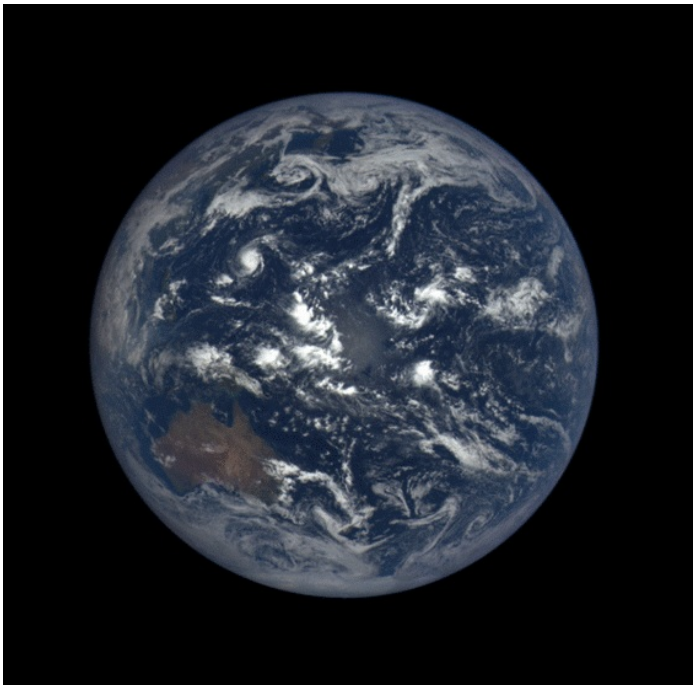
Daily views of Earth on new NASA website

http://epic.gsfc.nasa.gov/

NASA launched a new website yesterday (October 20) where you can see images of the full, sunlit side of the Earth every day.

Each sequence of images shows the Earth as it rotates, revealing the whole globe over the course of a day from a million miles away. It's cool! The images are taken by a NASA camera one million miles away on the Deep Space Climate Observatory (DSCOVR).

Once a day NASA will post at least a dozen new colour images of Earth acquired from 12 to 36 hours earlier by NASA's Earth Polychromatic Imaging Camera (EPIC). Each daily sequence of images will show the Earth as it rotates, thus revealing the whole globe over the course of a day. The new website also features an archive of EPIC images searchable by date and continent.

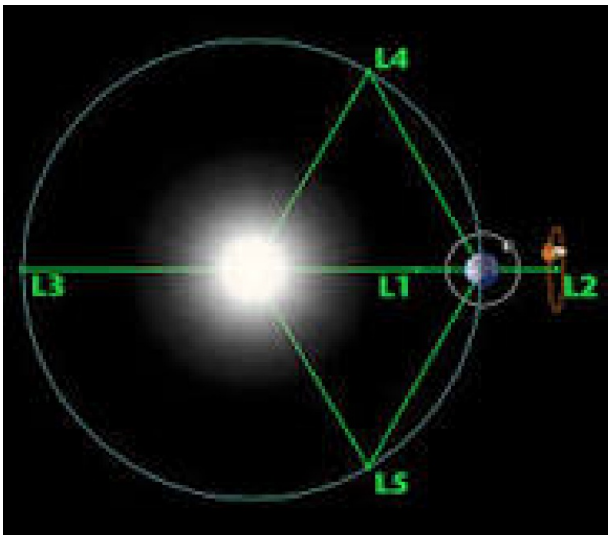


One of the 22 still images taken on September 17, 2015 by NASA's Earth Polychromatic Imaging Camera (EPIC) camera on the Deep Space Climate Observatory (DSCOVR) spacecraft.

EPIC's images of Earth allow scientists to study daily variations over the entire globe in such features as vegetation, ozone, aerosols, and cloud height and reflectivity. EPIC is a four megapixel CCD camera and telescope. The colour Earth images are created by combining three separate single-colour images to create a photographic-quality image equivalent to a 12-megapixel camera. The camera takes a series of 10 images using different narrowband filters — from ultraviolet to near infrared — to produce a variety of science products. The red, green and blue channel images are used to create the colour images. Each image is about 3 megabytes in size.

Since Earth is extremely bright in the darkness of space, EPIC has to take very short exposure images (20-100 milliseconds). The much fainter stars are not visible in the background as a result of the short exposure times.

The DSCOVR spacecraft orbits around the L1 Lagrange point directly between Earth and the sun. This orbit keeps the spacecraft near the L1 point and requires only occasional small manoeuvres, but its orbit can vary from 4 to 15 degrees away from the sun-Earth line over several years.



In celestial mechanics, the Lagrange points, L-points, or libration points are positions in an orbital configuration of two large bodies where a small object affected only by gravity can maintain a stable position relative to the two large bodies. The Lagrange points mark positions where the combined gravitational pull of the two large masses provides precisely the centripetal force required to orbit with them. **There are five such points, labeled L1 to L5, all in the orbital plane of the two large bodies. The first three are on the line connecting the two large bodies and the last two, L4 and L5, each form an equilateral triangle with the two large bodies.** The two latter points are stable, which implies that objects can orbit around them in a rotating coordinate system tied to the two large bodies.

Several planets have minor bodies near their L4 and L5 points, with Jupiter in particular having more than a million of these Trojans. Artificial satellites have been placed at L1 and L2 with respect to the Sun and Earth for various monitoring purposes.

The three collinear Lagrange points (L1, L2, L3) were discovered by **Leonhard Euler** (1707-1783) a few years before Lagrange discovered the remaining two. In 1772, **Joseph-Louis Lagrange** published an "Essay on the three-body problem" where he considered both the general three-body problem and the equilateral with circular orbits: An object that orbits the Sun more closely than Earth (L1) would normally have a shorter orbital period than Earth, but Earth's gravitational pull counteracts some of the Sun's pull, and therefore increases the orbital period of the object to balance it at L1 . L1 is about 1.5 million kilometres from Earth. AK, from NASA Notes