

Astronauts and citizens team up against light pollution

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The Iberian Peninsula at night, showing Spain and Portugal. Madrid is the bright spot just above the centre. Credit: NASA

For an astronaut looking out of the International Space Station windows, city lights are brighter than the stars. To tackle light pollution citizen

scientists are urged to help map out the problem on their smartphones by identifying images of cities taken from space.

Astronaut pictures are the highest-resolution, colour images of night available from orbit. "The International Space Station is the best observation point humankind has for monitoring Earth at night," says Kevin Gaston, project leader of the Lost at Night project that raises awareness of light pollution.

There are half a million high-resolution pictures of Earth at night in NASA's Astronaut Photography of Earth archives. Most images in the archive are uncatalogued and do not have a location assigned to them.

Lost at Night uses the power of citizen science to match images and identify the location of the [astronauts'](#) photographs online.

This helps the study of light pollution and how it affects life on our planet.

Artificial light has a broad range of impacts on the biological clock of both nocturnal and diurnal species. Light changes lead to knock-on effects that can impact whole ecosystems, from plant flowering times to migration disruptions for birds and turtles. Bright nights affect people's sleep and can negatively impact health.

More astronaut pictures and more clues from Earth's inhabitants will help researchers better evaluate these effects over time and encourage actions to optimise street lighting.



Nighttime view of the Nile River and its delta. On September 2019, the International Space Station was flying 400 km above the border between Sudan and Egypt around 1 am local time when an Expedition 60 crew member photographed this oblique view of the Nile River and its delta. Credit: European Space Agency

The human gaze

Human eyes can help shine a light on the huge catalogue.

"While computer algorithms have trouble distinguishing between stars, the Moon and cities, people are more reliable when it comes to recognising patterns and analysing complex images," says Alejandro Sánchez de Miguel, a research fellow at the UK's University of Exeter

and lead investigator of the project.

Over 30 000 images had their location pinpointed on by volunteers, but more help is wanted to complete the puzzle.

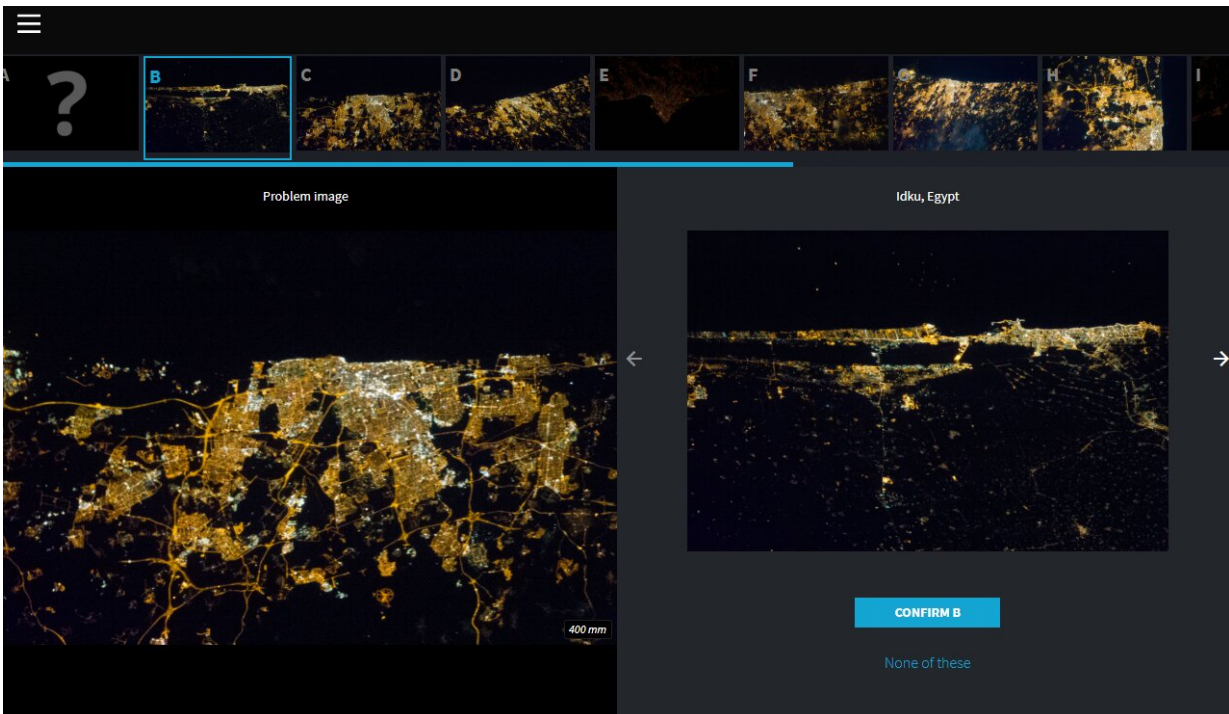
"We don't know which direction the astronauts pointed the camera from the Station. We only know the time it was taken and the area of Earth they were flying over," explains Alejandro.

The website invites you to identify cities lit up at night within a range of a 1000 km.

"Forget about playing Candy Crush in idle times. This is a great opportunity to learn about geography, the distribution of human activity and how your home town looks like from space," adds Alejandro.



Nighttime view from the International Space Station as it flies 400 km above Earth. A Russian spacecraft attached to the Space Station is pictured on the image. Credit: NASA



To tackle light pollution citizen scientists are urged to help map out the problem on their smartphones by identifying images of cities taken from space. Lost at Night uses the power of citizen science to match images and identify the location of the astronauts' photographs online. Users are presented an image from an unknown city and they must try to find the best match by comparing it with several options. This helps the study of light pollution and how it affects life on our planet. Credit: Lost at Night

There are many [scientific projects](#) associated with images taken from the International Space Station.

Astronauts take these pictures in their free time from the Space Station's Cupola, a seven-window observation module.

"European astronauts are talented photographers, but it is not only about sharing beautiful pictures. Their contribution is key to scientifically demonstrate the true extent and impact of [light](#) pollution," points out Lucía García, project manager of the precursor [Cities at Night](#) project.

Bright intelligence

Users are presented an image from an unknown city and they must try to find the best match by comparing it with several options.

Because humans make mistakes too, this initiative needs inputs from five people per image to bring the margin of error down. From there, artificial intelligence takes over.

The objective is to identify 90 000 images—enough to train [artificial intelligence](#) to automatically recognise a collection of pixels and locate images.

Provided by European Space Agency

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