



**ALAN 2021 - E-CONFERENCE**  
**7TH INTERNATIONAL CONFERENCE ON ARTIFICIAL LIGHT AT NIGHT**  
 JUNE 15-17, 2021

**Objectives**

1. Study of the impact of human activity on light pollution.
2. Evaluation of the brightness and color of the sky of our cities and towns.
3. Introduction to photometric measurement techniques with consumer grade digital cameras.
4. Network of digital cameras to monitor the brightness and color of the night sky

**Which is the impact of human activity in Light Pollution?**

The brightness of the night sky varies depending on the lights on the street, the movement of cars and the activity of the offices.

During COVID-19 lockdown, astronomical observations were reduced to those that we can carry out from our home with the instrumentation we happen to have with us. This project proposes a study over time of the brightness and color of the night sky through measurements obtained at home with the help of DSLR cameras.

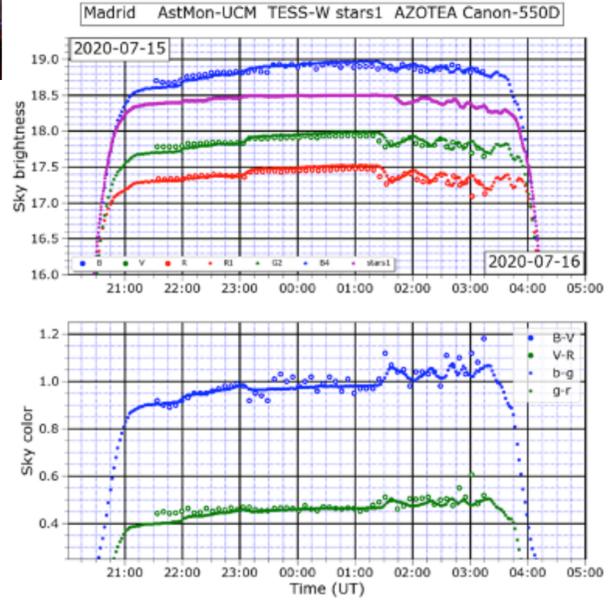
This citizen science project of ACTION (Participatory science toolkit against pollution) European project (Horizon 2020, SwafS programme) tries to detect differences in the brightness and color of the night sky to estimate the human contribution to light pollution.

“Estimating the relative contribution of streetlights, vehicles, and residential lighting to the urban night sky brightness”

**Salvador Bará, Ángel Rodríguez-Arós, Marcos Pérez, Borja Tosar, Raul C. Lima, Alejandro Sánchez de Miguel & Jaime Zamorano**  
 Lighting Research and Technology, 51:1092–1107 (2019).

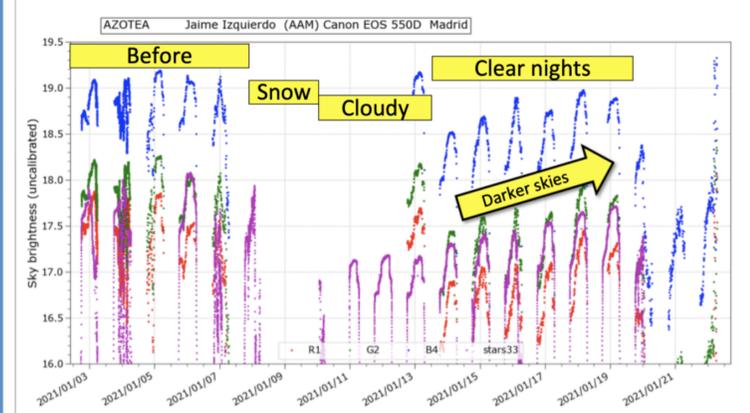
Jaime Zamorano, Rafael González, Salvador Bará, Sergio Pascual, Jaime Izquierdo, José Luis Navarro, Ignacio Hilera, Pablo Otero, Jesús Gallego, Nicolás Cardiel, José Robles, Alejandro Sánchez de Miguel, Cristóbal García, Esteban González, Enrique de Ferrá, Francisco Javier de La Torre, Francisco Ocaña, and Lucía García

Departamento de Física de la Tierra y Astrofísica, Universidad Complutense de Madrid, Instituto de Física de Partículas y del Cosmos (UCM), Agrupación Astronómica de Madrid, Departamento de Física Aplicada, Universidad de Santiago de Compostela; Agrupación Astronómica de Cuenca; Sociedad Astronómica de Alava-Arabako Astronomia Elkarte; Agrupación Astronómica AstroHenares; MPC-J14; Environment and Sustainability Institute, University of Exeter; Ontology Engineer Group, Universidad Politécnica de Madrid



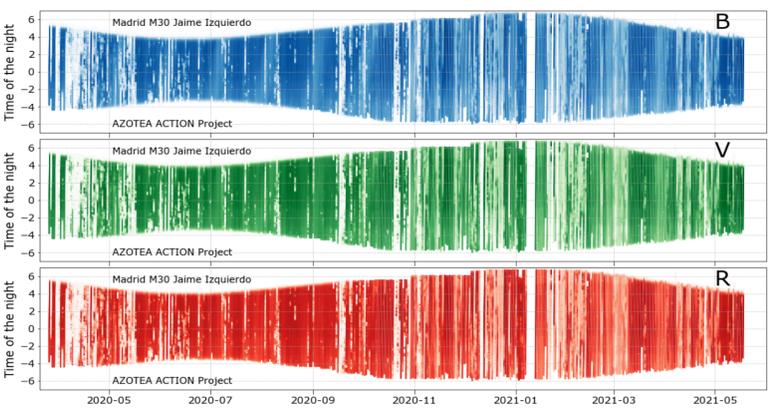
The data from the RGB channels of the camera (R1, G2, B4) adjust well to the astronomical photometry measurements Johnson B,V,R. This indicates that after calibrating the cameras we will be able to use them to measure the evolution of the brightness and color of the night sky.

**The snowfall that changed the night sky in Madrid**



The sky brightness of the night sky recorded by the STARS4ALL TESS-W photometer network and AZOTEA Project has allowed to study the evolution of the darkness of the night sky before, during and in the nights after the great 2021/01 snowfall in Madrid.

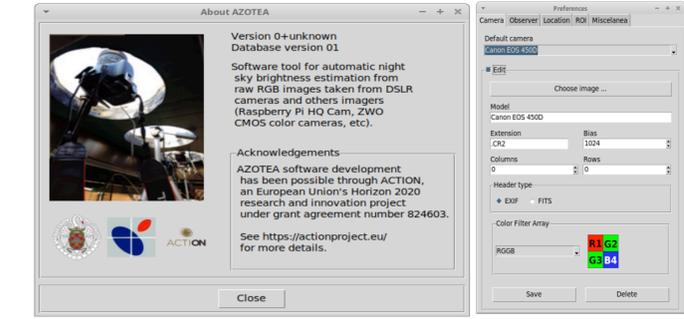
This was an unique opportunity to determine the contribution of the streetlight reflected on the ground to the light pollution.



**Open software**

Pictures are being uploaded by the contributors to our repositories and processed with the azotea open software (search guaix-ucm azotea in github)

We are working in a stand alone software to process the images with the contributors computers. In this case only the .csv files with the results have to be uploaded.



**Calibration**

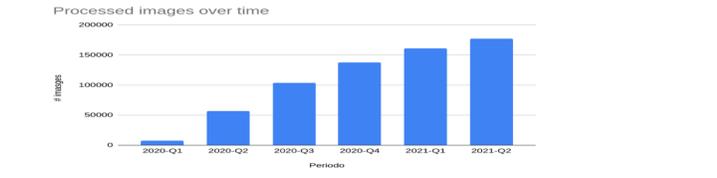
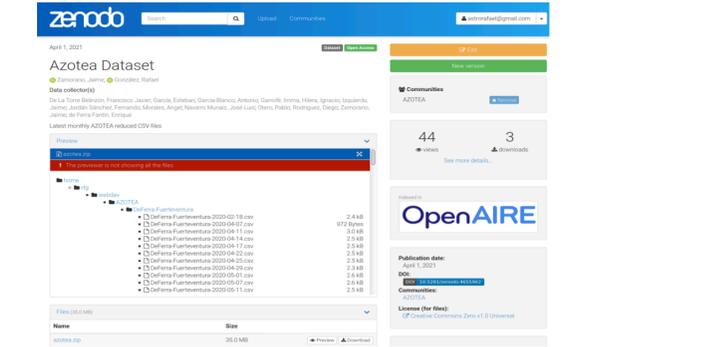
The absolute calibration could be obtained using the RGB photometric standards. See Cardiel talk in this meeting

“Synthetic RGB photometry of bright stars: definition of a standard photometric system and UCM library of spectrophotometric spectra”

**Nicolás Cardiel, Jaime Zamorano, Salvador Bará, Alejandro Sánchez de Miguel, Cristina Cabello, Jesús Gallego, Lucía García, Rafael González, Jaime Izquierdo, Sergio Pascual, José Robles, Ainhoa Sánchez, and Carlos Tapia**

**Open data**

The .csv files with the results are archived and can be accessed online. The dataset is also available at ZENODO.



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