Standards for Planetarium Audiovisuals

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“Industry standards”

- IMERSA AFDI/IPS Dome Standard Adoption: Typically 4k/30 FPS jpg sequences, 5.1 WAV audio
- Astronomy Visualization Metadata (AVM) standard
- Data2Dome standard

DATA2DOME

Why we need to change the way we present news and data

1. Astronomy is a dynamic discipline. New press releases, images, videos and data are being published every day.
2. But, this flow of exciting new content is typically not integrated in our products: new data is typically presented days or even weeks later — and often not at all
3. As a result, the planetarium and other centres of astronomy competence, lags behind blogs, newspapers, TV and other media.
4. AVM and Data2Dome (D2D) project aims at streamlining the flow of content from research institutions to planetariums, offering audiences a unique opportunity to access the latest data from space in near real time

What is necessary?

1. Data aggregation in one database
2. Instant access to content world-wide
3. A way to alert the users
4. Good visual overviews for users
5. Good data: Historical events, sky events, images, videos, show sequences
6. Gathering the community around one set of tools and standards like IMERSA AFDI/IPS Dome Standard, Data2Dome and the Astronomy Visualisation Metadata
7. Liberal licensing: Creative Commons Attribution.

What is AVM?

- A standard for tagging digital astronomical images stored as JPEGs, PNGs and TIFFs
- Extends the concept of Extensible Metadata Platform (XMP) headers to include useful astronomical information about:
  - The creator of the image
  - The content (including a description and subject category)
  - The method of observation (the facility, instrument and spectral information)
  - The World Coordinate System (WCS) position in the sky (for “cosmic” images)
  - The publisher of the image
  - And much more …

What is AVM?

Specifically tailored to address the needs and interests of the general public and outreach community, AVM ensures that relevant information is transferred with the image when it is shared with others

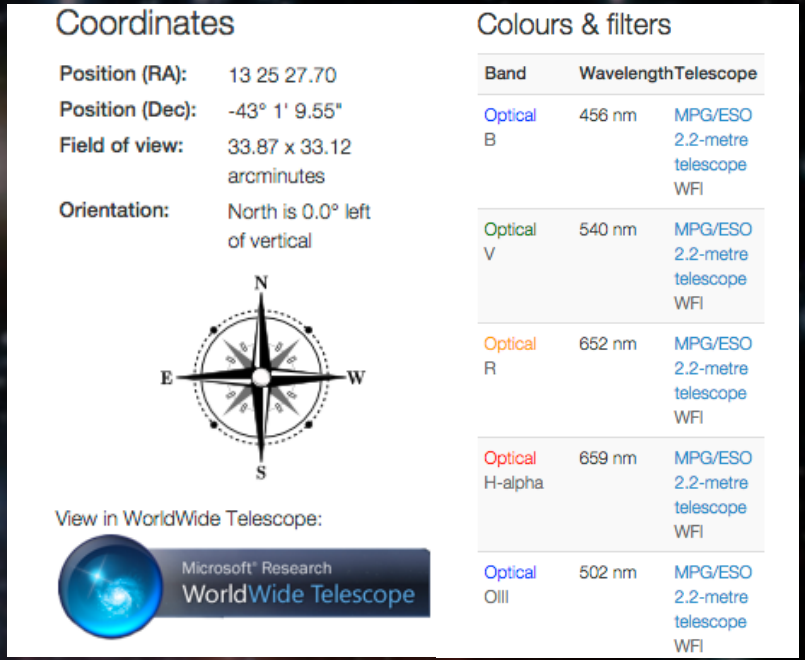
What can AVM be used for?

As well as Spitzer, Chandra, GALEX, WISE, NuSTAR, Planck, Herschel, the ESO and ESA/Hubble image galleries have AVM tagging running ”behind the scenes”.

All ESO and Hubble images are now fully tagged (!)

All the information you see on the webpage is also embedded in the highest and medium quality versions of the images (not thumbnails).

This integration allows all of the information to be carried along and used by other applications.



Coordinates

Position (RA):	13 25 27.70
Position (Dec):	-43° 1' 9.55"
Field of view:	33.87 x 33.12 arcminutes
Orientation:	North is 0.0° left of vertical

View in WorldWide Telescope:

Colours & filters

Band	Wavelength	Telescope
Optical B	456 nm	MPG/ESO 2.2-metre telescope WFI
Optical V	540 nm	MPG/ESO 2.2-metre telescope WFI
Optical R	652 nm	MPG/ESO 2.2-metre telescope WFI
Optical H-alpha	659 nm	MPG/ESO 2.2-metre telescope WFI
Optical OIII	502 nm	MPG/ESO 2.2-metre telescope WFI

AVM Tools

Elements of AVM:

- Interactive Tagging Tools
  - Photoshop XMP Panels
  - FITS Liberator
  - Web-based AVM form (customisable for local needs)
- WCS Recovery Utilities
  - WorldWide Telescope
  - PinpointWCS
  - Aladin
  - Astrometry.net
- Web and Scripting Resources
  - EXIFTool extensions
  - Python Library (PyAVM)
- Online Registry/Archive
  - IRSA ASTROPIX Archive

AstroPix

AstroPix beta
Share the Universe

About Browse Advanced Search Search

Digitized Sky Survey Image of the Eagle Nebula

April 30th, 2015 eso_eso1518e

Credit: ESO/Digitized Sky Survey 2. Acknowledgment: Davide De Martin.

This image is a colour composite of the Eagle Nebula (M 16) made from exposures from the Digitized Sky Survey 2 (DSS2). The field of view is approximatelly 3.8 x 3.3 degrees.

Image Source: http://www.eso.org/public/images/eso1518e/

Curator: European Southern Observatory, Garching bei München, Germany

Image Use Policy: Creative Commons Attribution 3.0 Unported license.

View Options

Fullscreen View in WorldWide Telescope

Download Options

320 x 273 (21.9 KB)
500 x 428 (46.2 KB)
1024 x 876 (214 KB)
1280 x 1095 (353 KB)
1600 x 1369 (580 KB)
3000 x 2568 (2.1 MB)
6000 x 5137 (7.17 MB)
12000 x 10274 (20.5 MB)
13749 x 11772 (26.4 MB)

Image Details

Image Type
Observation
Object Name
Eagle Nebula • M 16 • Messier 16
Subject - Milky Way
Nebula » Type » Star Formation

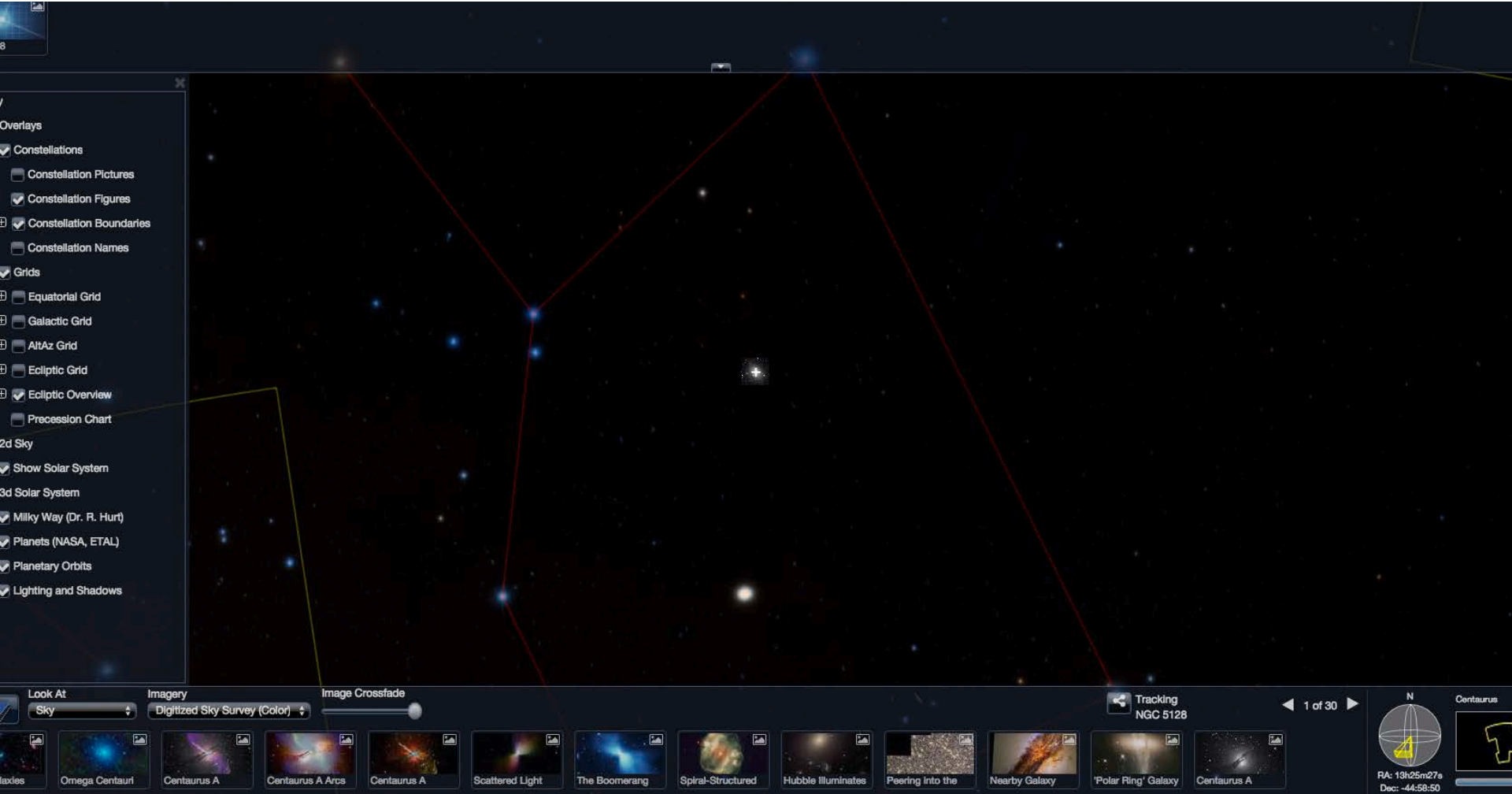
Position Details

Position (ICRS)
RA = 18h 18m 47.1s
DEC = -13° 51' 9.8"
Orientation
North is 5.8° CCW
Field of View
3.8 x 3.3 degrees
Constellation
Serpens

Color Mapping

Telescope	Spectral Band	Wavelength
Digitized Sky Survey 2 (None)	Optical (B)	-
Digitized Sky Survey 2 (None)	Infrared (I)	-

WorldWide Telescope



What can AVM be used for?

- The AstroPix database of astronomical images makes use of the AVM tags to offer access to collected image libraries of many of the leading astronomical observatories under a single unified interface
- Currently contains 7000+ AVM-tagged images and counting
- Several planetarium softwares support AVM:

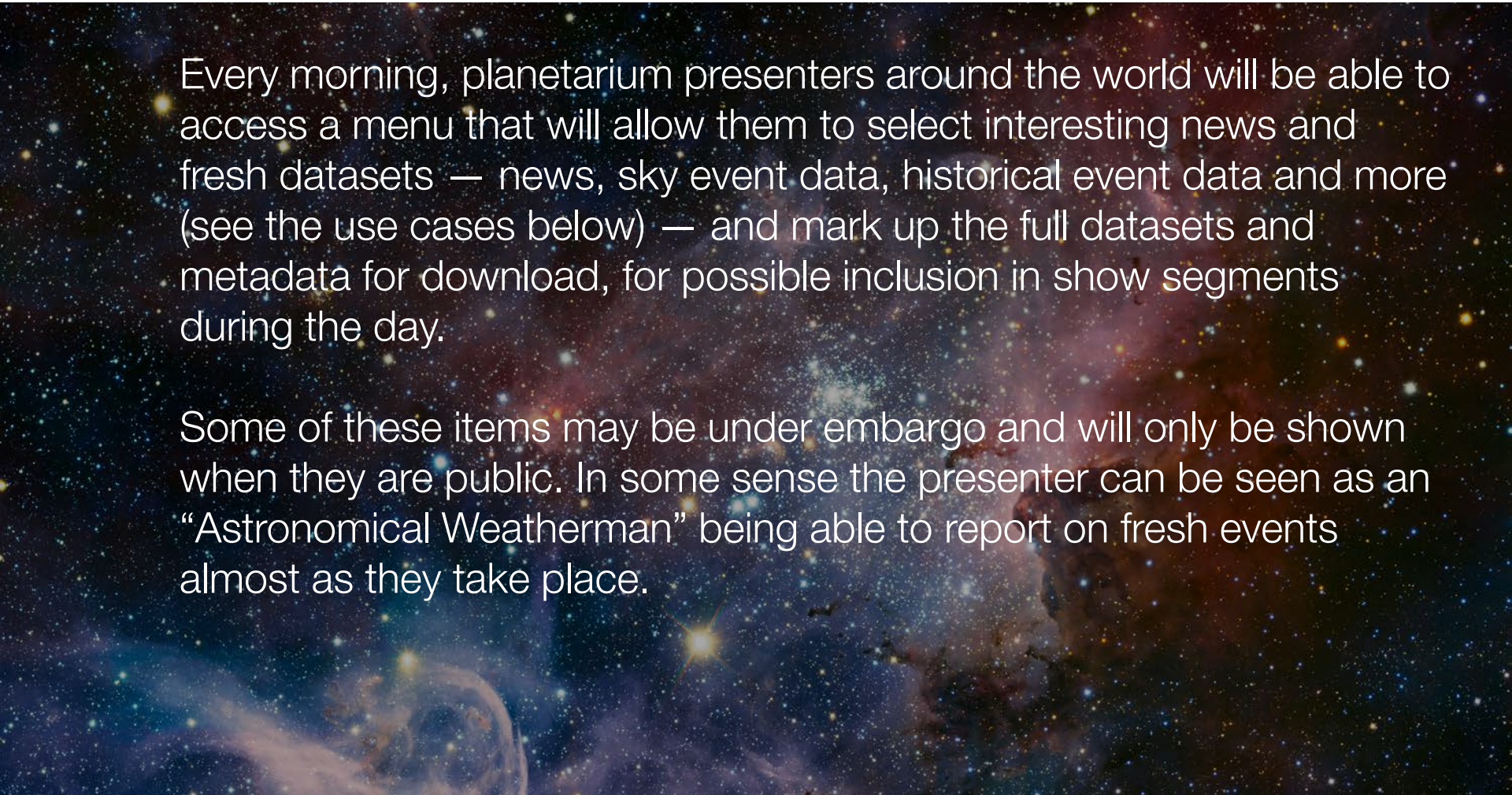
Package	Status
Powerdome	Partly implemented
Uniview	Planned for implementation
Digistar	Implemented
OpenSpace	Planned for implementation
SkyExplorer	Implemented
Dark Matter	Implemented
World Wide Telescope	Implemented
Mitaka	Not supported
Stellarium	Partly implemented
Redshift	Implemented
Starry Night	Implemented
Aladin	Implemented
WikiSky	Implemented
DS9	Implemented

Data2Dome Philosophy

Data2Dome relies on:

- **standardisation** of formats and process
- consolidation of data or metadata in online **databases**
- a combination of **staff curation of assets** as well as **crowd-curation**
- a **ranking system** on the side of the vendors
- **distribution** via the Internet.

Data2Dome Vision



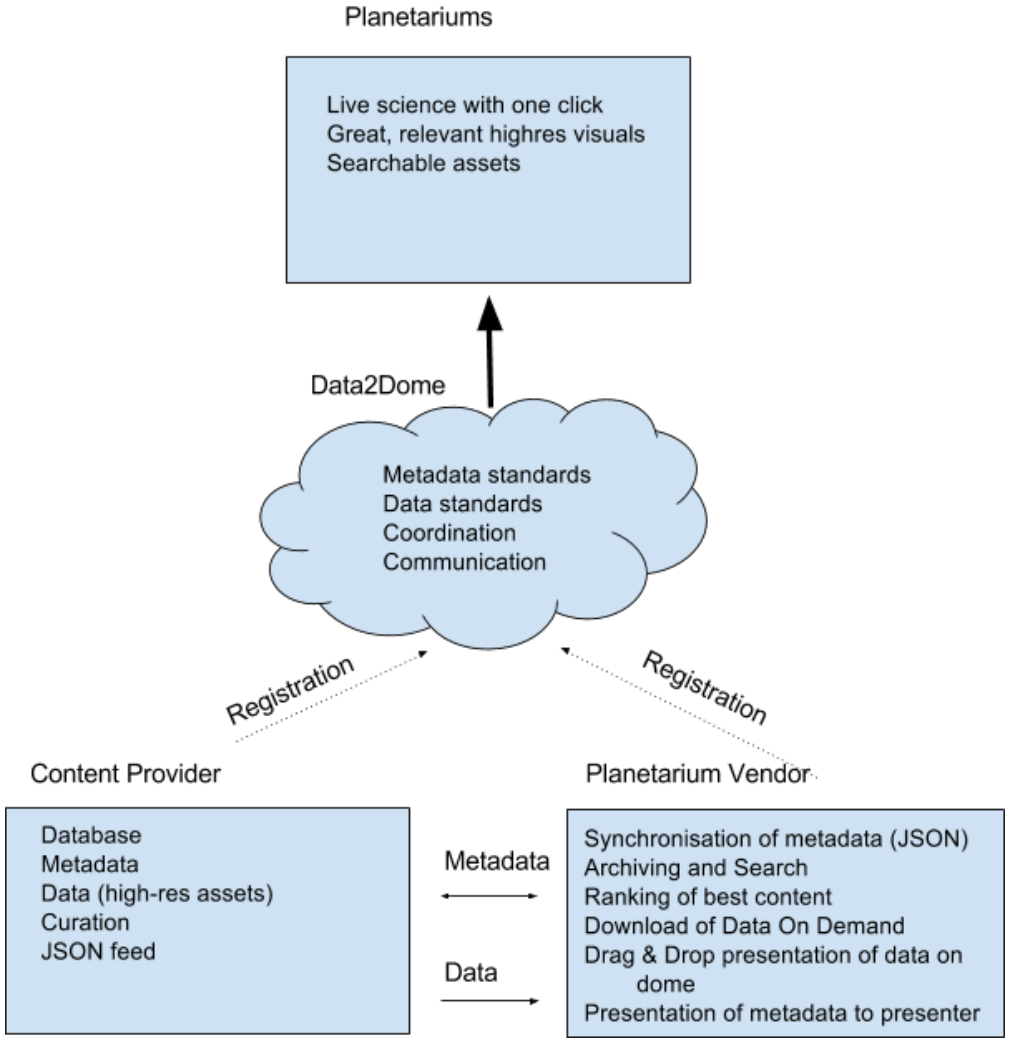
Every morning, planetarium presenters around the world will be able to access a menu that will allow them to select interesting news and fresh datasets — news, sky event data, historical event data and more (see the use cases below) — and mark up the full datasets and metadata for download, for possible inclusion in show segments during the day.

Some of these items may be under embargo and will only be shown when they are public. In some sense the presenter can be seen as an “Astronomical Weatherman” being able to report on fresh events almost as they take place.

Data2Dome Data

- **Descriptive metadata** as support for the presenter: concise, well-written descriptions of the content; credits; license; embargo date; links to more information etc. for the planetarium lecturer. The Astronomy Visualization Metadata Standard has been chosen for this.
- **Flat videos**
- **Flat images**, including planetary maps, images of sky objects, all-sky panoramas/fulldome images
- **Fulldome videos**
- **Audio**, including interview clips, sounds, music
- **3D objects**
- **Show sequences**, including presentation metadata

Implementation



Digistar 6

- Data2Dome is integrated in Digistar 6 from Evans & Sutherland with 20,000+ images and 5000+ videos.

E&S EVANS & SUTHERLAND

- Data providers so far:
  1. ESO (images, videos)
  2. Hubble (images, videos)

  Via AstroPix (Robert Hurt/IPAC):
  3. Spitzer
  4. Chandra
  5. GALEX
  6. WISE
  7. NuSTAR
  8. Planck
  9. Herschel
- Also implemented in:
  - SureyyaSoft, Digitalis, Emerald, Sky-Skan Dark Matter, RSA Cosmos…

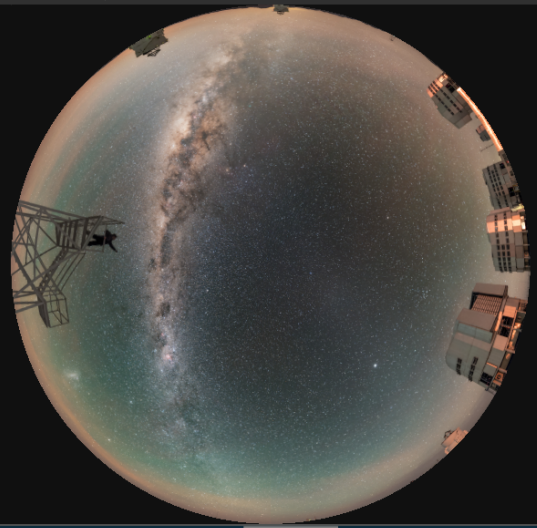
DIGISTAR 6

Host GPs Cloud

DomeSharingWorkspace

Presentations
Playlists
History

Dome View



Sky Date & Time Location Navigation Controls Information

Celebrating the night

In this panorama, extended to 360 x 180 degrees (with black) version, two of the four small Auxiliary Telescopes stand beside their larger counterparts, the four Unit Telescopes of the ESO Very Large Telescope (VLT) in Chile. In this fantastic moonlit world, the line of the Milky Way splits the sky, under which the faint blotches of our neighbouring dwarf galaxies — the Large and Small Magellanic Clouds — are just visible. The photographer celebrates the sky from atop a platform.

Credit: ESO/B. Tafreshi

Creative Commons Attribution 4.0 International License

Links to alternative projections of this image:

- Alternative projection of this image
- Fisheye projection of this image

Additional Information

European Southern Observatory
Karl-Schwarzschild-Strasse 2
Garching bei München, D-85748

Library

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  - Solar System
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      - Spherical All-Sky
      - Hemispherical All-
    - Video
  - ESA

Shortcuts

Content

Name	Created By	Rating	Upload Date
The Next-Generation Transit Survey	European Southern Observatory		1/26/2017
ALMA expanse	European Southern Observatory		1/26/2017
Paranal bow — extended	European Southern Observatory		1/18/2017
Milky Way between UTs	European Southern Observatory		1/18/2017
Dawn at La Silla	European Southern Observatory		1/18/2017
ALMA gegenschein	European Southern Observatory		11/24/2016
La Silla under the arch	European Southern Observatory		10/21/2016
Milky Way glow at Paranal	European Southern Observatory		10/11/2016
Extended panoramic Adaptive Optics	European Southern Observatory		10/11/2016
Hunter of the night	European Southern Observatory		10/4/2016
Extended desert arc at Paranal	European Southern Observatory		10/4/2016
Celebrating the night	European Southern Observatory		10/4/2016
ESO Director General at the VLT	European Southern Observatory		9/28/2016
Big and small	European Southern Observatory		9/28/2016
Extended auxiliary observing at Paranal	European Southern Observatory		9/26/2016
Extended Paranal panorama	European Southern Observatory		9/23/2016
Moonshine over La Silla	European Southern Observatory		9/22/2016
Milky Way over the Swedish-ESO Submillimetre	European Southern Observatory		8/26/2016
Inside VISTA	European Southern Observatory		8/23/2016
Coffee break La Silla style	European Southern Observatory		8/3/2016
ESO's Very Large Telescope Array	European Southern Observatory		8/2/2016
A comet across the Zodiac	European Southern Observatory		8/1/2016
Night sky at La Silla	European Southern Observatory		8/1/2016
The lonely road to la Silla	European Southern Observatory		7/31/2016

DIGISTAR 6

Host GPs Cloud

Presenter's Sample Workspace

Dome View

Presentations
- Shows
- Trailers
- Night Sky-Spring (
- Night Sky-Summer
- Night Sky-Autumn
- Night Sky-Winter (
- Basic Planet Tour
- Advanced Planet To
- Milky Way Tour
- SkyShow

Playlists
- Trailers (Loopable)

Set Up Milky | Our Solar Sy | Voyager 1 Pa | Voyager 1 To | Voyager | Oort Cloud | Exoplanet Sy | 61 Vir b

Algol Star Sy | Pleiades Ope | Optional Sho | NGC 6720 Pl | Planetary Ne | Globular Clu | Return Home | SpaceTime G

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- Data2Dome Content
  - Astropix
    - Images
      - Images
      - Spherical All-Sky
      - Hemispherical A
  - ESO
  - ESA

Shortcuts

Name	Created By	Rating	Upload Date	Duration
The Dawn of a New Era for Superr	Chandra X-ray Observ		2/24/2017	
Black Hole Meal Sets Record for D	Chandra X-ray Observ		2/6/2017	
Chandra Images Show That Geom	Chandra X-ray Observ		1/18/2017	
Chandra Images Show That Geom	Chandra X-ray Observ		1/18/2017	
Astronomers Discover Powerful Cc	Chandra X-ray Observ		1/5/2017	
Deepest X-ray Image Ever Reveals	Chandra X-ray Observ		1/5/2017	
Cosmic 'Winter' Wonderland	Chandra X-ray Observ		12/19/2016	
Cosmic 'Winter' Wonderland	Chandra X-ray Observ		12/19/2016	
Under Construction: Distant Galaxy	Chandra X-ray Observ		12/8/2016	
Under Construction: Distant Galaxy	Chandra X-ray Observ		12/8/2016	
A Stellar Circle of Life	Chandra X-ray Observ		11/21/2016	
Mysterious Cosmic Objects Eruptir	Chandra X-ray Observ		10/19/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
Discovering the Treasures in Chanc	Chandra X-ray Observ		10/14/2016	
X-ray Telescopes Find Evidence for	Chandra X-ray Observ		10/5/2016	
X-ray Detection Sheds New Light	Chandra X-ray Observ		9/14/2016	

Sky | Date & Time | Location | Navigation | Controls | Information

Cosmic 'Winter' Wonderland

Credit: X-ray: NASA/CXC/PSU/L.Townsley et al; Optical: UIOBT; Infrared: NASA/JPL-Caltech

http://chandra.harvard.edu/photo/image_sno.html

This composite image captures the star formation region called NGC 6357 located within the Milky Way galaxy. X-rays from Chandra and ROSAT (purple) reveal hundreds of point sources, which are the young stars in NGC 6357, as well as diffuse X-ray emission from hot gas. These have been combined with infrared data from Spitzer (orange) and optical data from the SuperCosmos survey (blue) to complete this spectacular cosmic vista.

Position (RA): 17:25:07
Position (Dec): -34:19:03
Distance: 5500 ly
Field of view: 0.0002 x 0.0002 °

Additional Information

AstroPix beta

Chandra X-ray Observatory
60 Garden St.
http://chandra.harvard.edu

Chandra X-ray Observatory Center
cxcpub@cfa.harvard.edu
617.496.7941

Added: 12/18/2016 5:00 PM
Size: 0 KB
Resolution: 3600 x 2850 px

DIGISTAR 6

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Name	Created By	Rating	Upload Date
The orbits of the seven planets arc	European Southern Ol		2/22/2017
Light curves of the seven TRAPPIS	European Southern Ol		2/22/2017
Screenshot of ESOcast 96	European Southern Ol		2/22/2017
Artist's impression of view from pla	European Southern Ol		2/22/2017
Comparison of the TRAPPIST-1 sys	European Southern Ol		2/22/2017
Light curve of TRAPPIST-1 — shov	European Southern Ol		2/22/2017
Comparison of the sizes of the TR/	European Southern Ol		2/22/2017
Artist's impression of view from dis	European Southern Ol		2/22/2017
VLT observations of the light curve	European Southern Ol		2/22/2017
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Artist's illustrations of planets in TR	European Southern Ol		2/22/2017
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Artist's impression of the TRAPPIST	European Southern Ol		2/22/2017
Comparison of the TRAPPIST-1 sys	European Southern Ol		2/22/2017
Seven planets orbiting the ultracoo	European Southern Ol		2/22/2017
Artist's impression of the TRAPPIST	European Southern Ol		2/22/2017
AstroCamp students	European Southern Ol		2/20/2017
ALMA's Hole in the Universe	European Southern Ol		2/19/2017
False Dawn	European Southern Ol		2/12/2017
When Stars Explode	European Southern Ol		2/5/2017
The Cat's Paw and Lobster Nebula	European Southern Ol		2/1/2017
Highlights from VST image of Cat's	European Southern Ol		2/1/2017
The star formation regions NGC 6:	European Southern Ol		2/1/2017

Dome View

Sky Date & Time Location Navigation Controls Information

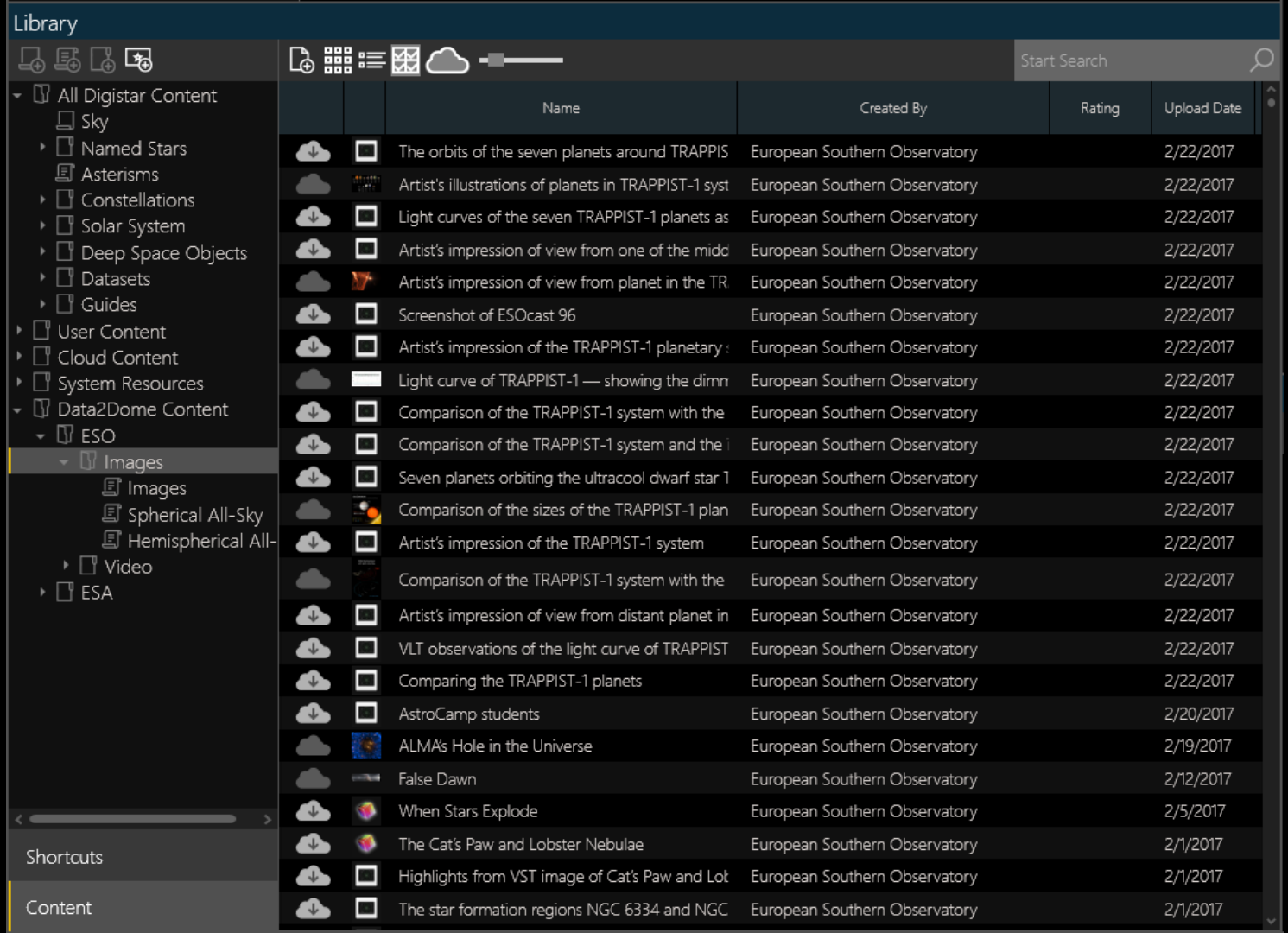
Artist's illustrations of planets in TRAPPIST-1 system and Solar System's rocky planets

This infographic displays some artist's illustrations of how the seven planets orbiting TRAPPIST-1 might appear — including the possible presence of water oceans — alongside some images of the rocky planets in our Solar System. Information about the size and orbital periods of all the planets is also provided for comparison; the TRAPPIST-1 planets are all approximately Earth-sized.

Additional Information

Credit: NASA

European Southern Observatory
Karl-Schwarzschild-Strasse 2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The orbits of the seven planets around TRAPPIS European Southern Observatory 2/22/2017
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Artist's impression of view from one of the midc European Southern Observatory 2/22/2017
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Artist's impression of the TRAPPIST-1 planetary European Southern Observatory 2/22/2017
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Seven planets orbiting the ultracool dwarf star T European Southern Observatory 2/22/2017
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The Cat's Paw and Lobster Nebulae European Southern Observatory 2/1/2017
Highlights from VST image of Cat's Paw and Lob European Southern Observatory 2/1/2017
The star formation regions NGC 6334 and NGC European Southern Observatory 2/1/2017

When Stars Explode

Credit: ESO Acknowledgement: Flickr user Josh Barrington

Over 75 million light-years away in the constellation of Virgo (The Virgin) lies NGC 4981 — a spiral galaxy with a rather explosive past.

NGC 4981 was discovered on 17 April 1784 by William Herschel, and subsequently documented in John Dreyer's New General Catalogue. Over a century later, on 23 April 1968, the galaxy once again made it into the records when a Type Ia supernova — a stellar explosion in a binary star system — occurred within its confines: SN 1968I. SN 1968I, however, was not to be the galaxy's only supernova. Decades later, the core collapse of a massive star led to supernova SN 2007c.

This spectacular shot of NGC 4981 — not showing any of the supernovae explosions; the bright star visible in the image is a foreground star — was captured by FORS, the visible and near-UV FOcal Reducer and low dispersion Spectrograph for ESO's Very Large Telescope (VLT). FORS is the Swiss Army knife of ESO's instruments — it is able to study many different astronomical objects in many different ways, and is responsible for some of the most iconic photos ever captured with the VLT (see eso9948f and eso0202a).

The data to create this image was selected from the ESO archive by Josh Barrington as part of the Hidden Treasures competition.

Position (RA): 197.2034 °
Position (Dec): -6.77698 °
Distance: 75000000 ly
Field of view: 0.10327 x 0.08422 °

Additional Information

European Southern Observatory
Karl-Schwarzschild-Strasse 2
Garching bei München, D-85748
Germany
http://www.eso.org

Added: 2/5/2017 10:00 PM
Size: 3.23 MB


https://supernova.eso.org/ips
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