

All about Remote Imaging



CEDIC – Saturday, 4th of April
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What do we learn?

- Why going remote?
- Remote Imaging – The Requirements
- Running a Remote Observatory
- What can you expect?

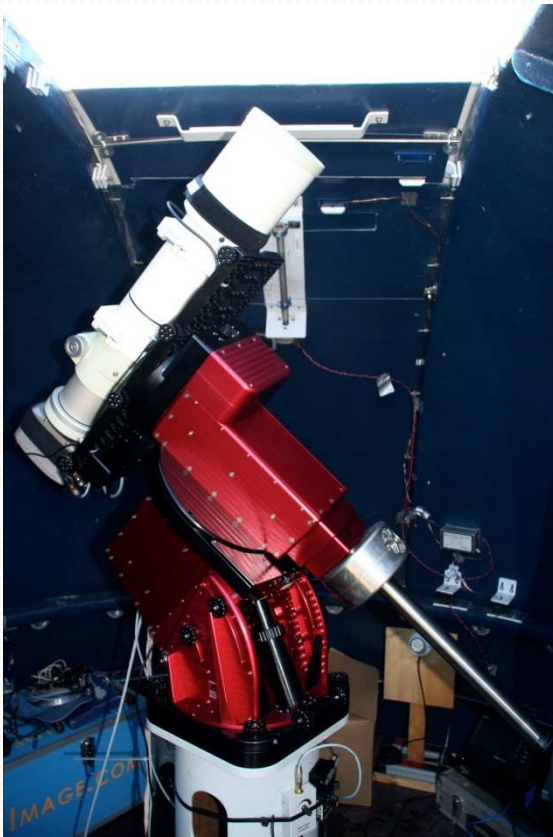
Why going remote?

- Better weather = more clear nights
- Better skies = higher quality of Images
- Controllable from everywhere
- Technical challenge
- Its fun!

Remote Imaging - Requirements

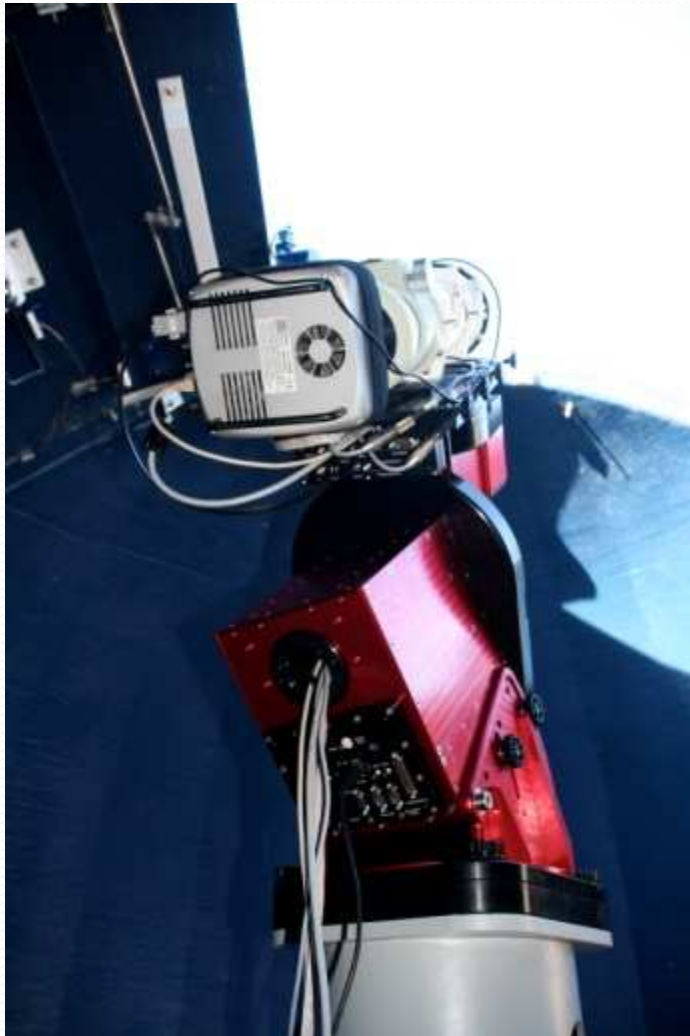
- Part 1: Hardware
 - Summary:
 - Telescope / Mount / CCD Kamera....
 - Dome
 - Computer / IT
 - Security instruments
 - Visual Feedback

Requirements: Telescope and more

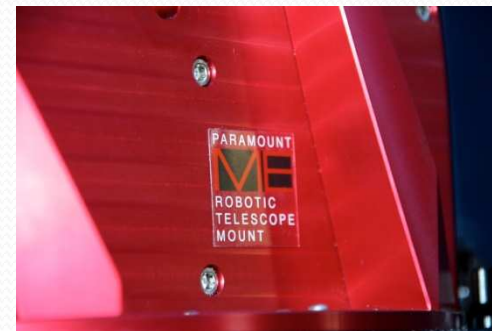


- High quality instruments
- Mount with Hardware-Home position
- CCD-Camera with controlled Colling
- Reliable Focuser
- Telescope with stable collimation

What I use



- Takahashi FSQ106N
- Software Bisque
Paramount ME
- STL-11000M
- Robofocus



Requirements: Dome



- High quality
- Reliable
- Wind- and rainproof
- Good painting
 - Staying cool in summer

What we use



- Technical Innovations
- Pro-Dome 10ft.



Requirements: Computer / IT



- Server-PC
- Enough RAM
- Enough Ports
- Enough Cooling
- Fixed IP-Addresses for all devices
- Enough LAN-Cable
- For Power: Remote Power Switch

Requirements: Security

- Automatic Dome-Closure System
- Weather Station and/or Cloudsensor
- Telescope Limits
- Optional: UPS System if bad power qlty
- Video-Camera System

What we have

- Private Security Team



Requirements: Visual Feedback

- Very important to always see the telescope
- Use very sensitive cameras
- Pan/Tilt/Zoom

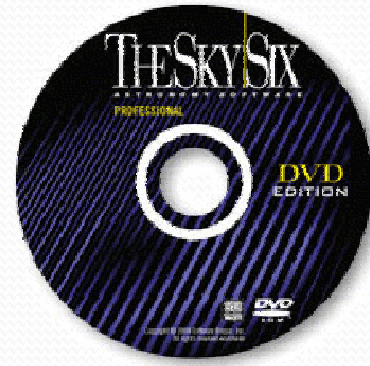


Remote Imaging: Requirements

- Part 2: Software
 - Summary:
 - Control Software
 - Power Control
 - Remote Software

Requirements: Control Software

- Mount Control
- CCD Control
- Focus Control
- Dome Control
- ...



Requirements: Power Control

- Important devices must be remotely power controlled
- Light Off/On
- Power Cycle
- Safe Energy





Requirements: Remote Software

- Good Security
- No real „impact“ to the remote PC
- Fast
- Multi-user compatible
- Radmin, VNC...

Remote Obs. in Action

- Always remember that you move „real“ hardware maybe thousands of km away!
- Always check video cameras before doing something!
- Check for suitable Mount Slew Limits
- Always check weather before doing something!

Remote Obs in Action (...)

- You can for sure still „manual“ image with your usual procedure
- You are more productive when you are using automation programs like CCDCommander or CCDAutopilot

Think before you are doing things

Making Darkframes

- Same as a „local“ Setup: Creating Darkframe Database for different temperatures and exposure times (be sure to renew the database every 1-2 Months for best quality)
- Best to create the Masterdarks on the Remote PC and then copy them to your local PC

Making Flatfields

- I am always doing automated Skyflats
- Automated because its much faster than manually
- Another solution is a special Flatfield illuminated frame inside your observatory (more complex and complicated)

Managing Frames

- Collected Data can be a lot
- Better weather = more data
- Use MaximDL's Fits compression modulus
 - STL11000 images of 21MB are only around 13MB after compression
- Copy frames during day or cloudy nights

Managing Frames (...)

- How I do it:
 - Images are automatically saved as compressed fits files
 - Raw frames are copied to my local desktop PC with Radmin during the day
 - Already copied files are moved to a special folder on the observatory PC

What it looks like

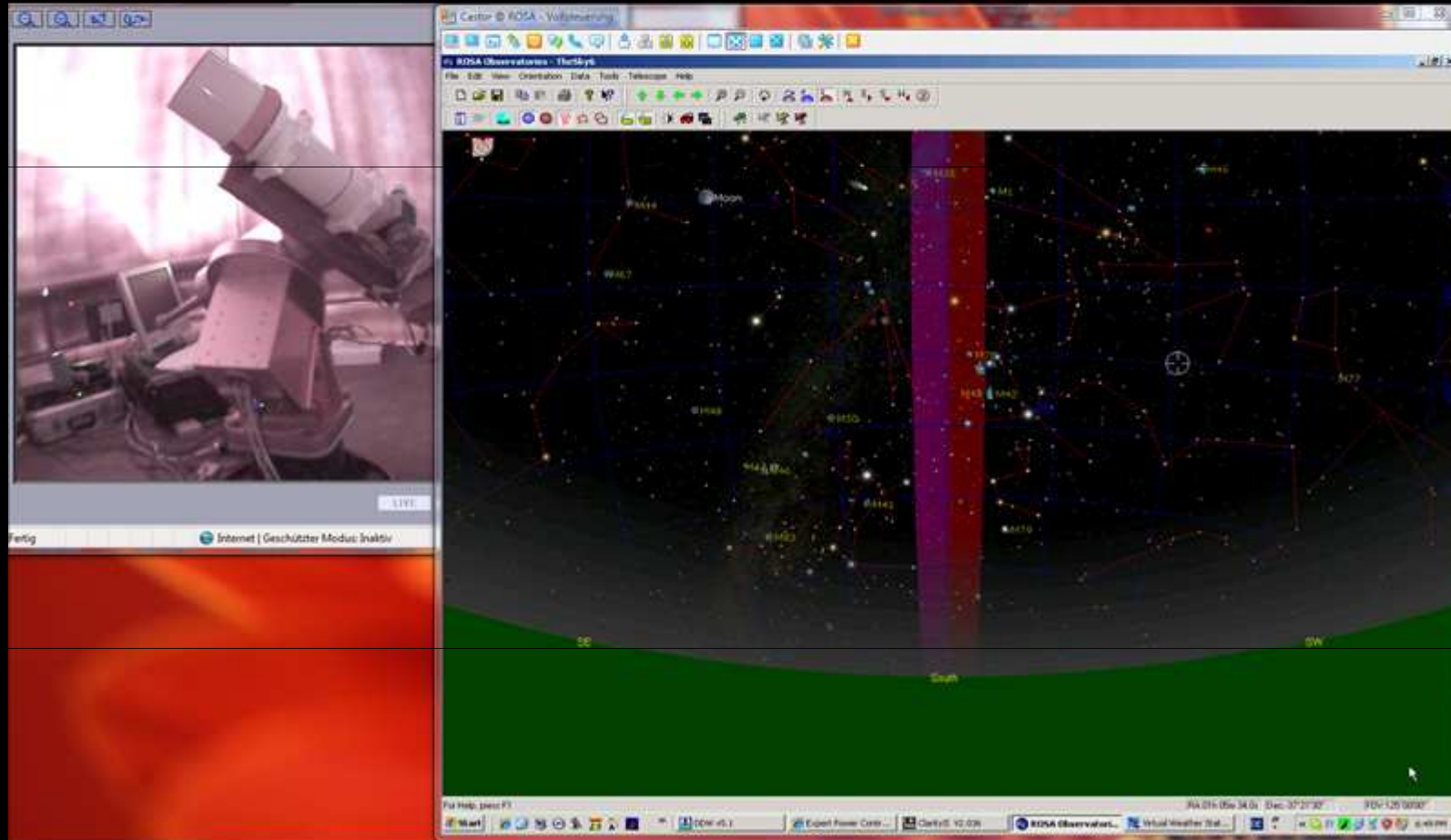


Outside Cam



Inside Cam

Telescope in action





What you can expect

- A lot of fun
- A lot of images to process
- You learn a lot about many different things (you didnt expect before)
- Nice Images...















More Informations:
www.Sky-Image.com

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Thank you very much
and happy (remote) Imaging!