

Flexify 2

Flaming Pear Software

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What it does

Flexify is a plug-in filter for paint programs. It warps full-sphere photos — those showing a full view of a scene in every direction — into new shapes that are more attractive or useful. It can also transform maps.



How to install

Illustrated installation instructions are online at www.flamingpear.com/faq.html.

To use this software, you need to install it into Photoshop.

Just drag the plug-in filter into the folder where Photoshop expects to find it. On OS X, it will be similar to Applications/Adobe Photoshop/Plug-ins.

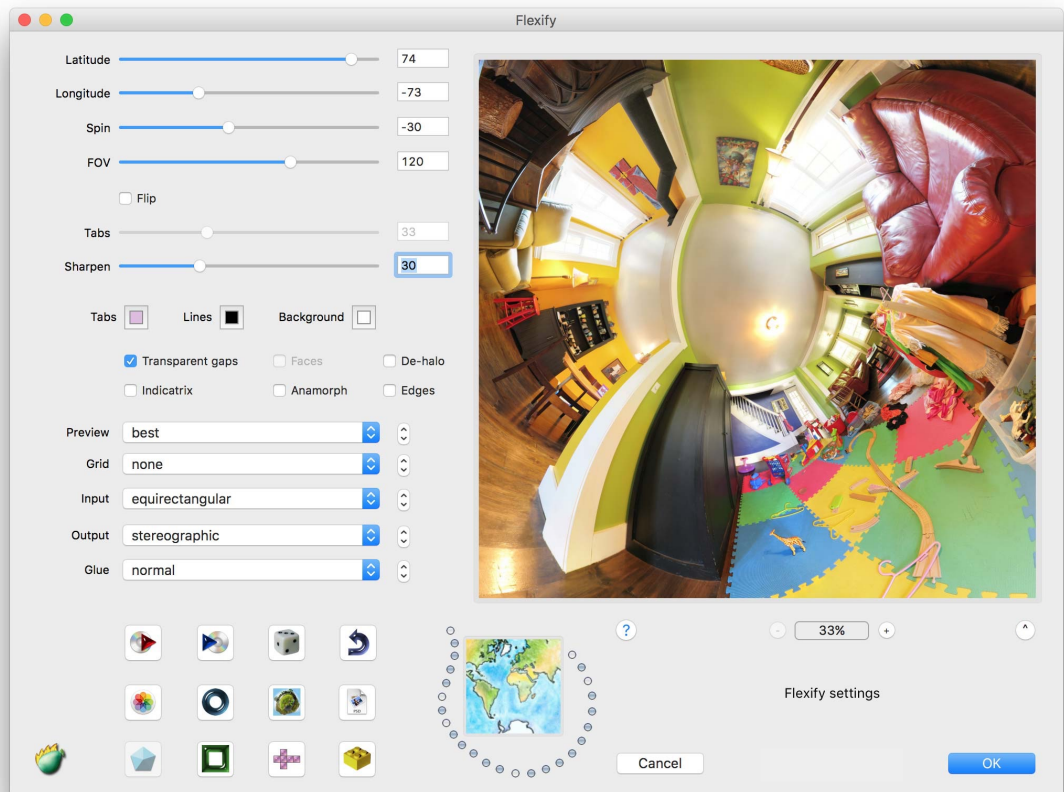
On Windows, it will be similar to C:/Program Files/Adobe/Adobe Photoshop/Plug-ins.

You must restart Photoshop before it will notice new plug-ins.

The plug-in is now installed. To use it, open any image and select an area. From the menus, choose Filter > Flaming Pear > Flexify 2.

Quick start

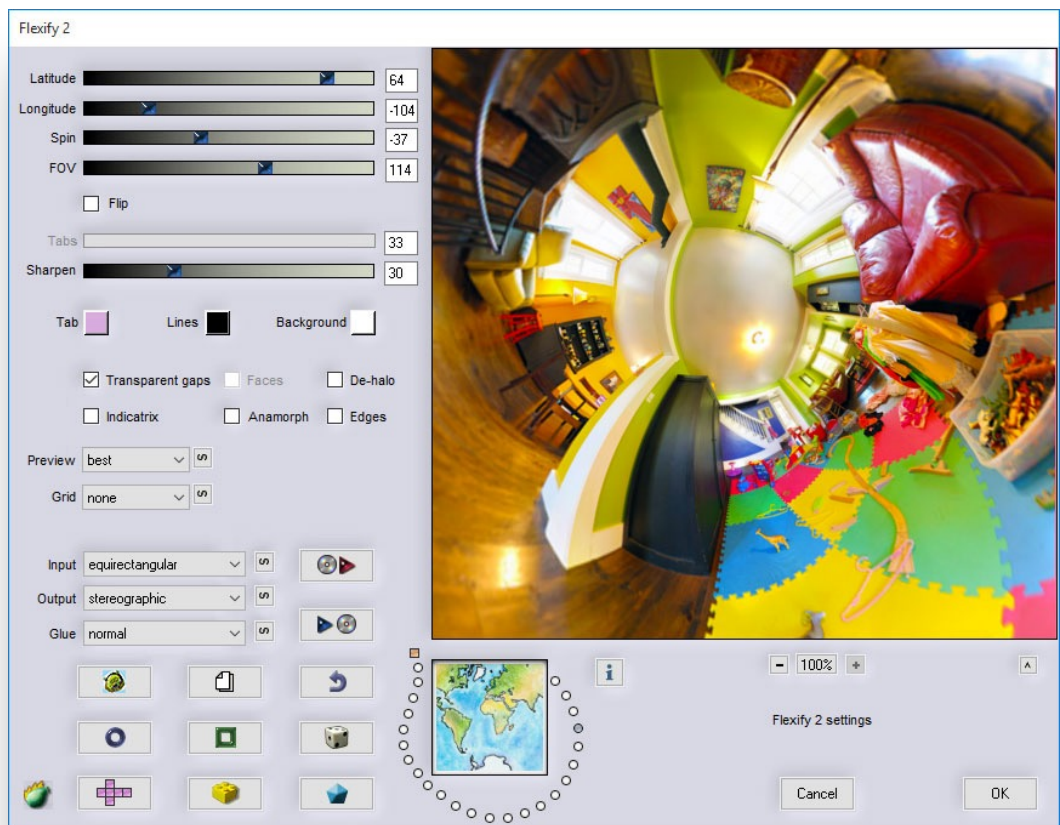
When you invoke Flexify 2, a dialog box will appear.



To get a quick idea of what Flexify does, load a full-sphere panoramic image into your paint program (there's a small example panorama [here](#)). If the image is circular, the selection should graze the edge of the circle.

Invoke Flexify, and tell it what kind of input image you're using via the "Input" popup menu. Choose a different projection from the Output popup. Click the dice button a few times until you see a result you like; then click OK.

Flexify's capabilities and controls are explained below.



Projections

A projection is a way of unwrapping and warping a spherical surface so that it will lie down flat. It's like making a flat map of the Earth — you have to make a choice about how to deform shapes.

Flexify can accept as input spherical panoramas in any of fifteen projections and can output them in more than fifty. Some of the projections are practical; some are weird and are meant to emphasize the bizarre, vertiginous nature of ultra-wide-angle photography.

Flexify can output the following projections:

quirectangular
a.k.a. cylindrical
equidistant or
plate carrée

The panorama fits into a rectangle. Meridians are vertical, parallels are horizontal, and the north and poles are stretched out to lines at the top and bottom. Scanning panoramic cameras produce this kind of image. Not the same as Mercator.



mirror ball

The reflection seen in a mirrored ball.



polar
a.k.a. azimuthal
equidistant

Angular distance from the center of projection increases uniformly toward the edge.



orthographic

The image sphere as seen from the outside.



tetrahedron

An unfolded 4-faced shape.

Most of Flexify's polyhedra can be exported as [3D .obj files](#).



cube

An unfolded 6-faced shape.



octahedron

An unfolded 8-faced shape.



dodecahedron

An unfolded 12-faced shape.



icosahedron

An unfolded 20-faced shape.



Hammer

A 2:1 wide ellipse.



Werner

A heart-shaped projection.



sinusoidal

a.k.a. Sanson-
Flamsteed

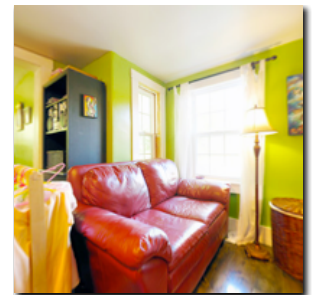
A pointy shape.



rectilinear

a.k.a. gnomonic

Like a regular view from a
normal lens. Straight lines
stay straight. The FOV slider
controls the zoom, which
can go all the way to a 180°
field of view.



hyperbolic

Produces views balancing
naturalness with vertigo.
The FOV slider controls the
zoom, which can go all the way
to a 360° field of view.



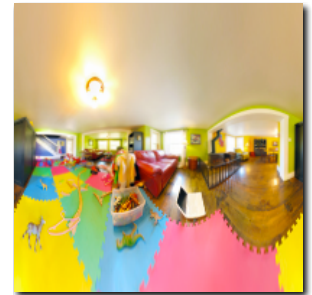
stereographic

Like hyperbolic but with less distortion of scale and shape. The FOV slider controls the zoom.



cylindrical

This is the format needed for some panorama viewers, including QuickTime VR. The view is infinitely stretched toward the top and bottom, so the vertical view is determined by the rectangle's proportions.



Wetch

An unusual projection with a finite height and infinite width. The FOV slider controls the zoom, which can go all the way to a 360° field of view.



pinwheel

Polar with a swirl.



lozenge

A wide diamond shape with a crease at the equator.



square

A square full of creases.
Good for scenes containing
lots of straight lines.



curvy

Labrys-like shape with
limited distortion. It's the
central portion of a mirror
ball projection.



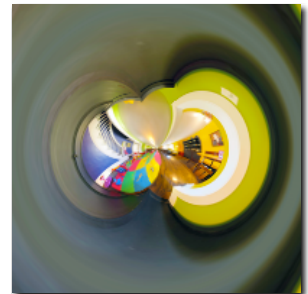
goggles

Goggle-shaped view which
presents the whole sphere
in a style like the hyperbolic
projection, but with less
extreme size changes.



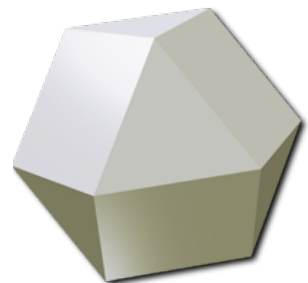
quasar

Weird projection with inside
and outside regions
bounded by a circular
black-hole-like
discontinuity.



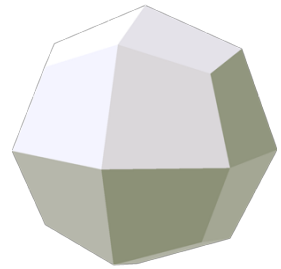
14 faces

An unfolded cuboctahedron.



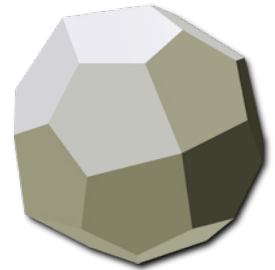
24 faces a

An unfolded deltoidal icositetrahedron.



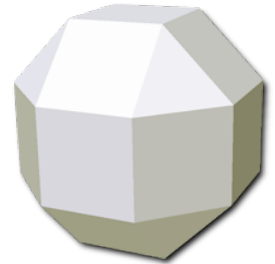
24 faces b

An unfolded pentagonal icositetrahedron.



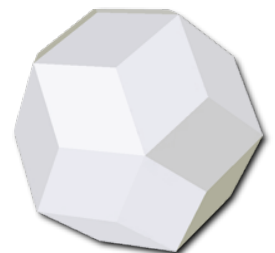
26 faces

An unfolded small rhombicuboctahedron.



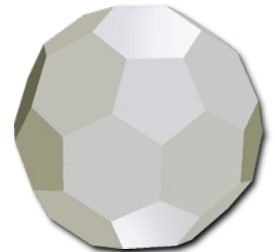
30 faces

An unfolded rhombic tricontahedron



soccer ball

An unfolded truncated icosahedron.



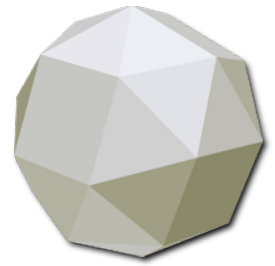
32 faces

An unfolded icosidodecahedron.



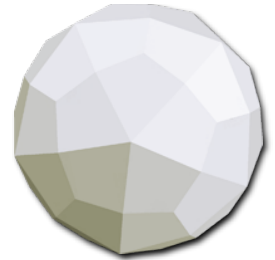
38 faces

An unfolded snub cube.



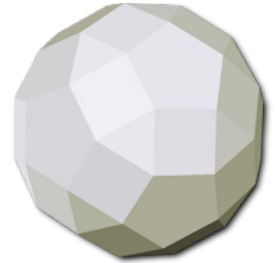
60 faces

An unfolded deltoidal hexecontahedron.



62 faces

An unfolded small rhombicosidodecahedron.



Winkel Tripel

A [compromise whole-earth projection](#) often used by the [National Geographic Society](#).



gores: 12

A shape for globemaking.



gores: 24

A shape for globemaking.



gores:multi

A shape for globemaking.
The FOV slider lets you
choose anything from 3 to
36 gores.



gores: 6/12

A shape for globemaking.
Shows only half the sphere.



loop

The scene repeats endlessly
toward the horns of the
loop.



two circles

Each half of the scene gets
its own hyperbolic
projection.



balloon

A popular origami pattern.
Read "Flexify Origami" for
folding instructions.



paperlock

An obscure origami pattern. Read “Flexify Origami” for folding instructions. Fun to write letters on the reverse and fold them into concealment.



Omnimax

The format of [Omnimax](#) 70mm film frames.



spikeball

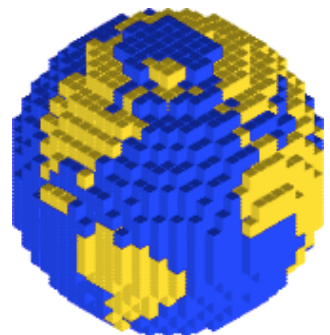
A tetrahedron 5-compound, and Flexify’s hardest-to-build polyhedron. It prints out as ten sawtooth shapes. Each sawtooth folds up into a pair of peaks, and you assemble them all to get the finished shape.



Because the shape is so complex, you should start with a very bold, simple picture.

brick preview

The image sphere built from Lego® bricks. Flexify can create building plans for these spheres. It’s explained in the Brick Sphere section of this guide.



Mollweide

A 2:1 wide ellipse with parallel lines of latitude.



icomap

An icosahedron unfolded in a way suitable for planetary maps in some role-playing games.



star 3

A polar-Werner hybrid.



star 5

Another polar-Werner hybrid.



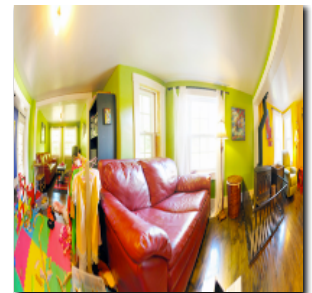
magnipolar

A polar projection emphasizing the center.



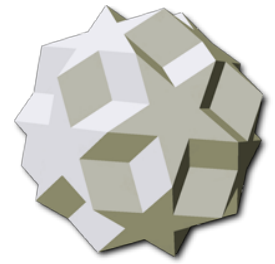
swoop

Rectilinear in the center, blending to hyperbolic at the left and right sides.



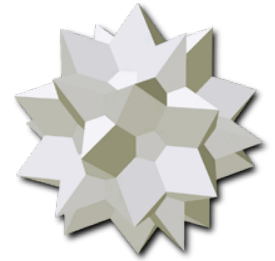
dodo

An unfolded
dodecadodecahedron.



GID

An unfolded great
icosidodecahedron.



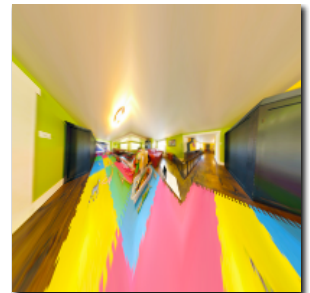
oculus

Rectilinear in the center,
blending to hyperbolic at
the top and bottom.



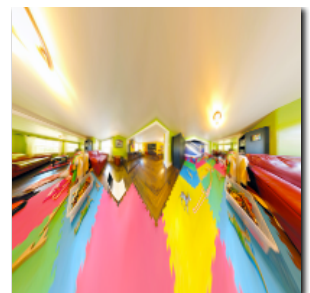
triptych

Three 120° rectilinear views
side by side. Great for
scenes with lots of straight
lines.



tetrptych

Three 90° rectilinear views
side by side. Suitable for
presenting rectangular
rooms.



annulus

A ring shape. The FOV slider controls the size of the hole.



shift lens

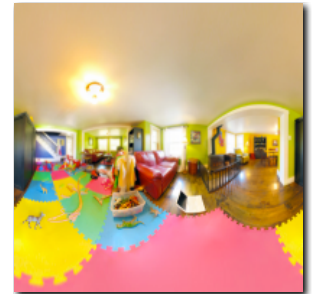
Rectilinear with a vertical offset controlled by the Latitude slider. Good for looking up at tall buildings while keeping the buildings' edges parallel.



Mercator

For making maps with straight loxodromes.

Not the same as equirectangular.



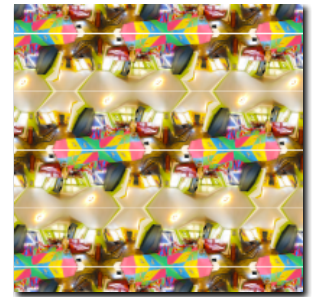
umbrella

An 8-gore shape suitable for making custom umbrellas. The FOV slider sets the length of the petals.



tetra tile

A tetrahedron unfolded to repeat endlessly.



hyper double

The panorama bent to appear twice in one picture.



hyper triple

The panorama bent to appear three times in one picture.



Mercator cross

A repeating cross pattern.



Mercator star

A repeating six-pointed star pattern.



Lagrange

A conformal projection in a circle.



rind 1

The image sphere unwrapped like the peel from an apple. The central ribbon makes one pass around the sphere.



rind 2

A rind with two passes around the sphere.



rind 3

A rind with three passes around the sphere.



tunable ellipsoid

Creates twelve gores for an ellipsoidal globe. The FOV slider controls the ellipsoid's proportions.

0 = 0.5:1 skinny ellipsoid.
90 = 1:1 sphere. 180 = 2:1 fat ellipsoid.

Or: aspect ratio = $2 \left(\left(\frac{\text{FOV}}{90} \right) - 1 \right)$



tunable egg

Like the tunable ellipsoid, except the result is egg-shaped.



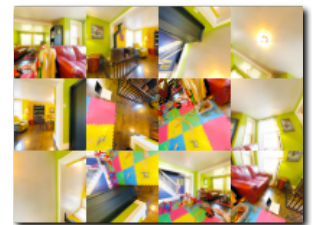
4 views

Four rectilinear views, rolled at random angles, looking along a uniformly distributed set of directions.



12 views

Twelve rectilinear views.



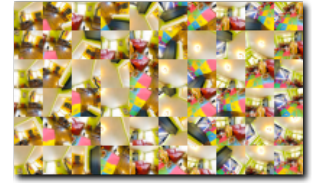
24 views

Twenty-four rectilinear views.



60 views

Sixty rectilinear views.



72 views

Seventy-two rectilinear views.



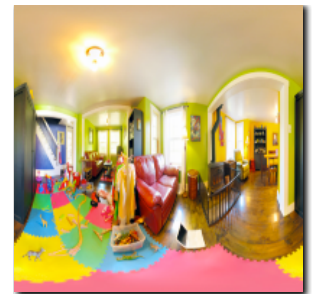
Robinson

A modern map projection.



equi tall

An equirectangular view stretched to fill the whole image. This is the way equirectangulars worked in Flexify 1.



semistereo

Midway between rectilinear and stereographic.



thorn

A cube unfolded, then warped. Conformal.



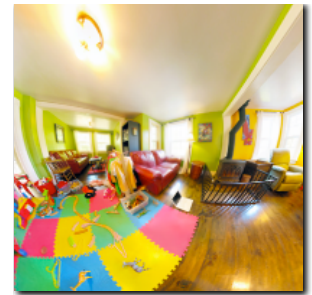
Lagrange 3/4

A conformal projection intermediate between stereographic and Lagrange.



squoculus

Good for de-emphasizing the sky.



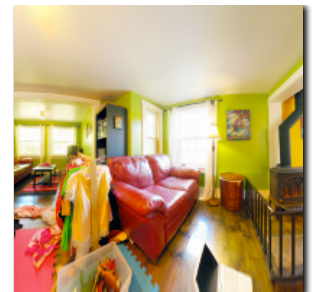
thorn levo

A left-handed version of thorn.



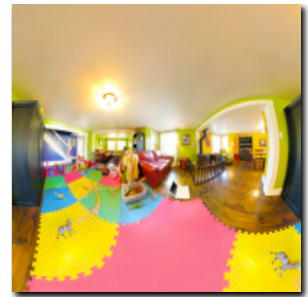
unFish

Good for improving fisheye pictures of people or architecture. Straightens verticals and makes distortion less objectionable over about a 180° field of view.



Lagrange plus

A Lagrange projection that shows more than 360° horizontally.



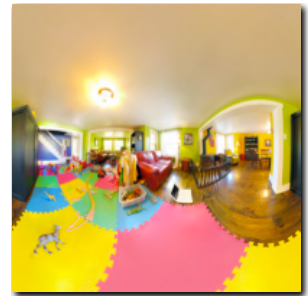
Adams I

A conformal mapping of the whole sphere to a square.



Adams II

A conformal mapping of the whole sphere to a square.



trecunx

A variant of Peirce quincunx.



quadracunx

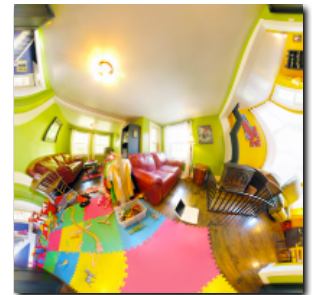
A variant of Peirce quincunx.



[Peirce quincunx](#)

A conformal mapping of the whole sphere to a square.

If your input is a world map, set Longitude to 90° to get the standard Peirce map layout.



sexacunx

A variant of Peirce quincunx.



septecunx

A variant of Peirce quincunx.



5-star

A polygon.



pentagon

A polygon.



Guyou

A 2:1 conformal rectangle



3-star

An awkward hexagon;
actually a star based on a
triangle.



triangle

A polygon.



rhombus 1

Each hemisphere in a triangle.



rhombus 2

Another way to present each hemisphere in a triangle.



6-star

A snowflake or star of David.



hexagon

A polygon.



Lee tetrahedric

A less-warped triangular layout.



rectangular tet

Lee tetrahedric dissected into a rectangle.



2-clover

A two-lobed shape; two stereographic hemispheres.



3-clover

A three-lobed shape.



4-clover

A four-lobed shape.



5-clover

A five-lobed shape.



6-clover

A six-lobed shape.



pentalene

A polygon.



naphthalene

A polygon.



phenathene

A polygon.



shuriken

A four-armed shape.



cross

A conformal shape.



double Guyou

A 4:1 conformal rectangle.



wide rect

A 2:1 conformal rectangle.



semicircle

A conformal shape.



ellipse

A conformal shape.



Reuleaux 1

One conformal Reuleaux triangle.



Reuleaux 2

Two conformal Reuleaux triangles.



Reuleaux 4

Four conformal Reuleaux triangles.



Reuleaux 8

Eight conformal Reuleaux triangles. Compare [Leonardo's mappamundi](#).



octreleaux

Eight stereographic segments.



zigzag

A conformal cube unfolding.



chevron

A conformal shape.



monozag

A conformal shape.



3-malta

A conformal shape.



4-malta

A conformal shape.



5-malta

A conformal shape.



6-malta

A conformal shape.



Gilbert

The world warped so everything appears on one side of a sphere.



stereo twice

Two copies of a stereographic view.



stereo thrice

Three copies of a stereographic view.



Adams diamonds

The image sphere in two squares.



equal-area
cylinder

An equal-area projection. Depending on the proportions, this can be Lambert (3.141:1), Behrmann (2.356:1), Edwards 37°24' (1.983:1), Hobo-Dyer (1.977:1), Gall-Peters (1.571:1), or Edwards 50°52' (1.251:1).



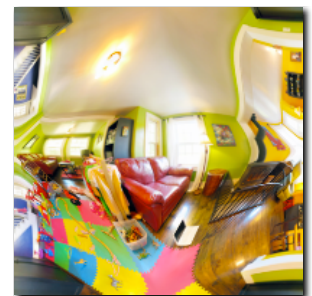
quick globe

A shaded 3D globe.



equal squarea

A Peirce quincuncial map warped into an equal-area version.



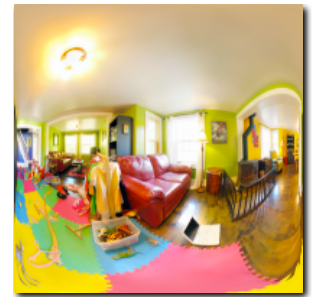
square fish 1

A square fisheye with strong peripheral distortion.



square fish 2

A square fisheye with less peripheral distortion and straighter verticals.



Gilbert globe

The world warped so everything appears on one side of a sphere. With 3D shading.



pointy

A conformal shape.



shuriken star

A conformal shape.



calyx 3

A conformal shape.



calyx 4

A conformal shape.



calyx 5

A conformal shape.



calyx 6

A conformal shape.



waffle

A conformal shape.



trident

A conformal shape.



astercurve 5

A conformal shape.



astercurve 7

A conformal shape.



astercurve 8

A conformal shape.



trizag

A conformal shape.



shark 3

A conformal shape.



shark 4

A conformal shape.



sunburst

A conformal shape.



2 cylinders

The shape formed by the intersection of two cylinders. A [Steinmetz solid](#).



3 cylinders

The shape formed by the intersection of three cylinders. A [Steinmetz solid](#).



Isle of Man

A rind with three arms.



shard

A conformal shape.



starburst

A conformal shape related to sunburst.



3-incurvate

A conformal shape.



4-incurvate

A conformal shape.



phenyl cross

A conformal shape.



anthracene

A conformal shape.



conformal
dodecahedron

A regular dodecahedron
with a conformal graticule.



tattoo 1

A sphere dissection.



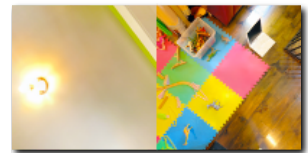
tattoo 2

A sphere dissection.



zenith & nadir

Top and bottom cube faces.
Good for hand-retouching
the poles of a spherical
panorama. Later, you can
re-import your changes
with the zenith-nadir input
mode.



horizontal cross

Cube faces in horizontal-
cross form. Good for
retouching. Later, you can
re-import your changes
with the horizontal cross
input mode. For best
results, use the PSD export
and choose 4x3 image
proportions.



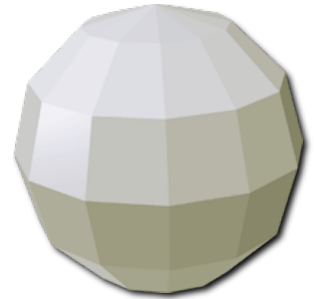
vertical cross

Cube faces in vertical-cross form. Good for retouching. Later, you can re-import your changes with the vertical cross input mode. For best results, the PSD export and choose 4x3 image proportions.



thirtysphere

A roughly spherical polyhedron with vertices every 30°.



devtet

A [developable](#) shape made of ruled surfaces.



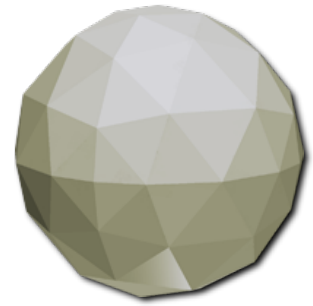
conictet

A [developable](#) shape made of four cones.



Flexify can make several kinds of Class I [geodesic spheres](#). In the output menu, geodesic spheres are named like this:

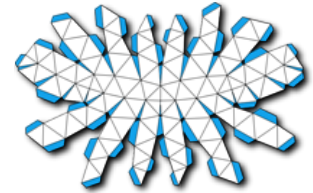
Geodesic 4|2 is based on a tetrahedron; frequency 2.



geodesic spheres

Geodesic 8|3 is based on an octahedron; frequency 3.

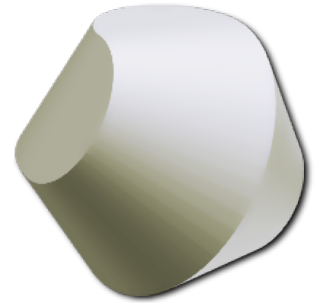
Flexify has all the Class I geodesic spheres from 4|2 up to 12|5. Plain Platonic solids like 4|1 appear elsewhere in the menu.



Sphericons are developable 3D shapes created by making a regular polygon into a surface of revolution, then twisting one half relative to the other.

In Flexify's output menu, the sphericons are named like this:

Sphericon 6/0 is based on a 6-sided polygon; 0 steps of rotation between the halves; even number of lanes.



Sphericon 6/0+ is like 6/0, but with an odd number of lanes.



Sphericon 6/0/H is hybrid built from half 6/0 and half 6/0+.

Flexify can create all the distinct sphericons from 3/0 up to 11/5. Where two sphericons are chirally equivalent, like 6/1 and 6/5, Flexify offers only the first one.

sphericons

quatretat

A curly projection.



twistless rind

A developable shape. After work by [D M Swart](#) and [Sebastien Perez-Duarte](#).



curvy cube

A developable shape. After work by [D M Swart](#) and [Sebastien Perez-Duarte](#).



baseball

A developable shape. After work by [D M Swart](#) and [Sebastien Perez-Duarte](#).



sprocket-4

A conformal shape.



sprocket-5

A conformal shape.



davcare

An asymmetrical



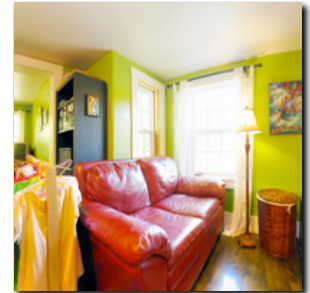
short rind

A developable shape.



Panini

Good for natural-looking, wide pictures with lots of straight lines. Stereographic horizontally, rectilinear vertically. Also called Vedutismo.

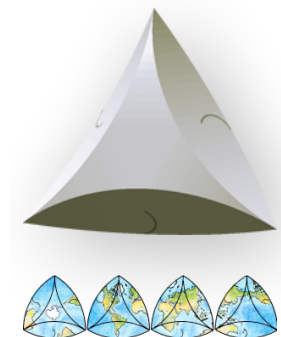


YangTet

A quasi-curved-origami shape based on [Oschene's tetrahedral teabag box](#).

To build:

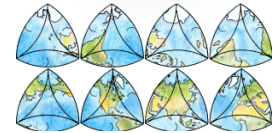
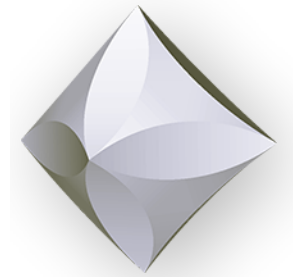
- Render with Edges turned on
- Score along the internal edges
- Cut along the semi-circular marks on each side
- Slide the overlapping lens-shaped parts together.



YangOct

A quasi-curved-origami shape, and an octahedral version of the YangTet.

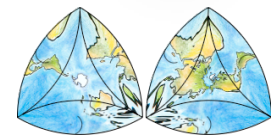
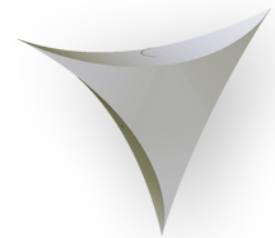
Build it like the YangTet.



Tribox

A quasi-curved-origami shape.

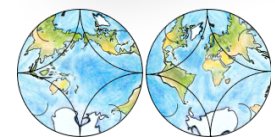
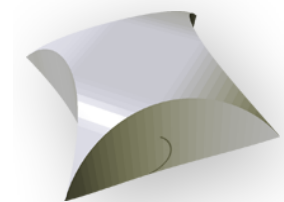
Build it like the YangTet.



Squarebox A

A quasi-curved-origami shape with a gnomonic projection.

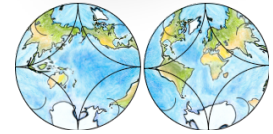
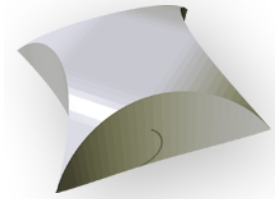
Build it like the YangTet.



Squarebox B

A quasi-curved-origami shape with a conformal projection.

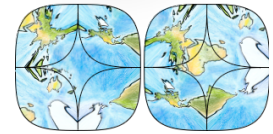
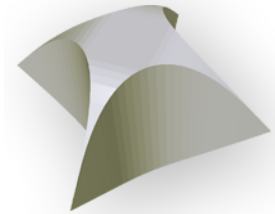
Build it like the YangTet.



Squirclebox A

A quasi-curved-origami shape with a gnomonic projection. It's based on work by [Oschene](#) and [vitroid](#).

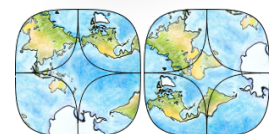
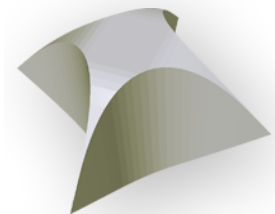
There are no semicircular cuts. Just slide the two halves together, alternating the flaps.



Squirclebox B

A quasi-curved-origami shape with a conformal projection. It's based on work by [Oschene](#) and [vitroid](#).

There are no semicircular cuts. Just slide the two halves together, alternating the flaps.



Triskelion fat

A developable shape.



Triskelion meso

A developable shape.



Triskelion skinny

A developable shape.



Triskelion plain

A developable shape.



Triskelion
straight

A developable shape.



Calliope

A developable shape.



Clio

A developable shape.



Euterpe

A developable shape.



Thalia

A developable shape.



Melpomene

A developable shape.



Terpsichore

A developable shape.



Erato

A developable shape.



Polyhymnia

A developable shape.



Urania

A developable shape.



Aglaia

A developable shape.



Euphrosyne

A developable shape.



Naiaid

A developable shape.



Thalassa

A developable shape.



Despina

A developable shape.



Galatea

A developable shape.



Larissa

A developable shape.



Proteus

A developable shape.



Triton

A developable shape.



Nereid

A developable shape.



Halimede

A developable shape.

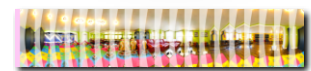
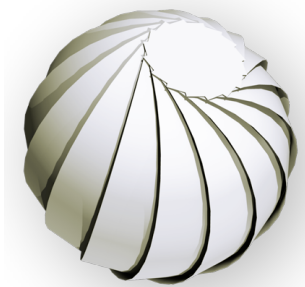


Folding sphere

A curved origami pattern which folds into a sphere. The FOV slider control the number of segments; a 16 – segment sphere looks nice.

Render it with Edges turned on. The straight edges are mountain folds, and the curved edges are valley folds.

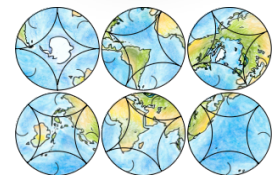
After work by [Jun Mitani](#), [Oschene](#), and [vitroid](#).



YangCube

A quasi-curved-origami shape.

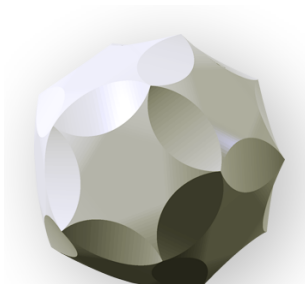
Build it like the YangTet.



Yang Dodecahedron

A quasi-curved-origami shape.

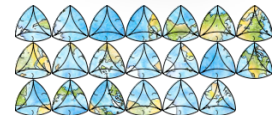
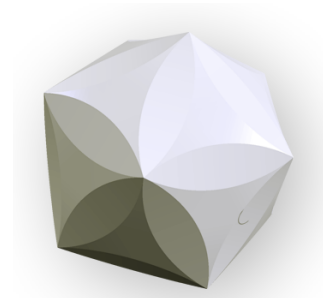
Build it like the YangTet.



YangIcosahedron

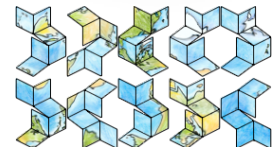
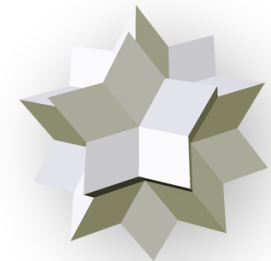
A quasi-curved-origami shape.

Build it like the [YangTet](#).



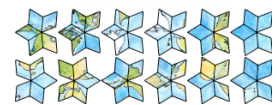
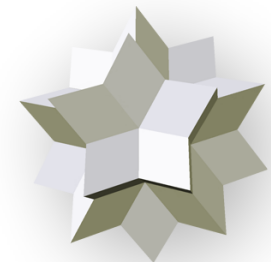
rhombic
hexecontahedron
A

A polyhedron unfolded so
as to yield the crispest
appearance when built.



rhombic
hexecontahedron
B

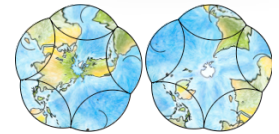
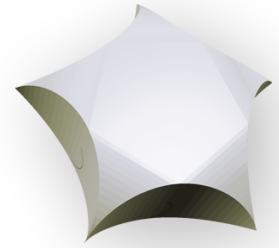
Like rhombic
hexecontehedron A, but
easier to assemble.



pentbox

A quasi-curved-origami shape.

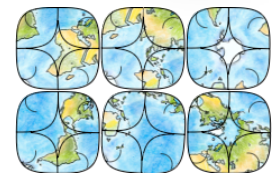
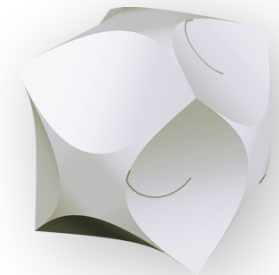
Build it like the YangTet.



squirclecube

A quasi-curved-origami shape like YangCube but with deeper curves.

Build it like the YangTet.



YangTet wide

A quasi-curved-origami shape like YangTet but with deeper curves.

Build it like the YangTet.



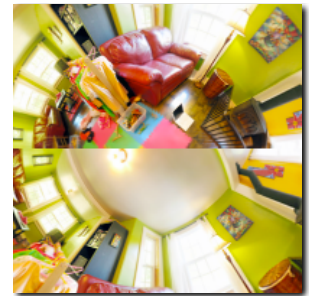
above and below

Two stereographic views separated by an angle chosen with the FOV slider.



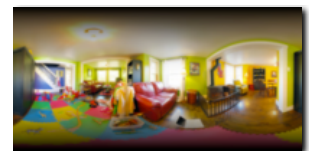
up and down

Two stereographic views separated by 180°.



cosine falloff

An equirectangular where the brightness tapers off toward the poles. Use for making lightmaps.



disc sphere A

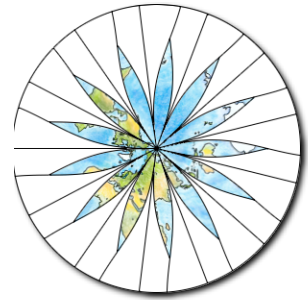
A spherical curved origami pattern. The FOV slider controls the number of segments. Tabs influences the overhang at the bottom.

Render it with Edges turned on. The straight edges are mountain folds, and the curved edges are valleys.



disc sphere B

Like disc sphere A but with less coloring.



trisplat

A conformal shape.



pentasplat

A conformal shape.



curlicue 1

A developable shape.



curlicue 2

A developable shape.



curlicue 3

A developable shape.



curlicue 4

A developable shape.



curlicue 5

A developable shape.



curlicue 6

A developable shape.



curlicue 7

A developable shape.



curlicue 8

A developable shape.



curlicue 9

A developable shape.



curlicue 10

A developable shape.



curlicue 11

A developable shape.



curlicue 12

A developable shape.



curlicue 13

A developable shape.



curlicue 14

A developable shape.



curlicue 15

A developable shape.



curlicue 16

A developable shape.



curlicue 17

A developable shape.



curlicue 18

A developable shape.



curlicue 19

A developable shape.



curlicue 20

A developable shape.



curlicue 21

A developable shape.



curlicue 22

A developable shape.



curlicue 23

A developable shape.



curlicue 24

A developable shape.



curlicue 25

A developable shape.



curlicue 26

A developable shape.



curlicue 27

A developable shape.



curlicue 28

A developable shape.



curlicue 29

A developable shape.



curlicue 30

A developable shape.



curlicue 31

A developable shape.



curlicue 32

A developable shape.



curlicue 33

A developable shape.



Unity 6 frames

A 6x1 arrangement of cube faces used by the [Unity game engine](#), [Nvidia Texture Tools](#), [Oculus](#), and the [Unreal Engine](#).



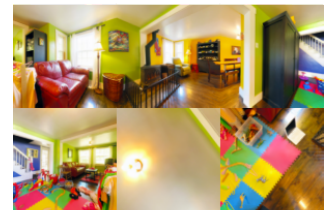
Facebook 3x2 cube

A 3x2 arrangement of cube faces used for [Facebook panoramic video](#).



Pano2VR 3x2 cube

A 3x2 arrangement of cube faces used by [Pano2VR](#).



Laskowski

The Laskowski tri-optimal projection, which simultaneously minimizes distance, angular, and areal distortion.



north armadillo

A northern view of the world on an [armadillo-shaped](#) torus.



north armadillo globe

A shaded northern view of the world on a torus.



south armadillo

A southern view of the world on a torus.



south armadillo globe

A shaded southern view of the world on a torus.



Mollweide ocean

An interrupted projection suitable for showing Earth's oceans.



Bonne

A Bonne projection with the standard parallel at 45°.



vertical
perspective

A perspective view of the sphere. The FOV slider moves the camera closer to the surface.



vertical
perspective globe

A shaded perspective view of the sphere. The FOV slider moves the camera closer to the surface.



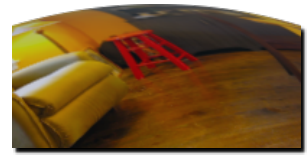
flyover

A perspective view of the upper edge of the sphere. The FOV slider flies the camera closer in.



flyover globe

A shaded perspective view of the upper edge of the sphere. The FOV slider flies the camera closer in.



cross 3

A conformal shape.



cross 5

A conformal shape.



tridactyl

A conformal shape.



Canters

The Canters W14 polyconic projection.



Natural Earth

A compromise projection.



sinusoidal interrupted

An equal-area map from 1570.



sinu-Mollweide

An equal-area hybrid projection.



Ginzburg 8

A compromise projection.



Larrivée

A compromise projection.



Oblate north

An orthoapsidal projection.



Oblate north
globe

An orthoapsidal projection
with shading.



Oblate south

An orthoapsidal projection.



Oblate south
globe

An orthoapsidal projection
with shading.



Prolate north

An orthoapsidal projection.



Prolate north
globe

An orthoapsidal projection
with shading.



Prolate south

An orthoapsidal projection.



Prolate south
globe

An orthoapsidal projection
with shading.



Triangle tile

A plane tiling with
conformal triangles.



Square tile

A plane tiling with
conformal squares.



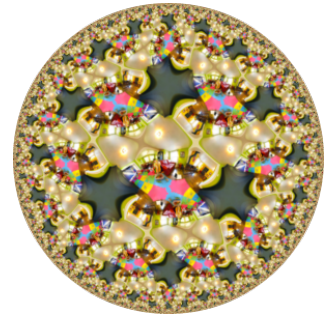
Hexagon tile

A plane tiling with conformal hexagons.



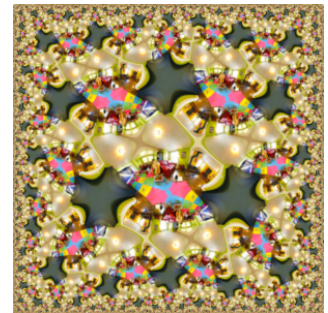
Hyperbolic 3,9 disc

A [Poincaré disc tiling](#).



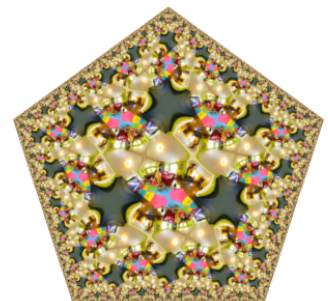
Hyperbolic 3,9 square

A Poincaré disc tiling conformally warped to a square.



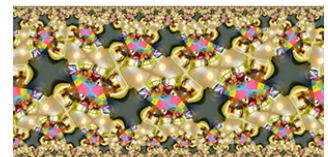
Hyperbolic 3,9 pentagon

A Poincaré disc tiling conformally warped to a pentagon.



Hyperbolic 3,9 band

A Poincaré disc tiling conformally warped to a wide band.



Hyperbolic 4,8
disc

A Poincaré disc tiling.



Hyperbolic 4,8
square

A Poincaré disc tiling
conformally warped to a
square.



Hyperbolic 4,8
pentagon

A Poincaré disc tiling
conformally warped to a
pentagon.



Hyperbolic 4,8
band

A Poincaré disc tiling
conformally warped to a
wide band.



Hyperbolic 5,4
disc

A Poincaré disc tiling.



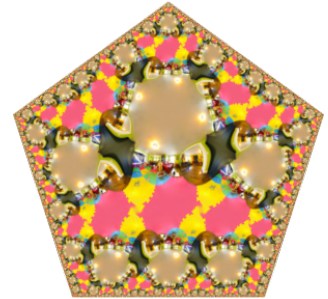
Hyperbolic 5,4
square

A Poincaré disc tiling
conformally warped to a
square.



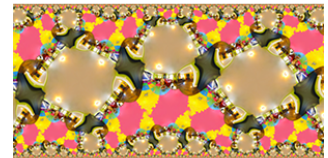
Hyperbolic 5,4
pentagon

A Poincaré disc tiling
conformally warped to a
pentagon.



Hyperbolic 5,4
band

A Poincaré disc tiling
conformally warped to a
wide band.



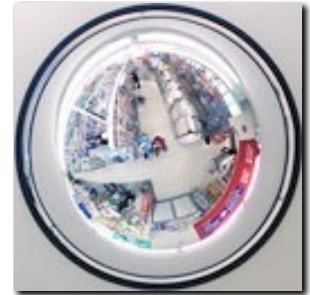
Input

Flexify can accept some of the above projections as input: equirectangular, mirror ball, polar, orthographic, cylindrical, ellipsoid, stereographic, Mollweide, gores:12, Robinson, Mercator, Lagrange, Hammer, Winkel Tripel, equal-area cylinder, gores:6, zenith & nadir, horizontal cross, vertical cross, and soccer.

Other input formats include:

ellipsoid

A frontal view of a security mirror. The major axis to minor axis ratio is 1.18:1.



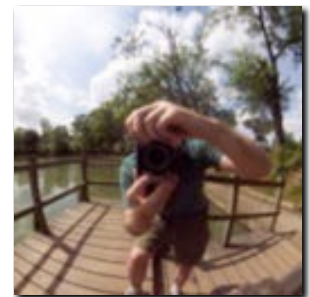
circular fisheye
180°

A circular image showing a 180° field of view across its diameter.



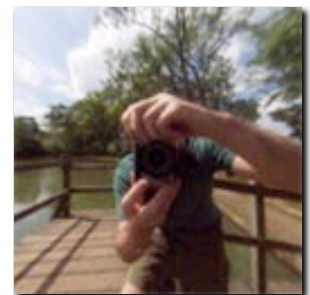
fullframe
fisheye 180°

A rectangular image showing a 180° field of view across its diagonal. The rectangle may have any proportions.



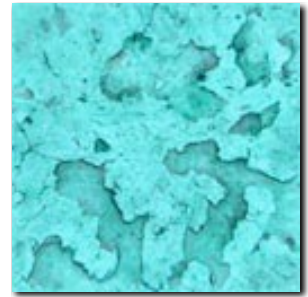
one cube face

A square showing a 90° rectilinear view.



tiling cube face

One cube face with all edges alike and symmetrical so that six tiles can seamlessly cover a sphere. You can make these with [MakeCubeTile](#) or [MakeIsoCubeTile](#).



half-equi

The left or right half of an equirectangular image. If your input image is too big for Flexify, you can use this mode to process it in halves.



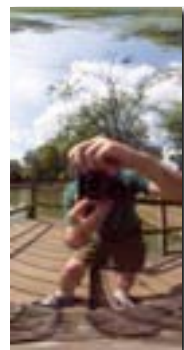
Nicolosi

A Nicolosi projection, a popular globular form found in antique world maps.



quarter-equi

One-fourth the width of an equirectangular image.



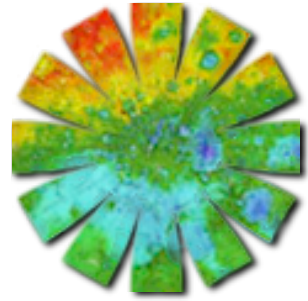
mylar

The reflection in a silver balloon. The major axis to minor axis ratio is 1.55:1.



gores: 12
radial

Twelve half-gores, a form sometimes used by the [US Geological Survey](#).



spinner 360°

An image from a [Lomography Spinner 360°](#) camera. Crop the input so it's 360° wide and the height spans from edge to edge of the film.



spinner guess
width

An image from a [Lomography Spinner 360°](#) camera with unknown horizontal field of view. Crop the input so the height spans from edge to edge of the film; Flexify will try to guess the horizontal field of view.



Unity 6 frames

A 6x1 arrangement of cube faces used by the [Unity game engine](#), [Nvidia Texture Tools](#), [Oculus](#), and the [Unreal Engine](#).



Facebook 3x2
cube

A 3x2 arrangement of cube
faces used for [Facebook
panoramic video](#).



Pano2VR 3x2
cube

A 3x2 arrangement of cube
faces used by [Pano2VR](#).



View

You can change the center of projection — the point in the input image that winds up at the center of the output.

Latitude moves the center of projection north and south.

Longitude moves the center of projection east and west.

Spin spins the view around the center of projection.



an off-center hyperbolic view

Flexify can set the center of projection automatically in three ways.

The **reset button** sets latitude, longitude, and spin to zero. This gets you back to the normal view.



reset

The **axis button** sets latitude, longitude, and spin to multiples of 90°. This usually gives symmetrical-looking views.



axis

The **dice button** generates totally random views.



dice

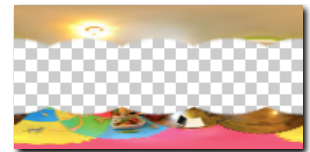
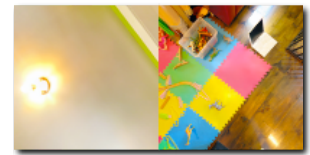
Retouching panoramas

Panoramas often need to be retouched by hand — the tripod needs to be painted out, or moving clouds need to be fixed — but it's hard to paint properly on an equirectangular panorama.

Flexify can help. You can export, retouch, and then re-import panoramas. Three projections have matching output & input modes designed just for this task so you can round-trip an image. [Detailed instructions are here.](#)

zenith & nadir

Top and bottom cube faces. Good for hand-retouching the poles of a spherical panorama. Later, you can re-import your changes with the zenith-nadir input mode. Flexify will then feather the edges a little to improve blending.



re-imported

horizontal cross

Cube faces in horizontal-cross form. Good for retouching. Later, you can re-import your changes with the horizontal cross input mode. For best results, use the PSD export button and choose 4x3 image proportions.



vertical cross

Cube faces in vertical-cross form. Good for retouching. Later, you can re-import your changes with the vertical cross input mode. For best results, use the PSD export button and choose 3x4 image proportions.



Polyhedra

Flexify has some projections that you can print, cut out, fold, and glue together to make a three-dimensional printout of your panorama.

If you use a map of Earth as your input image, you can make a crude globe.

Tabs sets the width of “glue tabs” that make the polyhedron easier to glue together.

The **Tab color** button sets the color of the tabs.

The **Faces** checkbox shows each face of the polyhedron in a single color, to make it clearer how the shape should be folded together.

The **Export Faces** button offers three ways to export a polyhedron.

First, you can write a multi-layer Photoshop document with one face of the current polyhedron on each layer. Extra tabs will be added to each face so that everything can be glued properly.

Second, you can export 3D models in OBJ and STL format.

Third, you can export an equirectangular map of all polyhedron faces.

If your image is 32 bits per channel, then each face will be written to a separate document. If you export an OBJ model, its JPEG texture map will still be 8 bits per channel.

[Pepakura Designer](#) is handy for editing cut-and-fold paper models.



color button



export faces

Other controls

The **Lines** color button sets the color of edges, that latitude–longitude grid, and the indicatrix.

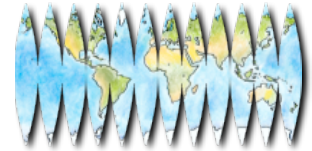
The **De-halo** checkbox guarantees that halos don't appear along contrasty edges, but this comes at the cost of making the whole image slightly softer. It's useful in HDR images where bad halos can appear at the edge of the sun or other bright lights.

Plus, **%** and **minus** buttons: if the selected image area is bigger than the preview, these buttons let you zoom in and out. You can move the preview by dragging it around; your cursor will turn into a hand.

Globemaking

Flexify can warp maps into new shapes for making globes. You can use any of the polyhedron modes, explained above, to make faceted fold-together globes.

You can also make a conventional round globe. First, get a spherical object to use as a form. Traditionally, a plaster sphere is used, but a toy ball will do. It has to be exactly spherical: measure its girth in several places and verify that all measurements are the same.



12-gore shape

Next, use Flexify to make “gores” — the lens-shaped strips of map that form a globe’s surface. Print these out so that the width of the gores is equal to the diameter of the sphere. Glue the gores onto the sphere, carefully making them conform to the curved surface.

The Tabs slider adds solid-colored “glue tabs” that make the gores easier to glue together. It also fattens the mapped part of the gores slightly too, so that you need not align them perfectly on the sphere.



color button

The Tab color button sets the color of the tabs.

If you don’t want tabs, but do want the gores to be slightly fattened, set the tab color to the same as the background color.

Flexify can also accept gores as input and turn them into a conventional map. Use the input mode gores: 12 or gores:6.

Brick spheres

Flexify can create plans for building an image sphere from Lego® bricks. Use the output mode called 'brick preview' to see what you can build.

To change settings, click the **brick button**. A new dialog box will appear.

Layers: To suit the proportions of the bricks, Flexify plans a sphere with a diameter $\frac{6}{5}$ of the height. For best results choose a height that's a multiple of 5.

Plates: Builds the sphere from $\frac{1}{3}$ height plates instead of bricks.

Colors: The best input images have vivid colors and strong, simple shapes.

For output you can choose among 12 colors: black, blue, brown, green, dark grey, light grey, red, sand red, tan, white, yellow, and sand green.

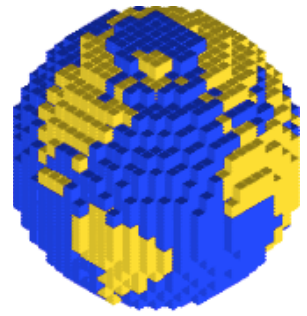
Light grey bricks will represent any undefined regions.

You can make three kinds of output:

- a multi-layer Photoshop document where each layer of the document is the plan for one layer of the sphere
- an [LDraw](#) model
- a text file with counts for each color of brick.

In the Photoshop document, parts that aren't visible from the outside are marked with black dots, so you can substitute other colors there. The sphere plan is hollow and just thick enough form a solid surface so you'll need to build supports inside as you go.

The plan doesn't specify exactly what bricks to use, just what colors go where.



brick preview



brick button

Cube maps

Flexify can split a panorama into six cube faces. Some panorama viewers want this format, and it's often used to make "sky boxes" in 3D action games.



Click the **cube map button** and a new dialog box will appear asking for the size of the faces. Flexify will write six Photoshop documents containing the cube faces.

cube map button

Frequently asked questions

I want to make maps and globes with Flexify. Where can I find suitable input maps?

Here are some places to start looking:

[NASA's Blue Marble imagery](#)

[Virtual Terrain project](#) links to many map sources

[NASA Jet Propulsion Lab](#) maps of most Solar System bodies

[Ars Technica](#) earth map

[LunarCell](#) synthetic worlds

You can use Flexify's polyhedron and gore modes to make cut-and fold globes.

How do I make a spherical photo without expensive special equipment?

Get a plain silver spherical Christmas-tree ornament and photograph it.

How do I improve photos of ornaments?

Panoramas made with the mirrored-ball technique always have a flaw at the point opposite the camera. You can either paint this out, or you can photograph the ball twice from two locations about 90° apart around the ball's equator. Unwrap both reflections; their flaws will be in two different places. Use the good part of one image to replace the flaw in the other.

Since the reflection in the ball contains the whole scene, the sun or another light source will probably appear in it, and this can cause your camera's auto-exposure to darken the whole picture. Avoid this by using a manual exposure setting appropriate for a typical part of the scene.

The best ornaments to use are blown-glass ones from eastern Europe, but there are other kinds of mirrors you can use:

Gazing balls. These are garden decorations originally popular in Victorian England, and they can be found at some garden-supply stores.

Safety/security mirrors. These are the dome-shaped mirrors sometimes seen at busy corridor intersections at airports and warehouses. These are usually not

hemispheres but ellipsoids with proportions of about 1 : 0.85, so you should use the 'ellipsoid' input mode.

Large steel ball bearings. The makers of [HDR Shop](#) have hints on where to get them.

Hemispherical mirrors from "whole sky cameras." These are hard to find since meteorologists now use fisheye lenses for sky photography.

Large steel or copper mixing bowls don't give sharp reflections, but they are inexpensive and can produce soft, tinted views with streaky blurs around the highlights.

Using a mirrored ball you can make a wide horizontal view panorama with no flaw. Place the ball on the ground and photograph it from directly above; or hang it from something and shoot it from below.

Use a zoom or telephoto lens to get far from the mirror and minimize the size of the camera in the picture.

To enable a telephoto lens to focus closer, use it together with a close-up lens. That this will reduce depth of field, making focussing trickier.

What is the difference between equirectangular and Mercator?

An equirectangular image shows the whole sphere, usually in a 2:1 wide rectangle. The north and south poles are stretched out to lines at the top and bottom, and the lines of latitude and longitude make a uniform grid of squares.



A Mercator projection shows most of the sphere, but not the poles or nearby regions, because the complete projection is infinitely tall. The lines of latitude and longitude form rectangles that stretch taller the further they are from the equator.



Although Mercator projections are notorious for making Greenland look as large as South America, they have two useful properties. They are conformal, which means angles are accurate within small regions. And they show lines of constant compass bearing as straight lines. These lines, known as rhumb lines or loxodromes, are useful in air and sea navigation, which is why Mercator maps are still used.

So:

Equirectangular images are good for panoramas and spherical texture maps.
Mercator maps are good for sailing across an ocean.

What panorama viewers exist?

Lots; click [here](#) for a list.

How else can I (ab)use Flexify?

Straighten out the horizon in panos shot off-level.

Warp an HDR lighting environment so it's easier to paint out the tripod.

Use it on non-panoramic photos to make them weird.

Distort the same image twice or more in a row to make it weird.

Photograph safety mirrors and security-camera bubbles in public places. De-warp the reflections to see what they see.

Extract a normal (rectilinear) view from the input.

Take a photo of a spherical object like an orange or the Earth and see what it would look like from a different point of view. Use orthographic input and orthographic output.

Make many-sided dice for role-playing games. Use only polyhedra whose sides are all the same shape, else the die will be biased.

Make weird graph paper. Start with a blank white image and turn the grid on.

What are some panoramic photo resources on the net?

[Panorama Tools](#) — software to view, create, edit and remap panoramic Images

[International Association of Panoramic Photographers](#)

[VR Photographers Resources](#)

Where can I get Lego® info and bricks?

[eBay](#) — good for used bricks

[BrickLink](#) — extensive selection

[Virtual Lego](#) — a book about Lego® software

[Lego Shop](#) — the official source

[LDraw](#) — model-planning software

[LUGNET](#) — users' group with extensive resources

Version history

Version 2.89

Adds new projections: oblate north, oblate north globe, oblate south, oblate south globe, prolate north, prolate north globe, prolate south, prolate south globe, triangle tile, square tile, hexagon tile, hyperbolic 3,9 disc, hyperbolic 3,9 square, hyperbolic 3,9 pentagon, hyperbolic 3,9 band, hyperbolic 4,8 disc, hyperbolic 4,8 square, hyperbolic 4,8 pentagon, hyperbolic 4,8 band, hyperbolic 5,4 disc, hyperbolic 5,4 square, hyperbolic 5,4 pentagon, hyperbolic 5,4 band.

Improves the interface on high-DPI Windows monitors.

Version 2.88

Adds new projections: cross 3, cross 5, tridactyl, Canters, natural earth, sinusoidal interrupted, sinu-Mollweide, Ginzburg 8, and Larrivée. Improves the Laskowski projection.

Version 2.87

Adds new projections: Laskowski, north armadillo, north armadillo globe, south armadillo, south armadillo globe, Mollweide ocean, Bonne, vertical perspective, vertical perspective globe, flyover, and flyover globe.

Version 2.86

Adds input and output modes for Facebook 3x2 cube and Pano2VR 3x2 cube.

Version 2.85

Fixes an issue with registration codes on Windows.

Version 2.84

Adds the Unity 6 frames input and output modes.

Version 2.82

Restores compatibility Mac OS X 10.8.

Version 2.82

Restores compatibility with 32-bit Photoshop.

Version 2.81

Minor updates for OS X El Capitan.

Version 2.80

Works with Photos app on OS X.

Version 2.79

Fixes an issue with registration codes.

Version 2.78

Restores compatibility with Mac OS X 10.7.

Version 2.77

Macintosh version works 32- and 64-bit modes.

Version 2.76

Macintosh version works in Retina resolution.

Version 2.75

Adds a control for the color of lines and edges. New output modes are disc sphere A, disc sphere B, trisplat, pentasplat, and 33 curlicue shapes.

Version 2.73

Fixes previews in 16-bit color.

Version 2.7.2

Fixes certain flawed projections in the Mac 64-bit version.

Version 2.7.1

Fixes issues with stability and misaligned freeform selections in previews.

Version 2.7.0

64-bit version for Macintosh. Adds four new output modes: YangTet wide, above and below, up and down, and cosine falloff.

Version 2.6.9

Adds four new output modes: rhombic hexecontahedron A, rhombic hexecontahedron B, pentbox, and squirclecube.

Version 2.6.8

Adds YangDodecahedron and YangIcosahedron output modes, and spinner 360° and spinner guess width input modes. Faster drawing of all polyhedral output and best-quality output.

Version 2.6.6

Adds YangCube output and Ortelius oval input.

Version 2.6.5

Adds the triskelion fat, triskelion meso, triskelion skinny, triskelion plain, triskelion straight, Calliope, Clio, Euterpe, Thalia, Melpomene, Terpsichore, Erato, Polyhymnia, Urania, Aglaia, Euphrosyne, Naiaid, Thalassa, Despina, Galatea, Larissa, Proteus, Triton, Nereid, Halimede, and folding sphere projections.

Version 2.6.2

Adds the YangTet, YangOct, Tribbox, Squarebox A, Squarebox B, Squirrelbox A, and Squirrelbox B projections. Fixes the missing the offset in shift-lens; proportion problems when exporting unFish, and improper cropping of 6-clover. Basic multicore support for Windows.

Version 2.6.0

Adds the Panini projection. Fixes faint dark lines that could appear in HDR images when “dehalo” is turned off. 64-bit version for Windows.

Version 2.5.2

Adds the sprocket-4, sprocket-5, daycare, and short rind projections. Fixes hairline gaps that can appear in the twistless rind. Fixes blank results when exporting some polyhedra to OBJ files.

Version 2.5.0

New output modes: zenith & nadir, horizontal cross, vertical cross, thirtysphere, devtet, conictet, geodesic spheres, sphericons, quatretat, twistless rind, curvy cube, baseball.

New input modes: six gores, zenith & nadir, horizontal cross, vertical cross, soccer.

Gores 3 of 12 output mode is now properly aligned when longitude = 0.

Option-click on the memdot preview now builds a web page showing how the current image would look with every memdot setting.

Version 2.4.0

Adds the tattoo 1 and tattoo 2 projections. Fixes improper results from exporting cube faces on Intel machines.

Version 2.3.9

Fixes a case where the Mac version can fail to produce a result after the user clicks OK.

Version 2.3.8

Adds the 3-incurvate, 4-incurvate, phenyl cross, anthracene, and conformal dodecahedron shapes. Fixes artifacts that can appear when “de-halo” is turned off.

Version 2.3.7

Fixes a crash that can happen on Macintosh PowerPC machines.

Version 2.3.6

Adds the shard and starburst projections. Makes the first preview appear faster in the Mac version.

Version 2.3.4

Fixes a case where the Register button may not respond.

Version 2.3.2

Fixes a crash that can happen on PowerPC Macs.

Version 2.3

Adds the waffle, trident, astercurve 5, astercurve 7, astercurve 8, trizag, shark 3, shark 4, sunburst, 2 cylinders, 3 cylinders, and Isle of Man projections. Adds exportation of equirectangular poly-face maps. Brick previews can have

antialiasing. PSD export has a “same proportions as original” option. Text entry of settings. The Mac version has multicore support, drag-and-droppable presets, and a resizable interface.

Version 2.2.5

Adds the pointy, shuriken star, calyx 3, calyx 4, calyx 5, and calyx 6 projections. Fixes cosmetic problems with the interface under Mac OS 10.5.

Version 2.2.4

Adds the square fish 1, square fish 2, and Gilbert globe projections. Improves the handling of input modes which have transparent areas or discontinuities. Changes the Gilbert projection so it reacts more usefully to nonzero latitude settings.

Version 2.2.2

Adds quick globe and equal squarea projections. Improves “best” mode results in strongly anisotropic regions. Removes speckled pixels that sometimes appeared on one edge of previews in “better” mode. Some polygonal projections now show colored faces better.

Version 2.2

Adds antialiased (smoothed) output and preview. New input modes: Hammer, Winkel Tripel and equal-area cylindrical. New output modes: cross, double Guyou, wide rect, semicircle, ellipse, Reuleaux 1, Reuleaux 2, Reuleaux 4, Reuleaux 8, octreleaux, zigzag, chevron, monozag, 3-malta, 4-malta, 5-malta, 6-malta, Gilbert, stereo twice, stereo thrice, Adams diamonds, equal-area cylinder. No more missing graticule lines. Graticule slid over one pixel to the proper location. Added the Tissot indicatrix. Gores:6 output removed; use gores:multi instead.

Version 2.10

Adds the shuriken output mode. Fixes a Windows problem where the plug-in wouldn't remember its registration when it was installed in one user account but activated in another. Fixes a Macintosh problem where the plug-in could have bad settings or crash when installed on a machine for the first time.

Version 2.09

Adds 19 new output modes and the Lagrange input mode. Replaces gores:36 with the more adjustable gores:multi. Improves the appearance near the poles in most conformal projections: no interrupted graticules, no top-to-bottom color wraparound.

Version 2.08

Adds new output modes: thorn levo, unFish, Lagrange plus, Adams 1, Adams 2, trecunx, quadracunx, quincunx, sexacunx, heptecunx. Smoothed out creases in thorn mode. Fixed poor antialiasing in the 4/12/24/60/70 views modes. Fixed a problem where the latitude-longitude grid would sometimes not appear, and de-cluttered the grid near the poles. More memory dots. Windows PSD export can have a custom size. Mac presets have custom Finder icons.

Version 2.06

Adds new output modes: semistereo, thorn, Lagrange 3/4, squoculus, and box. Universal binary on Macintosh. More memory dots. Exported HDR files can be layered. Exported OBJ files fixed to work with Photoshop CS3.

Version 2.05

Adds exportation of PSD images with custom size; new grid option. New input modes are 12 gores: radial and Mercator. Fixes a problem under Windows where the software could crash on HDR images.

Version 2.04

Adds the equi tall projection. Fixes a problem where the software could forget its registration.

Version 2.02

Adds IPTC keywords and color profiles to all exported images.

Version 2.0

Adds 32-bit high-dynamic-range capability. Can handle images up to 30,000 x 30,000 pixels, given enough hard drive space. Adds the quarter-equi, Robinson,

and mylar input modes; rind 1, rind 2, rind 3, tunable ellipsoid, tunable egg, 4 four views, 12 views, 24 views, 60 views, 72 views, and Robinson output modes. Memory dots, info button, exportation of 3D models. Changes 'transparent gaps' to make backgrounds transparent too. Equirectangular output is now always 2:1. Cube maps now always export to six separate files. Adds Anamorph and De-halo controls. Exported PSD files now have color profiles. The Mac version lets you use Adobe's color picker.

Version 1.99

Adds the stereographic, hyperdouble, hypertriple, Mercator cross, Mercator star, and Lagrange projections. Fixes tiny flaws in the grid lines and adds a glue mode. Better previews in the file chooser. The Mac OS X version adds the iPhoto button.

Version 1.98

Faster. Adds the Mercator and umbrella projections.

Version 1.97

Adds the GID, oculus, triptych, tetrptych, and annulus projections; sharpening; transparent gaps; polyhedron edges; two new glue modes.

Version 1.96

Adds the dodo projection and face exportation.

Version 1.95

Adds the 6/12 gores projection, and Nicolosi, stereographic, and half-equi input. Works with 16-bit-per-component color.

Version 1.94

Adds the swoop projection and more glue modes.

Version 1.92

Recordable as a Photoshop action. Adds the beanbag projection.

Version 1.9

Adds globe gore input, more brick options including LDraw; the star 3, star 5, and magnipolar projections; and six new glue modes. Improves globe gore output.

Version 1.86

Adds a button for creating cube maps. Adds a six-gore mode and changes gore shapes slightly for better results. Fixes the appearance of previews in presets from version 1.85.

Version 1.85

Adds two input modes: circular fisheye 180° and full-frame fisheye 180°. Fixes tabs on the '24 faces a' shape.

Version 1.84

Adds Mollweide input and output, and icomap output.

Version 1.82

Adds more glue modes and fixes a crash that could happen when using the menus under Windows XP.

Version 1.81

Adds the ellipsoid input mode. Adds new glue modes: Color, Luminance, Linear Light, and Pin Light. Fixes the appearance of text in the interface when running under Mac OS X 10.2.3 .

Version 1.8

Adds the brick sphere.

Version 1.75

Adds the spikeball. Fixes the sizes of the half-polar, Hammer, lozenge, and two-circles projections, which were too small in version 1.7. Changes the tabs on the 'gore' projections to simplify printing them at the right size.

Version 1.7

Adds the paperlock and Omnimax projections, and origami instructions.

Version 1.6

Adds the grid checkbox.

Version 1.5

Adds the '24 faces b' shape.

Version 1.4

Adds the loop, two-circles, and balloon shapes.

Version 1.3

Adds the 12-, 24-, and 36-gore shapes for globemaking.

Version 1.2

Adds the 30-faces polyhedron shape; adds two new input modes, cylindrical and orthographic; and fixes a bug where some polyhedra would not display correctly.

Version 1.1

Adds eight new polyhedron shapes.

Version 1.0

The first public release.

How to purchase

You can place an order online [here](#). A secure server for transactions is available.

Questions

The software, documentation, and supporting materials are made by Flaming Pear Software. Answers to common technical questions appear on our [support page](#), and free updates appear periodically on the [download page](#).

For bug reports and technical questions, please write to support@flamingpear.com.

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