

## How to Observe the Venus Transit

Observing the transit of Venus really means observing the Sun. Here you can see the approximate times and positions of Venus in relation to the Sun. You will be able to see the transit of Venus from anywhere in Europe, but the time will depend on where you live. This is what gave scientists the idea of linking students and the general public across the Continent in one project .

The European Southern Observatory, Observatoire de Paris, European Association for Astronomy Education and Astronomical Institute of the Academy of Sciences of Czech Republic announced the joint project “Venus Transit 2004”.

Stanislav Stefl, Astronomical Institute of the Academy of Sciences of the Czech Republic, Ondrejov

I would like to emphasise that this is not a project aimed at new discoveries and new scientific results. What we want above all is for the broader public, amateur astronomers and especially pupils to try out scientific methods and scientific measurements so that a very important experiment can be repeated.

Grammar school pupils in Prostejov, led by their physics teachers, will try to surpass astronomers of earlier centuries.

Marketa Jureckova, Grammar School in Prostejov

We registered on the vt-2004.astro.cz ([www.vt-2004.org](http://www.vt-2004.org)) website. If you click on the link *How to Participate* you will find the next link – *Registration* – and then you just follow the registration procedure, filling in the required data. You have to fill in the country where you live and, most important of all, the latitude and longitude of the town where you are.

Rostislav Halas, Grammar School in Prostejov

Participants can either find this on local, large-scale maps or use the GPS receiver, in this age of developed technologies possibly the most elegant method.

In this case, school pupils found their geographical position by using the internet.

Marketa

The latitude is 49 degrees 22 minutes 21 seconds North and the longitude 17 degrees 6 minutes and 56 seconds East.

You can use many different ways to observe the Venus transit, from the simplest to the most complicated.

R. Halas

One possibility, I would say a poetic one, is to go to a park – find a leafy one with lots of foliage on the trees – and look down on the ground, where you’ll see how the light shines through the crevices between the leaves, creating something like little suns with diameters of about 10 centimetres.

Another reasonably simple method is to use a mirror. As the Sun moves direct the mirror towards the Sun and let it project onto a wall which is in the shade. That way you’ll get an image of the Sun which you can look at to observe this phenomenon.

J. Prudky, Observatory in Prostejov

The grammar school also has a close cooperation with the observatory in Prostějov. The general public can learn about a variety of methods of observation as well.

You can buy tested glasses at observatories in the Czech Republic. The glasses you see now have been issued with a certificate.

It is safe to wear the glasses even for longer periods – and the Venus transit will last all afternoon!

Someone who does not plan to visit an observatory can buy a welder's filter.

J. Prudký

Glass with a filtr factor of 13 or 14 is the most suitable for observing such a phenomenon.

Some institutions may even buy this Venuscope. It is based on the traditional camera obscura principle, but is fitted with optics and a mirror which reflects the image of the Sun on the screen. Everything that's happening can be seen perfectly, these sunspots for example.

The pupils of the grammar school in Prostějov have another observation instrument, designed by their physics teacher, Mr. Halaš and made by their skilful school caretaker. You will need mainly binoculars, a tripod, a rod and some pads.

The school caretaker

Now we'll fix it so it holds tight...

Now I'm adjusting the rod so it's parallel with the binoculars...

If we want to determine the exact times of contact between the Sun and Venus, we will have to set a watch according to the radio and TV time signals. There is also a time signal transmitter in Frankfurt-am-Main. The transmitter's signal is received all over Europe, including the Czech Republic, and some watches are regulated automatically according to the signal. We find Universal Time by deducting two hours from Czech summertime.

Then all that remains is to watch for the exact moment of contact.

The European Southern Observatory has offered a prize for the best video recorded in connection with the Venus transit. The winner will visit the Paranal observatory in Chile.

Monika Frycova, Faculty of Fine Arts, Technical University, Brno

I study at the Technical University, but I'm not a scientist at all. I just make use of technology to express and communicate what I feel...

Monika is participating in the competition. Her work is conceived in a very unusual way.

Monika

I'm making a video about Venus in such a way that the main role is played by the story, the action, so I'm trying to shape and depict Venus as a woman and man together.

Students from the grammar school in Prostejov have entered a competition set by the British Council in the Czech Republic for the best website in English.

Jiri Stiskal, Secondary Grammar School in Prostejov

It should be something in the style of the universe. There should be some planets, some animation, then we'll see how it goes.

Elizabeth White, Deputy Director, British Council in the Czech Republic

The competition is open to all of the schools in the country and we already have a lot of people interested in it. The school which wins, the website which wins, will be invited to the young scientists' get-together at the London International Networking for young scientists.

J. Prudky

Another method of observing the Venus transit across the Sun will suit owners of really high-quality astronomical telescopes for which some companies supply professional filters.

Such filters transmit approximately a thousandth of a per cent of impact rays and cut out infra-red and ultra-violet rays. An instrument like this allows you to make digital photographs or a video-recording.

On June 8 we will see a picture similar to the one we saw during last year's Mercury transit. However, Venus will be much bigger – even so, it will be only most visible with the naked eye.

Different temperatures and stratification of the air may cause turbulence in the Earth's atmosphere. In these cases the quality of the photographs is very poor.

Petr Heinzl, Institute of Astronomy, Academy of Sciences of the Czech Republic

So there are methods that enable us to reconstruct such photographs of a sunspot – or in our case the little Venus disc – in a mathematical way, using special computer programs.

People with an interest in this may send a low-quality digital picture to the internet address of the Observatory in Ondrejov. The picture will be processed automatically and the improved version returned.

J. Prudký

With this telescope we go back to the projection method, but using a reliable telescope which enables us to project an image of the Sun onto the screen with a diameter of a quarter of a metre.

However, it will be difficult to set the time of the first contact between Venus and the Sun. Hardly anyone will be able to measure T1. Other contact times should be measurable by almost anybody. School pupils and the general public can then send the times measured via the Internet to the headquarters of the European Southern Observatory in Garching near Munich. Everyone will thus find out how precisely they can measure the distance between the Earth and the Sun.

But do be careful! You must protect your sight during observation! Sun glasses, undeveloped film and floppy discs are not enough! Only special glasses and filters are suitable for observation, as these eliminate the part of the electromagnetic spectrum with malignant effects. Infra-red rays can cook the retina, whilst ultra-violet rays cause irreversible chemical changes to the outer layers of the eye.

But what happens if it is overcast or rainy on the day of the transit? There is a dense network of observatories, planetariums and museums in the Czech Republic that have prepared substitute programmes. It will be possible to watch the Venus transit thanks to internet relays from observatories that will have a cloudless sky above them.