UNIVERSIDAD COMPLUTENSE MADRID

NOTA DE PRENSA

First open Atlas of nighttime images of the earth taken by astronauts

- ***An Atlas of the nighttime images of the Earth that have been taken by astronauts aboard the International Space Station (ISS) has been produced. The creators invite interested people to contribute to their study of light pollution with a new online citizen science platform***

Madrid, 9 July 2014. Over 1,200,000 pictures have been taken by astronauts from the ISS since 2003 and approximately 30% were taken at night. Only a small fraction of the images have been classified (~10%). The total number and quality of nighttime images of cities on the archives is therefore not known. In order for them to be of use, they must first be found and tagged.

The Universidad Complutense de Madrid (Depto. Astrofísica y CC. de la Atmósfera) leads a citizen science project to explore and catalog nighttime images of the ISS repository. MediaLab-Prado, the Spanish Light Pollution Research Network, the European COST Action Loss of the Night Network, the Crowdcrafting citizen science platform, Celfosc and AstroMadrid are the main collaborators.

Most of the previous work has been done nonprofit collaboration of citizens, researchers and institutions. The investigation has a 100% open data and development policy, and the project website has been translated into 13 languages. Our catalog of 1700 nighttime images was produced by students, volunteers from several countries, UCM staff, the Freie Universität Berlin, and IGB Berlin. The images will be of use for the media, for public enjoyment, and for scientific studies. An announcement of the project appears in the News and Reviews section of the journal Astronomy & Geophysics, and a research paper using data from the Atlas will soon be submitted. In addition to the catalog, three citizen science applications are allow citizens to contribute to research, regardless of their previous knowledge:

- *Dark Skies of ISS* allows citizens to sort images between different types: Images of cities, images of stars, and other images. It requires no previous knowledge, and is only available online. It is the simplest of the three projects.
- *Night Cities* aims to allow citizens to apply their lay knowledge of local and international geography. The project shows paired images of cities with maps. Project volunteers identify points in the night images and match them to positions on the maps. With this help we can generate light maps of cities.
- *Lost at Night - Locate images from ISS* is the stiffest challenge for citizens with knowledge of geography. Their goal is to identify which city is in an image without any identification. The position of the cities in this case is only known to within about 500 km.

In the first phase, we intend to classify pictures taken by astronauts Shkaplerov, Burbank, Ivanishin, Kuipers, Kononenko and Pettit. Especially because of the presence during the mission ISS030 of the

Nightpod motorized tripod manufactured by ESAwhich was operated by ESA astronauts André Kuipers and Don Pettit of NASA (space pioneered night photography).

Nighttime images from the ISS have a resolution of up to 10 meters. This is far better than the best available global nighttime satellite images, which have a resolution of 750 meters. The colors in the nighttime images are also useful, because they can help scientists distinguish what types of lamps are in use. The images could also be used by cities interested in saving money and reducing their "light footprint". The images could also be used in statistical studies in subjects such as road or public safety, epidemiological incidence of prostate or breast cancer, or other human health effects, loss of biodiversity, loss of cultural heritage, and changes in atmospheric chemistry.

We want to thank the astronauts who took the pictures, in particular astronauts Soichi, Haldfield, Kupiers, Fyodor, Pettit and Parmitano. We also acknowledge the international cooperation that makes the ISS and this research possible.

References

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2 Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)

Project web page and pictures:
Web Project: http://www.citiesatnight.org

Publications:

-Alejandro Sánchez de Miguel, José Gómez Castaño, Jaime Zamorano, Christopher CM Kyba, Sergio Pascual, M Ángeles, L Cayuela, Guillermo Martín Martinez and Peter Challupner, Atlas of astronaut photos, of Earth at night, News and Reviews in Astronomy & Geophysics, Vol. 55 nº4. August 2014 (in press).

Webpage of the Citizen science projects:
-Dark Skies of ISS : http://crowdcrafting.org/app/darkskies/
-Night Cities: http://crowdcrafting.org/app/nightcitiesiss/
-Lost at Night: http://crowdcrafting.org/app/LostAtNight/

More information:
UCM Group: http://guaix.fis.ucm.es/DarkSkies
International Dark-Sky Association: http://www.darksky.org/

ESA-Nightpod: http://blogs.esa.int/promisse/tag/nightpod/
The Gateway to Astronaut Photography of Earth (NASA Archive):
http://eol.jsc.nasa.gov/

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