PhotoPills User Guide

PhotoPills

www.photopills.com

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Never Stop Learning

The Definitive Guide to Shooting Hypnotic Star Trails

How To Shoot Truly Contagious Milky Way Pictures

Understanding Golden Hour, Blue Hour and Twilights

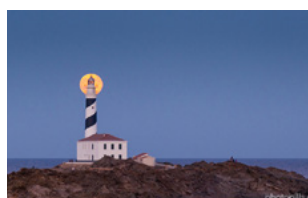## 7 Tips to Make the Next Supermoon Shine in Your Photos

MORE TUTORIALS AT PHOTOPILLS.COM/ACADEMY

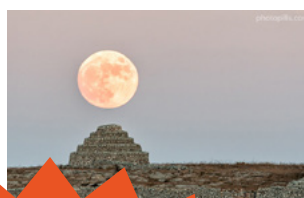### Understanding Azimuth and Elevation

How To Plan the Milky Way Using The Augmented Reality
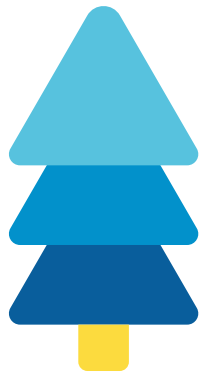

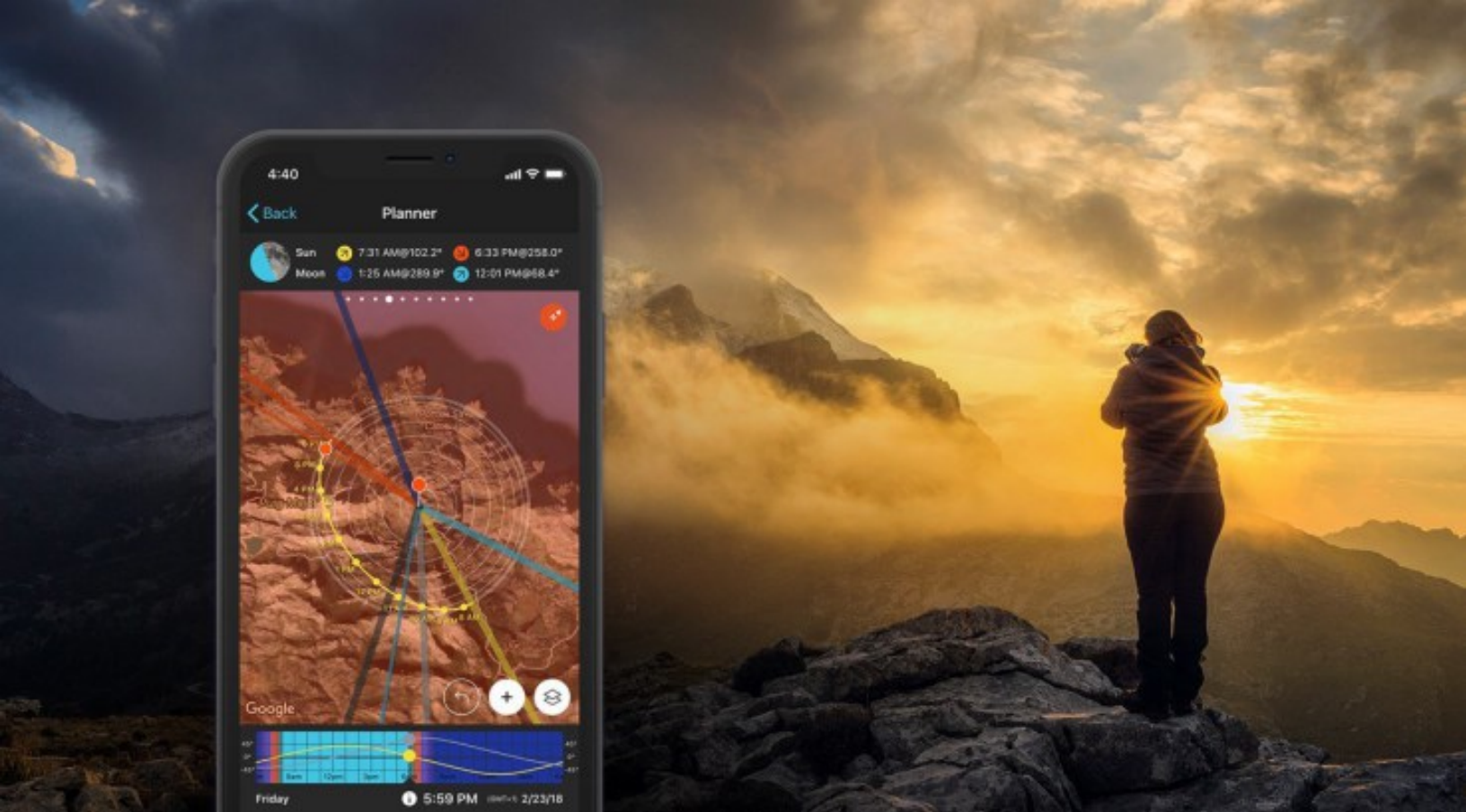### How to find moonrises and moonsets

How To Plan The Next Full Moon

PhotoPills Camp

Join PhotoPillers from around the world for a 7 fun-filled days of learning and adventure in the island of light!

Learn More

(Updated to iOS v2.12, Android v1.7)

Welcome to **PhotoPills**!

It all began in 2013 with an iPhone app, but after developing the Android version and creating a tribe of over 400,000 PhotoPillers across the world, PhotoPills is turning into something different, something more exciting... A movement of photographers that share the same vision:

"To always be at the right place at the right time to capture the scenes we imagine..."

PhotoPills is our crystal ball, our lightsaber... The tool that allows us to let our imagination fly and do all the planning to capture the photos we dream of.

Imagine. Plan. Shoot!

We created PhotoPills to help you go from ideas to real photos.

To help you:

- **Imagine**, get inspired, be more creative, come up with different photo ideas with the Sun, the Moon, the Milky Way, Star Trails, Meteor Showers, Eclipses...

- **Plan** them, find the right shooting spot and right shooting date and time the scenes you imagine actually happen...

- So you can go and **Shoot** them, capture your own photo ideas.

To achieve it, **PhotoPills** includes all you need: from sources of inspiration and learning to advanced planning tools and photography calculators.

All of this will become clear as you read through this guide.

Ready?

"A goal without a plan is just a wish." – ***Antoine de Saint-Exupéry***

Contents

Section 1:
Getting Started

The first thing you should do when downloading PhotoPills: Enable the Widgets!

Congratulations!

Because you're here reading these lines, you've just entered the selected group of PhotoPillers that know the Widgets exist!

Take advantage of it. :)

Why you should use the PhotoPills Widgets
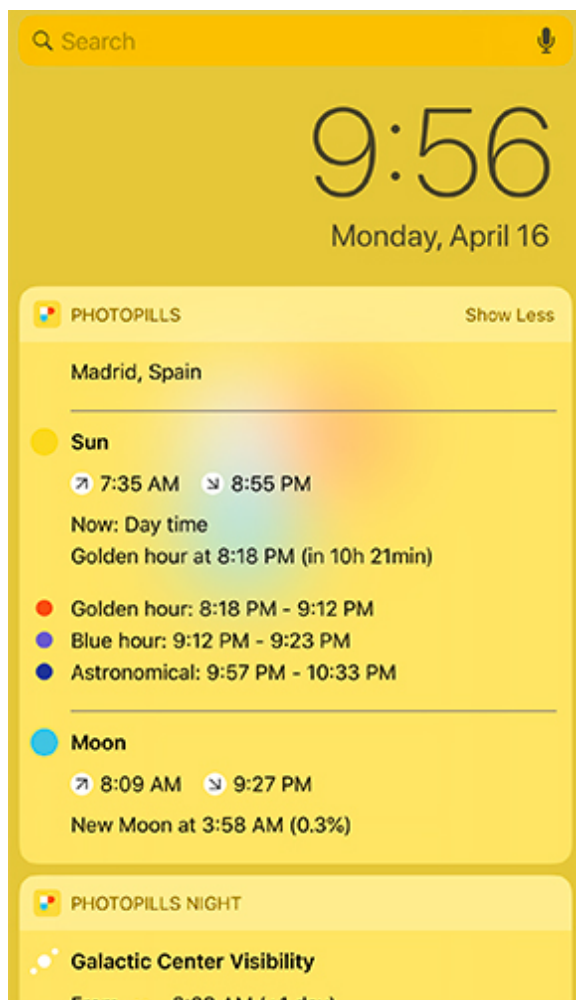
PhotoPills Widgets - Sun, Light and Moon info on April 16, 2018 in Madrid, Spain.
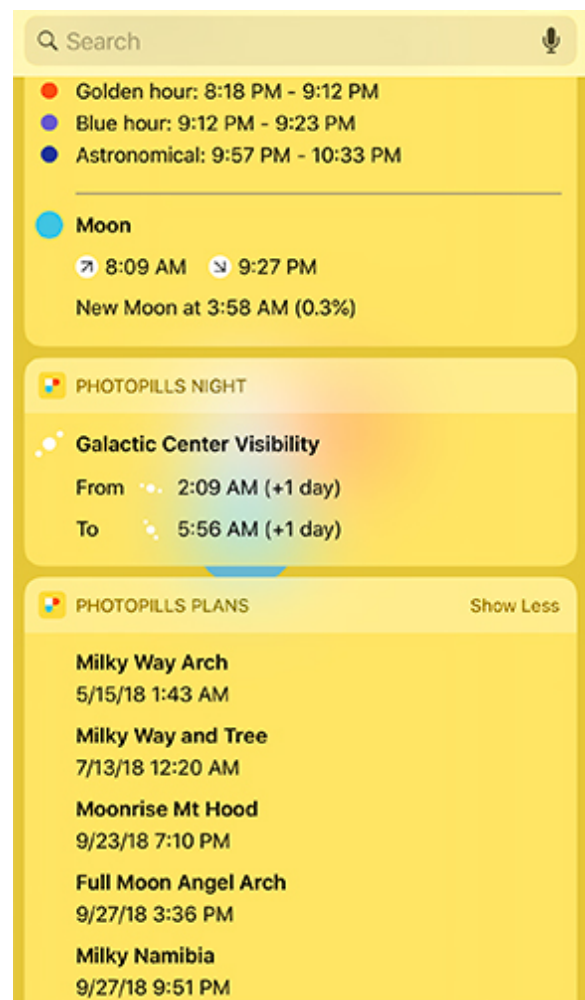
PhotoPills Widgets: Milky Way info and your five upcoming planned photos.

The **PhotoPills** Widgets are a shortcut to the key Sun, Light, Moon and Milky Way information (**for the location you are and the date you are**):

- Sunrise and Sunset times.

- Current light type and remaining time to next light type (only in iOS).

- Golden hour, blue hour and astronomical twilight times.

- Moonrise and Moonset times.

- Moon phase.

- Galactic Center visibility times and position in the sky (Milky Way).

- Your five upcoming photo plans you've saved with the Planner.

And they work offline!

Therefore, no matter where you are in the world (even offline), to have a quick look at all the fresh daily information, you won't even need to go to **PhotoPills app**. All you have to do is to enable the widgets.

In iOS there are 3 different widgets:

- **PhotoPills**: Sun and Moon info.

- **PhotoPills Night**: Galactic Center visibility times and position.

- **PhotoPills Plans**: Your 5 upcoming photo plans you've saved with the Planner.

In Android 5 different widgets:

- **PhotoPills**: Sun and Moon info, and the Galactic Center visibility times and position. Size: 4×4 cells.

- **PhotoPills Moon**: Moon info. Size: 4×1 cells.

- **PhotoPills Sun**: Sun info. Size: 4×2 cells.

- **PhotoPills Galactic Center Visibility**: Galactic Center visibility times and position. Size: 4×1 cells.

- **PhotoPills Plans**: Your 5 upcoming photo plans you've saved with the Planner. Size: 4×3 cells.

The widgets are super useful and super easy to use... Enable them!

How to enable and use the Widgets

Watch this video to learn how to enable and use the PhotoPills Widgets on both, iOS and Android.

Now that you have enabled the Widgets, read the next section before you even open **PhotoPills**... It's important!

How to approach PhotoPills? Set a goal first!

This is key!

The first time you open **PhotoPills**... Don't try to master everything!

It's like trying to master all the buttons and options of your digital camera (or Lightroom or Photoshop) the first time you use it.

You'll feel overwhelmed and frustrated.

Don't do it.

Instead, set a goal first!

Do you want to know when the Sun sets today? Calculate the depth of field? Or plan a Milky

Way photo idea you have?

Set a goal.

When you know what you want, it's easier to use **PhotoPills** to find the answer.

So, set a goal, come back to this guide, find the PhotoPills tool you need to use and learn how to use it. Finally, go to PhotoPills and get the answers...

But let me go straight to the point. Open PhotoPills, we are going to explore the three menus together.

The three PhotoPills Menus (My Stuff, Pills and Academy)
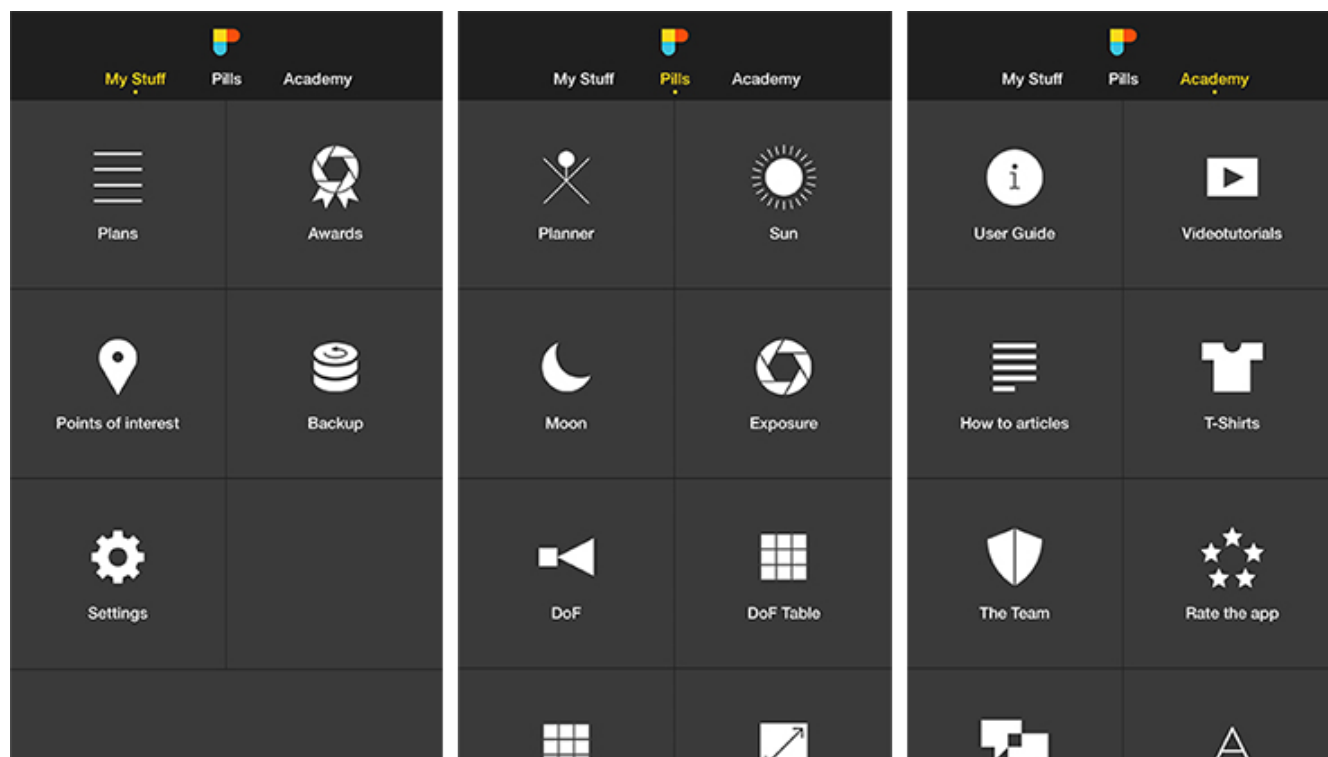
PhotoPills has three main menus:

- **Pills**: Where you make all the calculations.
- **My Stuff**: Where you get inspired and access your stuff (plans, points of interest, etc.).
- **Academy**: Where you learn both, how to use PhotoPills and photography.

You can change from one menu to the other by swiping the main menu right and left. And

by tapping the name of the menu (at the top).

Scroll up and down to see more options in the selected menu.

Let's have a quick look at the options within the menus.

Pills (Menu)

Planner
It's the most advanced planning tool. Use it to plan any Sun, Moon, Eclipse, Milky Way and Star Trails photo you imagine both from home and in the field.

Sun
It gives you quick access to all the fresh daily information (even offline), including: Sunrise and Sunset times, Sun path view in augmented reality, golden hour, blue hour and twilight times, Moonrise and Moonset times, Galactic Center visibility times…

Moon
It gives you quick access to the main Moon information (even offline), including: Moonrise and Moonset times, Moonphase, Moon path view in augmented reality, Moon calendar and SuperMoon dates.

Exposure
Use this calculator to work out the equivalent exposure time when shooting long exposures in low light, at night or when using ND filters. It also includes a timer and a table of exposure values.

Depth of field (DoF)
Get the depth of field information for a given camera settings, including: hyperfocal distance, total depth of field, DoF near limit an DoF far limit. You can visualize the depth of field info in three ways: on a table, on a picture and on the real world with the augmented reality view (AR).

Field of View (FoV)
Get the field of view information for a given camera settings, including: angle of view (horizontal, vertical and diagonal) and field of view (horizontal, vertical, diagonal). Visualize the FoV on a table, on a picture and on the reality with the augmented reality view (AR). Just tap on the AR view to see the frame on the real world, and see what you'd capture in the frame.

Depth of field Table
Get the depth of field information on a table.

Hyperfocal Table
Get the hyperfocal information on a table.

Night AR

Point your device at the sky and visualize all the key night information on the real world with the augmented reality view, including: Milky Way position, Galactic Center position, Moon position, Moon path, Moon phase, Polaris, south celestial pole, celestial equator and Star Trails patterns.

Meteor Showers

All you need to plan your Meteor Shower shots: Meteor Shower calendar, dates and local times of Meteor Shower peaks for the selected location, Meteor Shower visibility and quality (taking into account Moonlight and daylight) for your location, radiant information and position in the Augmented Reality view, detailed information for each Meteor Shower, Sunrise and Sunset times, Moonrise and Moonset times, number of hours with no Moon, Galactic Center visibility times (Milky Way).

Star Trails

Make Star Trails simulations and figure out the the exposure time you need for a desired Star Trails length, and vice versa. It includes a timer.

Spot Stars

Useful for Milky Way photography. Use it to calculate the maximum exposure time you can use in your night shots to prevent stars from trailing. To capture stars as big bright dots. It includes a timer.

Time lapse

Make all your time lapse calculations in seconds: clip length, shooting interval, number of photos, total memory usage, etc. It includes a timer and a shooting interval table.

Timer

Use it when shooting Star Trails, time lapse and long exposures in low light, at night or with ND filters. Get a notification when the exposure time or total shooting time ends.

Subject distance

Calculate the minimum distance to fit a subject in the frame.

Focal length match

Calculate the focal length and aperture you need to use in a second camera (with different sensor size) to capture the same field of view and depth of field.

My Stuff (Menu)

Awards
Welcome to the **PhotoPills Awards**. Get inspired by other PhotoPillers. And submit your legendary photos, get featured, win amazing rewards (6,600$) and become a **Legend**.

Plans
Your to-do list of planned photos. Here you'll find the photos you've planned and saved with the Planner.

Points of Interest
Your list of points of interest (locations). Here you'll find the points of interest you've saved with the Planner.

Backup
Make sure you backup your Plans and Points of Interest from time to time. It'll create a KMZ file you can send to yourself by email. It also explains how to import your backup file onto PhotoPills.

Settings
Personalize **PhotoPills**: units (metric, imperial), sync Plans and Points of Onterest with iCloud (only on iOS), aperture stop scale (full, half, third), elevation service provider, azimuth (true north, magnetic north), etc.

Academy (Menu)

User Guide
Download this manual in PDF format or **read it online**.

Video Tutorials
Videos to help you master PhotoPills.

"How To" articles
Articles to help you master photography.

T-Shirts
Our **funny T-Shirts**!

The Team
Meet the four friends behind the **PhotoPills Team**: Germán Marquès (the Developer), Joan Pons (the Designer), Antoni Cladera (The Photographer) and Rafael Pons (the Bard).

Rate the app
Rate PhotoPills on the App Store or on Google Play.

Feedback

Send us suggestions, bugs, complaints... We're continuously improving PhotoPills. We need your feedback!

Glossary

The **glossary** contains all the terms used in PhotoPills, including: azimuth, elevation, angular diameter, depth of field, etc.

Well, now that you have a global vision of the tools you can find in PhotoPills.

Let me tell you which tool to use depending on the question you have.

Keep reading!

Tell us your pain and we'll tell you the Pill to take (problem vs. solution)

"Why the name PhotoPills?"

Good question!

This is the funny part...

We chose the name **PhotoPills** as a wink to the medical world. Because our main purpose is to cure all the pains you have when planning and shooting your creative ideas: from lack of inspiration, planning the shots and making all the calculations when shooting to learning and improving your photography.

So we locked ourselves in our laboratory for three long years and engineered a pill for every pain photographers have.

These are the pills you should take depending on your pains:

Lack of inspiration
Awards (My Stuff)

Learning photography
"How To" articles (Academy)
Milky Way
Moon
Moon silhouettes videos
Astronomical events
Solar eclipses
Lunar eclipses

Star Trails
Meteor showers
Exposure
Depth of field (DoF)
Golden hour, blue hour and twilights
Azimuth and elevation
Lens filters and long exposure

Learning PhotoPills
Video tutorials and "How To" articles (Academy)
The first thing you need to do when downloading PhotoPills: Enable the Widgets
Calibrating the Augmented Reality views (AR)
Planner: How to move the Red Pin of the Planner
Planner: How to find and plan the Milky Way
Planner: Understanding the (+) Map button of the Planner (Toolbar)
Planner: How to save, share and import plans and locations
Planner: Mastering the Load button of the Planner
Planner: How to plan August 21 2017 total solar eclipse
Planner: How to plan any Star Trails shot you imagine
Planner: Managing the Map
Planner: Sun and Moon info
Planner: The Time Bar
Planner: Twilights and magic hours
Planner: Geodesic information
Planner: Shadow information
Planner: Find Sunrises and Sunsets
Planner: Find Moonrises and Moonsets
Planner: Find a Sun or a Moon at a determined position
Planner: Find a Sun or a Moon over a mountain

Photo planning examples
Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids, Cairo (Egypt)
Plan 2. Supermoon rising behind our favorite stone hut in Punta Nati, Menorca (Spain)
Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia)
Plan 4. Sun setting through North Window and Turret Arch, Arches National Park (USA)
Plan 5. Manhattanhenge with the Sun and with the Moon, New York (USA)
Plan 6. Full Moon at the top of the Sky Tower, Auckland (New Zealand)
Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina
Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands

Golden hour, blue hour and twilights times
For your current location and date: **Widget** PhotoPills
For your current location and any date: Sun > **Info** (Pills)

For any location and any date: Planner > Top **Panel 5** and **Panel 6**

Article: **Understanding golden hour, blue hour and twilights**

Video: **Twilights and magic hours**

Sunrise and Sunset times

For your current location and date: **Widget** PhotoPills

For your current location and any date: Sun > **Info** (Pills)

For any location and any date: Planner > Top **Panel 4**

Video: **Sun and Moon info**

Sun position and path

For your current location and any date: Sun > **AR** (Pills)

For any location and any date: Planner > **Map Sun layers**, Planner > **AR** (Pills)

Video: **Sun and Moon info**

Sun azimuth and elevation (numeric)

For your current location and any date: Sun > **Info** (Pills)

For any location and any date: Planner > Top **Panel 3**

Article: **Understanding azimuth and elevation**

Video: **Sun and Moon info**

Sun planning (from home)

You know the date of the shooting: **Planner** (Pills)

You have an idea but don't know when it happens: Planner > **Find** (Pills)

Article: **Understanding golden hour, blue hour and twilights**

Article: **Understanding azimuth and elevation**

Article: **How to find Sunrises and Sunsets**

Video: **How to find Sun or Moon over a mountain**

Video: **Sun and Moon info**

Video: **Plan 4. Sun setting through North Window and Turret Arch, Arches National Park (USA)**

Video: **Plan 5. Manhattanhenge with the Sun and with the Moon, New York (USA)**

Video: **Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands**

Moonphase

For your current location and date: **Widget** PhotoPills (Widgets), Moon > **Info** (Pills)

For your current location and any date: Moon > **Calendar** (Pills)

For any location and any date: Planner > Top **Panel 3** and **Panel 4**

Video: **Sun and Moon info**

SuperMoon dates

Moon > **Distances** (Pills)

Moonrise and set times

For your current location and date: **Widget** PhotoPills
For your current location and any date: Moon > **Info** (Pills)
For any location and any date: Planner > Top **Panel 4**
Video: **Sun and Moon info**

Moon position and path
For your current location and any date: Moon > **AR** (Pills)
For any location and any date: Planner > **Map Moon Layers**, Planner > **AR** (Pills)
Article: **Understanding azimuth and elevation**
Video: **Sun and Moon info**

Moon azimuth and elevation (numeric)
For your current location and any date: Moon > **Info** (Pills)
For any location and any date: Planner > Top **Panel 3**
Article: **Understanding azimuth and elevation**
Video: **Sun and Moon info**

Moon planning (from home)
You know the date of the shooting: **Planner** (Pills)
You have an idea but don't know when it happens: Planner > **Find** (Pills)
Article: **Moon Photography, the Definitive Guide**
Article: **How to plan the next full Moon**
Article: **7 tips to make your next SuperMoon shine in your photos**
Article: **How to find Moonrises and Moonsets**
Article: **How to shoot striking full Moon silhouettes videos**
Video: **Plan 2. Supermoon rising behind our favorite stone hut in Punta Nati, Menorca (Spain)**
Video: **Plan 6. Full Moon at the top of the Sky Tower, Auckland (New Zealand)**
Video: **Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands**
Video: **How to find Moonrises and Moonsets**
Video: **How to find Sun or Moon over a mountain**
Video: **How to find Sun or Moon at a determined position**
Video: **Plan 2. Supermoon rising behind our favorite stone hut in Punta Nati Menorca (Spain)**

Galactic Center visibility times and directions
For your current location and date: **Widget** PhotoPills Night
For any location and any date: Planner > Top **Panel 7**, Planner > **Map Milky Way layer**
Video: **How to Find and Plan the Milky Way**

Milky Way and Galactic Center position
For your current location and any date: **Night AR** (Pills)
For any location and any date: Planner > **Map Milky Way layer**, Planner > **Night AR**, Planner > Top **Panel 8** (Pills)

Video: **How to Find and Plan the Milky Way**

Milky Way planning
For your location and date (in the field): **Night AR** (Pills)
For any location and any date (from home): **Planner** (Pills)
Exposure time for Milky Way: **Spot Stars** (Pills)
Article: **Milky Way Photography - The Definitive Guide**
Video: **How to Find and Plan the Milky Way**
Video: **Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia)**

Star Trails planning
For your current location and any date: **Night AR** (Pills)
For any location and any date: Planner > **Night AR** (Pills)
Star Trails length for a given exposure time: **Star Trails** (Pills)
Article: **Star Trails Photography - The Definitive Guide**
Video: **How to plan any Star Trails shot you imagine**

Meteor Shower calendar
For your location: Meteor Showers > **Calendar** (Pills)
For any location: Planner > **Meteor Shower layer**
Meteor shower peaks, visibility and quality
For your location: Meteor Showers > **Info** and **Calendar** (Pills)
For any location: Planner > **Panel 11** and **Meteor Shower layer**
Meteor shower's radiant position
For your location: Meteor Showers > **AR** (Pills)
For any location: Planner > **Night AR**
Meteor shower planning
For your current location and date: **Meteor Showers** (Pills)
For any location: Planner > **Panel 11** and **Meteor Shower layer**
Article: **Meteor Shower Photography: The Definitive Guide**

Eclipse dates and key phase times
For any location: Planner > Top **Panel 9** and **Panel 10** (Pills)

Eclipse path
For any location: Planner > Map **Eclipse layer** (Pills)
Eclipse planning
For any location: Planner > Top **Panel 9** and **Panel 10**, Map **Eclipse layer** (Pills)
Article: **Solar Eclipses - The Definitive Photography Guide**
Article: **Lunar Eclipses - The Definitive Photography Guide**
Video: **How to plan August 21 2017 total solar eclipse**
Video: **Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids, Cairo (Egypt)**
Video: **Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina**

Video: **How to plan August 21, 2017 total solar eclipse**

Drone planning
For any location and any date: Planner > **Map Drone view** (Pills)
Manage your photo plans
Save a photo Plan: Planner > **Save** (Pills)
Load a photo Plan onto the Planner: Planner > **Load** (Pills), **Plans** > [Select Plan] > Action > Send to Planner (My Stuff)
Add alert to your calendar: **Plans** > [Select Plan] > Action > Calendar (My Stuff), Planner > More > **Action** > Calendar (Pills)
See your list of photo Plans: **Plans** (My Stuff)
Delete a photo Plan in iOS: **Plans** > Swipe left on the Plan > Delete (My Stuff)
Delete a photo Plan in Android: **Plans** > vertical ellipsis button > Delete (My Stuff)
Backup your photo plans: **Backup** (My Stuff)
Sync photo plans between devices (only iOS): **Settings** > Synchronize data (My Stuff)
Video: **How to save, share and import plans and locations**
Video: **Mastering the Load button of the Planner**

Manage your locations
Save a point of interes: Planner > **Save** (Pills)
Load a point of interest onto the Planner: Planner > **Load** (Pills)
See your list of points of interest: **Points of interest** > My list (My Stuff)
Delete a point of interest in iOS: **Points of interest** > My list > Swipe left on the points of interest > Delete (My Stuff)
Delete a point of interest in Android: **Points of interest** > My list > vertical ellipsis button > Delete (My Stuff) Backup your points of interest: **Backup** (My Stuff)
Sync Points of interest between devices (only iOS): **Settings** > Synchronize data (My Stuff)
Video: **How to save, share and import plans and locations**
Video: **Mastering the Load button of the Planner**

Equivalent exposure time in low light (or at night)
Exposure (Pills)
Article: **Exposure in Photography: The Definitive Guide**

Equivalent exposure time Star Trails (single shot)
Exposure (Pills)
Article: **Exposure in Photography: The Definitive Guide**
Article: **Star Trails Photography - The Definitive Guide**

Equivalent exposure time with ND filters
Exposure (Pills)
Article: **Exposure in Photography: The Definitive Guide** brh|
Article: **Lens Filters and Long Exposure Photography - The Definitive Guide**

Exposure value table
Exposure > **Exposure Values** (Pills)

Depth of field information
DoF, **DoF Table** (Pills)
Article: **Depth of Field - The Definitive Photography Guide**

Depth of field on Augmented Reality
DoF > **AR**, DoF Table > **AR** (Pills)

Hyperfocal distance information
DoF, **Hyperfocal Table** (Pills)
Article: **Depth of Field - The Definitive Photography Guide**
Video: **How to focus at the hyperfocal distance**

Hyperfocal distance on Augmented Reality
DoF > **AR**, Hyperfocal Table > **AR** (Pills)

Field of view information (frame)
FoV (Pills)

Field of view on Augmented Reality (frame)
FoV > **AR** (Pills)

Minimum shooting distance to fit a subject in the frame
Subject Distance (Pills)

Focal length between different sensor size to keep same FoV and DoF
Focal length match (Pills)

Exposure time for Milky Way
Spot Stars (Pills)
Article: **Milky Way Photography - The Definitive Guide**

Star Trails length for a give exposure time
Star Trails (Pills)
Article: **Star Trails Photography - The Definitive Guide**

Time lapse settings
Time Lapse (Pills)

Suggested time lapse shooting intervals
Time Lapse > **Interval Table** (Pills)

Get alert when a long exposure ends
Exposure > **Timer**, Spot Stars > **Timer**, Star Trails > **Timer**, **Timer** (Pills)

Change units (metric, imperial)
Settings > Units (My Stuff)

Adjust other settings
Settings (My Stuff)

Buy a PhotoPills T-Shirt
T-Shirts (Academy)

Rate PhotoPills
Rate rate the app (Academy)

Send feedback to the PhotoPills team
Feedback (Academy)

Meet the PhotoPills team
The Team (Academy)

Show your photos to the world
Awards > Submit (My Stuff)

Win rewards ($6,600)
Awards > Submit (My Stuff)

Section 2:
Planner – Introduction

The Planner is the first tool in the Pills menu.

Use it to plan any photo you imagine involving natural light, shadows, the Sun, the Moon, a Solar Eclipse, a Lunar Eclipse, a Meteor Shower or the Milky Way for any location on Earth!

So, open **PhotoPills** and go to the Planner (Pills).

Now, before I explain you all the elements and options of the Planner, it's important you understand the logic behind planning a photo.

Introduction to planning

The planning work consists in finding the right shooting spot and right shooting date and time the scene you imagine happens.

Therefore, to plan a photo you need to know where the Sun, the Moon, the Eclipse, the radiant of a Meteor Shower or the Milky Way will be for a given location, date and time.

And here is when the Planner makes things much easier!

You have two ways of planning a shot with the Planner:

When you know the date of the shooting (or planning day by day)

This is the most common workflow. It's when you know the date you wish to go shooting and need to find the right shooting spot and shooting time. For example, when you wish to photograph the Sunset next Sunday, or the next Full Moon, or a determined Eclipse, or the next important Meteor Shower peak or the Milky Way during the next new Moon.

In this case, the Planner allows you to:

- Choose a date and time, by using the **Time Bar** (the colorful bar below the Map).
- Visualize the key light, shadows, Sun, Moon, Eclipse, Meteor Shower and Milky Way information both on the Map and the **Top Panels** (above the Map).
- And choose a shooting spot, by moving the **Red Pin** you see on the Map.

Then, you keep changing the shooting spot (Red Pin) and the shooting time until you find the photo you want.

And if the photo you want is not happening on that date, just try another date.

Watch this video to see an example of the workflow to plan the Moon aligned with a building: **Plan 6. Full Moon at the top of the Sky Tower, Auckland (New Zealand)**.

And watch this video tutorial to see an example of this workflow to plan the Milky Way: **Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia)**.

When you don't know the date of the shooting (using the Planner > Find tool)

Let's say that you know the shooting spot. You know the photo you want and need to figure out when the Sun or the Moon will be in a determined position in the frame. For example, on top of a building.

In this case you need to:

- Place the **Red Pin** on the desired shooting spot.

- And use the **Find** option (at the bottom left-hand corner) to find the shooting date and time.

Watch these video tutorials to see an example of this workflow: **Plan 4. Sun setting through North Window and Turret Arch, Arches National Park (USA)**
Plan 5. Manhattanhenge with the Sun and with the Moon, New York (USA)
Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands

And here you have a few more (using an older PhotoPills version but they're also valid): (i) **Find Sunrise/Sunset**, (ii) **Find Moonrise/Moonset**, (iii) **Find Sun/Moon over a mountain**, (iv) **Find Sun/Moon at a position**.

But let's slow down a bit. Because before you can start planning, you need to master all the elements of the Planner.

Let's have a look at the different parts of the Planner.

The 4 parts of the Planner
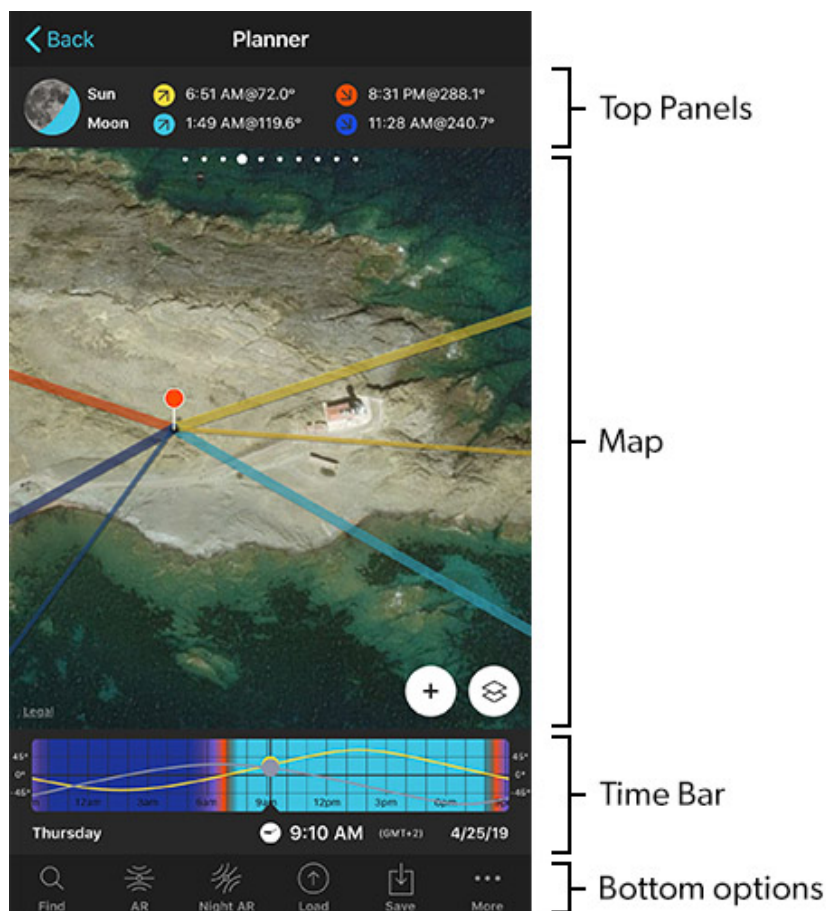
The Planner has 4 parts: **Top Panels**, **Map**, **Time Bar** and **Bottom options**.

Top Panels

Swipe right or left to go from one Panel to another.

Here you'll find all the key light, Sun, Moon, Milky Way, Shadows, Geodetic (terrain topography) Meteor Shower and Eclipse information for the position of the Red Pin and the selected date and time.

Panel 1
Shadow length calculator. Button to switch on the **Shadows info layer** on the Map. Use it to plan shadows (Sun & Moon). **Watch the video tutorial**.

Panel 2
Pin to Pin Geodetic info. Take into account topography. Button to switch on the **Black Pin** on the Map. Sun, Moon, Milky Way arch and Galactic Center altitude above Black Pin ground level. **Watch the video tutorial**.

Panel 3

Sun/Moon position (azimuth and elevation). Moon phase info. Button to switch on the **Sun info layer** and the **Moon info layer** on the Map. **Watch the video tutorial**.

Panel 4

Sun/Moon rise and set times (and azimuth). Moon phase picture (tap it to jump time to the next important Moon phase). **Watch the video tutorial**.

Panel 5

Twilight times (civil, nautical, astronomical). Button to switch on the **Twilights layer** on the Map. **Watch the video tutorial**.

Panel 6

Magic hours times (golden hour, blue hour). **Watch the video tutorial**.

Panel 7

Galactic Center visibility (Milky Way). Button to switch on the **Milky Way layer** on the Map. **Watch the video tutorial**.

Panel 8

Milky Way quality and position. Milky Way position picture (tap it to jump time to the next new Moon). **Watch the video tutorial**.

Panel 9

Eclipse information (date, type, magnitude). Button to select the eclipse. And switch on the **Eclipse layer** on the Map. **Watch the video tutorial**.

Panel 10

Eclipse phases times. Picture of the eclipse phase (tap it to jump time to the next phase). **Watch the video tutorial**.

Panel 11

Meteor Shower information (name, activity period, peak date and time, radiant position, and meteors/h of all active meteor showers in the selected date). Button to select the Meteor Shower and switch on the **Meteor Shower layer** on the Map.

Map

Red Pin

The shooting spot. Place the **Red Pin** on the location you wish to plan a shot. During the planning, you'll change the position of the Red Pin until you find the right shooting spot for the photo you wish to take. **Watch the video tutorial**.

Black Pin

You switch the **Black Pin** on from **Panel 2** (Pin to pin geodetic info). Place it on your sub-

ject or any place you wish to measure the elevation angle relative to the Red Pin. It helps you understand terrain topography when planning a shot. Use the **Time Bar** to change time and align the Sun/Moon/Galactic Center azimuth line with the Black Pin. When the Sun/Moon/Galactic Center azimuth line is aligned with the Black Pin and it's dashed, then the obstacle (hill, mountain) hides the Sun/Moon/Galactic Center. When it's not dashed (continuous), the Sun/Moon will be visible above the obstacle. **Watch the video tutorial**.

(+) Map button
Switch on the **Map toolbar** to access the GPS button (place the Red Pin where you are), Move Red Pin button, Undo/Redo, Expand Map, Swap Pins, Expand Map lines, Show your location on the Map, Map type, Compass, Lock buttons view. **Watch the video tutorial**.

Map Settings button
Located next to the (+) Map button, the **Map Settings button** allows you to choose between Camera mode, Drone mode, Map type, Map tools (FoV, DoF, Sun/Moon), Map layers (decide what information you wish to see on the Map) and Reset Map layers.

Map information
Visualize on the Map the key **Sun**, **Moon**, **Milky Way**, **Twilights**, **Shadows**, **Geodetic** and **Eclipse** information layers for the position of the Red Pin and the selected date and time. You control what you see on the Map with the Map Settings button and top Panels. Oh! And you can rotate the Map!!

Time Bar

Use the **Time Bar** to change the date and time. If you know the date of the shooting, set it using the Time Bar (for example, when you wish to plan the next full Moon). **Watch the video tutorial**.

Bottom options

Find
Use the **Find** option to figure out when the Sun or Moon will be where you want it to be in the frame. Watch these video tutorials: (i) **Find Sunrise/Sunset**, (ii) **Find Moonrise/Moonset**, (iii) **Find Sun/Moon over a mountain**, (iv) **Find Sun/Moon at a position**.

Augmented Reality view (AR)
Use the **AR** option to visualize the position and path of the Sun and Moon for the position of the Red Pin and the selected date and time. **Watch the video tutorial**.

Night Augmented Reality view (Night AR)
Use the **Night AR** option to Visualize the position of the Milky Way (and the Star Trails pattern) for the position of the Red Pin and the selected date and time.

Load

Use the **Load** option to load a saved photo Plan. Also place the Red Pin to a location based on an address, a saved Point of Interest, a latitude/longitude and a geotagged photo. **Watch the video tutorial**.

Save

Use the **Save** option to save a photo Plan or a Point of Interest to your list. **Watch the video tutorial**.

Date (More button)

Use the More > **Date** option to set date, time and time zone. **Watch the video tutorial**.

Altitudes (More button)

Use the More > **Altitudes** option to manually set the Red Pin and Black Pin altitude and off-set.

Horizon (More button)

Use the More > **Horizon** option to adjust Sunrise/Sunset and Moonrise/Moonset times and azimuths to the height above the horizon. Useful when you're shooting from top of a great mountain.

Action (More button)

Use the More > **Action** option to share a photo Plan or a location (email, Facebook, Twitter), add alert to calendar, sent Red Pin position to Maps and copy location coordinates. **Watch the video tutorial**.

Section 3:
Planner - Top Panels

Swipe right or left to go from one Panel to another.

Panel 1: Shadow length calculator
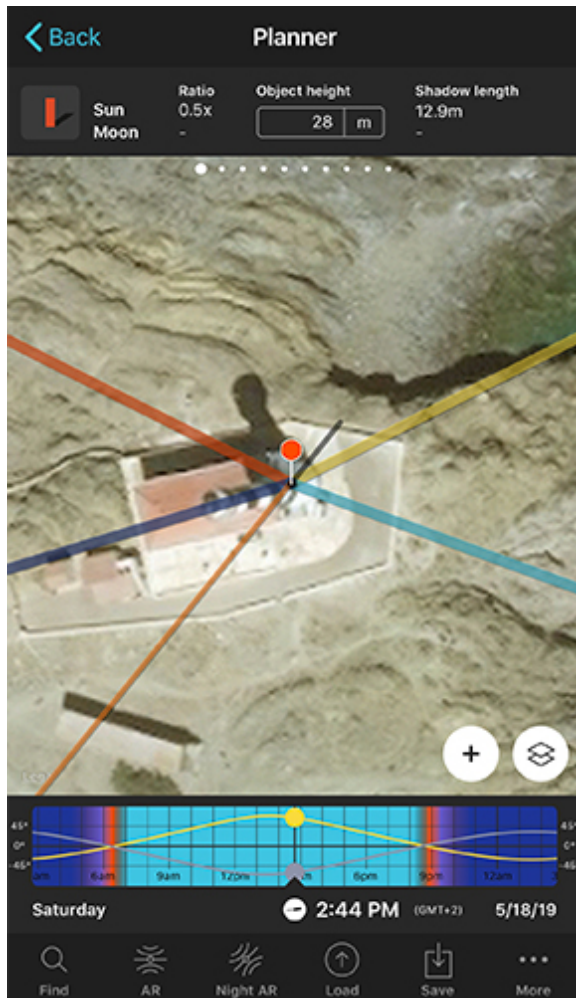
See Panel 1 above the Map view. Read on the Panel, subject height and shadow length for the selected date, time and Red Pin position. Also notice the lighthouse shadow length on the Map (black segment aligned with the Sun azimuth thin orange line).

Use this Panel when planning to include the shadow of an object in your photo.

Place the **Red Pin** on your subject, swipe the top Panels to set Panel 1, set your subject height (Favaritx lighthouse is 28 meters tall), tap the Shadow button (on the Panel) and get the shadow length (on the Panel and on the Map) cast by your subject as you change time with the **Time Bar**.

This is the information you'll find on this Panel:

Shadow calculator

Introduce the object's height to calculate its shadow length for the selected date, time and Red Pin position.

Shadow button

Tap on the shadow button to visualize on the Map the length and azimuth (direction) of the shadow cast by an object placed in the location of the Red Pin, caused by the Sun (daytime) or the Moon (nighttime), for the selected date and time.

Note: *You can also switch on the* **Shadow layer** *by using the Map settings button. You'll find it on the Map on the bottom right-hand corner (next to the (+) Map button).*

 Shadow length calculator enabled

 Shadow length calculator disabled

Recommended video tutorial: Shadow length calculator Panel.

Panel 2: Pin to pin geodetic info (Black Pin)

See Panel 2 just above the Map. The Black Pin has been placed on the subject to plan a Moon shot. Read on the Panel: distance between pin, azimuth, elevation difference, Sun/Moon/Milky Way arch/Galactic Center altitude and Sun/Moon size.

Take into account topography (and the height of a building) in your planning!

Use this Panel to find out:

- Whether the Moon, the Sun, the Milky Way arch (the highest point on the Milky Way) or the Galactic Center will be visible above the Black Pin ground level.

- The altitude of the Moon, the Sun, the Milky Way arch (the highest point on the Milky Way) or the Galactic Center above the Black Pin ground Level. If needed, you can compare this altitude with the height of a building when planning your shots.

- The size of the Sun or the Moon you'll get at the Black Pin distance. Place the Black Pin on your subject and you'll be able to compare the size of the Sun/Moon with the size of your subject.

Zoom in the Map on the mountain/hill/subject/building. Then, tap the button on the Panel (icon of the Red Pin and Black Pin). A **Black Pin** will appear on the Map. Finally, place the Black Pin on the mountain/hill/subject/building (drag and drop it), or where you wish the Sun/Moon/Milky Way arch/Galactic Center to be, and zoom out.

Now, use the **Time Bar** o set the time the Sun/Moon/Milky Way arch/Galactic Center will be aligned with the Black Pin. By comparing the elevation of the Sun/Moon (**Panel 3**) or Galactic Center (**Panel 8**) and the elevation angle between the two Pins (Panel 2), you'll know whether the Sun/Moon/Milky Way arch/Galactic Center will be hidden or not by the terrain.

Also, when the Sun/Moon/Galactic Center azimuth line is aligned with the Black Pin and it's dashed, then the obstacle (hill, mountain) hides the Sun/Moon/Galactic Center. When it's not dashed (continuous), the Sun/Moon/Galactic Center will be visible above the obstacle.

On Panel 2, you also have the Sun/Moon/Milky Way arch/Galactic Center altitude above the Black Pin ground level. And the Sun/Moon size at the Black Pin distance. This information is great to help you plan any Sun/Moon/Milky Way photo taking into account the terrain and/or the height of a building.

The Panel gives you the following information:

Distance between Pins
Very useful to measure distances on the Map and to plan long distance shots with the Sun/Moon.

Azimuth between Pins
The bearing or the angle centred on the Red Pin location and measured between the direction of the Black Pin and the north.

Altitude difference between Pins
Measured from the ground level. It does not take into account the height of a building. This is the Black Pin Altitude minus the Red Pin altitude. It's negative when the Black Pin is below the Red Pin.

The elevation angle of the Black Pin relative to the Red Pin
Measured from the ground level. It does not take into account the height of a building. It's negative when the Black Pin is below the Red Pin.

Moon/Sun/Milky Way altitude above Black Pin
When the Moon, the Sun or the Milky Way (Milky Way arch or Galactic Center) is aligned with the Black Pin, the panel shows its altitude above the terrain. This is the altitude above the

Black Pin ground level. This way it is super easy to know if the Moon, the Sun or the Milky Way is at the elevation you need above the terrain (or a building).

Moon/Sun size at Black Pin distance
It appears in brackets () at the end of the Moon/Sun altitude above Black Pin. It shows the real Size of the Moon or the Sun. If you place the Black Pin on your subject, then you'll be able to compare the Moon/Sun size with the size of your subject.

Note: *Tap the Black Pin to read latitude/longitude, altitude, altitude difference and elevation difference between Pins.*

   Black Pin enabled

   Black Pin disabled

   Black Pin

Recommended video tutorial: Pin to Pin geodetic info Panel.

Panel 3: Sun/Moon position (azimuth and elevation)
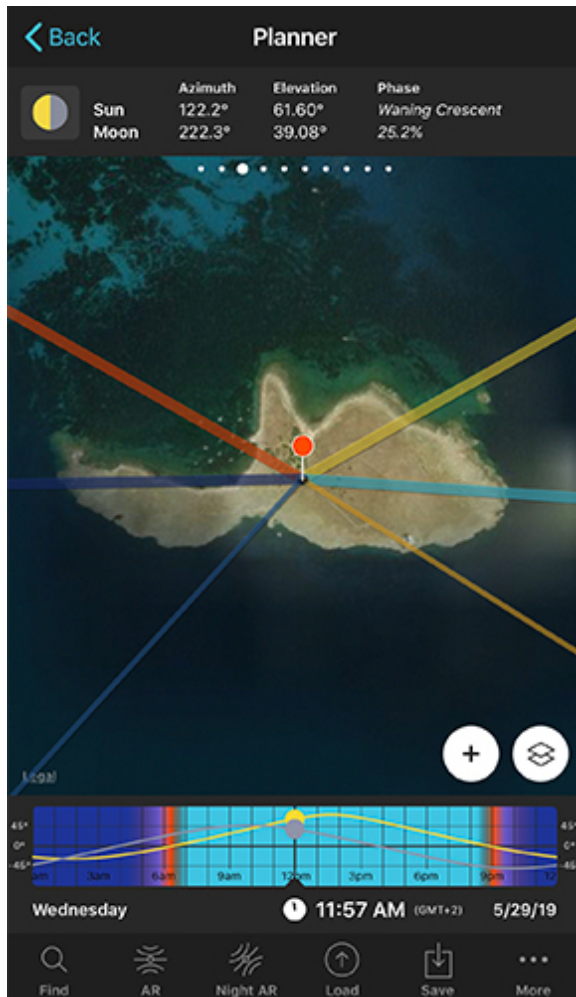
See Panel 3 above the Map view. Get the position (azimuth and elevation) of the Sun/Moon for the selected date, time and Red Pin position. And the Moon phase info. On the Map, the thin blue line tells you the position of the Moon for the selected date and time. And the thin orange line, tells you the position of the Sun for the selected date and time. The thick ones are the sunrise (yellow), Sunset (orange), Moonrise (light blue) and Moonset (dark blue) directions.

Mainly use this Panel when planning a long distance shot with the Moon. Because it give you the elevation of the Moon and Sun for the selected date, time and Red Pin position.

This is the information you'll find on the Panel:

Position of the Sun (**azimuth and elevation**)
Useful to plan Sun shots and also to understand the light you'll have (daytime, golden hour, blue hour, twilights, nighttime). Remember that light depends on the elevation of the Sun. Check this article to understand natural light: **Understanding golden hour, blue hour and twilights**.

On the Map, the thin orange line tells you the position of the Sun for the selected date and

time. And the thick ones are the Sunrise (yellow) and Sunset (orange) directions.

Position of the Moon (**azimuth and elevation**)
Use the elevation of the Moon to **plan your Moon shots**. And don't forget to check the elevation of the Sun to know the type of natural light you'll have.

On the Map, the thin blue line tells you the position of the Moon for the selected date and time. And the thick ones, the Moonrise (light blue) and Moonset (dark blue) directions.

Moon phase
Read the Moon phase name and percentage.

Sun/Moon button
Tap it to toggle what information is displayed on the Map: Sun and Moon, only Sun, only Moon or no information at all.

Note: *You can also use the Map settings button to choose the* **information you wish to see** *on the Map. You'll find it on the Map, at the bottom right-hand corner (next to the (+) Map button).*

Sun and Moon lines on the Map

Only Sun lines on the Map

Only Moon lines on the Map

No Sun or Moon lines on the Map

Recommended video tutorial: Sun and Moon info.

Panel 4: Sun/Moon rise and set times
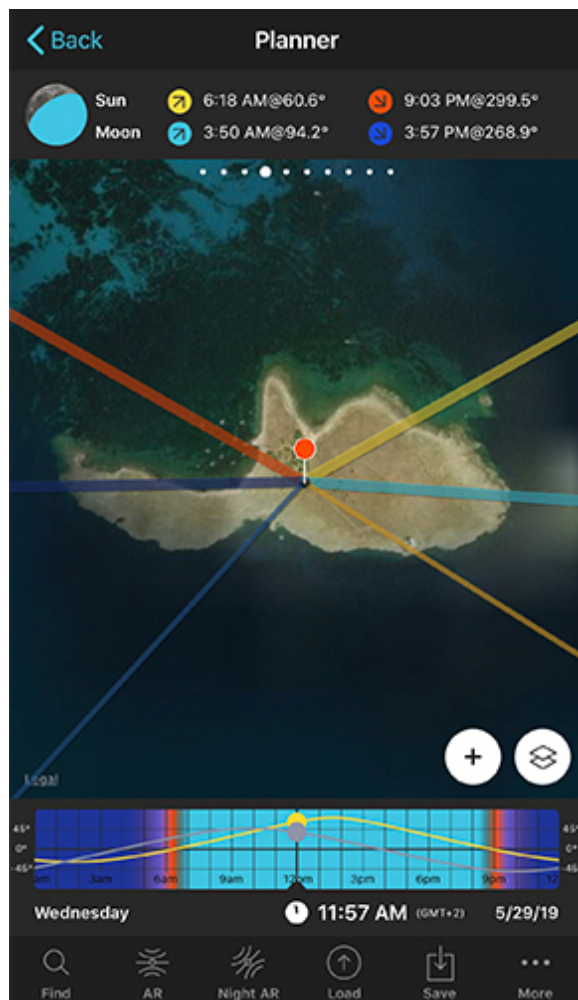
See Panel 4 just above the Map view to get Sun/Moon rise/set times and the Moonphase for the selected date and Red Pin position. The thick lines on the Map are the Sunrise (yellow), Sunset (orange), Moonrise (light blue) and Moonset (dark blue) directions.

Wish to know when the Sun/Moon rises/sets?

This is the Panel to check!

On this Panel you'll find:

Sun/Moon rise/set times (and azimuth)
The time and azimuth (time @ azimuth) of sunrise, Sunset, Moonrise and Moonset for the selected date and Red Pin location.

On the Map, the thick lines show the Sunrise (yellow), Sunset (orange), Moonrise (light blue) and Moonset (dark blue) directions.

Note that the colors of the arrows on the top Panel (up and down) are the same as the

Sun/Moon rise/set lines on the Map.

 Sunrise

 Sunset

 Sun

 Moonrise

 Moonset

 Moon

Moonphase picture

It shows how you would see the Moon on the selected date and time if you were placed in the location of the Red Pin. Tap once the picture of the Moon to jump to the date of the next important Moon phase. Double-tap the picture of the Moon to jump to the date of the previous important Moon phase.

 Daytime

 Night-time

 Moonset in daytime

 Moonset in night-time
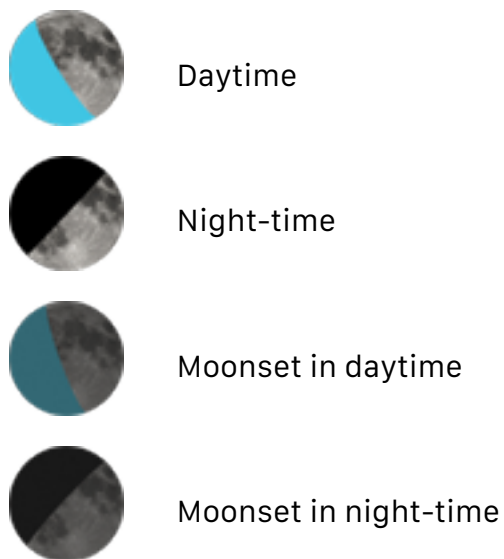
Recommended video tutorial: Sun and Moon info.

Panel 5: Twilights
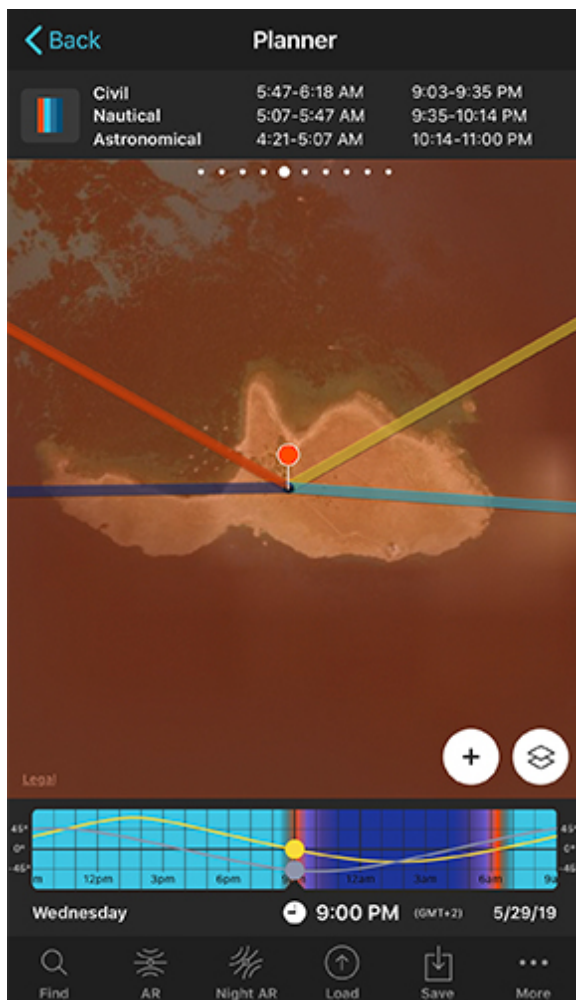
See Panel 5 just above the Map view. It gives you the twilight times for the selected date and Red Pin position. When you switch on the Twilight Map layer, the color of the Map will show you the type of light you'll have.

Understanding natural light is key to any photographer!

Please, read the following guide to know what type of photos you can take depending on the light you have: **Understanding golden hour, blue hour and twilights**.

Panel 5 gives you the twilight information for the selected date and Red Pin position:

Twilight times
Time range of the civil, nautical and astronomical twilights.

Twilight layer button
On iOS, tap on the Twilight button to visualize, on the Map, the worldwide distribution of light. Visualize the parts of the world that are in nighttime, astronomical twilight, nautical twilight, civil twilight, golden hour and daytime for the selected date and time.

On Android, tap on the Twilight button to visualize the light type color layer on the Map. But due to resources consumption, on the Android platform you can't zoom out and see the world light distribution layer.

Note: *You can also switch on the* **Twilight layer** *by using the Map settings button. You'll find it on the Map on the bottom right-hand corner (next to the (+) Map button).*

Light layer enabled

Light layer disabled

Recommended video tutorial: Twilights and magic hours.

Panel 6: Golden hour and blue hour
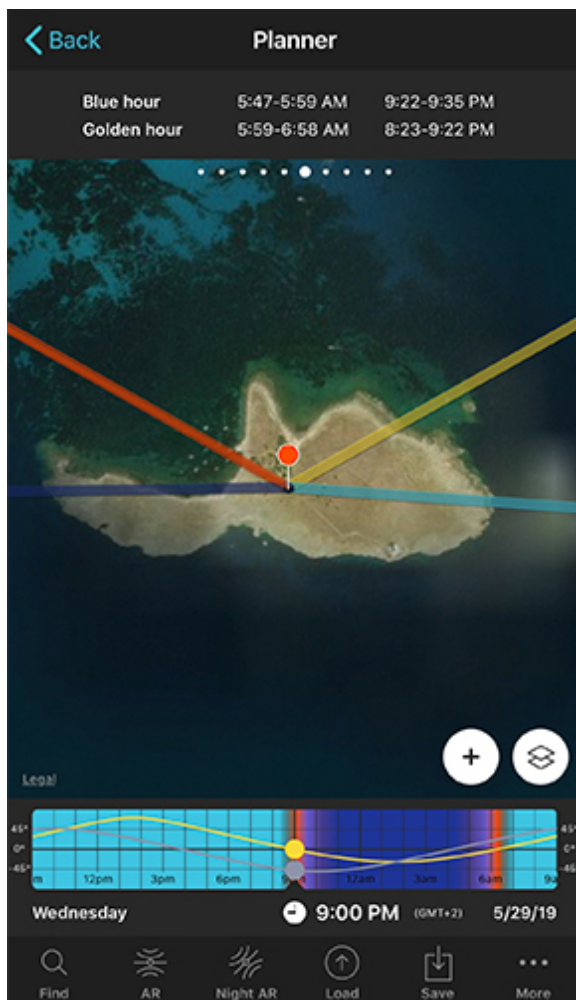
See Panel 6 just above the Map. It gives you the golden hour and blue hour time for the selected date and Red Pin position.

Again, understanding golden hour and blue hour is key to any photographer!

Please, read the following guide to know what type of photos you can take depending on the light you have: **Understanding golden hour, blue hour and twilights**.

On this Panel you'll find the time range of the golden hour and the blue hour for the selected date and Red Pin location.

Recommended video tutorial: Twilights and magic hours.

Panel 7: Galactic Center visibility (Milky Way)
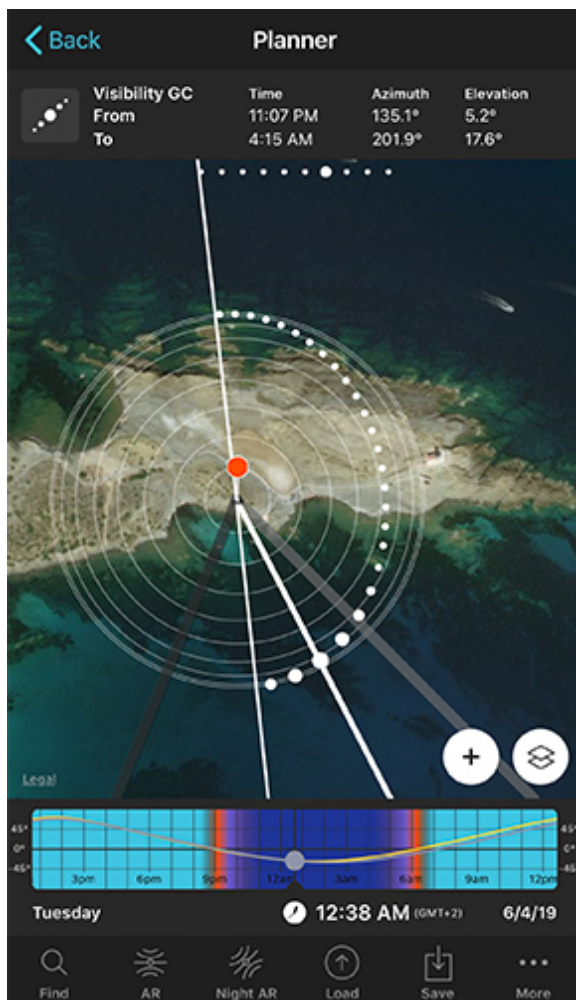
See Panel 7 just above the Map. This Panel gives you when and where the Galactic Center will become visible (light grey line on the Map) and not visible (dark grey line on the Map) for the selected date and Red Pin position. Tap on the button on the Panel to see the Milky Way info on the Map: Milky Way arch (dotted arch), Galactic Center position (larger dot on the Arch and thick white line) and Milky Way crossing points with the horizon (thin white line).

Use this Panel when **planning the Milky Way**!

Place the Red Pin near your subject, set the date you wish with the Time bar (we usually check the New Moon dates first) and tap on the button you see on Panel 7 to start planning.

This is the information you'll find on the Panel:

Galactic Center visibility
When and where (azimuth and elevation) the Galactic Center will become visible (light grey line on the Map) and not visible (dark grey line on the Map).

Milky Way button

Tap on the button to switch on (and off) the Milky Way Map layer.

Tap on it to see the Milky Way information on the Map: Milky Way arch (dotted arch), Galactic Center position (larger dot on the Arch and thick white line) and Milky Way crossing points with the horizon (thin white line).

Note: *You can also switch on the* **Milky Way Map layer** *by using the Map settings button. You'll find it on the Map on the bottom right-hand corner (next to the (+) Map button).*

Milky Way Map layer enabled

Milky Way Map layer disabled

On the Map you'll see the following Milky Way information:

Milky Way Arch. The larger dot represents the Galactic Center.

Contour circumferences from 0 degrees (outer) to 90 degrees (center) in steps of 10 degrees of elevation.

Direction where the Galactic Center becomes visible for the selected

Direction where the Galactic Center becomes not visible for the selected date

Thick white line: Direction where the Galactic Center is for the selected date and time

Thin white line: Directions where the arch of the Milky Way crosses the horizon

Recommended video tutorial: How to Find and Plan the Milky Way.
Planning example: Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia).

Panel 8: Milky Way quality and position
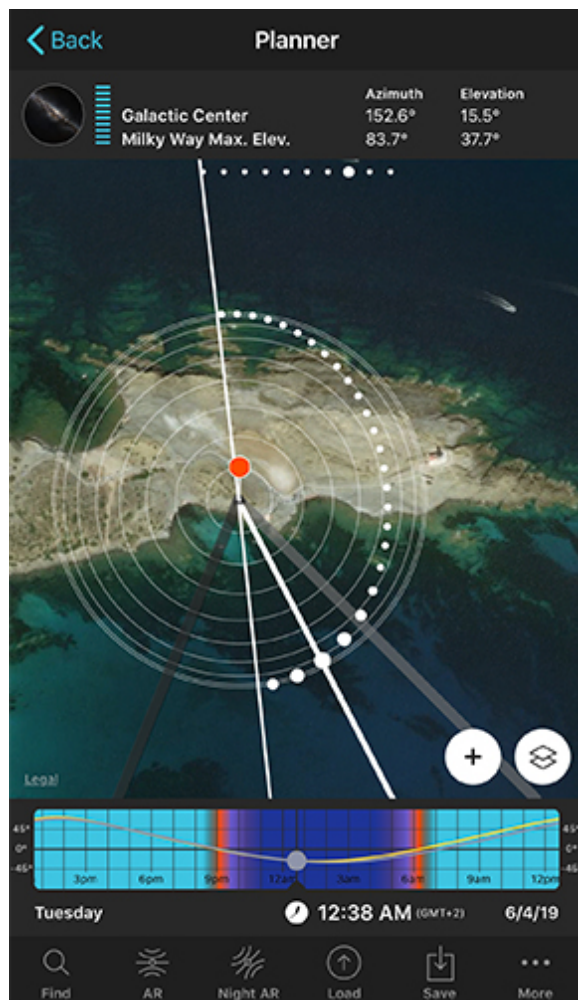
See Panel 8 just above the Map. This Panel gives you the position of the Milky Way in the sky for the selected date, time and Red Pin position. It also gives you information about the Moon phase (blue energy bar besides the Milky Way picture).

Again, use this Panel when **planning the Milky Way**!

This is the information you'll find on the Panel:

Picture of the Milky Way
It shows you the inclination of the Milky Way in the sky for a given date, time and position of the Red Pin.

It also helps you set the New Moon date fast. Tap it once to jump the date to the next New Moon. Double-tap it to jump the date to the previous New Moon.

Blue energy bar
It tells you if the Moon will add light in the scene. It's linked to the Moonphase. During New

Moon, the energy bar is full (all blue). During Full Moon, the energy bar is empty (all dark).

Position of the Galactic Center
Azimuth and elevation of the Galactic Center for the selected date, time and Red Pin position.

On the Map, the Galactic Center is represented by the larger white dot on the arch. It's linked with the Red Pin with the white thick line.

Position of the highest point on the Milky Way (center of the arch)
Azimuth and elevation of the highest point of the Milky Way for the selected date, time and Red Pin position.

It's the point located right at the center of the Milky Way arch you see on the Map.

Note: *You can also switch on the* **Milky Way Map layer** *by using the Map settings button. You'll find it on the Map on the bottom right-hand corner (next to the (+) Map button).*

Milky Way visible

Milky Way not visible

New Moon

Moon phase 50%

Full Moon

Recommended video tutorial: How to Find and Plan the Milky Way.
Planning example: Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia).

Panel 9: Eclipse selector and info
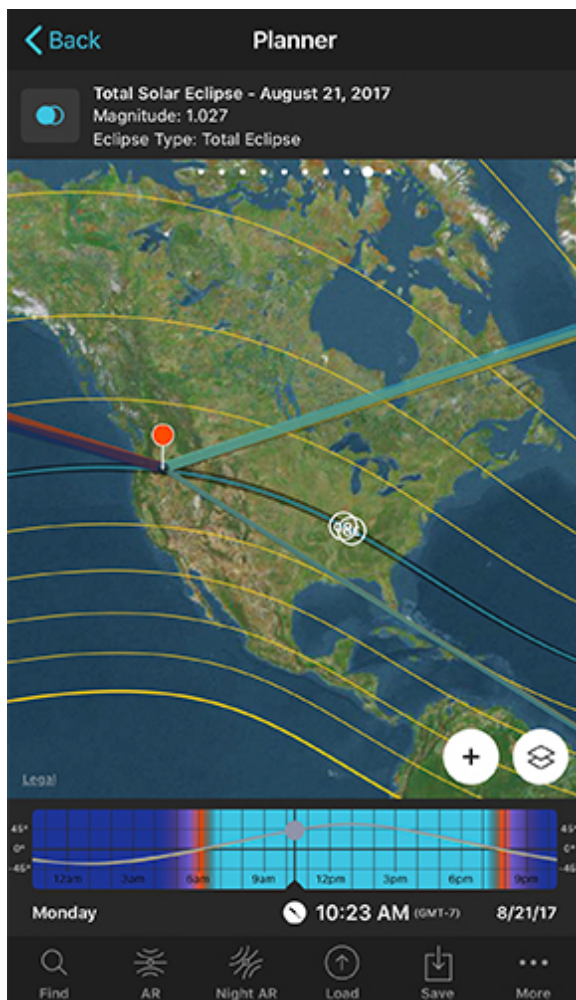
See Panel 9 just above the Map view. Use this Panel to set the eclipse you wish to plan. It also gives you the eclipse name, date, magnitude and type (partial, total) for the position of the Red Pin. On the Map you'll see the eclipse path information. For the solar eclipse shown on the screenshot: path of totality (total eclipse area), partial eclipse area, and no eclipse area.

Use this Panel to plan your Sun and Moon eclipse shots!

This is the information on the Panel:

Eclipse selector button
Tap it to choose the eclipse you wish to plan. Once selected, the eclipse information will appear on this Panel, on **Panel 10** and on the Map (check the **Eclipse Map layer**).

On the Map you'll see the eclipse path information. The information varies between a solar eclipses and Moon eclipses:

- **Solar eclipse Map information**: path of totality (total eclipse area), partial eclipse

area, and no eclipse area.

- **Moon eclipse Map information**: eclipse visible area, eclipse not visible area, eclipse visible at Moonrise area(color lines area) and eclipse visible at Moonset area (color lines area).

Note: *You can also switch on the* **Eclipse Map layer** *by using the Map settings button. You'll find it on the Map on the bottom right-hand corner (next to the (+) Map button).*
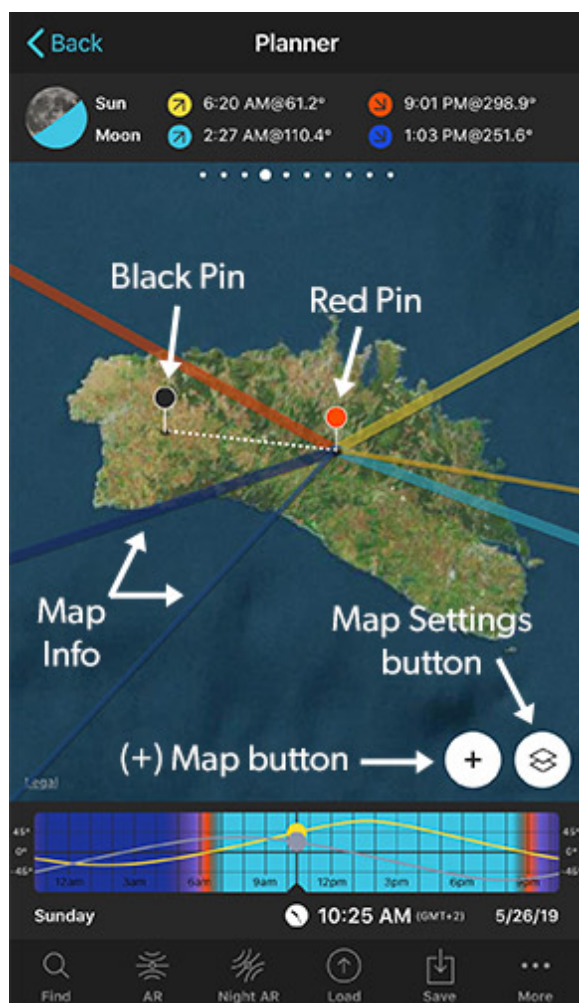
Eclipse information
Eclipse name, date, magnitude and type (partial, total).

- **Eclipse Magnitude:** For a solar eclipse, it represents how much of the solar diameter is covered by the Moon. It usually has a value between 0 and 1 inclusive, where 1 is totally eclipsed. For a lunar eclipse, it represents how much of the Moon diameter is covered by Earth's shadow. Because Earth casts two different shadows (umbral and penumbral), PhotoPills gives you two magnitudes, the umbral magnitude (umb) and the penumbral magnitude (pen).

- **Eclipse Type:** The eclipse type that can be seen from the red pin position (total, partial or not visible).

Planning example: Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids, Cairo (Egypt).
Recommended video tutorial: How to Plan August 21 2017 Total Solar Eclipse.
Recommended article: Solar Eclipses 2019: The Definitive Photography Guide.
Recommended article: Lunar Eclipses - The Definitive Photography Guide.
Planning example: Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina.

Panel 10: Eclipse phase times
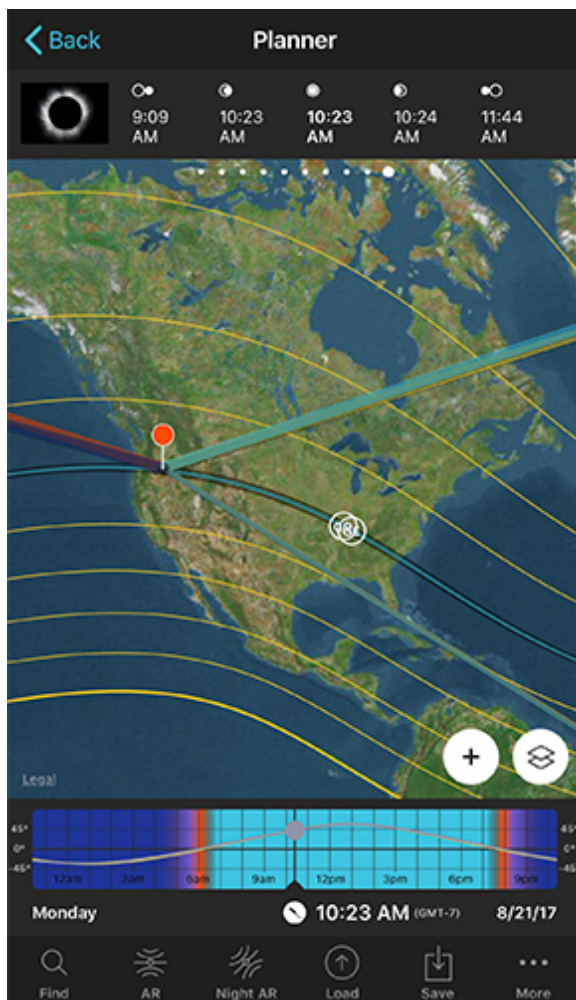
See Panel 10 just above the Map view. This Panel gives you the time and picture of the eclipse main important phases for the Red Pin position.

Again, this is a key Panel to plan your eclipse shots. But to see the information on Panel 10 you need to choose an eclipse on **Panel 9**.

It displays the following eclipse information:

Eclipse phase picture
It shows the eclipse phase for the selected time and Red Pin position. Tap it to set time to the next important eclipse phase.

Eclipse phase times
The time of all the key eclipse phases. Tap and hold on the desired eclipse phase time to set it on the Time bar.

Planning example: Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids,

Cairo (Egypt).

Recommended video tutorial: How to Plan August 21 2017 Total Solar Eclipse.

Recommended article: Solar Eclipses 2019: The Definitive Photography Guide.

Recommended article: Lunar Eclipses - The Definitive Photography Guide.

Planning example: Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina.

Panel 11: Meteor Shower selector and info

See Panel 11 just above the Map view. Use this Panel to set the Meteor Shower you want to plan. For the position of the Red Pin, it also gives you the Meteor shower name, activity period, peak date and time, radiant coordinates (azimuth and elevation) and the number of meteors/h (of all active meteor showers) for the selected date. On the Map you see the Meteor Shower radiant position and path information.

Use this panel when planning a Meteor Shower.

This is what you'll find on the panel:

Meteor Shower selector button
Tap the button on the panel, select the Meteor Shower you want to plan and all the key information will be displayed on the panel and on the map (check the **Meteor Shower layer**).

Now move the Red Pin to the location where you want to plan the Meteor Shower to get all

the information for that location.

Note: *You can also switch on the Meteor Shower layer by using the Map settings button. You'll find it on the Map on the bottom right-hand corner, next to the (+) Map button.*

Meteor Shower information
Meteor Shower name, activity period, peak date and time, radiant coordinates (azimuth and elevation) and the number of meteors/h for the position of the Red Pin:

- **Activity period**: This is the period of time when the Meteor Shower is active.

- **Peak information**: The peak date and local time.

- **Radiant**: It's the point in the sky where all meteors appear to originate during the Meteor Shower. It's located within or near the constellation that give the name of the Meteor Shower. Knowing where the radiant is at all times is key. It helps you decide your shooting spot and framing, depending on the image you wish to capture.

- **Meteors/h**: Number of meteors/h. The higher it is, the more intense is the Meteor Shower. For example, during the peak night of the Perseids, the rate could theoretically reach 100 meteors/hour.

Recommended article: Meteor Showers - The Definitive Photography Guide.

Section 4:
Planner - Map

On the Map area you see the Red Pin, Black Pin (**Panel 2**), (+) Map button, Map Settings button and the information layers you have enabled (Sun, Moon, Milky Way, Meteor Shower, Eclipse, Twilights, Shadows).

The Map is the central part of the Planner and where the most planning work will happen.

To plan a photo you'll have to learn how to move the Red Pin and understand how the Sun, Moon, Meteor Shower, Eclipse and Milky Way information is displayed on the Map for a given date and time.

Notice that you can rotate the Map if you need it!

Also, to plan a shot you'll have to master the two Map buttons: (+) Map button and Map Settings button.

Finally, you'll have to know how to work with the Black Pin and the top **Panel 2** to take into account the landscape topography.

Let's dig deeper into the different elements of the Map.

Red Pin

Red Pin

It's the shooting spot. Place the Red Pin in the location you want to plan a shot. Keep moving it until you find the shooting spot that makes the photo possible.

All the information displayed in the Planner is related to the location of the Red Pin.

It's key you learn how to move the Red Pin.

There are multiple ways to move the Red Pin:

- **Drag and drop**: Tap and hold on the Red Pin. The pin will lift. Drag the finger on a new location and lift it to drop the pin.

- **Long press the Map**: Tap and hold on any location on the Map to bring the pin to that location.

- **Move the pin to your current location**: Tap the **(+) button on the Map** to show the Map toolbar and then tap the GPS button. It's the first button on the left in this toolbar.

- **Move the pin with the Move pin button**: Tap the **(+) button on the Map** to show the Map toolbar and then tap the Move Pin button. It's is the second button on the left in this toolbar. Just next to the GPS button.

- **Move the pin to an address**: Tap the **Load button** in the bottom bar and use the top search address.

- **Move the pin to a coordinate**: Tap the **Load button** in the bottom bar and select Latitude/Longitude.

- **Move the pin to a geotagged photo location**: Tap the **Load button** and select Geotagged photo. If the selected photo has a GPS location in the EXIF data, the Red Pin will be placed to this location.

- **Move the pin to a Point of Interest**: Tap the **Load button** and select a Point of Interest from you list.

Note: *If you have lost the Red Pin and you don't have a clue where it is, just shake your device! :) The Map will center in the Red Pin location and the date and time will be set to your current time.*

Recommended video tutorial: How to move the Red Pin.

Black Pin

 Black Pin

The Black Pin is linked to the **Panel 2** (Pin to Pin geodetic info). It helps you understand the topography when planning a shot.

This is how you use it:

- Tap on the button you see on **Panel 2** to switch it on. Zoom in onto the location you wish to place the Black Pin before tapping the button. This way the Black Pin will appear near the location you wish to place it, your subject for example.

- Then, place the Black Pin (drag and drop it) on a mountain, or on your subject, and read the topography information on **Panel 2** (distance between pins, azimuth between pins, altitude difference and elevation difference).

- Also tap once on the Black Pin to get this info: latitude/longitude, altitude, altitude difference between Black Pin and Red Pin, elevation difference between Black Pin and Red Pin.

- Use the Time Bar to set the time the Sun/Moon/Galactic Center will be aligned with the mountain. By comparing the elevation of the Sun/Moon (see **Panel 3**) or Galactic Center (see **Panel 8**) and the elevation angle between the two Pins, you'll know whether the Sun/Moon/Galactic Center will be hidden or not by the mountain.

- Also, when the Sun/Moon/Galactic Center azimuth line is aligned with the Black Pin and it's dashed, then the obstacle (hill, mountain) hides the Sun/Moon/Galactic Center. When it's not dashed (continuous), the Sun/Moon/Galactic Center will be visible above the obstacle.

You can also place the Black Pin on your subject to have it perfectly identified on the Map.

You need to master the Black Pin!

Note: *If you have the Black Pin visible on the Map, but it's far away from your current Map area, just tap once the Black Pin button (on **Panel 2**) to hide it and tap it again to drop it near your location. :)*

Recommended video tutorial: Pin to Pin geodetic info Panel.

Map buttons: (+) Map button and Map settings button

At the bottom right-hand corner of the Map you'll find the two Map buttons. They are key!

(+) Map button: Tap it to see a toolbar with multiple options, including the GPS button (to place the Red Pin where you are), Move Red Pin button, Undo/Redo, Expand Map, Swap Pins, Expand lines (expand Sun/Moon lines), Map type, Lock toolbar (see **section 5**).

Map Settings button: Tap it to set what information you wish to see on the Map, including the Planner mode (Camera mode or Drone mode), Map Type, Map tool (Field of View, Depth of Field, Sun/Moon), Map layers (Sun, Moon, Milky Way, Meteor Shower, Eclipse, Twilights and Shadows) and Reset layers button (see **section 6**).

Map tools (Field of View, Depth of Field, Sun/Moon)

Tap the Map Settings button (see previous section). Then, tap on the Map tool you wish to use on the Map (Field of View, Depth of Field, Sun/Moon).

Go to **section 6** to learn how to use these tools.

Map info: Sun, Moon, Milky Way, Meteor Shower, Eclipse, Twilights, and Shadows

Tap the Map Settings button (see previous section) and switch on the information you wish to see on the Map (Sun, Moon, Milky Way, Meteor Showers, Eclipse, Twilights and Shadows).

Would you like to know what kind of info you can use and how it is represented on the Map? Go to **section 6**!

Oh! And remember that you can rotate the Map at you will. ;)

Section 5:

Planner - (+) Map button (toolbar)
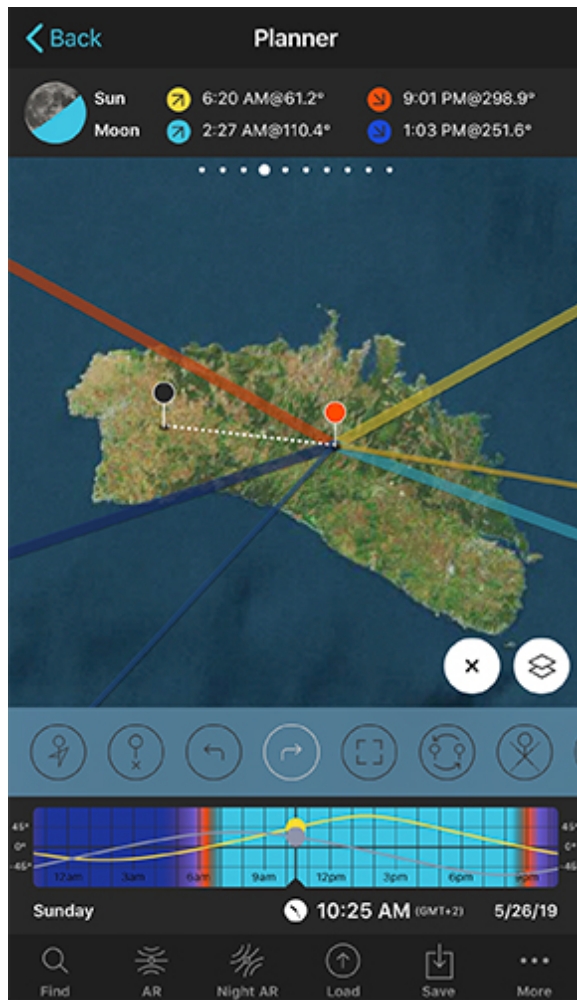
You'll find the (+) Map button on the bottom right-hand corner of the Map. Tap it to see all the options (toolbar).
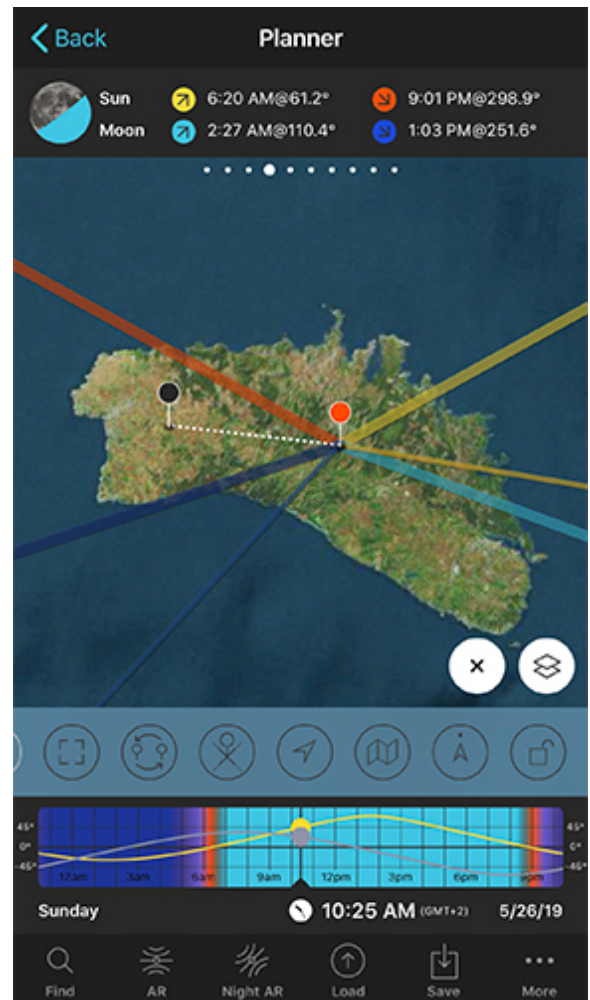
Swipe left the toolbar to discover more options.

The options hidden within the (+) Map button will help you a lot with the planning.

Just tap on the (+) button you see on the Map (bottom hand-right corner, next to the Map settings button) to have access to the following options (swipe left to see all the options):

GPS button: Quickly place the Observer's pin in your current position.

Move Red Pin button: It is very useful for long distance moves. Tap on it. Then, scroll the Map to explore the territory. Once you have found a good location, tap on it again, or tap on the white X to place the Red Pin in the desired location.

Undo button: Very useful to recover the previous position of the Red Pin and the Black Pin. This button doesn't act on time.

Redo button: Very useful to re-recover the previous position of the Red Pin and the Black Pin. This button doesn't act on time.

Expand Map button: Work comfortably with a larger Map screen.

Swap pins button: Tap it when you want to swap the position of the Red Pin and the Black Pin. This is very useful when you want to enter the position of the Black Pin by introducing the latitude and longitude. Just place the Red Pin using the desired latitude and longitude using the Load button (bottom options, below the Time Bar) and then tap the Swap button.

Extend Sun/moon azimuth lines button: Use it to figure out where you can place the Red Pin for a given Sun or Moon alignment.

Show your current position on Maps button: Enable/disable your current position on the Map, directly from the Planner.

Change Map type button: Change the Map type faster, directly from the Planner. You can also change the Map type form the Map Settings button (next to the (+) Map button).

Compass button: Auto rotate the Map according to compass orientation. It helps to orientate yourself when doing field work.

Block Map buttons: Tap it if you want to have all the options visible all the time. Tap on it again to hide the options.

Everytime you use one of the options, the button of the option will appear besides the (+) Map button. This way you can use it again without having to tap on the (+) Map button.

To delete this new button from the Map, just do a long press on it and drag it to the (+) Map button. You'll see how an icon of a trash appears, then drop it, and the button will be re-moved from the Map.

Recommended video tutorial: Understanding the (+) Map button.

Section 6:

Planner – Map Settings button

You'll find the Map Settings button at the bottom right-hand corner, next to the (+) Map button.
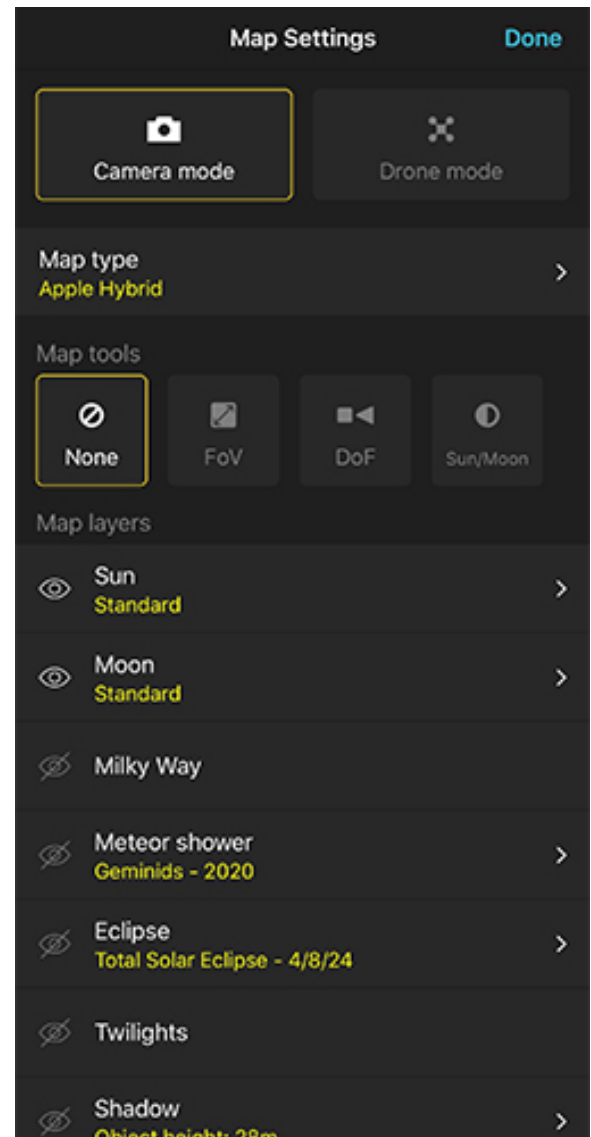
All the options within the Map Settings button: Planner Mode (Camera, Drone), Map type, Map tools (Field of View, Depth of Field, Sun/Moon), Map layers (Sun, Moon, Milky Way, Meteor Shower, Eclipse, Twilights, Shadows) and Reset Map layers button.

We love this button! Because it allows us to decide what we wish to see on the map, and much more.

Let's start for the beginning... The Planner Modes (Camera vs Drone).

Planner modes: Camera mode and Drone mode
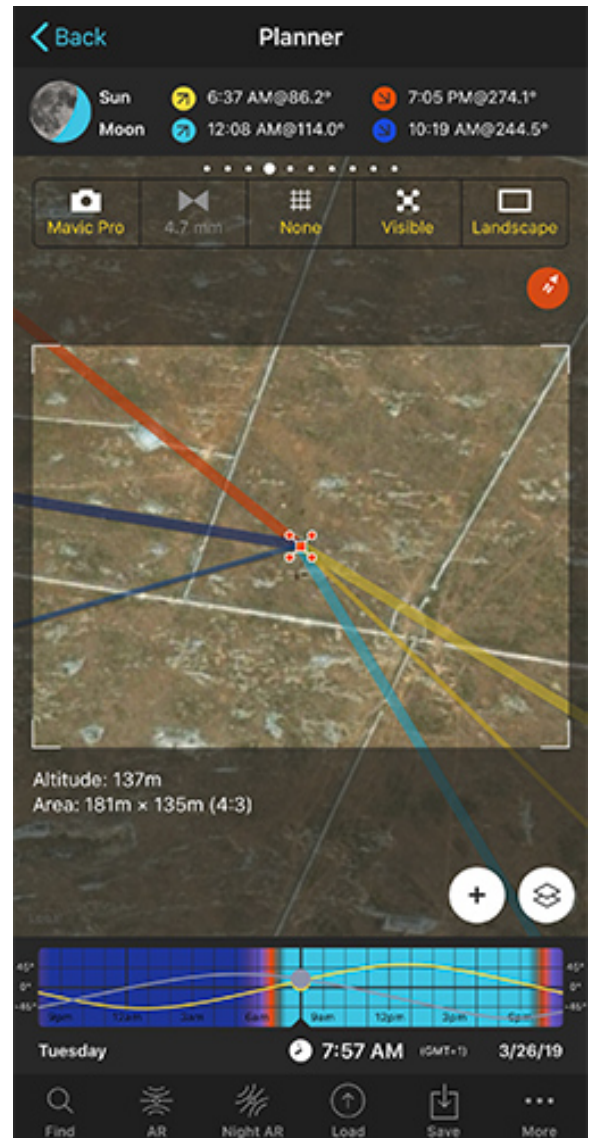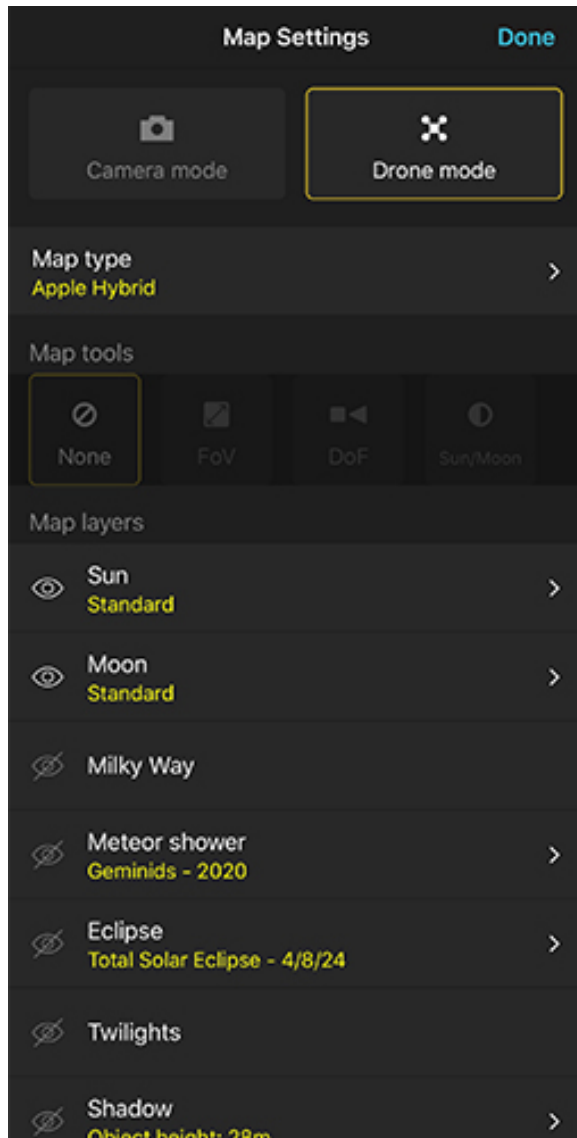
Tap on the Map Settings button and choose between Camera mode and Drone mode (at the top of the screen).

Drone mode of the Planner.

The default Planner mode is the Camera mode. Use it when planning a photo you'll take with your camera.

And then, you have de Drone mode, to plan your drone shots!

The Drone mode includes:

- **5 Drone buttons**:
    - **Drone selector**: Select your drone or the camera you've attached to a drone.

— **Focal length**: Select the focal length you'll use with your drone. If it's in grey it displays the fixed focal length of your selected drone.

— **Composition grid**: Choose from different composition rules (thirds, golden ratio, triangle, diagonal, golden spiral, etc.).

— **Visible/Invisible**: Hide the Drone, Sun, Moon and Milky Way Map lines to enjoy a clean view of the Map.

— **Landscape/Portrait**: Choose between landscape and portrait shooting orientation.

- **Drone frame on the Map**: It shows what the drone is capturing in the frame based on its altitude. Zoom in and out the Map to adjust the drone altitude and frame.

- **Drone altitude**: Approximate altitude of the drone needed to capture the frame you see on the Map.

- **Area**: The field of view the drone is capturing.

- **Grid**: Only visible when you select a grid that has more than one position with the Composition Grid button (triangle, golden spiral, etc.). You can tap on the name of the Grid to choose a different position of the same grid.

Map type button

Use this button to change the Map type of the Planner.

Note: *You can use Maps offline! If you think there will be no network coverage, to create a Map that you can access offline you must proceed as follows: In the Planner, view the locations you want available offline by panning and zooming in and out to cover all the views you need. Notice that iOS and Android store the offline Map tiles in the cache memory. Thus, if you're running out of memory on your device, the Map views will be deleted.*

Map tool overview
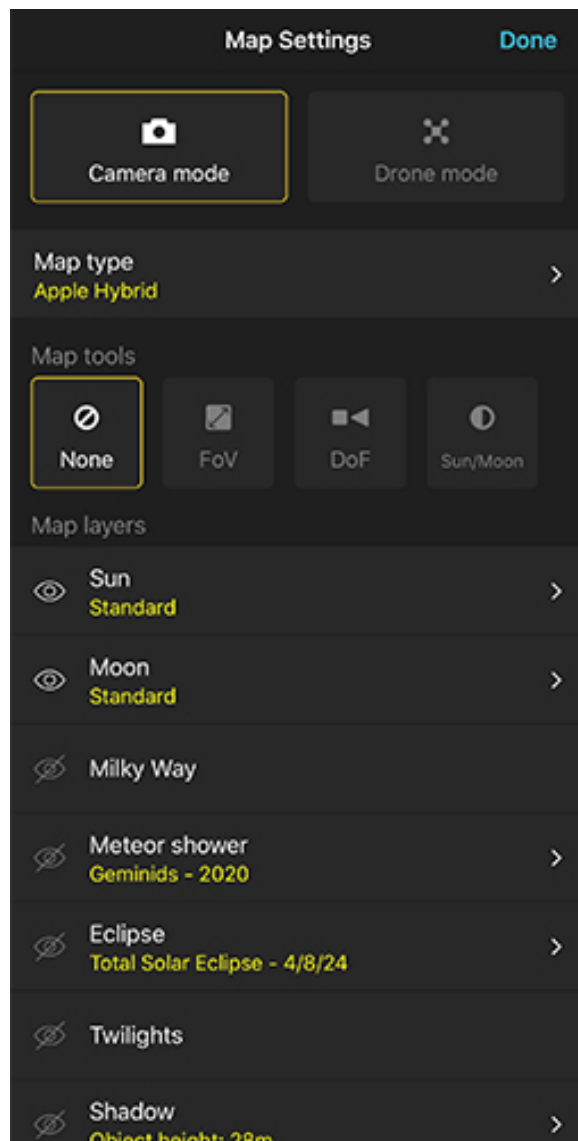
Map settings button – No Map tool has been selected yet.
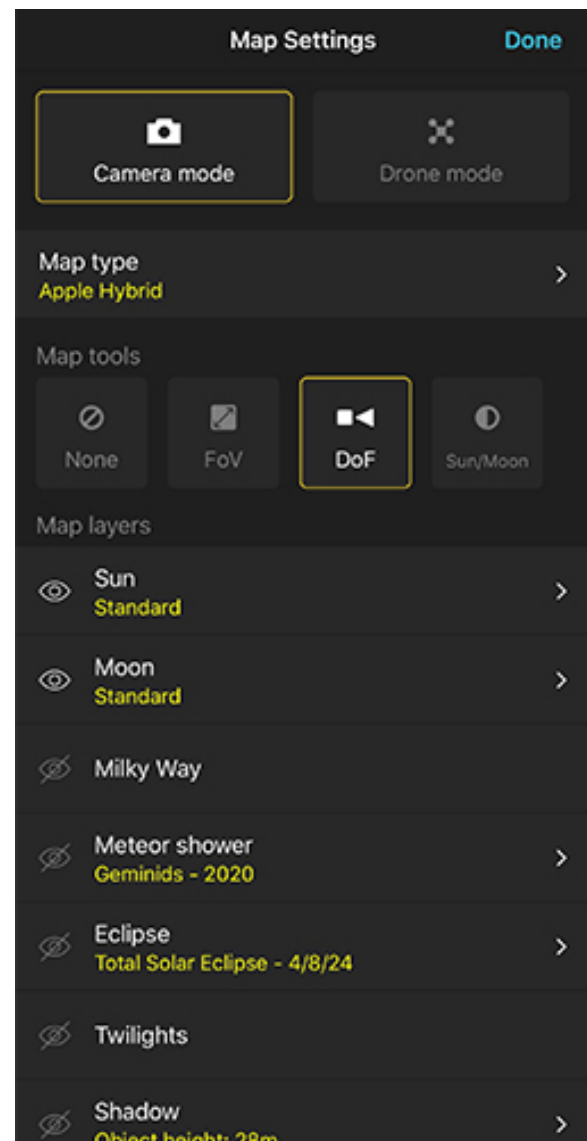
Map settings button – Depth of Field tool has been selected.

The Map tool button allows you to choose the tool you wish to use on the map.

By default, no Map tool is enabled. The option None is selected.

Notice that you can only select one tool at a time because each tool serves a different purpose… Divide and conquer!

You can choose from the following tools:

Field of View

It shows the Field of View on the map for the selected camera, focal length, focus distance, shooting orientation (landscape, portrait) and shooting direction (azimuth). It helps you quickly assess the focal length (and shooting distance) you need to get the frame you want.

Depth of Field

It shows both the Field of View and Depth of field on the map for the selected camera, focal length, aperture, focus distance, shooting orientation (landscape, portrait) and shooting direction (azimuth). It helps you figure out the settings you need for the desired frame and **depth of field**.

Sun/Moon tool

It shows the shooting distance from the Black Pin to get the desired size of the Sun/Moon.

Field of View tool
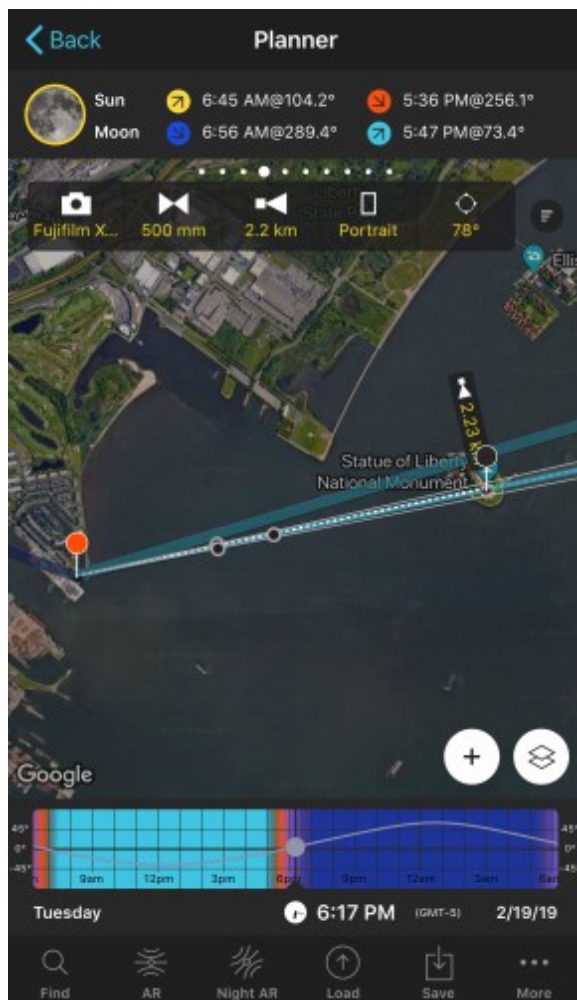
Example of planning the Moon over the Statue of Liberty, New York. Set your camera, focal length, focus distance, shooting orientation (landscape, portrait) and shooting direction (azimuth) to see the resulting field of view on the map.
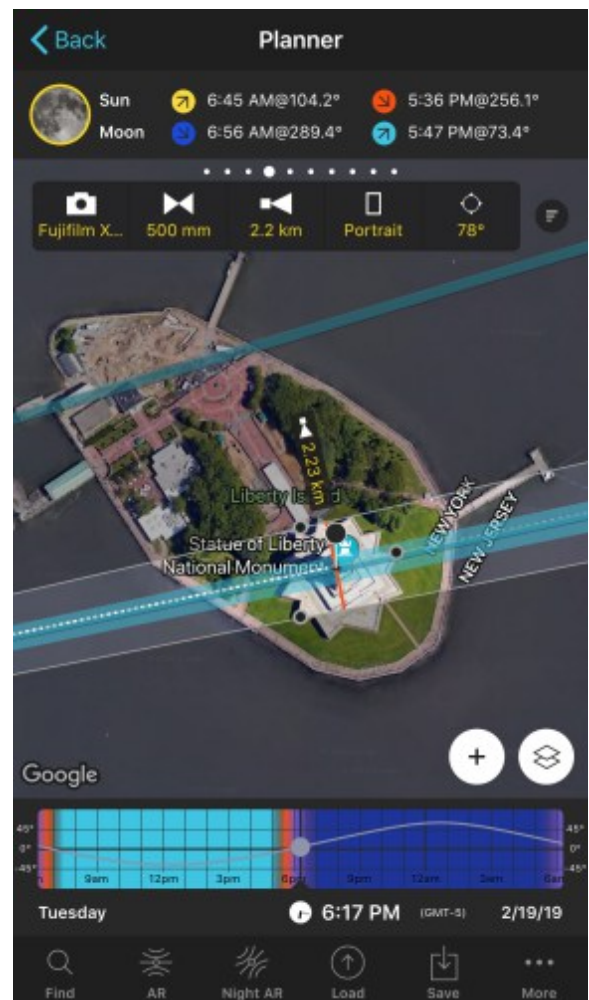
PhotoPills Planner - Close up of the field of view and focus distance. Notice that the blue azimuth line of the Moon shows the size of the Moon. You can enable this option taping Map Settings button > Map Layers > Moon > Show Moon Size.

Once you've planned the shooting spot and shooting date and time, the Field of View (FoV) map tool allows you to visualize on the map what area of the scene will be captured in the frame. The area that won't be captured is covered by a dark layer.

This tool helps you assess the focal length (and shooting distance) you need to capture the frame you want.

To see the FoV on the map, set the following settings you wish to use for the shot using the settings box at the top of the map:

Select your camera. The crop factor will be taken into account in the calculations.

Set the focal length. Here, you can choose to set the nominal value or the 35mm equivalent. You can also add a teleconverter, and even **lock the focal length value**. Use this option when you don't want to change the field of view directly from the map.

Set the focus distance. Introduce a custom distance or choose to focus at the Black Pin.

Set the shooting orientation, landscape or portrait.

Set the azimuth. This is the direction you're aiming the camera at (the shooting direction). Introduce a custom azimuth or choose to align it with the Black Pin.

See the Field of View numbers. Tap the last button of the settings box to see the field of view values on a table and represented on a picture.

You can also change the field of view and shooting direction directly on the map:
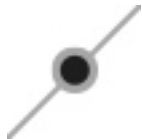
To change the field of view, drag the two black circles that you see on the two field of view lines. This will help you to quickly assess the focal length you need.

To change the shooting direction, drag the black circle you see on the field of view central line.

Note that when you change the field of view and/or shooting direction on the map, their values also change in the settings box at the top of the map.

Depth of Field tool
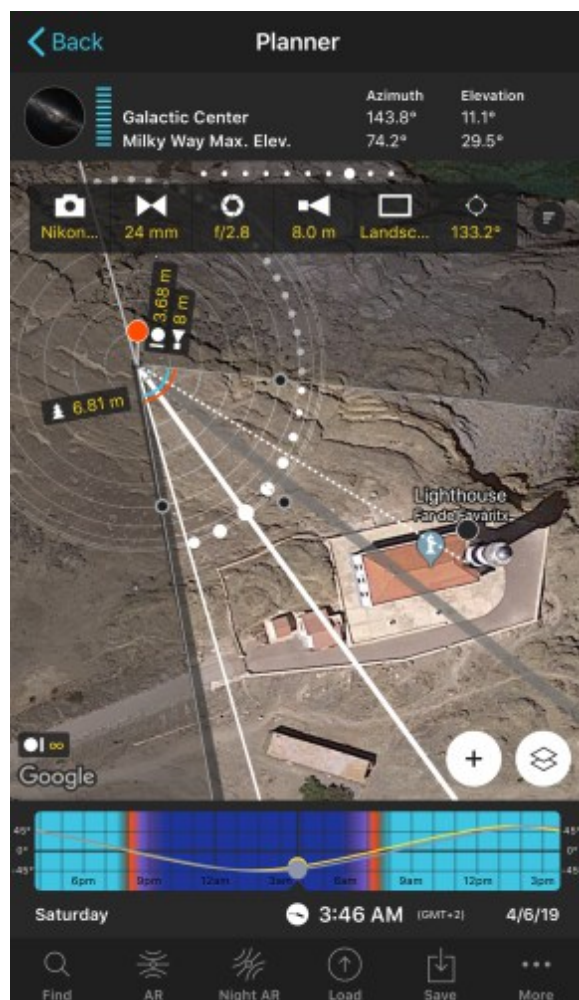
Example of planning the Milky Way over the Favàritx lighthouse in Menorca. Set your camera, focal length, aperture, focus distance, shooting orientation (landscape, portrait) and shooting direction (azimuth) to see the depth of field and the field of view on the map.
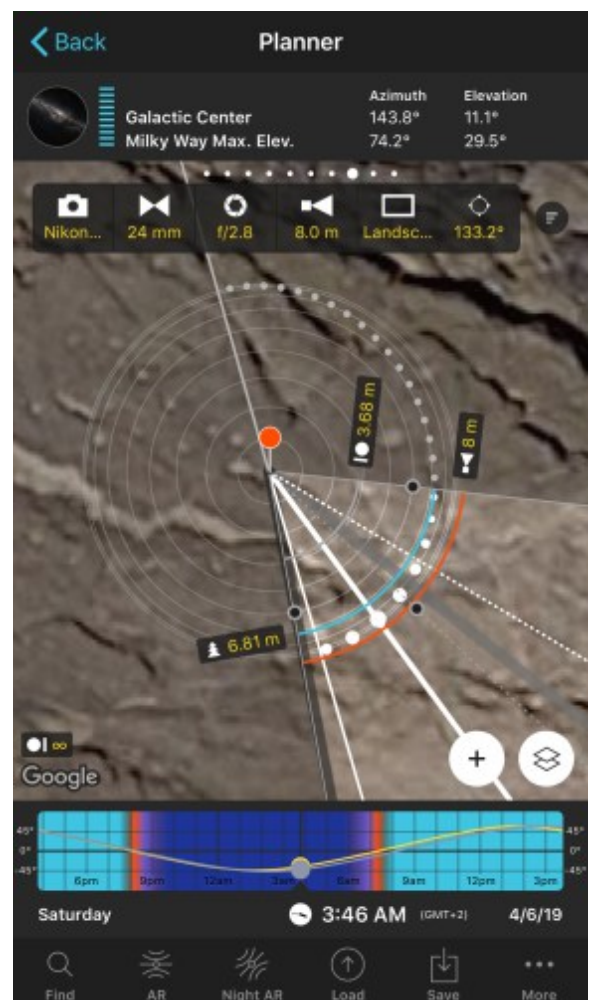
Close up of the focus distance (8m), hyperfocal distance (6.81m), DoF near limit (3.68m) and DoF far limit (infinity, located just above the Google logo).

Once you've planned the shooting spot and shooting date and time, the Depth of Field map tool allows you to visualize both the **depth of field** (DoF) and the field of view (FoV) information on the map. The area that won't be captured in the frame is covered by a dark layer on the map.

This tool helps you assess the settings you need to get the frame and depth of field you want.

This is the depth of field information you'll see on the map:

I⬤   DoF near limit (gray arch).

⬤I   DoF far limit (gray arch). When the depth of field far limit is infinity, its value will appear on the bottom left hand corner of the map.

■◀   Focus distance (red arch).

🌲   Hyperfocal distance (blue arch).

To see the DoF and FoV on the map, set the settings you wish to use using the settings box at the top of the map:

📷   Select your camera. The crop factor will be taken into account in the calculations.

▶◀   Set the focal length. Here, you can choose to set the nominal value or the 35mm equivalent. You can also add a teleconverter, and even **lock the focal length value**. Use this option when you don't want to change the field of view directly from the map.

⬡   Set the aperture.

■◀   Set the focus distance. Introduce a custom distance or choose to focus at the Black Pin or the hyperfocal distance.

▭   Set the shooting orientation, landscape or portrait.

◇   Set the azimuth. This is the direction you're aiming the camera at (the shooting direction). Introduce a custom azimuth or choose to align it with the Black Pin.

≡   See the Depth of field numbers. Tap the last button of the settings box to see the depth of field numbers represented on a picture.

Similarly to what happens with the **Field of View map tool**, you can change the field of view and shooting direction (azimuth) directly on the map:
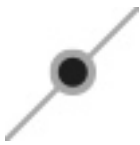
To change the field of view, drag the two black circles that you see on the two field of view lines. This will help you to quickly assess the focal length you need.

To change the shooting direction, drag the black circle you see on the field of view central line.

Note that when you change the field of view and/or shooting direction on the map, their values also change in the settings box at the top of the map.

Sun/Moon tool
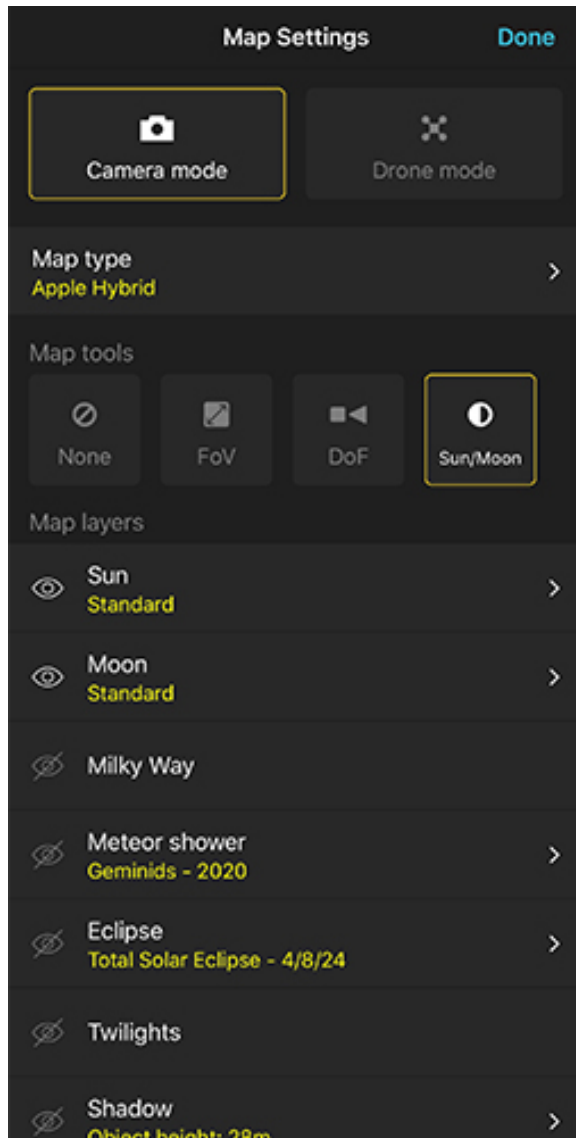
Switch on the Sun/Moon map tool from the Map Settings button.

Choose to plan the Sun or the Moon and the Sun/Moon size to calculate and see the shooting distance on the Map.

Quickly figure out the shooting distance for the Sun/Moon size you need!

Imagine that you're planning the next full Moon. In the Planner, you place the Red Pin in the location you wish to plan the shot and set the full Moon date.

When designing a Moon (or Sun) long distance shot, once you've decided the size of the Moon you want compared to your subject, you need to calculate the shooting distance that gives you the desired Moon size. So you know the distance you have to place the Red Pin… to start looking for the shooting spot that gives you the right Moon alignment.

Till now, as a rule of the thumb, we used the PhotoPills rule of 100 to calculate it. Therefore, to get the shooting distance, we multiplied the desired Moon size by 100.

Well…

Now you can use the new Sun/Moon map tool to work out the shooting distance faster and with more precision.

In the Planner, place the Black Pin on your subject. Then tap on the Map settings button (next to the "+" map button). And switch on the Sun/Moon map tool.

To calculate the shooting distance, use the tool box that appears above the map (under the top panels):

Choose to plan the Sun or the Moon.

Set the Sun/Moon size you want. This is the diameter of the Sun/Moon.

You can also set the shooting distance if you wish to calculate the size of the Moon you'll get.

On the map, a gray circumference will point out the shooting distance you need. This way, based on the desired alignment and desired Moon size, you'll quickly know where to place the Red Pin.

Map layers overview
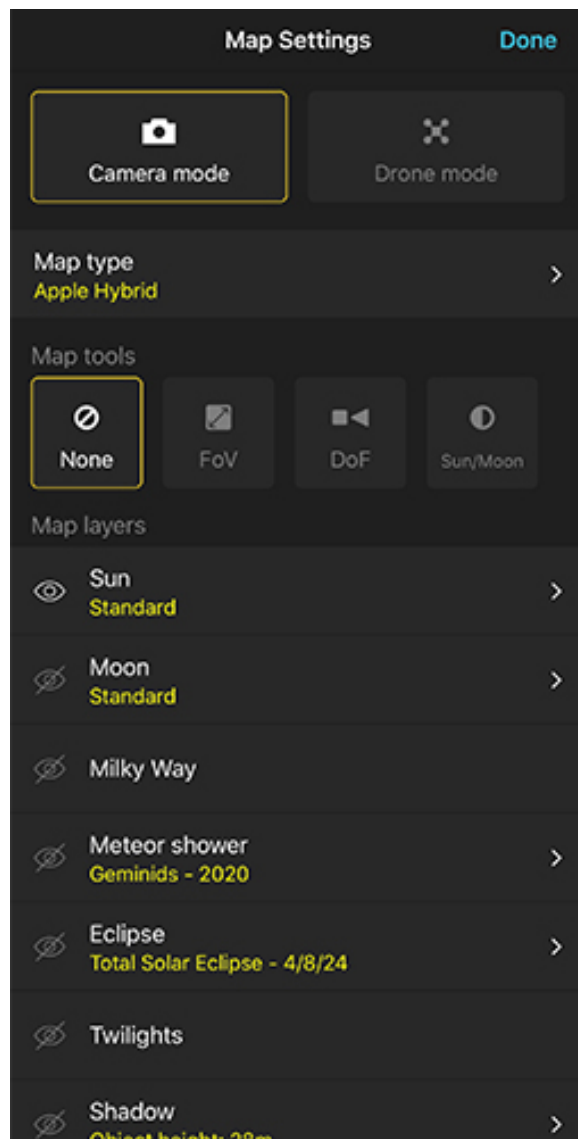
Map Settings button – Only the Standard Sun layer is active. Tap on the eye icon on the left to switch on and off a layer.
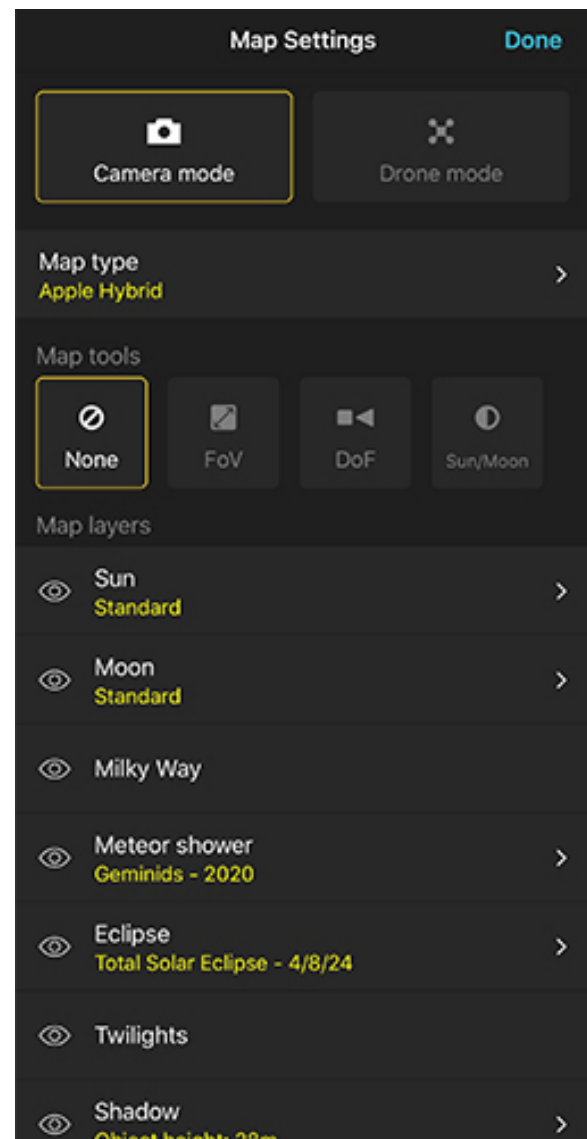
Map Settings button – All the layers are active.

The Map layers menu allows you to comfortably choose the information you want to have visible on the Map: Sun, Moon, Milky Way, Meteor Shower, Eclipse, Twilights and Shadow.

To switch on and off a layer tap on the eye icon you see on the left.

    Layer visible

 Layer not visible

These are the layer options you have available:

Sun layer
Layer styles:

- **Standard**: Sunrise and Sunset directions (thick azimuth lines) for the selected date. Direction of the Sun (thin azimuth line) for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

- **Path**: Path and position of the Sun for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

- **Light direction**: Position of the Sun and light direction for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

More options:

- **Show Sun size**: It shows the angular diameter of the Sun on the Map. Use it when planning a long distance Sun shot. Zoom on your subject and on the Sun azimuth line to see how big the Sun will be compared to your subject.

Moon layer
Layer styles:

- **Standard**: Moonrise and Moonset directions (thick azimuth lines) for the selected date. And the direction of the Moon (thin azimuth line) for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

- **Path**: Path and position of the Moon for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

- **Light direction**: Position of the Moon and light direction for the selected date and time. This layer is linked to **Panel 3** and **Panel 4**.

More options:

- **Show Moon size**: It shows the angular diameter of the Moon on the Map. Use it when you plan a long distance Moon shot. Zoom on your subject and on the Moon azimuth line to see how big the Moon will be compared to your subject.

Milky Way layer

It shows the position of the Milky Way and Galactic Center for a given date and time. This layer is linked to **Panel 7** and **Panel 8**.

Meteor Shower layer

Choose the Meteor Shower you want to see on the map and start planning your Meteor Shower shot. This layer is linked to **Panel 11**.

Eclipse layer

Choose the Solar and Lunar eclipse you wish to see on the Map. And start planning your eclipse photo ideas. This layer is linked to **Panel 9** and **Panel 10**.

Twilights layer

It colors the Map view according to the light distribution (golden hour, blue hour and twilights). This layer is lined to **Panel 5** and **Panel 6**.

Shadow layer

It shows the shadow length and direction on the Map cast by an object of the selected height. This layer is linked to **Panel 1**.

Reset Map layers

Use this button to switch on the default layer configuration (Sun-Standard, Moon-Standard and Twilights).

Sun layer

Choose the Sun layer style you need to plan your Sun shots from the Map Settings button (bottom right-hand corner, next to the (+) Map button).
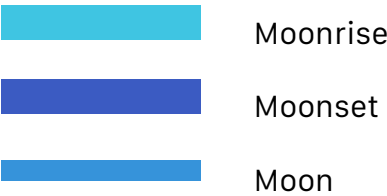
Standard (Sun)
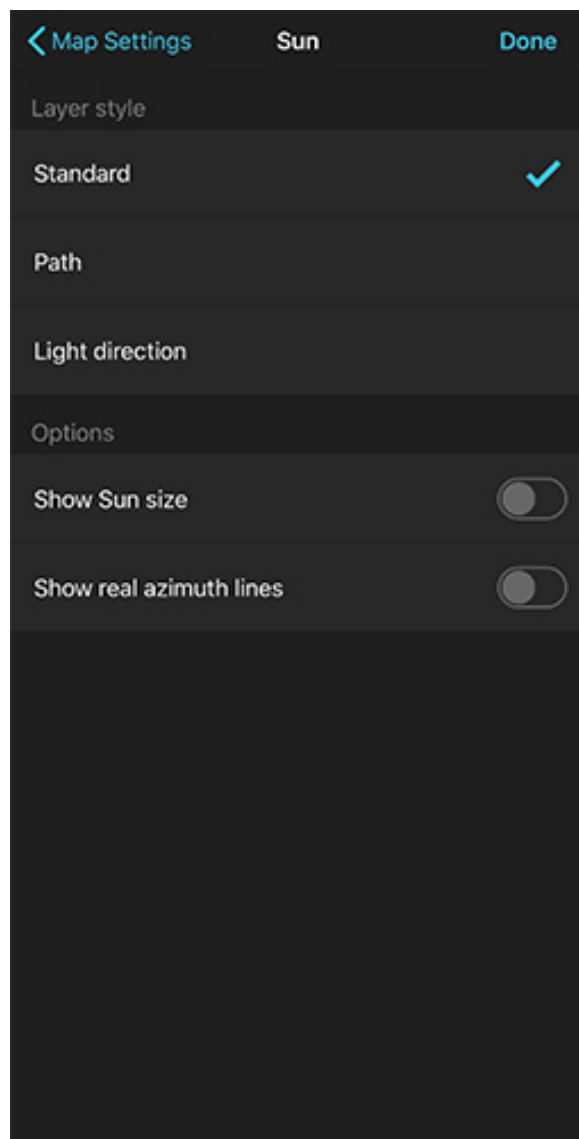
Sun layer selector: Standard, Path, Light direction, Show Sun size and Show real azimuth lines.

Sun Standard Layer: sunrise and Sunset directions. And Sun direction for the selected date and time.

The Sun Standard layer shows the direction of the Sunrise (thick yellow line) and the Sunset (thick orange line) for the selected date and the Red Pin position. It also shows the position of the Sun (thin yellow line) for the selected date, time and Red Pin position.

    ▬▬▬▬▬   Sunrise

    ▬▬▬▬▬   Sunset

    ▬▬▬▬▬   Sun
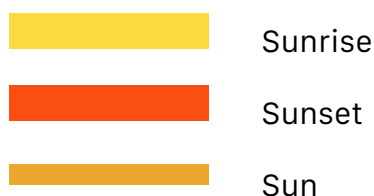
On **Panel 4** (see second screenshot above) you have the Sunrise and Sunset times. And on

**Panel 3** you have the Sun position coordinates (azimuth and elevation).

Use the Sun Standard layer and the top Panels (3 and 4) to plan any Sun shot you imagine.

Recommended video tutorial: Sun and Moon info.

Path (Sun)
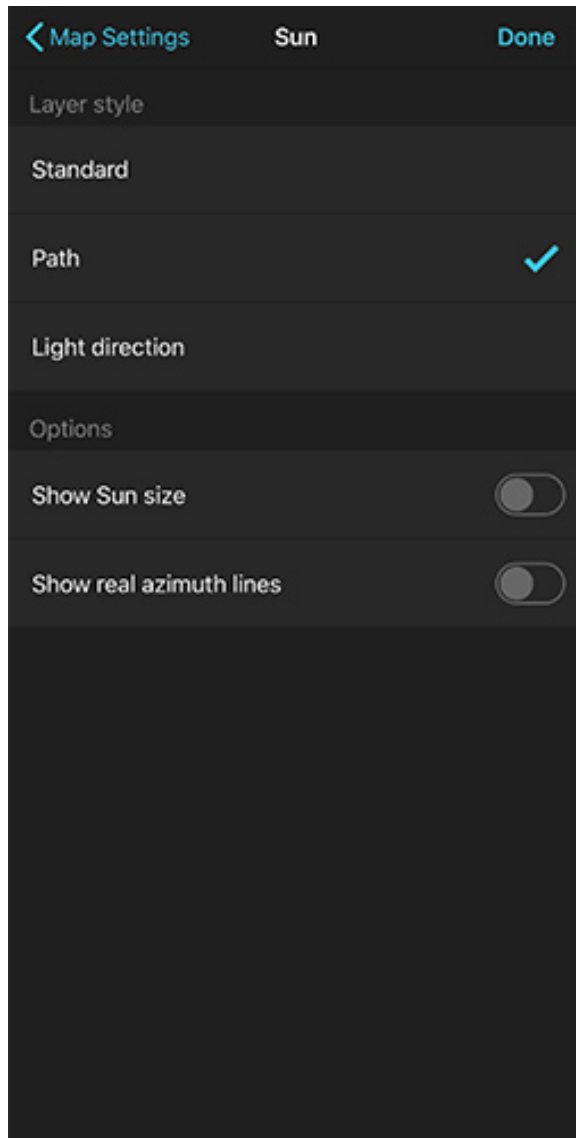
Sun layer selector: Standard, Path, Light direction, Show Sun size and Show real azimuth lines.
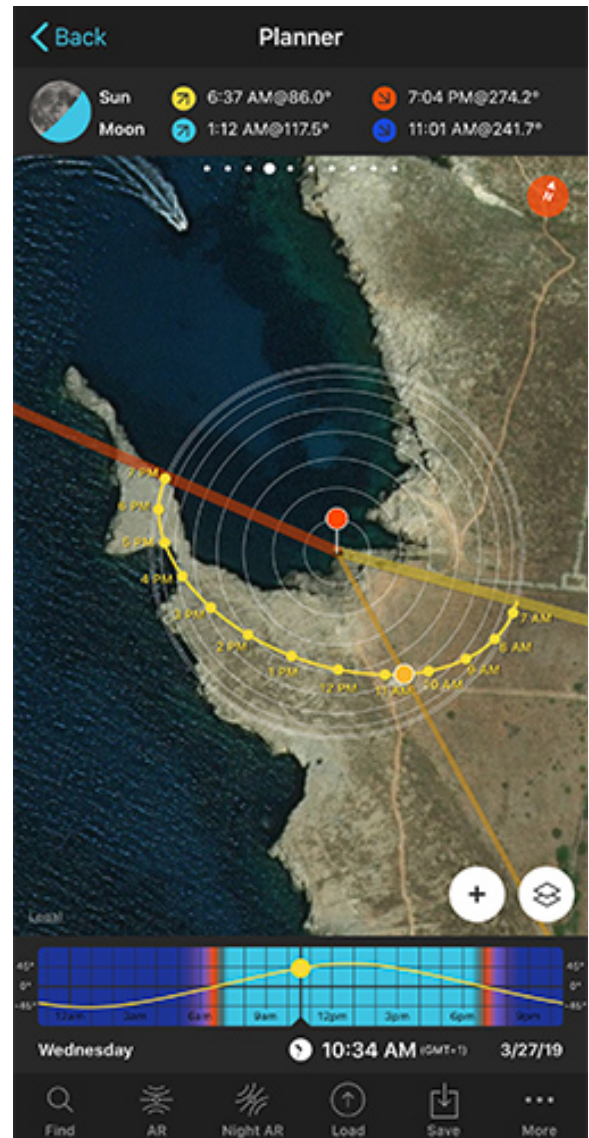
Sun Path Layer: Sun path, sunrise and Sunset directions. And Sun direction for the selected date and time.

The Sun Path layer shows the same info thant the Standard layer plus the Sun path for the selected date.

Working together with the Sun Path and the contour circumferences you can quickly assess

the position of the Sun in the sky (direction and elevation).

 Sun path

 Contour circumferences from 0 degrees (outer) to 90 degrees (center) in steps of 10 degrees of elevation.

Light direction (Sun)
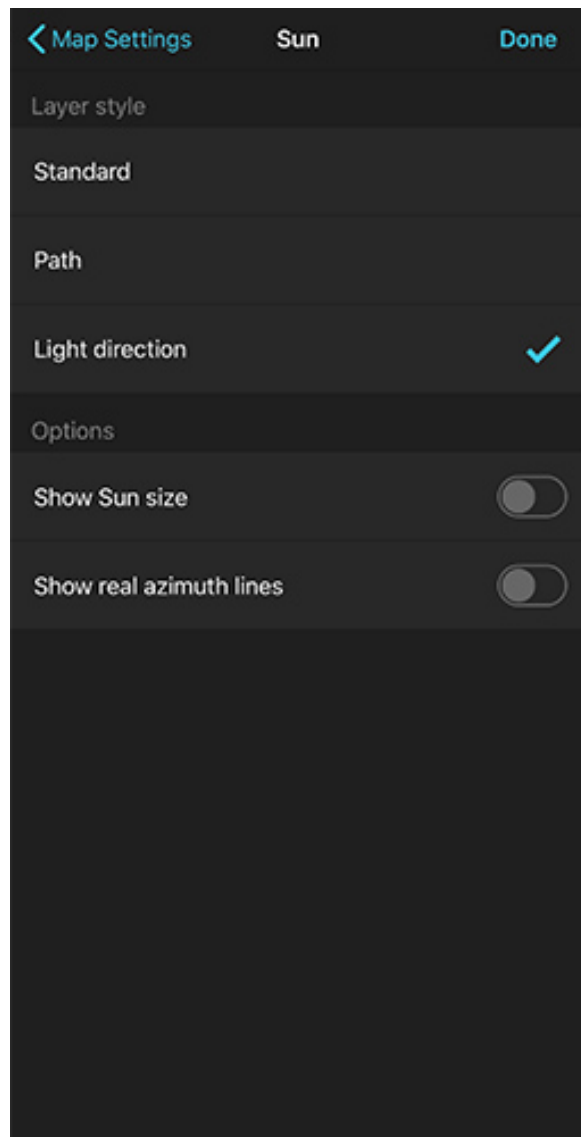
Sun layer selector: Standard, Path, Light direction, Show Sun size and Show real azimuth lines.
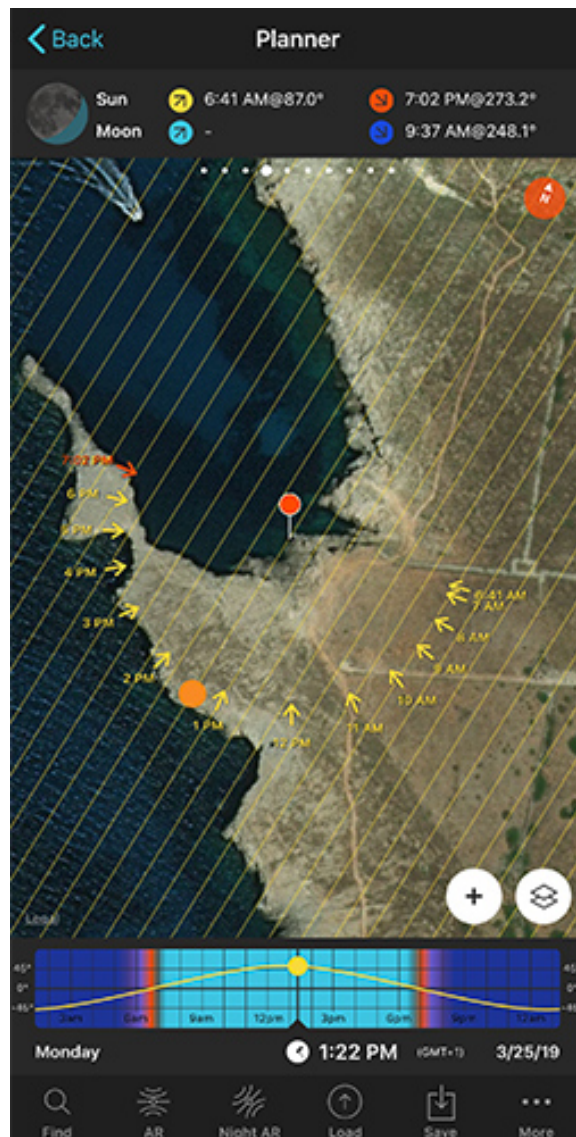
Sun Light direction layer: Sunlight, Sunrise and Sunset directions and times for the selected date.

If you wish to figure out how light will hit your subject on a given date, this is your layer!

The Sun Light direction layer shows the direction of light throughout the selected date.
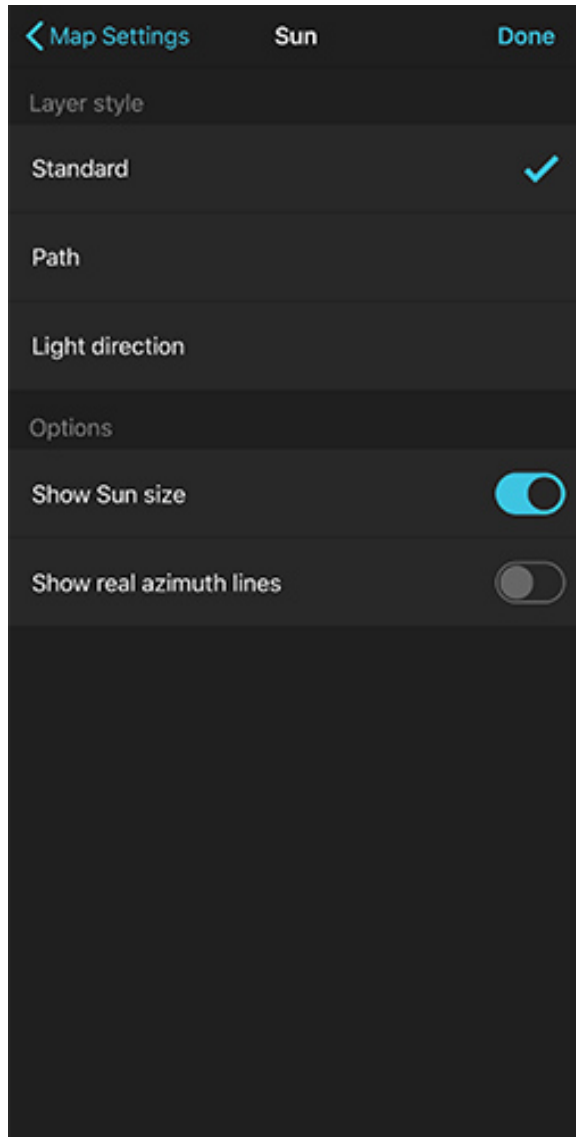
Show Sun Size

Sun layer selector: Standard, Path, Light direction, Show Sun size and Show real azimuth lines.
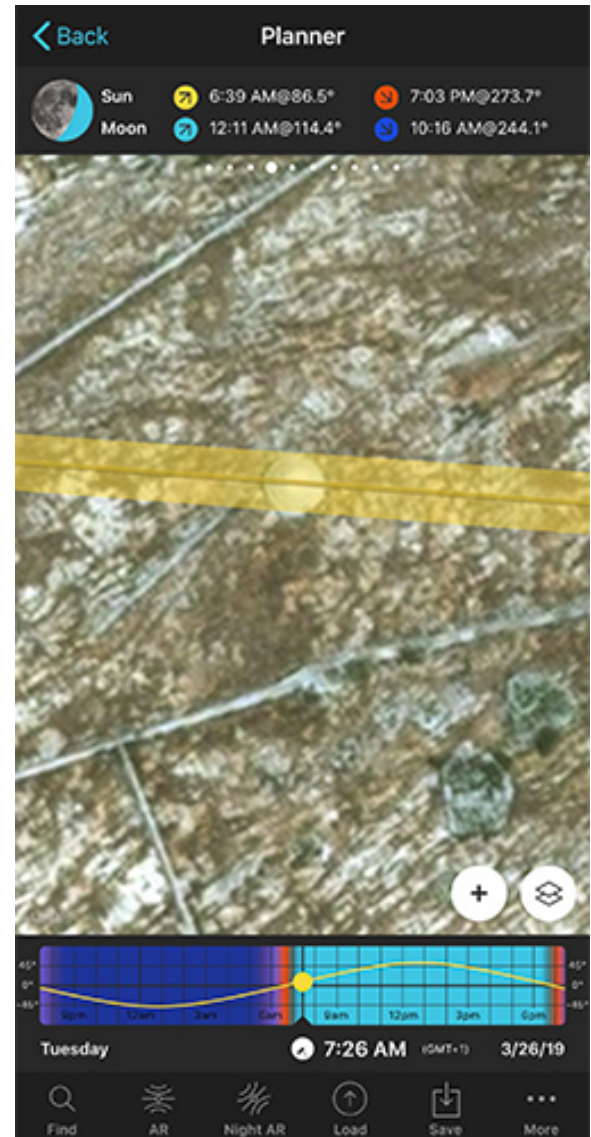
Sun Size option: The angular diameter of the Sun for the selected date and time is displayed on the Map. So you know how big the Sun will be compared to your subject.

This option is super useful when planning long distance shots of the Sun with the Sun Standard or Path layers. Switch the Sun size on and the azimuth line of the Sun will turn into a sector showing the angular diameter of the Sun.

This way you'll be able to visualize how big the Sun will be compared to your subject di-

rectly on the Map.

Note: *The angular diameter of the Sun varies around 0.5 degrees. It's pretty small, so make sure you zoom in on the subject to see it!*

 Angular diameter of the Sun (or Sun size)

Recommended article to understand the angular diameter of the Sun/Moon: The Shooting spot determines the size of the Moon relative to your subject

Show real azimuth lines
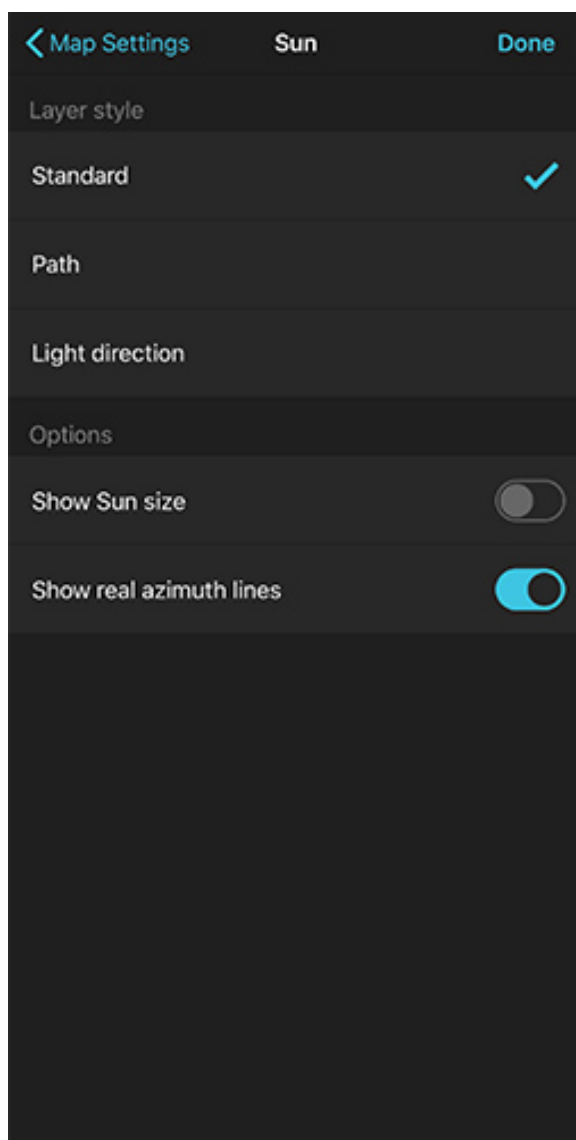
Sun layer selector: Standard, Path, Light direction, Show Sun size and Show real azimuth lines.
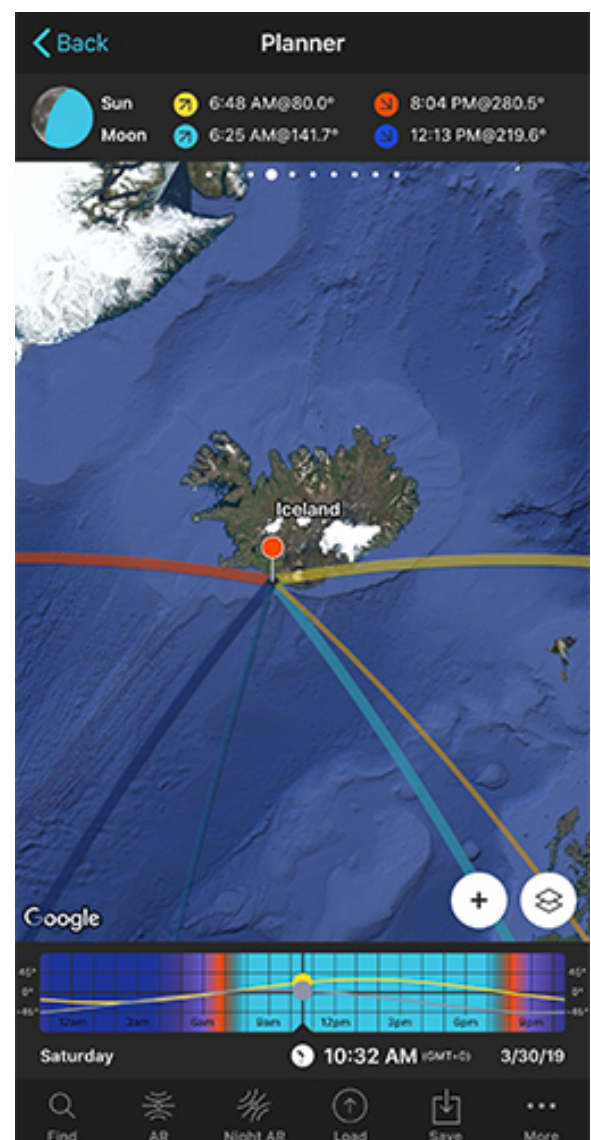
The Moon and Sun azimuth lines will take into account Earth curvature to show you a more accurate position of the Moon and the Sun.

Earth is not flat!

When planning Sun alignments for short shooting distances, assuming the azimuth lines to be straight lines works pretty well.

But for long shooting distances, Earth curvature must be taken into account when drawing the azimuth lines on the map, to have a more precise position of the Sun.

So switch on Show real azimuth lines.

This will give you a more accurate position of the Sun on the map.

Notice that the Sun azimuth lines aren't straight lines anymore. They are curves, to show you a more real position of the Sun.

Moon layer

Choose the Moon layer style you need to the plan your Moon shots from the Map Settings button (bottom right-hand corner, next to the (+) Map button).

Standard (Moon)
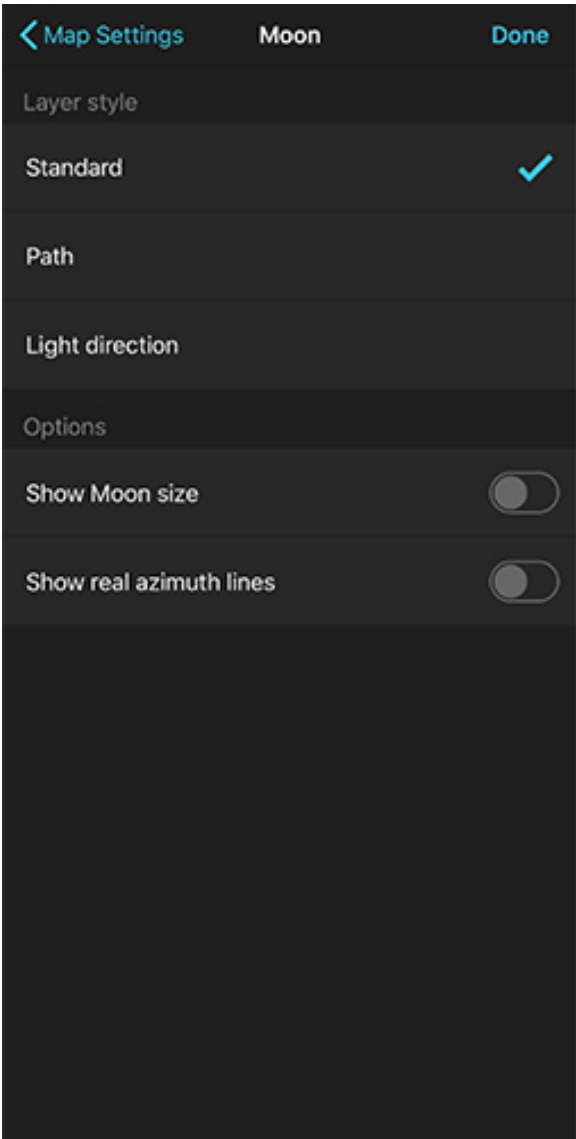
Moon layer selector: Standard, Path, Light direction, Show Moon size and Show real azimuth lines.
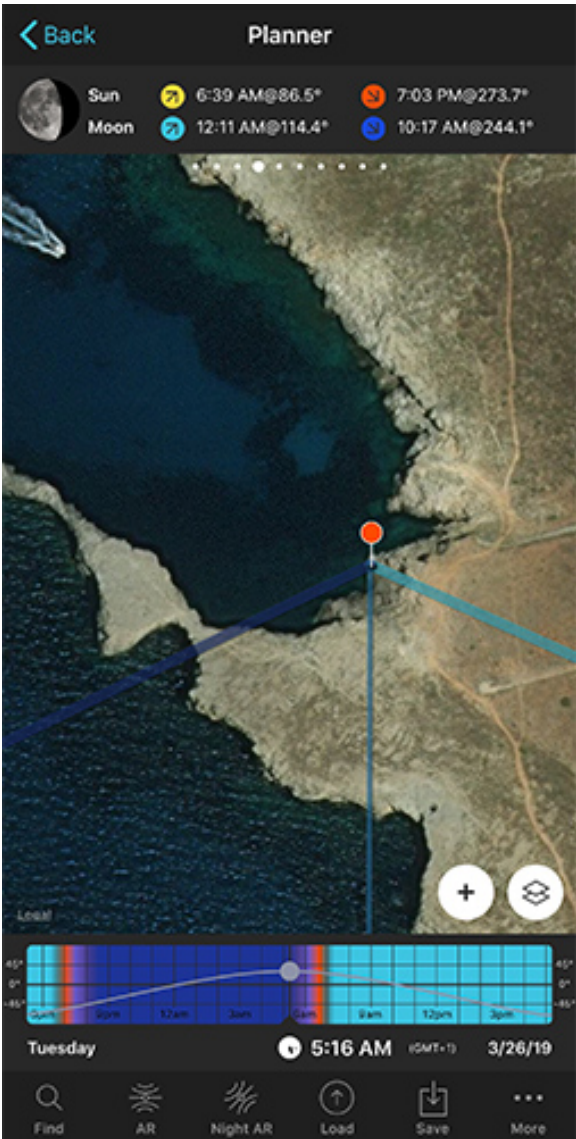
Moon Standard Layer: Moonrise and Moonset directions. And Moon direction for the selected date and time.

The Moon Standard layer shows the direction of the Moonrise (thick light blue line) and the Moonset (thick dark blue line) for the selected date and the Red Pin position. It also shows the position of the Moon (thin blue line) for the selected date, time and Red Pin position.

Moonrise

Moonset

Moon

On **Panel 4** (see the second screenshot) you have the Moonrise and Moonset times. And on **Panel 3** you have the Moon position coordinates (azimuth and elevation).

Use the Moon Standard layer and the top Panels (3 and 4) to plan any Moon shot you imagine.

Recommended video tutorial: Sun and Moon info.

Path (Moon)
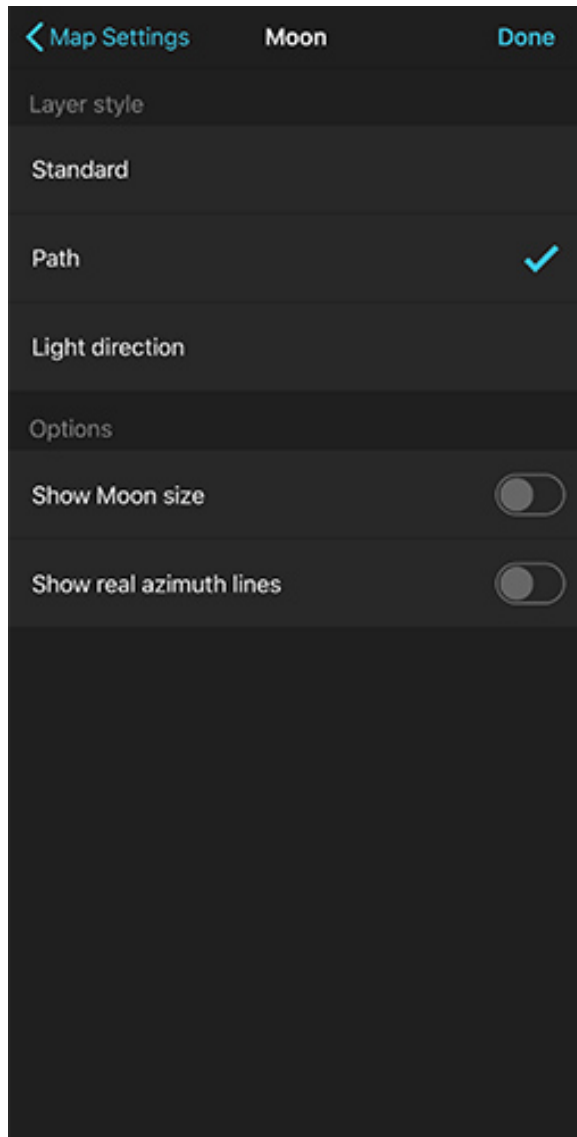
Moon layer selector: Standard, Path, Light direction, Show Moon size and Show real azimuth lines.
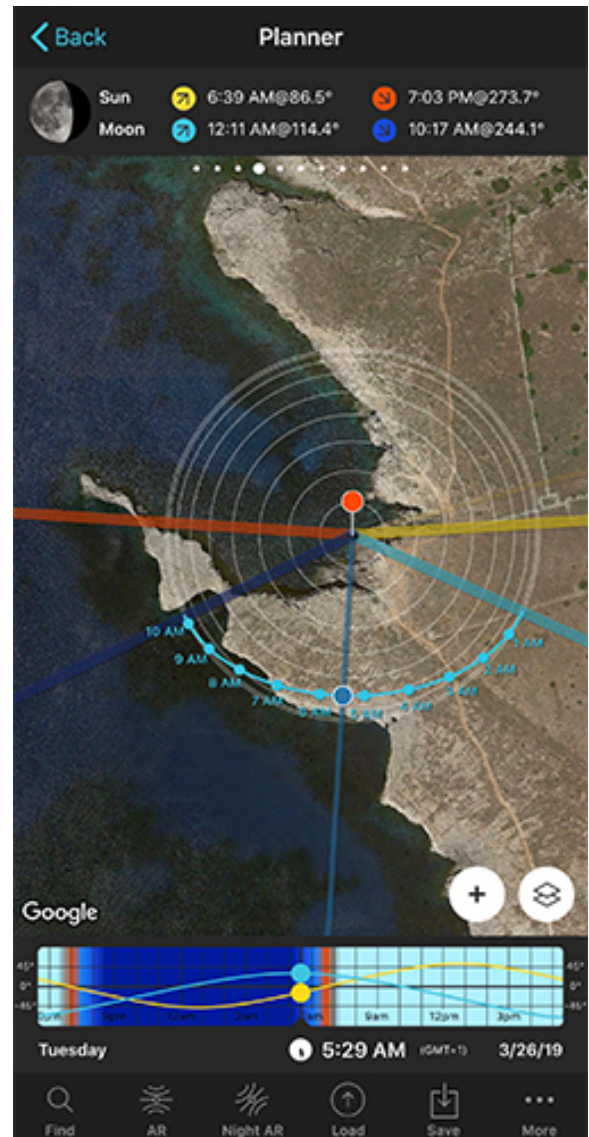
Moon Path Layer: Moon path, Moonrise and Moonset directions. And Moon direction for the selected date and time.

The Moon Path layer shows the same info than the Standard layer plus the Moon path for the selected date.

Working together with the Moon Path and the contour circumferences you can quickly assess the position of the Moon in the Sky (direction and elevation).

Moon path

Contour circumferences from 0 degrees (outer) to 90 degrees (center) in steps of 10 degrees of elevation.

Light direction (Moon)
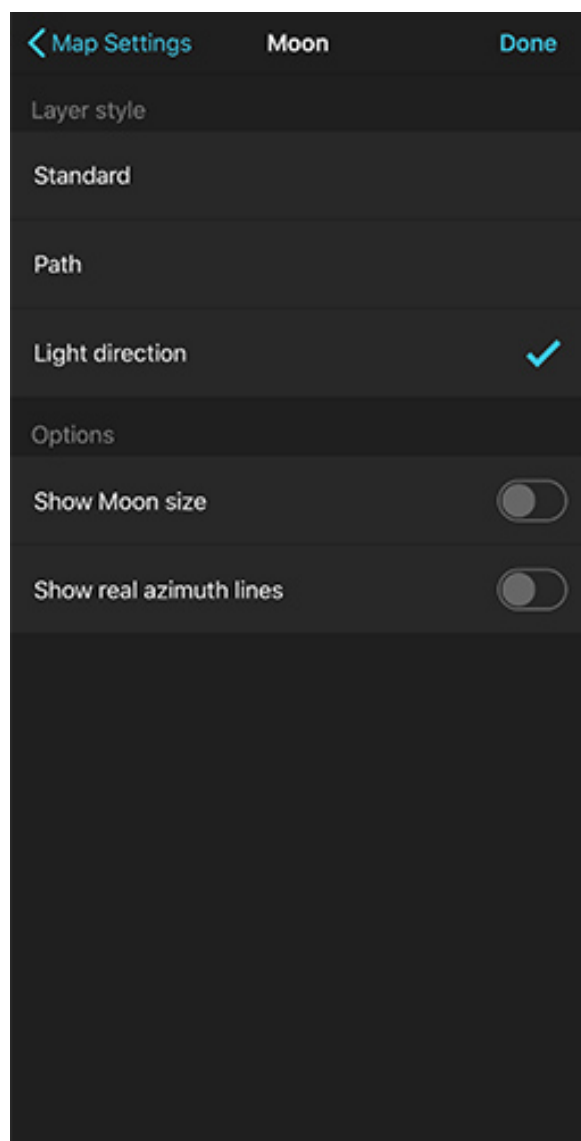
Moon layer selector: Standard, Path, Light direction, Show Moon size and Show real azimuth lines.
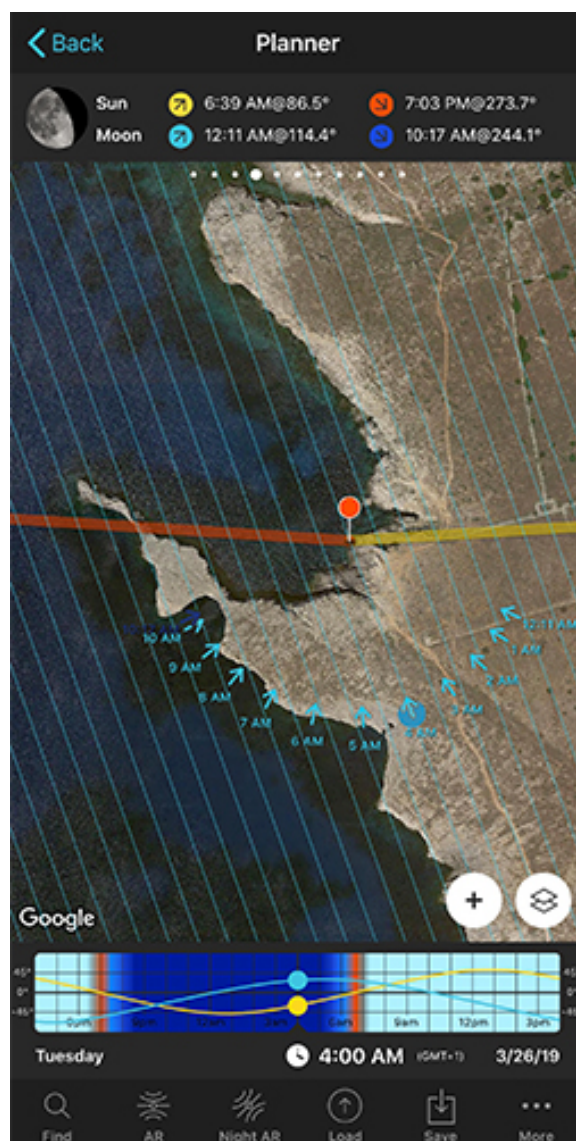
Moonlight direction layer: Moonlight, Moonrise and Moonset directions and times for the selected date.

If you wish to figure out how light will hit your subject on a given date, this is your layer!

The Moonlight direction layer shows the direction of light throughout the selected date.

Notice that the thin blue lines showing the direction of light will only appear during night-time. Because Moonlight is only important at night!

 Light direction and time

Show Moon Size
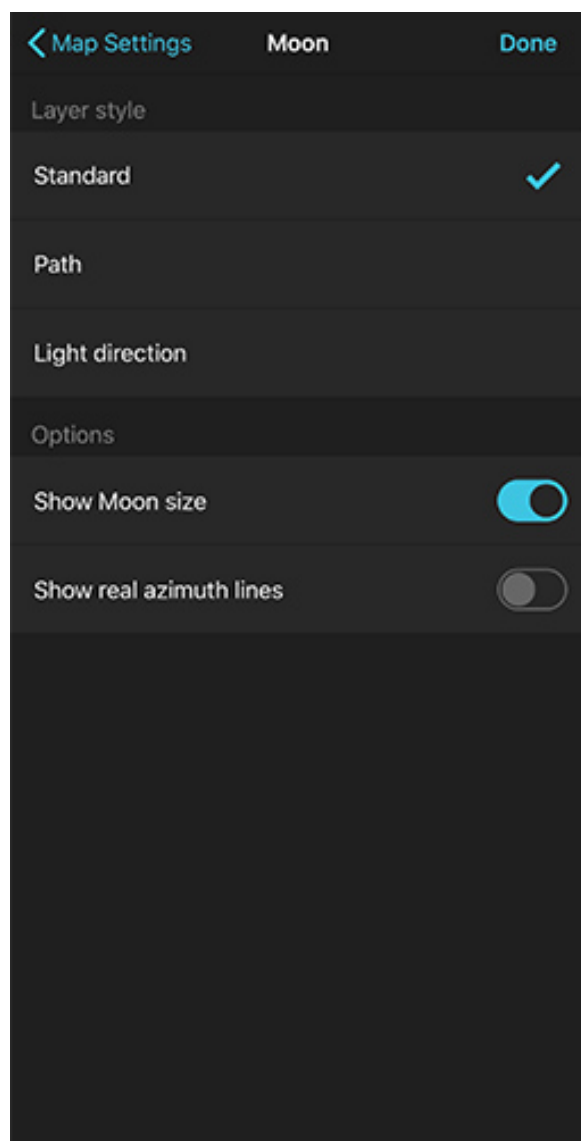
Moon layer selector: Standard, Path, Light direction, Show Moon size and Show real azimuth lines.

Moon Size option: The angular diameter of the Moon for the selected date and time is displayed on the Map. So you know how big the Moon will be compared to your subject.

This option is super useful when planning long distance shots of the Moon with the Moon Standard or Path layers. Turn it on and the azimuth line of the Moon will turn into a sector showing the angular diameter of the Moon.

This way you'll be able to visualize how big the Moon will be compared to your subject directly on the Map.

Note: *The angular diameter of the Moon varies around 0.5 degrees. It's pretty small, so make sure you zoom in on the subject to see it!*

Angular diameter of the Moon (or Moon size)

Recommended article to understand the angular diameter of the Sun/Moon: The Shooting spot determines the size of the Moon relative to your subject

Show real azimuth lines
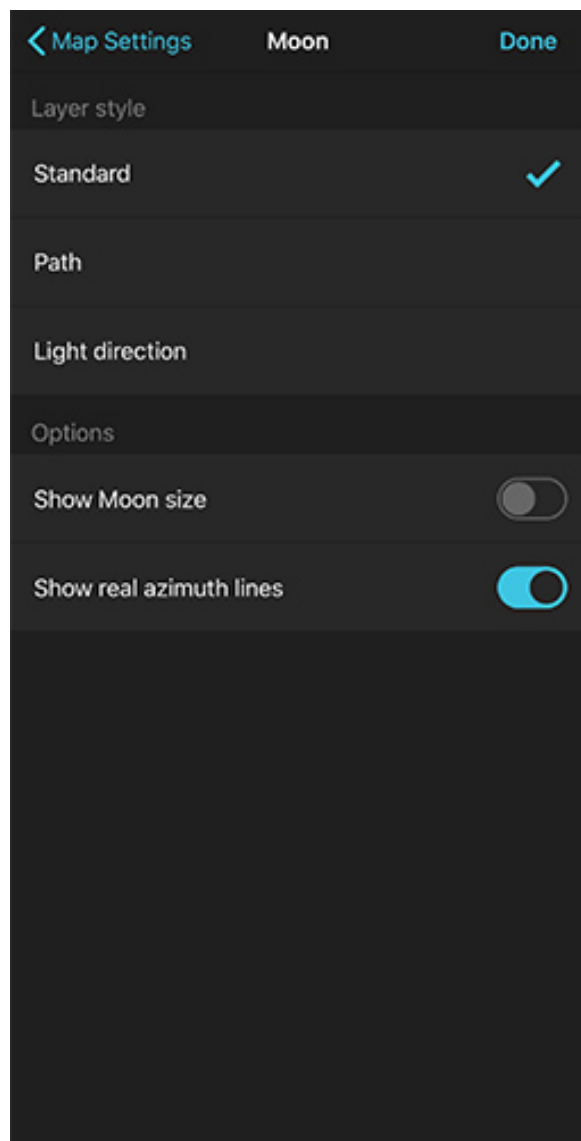
Moon layer selector: Standard, Path, Light direction, Show Moon size and Show real azimuth lines.
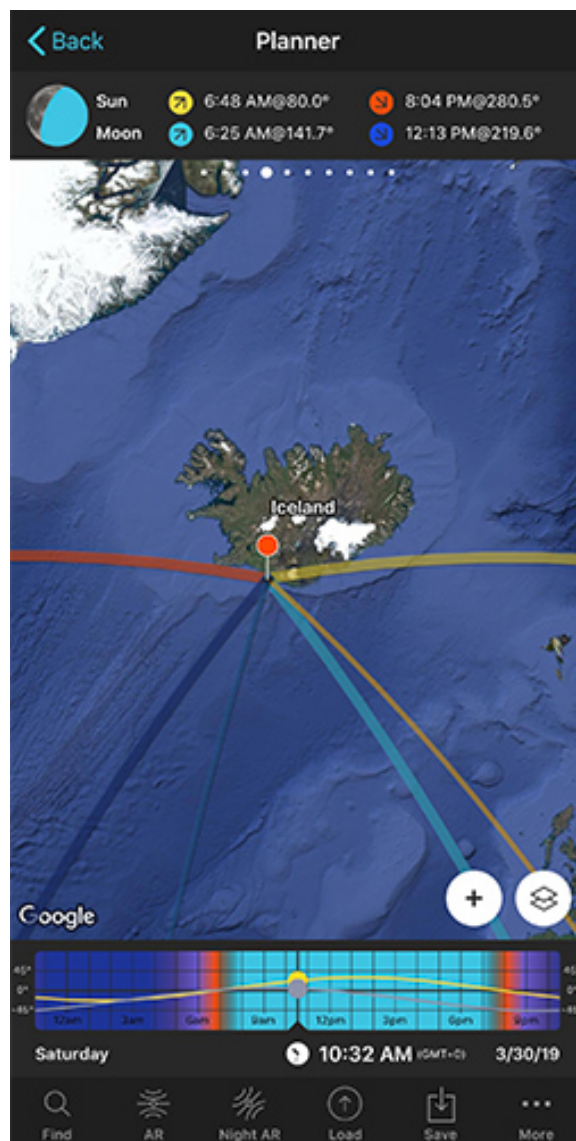
The Moon and Sun azimuth lines will take into account Earth curvature to show you a more accurate position of the Moon and the Sun.

Earth is not flat!

When planning Moon alignments for short shooting distances, assuming the azimuth lines to be straight lines works pretty well.

But for long shooting distances, Earth curvature must be taken into account when drawing the azimuth lines on the map, to have a more precise position of the Moon.

So switch on Show real azimuth lines ;)

This will give you a more accurate position of the Moon on the map.

Notice that the Moon azimuth lines aren't straight lines anymore. They are curves, to show you a more real position of the Moon.

Milky Way layer
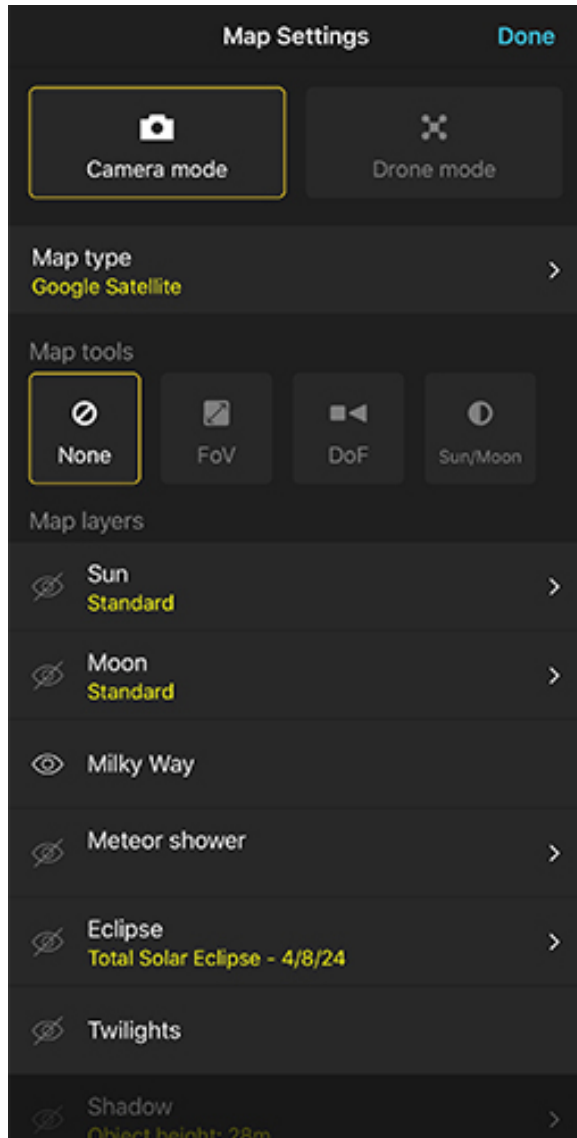
Map Settings button - Only the Milky Way layer is active.
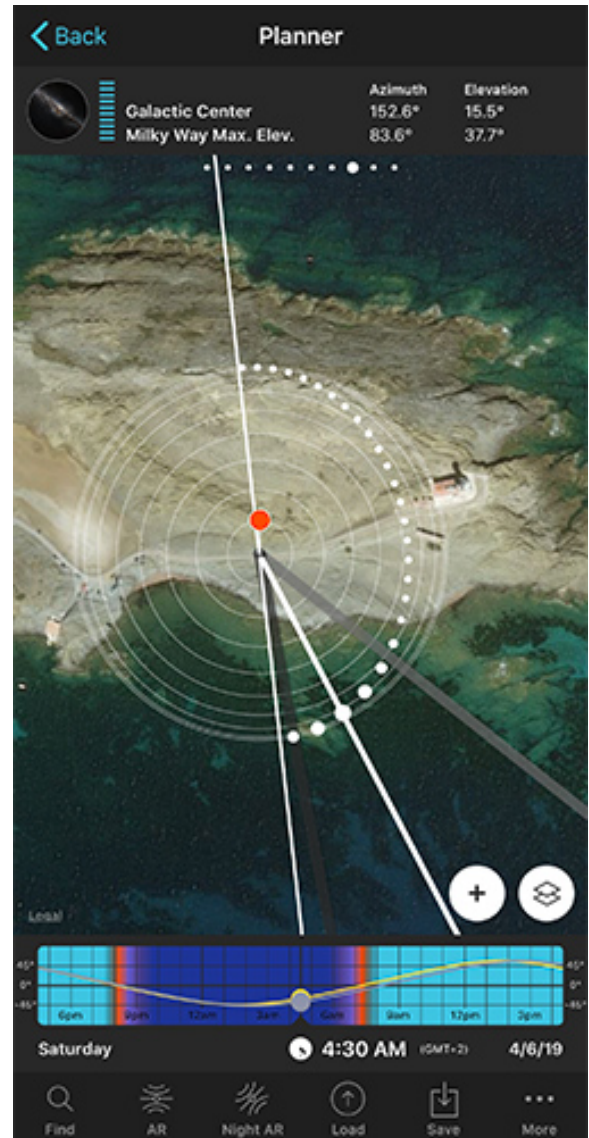
Milky Way layer: Milky Way arch, Galactic Center direction and Galactic Center visibility lines (light grey and dark gray). Milky Way visibility times appear on **Panel 7** above the Map.

Switch on the Milky Way layer from the Map Settings button (bottom right-hand corner, next to the (+) Map button) to see the following Milky Way information on the Map: where the Galactic Center will become visible (light grey line) and not visible (dark grey line) for

the selected date and Red Pin position. Also, at nighttime, you'll see the Milky Way arch (dotted arch), Galactic Center position (larger dot on the Arch and thick white line) and Milky Way crossing points with the horizon (thin white line).

You can also switch the Milky Way layer from **Panel 7** (Galactic Center visibility Panel).

Use the Milky Way layer to plan your Milky Way shots from home (or in the field). Use the information on the Map together with the information displayed in the two Milky Way Panels above the Map (**Panel 7** and **Panel 8**).

Again, this is the Milky Way info you'll see on the Map:

Milky Way Arch. The larger dot represents the Galactic Center.

Contour circumferences from 0 degrees (outer) to 90 degrees (center) in steps of 10 degrees of elevation.

Direction where the Galactic Center becomes visible for the selected

Direction where the Galactic Center becomes not visible for the selected date

Thick white line: Direction where the Galactic Center is for the selected date and time

Thin white line: Directions where the arch of the Milky Way crosses the horizon

Recommended video tutorial: How to Find and Plan the Milky Way.

Meteor Shower layer
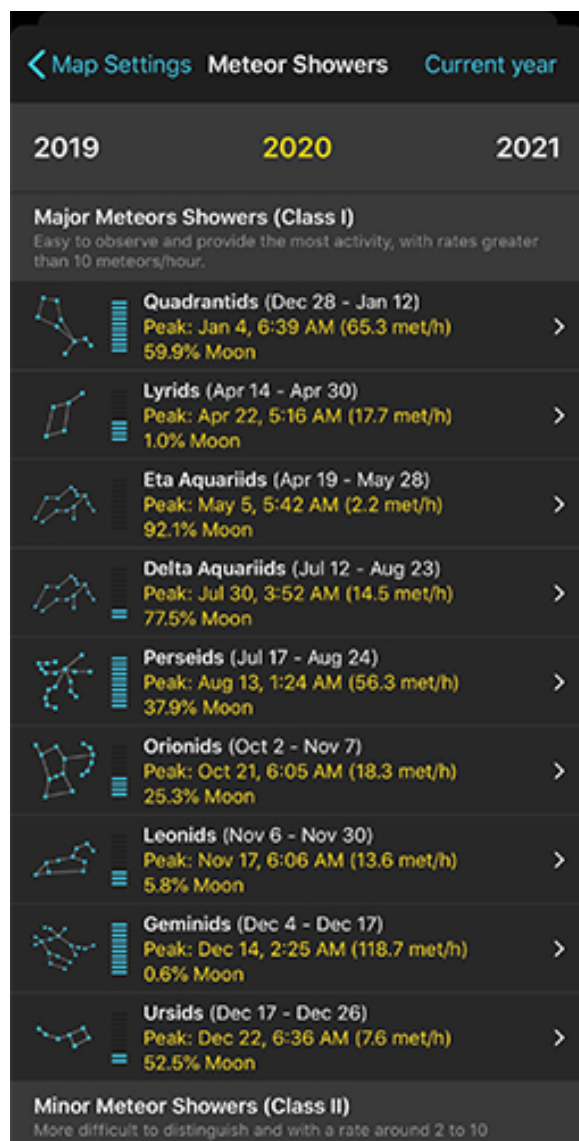
Meteor Shower Calendar.
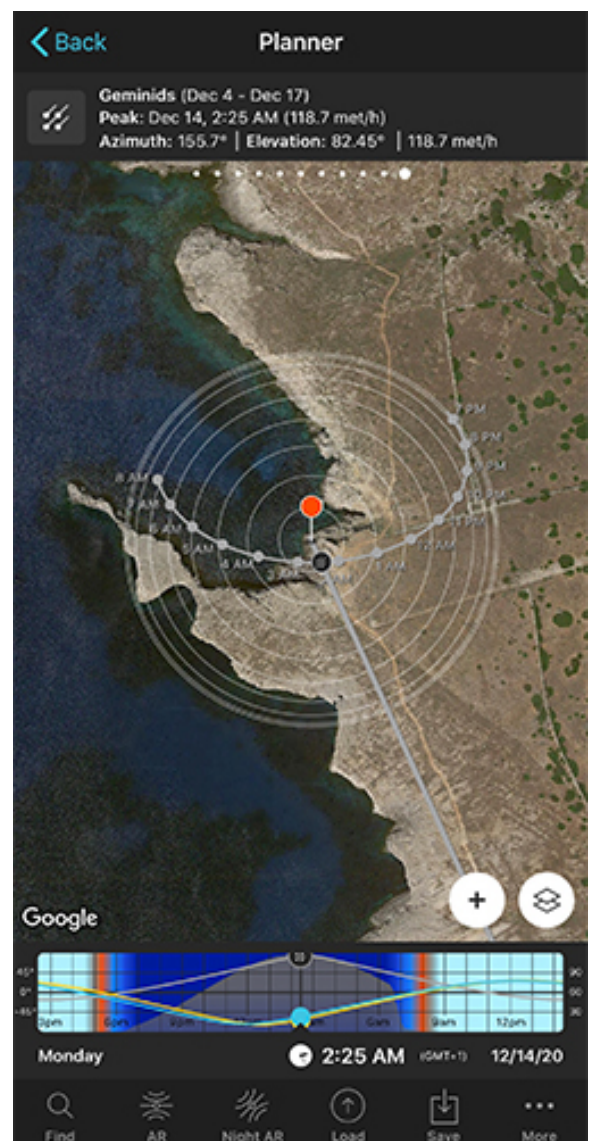
Tap the Meteor Shower you want to plan to see the information on the Map and on Panel 11.

Tap the Meteor Shower layer and choose the Meteor Shower you want to plan from the calendar. All the key Meteor Shower information will be displayed on the Map and on **Panel 11**.

Note: *You can also choose the Meteor Shower by tapping the button on Panel 11.*

This is the Meteor shower information you'll find on the Map:

- **Radiant path:** The path the radiant will follow during the night. It appears as an arch on the map. It's where the radiant is moving.

- **Radiant position:** The radiant is displayed as a circle on the path. The radiant azimuth

line (that starts at the Red Pin) shows you where the radiant is at the selected date and time.

- **Concentric circumferences:** A kind of contour lines that help you understand the elevation of the radiant. The azimuth and the elevation of the radiant also appear on Panel 11.

And on **Panel 11** you have the Meteor Shower name, activity period, peak date and time, radiant coordinates (azimuth and elevation) and number of meteors/h (of all active meteor showers) for the position of the Red Pin and selected date and time.

Also note that on the Time Bar you have the path of the radiant of the selected Meteor Shower and the number of meteors/h of all active Meteor Showers (gray graph).

Swipe the Time Bar to see how the radiant changes its position throughout the night.

Again, knowing the position of the radiant at all times will help you adjust your shooting spot and framing.

Eclipse layer

Sun and Moon eclipse calendar.
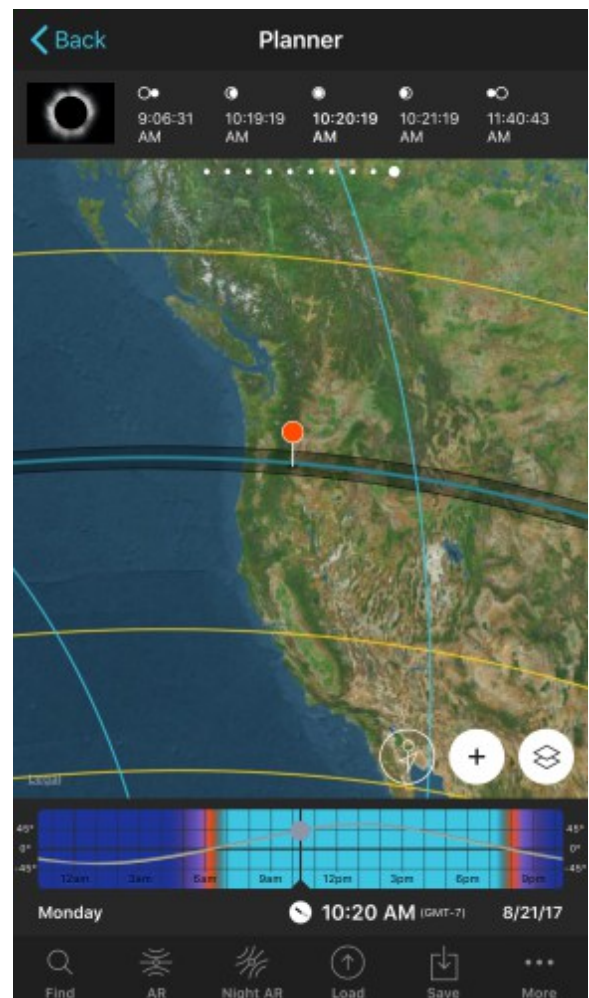
Tap on the Eclipse you wish to plan to see the Eclipse information on the Map, on Panel 9 and on Panel 10.

Switch on the Eclipse layer, tap on it and choose from the eclipse calendar the Sun or Moon eclipse you wish to plan. All the key eclipse information will be displayed on the Map, on **Panel 9** and on **Panel 10**.

You can also choose the Eclipse by tapping the button on Panel 9.

This is the Sun Eclipse information you'll find on the Map:

- **Map central dark area**: It's the path of totality (the area of total darkness). In other words, the area where you can observe how the Moon will completely cover the Sun.

- **Map blue line within the path of totality**: It's the centerline. The further away from the centerline you are (while being in the path), the shorter amount of time the Sun will be covered by the Moon. In other words, you will see a shorter totality duration.

- **Map yellow lines**: Outside the path of totality you'll be able to see a partial eclipse. The first yellow line on both sides of the path represents the locations where the Moon will cover 80% of the Sun. The next yellow line represents 60% and so on. The furthest from the path of totality, the more partial the eclipse will be.

- **Map Greatest Duration Point (GD)**: The location where totality lasts longer, where the phase of total eclipse lasts longer.

- **Map Greatest Eclipse Point (GE)**: Don't confuse it with the Greatest Duration Point. The Greatest Eclipse Point is not where the total eclipse lasts longer. It is just a geometric point. GE wasn't a good name choice at all. It is actually the location where the shadow of the Moon is nearest to the center of the Earth. Sometimes, it falls very close to the GD point, but it's not always the case.

Regarding the Moon eclipses, you'll need first to understand the 7 phases of a total lunar eclipse:

- **Penumbral eclipse begins (P1)**: When the penumbral part of Earth's shadow starts moving over the Moon.

- **Partial eclipse begins (U1)**: Earth's umbra starts covering the Moon.

- **Total eclipse begins (U2)**: Earth's umbra completely covers the Moon. The Moon turns into red, brown or yellow.

- **Greatest eclipse**: When the Moon passes closest to the center of the Earth's shadow.

- **Total eclipse ends (U3)**: Earth's umbra starts moving away from the Moon.

- **Partial eclipse ends (U4)**: Earth's umbra completely leaves the Moon.

- **Penumbral eclipse ends (P4)**: Earth's penumbral shadow moves away from the Moon. It's the end of the eclipse.

Given the Moon eclipse phases, this is the Moon Eclipse information you'll find on the Map:

- **Eclipse visible area**: The Map label Eclipse visible shows you the map area where all phases of the Moon eclipse are visible (P1, U1, U2, Total, U3, U4, P4). This is the area between the blue lines (P1 and P4).

- **Eclipse visible at Moonrise area**: The Map label Eclipse visible at Moonrise shows you the map area where at least one of the eclipse phases is visible during Moonrise. This is the area between the two blue lines (P4 and P1) which also contains the yellow and red lines.

- **Eclipse visible at Moonset area**: The Map label Eclipse visible at Moonset shows you the map area where at least one of the eclipse phases is visible during Moonset. This is the area between the two blue lines (P4 and P1) which also contains the yellow and red lines.

- **Eclipse not visible area**: The Map label Eclipse not visible shows you the map area where the eclipse is not visible (because the eclipse happens when the Moon is under the horizon). This is the area between the blue lines (P1 and P4).

- **Map Greatest Eclipse Point (GE)**: It's the moment when the Moon passes closest to the axis of Earth's shadow.

For the eclipse Moonrise area:

- **Area between the blue and yellow lines (P4 and U4)**: It represents the locations where the Moon rises during the penumbral eclipse, after the end of the total eclipse. It's visible until the end of the penumbral eclipse (P4).

- **Area between the yellow and red lines (U4 and U3)**: It represents the locations where the Moon rises during the partial eclipse, after the end of the total eclipse. The end of partial eclipse (U4) and end of penumbral eclipse (P4) phases are visible.

- **Area between the two red lines (U3 and U2)**: It represents the locations where the Moon rises during the total eclipse, and the end of total eclipse (U3), end of partial eclipse (U4) and end of penumbral eclipse (P4) phases are visible. Depending on the location within this area, the maximum eclipse phase may or may not be visible.

- **Area between the red and yellow lines (U2 and U1)**: It represents the locations where the Moon rises during the partial eclipse. All phases are visible except for the penumbral eclipse (P1) and the beginning of the partial eclipse (U1).

- **Area between the yellow and blue lines (U1 and P1)**: It represents the locations where the Moon rises during the penumbral eclipse. All phases are visible except for the beginning of the penumbral eclipse (P1).

For the eclipse Moonset area:

- **Area between the blue and yellow lines (P4 and U4)**: It represents the locations where all the Moon eclipse phases are visible except for the final of the penumbral eclipse (P4).

- **Area between the yellow and red lines (U4 and U3)**: It represents the locations where all the Moon eclipse phases are visible except for the end of the partial eclipse (U4) and the end of the penumbral eclipse (P4). When the Moon sets, the eclipse is partial.

- **Area between the two red lines (U3 and U2)**: It represents the locations where the beginning of the penumbral eclipse (P1), the beginning of the partial eclipse (U1) and the beginning of the total eclipse (U2) phases are visible. When the Moon sets, the eclipse is total. Depending on the location within this area, the maximum eclipse phase may or may not be visible.

- **Area between the red and yellow lines (U2 and U1)**: It represents the locations where only the beginning of the penumbral eclipse (P1) and the beginning of the partial eclipse (U1) phases are visible. When the Moon sets, the eclipse is partial.

- **Area between the yellow and blue lines (U1 and P1)**: It represents the locations where only the beginning of the penumbral eclipse (P1) phase is visible. When the Moon sets, the eclipse is penumbral.

Planning example: Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids, Cairo (Egypt).
Recommended video tutorial: How to Plan August 21 2017 Total Solar Eclipse.
Recommended article: Solar Eclipses 2019: The Definitive Photography Guide.
Recommended article: Lunar Eclipses - The Definitive Photography Guide. **Planning example: Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina**.

Twilights layer
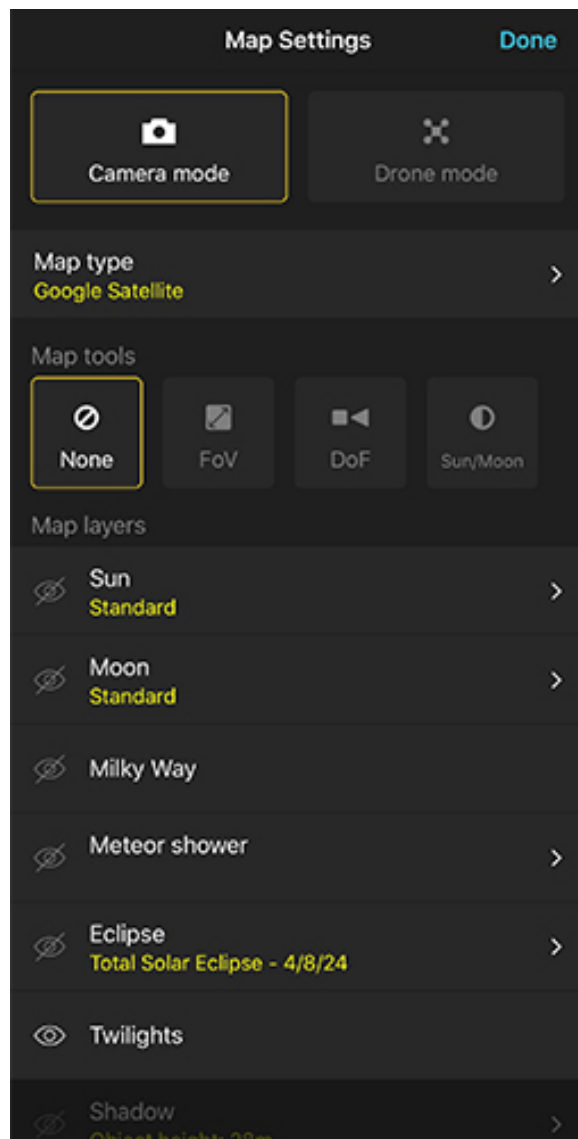
Map Settings button - Only the Twilight layer is active.
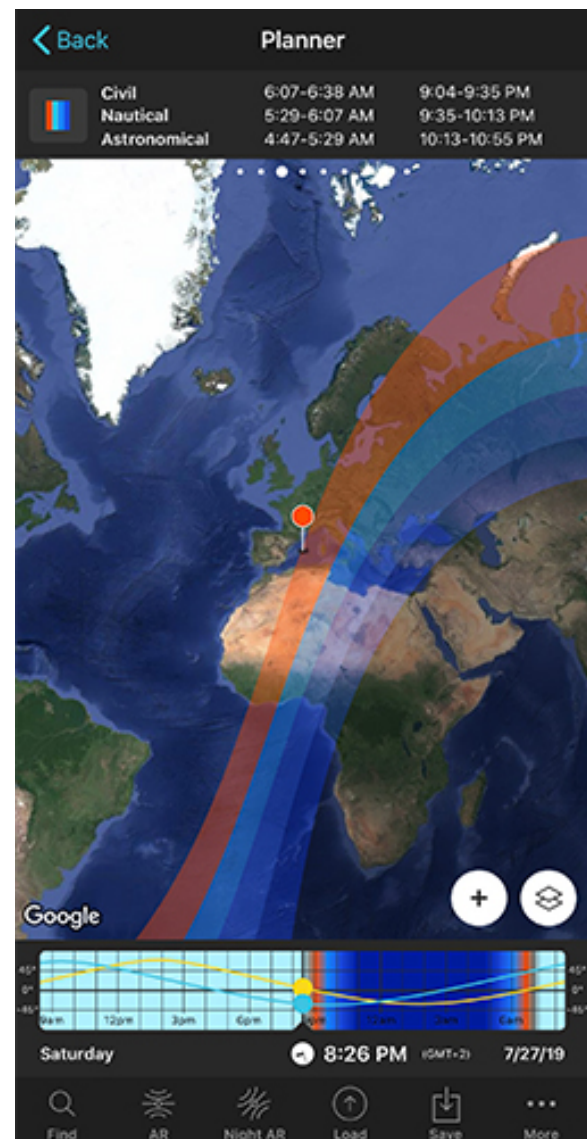
Twilight layer: Zoom out to see the world light distribution (Only on iOS). Twilight times appear on **Panel 5** above the Map.

Switch on the Twilight layer from the Map Settings button (bottom right-hand corner, next to the (+) Map button). You can also switch it on from **Panel 5** (Twilights Panel).

On iOS, zoom out too see the worldwide distribution of light. You'll visualize the parts of the world that are in nighttime, astronomical twilight, nautical twilight, civil twilight, golden hour and daytime for the selected date and time.

On Android, you'll be able to see the Map with the hue of the type of light happening during the selected date and time. On the Android platform, the world light distribution layer hasn't been implemented yet due to resources consumption.

Shadow layer
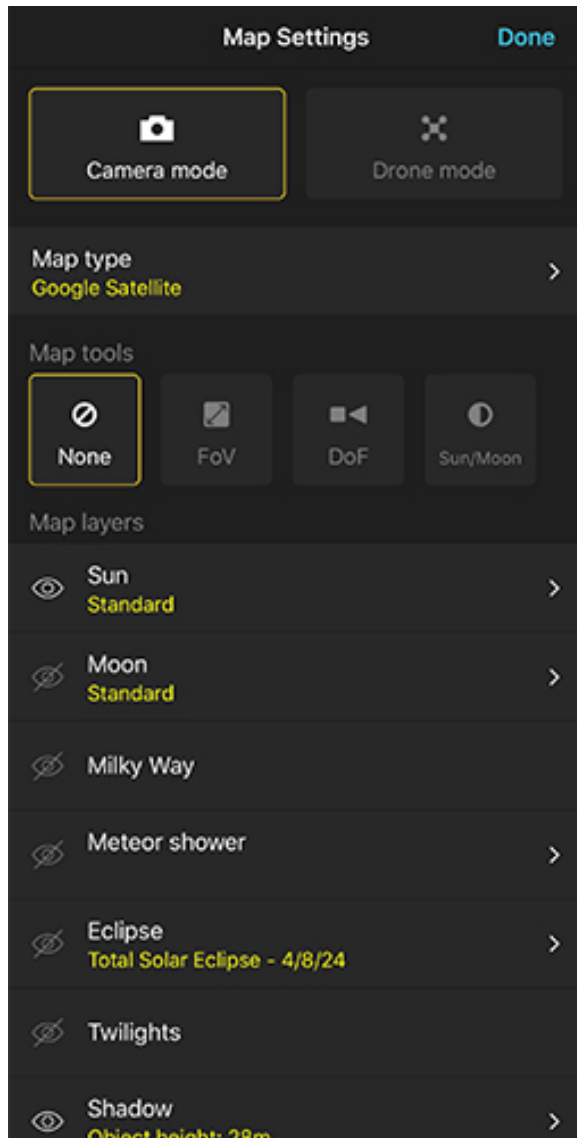
Map Settings button - Only the Shadow layer and the Sun layer are active.

Shadow layer: Shadow length and direction cast by an object (lighthouse) and caused by the Sun for the selected date and time. Set the height of the object in the top **Panel 1** to get the shadow length.

Wish to plan a shot involving the shadow cast by your subject? Yes? Then, switch on the Shadow layer, set the height of the subject and visualize its shadow on the Map!

Switch on the Shadow layer from the Map Settings button (bottom right-hand corner, next to the (+) Map button). You can also switch it on from **Panel 1** (Shadow length calculator).

Recommended video tutorial: Shadow information.

Reset Map layers
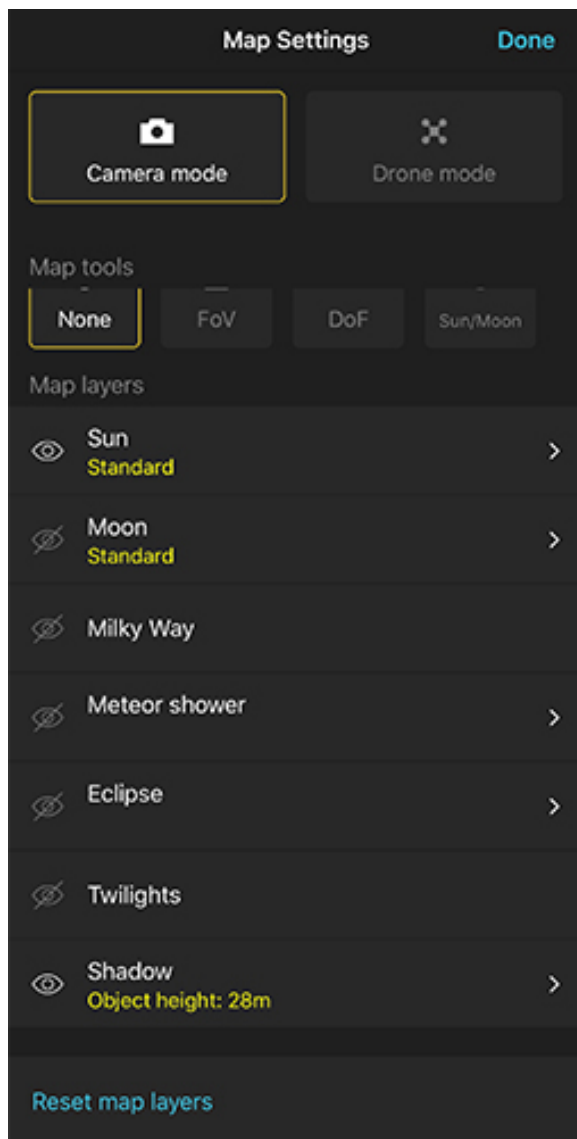
Map Settings button - Only the Sun and the Shadow layers are active.
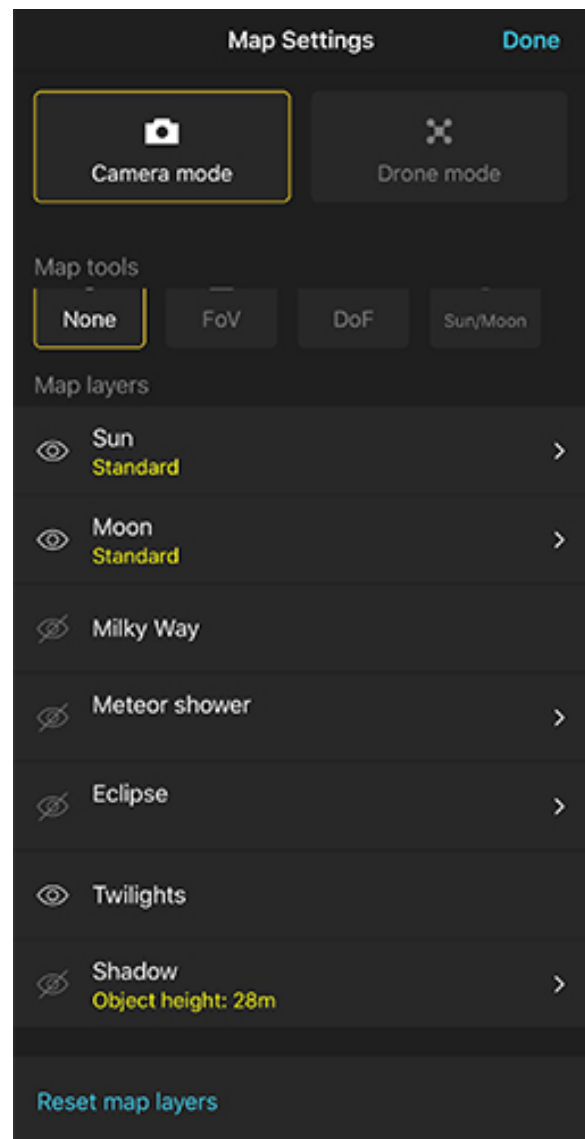
Tap the Reset Map layers button at the bottom to switch on default layers: Sun-Standard, Moon-Standard and Twilights.

Tap the Reset Map layers button to have the following Map layers visible: Sun–Standard, Moon–Standard and Twilights.

The Map tool will be set to None and any other layer will be switched off.

Section 7:
Planner - Time Bar
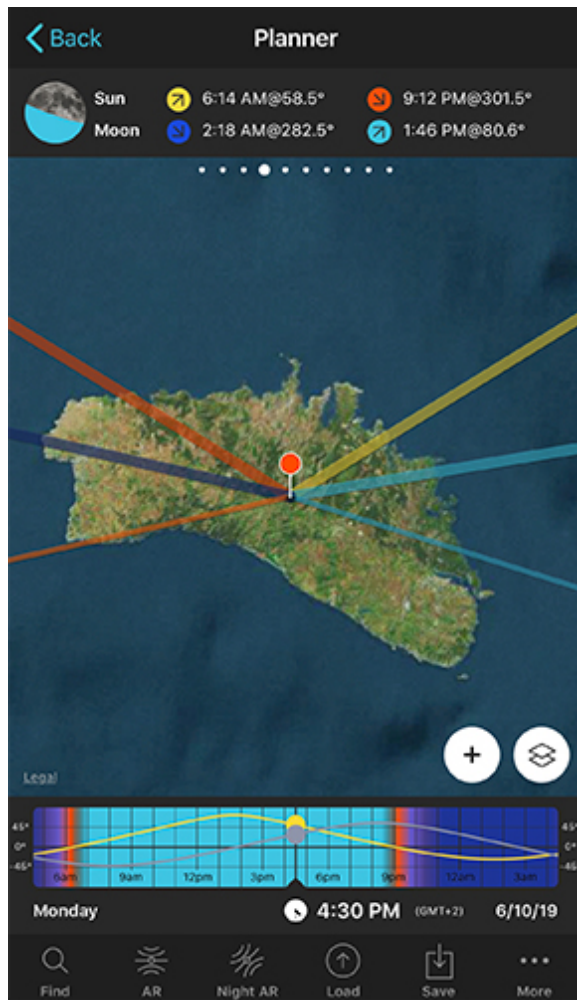
Time Bar showing a 24-hour length.

Tap and hold on the center of the Time Bar to switch to a 1-hour length. This way you can change time with more precision. Tap and hold again on the center to go back to a 24-hour length.

The Time Bar is the colorful bar you see just below the Map.

When planning a shot, use the Time Bar to change the date and the time and see how the Sun, the Moon, the Shadows, the Light or Milky Way info changes on the Map and top Panels.

How to change date and time with the Time Bar

This is how you can change date and time with the Time Bar:

- Drag the Time Bar towards the left to go forwards in time and towards the right to go backwards in time. The normal time range is 24 hours.The distribution of light over a 24-hour period is represented on the bar. Therefore, you can visually find out when it is nighttime, astronomical twilight, nautical twilight, civil twilight, golden hour and daytime.

- Tap on the centre of the Time Bar to set a future date and time. In this screen, you can manually select your time zone. This is very useful if you are in an area where there is no network coverage.

- Double tap on the centre of the Time Bar to come back to the current date and time.

- Tap on the right-hand side of the Time Bar to jump to the next important event (Sunset, golden hour, blue hour, twilights, Sunrise, Moonrise, Moonset).

- Tap on the left-hand side of the Time Bar to jump backwards to the previous important event (Sunset, golden hour, blue hour, twilights, Sunrise, Moonrise, Moonset).

- Do a long press (tap and hold) on the Time Bar to switch from a 24-hour time range to a 15-minute time range, and vice versa.

- Shake the device to re-centre the Red Pin on the Map and go to current date and time.

It's also important to notice that:

- The elevation paths of the Sun and the Moon are displayed on the Time Bar.

- You'll find the date and time just below the colorful band of the Time Bar.

- When there is no network coverage, the time zone (GMT) appears in red. If you have manually set the timezone it appears in yellow. Otherwise it appears in white.

Note: *As you'll see in the next chapter "Bottom options", you can also change the date and time tapping the More button (at the bottom right-hand corner of the Planner) and then choose Date.*

Recommended video tutorial: The Time Bar.

Section 8:
Planner - Bottom options

Below the Time Bar you have several options that will help you better plan your shots. Take advantage of them. :)

Find
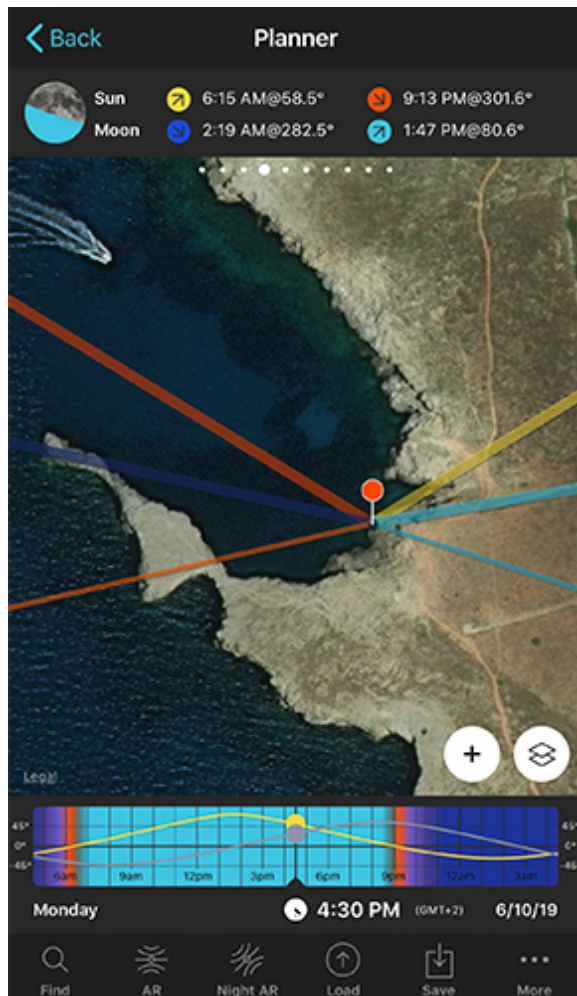
Bottom options of the Planner: Find, AR, Night AR, Load, Save and More.
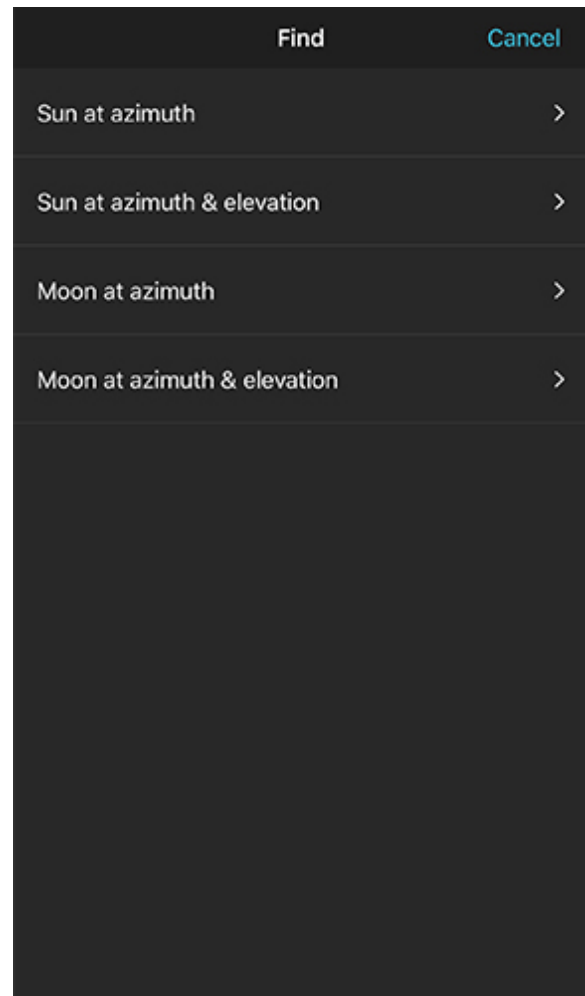
Planner > Find: On iOS you have 4 options (Sun at azimuth, Sun at azimuth and elevation, Moon at azimuth and Moon at azimuth and elevation). On Android you have 2 options (Sun and Moon), which are the equivalent of Sun/Moon at azimuth and elevation on iOS.

When to use the Find option

The Find option allows you to figure out, in seconds, the exact dates and times the Sun or the Moon will be at a desired position (azimuth and elevation) for the selected date range and Red Pin position.

Use the Find option when you know from where you wish to take the photo (there is only

one possible shooting spot) and where you wish to have the Sun or Moon in the frame.

To give you an example, the following photo was planned using the Find option. We calculated when the Sun would set under Es Pont d'En Gil (Menorca, Spain), a beautiful natural arch. You'll find a full explanation on how we planned it: **How to find sunrises and Sunsets**.

Find Sun/Moon at azimuth vs Find Sun/Moon at azimuth and elevation
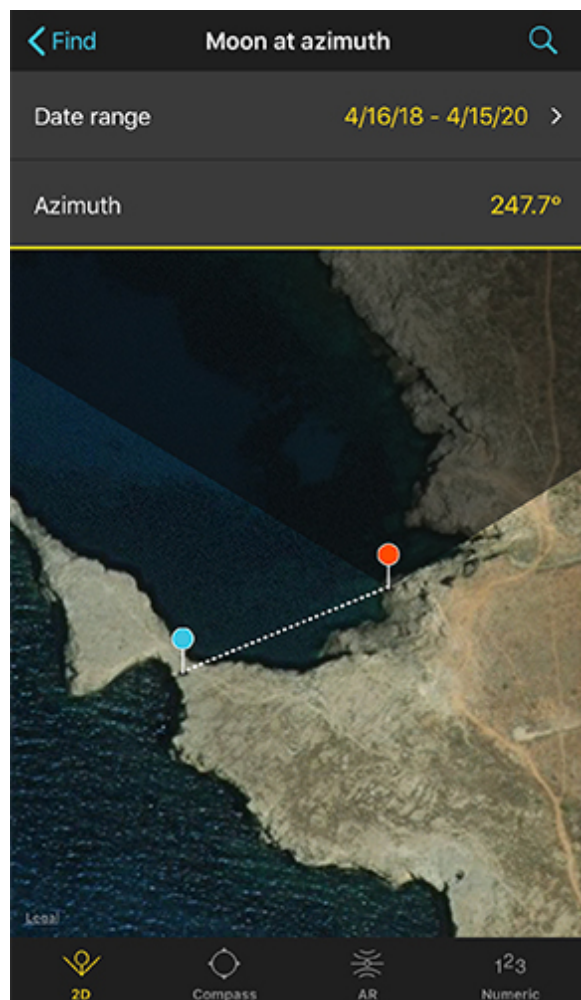
Moon at azimuth: Date range selector, azimuth selector and search button (magnifying glass at the top right-hand corner).
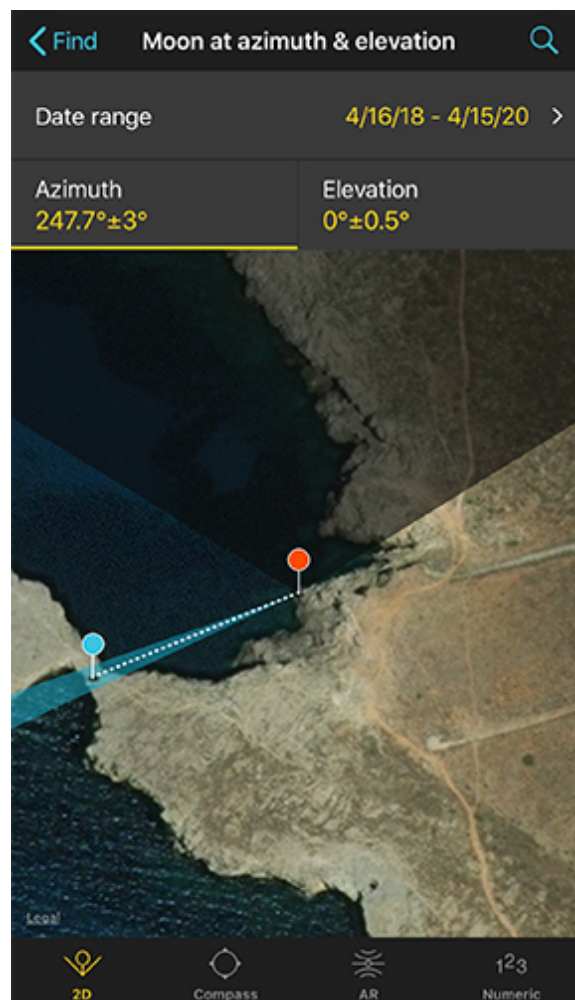
Moon at azimuth and elevation: Date range selector, azimuth selector, elevation selector and search button (magnifying glass at the top right-hand corner).

On iOS you have 4 Find options:

- **Sun at azimuth**: Find when the Sun will be in a desired direction no matter the elevation.

- **Sun at azimuth and elevation**: Find when the Sun will be in a desired position (azimuth and elevation).

- **Moon at azimuth**: Find when the Moon will be in a desired direction no matter the elevation.

- **Moon at azimuth and elevation** Find when the Moon will be in a desired position (az-

imuth and elevation).

On Android you have only 2 Find options:

- **Sun**: Find when the Sun will be in a desired position (azimuth and elevation).

- **Moon**: Find when the Moon will be in a desired position (azimuth and elevation).

The reason is that after implementing the 4 options on iOS we realized that we were only using 2. We were always using either Sun at azimuth and elevation or Moon at azimuth and elevation. So we decided to implement on Android only the valuable ones. The two we were using.

Ok, let's see how it works!

Go the the Planner, place the Red Pin on the desired shooting spot and tap on Find (bottom left-hand corner). Then choose what you wish to Find, the Sun (at azimuth and elevation) or the Moon (at azimuth and elevation).

Now, the first thing you need to do is to choose the Date Range.

Set the Date range
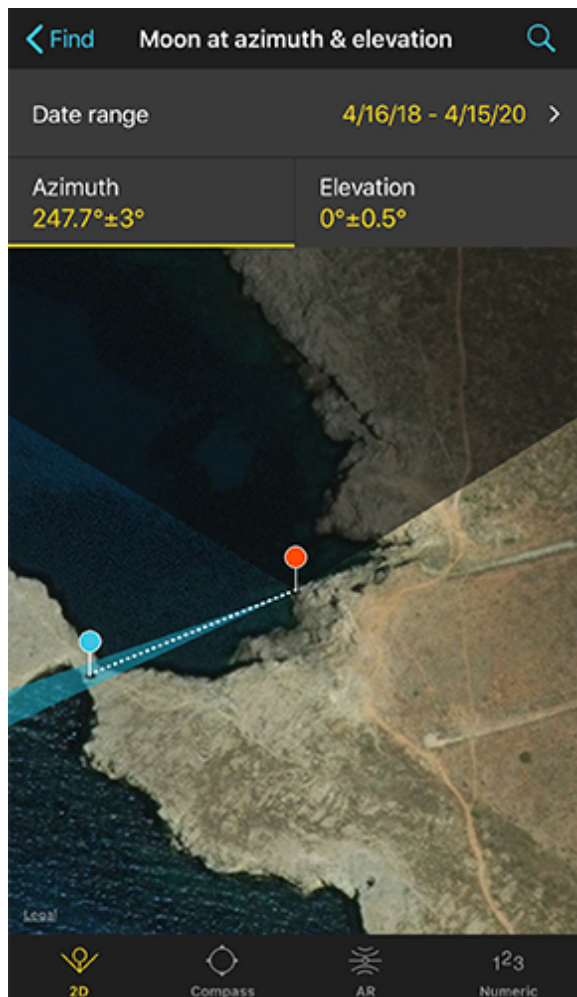
Moon at azimuth and elevation: Date range selector, azimuth selector, elevation selector and search button (magnifying glass at the top right-hand corner).
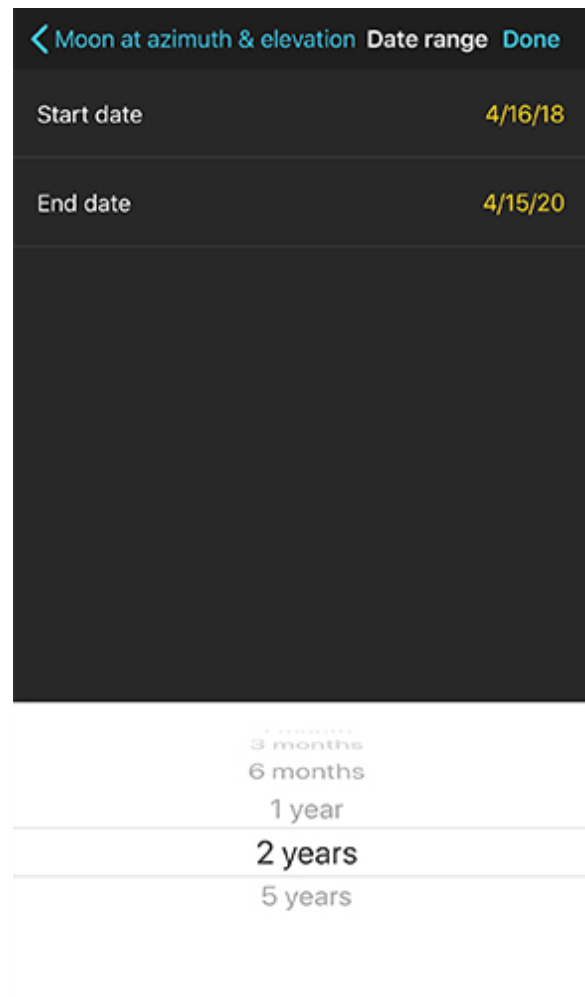
Moon at azimuth and elevation: Date Range selector.

Tap on Date Range to set the period of time within which you wish to look for positions of the Sun/Moon:

- **Start date**: The date you wish to start looking for results.

- **End date**: The date you wish to stop looking for results.

Note: *If you tap on the black area below End date you'll be able to set it by choosing a period of time (1 day, 1 week, 6 months, 1 year, 2 years, etc.).*

For the Sun we recommend you to use 1 year starting from today. And for the Moon, we always use 2 or more years. The Moon is trickier to plan and some shots might be possible once every 5 years or more!

Tap on Done (top right-hand corner) to go back to the main screen.

Set the Azimuth
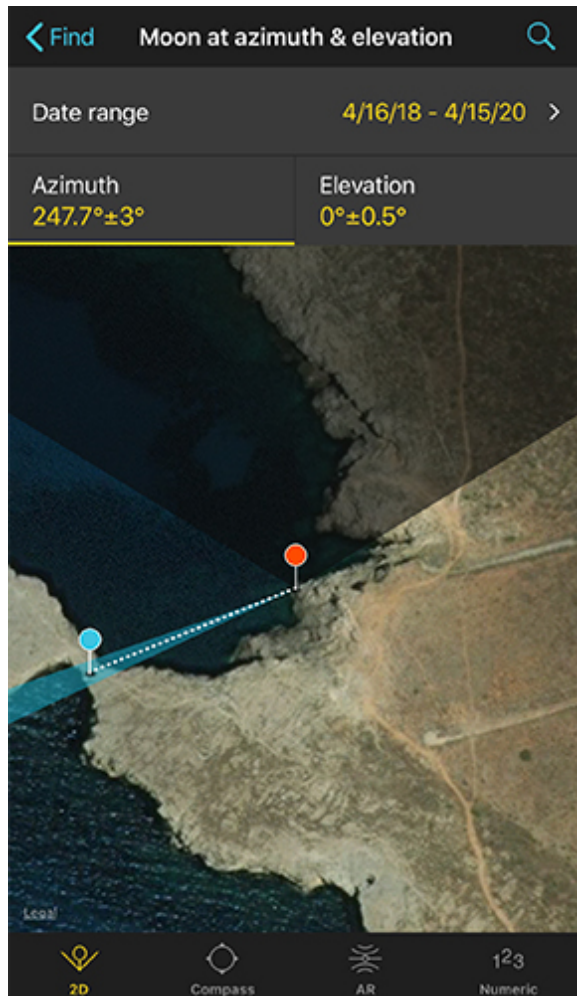
Moon at azimuth and elevation: 2D azimuth selector view.
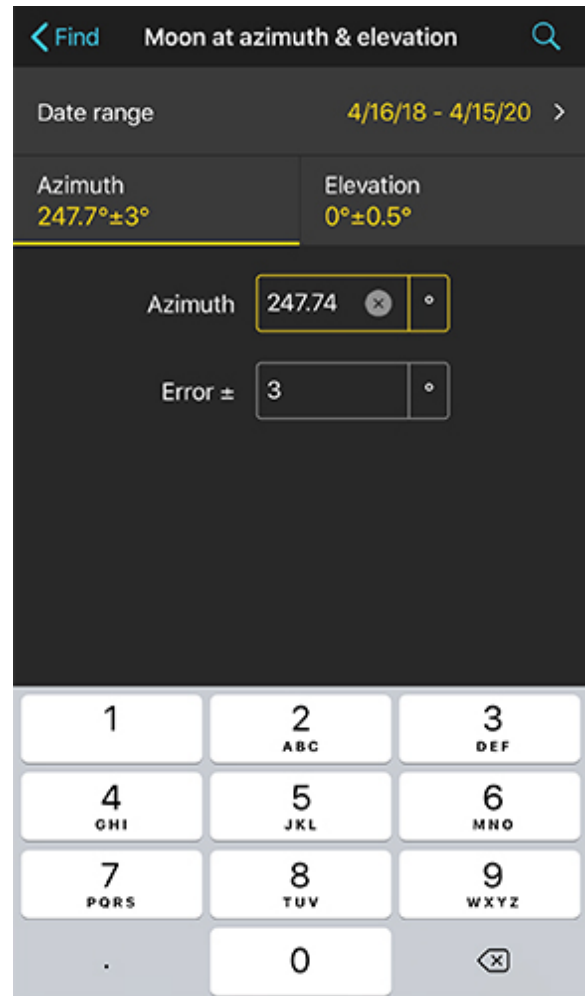
Moon at azimuth and elevation: Numeric azimuth selector view.

Below the Date Range button, you have 2 tabs: Azimuth (selected by default) and Elevation.

The Azimuth tab displays the selected azimuth and error value (tolerance). Setting an error value different to zero increases the likelihood of finding a result. Change the error value by using the Numeric option (bottom right-hand corner).

We usually use an error value of 3 degrees for the Azimuth. But this depends on whether you can move or not to adjust your shooting spot. The more margin of manoeuvre, the larger the error value can be.

On iOS you have 4 ways to set the azimuth and 3 on Android (see the options at the bottom of the screen):

- **2D**: Set the Sun/Moon azimuth comfortably on the Map:

  - Select the azimuth by dragging the Sun (yellow) or Moon (blue) pin.

  - The Red Pin is now in the position in which you have placed it in the Planner main screen. You cannot move it in this screen. To move it, go back to Planner main screen.

  - The Azimuth Error is represented on the Map by the yellow (Sun) or blue (Moon) sector. All results will have azimuths that belong to this area.

  - The darker Map area is the impossible azimuth area. It represents azimuths where it is impossible to find the Sun/Moon for the selected date range.

  - Tap on the Red Pin to see the terrain altitude above the sea level.

  - Tap on the Sun/Moon Pin to see the terrain altitude above the sea level. Furthermore, after the vertical slash, you find the relative altitude between the Red Pin and the Sun/Moon Pin and the elevation angle (in degrees) of the Sun/Moon Pin relative to the Red Pin.

- **Compass (only on iOS)**: Setting the azimuth using a compass is not very useful. That's why we didn't implement it on Android.

- **Augmented Reality (AR)**: When planning photos in situ or scouting a location, the Augmented Reality (AR) view is one of the fastest ways to select the desired position (azimuth and elevation) of the Sun/Moon. Select it by tapping on the augmented reality screen. This option selects both azimuth and elevation.

  - Always calibrate the AR view before tapping on the screen. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom right-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

  - Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

  - We recommend that you check on the azimuth selector (2D) Map that the selected azimuth is the one you really wanted. If not, just adjust it on the Map.

  - The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

  - iPod Touch users or Android devices without compass sensor: these devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. This is why the AR is not available.

- **Numeric**: Introduce the azimuth and the azimuth error numerically. Set the errors you are prepared to tolerate in your search. **PhotoPills** will look for results with azimuth between these two values: (azimuth-error, azimuth+error).

Set the Elevation

Moon at azimuth and elevation: 2D elevation selector view.
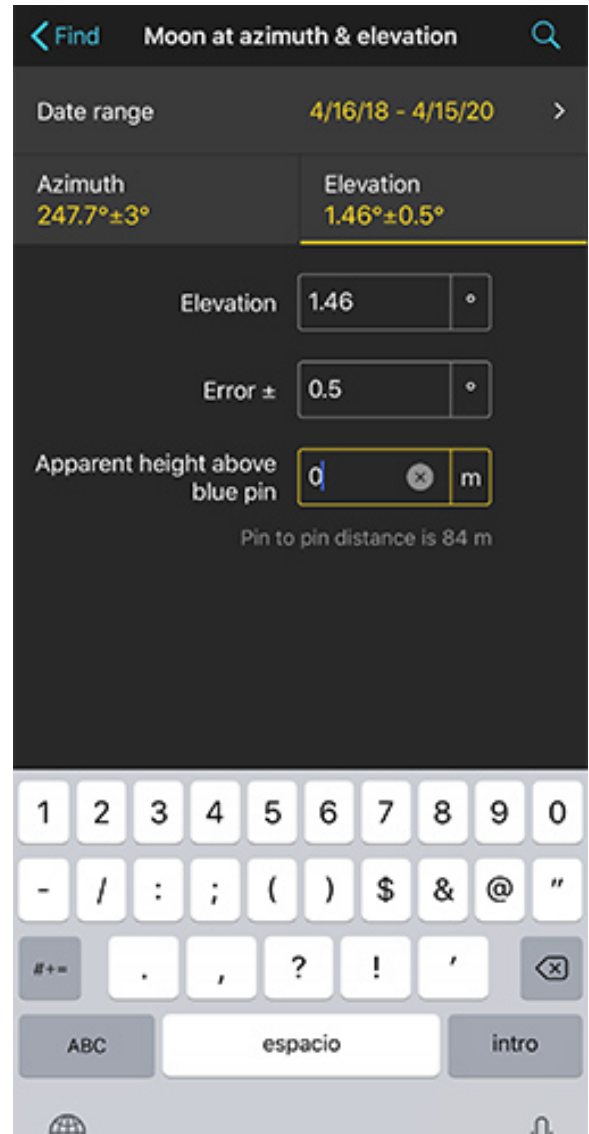
Moon at azimuth and elevation: Numeric elevation selector view.

Now, Tap on the Elevation tab.

The Elevation tab displays the selected elevation and error value (tolerance). Setting an error value different to zero increases the likelihood of finding a result. Change the error value by using the Numeric option (bottom right-hand corner).

We usually use an error value of 0.5 degrees for the Elevation.

On iOS you have 4 ways to set the elevation and 3 on Android (see the options at the bottom of the screen):

- **2D**: Select the elevation by dragging the Sun/Moon represented on the picture:

  - Select the elevation by dragging the Sun (yellow) or Moon (blue) picture.

  - The Elevation Error is represented on picture by the yellow (Sun) or blue (Moon) sector. All results will have elevations that belong to this area.

  - The darker area on the picture is the impossible elevation area. It represents elevations where it is impossible to find the Sun/Moon for the selected date range and azimuth.

  - The Sun/Moon apparent altitude appears below the picture. It is the altitude of the Sun/Moon at the location of the Sun/Moon's pin.

- **Inclinometer (only on iOS)**: Setting the elevation using an inclinometer is not very useful. That's why we didn't implement it on Android.

- **Augmented Reality (AR)**: When planning photos in situ or scouting a location, the Augmented Reality (AR) view is one of the fastest ways to select the desired position (azimuth and elevation) of the Sun/Moon. Select it by tapping on the augmented reality screen. This option selects both azimuth and elevation.

  - Always calibrate the AR view before tapping on the screen. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom right-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

  - Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

  - We recommend that you check on the azimuth selector (2D) Map that the selected azimuth is the one you really wanted. If not, just adjust it on the Map.

  - The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

  - iPod Touch users or Android devices without compass sensor: these devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.

- **Numeric**: Introduce the elevation, the elevation error and the apparent altitude above Blue Pin ground level numerically. Set the errors you are prepared to tolerate in your

search. PhotoPills will look for results with elevations between these two values: (elevation-error, elevation+error).

Tap the Search button to get the table of results

Moon at azimuth and elevation: Table of results sorted by Moon phase. Just tap Phase, at the top of the column, to sort results from Full Moon to New Moon.
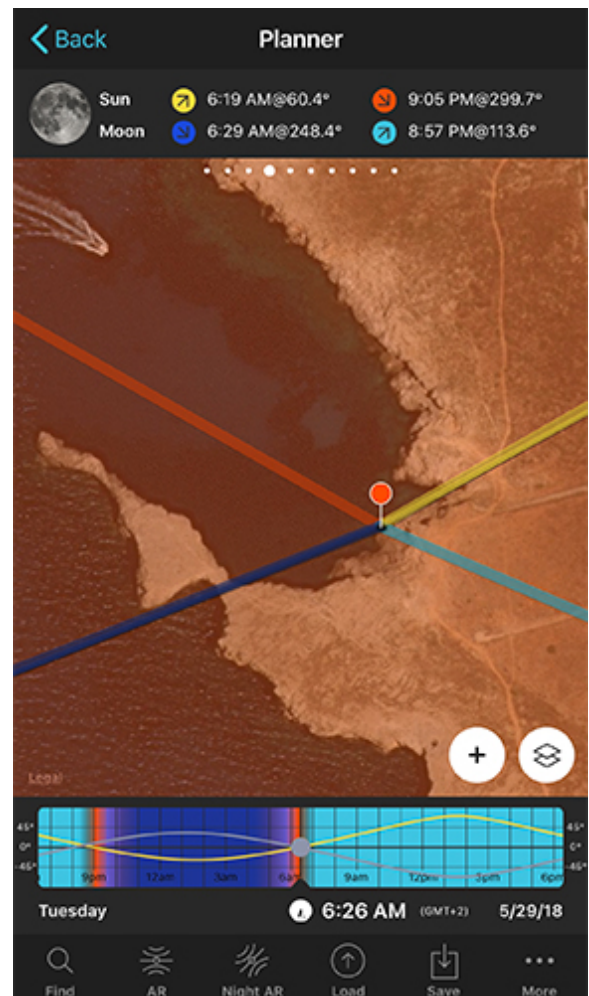
Tap on the result you wish from the table to see the plan. The Moon sets right where you wanted.

Once you've introduced the desired date range and position (azimuth and elevation) of the Sun/Moon, tap on the Search button (top right hand corner, magnifying glass icon) to get a table with all the dates and times it happens.

The table contains the date, time, azimuth, elevation and picture for each result. You can sort the table by tapping on the name of each column (date, azimuth, elevation, phase).

On the right side of the table you'll see a Sun/Moon picture. This picture tells you if the result will happen in daytime, golden hour, blue hour, nautical twilight, astronomical twilight or nighttime. Furthermore, in the case of the Moon, the picture shows you how you'd see

the Moon (phase and orientation) if you were placed in the location of the Red Pin.

Sun in daytime

Sun in golden hour

Moon in daytime

Moon in golden hour

Moon in blue hour

Moon in nautical twilight

Moon in astronomical twilight

Moon in night-time

All you have to do now is to choose the result you wish to see and adjust it on the Planner!

Recommended tutorials

To master the Find option, we recommend you to study the following tutorials:

Video: **Plan 4. Sun setting through North Window and Turret Arch, Arches National Park (USA)**.

Video: **Plan 5. Manhattanhenge with the Sun and with the Moon, New York (USA)**.

Video: **Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands**.

Video: **Find Sunrises and Sunsets**.

Video: **Find Moonrises and Moonsets**.

Video: **Find Sun or Moon at a determined position**.

Video: **Find Sun or Moon over a mountain**.

AR (Augmented Reality)
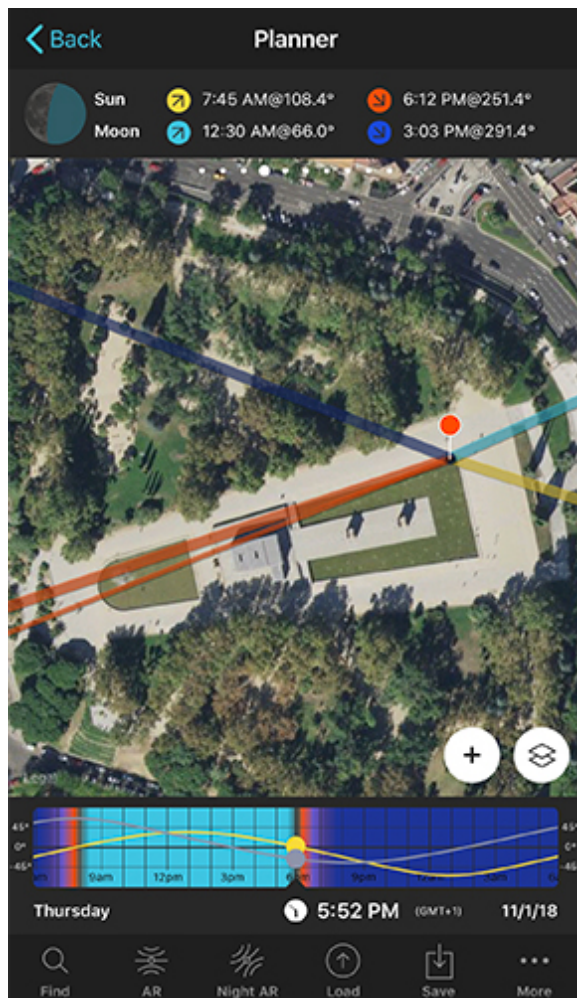
Bottom options of the Planner: Find, AR, Night AR, Load, Save and More.
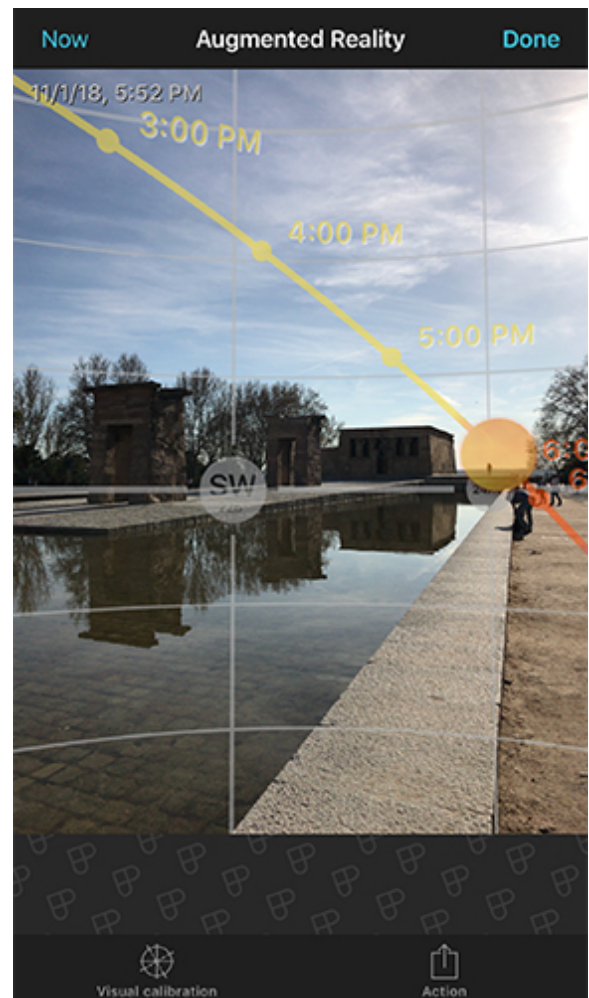
Augmented reality option (Planner > AR).

Use the Augmented Reality view when planning your shots in situ. And also to adjust your frame for the best composition before you shoot.

Imagine that you've planned a photo with the Planner and wish to visualise the scene, to make sure that the Sun/Moon will be at the desired position.

Locate yourself at the position of the Red Pin, tap on the AR option and visualize it using the augmented reality where the Sun/Moon will be for the selected date and time.

To sum up, the AR view gives you the following information for the selected date, time and Red Pin Position: Sun/Moon position, Sun/Moon path, Sunrise/Moonrise directions and Sunset/Moonset directions.

Sun path

Moon path

Horizon

Elevation (10-degree steps) and azimuthal lines
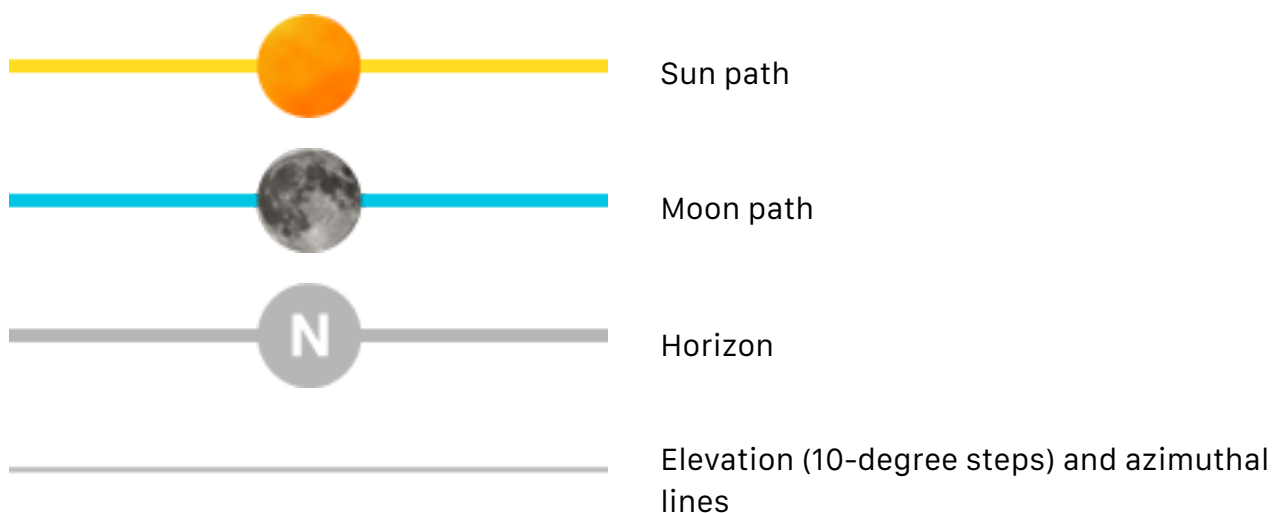
You'll see the selected date and time on the top left-hand corner of the AR view.

Notice that you can change the date and time directly from the AR view:

- Swipe the AR view to the left to move time forwards. Swipe it to the right to move time backwards.

- Tap on the right-hand side of the AR view to jump to the next day.

- Tap on the left-hand side of the AR view to jump to the previous day.

- Double tap on the center of the screen to come back to your current date and time.

Also, take into account these considerations when using the AR view:

- Always calibrate the AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button

(bottom right-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

- Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

- The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

- iPod Touch users or Android devices without compass sensor: these devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.

Night AR
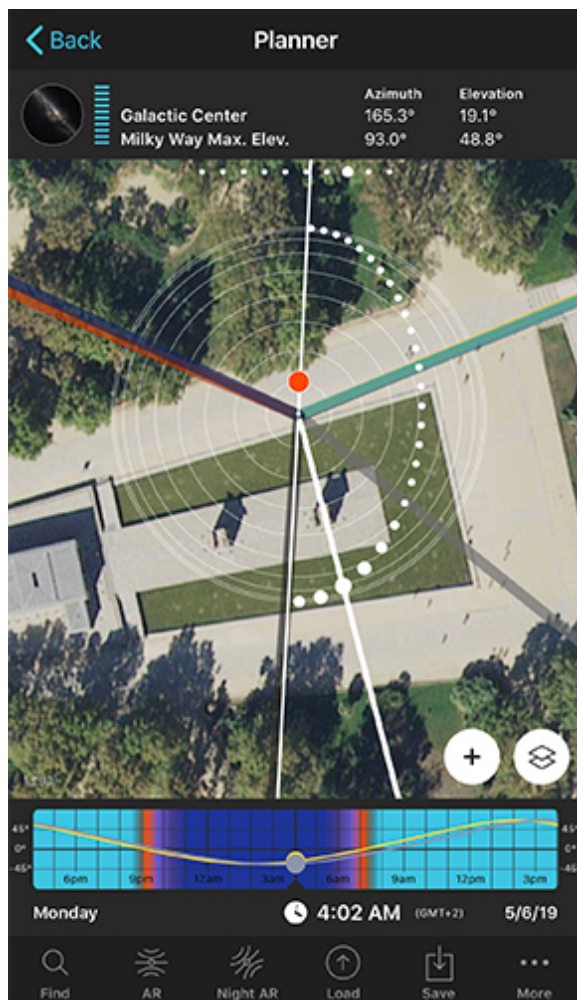
Bottom options of the Planner: Find, AR, Night AR, Load, Save and More.

Night Augmented reality option (Planner > Night AR).

Use the Night Augmented Reality to plan your night shots in situ and adjust your frame for the best composition before you shoot.

Reduce try and fail. Just locate yourself at the position of the Red Pin and visualize in augmented reality for the selected date and time: Milky Way, celestial equator, Polaris, north/south celestial pole, circumpolar stars path and sense of rotation, Moon position, Moon path, Moonrise/set directions, right ascension and declination lines.

And if you're planning a Meteor Shower, you'll also see the radiant position and path in the sky. Locating the radiant in the sky will help you decide the shooting spot and where to frame your camera, depending on the image you wish to capture:

- You want the radiant in the frame if you intend to create an image in post-processing where all the meteors appear to converge in one spot in the sky. Like I did to create the

cover image of our **Meteor Shower Photography guide**. It's a cool effect. You can create it too in post-processing by using the technique described in this **video by David Kingham**.

- The further away a meteor appears from the radiant, the longer its tail might be. So to increase the odds of capturing longer tails, frame an area of the sky that is away from the radiant.

- Also, to capture the maximum number of meteors, use the shortest possible focal length (wide angle lens). The more sky you include in the frame the more meteors you'll potentially capture.

- But don't forget to include an interesting subject in the foreground. Connecting the action in the sky with a powerful foreground will make your image shine!

Milky Way and Galactic Center (Red dot on the image)

Celestial equator

Moon path

Horizon

Right ascension and declination lines (10-degree steps)

North celestial pole

South celestial pole

You'll see the selected date and time on the top left-hand corner of the Night AR view.

Notice that you can change the date and time directly from the Night AR view:

- Swipe the Night AR view to the left to move time forwards. Swipe it to the right to move time backwards.

- Tap on the right-hand side of the Night AR view to jump to the next day.

- Tap on the left-hand side of the Night AR view to jump to the previous day.

- Double tap on the center of the screen to come back to your current date and time.

Also, take into account these considerations when using the Night AR view:

- The stars in movement show you the sense of rotation around celestial poles.

- The information displayed on the Night AR view depends on the position of the Red Pin. Make sure you are at the position of the Red Pin when visualizing the night augmented reality information.

- Always calibrate the Night AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom right-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

- Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

- The quality of the information displayed in the Night AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

- iPod Touch users or Android devices without compass sensor: these devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.

Recommended video tutorial: How to find and plan the Milky Way.
Recommended video tutorial: How to plan any Star Trails shot you imagine.

Load
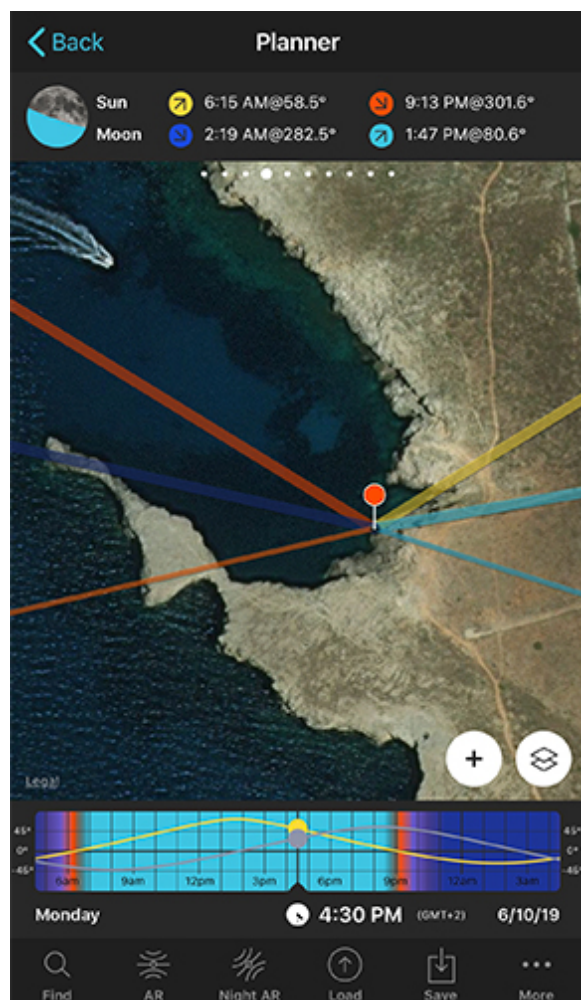
Bottom options of the Planner: Find, AR, Night AR, Load, Save and More.
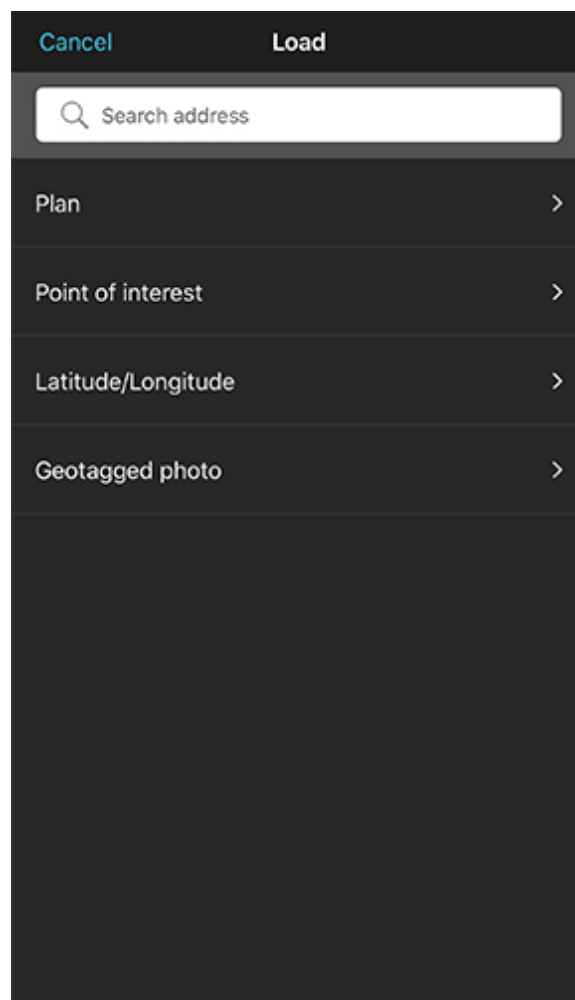
Load option: Search address, Plan, Point of Interest, Latitude/Longitude, Geotagged photo.

Use the Load option to load your Plan and Locations onto the Planner:

- **Search address**: Use the top address bar to place the Red Pin to a desired address.

- **Plan**: Tap on Plan to see your list of saved photo plans and choose the one you want to load onto the Planner. Load the location, date and time of those creative photos that you have already thoughtfully planned and you wish to check.

- **Point of Interest**: Place the Red Pin to a location you have previously saved.

- **Latitude/Longitude**: Place the Red Pin to a location by introducing the latitude and longitude in one of the following formats:

  - DDD: Degrees format.
  - DMS: Degrees, minutes, seconds format.

- **Geotagged photo**: Place the Red Pin to a location by loading a geotagged photo from your camera roll.

Recommended video tutorial: Mastering the Load button of the Planner.

Save
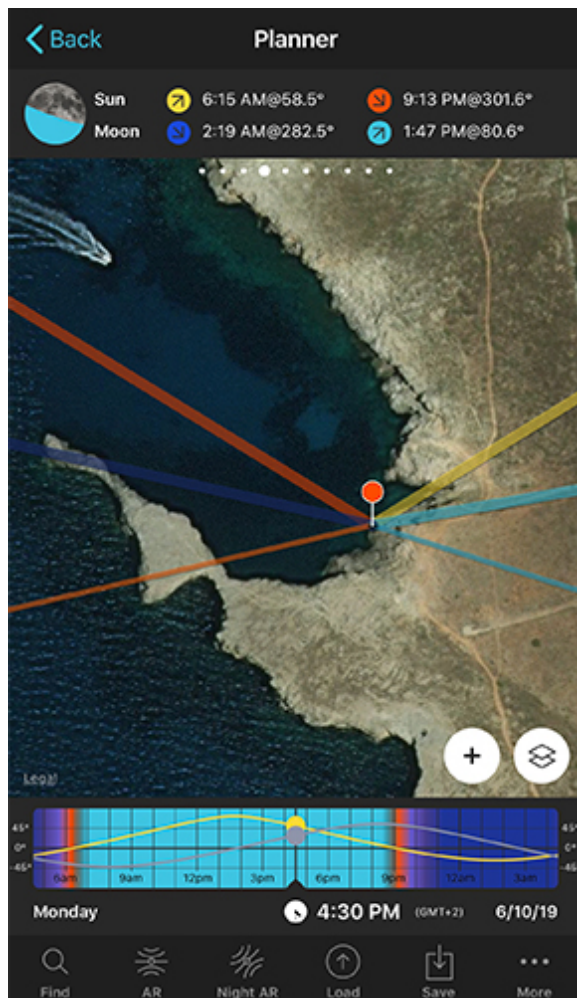
Bottom options of the Planner: Find, AR, Night AR, Load, Save and More.
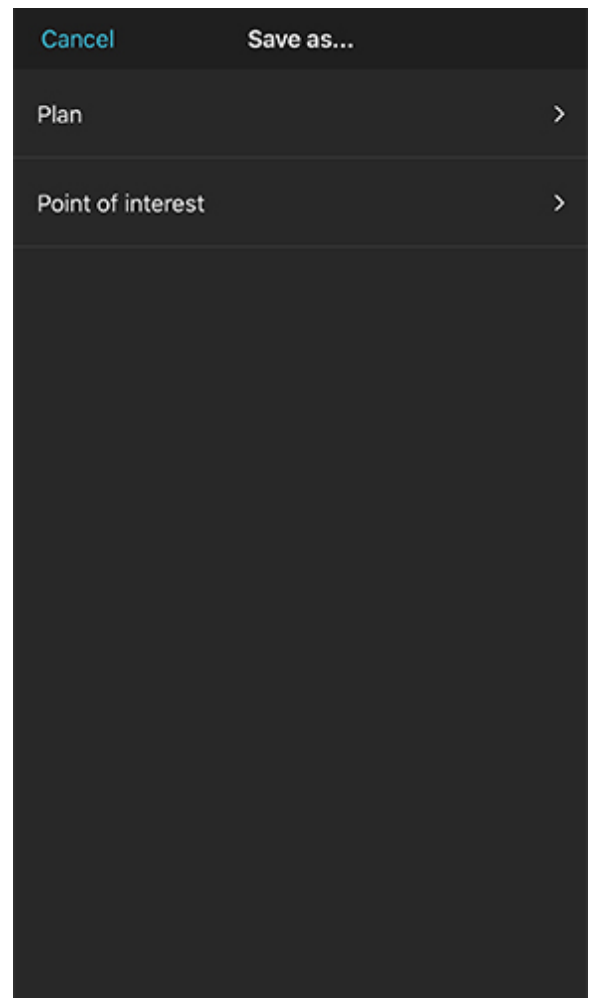
Save option: Plan, Point of Interest.

Improve the way you manage your photo plans and your secret locations!

Once you have planned a photo, you can save the location, date and time as a Plan to be used in the future.

In the same way, if you come across a beautiful location you wish to remember, place the Red Pin on it, and save the location as a Point of Interest (POI).

So, use the Save option to save a:

- **Plan**: Save the Red Pin position, date and time of those original photos that you have thoughtfully designed. All the Plans will be stored in the option Plans of the menu My Stuff. You can create a new Plan or overwrite an existing one.

- **Point of Interest**: Save the Red Pin position as a Point of Interest. Save unique locations (a secret waterfall, a beautiful natural stone arch, etc.) to create your own database. All the Points of Interest will be stored in the option Points of Interest of the menu My Stuff. You can create a new Point of Interest or overwrite an existing one.

Recommended video tutorial: How to Save, Share and Import Plans and Locations.

More > Date
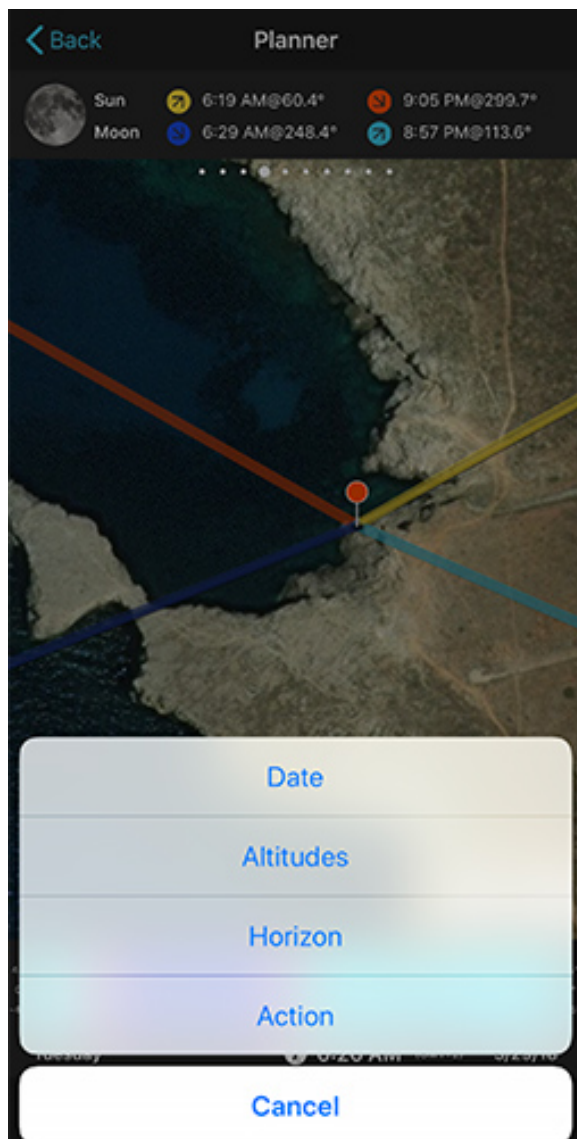
Bottom options of the Planner > More: Date, Altitudes, Horizon and Action.
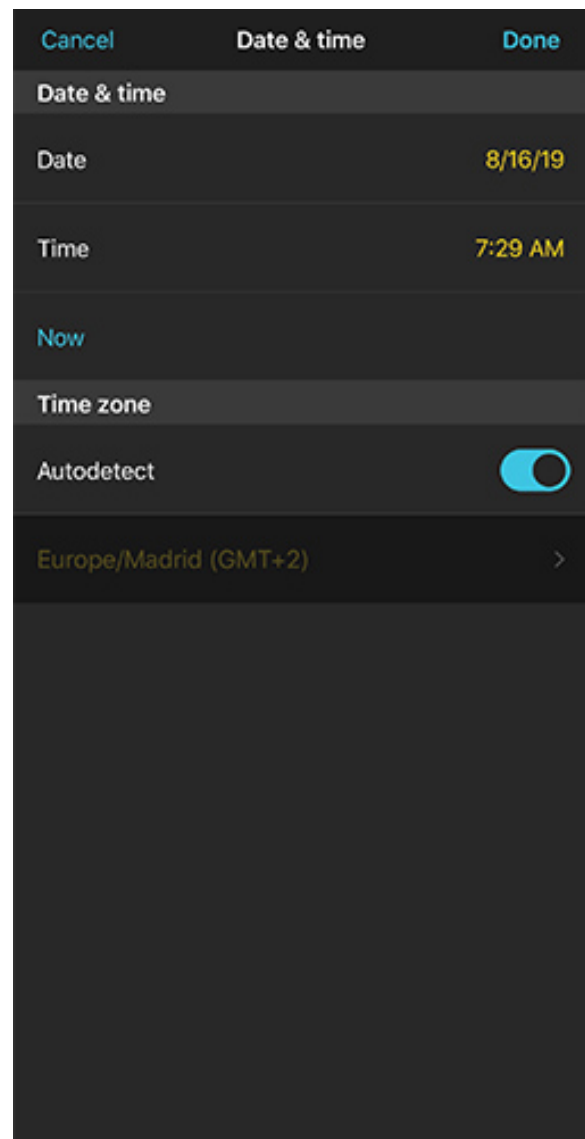
More > Date option: Set date, time and time zone.

Use the Date option to:

- Set the date.

- Set the time.

- Set current date and time by tapping the button "Now" (blue).

- Set the time zone to Autodetect to allow the Planner to automatically detect the time zone when you move the Red Pin (needs internet connection to work).

- Set the time zone manually. You choose the time zone you wish to use.

Remember that you can use the Time Bar to set the date and time

More > Altitudes
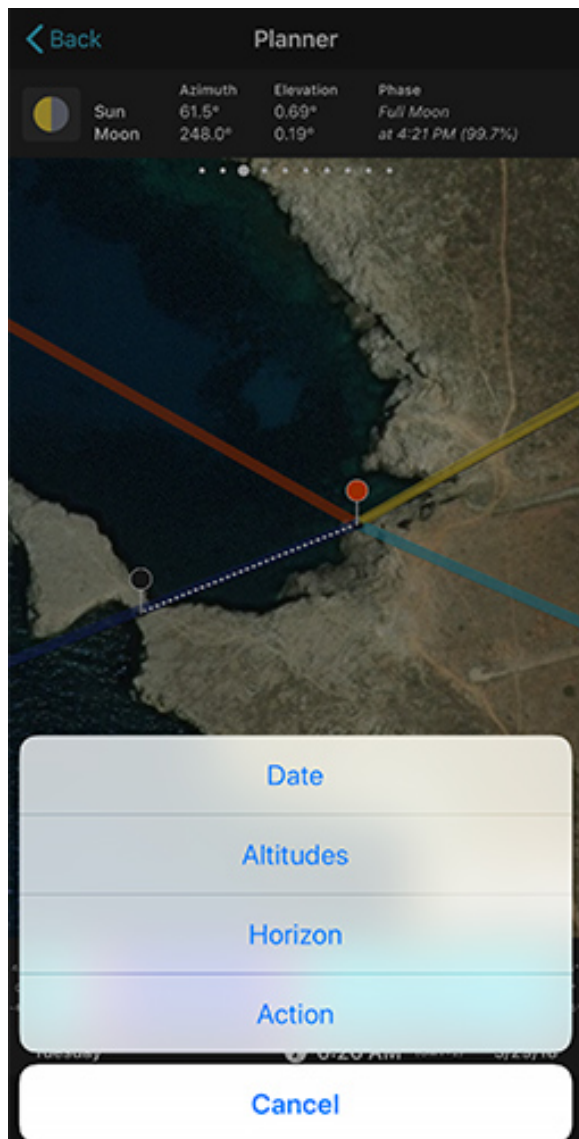
Bottom options of the Planner > More: Date, Altitudes, Horizon and Action.
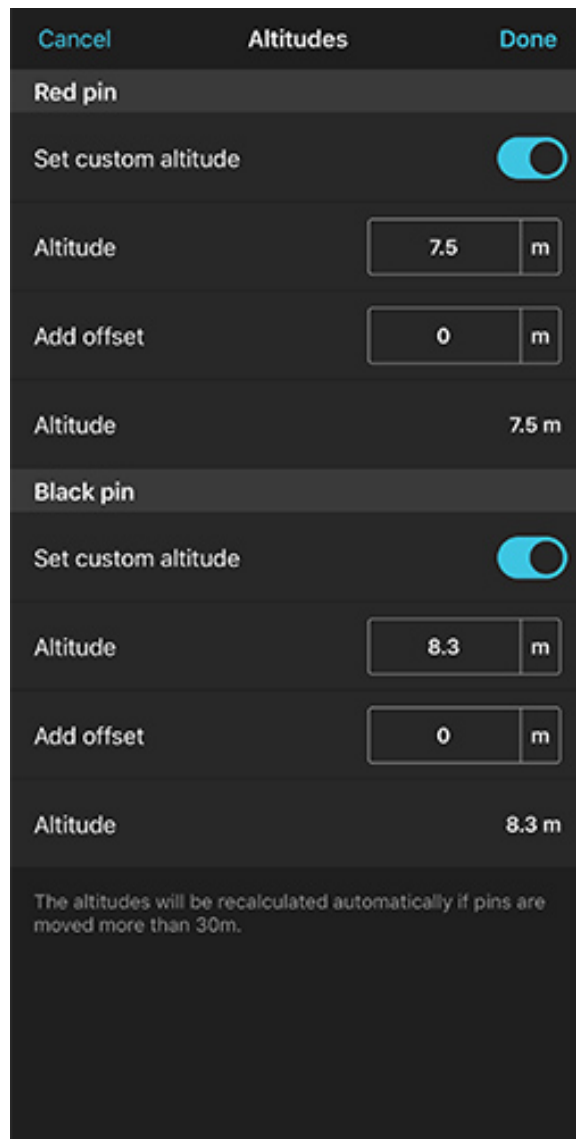
More > Altitudes option: Change the Red Pin and Black Pin altitudes and offset.

Manually set the Red Pin and Black Pin altitudes!

When you have access to a local map that offers accurate terrain altitudes, or when you're shooting from the top of a building… now you can manually plug the Red Pin and Black Pin (if you have it visible on the map) altitudes and offsets to work out your Sun, Moon and Milky Way alignments.

To do it, go to the Planner, tap on More (at the bottom right hand corner), tap on Altitudes

and introduce the values you wish to use: Terrain altitude and/or offset.

Introduce an offset when you wish to take into account the height of a building.

When you use custom elevation values, the altitude values in **Panel 2** adjust accordingly.

To go back to use the default Red Pin altitude values move the Red Pin more than 30m (100ft) or switch of Set custom altitudes from More>Altitudes. The same thing happens with the Black Pin.

¿When to add an offset?

Add it:

- When shooting from the top of a building. In this case, the Red Pin offset would be the height of the building.

- When you wish the Sun/Moon to be aligned with a certain offset above the terrain. For example, the top of a building. In this case, the Black Pin offset would be the height of the building.

More > Horizon
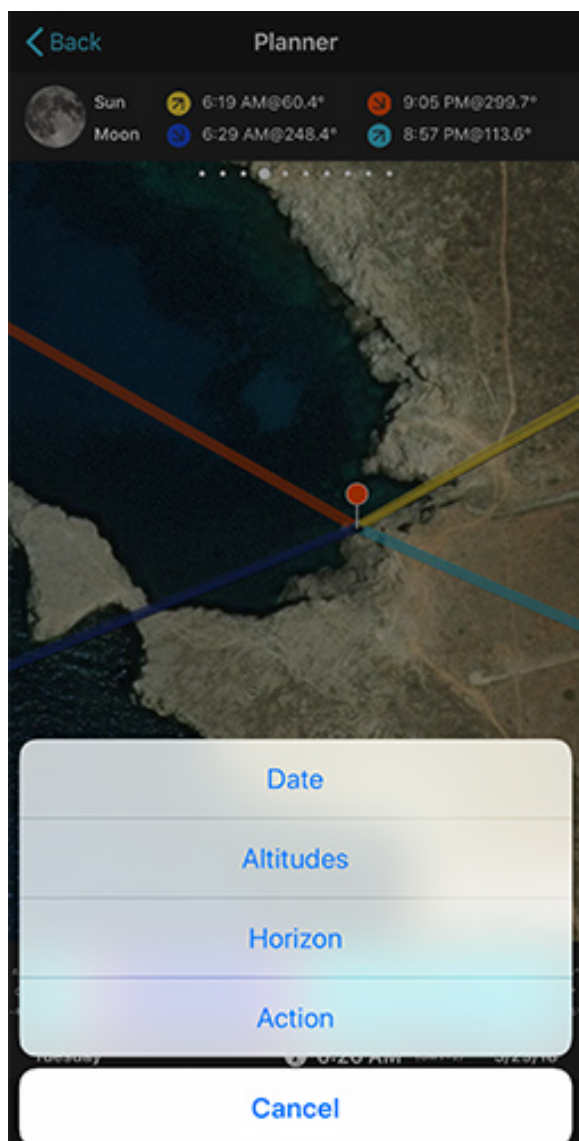
Bottom options of the Planner > More: Date, Altitudes, Horizon and Action.
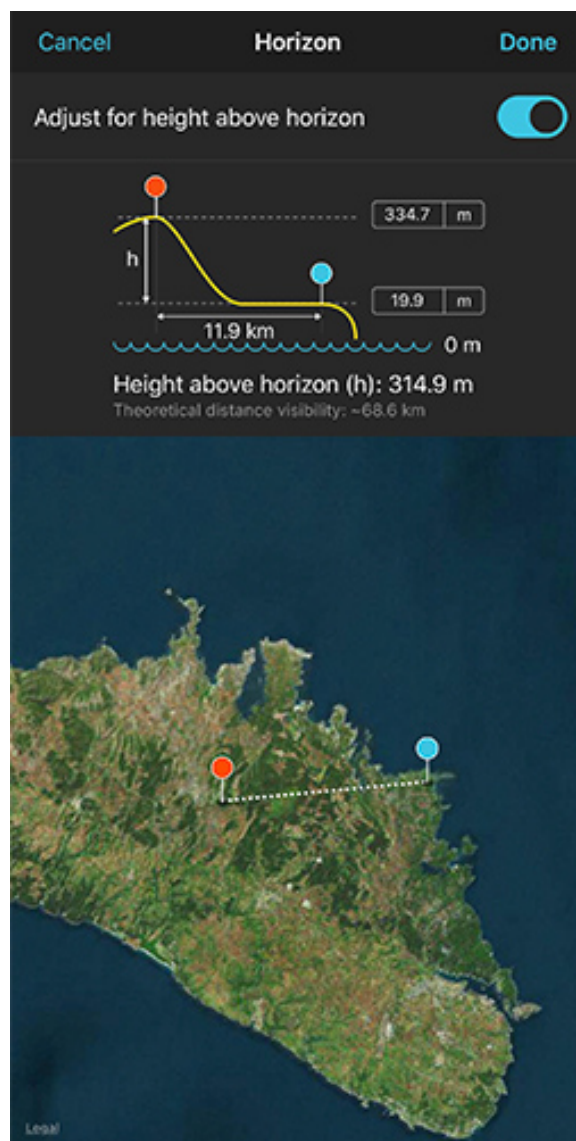
More > Horizon option: Take into account your height above the horizon.

When you are shooting from the top of a mountain, at a considerable height above the horizon, you need to adjust the calculations of the Sun/Moon rise/set times and directions (azimuths).

For example, if a photographer is located at the top of a mountain, at 2,000 feet of height above his horizon, he will see the Sunrise earlier than a photographer located at the horizon level.

Therefore, time and azimuth must be adjusted to the Red Pin height above the horizon.

This is how it works:

- Place the Red Pin on the shooting spot (on top of a mountain for example).

- Tap on More > Horizon and then switch on Adjust for height above horizon.

- Place the Blue Pin (Horizon Pin) where you visualize the horizon (it should be several kilometers away from the Red Pin.

- The height above horizon is automatically calculated.

- Finally, tap on Done (top right-hand corner) to go back to the Planner.

- The Sun/Moon rise and set times and directions (azimuths) will be updated to take into account the height above the horizon.

It's important to notice that:

- The Red Pin must always be located at a higher elevation than the Blue Pin (Horizon pin), otherwise it makes no sense to use this option.

- If you tap on the Red Pin, you'll see that the height above the horizon appears in the information box that pops up.

- To stop taking into account the height above the horizon just tap on More > Horizon and switch off Adjust for height above horizon.

More > Action
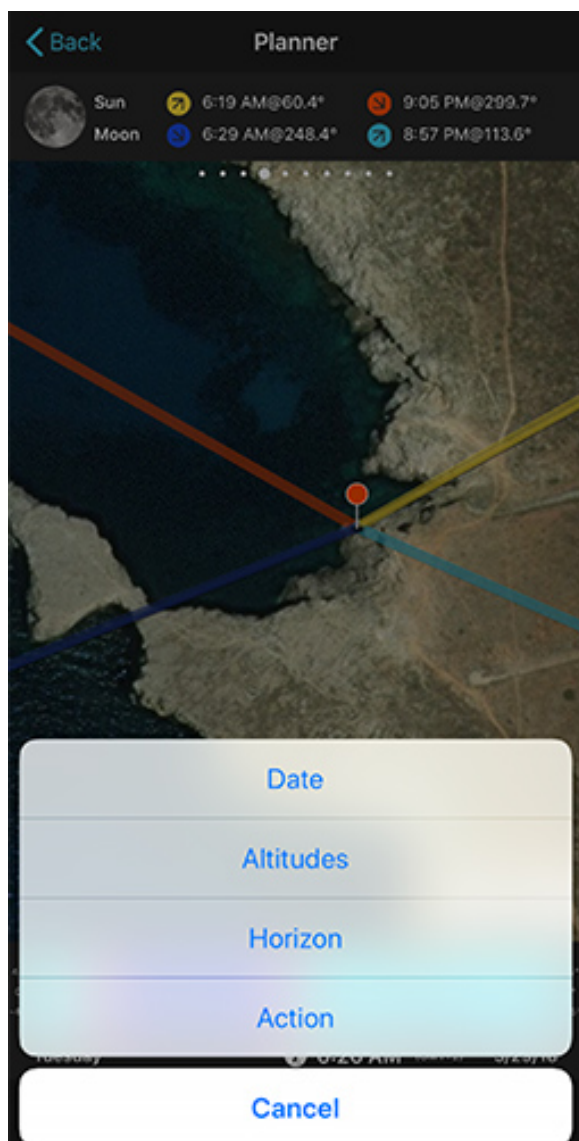
Bottom options of the Planner > More: Date, Altitudes, Horizon and Action.
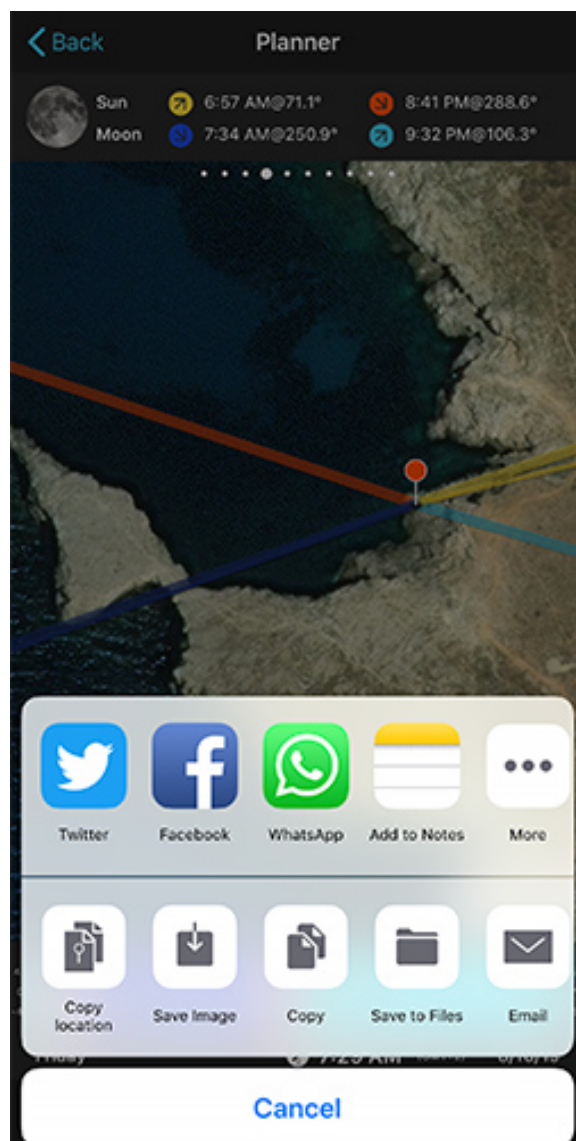
More > Action option: share (via email, Facebook, Twitter, etc.), add alert to your calendar, send Red Pin position to Maps, etc.

The action button allows you to to many things, including:

- **Send a Plan or Point of Interest via email to a friend using the format used by Google Earth (KMZ)**. This way, if your friend is a PhotoPiller, she will be able to import the Plan or Point of Interest to **PhotoPills**. To import it, open the email you've received from a friend and tap and hold on the KMZ file until a window pops up. Choose Open in **PhotoPills**. The Plan will be stored in your Plan list (My Stuff > Plans).

- **Add an alert to your Calendar**. Be notified when the day of the shooting arrives.

- **Send the position of the Red Pin to the Maps app/Google Maps app**. This way you'll be able to calculate the route to the Red Pin position.

- **Copy the latitude/longitude of the Red Pin position**. So you can paste them to your notes for example.

- **Share your photo plans and locations on Facebook and Twitter**.

- **Save Plan as an image to your camera roll**.

Section 9:
Sun

You'll find the Sun Pill in the Pills menu. And it works offline!

It gives you quick access to all the Sun information, including: Sunrise and Sunset times, Sun path view in augmented reality (AR), golden hour, blue hour and twilight times, Moonrise and Moonset times, Moonphase, Galactic Center visibility times and more.

Use it in the field to have a fast look to the daily information or to visualize the Sun position and path with the augmented reality view (even offline).
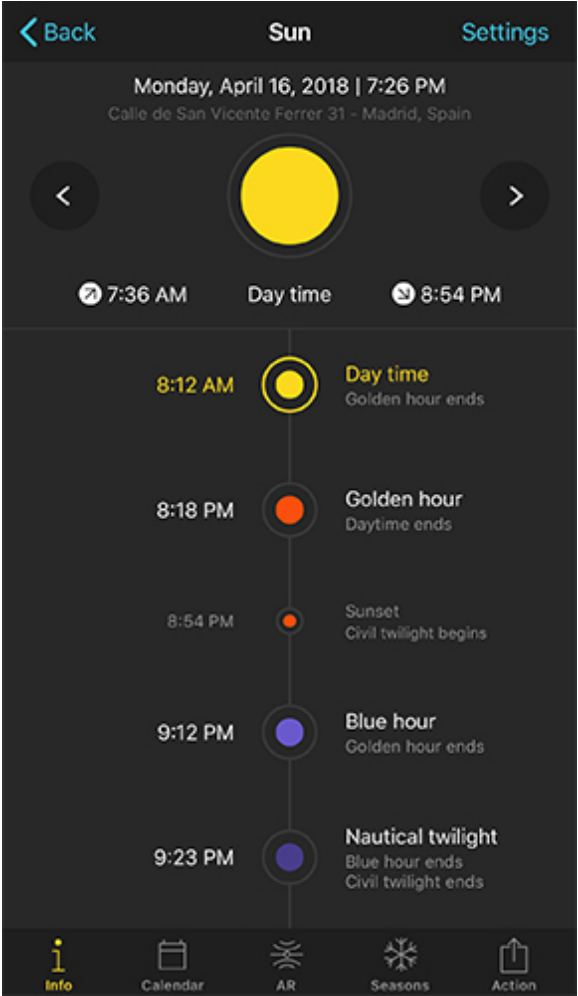
Info

Sun > Info: All the key Light, Sun, Moon and Milky Way events for the selected date and location.
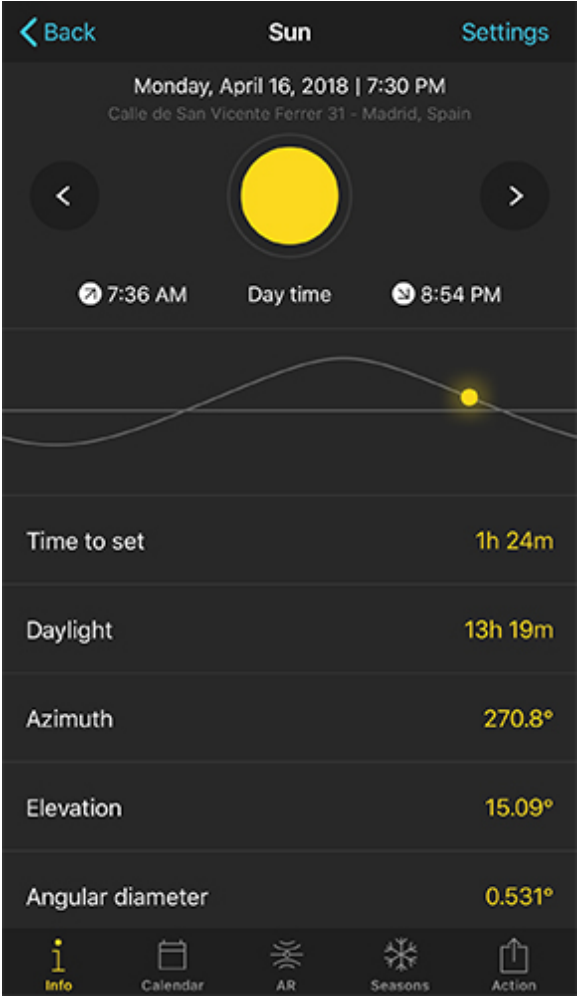
Sun > Info: Scroll the screen to discover more info.

Location, date and time

Right above the big Sun picture you'll see the date, time and location the Sun Pill is using to display all the information.

Settings: change location and time

By default, the Sun Pill gives you the information relative to your current position, date and time. But you can choose a different location, date and time by tapping on the Settings button (top right-hand corner).

There is another way to change the date and time. We'll show it to you in the following section.

Change date and time shortcut

To jump to the next day, tap the arrow you see on the right-hand side of the big Sun picture.

To jump to the previous day, tap the arrow you see on the left-hand side of the big Sun picture.

To change time forward, swipe the big Sun picture to the left.

And to change time backwards, swipe the big Sun picture to the right.

Big Sun Picture, rise and set times and light

The big picture of the Sun will change its color as the light changes: yellow (daytime), orange (golden hour), purple (blue hour), dark purple (nautical twilight), dark blue (astronomical twilight), and gray-yellow (nighttime).

Below the big picture of the Sun you have the Sunrise and Sunset times for the selected date. And also the name of the type of light you have at the selected date and time (daytime, golden hour, blue hour, nautical twilight, astronomical twilight and nighttime).

Daily Light, Sun, Moon and Milky Way events

The Sun > Info gives you all the key day events displayed in order from midnight to midnight, including:

- **Sunrise and Sunset times**.

- **Moonrise, Moonset times and Moon phase**. Next to the time, you'll see a small Moon picture showing the Moon phase. The background color of the Moon picture tells you the light, daytime (blue), nighttime (black), golden hour (orange), blue hour (dark blue)...

- **Galactic Center visibility times**. Next to the time, you'll see a line of white dots that shows you the inclination of the Milky Way at that time. This way it's easy to know

whether the Moon will be out when shooting the Milky Way.

- **Golden hour times (morning and evening)**.

- **Blue hour times (morning and evening)**.

- **Civil, nautical and astronomical twilight times (morning and evening)**.

Elevation of the Sun path

If you keep scrolling down, you'll find the elevation path of the Sun. Change the time and see how the Sun changes the elevation. To change the time just swipe right or left the Sun path.

Sun information table

Below the elevation path of the Sun you'll find a table with key information for the selected date:

- **Time to rise/Time to set**: Hours left for Sunrise or Sunset (relative to the date and time you have set).

- **Daylight**: Number of hours between Sunrise and Sunset.

- **Azimuth**: Position of the Sun measured in angle from the north. Read the article Understanding azimuth and elevation.

- **Elevation**: Position of the Sun measured vertically. Read the article **Understanding azimuth and elevation**.

- **Angular diameter**: The diameter of the Sun measured in angle. It's useful when planning long distance shots of the Sun and you wish to control how big the Sun will be compared to your subject. You can do the same thing with the Moon. Read the article **The shooting spot determines the size of the Moon relative to your subject**.

- **Distance**: Distance between the Sun and Earth.

- **Shadow ratio**: The ratio of an object's height to its shadow length. Multiply the height of any object by the shadow ratio to calculate the length of the object's shadow.

- **Transit**: The time when the Sun reaches its highest position in the sky.
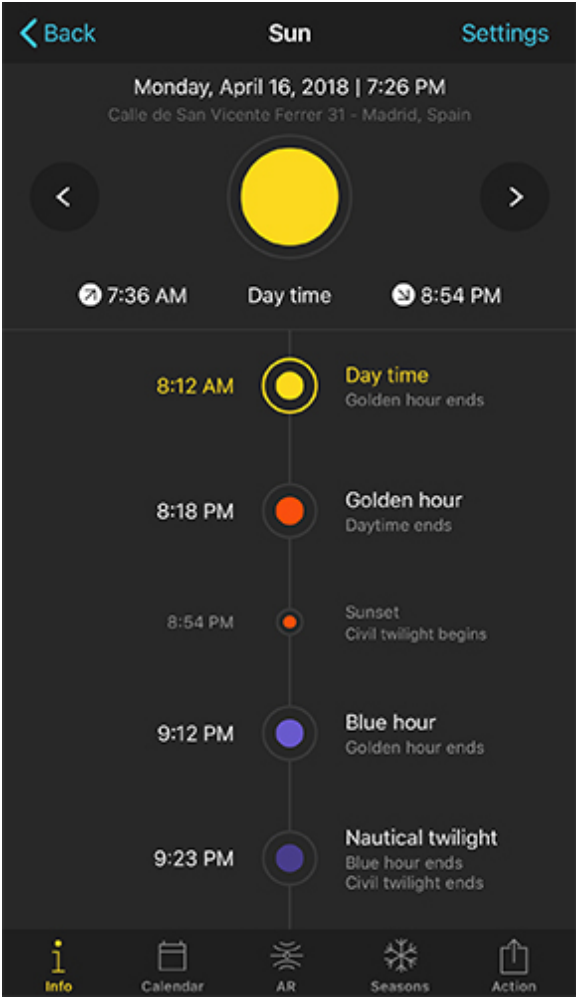
Calendar

Sun > Info.

Sun > Calendar.

For the selected month, Sun > Calendar gives you a table with the daily Sunrise and Sunset times. And also the **azimuths** the Sun is rising and setting: **Time@azimuth** (7:45 AM@78.9°).

To change the month, swipe the calendar right or left. Or tap the month you see on top of the table (on the sides).

Tap on the date you wish to see the Sun information.

To go back to the current month, tap Today (on the top right-hand side corner).

Augmented Reality (AR)
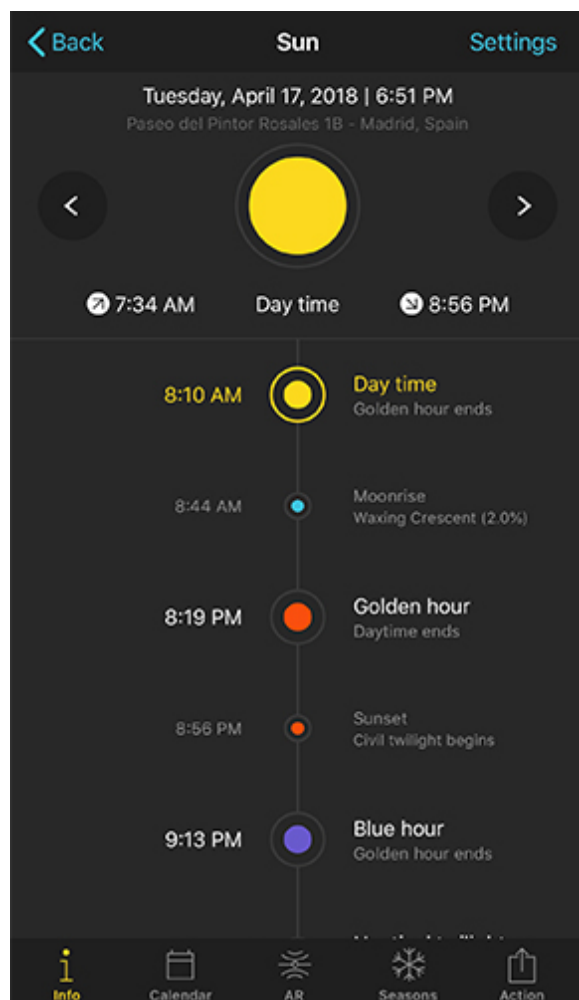
Sun > Info.

Sun > AR.

Imagine that you're in the field about to shoot the Sunrise. Tap on Sun and use the AR view to see where the Sun will rise.

Information on the AR view

The augmented reality view gives you the position and path of the Sun for the selected location (by default where you are), date and time.

You'll see the selected date and time on the top left-hand corner of the AR view.

Use it when planning your Sun shots in situ, to adjust your frame and shooting spot for the best composition before you shoot.

Sun path

Horizon

Elevation (10-degree steps) and azimuthal lines
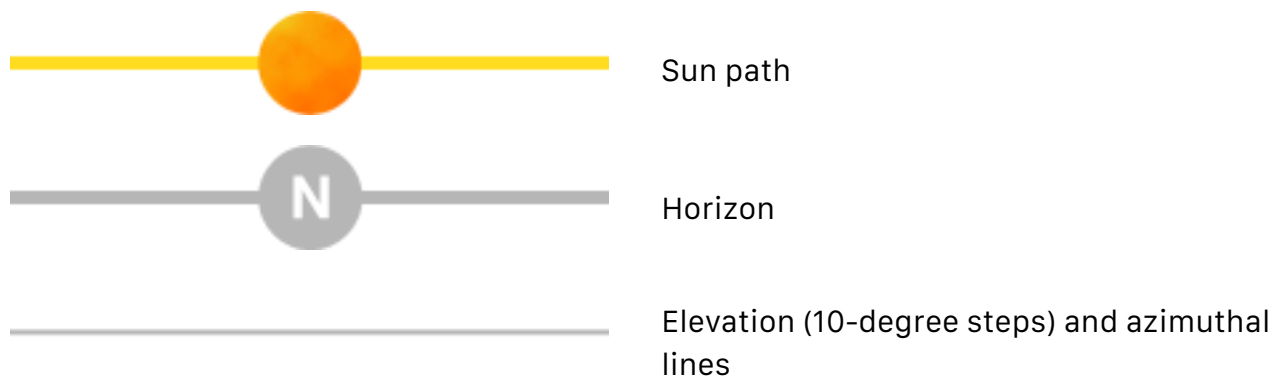
Change date and time

Swipe the AR view to the left to move time forward. Swipe it to the right to move time backwards. See how the Sun moves on the AR view!

Tap on the right-hand side of the AR view to jump to the next day.

Tap on the left-hand side of the AR view to jump to the previous day.

Tap on Now (top left-hand corner) or double tap on the center of the screen to come back to your current date and time.

Calibrating the AR view

The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

And always calibrate the AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom left-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

Note: *iPod Touch users or Android devices without compass sensor! These devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.*

Seasons
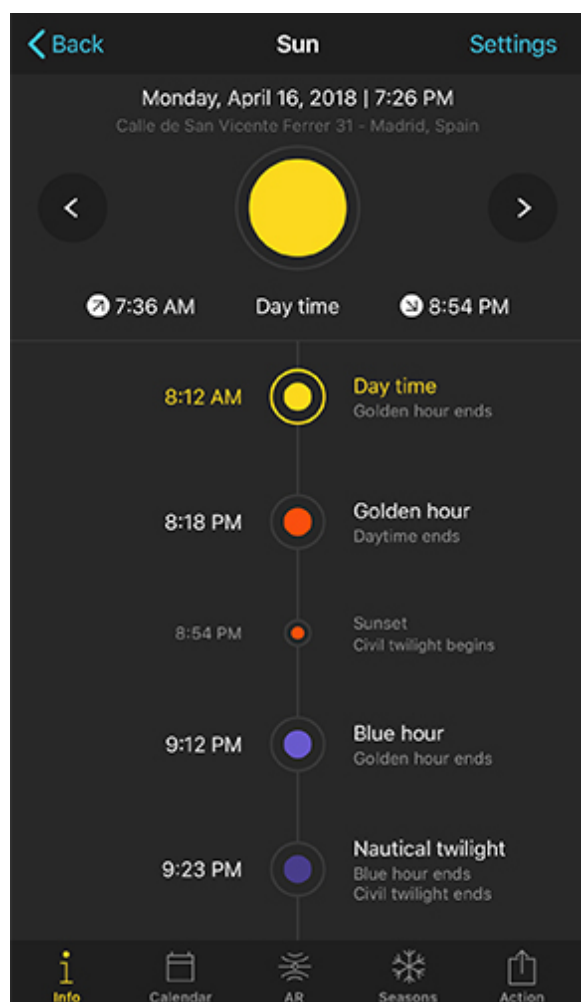
Sun > Info.
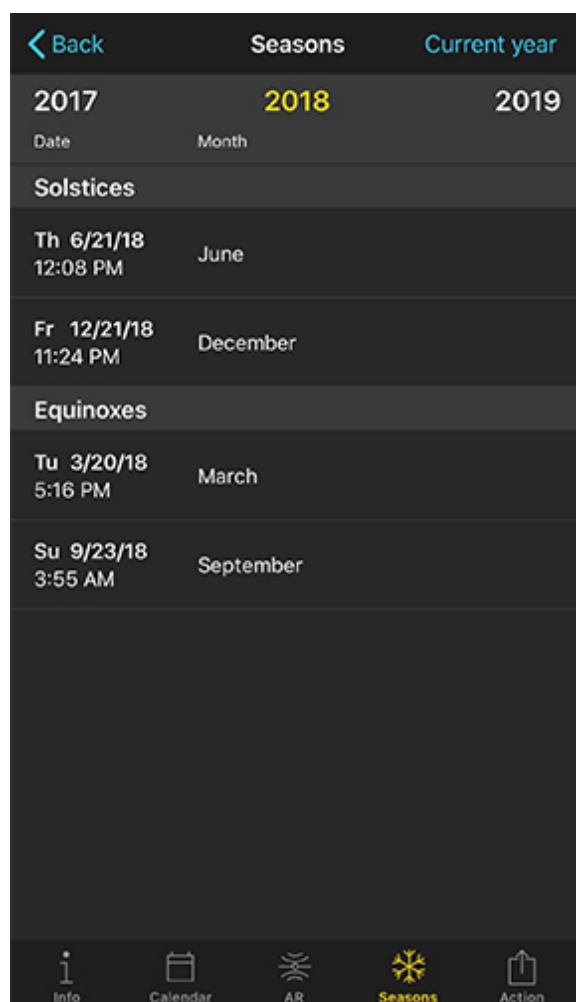
Sun > Seasons.

For the selected year, Sun > Seasons gives you a table with the solstices and equinoxes dates.

Tap on the desired date to see Sun > Info.

To change the year, swipe the table right or left. Or tap the year you see on top of the table (on the sides).

To go back to the current year, tap Current year (on the top right-hand side corner).

Action
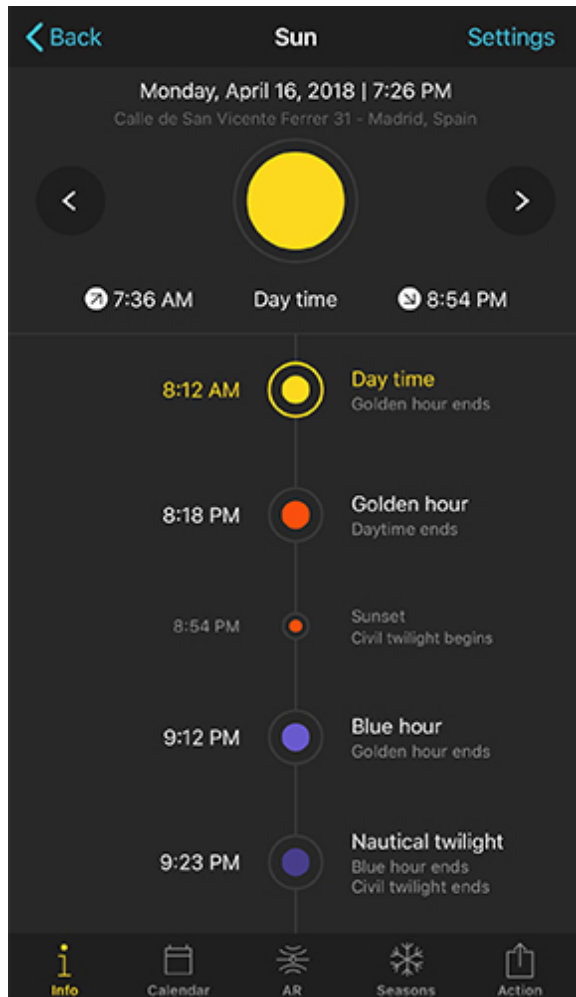
Sun > Info.
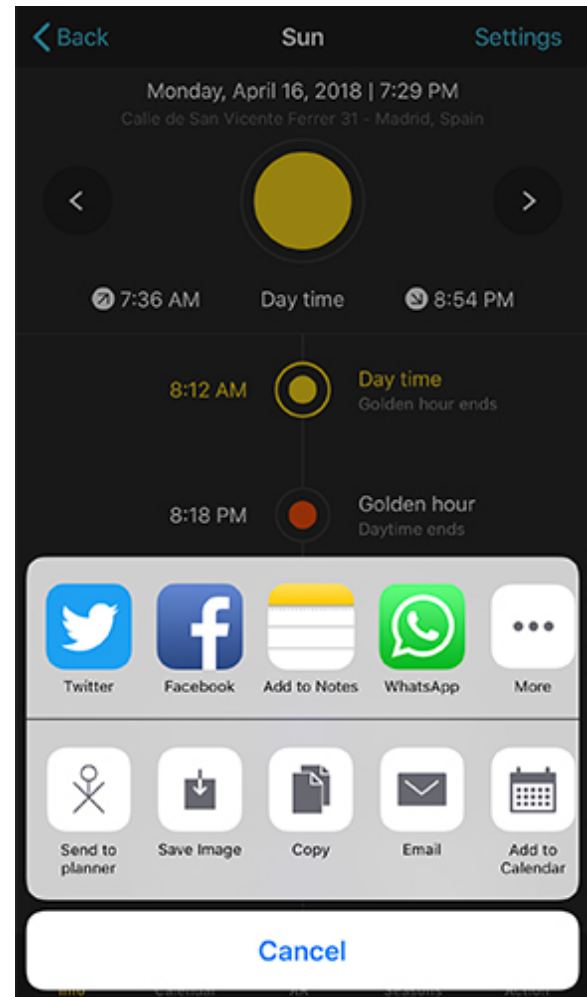
Sun > Action.

Tap on the Action button (bottom right-hand corner) to share a screenshot of the Sun option you're using (Info, Calendar, AR or Season) on Facebook, Twitter, or by email. And to save it to your camera roll.

When you're using Sun > Info, the action button allows you to send the date and time to the Planner, and even to add an alert to your device calendar.

Section 10:
Moon

You'll find the Moon Pill in the Pills menu. And it works offline!

It gives you quick access to the main Moon information (even offline), including: Moonrise and set times, Moon phase, Moon path view in augmented reality, Moon calendar and SuperMoon dates.

Use it in the field to have a fast look to the Moon information or to visualize the Moon position and path with the augmented reality view (even offline).

Oh!

And the Moon calendar is super useful!

Info

Moon > Info: All the key Sun, Moon and Milky Way events for the selected date and location.
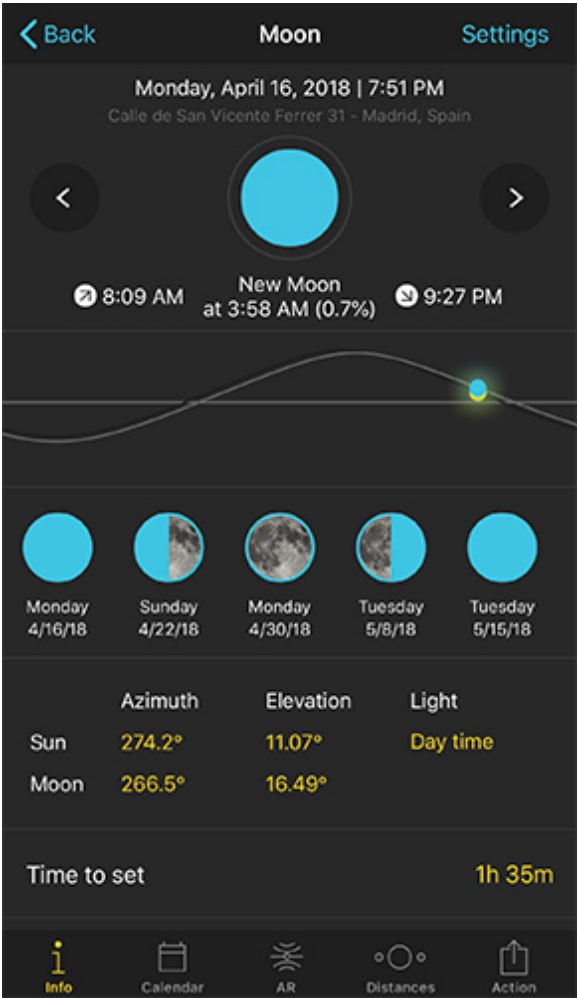
Moon > Info: Scroll the screen to discover more info.

Location, date and time

Right above the big Moon picture you'll see the date, time and location the Moon Pill is using to display all the information.

Settings: change location and time

By default, the Moon Pill gives you the information relative to your current position, date and time. But you can choose a different location, date and time by tapping on the Settings button (top right-hand corner).

There is another way to change the date and time. We'll show it to you in the following section.

Change date and time shortcut

To jump to the next day, tap the arrow you see on the right-hand side of the big Moon picture.

To jump to the previous day, tap the arrow you see on the left-hand side of the big Moon picture.

To change time forward, swipe the big Moon picture to the left.

And to change time backwards, swipe the big Moon picture to the right.

Big Sun Picture, rise and set times and light

The big picture of the Moon you see at the top shows you the Moonphase and how you would actually see the Moon for the selected date, time and location.

Daytime

Night-time

Moonset in daytime

 Moonset in night-time

Below the big picture of the Moon you have the rise and set times for the selected date. And the Moonphase name and percentage for the selected date and time.

Daily Moon, Sun and Milky Way events

All the key day events relative to the Moon displayed in order from midnight to midnight, including:

- **Sunrise and Sunset times**

- **Moonrise, Moonset times and Moon phase**. Next to the time, you'll see a small Moon picture showing the Moon phase. The background color of the Moon picture tells you the light, daytime (blue), nighttime (black), golden hour (orange), blue hour (dark blue)...

- **Light information and elevation of the Sun at Moonrise and Moonset**.

- **Galactic Center visibility times**. Next to the time, you'll see a line of white dots that shows you the inclination of the Milky Way at that time. This way it's easy to know whether the Moon will be out when shooting the Milky Way.

Elevation of the Moon path and the Sun path

If you keep scrolling down, you'll find the elevation path of the Moon and the Sun. Change the time and see how the Moon and Sun change the elevation. To change time just swipe right or left the Sun/Moon path.

Main Moon phase dates

Here you have access to the next 5 important Moonphase dates. Tap on the desired Moonphase to see the Moon info.

Swipe the Moonphase row to the left to seen more dates.

Moon and Sun azimuth and elevation (and light!)

This table shows you the Sun and Moon position (**azimuth and elevation**) for the selected date and time. It also tells you the light you'll have depending on the elevation of the Sun.

Moon information table

A table with key Moon information for the selected date:

- **Time to rise/Time to set**: Hours left for the Moonrise or Moonset (relative to the date and time you have set).

- **Angular diameter**: The diameter of the Moon measured in angle. It's useful when planning long distance shots of the Moon. It allows you to control how big the Moon will be compared to your subject. Read the article **The shooting spot determines the size of the Moon relative to your subject**.

- **Age**: The time that has elapsed since the last preceding conjunction of the Sun and Moon (New Moon).

- **Distance**: Distance between the Moon and Earth.

- **Shadow ratio**: The ratio of an object's height to its shadow length. Multiply the height of any object by the shadow ratio to calculate the length of the object's shadow.

- **Transit**: The time when the Moon reaches its highest position in the sky.
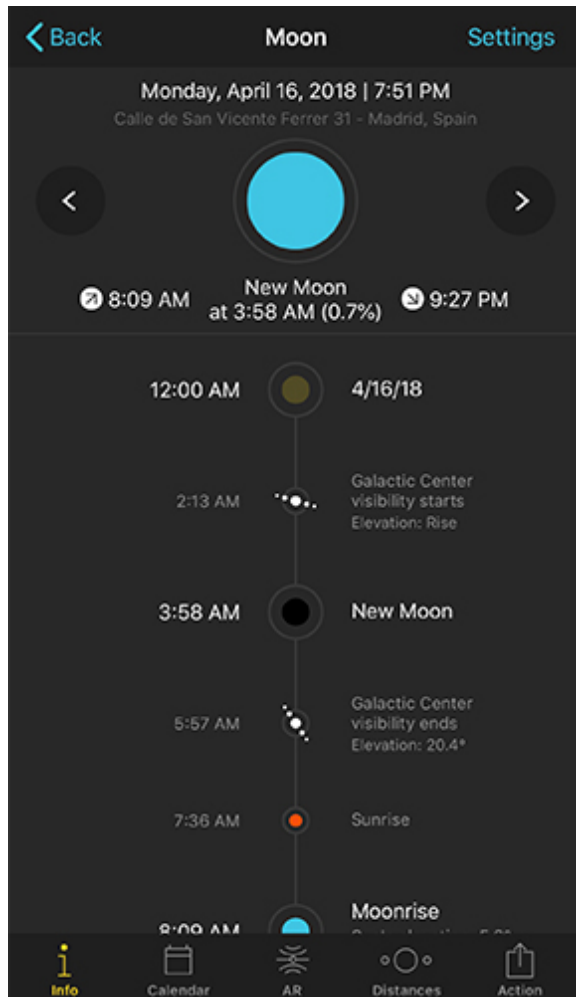
Calendar

Moon > Info.
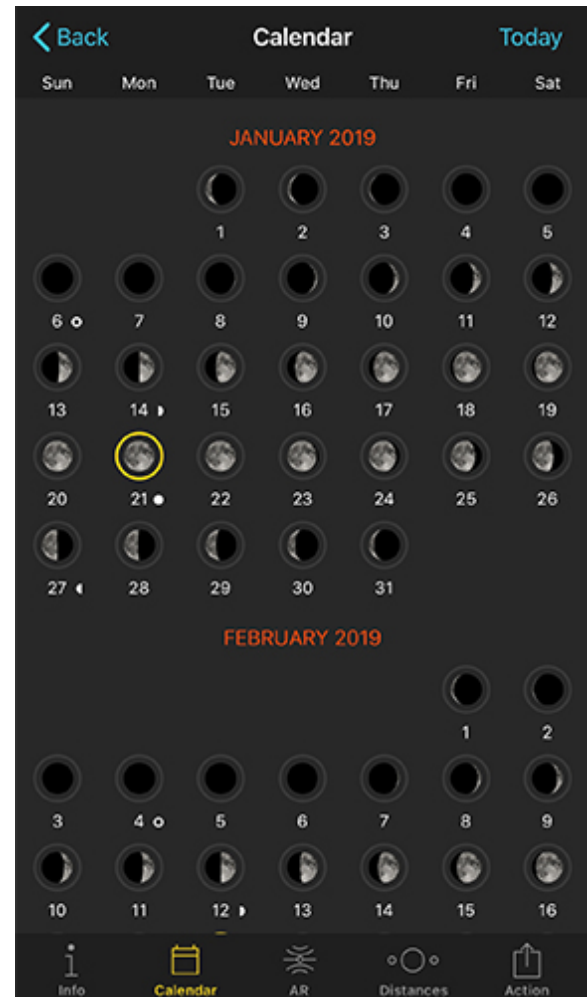
Moon > Calendar.

A cool Moon calendar to quickly find the Moonphase dates you need and the SuperMoon dates.

The current date appears with a blue circle. And the SuperMoon dates appear in a yellow circle.

Scroll up and down to navigate through the months and find the SuperMoons!

Tap on the desired Date of the Calendar to see the Moon > Info.

To go back to the current month, tap Today (on the top right-hand side corner).

Augmented Reality (AR)
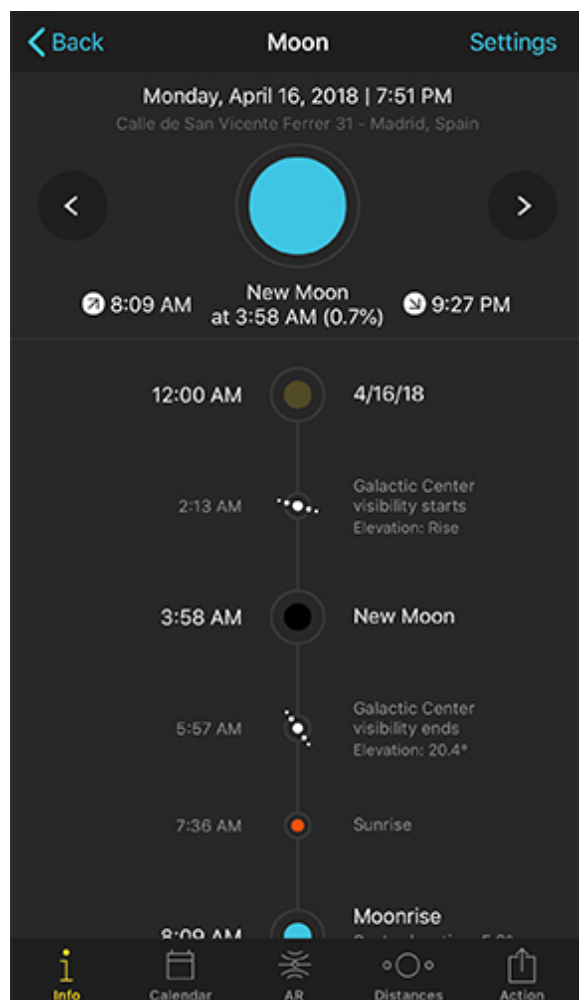
Moon > Info.

Moon > AR.

Imagine that you're in the field about to shoot the Moonset. Tap on Moon and use the AR view to see where the Moon will set.

Information on the AR view

The augmented reality view gives you the position and path of the Moon for the selected location, date and time.

You'll see the selected date and time on the top left-hand corner of the AR view.

Use it when planning your Moon shots in situ, to adjust your frame and shooting spot for the best composition before you shoot.

Moon path

Horizon

Elevation (10-degree steps) and azimuthal lines
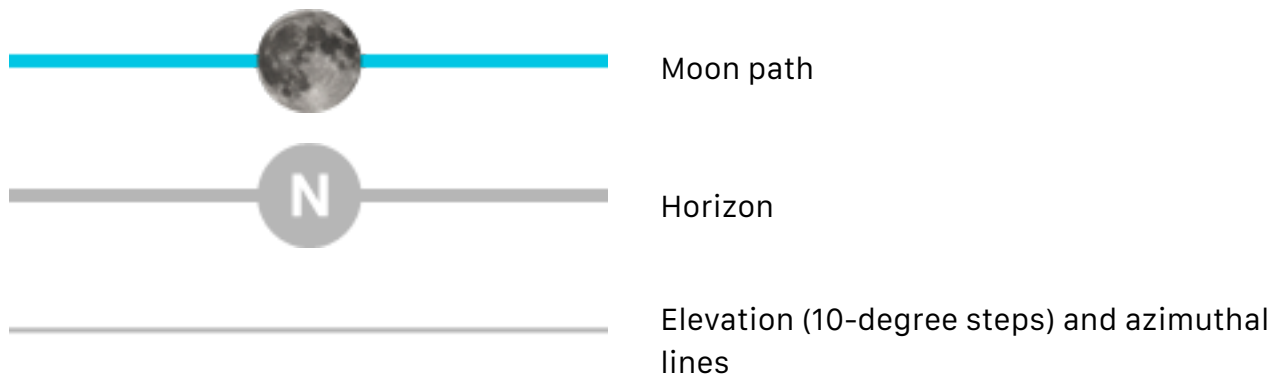
Change date and time

Swipe the AR view to the left to move time forwards. Swipe it to the right to move time backwards. See how the Moon moves and the Moon phase changes!

Tap on the right-hand side of the AR view to jump to the next day.

Tap on the left-hand side of the AR view to jump to the previous day.

Tap on Now (top left-hand corner) or double tap on the center of the screen to come back to your current date and time.

Calibrating the AR view

The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

And always calibrate the AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom left-hand corner of the AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

Note: *iPod Touch users or Android devices without compass sensor! These devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.*

Distances

Moon > Info.

Moon > Distances: Quickly find the SuperMoon dates.

Find out the SuperMoon dates!

For the selected year, Moon > Distances gives you the SuperMoon dates (Full Moons close to perigee), perigees (Moon is closer to Earth) and apogees (Moon is farthest from Earth).

Tap on the desired date to see Moon > Info.

To change the year, swipe the table right or left. Or tap the year you see on top of the table (on the sides).

To go back to the current year, tap Current year (on the top right-hand side corner).

The Moon picture you see on the right-hand side of the table tells you if the perigee/apogee will happen in daytime, golden hour, blue hour, nautical twilight, astronomical twilight or nighttime. Furthermore, the picture shows you how you'd see the Moon (phase and orienta-

tion) from the selected location.

 Moon in daytime

 Moon in golden hour

 Moon in blue hour

 Moon in nautical twilight

 Moon in astronomical twilight

 Moon in night-time

Action
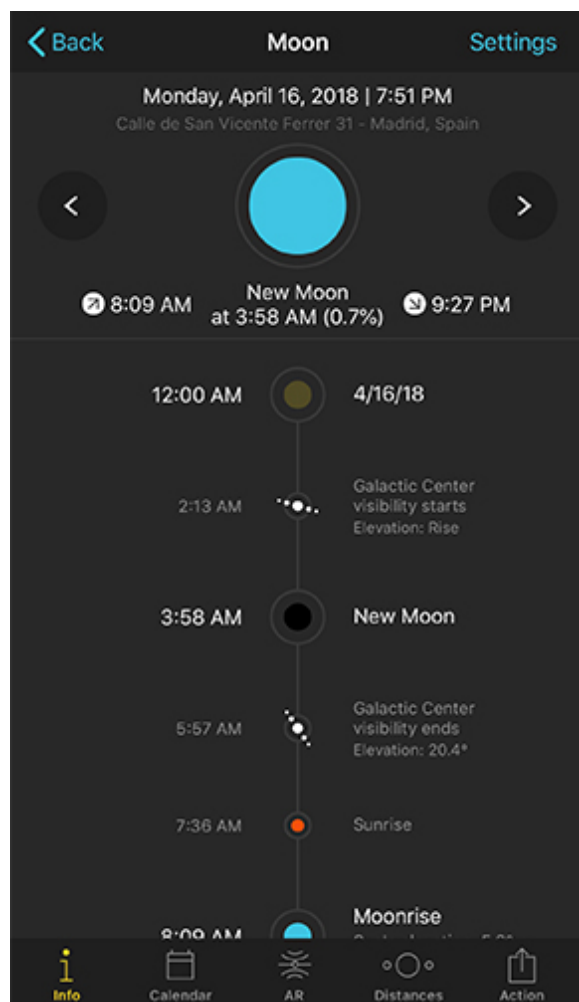
Moon > Info.
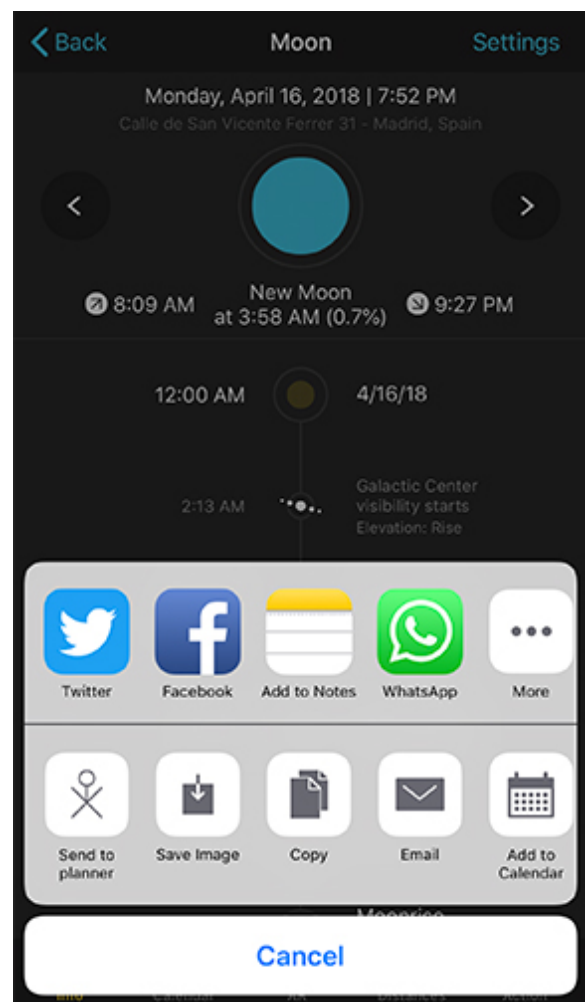
Moon > Action.

Tap on the Action button (bottom right-hand corner) to share a screenshot of the Moon option you're using (Info, Calendar, AR or Distances) on Facebook, Twitter, email. And also to save it to your camera roll, etc.

When you're using Moon > Info, the action button allows you to send the date and time to the Planner, and even to add an alert to your device calendar.

Section 11:
Exposure

Long Exposure photography is something that can take your breath away when you get it right. Put all your energy in the creativity part, leave all calculations to **PhotoPills**!

Long exposure calculator (ND filters, Star Trails, low light and at night)
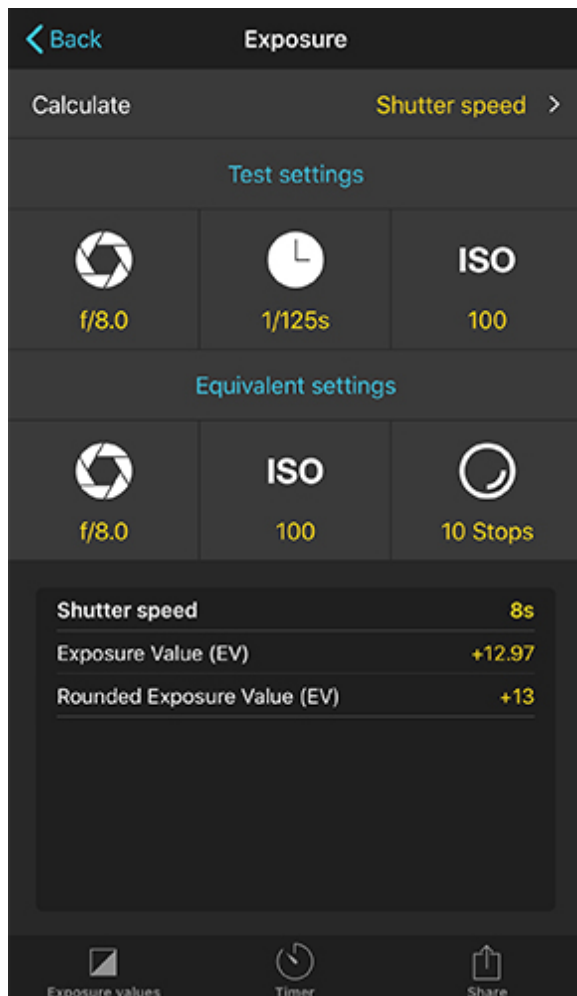
Exposure Calculator for long exposures in low light, at night and with ND filters.

Exposure > ND filter selector.

Use the Exposure Pill to calculate equivalent exposures when shooting long exposures with ND filters, in low light and at night.

Check these two tutorials to learn how to use the Exposure Pill for your:

- Long exposures with ND filters: **Use filters to successfully capture high contrast images**.

- Single shot Star Trails: **How to shoot a single exposure Star Trails**.

Let's see how the Exposure Pill works.

Setting to calculate

Tap on Calculate (at the top) and choose the camera setting you wish to calculate: shutter speed, aperture or ISO.

Usually, the parameter you need to calculate is the shutter speed (exposure time).

Now, the Exposure Pill uses the **reciprocity law** to calculate different camera setting that give the same exposure.

It all begins by working out the test settings.

Test settings

You're out there, facing the scene. It's the moment to take a test shot that gives you a photo correctly exposed.

The camera settings (aperture, shutter speed and ISO) you're using for the test shot are not the ones you want for the final photo. But they'll help you quickly find the right exposure.

For a single Star Trails shot, as a test settings you'll probably use a wide aperture (f/2.8–f/4.0) a high ISO (3200-6400 or more) and an exposure time under 30s (20-30s). You wish to use the shortest exposure time possible to spend the least time testing.

For a long exposure with a ND filter, as a test settings (without the ND filter) you'll use the settings that give you the right exposure based on the light you have in the scene.

So, take the test shot, check the histogram and make sure the photo is correctly exposed. :)

Now introduce the Test Settings in the Exposure calculator. These are the aperture, shutter speed and ISO that gives you a test photo correctly exposed.

Equivalent settings

Next step is to introduce the camera settings you wish to use in the final photo.

For example, if you have decided to calculate the shutter speed, these settings are the aperture, the ISO and the ND filter when needed.

In this case, these settings will be used to calculate the shutter speed that gives you the same exposure value as the test shot and, therefore, the photo will be exposed correctly too.

Results

The table of results gives you the calculated setting (shutter speed, aperture or ISO) and the exposure value (EV).

Exposure values

Exposure Calculator.

Exposure > Exposure values.

It's a table that contains the exposure values (EV) for ISO 100 related to different types of light situations.

Tap an exposure value (EV) on the table to set it to the Exposure calculator.

Timer
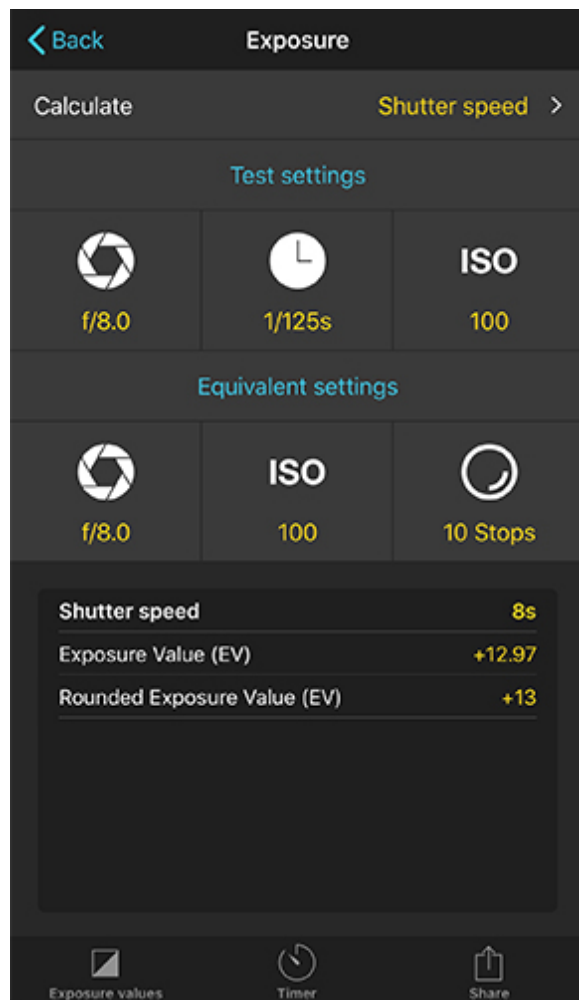
Exposure Calculator.
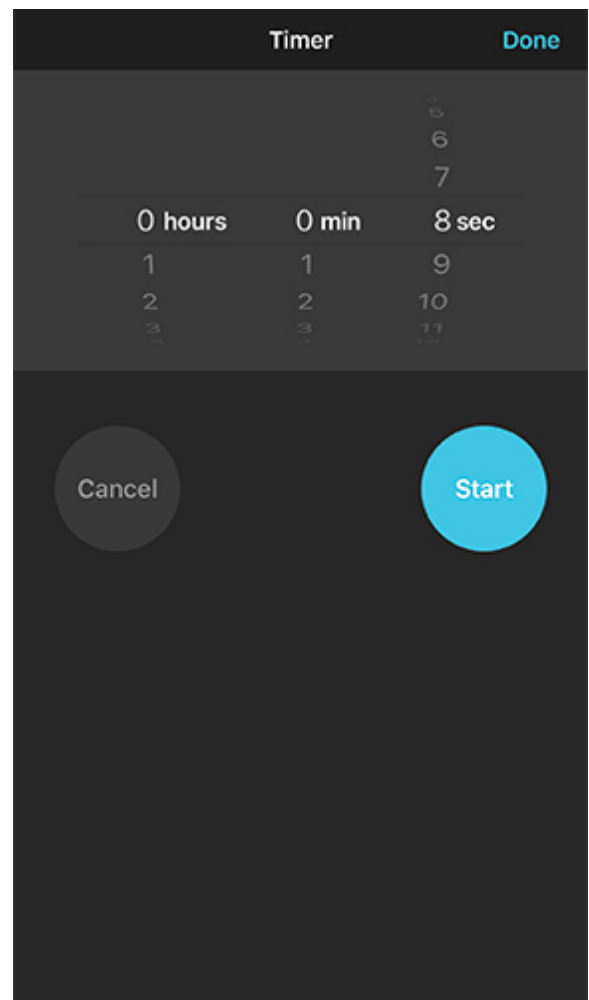
Exposure > Timer.

Once you've calculated the exposure time you need, use the Timer to be notified when the exposure time ends. So you know when to stop the camera.

Share
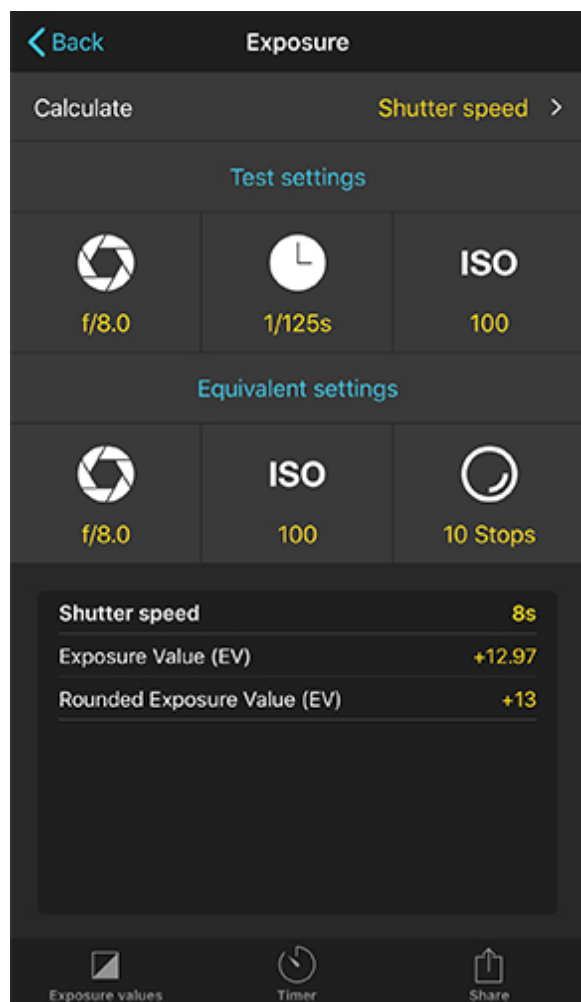
Exposure Calculator.
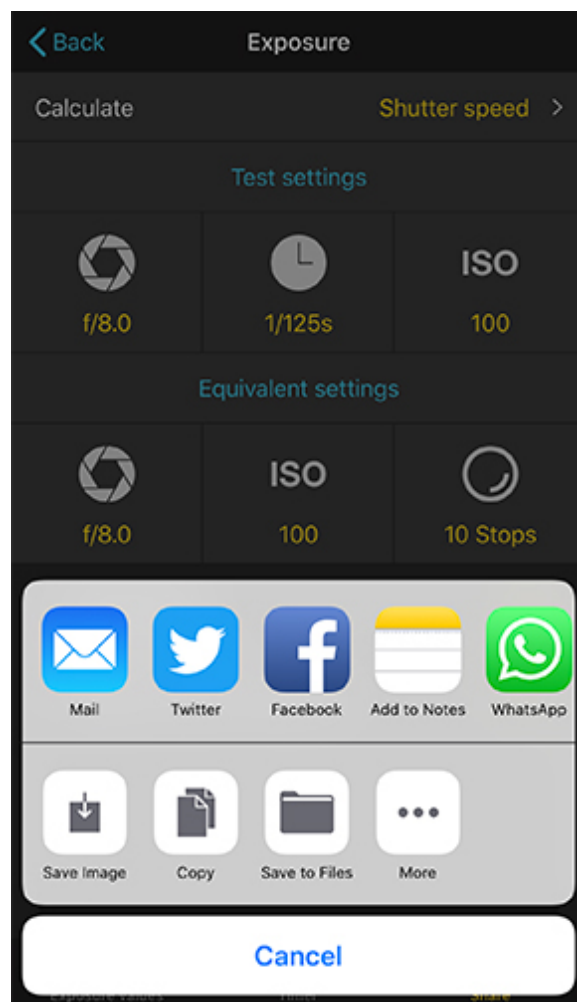
Exposure > Share.

Share your exposure calculations on Facebook, Twitter or by email. Save your calculations as an image to your camera roll.

Section 12:
Depth of field (DoF)

With **Depth of field** (DoF), you get the creative control on the design of your photos. Decide the zone of sharpness you need to tell the story you want and get your message across.

Reduce trial and error, have the calculations done for the result you desire. So you can calculate a certain DoF using the camera settings (Classic) or get the camera settings according to a certain DoF (Inverse).

Learn and improve, quickly understand the relations among aperture, focal length, subject distance and DoF/hyperfocal distance.

Classic depth of field calculator

Classic depth of field Calculator.
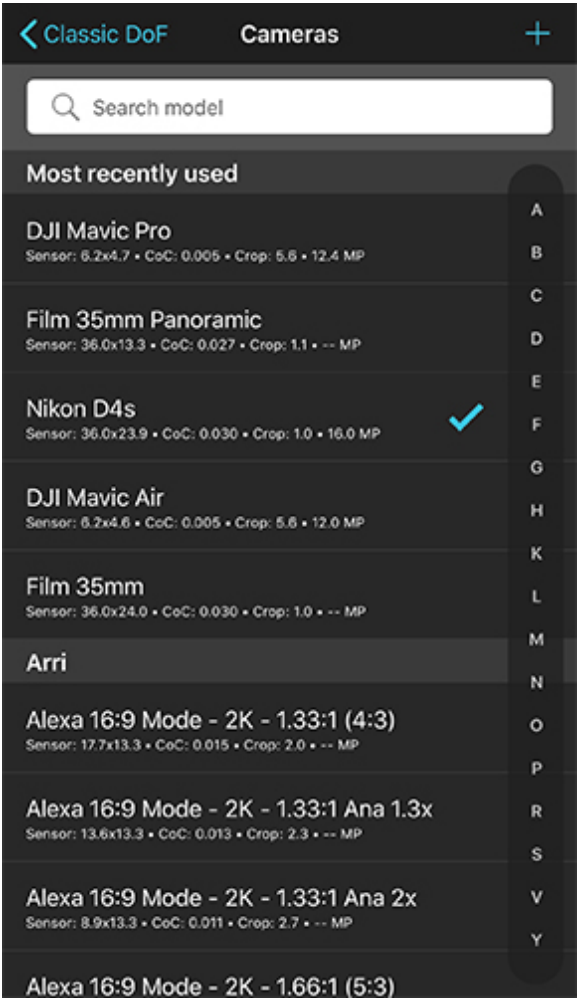
DoF > Camera Selector.

Use the Classic depth of field calculator to work out the **depth of field** parameters for a given camera and camera settings (focal length, aperture, subject distance and teleconverter).

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Settings

Introduce the focal distance (the real one, not the 35mm equivalent), aperture, subject distance (focus distance) and teleconverter factor to calculate DoF information.

DoF information

Get the following DoF information: hyperfocal distance, hyperfocal distance near limit, DoF near limit, DoF far limit, total depth of field, depth of field in front and behind.

Swipe left the DoF information table to see it on a picture. Swipe left again to see the Hyperfocal information on a picture.

Note: *Tap on the AR button (at the bottom) to see the DoF information in the real world.*

Inverse
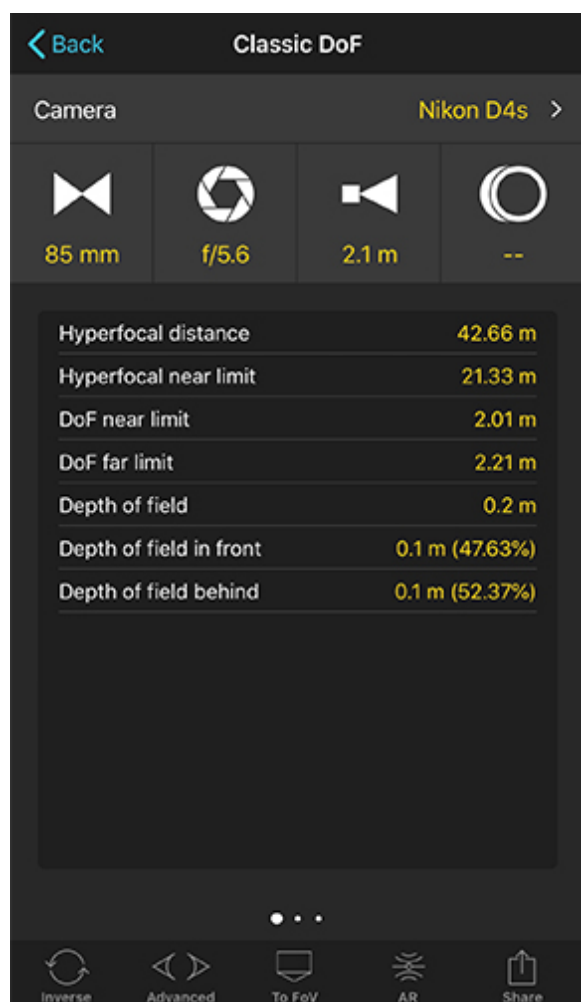
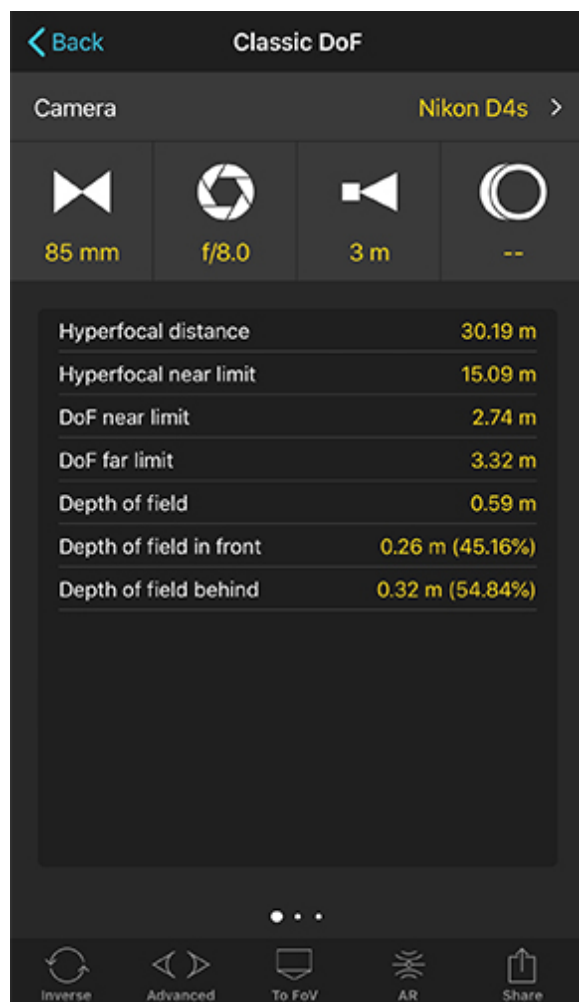Classic depth of field Calculator.
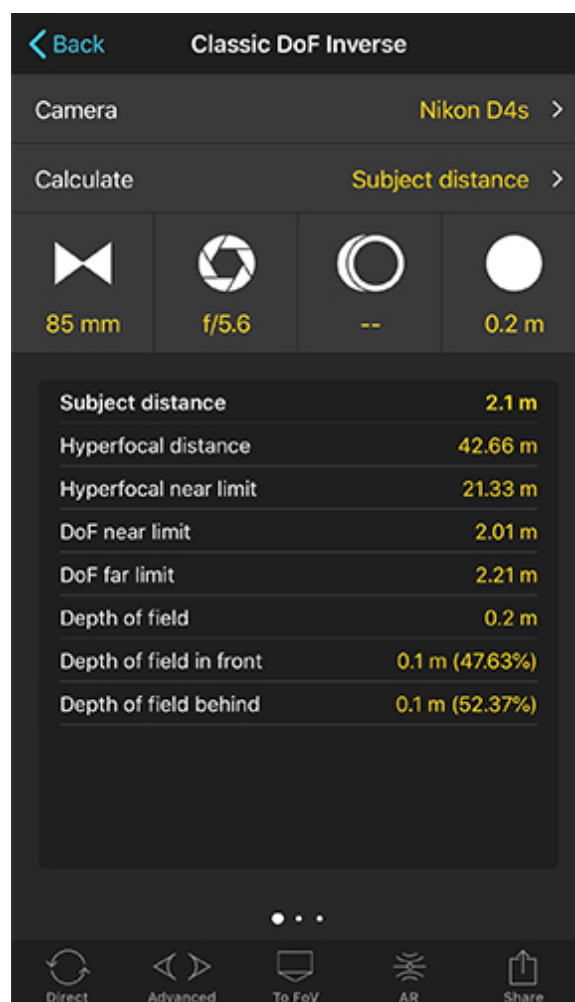
Inverse depth of field calculator (DoF > Inverse).

Use the Inverse depth of field calculator to work out the camera settings that give you a desired depth of field.

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Setting to calculate

Choose the setting you wish to calculate: focal length (the real one, not the 35mm equivalent), aperture or subject distance (focus distance).

Settings

Depending on the camera setting you wish to calculate you must introduce the rest of the camera settings and DoF information.

For example, if you have decided to calculate the subject distance, you need to introduce the aperture, focal length, teleconverter factor and desired DoF.

In this case, these settings will be used to calculate the subject distance you need to focus at that gives you the depth of field you wish to have in the photo.

Calculated Setting and DoF information

Get the calculated setting (focal length for example) and following DoF information: hyperfocal distance, hyperfocal distance near limit, DoF near limit, DoF far limit, total depth of field, depth of field in front and behind.

Swipe left the DoF information table to see it on a picture. Swipe left again to see the Hyperfocal information on a picture.

Note: *Tap on the AR button (at the bottom) to see the DoF information in the real world.*

Advanced
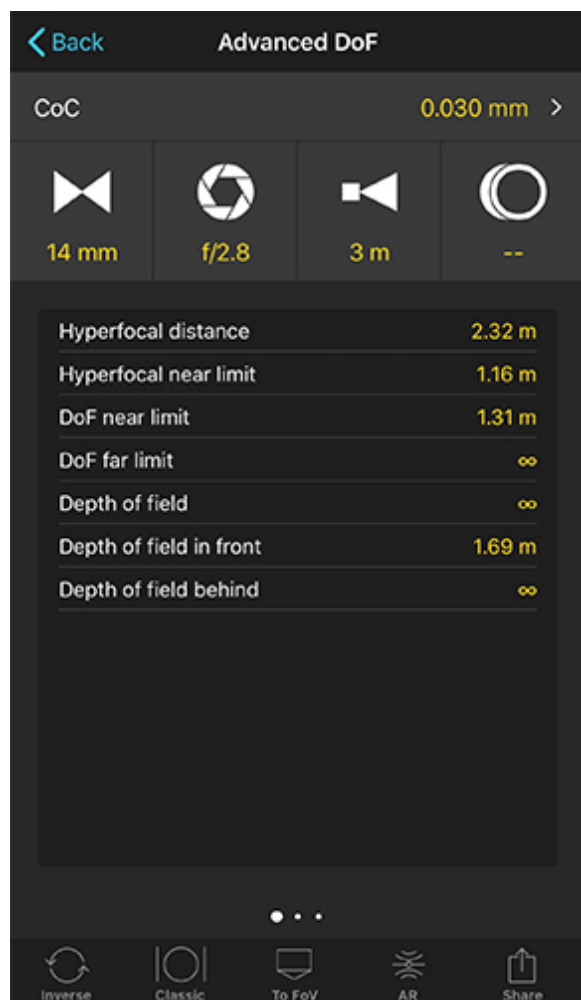
Advanced depth of field Calculator.
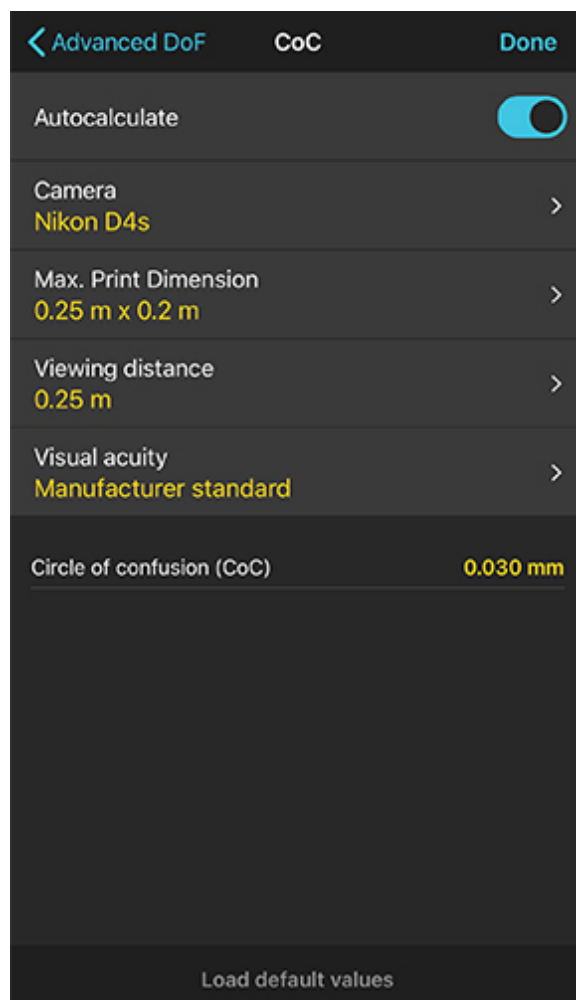
Circle of Confusion selector (Advanced DoF > CoC).

Use the Advanced DoF calculator to get more control over what is "acceptably sharp". Take into account your camera sensor size, print size, viewing distance and visual acuity to adjust your camera CoC that will be used in your DoF calculations.

Let's see how it works.

CoC

Set the desired Circle of Confusion.

Calculate the adjusted **Circle of Confusion** (CoC) taking into account your camera sensor size, print size, viewing distance and visual acuity.

Note: *Tap Load default values at the bottom to load the default CoC settings values: print size 8x10 inch (0.25x0.2 meters), viewing distance of 1 foot (0.25 meters) and manufacturer*

standard visual acuity.

If you use the default values, Advanced DoF and Classic DoF calculators give the same results.

Settings

Introduce focal distance (the real one, not the 35mm equivalent), aperture, subject distance (focus distance) and teleconverter factor to calculate DoF information.

DoF information

Get the following DoF information: hyperfocal distance, hyperfocal distance near limit, DoF near limit, DoF far limit, total depth of field, depth of field in front and behind.

Swipe left the DoF information table to see it on a picture. Swipe left again to see the Hyperfocal information on a picture.

Note: *Tap on the AR button (at the bottom) to see the DoF information in the real world.*

To field of view (FoV)
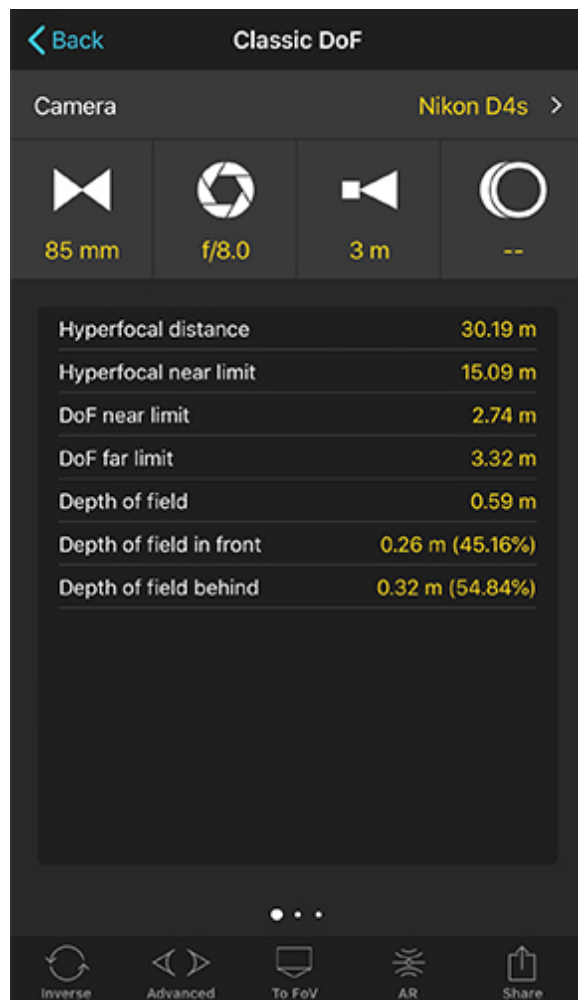
Classic depth of field Calculator.
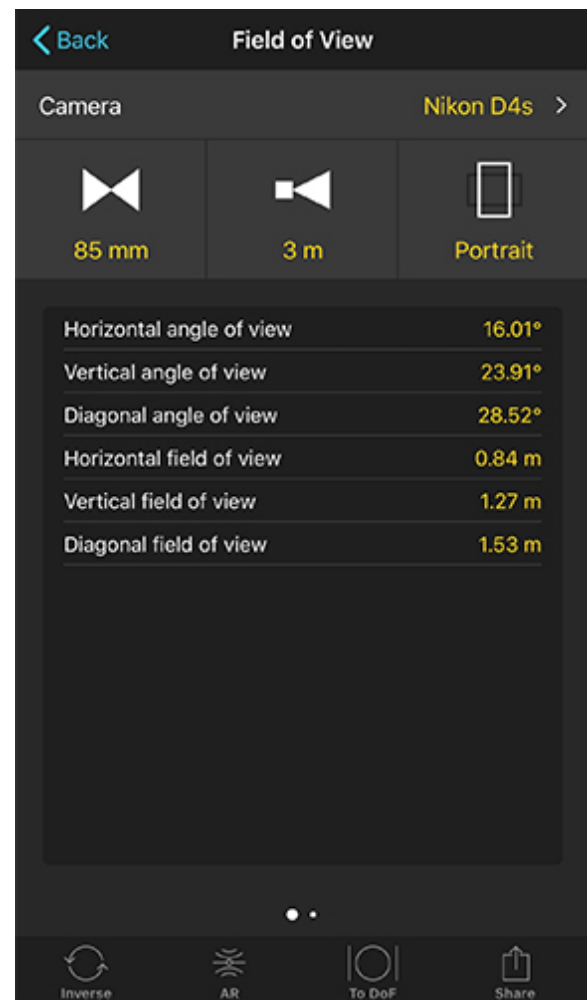
Field of View Calculator (DoF > To FoV).

Tap To FoV to send the settings to the Classic FoV calculator.

Augmented Reality (AR)

Classic depth of field Calculator.
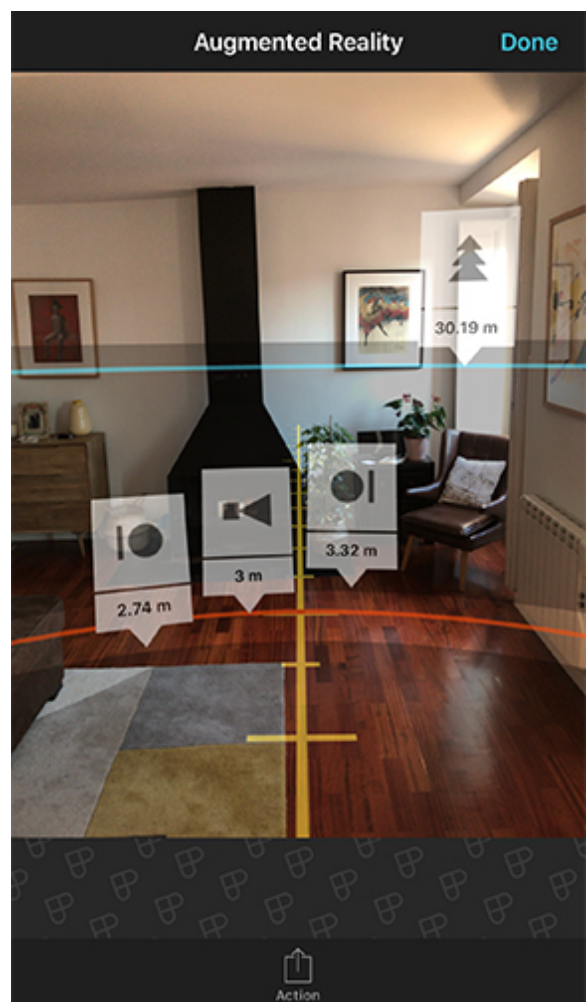
Augmented Reality view (DoF > AR).

Visualize the Depth of Field on the reality!

Once you've done all the DoF calculations that give you the desired depth of field effect, use the AR view to visualize and measure in situ the following distances: subject distance, DoF near limit, DoF far limit and hyperfocal distance.

 DoF near limit

 Subject distance (focus distance)

DoF far limit

Hyperfocal distance

All lines are drawn on the ground. It is assumed that your device is situated 1.35 meters over the ground level. This height can be customized from the PhotoPills Settings button located in My Stuff menu.

You can use the ruler to measure distances. If you are using the Metric units system, each separation measures 0.5 meters. If you are using the Imperial units system, each separation measures 1 foot.

Share

Classic depth of field Calculator.
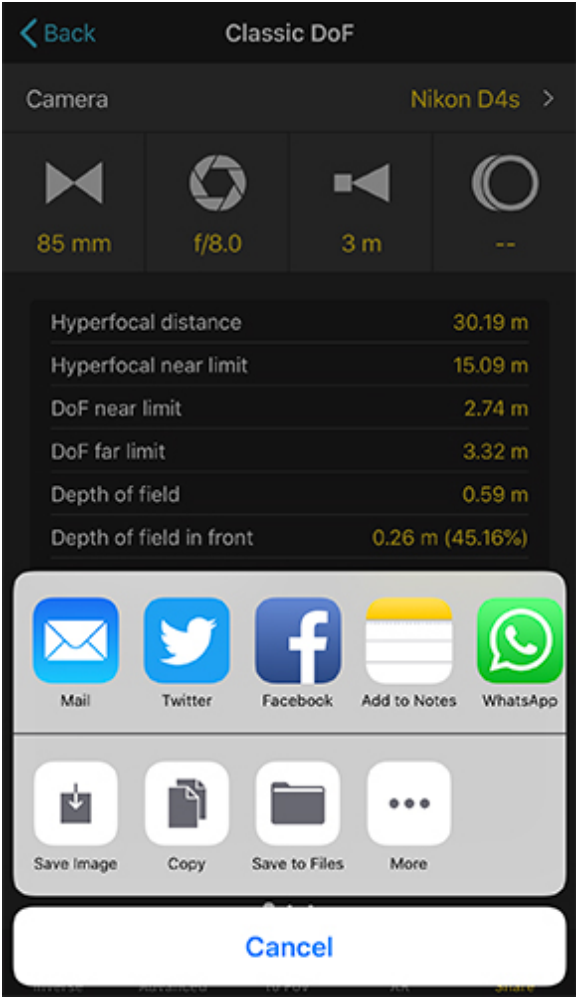
DoF > Share.

Share your DoF calculations on Facebook, Twitter or by email. Save your calculations as an image to your camera roll.

Section 13:
Field of View (FoV)

Digital director's viewfinder. Perfect for location scouting or making storyboards. Preview what would be captured in your frame. Reduce trial and error.

Have the calculations done for the result you desire. So you can calculate a certain FoV using the camera settings (Classic) or get the camera settings according to a certain FoV (Inverse).

Learn and improve. Quickly understand the relations between camera sensor, focal length, subject distance and field of view.

Classic field of view calculator

Classic Field of View Calculator (FoV) – Results on a Table.
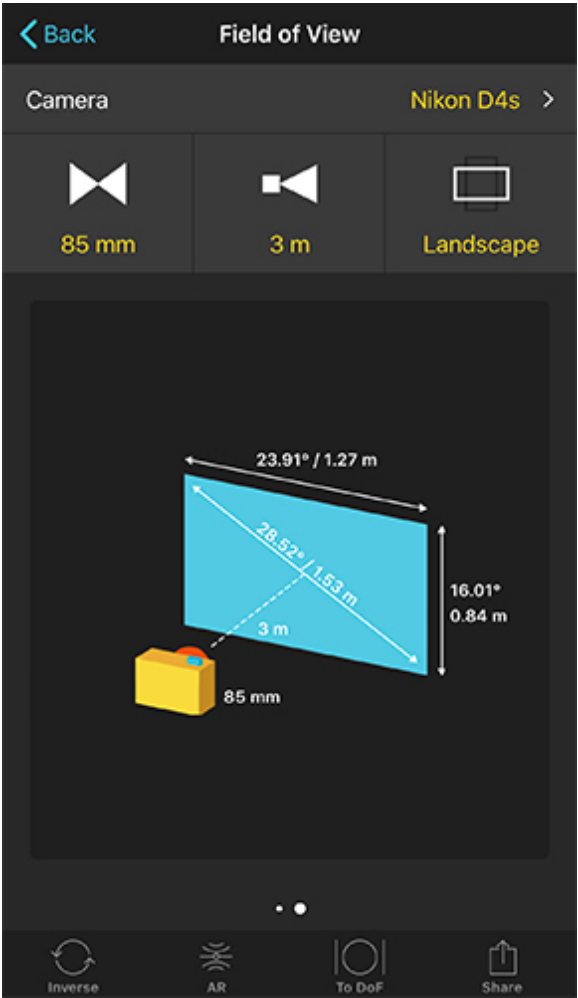
Classic Field of View Calculator (FoV) – Results on a Picture.

The FoV calculator helps you to predetermine a proper rectilinear lens selection and subject distance for the desired framing.

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Settings

Introduce focal length (the real one, not the 35mm equivalent), aperture, subject distance (focus distance) and camera orientation (portrait or landscape).

FoV information

Get the following FoV information: horizontal, vertical and diagonal angle of view and field of view.

Swipe left the FoV information table to see it on a picture.

Note: *Tap on the AR button (at the bottom), and then tap on the AR view to see the frame in the real world*.

Inverse
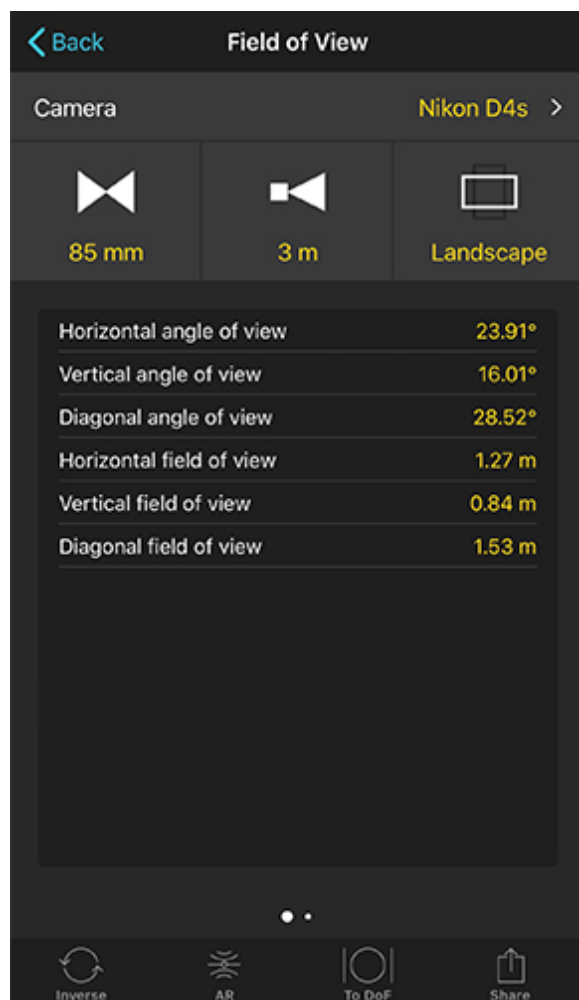
Classic Field of View Calculator (FoV).
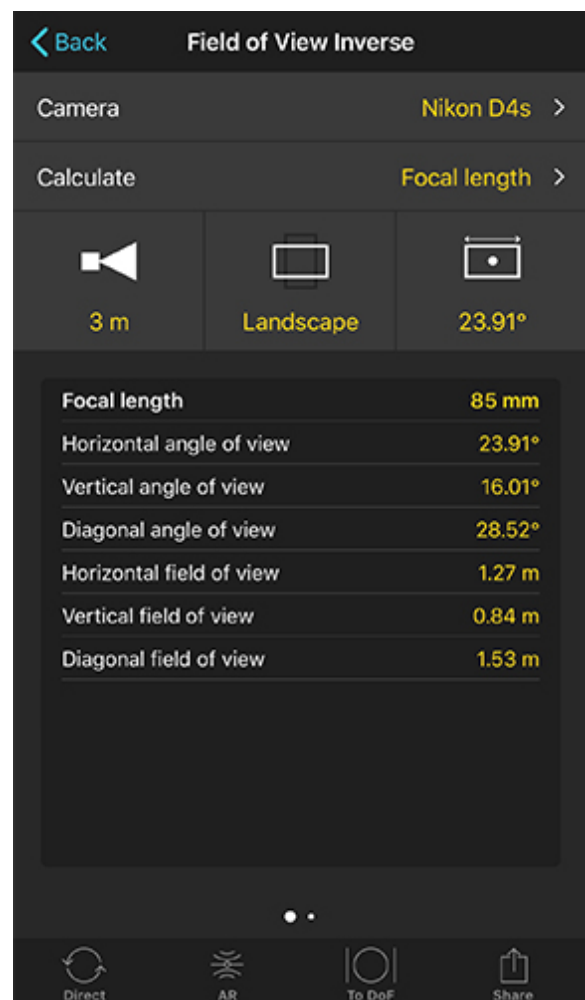
Inverse Field of View Calculator (FoV > Inverse).

Use the Inverse FoV calculator to calculate the camera settings you need for a certain field of view.

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Setting to calculate

Choose the setting you wish to calculate: focal length (the real one, not the 35mm equivalent) or subject distance (focus distance).

Settings

Depending on the setting you wish to calculate you must introduce the rest of camera settings and FoV information.

For example, if you have decided to calculate the focal length, you need to introduce the subject distance, camera orientation and desired FoV.

In this case, these settings will be used to calculate the focal length that gives you the field of view you wish.

Calculated setting and FoV information

Get the calculated setting (focal length for example) and the following FoV information: horizontal, vertical and diagonal field and angle of view.

Swipe left the FoV information table to see it on a picture.

Note: *Tap on the AR button (at the bottom), and then tap on the AR view to see the frame in the real world*.

Augmented Reality (AR)
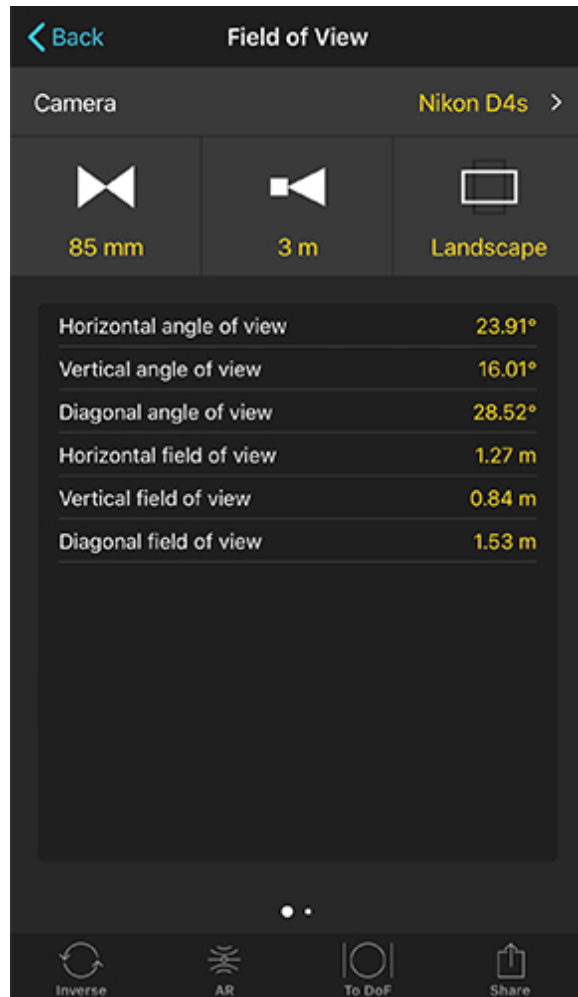
Classic Field of View Calculator (FoV).   Augmented Reality (FoV > AR).

For a given camera, focal length, subject distance and camera orientation, you can visualize in augmented reality what you would capture in the photo.

Tap on the screen and position your frame where you want. Reduce trial and error. Make sure you take the photo you want.

To depth of field (DoF)
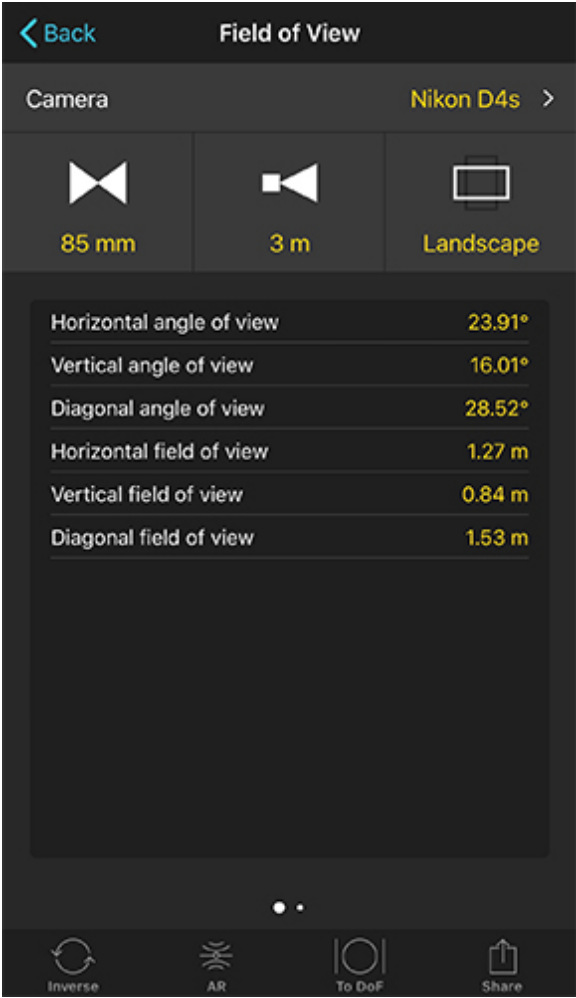
Classic Field of View Calculator (FoV).

Classic Depth of Field Calculator (FoV > To DoF).

Tap To DoF to send the settings to the Classic DoF calculator.

Share
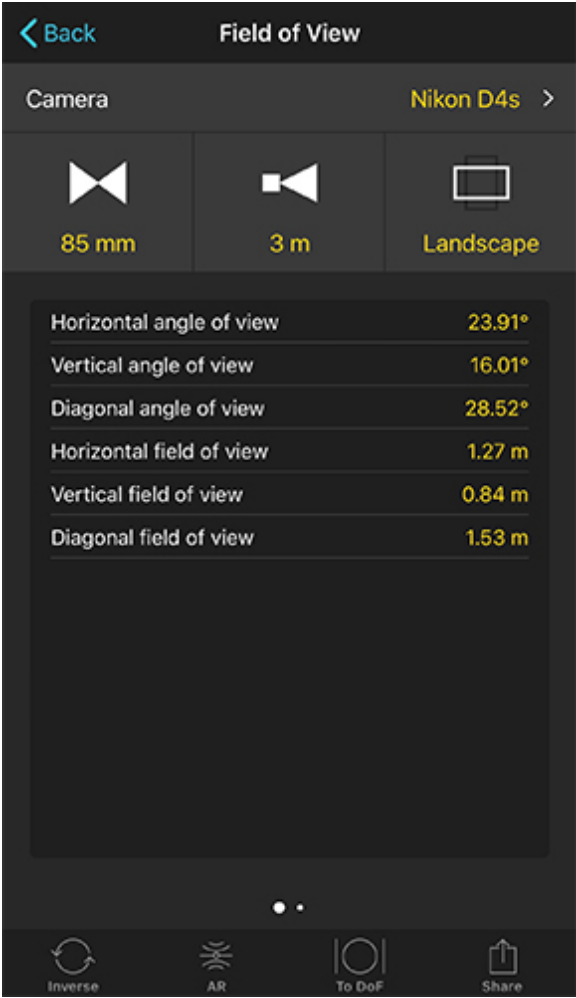
Classic Field of View Calculator (FoV).
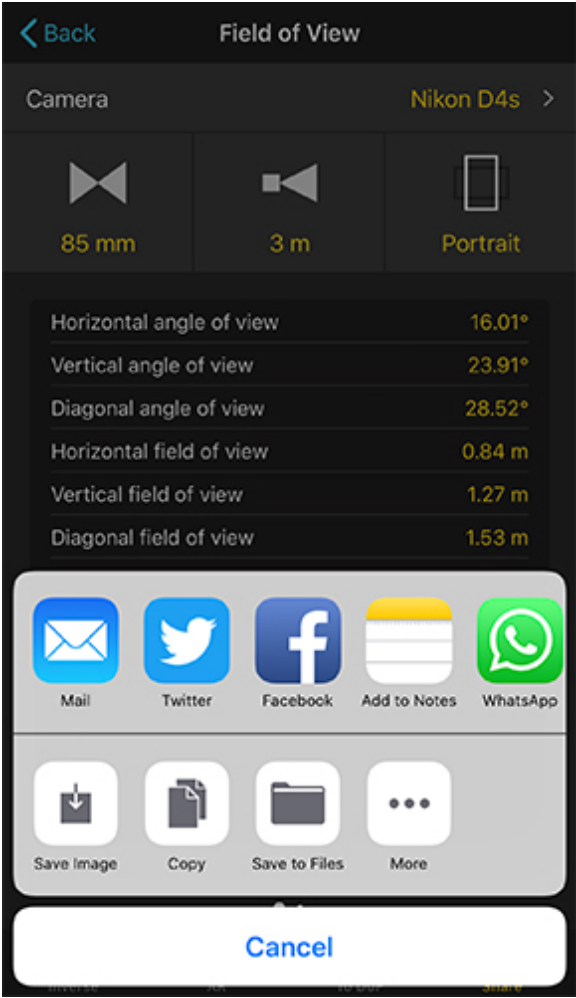
FoV > Share.

Share your FoV calculations in Facebook, Twitter or by email. Save your calculations as an Image to your camera roll.

Section 14:
Depth of field Table

The fastest way to have your **Depth of field** (DoF) and **Hyperfocal** calculations done.

Depth of field Table

<table>
<tr><td>‹ Back</td><td colspan="4">DoF Table</td></tr>
<tr><td>Camera</td><td colspan="4">Nikon D4s ›</td></tr>
<tr><td>Focal length</td><td colspan="4">85 mm ›</td></tr>
<tr><td>Calculate</td><td colspan="4">Total DoF (m) |●|</td></tr>
<tr><td>Subject distance (m)</td><td>f/5.0</td><td>f/5.6</td><td>f/6.3</td><td>f/7.1</td></tr>
<tr><td>0.75</td><td>0.02</td><td>0.02</td><td>0.03</td><td>0.03</td></tr>
<tr><td>1</td><td>0.04</td><td>0.04</td><td>0.05</td><td>0.05</td></tr>
<tr><td>1.5</td><td>0.09</td><td>0.1</td><td>0.11</td><td>0.13</td></tr>
<tr><td>2</td><td>0.16</td><td>0.18</td><td>0.2</td><td>0.23</td></tr>
<tr><td>2.5</td><td>0.25</td><td>0.28</td><td>0.32</td><td>0.36</td></tr>
<tr><td>3</td><td>0.37</td><td>0.41</td><td>0.46</td><td>0.52</td></tr>
<tr><td>3.5</td><td>0.5</td><td>0.57</td><td>0.64</td><td>0.71</td></tr>
<tr><td>4</td><td>0.66</td><td>0.74</td><td>0.83</td><td>0.94</td></tr>
</table>

Visual   AR   Share

Depth of field table (DoF Table).

<table>
<tr><td>‹ Back</td><td colspan="4">DoF Table</td></tr>
<tr><td>Camera</td><td colspan="4">Nikon D4s ›</td></tr>
<tr><td>Focal length</td><td colspan="4">85 mm ›</td></tr>
<tr><td>Calculate</td><td colspan="4">Total DoF (m) |●|</td></tr>
<tr><td>Subject distance (m)</td><td>f/5.0</td><td>f/5.6</td><td>f/6.3</td><td>f/7.1</td></tr>
<tr><td>0.75</td><td>0.02</td><td>0.02</td><td>0.03</td><td>0.03</td></tr>
<tr><td>1</td><td>0.04</td><td>0.04</td><td>0.05</td><td>0.05</td></tr>
<tr><td>1.5</td><td>0.09</td><td>0.1</td><td>0.11</td><td>0.13</td></tr>
<tr><td>2</td><td>0.16</td><td>**0.18**</td><td>0.2</td><td>0.23</td></tr>
<tr><td>2.5</td><td>0.25</td><td>0.28</td><td>0.32</td><td>0.36</td></tr>
<tr><td>3</td><td>0.37</td><td>0.41</td><td>0.46</td><td>0.52</td></tr>
<tr><td>3.5</td><td>0.5</td><td>0.57</td><td>0.64</td><td>0.71</td></tr>
<tr><td>4</td><td>0.66</td><td>0.74</td><td>0.83</td><td>0.94</td></tr>
</table>

Visual   AR   Share

Tap on the result you wish to select it.

Use the DoF table to visualize how **depth of field** changes according to the aperture and subject distance for a given focal length.

Learn and improve. Quickly understand the relations between aperture, focal length, subject distance and DoF/hyperfocal distance.

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Focal length button

Introduce the focal length you wish to use. The real one, not the 35mm equivalent.

DoF options

Tap on the Calculate button to switch the values on the table between total DoF or DoF limits.

Table of results

Browse the table to find out the combination of subject distance and aperture that gives you the sharpness you need in your photo.

Tap the result you wish to select it. Then tap on Visual to see it on a picture. Or tap on AR to see it in augmented reality.

Note: *You'll find the hyperfocal distance in the first row.*

Visual

Depth of field table (DoF Table).

DoF Table > Visual.

Select a cell from the DoF table and tap on the Visual button to see the depth of field information on a picture.

Augmented Reality (AR)

Depth of field table (DoF Table).

Augmented Reality (DoF Table > AR).

Visualize the depth of field on the reality!

Select a cell from the table and tap on the AR button to visualize and measure in situ the following distances: subject distance, DoF near limit, DoF far limit and hyperfocal distance.

 DoF near limit

 Subject distance (focus distance)

 DoF far limit

 Hyperfocal distance

All lines are drawn on the ground. It is assumed that your device is situated 1.35 meters over the ground level. This height can be customized from the PhotoPills Settings button located in My Stuff menu.

You can use the ruler to measure distances. If you are using the Metric units system, each separation measures 0.5 meters. If you are using the Imperial units system, each separation measures 1 foot.

Share

Depth of field table (DoF Table).

DoF Table > Share.

Share your Depth of Field table on Facebook, Twitter or by email. Save the table as an image to your camera roll.
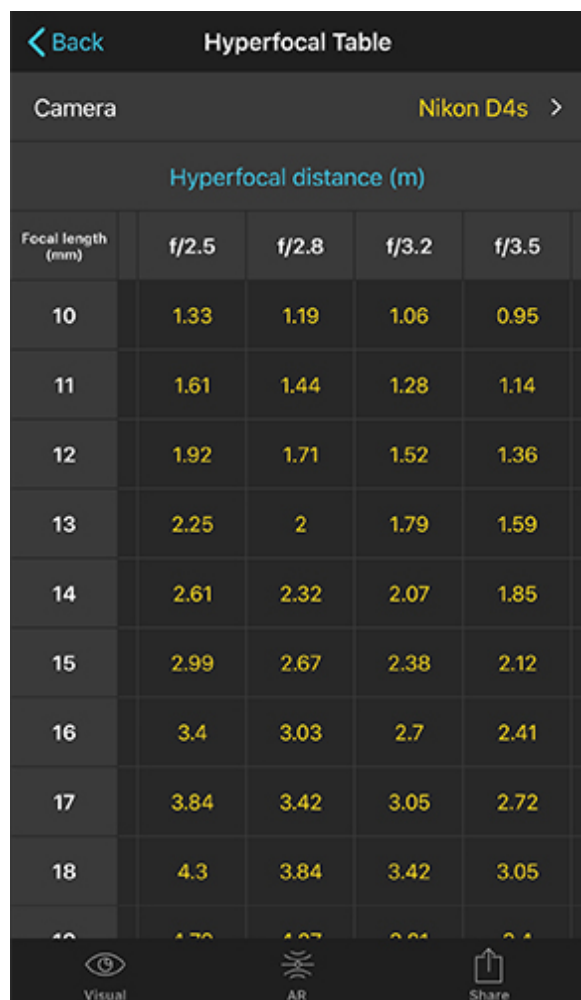
Section 15:
Hyperfocal Table

The fastest way to have your Hyperfocal calculations done.

If you wish to understand the hyperfocal distance and learn how to use it, take a look at our **depth of field** article.

Hyperfocal table

| Hyperfocal Table. | Tap on the result you wish to select it. |

Use the Hyperfocal table to visualize how the hyperfocal distance changes according to the aperture and focal length.

Learn and improve. Quickly understand the relations between aperture, focal length and hyperfocal distance.

Let's see how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Table of results

Browse the table to find out the combination of focal length (the real one, not the 35mm equivalent) and aperture to get the hyperfocal distance.

Visual

Hyperfocal Table.

Hyperfocal Table > Visual.

Select a cell from the Hyperfocal table and tap on the Visual button to see the Hyperfocal information on a picture.

Augmented Reality (AR)

Hyperfocal Table.

Augmented Reality (Hyperfocal Table > AR).

Visualize the Hyperfocal distance on the reality!

Select a cell from the table and tap on the AR button to visualize and measure in situ the hyperfocal distance.

 Hyperfocal distance

The Hyperfocal distance is drawn on the ground. It is assumed that your device is situated 1.35 meters over the ground level. This height can be customized from the PhotoPills Settings button located in My Stuff menu.

You can use the ruler to measure distances. If you are using the Metric units system, each

separation measures 0.5 meters. If you are using the Imperial units system, each separation measures 1 foot.

Share

Hyperfocal Table.

Hyperfocal Table > Share.

Share your Hyperfocal table on Facebook, Twitter or by email. Save the table as an image to your camera roll.

Section 16:

Night Augmented Reality (AR)

Point your device at the sky and visualize all the key night information on the real world with the augmented reality view, including: Milky Way position, Galactic Center position, Moon Position, Moon path, Moon phase, Polaris, south celestial pole and Star Trails patterns.

Night Augmented Reality (AR)

Night AR view - Galactic Center.

Night AR view - Polaris.

Use the Night Augmented Reality to plan your night shots in situ and adjust your frame for the best composition before you shoot.

Just tap on Night AR (Pills menu) and visualize in augmented reality for the selected date, time and position: Milky Way, celestial equator, Polaris, north/south celestial pole, circumpolar stars path and sense of rotation, Moon position, Moon path, Moonrise/set directions, and the Star Trails patterns.

The blue curved lines you see on the Night AR represent the Star Trails pattern you'll get

when framming in that direction. With the Night AR, planning your Star Trails photos is super easy :)

The selected date and time is displayed on the top left-hand corner of the Night AR view.

Notice that you can change the date and time directly from the Night AR view:

- Swipe the Night AR view to the left to move time forwards. Swipe it to the right to move time backwards.

- Tap on the right-hand side of the Night AR view to jump to the next day.

- Tap on the left-hand side of the Night AR view to jump to the previous day.

- Double tap on the center of the screen to come back to your current date and time.

On the Night AR you'll see:
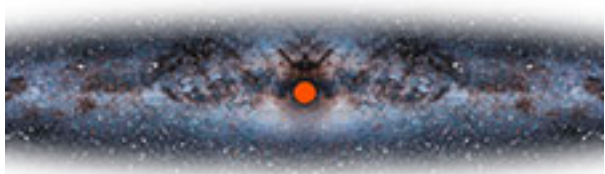
Milky Way and Galactic Center (Red dot on the image)

Celestial equator

Moon path

Horizon

Right ascension and declination lines (10-degree steps)

North celestial pole

South celestial pole

Note: *The stars in movement show you the sense of rotation around the celestial poles*.

Settings (change location, date and time)

Night AR view - Galactic Center.
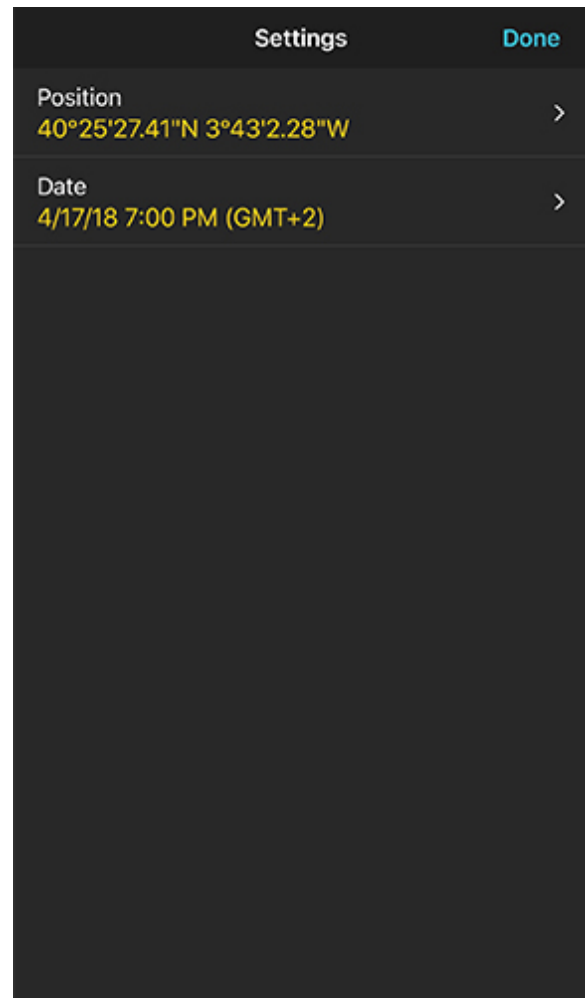
Night AR > Settings.

By default, the Night AR Pill gives you the information relative to your current position, date and time. But you can choose a different location, date and time by tapping on the Settings button (top right-hand corner).

You'll see the selected date and time on the top left-hand corner of the Night AR view.

Visual calibration

Night AR view – Galactic Center.
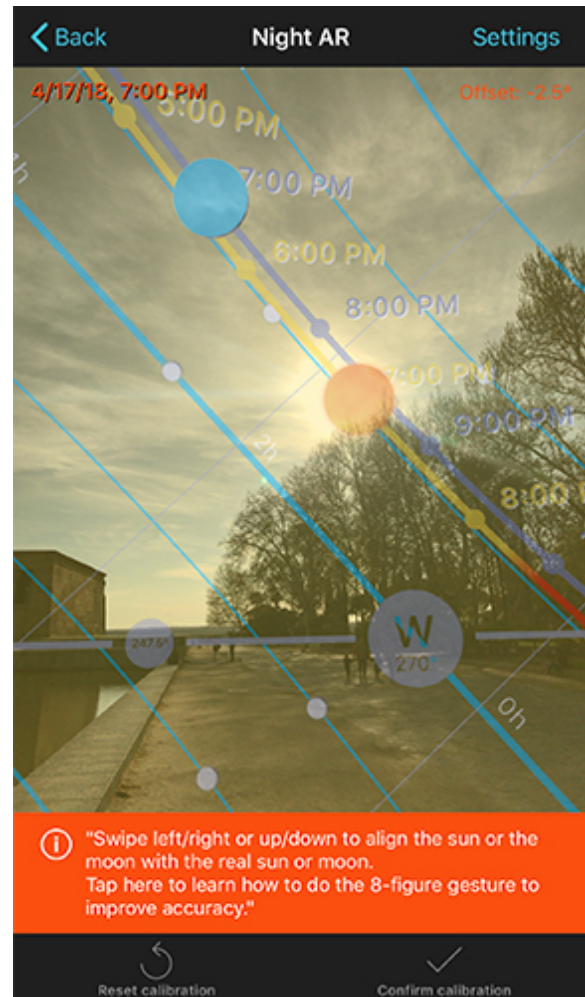
Night AR > Visual calibrations. Place the Sun (or Moon) on the real Sun (or Moon) to calibrate the augmented reality view. And tap on Confirm Calibration.

The quality of the information displayed in the Night AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

And always calibrate the Night AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom left-hand corner of the Night AR view) to visually calibrate this view with the real

Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

Note: *iPod Touch users or Android devices without compass sensor! These devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.*

Action

Night AR view - Galactic Center.
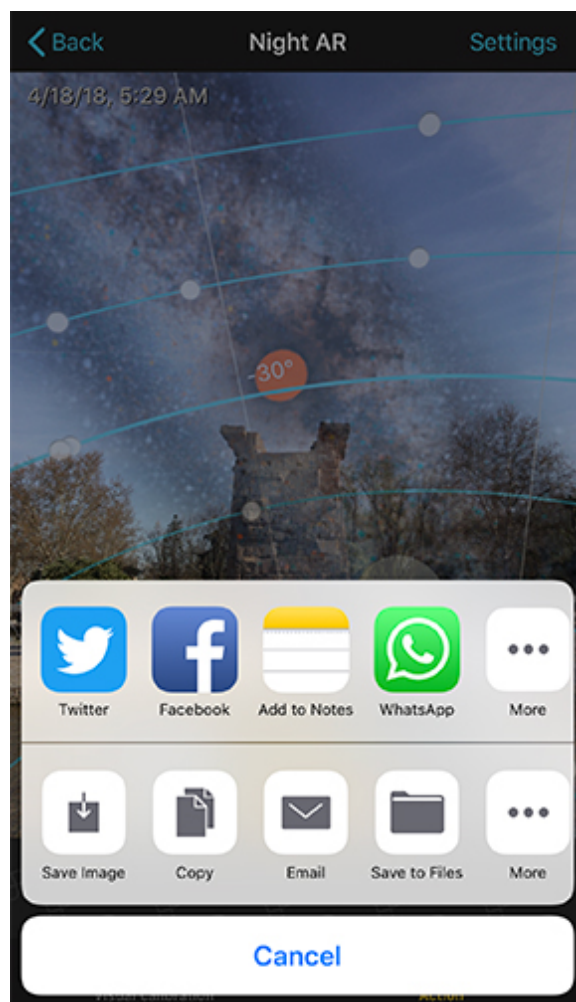
Night AR > Action.

Tap on the Action button (bottom right-hand corner) to share a screenshot of the Night AR view on Facebook, Twitter or by email. And to save it to your camera roll.

Section 17:
Meteor Showers

The Meteor Shower Pill gives you instant access to the key information of the most important Meteor Showers. And it works offline!

Here you'll find:

- A Meteor Shower calendar.

- Dates and local times of meteor shower peaks for the selected location.

- Meteor Shower visibility and quality for your location (taking into account Moonlight and daylight).

- Radiant information and position in the Augmented Reality view.

- Detailed information for each Meteor Shower, Sunrise and Sunset times, Moonrise and Moonset times, number of hours with no Moon, and Galactic Center visibility times (Milky Way).

Use it in the field to visualize the Meteor Shower radiant position and path with the Augmented Reality view (even offline).
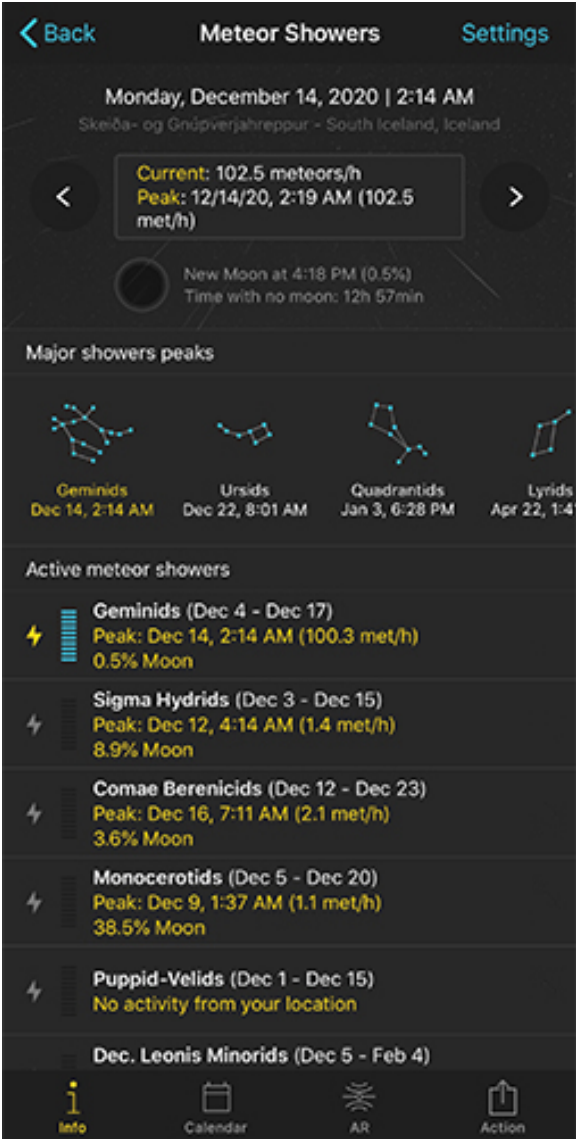
Info

Meteor Showers > Info: All the key information about the active Meteor Showers for a selected date and location. And also a shortcut to the most important Meteor Shower peaks.
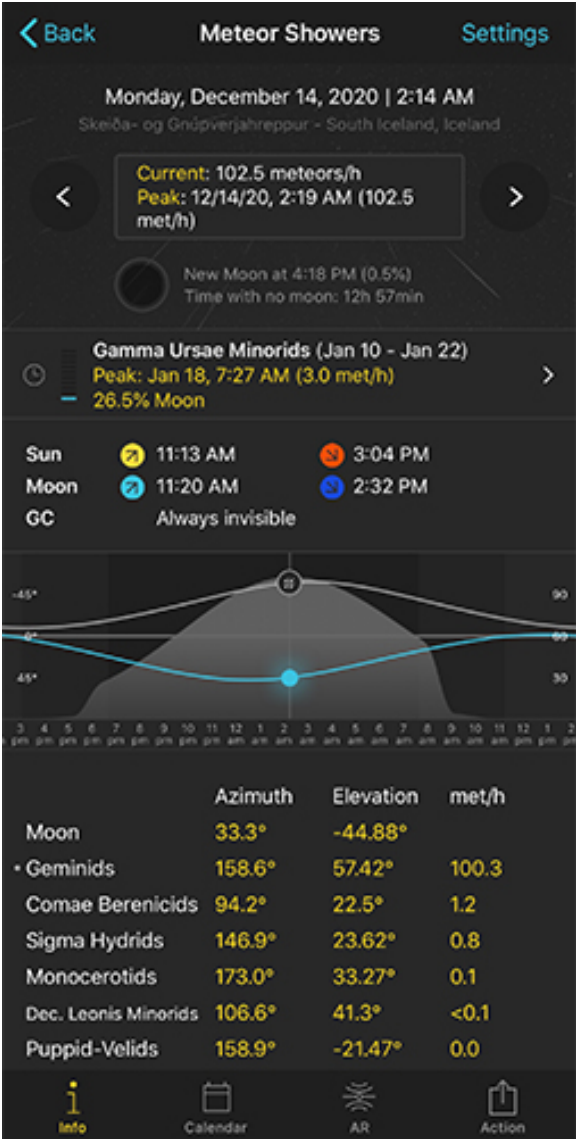
Meteor Showers > Info: Scroll down the screen to discover additional information. Including the key Sun, Moon and Milky Way information; a graph showing the peak of activity and the paths of the radiant and the Moon; the azimuth and elevation of the Moon and active Meteor Showers, and meteors/h of each shower.

Location, date and time

At the top, right above the big box, you'll see the date, time and location the Meteor Shower Pill is using to display all the information.

Settings: change location, date and time

By default, the Meteor Shower Pill gives you the information relative to your current position, date and time. But you can choose a different location, date and time by tapping on the Settings button (top right-hand corner).

There is another way to change the date and time. We'll show it to you in the following section.

Change date and time shortcut

To jump to the next day, tap the arrow you see on the right-hand side of the big box. To jump to the previous day, tap the arrow you see on the left-hand side of the big box. To change time forward, swipe the big box to the left. To change time backwards, swipe the big box to the right. To come back to your current date and time, double tap the big box. To set the time to the peak time for the selected date, tap once on the big box.

Key Meteor Showers information

The information in the big box is telling you the meteors/h for the selected location, date and time (taking into account all active Meteor Showers). For the selected date, it also tells you the peak time and peak meteors/h. Below the big box, you find the Moon phase and the amount of time you can enjoy the Meteor Shower with no Moon. Major Meteor Showers peaks

The dates and times of the major Meteor Showers peaks. Swipe the showers to the left to discover more. And tap a Meteor Shower peak to select it and see all the key information.

Active Meteor Showers

A list of the active Meteor Showers for the selected date and location. It includes the name, period of activity, peak date, peak time, peak meteors/h and peak Moon phase.

It also includes an energy bar showing you how good is the Meteor Shower in terms of the number of meteors you could potentially capture. The more filled the energy bar is, the better the Meteor Shower is expected to be.

Tap a Meteor Shower to set the date to the peak date and time of this particular meteor shower.

Upcoming Meteor Showers

A list of meteor showers that are happening soon. It includes the name, period of activity, peak date, peak time, peak meteors/h and peak Moon phase.

It also includes an energy bar showing you how good is the Meteor Shower in terms of the number of meteors you could capture. The more filled the energy bar is, the better the Meteor Shower is expected to be.

Tap a Meteor Shower to set the date to the peak date and time of this particular meteor shower.

Sun, Moon and Milky Way info

Sunrise and set times, Moonrise and set times and the Galactic Center visibility times are key when you're planning a Meteor Shower shooting. Maybe you're planning a Milky Way shot with a few meteors… That would be cool :)

Peak of intensity, radiant path and Moon path

If you keep scrolling down, you'll find a cool graph. This graph is great to quickly understand when is the time of meteors maximum intensity and how intense the shower will be. Moreover, visualizing the radiant and Moon path gives you valuable inputs on how the Moon and the radiant will affect the shooting session.

Position and activity of the Moon and active meteor showers

The azimuth and elevation of the Moon and the radiant of all the active Meteor Showers for the selected date and time. It also includes the number of meteors/h of each shower.

Calendar
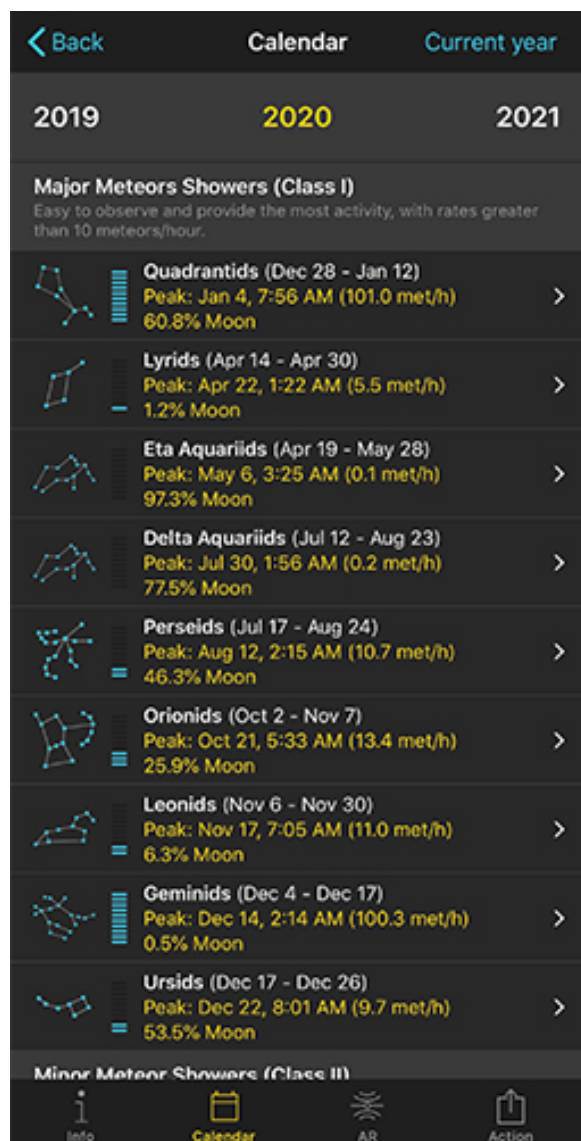
Meteor Showers > Calendar. Swipe right or left to change the year.
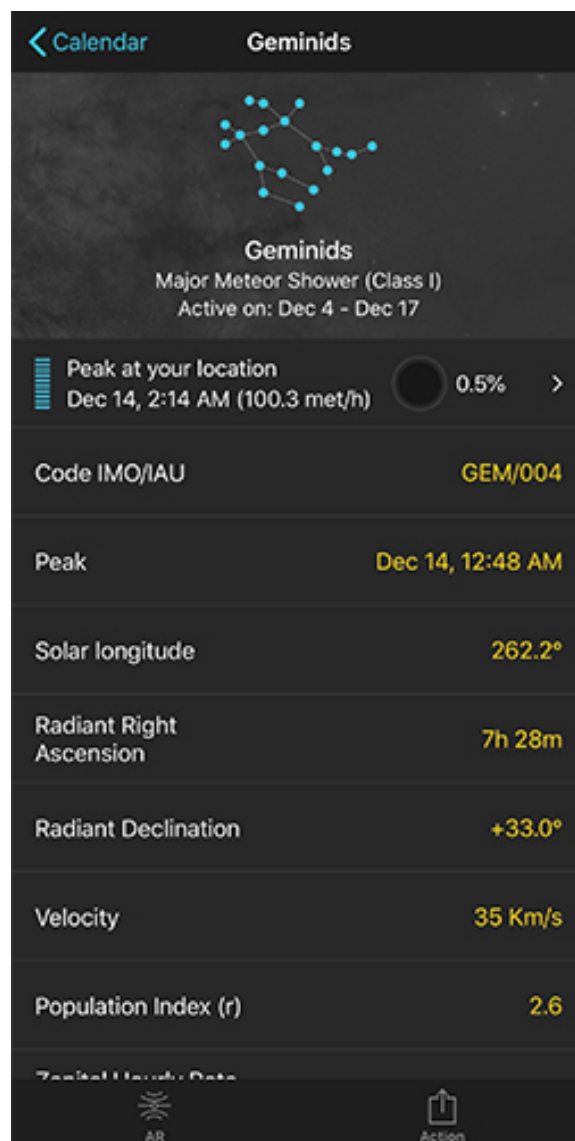
Meteor Showers > Calendar. Tap a Meteor Shower to see its key information. On this screen, tap the first row (Peak at your location) to see the Meteor Shower in the main information screen.

For the selected year, Meteor Showers > Calendar gives you the most important Meteor Showers according to 4 different classes.

- Class I: Easy to observe, they produce the greatest activity, with rates higher than 10 meteors/hour.

- Class II: More difficult to distinguish and with a rate of around 2 to 10 meteors/hour.

- Class III: Can produce strong activity on rare occasions, but they usually have a rate of

1 meteor/hour.

- Class IV: Too weak for your naked eye, with rates rarely greater than 2 meteors/hour.

The calendar includes the name, period of activity, peak date, peak time, peak meteors/h and peak Moon phase.

It also includes an energy bar showing you how good is the Meteor Shower in terms of the number of meteors you could capture. The more filled the energy bar is, the better the Meteor Shower is expected to be.

Tap a Meteor Shower to see the Meteor Shower information sheet. And then, tap the first row of the table to see the Meteor Shower in the main information screen.

Augmented Reality (AR)

Meteor Showers > AR. Check the position of the radiant at the beginning of the shooting.
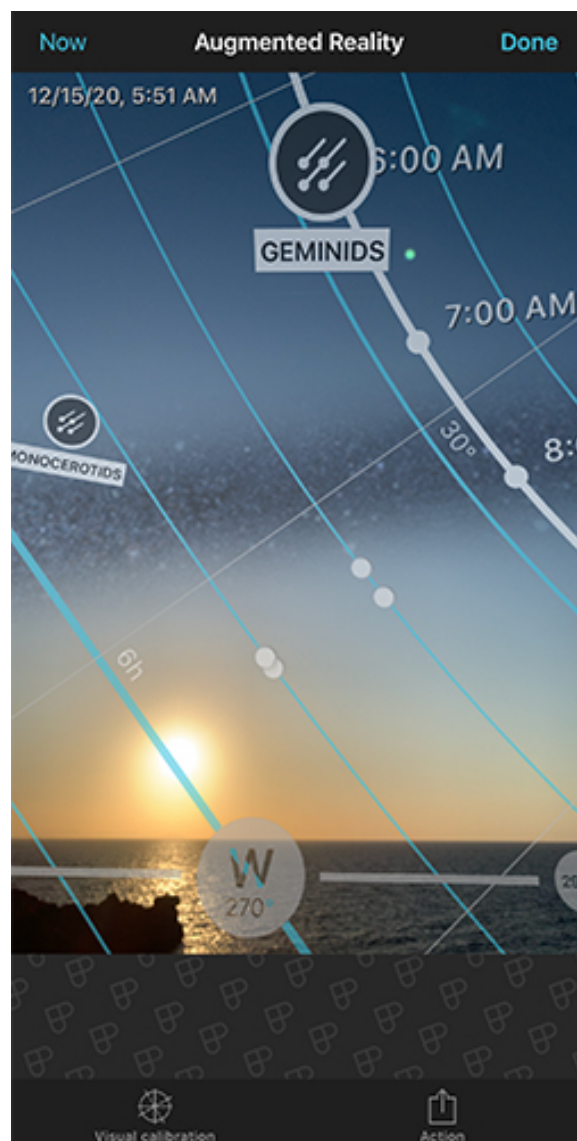
Meteor Showers > AR. Check the position of the radiant at the end of the shooting.

The AR view will help you visualize the radiant position and path in the sky. This will help you decide the shooting spot and where to frame your camera, depending on the image you wish to capture:

- You want the radiant in the frame if you intend to create an image in post-processing where all the meteors appear to converge in one spot in the sky. Like I did to create the cover image of our **Meteor Shower Photography guide**. It's a cool effect. You can create it too in post-processing by using the technique described in this **video by David Kingham**.

- The further away a meteor appears from the radiant, the longer its tail might be. So to increase the odds of capturing longer tails, frame an area of the sky that is away from the radiant.

- Also, to capture the maximum number of meteors, use the shortest possible focal length (wide angle lens). The more sky you include in the frame the more meteors you'll potentially capture.

- But don't forget to include an interesting subject in the foreground. Connecting the action in the sky with a powerful foreground will make your image shine!

Imagine that you're in the field about to shoot the Meteor Shower and you want to include the radiant in the frame to create a image where all meteors appear to converge in one single point.

Open PhotoPills, go to the Meteor Shower Pill and choose the Meteor Shower from the calendar.

Now tap the AR view and swipe the AR view from left to right to move time backwards and set the time to the beginning of the shooting session. Look for the radiant too.

Then, swipe the AR view from right to left to move time forward and visualize how the radiant moves across the sky. This way you'll know where the radiant will be at the beginning and at the end of the shooting session. This is key to know where to frame your camera.

Information on the AR view

The Augmented Reality view shows you the position and path of the radiant of the selected Meteor Shower, for the selected location (by default where you are), date and time.

You can also visualize: the radiants of other active Meteor Showers, the Milky Way, the celestial equator, the Polaris, the north/south celestial pole, the circumpolar stars path and sense of rotation, the Moon position, the Moon path, the Moonrise/set directions, and the Star Trails patterns.

The blue curved lines you see on the AR represent the Star Trails pattern you'll get when framing in that direction. With the AR, planning your Star Trails photos is super easy :)

The selected date and time is displayed on the top left-hand corner of the AR view.

On the AR you'll see:

Radiant position and path of the selected Meteor Shower

	Radiants of other active Meteor Showers
	Milky Way and Galactic Center (Red dot on the image)
	Celestial equator
	Moon path
	Horizon
	Right ascension and declination lines (10-degree steps)
	North celestial pole
	South celestial pole
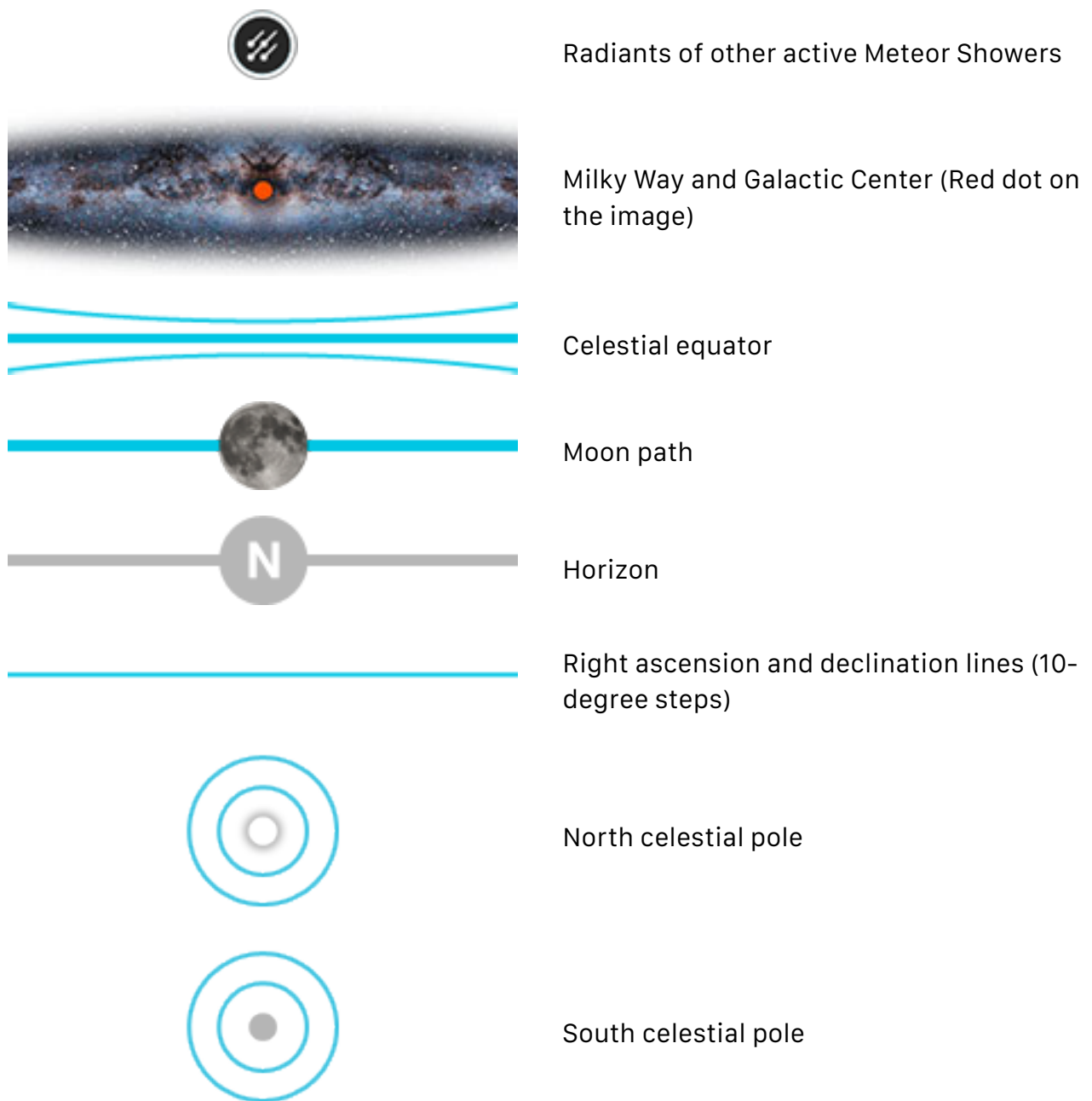
Note: *The stars in movement show you the sense of rotation around the celestial poles.*

Change date and time

Swipe the AR view to the left to move time forward. Swipe it to the right to move time backwards. See how the Meteor Shower radiant moves across the sky on the AR view!

Tap the right-hand side of the AR view to jump to the next day.

Tap the left-hand side of the AR view to jump to the previous day.

Tap Now (top left-hand corner) or double tap the center of the screen to come back to your current date and time.

Visual Calibration

I recommend you to arrive to the location before Sunset and calibrate the AR view. This way you'll make sure that what you're seeing through your smartphone is accurate when planning the shot.

The quality of the information displayed in the AR view is good enough to work, but it strongly depends on the limitations of the sensors of your device (GPS, Accelerometer, Gyroscope). This is an issue we cannot control but, as technology advances, manufacturers improve the quality of sensors too.

Make sure you are away from any electronic device or magnetic field because they may interfere with the sensors of the device. It is recommended to wait a few seconds to let the system become stable.

And always calibrate the Night AR view. Doing the **8-figure gesture** four or five times to ensure that the compass is as accurate as possible. You can also use the calibration button (bottom left-hand corner of the Night AR view) to visually calibrate this view with the real Sun, Moon or Milky Way. **Watch this video tutorial: Calibrating the Augmented Reality views**.

Note: *iPod Touch users or Android devices without compass sensor! These devices do not have a magnetometer. Therefore, it is not possible to draw in augmented reality (AR) the information of the Sun, Moon, Milky Way, celestial equator and celestial poles. That's why the AR is not available.*

Action

Meteor Showers > Info
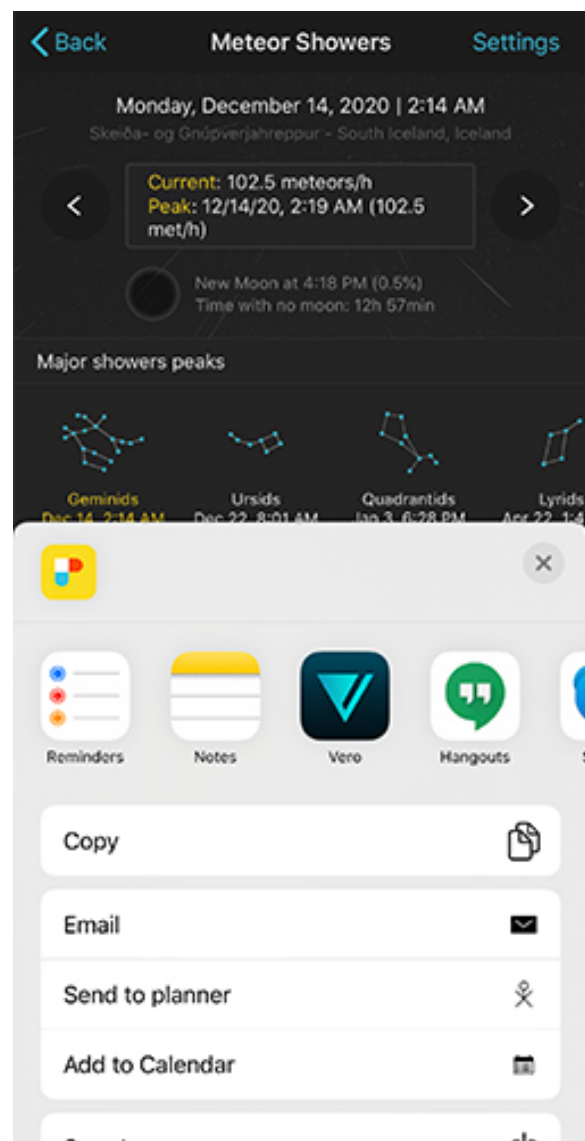
Meteor Showers > Action

Tap the Action button (bottom right-hand corner) to share a screenshot of the Meteor Shower option you're using (Info, Calendar or AR) on Facebook, Twitter, email. And also to save it to your camera roll, etc.

When you're using Meteor Showers > Info, the action button allows you to send the date and time to the Planner, and even to add an alert to your device calendar.

Section 18:
Star Trails

Long exposure photos of circumpolar stars are spectacular. Make your own simulations of **Star Trails**. Visualize how stars rotate and the angle they make in a given exposure time.

Star Trails calculator
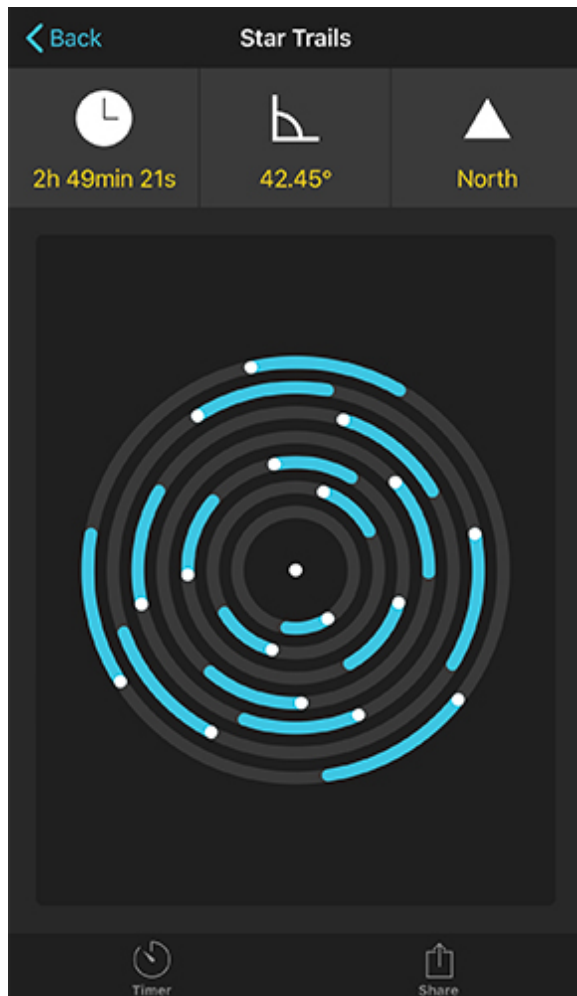
Star Trails calculator – North Hemisphere.
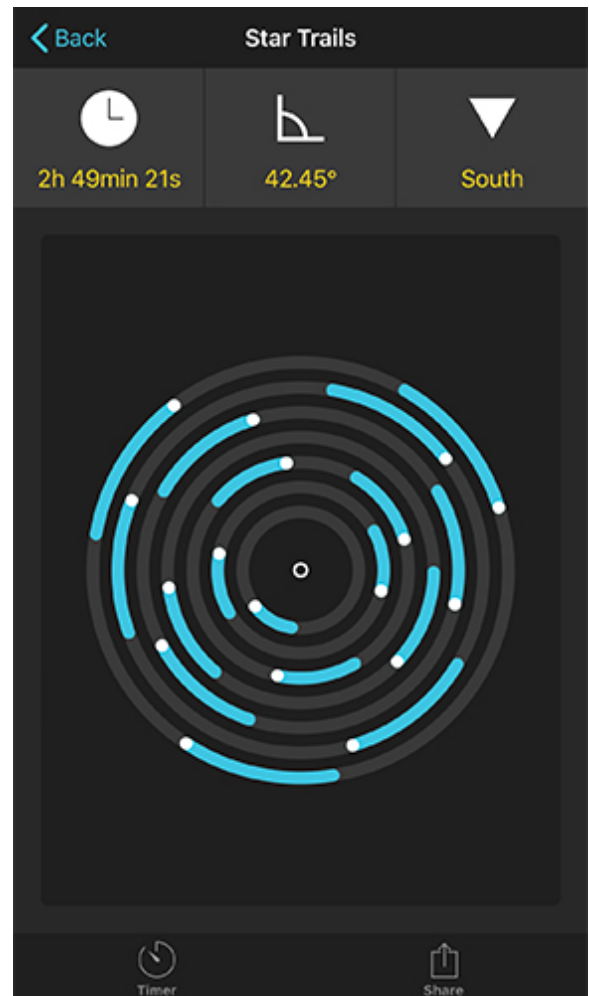
Star Trails calculator – South Hemisphere.

Use the Star Trails Pill to calculate the exposure time you need for a desired Star Trails length, and vice versa.

Let's see how it works.

Star Trails settings

Introduce your desired exposure time or rotation angle and the hemisphere, to visualize a simulation of the Star Trails.

Star Trails picture

A simulation of the Star Trails for the given exposure time and hemisphere.

Timer
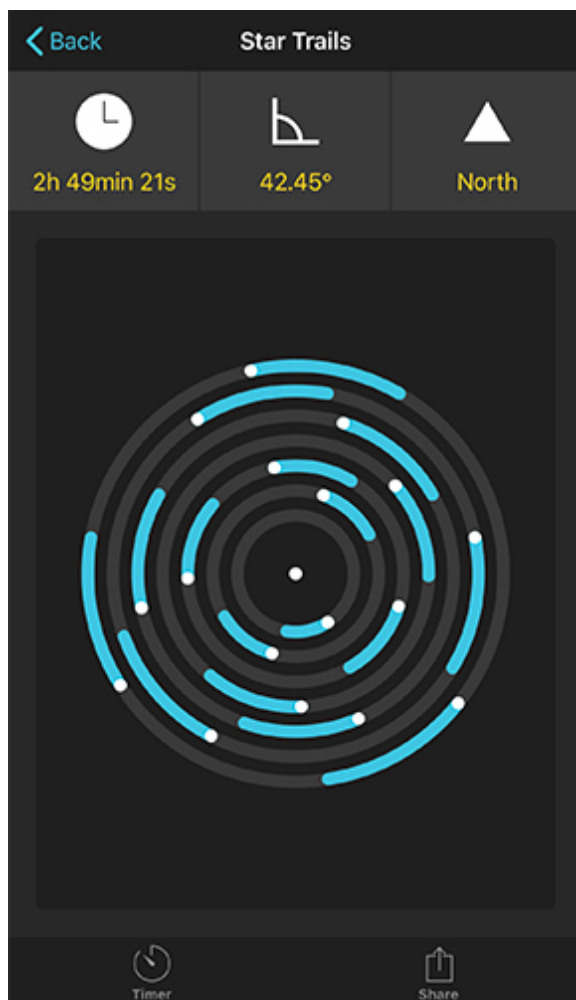
Star Trails calculator.
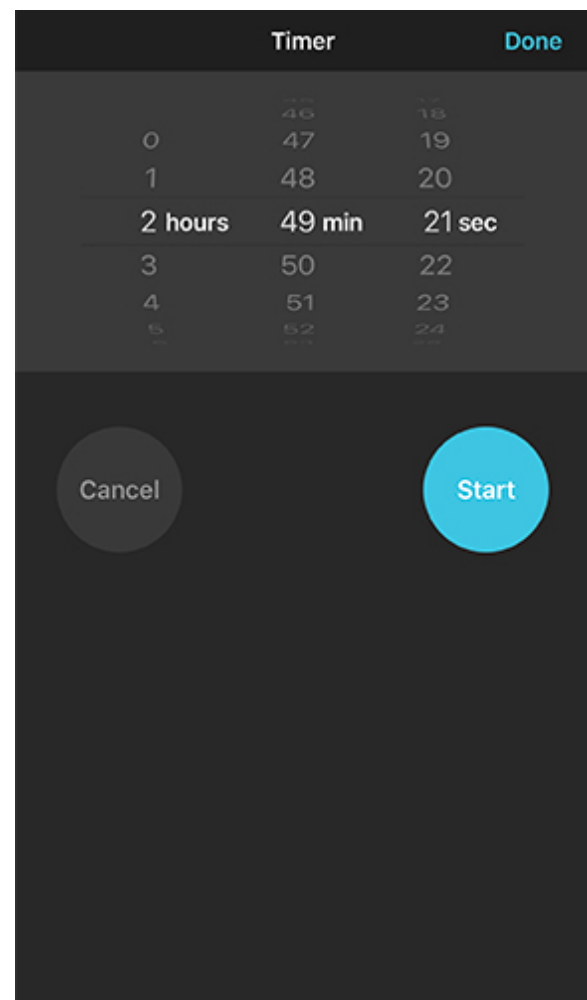
Star Trails > Timer.

Tap on the Timer (at the bottom left-hand corner) and keep control on the exposure time left.
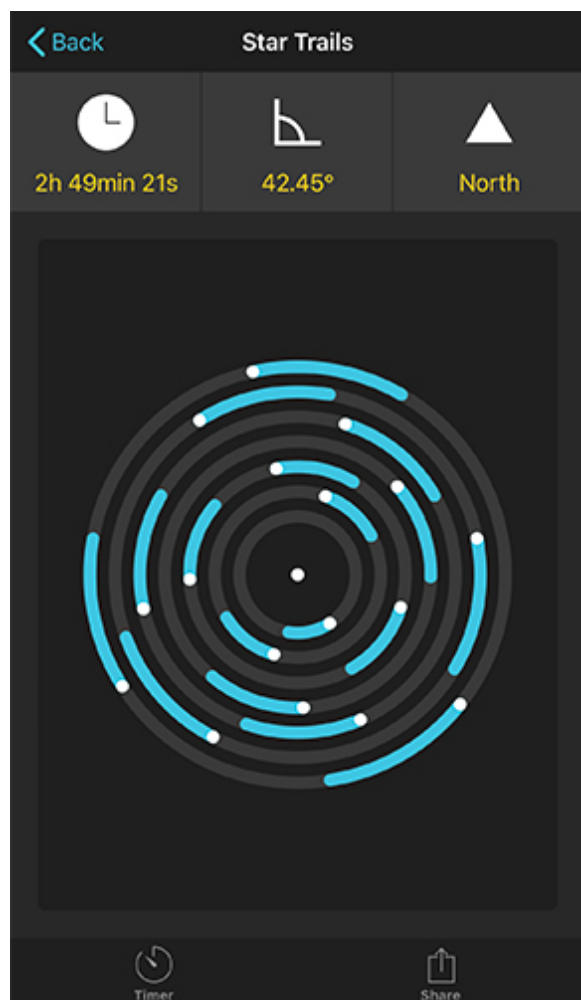
Share

Star Trails calculator.
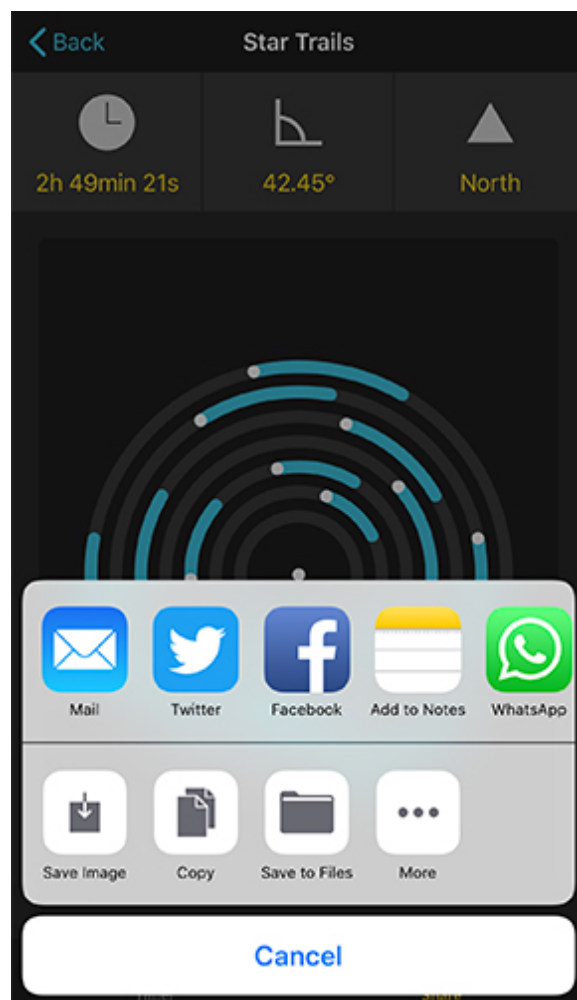
Star Trails > Share.

Share your Star Trails calculations on Facebook, Twitter or by email. Save the diagram as an image to your camera roll.

Recommended tutorial: Star Trails Photography - The Definitive Guide

Section 19:
Spot Stars

Useful for **Milky Way photography**. Calculate the maximum exposure time to get stars as big bright spots in your Milky Way photos. Avoid trails! The calculator will take into account the camera sensor size and megapixels to calculate the exposure time. It includes a timer.

Spot Stars calculator
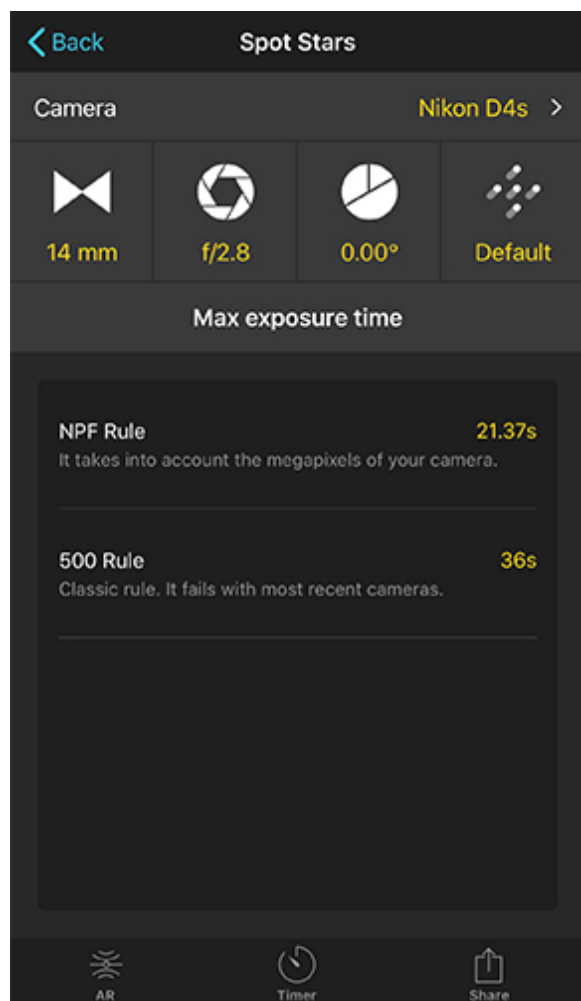
Spot Stars calculator.
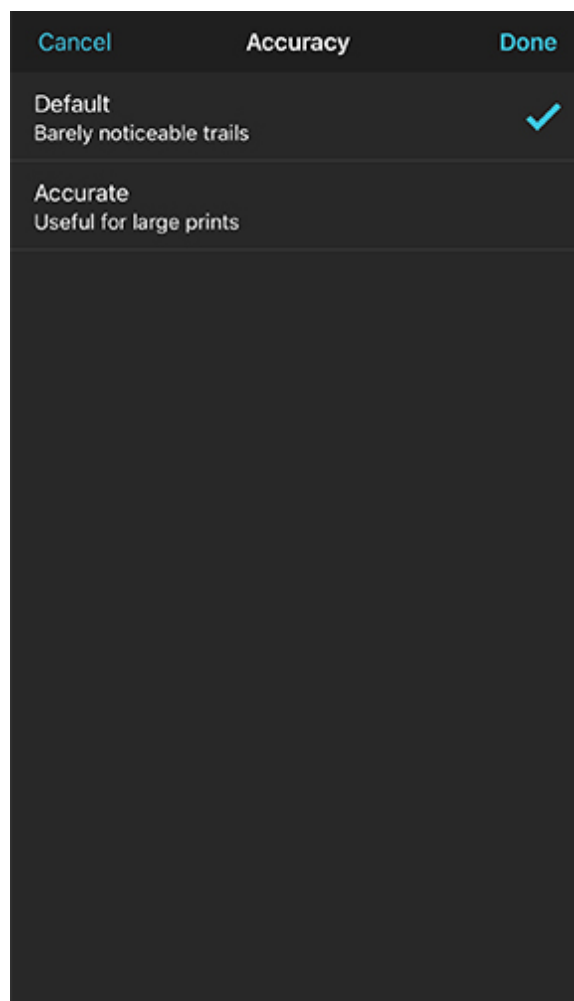
Spot Stars > Accuracy (Default, Accurate).

Use the Spot Stars Pill to calculate the maximum exposure time you can use in your Milky Way shots to prevent stars from trailing, that is to capture stars as big bright dots.

This is how it works.

Camera

Set your camera.

If your camera has a crop factor, it'll be taken into account.

Camera settings

Introduce focal length (the real one, not the 35mm equivalent), aperture, declination and accuracy (Default, Accurate).

Declination

If you know the minimum declination of the star that is captured in your frame, set it.

If you don't know what the declination is or you're in doubt, just set the declination of the stars to 0 degrees. That's the worst scenario (i.e. the celestial equator enters in your frame), so the exposure time will work for any shooting direction.

You can also use the AR button (bottom) to calculate it. Point your device where you wish to frame the shot, and the declination and the maximum exposure time will be automatically calculated.

Accuracy

Choose the accuracy. Default is the recommended value for most cases, and it will allow you to shoot longer exposure times (slower shutter speeds). This will allow you to keep the ISO relatively low.

However, if you wish to print in a very large format, set this value to Accurate. You'll get a super short exposure time (fast shutter speed). Notice that this will force you to push the ISO to get the right exposure, getting noisy images on most cameras. That's why I suggest you to use the Default value when possible.

Exposure values

Despite the app will display both the **500 and the NPF rule** results, use the exposure time (shutter speed) you get with the NPF Rule from the table of results. It's more accurate.

Use this value as a starting point, take a test shot and adjust accordingly.

Augmented Reality (AR)
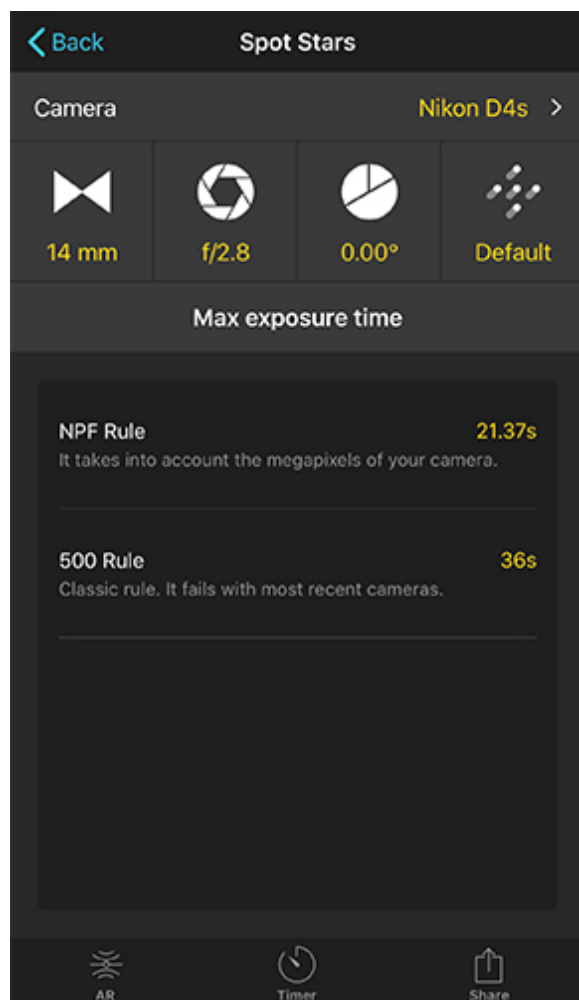
Spot Stars calculator.
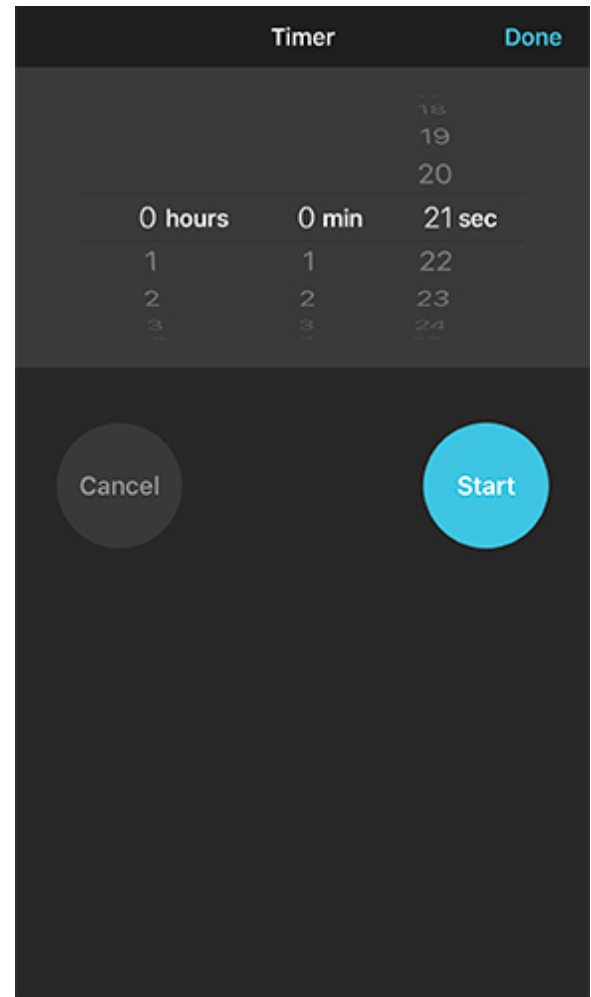

Spot Stars > AR.

Use the AR button to have the exposure time in the Augmented Reality view. Tap on it, point your device where you wish to frame the shot, and the declination and the maximum exposure time will be automatically calculated.

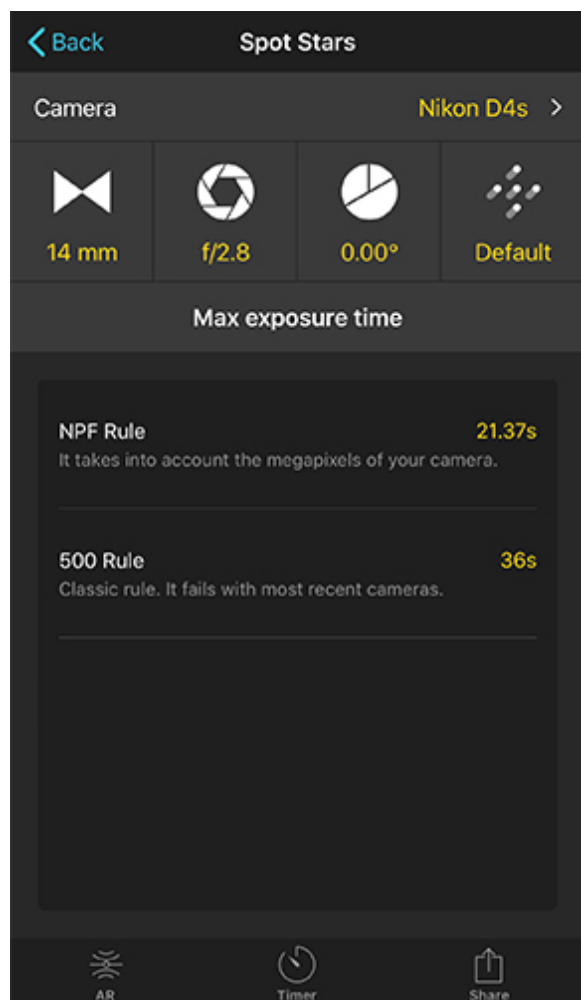Notice that you get the values for both, when shooting in landscape mode and portrait mode.
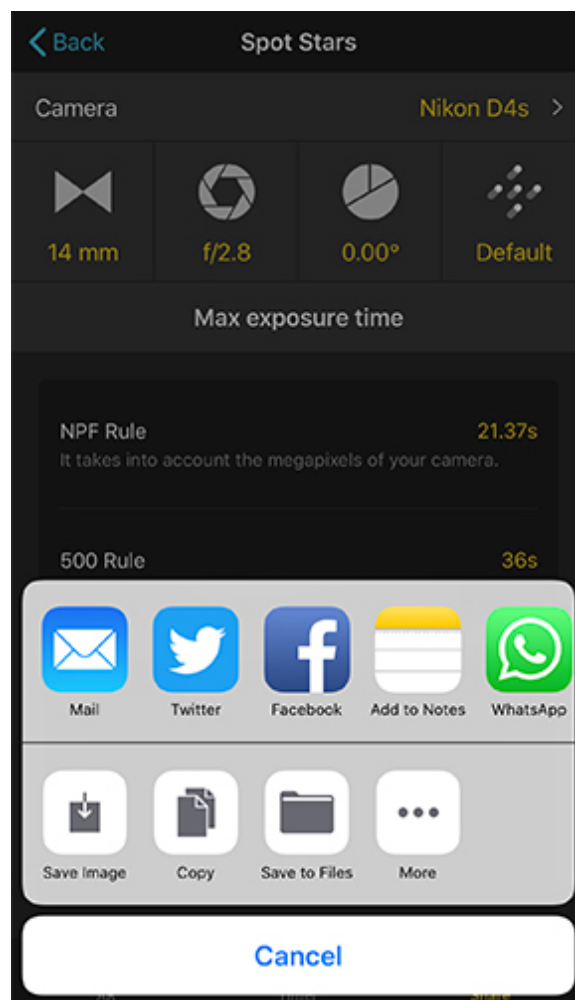
Timer
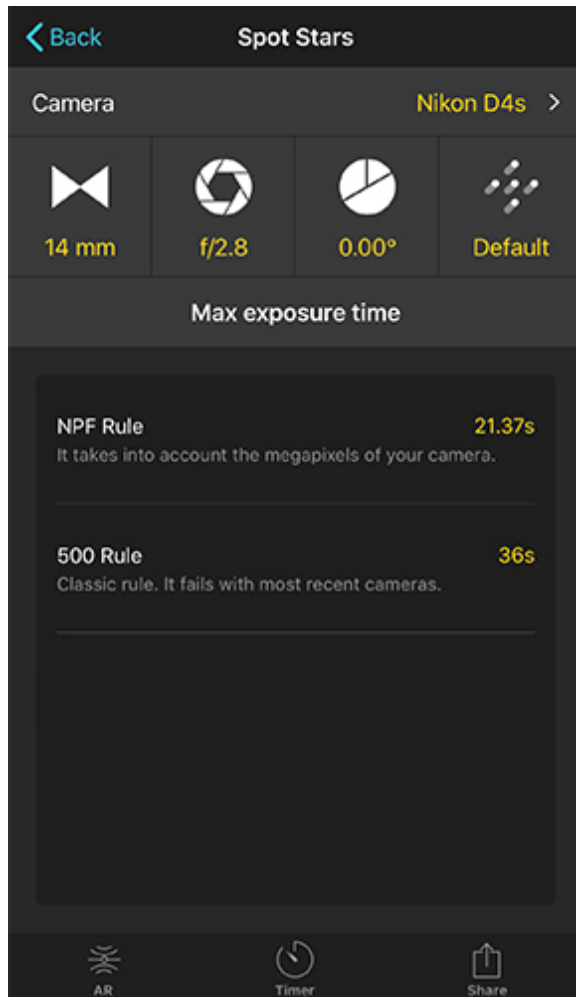
Spot Stars calculator.

Spot Stars > Timer.

Tap on the Timer (at the bottom of the screen) and keep control on the exposure time left.

Share

Spot Stars calculator.

Spot Stars > Share.

Share your Spot Stars calculations in Facebook, Twitter or email. Save your calculations as an image to your camera roll.

Recommended tutorial: Milky Way Photography - The Definitive Guide

Section 20:
Time lapse

Time lapse helps us understand the world by visually showing changes that we cannot normally perceive. Put all your efforts into the creative part. PhotoPills does all the time lapse maths and calculations for you.

Time lapse calculator
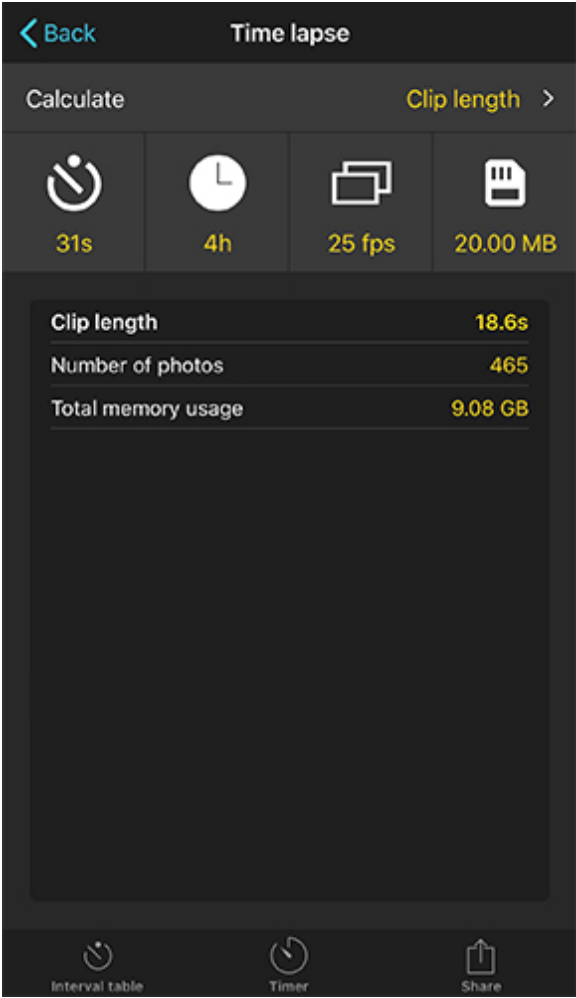
Time lapse calculator - Calculating clip length for a desired shooting interval and event duration (shooting time).
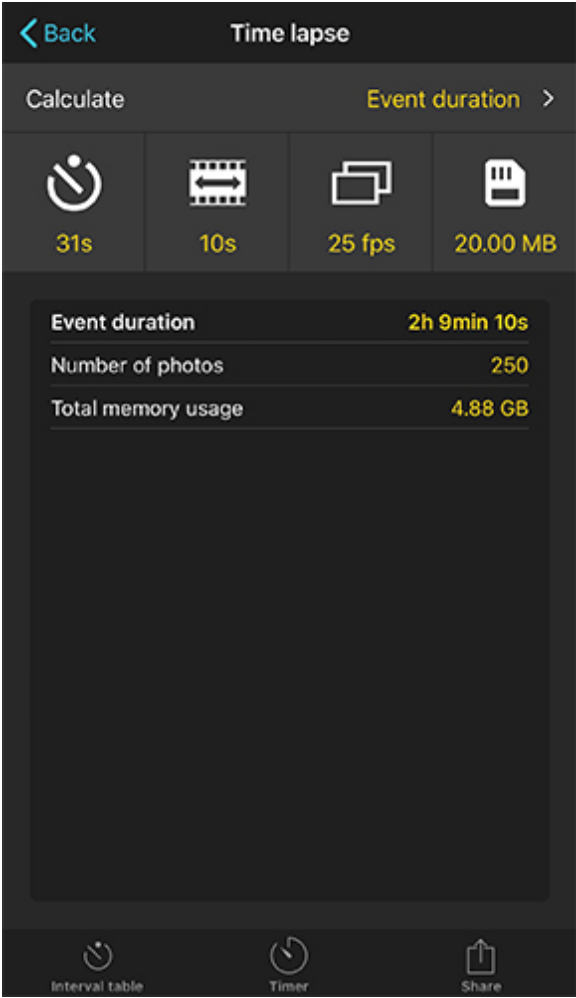
Timelapse calculator - Calculating event duration (shooting time) for a desired shooting interval and clip length.

Use the Time lapse Pill to make all your time lapse calculations in seconds: clip length, shooting interval, number of photos, total memory usage, etc. It includes a timer and an shooting interval table.

This is how it works.

Setting to calculate

Tap on Calculate and choose the setting you wish to calculate: shooting interval (time between two consecutive photos), clip length (duration of the resulting time lapse video) or event duration (total shooting time).

Time lapse settings

Introduce the settings you wish to use to make the time lapse. For example, if you have decided to calculate the shooting interval, these settings are: clip length, event duration, frames per second and image size (MB of one photo).

Results

Get the setting you needed (Clip length for example), the number of photos you need to take and the total memory usage.

Interval table

Time lapse calculator

Time lapse > Interval table view.

Don't know what shooting interval to use? Check the Interval Table for recommended shooting intervals for typical events.
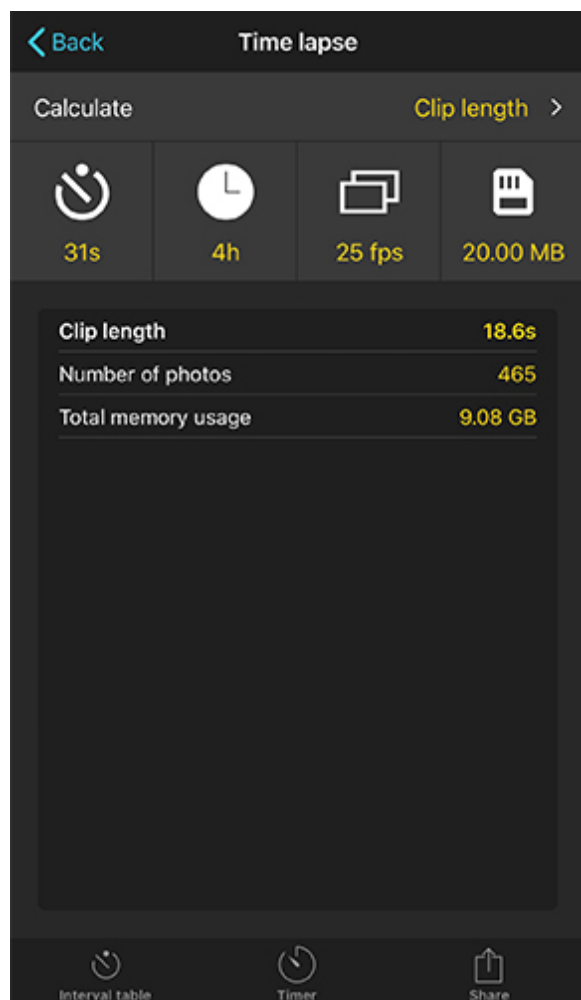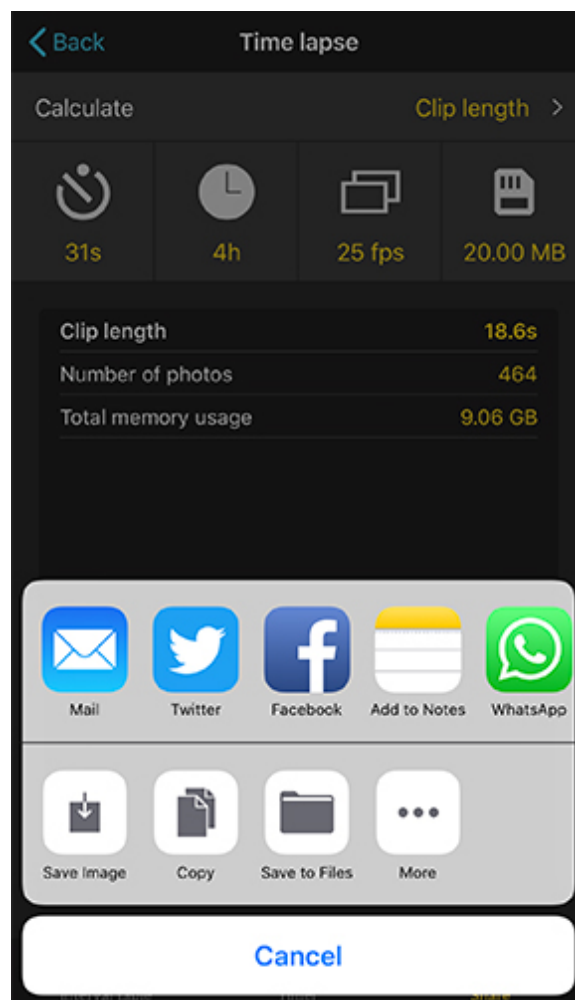
Timer
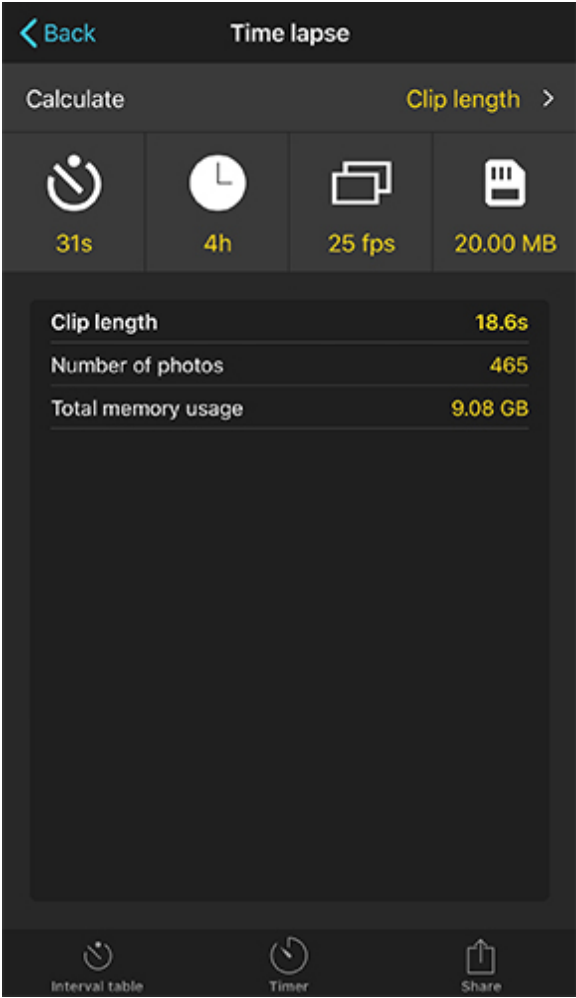
Time lapse calculator.
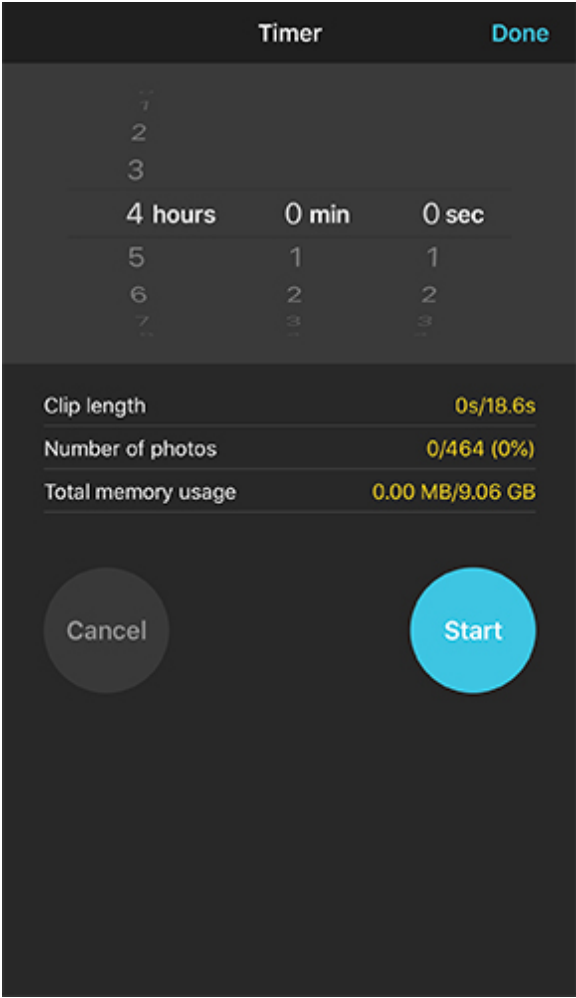
Time lapse > Timer.

Tap on the Timer (at the bottom of the screen) and keep control on the time lapse progress and time left.

Share

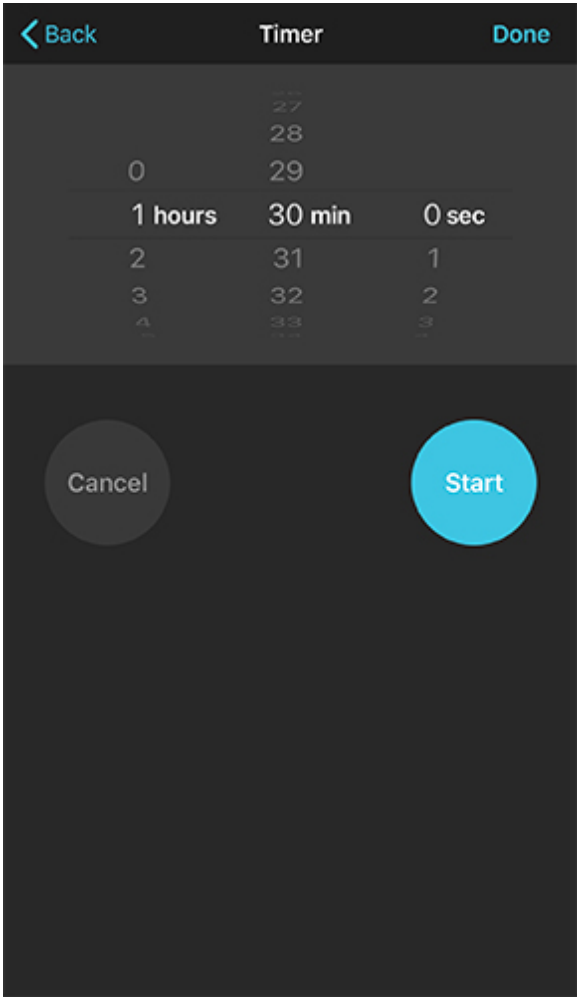Time lapse calculator

Time lapse > Share.

Share your Time lapse calculations in Facebook, Twitter or by email. Save your calculations as an image to your camera roll.
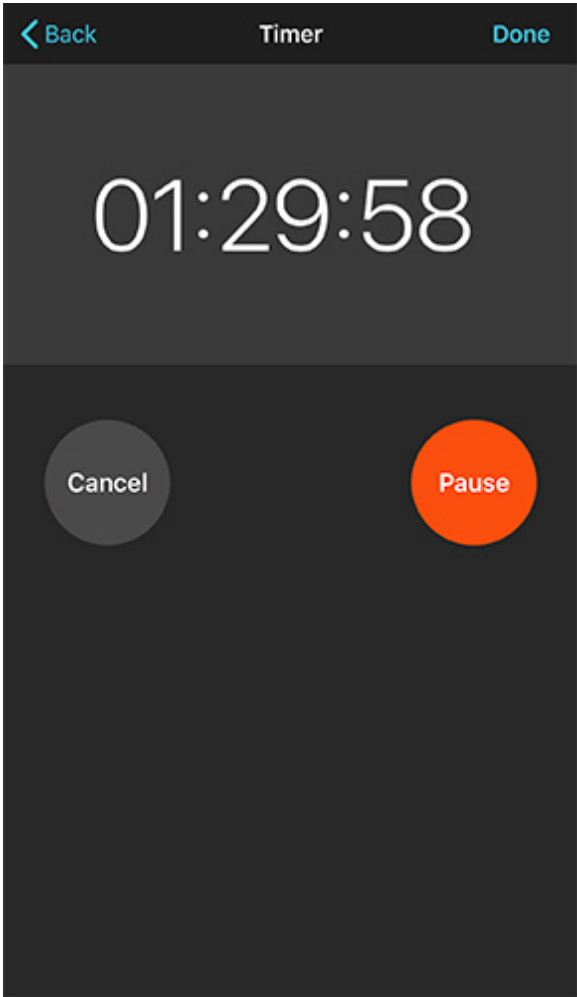
Section 21:
Timer

Keep track of time!

Timer
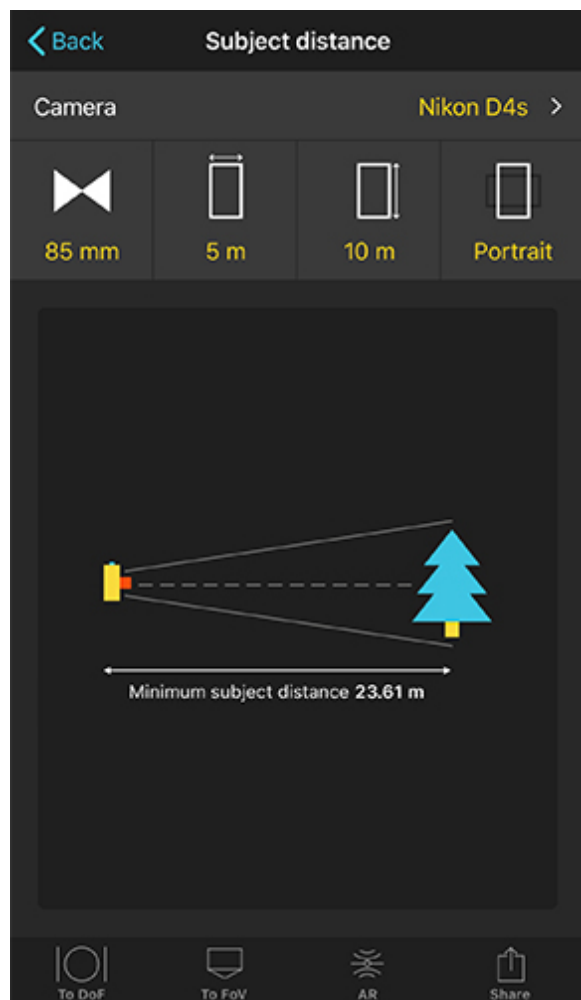

Timer.

Timer > Timer countdown.

Use it when shooting Star Trails, time lapse and long exposures in low light or with ND fil‐
ters. Get a notification when the exposure time or total shooting time ends.
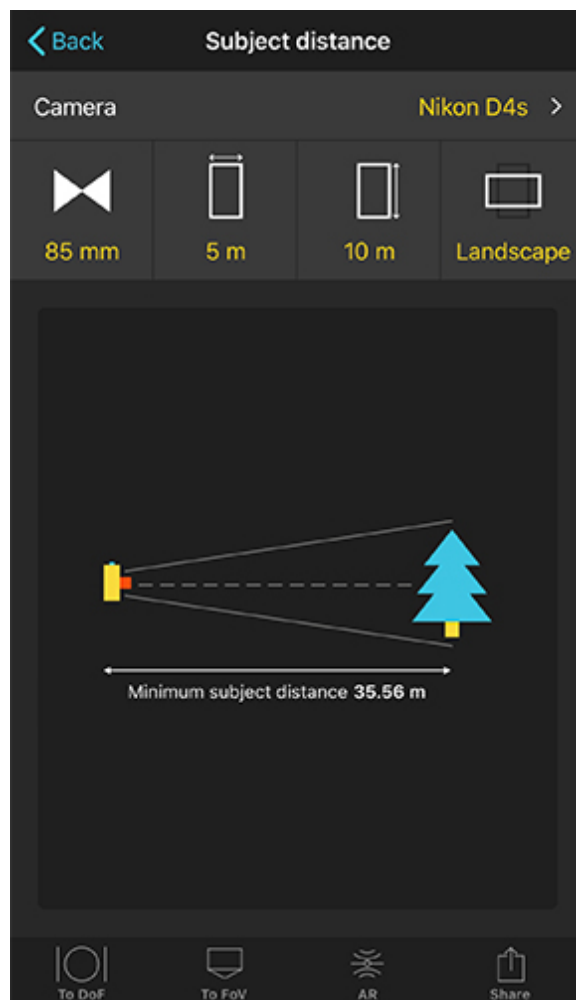
Section 22:
Subject distance

Make sure your subject fits in your frame.

Subject distance calculator

Subject distance calculator – Portrait.

Subject distance calculator – Landscape.

Use the Subject Distance Pill to calculate the minimum shooting distance to fit your subject in the frame.

Let's see how it works.

Camera

Set your camera.

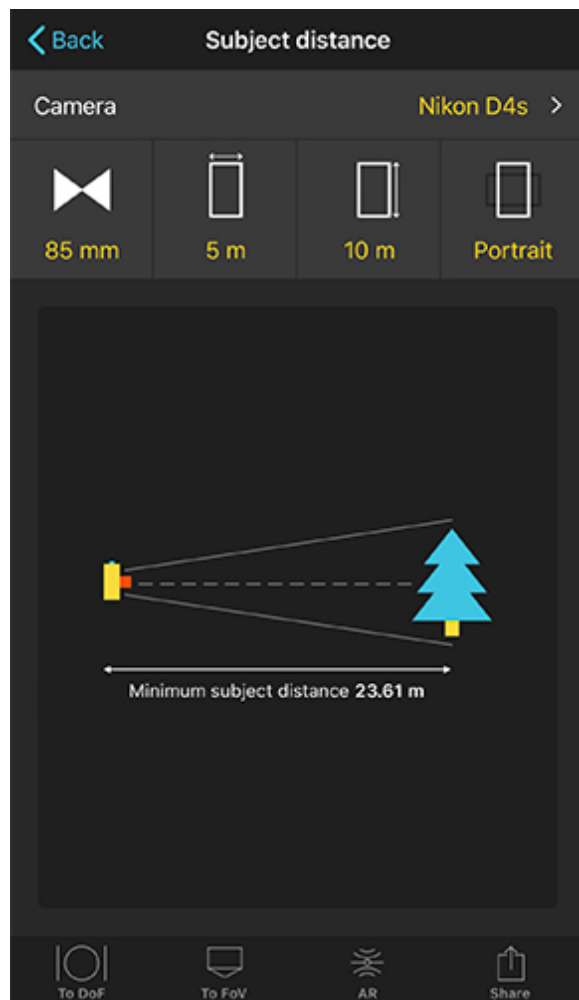If your camera has a crop factor, it'll be taken into account.

Settings

Introduce focal length (the real one, no the 35mm equivalent), subject dimensions and camera orientation (landscape, portrait).
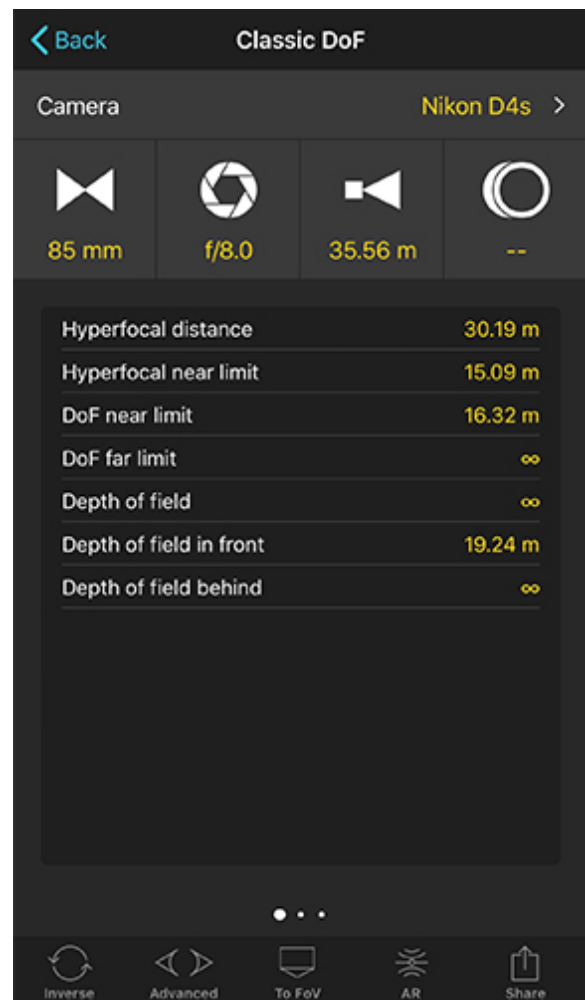
Subject distance information

Visualize on a picture the calculated minimum subject distance.

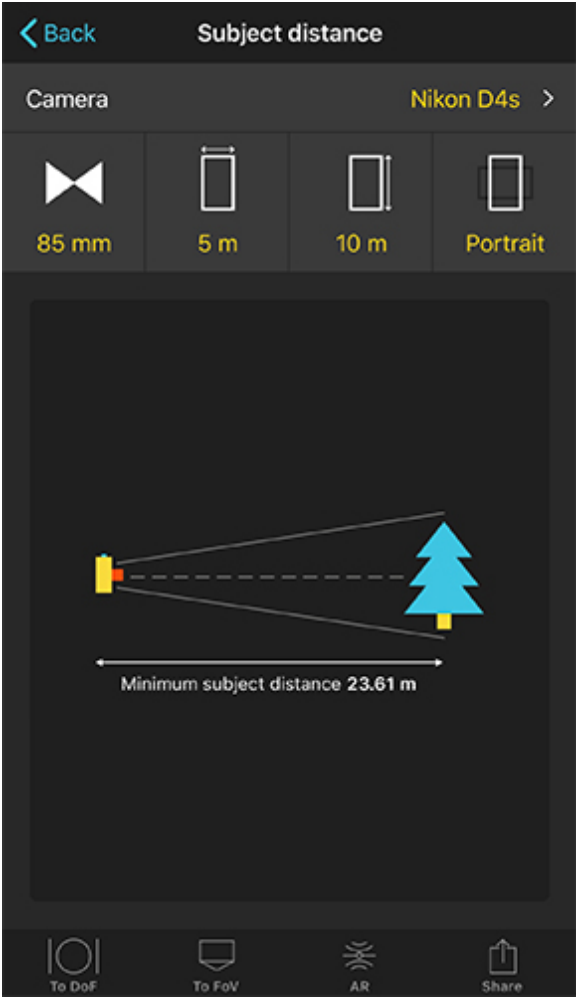# To depth of field (DoF)

Subject distance calculator.

Classic Depth of Field Calculator (Subject Distance > To DoF).

Tap To DoF to send the settings to the Classic DoF calculator.
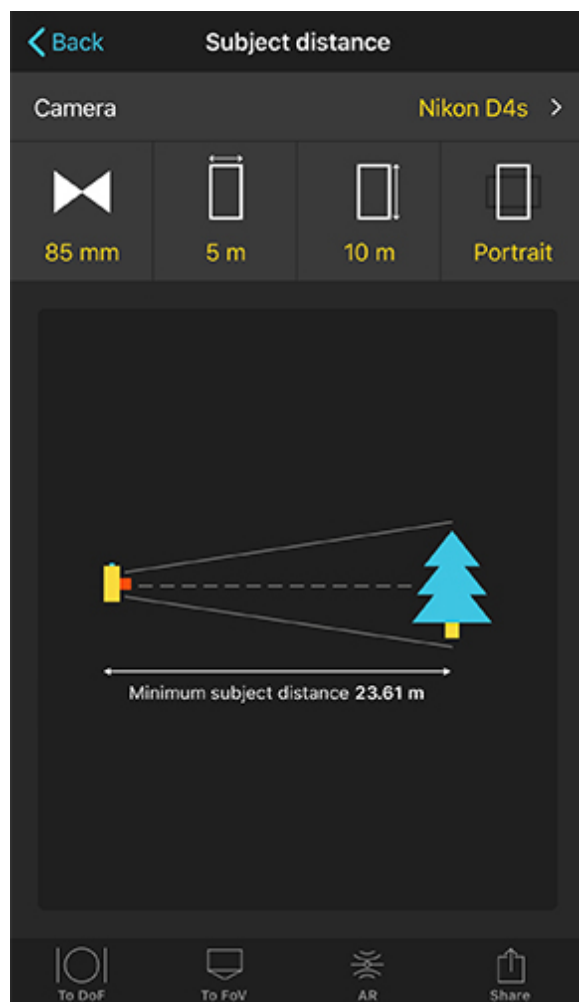
To field of view (FoV)

Subject distance calculator.

Classic Field of View Calculator (Subject Distance >
To FoV).

Tap To FoV to send the settings to the Classic FoV calculator.

Augmented Reality (AR)

Subject distance calculator.

Subject Distance > AR.

Visualize and measure in situ the calculated minimum subject distance.

 Subject distance (focus distance)

The subject distance is drawn on the ground. It is assumed that your device is situated 1.35 meters over the ground level. This height can be customized from the PhotoPills Settings button located in My Stuff menu.

You can use the ruler to measure distances. If you are using the Metric units system, each separation measures 0.5 meters. If you are using the Imperial units system, each separation measures 1 foot.
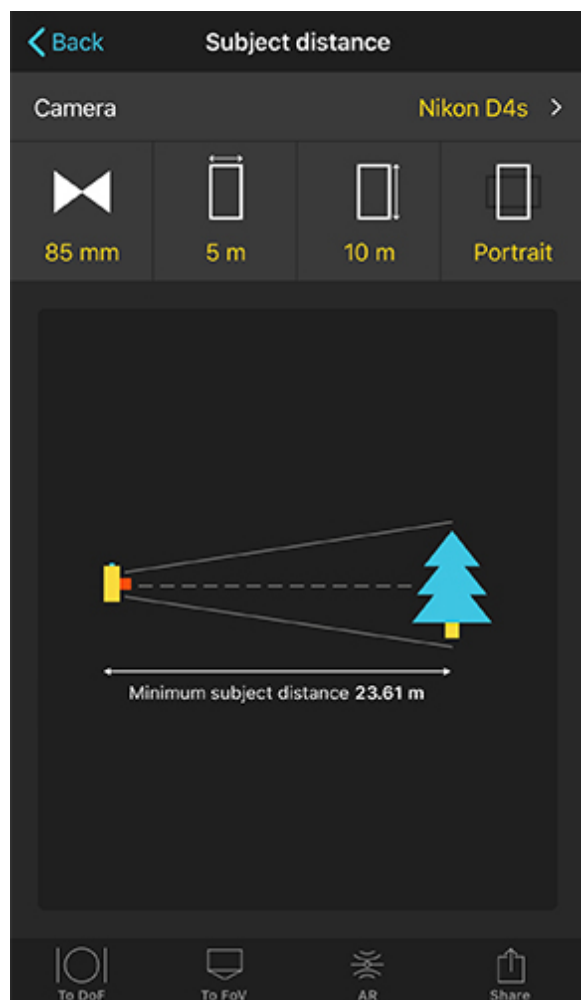
Share

Subject distance calculator.
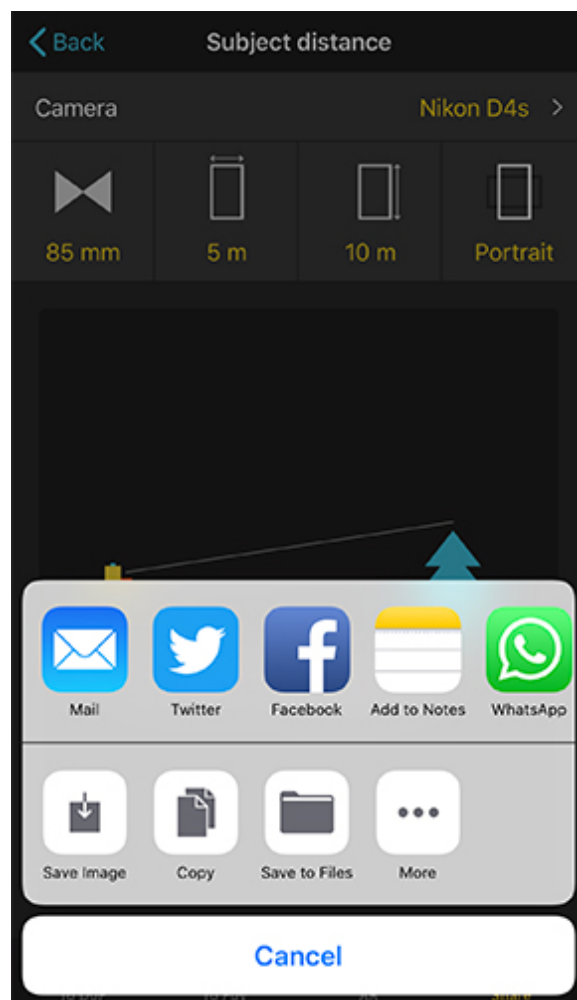
Subject Distance > Share.

Share your Subject Distance calculations on Facebook, Twitter or by email. Save the table as an image to your camera roll.

Section 23:
Focal Length Match

Focal length match calculator
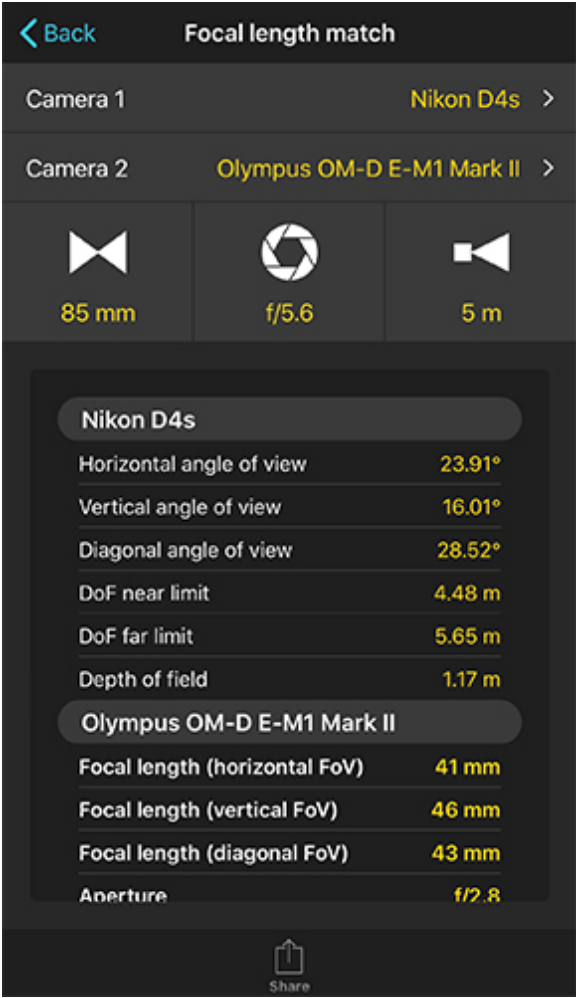
Focal length match calculator.

Scroll the table of results to see more.

Compute the equivalent lens focal length and aperture to produce the same field of view and depth of field between two cameras with different sensor sizes.

Let's see how it works.

Camera 1

Set your camera (sensor 1).

If your camera has a crop factor, it'll be taken into account.

Camera 2

Set the camera (sensor 2) you wish to calculate the focal length and aperture.

Settings

Introduce focal length (the real one, not the 35mm equivalent), aperture and subject distance (focus distance) you used for the photo with Camera 1.

Focal length match information

For Camera 1, get the angle of view and depth of field information.

For Camera 2, get the focal length and aperture to match the field of view and depth of field you got with Camera1. Also get the angle of view and depth of field information.

Share
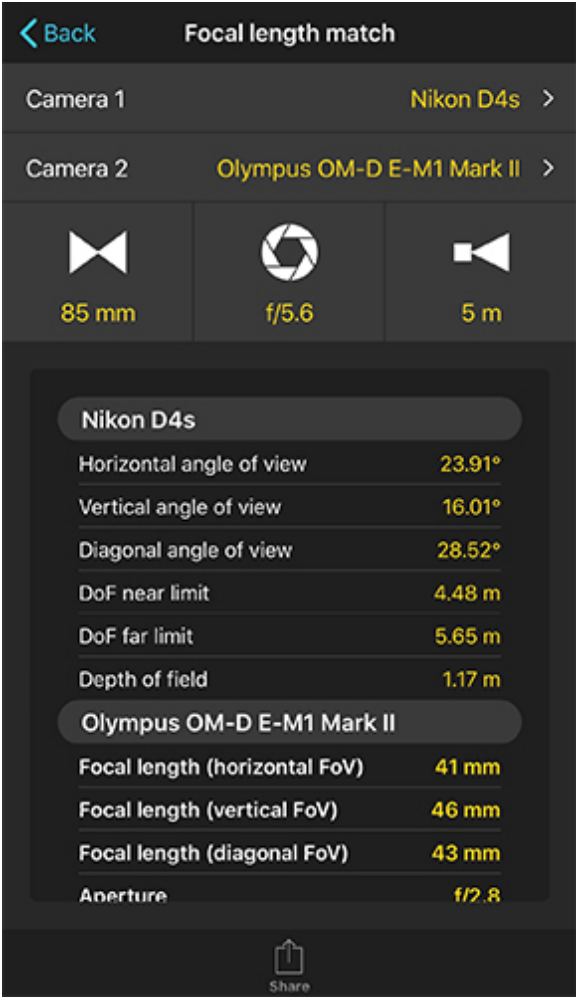
Focal length match calculator.

Focal length match > Share.

Share your Focal length match calculations on Facebook, Twitter or by email. Save the table as an image to your camera roll.

Section 24:
My Stuff (Menu)

In My Stuff you'll find inspiration (Awards), your saved Plans and Points of Interest and a way to backup them. And also a Settings menu to personalize **PhotoPills**.

Awards
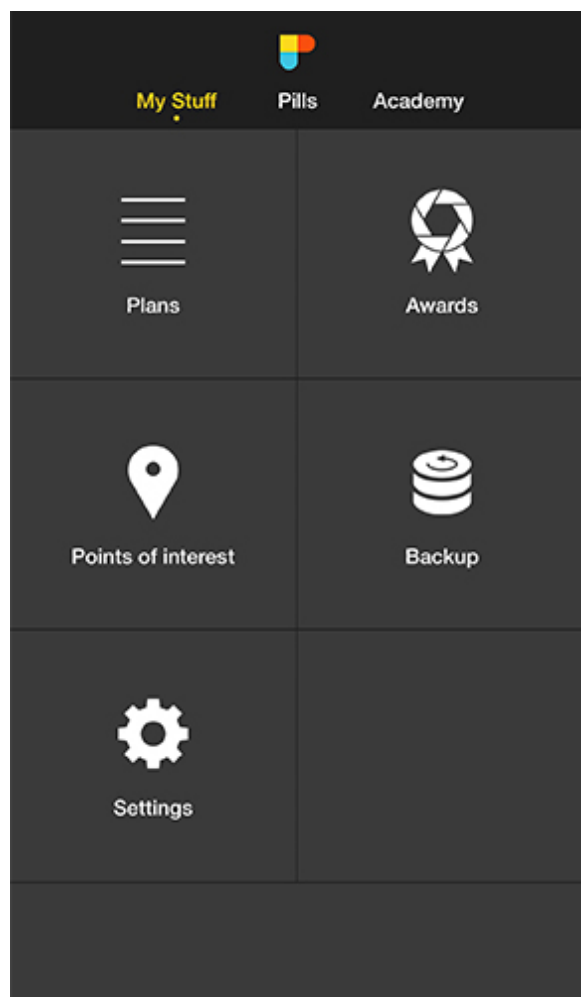
My Stuff menu.
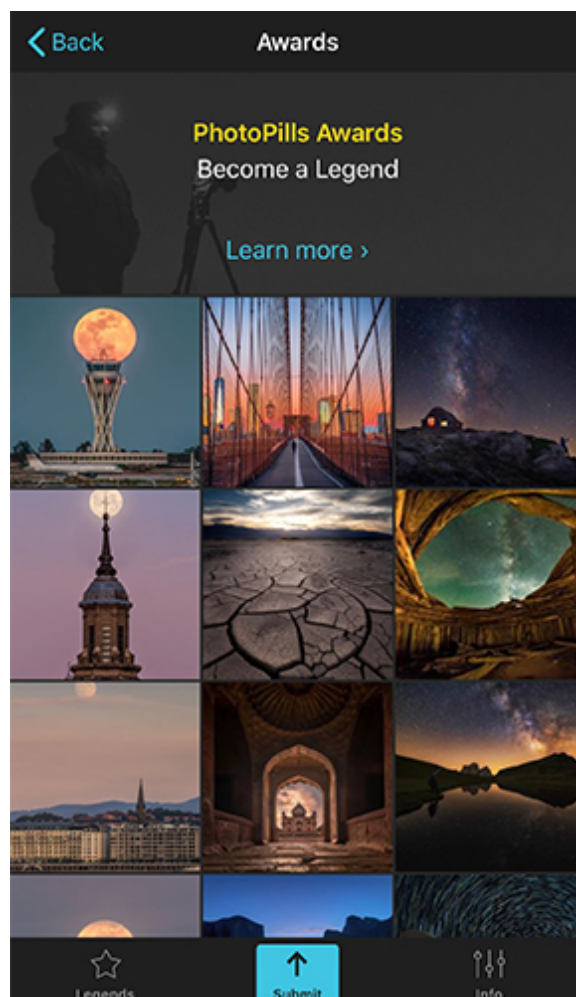
My Stuff > Awards.

Welcome to the **PhotoPills Awards**!

Because we know the huge amount of time, energy and love you put in your photos. We want to HONOR them, SHOW them to the world, and REWARD you with up to $6,600 in cash prizes.

Get inspired by other PhotoPillers

Everyday, we feature one photo taken by a PhotoPiller both on PhotoPills > My Stuff > Awards and on our **PhotoPills Instagram**.

It's a cool way to see the photos PhotoPillers imagine, plan and shoot across the globe!

Tap on the image you like to learn how it was taken (we also share the EXIF data).

Submit your legendary photos

Submit your photos (Awards > Submit), get featured, win amazing rewards (6,600$) and **become a Legend**.

Submit unlimited photos in 3 categories (past photos allowed):

- **Night**: Proof your skills under the dark sky. Send us your Milky Ways, Star Trails, meteor showers, planet conjunctions, ISS, northern lights, light painting photos...

- **Moon**: It's all about the Moon! Send us your full Moons, thin Moons, SuperMoons, Moon Silhouettes, Moonrises, Moonsets, lunar eclipses...

- **Sun**: Any photo that does not involve the Moon nor the night sky. Send us your Sunrises, Sunsets, golden hours, blue hours, twilights, solar eclipses, Sun silhouettes or any photo where you carefully planned the natural light.

And get amazing rewards!

- **Daily winners**: Every day, get featured as PhotoPiller of the Day on **Instagram**. And, at the end of the year, the 365 featured photos will be included in the **PhotoPills Awards Book**, joining the PhotoPillers' legacy.

- **$300 every month**: Every month, in each category, we'll choose the best photo from all the featured ones on Instagram. Each category winner will be awarded with $100 in cash. We'll also choose the best photo of the month. The photographer will be awarded with the PhotoPiller of the Month title and will enter our Hall of Legends.

- **Become the PhotoPiller of the Year and get $3,000**: Every year, we'll choose the best photo from all the featured ones on Instagram as PhotoPiller of the Day. The winner will be awarded with the PhotoPiller of the Year title and $3,000 in cash.

Learn more here: **PhotoPills Awards**.

Plans
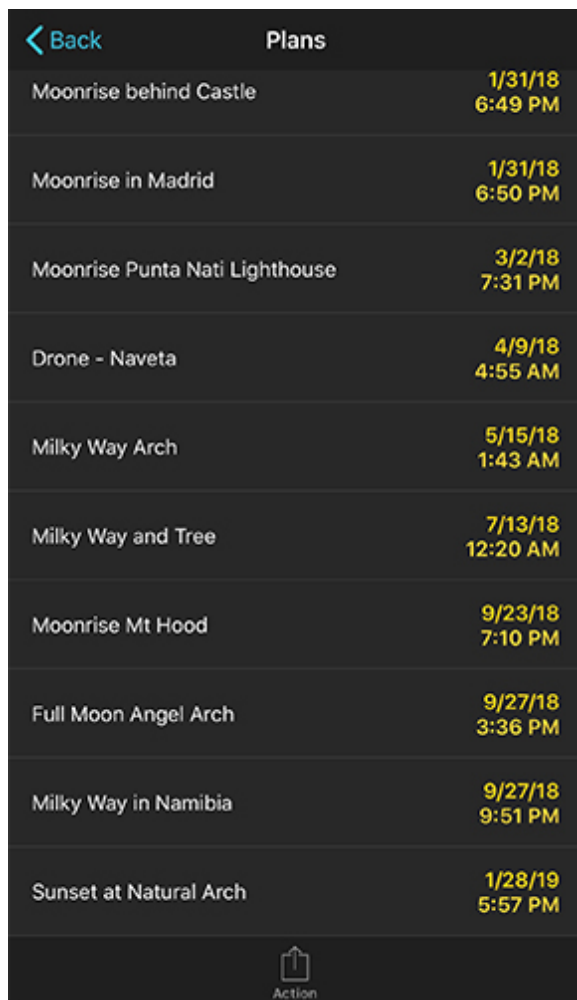
Plans.
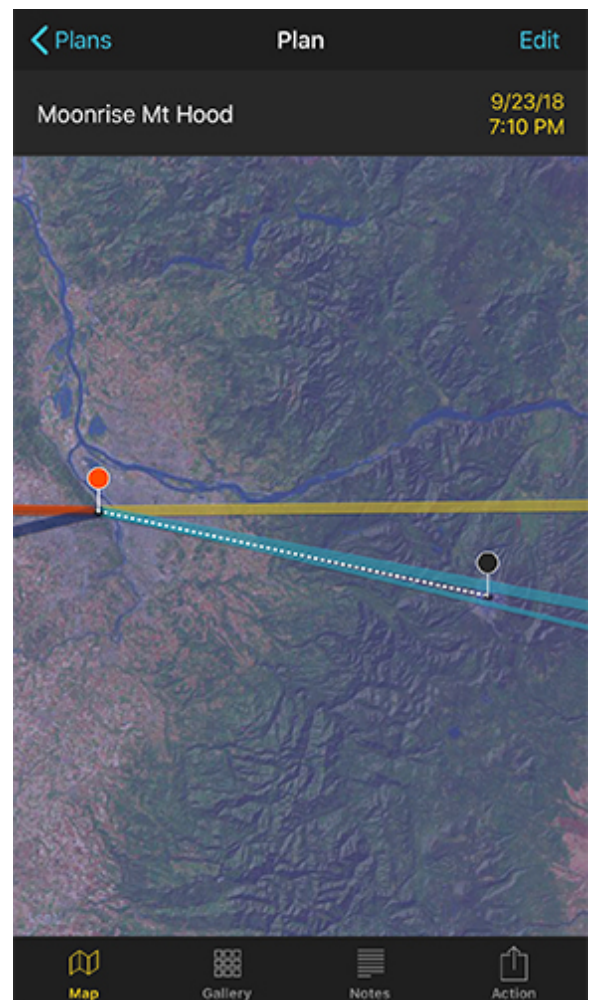
Plan information Sheet.

Never miss an unmissable scene again!

Manage your Plans in a comfortable way and get on the spot at the right time. Add photos and notes to better describe the photo. Share your Plans with your colleagues. Enjoy!

Your to-do list of Plans

Tap on Plans to see all the photo Plans you've saved with the Planner.

Backup your Plans

If you wish to backup all your Plans, tap on Action (at the bottom) and then Backup all by email.

Delete a Plan

Swipe left on a Plan to delete it on iOS and press and hold on Android.

See Plan information sheet

Tap on one of your Plans to consult the location of the photo, the Sun/Moon/Milky Way conditions and the information you collected when doing the field work (photos and notes).

From this screen you can:

- **Edit Plan name**: On the Plan information sheet, tap on Edit (top right-hand corner) to edit the Plan name.

- **Add photos to the Plan**: On the Plan information sheet, tap on the Gallery option (at the bottom) and add photos to the Plan. Just tap on the camera icon at the top right-hand corner.

- **Add notes to the Plan**: On the Plan information sheet, tap on the Notes option (at the bottom) and add notes to the Plan.

- **Actions you can do with your Plan**: On the Plan information sheet, tap on the Action option (at the bottom) to send the Plan to the Planner, send it to a friend by email (KMZ file), add an alert to your calendar, send the position of the Red Pin to Maps (to calculate the route), share the Plan on Facebook and Twitter and more.

- **Import a Plan from Email (KMZ file)**: If a friend sends you a Plan by email (KMZ file), you'll be able to import it to PhotoPills. Once you have opened the email, do a long press on the KMZ file until a window shows up. Choose Open in PhotoPills. The file will be stored in your Plan list (My Stuff > Plans).

Points of Interest

Points of Interest > Map.
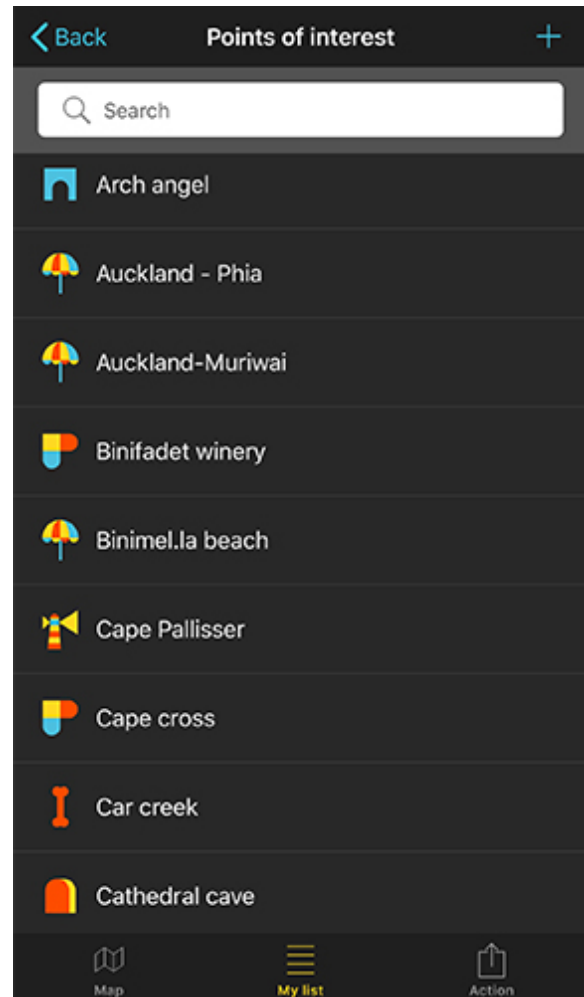
Points of Interest > My List.

Create your own database of Points of Interest (POI). Add photos and notes to describe them. Share your Locations with your colleagues.

And travel and discover new places with our database of more than 10,500 Points of Interest all around the world. Enjoy!

Find Points of Interest on a Map

Tap on Map (at the bottom) and navigate the Map to find your points of interest (and the 10,500 included in **PhotoPills**).

On iOS you'll see a (+) button on the Map. This button includes some of the options included in the (+) Map button of the planner. See **section 5**.

Your list of Points of Interest

Tap on My list (at the bottom) to see all the Points of Interest you've saved with the Planner.

Backup your Points of Interest

From My list, if you wish to backup all your Points of Interest, tap on Action (at the bottom) and then Backup all by email.

Delete a Point of Interest

From My list, swipe left on a Point of Interest to delete it or tap and hold on Android.

See Point of Interest information sheet

From My list, tap on one of your Points of Interest. The screen will change to the Map view centered on your Point of Interest. Now, to see the information sheet, tap on the "i" you see in the Point of Interest information box.

From this screen you can:

- **Edit the Point of Interest name and position**: On the Point of Interest information sheet, tap on Edit (top right-hand corner) to edit the name or adjust its position by moving the Red Pin.

- **Add photos to the Point of Interest**: On the Point of Interest information sheet, tap on the Gallery option (at the bottom) and add photos to the Point of Interest information. Just tap on the camera icon at the top right-hand corner.

- **Add notes to the Point of Interest**: On the Point of Interest information sheet, tap on the Notes option (at the bottom) and add notes to the Point of Interest.

- **Actions you can do with your Point of Interest**: On the Point of Interest information sheet, tap on the Action option (at the bottom) to send the Point of Interest to the Planner, send it to a friend by email (KMZ file), send the position of the Red Pin to Maps (to calculate the route), share the Point of Interest on Facebook and Twitter and more.

- **Import a point of interest from Email (KMZ file):** If a friend sends you a Point of Interest by email (KMZ file), you'll be able to import it to PhotoPills. Once you have opened the email, do a long press on the KMZ file until a window shows up. Choose Open in PhotoPills. The file will be stored in your Points of Interest list (My Stuff > Points of Interest > My list).

Backup
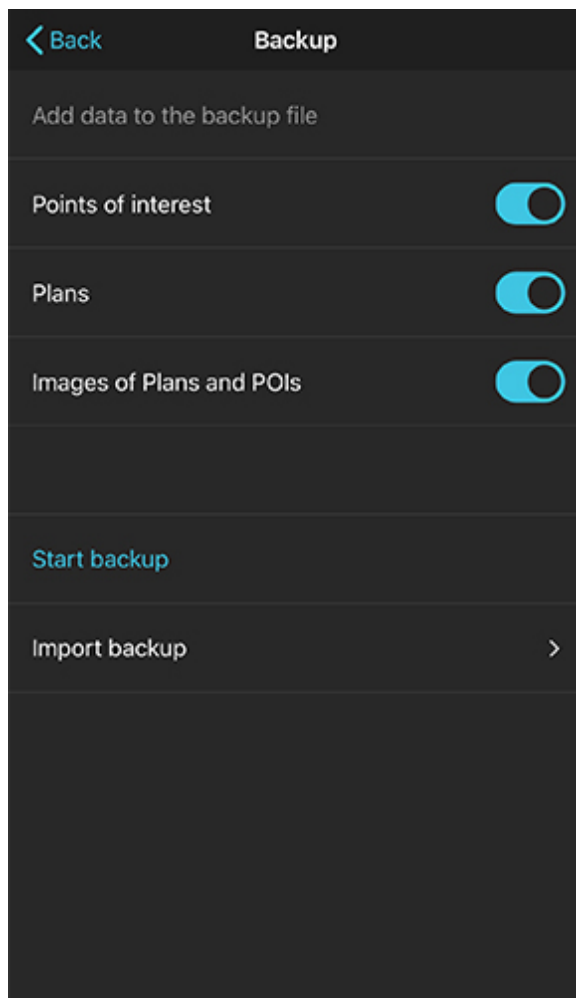
Backup.
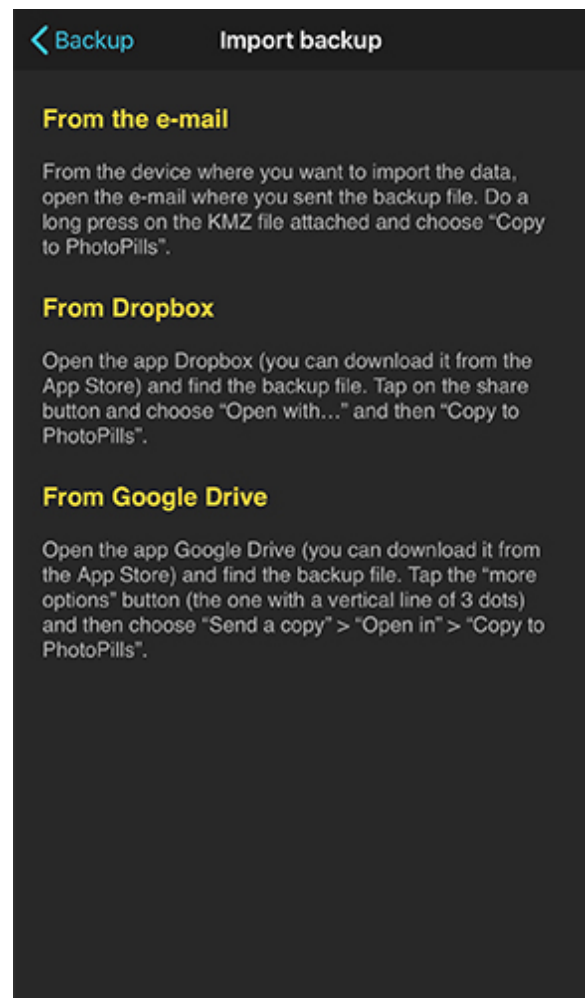
Backup > Import.

Create your backups

Backup your Plans and Points of Interest by creating a KMZ file you can send to yourself by email.

Import your backups

Learn how to import your backup from the email, Dropbox and Google Drive.

Settings
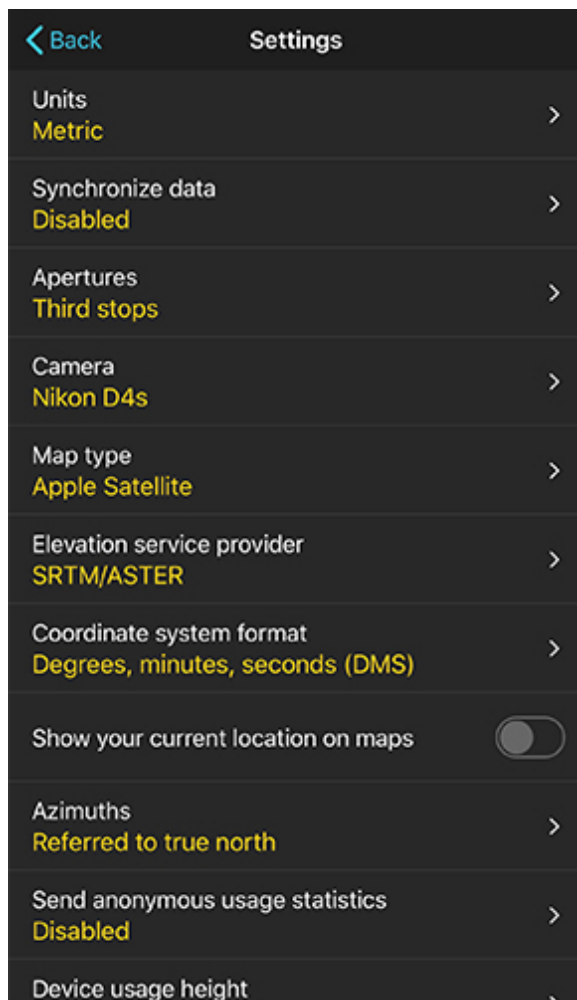
Settings.

Settings > Units.

Personalize PhotoPills to your convenience.

Units

Choose between Metric and Imperial units system.

Synchronize data (only on iOS)

Synchronize your Plans and Points of Interest across devices with iCloud.

Apertures

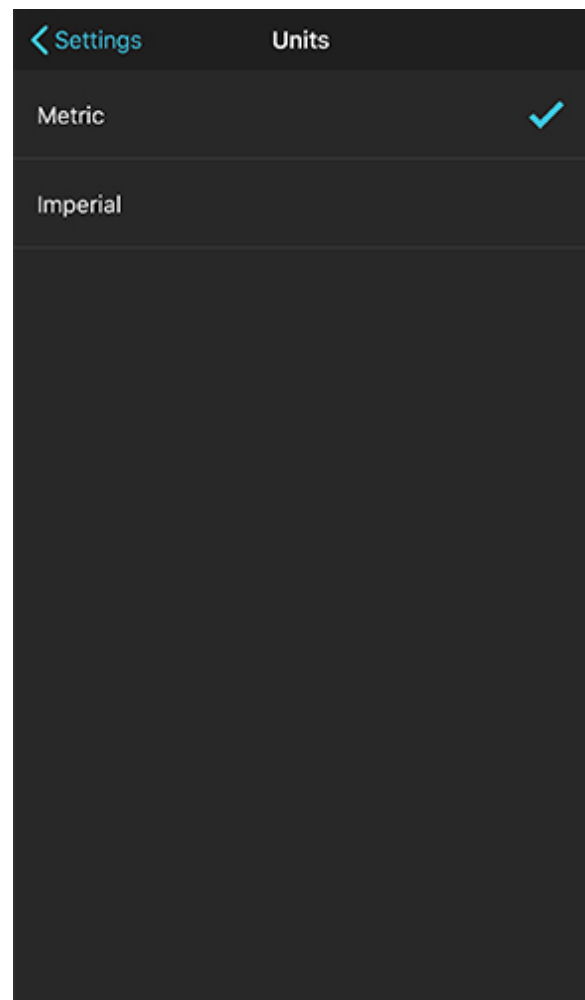Set the aperture stops you wish to use in the calculations: full stops, half stops and thirds of a stop.

Camera

Set your default camera.

Map type

Choose the Map type you wish to use.

Elevation service provider

By default PhotoPills uses SRTM/ASTER datasets. But, if you are a Moonhunter and you need really accurate altitude information set the Google Elevation API.

Coordinate system format

Choose the Latitude/Longitude format you wish to use: Decimal degrees (DDD), Degrees, decimal Minutes (DMM) or Degrees, Minutes and Seconds (DMS).

Your current position

Activate to show your current position on the Map. It's the best way to visualize if you are right on the shooting spot of a saved Plan.

Azimuths

Choose to have the azimuth information referred to Magnetic north or True north.

Send anonymous usage statistics

Would you like us to continuously improve PhotoPills? You can easily help us with no effort. Just activate this option to share data on how you use the app. Data collection is anonymous. No personally identifiable information is included. Stay tuned for updates! Thanks.

Device usage height

Enter the height at which you normally use the device in order to correctly represent the augmented reality (AR).

Use Camera2 API (only in Android)

Enabled by default. Only disabled if the AR views crash or are not displayed correctly. This can happen on old devices which in theory should support Camera2 API but they actually don't.

Show compass accuracy warning in AR views (only in Android)

Enabled by default. Only disable it if your device never hides the accuracy warning in the AR views, even though you do the **8-figure gesture** to calibrate the compass sensor. Some devices always report that the compass sensor is not calibrated, although the AR view is spot on. If you disable the warning remember to always do the 8-figure gesture when using the AR views.

Use gyroscope in the AR views (only in Android)

Enabled by default. Disable it if the AR views doesn't move correctly or doesn't move at all. If the gyro sensor is damaged or doesn't work correctly it can affect the AR view performance.

Calendar

Choose the Calendar you wish to use by default to add alerts for your photo Plans.

Delete cached eclipse KML files

When you load an Eclipse onto the Planner, a KML file will be stored in your device. To delete all KML files just tap Delete cached eclipse KML files.
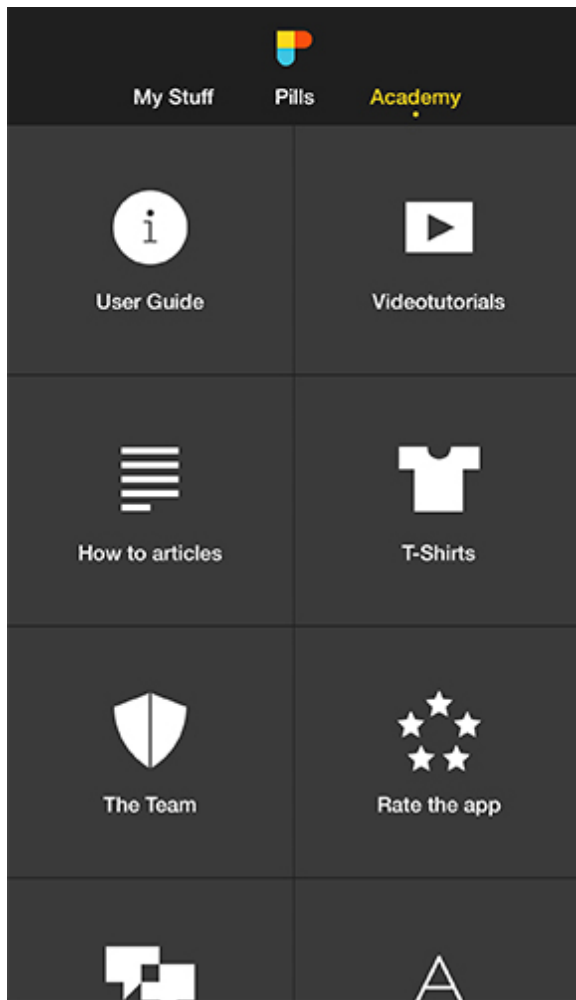
Acknowledgements

Here you'll find the sources of information we're using.

Version

The PhotoPills version you're using.

Section 25: Academy (Menu)

Academy menu.

In the Academy menu you'll find lots of learning material about **PhotoPills** and photography in general.

Never stop learning!

User Guide

Access the **PhotoPills user guide** online and download it in PDF format.

Video tutorials

Watch the following video tutorials on PhotoPills:

The first thing you need to do when downloading PhotoPills: Enable the Widgets
Calibrating the Augmented Reality views (AR)
Planner: How to move the Red Pin of the Planner
Planner: How to find and plan the Milky Way
Planner: Understanding the (+) Map button of the Planner (Toolbar)
Planner: How to save, share and import plans and locations
Planner: Mastering the Load button of the Planner
Planner: How to plan August 21 2017 total solar eclipse
Planner: How to plan any Star Trails shot you imagine
Planner: Managing the Map
Planner: Sun and Moon info
Planner: The Time Bar
Planner: Twilights and magic hours
Planner: Geodesic information
Planner: Shadow information
Planner: Find Sunrises and Sunsets
Planner: Find Moonrises and Moonsets
Planner: Find a Sun or a Moon at a determined position
Planner: Find a Sun or a Moon over a mountain
Plan 1. Total lunar eclipse January 21st 2019 with the Giza pyramids, Cairo (Egypt)
Plan 2. Supermoon rising behind our favorite stone hut in Punta Nati, Menorca (Spain)
Plan 3. Milky Way arching above the Vingerklip, Damaraland (Namibia)
Plan 4. Sun setting through North Window and Turret Arch, Arches National Park (USA)
Plan 5. Manhattanhenge with the Sun and with the Moon, New York (USA)
Plan 6. Full Moon at the top of the Sky Tower, Auckland (New Zealand)
Plan 7. July 2nd Total Solar Eclipse in Chile and Argentina
Plan 8. Sun and Moon rising aligned with the Giant and the Witch, Faroe Islands

"How To" articles

Build your photography skills with our detailed guides on:

Milky Way
Moon
Moon silhouettes videos
Astronomical events
Solar eclipses
Lunar eclipses

Star Trails

Meteor showers

Exposure

Depth of field (DoF)

Golden hour, blue hour and twilights

Azimuth and elevation

Lens filters and long exposure

T-Shirts

Our funny **T-Shirts**!

The Team

Meet the four friends behind the **PhotoPills Team**: Germán Marquès (the Developer), Joan Pons (the Designer), Antoni Cladera (The Photographer) and Rafael Pons (the Bard).

Rate the app

Rate PhotoPills on the App Store or on Google Play.

Feedback

Send us suggestions, bugs, complaints... We're continuously improving PhotoPills. We need your feedback!

Glossary

The **glossary** contains all the terms used in PhotoPills, including: azimuth, elevation, angular diameter, depth of field, etc.

Section 26:

This is just the beginning

What's next?

Answer: We'll keep writing photography guides and improving **PhotoPills** as much as we can!

We have a long, long, long to-do list... that grows and grows. :)

So get ready for more cool updates!

This is just the beginning...

Oh!

And remember...

You have the power to imagine, plan and shoot legendary photos!