planetarium dome.

Downloadable Files:

- Fermi Constellations ZIP (14.22 MB)
- Full Site Download Including screenshots of stick figures ZIP (42.72 MB)
-