

Solar Eclipse Timings



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As a solar eclipse neophyte, I anxiously await the great North American celestial event in August this year. If I'm lucky, I will experience my first total solar eclipse. My packing list grows every day with items I feel I must have. I continue to research and study what will happen and, if I dare, how to photograph the spectacle. I keep testing equipment and batteries and simulating the event. Of course, I hope to employ a good app on my tablet and/or smartphone.

As I discovered the many available applications, I considered helpful and interesting features. I think the app should accurately calculate key times and durations for a given location that is automatically detected. It should have a countdown timer for totality. But perhaps what I thought most useful would be audible responses. I was very interested in an app that would quote timings or do countdowns with spoken words so that I could watch the sky—not the tablet screen—to be aware of and prepare for specific events.

I briefly tried a couple of software tools but was looking for something that worked on both the iOS and Android platforms. At one point, I spotted Solar Eclipse Timer (www.solarecliptimer.com) and it looked very interesting with a pleasing user interface and a number of good features, but I

moved on under the impression it was only available for Apple devices. Perhaps I read it wrong or initially it was only available on iOS, but when I looked at the website again, I happily found the Google Play button. I purchased version 1.3 for Android at \$2.69 and began exploring.

The Solar Eclipse Timer (SET) app opened in portrait mode to the Timer screen (Figure 1). Immediately I noted the wording “Universal Time”

but via the Settings panel I changed this to read as “Local Time.” I saw where the Timer display would show duration of totality, the calculated values for the first through fourth contact moments, along with the Max Eclipse incident time. With some satisfaction, I noted the safety warning reminding users to wear their eclipse glasses during partial phases. I also enjoyed the background multi-exposure photograph (by the owners) with prominences and hints of the corona bracketed by thin solar crescents.



Figure 2 — The Settings screen from 7" Android tablet.

The ADJUST buttons were intriguing. It seems they can be used if the automatically generated times are incorrect or not calculated at all.

I was a little disappointed to not see eclipse magnitude or obscuration values.

In Settings (Figure 2) I guessed at the purpose of the LOAD DEMO CONTACT TIMES button without reading the detailed description. The app prepared

the Timer screen with sample times to help me experience how the tool would function. Effectively, it was as if the eclipse were happening in a few moments. At T minus 3 minutes, I took in the scrolling on-screen prompt telling me to “Prepare For 1st Contact.” I waited for the audio content issued two minutes later. A man's voice said, “First contact in 60 seconds.” Then, the recorded voice started counting down, “40 seconds... 20 seconds...” I actually felt a little excited! “10 seconds.” I turned up the volume, wondering if I would be able to hear my device during the real event, over the din of anxious humans (I better pack the earbuds). “Five, four, three, two, one,” then an audio tone sounded as a new photograph appeared, one taken just after first contact, with a nibble out of the Sun (like Figure 3).

While I was very pleased with the audio capabilities, I realized the visuals had to be taken with a grain of salt. I caught myself expecting a simulated view like in planetarium software. If I were using Stellarium or SkyTools, for example, I could set the view as if I were examining the horizon. I could configure the view to show a normal presentation like with a camera lens or binoculars, as opposed to a rotated or flipped telescopic view.

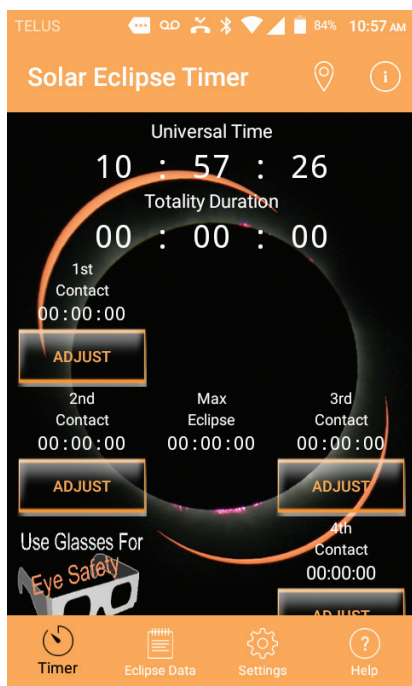


Figure 1 — The main Timer screen from a small Android smartphone.

I would then see that on August 21 the Moon will encroach from the top-right of the Sun's disk from the west with the ecliptic steeply inclined.

A few minutes later, my ASUS screen brightened and a new message scrolled: "Prepare for Temperature Observation." This was followed up with an audio dispatch, "Forty-five minutes until totality, observe decrease in ambient temperature." The photograph changed, now showing the Moon further into the Sun. At 30 and 15 minutes from second contact, the communiqués repeated. Then the curiously worded message, "Prepare for Lighting Observation," appeared. The verbal prompt at T-10 made it clear I should watch for "changes in ambient lighting." At 8 minutes to go, SET reminded me to listen for changes in fauna and at 3 mins before totality I was encouraged to look for shadow bands. I found all these reminders very helpful and I hope to exploit them on the big day. That said, I wanted hints about planets and bright stars that might be visible—that I intend to look for—unfortunately, the app does not incorporate these.

The long demonstration carried on, periodically updating photos revealing less and less of the Sun's photosphere. At last the main event drew near, SET informed me of second contact in 2 minutes, and showed our star as a thin crescent. Once again, the app started counting down. At 10 seconds, a photo highlighting prominences was shown. After the final 5-second countdown, a tone sounded, the background rendered a coronal image, and an audio message stated, "glasses off." All of a sudden everything seemed to happen very quickly! The Totality Duration timer started counting down (Figure 4), the glasses warning was removed, and before I knew it, the voice

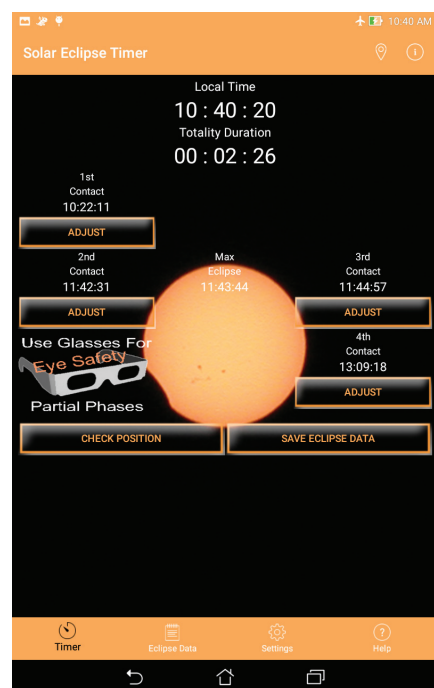


Figure 3 — A full simulation in Casper, Wyoming, after first contact.

said the maximum eclipse was due in 10 seconds, then 5, and also reminded me to "observe the horizon," when I noticed the photo changed to a diamond ring as the app advised of 3rd contact and prodded, more than once, to put my protective eye-wear back on, and it was rapidly over, just like that! No doubt it will seem faster to me in the plains of Wyoming.

At this stage, the demo did

not continue in real-time, but wound down briskly. It fast-forwarded to fourth contact and concluded. Demo mode can be halted at any time by tapping the Stop button in the top bar.

This initial test was performed with my USB data/power cable plugged into the tablet. With the Android machine running continuously and not shutting off the screen, I didn't miss a

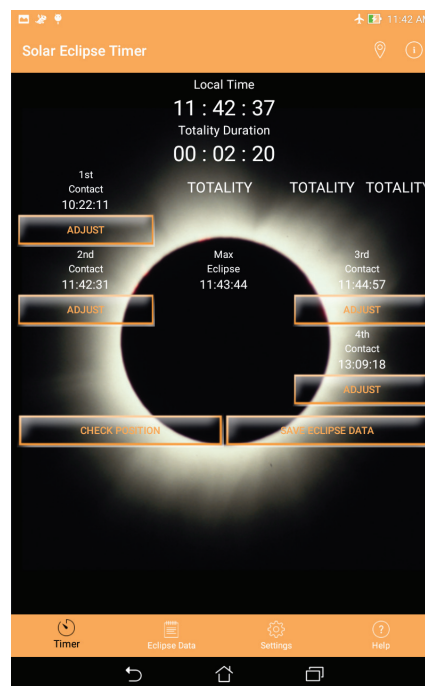


Figure 4 — Timer screen during totality in 2017 August 21 test.

beat. But I knew I needed to try it without external power, which is how I'll be using my mobile device. Sadly, it did not work as I had hoped, but this is likely an issue with my old ASUS. Onboard Help notes discuss device issues that may interfere with notifications. I heard a number of audio tones and prompts to be sure, while my tablet was in sleep mode, like "Eclipse event, open app." Notification messages like "45 min until Totality/observe ambient temperature" were obvious (like Figure 5). But during testing, 2 minutes from totality, no sound came from my device! Should I not rely too heavily on this app? Or can I keep the tablet from sleeping? I've seen some mobile apps with an option for overriding the automatic power-off; I wished for a convenient switch in this program. Happily, my smartphone, with a newer operating system, worked well!

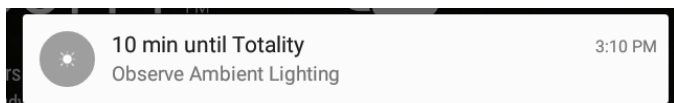


Figure 5 — Android notification shortly before second contact.

I also conducted a test for a future date and time and a location in the shadow path (city of Casper). It was fairly easy to tell the app where I was located after hitting the CHECK POSITION button from the Timer screen. The app only supports latitude and longitude in decimal format. Simulating the date and time of eclipse day in the seat of Natrona County, however, was awkward with no control inside the app proper. It took me a few moments to realize I had to first turn on Airplane mode to block automatic updating from the internet! Then my manually adjusted date/time values in the Android settings were followed.

Practice mode (available from Settings) lets you do real-time trials, perhaps to refine steps on your script or practice a photography or video run. All while the app plays a little movie with audio (from a cruise ship with very excited passengers).

The interesting Partial Phase Images panel shows sample thumbnail photos, but most importantly a timetable with calculated values should you want to shoot multiple images of

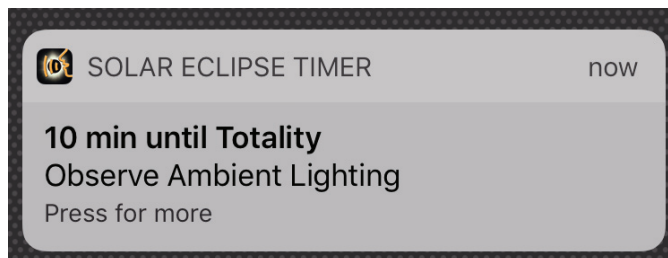


Figure 6 — Apple iOS notification from Solar Eclipse Timer.

the solar eclipse, perhaps for a single-frame multiple-exposure composition.

The SAVE ECLIPSE DATA button from the Timer display can be used to record your local eclipse circumstances, location details, and other notes. It can also act as a log sheet. But the owner explained the primary purpose as being “able to very quickly [save] your coordinates and your times in case [you’re chasing] good weather and you ended up observing at a site you did not expect or plan for.” Once you have saved notes you can access and edit them from the Eclipse Data list.

The indexed Help screens seem very thorough. There is also extensive information on the SET website. Owner Gordon Telepun enthusiastically helped me with various questions and provided screen snapshots from various devices.

There are certainly other apps out there if SET does not grab you. I liked the countdown to the next eclipse and auditory prompts in EclipseDroid. Some apps include interactive location maps and regional weather information. Some simulate a binocular view of the Sun being occulted by the Moon, for a particular location, to help the observer know where to look for first contact. Some get into a bit of the science of eclipses with history, photos, orbital diagrams, upcoming events, etc. One showed detailed technical information like the Moon–Sun size ratios and umbral depth.

Overall, I am pleased with Solar Eclipse Timer. It is straight forward and does what it promises. With its audio prompting, it sounds like it will be a good tool for eclipse day.

Update Bits

A new version (3.1.9) of Backyard EOS was made available back in March.

Do you have a favourite app? Have you written your own app? Let me know! ★

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 Carr Astronomical Observatory, and is a councillor for the Toronto Centre. In daylight, Blake works in the IT industry.