



OPTICKS: a Project Communicating Science and Creating International Collaborations through Art

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Abstract

OPTICKS is an art/science project realized by visual artist Daniela de Paulis in collaboration with the CAMRAS radio amateur association based at Dwingeloo radio telescope in The Netherlands.

OPTICKS was presented in April 2011 as a live performance during Global Astronomy Month, an international event for science outreach created and coordinated by Astronomers Without Borders.

OPTICKS will be described, including the EME (Earth-Moon-Earth) technology employed, the artistic and scientific aspects of EME research and the collaboration with the Dwingeloo radio telescope team. Images that have been bounced off the moon as radio waves will be shown.

Applications of OPTICKS and EME for science outreach activities will be described based on the collaboration with Astronomers Without Borders and other scientific organizations.

The project's website is www.opticks.info

1. Introduction

The introduction will include an overview of the project along with audio-visual recordings of the OPTICKS performance for Global Astronomy Month 2011. The project consists of a live audio-visual performance during which digital images of the seven colours of the spectrum are transmitted as radio signals to the Moon. The signal reflected from the Moon's surface is then received by the Dwingeloo radio telescope, converted back into the original colour images and projected live into an exhibition room.

The colour images received live from the moon are 'sonified' live by sound designer Marty Quinn.

Each performance of OPTICKS includes a live audio-visual presentation -via the Internet- of the technology employed by the team of radio amateurs based at Dwingeloo radio telescope and led by Jan van Muijlwijk.

The end of each OPTICKS performance is marked by audience participation. Images submitted by the audience are also moonbounced live and sonified by Marty Quinn.

1.1 Technical aspects of OPTICKS

Earth-Moon-Earth, or EME, is a radio technology employed by the US Navy during the Cold War before the deployment of artificial satellites. It is now used by international radio amateurs for voice and Morse code transmissions. The author's inquiry to the CAMRAS team regarding moonbouncing images and sounds for an art project led team leader Jan van Muijlwijk to research the possibilities using the MMSSTV, leading to the first successful image transmission via the Moon from Switzerland. Addition of transmitting stations in Brazil and the UK improved the quality of the moonbounced images to a level adequate for the live art project. As a live event, OPTICKS combines radio technology with the MMSSTV software and the Internet.

2.2 Artistic aspects of the project

According to Niels Hutchison 'Newton constructed the colour music disc dividing the spectrum into the seven colours, ROYGBIV, to be fitted in between the eight notes of an octave. The colour music disc in "Opticks" analogizes music to colour, just as its

prototypes (of Plato, Ptolemy and Kepler) had connected music to planets and other qualities' [1]. OPTICKS borrows its name from the essay in which Newton speaks of his discovery of the light spectrum. During the project's live performance, the images of the seven colours of the spectrum are moonbounced and projected in the exhibition space after their return to Earth. The images are accompanied by sounds created by Marty Quinn that are an acoustic representation of the colour pixels, thus re-interpreting, in a contemporary language, Newton's association of the seven colours of the spectrum with musical notes and the planets known in his era. Examples of moonbounced images will be shown with accompaniment of sounds specially composed for the project by Marty Quinn and other collaborating artists.

3.3 Collaborative aspects of the project

As with a scientific team, the process of creating OPTICKS - as well as each live performance of the project - requires a collaborative approach between the artists and the radio amateurs. The collaboration includes continuing research in the visual/artistic and technical aspects of the project.

The OPTICKS team works closely not only to bring new technologies to live performances but also to introduce new technological applications that are valuable for both the artistic and scientific communities. The CAMRAS team and the principal author have collaborated with the science centre Museon in The Hague (NL), the Holland Space Center, Astronomers Without Borders (AWB) and others. The collaboration with AWB proved especially inspirational in terms of outreach activities related to astronomy in general and the Moon in particular.

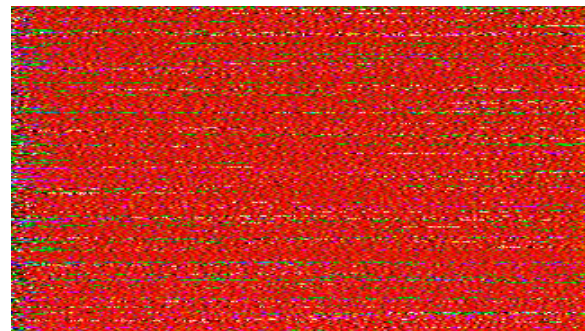
The collaborative aspect of OPTICKS is expanding to include the contribution of other artists and scientists. The project will be the model for a new art

and science foundation that is hoped to be established at The Hague (NL) in 2012.

3. Figures



Moonbounced RED



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References

[1] Niels Hutchison: Colour Music, Music for Measure <http://home.vicnet.net.au/~colmusic/opticks3.htm> 2004