

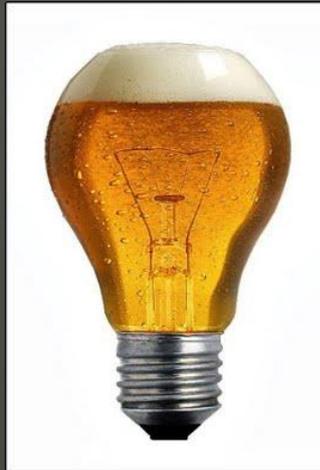


# CEDIC Team goes Chile

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!



NightWaves | Hacienda Los Andes / Chile 2014 | Nils U. & M. A. | Christoph Kalkas

# 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=819mm
- ◆ SBIG STL11000
- ◆ Alt AD5



# Astro-Physics Starfire 175 EDF

- ◆ AP175 EDF
- ◆ f/8.0
- ◆ f=1400mm
- ◆ FLI PL 29050
- ◆ AP1200GTO
- ◆ Roll-off roof



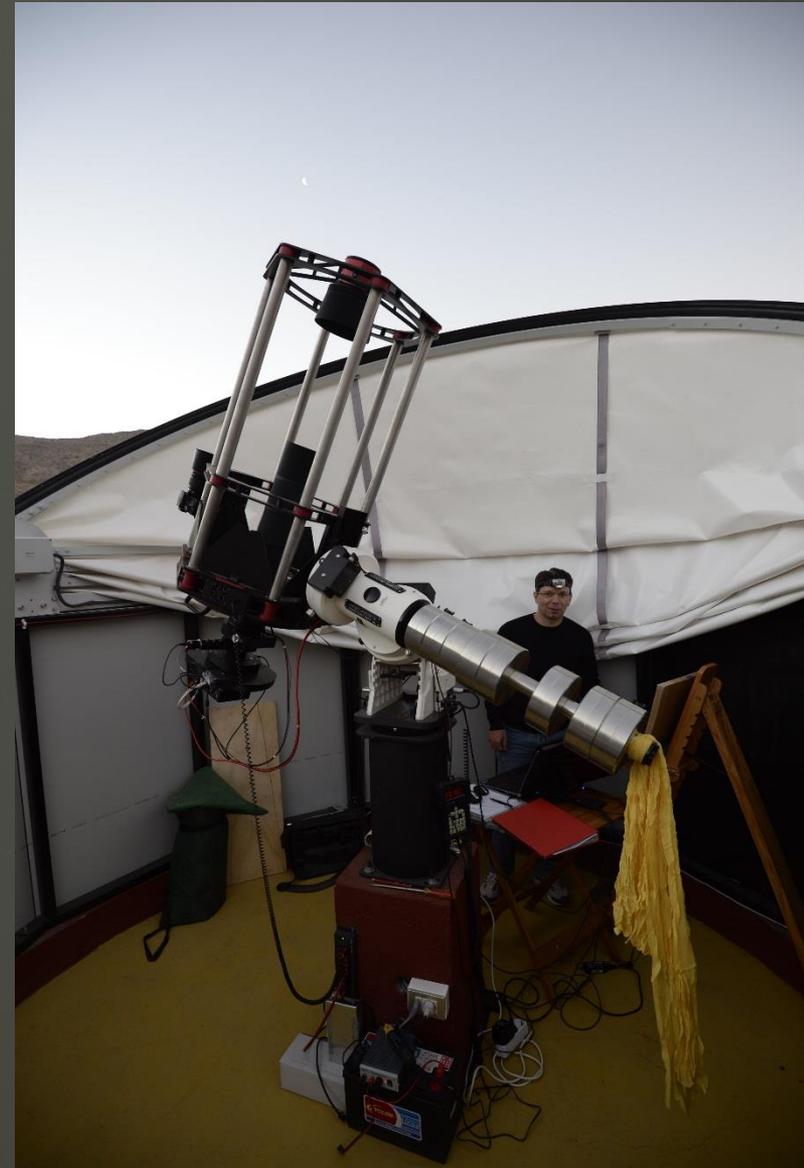
# RCOS RC 14.5" f/9.0

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



# TEC 500 RC 20" f/9.0

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

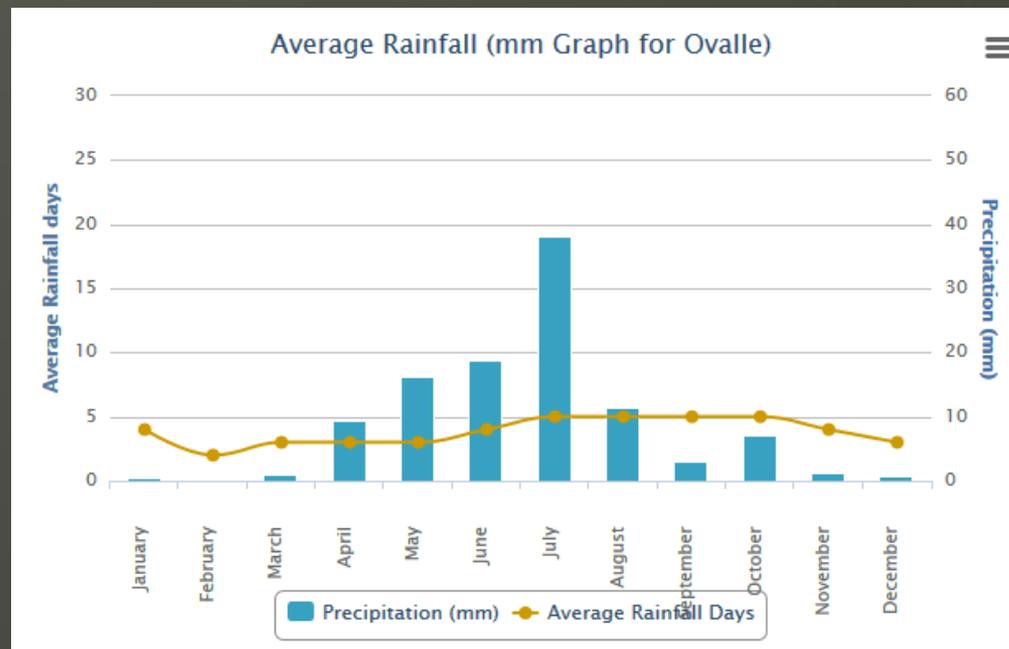


# Widefield

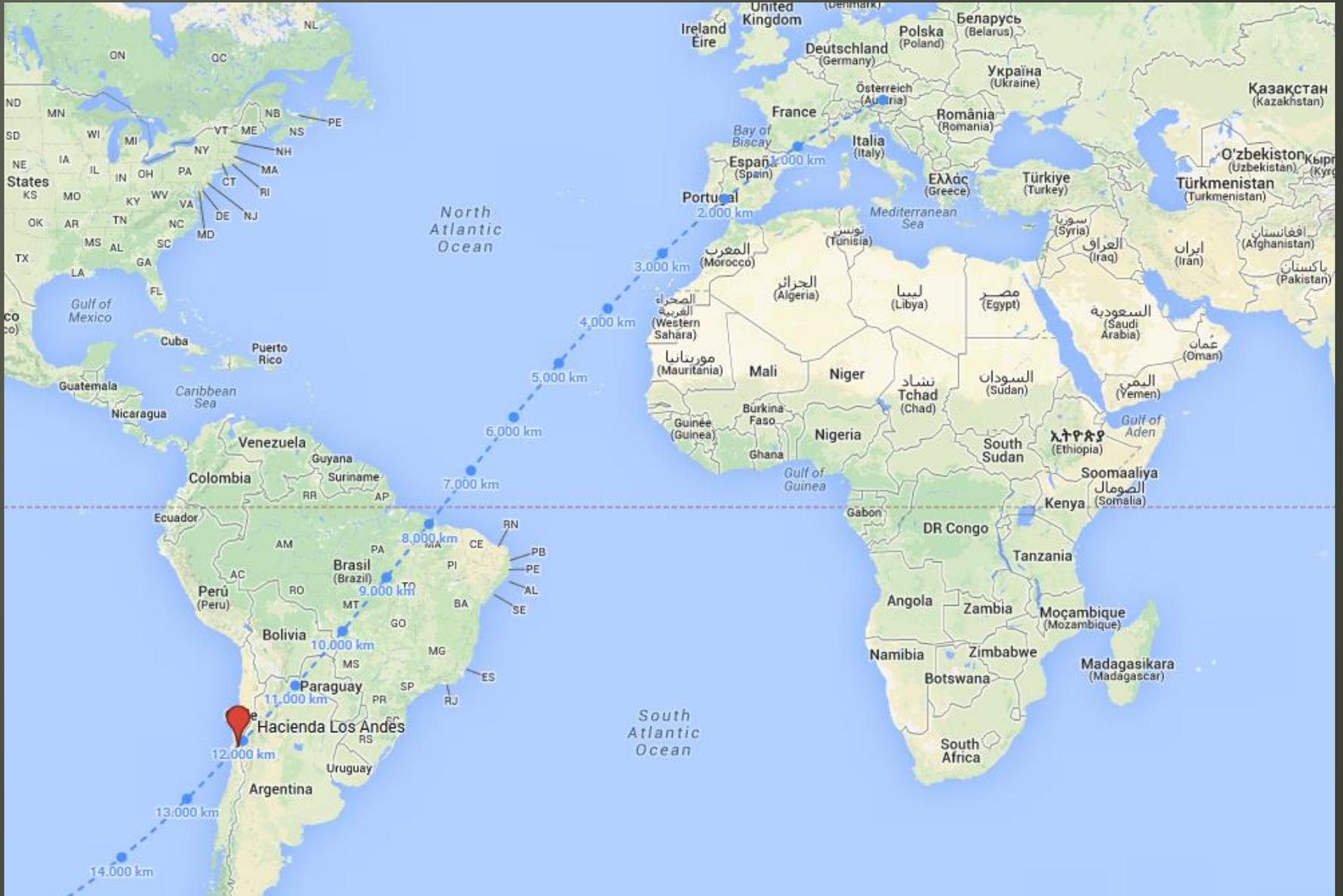
- ◆ Mainly option A (bring own complete system)
- ◆ Star tracker mounts
  - Several Astrotrac's
  - Vixen Polaris
- ◆ Telephoto lenses
  - Nikkor 200mm f/2.0
  - Canon EF 200mm f/2.8
  - Canon EF 135mm f/2.0
- ◆ Several wide-angle lenses

## 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

# Data of potential cameras

CHILE 2014				Setuplisten Herbert Walter v9					
C A M E R A	CCD	Filter	DSLR	C H I P	x [mm]	y [mm]	Pixel [μ]	Pixel x	Pixel y
Daniel	FL PL 16803	Astrodon LRGB HSO		FL PL 16803	36,8	36,8	9	4096	4096
	FL PL 16070	FL LRGB, Astrodon HSO		FL PL 16070	36	23,9	7,4	4864	3232
	FL PL 29050	FL LRGB, Astrodon HSO		FL PL 29050	36,2	24,1	5,5	6576	4384
	FL PL 29050	FL LRGB, Astrodon HSO							
	SBIG 11000	LRGB HSO		SBIG 11000	37,25	25,7	9	4008	26
Christoph	QSI 8300m - inkl. (!) netbook	L/R/G/B ? 1,25"	Nikon D800E						
	? OSC ?		Nikon D800E + Nikon 200mm f2.0						
			Nikon DF	8300	18	13,5	5,4	3326	2504
Herbert	Moravian 8300m	L/R/G/B/Ha/OIII 1,25"	Canon EOS 6D	4000c	15,2	15,2	7,4	2048	2048
Wolfgang			Nikon	2000XM	11,8	8,9	7,4	1600	1200
			Canon 1100Da						
				Canon EOS 6D	36	24	6,25	5496	3670
Bernhard			Canon EOS 6D	Canon EOS 1000D	22,2	14,8	5,7	3888	2592
			Canon EOS 1000D						
				Canon 1100Da	22,2	14,8	5,2	4272	2848
				Nikon D800E	36	24	4,88	7378	4924
				Nikon D700	36	24	8,45	4256	2832

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?

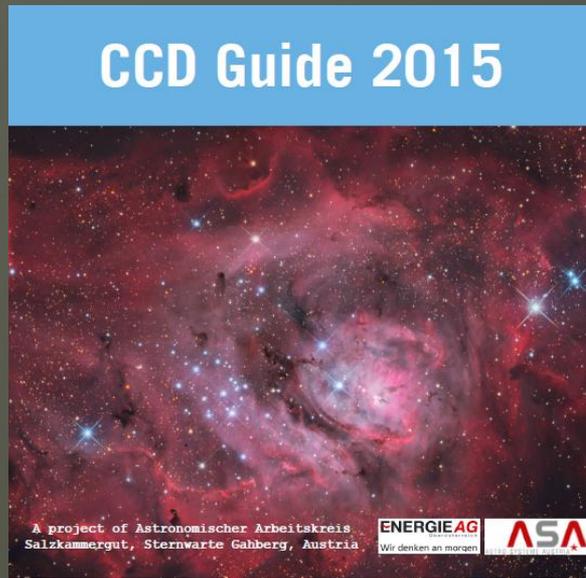
# Data of potential setups

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	LRGBHSO	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	LRGBHSO	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	LRGBHSO	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	???	LRGBHSO	0,81	89 x 59	Maxim	?	CWV	Christoph	ja	ja	x	Folie	
4a		Huckepack DSLR via Kugelkopf												Christoph					
	<b>Varianten</b>	<b>variable Optiken auf AD5</b>																	
5		AP130GT		AD5	820	SBIG 11000	intern	LRGBHSO	2,26	156 x 108	?	?							
5a		DSLR Huckepack Kugelkopf möglich?			300														
6		?? Officina Veloce RH200 f/3 ??	Christoph	AD5	600	Nikon D800E	MGEN		1,68	206 x 138				Christoph	x	x		Folie	
6a																			
	<b>Kleinoptiken</b>																		
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>(8)</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																			
<sup>(1)</sup> in Arbeit - wird fertig - Stand Nov 2013																			
<sup>(2)</sup> erst nach Mitternacht, da vorher Führungen																			
DSLR huckepack - AP1200 läuft sicher genauer als die Fornax 10																			
<sup>(3)</sup> Plugin (SkyFlatAssistent) für MaximDL dringend empfohlen																			
<sup>(4)</sup> welcher Laptop (s. Liste) wird verwendet (notw. Software muss installiert sein)																			
<sup>(5)</sup> wer von uns betreut das Setup bzw. erledigt die Bildgewinnung																			
<sup>(6)</sup> für Filterwechsel																			
<sup>(8)</sup> 14.5 & 20 Skyflats, für Apos sind EI-Folien vorhanden																			
<sup>(10)</sup> Adapter Moravian-Canon Objektiv																			

## Tip #6 Object planning

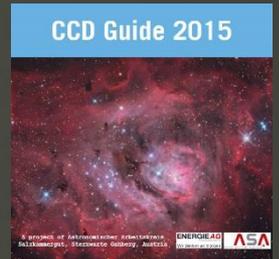
- ◆ Planning phase > 3 months
- ◆ 10 different setups
- ◆ 260 potential objects
- ◆ Overbook each main setup by a factor of 3
- ◆ Usage of a software (e.g. CCD-Guide)

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

Objectname:  Set Object:

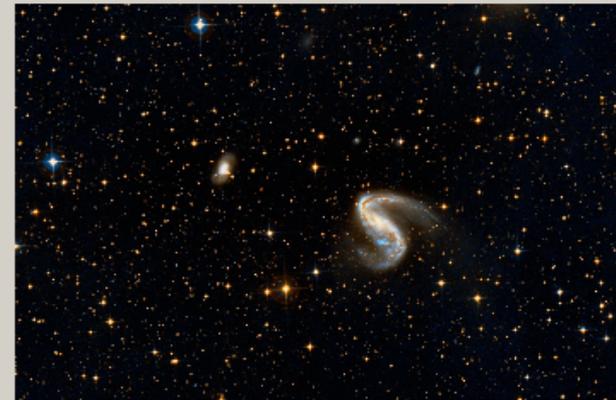
State:

Image From:

Imagename:

Planner Comm.:

FOV Image | Ref Image



Objectname:

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 - CapellaE	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 >  ['] <  [']

Constellation

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 Save Reset Slide Show Planetarium 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		
<b>NGC 3496</b>	<b>Open Star Cluster</b>	<b>III1m</b>	<b>10h 59m 36.0s</b>	<b>-60° 20' 12"</b>	<b>Carina</b>	<b>7</b>	<b>8.2</b>	
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	

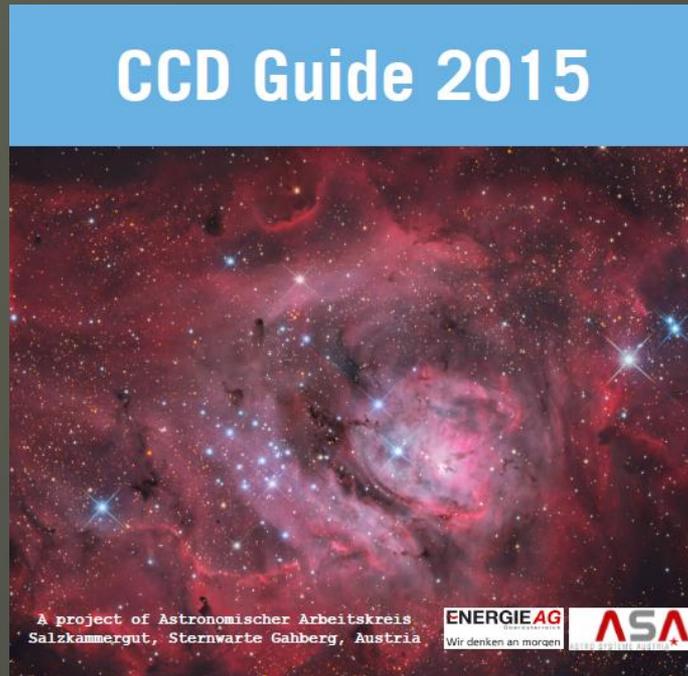
# FOV image



## 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

