

ORBITER Credits & Contributions

Last updated 14 September 2019.

Special thanks:

Doug, Josh, Gary, Orb and the entire Orbiter Forum team for keeping things running smoothly, and in particular Josh for providing and maintaining the server for the forum and Orbiter downloads.

Jarmo for pushing the envelope with the D3D9 client, and helping debug Orbiter and the graphics interface.

All beta testers and bug reporters for their help in getting the new version into shape.

All Orbiter users for their continued support. Keep playing!

Data sources planetary textures

Mercury

Mosaics created using MESSENGER orbital images released by [NASA's Planetary Data System \(PDS\)](#) on September 7, 2012.

NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington

http://messenger.jhuapl.edu/the_mission/mosaics.html

Mercury surface labels

USGS

Astrogeology Research Program

Planetary Geomatics Group

Gazetteer of Planetary Nomenclature

<http://planetarynames.wr.usgs.gov/>

Venus surface

Composite of Magellan synthetic aperture radar mosaics.

Jet Propulsion Laboratory Multimission Image Processing Laboratory

Solar System Visualization Project and Magellan science team

p45187.tif (5120x2560)

Venus clouds

Björn Jónsson

<http://www.mmedia.is/~bjj>

Earth land surface

Custom processed from Landsat 7 ETM orthorectified imagery.

Florida:

Digital Orthoimage Quarter Quads,

Florida Department of Environmental Protection
Land Boundary Information System (www.labins.org)
Download: <ftp://146.201.97.137/DOQQ/2004/RGB/UTM/MrSid>

Earth water surface

Based on NASA Visible Earth Blue Marble maps
<http://visibleearth.nasa.gov/>

Earth night lights

Custom processed, based on NASA Visible Earth Blue Marble maps
<http://visibleearth.nasa.gov/>

Earth clouds

NASA Visible Earth Blue Marble maps
<http://visibleearth.nasa.gov/>

Earth elevation

SRTM 90m Digital Elevation Data by NASA, released by USGS
CGIAR-CSI version 4 Processed for void removal by International Centre for Tropical Agriculture (CIAT)

Moon surface

LRO LROC-WAC Global Mosaic 100m June2013
Arizona State University
Astrogeology Science Center

Moon elevation

LOLA-GDR/Cylindrical
http://imbrium.mit.edu/DATA/LOLA_GDR/CYLINDRICAL/IMG/

Mars surface

Custom processed, based on
NASA MGS/MOC. 256 ppd/230m
Mars Odyssey THEMIS-IR Day Global Mosaic 100m v12
http://astrogeology.usgs.gov/search/map/Mars/Odyssey/THEMIS-IR-Mosaic-ASU/Mars_MO_THEMIS-IR-Day_mosaic_global_100m_v12
Viking MDIM2.1 Colorized Global Mosaic 232m
http://astrogeology.usgs.gov/search/details/Mars/Viking/MDIM21/Mars_Viking_MDIM21_ClrMosaic_global_232m/cub

Mars elevation

MOLA Mars elevation data at 128 pixels per degree
http://pds-geosciences.wustl.edu/mgs/mgs-m-mola-5-megdr-l3-v1/mgsl_300x/meg128/

Mars surface labels

USGS
Astrogeology Research Program
Planetary Geomatics Group

Gazetteer of Planetary Nomenclature

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Vesta surface

Dawn FC HAMO Global Mosaic 60mp

http://astrogeology.usgs.gov/search/details/Vesta/Dawn/DLR/HAMO/Vesta_Dawn_FC_HAMO_Mosaic_Global_74ppd/cub

Vesta elevation

Dawn HAMO DTM Global 93mp

http://astrogeology.usgs.gov/search/details/Vesta/Dawn/DLR/HAMO/Vesta_Dawn_HAMO_DTM_DLR_Global_48ppd/cub

Jupiter

“Cassini's best map of Jupiter”

NASA/JPL/Space Science Institute

Cassini Imaging Central Laboratory for Operations

<http://www.ciclops.org/view/1270/Cassinis-Best-Maps-of-Jupiter>

Rolf Keibel: Jupiter cloud map based on CICLOPS maps

Io Surface

Based on:

Io Galileo SSI/Voyager Color Merged Global Mosaic 1km

Astrogeology Science Center

USGS

http://astrogeology.usgs.gov/search/map/lo/Voyager-Galileo/lo_GalileoSSI-Voyager_Global_Mosaic_ClrMerge_1km

Io Elevation

Based on:

Oliver L. White, Paul M. Schenk, Francis Nimmo, Trudi Hoogenboom,

"A new stereo topographic map of Io: Implications for geology from global to local scales", Journal of Geophysical Research: Planets 119(6), 1276-1301 (2014), doi: 10.1002/2013JE004591

<http://onlinelibrary.wiley.com/doi/10.1002/2013JE004591/abstract>

Europa:

Based on:

Europa Voyager and Galileo SSI Global Mosaic 500m

Astrogeology Science Center

USGS

http://astrogeology.usgs.gov/search/map/Europa/Voyager-Galileo/Europa_Voyager_GalileoSSI_global_mosaic_500m

Ganymede

Ganymede Voyager and Galileo Color Global Mosaic 1.4km

Astrogeology Science Center

USGS

http://astrogeology.usgs.gov/search/map/Ganymede/Voyager-Galileo/Ganymede_Voyager_GalileoSSI_Global_ClrMosaic_1435m

Callisto

Based on:

Callisto Galileo/Voyager Global Mosaic 1km

Astrogeology Science Center

USGS

http://astrogeology.usgs.gov/search/map/Callisto/Voyager-Galileo/Callisto_Voyager_GalileoSSI_global_mosaic_1km

Io, Europa, Ganymede, Callisto surface labels

USGS

Astrogeology Research Program

Planetary Geomatics Group

Gazetteer of Planetary Nomenclature

<http://planetarynames.wr.usgs.gov/>

Saturn

Björn Jónsson

<http://www.mmedia.is/~bjj>

Rolf Keibel: texture adaptation

Saturn rings

Björn Jónsson

<http://www.mmedia.is/~bjj>

Mimas

NASA/JPL-Caltech/SSI/Lunar and Planetary Institute

Cassini Imaging Central Laboratory for Operations

PIA 18437

<http://www.ciclops.org/view/7963/Color-Maps-of-Mimas---November-2014>

Enceladus

NASA/JPL-Caltech/SSI/Lunar and Planetary Institute

Cassini Imaging Central Laboratory for Operations

PIA 18435

<http://www.ciclops.org/view/7961/Color-Maps-of-Enceladus---November-2014>

Tethys

NASA/JPL-Caltech/SSI/Lunar and Planetary Institute

Cassini Imaging Central Laboratory for Operations

PIA 18439

<http://www.ciclops.org/view/7965/Color-Maps-of-Tethys---November-2014>

Dione

NASA/JPL-Caltech/SSI/Lunar and Planetary Institute

Cassini Imaging Central Laboratory for Operations

PIA 18434

<http://www.ciclops.org/view/7960/Color-maps-of-Dione---November-2014>

Rhea

NASA/JPL-Caltech/Space Science Institute/Lunar and Planetary Institute
<http://photojournal.jpl.nasa.gov/catalog/PIA18438>

Titan surface

NASA/JPL/Space Science Institute/Cassini Data Analysis Program/USGS Astrogeology Science Center/Ian Regan

Updated, amended and restored version of USGS photomosaic

https://astrogeology.usgs.gov/search/map/Titan/Cassini/Global-Mosaic/Titan_ISS_P19658_Mosaic_Global_4km

https://astrogeology.usgs.gov/search/map/Titan/Cassini/Global-Mosaic/Titan_ISS_Globe_65Sto45N_450M_AvgMos

<https://www.flickr.com/photos/10795027@N08/43023455582/>

<https://www.insaturnsrings.com/titan-seam-blending>

Map used with permission

Titan elevation

P. Corlies, A. G. Hayes, S. P. D. Birch, R. Lorenz, B. W. Stiles, R. Kirk, V. Poggiali, H. Zebker, L. Less "Titan's Topography and Shape at the End of the Cassini Mission",
Geophysical Research Letters 44(23), 11754-11761 (2017)

<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017GL075518>

Titan surface labels

USGS

Astrogeology Research Program

Planetary Geomatics Group

Gazetteer of Planetary Nomenclature

<http://planetarynames.wr.usgs.gov/>

Iapetus

NASA/JPL-Caltech/SSI/Lunar and Planetary Institute

Cassini Imaging Central Laboratory for Operations

PIA 18436

<http://www.ciclops.org/view/7962/Color-Maps-of-Iapetus---November-2014>

Phoebe

NASA/JPL/Space Science Institute

Cassini Imaging Central Laboratory for Operations

PIA 07775

<http://www.ciclops.org/view/1743/Map-of-Phoebe---December-2005>

Uranus

James Hastings-Trew

<http://apollo.spaceports.com/~jhasting/>

Rolf Keibel: texture adaptation

Miranda, Ariel, Umbriel, Titania, Oberon

Robert Stettner

Credits: Planetary Satellite Mean Orbital Parameters and Moon Maps

Neptune

James Hastings-Trew

<http://apollo.spaceports.com/~jhasting/>

Triton, Proteus, Nereid

Robert Stettner

Credits: Planetary Satellite Mean Orbital Parameters and Moon Maps

Rolf Keibel: Triton texture adaptation from Voyager images

Celestial sphere background images

DDS2 (visible), Hydrogen alpha, IRAS (far IR), Planck (Microwave, Source: ESA/Planck), Radio, RASS (X-ray), Fermi (Gamma)

Chromoscope <http://www.chromoscope.net/>

Stuart Lowe, Chris North (Cardiff University) and Robert Simpson (Oxford University)

WMAP Microwave images

WMAP Science Team

WMAP "Science on a sphere" microwave sky images

NASA/LAMBDA

<http://lambda.gsfc.nasa.gov/product/map/current/sos/>

Spacecraft and structure models and textures

DeltaGlider and DG-S mesh and virtual cockpit

Roger "Frying Tiger" Long

Space Shuttle Atlantis

Michael Grosberg: meshes and textures

Don Gallagher: mesh and texture extensions

Robert Conley ("estar"): Module extensions: Movable arm and grappling, including MMU and Satellite extensions; documentation

David Hopkins: Module code extensions

Damir Gulesich: Space Shuttle External Tank and Solid Rocket Booster mesh and textures.

LDEF mesh and textures

Don Gallagher

ISS model "Project Alpha"

Andrew Farnaby

Mir model

Jason Benson ("agent036")

Dragonfly model

Roger "Frying Tiger" Long: Mesh improvements and textures

Radu Poenaru: Electrical and environmental simulation, Dragonfly panels

Shuttle-A model

Roger “Frying Tiger” Long: Shuttle-A mesh
Radu Poenaru: Virtual cockpit and cargo management

Hubble Space Telescope (HST) model

David Sundstrom

KSC VAB mesh

Valerio Oss

PTV (Personal transport vehicle) mesh

Balázs Patyi
patyibalazs@yahoo.com

Default exhaust texture, cloud microtextures

“McWgogs”
<http://mcwgogs.deviantart.com/>

Code, data and algorithms

VSOP87

Planetary perturbation terms for Mercury to Neptune
Bureau des Longitudes, CNRS URA 707
P. Bretagnon pierre@bdl.fr
G. Francou francou@bdl.fr

Lunar Solution ELP 2000-82B

Semi-analytical lunar ephemerides
Bureau des Longitudes, CNRS URA 707
75014, Paris, France
M. Chapront-Touze, J. Chapront
Astron. Astrophys. 124, 50 (1983)
Astron. Astrophys. 190, 342 (1988)

Earth precession parameters

IAU SOFA C Library
<http://www.iausofa.org/>

Planetary precession parameters

IAU/IAG Working Group
Report of the IAU/IAG Working Group on cartographic coordinates and rotational elements
2006, <http://www.springerlink.com/content/e637756732j60270/>

Phobos and Deimos ephemeris modules

Carl Romanik (“Chode”)
Code based on: Sinclair, Astron. Astrophys. 220, 321 (1989)

“Testing against Horizons shows agreement within 20km for Phobos, 50km for Deimos for 2000-2024.”

Miranda, Ariel, Umbriel, Titania, Oberon ephemeris modules

Carl Romanik (“Chode”)

Code based on: Laskar and Jacobson, Astron. Astrophys. 188, 212 (1987)

“According to the Horizons documentation, this is the same theory they use for Uranus, and the agreement of the DLLs with Horizons looks to be within about 50km.”

Triton ephemeris module

Carl Romanik (“Chode”)

Code based on: Jacobson et al., Astron. Astrophys. 247, 565 (1991)

“This also appears to be what Horizons use, and the DLL agrees within about 1000km.”

TransX MFD mode

Duncan Sharpe: TransX MFD mode module

Steve Arch: TransX development <http://orbiter.quorg.org>

Zlib

Compression/decompression library

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Mark Adler madler@alumni.caltech.edu