

# Earth L.A.T. 12:00

Watch the Rotating Earth – <https://EarthLAT1200.org>

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Fig. 1: The sundial's 12:00 line indicating local noon – here at 1 min steps

## Abstract

The earth is mostly a sphere, rotates around its own axis and orbits the sun on a slight ellipse. This dynamic constellation can be given in numbers. But numbers will not really give humans the sense of this huge movement. Watching the rotating earth could produce this sense like the epic shot of the earth rise above the moon horizon done by the Apollo 8 crew. Unfortunately the physical dimensions of the diameter of the earth with respect to the size of humans is that big that humans hardly find a way checking these dynamic parameters by their five senses only. The aim of the project *Earth L.A.T. 12:00* is to encourage observers watching the rotation by the usage of very few and simple ancient and modern tools. There is a stick on the ground producing a flowing shadow by time, a camera digitizing that view, a transfer device uploading this image to a server and a browser displaying the live image. The user can watch the view of a sundial at high noon at the given site. While the earth is rotating eastwards the server displays the next west sundial images where the respective high noon appears some short time after the first one. And so on. From nearly any place on earth there will be a 24 h per day / 7 days a week show of sundials displaying their local apparent time 12:00 (Fig. 1). This is how humans can watch the rotating earth easily without being pushed into space.

**Keywords:** Globe, sundial, LAT, local apparent time, webcam, series of stations worldwide, server, automatic switch to high noon sundial images.

## Introduction

Because the earth is that huge and most of the surrounding components including the observer are moving at nearly the same speed as the surface of the globe humans cannot sense the absolute speed of rotation and/or orbiting. Some has to trust the scientific community for reasoning out and being convinced of the spherical shape of the piece of ground we are standing and living. Astronauts, who left the gravitational impact of the earth, told us the about their amazing view of the globe and sense of geometrical relationships. Using this project we want to visualize the dynamics, get people involved in realizing a relative simple astronomical instrument—the sundial—and put some devices together for delivering images to other observers. The back bone is ready to go: Via <https://EarthLAT1200.org> one can follow live images of the first contributing sundial, the Austrian KEPLERUHR. The call for contributions for similar sundials equipped with a webcam will go public this spring 2019. After partner stations are registered they can send series of images to the server. This server automatically selects the actual shown dial by time and local weather conditions. There is need for about 200+ partner stations worldwide for achieving a 24/7

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stream of sundials near local noon.

## Who shall take care

In contrast to many other important astronomical projects which make usage of dark skies this approach addresses day light conditions. It can easily be used without specific tools to sense humans for their spherical and high dynamic environment of the globe. Firstly everybody can watch and feel the movement. Secondly students of secondary or high schools or universities are asked to establish partner stations worldwide within their STEM education. Hints how to can be found at the project's website.

## Didactical Notes

Teachers can take this global tool to explain physics, astronomy, Kepler's laws, mathematics, geometric, projection, history, original meaning of zodiac signs, time notations, SW-development, internet of things, project handling, or just discuss observations.

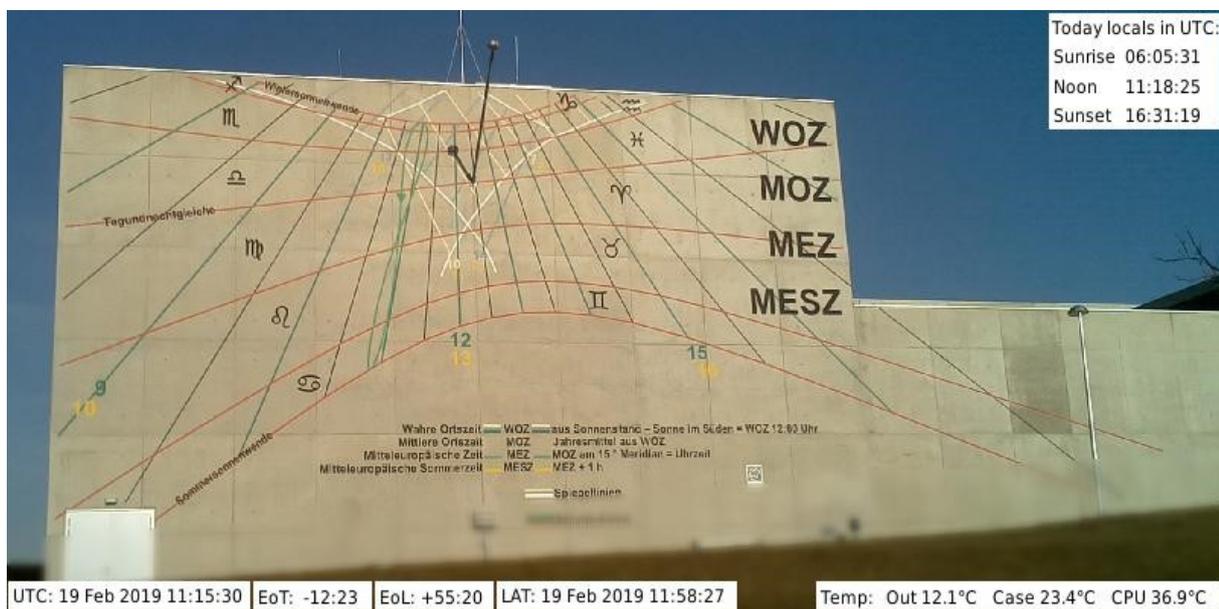


Fig. 2: Webcam image including additional information of time and temperatures – <https://kepleruhr.at/en/live-view>

Fig. 2 shows an image of KEPLERUHR. It is located at a high school building, the size is 240 m<sup>2</sup>. This sundial is used periodically for public explanations, special astronomical events, helps local schools in their education mission. Near noon time this webcam updates images every 30 seconds, the rest of the day every 2-3 minutes. Just by watching the floating shadow one may sense the dynamics of the globe within the solar system.

## Conclusion

Make usage of this project as a teacher or as a student if you want to submit your own sundial images. Observe and clarify the movement and rotation of our globe. Explain vector calculus of sun beams, the central projection via the Nodus and the according hyperbolic lining at the dial. Explain the development in time reading since 5000 years as a synchronization to illumination variations. Derive the Equation of Time, the difference in sundial and clock reading. Watch the floating shadow live via the website 24/7 – you will sense the dynamics of earth rotation with respect to the sun. But be patient: It will take another 5-10 years until the estimated 200+ partner stations are connected for the fulfillment of the given task.