ASI

Astronomical Cameras
Product Catalog

Suzhou ZWO Co.,Ltd.

ZWO is a world-renowned company focused on innovative product development in the field of astrophotography. ZWO dedicated to production of CMOS cameras, smart astro-imaging devices and astrophotography accessories. The company was founded by Sam Wen in 2011, with the headquarters in Suzhou, China. ZWO supplies cameras to more than 60 countries all over the world.

Innovate continuously, ZWO made one milestone after another in astronomy field. More than 40 energentic empolyees with rich experience and knowledge serve our customers worldwide. We all come together for one dream.

Make astrophotography easy and fun

ASI TIMELINE

2011

Nov

ZWO Founded

The ZWO Company was established by Founder and CEO Sam Wen.

Dec

World's first planetary CMOS camera

The ZWO ASI130MM was the first CMOS camera designed for planetary imaging.

2012

Sep

Milestone! The first planetary CMOS camera beat CCD

The ZWO ASI120 camera allowed the CMOS camera to completely dominate the planetary camera market.

2014

Jun

World's first USB3.0 Camera for astrophotography

The ZWO ASI120-S camera, featuring a USB3.0 connection, image download times are lightning fast.

2015

Feb

The biggest & fastest planetary CMOS camera in the world

This new camera makes SONY's Pregius Global Shutter CMOS technology available for amateurs without breaking the bank. The ZWO ASI174 has the largest sensor for planetary and solar/lunar imaging. And it can incredibly capture a maximum of 164 FPS at full resolution!

Jul

Excellent Series for planetary imaging

The ZWO ASI224, ASI290, ASI178, ASI185 were introduced to astronomy market at the very beginning by ZWO. The excellent performance in planetary imaging is well known throughout the world.

2016

May

Another Milestone, the ZWO ASI1600 changed the world

The ZWO ASI1600 broke the CCD camera's leading position in DSO imaging.

Nov

The first APS-C format CMOS cooled camera in the world

The ZWO ASI071 was the biggest CMOS camera in astrophotography.

2017

Sep

New Product line: Mini guide camera

The ZWO ASI120 Mini, ASI290 Mini, ASI174 Mini guide cameras, small and stable, they are dedicated and designed for guiding.

Oct

The first CMOS cooled camera with 4/3" BSI sensor

The ZWO ASI294 was integrated with SONY's latest IMX294 back-illuminated sensor with very high sensitivity and low read noise.

Dec

20 Megapixels camera series released

The ZWO ASI183 cameras have 20 Megapixels and impressive 84% QE.

2018

July

Game changer: ASIAIR

The ZWO ASIAIR is a smart WiFi device for astrophotography.
The ASIAIR completely changed the way people used to do astrophotography, easy & fun.

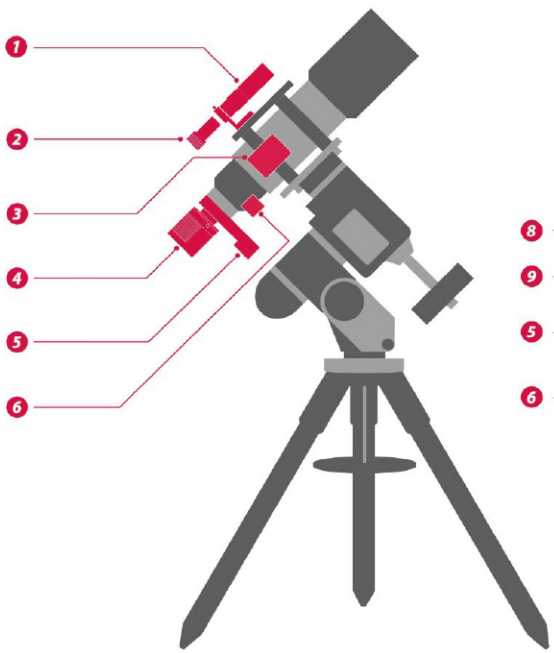
Future

Still under developing...

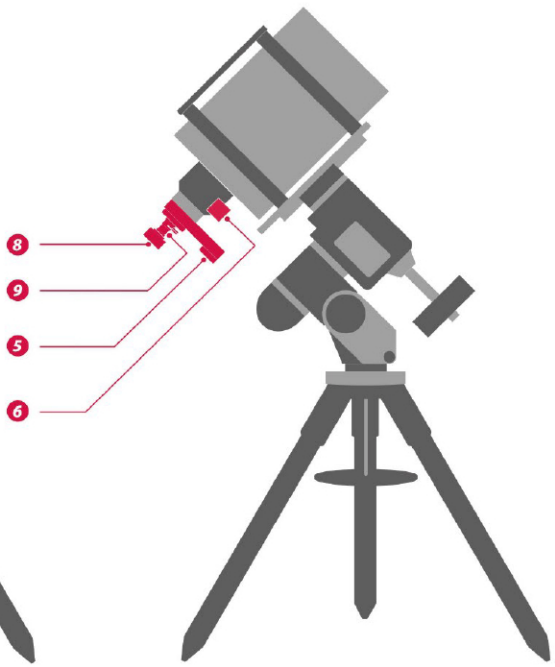
ZWO Astrophotography Solutions

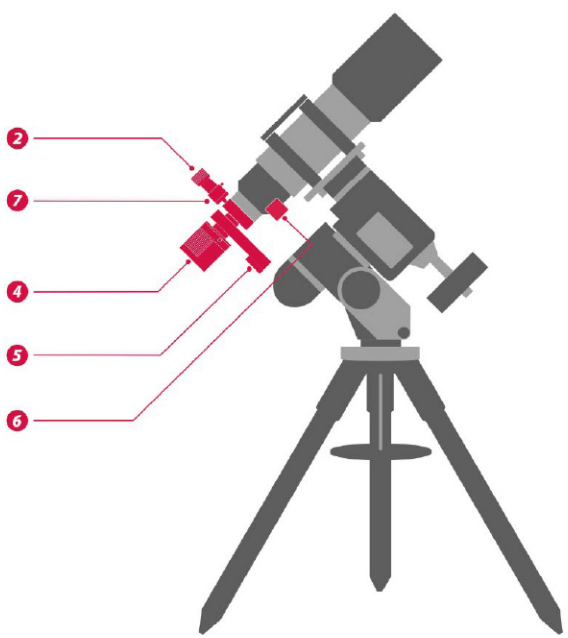
Our Products

For DSO imaging



For Planetary imaging





1. Mini Guide Telescope
2. Guide Camera
3. ASIAIR
4. DSO Cooled Camera
5. Electronic Filter Wheel
6. Electronic Automatic Focuser
7. Off-Axis Guider
8. Planetary Camera
9. Atmospheric Dispersion Corrector

Camera Naming Rule

Camera Type
Rule 1 Number of total pixels, eg. ASI1600/ASI120/ASI130 etc.
Rule 2 Sensor type, eg. ASI290/ASI094 etc.

Camera brand of ZWO

Pro Cooled camera, DDR3 buffer
Cool Cooled camera, no buffer
GT All in one cooler camera, DDR3 buffer
No suffix means uncooler camera, no buffer

ASI 1600 M M PRO

M CMOS sensor
C CCD sensor, never used

M Monochrome sensor
C Color sensor

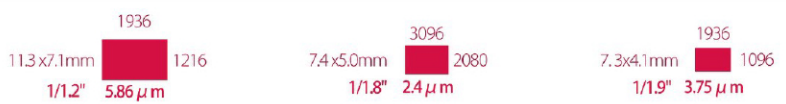
ASI Camera Sensor Size

DSO Cooled Cameras

Planetary Cameras

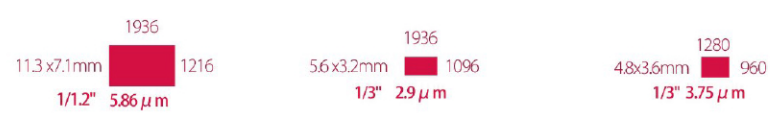
Guide Cameras

ASI071MC PRO | ASI1600MM PRO | ASI294MC PRO | ASI183MM/MC PRO



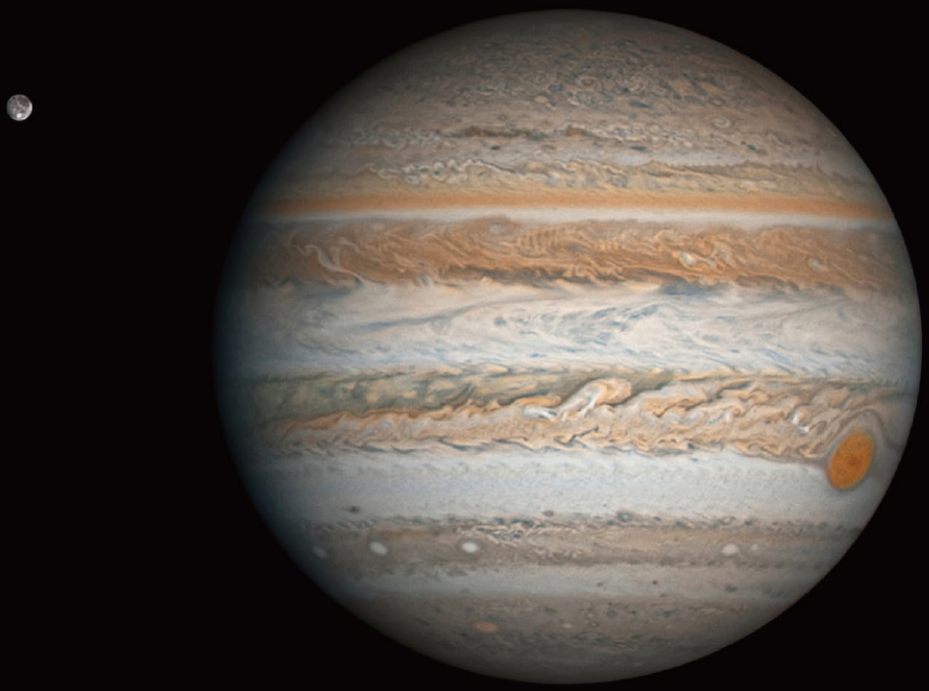
ASI174MM | ASI178MM/MC | ASI385MC

ASI290MM/MC | ASI224MC | ASI120MM/MC

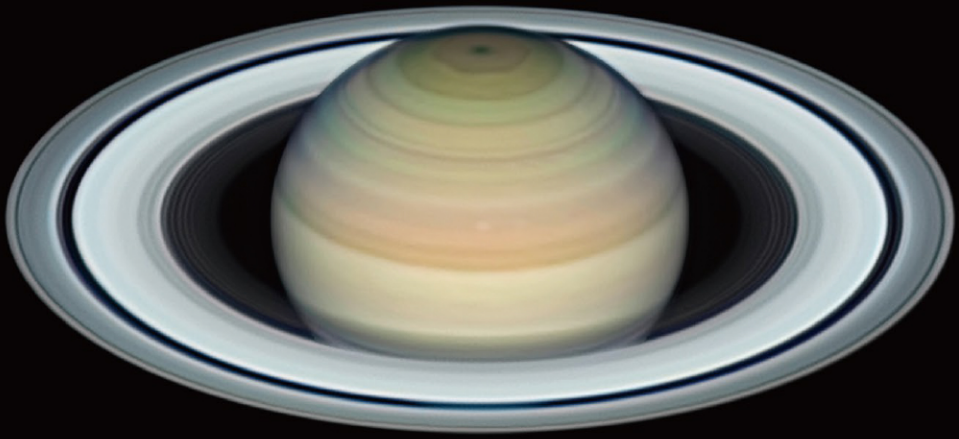


ASI174MM Mini | ASI290MM Mini | ASI120MM Mini


Half moon Sean Wang@ZWO
Imaging telescope: ES 127 CF APO
Imaging camera: ZWO ASI1600MM PRO
2000 frames,25% stacked



T1M Pic du Midi / pic-net.org - D. Peach/E. Kraaikamp/F. Colas/M. Delcroix/R. Hueso/C. Sprianu/G. Therin
Pic du Midi observatory (OMP-IRAP), Paris Observatory (IMCCE/LESIA), CNRS (PNP), Europlanet, S2P
105cm F17 Cassegrain with ASI290MM



106cm F/17 Cassegrain, Pic du Midi Observatory. ASI174MM

Planetary Cameras

HOT PRODUCT 2014 SKY & TELESCOPE

The best enter-level camera

ASI120MC/MM-S

The ASI120 is ZWO's legendary CMOS camera. It once broke the CCD camera's leading position in the field of planetary imaging with high sensitivity and high frame rate. This allowed the CMOS camera begin to dominate the planetary camera market.

HOT PRODUCT 2016 SKY & TELESCOPE

The most popular planetary camera

ASI224MC

The ASI224MC color camera has a super low read noise of 0.8e. No filter wheel or LRGB filters are required, which saves on cost and simplicity. Still the ASI224MC delivers excellent astro-imaging performance and provides amazing results in planetary imaging.

The best color planetary camera

ASI385MC

The ASI385MC is a big brother of ASI224MC, which shares the same pixel size and ultra-low read noise but bigger chip size of 1/1.9 ", so it is also suitable for DSO lucky imaging.

The best mono planetary camera

ASI290MM/MC

The ASI290 uses the Sony IMX290 1/3" CMOS back-illuminated sensor, with a 1936 x 1096 array of 2.9um pixels. This sensor has an extremely low read noise of 1.0e and can capture a maximum of 170 FPS at full resolution. It also has monochrome version, making it excellent for lunar, solar, and planetary imaging .

High resolution imaging

ASI178MM/MC

The ZWO ASI178 camera uses the Sony IMX178 back-illuminated, 6.4M pixel image sensor. The 1/1.8" sensor has an array of 3096 x 2080 pixels which are 2.4um square. With a 14bit ADC, high sensitivity, the sampling accuracy can be greatly improved.

Lunar Solar imaging

ASI174MM

The ASI174MM is recognized as the best camera for solar imaging. It features a 1/1.2" large sensor, a high frame rate of 164 fps, and uses global shutter. It is also a great camera for imaging high-speed moving objects such as ISS.

- USB3.0 high speed
- ST4 Port
- High sensitivity

Model	Type	Format	Resolution	Pixel Size(μm)	QE	Read Noise	Shutter	FPS	ADC
ASI120	Mono/Color	1/3"	1280*960	3.75	75%	4.0-6.6e	Rolling	60	12bit
ASI224	Color	1/3"	1304*976	3.75	TBD	0.8-3.2e	Rolling	150	12bit
ASI290	Mono/Color	1/3"	1936*1096	2.9	80%	1.0-3.2e	Rolling	170	12bit
ASI178	Mono/Color	1/1.8"	3096*2080	2.4	79%	1.4-2.2e	Rolling	60	14bit
ASI385	Color	1/1.9"	1936*1096	3.75	TBD	0.7-2.8e	Rolling	120	12bit
ASI174	Mono	1/1.2"	1936*1216	5.86	77%	3.5-6.0e	Global	164	12bit

Orion Nebula **Maicon Germiniani**

Imaging telescope: TS 115 / 800 Triplet APO
Imaging camera: ZWO ASI183MM PRO
Integration: 6.2 hours

The Cocoon nebula **Marcel Drechsler**

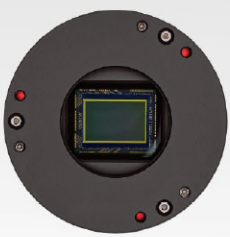
Imaging telescope: RASA 11"
Imaging camera: ZWO ASI1600MM-Cool
Integration: 33.5 hours

DSO Cooled Cameras

The Lowest dark current DSO camera

ASI071MC PRO

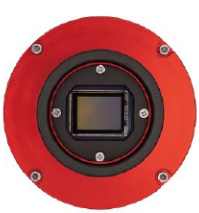
The ASI071MC PRO has a new sealing structure and a built in tilt adapter. As the amp-glow free camera with super low dark current noise, it is very suitable for long time exposure DSO imaging. The APS-C format is the largest frame that most flatteners and coma correctors on the market can support.



The most popular mono DSO camera

ASI1600MM PRO

The legendary ASI1600 is a milestone in astrophotography history. It was the first CMOS camera that can beat CCD. It has very low dark current and 1.2e extremely low read noise. Don't underestimate the 4/3" format, as long as you match the appropriate telescope focal length, you can take excellent photos.

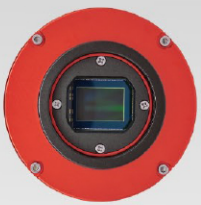


DSO Cooled Cameras

The most popular color DSO camera

ASI294MC PRO

The ZWO ASI294 MC Pro is a remarkably capable one-shot-color CMOS camera for deep sky astrophotography with 4/3" Sony IMX294 back-illuminated sensor. Thanks to it's built-in 14bit ADC and 63ke full well , it can provide great images with very short time exposure.



High resolution Imaging

ASI183MM/MC PRO

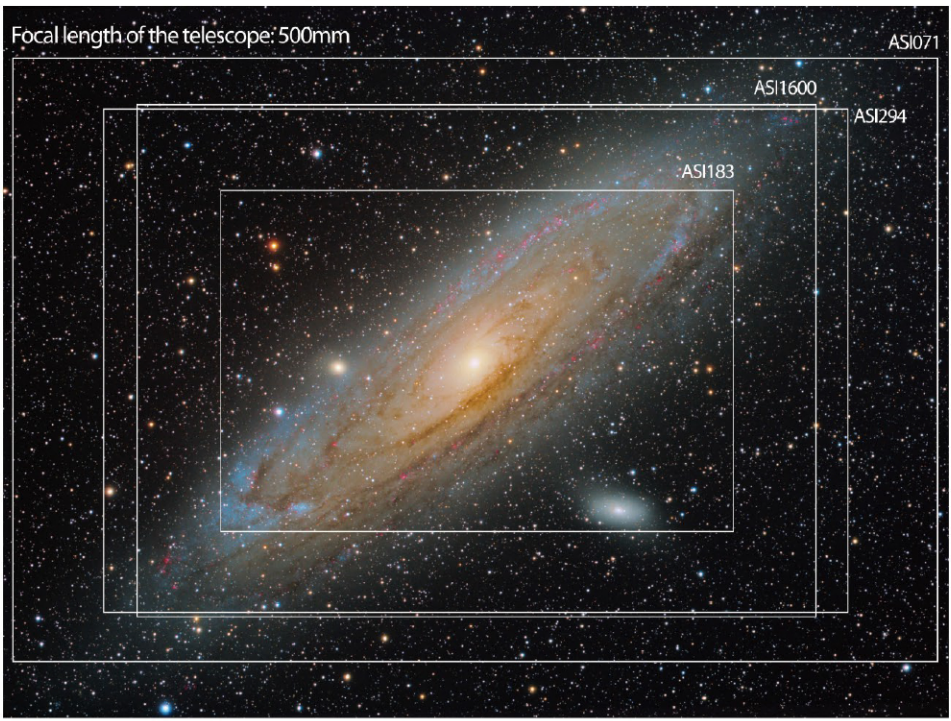
The new 1" format back-illuminated sensor make 183 cameras have 84% extreme-high sensitivity, high frame rate. it has 20 mega pixels. It can be regarded as the best choice for small or medium sized short focal length telescopes. Wonderful choice for both DSO imaging and planetary imaging with some serious power and versatility!

- DDR3 256MB Buffer
- USB3.0 high speed
- USB2.0 HUB
- 2-stage TEC Cooling

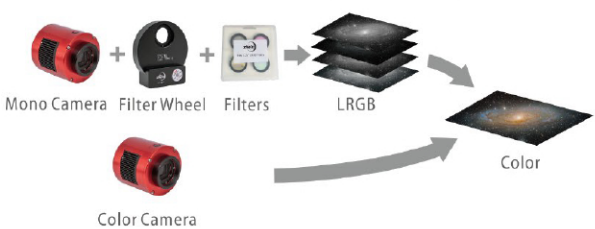
Model	Type	Cooling	Format	Resolution	Pixel Size(μm)	Read Noise	QE	Full Well	ADC	Back Focus
ASI183	Mono/Color	Cooled/ Uncooled	1"	5496*3672	2.4	1.6-7.0e	84%	15000e	12bit	6.5mm/ 17.5mm
ASI294	Color	Cooled/ Uncooled	4/3"	4144*2822	4.63	1.2-7.3e	TBD	63700e	14bit	6.5mm/ 17.5mm
ASI1600	Mono	Cooled/ Uncooled	4/3"	4656*3520	3.8	1.2-3.6e	60%	20000e	12bit	6.5mm/ 17.5mm
ASI071	Color	Cooled	APS-C	4944*3284	4.78	2.3-3.3e	50%	46000e	14bit	17.5mm

The Choice Of Sensor

In the case where the telescope's focal length is determined, the sensor size determines the field of view.
Using a larger sensor size means you can capture a wider field of view,
without exceeding the effective imaging circle of the telescope.

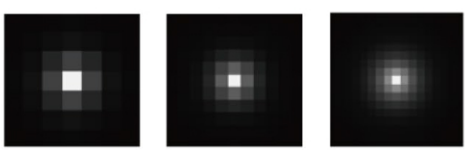


Monochrome Or Color?



Monochrome cameras have higher quantum efficiency and wider band capabilities.Color cameras are simpler to use and you can get color images directly.

Pixel size?



The pixel size and focal length determines the sampling accuracy, and you need to choose a camera that best matches your telescope to get the best sampling accuracy.

$$\text{Sampling Rate(arcsec/pixel)} = \frac{206 \times \text{Pixel Size}}{\text{Focal Length}}$$

Non-cooled Or Cooled ?

Non-cooled cameras with high sensitivity are excellent for short exposure imaging such as: planetary, lunar and solar imaging.
Cooled cameras are dedicated for long time exposure imaging such as DSO Imaging.

The Electronic Filter Wheel will be a good addition to the monochrome cameras. It can be used with a variety of astronomical filters such as LRGB filters, IR-PASS filters,and UV-PASS filters.

EFW

Electronic Filter Wheel
400g(14oz)

8 x 1.25"/31mm

7x36mm

EFW mini

Mini Electronic Filter Wheel
300g(10.6oz)

5 x 1.25"/31mm

Manual Filter Wheel

5x1.25"

ZWO Filter Series

	1.25”	31mm	36mm	2”
LRGB	✓	✓	✓	X
SHO	✓	✓	✓	X
UV IR-cut	✓	X	X	✓
CH4	✓	X	X	X
IR850	✓	X	X	X

Guide Cameras and Accessoires

Widely Use

ASI120MM Mini

The ZWO ASI 120 Mini is a top notch monochrome guide camera with afforadble price, well suited to both planetary imaging and acting as a guider to amplify the usefulness of other astronomy instruments.
This camera has a 4.8mm x 3.6mm sensor with small pixels 3.75 micron pixels. It is also more compact than other ASI120-series cameras.

Precise Guiding

ASI290MM Mini

The ASI290 Mini contains 2.9 µm pixels for a higher arcsec per pixel than either the 224 or 120 series cameras. This means the ASI290 Mini can detect even more negligible star movement in the same guide scope. This camera can enhance guiding precision over the 120 mm by about 30%.

Big FOV

ASI174MM Mini

Designed for big FOV guiding, the ASI174 Mini serves as a useful OAG for locating a guide star. When using an OAG in conjunction with an RC or SCT, the most difficult part is searching for a guide star. The ASI174 Mini features a large 1/1.2" sensor for a 4x bigger FOV than 120 mm.

- Small and light weight
- USB2.0 Type-C Port
- ST4 Port
- 1.25" Diameter as eyespiece

Mini Guide Scope

Lens Diameter: 30 mm
Weight: 250 g
Focal Length: 120 mm
Back Focus: 0~20 mm

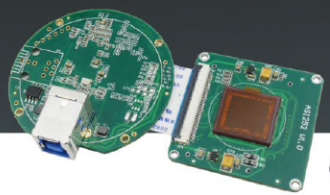
Off-Axis Guider

HOT PRODUCT 2017 SKY & TELESCOPE

ZWO Atmospheric Dispersion Corrector

While observing or imaging low altitude objects, the ZWO ADC is very useful

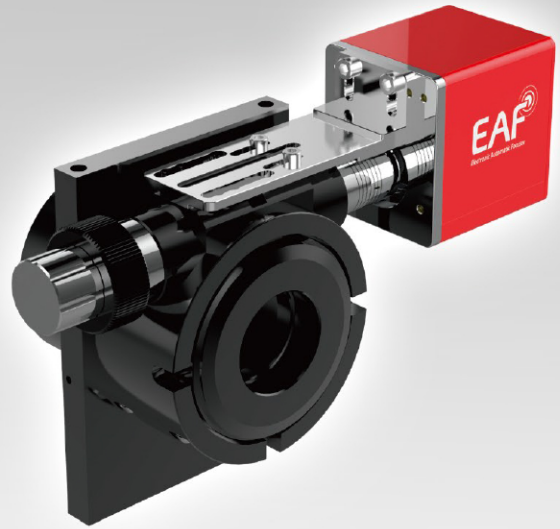
OEM Solutions



OEM Camera Board Sets

OEM Camera

Model	Sensor	Mono	Color	USB3.0	USB2.0	Trigger	Global Shutter	Resolution	Format	Pixel Size(μm)	QE	ADC
ON Semi	NOIP1SN1300A	√	√	√	√	×	×	640 X 480	1/4''	4.8	56%	10
	ASX340CS	×	√	×	√	×	×	728X 512	1/4''	5.6	60%	10
	MT9V034	√	√	×	√	×	×	752 X 480	1/3''	3.75	TBD	12
	AR0130CS	√	√	√	√	×	×	1280 X 960	1/3''	3.75	75%	12
	MT9M034	√	√	√	√	×	×	1280 X 960	1/3''	3.75	75%	12
	MT9M001	√	×	×	√	×	×	1280 X 1024	1/2''	5.2	TBD	10
SONY	IMX136	√	√	×	√	×	×	1944 X 1224	1/2.8''	2.8	TBD	12
	IMX178	√	√	√	√	√	×	3096 X 2080	1/1.8''	2.4	79%	14
	IMX185	×	√	√	√	×	×	1944 X 1224	1/1.9''	3.75	TBD	12
	IMX224	×	√	√	√	√	×	1304 X 976	1/3''	3.75	TBD	12
	IMX226	×	√	√	√	×	×	4072 X 3040	1/1.7''	1.85	76%	12
	IMX252	√	√	√	√	√	√	2064 X 1544	1/1.8''	3.45	76%	12
	IMX273	√	√	√	√	√	√	1456 X 1088	1/2.9''	3.45	71%	12
	IMX287	×	√	√	√	√	√	728 X 544	1/2.9''	6.9	71%	12
	IMX290	√	√	√	√	√	×	1936 X 1036	1/3''	2.9	80%	12
	IMX385	×	√	√	√	√	×	1936 X 1096	1/2''	3.75	TBD	12
	IMX174	√	√	√	√	√	√	1936 X 1216	1/1.2''	5.86	77%	12
	IMX249	√	√	√	√	√	√	1936 X 1216	1/1.2''	5.86	80%	12
	IMX183	√	√	√	√	√	×	5496 X 3672	1''	2.4	84%	12
	IMX432	√	√	√	√	√	√	1608 X 1104	1.1''	9	TBD	12
	IMX294	×	√	√	√	√	×	4144 X 2822	4/3''	4.63	TBD	14
	IMX299	×	√	√	√	√	×	4144 X 2822	4/3''	4.63	TBD	14
	IMX071	×	√	√	√	√	×	4944 X 3284	APS-C	4.78	50%	14
	IMX128	×	√	√	√	√	×	6032 X 4032	Full Frame	5.97	53%	14
	IMX094	×	√	√	√	√	×	7376 X 4928	Full Frame	4.88	56%	14
Panasonic	MN34230	√	√	√	√	√	×	4656 X 3520	4/3''	3.8	60%	12
Gpixel	GMAX0806	√	×	√	√	√	√	7912 X 5436	APS-C	2.8	62%	12



EAF

Electronic Automatic Focuser

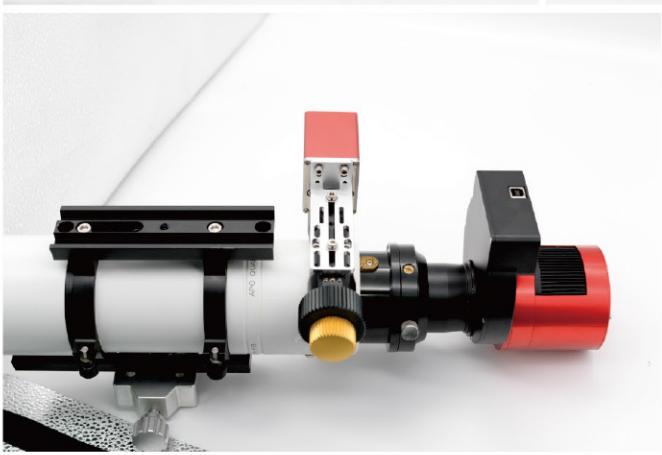
Introducing the new EAF, the latest innovation from the engineers at ZWO. This electronic focuser enables precise, dynamic focus control for planetary and deep-sky imaging.

5KG capacity
ASCOM & ASIAIR Supported

The ZWO EAF works with all capture software supported by the ASCOM platform. The focuser also completes the ASIAIR WiFi imaging and control system. Now control your entire imaging runs from a smart phone or tablet, even from indoors.

The design on the body is inspired by the changing Airy diffraction pattern through a range of focus.

The EAF is constructed from an all-metal housing in an attractive red color that matches our cameras.



Body size: 60mm x 50mm x 40mm
Power port: 12V DC 5.5mm x 2.1mm, center positive
Data port: USB2.0 port
Weight: 277g
Capacity: 5kg

Standard version
EAF body
flexible coupling
motor bracket
USB2.0 cable

Advanced version
EAF body
flexible coupling
motor bracket
USB2.0 cable
hand controller
temperature sensor

Astrophotography has never been easier!

ASIAIR

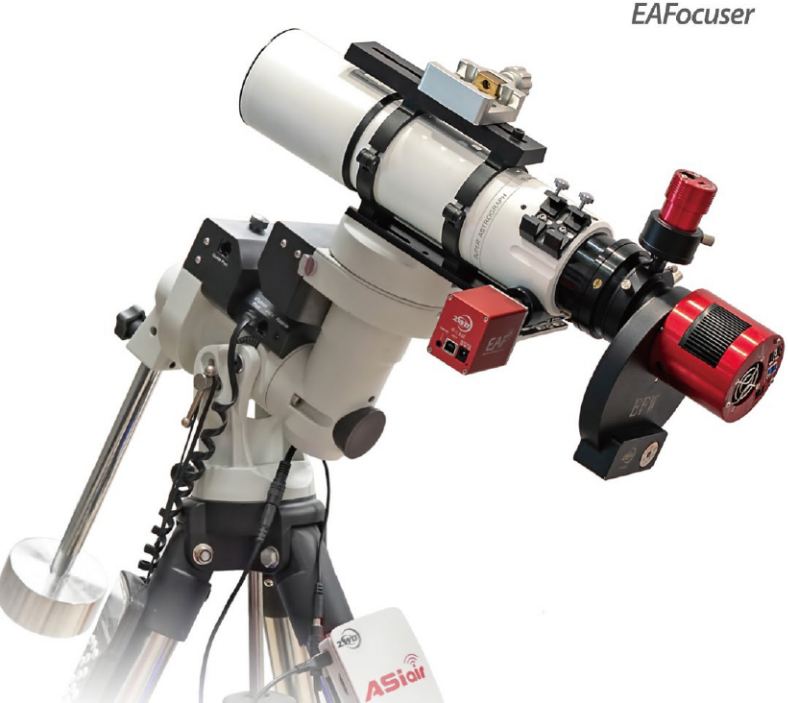
CHANGE YOUR WAY OF ASTROPHOTOGRAPHY!

ASIAIR is a smart WiFi device that allows you to control all ASI USB 3.0 cameras, ASI Mini cameras, DSLRs and equatorial mount to do plate solving and imaging with your phone or tablet/iPad when connected to ASIAIR via WiFi.

Support New Equipments!

EAFocuser

Nikon&Canon



iOS

ANDROID

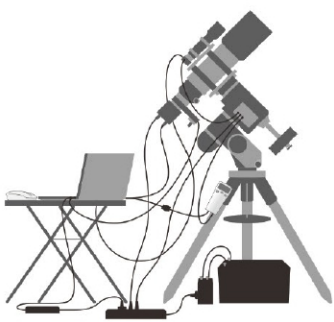
as easy as 123!

CONNECT

SETTING

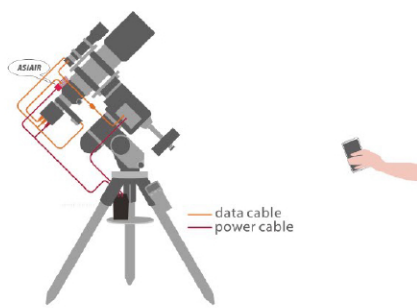
ENJOY!

Without ASIAIR comparision With ASIAIR

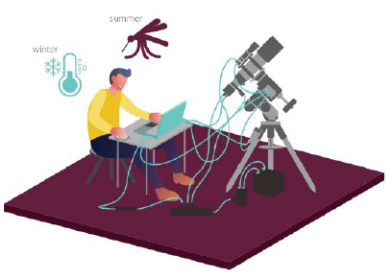


A lot of cables between equipments and laptop

1 SETUP



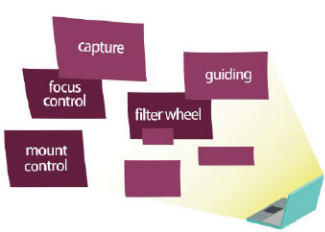
Less cables and Say Goodbye To Laptop!



Have to stick to your equipment
and fight with mosquitoes and cold

2 OCCASION

Stay wherever you want



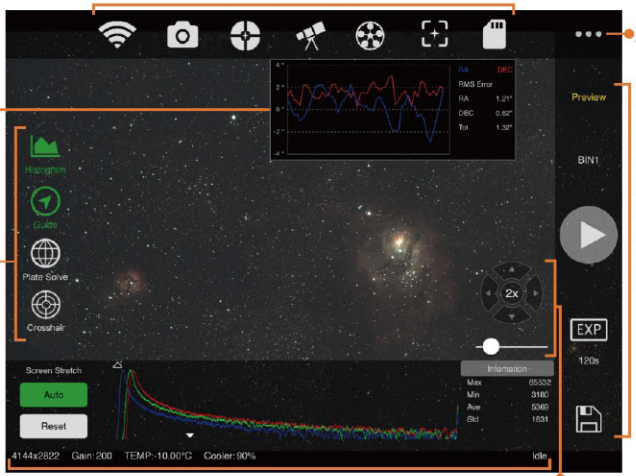
Too many software operated on PC

3 OPERATION

All in one app

Device Settings

ASIAIR, Main Camera, Guide, Telescope, Filter wheel, SD card etc.



Real-time information

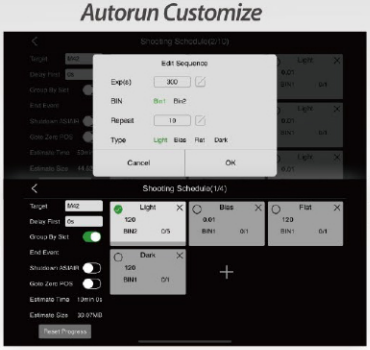
Mount Control Pad

Most useful and important information of all devices and functions.

Mount control

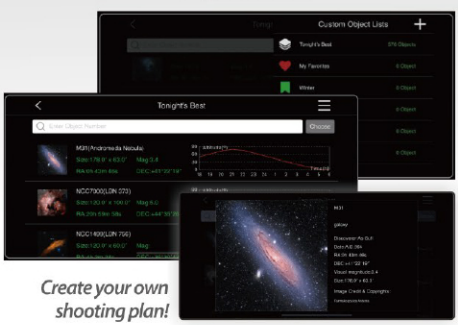
Plate solving

Autorun Customize



Make your shooting schedule freely !

Target Choose



Create your own shooting plan!

Little box, big universe!

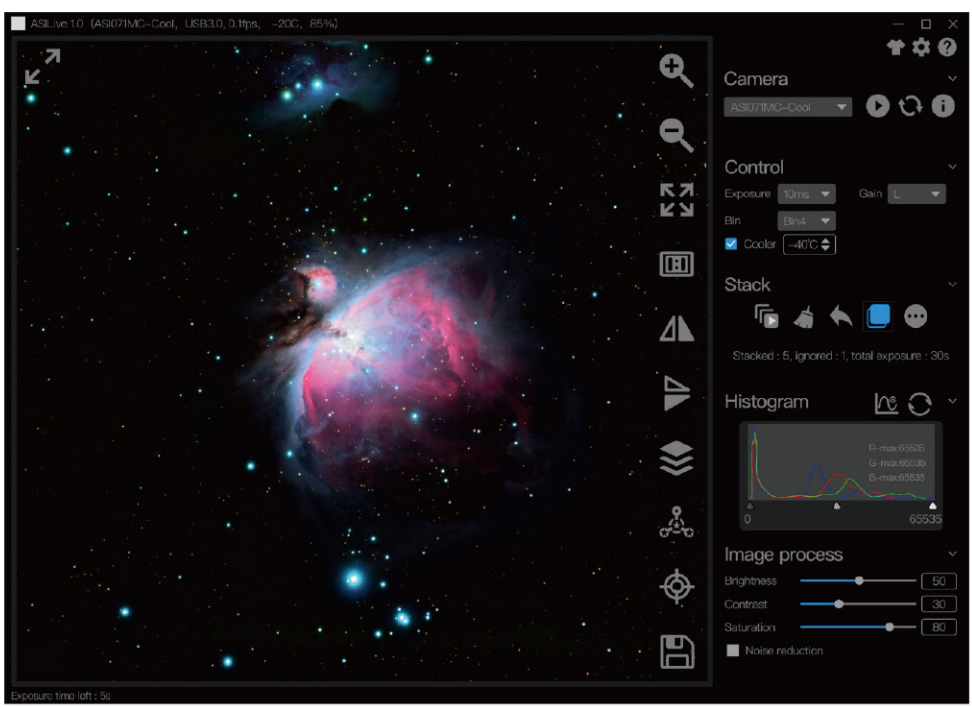
Software

ASICap

For planetary imaging

ASILive

For DSO live stacking



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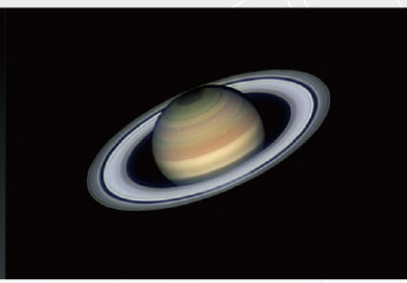
ZWO Astronomy Cameras







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