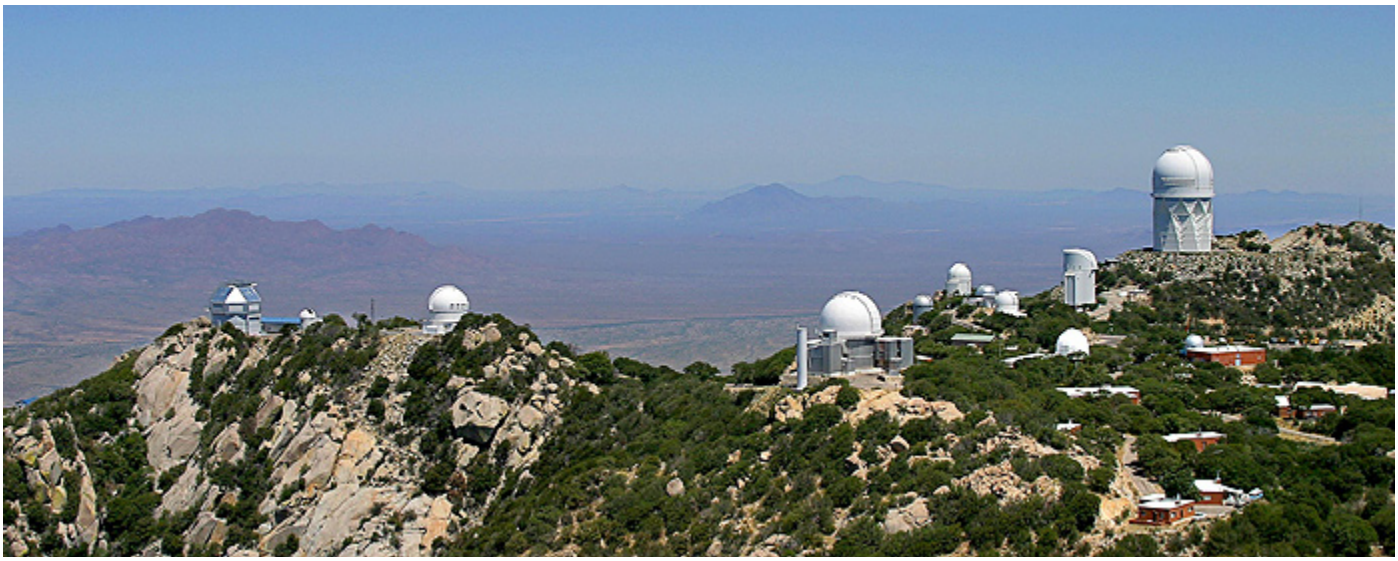
Getting Ready for the Next 50 Years

Buell T. Jannuzi



As AURA celebrates its 50th anniversary, Kitt Peak National Observatory is preparing for its own 50th birthday next year. We will mark our half-century while we work with the NSF to implement the recommendations of the recently completed NSF Senior Review.

One of the more important recommendations for Cerro Tololo Inter-American Observatory (CTIO) and Kitt Peak National Observatory (KPNO) was for us to address deferred maintenance issues and to modernize our telescopes, instruments, and support facilities in order to provide the community with the confidence that these telescopes, the core of the mid-sized US telescope system, are going to be maintained and supported at a high level of quality. We are also encouraged to consider what new facilities and instruments might significantly augment the capability of NOAO to provide the community with access to state-of-the-art observational facilities over the full range of telescope aperture. NOAO is responding to these recommendations, including the reprogramming of funds in our base budget to enable a renewal of KPNO.

Over the past 20 years, the size of the KPNO staff—general facility, technical, engineering and scientific—has greatly decreased. To successfully undertake improvements in our facilities requires additional staff members. By the start of 2008 we will have added five people to our technical and engineering staff in order to undertake the modernization efforts recommended so strongly by the Senior Review. Our initial efforts to improve the observatory are detailed below. Working with the community, we will also be developing longer-term projects, including new instruments, to maintain KPNO as a scientifically productive observatory.

1. We need to improve our ability to care for instruments on the mountain. Over the next few years, KPNO is fortunate to have several new and very capable instruments coming to our telescopes. These include NEWFIRM, a wide-field near-infrared imager, at the Mayall 4-meter telescope; the orthogonal transfer array optical imagers QUOTA and the One-Degree Imager at the WIYN 3.5-meter telescope; the near-infrared imager WIYN High-Resolution Infrared Camera (WHIRC) at WIYN 3.5-meter; and the Half-Degree Imager at the WIYN 0.9-meter telescope. Several of these instruments are quite large and difficult to physically manipulate and service on the mountain. We will be purchasing a new forklift, large instrument handling cart, and other equipment to enable the safe transport and installation of these instruments. We will repair and upgrade the Mayall 4-meter instrument shop, and purchase and install a crane/hoist for the WIYN 3.5-meter Bench Spectrograph room. We will study the feasibility of developing an instrument-handling facility (including clean room) on the mountain to allow significant servicing of instruments to be carried out on the mountain, rather than subjecting the instruments to the risks incurred during transport to and from Tucson.

2. We need to improve our ability to make any necessary repairs in a timely manner and help prevent the need for major repairs. This requires improving our stock of spare components for critical systems (some of which are more than 30 years old) and developing a more robust program of preventative maintenance. For all three of our main telescopes (Mayall 4-meter, WIYN 3.5-meter, and the 2.1-meter telescopes), we have identified significant systems that either do not currently have spare components available or need to be replaced in order to make them easier to maintain. These range from items as major as the Mayall 4-meter telescope drive brake and motor armature to items that are easier to replace, like the hydrostatic oil bearing pump.

continued

Getting Ready for the Next 50 Years continued

3. The Mayall 4-meter telescope was built before the age of computer-controlled telescopes. Many aspects of using computers to control telescopes and instruments were pioneered at the Mayall. Unfortunately, computer systems age more quickly than the steel comprising the telescope structures, and many of the electronic and computer systems at the Mayall and WIYN 3.5-meter need to be replaced if they are to sustain effective scientifically productive operations for the next decade. This work will begin in 2008 and continue for several years.

4. The KPNO support buildings are 30 to 45 years old. They are in need of repair. We will begin a program to renovate essential buildings starting with the mountain dormitories in 2008.

5. The 26 telescopes that are located on Kitt Peak will all benefit from a new suite of site-monitoring equipment that will be installed over the next year. Based on the systems currently available at CTIO and used for the site-testing underway for a Giant Segmented Mirror Telescope, the new equipment will include an all sky-camera, a Differential Image Motion Monitor, and a weather station. These will be integrated into the observatory operations (including storage of the resulting data in the NOAO Science Archive) and will be available to all the tenant observatories.

6. Our existing instruments would benefit from modern guide-camera systems and detector controllers. As the MONSOON controller system being deployed for NEWFIRM and QUOTA becomes available, we will work over the next five years to selectively upgrade the controllers for our older instruments that are still in heavy demand. This work will begin in 2008 and will result not only in improved operations of the instruments, but in systems that are easier for our staff to maintain.

Other obvious maintenance and safety issues will be addressed over the next year. Longer-term activities, such as new instruments or telescopes, require active consultation with the community and discussions with the NOAO Users Committee and other advisory bodies. However, all members of the community are encouraged to share their desires and aspirations for improvements at KPNO with us (*jannuzi@noao.edu*). With these and future improvements in the years ahead, we look forward to at least another 50 years of successful operation of KPNO.

Another Instrument Visits the 2.1-meter Telescope at Kitt Peak

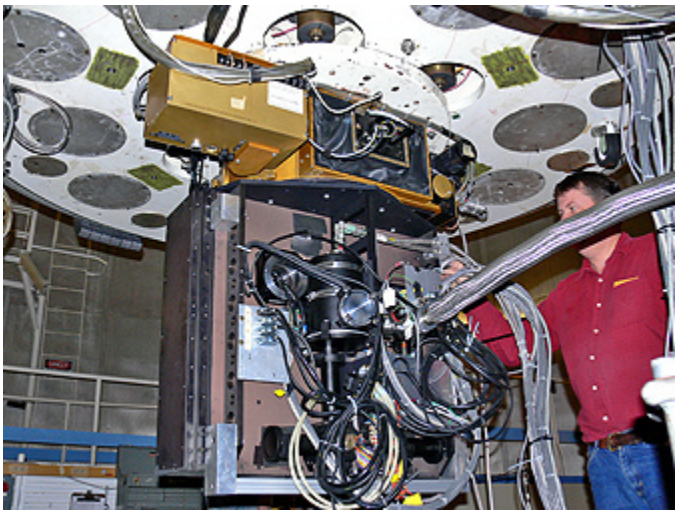
A. E. Szymkowiak (Yale University) & Buell Jannuzi

The 2.1-meter telescope at KPNO has a venerable set of regularly used instruments, including GoldCam and SQIID. The telescope is also a valuable test bed for the development of innovative new instruments from many different institutions. These have included the University of Florida's FLAMINGOS (the first fully cryogenic, multi-slit near-infrared (IR) imaging spectrograph), NASA Goddard Space Flight Center's Infrared Multi-Object Spectrograph (the first near-IR spectrograph to use a digital micro-mirror device to provide controllable micro-mirror slits), and the University of Florida's Exoplanet Tracker, or "ET."

The latest example of a university-built instrument using the 2.1-meter for testing and commissioning is a new optical long-slit spectrometer being built by Yale for eventual use on the WIYN 3.5-meter telescope. Equipped with Volume-Phase Holographic gratings, the new spectrograph is designed for use at the modified Cassegrain port of the WIYN telescope.

However, nights on a 3.5-meter telescope are too valuable to spend on initial debugging and commissioning activities if there is another alternative. The KPNO 2.1-meter telescope, when equipped with its $f/15$ secondary, is a good optical match to the new Yale spectrometer. All that was required was an appropriate spacer plate to fit the 2.1-meter instrument adapter (also known as the Gold Guider) and the instrument was ready to test.

The Yale spectrometer team brought the instrument to KPNO during Testing and Engineering (T&E) time in November 2006, and with the able assistance of Skip Andree, Dick Joyce, and Dianne Harmer of the KPNO staff, the instrument was mounted and performing observations in short order. The Yale team took spectra



Will Emmet (Yale University) attaches one of the cables to the Yale long-slit spectrometer during its first visit to the Kitt Peak 2.1-meter telescope in November 2006.

of some spectrophotometric standard stars to characterize the throughput and other properties of the spectrometer. The team will have a second T&E run on the 2.1-meter in June 2007 to continue the commissioning, and they have proposed to begin science observations during darker nights in semester 2007B. KPNO encourages instrument builders interested in testing their ideas on a convenient and easy-to-use telescope to contact the observatory about opportunities for observing time with their instrument.