

NEID 2021B Information Session

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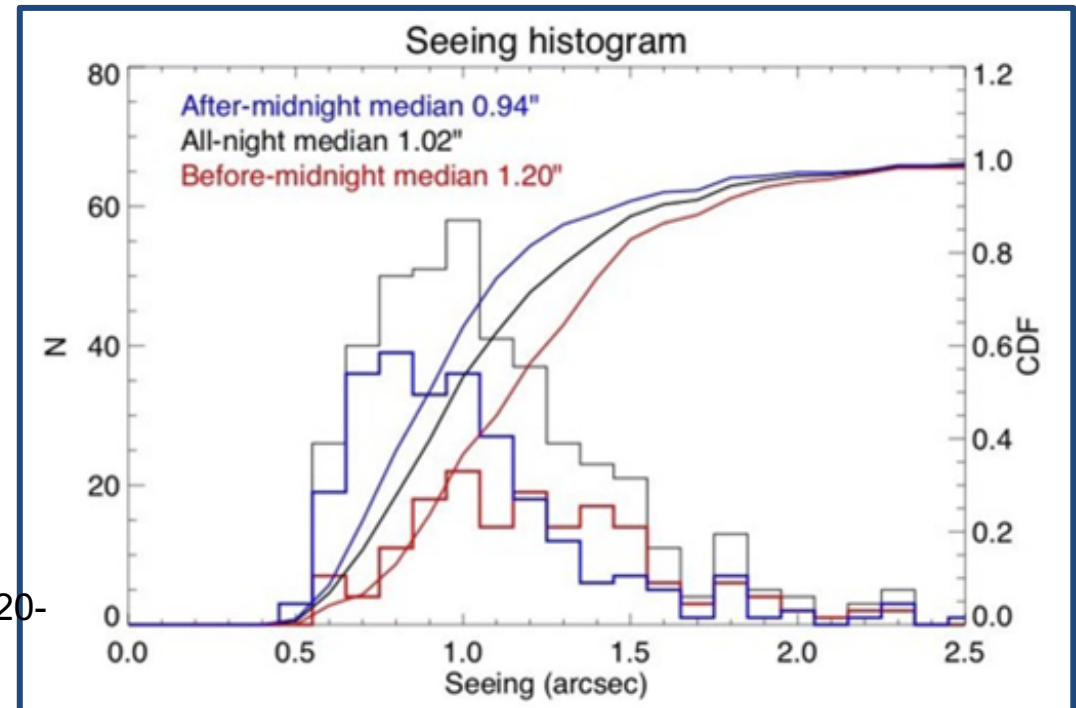
Mark Everett (NESSI Instrument Scientist/NEID Queue Development Team)

Jayadev Rajagopal (WIYN Executive Director)

Basic observational considerations @ WIYN



- **Elevation limit:** 15 deg (note: no requirement on NEID ADC performance below 19 deg)
- **“Cone of Avoidance:”** Cannot track a star within ~ 3 deg of zenith
- **Seeing:**



Seeing measured
with NEID from
Dec '20-
March '21

NEID: The Basics



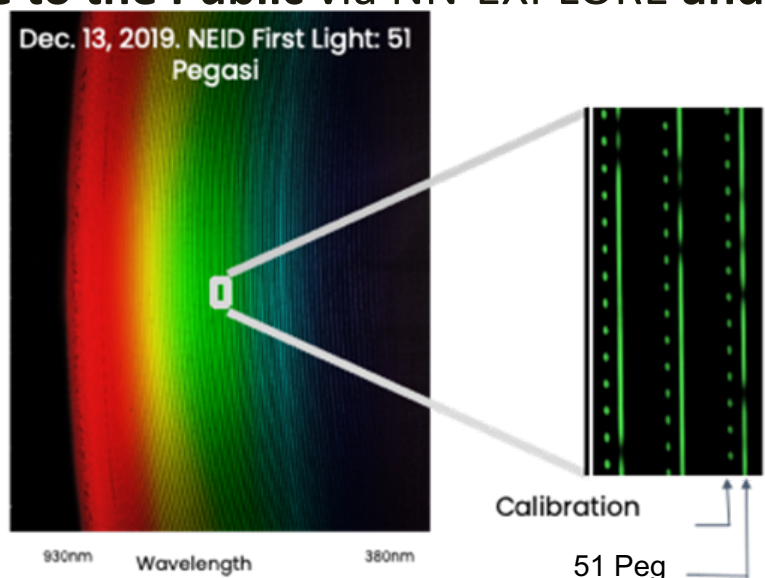
Waveband & Resolution: 380 – 930 nm, complete coverage, $R \sim 120K$ in HR mode

Expected Precision: ~ 30 cm/s baseline goal (single measurement precision)

Commissioning and Shared Risk Science Happening Now:

- Operational Readiness Review planned for Spring 2021
- NEID fully available for Science in 2021B

Available to the Public via NN-EXPLORE and WIYN Partners through institutional time



Exposure Time Calculator:

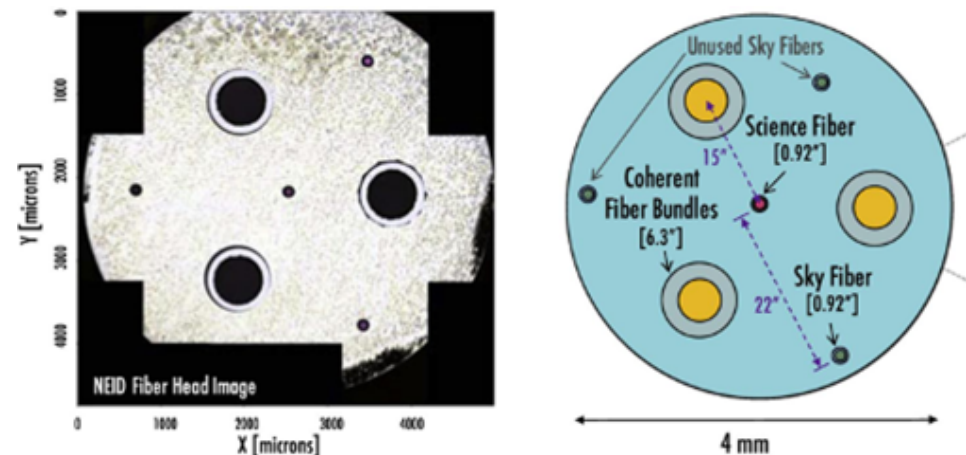
Allows proposers to estimate exposure times, SNRs, and expected RV precision --

http://neid-etc.tuc.noao.edu/calc_shell/calculate_snr

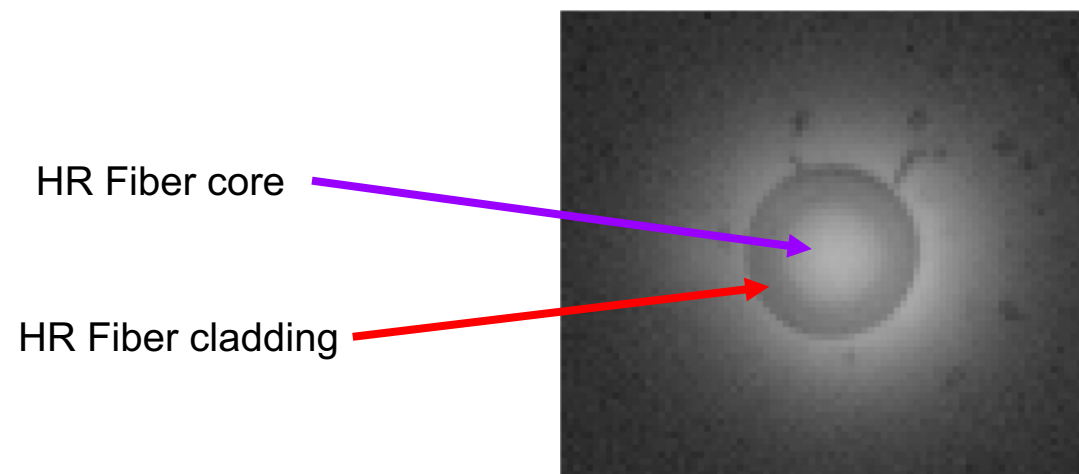
Credit: NEID team; Guðmundur Stefánsson

NEID: Choosing a Spectral Resolution

- **High Resolution** or **HR** mode ($R \sim 120,000$)
 - $\sim 0.92''$ fiber
 - Highest precision RVs on bright targets ($V < 12$, e.g. TESS)
 - Allows for simultaneous calibrations
 - Specified at Phase 2
 - Requires OD filter selection to balance etalon and science light on the detector
- **High Efficiency** or **HE** mode ($R \sim 60,000$)
 - $\sim 1.5''$ fiber
 - Faint targets ($12 < V < 16$)
 - Poor weather
 - No simultaneous calibrations



Credit: Roy et al. (2020)



NEID Calibrations

Standard Calibrations (not charged to PIs):

- Daily: Morning/afternoon cals -- darks, flats, wavelength calibrators (i.e. arc lamps, etalon, laser frequency comb)
- Every NEID night:
 - 1-3 RV standards (List at -- https://www.wiyn.org/Instruments/wiynneid_observers.html)
 - *Subject to change based on final commissioning results:*
 - 25 - minute intermediate cals near midnight
 - Bracketing etalons between each target
 - If you expect to need bracketing etalons, it should be noted in your proposal

Other calibrations are considered specialty calibrations and should be requested in your proposal (including spectrophotometric standards). They will be charged to your program.

Observing in Queue: How to choose observing priorities

P0 - Highly time sensitive observations

- *e.g. transits, R-M observations*

P1 - Moderately time sensitive observations

- *e.g. quadrature, periastron, small number of observations evenly spaced in orbital phase; transits, R-M observations*

P2 - Lowest priority for programs needing a high completion rate

P3 - Programs that can be executed during sub-optimal conditions

- *e.g. non-time sensitive observations, programs not needing a high completion rate*

P4 - Programs that can be executed in poor conditions

- *e.g. bright targets needing single visits*

Each partner receives a portion of time at each priority level:

P0 = 8%, P1 = 17%, P2 = 25%, P3 = 25%, P4 = 50%

The NEID proposal process happens in phases.

Phase 1: Typical NOIRLab proposal process

Phase 2: For accepted programs -- PIs input target and observation details to the NEID web portal

Phase 3: (optional) PIs may change observing parameters or request new targets during the semester

Note: The more technical information you can provide in Phase 1 (e.g. targets and specific timing windows) and Phase 2 (e.g. observing constraints and finding charts) the better.



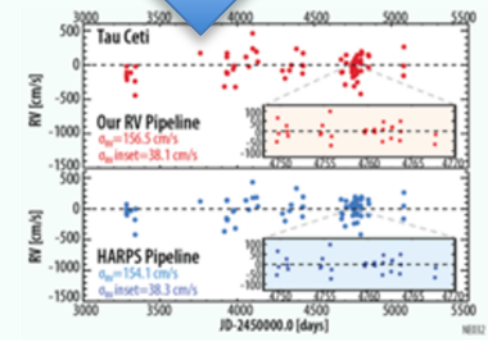
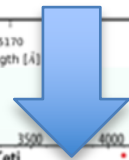
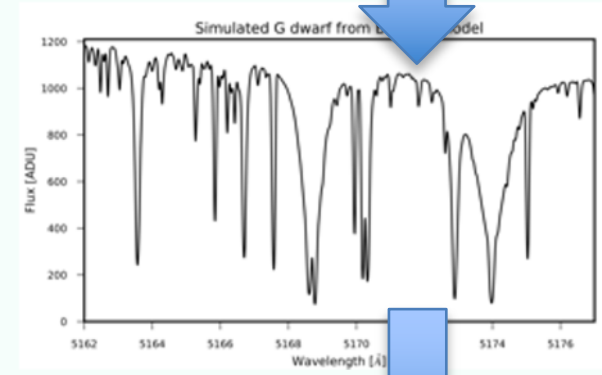
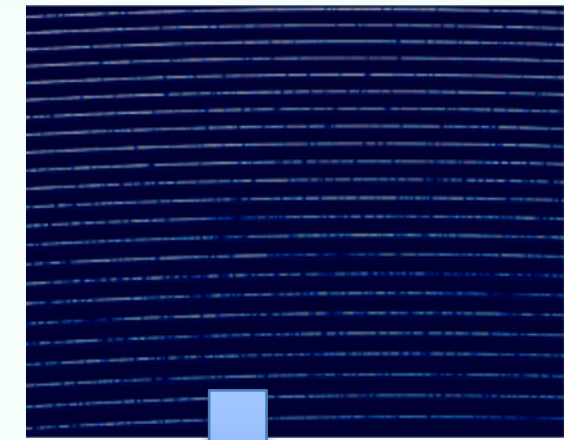
HD Catalog ID	TIC ID	JPLSS ID
HD 10700	419015728	2MASS J01440402-1556141
Gaia DR2 ID	Alternative Target Name	
2452378778434276992	Required if no other ID is given	
Right Ascension (Decimal degree)	Declination (Decimal degree)	Epoch
26.0093028766699	-15.933798629412	2000.0
Right Ascension (Sexagesimal)	Declination (Sexagesimal)	
01:44:02.2327	-15:56:01.675	
Proper Motion in RA (mas/yr)	Proper Motion in Dec (mas/yr)	Epoch
-1728.72572419114	855.492578244384	2015.5
Parallax (mas)	Radial Velocity (km/s)	Red Shift
277.51621578613	-18.587	-5.5e-05
Magnitude	Magnitude Type	
3.1336	G	
Ref ID	Source Type	
5375	GalV	
Program ID	Start Date	End Date
3021A-2014	02/02/2021	06/02/2021

Buttons: Edit Target, Add Observation For This Target

NEID: From Proposal to Reduced Spectra

- Proposals reviewed and allocated time by TACs early May
- WIYN schedule released mid-June; NEID Queue nights identified
- PI account setup on Queue Portal early July
 - Phase 2 information submitted by PI at least 10 days prior to observation
 - Targets and Observations approved by WIYN staff
- Observations scheduled via Queue Scheduler
- PI notified the next day if data was taken for their program
- Pipeline reduced data (Level 2) to be made available 24 hours after observations on the NEID Archive at NExScI
(<https://neid.ipac.caltech.edu/search.php>)

- Data will be fully reduced by the data reduction pipeline provided by the instrument team
- Every PI will have access to high-quality RVs produced by a common pipeline
- The archive will host three levels of reduced data for each observation:
 - Level 0 - Raw data
 - One FITS file for each exposure
 - Each instrument readout (16 total) in an HDU
 - HDUs for exposure meter, guider image and coherent fiber bundle
 - Level 1 – Extracted Spectra
 - 2D FITS images (order x pixel column) with extensions for sky, calibration, science fibers, and wavelength solution
 - Level 2 – Radial Velocities
 - Cross correlation function data
 - Sky and telluric models
 - Activity indicators
 - Additional keywords include
 - Barycentric correction
 - RV per order
 - Drift terms



Slide courtesy:
NEID team;
Chad Bender

Important Dates, Time Available in 21B

Semester 21B: 1 August 2021 - 31 January 2022

NOIRLab proposal deadline: **31 March 2021** at 11:59 pm (MST)

WIYN University partner proposal deadline: **15 April 2021** at 11:59 pm (MST)

Phase 2 information (full target/observation details): 10 days prior to expected observations

Time Available in 21B

- Approximately 30 nights for NOIRLab/NN-Explore time
 - Includes all instruments (*NEID, NESSI, Hydra, WHIRC, IFUs*)
- University allocations are still TBD

For questions, please e-mail: neid_info@noirlab.edu