Getting used to telescope and astrophotography
DSLR

YOUR VERY NEXTDOOR

DSLR

- Digital SLR (single-lens reflex)

Figure 1.3. A more elaborate view of what's inside a DSLR. Note computer circuitry ("DIGIC II") at right. (Canon USA.)

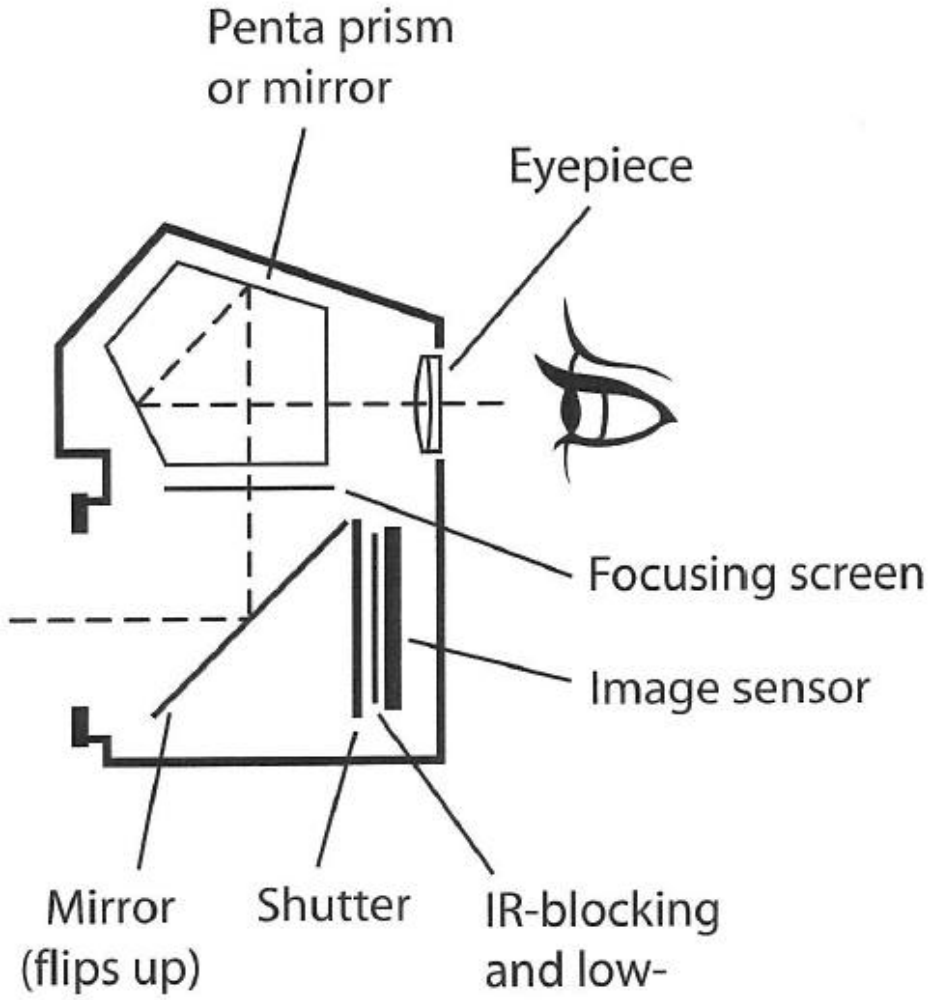


Figure 1.2. A DSLR is a single-lens reflex with a digital image sensor. Mirror and eyepiece allow you to view the image that will fall on the sensor when the mirror flips up and the shutter opens.

DSLR

- How color is recorded

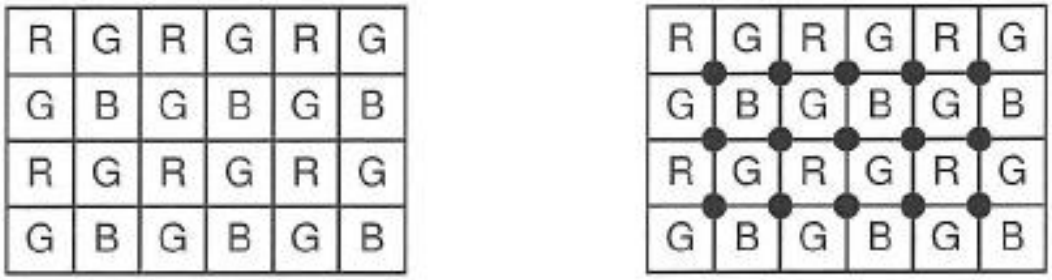


Figure 2.4. Left: Bayer matrix of red, green and blue filters in front of individual sensor pixels. Right: Dots mark "virtual pixels," points where brightness and color can be computed accurately.

- Invented by Dr. Bryce Bayer of Kodak, in 1975
- Green pixels outnumber red and blue because the eye is more sensitive to fine detail in the middle part of the spectrum
- Brightness and color are calculated by combining readings from red, green and blue pixels

DSLR

- Basic settings
  - **Shutter speed and Manual focusing**
    - The camera's mode dial to M
    - Setting shutter speed with the thumbwheel
    - Focusing manually
  - ISO (International Standard Organization)
  - Exposure time

DSLR

Figure 3.2. For manual control of shutter and aperture, set mode dial to M.

DSLR

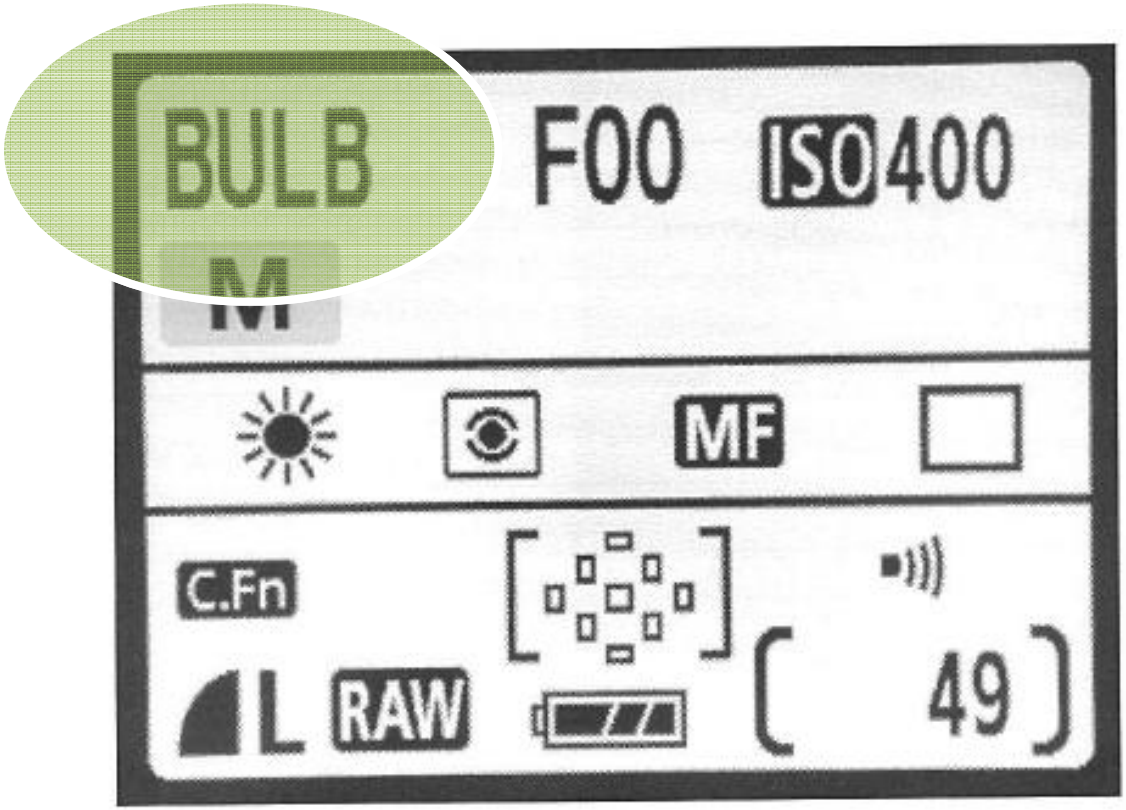


Figure 3.1. Display panel of a Canon XTi (400D) set up for deep-sky photography. *F00* means the lens is not electronic and the camera cannot determine the *f*-stop. *C.Fn* means custom functions are set.

DSLR

- Basic settings
  - Shutter speed and Manual focusing
  - ISO (International Standard Organization)
  - **Exposure time**
    - Bright object, shorter exposure time
    - Fainter object, longer exposure time
    - Trial and error
      - Starting with 3 minutes at ISO 400
      - Underexposed? Then switching 6 minutes at ISO 800

DSLR

- Types of Coupling

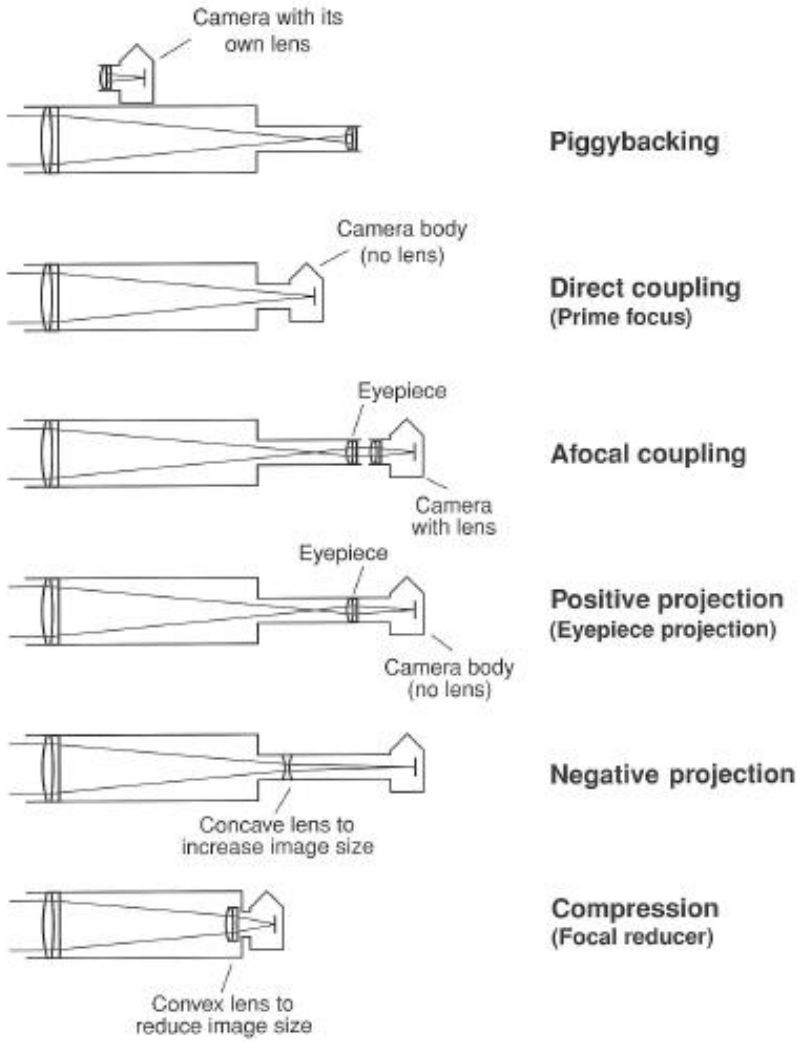


Figure 5.2. Ways of coupling cameras to telescopes. Piggybacking, direct coupling, and compression are main modes for deep-sky work.

DSLR

- Fitting it all together

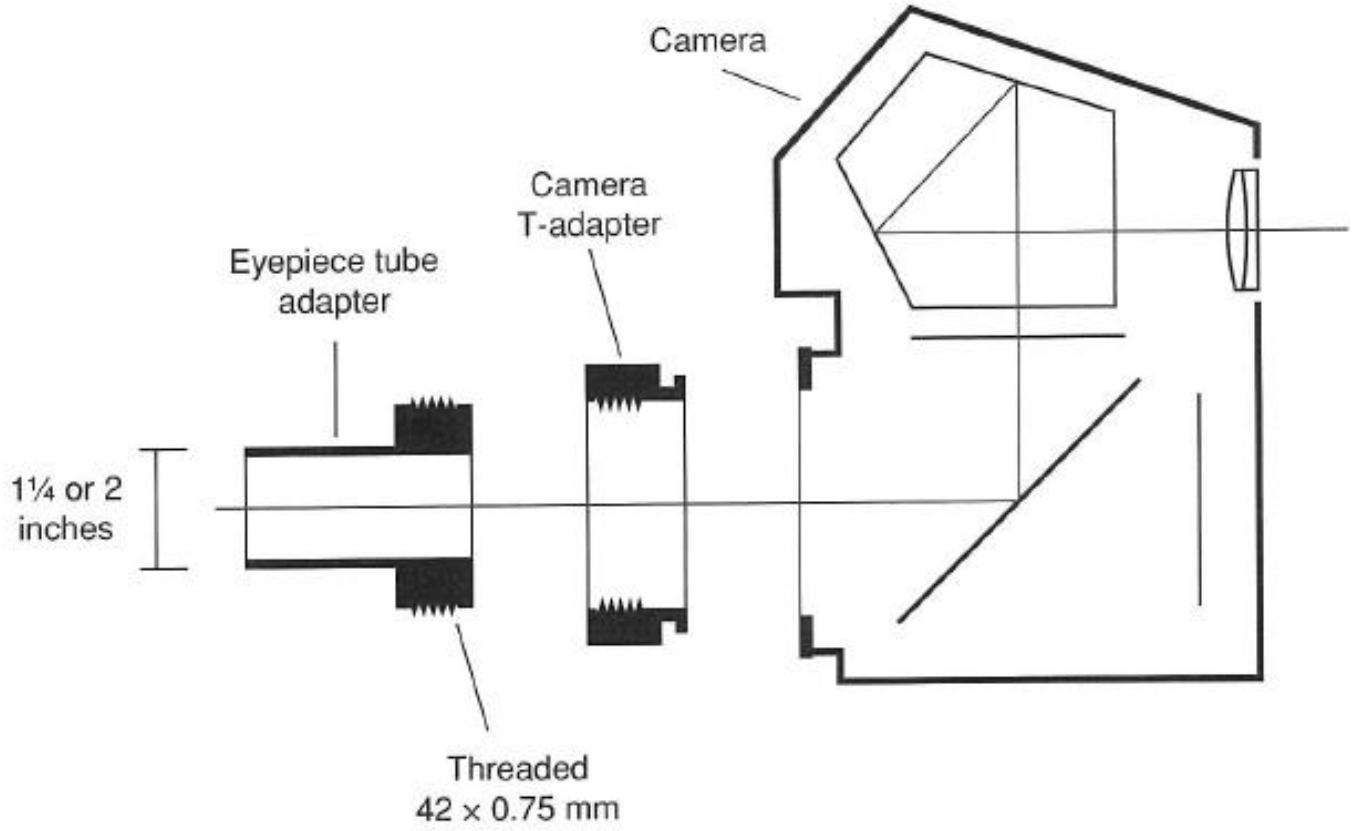
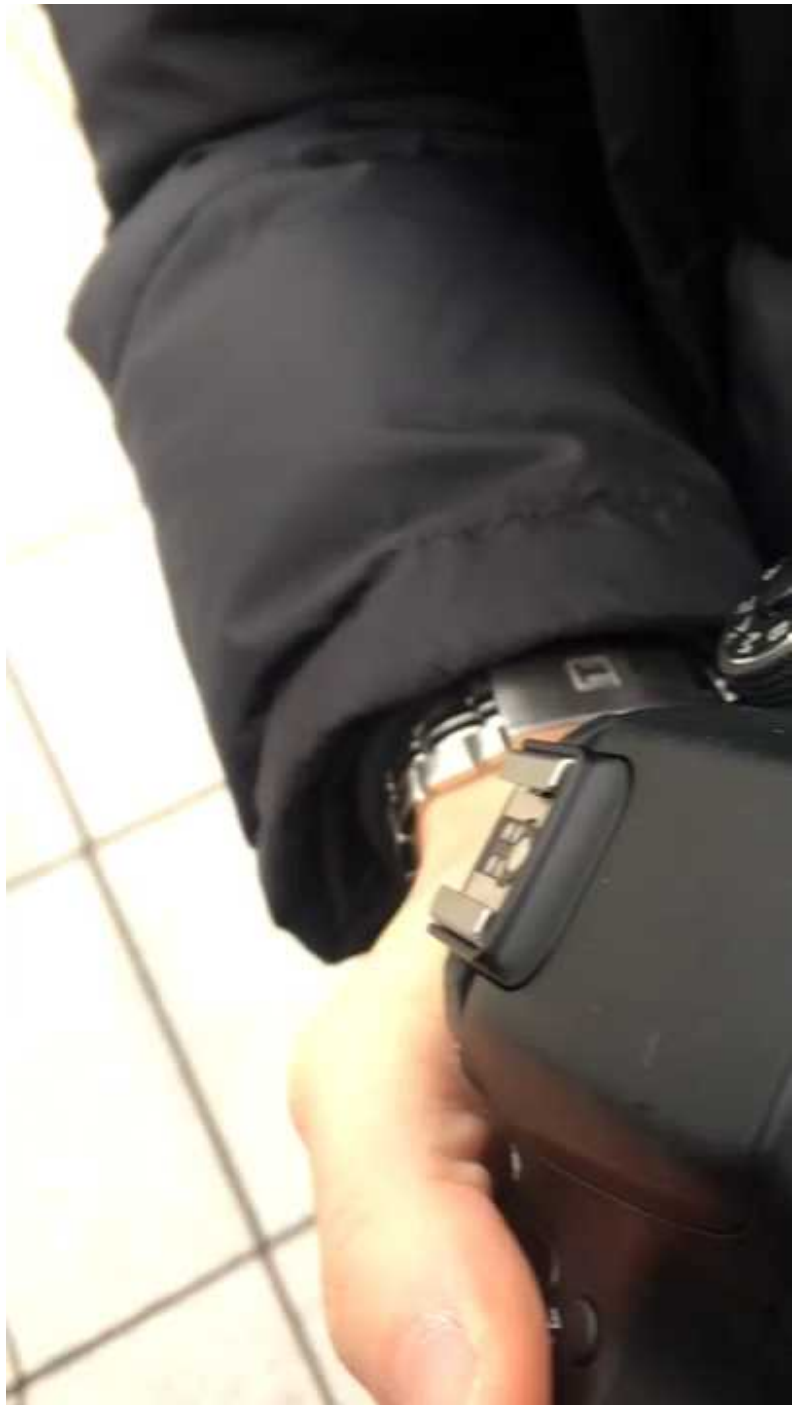


Figure 5.4. Simplest camera-to-telescope adapter fits into telescope in place of eyepiece.



Skills

Keeping Records

Keeping Records

- Planning observations, making measurements, observations, analyse and interpret data
  - Months, years or even decades on research projects
    - Writing reports, publishing papers and giving presentation at conferences
    - Essential to have an accessible, reliable and complete record of the work
  - Keeping records is crucial
    - Weather conditions prevent observations
    - Equipment breaks down
    - Variety of different approaches to analysing the data
    - Part of the investigation are unsuccessful so that different approaches have to be deviced

Keeping Records

- Using an observatory notebook
- Advantages
  - To produce a report of project
  - To compare the records when you get different results from other students for a project
  - To refer back to records of similar techniques or similar data analysis to one that you have done previously → You may avoid having to start again from scratch

Keeping Records

- How to keep a record of your observatory work
  - Use a bound notebook or ring-binder
  - Make your record clear and concise
  - Record all relevant information
    - Title; date
  - Record details of observations
    - Time; target, filter..
  - Space out your entries; Correcting errors in your notebook
  - Data analysis
  - Conclusions and critical reflections

Keeping Records

- A typical observing log from part of a night's observing session

Date 28th September 2003 **Site** Majorca **Photometry/Spectroscopy** Photometry

Telescope Meade 12" LX200 **CCD camera** SBIG ST-8 **Spectrograph** n/a

Notes Observers: A. Smith & B. Jones, weather: no cloud, temperature ~ 6°C, humidity ~ 25%

File No.	Time/UT	Target	RA/h m s	Dec/° ′ ″	Filter *or* Slit width	Exposure/s	Airmass	Comments
128	21 34	bias	-	-	-	0	-	last bias frame
129	21 36	M39	21 32	+48 26	B	120	1.04	open cluster
130	21 39	M39	21 32	+48 26	V	90	1.03	open cluster
131	21 43	Lan 112	20 42	+00 19	B	60	1.23	Standards, Landolt field 112
132	21 45	Lan 112	20 42	+00 19	V	45	1.21	Standards, Landolt field 112

Keeping Records

Title:				
Date:				
Telescope:	Name: (Pegasus, WilliamA, WilliamB, WilliamC, Takahashi)			
	Diameter: Focal length:			
Camera:				
Observer:				
Weather:				
			Obj_Date_TelName_observers.jpg ex. Jupiter_20140402_pegasus_observers.jpg	
Time	**Target**	**Exposures**	**FileName**	**Comments**
Printed Photo:				

Date: 2015.03.22. Site: KSA 천문대. Photometry/Spectroscopy/image:

Telescope: Pegasus. Camera: Canon ⓐ 70D-201310 Spectrograph:

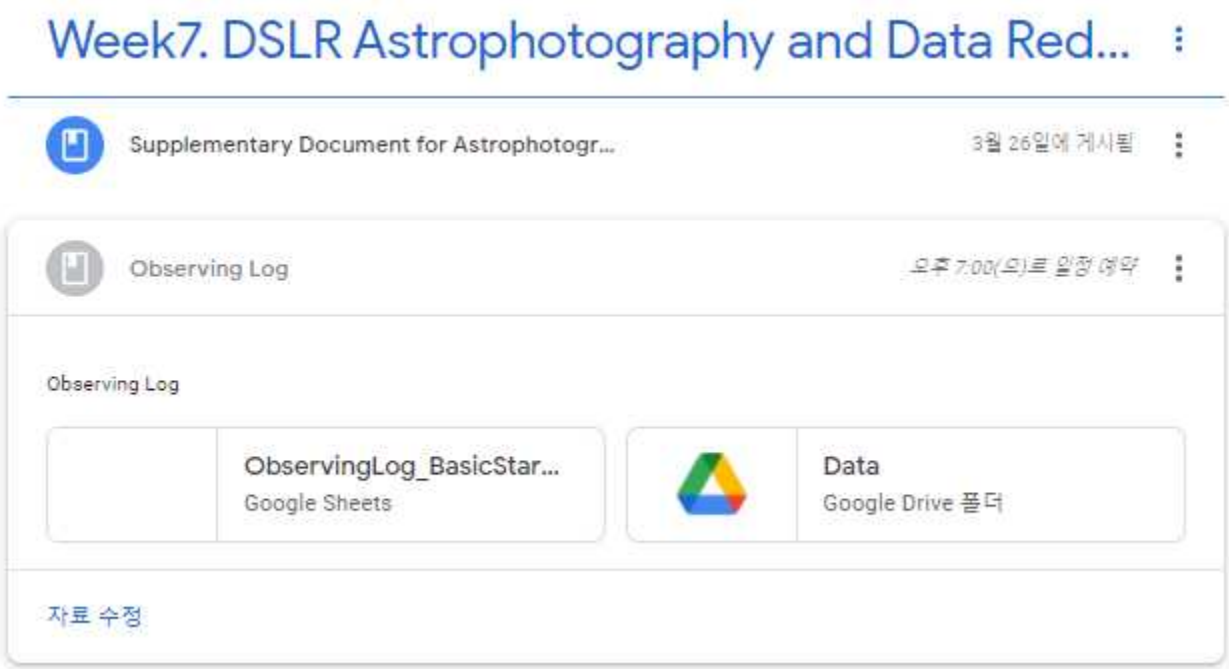
Observers: 박정찬 양정우. 표성준

Weather: 맑음.

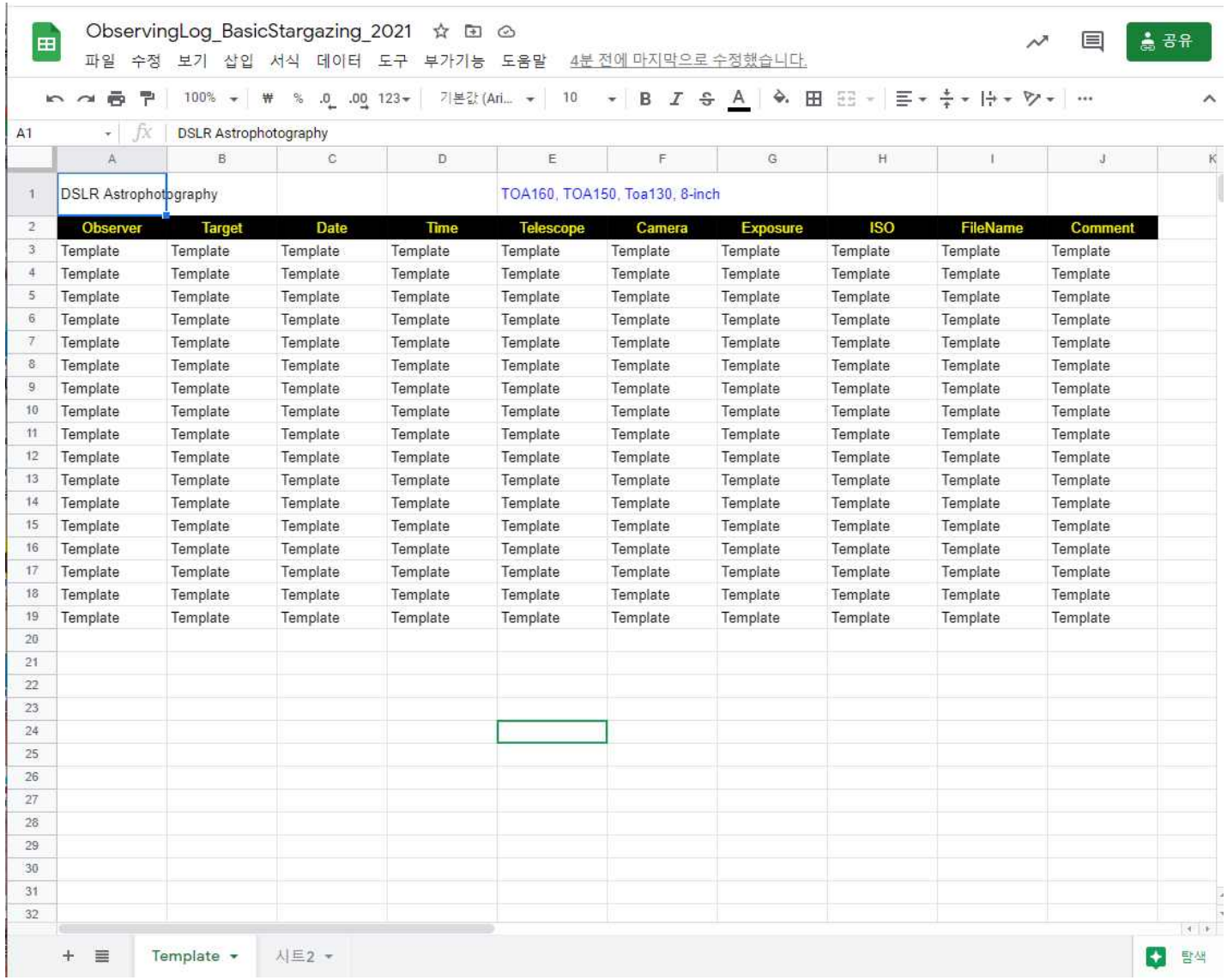
FileNo.	Time	Target	RA/hms	Dec/deg.	Filter or Slit width	Exposure	Comments
Jupiter satellite - 20150322 2045 - 박정찬양정우표성준						2 (s)	ISO : 400 / 4개 위성 확인

Callisto
Europa
Ganymede

Keeping Records



Keeping Records



ObservingLog_BasicStargazing_2021

파일 수정 보기 삽입 서식 데이터 도구 부가기능 도움말 4분 전에 마지막으로 수정했습니다.

공유

A1 DSLR Astrophotography

	A	B	C	D	E	F	G	H	I	J
1	DSLR Astrophotography				TOA160, TOA150, Toa130, 8-inch					
2	Observer	Target	Date	Time	Telescope	Camera	Exposure	ISO	FileName	Comment
3	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
4	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
5	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
6	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
7	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
8	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
9	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
10	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
11	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
12	Template	Template	Template	Template	Template	Template	Template	Template	Template	Template
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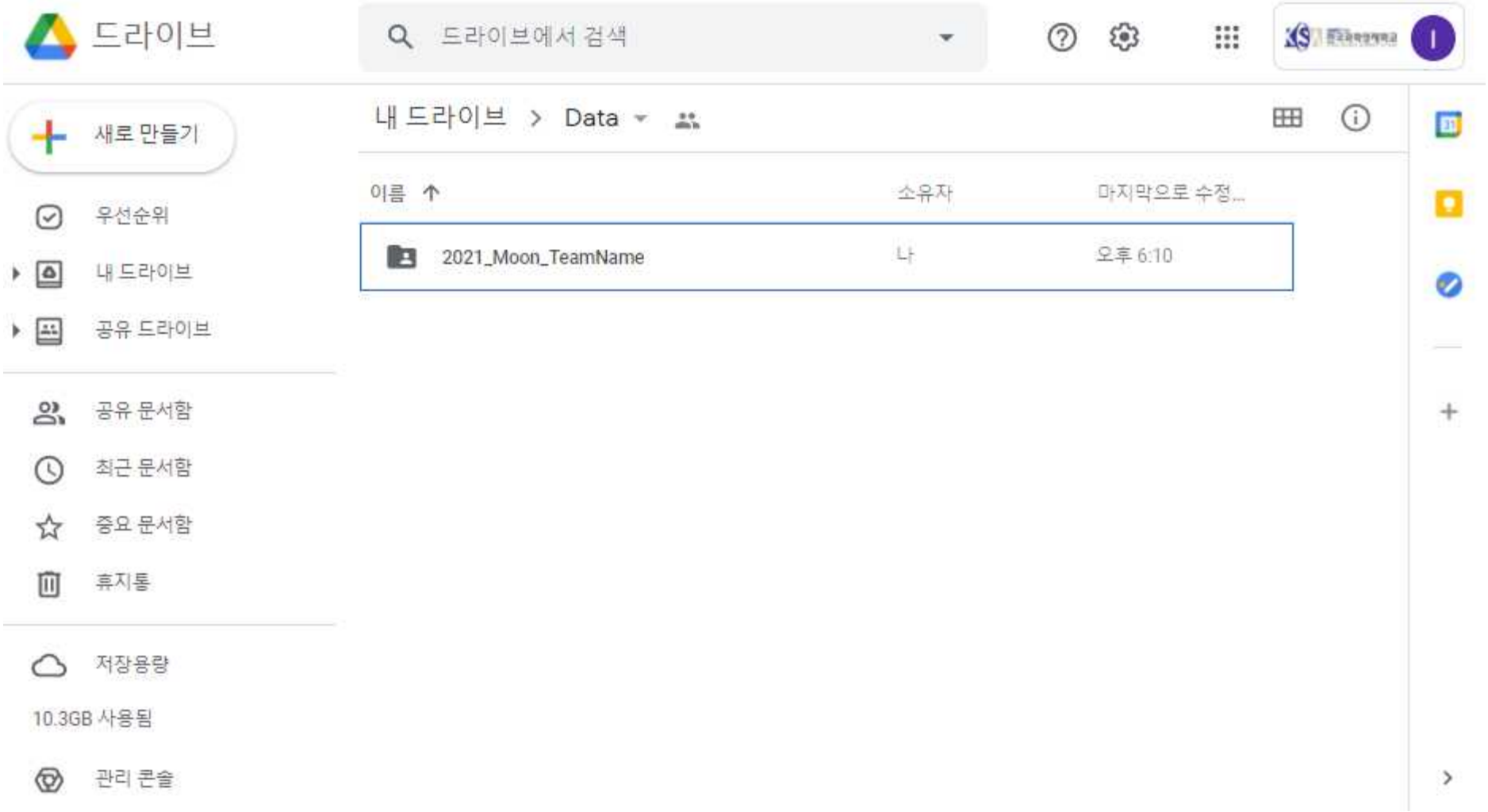
Template 시트2 탐색

Keeping Records



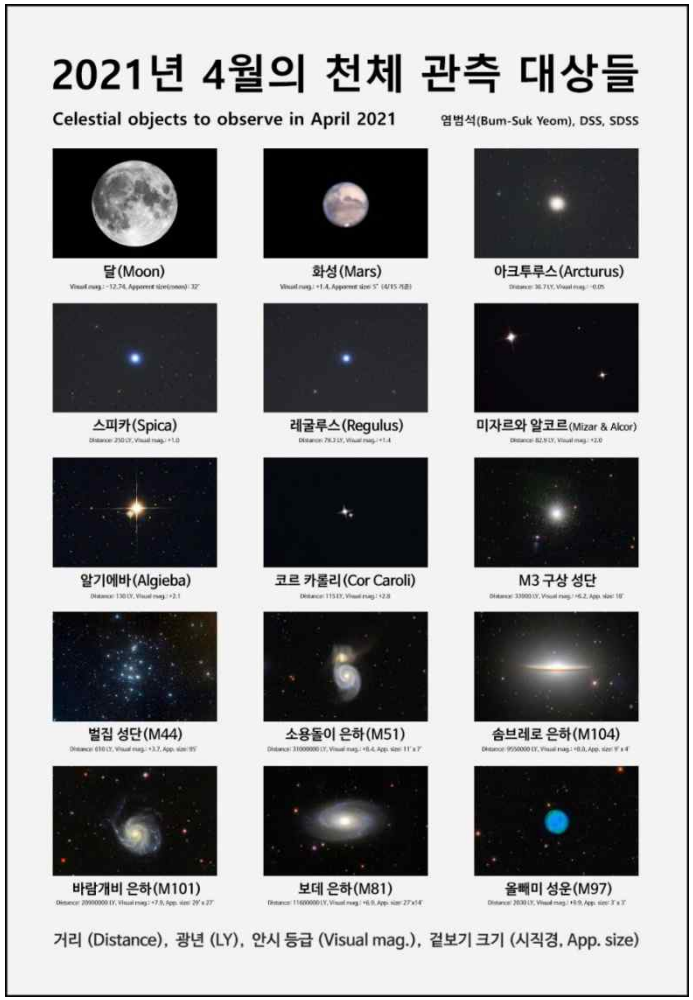
Target Today

The Moon
(There will be two more in collaboration)

For determining eccentricity of the Moon's orbit

Target Today

Today is good condition to take astrophotography because of no moon

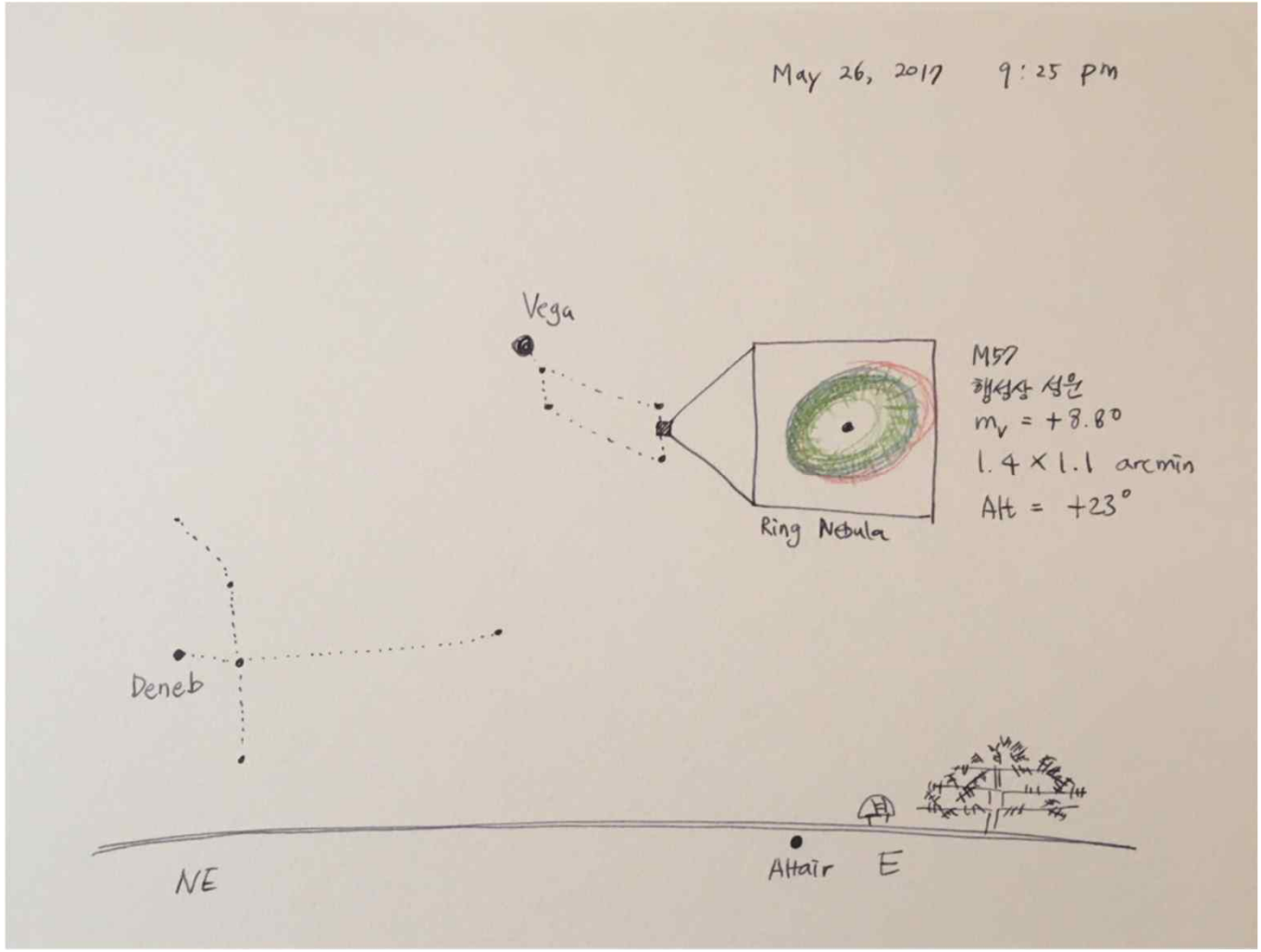


Early Evening:
Orion Nebula

M3
M44
M51
M104
M101
M81
M97

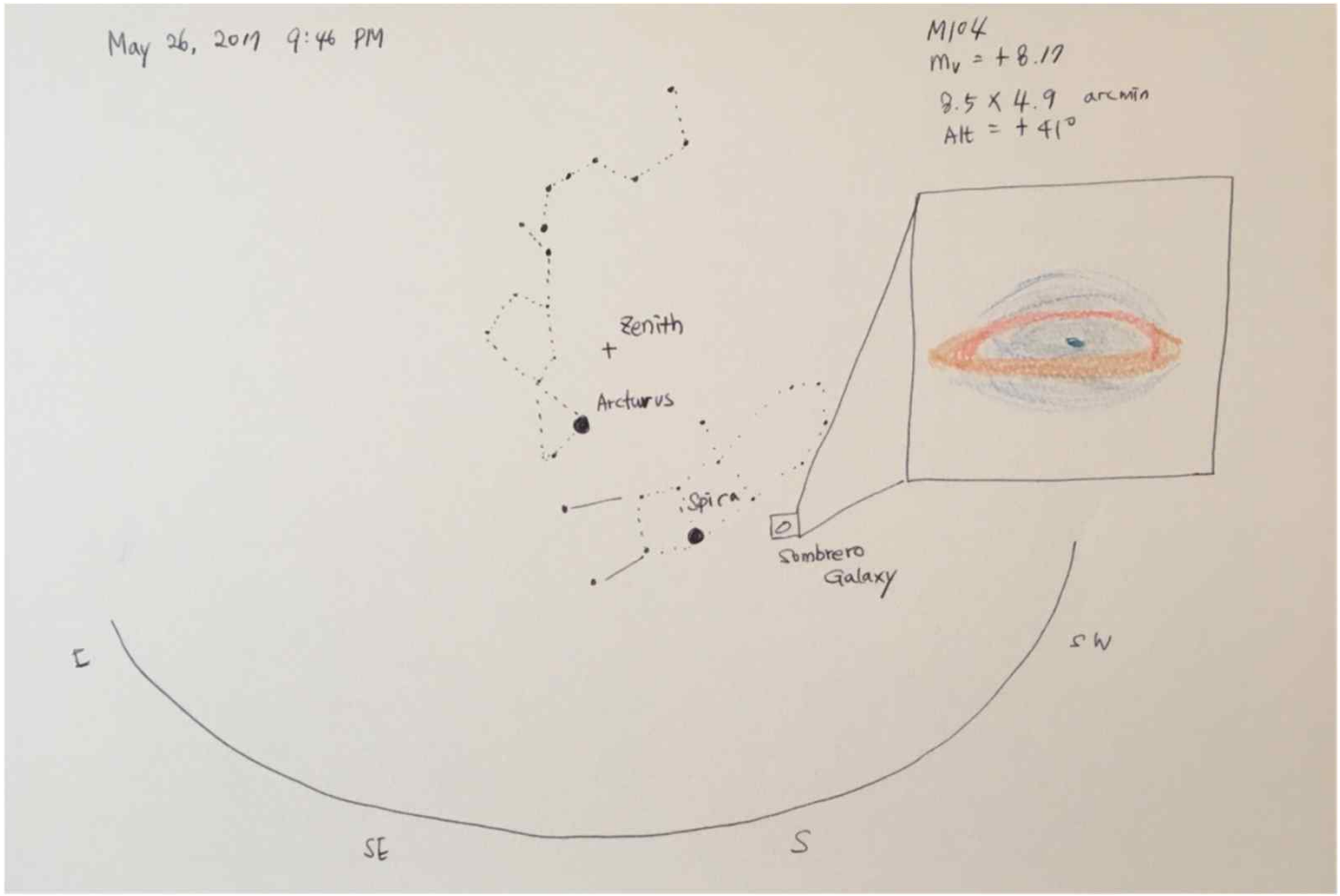
대상 사진 촬영

예,


May 26, 2017 9:25 pm
Vega
Ring Nebula
M57
행성상 성운
m_v = +8.80
1.4 × 1.1 arcmin
Alt = +23°
Deneb
NE
Altair
E

대상 사진 촬영

예,


May 26, 2017 9:46 PM
M104
m_v = +8.17
8.5 x 4.9 arcmin
Alt = +41°
Zenith
Arcturus
Spica
Sombrero Galaxy
E
SW
SE
S

Camera Setup

관측 카메라 셋업

You have English Document

1.1 DSLR 카메라 세팅

Cannon 70D

메뉴얼 모드 (M) 를 선택하여 메뉴얼 상태의 메뉴를 선택할 수 있게 한다 (그림 1.1).

raw image 생성 선택 raw image 와 좋은 화질로 저장될 수 있도록 선택 (그림 1.2)

센서 클리닝 센서 클리닝 OFF. FLAT 영상을 얻어 더 효율적으로 제거할 것임 (그림 1.3)

노이즈 감소 노이즈 감소 기능 OFF. DARK 영상을 얻어 더 효율적으로 제거할 것임 (그림 1.4)

날짜 확인 관측날짜와 시간의 기록 중요함 (그림 1.5)

LCD 밝기 조정 최대 밝기로 설정. 어두운 별을 확인하기에 좋음 (그림 1.6)

화이트 밸런스 화이트 밸런스 태양광으로 셋업 (그림 1.7)

Figure 1.2: raw image 생성 선택

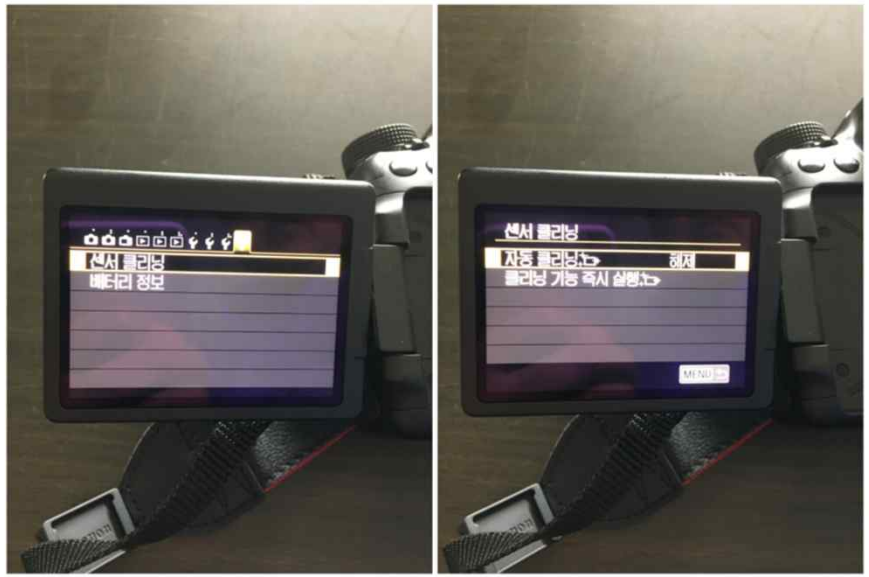


Figure 1.3: 센서 클리닝 해제

Figure 1.4: 노이즈 감소 기능 해제

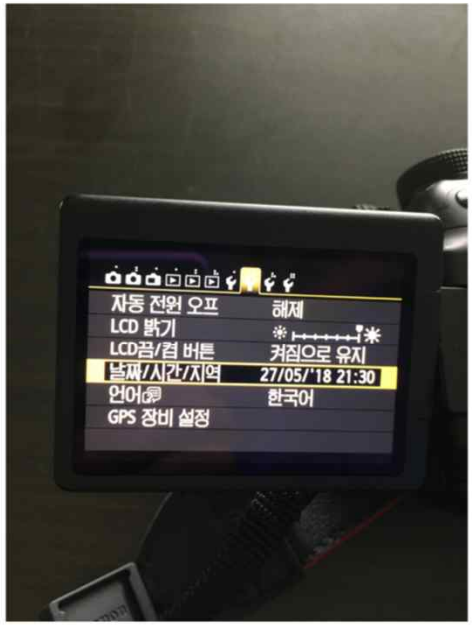


Figure 1.5: 날짜와 시간 설정

Figure 1.6: LCD 밝기 조정

Figure 1.7: 화이트 밸런스 - 태양광

In Practice

- Today's objective:
  Taking photo of the Moon
- Using Basket for Accessories
- Make sure the best focused image and copy the file (then, clear the files on Camera for the next use)
- Write the logbook on Google Classroom
- Upload the file with proper filename on Google Drive (As it is is the best)
- Important!! Safety first
- Class plan