Hi,

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I'm am inviting you
yes you
to be a member of the SAS panel discussion on
"Remote Observatories for Small-Telescope Science"
taking place at the SAS Symposium in Ontario
Friday afternoon 31 May. 2019
at 4:00 PM — 'till'.

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We placed the discussion last on the agenda. While planning for 1 hour it can be allowed to run long.

Below is a list of the basic topics off the top of my head, please add and delete as you see fit.

I am approaching this Panel as a 'blank slate'. If you wish to participate please let me know ASAP – then take some time to pull together and send me questions you feel are important to the discussion. We plan to have a power-point available. We will take questions primarily from the audiance.

If you have information that can fit into slides I will create an overall PPT presentation with hyper-links so we can call upon the slides as needed at various points during the discussion.

The implicit goal of the panel is to encourage an ongoing discussion to promote best-practices of small-telescope remote operation and to avoid a one-prescription fits all answer.

I will be the moderator. I will not be involved in the answers but will serve to keep the discussion moving along.

We want to include hilarious mistakes to avoid, disasters to celebrate, and to avoid one-prescription fits all answers.

Experience is a good teacher. Somebody else's experience is a better teacher!

Sincerely, Wayne Green

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1.1   Broad Initial Topics

1. First off
   (a) Experience Level
   (b) Buy
   (c) Build
   (d) Interoperability
   (e) INDI vs ASCOM
   (f) Planetarium Software
   (g) Planning

        i. Software
       ii. Web resources
      iii. catalogs
      iv. database
   (h) Raw Target List

2. Health and Safety

   (a) Battery burns the house down
   (b) Lightening
   (c) Its Dark!
   (d) Its Cold!
   (e) Its Dirty!
   (f) Its Quiet
        i. Cameras/audio
   (g) Thermal Expansion
        i. Cable Flexibility
       ii. Heat/Cold loosening connections
      iii. Electrical intermittants
      iv. Grease thermal range
   (h) Its Hot!
   (i) Near-by human to fix/protect things

3. Telescopes - align/clean/thermal expansion

   (a) OTA
   (b) Platescale

4. Mounts

   (a) German, Fork-Equitorial, Nasmyth
   (b) Alignment (field rotation)
   (c) Limit Switches
   (d) Home-position feedback
   (e) Encoders
   (f) Weight/Balance/Inertia

5. Targets

   (a) Acqiisition
   (b) Verify
   (c) Guiding

6. Software

   (a) Communications
   (a) WiFi
   (b) EFI (Electronic Noise)
   (c) Interface
      • Teamviewer
      • VNC
   (d) NTPD Time Sync
   (e) File Export
      • Preprocess with pipelines

- SSH/Putty
- SFTP
- Git

7. Windows/Linux/Mac
    (a) Commercial
    (b) Custom

8. SoC
    (a) Pi
    (b) Arduino
    (c) Distributed/Integrated

9. Mounts
    (a) Control/Recovery

10. Controls:
    (a) open-loop
    (b) closed-loop

11. Sensors:
    (a) Usual:

    - Zeros/darks/flats (not why but scheduling)
    - Dome flats/twilight flats

12. Cameras and Filters
    (a) Focus
    (b) Control/Recovery

13. Spectrographs
    (a) Control/Recovery
    (b) Comparison lamps

14. Dome vs Roll-off

15. Mechanical Topics
    (a) Motors
    (b) Grease

16. Power Quantity/Quality
    (a) UPS
    (b) Standalone Batteries

17. Weather
    (a) Forecasts
    (b) Monitoring
    (c) Panic

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Addition Remote astronomy topics:

1. Periodic Maintenance
    (a) cleaning - optics, elecctronics, keyboards...

     (b) lubrication
     (c) Balance
     (d) Desicants
     (e) UPS's
     (f) Spares Inventory
     (g) Anticipate
         i. Failures
         ii. Obsolesence
         iii. Software Support Withdrawl

2. Infrastructure

     (a) Communication
     (b) Phone
     (c) Radio/Microwave
     (d) Internet
     (e) Ethernet
     (f) Wifi
     (g) Fiber
     (h) Routers
     (i) Security
         i. VPNs
         ii. SSH
         iii. Firewalls
     (j) DHCP-DNS Servers
     (k) Communications Failure/Recovery

3. Power

     (a) On grid/Off Grid
     (b) Batteries
     (c) UPS's
     (d) Remote outlet Switching
     (e) Power Failure Management/Recover
     (f) Mounts
         i. Plate Solutions
         ii. Focus, Focus, Focus..
         iii. Mutliplexed Instruments on a single mount
     (g) Control Paradigms
     (h) Telepresense
     (i) Scripting
         i. Closed/Extensible
         ii. Scripting extension languages
     (j) Scheduling
     (k) Shared/Private Use
     (l) Remote Facility Locale
         i. Nearby - minutes
         ii. Distant - hours
         iii. Very Distant - Days
    (m) Distributed Control

(n) Construction

    i. Planning
    ii. Document!!!
    iii. Toolchain Preservation
    iv. Archiving:

    i. Never trust a cloud!!!
    ii. Tools
    iii. Software
    iv. Systems
    v. Rawdata
    vi. Utilities
    vii. Licenses/Keys
    viii. Manuals
    ix. Scripts