

ASTURIAS RECUPERA LOS CIELOS (ASTROS)

–Asturias recovers the skies–

R. Hevia Díaz¹, E. Díez Alonso¹, S. Fernández-Menéndez¹, R. Muñiz¹, J. Menéndez¹ ,
F. García Riesgo¹, A. Castro González¹, F. J. de Cos Juez¹.

¹Instituto universitario de Ciencias y Tecnologías Espaciales de Asturias (ICTEA), C.Independencia 13, E-33004 Oviedo, Spain.

Presented by: **R. Hevia Díaz, E. Díez Alonso & F.J. de Cos Juez**

Universidad de Oviedo - Instituto Universitario de Ciencias y Tecnologías Espaciales de Asturias (ICTEA)



Abstract

Each year the night sky is more illuminated. Even though for the astronomers this difficult them to see the celestial objects and our galaxy from the cities, there are others problems we are not aware of, and which affect the human being, plants, animals and economy.

From ICTEA, and with citizen collaboration, we have been working on a project, ASTROS (supported by FECYT) taking data from the light pollution and generating a map which, in time, will allow us to analyse and promote initiatives to protect the night sky.

Context

The light pollution is going higher and is a reality (*Midiendo la contaminación del cielo desde el espacio, Alejandro Sanchez de Miguel & Jaime Zamorano, 2008*). The satellite VIRSS detects an increment of 2% every year. In 6 years we will have 22% more Light Pollution than 4 years ago. This will probably get worse by the uncontrolled proliferation of LEDs.

That increment affects humans with diseases such as stress, alteration of circadian rhythms and other related pathologies (*Blue light has a dark side, Harvard Medical School 2012-2018; Relationship Between Circadian Rhythm and Blue Light, Asghar Amanpour 2020*). Nature can also be altered in terms of plants blooming, bird desorientation, alteration in their habitats, etc.

And finally, professional and amateur observatories will have more difficulties to find a suitable place for astronomy research.

Control and protection of the night sky is necessary. With ASTROS, we seek to promote awareness and protection of dark skies, involving our society.



Light pollution in Asturias in 2015 (left) and in 2017 (right). VIRSS

Methodology

Promoting public awareness of the issue

Through the conferences, photo and video contests, webs, posters and publications, travelling exhibitions and media.



Encourage citizen participation

Through the creation of a mobile application that allows to measure the intensity of light pollution and automatically send that measurement to our server located in the University of Oviedo, with data of coordinates, time, class of sensor, and lux.



Assess the actual magnitude of the problem

With the information collected by citizens a geographic information system (GIS) is fed in order to determine the most affected areas and their possible evolution.



Get support for a specific regulation

We collaborate with the Regional Govern and the Asturian Energy Foundation to “tackle” the problem.



GOBIERNO DEL
PRINCIPADO DE ASTURIAS

CONSEJERÍA DE INFRAESTRUCTURAS,
ORDENACIÓN DEL TERRITORIO Y MEDIO AMBIENTE



Results (public awareness)



Schools and conferences



Press and TV



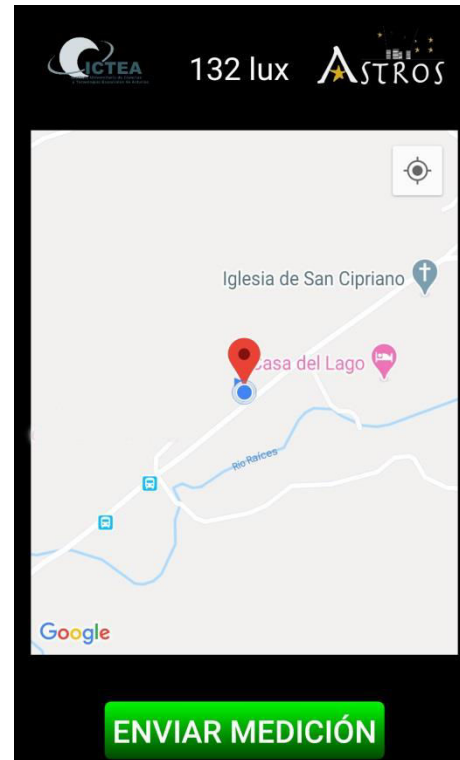
Posters and publicity



Results (citizen participation)

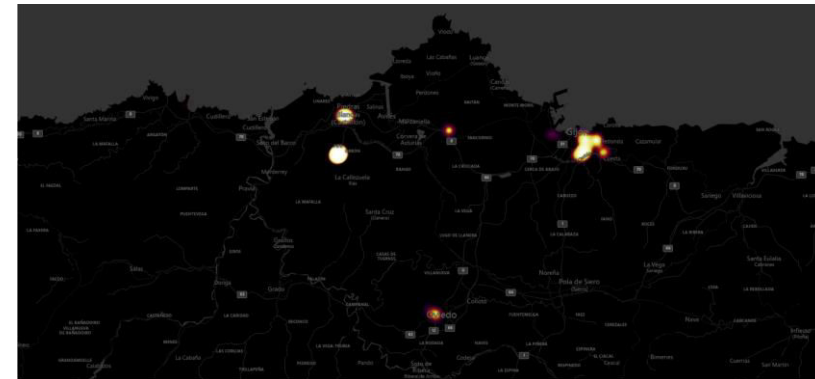
Web and Apps

<https://astros.uniovi.es/>



Easy to use

Data examples



```
0:
  geometry:
    coordinates:
      0: -5.65437
      1: 43.5231
    type: "Point"
  id: 3
  properties:
    accuracy: 17.629
    altitude: 68.1
    deviceId: "149389d98da363dd"
    deviceType: "android"
    lightLevel: 74
    measurementDate: "Fri, 04 Oct 2019 20:03:09 GMT"
    pitch: -7.85647
    roll: -1.90925
    sensorModel: "TCS3400 ALS"
    sensorVendor: "ams AG"
    sensorVersion: 1
    verticalAccuracy: 7.8
    type: "Feature"

3:
  geometry:
    coordinates:
      0: -5.65296
      1: 43.524
    type: "Point"
  id: 10
  properties:
    accuracy: 14.542
    altitude: 66.7
    deviceId: "0f0844c4d483341a"
    deviceType: "android"
    lightLevel: 31
    measurementDate: "Tue, 05 Nov 2019 21:29:33 GMT"
    pitch: -8.3909
    roll: -2.52512
    sensorModel: "TCS3400 ALS"
    sensorVendor: "ams AG"
    sensorVersion: 1
    verticalAccuracy: 17.6
    type: "Feature"
```

In process of data acquisition.

Future

Collaboration with professionals and specialists (Architects, Engineers, etc) in order to advise on future actions.

Implementation of artificial lighting regulations that improve energy and lighting efficiency (stablishing regulations with the Asturias Government).

Improve the management of public and private lighting throughout the regional geography.

Reducing energy consumption to minimize environmental impact by 60 and 70%.

Establish protected areas for the night sky, both for animal species and astronomical observation. This will also generate business opportunities in rural areas (making a quality seal).

