

Image analysis

In order to identify images that would be best suited for an earth-bound Virtual Space Lab (VSL) simulation, keeping in mind the goal, which was to enable the greatest opportunity for persons on earth to have the same experiences of AW had by astronauts in space, we examined thousands of images. The choice of images was informed by a number of considerations, including availability, image quality, details about practices in the different space vehicles involved, and historical analysis of the image.

In regard to the latter, for example, the classic “Blue Marble” image, the best-known example of a space image that strongly affected the feelings of many people worldwide, is a photograph taken on December 7, 1972 by the Apollo 17 mission. This image shows the Earth from a perspective in outer space and was the first photograph many people saw of the planet they inhabited. Its effect is dependent upon the powerful emotions it evokes. Before it was able to have this kind of impact, the photograph – taken with a 70 mm Hasselblad camera and an 80 mm lens – had to be reoriented. Originally, the South Pole was visible to the crew of the Apollo 17 at the top of the globe; the published image was rotated 180° to provide a view familiar from maps and atlases. In effect, what the astronauts actually saw and marveled about was not precisely depicted in the popular image. In addition, as a rule, the Earth appears partially in shadow, so the most celebrated image of the planet is also a relatively uncharacteristic one. This example highlights that the task of finding images suitable for a simulation cannot rely exclusively on the reports from the astronauts or an uncritical acceptance of images from NASA.

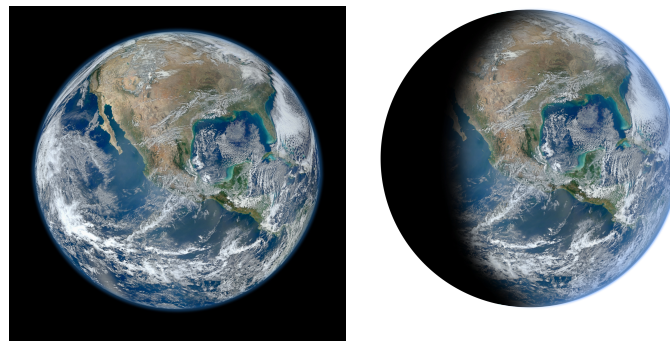
Our research team included members of the *Bildakt* group [LINK TO **TEXT BELOW] at the Humboldt University in Berlin. They used the NASA Image Database, to define criteria for image selection for the VSL. The NASA database is classified according to four major categories (item, location, person, time). These categories do not differentiate between media, contexts, or individuals, so that specific keywords like “earth” (23,491 entries) or “sun” (16,092 entries – accessed in January 2012) also return a large number of diagrams, models, artistic views (drawings, paintings), documentary photographs of laboratories, staff etc. Less than 10% of all images in the gallery were considered relevant for selection. The following selection criteria were defined:

- no (or little) artifacts due to optical refraction and other lens effects
- no aged colors on chemical films
- no visible manipulation in terms of coloring, digital editing, etc.
- no markings and inscriptions (except watermarks made by a photographer, which can be cropped)
- pictures should be focused or rich in detail
- views should be possible from a spacecraft within the earth-moon-system and could be made by human observers
- earth view: earth should be visible as crescent, not as iconic blue marble

- space view: no particular object(s) should dominate the image; image may be used as background for animation; number of visible stars should be higher than in a sky seen from earth (= clarity of sight)

A number of challenges were met in following these criteria. First, finding high quality images that showed on monitors in high fidelity was difficult. Our first attempts looked flat. Second, images had to be dynamic in ways that did not violate the laws of physics.

Fortunately, on 25 January 2012, NASA released a composite image of the western hemisphere of Earth entitled Blue Marble 2012 (Figure 1A). The picture was widely viewed, logging over 3.1 million views on the Flickr image hosting website within the first week of release. On 2 February 2012, NASA released a companion to this new Blue Marble, showing a composite image of the eastern hemisphere. These images served as the basis for developing a 3-D simulation for the VSL. Simulation developers introduced a crescent element (Figure 1B, modified image), and this was one image incorporated into the VSL, which moved relative to the observer.



A

B

Figure 1: (A) Blue Marble 2012; (B) modified image used as the basis for one part of the simulation

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The *Bildakt* group

Kolleg-Forscherguppe Bildakt und Verkörperung [LINK TO <http://bildakt-verkoerperung.de/en/kolleg/>] (The Collegium for the Advanced Study of Picture Act and Embodiment) at the Humboldt University. The term *Bildakt* (image- or picture-act) derives from the work of Horst Bredekamp, Director of the *Bildakt* group. It should be understood in a way similar to the concept ‘speech-act’. It involves the interdisciplinary study of how we use images, what images do *for* us, and what they do *to* us. See <http://bildakt-verkoerperung.de/en/kolleg/>.