

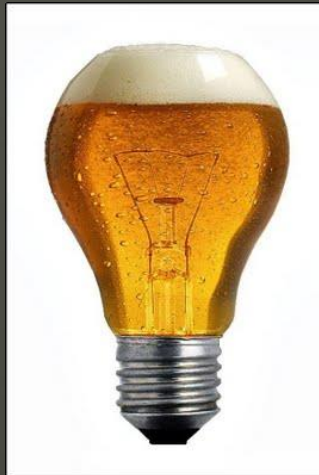


# CEDIC Team goes Chile

How to maximize the output of an  
astrophotography journey

# The beginning ...

- ◆ ... A meeting of four guys of the CEDIC team
  - Christoph Kaltseis
  - Herbert Walter
  - Wolfgang Leitner
  - Bernhard Hubl
- ◆ Discussing and planning CEDIC 2013
- ◆ After several beers a new idea was born!



# The idea ...

- ◆ Let's visit Daniel Verschats's new Chilean location for astrophotography – Hacienda Los Andes!



# First thoughts ...

- ◆ None of us has ever done an astrophotography trip to the southern sky.
- ◆ How should we start?
- ◆ What do we want?
- ◆ What do we need?





# Do we need a jeep?





Do we need horses?



Are we greenhorns?





# The solution ...

- ◆ Planning
- ◆ Planning
- ◆ Planning





## Six tips for ...

- ◆ ... maximizing the output of an astrophotography journey



## Tip #1 Prefer running systems

- ◆ Reduce the number of unknown interfaces and parameters of your setup(s)
- ◆ Prefer complete running systems

# Bring or Rent

B - Bring

R - Rent

Option	Mount	Telescope	Camera	Laptop	Ease of use
A	B	B	B	B	+++
B	R	B	B	B	+
C	R	R	B	B	-
D	R	R	R	B	+
E	R	R	R	R	++

- ◆ Option A: best, but only for very light mounts (star tracker)
- ◆ Option E: best solution for heavy systems



# Setups at Hacienda Los Andes

- ◆ Mainly option E (rent complete running system)



# Astro-Physics Starfire 130 EDF GT

- ◆ AP130 EDF GT
- ◆  $f/6.3$
- ◆  $f=819\text{mm}$
- ◆ SBIG STL11000
- ◆ Alt AD5





# Astro-Physics Starfire 175 EDF

- ◆ AP175 EDF
- ◆  $f/8.0$
- ◆  $f=1400\text{mm}$
- ◆ FLI PL 29050
- ◆ AP1200GTO
- ◆ Roll-off roof





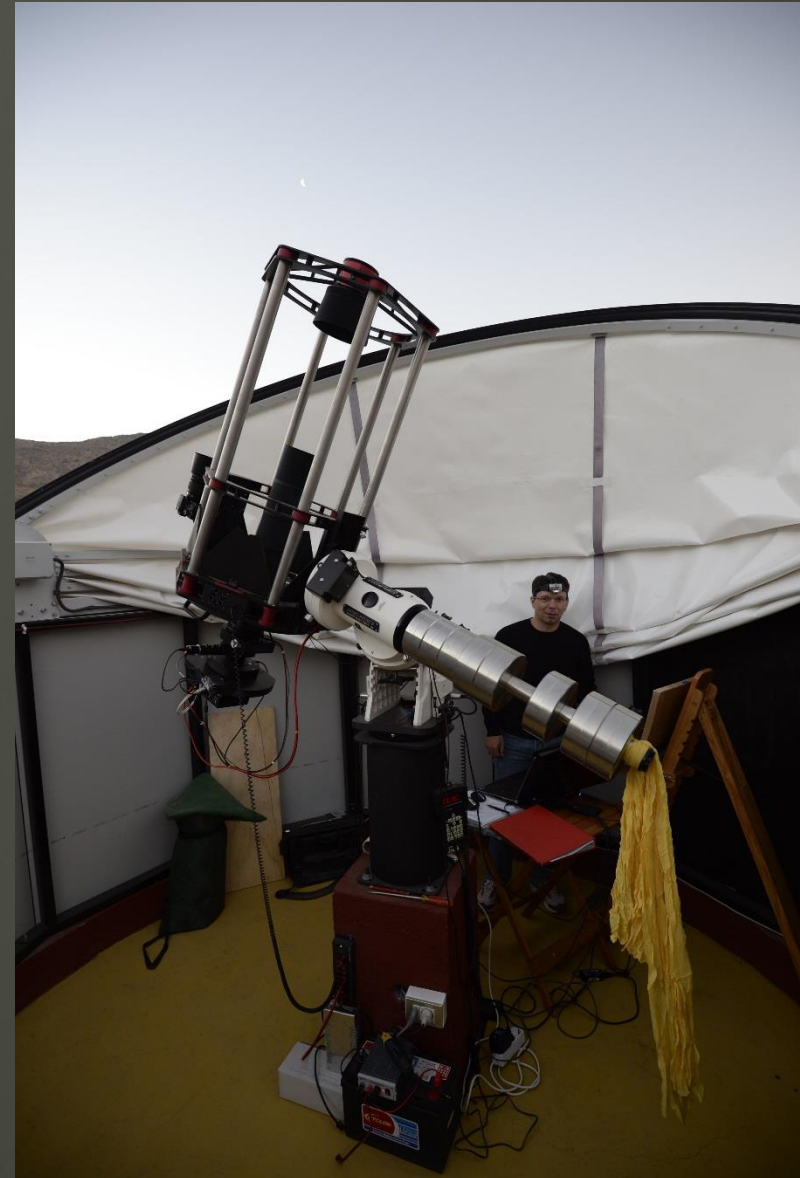
# RCOS RC 14.5" f/9.0

- ◆  $f=3315\text{mm}$
- ◆ FLI PL16070
- ◆ AP1200GTO
- ◆ Clam Shell



# TEC 500 RC 20" f/9.0

- ◆  $f=4572\text{mm}$
- ◆ FLI PL16803
- ◆ AP1600GTO
- ◆ Cabrio Dome





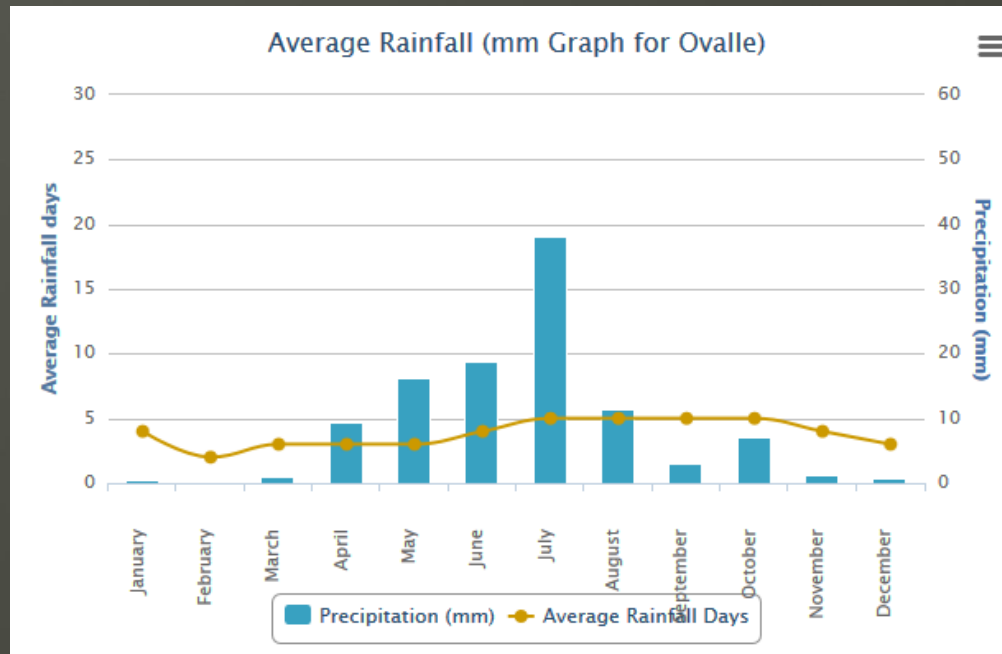
# Widfield

- ◆ Mainly option A (bring own complete system)
- ◆ Star tracker mounts
  - Several Astrotrac's
  - Vixen Polarie
- ◆ Telephoto lenses
  - Nikkor 200mm f/2.0
  - Canon EF 200mm f/2.8
  - Canon EF 135mm f/2.0
- ◆ Several wide-angle lenses

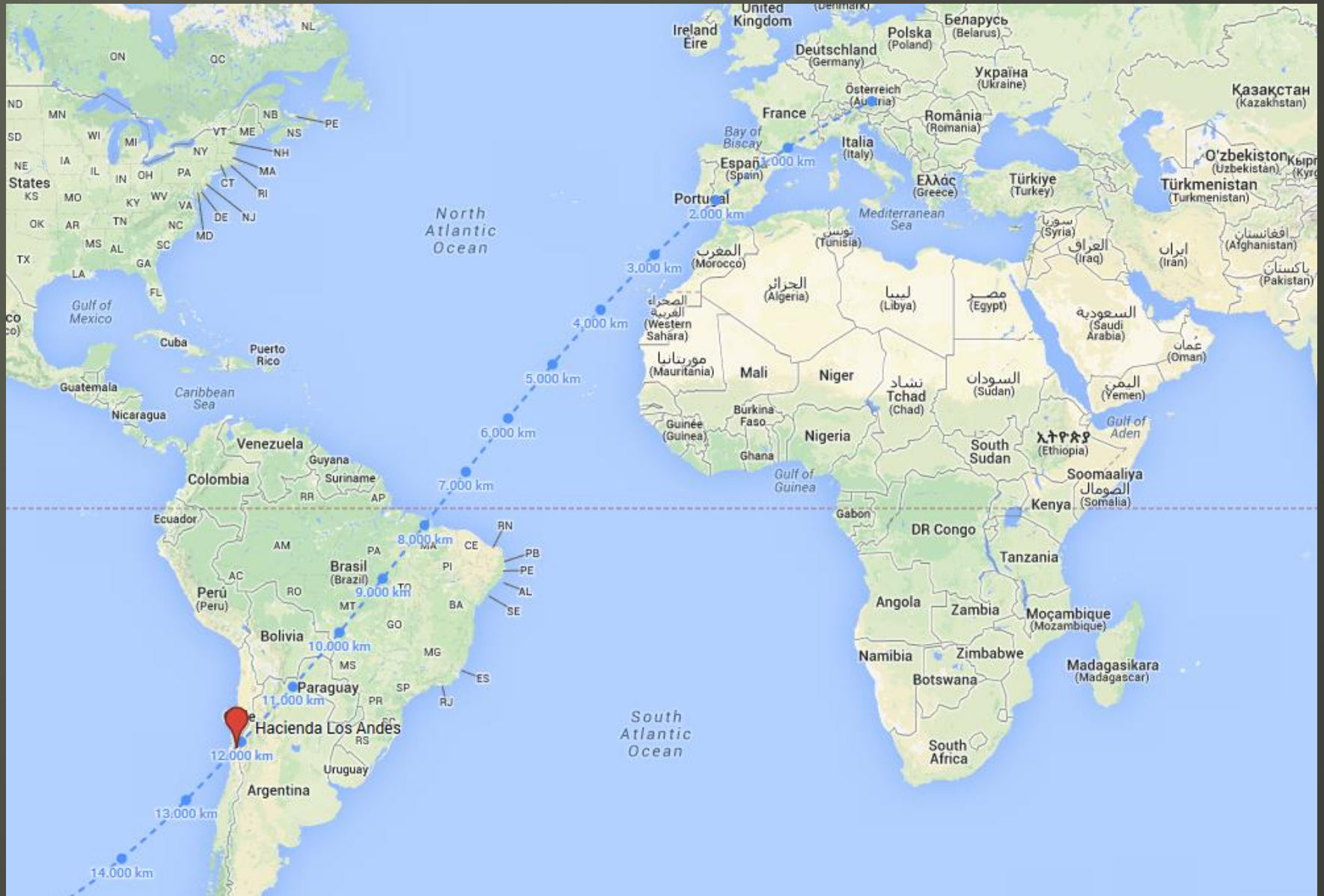


## Tip #2 Location and time

- ◆ Choose a location with excellent equipment and service
- ◆ Choose a location and a time with the highest probability for clear nights
- ◆ Especially important for the first trip
- ◆ Chile is perfect in February



# Location



# Location





# Location



Hacienda Los Andes  
Ovalle, Region IV  
Hurtado  
CHILE

30°17'50" S

70°42'44" W

Sea level: 1100m

[www.haciendalosandes.com](http://www.haciendalosandes.com)

## Tip #3 Travel in a team

- ◆ A team is more productive than individuals
- ◆ Planning within a team
  - Reduces risk that important issues are overlooked
- ◆ Use components together
  - Star tracker, flat field foil, telephoto lenses, ball heads, ..
- ◆ Solve problems together
- ◆ The most important advantage: More fun!



Source: Yuri Beletsky

## Tip #4 Run cameras in parallel

- ◆ Requirements:
  - Follow tips #1 and #2 (perfect setups and location)
  - Careful object planning (tip #6)
- ◆ Each team member can run 2 to 3 cameras
- ◆ Camera 1: main CCD camera
  - Long focal length
  - Always priority 1
- ◆ Camera 2: Piggy-back on main system
  - DSLR with a small refractor or telephoto lens
  - Main system and piggy-back point in the same direction
  - Not always useful
- ◆ Camera 3: star tracker
  - DSLR with telephoto lens or wide-angle lens





## Tip #5 Setup planning

- ◆ Gather information about ...
  - Components: Optics, mounts, filters, cameras, laptops, software, guiding
  - Restrictions and basic conditions: mounting of piggy-back optics, flat fielding
- ◆ Include also potential components
- ◆ Create detailed lists



orange Felder: Info bzw. Entscheidung fehlt noch



## Tip #5 Setup planning

- ◆ Decide all open questions:
  - Fix all components of all setups
  - Who is responsible for which setup?
  - Which parts of your own equipment are necessary?

# Data of potential setups

CHILE 2014		Setuplisten Herbert Walter v9																
	FIX	Optic	Imagetrain	Montierung	FL [mm]	Kamera	Guiding	Filter	px/arcs	FOV ["]	notw. Software	notw. Treiber	Laptop <sup>(4)</sup>	Photograph <sup>(5)</sup>	Flattener	Reducer	notw. Adapter	Flatfield <sup>(6)</sup>
1 <sup>(1)</sup>	Kuppel 2	TEC 500RC 20" f/9	fix, v. Daniel	AP1600GTO	4572	FLI PL16803	MOAG Lodestar	LRGBH50	0,41	28 x 28	Maxim, SkyFlats	?	BXP	Bernhard	ja	x	x	Skyflat <sup>(1)</sup>
1a		inkl. TEC110FL 110mm/f5.6	nein		616	Canon 1000D			1,91	124 x 83			BXP	Bernhard	ja	x	für CanonDSLR vorhanden	Folie
2	Kuppel 1	RCOS 14,5" f/9	fix, v. Daniel	AP1200GTO	3315	FLI PL16070	MOAG Lodestar	LRGBH50	0,46	37 x 25	Maxim, SkyFlats		D2	Herbert	ja	x	x	Skyflat <sup>(1)</sup>
2a		inkl. Refractor AP Traveler 105 EFS, 4.1"/f6	nein		600	Canon 1100Da			1,79	127 x 85	EOS Utility			Herbert	ja	x	für CanonDSLR vorhanden	Folie
3 <sup>(2)</sup>	Roll off	TEC APO200FL f/8	fix, v. Daniel	AP1200GTO	1600	FL PL 29050	aader Variofinder, Lodesta	LRGBH50	0,71	78 x 52	Maxim	?		Wolfgang	ja	x	x	Folie
3a		William Megrez (Wolfgang)	Wolfgang		342	DSLR Vollformat				362 x 241				Wolfgang	ja	ja		Folie
4	Kuppel 3	AP175ED f/8.3	fix, v. Daniel	AP1200GTO	1400	FL PL 29050	???	LRGBH50	0,81	89 x 59	Maxim	?	CWV	Christoph	ja	ja	x	Folie
4a		Huckepack DSLR via Kugelkopf												Christoph				
	Varianten	variable Optiken auf AD5																
5		AP130GT		AD5	820	SBIG 11000	intern	LRGBH50	2,26	156 x 108	?	?						
5a		DSLR Huckepack Kugelkopf möglich?			300													
6		?? Officina Veloce RH200 f/3 ??	Christoph	AD5	600	Nikon D800E	MGEM		1,68	206 x 138				Christoph	x	x		Folie
6a																		
	Kleinoptiken																	
7		Nikon 300 f2.8 (Christoph)		Astrotrac	300	EOS 6D				413 x 275	EOS Utility		BNet7	Bernhard	x	x		Folie
8		Nikon 200 f2.0 (Christoph)		Kuppel 3	200	D800E				619 x 413			kein	Christoph	x	x		Folie
9		Canon EF200 (Bernhard)		Astrotrac	200	EOS 6D				619 x 413	EOS Utility		BNet7	Bernhard	x	x		Folie
10		Canon EF135 (Daniel)		Astrotrac	135	EOS 6D				917 x 611	EOS Utility		BNet7	Bernhard	x	x		Folie
11		Canon EF200 (Herbert)		Fornax10	200	EOS 6D				619 x 413	EOS Utility		H8	Herbert	x	x		Folie
		Canon EF200 (Herbert)			200	Moravian		LRGBH		309 x 232	EOS Utility, Maxim <sup>(10)</sup>		H8	Herbert	x	x	für Canon Objektiv <sup>(10)</sup>	
12		Canon EF 100 (Herbert)			100	Moravian		LRGBH		619 x 464			H8	Herbert	x	x	für Canon Objektiv <sup>(10)</sup>	
		Canon EF 100 (Herbert)			100	EOS 6D				1238 x 825								
13		Canon EF 50 (Herbert)		Polarie	50	Moravian		LRGBH		2475 x 1650								
orange Felder: Info bzw. Entscheidung fehlt noch																		

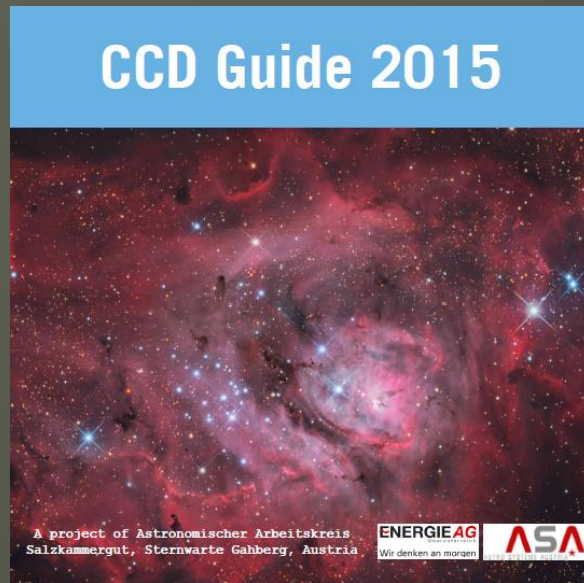


## Tip #6 Object planning

- ◆ Planning phase > 3 months
- ◆ 10 different setups
- ◆ 260 potential objects
- ◆ Overbook each main setup by a factor of 3
- ◆ Usage of a software (e.g. CCD-Guide)

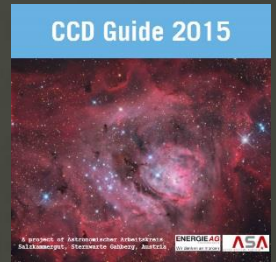


# What is CCD-Guide?



- ◆ Project of AAS
- ◆ Publication of the best images on DVD
- ◆ Yearly update

# Highlights of CCD-Guide



- ◆ Image + data browser
- ◆ 4500 images of 50 astrophotographers
  - new: Verschate, Schedler, Rusterholz, CEDIC team, ...
- ◆ Deep sky object database
  - new: SANDQVIST, DCLD
- ◆ Easy to search and to filter
- ◆ Slide show
- ◆ Input your own images
- ◆ Planner
- ◆ Minimal system requirements

# Planning with CCD-Guide

- ◆ Create setups (= telescope + camera)

Setups

Name  Telescope

Camera  Focallength [mm]

NAME	TELESCOPE	CAMERA
Chile_AP130	Astro-Physics 130mm f6.3 Starfi	SBIG STL-1
▶ Chile_AP175	Refractor	FLI PL29050
Chile_EF200	Canon EF 200mm f/2.8L	Canon EOS
Chile_RC14	RCOS 14.5" f/9	FLI PL16070
Chile_RC20	Ritchey-Chretien	FLI PL16800



# Planner

Browser | **Planner** | Edit Setup | Edit Object | Edit Picture | Options | Help | About

Edit

Setupname **Chile\_RC14**

Telescope = RCOS 14.5" f/9  
Camera = FLI PL16070  
Focallength = 3315mm / FOV = 37,2'x24,8'

Objectname **NGC 2442**

Set Object Objectname

State **0 - Image is missing**

Image From **FOV Image**

Imagename **Ref Image**

Planner Comm. Center RA: 07h 37m 06s, Center DE: -69° 30' 39"

FOV Image | Ref Image



Objectname  Find Object **Set Filter** Reset Filter

Slide Show Planetarium sky-map.org

18/44

PlannerData

SETUPNAME	STATE	PLANERCOMMENT	OBJNAME	OBJECTTYPE	OBJCLASS	RATXT	DETXT	CONSTELLATION
Chile_RC14	0	Center RA: 07h 37m	NGC 2442	Galaxy	SBbc	07h 36m 23.8s	-69° 31' 51"	Volans
Chile_RC14	0	mit RNPrioHe1; PrioE	NGC 2547	Open Star Cluster	II2p	08h 10m 09.0s	-49° 13' 30"	Vela
Chile_RC14	0	Sakib Rasool	NGC 3109	Galaxy	SBm	10h 03m 06.6s	-26° 09' 30"	Hydra
Chile_RC14	0	Ref Image - Willasch	NGC 3199	Emission Nebula	HII	10h 17m 24.0s	-57° 55' 18"	Carina
Chile_RC14	0	Center RA: 10h 26m	NGC 3250	Galaxy	E4	10h 26m 32.1s	-39° 56' 37"	Antlia
Chile_RC14	0	mit NGC 3263Center	NGC 3256	Galaxy	Sb/P	10h 27m 51.4s	-43° 54' 19"	Vela
Chile_RC14	0	Ref Image - CapellaS	NGC 3293	Open Star Cluster	I3r	10h 35m 51.0s	-58° 13' 48"	Carina
Chile_RC14	0	Center RA: 10h 43m	NGC 3347	Galaxy	SBb	10h 42m 46.6s	-36° 21' 12"	Antlia
Chile_RC14	0	Schlüsselloch-Nebel	NGC 3372	Emission Nebula	HII	10h 45m 06.0s	-59° 52' 00"	Carina
Chile_RC14	0	PrioWo1	NGC 3576	Emission Nebula	HII	11h 12m 02.0s	-61° 12' 18"	Carina
Chile_RC14	0	Center RA: 11h 35m	NGC 3742	Galaxy	SBab/P	11h 35m 32.1s	-37° 57' 22"	Centaurus
Chile_RC14	0		NGC 3766	Open Star Cluster	I1p	11h 36m 14.3s	-61° 36' 36"	Centaurus
Chile_RC14	0	Sakib RasoolPrioHe2	NGC 3981	Galaxy	SBbc	11h 56m 07.0s	-19° 53' 50"	Crater
Chile_RC14	0	Sakib Rasool	NGC 4650	Galaxy	SB0-a	12h 44m 19.4s	-40° 43' 55"	Centaurus

Save

Delete

New

Clone

# ObjectBrowser

- ◆ Access to 35,000 objects
- ◆ Filter

**Set Filter**

Object Criteria

RA2000  [h]  [h]  
 DE2000  [°]  [°]  
 Object Size >  5 [''] <  20 ['']

Constellation  Carina  
 Catalogue

Excellent Picture of object  
☐ Exist  
☐ Not Exist  
☒ Full

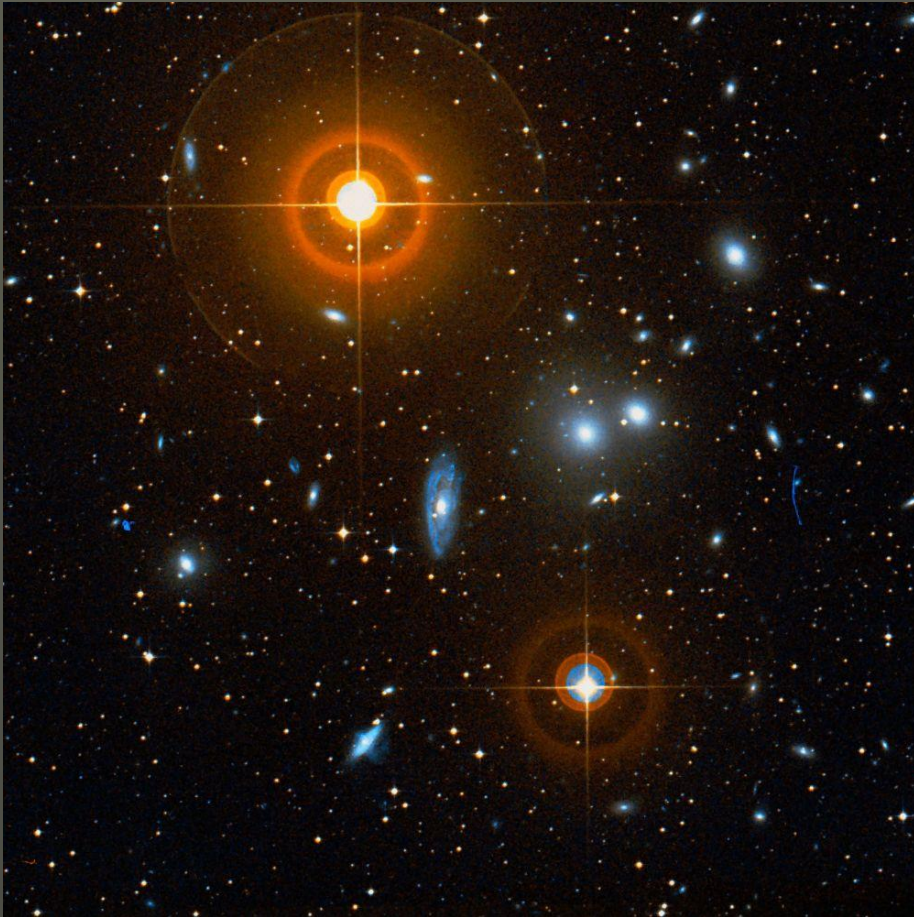
Objecttype

- ☐ Comet
- ☐ Constellation
- ☐ Dark Nebula
- ☐ Emission Nebula
- ☐ Galaxy
- ☐ Galaxy Cluster
- ☐ Galaxy Group
- ☐ Globular Star Cluster
- ☐ Milky Way
- ☐ Minor Planet
- ☐ Moon
- ☐ Not Found
- ☒ Open Star Cluster
- ☐ Part of Galaxy
- ☐ Planet
- ☐ Planetary Nebula
- ☐ Reflection Nebula
- ☐ Star(s)
- ☐ Sun
- ☐ Supernova Remnant

Find Object **Set Filter** Reset Filter ☐ Simple ☐ Image ☐ User ☒ Object ☐ Full     sky-map.org 3/29

OBJECTNAME	OBJECTTYPE	OBJCLASS	RATXT	DETXT	CONSTELLATION	OBJSIZE	MAG	
IC 2714	Open Star Cluster	II3m	11h 17m 22.0s	-62° 43' 18"	Carina	15	8,2	
NGC 2609	Open Star Cluster	OCL	08h 29m 30.0s	-61° 06' 36"	Carina	6		
NGC 3496	Open Star Cluster	III1m	10h 59m 36.0s	-60° 20' 12"	Carina	7	8,2	
NGC 3519	Open Star Cluster	III2p	11h 04m 02.7s	-61° 22' 05"	Carina	8	7,7	
NGC 3572	Open Star Cluster	I2m	11h 10m 26.6s	-60° 14' 38"	Carina	7	6,6	

# FOV image

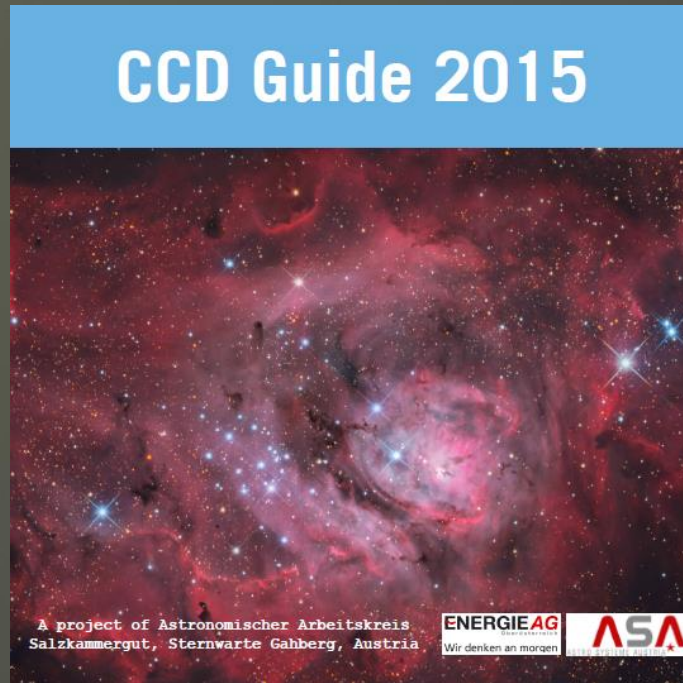




# Summary: Planning works 😊

- ◆ 3 weeks, 4 guys, 10 cameras (CCD + DSLR)
- ◆ Over 300 hours exposure time (only CCD!)
- ◆ Over 500 GB raw data (CCD+DSLR)
- ◆ Over 1 year of image processing
- ◆ Over 100 very good images
- ◆ 3 APODs

# CCD-Guide for each astro-trip!



- ◆ [www.ccdguide.com](http://www.ccdguide.com): 29 EUR
- ◆ CEDIC 2015 special edition: 25 EUR

