

Planetary Defense

Become a Planetary Guardian

User Guide
V2.0



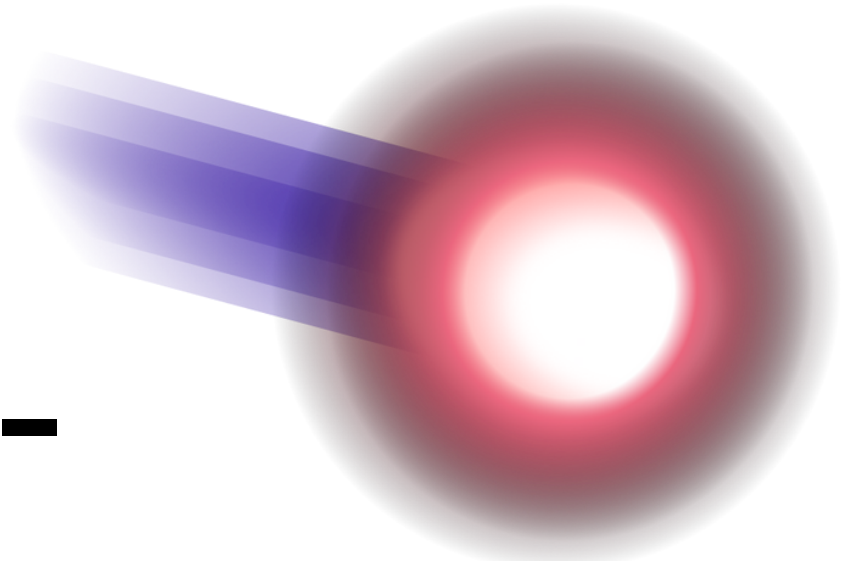


UNISTELLAR

App version 2.0.1 (436)

Planet Guarding Tutorial

First time observing a Near-Earth Object? Read this page to master your Unistellar telescope and join our team of Planetary Guardians.



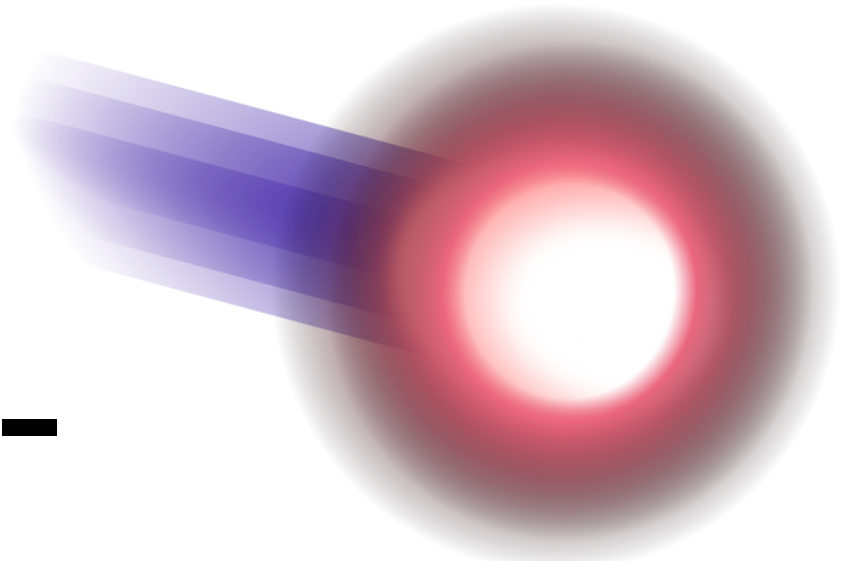
PRE-OBSERVATION

1

Select your mission

The passage of a near-earth object is a rare event to record. To begin guarding the planet, you first need to select a mission suitable for your observing location. Go to our [Planetary Defense Campaign Page](#) and select a near-earth asteroid you want to observe. Your ability to participate in the scientific mission may depend on which hemisphere you are observing from!





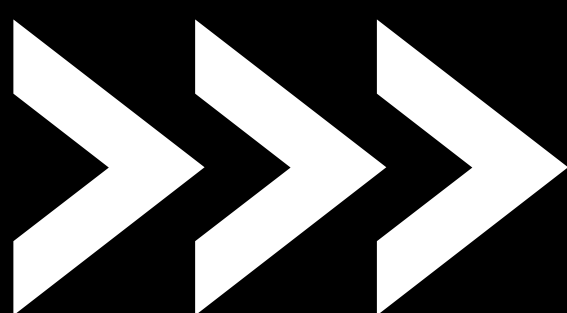
PRE-OBSERVATION

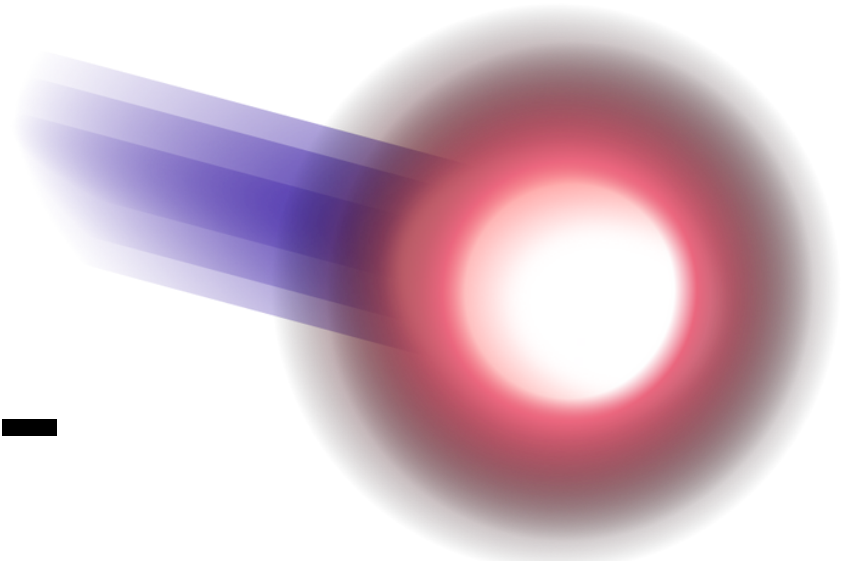
2

Compute Coordinates

Near-Earth objects are fast-moving targets to observe. Their coordinates in the sky depend on the location and date of the observation. If the near-earth object is in the Unistellar App Catalog, then you will have access to the coordinates from the catalog. However, if the near-Earth object is *not* in the Unistellar App Catalog, you have to compute its celestial coordinates with our [Moving Target Ephemerides](#) page. The recording parameters, Record duration, Exposure Time and Gain, are always given on the [Planetary Defense Campaign Page](#).

If the near-Earth object is not in the Unistellar App, see the instructions for how to compute coordinates on the next page.



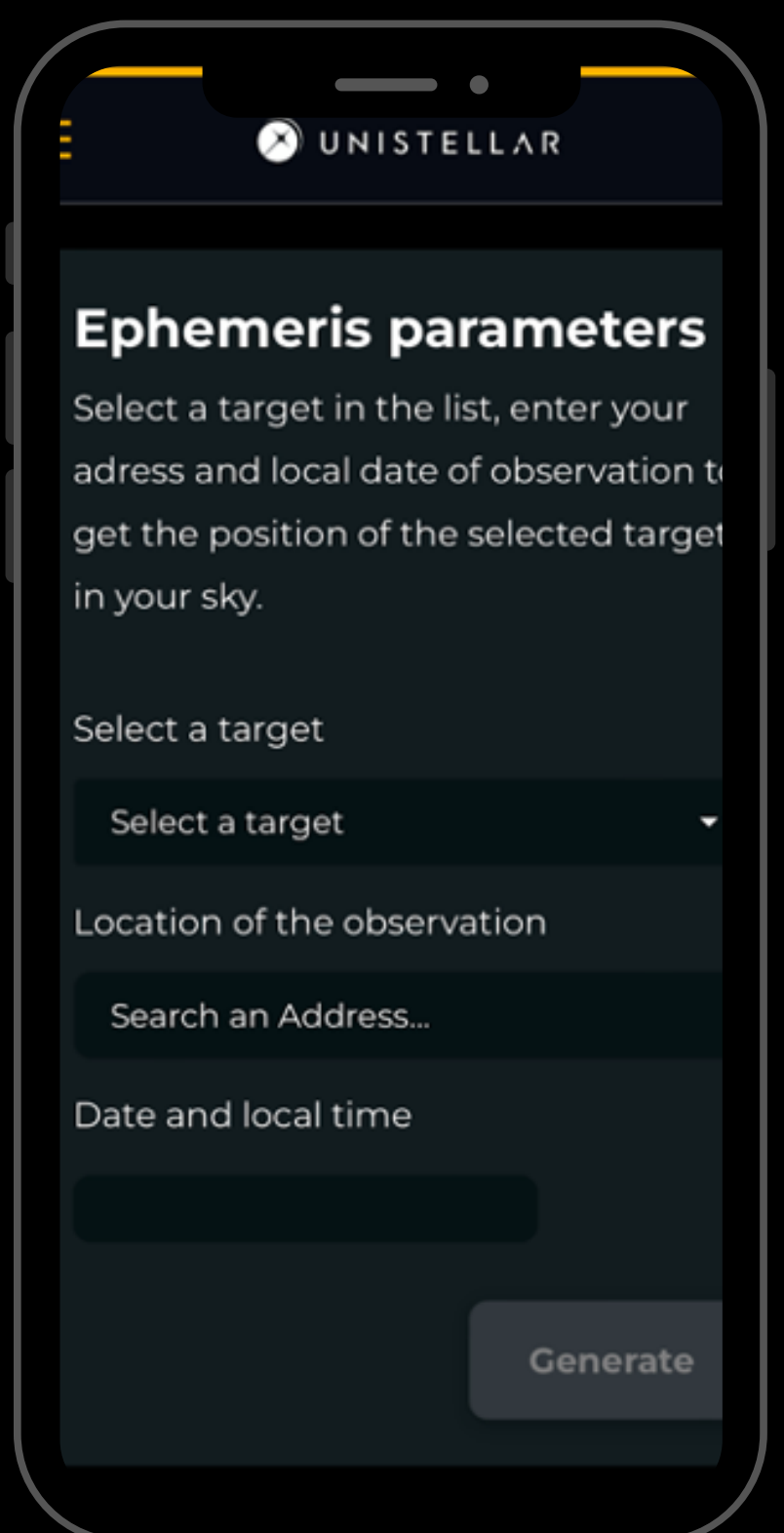
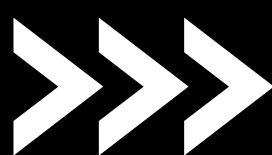
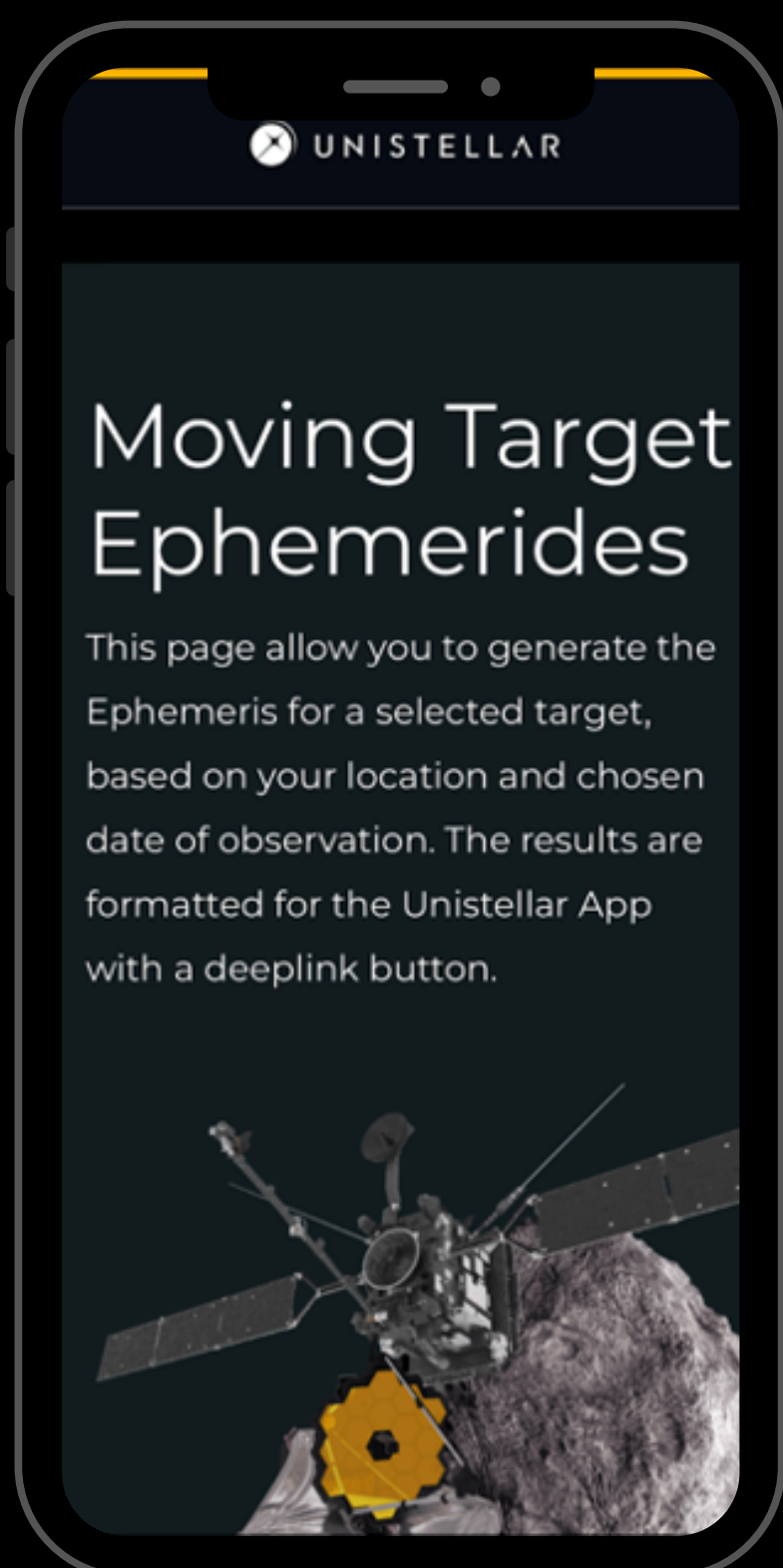


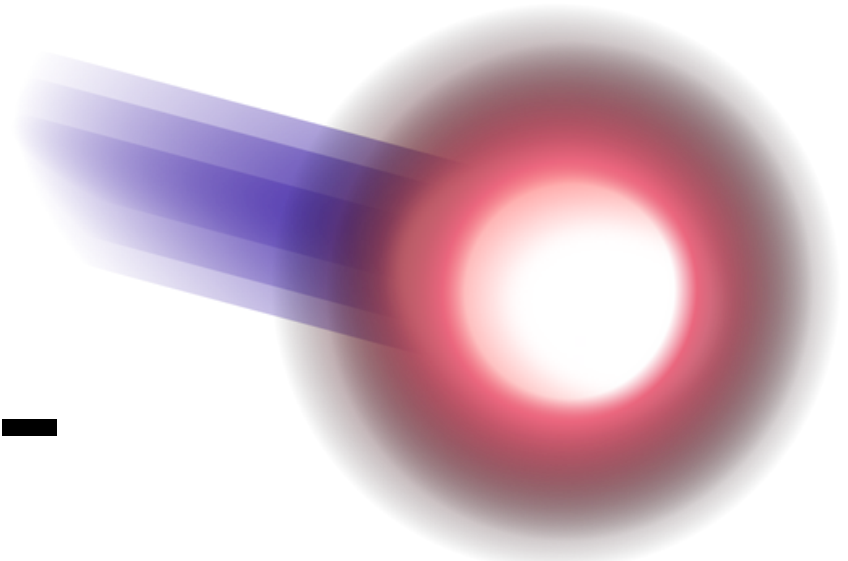
PRE-OBSERVATION

2 Compute Coordinates (optional)

Moving Target Ephemerides

If you want to observe a Near-Earth Object that is not in the Unistellar App Catalog, visit our [Moving Target Ephemerides](#) page. In the Ephemeris Parameters section, select your target and enter the location where you'll be observing, as well as the date and local time when you'll be observing. Click on **Generate** to get your results.



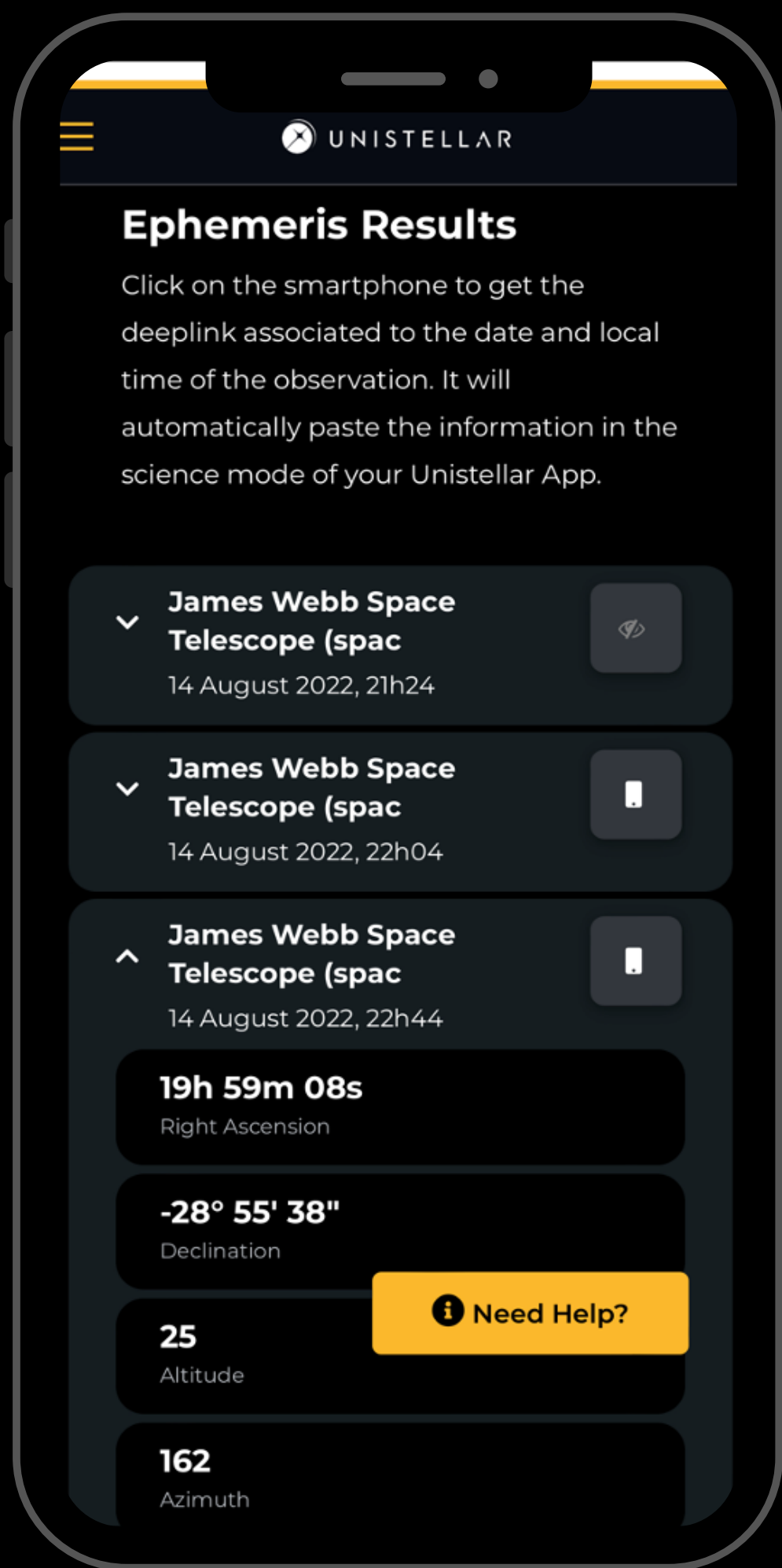


PRE-OBSERVATION

2

Compute Coordinates (optional)

After a few seconds, the Ephemeris Results section will be generated with a list of celestial coordinates for your night. Each line corresponds to the position of your target at a specific time. If the target is visible from your location, you will be able to click on the smartphone icon ([Deep Link](#)) that will open your Unistellar App and fill the *Planetary Defense* tab with the proper fields. If your target is not visible, a crossed-out eye icon will appear. You need to save these coordinates for your observation or you will have to compute them during your observation.



*JWST is simply an example target



PRE-OBSERVATION

3

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.

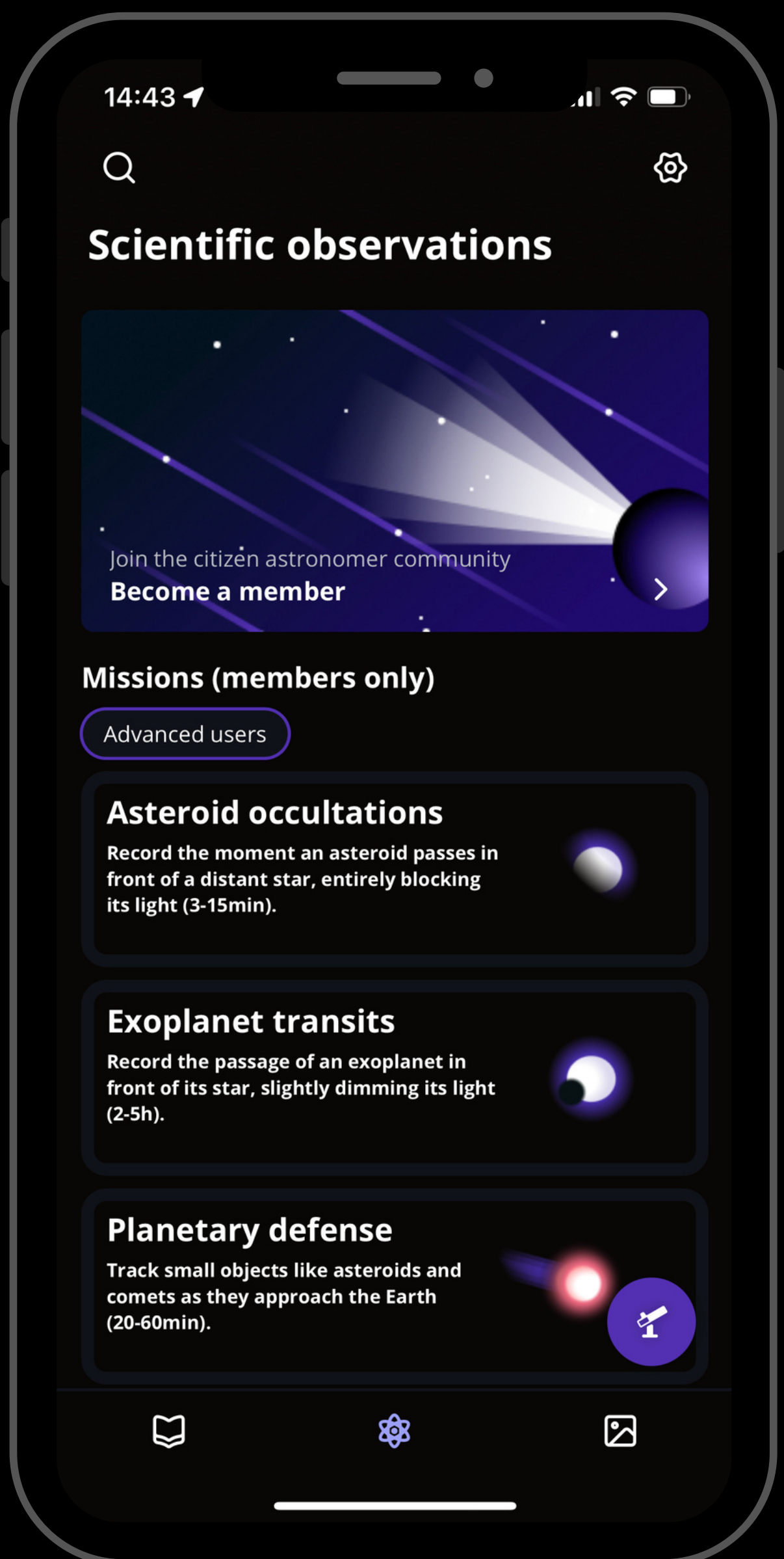


PRE-OBSERVATION

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 and professional 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

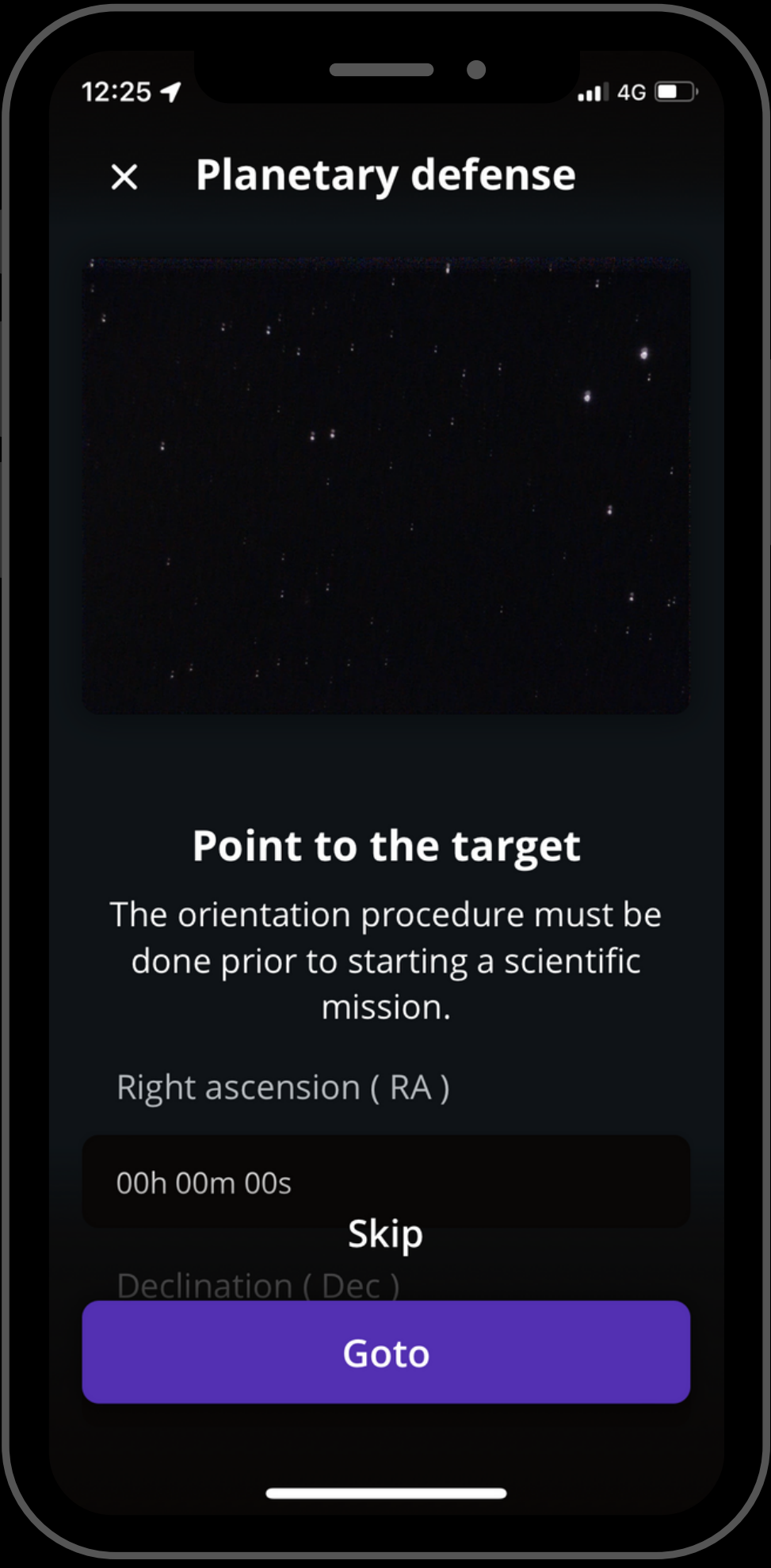
10 minutes before

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

A. The asteroid is in the App Catalog: Open your Unistellar App. In the Catalog, enter the name of your asteroid, select it and click on **Goto**. Once the goto is done, click on the Science menu and select the Defense tab. Skip the step that prompts you to "Point to the Target". Enter the *Record duration*, *Exposure time*, and *Gain* - then click on **Save**.

B. The asteroid is NOT in the App Catalog: The quickest way to find your target is to use your smartphone to click on the [Deep Link](#) generated with our Moving Target Ephemeris tool that you read about in the previous section. It will automatically open the Defense tab of your Unistellar App to enter the coordinates of the target and its recording parameters. If the *Right ascension* 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, you can click on **Save**.

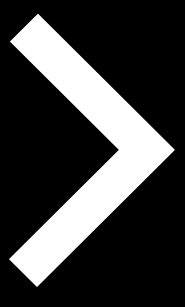




Pointing
to your
target



Entering
observation
details



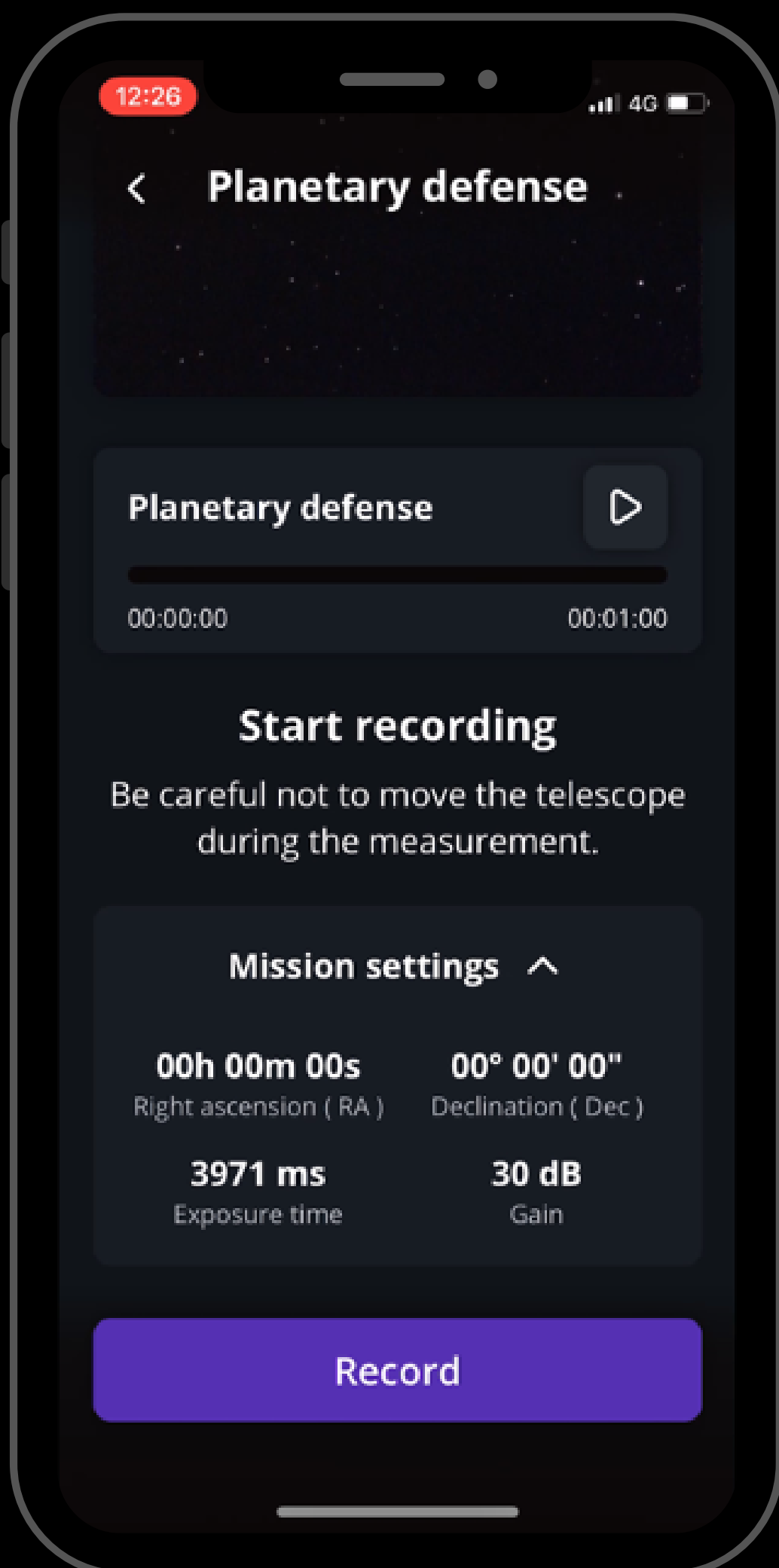
DURING OBSERVATION

3

Launch observation

When you are ready, click on the **Record** button to start the observation.

Note that you can begin recording at any point of the night when the target is visible to you and will remain so for around two hours. We generally ask for three, back-to-back, 40 minute observations, as the target can move out of your telescope's field of view.



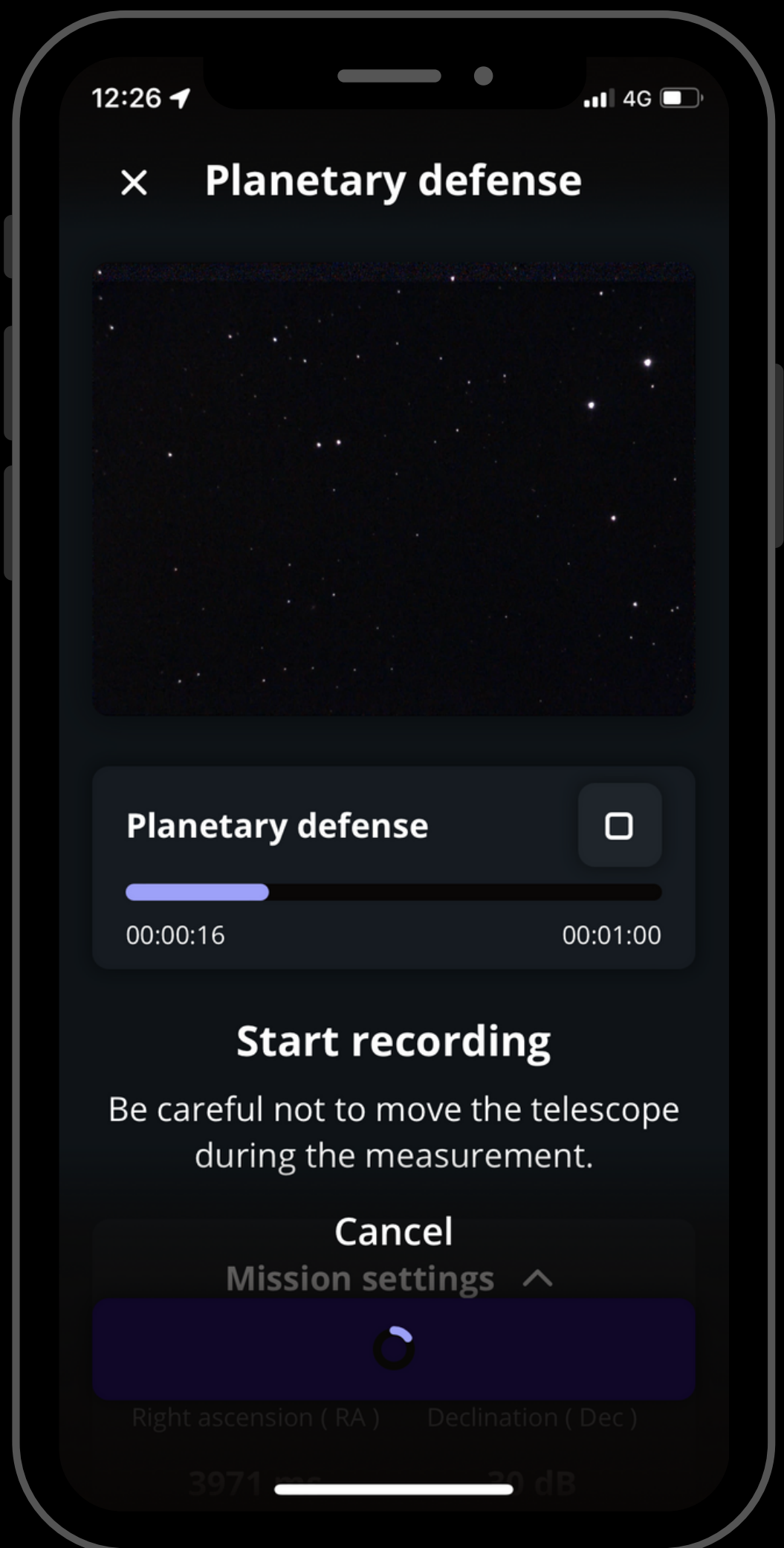
DURING OBSERVATION

4

Complete observation

During the observation, you may see the NEO moving in the live view. If you see it move out of the live view, it is time to stop the current observation.

Once the recording is over, click on **Continue** to calibrate your sensor.

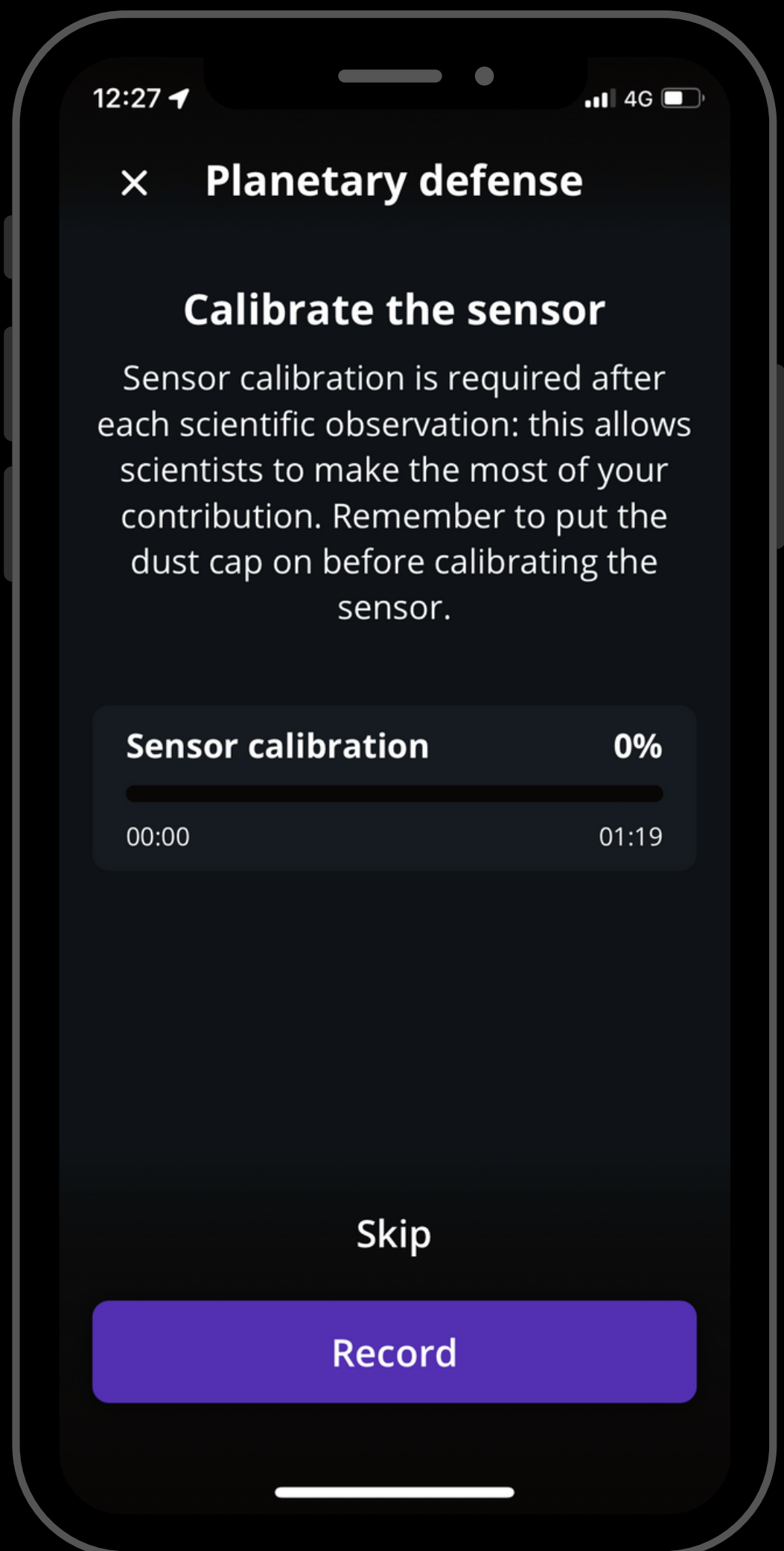


DURING OBSERVATION

4 Complete observation

This calibration step gathers *Dark Frames* which will help us better analyze your observation. You must put the dust cap on your telescope before recording the calibration.

After this step, a final message appears: “Recording complete”. The mission is over.



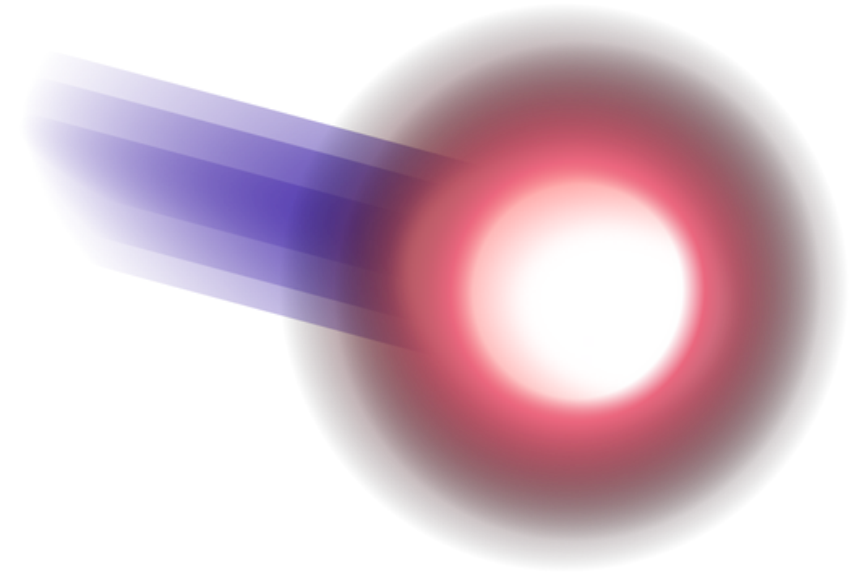


POST - OBSERVATION

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 near-Earth object. 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 [Planetary Defense Observation Report](#). It asks for your name, the serial number of your telescope, and the name of the scientific mission you just accomplished.





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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