



Dear customer, welcome to the CHILESCOPE remote imaging world!

This document will help you to understand all necessary steps you need to take to acquire the high quality Deep Sky images using CHILESCOPE services.

CHILESCOPE team is proud to propose you remote imaging services under dark and clear Chilean sky.

Our site has about 300 clear nights per year and sub-second seeing condition. This provides astrophotographer with unique opportunity of high-resolution imaging.



You have choice of four telescopes to operate

Telescope 1

Richie- Chretien optical system
Aperture 1000mm
F:6,8
Two Nesmith focuses
Mount. AltAz, direct drive
Field rotators in both focuses
Camera. FLI ProLine 16803
FOV 18,2X18,2 arc min
PA depends on guiding star
Scale 0,27 arc sec/pix
Filters: LRGB, Ha, Oiii, Sii, R-Sloan



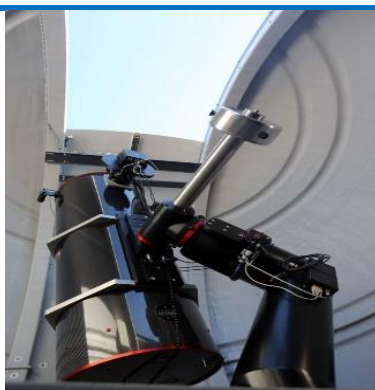
Telescope 2

ASA Newtonian with field corrector
Aperture 500mm
F:3,8
Mount ASA DDM85 equatorial mount with direct drives
Camera. FLI ProLine 16803
FOV 65X65 arc min
PA 270 deg
Scale 0,9 arc sec/pix
Filters: LRGB, Ha, Oiii, Sii



Telescope 3

ASA Newtonian with field corrector
Aperture 500mm
F:3,8
Mount ASA DDM85 equatorial mount with direct drives
Camera. FLI ProLine 16803
FOV 65X65 arc min
PA 270 deg
Scale 0,9 arc sec/pix
Filters: LRGB, Ha, Oiii, Sii



VST (Very Small Telescope)

Nikkor 200:2 lens
Mount 10 Micron 1000HST
Camera FLI Microline 16200
FOV 7,7 X 6,3 deg
PA 0 deg
Scale 6,3 arc sec/ pix
Filters: LRGB, Ha, Oiii, Sii



Telescope5

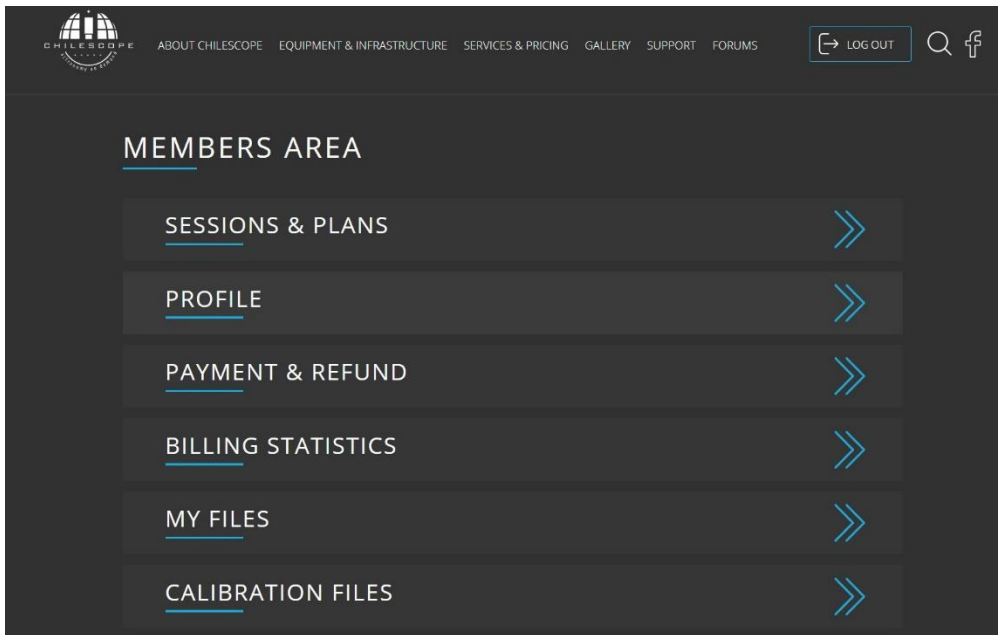
Officina Stellare RH200 F/3
Mount Astro-Physics 1200GTO
Camera FLI Microline 16200
FOV 2,6 X 2,1 deg
PA 90 deg
Scale 2 arc sec/ pix
Filters: LRGB, Ha, Oiii, Sii



1. Sign up on our web portal www.chilescope.com. Enter your user name, password and e-mail address. All

alerts regarding your imaging sessions will be sent to this e-mail address.

2. After registered you allow access to Members Area where you can plan your observing sessions, monitor your observations, upload FITS files and so on.
[SESSIONS and PLANS](#) section. Schedule your observing session, develop observing plan
[PROFILE](#). Maintain your personal data
[PAYMENT and REFUND](#). Make payments through PayPal system, use available discounts
[BILLING STATISTICS](#). Monitor your balance and all financial transactions
[MY FILES](#). Upload FITS files acquired during your sessions
[CALIBRATION FILES](#). Upload calibration files according to the telescope used, exposures, sensor temperature and so on



3. You can replenish your account in [PAYMENT](#) and [REFUND](#) section.

PAYMENT & REFUND

We have one base Pricing Plan — 200 USD per hour of observation. But we have nice discounts :) The more your total income is — the bigger is the discount!

YOUR PAY

\$

YOUR CURRENT DISCOUNT IS

0 %

YOUR GET

0 POINTS

[PAY NOW](#)

CUMULATIVE DISCOUNT

You get more points paying the same amount of money as your total payment sum rises

Payment Sum (\$USD)	Discount (%)
0 - 500	0%
501 - 2000	5%
2001 - 4000	10%
4001 - 6000	15%
6001 and more	20%

4. The telescopes per frame rates and discounts are located in [PRICES](#) section of web portal. There are two types of discounts:
- [CUMULATIVE](#) discount. Depends on total (cumulative) amount you have transferred to CHILESCOPE account

MOON PHASE REFUND. Depends on Moon phase within the period of particular session

MOONPHASE	DISCOUNT (%)
NEW MOON	0
WAXING CRESCENT	50
FIRST QUARTER	35
WAXING GIBBOUS	50
FULL MOON	75
WANING GIBBOUS	50
LAST QUARTER	35
WANING CRESCENT	50

5. As soon as your balance is positive, you can start to plan your observing sessions and plans. Before creating sessions and plans on CHILESCOPE portal please do some preparatory work to plan your observation better. Choose the object you want to image. Using any planetarium software, check and determine the best date and time for observation. Check if the object size fits the FOV of telescope you plan to use. Think about session strategy (filters, exposures, focusing and so on).

Our scheduling system will automatically check if

- the object is higher than 30 deg above the horizon during the imaging plan
- the session time period fits the dark time (Sun is below -15 deg)
- customer balance is enough for session duration
- some other checks

6. As soon as you are ready with imaging strategy you can start session development

Go to section [SESSIONS and PLANS](#) and then go to [START OBSERVATION](#)

SESSIONS & PLANS

CURRENT STATUS



WEATHER: SUITABLE
TELESCOPE 1: OFFLINE
TELESCOPE 2: ONLINE
TELESCOPE 3: OFFLINE

START OBSERVATION

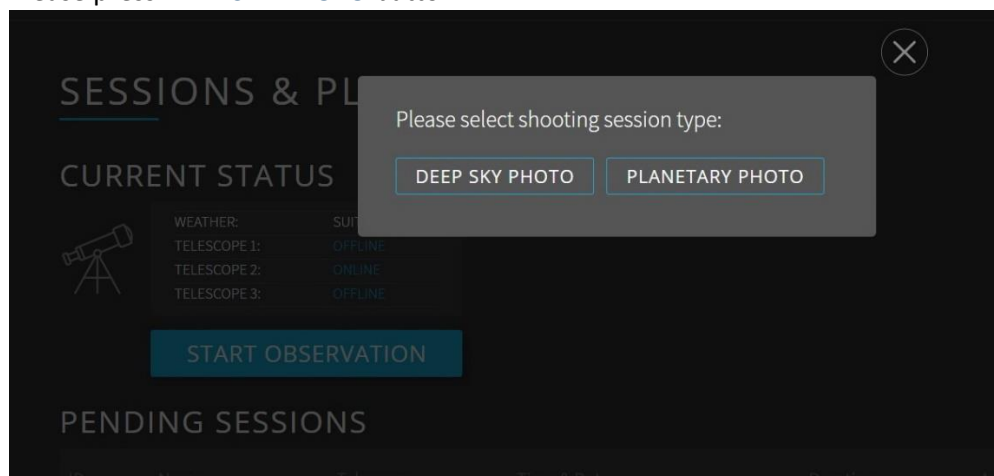
PENDING SESSIONS

ID	Name	Telescope	Time & Date	Duration	Actions
1362	2 galaxies-2	Telescope 2	20:12 PM 06/30/2017	8 hr 00 min	

FINISHED SESSIONS

ID	Name	Telescope	Time & Date	Duration	Actions
1315	Tomato test777	Telescope 1	23:00 PM 02/16/2017	1 hr 00 min	

7. The system will suggest you to choose **DEEP SKY** or **PLANETARY PHOTO**. Planetary sessions are not automated. The system just books observing time for you. The session is done manually with CHILESCOPE operator assistance. Planetary imaging can be done on Telescope 1 only (1m RC F:8). If you are interested in planetary please find appropriate manual on web site.
Please press **DEEP SKY PHOTO** button



8. Now you are ready to plan your sessions and plans.
Before session planning!
We highly recommend (especially for 1m telescope – Telescope1) to check the jetstreams forecast (seeing forecast strongly depends on jetstreams speed) if you are interested it high-resolution images here:
<http://www.chilescope.com/equipment-and-infrastructure/weather-conditions/seeing-jetstream-forecast/>

NOTICE, Telescope 1 (1m RC) is Alt-Az instrument so it has dead spot in Zenith area! The observations at Alt higher than 82 deg are NOT POSSIBLE! Please take this in consideration when planning your sessions.

NOTICE, time the system operates is UTC time!

Please input telescope you plan to use, date of session, start time of session, session name and session duration.

Notice! Minimum session time is 30 min! The session time can be increased with 10 minutes intervals (40 min, 50 min, 60 min.....)

During session, the system runs many technical operations to provide high quality images as a result.

We call these technical operations “observing session overheads”

You can see sample log below for better understanding:

- Slewing to the object
- Dome sync
- Pointing exposure
- Plate solve
- Looking for focusing star
- Slewing to focusing star
- Rotate the rotator to put guiding star on the sensor (on 1m telescope)
- Dome sync
- Focusing
- Slewing back to the object
- Dome sync
- Pointing exposure
- Plate solve and sync
- Starting autoguider
- Move star for dithering
- Move scope to center the star on guider sensor
- Settle down the guider
- And so on

Taking all this in consideration the system automatically adds 60% of total exposure time of plan (Telescope 2 and Telescope 3) to the session duration in order to compensate session overheads.

The system automatically adds 80% of total exposure time of plan (Telescope 1) to the session duration in order to compensate session overheads.

The system automatically adds 50% of total exposure time of plan (Telescope 4) to the session duration in order to compensate session overheads.

Booking 60 minutes session on Telescope 2 for example you actually book 96 minutes. These extra 36 minutes are free for the customer.

The system checks if

- the session time period fits the dark time (Sun is below -15 deg)
- customer balance is enough for session duration
- if your session intersects with another sessions
- some other checks

- you can see sunrise and sunset icons on the time scale for your convenience
 - you can save session and add observing plans later or start to add plans now
- Now your session is on the graph

CREATING A NEW SESSION (DEEP SKY)

Session name
Alpha Centaurus

Telescope
Telescope 2

Duration
3 hrs 0 mins

Date
07/19/2017

Choose time of beginning (local Chile time)
9 : 13 am pm

Available time periods:

8:16 PM 12:00 am 3:00 am 6:00 am 7:22 AM

telescope availability

Available time Scheduled sessions Your session Time for technical operations Scheduled session intersects with existing

Session Duration ?	Telescope-1 Rate	Moonphase Discount	Total Price
3 hour 0 minutes	60 pts	50 %	90 pts

CONTINUE TO ADD PLANS ADD PLANS LATER

[Exit without Saving](#)

Also you can check telescope availability on weekly, monthly and yearly basis by pressing appropriate link



9. If all session checks are ok, you can add observing plans to your session. Press [CONTINUE TO ADD PLANS](#).

Please input

- Object name
- Object coordinates (RA and DEC in 2000 epoch)
- Check all necessary checkboxes (focusing, auto guiding, dithering and others)
- Add all necessary filters (add new filter button) with appropriate counts of exposures, exposure duration and CCD binning
- Delete filter by pressing Delete button if needed
- Delete plan totally if needed by pressing Delete This Plan button
- Add another plan (another object) by pressing Add a Plan button

Plans of the Session

Plan #1

Starting at 20:12 29/06/2017

Target Name

Right Asc.

Declination

NGC4945

13 h 05 m 24 s

-49 ° 28 ' 00 "

Coordinates in J2000

☒ Autofocus at start

☐ Auto calibrate

☒ Autofocus every 40 min

☒ Auto guide

☐ Autofocus

☐ Pointing

☐ No solve

Dithering 6 (pixels rms, -1.0 for auto)

Count	Filter	Duration	Binning	
6	Lum	600	1	<input checked="" type="checkbox"/> Delete
6	Red	600	1	<input checked="" type="checkbox"/> Delete
6	Green	600	1	<input checked="" type="checkbox"/> Delete
6	Blue	600	1	<input checked="" type="checkbox"/> Delete

[Add new filter](#)

☒ Delete This Plan

Collapse

Plan #2

Starting at 7:00 30/06/2017

When you press “SAVE” the system automatically calculates actual time of your observing plan/plans according to formula:

For Telescope 2 and Telescope 3

When booking the session, the system automatically adds 60% of observing time to the plan. This is technical time.

$$\text{Total Plan Time} = \text{Total Exposure Time} + (N-1) \times S + (\text{Total Exposure Time} + (N-1) \times S) / \text{Int} \times 7$$

Where:

Total Exposure Time- Sum of all exposures in plan in minutes

N- number of frames in plan

Int- Interval of periodic autofocus

S= 3 if dithering is used

S=1 if dithering is not used

For Telescope 1

When booking the session, the system automatically adds 80% of observing time to the plan. This is technical time.

$$\text{Total Plan Time} = \text{Total Exposure Time} + (N-1) \times S + (\text{Total Exposure Time} + (N-1) \times S) / \text{Int} \times 10$$

Where:

Total Exposure Time- Sum of all exposures in plan in minutes

N- number of frames in plan

Int- Interval of periodic autofocus

S= 4 if dithering is used

S=1 if dithering is not used

For Telescope 4

The system automatically adds 50% of observing time to the plan. This is technical time.

In most cases this time is enough to finish the session since there is no guiding and dithering is much faster on VST

For example, you plan 120 min session on Telescope 3 and observing plan 12X 10min, dithering= 2, autofocus every 30 min

According to the formula actual plan duration will be 188 minutes

The system has booked 120 min +60%= 192 min for this session.

In this case you can book shorter session or add frames to the plan to use session time more efficient

Or you can press OK and save the session and plan as is

Another example:

You have booked 120 min session on Telescope 2 and observing plan 24 X 5 min, dithering =2, autofocus every 30 min

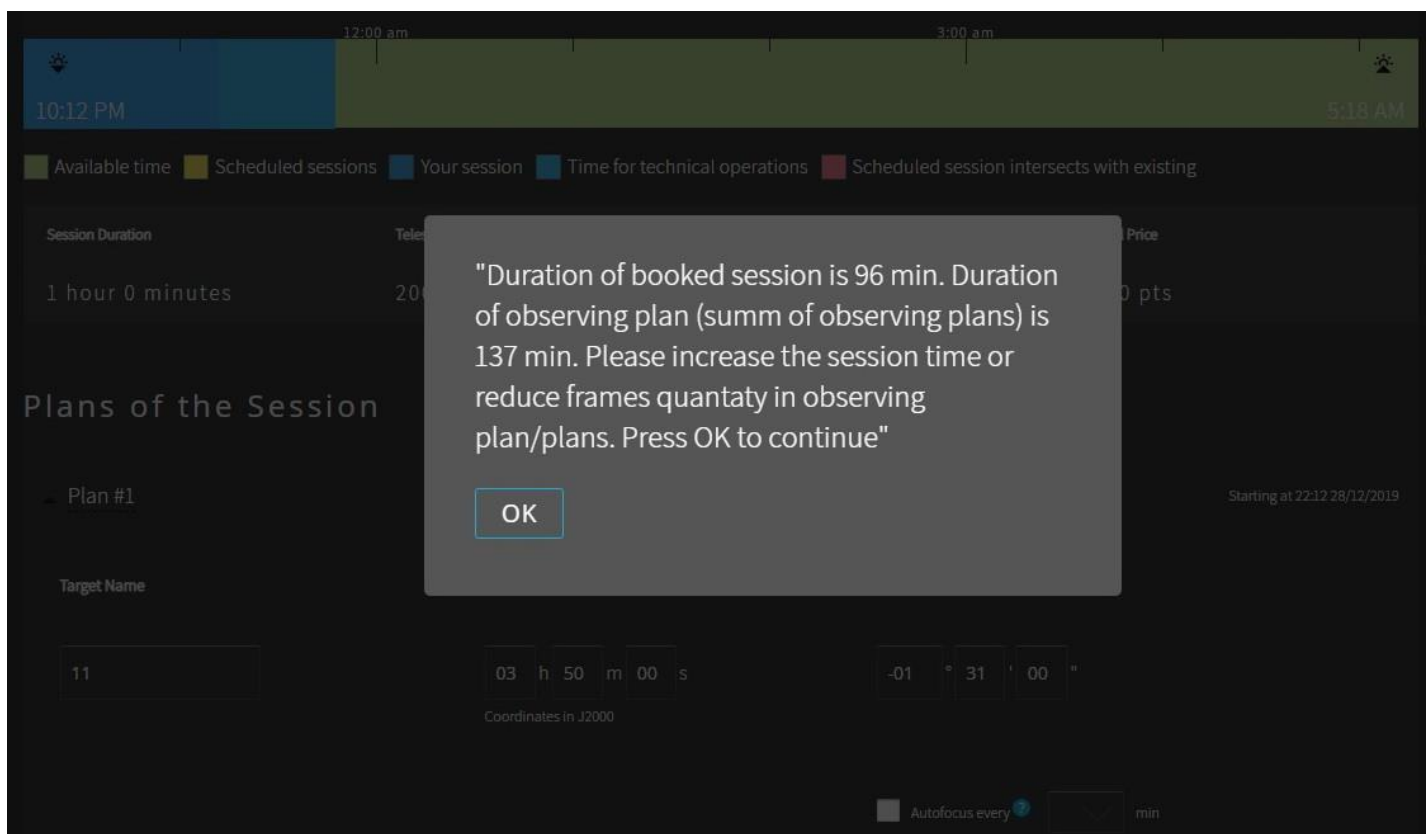
According to the formula, actual duration will be **224 min**

The system has booked 120 min +60%= **192 min for this session.**

In this case, you have two options:

- Book longer session
- Reduce the number of frames in the observing plan
-

When saving the observing plan the system will inform you about planned and actual session duration and suggest the options to optimize your observing session



Notice!

1m telescope (Telescope1) is Alt-Az instrument and it is equipped with de-rotators in both focuses. The FOV on guider sensor is very small so in 90% of cases there is no guiding star on sensor. To deal with this we use very smart script to find the suitable guiding star. The system makes test frame, plate solve it and find nearest guiding star. Then it rotates the rotator to put the star on the guider sensor. So the Position Angle (PA) is determined by the nearest guiding star position. If you observe the same object

next night the system used so-called “saved coordinates” – same RA, DEC and PA as in the previous session. It happens if the system sees no Observing Plan Name (object name) change! Please do not change the name of the Observing Plan (object name) if you are going to image the same object from night to night just to make sure the coordinates are the same!

10. Press **SAVE SESSION** button when ready with plans. Now your session has **PENDING** status and can be seen in **SESSIONS** and **PLANS** section of web site. You can edit or delete your pending sessions if needed. Attention! You cannot edit or delete your pending sessions after observatory startup time. This time is calculated as Sunset time on the date of observation – (minus) 3 hours. If you have not deleted the session until that time the session will execute and your balance will be credited. The finished sessions can be seen in **SESSIONS** and **PLANS** section as well. You can see logs of finished session to analyze the session strategy and to improve. In addition, you can create new session using finished sessions or pending sessions as templates. This is very useful function especially if you are imaging the same objects from night to night.

NOTICE!

If you have booked session only (no observing plan was created) please do not forget to edit the session later and create observing plan. If you forget to do this, the time will be booked but the telescope will stay doing nothing expecting the observing plan to execute. Such missed sessions will not be refunded! Please be attentive!


Attention!

If you press “Add Plan”, the session will be saved automatically even if you did not create and save the plan assuming you will create the plan later. In this case, you need to cancel the session in the list of your booked sessions. Please be attentive!

[SESSIONS](#)
[PROFILE](#)
[TELESCOPES & SENSORS](#)
[DETAILED STATISTICS](#)
[API FILES](#)
[CHECK FOR UPDATES](#)

SESSIONS & PLANS


CURRENT STATUS





















WEATHER:	SUITABLE
TELESCOPE 1:	OFFLINE
TELESCOPE 2:	ONLINE
TELESCOPE 3:	OFFLINE

START OBSERVATION

PENDING SESSIONS

ID	Name	Telescope	Time & Date	Duration	Actions
1362	2 galaxies-2	Telescope 2	20:12 PM 06/30/2017	8 hr 00 min	

FINISHED SESSIONS

ID	Name	Telescope	Time & Date	Duration	Actions
1315	Tomato test777	Telescope 1	23:00 PM 02/16/2017	1 hr 00 min	  
1316	TestSession	Telescope 1	05:35 AM 02/17/2017	1 hr 00 min	  
1332	Full Test	Telescope 2	21:10 PM 03/30/2017	1 hr 00 min	  
1333	Full Test	Telescope 2	21:00 PM 03/31/2017	1 hr 00 min	  
1335	Full Test	Telescope 2	22:00 PM 04/01/2017	1 hr 00 min	  
1340	Hardware test	Telescope 2	21:00 PM 05/19/2017	1 hr 00 min	  

- Now your session is created, saved and will execute automatically on date and time you have specified. Just after session starts, you will receive e-mail with session status and link to session log in real time. After session is finished you also can explore log file going to FINISHED SESSIONS section

System Status

[Help](#)

Hover the mouse over the links to see what they do

Observatory	Telescope	Imager	Activity	Plan
Offline	Offline	Offline	Idle	Set
Local: 06:22:57			FWHM	Target
UTC: 10:22:56	HA: View	Filter N/A		Repeat
LST: 00:18:32	RA: View	Binning 256		Filter
Owner Free	Dec: View	Guider		Count
Weather N/A	Az: View	Offline		Tracking Errors
	Alt: View	Interval (sec) 100		
	Air: View	Error Ex: View		
		(pix) Ey: View		

























[Show/Hide Run Log and Abort Control](#)

[Stop Run](#)

```
Parking dome
DOME at home
Parking scope
OK
Telescope close cover
Telescope stop fans
Telescope motor off
Disconnecting Scope
Disconnecting weather.
Shutting down imager. Please wait...
(raising temperature to +5.0C... 20 min max)
(cooler is now at -30.0C)
(cooler is now at -22.1C)
(cooler is now at -12.2C)
(cooler is now at -3.4C)
(cooler is now at 2.6C)
(cooler is now at 6.0C)
OK, imager shutdown complete.
Shutting down programs
```

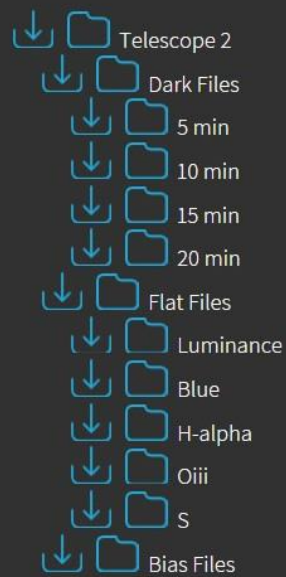
- After session is finished all FITS are uploaded to our FTP server and then are available for download. Please go to [MY FILES](#) section and download. You can download both every particular file or whole folder (all images made during imaging plan)

MY FILES

		2017-02-17_TestSession_Telescope 1
		2017-03-31_Full Test_Telescope 2
		2017-03-31_Full Test_Telescope 2_1 2-S001-R001-C001-Luminance.fts 2-S001-R001-C002-Luminance.fts
		2017-04-01_Full Test1_Telescope 2
		2017-04-01_Full Test1_Telescope 2_1
		2017-04-01_Full Test1_Telescope 2_2
		2017-04-01_Full Test_Telescope 2
		2017-04-01_Full Test_Telescope 2_1
		2017-04-02_Full Test1_Telescope 2
		2017-04-02_Full Test_Telescope 2
		2017-05-19_Hardware test_Telescope 2 TT1-S004-R001-C001-Blue.fts TT1-S004-R001-C001-Luminance.fts TT1-S004-R001-C002-Luminance.fts TT1-S005-R001-C001-Blue.fts TT1-S005-R001-C001-Luminance.fts TT1-S005-R001-C002-Luminance.fts
		2017-05-19_Hardware test_Telescope 2_1
		2017-06-28_2 galaxies_Telescope 2
		2017-06-29_2 galaxies_Telescope 2

13. The calibration files are acquired automatically and are located in [CALIBRATION FILES](#) section.
The calibration files are specified for each telescope, filter, exposure and so on. You can download any time you want

CALIBRATION FILES



14. As soon as your FITS files are on your hard drive you are ready for processing. Have fun!

15. Refunds

We give the refund for:

- Stars out of focus
- Bad tracking/guiding (elongated stars)
- Very bad seeing (FWHM more than 3")
- Wrong positioning (error more than 5 arc min)
- Uncompleted images

- Images affected by clouds
- Other cases caused by hardware or software errors

We do not refund

- Gradients on images caused by Moon light
- Wrong positioning (if the customer made a mistake during coordinates inputting)
- Missed observation (if the customer created the session but forgot to create/save the observing plan)

