



# ReSTAR Implementation Plan: Status Report

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# Summary

- On-going constructive dialogue with NSF
- White paper released widely for discussion
- Proposal to be submitted
  - Preliminary review by end of year (?)
  - 7 Phase 1 goals, highest priorities implemented first

Many thanks to Todd Boroson!



- Renewing Small Telescopes for Astronomical Research
- NOAO appointed committee
- Chairperson: Caty Pilachowski (Indiana U)
- Surveyed community about desired capabilities in the less than 6.5 m range
- Output: report containing science cases and recommendations for the 2 – 5 m range
- See NOAO ReSTAR web site for all the details (<http://www.noao.edu/system/restar/>)



# ReSTAR Priorities

- Report Summary

- Wide-field, broad-band optical imaging
- Moderate resolution optical spectroscopy
- Near-IR (1 – 5 micron) imaging
- Moderate resolution near-IR (1 – 5 micron) spectroscopy
- High-resolution ( $10,000 < R < 50,000$ ) optical spectroscopy
- Wide-field narrow-band optical imaging
- High spatial resolution IR imaging

Quote: “...spectroscopy should receive the highest priority for new instrumentation, since instrumentation for imaging is in a somewhat better state.”



# Post-ReSTAR action plan

- Initial internal drafts iterated with NSF
  - Documented estimated costs of various ReSTAR recommendations
  - Lead to pragmatic discussion about achievable NSF supplementary cash flow
- White paper released and widely circulated
  - Describes a 3-phase plan, each phase 3 years and ~ 10 M\$
  - Each phase produces something concrete while preparing for the next phase
  - Phase 1: taking shape, 7 goals identified as high priority
- Proposal in preparation
  - Goal: submit by early October, get reviewed by end of year
- Funding time scale
  - Depends on how NSF FY09 budget allocation plays out

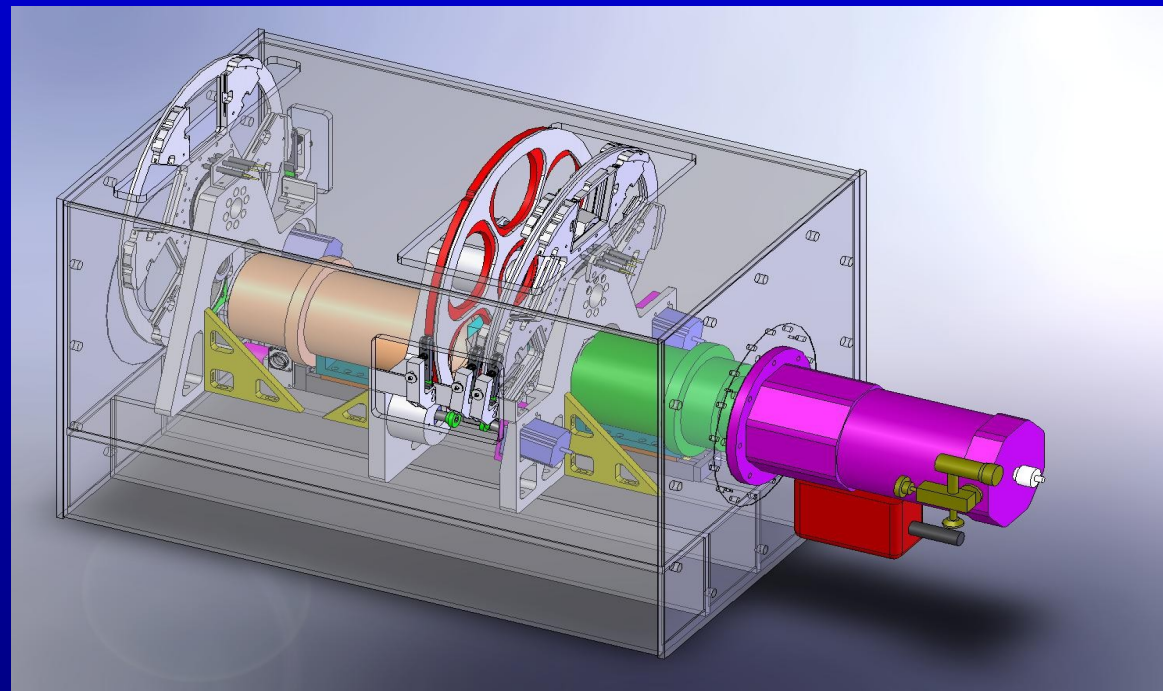


# Proposed Phase 1 Goals – I

- Infrastructure renewal at CTIO & KPNO
  - Some work has begun
  - See presentations by Jannuzi & Walker

## Proposed Phase 1 Goals – II

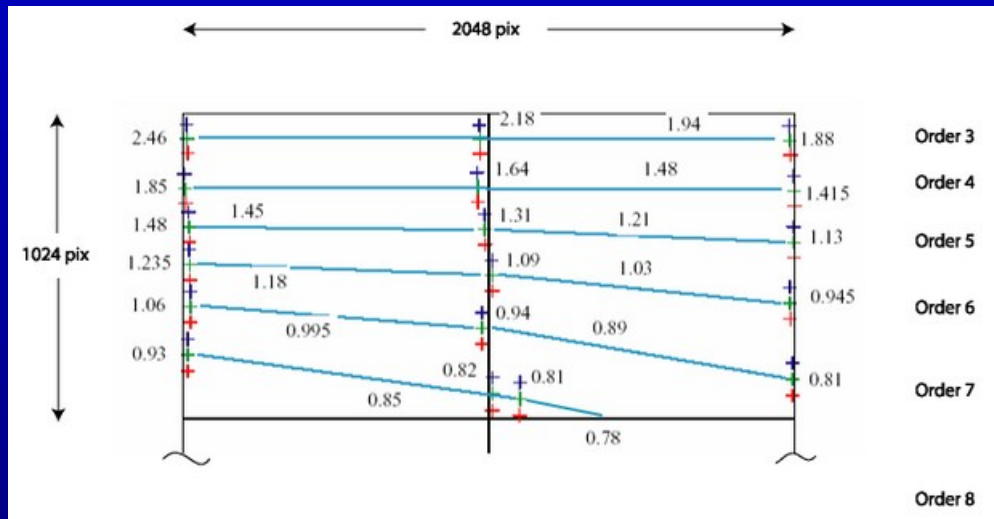
- Based on OSMOS Design from OSU
  - Straight-through VPH Grism,  $R \leq 5000$  + imaging
  - Rapid reconfiguration, Reliable  $\leq$  3-wheel design
- Re-design Study during FY2009 (budget permitting)
- Construction Start ~Oct 2009 (if NSF funds ReSTAR)
- Deployment ~end of CY2010
- Two copies, for Mayall & Blanco





# Proposed Phase 1 Goals – III

- Near-clone of TripleSpec (Palomar, ARC, Keck)
- High-throughput, all of  $J+H+K$  in 6 orders at  $R = 2900$
- Slit-viewing A&G camera
- No moving parts
- Discussions underway with Cornell team (Palomar copy)



- FY2009: trade study on modest increase in resolution, + update costing
- Construction start ~mid-CY2009 if NSF funds ReSTAR



## Proposed Phase 1 Goals – IV

- Optical Echelle Spectrograph (R=60,000)
- Notionally part of DCT Partnership
- Design still not settled
  - Two Lowell scientists had optical concept drawn up
  - NOAO studying whether that concept will meet community's scientific needs
  - Many system engineering challenges (size, weight)
- FY2009 effort focused on flow-down of community science requirements, with conceptual design to follow



# Proposed Phase 1 Goals – V

- Partnership: Discovery Channel Telescope
  - 4.2m telescope under construction 40 miles south of Flagstaff for Lowell Observatory
  - First light expected in 2010
  - Lowell has offered NOAO a 30% share
  - **Helps develop a new System facility**



## Proposed Phase 1 Goals – VI

- Partnership: Palomar Hale 5m
  - 50 nights per year starting early 2010
  - All instruments available to NOAO community
  - Main interests
    - Double Spectrograph
    - TripleSpec
  - Provides improved access to spectroscopy until OSMOS and TripleSpec projects are completed
  - **Helps support an important System facility**



# Proposed Phase 1 Goals – VII

- Design study for 2m telescopes
  - Partnership with Las Cumbres Observatory Global Telescope (LCOGT)
  - Goal: create array of five longitudinally-distributed 2m telescopes, all with same instrument package
  - Two telescopes already exist (Haleakela, Siding Spring)
  - NOAO to add two more, at or near KPNO and CTIO
  - NOAO to gain 50% of time on network
  - Could be operated by robotically, by remote observers, or by on-site observers
  - In this phase:
    - Design and cost new telescopes, instruments
    - If appropriate, begin site preparation



# Proposed Phase 1 Goals – Looking to the Next Phase

- Conceptual studies
  - Time-domain research
  - AO for 2 – 4m telescopes
  - Improved community access to existing optical interferometers
- System infrastructure development
  - Develop program to help non-NOAO facilities
  - Will lead to improved community access at those facilities
  - Informal support for such a program already exists



# Closing Thoughts

*Closing words in white paper...*

We expect that this program will be somewhat dynamic...

We believe that the end product of this program will be a system that is more than just a set of facilities or capabilities. It will be strongly tied to the community of users and to the community of providers, and it will give a more coherent voice to the researchers and teachers who depend on the ground-based O/IR system.



End of presentation