

Binary Universe

Super Mars



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In late July 2018, Mars will be super! While low in our Canadian skies, the red planet will be close to the Earth, hopefully making for some of the best views since the Great Mars Apparition of 2003. I will be trying to view the fourth planet (and its elusive moons) as much as possible.

Around opposition, when Mars is well within one astronomical unit, it will be large and brilliant—approximately 24 arc seconds in size and brighter than -2.7 magnitude.

Being so close means that we will be able to see features on the surface of Mars. While we know it is not traversed with water-filled canals and tripod aliens plotting against us, we should be able to pick off light and dark regions, the south pole, and perhaps dust storms in the thin atmosphere.

I will highlight some products to help you dive deep into our neighbouring world.

The Web Tool

A time-tested tool is from *Sky & Telescope* magazine, the *Mars Profiler*.

www.skyandtelescope.com/observing/interactive-sky-watching-tools/mars-which-side-is-visible/

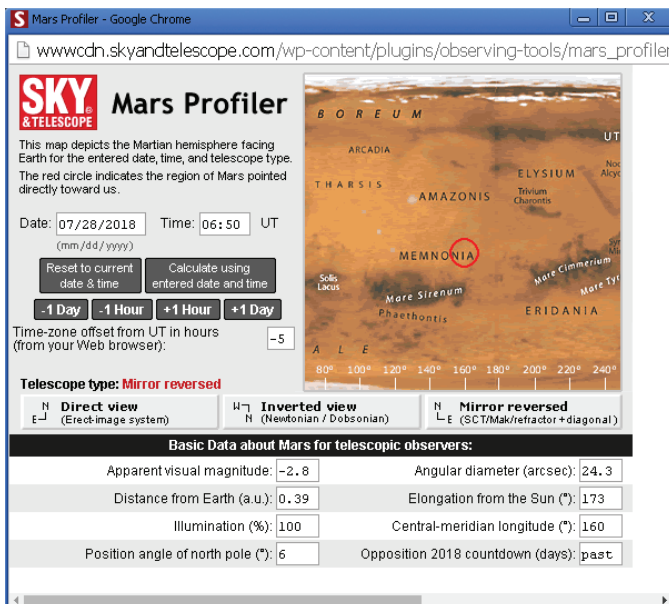


Figure 1 — Mars Profiler tool with rectangular map and control panel.

While not strictly a stand-alone smartphone app, the website resource can be run in a browser tab. I specifically tested it offline and found it worked fine, so you should be able to use it no matter where you go. Of course, it is free.

Mars Profiler uses Javascript technology and initially opens a new pop-up window, both of which you may need to enable.

On loading the S&T Mars tool, you will see a cylindrical projection of the red planet with a control panel (Figure 1). The red circle is the Earth-facing indicator alluding to what's toward us for a given date and time here on Earth. Major features of Mars are identified. The map also shows a longitude scale.

With the controls, it is easy to show Mars's face for the current time. Setting to a time in the past will be helpful when updating one's log book. Using a future period will help with planning. Handy buttons allow one to advance or retreat by one day or hour. You will note Universal Time is used, so if you manually enter values, do so in UT.

Below the map are buttons that allow you to indicate the telescope type. Three views are offered including Direct or normal like how binoculars work, the Inverted view for an even number of reflections within a telescope, and the Mirror Reversed view for an odd number of reflections. Of course, this may change if you're using a star or mirror diagonal or a camera.

Finally, there is a table with Basic Data of the fourth planet, such as the magnitude, the angular size, the distance, and the countdown to the next opposition.

The *Mars Profiler* sets the standard of what is useful. Being able to control the date, time, and telescopic view are important. This basic tool is limited, you can't zoom in, nor can you toggle the labels. The biggest issue is the map display, which you may find challenging. You must remember that things at the extreme left and right edges will be at the limbs of the disk and there is increasing distortion the further you move from the centre or the red circle. *Mars Profiler* does not have a red night-vision mode.

The Apple Tool

I tested a couple of apps for iOS and found *Mars Atlas* by Julian James to be the best. It is a very good application for simulations of Mars. He makes two editions, one for a full Macintosh computer and one for an Apple mobile device.

Mac app:

<https://itunes.apple.com/us/app/mars-atlas/id429268403>

iOS app:

<https://itunes.apple.com/gb/app/mars-atlas/id303482394>

After the acquisition for less than \$10, I installed and tested version 2.6.0 on an iPad.

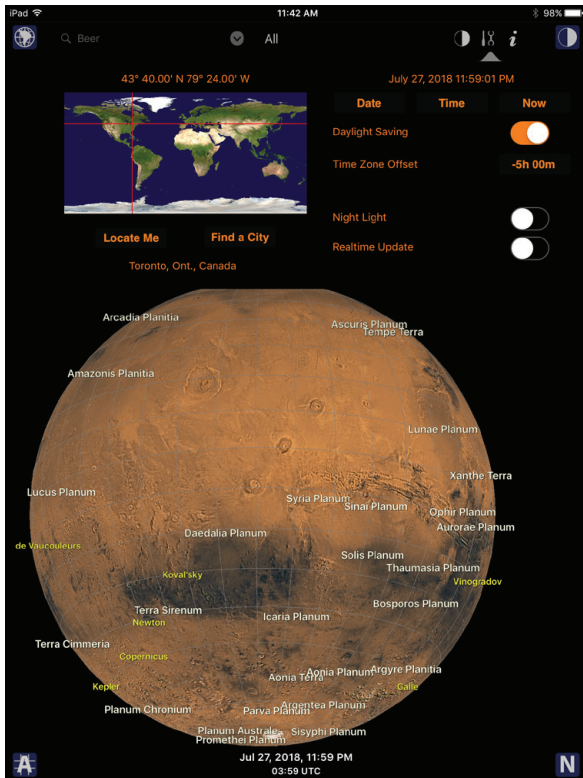


Figure 2 – Mars Atlas with Settings panel open.

The simulated view of the Mars globe from Earth appears with some features identified. The display can be zoomed to reveal more detail. By default, the sunlight effect is enabled, meaning it shows the sunward side of the red world illuminated and the hemisphere opposite in darkness. You can easily turn this on or off with the “phase” button. This may be moot during the Mars apparition when it will appear full to us.

Tapping on the tools icon shows the Settings panel that allows one to specify the user’s location, set the date and time, daylight-saving option, and time zone. The Realtime Update switch is handy when you want to verify what you are seeing right now in the ocular or on the camera screen—I had to manually set time zone and choose my location as the Locate Me button didn’t work. Regardless, I was able to easily adjust for the past or future.

I was very happy to see the Night Light control that turned the entire application interface red, including the controls.

There is a display mode button, which when tapped, shows a grid and/or features. The items shown include classic “albedo” surface details, the easily identified light and dark regions. If you zoom in, you will see smaller features identified by the US Geological Survey, and note spacecraft locations. If you double tap a feature (when the finicky option works), you will see a pop-up (Figure 3).

To simulate your view at high magnification, *Mars Atlas* supports the traditional telescope views (normal, mirror-reversed, and rotated) plus the unusual rotated-mirror.

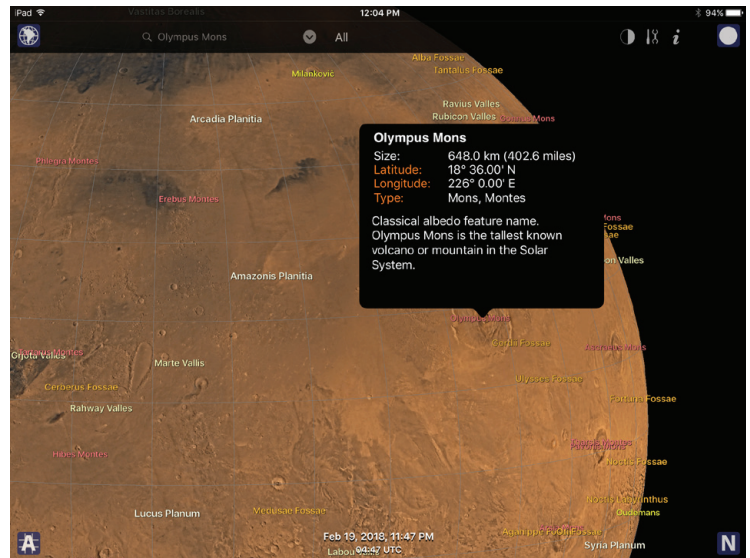


Figure 3 – Mars Atlas with detailed feature pop-up.

The app has a couple of other interesting features. For example, you can perform a search action to quickly find a specific feature. The Globe Mode allows you to move around the planet as if in your own spaceship.

The developer was helpful and quick to respond to my questions. The app is not perfect, but I found it to be the best of all. It was fairly easy to use and the on-board instructions helped me understand the interface.

The Android Tool

I scoured the Google Play store as I researched Android options. I was most intrigued by *Physical Mars* from Requio Web Design. While it looked very thorough with topographic and temperature maps, it didn’t seem to support all telescopic views, particularly mirror flipping. Still I purchased it for less than \$3 and downloaded the app to my phone.

When I started *Physical Mars*, I was presented with the main screen (Figure 4). This shows a rectangular projection of Mars evocative of a Geochron clock. The sunlit face of Mars was emphasized with the light sinusoidal region along with the yellow dot. I presume the blue dot is to indicate the sub-Earth point over the Martian surface. The table below shows a number of values, including the central meridian, geocentric distance, and angular diameter, as well as the light-time to Earth.

For this map, labels can be shown by tapping the menu button and choosing from Craters, Monts, Landing Sites, etc., although I found the font terribly tiny on my small screen. The Wide Areas highlights a number of the albedo features, such as Syrtis Major. Selecting one set of labels clears the others. Tapping the Real-Time button allows one to choose a past or future date and time. Like the S&T *Mars Profiler* map, there is significant distortion in this type of projection.



Figure 4 — Physical Mars main Ephemerides screen.

Switching to a realistic spherical presentation is quickly done by tapping the Globes button. Initially, the Earth-facing side of Mars is shown (Figure 5). The Martian latitude and longitude appears, as well as your “altitude” above the surface. You can easily zoom, decrease, or increase your altitude. You can illuminate the dark side of Mars, if necessary, although I found the terminator very soft. When you drag or swipe on your screen the planet is rotated.

The fourth button in the toolbar, Free/Lock, allows you to lock on the current latitude and change only the longitude. Otherwise you can freely move about the fourth planet to examine the north and south poles.

I did not see a way to show labels in the Global View, which I thought somewhat strange. However, you can browse for a feature and have it centred.

The Global View takes the date and time from the main screen, so you will need to back up to the previous screen.

From the Global View menu, one can view the Earth or force the Mars display to be rotated. It is here I was hoping to find a mirror-reversed option, but it is definitely not available. You’ll have to do some mental gymnastics, get out a pocket mirror, or flip the image in an image app.

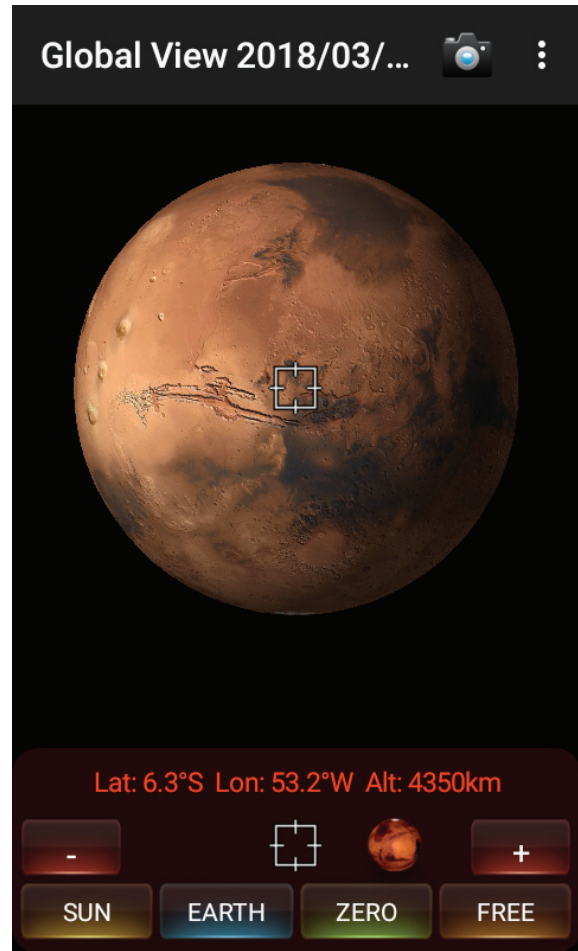


Figure 5 — Physical Mars in Globes mode.

There are a number of interesting additional features including the Orbit View diagram. *Physical Mars* lacks a red-light mode.

Overall the Android app is fair. Certainly, if you regularly use a Newtonian telescope or plan to photograph Mars, this app may prove very useful.

I never heard from the developer despite repeated attempts. I would like to know if version 1.12 last revised in 2014 would be updated for bugs and additional features. While not as feature-rich as other apps, the price of *Physical Mars* is reasonable.

Mars is coming. Be ready.

Bits and Bytes

There is a new edition of Aladin available, version 10, with an improved interface. ★

Blake's interest in astronomy waxed and waned for a number of years but joining the RASC in 2007 changed all that. He volunteers in education and public outreach, supervises at the Toronto Centre Carr Astronomical Observatory, and is a member of the national observing committee. In daylight, Blake works in the IT industry.