

Automatic Speckle Interferometry Development Program

Russ Genet

California Polytechnic State University

Plus students, helpers, and advisors

Outline

- **Program goals**
- **Program phases**
- **Software**
- **Observations**
- **Scheduling**
- **Processing**
- **Large telescopes**
- **Conclusions**

Program Goals

- **Serve pro, amateur, and student observers**
- **Automatic/semi-automatic/manual/single step/remote access**
- **Software/documentation/training/support**
- **Free/open source/cross platform**
- **Recommend hardware**

Program Phases

- **Plan program**
- **Minimal automation 10" Orion Observatory**
 - **Manual start up and shut down**
 - **Simple scheduler**
 - **Off-line reduction**
- **Full automation of 10"**
 - **Auto start up and shut down**
 - **Test all modes**
- **Beta test other small telescopes and users**

Program Phases (continued)

- **Develop support**
 - Documentation
 - Training videos and on-line training sessions
 - User support Yahoo group
- **Expand use**
- **Develop larger telescopes**
 - Specialized, dedicated, automatic
 - Ultra low cost for aperture

Software

- **Existing software**
 - Windows / ASCOM / ACP / MaxIm DL
 - RTS2 / RoboAO? / Others
- **New Software**
 - Open source
 - Cross platform
 - Python / Andor SDK C
 - PS3 VB.net to Python or ...

Observations

- **Acquisition**
 - **Very accurate go-to**
 - **Wide-field plate solve**
 - **Medium-field bright sync star**
- **Science**
 - **Centering**
 - **Exposure time**
 - **Gain**

Observations (continued)

- **Optical**
 - Focus
 - Switch optical path
 - Filters
 - Magnification
 - Riseley prism ADC
- **Advanced**
 - Autoguide
 - Rotatable masks
 - Other large delta mag

Scheduling

- **Dynamic versus pre-scheduled**
- **Nearest meridian**
- **Season extension (needed?)**
- **Avoid moon**
- **Repeat same night**
- **Repeat multiple nights/season**
- **Select reference singles**
- **Calibration / QC**
- **Program priority / program balance**

Processing

- **Save raw or just preprocess**
- **Apply darks and flats**
- **Preprocess on behind**
- **Reduce one behind**
- **Auto evaluate reduction / retry or just flag**
- **Post on line as go / post end of night**
- **Distribution / permissions**
- **Morning report**

Large Speckle Telescopes

- **Design Advantages**
 - **Very small field-of-view (spherical primary)**
 - **Quasi-meridian**
 - **Dedicated robotic**
 - **Bright stars**
 - **Observe in Declination bands**

Large Speckle Telescopes (continued)

- **Mirrors**

- Meniscus
- Sandwich
- Foam glass
- Spin-cast epoxy
- Active control

- **Mounts**

- Alt-az
- Equatorial platform
- True meridian

Large Speckle Telescopes (continued)

- **Misc.**
 - Direct drive
 - Small-hatch enclosure
 - Low cost location
- **Far out**
 - Equatorial meridian amplitude interferometry
 - Intensity interferometry
 - Other

















Conclusions

- **Goal: many users, multi-mode, free, well supported**
- **Phased evolution**
- **Software open source, cross platform**
- **Sophisticated camera control**
- **Advanced, adaptable scheduler**
- **Near real time preprocess and reduction**
- **Large telescope development (Maui)**