

# ASTRONOMY AND SPACE SCIENCES EDUCATION IN PORTUGAL A CASE STUDY : NAVEGAR FOUNDATION

Pedro Russo and António Pedrosa – Navegar Foundation, Portugal  
pedro@multimeios.pt | www.multimeios.pt

## Abstract

Navegar Foundation was created to manage Centro Multimeios de Espinho – Portugal. From the beginning, one of the foundation's main areas was, by default, astronomy education: its main equipment was a planetarium. The regular exhibition of planetarium shows attracted a large number of schools (the statistics tell us that we now have an average of 20 000 student per year in a city of 30 000 inhabitants, our public is now national and not regional). With the ascend of new ideas and equipments new activities came to life: astronomy public library; observatory; student and teacher training; content development; astronomy laboratories; production of planetarium shows; public talks, among others.

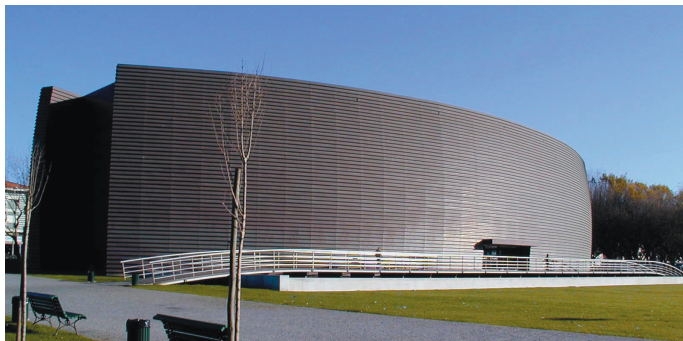


Fig.1 – Centro Multimeios de Espinho

## Mission

Created in the year 2000, the Navegar Foundation work to the Art, Science, and Cultural Science awareness. Among other things, the Foundation it is responsible for the management of the Centro Multimeios de Espinho (fig.1), a building with several equipments, such as a planetarium, a large format film theatre, an astronomical observatory, an astronomical library, and an exhibition gallery. The creation of educational contents, mainly in Astronomy, is one of the major tasks of the people those working at Navegar Foundation. It includes planetarium shows, DVDs, books and other educational material.

## Planetarium

In the center of our dome we find the Konica-Minolta Cosmoleap 10 star projector. This machine enables our audience to see more than 6000 stars, the Sun and it's planets from any point in the Solar System using the most accurate calculations. Under the stars, people can appreciate a variety of shows covering different subjects in astronomy, science in general and even History. But the planetarium is not

only made of stars and planets. A great number of projectors surround the audience with images and videos. A digital sound system with six independent channels and three subwoofers creates a even more splendid ambiance. The Planetarium is not only a science instrument, it's a place where science, culture and art can meet to celebrate the conquests of human mind.

## Observatory

The Astronomical Observatory is located in Centro Multimeios de Espinho, at the top of the building. It has an automated roof, which can be opened in order to perform astronomical observations.

The observatory is equipped with a modern 16 inch reflector telescope, digital CCD cameras, filters, autoguider and several eyepieces. Everything is automated and controlled by a computer, using astronomical software thus making its operation very simple, whether in loco, or remotely. The observatory is used for public shows, workshops for students, and science purposes.

## Cosmoteca: Sky and Space Library

Cosmoteca is a public library dedicated to Astronomy. It works as a complement to the planetarium and the astronomical observatory that also can be visited at Centro Multimeios de Espinho. It is a place for study, training and science education, where it is possible to find educative and didactic material, including books, magazines, videos, CD-Roms, DVDS and computers. Cosmoteca, Sky and Space Library, is available for everyone who have has interest in astronomy. It was created having in mind the rising importance of Astronomy in nowadays school programs. Here, even the teachers, themselves, can find support on their class preparation, and the students in their homework and group works.

## Content Development, Research and Production

### Planetarium Shows

Navegar Foundation has already several years of experience in the planetarium's content production. The shows produced are completely original, and targeted for at specific audiences, according to their ages. The production involves a team within different expertise areas, such as astronomers, planetarium technicians, movie directors, animators, music composers, sound technicians, among and others. The

shows are conceived to reach an international audience, with special care taken in order for them, to be both entertaining and educative. The shows are first exhibited in our Planetarium, this gives us the opportunity to test them before released, in order to evaluate several different aspects of the shows, such the story, astronomical content, music, sound effects, etc.

### ***The Moon is Angry***

The challenge was to produce a session for a very young audience between 3 and 10, where basic concepts of Astronomy and Space Sciences are introduced during 25 minutes. The premise for the story is a non ending solar eclipse. The Moon is fixed in the sky obscuring the home town of the story heros, that go on a fantastic trip around the solar system to solve the mystery. The creation and production of this session involved experts from more than 10 different areas, from scriptwriters to astronomers.

### ***Camping With the Stars***

It is the fourth show produced by the Navegar Foundation, and its main target audience are students in the 8th grade, although it can be seen and enjoyed by all the family. This time, the producers decided to use comics, as the support in which the entire show is built on, to illustrate the scientific themes that are being introduced to the audience, making this a very colourful and dynamic show.

The Story: A school class goes on a camping trip with some teachers. At night everyone goes to sleep, except one of the teachers, who take this opportunity to watch the sky. Two of the students, Pedro and Luis, hear a noise and decide to see what is happening. They find the teacher admiring the sky and decide to stay with him. Their curiosity arouses and they question the teacher about the galaxies, the stars, and the movement of the sky. Latter they are joined by Sofia, another student, and spend the night watching the sky and talking about astronomy. All the themes in this show are explained using dialogs between the teacher and the three students, introducing the concepts in a light and sometimes, funny way.

## **Services**

### ***Slide printing***

Slide printing in high resolution pin registered camera, with mask and mount.

### ***Image Processing***

According to the needs, we can process images, like digitalization, enhancement, mask production, dome processing, etc.

### ***Animations***

We produce computer animations, 2D and 3D, according to specific requirements.

### ***Software: Fulldome Plug-in***

A Plug-in for Adobe After Effects is being developed,

for composing and editing fulldome movies. Developed together with the Computer Science department of Oporto University.

## **Exhibition**

### ***A Universe of Butterflies***

In collaboration with the Natural History Museum of the Faculty of Sciences of Oporto University, we produced an exhibition bringing that brought together Astronomy and Biology. It's based on the comparison of Earth Butterflies and Cosmic Butterflies, the Planetary Nebulae. To explore the subject, several characteristics of both Butterflies were compared, like shape, size, lifetime, life cycle, colour, etc, and putted together face to face on large colourful panels.