Asteroid Occultations

Become a Shadow Hunter

User Guide
V2.0

App version 2.0.1 (436)

Shadow Hunting Tutorial

First time observing an occultation of a star by an asteroid? Read this presentation to master your Unistellar telescope and join our team of shadow hunters.
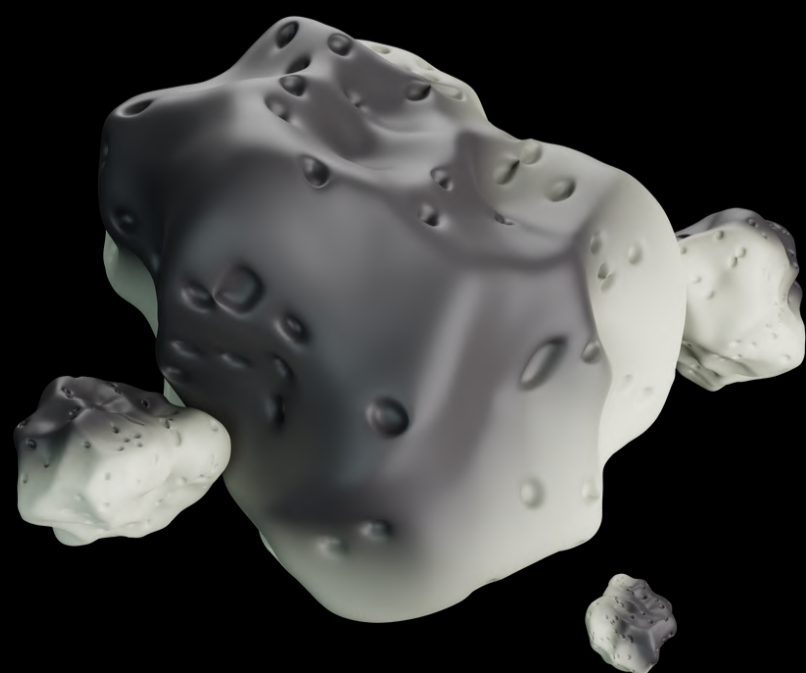
PRE-OBSERVATION

Select your mission

An asteroid occultation is a unique event to record. To catch this moment you need to be in a specific location on Earth. First, you have to select a mission near your location. Go to our Occultation Prediction Page and select an occultation you want to observe.

To find out if you will be in an asteroid's shadow, simply zoom by scrolling on the map. If you are observing from anywhere between the two orange lines, you are qualified for the scientific mission! The closer you are to centrality, marked by the red line, the better chance you have of detecting the occultation.
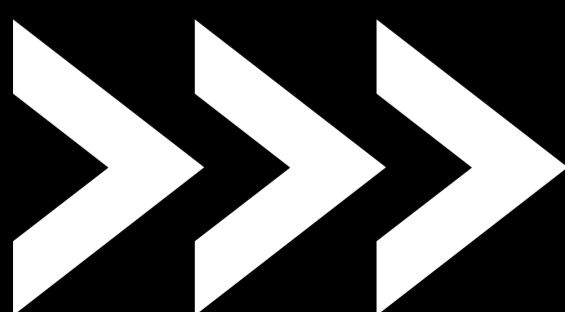
PRE-OBSERVATION

2 Read the Prediction

Once you have selected a scientific mission based on your location, you need to access the observation details:

- the time of the event
- the coordinates of the star
- the recording parameters

All of these parameters are listed on our Occultation Prediction Page. You will need these to observe the occultation.

On the next page is an example of a prediction map similar to what you will see if you go to the Occultation Prediction Page.
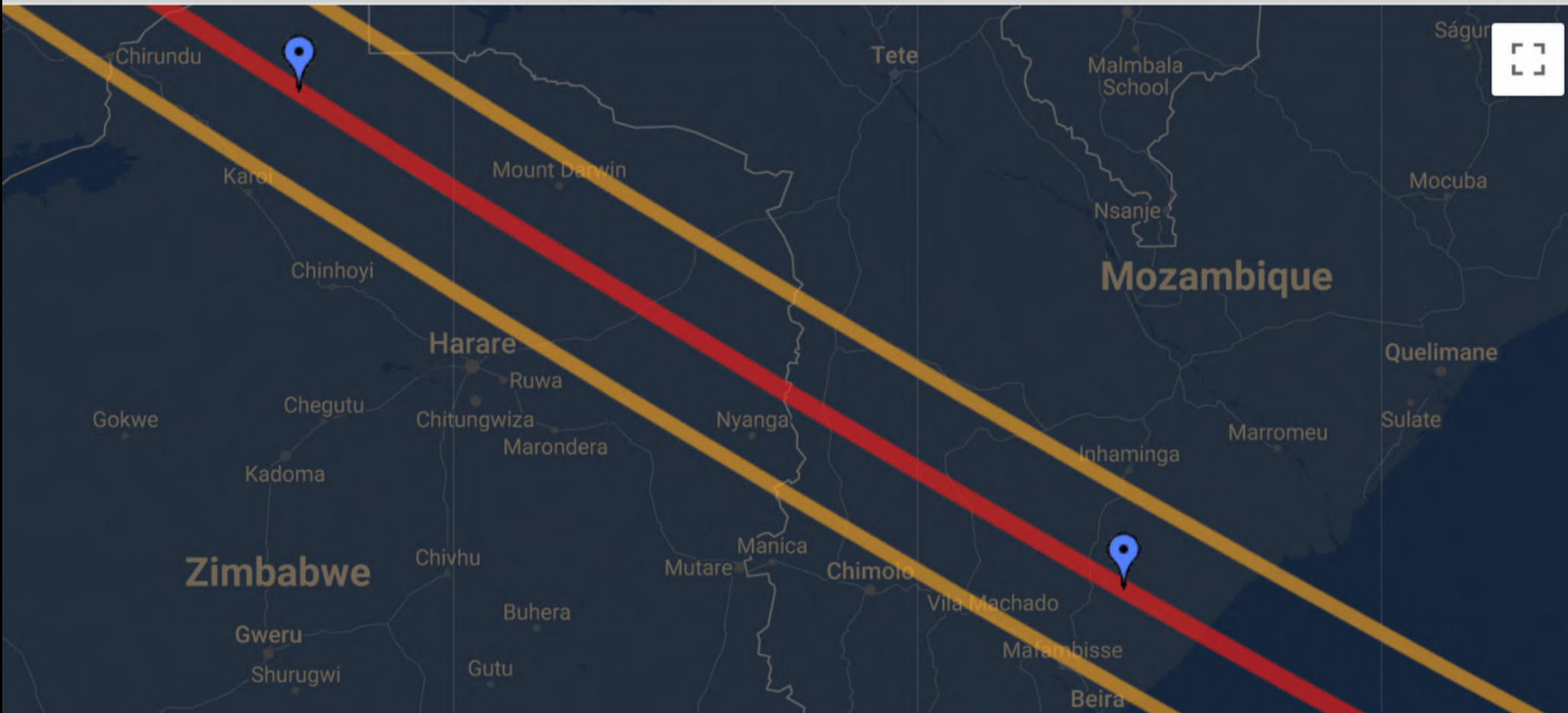
>>>

PRE-OBSERVATION

2 Read the Prediction

Link❓	Name	Type	Date^{UTC}	Time^{UTC}	Local ❓	Ra	Dec	Exp.	Gain	Dur.
📱	306 Unitas	Main-Belt	29 Jul	18:39	29 Jul 20:39	15h 43m 01s	-10° 56' 07"	300	20	14m00s

Based on the prediction example (above) :

- Local start date of the event : 29 July at 20h39
- Coordinate RA: 15h 43m 01s
- Coordinate Dec: -10° 56' 07''
- Recording parameters: 300ms, 20 dB and 14min00s

All these parameters are also saved in a Deep Link that you can use 10 minutes before your observation. It is the first icon of the row, illustrated by a phone. (More information about Deep Links are given below in "During Observation".)
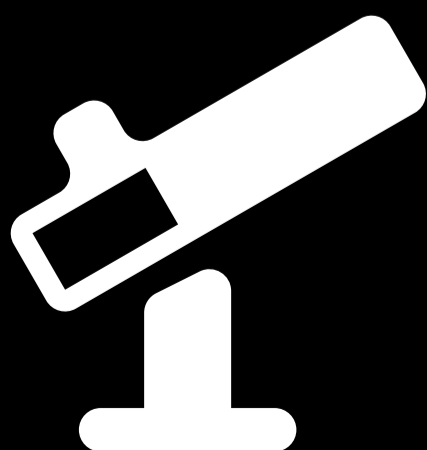
PRE-OBSERVATION

Get ready

Prepare your gear:

The day before your scientific mission, you need to charge your Unistellar telescope and empty its memory. If you need help emptying the memory of your telescope, please read these guidelines on "how to upload my data".

Find your location:

To improve the quality of your data we recommend observing from a place with few street lights, not exposed to wind, and where you have good cellular service. You should also check the weather to avoid clouds and strong winds. The websites ClearOutside or Astrospheric are good tools for astronomers.
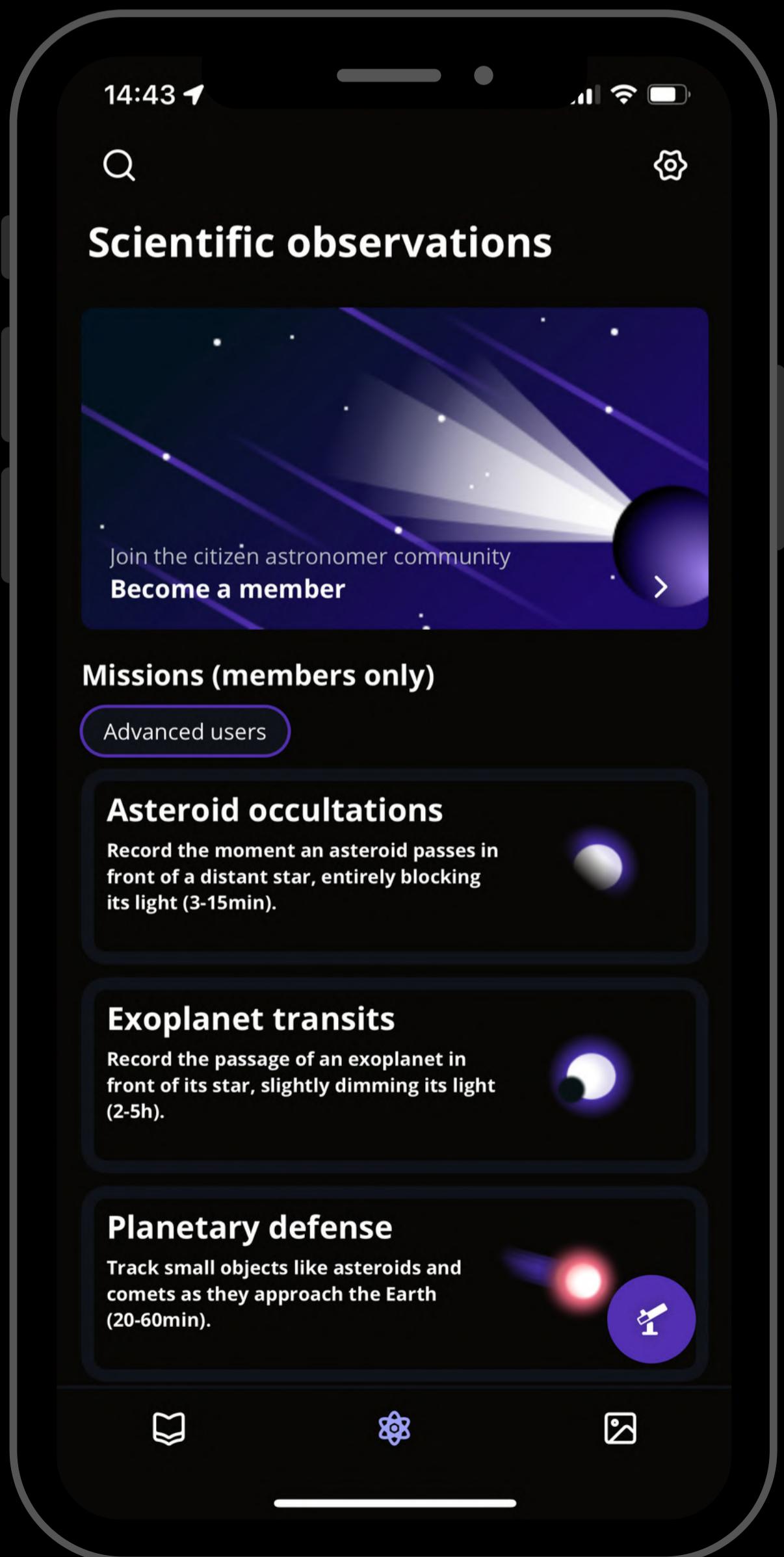
PRE-OBSERVATION

4 Become a member

Join the community of Citizen Astronomers to receive alerts and be credited for your observation. To do so, in the Unistellar App V2.0, select the science menu and click on "Become a member". You will also receive an email invitation to join our Slack communication platform where thousands of Unistellar Citizen Astronomers are connected.

DURING OBSERVATION

1 30 minutes before

Set up your Unistellar telescope as you normally would before observing.

- Level the tripod
- Launch the Unistellar App (make sure that your smartphone was connected to 3G/4G/5G before opening)
- Turn your telescope On
- Launch Autonomous Field Detection through the App
- Calibrate your telescope with the Collimation Screw and Focus Wheel. If you need help calibrating, please read these guidelines on "how to collimate my mirror" and "how to use the bahtinov mask for focus"
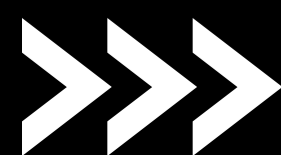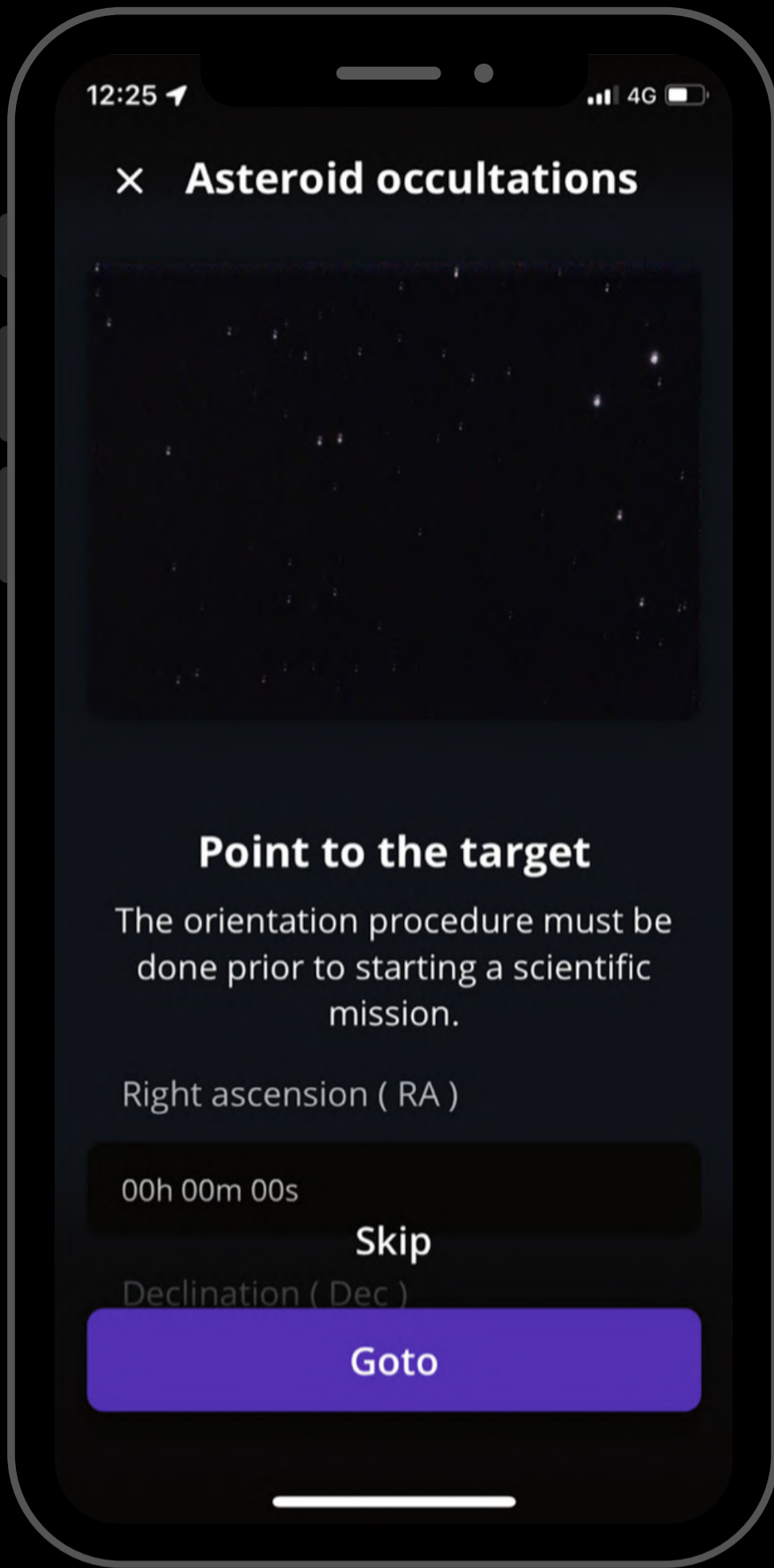
DURING OBSERVATION

2 10 minutes before

It is time to point to your target! Two options:

1. **Deep Link method:** The quickest way to find your target is to use your smartphone to click on the Deep Link associated with your event. Refer back to page 5 to see where this is located. It will automatically open the Occultation tab of your Unistellar App and fill up the coordinates of the target and its recording parameters. If the *Right Ascension* box and *Declination* box are filled with the correct coordinates, click on Goto to point to your target. Once Goto is done, if the *Record duration*, *Exposure time*, and *Gain* are correct, click on Save.

2. **Manual method:** Open your Unistellar App, click on the Science menu and select the Occultation tab. Enter the *Right Ascension* and *Declination* and click on Goto to point to your target. Once Goto is done, enter the *Record duration, Exposure time,* and *Gain* and click on Save.
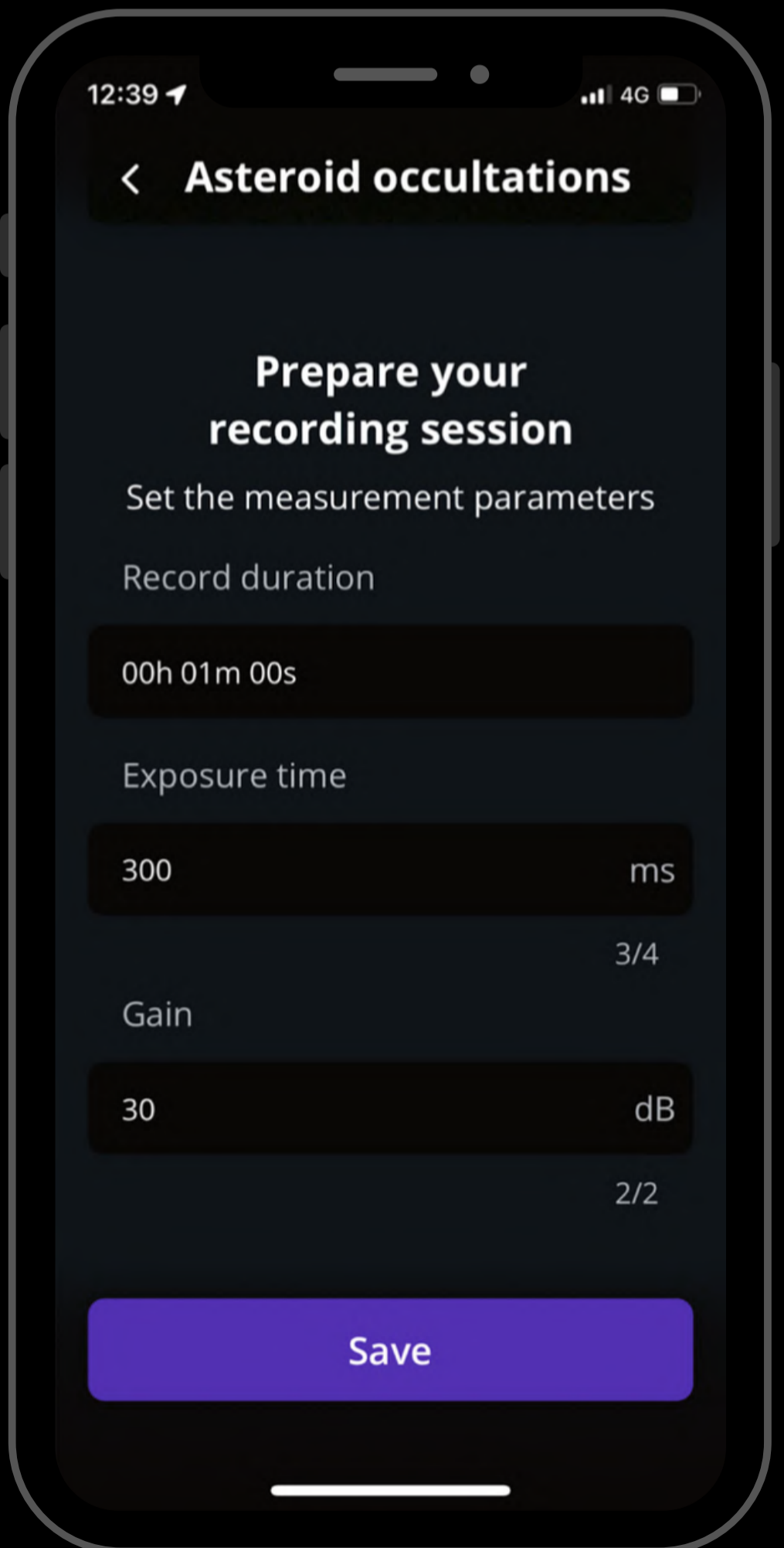
>>>

12:25 ◢   ▪▪▪ 4G ▪

✕ **Asteroid occultations**

Point to the target

The orientation procedure must be done prior to starting a scientific mission.

Right ascension (RA)

00h 00m 00s

Skip

Declination (Dec)

Goto

Pointing
to your
target

〈

Entering
observation
details

〉

12:39 ◢   ▪▪▪ 4G ▪

〈 **Asteroid occultations**

Prepare your
recording session

Set the measurement parameters

Record duration

00h 01m 00s

Exposure time

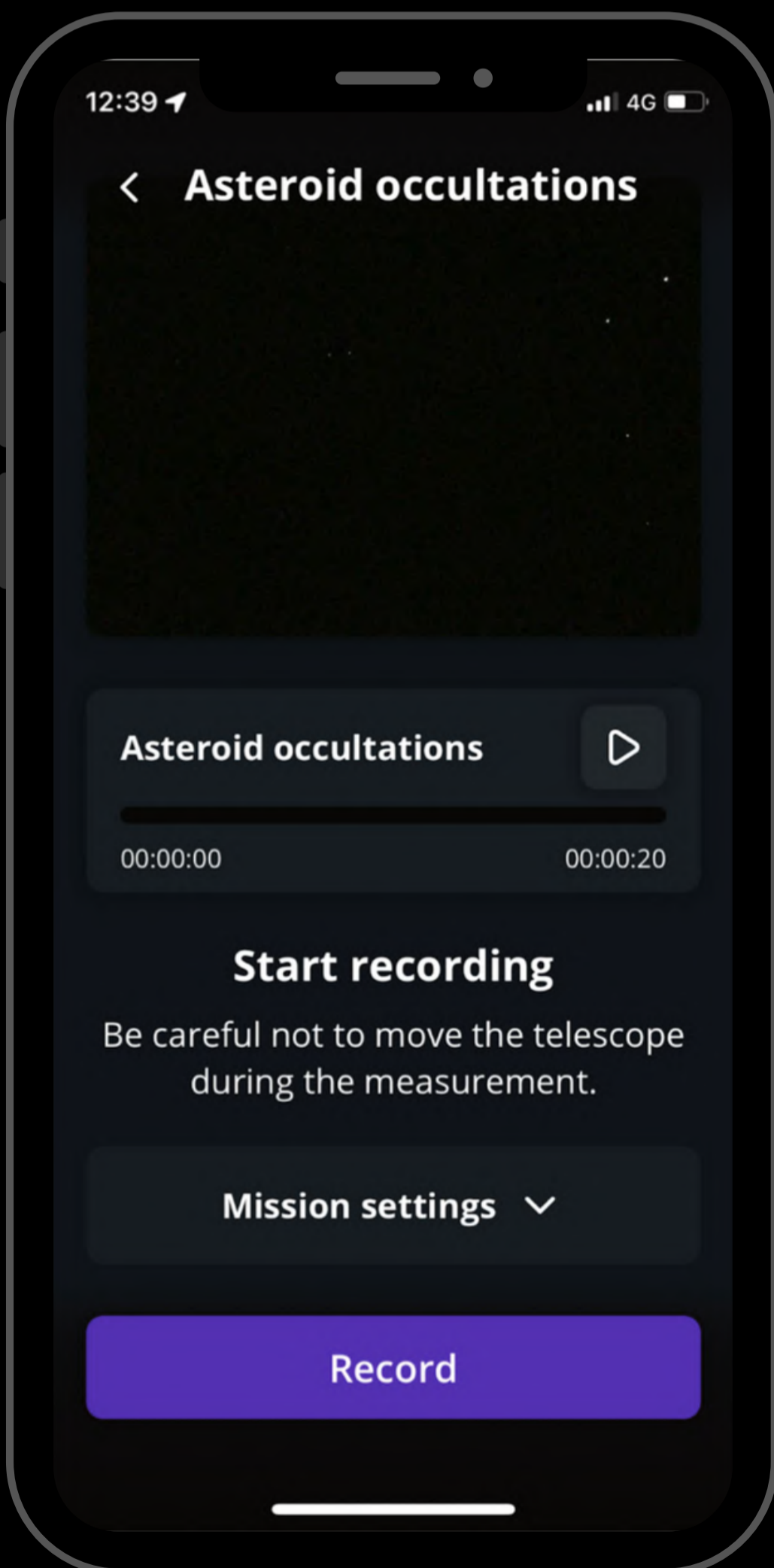300   ms

3/4

Gain

30   dB

2/2

Save

DURING OBSERVATION

Launch observation

At the start time, click on the Record button to start the observation.

Note that the "Local Time" listed on the Occultation Prediction Page *is the start time* when you should press Record. If you begin to record at this time and observe for the entire duration, you have the best chance to catch the occultation.
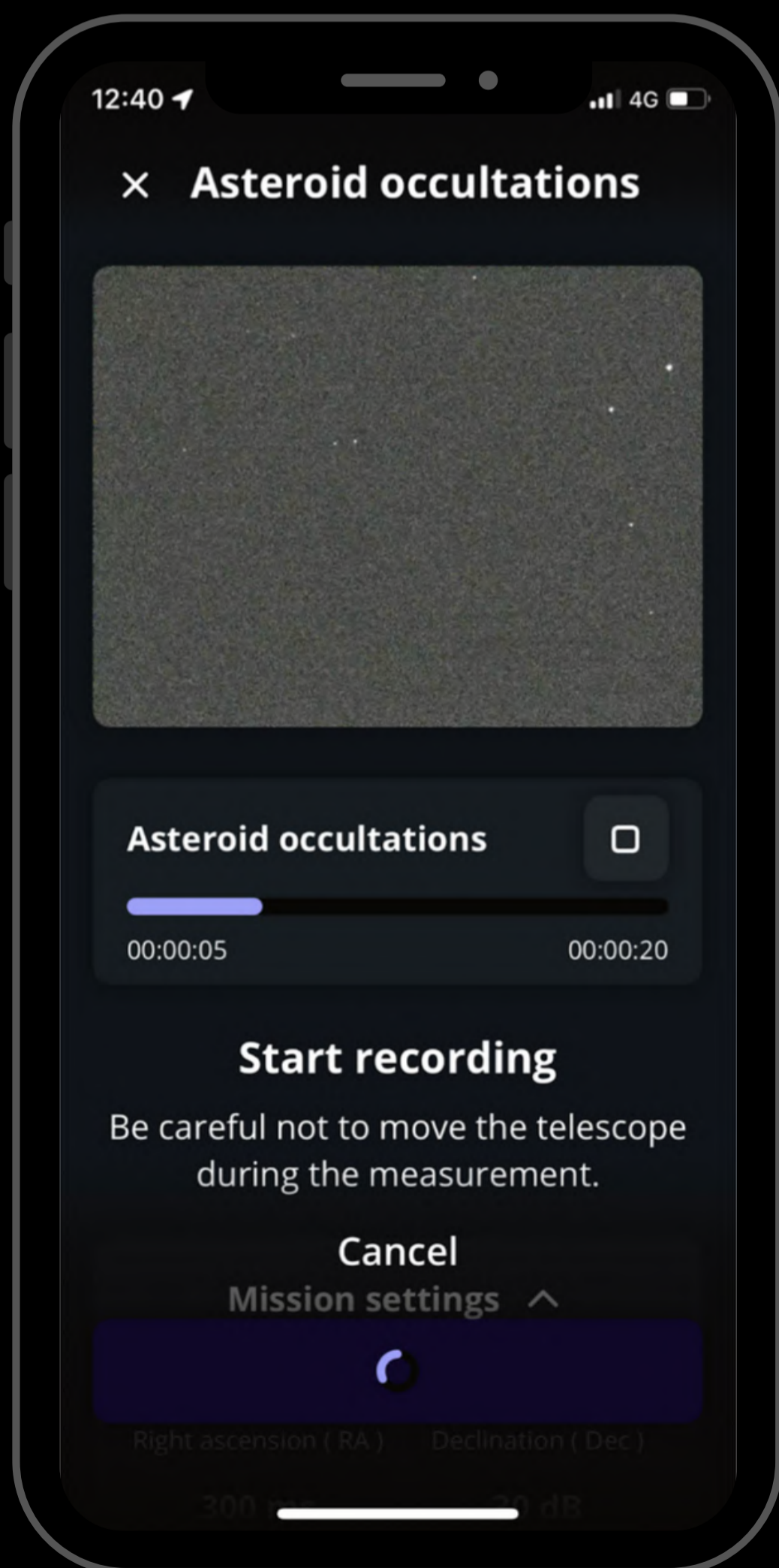
DURING OBSERVATION

Complete observation

During the observation, keep an eye on your star – you may see it briefly disappear in the live view due to the passing asteroid.

Once the observation is over, a final message appears: "Recording complete".

POST - OBSERVATION

1. Share your data: Once you are at home, please upload your data to our server. Our team of scientists will analyze your observation to check if you detected the occultation. If you need help, please read these guidelines on "how to upload my data".

2. **Tell Unistellar you have participated:** To make sure your contribution is properly processed and you are credited for the result, always fill out this Occultation Observation Report. It asks for your name, the serial number of your telescope, and the name of the scientific mission you just accomplished.

CITIZEN SCIENCE

ASTEROID OCCULTATIONS

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YOU'RE DONE

We will send you the result of your scientific mission through our Slack communication platform, typically within 24 hours.

Great Work, Citizen Astronomer!

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