REMOTE CONTROLLED TELESCOPES

SMART ASTRONOMY

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WHY?

- Automate astrophotography/ observing
- Out of the cold
- No wires to trip over
- Not disturb other observers
- Weather
- Location

HOW?

- Online
- DIY

ONLINE

- Remote telescope (Internet based)
- Several:
  - Marc Slade Remote Observatory
  - Telescope Live
  - iTelescope

MARC SLADE REMOTE OBSERVATORY

- **FPL-53 165mm ED APO (f7)/ Losmandy G11 Eq Mount / QHY 163C or QHY 174M**
- **One-on-one with MSRO astronomer – Session 1,5 hr**
- **High-speed internet + Tight VNC + Skype**
- **Pre-booking**
- **MSRO in Virginia, USA**
- **Limits +90 to +20 degrees i.e. Northern Hemisphere**
- **$150**

TELESCOPE LIVE

- Global Network of telescopes – two hemispheres and three continents
- Observatories in Chile, Spain and Australia
- Planewave CDK 24, Takahashi FSQ-106ED (f3.6), Meade in Australia decommissioned
- Requested images are quality checked by pro’s
- One-Click observations – color images + raw images
- Pro datasets – need to process raw monochrome images in datasets
- Advanced requests – more hands on re post-processing
- Learning resources – videos and tutorials
- $19/month – free trail

iTELESCOPE

- Observatories in Australia (Siding Springs), New Mexico, California, Spain
- Large number of telescopes – mainly large reflectors in Australia, refractors elsewhere
- User controls ‘scope via internet
- Many tools available, i.e. Vphot for photometry, Telescopius for planning, Moon discount
- Pay for exposure time only
- Learning resources
- 15 years experience
- Fees from $19.95 to $999.95

BENEFITS

- Ease of use – others do the work
- Professional equipment
- Run projects – comet hunting

CONS

- Cost – dollars are not cheap!
- Satisfaction of doing it yourself.

ENTER THE PI

- Experimental project
- Raspberry Pi with current equipment
- Equipment: Edge 8 HD, AVX mount, Canon 800D, ZWO 174M, Celestron Guider (Imaging Source)

DIY

- Paspberry Pi
  - Software: Astroberry Server
  - Kstars – planetarium software
  - Ekos – controllers for equipment – mount, cameras, focusers etc
  - PHD2 –guiding
  - Cartes du Ciel – planetarium software
  - Communication via browser or Tight VNC or SSH (All Wi-Fi)

DIY

- Results (thus far)
  - Ekos interacts with all equipment – no hassles (except for the guide camera)
  - Learning curve fairly steep, similar to other software.

DIY

- Advantages:
  - No cables to trip over!
  - Pi can be used for other things as well
  - Software is Opensource = free
  - Pi is relatively cheap
- Disadvantages:
  - MicroSD card can become corrupted
  - Pi not good in extreme temperatures

DIY

- Conclusions:
  - Raspberry Pi is viable. Can be ideal for small observatory with permanent installation.
  - Not really remote ‘scope - no focuser. Pi can control focuser and dome

AKNOWLEDGEMENTS

- Telescope Live https://telescope.live
- Mark Slade Remote Observatory https://www.msroscience.org/
- iTelescope https://www.itelescope.net