Introduction
In October 2019, the NEID instrument (PI Suvrath Mahadevan, PSU) was delivered to the WIYN 3.5 m Telescope at Kitt Peak National Observatory. Commissioning began shortly after delivery, but was paused due to a COVID-19 imposed observatory shutdown in March 2020. The observatory has recently reopened and NEID commissioning has resumed.

NEID is an optical (380-930 nm), fiber-fed, precision Doppler radial velocity system developed as part of the NASA-NSF Exoplanet Observational Research (NN-EXPLORE) partnership. While the spectrometer and calibration system are maintained in a highly controlled environment on the baseline of the WIYN, the NEID Port Adapter mounts directly to a bent-Cassegrain port on the telescope and is responsible for precisely and stably placing target light on the science fibers. Here we present a brief overview of the as-built Port Adapter and its sub-components, which include four cameras for acquisition, guiding, and precision triangulation on both a high-resolution (R~120,000) and high-efficiency science fiber head. We then discuss preliminary on-sky performance compared to requirements as well as next steps as we complete commissioning.

Port Adapter Key Functionalities

<table>
<thead>
<tr>
<th>Function</th>
<th>Subassembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire the target star</td>
<td>Guide Camera (90° FOV)</td>
</tr>
<tr>
<td>Stabilize the target star position</td>
<td>Tip/Tilt Mirror + Guide Camera</td>
</tr>
<tr>
<td>Correct for atmospheric dispersion</td>
<td>Atmospheric Dispersion Corrector (ADC)</td>
</tr>
<tr>
<td>Maintain telescope focus</td>
<td>Guide Camera + Toroidal Lens (Coming Soon)</td>
</tr>
<tr>
<td>Calibration source injection</td>
<td>Calibration Assembly</td>
</tr>
<tr>
<td>Real-time sky monitoring</td>
<td>Coherent Fiber Bundle (CFB) Imager</td>
</tr>
<tr>
<td>Image the fiber bundles</td>
<td>Fiber Viewer Camera</td>
</tr>
</tbody>
</table>

Port Adapter Component Overview

Component: Structural Bench
Contents: Main optical assembly including: 3 cameras, ADC, tip/tilt mirror, calibration and solar light injection unit

Component: FCB Enclosure
Contents: Optics and camera for imaging 6 coherent fiber bundles (CFBs)

Component: Electronics Box
Contents: Computer, power supplies, and controllers

Tip/Tilt Guiding

Performance Requirement:
The Port Adapter guiding system must maintain the RMS centroid of the stellar PSF on the science fiber to within 0.05′′ (3.4 μm) of the center of the fiber for 90% of 1-minute intervals under median seeing (0.8 arcsec) and wind conditions with a V_{max} = 12 star or brighter.

Closed-Loop Design:
- Guide camera imaging at 50 Hz
- User-specified centroiding algorithm
- Fast steering, tip/tilt mirror correction
- Outer Loop: Telescope drift correction

Atmospheric Dispersion Correction

Performance Requirement:
The peak/valley displacement error due to atmospheric dispersion within the NEID bandpass shall not exceed 0.1 arcseconds for zenith angles from 0° to 58°, and shall be better than 0.2 arcseconds down to a zenith angle of 71°, within the central 5° FOV.

Design and Preliminary Operation:
- Two Amici prisms (Schwab et al., 2018)
- Automated to rotate every 10s based on zenith distance using look-up table

Realtime Focus Monitoring with Toroidal Lens

Performance Requirement:
The Telescope must achieve and maintain focus of the beam at the science fiber to ±30 microns under median seeing and wind conditions with V ≤ 16 mag stars.

Current Operation:
- Manual secondary mirror focus sweeps taken periodically through the night
- Automatic focus adjustments via temperature vs focus look-up table
- NEID Queue Observers manually implement minor focus adjustments during observations, if needed

Current Status and Next Steps:
- Commissioning of the NEID Port Adapter resumed in November 2020, and is nearing completion.
- Toroidal lens is expected to arrive at WIYN in early 2021.
- NEID Spectrometer commissioning is scheduled to resume in December and is expected to be completed in 2021A.
- NEID will be run in queue mode with queue commissioning happening simultaneously with spectrometer commissioning (also see Poster 11449-116 for more details on the queue). Three NEID Queue Observers are on staff at WIYN and are commissioning the instrument.
- Shared risk science time is scheduled for late-2020B, with full science operations expected in 2021A.