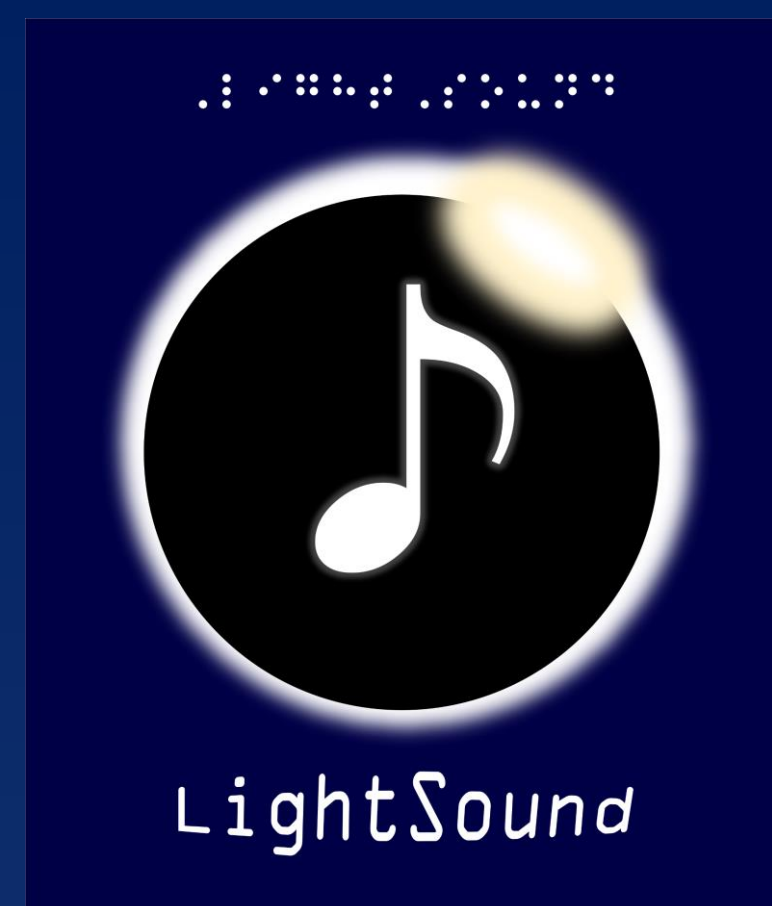# Accessibility for the 2023 and 2024 Eclipses

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LightSound

CENTER FOR **ASTROPHYSICS**
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1 Background

Solar eclipses are typically thought of as striking visual phenomena, but, as such, are often inaccessible to blind and low-vision (BLV) individuals. For the 2017 Great American Solar Eclipse, we developed a device called LightSound that turns the light intensity from the eclipsing Sun to sound through a process called "sonification." Three devices in Wyoming and Kentucky took data or streamed sound online for people around the world.

2 2019 & 2020 South American Eclipses

For the 2019 and 2020 South American Eclipses, we re-designed the device with a higher dynamic sensor range and improved MIDI sound capabilities. With an IAU100 Special Projects grant, we built and distributed 20 devices to Chile and Argentina for the 2019 eclipse. Our South American colleagues received additional funding to distribute over 100 additional devices as part of "Inclusive Eclipse" kits to BLV people and eclipse events across the 2020 total solar eclipse.

A 3D-printed case distributed for the 2020 eclipse by the Chilean Astronomía Inclusiva.

3 The Device

The LightSound uses Arduino technology with a sensor that measures the ambient light and converts it to sound using an Adafruit Flora board and a MIDI synthesizer board. The Flora microcontroller board has a micro-USB port that is used to upload the Arduino code and record data during observations.

Funding:
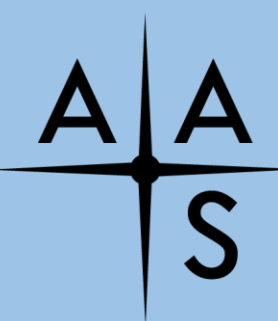
AAS AMERICAN ASTRONOMICAL SOCIETY

### July 2019 South American Eclipse

Clockwise from top left: a LightSound sits on a table playing sounds for a group of BLV people at an eclipse event in La Serena, Chile; a young boy holds a LightSound to the Sun at a demonstration event in Santiago, Chile; an Argentinian BLV man in a wheelchair holds a LightSound; a young Chilean girl holds an Inclusive Eclipse kit that has a LightSound in it.

December 2020 South American Eclipse
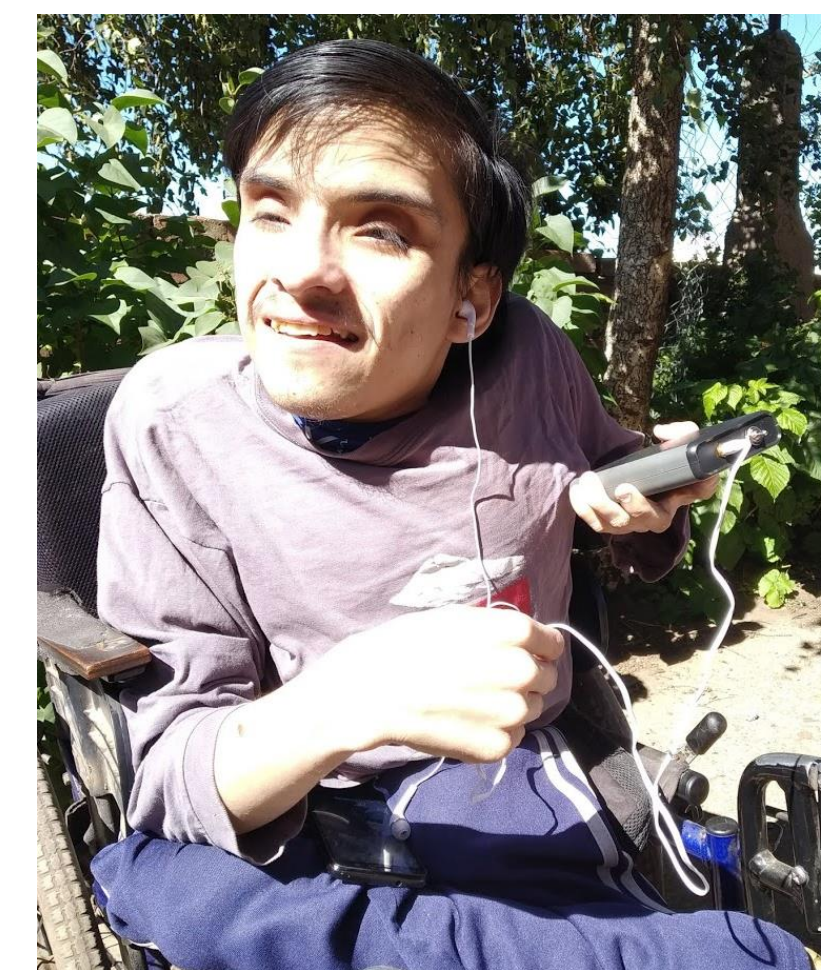
Post-Eclipse Sonifications
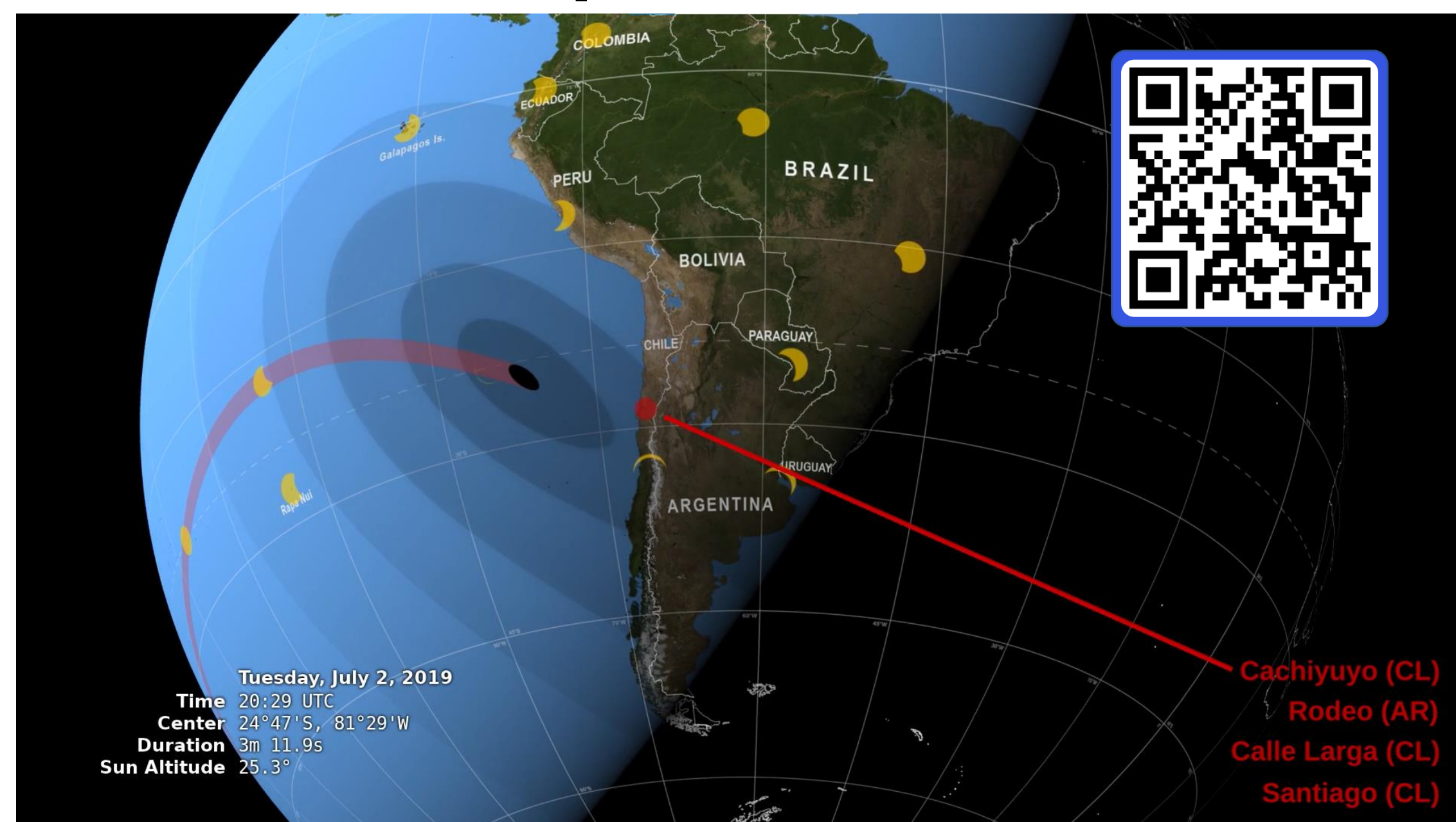
Data collected from eclipses with LightSounds can be re-sonified at a later data, such as this 2019 Eclipse Map, which plays the sonifications from Rodeo (Argentina), Cachiyuyo (Chile), Calle Larga (Chile), and Santiago (Chile) along with a NASA animation of the eclipse. Scan or click on the QR code icon to watch/listen to the map or click here.

"I can perceive lights, I can recognize day and night, but this amazed me. I felt like I was entering the mysterious world of the planets and the solar system."
– Denisse Reyes, via Reuters

4 2023 and 2024 Eclipses Preparations

Through a AAS mini-grant program and the Rochester Eclipse Planning Workshop, we are able to donate 50 devices to communities, museums, National Parks, universities, etc. that will be hosting events and running solar eclipse educational events. We are also planning another workshop next spring to build 100 more devices to distribute.

Since the LightSound is sensitive to light changes, it is beneficial to both sighted and unsighted people when the Sun is not visible or safe to look at with the naked eye, e.g., cloudy conditions or an annular eclipse.

5 Workshops and Build-a-thons

One of the goals of the LightSound project is to become a sustainable project, where people can easily build or obtain a LightSound, if they desire. We have run several workshops and build-a-thons to teach people how to build the devices that will then be donated.

If you are interested in partnering with us, please get in touch!

Participants build LightSounds at the AAS 235 Workshop.
(Photo credit: Todd Buchanan)

6 Build or Request a LightSound

LightSound is a completely open-source resource with instructions online for building and using it in English and Spanish. We have also provided the source code for running the device online, along with Python plotting tools. For instructions and code for building your own LightSound, visit the Harvard Astronomy Lab's Accessibility page by clicking here or scanning the QR code (top).

To request a device, please fill out the form by clicking here or scanning the QR code (bottom).