NOAO Newsletter - June 1994 - Number 38

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NOAO Highlights!

Director's Office

Cerro Tololo Inter-American Observatory

Kitt Peak National Observatory

National Solar Observatory

Global Oscillation Network Group

US Gemini Program

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Comments concerning this Newsletter are welcome and will be forwarded to the appropriate editors.

"New" Photometry of an "Old" Supernova Gives a Large Hubble Constant(1Jun94)

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"New" Photometry of an "Old" Supernova Gives...(1Jun94)
a Large Hubble Constant
(from NOAO HIGHLIGHTS!, NOAO Newsletter No. 38, 1 June 1994)

The major stumbling block in measuring the Hubble Constant (Ho) is that different techniques produce inconsistent values. Although George Jacoby and collaborators (1992) have demonstrated that most modern techniques produce consistent distance estimates to galaxies, the use of type Ia supernovae (SN Ia) as standard candles stands as a major exception. Sandage and collaborators (1993) recently used the Hubble

[Figure not included]

Figure 1: A V-band CCD image of IC 4182 (left), the host galaxy to SN 1937C, taken with the KPNO 2.1-m telescope, and a small region of the first epoch film (right) taken by Baade and Zwicky. The two bright stars form a right triangle with SN 1937C at the vertex. The supernova is not visible in the 2.1-m image.

Space Telescope to find Cepheids in the nearby galaxy IC 4182, determining the absolute magnitude of the historical supernova, SN 1937C, hence calibrating the SN Ia distance scale for the first time. Distances to galaxies using this scale, however, are inconsistent with those from H I line width-Luminosity relationship (Tully-Fisher), Surface Brightness Fluctuations, Planetary Nebula Luminosity Functions, and the Expanding Photosphere Method applied to type II SNe. The inescapable conclusion is that either SN Ia or the four other methods are miscalibrated.

The recent discovery of a strong correlation between the absolute luminosity of Type Ia SNe and their rates of decline by Phillips (1993) has led Mike Pierce and George Jacoby to re-examine the photometry of SN 1937C as a potential source of the discrepancy. Unfortunately, the photographic magnitudes available for SN 1937C published by Baade and Zwicky (1938) and others are too uncertain to derive an accurate rate of decline. Consequently, Pierce and Jacoby acquired the original 18-inch Schmidt films taken by Baade and Zwicky of SN 1937C from the Caltech plate archive (Figure 1).

[Figure not included]

Figure 2: A typical transformation curve used to convert PDS photographic density to m(pg). The vertical dotted line, representing the PDS density of SN 1937C at ~19 days after maximum, intersects the transformation curve at the position of the horizontal dotted line to yield m(pg).

[Figure not included]

Figure 3: B (solid points) and "V" (open circles) light curves for SN 1937C. The template represents SN 1991T, a SN Ia similar to SN 1937C. The lower panel shows the color evolution of SN 1937C. Templates are shown for SN 1991T (dotted), SN 1992bc (dot-dash), and SN 1992A (dashes). The latter has a V-band excess similar to that seen in SN 1937C.

A region of the 76 photographic and the previously unpublished 50 "visual" bandpass films surrounding SN 1937C was digitized using the

KPNO PDS. This region contains a sequence of 26 photometric standards measured by Schaefer (1994). Excellent relations can be derived between the total integrated photographic density of the stellar images on each film and their m(pg) or "V" mags (Figure 2). (The "V" bandpass is not strictly a Johnson V but extends into the R band. The SN spectrum generally is not a stellar continuum, especially at later times, and so classic transformation methods may incur an added uncertainty. We refer to these magnitudes as "V.") Typical RMS errors of the transformation curve are 0.06 and 0.04 mags for m(pg) and "V," respectively. The standard m(pg) to B transformation (Arp 1961; Hamuy et al. 1991) was used to convert the photographic data to the modern system. The B and "V" light curves and color evolution are shown in Figure 3. The scatter around a low-order fit is smaller than 0.05 mag at B and 0.03 at "V," or less than half that derived from the Baade and Zwicky photometry. This improvement implies that significant gains in the precision of photographic photometry are possible with modern techniques and a sequence of local standards.

Since SN 1937C was discovered after maximum light, its peak brightness is not well constrained by the Baade and Zwicky data, particularly given the variety in the shapes of individual SN Ia light curves. Fortuitously, Comet Finsler (1937f) passed within 8 degrees of IC 4182 7-8 days prior to the discovery of SN 1937C. A plate containing images of both the comet and SN 1937C was obtained by Leutenegger (1937). This plate was kindly lent to Pierce and Jacoby by Herrn Mohr. This pre-maximum B mag provides a strong constraint to both the peak brightness and the time of maximum for SN 1937C. Pierce and Jacoby find B(max) = 9.03 +- 0.05 and "V"(max) = 9.06 +- 0.05 for SN 1937C, values 0.25 and 0.47 mag, respectively, fainter than Saha et al. (1994) assumed in their calibration. Furthermore, the light curve shape is intermediate between that of SN 1991T and SN 1992bc (see Figure 3), two of the slowest declining SN Ia ever observed (e.g. Phillips 1993). This implies that SN 1937C was ~ 0.4 mag more luminous than a typical SN Ia event.

Combined with the Sandage et al. (1993) distance to IC 4182, the revised photometry and the correction for the slow rate of decline give Ho = 75 +- 12 km/s/Mpc from SN Ia. This value is now consistent with that estimated using the four other methods and eliminates much of the discrepancy between the different methods of estimating the Hubble Constant.

This program is indebted to Alain Porter for locating and acquiring the original Baade and Zwicky films of SN 1937C. Unfortunately, Alain passed away before he could further contribute to this effort. A detailed report of this work is about to be submitted to the Astronomical Journal. The 136 digitized scans will be made available to interested parties shortly.

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Pop II and the Dark Matter Halo (1Jun94)

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Pop II and the Dark Matter Halo (1Jun94)
(from NOAO HIGHLIGHTS!, NOAO Newsletter No. 38, 1 June 1994)

Explorations of the faint end of the luminosity function in nearby globular clusters are improving understanding of topics ranging from the structure of stars near the hydrogen-burning limit to the nature of the dark matter halo (DMH) of the Galaxy. The inferred mass of the DMHs in galaxies like the Milky Way can provide about 0.05 to 0.1 of the density required to close the Universe. Hot Big Bang nucleosynthesis calculations suggest about this mass in baryons was formed in the early Universe, thus it is reasonable to suppose that the DMH of the Galaxy is made of ordinary matter. One obvious possibility is that low-mass stars from the Pop II field contain sufficient mass to explain the various dynamical effects suggestive of a DMH. Stars near 0.1 Mo have M/L ratios ranging from 1500 to 4000 more than "dark" enough to explain the DMH M/L of between 30 and 100. The observational problem is to measure the luminosity and mass function for the Pop II field for M &lt 0.5 Mo.

[Figure not included]

In situ studies of the Pop II luminosity function (LF) are difficult because of the intrinsic faintness of low-mass stars. Even surveys with very faint limiting magnitudes sample only a small volume of space. Further complications are the large population of faint galaxies in deep surveys and the difficulties of retrieving distance and [Fe/H] information given only broad-band colors and brightnesses. Nevertheless, such studies have been undertaken and may soon provide some valuable constraints (one such ambitious and recent program is described in Richer and Fahlman, 1992, Nature, 358, 383).

An alternative is to look where there are large numbers of low-mass Pop II stars at a known distance and metallicity - the Galactic globular clusters. Although there is considerable uncertainty in the connection between cluster and the field LFs, most theoretical studies suggest that the LF measured in current-day clusters probably represents a conservative limit on the population of low-mass stars in clusters. Recent faint LFs based on I band observations in the clusters M13, NGC 5139 (j Centauri), and NGC 6752 have indicated a sharp increase in the number of stars below 0.4 Mo (Richer et al. 1991, ApJ, 359, L11). In the single-color study of NGC 6752 there was no sign of a turnover in the LF down to the Richer et al. faint limit corresponding to ~ 0.17 Mo. If the Pop II field has as steep a slope as that seen in NGC 6752 and it extends to masses as low as 0.02 Mo this could explain the Galactic DMH if it indeed has the shape of the Pop II spheroid and a M/L ~ 30.

A effort was begun in June 1993 using the CTIO 4-m + PFCCD by Bolte (U. of California, Santa Cruz), Hesser and Stetson (NRC/Dominion Astrophys. Obs.), and VandenBerg (U. of Victoria) to verify and extend to faint luminosities and lower masses the Richer et al. work in NGC 6752. The program involves very deep imaging in two bands (V and I) and avoids many of the uncertainties of single bandpass studies. The color-magnitude diagram shown in the figure is the result of ALLFRAME (Stetson 1994, PASP in press) reductions of 10 X 900 seconds exposures in V and 10 X 600 seconds exposures in I. The main sequence of stars in NGC 6752 is unambiguously defined to V = 24, corresponding to Mv 11.5. Even with the rough calibration that was used to generate the figure, it is clear that the inflection of the main sequence at faint Mv (seen at V ~ 22.5) predicted by the Bergbusch and VandenBerg (1992, ApJS, 81, p.163) isochrones does occur in real clusters. Determining LFs to the limit of the data requires an extensive battery of artificial star experiments; however, the preliminary result is that the Richer et al. steep LF in NGC 6752 is verified. Time has been granted in July 1994 to extend these observations to even lower masses. Although the extremely steep mass-luminosity relationship for stars with M &lt 0.2 Mo makes it very difficult to test directly whether or not the mass function will extend to 0.02 Mo it will be possible to explore to the hydrogen burning limit. If the steep LF continues to 0.1 Mo then at the very least the Pop II low-mass stars must be considered as an important (5-20%) constituent of the Galactic DMH.

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Surface Activity on Sun-like Stars (1Jun94)

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Observations show that late-type stars which are otherwise characterized by essentially identical photospheric properties can exhibit a significant range in their levels of chromospheric and coronal emission. The detailed physical processes responsible for outer atmospheric heating in the late-type stars are poorly understood. However, studies of the Sun and solar-type stars indicate that `activity' is spatially associated with sites of emergent magnetic flux.

The magnetic fields themselves are widely regarded as the surface manifestations of an interior dynamo mechanism which, in a general way, involves the interaction between rotation, convection, and an extant magnetic field. It is believed that the solar cycle is a result of such a process.

The further development of stellar dynamo theory - the theory of the

origin and evolution of magnetic fields in the Sun and Sun-like stars - requires a knowledge of magnetic field properties. In particular, the difference between an `active' star and a `quiet' star or, equivalently, a solar active region and the quiet Sun, may be due to the differences in the characteristics of the magnetic field that, in turn, influence the structure of the chromosphere and corona.

Recent observational investigations suggest that the primary difference between active and quiet stars is in the fractional area coverage, or `filling factor,' of magnetic regions analogous to solar plages on the stellar surface. In order to verify and extend this tentative result, we must measure the filling factor of magnetic complexes on stars. Since we cannot spatially resolve the surfaces of nearby, main-sequence stars, we must rely on the analysis of spectroscopic diagnostics to infer active region filling factors. Vincenzo Andretta (U. of Naples, Italy, and a former NSO summer student and visiting thesis student) and

[Figure not included]

Correlations computed by Andretta and Giampapa between the strengths of lambda 10830 vs. lambda 5876 (D3) for several filling factors for G and F dwarfs. The solid points are from sources in the literature. Arrows indicate upper limits. In the case of solar-type (G) stars, fractional area coverages of up to 80% are indicated for some particularly active objects.

Mark Giampapa have been working on a novel approach for estimating active region filling factors on solar-type stars. Their method involves observations of the He I triplet lines at 5876 A (D3) and 10830 A, respectively, combined with model computations of the intrinsic strengths of these features in stellar active regions. These lines appear in absorption in plages on the Sun and, by implication, in the active regions on Sun-like (F - early K) stars. The D3 line and lambda 10830 either do not appear, or occur only very weakly, in the quiet solar (or stellar) photosphere. Hence, these spectral features are ideal tracers of magnetic regions.

In order for their method to work, the maximum strength that these uniquely useful lines can attain in the active regions associated with the magnetic fields on the surfaces of Sun-like stars must be estimated. Andretta and Giampapa use a combination of observations and theory to calibrate the maximum strength of the helium lines in magnetic regions. They have constructed a grid of stellar model chromospheres based on models of the solar chromosphere. The chromospheric thermal structures are then superposed on models of F and G star photospheres, and the strengths of the helium lines computed using a radiative transfer code.

Using data from the McMath-Pierce FTS on Kitt Peak and the Jack Evans Facility at Sacramento Peak, Andretta and Giampapa find that their computations are in good agreement with what is seen in solar active regions. From their results as applied to stars, they find that the coverage of magnetic, plage-like regions on the surfaces of stars that are more active than the Sun can exceed 20%. Andretta and Giampapa are now refining this method in an effort to deduce the actual filling factor, rather than just lower limits, of stellar magnetic regions using observations of the helium triplet lines. Some preliminary results of this effort are shown in the figure. In this illustration the theoretical correlation between the strengths of D3 and lambda 10830 for several filling factors are shown. Also plotted are the observed equivalent widths of these lines for a number of G and F dwarfs. As can be seen, fractional area coverages of up to 80% are indicated in some active, solar-type stars.

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The Formation of Heavy Metals in the Early Universe (1Jun94)

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The Formation of Heavy Metals in the Early Universe (1Jun94)
(from NOAO HIGHLIGHTS!, NOAO Newsletter No. 38, 1 June 1994)

High redshift quasars allow us to study the universe when it was very

young. Metal lines in quasar spectra provide both a record of the star formation history of the host galaxy, and in principle a chronometer that can place a lower limit on the age of the universe at the lookback time of the quasar. Unfortunately, most of the strong UV emission lines in quasars are due to alpha-process elements that are rapidly synthesized in type II supernovae explosions. Due to the short lives of their progenitors, the abundance of alpha-process elements cannot place strong constraints on the star formation history. Iron, on the other hand, is mostly enriched through supernovae type Ia explosions. The accepted model for type Ia supernovae involves a merger with a white dwarfs following a common envelope phase, thus delaying the enrichment. Models of the ISM suggest that the Fe enrichment time scale is about 1 Gyr. Thus, a large Fe abundance at high redshift implies significant star formation over the prior 1 Gyr.

Strong Fe emission is frequently seen in low redshift AGN in the spectral regions near HB (4861 A) and Mg II (2800 A). Models of such strong Fe II emission imply relative iron abundances at least several times solar. The detection of strong Fe emission thus implies a large enrichment by type Ia supernovae. Recently, infrared spectrometers have become sensitive enough to detect Fe emission at redshifts beyond 2.5, which is where the Fe emission shifts out of the grasp of optical spectrographs.

Using the KPNO Cryogenic Spectrometer (CRSP) on the 2.1-m telescope, Richard Elston (CTIO), Gary Hill (U. of Texas, Austin) and Keith Thompson (Naval Research Lab.) observed the spectral regions near HB in two redshift ~ 3.3 quasars, redshifted into the K band (1994 Nature, 367, p.250). They found strong rest-frame Fe emission in both objects (Figure 1). The optical Fe emission is stronger than that seen in 98% of low-redshift quasar samples, thus indicating a high Fe abundance. They argue that star formation must have occurred at z &gt 6 for qo = 0.1, Ho = 80 cosmology, if the iron was indeed created in type Ia supernovae. Furthermore, if qo = 0.5, one can rule out standard cosmologies with Ho &gt 80, because the age of the universe would then be less than the required enrichment time of 1 Gyr.

[Figure not included]

Figure 1: Rest-frame spectra around HB of Q0014+813 and Q0636+680, together with the ultra-strong Fe II emitter IRAS 07598+6508. The various Fe II lines are indicated. Note the good coincidence with features in high redshift quasars, but that the ratios are different from those seen in low redshift QSOs.

Since type II and type Ib supernovae synthesize little Fe relative to alpha-process elements, a clear signature that the Fe is synthesized by type Ia supernovae would be a large Fe abundance relative to an alpha-process element. Measuring the strength of Fe II emission near the Mg II line allows this test to be done. Measuring Fe II relative to the alpha-process ion Mg II is a particularly good test, since they have similar ionization potentials and will thus originate in the same regions. In December 1993 Elston, Hill and Thompson observed the region near Mg II, redshifted into the J band, in the same two redshift ~ 3.3 quasars using CRSP with its new 256 X 256 InSb array on the KPNO 4-m telescope (Figure 2). The improved CRSP provided a large increase in performance, allowing the clear detection of the low equivalent-width Fe II complexes near Mg II. This observation demonstrates high Fe abundance relative to Mg II, implying enrichment by type Ia supernovae.

[Figure not included]

Figure 2: Rest-frame spectra around Mg II of the same quasars showing strong UV Fe II emission, which confirms the high abundance of iron in these objects at z ~ 3.3.

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NOAO 2000 (1Jun94)

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NOAO 2000 (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

Over the past year, NOAO has undertaken a re-examination of its mission and priorities. Several factors make such a re-examination timely. In the next 18 months, the GONG observing stations will be deployed. Questions arise about how to take advantage of this new facility; how long to operate the GONG network; what kinds of observations might be combined with helioseismology to build models of the entire convection zone in an effort to understand the nature and origin of solar variability. Another question for solar astronomy is what should be done to renew the solar facilities. Apart from GONG, no new facilities have been built within NSO in 25 years.

The advent of the Gemini project requires a similar re-examination of the nighttime program, both north and south. Gemini is an international - not an NOAO - project. However, Gemini relies on national project offices, which are located in the national observatories, to serve as an extension of the project team with specific responsibility for serving as an interface between Gemini and the national communities; to represent national positions concerning the science requirements for the Gemini facilities; and to participate in design reviews and assist with technical oversight. In addition, the southern Gemini telescope will be operated on a site that is owned by AURA, the Gemini and CTIO staffs will occupy shared space both in La Serena and on the mountain, and some staff may be shared between the two operations.

Even in the absence of new programs, a re-examination of NOAO priorities would be required by the budget climate (see previous Newsletter). In terms of purchasing power, the budget for NOAO operations is now 30 percent below what it would have been had it simply kept pace with inflation since 1984. The baseline plan for domestic discretionary spending by the federal government for the next five years is level dollar funding. With allowance for further inflation, that means an additional cut of perhaps 20 percent for most discretionary programs. Astronomy cannot grow, or even keep pace with inflation, unless other programs shrink.

In fact, astronomy has a good case to make for expanding its support. Over the next decade, half a billion dollars in capital will be invested in large new telescopes. This is the first major investment in ground based facilities in 25 years and represents a watershed in astronomy. A relatively modest amount of additional NSF support - 12 to 15 million dollars per year - would ensure the effective use of these telescopes. The funds are needed for instrumentation of the independent observatories (Keck, Magellan, LBT, and the MMT upgrade) and for operations of Gemini. Innovative instrumentation is essential for all these telescopes. A poorly-instrumented 8-m telescope is likely to be less effective than a well-instrumented 4-m telescope, and the latter is less expensive to build and operate.

As part of the effort to define what NOAO should look like in the year 2000 and beyond, astronomers from both the solar and nighttime programs discussed mission statements. While some people may regard such statements as unimportant, the attempt to arrive at a mission statement can serve to clarify the goals and shared values of the organization and can provide an important guide in determining priorities. The goals that are shared throughout the observatory are:

- To enable excellent scientific research by the US astronomical community.

- To support diverse and innovative approaches to scientific problems.

- To provide access to forefront facilities through open competition.

Paul Schechter, who chairs AURA's Observatories Advisory Committee, characterizes these goals as the four E's: enabling excellence without exclusivity or entitlement.

The challenge, of course, is to translate this statement into a program. In the next several Newsletters, we will outline the program that NOAO will propose for both solar and nighttime astronomy. This program will address issues on all time scales from what we do after GONG and after Gemini to what instruments and telescope upgrades will be completed in the next two years. We will indicate our priorities for various budget levels. And we want your feedback. NOAO does not formulate programs in a vacuum but rather works closely with the community that it serves; AURA and NSF approval are also required before specific programs can go forward.

In an upcoming Newsletter, Jacques Beckers will outline the program that he is developing with the NSO staff. The other divisional directors will also comment on the priorities for their portions of the NOAO program in this and future Newsletters.

In this Newsletter, however, I want to make some general statements that indicate the kinds of changes that will occur in the NOAO nighttime program in response to Gemini, which dominates future planning. The priorities will be:

1) Support for Gemini - whatever the international Gemini project requires the National Observatories to do to support the Gemini program will have the highest priority;

2) Telescopes and instruments that support Gemini observations - in order to use the Gemini telescopes effectively and to mount a broad attack on astrophysical problems, observations, such as wide-field imaging to select objects for spectroscopy with Gemini, will be required;

3) Capabilities not provided by Gemini - as one example, Gemini will not provide a wide field for fiber spectroscopy for several years after first light.

Consistent with these priorities, we plan to re-orient the programs of both KPNO and CTIO. In the future, the emphasis at CTIO will be on operations. The near term goal is to improve the delivered image quality of the CTIO 4-m telescope. The planned program is extensive, involving changes in the structure of the dome, refiguring of the secondary, cooling the oil and primary mirror, modifying the mirror support system, and adding a secondary with tip/tilt capability. Other telescopes will be upgraded and repaired in order to lower long term maintenance costs as resources permit. The goal is to complete this program before installation of the southern Gemini telescope begins. While Gemini has the option of hiring its own personnel, we believe that the CTIO staff can and should contribute to the commissioning of the southern Gemini telescope, and that on the basis of their experience over the next few years, they will be well positioned to compete for Gemini positions.

The staff representatives from both CTIO and KPNO who attended the NOAO 2000 meeting agreed that a goal of NOAO should be to provide instrumentation of comparable (but not necessarily identical) capability at both sites. Estimates show that essentially all of the engineering effort at CTIO, which has been steadily eroded by budget cuts over the past few years, will be required for the program of telescope upgrades. Both KPNO and CTIO also agree that there is a threshold size required in an engineering group if it is to be effective in building complex modern instrumentation. NOAO can no longer support such an instrumentation group at more than one of its nighttime sites. Therefore, CTIO and KPNO have agreed that in the future all major instruments for both sites will be built in Tucson. The IR and O/UV instrumentation groups formerly responsible for providing instruments to KPNO will become an NOAO instrumentation group. Since no new resources are being provided to this group from within NOAO, it is likely that the rate of installation of new instruments at KPNO will be reduced by as much as a factor of two. The NOAO instrument program will compete to build some of the Gemini instruments assigned to the US and will work with the international Gemini project in planning and evaluating the entire instrumentation program. Priorities for the NOAO instrument group will ultimately be determined by the NOAO Director on the basis of a program developed jointly by KPNO, CTIO, and where appropriate, the US Gemini Program. Because we believe that instrumentation is key to keeping the NOAO and Gemini telescopes competitive and that the instrumentation resources are at the minimum viable level for serving the telescopes of both KPNO and CTIO, this program will not be preferentially cut in order to keep telescopes in operation. Any proposed cuts will be reviewed on an NOAO-wide basis.

A joint IR program has been worked out and will be described in a future Newsletter and discussed with the users' committees at their next meetings. A program in O/UV instrumentation is under discussion.

In setting priorities for the instrumentation program, NOAO will emphasize its strengths, which include optical and IR detectors, infrared instruments, optical imaging, and optical spectroscopy, including multi-object fiber spectroscopy. In other areas, including adaptive optics, NOAO will attempt either to purchase systems or to make them available to the community in return for observing time. Plans for adaptive optics will be described in a future Newsletter.

With respect to telescope operations, the plan is to retain the current balance of resources north and south, solar and nighttime. Resources will not be shifted from one site to another. It is possible to make a strong scientific case for each of the telescopes that we operate, and so the scientific arguments for shifting resources are not compelling. We believe that fixing the resource allocations will stimulate each site to devise creative approaches to cutting costs since each site will benefit from whatever cost savings it achieves.

As I prepared this year's program plan, I was impressed once again with the significance and diversity of the science pursued on telescopes

other than the two 4-m telescopes. Astronomy requires access to facilities with a range of apertures and a diverse set of instruments. As indicated by the mission statement, we are committed to supporting a broad community. That said, there are two threats to the continued operation of the telescopes other than the two 4-m class telescopes and WIYN. One is the continuing decline in the budget. Both KPNO and CTIO are finding it increasingly difficult to continue operations at the level of reliability that the user community has come to expect.

The second threat is even greater. The telescopes are aging, are becoming increasingly difficult to maintain, and several may have to be retired sometime in the next decade independent of budget levels. What is needed is a systematic plan for replacing these telescopes. Both KPNO and CTIO would like to have one additional 4-m class telescope. For both sites, the telescopes should be alt-az with a Cassegrain focus, so that they can be used to commission Gemini instrumentation. At least one of them should be designed for infrared astronomy. Both sites would benefit from modern 2-m class telescopes capable of wide-field imaging. If two new telescopes were built at each site, then we could retire the existing telescopes, with the possible exception of the 2.1-m and the 1.5-m telescopes, lower maintenance costs, and have more powerful facilities for the community. The most likely model for obtaining such new telescopes appears to be the WIYN model, where much of the capital for construction is provided by partners and NOAO assumes much of the responsibility for operations.

A theme that will pervade future planning in NOAO is that we are committed to working flexibly and in new ways with university and other groups. We expect to acquire some portion of our instrumentation from outside groups either by purchasing it or by exchanging telescope time for it. We are prepared to share our sites with people who wish to build and operate their own facilities. And we are interested in exploring partnerships that would follow the WIYN model in order to replace our aging facilities. Such cooperative efforts are one approach to making the most effective use of the resources available to ground-based astronomy. If you have ideas for partnerships that would aid your own scientific program while adding to the observing opportunities that we can provide to the community that we serve, please do contact me or one of the other directors of NOAO.

Sidney Wolff

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Your Opinion Counts! (1Jun94)

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Your Opinion Counts! (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

As you have seen in the AAS Newsletter and the last edition of the NOAO Newsletter, a review is in progress to determine strategies for support of ground-based optical/infrared observing facilities, with particular attention to the role of NOAO. The review panel is chaired by Dick McCray, and is making an energetic effort to understand the needs of observers and the costs of running both national observatories and those with other non-federal funding support. The committee may consider such issues as the balance of NSF support to NOAO and the instrumentation and research grants program, the way in which instrumentation is developed for public and private observatories, and the mode of operation and optimal mix of publicly accessible facilities.

It is critically important to this process that you make your voice heard. The panel has solicited comments from the general community of astronomers through an e-mail bulletin board. A small response will tend to be biased toward the most vocal proponents and opponents. A large response will be much more reflective of the general experience of astronomers who use NOAO and other facilities. Please send your thoughts to oirpanel@jila.colorado.edu.

Richard Green

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Appointment of Deputy Director (1Jun94)

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Appointment of Deputy Director (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

I am planning to appoint a Deputy Director of NOAO, who will serve as Acting Director whenever I am away from Tucson. This individual must be able to work effectively with the NSF, AURA, the user community, and the other directors of NOAO. He or she will assist with developing program plans, preparing budgets, and allocating resources. Since funding does not permit an increase in staff, the Deputy Director will be a member of the current NOAO staff. Applications are now being sought, and I am confident that an excellent candidate will be found. If you wish to make any comments on this appointment, please feel free to contact me.

Sidney Wolff

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Welcome to New NOAO Scientific Staff (1Jun94)

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Welcome to New NOAO Scientific Staff...(1Jun94)
and Farewell to Those Departing
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

We are very pleased that Buell Jannuzi has accepted our offer to become an Assistant Astronomer at NOAO in Tucson. Buell is currently a Hubble Fellow at the Institute for Advanced Study in Princeton. He received his PhD from the University of Arizona, and had his first post-doc with John Bahcall at the Institute. He works on polarized emission from radio galaxies and BL Lacs and on the space distribution of quasar absorption systems. Buell will start in Tucson next January as a Hubble Fellow and will move into his staff position during the summer.

We are also happy that Charles Claver will be joining KPNO as an Assistant Scientist. Chuck is finishing his PhD work at the University of Texas at Austin, analyzing the luminosity function of very cool white dwarfs in the field and in open clusters. Chuck's experience in implementing a wide field prime focus corrector and CCD camera at the McDonald 0.76-m will come in handy for his responsibilities for optical imaging on Kitt Peak. Chuck plans to start in Tucson next January as a post-doc, and assume his staff responsibilities the following 1 October.

The new KPNO Post-doctoral Fellow will be Stephane Charlot. Stephane received his PhD officially at the University of Paris while working with Mike Fall at the Space Telescope Science Institute. He is currently a post-doctoral fellow at UC Berkeley. Stephane's research interests include stellar population synthesis to interpret the near-UV spectra of galaxies with a goal of deriving the history of star formation and shape of the IMF. Stephane plans to arrive in Tucson in October.

Also joining NOAO will be Paola Sartoretti, currently finishing her thesis with Melissa McGrath at the Space Telescope Science Institute on Io and its sodium cloud. Paola will be working with Mike Belton here, in part continuing her studies of the interaction between the atmosphere of Io and the plasma torus, and also with Bob Brown at STScI on a search for extra-solar system planets.

Three of our current post-docs will be leaving us by fall of this

year. Heather Morrison, currently a Hubble Fellow, will be taking a faculty position at Case Western Reserve University, Mike Pierce will join the faculty of Indiana University, and Mike Wise will become a staff member of the AXAF Science Institute at MIT. Since both Case and Indiana are partners with NOAO in running telescopes on Kitt Peak, we look forward to a continuing association. Their presence has made a valuable contribution to the scientific atmosphere in Tucson, and we wish them continuing success in their research careers.

Richard Green

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Astronomy News Wanted (1Jun94)

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Astronomy News Wanted (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

The National Science Foundation's public affairs officer for astronomy, Lynn Simarski, is seeking astronomy news items to send out to the media as possible story ideas. NSF regularly issues news releases and shorter "news tip" items (about one-two paragraphs long) on results of NSF-funded research. NSF works closely with the public affairs officers of the grantees' own institutions to coordinate the timing of news announcements, and to expand media coverage of research findings. Since a result often becomes "news" as it is published in a journal or announced at a meeting, public affairs officers need to be informed beforehand to time news releases properly. NSF needs your help to spread the excitement of astronomy to the widest audience possible. Please send a brief description of possible news items to: Lynn Simarski (lsimarsk@nsf.gov), or call (703) 306-1070.

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Engineering and Technical Services: Aladdin - The 1024 x 1024 InSb Array (1Jun94)

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Engineering and Technical Services: Aladdin - ...(1Jun94)
The 1024 X 1024 InSb Array
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

Since the last Newsletter, the project has successfully passed a major milestone. A bare readout has been tested and the design is a complete success. This was a major milestone since any problems at this point would have required mask changes and a new processing lot, which would have delayed the project by several months. Santa Barbara Research Center (SBRC) is now in the process of wafer testing all the devices in the first lot to determine yield information. The next step is to dice up one of the wafers and proceed to cold testing the bare readout.

The detector critical design review was held in March and that task is proceeding with the mask design and processing. There are several smaller (256 X 256) devices on the mask set which will be used to test the quality of the detector material. A paper, "Next Generation in InSb Arrays: ALADDIN, the 1024 X 1024 InSb Focal Plane Array Development Project Status Report" was presented at the SPIE Conference on Instrumentation in Astronomy in Kona, Hawaii in March. A copy of the paper can be obtained by contacting Carol Gregory (cgregory@noao.edu). Work is continuing on a plan whereby the community can participate with NOAO in a production run at SBRC of Aladdin FPAs. More will be

forthcoming on this effort.

In upgrading the detector evaluation test system GoFish for operation
of the Aladdin arrays, we evaluated the performance of the Analogic
ADC4322 16 bit 2 Mhz converter. We found the converters to perform as
advertised and have incorporated them in our system. Since they
operate on the +-15 VDC supplies, some care must be taken to eliminate
noise created by the converters from the analog electronics. A copy of
the test report, "Testing the Analogic ADC4322 Chips," by Dave
Hagelbarger and Julie Heynssens is available from Carol Gregory.

Al Fowler

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News from AURA: AURA Welcomes New Board Members (1Jun94)

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News from AURA: AURA Welcomes New Board Members (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

We are pleased to welcome Morton Lowengrub as the institutional
director representing Indiana University. Lowengrub is the Dean of
Indiana's College of Arts and Sciences. The Board also elected two
directors-at-large: Vera Rubin (Dept. of Terrestrial Magnetism/Carnegie)
and Simon Lilly (Univ. of Toronto).

Our thanks go to Hollis Johnson (Indiana Univ.), 1991-1994; France
Cordova (Penn State Univ., now on leave to NASA), 1989-1993; and
Malcolm Smith (formerly heading the Joint Astronomy Centre, now
directing CTIO), 1987-1993.

Goetz Oertel

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News from AURA: Observatoire du Mont MÃ©gantic Joins AURA (1Jun94)

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News from AURA: Observatoire du Mont Megantic Joins...(1Jun94)
AURA
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

On 8 April the Board of Directors voted to admit Mont Megantic as AURA's
third international affiliate member. Mont Megantic is a joint center
of the Universite de Montreal and Universite Laval. We welcome our new
member and look forward to a closer association.

Lorraine Reams

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NOAO Preprint Series (1Jun94)

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NOAO Preprint Series (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

The following preprints were submitted during the period 1 February 1994 to 30 April 1994. Please direct all requests for copies of preprints to the NOAO author marked with an asterisk.

568 *Ajhar, E.A., Tonry, J.L., "Surface Brightness Fluctuations in Globular Clusters and Stellar Populations in Galaxies"

569 *Sarajedini, A., "CCD Photometry of the Galactic Globular Cluster NGC 6535 in the B and V Passbands"

570 *Sarajedini, A., "Recent Progress on a Continuing Survey of Galactic Globular Clusters for Blue Straggler Stars"

571 *Sarajedini, A., Norris, J.E., "CCD Photometry for Six Metal-Rich Galactic Globular Clusters"

572 *Hill, F., Fischer, G., Grier, J., Leibacher, J.W., Jones, H.P., Jones, P.B., Kupke, R., Stebbins, R.T., "The Global Oscillation Network Group Site Survey I. Data Collection and Analysis Methods"

573 *Hill, F., Fischer, G., Forgach, S., Grier, J., Leibacher, J.W., Jones, H.P., Jones, P.B., Kupke, R., Stebbins, R.T., Clay, D.W., Ingram, R.E.L., Libbrecht, K.G., Zirin, H., Ulrich, R.K., Webster, L., Hieda, L.S., LaBonte, B.J., Lu, W.M.T., Sousa, E.M., Garcia, C.J., Yasukawa, E.A., Kennewell, J.A., Cole, D.G., Zhen, H., Su-Min, X., Bhatnagar, A., Ambastha, A., Al-Khashlan, A.S., Abdul-Samad, M-S., Benkhaldoun, Z., Kadiri, S., Sanchez, F., Palle, P.L., Duhalde, O., Solis, H., Saa, O., Gonzalez, R., "The Global Oscillation Network Group Site Survey II. Results"

574 *Samarasinha, N.H., Belton, M.J.S., "The Nature of the Source of CO in Comet P/Halley"

575 *Crawford, D.L., "UVBY and ~ Photometry for Stars in the Open Cluster NGC 1502"

576 *November, L.J., "Inferring the Depth Extent of the Horizontal Supergranular Flow"

577 *De Young, D.S., Heckman, T.M., "The Effect of Central Starbursts on the Interstellar Medium of Dwarf Galaxies"

578 *Hinkle, K.H., Drake, R., Ellis, T., "Cryogenic Single-Crystal Silicon Optics"

579 *Simon, G.W., Brandt, P.N., November, L.J., Scharmer, G.B., Shine, R.A., "Large-Scale Photospheric Motions: First Results from an Extraordinary Eleven-Hour Granulation Observation"

580 *Heim, G.B., Buchholz, N.C., Luce, R.W., "NOAO Wildfire Instrument Controller"

581 *Fowler, A.M., Gatley, I., Vrba, F.J., Ables, H.D., Hoffman, A., Woolaway, J., "Next Generation in InSb Arrays: Aladdin, the 1024 X 1024 InSb Focal Plane Array Development Project Status Report"

582 Craine, E.R., *Giampapa, M.S., Hott, D.A., "An Extrasolar Planetary Search Using a Network of Automated Telescopes"

*Giampapa, M.S., Simmons, J.E., Jaksha, D.B., Perkins, E.L., "Upgrade of the McMath-Pierce Stellar Spectrograph"

583 *Keil, S.L., Balasubramaniam, K.S., Bernesconi, P., Smaldone, L.A., Cauzzi, G., "Observations of Active Region Dynamics: Preflare Flows and Field Observations"

584 Coulter, R., *Kuhn, J.R., Rimmele, T., "Using Scintillation Measurements to Achieve High Spatial Resolution In Photometric Solar Observations"

585 *Penn, M.J., Arnaud, J., Mickey, D.L., LaBonte, B.J., "Near Infrared Emission Line and Continuum Observations from the 1991 Eclipse"

586 *Vaughnn, D., "What's Wrong with the Throughput-Resolution Product?"

587 *Probst, R.G., Ellis, T., Fowler, A.M., Gatley, I., Heim, G., Merrill, K.M., "Cryogenic Optical Bench: A Multifunction Camera for Infrared Astronomy"

588 *Walker, A.R., "BVI CCD Photometry of Galactic Globular Clusters. II. M68"

589 *Veilleux, S., Cecil, G., Bland-Hawthorn, J., Tully, R.B., Filippenko, A.V., Sargent, W.L.W., "The Nuclear Superbubble of NGC 3079"

590 *Kinman, T.D., Suntzeff, N.B., Kraft, R.P., "The Structure of the Galactic Halo Outside the Solar Circle as Traced by the Blue Horizontal Branch Stars"

591 *Walker, A.R., "BVRI Photometry of the Omega Centauri Hubble Space Telescope Calbration Field"

592 *Armandroff, T.E., "The Use of CCDs on Schmidt Telescopes"

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Non-NOAO Preprints (1Jun94)

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Non-NOAO Preprints (1Jun94)
(from the Director's Office, NOAO Newsletter No. 38, 1 June 1994)

Preprints that were not included in the NOAO preprint series but are available from staff members are listed below in alphabetical order by first author. Please direct all requests for copies of these preprints to the NOAO author marked with an asterisk.

*Abt, H.A., Willmarth, D.W., "First Radial Velocities for F- and G-Type Stars"

*Beckers, J.M., "Imaging with Array Detectors Using Chopping and Other Forms of Differential Detection"

Christou, J.C., Hege, E.K., *Jefferies, S.M., Keller, C.U., "Application of Multi-Frame Iterative Blind Deconvolution for Diverse Astronomical Imaging"

Craine, E.R., *Giampapa, M.S., Hott, D.A., "An Extrasolar Planetary Search Using a Network of Automated Telescopes"

*D'Silva, S., Howard, R.F., "Sunspot Rotation and the Field Strengths of Subsurface Flux Tubes"

*Eggen, O.J., "The Very Short Period Cepheid (RR Lyr) Variables. II. Light and Color Curves of Variables in the Solar Vicinity"

Fleming, T.A., Schmitt, J.H., *Giampapa, M.S., "The X-Ray Luminosity Function of the Nearby K and M Dwarfs: Results from ROSAT"

*Giampapa, M.S., "Astronomy with the Deep UV Explorer Observatory"

*Giampapa, M.S., Simmons, J.E., Jaksha, D.B., Perkins, E.L., "Upgrade of the McMath-Pierce Stellar Spectrograph"

Grauer, A.D., Ringwald, F.A., Wegner, G., Liebert, J., Schmidt, G.D., *Green, R.F., "The Nova-Like Cataclysmic Variable Star: KUV 0859+415"

Grillmair, C.J., Faber, S.J., *Lauer, T.R., Baum, W.A., Lynds, C.R., O'Neil, Jr., E.J,, Shaya, E.J., "Nuclear Regions of NGC 3311 and NGC 7768 Imaged with the HST Planetary Camera"

*Komm, R.W., "Hurst Analysis of Mt. Wilson Rotation Measurements"

Kormendy, J., Dressler, A., Byun, Y-I., Faber, S.M., Grillmair, C., *Lauer, T.R., Richstone, D., Tremaine, S., "HST Photometry of the Cores of Early-type Galaxies"

Kulkarni, V.P, Huang, K.,. *Green, R.F., Bechtold, J., Welty, D.E., York, D.G., "Pruning the Lyman Alpha Forest of Q 1331+170"

Linsky, J.L., Andrulis, C., Saar, S.H., Ayres, T.R., *Giampapa, M.S., "The Relationship Between Radiative and Magnetic Fluxes for Three Active Solar-Type Dwarfs"

*Neidig, D.F., De Luca, E.E., Kim, I.S., Koutchmy, S., Smartt, R.N., "Prospects for Observing Space Debris with Solar Coronagraphs"

*Penn, M.J., Arnaud, J., Mickey, D.L., LaBonte, B.J., "Near Infrared Emission Line and Continuum Observations from the 1991 Eclipse"

*Penn, M.J., Kuhn, J.R., "Ground-Based Detection of an IR [SiX] Coronal Emission Line and Improved Wavelengths for the IR [Fe XIII] Emission Lines"

Prosser, C.F., *Giampapa, M.S., "A Radial Velocity Survey of the Open Cluster IC 4665"

*Smartt, R.N., "Coronagraph"

*Smartt, R.N., "Spectroheliograph"

*Smartt, R.N., Zhang, Z., Kim, I.S., Reardon, K.P., "Coronal Loop Interaction Observed at Visible Wavelengths"

Stauffer, J.R., Hamilton, D., *Probst, R.G., "CCD-Based Search for Very Low Mass Members of the Pleiades Cluster"

Stauffer, J.R., Liebert, J., *Giampapa, M.S., MacIntosh, B., Reid, N., Hamilton, D., "Radial Velocities of Very Low Mass Stars and Candidate Brown Dwarf Members of the Hyades and Pleiades"

*Zirker, J.B., Cleveland, F.M., "Searching for Nanoflares"

** Available in the preprints directory on pandora.

Ann Barringer, John Cornett, Elaine Mac-Auliffe,
Jane Marsalla, Shirley Phipps, Cathy Van Atta

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Update on 4-m Image Quality (1Jun94)

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Update on 4-m Image Quality (1Jun94)
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

The last edition of this Newsletter reported that the f/8 secondary had been re-installed on the 4-m telescope, but that there were a variety of image problems including structure in the image on the subarcsec scale. We're pleased to report that at least the most obvious of those problems appears to have been solved. We were able to take the secondary mirror back off the telescope for several weeks starting in late February and make some further modifications to its cell. When the secondary was re-installed the two- and three-pointed structure we had been seeing in the images were gone, and instead we saw round images with FWHM = 0.7 arcsec. Seeing measurements taken at the zenith during the following several nights of f/8 observing frequently gave FWHM values in the vicinity of 0.8 arcsec.

We believe that all three of the 4-m foci (prime, f/8 and f/30) are now routinely capable of giving 0.8 arcsec images at the zenith, seeing permitting. But there is still an important problem affecting all three foci. The primary mirror becomes very astigmatic when the telescope is pointed to largezenith distances. This is particularly obvious for positions north of the equator, where slightly out-of-focus images often appear double. An important point here is that the focus of the telescope does change as a function of zenith distance, and with careful refocussing it is possible to obtain round(ish) images with 1.5 arcsec or better FWHM even as far north as +30 degrees.

This astigmatism problem has been there since we started making quantitative measurements with image analyzers back in 1990, but it has been slowly getting worse. During the past several months we have repeatedly checked all of the parts of the primary mirror support system that we can get to while the mirror is in the telescope, and we cannot find anything wrong. We suspect this is a problem in the radial support system. We hope to be able to solve it while the mirror is out

of the telescope during the August shutdown (see accompanying story), either by finding and fixing the actual problem, or by compensating for it with the new active axial support system.

Jack Baldwin, Brooke Gregory

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4-m Telescope to be Shut Down for Four Weeks in August (1Jun94)

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4-m Telescope to be Shut Down for Four Weeks...(1Jun94)
in August
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

The CTIO 4-m telescope will be shut down for an unusually long realuminization and engineering run starting in early August. We are presently planning to take 29 days, probably 8 August - 6 September. The realuminization is routine (and would take over a week by itself), but there are a number of other things that we need to get done while the mirror is out of the telescope.

These include:

Installation of Active
Primary Mirror Support System

The 33 air bags that provide the axial support for the mirror will be "re-plumbed" with air lines leading to 33 individual air pressure controllers, which will be under computer control. We will also be able to continue using our old air-pressure controllers, so the plan is to carry out just the basic installation in August and then use engineering nights over the next several months to debug the new active system. We believe that this is a low-risk way to make this changeover.

Inspection and Alignment of
Primary Mirror Radial Supports

As is noted in an accompanying article, the telescope's astigmatism at large zenith distances has recently increased. The new active axial support system should be able to remove any reproducible components of this astigmatism. The problem most likely comes from the radial supports and we obviously need to try to correct the problem at its source.

Improvements to Air Ducts for
Primary Mirror Cooling System

We will install some missing baffles and make other modifications to this system, which has been in routine daytime use for the past several months.

Inspection and Possible Repairs to
Declination Drive

We had a close call a few months ago when one of the declination drive motors suddenly stopped working. The drive uses two torque motors working in opposition to each other. Fortunately, it turned out that after we used the surviving motor to move the telescope a small distance, the other one came back to life again. Since it takes three days of down time to remove and inspect these motors, we will do it during the August shutdown when we can schedule it, rather than risk having the telescope die for three days during somebody's observing run (as was almost the case).

Removal of Unnecessary Counterweight
from Chimney

The chimney (light baffle) sticking up from the center of the primary mirror has been carrying around an extra ton of weight for the last 20 years. This was installed instead of the flip-in tertiary mirror for the (never-implemented) coud focus. This extra weight causes undesirable amounts of flexure in the primary mirror cell, so we feel it is high time to lighten the ship.

The 29-day schedule for the shutdown includes 6 test nights at the end, as well as 5 contingency days on top of 18 days of planned work. We hope that this will let us deliver the telescope back to the scheduled astronomical observers on time and in good shape.

Jack Baldwin

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Changes in Instrumentation Available at CTIO (1Jun94)

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Changes in Instrumentation Available at CTIO (1Jun94)
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

We are in the process of reviewing the instrumentation that we offer on our telescopes, as part of an effort to minimize operational costs while maximizing scientific utility. Some of the changes announced below are definitive, while others are still under study. In the latter case, the September Newsletter will provide the final decision, but because it comes so close to the proposal deadline, we felt it useful to provide some advance notice.

Availability of Plates

As most readers of the Newsletter are already aware, Kodak has discontinued a number of plate types and is likely to discontinue more in future.

Simultaneously, the demand for plate use of the CTIO telescopes has steadily diminished. At present, requests for plates are restricted to an average of one per semester on the 4-m and roughly two on the Schmidt; the TAC typically grants time to about half of these.

As a result, we are adopting the following policy on plate use on these two CTIO telescopes for direct imaging (plate use is not supported elsewhere):

4-m telescope: CTIO will maintain a small stock of plates, of the two or three most popular types (nominally IIIaJ and IIIaF; check the September Newsletter for final details). Users who plan to use more than a couple of dozen plates, or plates of other types, will be expected to make arrangements to supply them. This policy is effective beginning first semester 1995.

Schmidt telescope: CTIO currently has a modest stock of IIaO plates. Proposals to use these plates will be accepted until the stock runs out. Since IIaO plates have been discontinued by Kodak, a decision will be made on a replacement type once present stock nears exhaustion. Plates of other types will be provided, if we have them in stock; users should consult the mountain staff or the CTIO staff member in charge of photography (Nick Suntzeff: nsuntzeff@noao.edu). Any additional plates will have to be supplied by the user. This policy is effective beginning first semester 1995. A staff committee is investigating long-term options. Suggestions are welcome, provided they take into account the very limited resources that CTIO and the University of Michigan can devote to the telescope. (Comments may be directed to Mark Phillips: mphillips@noao.edu.)

IR Single Channel Photometry

As announced in the previous Newsletter, this instrument is no longer available on any telescope.

HgCdTe Imager on Small Telescopes

During the up-coming semester, we will be testing the HgCdTe Imager on the 1-m and Schmidt telescopes, in addition to providing it for scheduled use on the 4-m and 1.5-m telescopes, starting in October. Given the pressures of commissioning this instrument on the larger telescopes, we will not have completed the tests in time to schedule the instrument first semester of next year. It is our expectation that we will be offering the instrument on at least one of the two telescopes for the second semester of 1995. Check the December Newsletter for further news.

2D-Frutti on 1-m Telescope

The cassegrain spectrograph on the 1-m telescope currently sees little use (perhaps once or twice a semester). The image tubes used in the 2d-Frutti are slowly aging and will eventually fail; we have only limited spares. In addition, support of the HgCdTe infrared imager is only practical if we can heavily block-schedule the telescope. We therefore propose to withdraw the 2D-Frutti from service over the next year, as follows:

1) Time will be granted only to continuing programs.

2) It will not be scheduled as a backup for photometric programs (except for continuing programs which include spectroscopy).

We do not expect to support it beyond the end of 1995.

Tek 2048-2 on 0.9-m Telescope

Starting with the current semester, it is our intention to attach one of our Tek 2048 X 2048 CCDs permanently to the 0.9-m telescope. Given that these chips have good UV sensitivity and fast read-out under ArCon, we do not believe that any scientific program will be seriously affected by this policy. This means that only one Tek2048 will be available to serve the needs of the larger telescopes, but we already have considerable practical experience meeting their needs with a single CCD.

The 0.9-m CCD will be removed only for engineering tests of other CCDs by local staff, or in the event of a serious failure of the 4-m/1.5-m CCD.

J. Elias, J. Baldwin, R. Elston,
S. Heathcote, M. Phillips, N. Suntzeff

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New CTIO Proposal Form? (1Jun94)

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New CTIO Proposal Form? (1Jun94)
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

CTIO has been using electronic submission of proposals for roughly five years, but we have limited the process to text-only proposals (although ingenious people have found ways around this from time to time). KPNO has recently adopted an electronic submission procedure that permits submission of figures.

CTIO intends to switch to a similar procedure, with a nearly identical form (the content of the two forms is virtually the same already). This work has not yet been done; we expect to complete it by July, in time to provide full details in the September Newsletter. Alternatively, users who wish to submit proposals early will find the new form and instructions in the pub/ctioforms sub-directory via anonymous ftp, after 1 August. In the event that there are difficulties with the implementation, the old form and a suitable announcement will be found in the same sub-directory.

Jay Elias

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CTIO/ESO Workshop Held in La Serena (1Jun94)

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CTIO/ESO Workshop Held in La Serena (1Jun94)
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

The Third CTIO/ESO Workshop was held in La Serena 24-28 January 1994. This year's workshop topic was "The Local Group: Comparative and Global Properties." The workshop featured approximately 70 astronomers from North and South America, Europe, and Australia. Session topics included the interstellar medium, young stellar populations, old stellar populations, and the dynamics of Local Group galaxies. A final session highlighted the knowledge gained from Local Group galaxies in the context of interpreting observations of more distant galaxies.

The organizers would like to express their thanks to the participants for making this an exciting and informative workshop. We especially thank the CTIO and ESO staff personnel for service above and beyond the call of duty in making this meeting a success.

We are now in the process of editing the proceedings, and hope to have them out before the northern fall.

Andrew Layden, Chris Smith (CTIO), Jesper Storm (ESO): co-chairs, Local Organizing Committee

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CTIO Telescope Time Request Statistics (1Jun94)

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CTIO Telescope Time Request Statistics (1Jun94)
(from CTIO, NOAO Newsletter No. 38, 1 June 1994)

The tables below summarize the telescope time requests for second semester 1994. On the 4-m telescope, the requests are almost at the all-time record level achieved for first semester, and well above the equivalent period last year, when the f/8 secondary was out of service almost all of the semester. The demand for the R-C spectrograph is such that the telescope could (in principle) be block-scheduled with that instrument for the entire semester. The shut-down associated with work on the primary mirror, declination motors, and other activities (as outlined in one of the preceding articles) has obviously reduced the number of nights available below "usual" levels; the reduced availability coupled with the heavy demand has led to an over-subscription factor greater than 3; it is nearly 4 for dark time. The demand on the smaller telescopes seems to be roughly normal, when compared with the requests a year ago; there is a slight decline on the 1.5-m.

4-m Telescope: 128 nights available

Requests		Nights Requested				
Dark	Bright	Dark	Bright	Instrument	Nights	%
1	1	4	3	ASCAP	7	1.8
9	5	28	14	Argus	42	10.7
32	11	118	35	CS/CCD	153	39.1
3	11	9	40	Ech/CCD	49	12.5
0	4	0	12	IR/Imager	12	3.1
1	4	3	11	IR/IRS	14	3.6
18	0	64	0	PF/CCD	64	16.4
2	0	5	0	PF/Plates	5	1.3
4	3	14	6	RF-P	20	5.1
1	4	8	17	OSIRIS	25	6.4
71	43	253	138		391	100%

	Now	Last Semester	Semester Before Last
No. of requests	114	120	107
No. of nights requested	391	404	355
Oversubscription	3.05	2.42	2.23
Average request	3.43	3.37	3.32

1.5-m Telescope: 165 nights available

Requests		Nights Requested				
Dark	Bright	Dark	Bright	Instrument	Nights	%
2	0	13	0	ASCAP	13	4.9
23	2	96	10	CF/CCD	106	39.7
3	4	12	21	CS/CCD	33	12.4
0	3	0	13	Ech/CCD	13	4.9
1	5	2	31	IR/Imager	33	12.4
0	2	0	11	IR/IRS	11	4.1
3	3	12	13	RF-P	25	9.4
0	2	0	10	Visitor	10	3.7
0	5	0	23	OSIRIS	23	8.6
32	26	135	132		267	100%

	Now	Last Semester	Semester Before Last
No. of requests	58	67	69
No. of nights requested	267	340	301
Oversubscription	1.58	2.00	1.80
Average request	4.60	5.07	4.36

1-m Telescope: 177 nights available

Requests		Nights Requested				
Dark	Bright	Dark	Bright	Instrument	Nights	%
7	4	62	37	ASCAP	99	96.1
0	1	0	4	CS/2DF	4	3.9
7	5	62	41		103	100%

	Now	Last Semester	Semester Before Last
No. of requests	12	19	13
No. of nights requested	103	189	101
Oversubscription	0.58	1.09	0.57
Average request	8.58	9.95	7.77

0.9-m Telescope: 169 nights available

Requests		Nights Requested				
Dark	Bright	Dark	Bright	Instrument	Nights	%
28	9	151	59		210	100%

	Now	Last Semester	Semester Before Last
No. of requests	37	36	36
No. of nights requested	210	220	207
Oversubscription	1.24	1.31	1.21
Average request	5.68	6.11	5.75

Schmidt Telescope: 105 nights available

CF/CCD	17 requests for	104 nights	85.2
Plates	3 requests for	18 nights	14.8
20		122	100%

	Now	Last Semester	Semester Before Last
No. of requests	20	16	18
No. of nights requested	122	133	104
Oversubscription	1.16	1.23	0.96
Average request	6.10	8.31	5.78

0.6-m Telescope: 181 nights available ASCAP 3 requests for 40 nights
(Average request - 13.33 nights)

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KPNO 2000 - The Future of Kitt Peak in the Gemini Era (1Jun94)

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Era
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

For the last several months the NOAO scientific staff have been involved in discussions to identify and plan for the long-term future of NOAO, focusing particularly on how the Observatories will change to meet the challenges of the Gemini 8-m telescopes. These discussions culminated in the NOAO 2000 meeting held at Sacramento Peak in late March, discussed elsewhere in this Newsletter. Of special importance to our KPNO user community is the role KPNO will play in the Gemini Era, as well as the telescopes, instruments, and scientific capabilities which it will provide to astronomers. Two themes arose repeatedly throughout our discussions. First, the scientific capabilities, rather than just the apertures of telescope mirrors, are the important components of any program. Scientific capabilities require telescopes, instruments, observing time, software, and staff together to yield quality scientific results. The second theme was the achievement of excellence in those scientific capabilities we choose to pursue. The range of capabilities in which we excel must address the diversity of forefront scientific problems of interest to the community, but be limited in number so that our resources can be focused effectively. The scientific capabilities which we believe will be critically important to enable our user community to address scientific research problems at the start of the next century are:

- Wide-field optical and IR imaging with the highest achievable image quality short of high-speed adaptive technology.

- High spatial resolution optical and diffraction limited IR imaging with adaptive optic techniques.

- Multi-object spectroscopy in the optical and in the infrared.

- Faint object spectroscopy with high throughput.

- Moderate/high dispersion stellar spectroscopy of large samples and broad spectral coverage (and stability for stellar seismology).

The KPNO of the 21st century will work in partnership with the Gemini telescopes to bring these important scientific capabilities to the community, and to enable excellence in the scientific productivity of Gemini and cost effectiveness in the operations of the Gemini telescopes. The development of outstanding Gemini instrumentation at NOAO will require access to telescopes to prototype and to commission instruments. Those telescopes are best provided near the scientific and engineering resources responsible for building the instruments, and KPNO is the natural site for carrying out these tasks. KPNO will also play an essential role in supporting Gemini science programs; rare is the observational project which can be carried out without access to other facilities for program definition, feasibility demonstration, and followup. Our existing telescopes will play an important role in providing new observations needed from smaller telescopes to make the most productive use of data from the Gemini telescopes and the most efficient use of time allocated on the Gemini telescopes. KPNO staff will also contribute significantly to the scientific operation of Gemini through the allocation of telescope time, support of users in observing run preparation, data reductions, archiving, remote observing, and so forth.

Each of these components leads KPNO to a full role in the scientific support of the Gemini telescopes. We must pursue each of these parts of the overall program vigorously if we expect to provide the level of support that the astronomical community will demand of us in the Gemini Era. The implementation of a successful national Gemini program requires the continued operation of smaller telescopes equipped with instrumentation providing needed support to Gemini observing programs. Additionally, many important scientific programs do not require 8-m telescopes, or cannot be carried out on large telescopes, and NOAO/KPNO will continue to support such programs at a modest level. The most critical priorities for the KPNO portion of the NOAO program for NOAO 2000 are:

- The provision of scientific capabilities not available at Gemini (e.g. wide field imaging, multi-object fiber spectroscopy).

- The development, commissioning, and deployment of state-of-the-art instrumentation for Gemini telescopes.

- The support of Gemini observing programs requiring additional data to make the most effective use of Gemini observing time.

- The development of new observing modes, flexible scheduling, data archiving, and remote observing technology to apply to the Gemini telescopes to obtain the greatest scientific effectiveness for those telescopes.

- The availability of telescope time to a broader astronomical community than can be served by the limited resources of Gemini.

Between now and the end of the century KPNO will gradually reshape its program to focus on the scientific capabilities listed above. Decisions to upgrade or replace existing facilities or instruments will be made with these priorities in mind, always considering the context of Gemini. Over the years the KPNO small telescopes (i.e. &lt 2-m) have become increasingly specialized with innovative instrumentation which excels at particular types of observations; each telescope is a competitive, world-class facility dedicated to demanding scientific problems. Our general purpose 2.1-m and 4-m telescopes are now equipped with a stable of instruments, some of which are arguably the best in the world. The new 3.5-m WIYN telescope, of which NOAO will receive a 40% share of the observing time, is optimized for wide field, multi-object, fiber spectroscopy and optical imaging. Further specialization of all of the existing KPNO telescopes will be required to reduce operating costs if we are to continue to provide both the range of capabilities and the access to telescope time that we believe the community wants.

A second new direction which KPNO will pursue vigorously is the initiation of collaborations with the community to make new capabilities and scientific opportunities available to our users. Discussions with several groups are now underway to bring new instruments to Kitt Peak or to open innovative facilities to community access. Further details will appear in future issues of the Newsletter as these collaborations are realized. We are interested in making such partnerships work to everyone's benefit. Of particular interest now is a desire to seek out university, commercial, or private partners to build a new, modern technology, 2-m to 4-m class telescope on Kitt Peak in support of Gemini science and instrumentation programs.

A third component of our program for the rest of the decade is the development of new observing modes to provide useful astronomical data to a wider community of users. In the last year we have initiated several experiments, including the queue scheduling program of last summer and the fall 1993 semester, the "Save the Bits" data archive, and the Key Projects initiative. Shared risk observing on the new 3.5-m WIYN telescope will commence in early 1995, and observing time on WIYN will be allocated primarily in a queue or service mode. The purpose of these various programs is to provide a wider range of scientific opportunities to our users, with mechanisms to accomplish both smaller and larger programs than we have traditionally supported, as well as to provide access to a broader community of astronomers. These initiatives will not only provide better service to our users, but will also serve as blueprints for Gemini telescope operations.

These three components outlined above, specialization, collaboration, and new modes of observing, together provide an exciting path to the future for KPNO, taking into account the needs of our user community as well as the context of the Gemini 8-m telescopes. Some of the decisions we must make to achieve these goals will be painful. KPNO cannot serve all needs, or continue to try to, but must focus its resources on the most important priorities for the coming century. To achieve this vision for KPNO 2000 will require hard work, hard decisions, and your help.

Caty Pilachowski,
Interim Director of KPNO

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A New Science Opportunity at KPNO (1Jun94)

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A New Science Opportunity at KPNO (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

KPNO has recently initiated a program whereby large observing projects with broad implications (Key Projects) can be supported at Kitt Peak. The purpose of this program is not only to provide a wider variety of scientific opportunities to the community, but also to develop expertise within the Observatory to review, allocate, and support large programs. A key project is an observing program which seeks to answer a significant scientific question of general interest. Key Projects can be awarded up to 20 nights per semester for up to 3 years.

Several proposals for Key Projects were received for the fall observing semester, and these proposals will be reviewed by the Telescope Allocation Committee. In addition to scientific merit, evaluation criteria relevant to Key Projects will include:

- whether access to significant amounts of telescope time is necessary to make progress on the scientific problem;
- whether KPNO telescope time will comprise most of the observing for the project;
- that the projects selected be distributed among several KPNO telescopes, and not be concentrated on the 4-m; and
- will the large body of data collected be made available to the community?

During July, August, or September, KPNO will again host small groups of astronomers who wish to develop Key Project Proposals for submission for telescope time in the spring 1995 semester. We will provide travel funds, pay room and board expenses, and provide access to local expertise in the capabilities of any of the Kitt Peak telescopes and instruments for up to three such exploratory workshops, based on a written submission (less than one page) that indicates the nature of the problem to be addressed, the general approaches to be explored, the makeup of the proposing team (limited to six participants from outside Tucson), and the dates desired for the meeting. We point out the desirability of including a KPNO collaborator, but will not insist that one be included. Proposals for Key Projects on KPNO telescopes will also be accepted from individuals and groups which are not funded for project development workshops or which do not apply for such funding. Requests for Key Project development workshops received by 1 July 1994, will be considered for support.

Please submit requests by mail, e-mail, or FAX to: KPNO Director's Office, National Optical Astronomy Observatories, P.O. Box 26732 Tucson, AZ 85726-6732, kpno@noao.edu, (602) 325-9360 (FAX).

Caty Pilachowski

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WIYN Science Operations Planning Update (1Jun94)

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WIYN Science Operations Planning Update (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

As described in the following article, WIYN is rapidly nearing completion. We are on schedule for a "shared risk" operations start in early 1995. We remind potential WIYN users that details about WIYN observation proposals and the WIYN time allocation process will be released on 15 August 1994. At that time, the current status of the telescope and instrumentation as well as the application, proposal review, and program scheduling process will be described. The application process will be very similar to the current KPNO process, and applications will be accepted either electronically or in paper form.

During the "shared risk" period, most observations will be queue/service scheduled as preliminarily described in "Planning for Early WIYN Science Operations" in NOAO Newsletter No. 36 (December 1993) and "Preparing for WIYN Proposals" in NOAO Newsletter No. 37 (March 1994). The latter article also contains a preliminary discussion of "first light" WIYN instrumentation.

All WIYN science operations planning material will be available via anonymous ftp and will reside at ftp.noao.edu in the directory wiyn/sciops/shared. The README file in that directory will provide further instructions. Readers may request information release notification from Dave Silva (silva@noao.edu or (602) 325-9358). A paper version of this information will also be available from Silva. This information will also be disseminated in the September 1994 NOAO Newsletter.

Dave Silva, Caty Pilachowski

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WIYN Telescope Update (1Jun94)

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WIYN Telescope Update (1Jun94)

Rapid progress continues towards the completion of the WIYN construction. At the time of this writing (late April), we are nearing "first light" and the beginning of commissioning activities. Highlights of construction activity between mid-January and mid-April are described below.

Much of the activity during this period involved preparation for optics installation and the actual installation of the primary. The primary mirror cell was installed in the telescope and mechanically aligned to center the optical axis of the mirror in the Optic Support Structure and square it to the elevation axis. The primary mirror itself was aluminized at the 4-m coating facility and installed on 8 March. The NOAO WIYN mirror group has tested the active supports for various elevations and reports that the on-telescope hardware is working correctly. The off-telescope portions of the primary mirror thermal control are currently nearing completion and will be ready for early optical tests on stars.

Laboratory assembly of the secondary and tertiary mirrors in their cells has been completed and both mirrors have been aluminized at the mountain solar telescope coating facility. At this writing, they are currently being re-assembled in their cells and will be installed on the telescope in the near future.

A video rate camera has been mounted at the Nasmyth port to check initial collimation and verify the pointing and tracking of the mount. A science-grade cooled CCD will be substituted for the video camera in early May and image quality measurements will commence.

The lenses for the fiber optic fed Multi-object Spectrograph (MOS/Hydra) wide-field corrector are being ground at Rayleigh Optical in Tucson and are expected to be completed early this summer. The corrector cell will be ready at about the same time. Once the corrector is installed on the telescope, the NOAO MOS/Hydra instrument group plans to use a photographic camera to map the field distortion in preparation for spectrograph commissioning.

Installation and testing of the telescope control system (TCS) continues as the rest of the telescope hardware is brought on-line. Development of a TCS graphical user interface has started and will continue throughout the commissioning phase. Instrument computers are being acquired for both the MOS/Hydra spectrograph and CCD imager.

Telescope completion took precedence over development of the Instrument Adapter/Guider for the WIYN Nasmyth (CCD imager) port during this period. Nevertheless, the general design has been approved and mechanical detailing is underway. Long lead time items such as the guide cameras and integrating CCD for the wavefront sensor have been ordered and some parts of the guider box are currently being fabricated. The guider effort will ramp up following installation of the optics as resources become available.

Commissioning of the observatory will begin following final integration and test of the control system. Commissioning activities for both the telescope and instrumentation are expected to continue through the end of the calendar year with science operations starting in early 1995.

Matt Johns, Caty Pilachowski, Dave Silva

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Tech Transfer Meeting Held at NOAO (1Jun94)

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Tech Transfer Meeting Held at NOAO (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

Recent Federal legislation and Executive Orders have encouraged federally funded facilities such as NOAO/KPNO to share their scientific and technical innovations. As a result, AURA and its observatories are actively exploring partnerships and collaborative ventures that could lead to profitable marketing of NOAO developed technology by industrial companies or corporations. The staff at NOAO/KPNO believes that there is a renewed interest in small state-of-the-art telescopes (here defined as apertures 2-m or smaller) and believes that there exists an attractive business opportunity for US industry.

A meeting was held in Tucson on 22 April 1994 with a number of companies now active in small telescope technology, as well as with several representatives from a number of organizations interested in procuring such telescopes when funding is available, to assess their level of interest in potentially joining with NOAO in an alliance to design, fabricate, and market high quality small telescopes. Such telescopes are part of NOAO's future, so there is a significant interest in insuring a market for quality, relatively low-cost, new generation small telescopes. The full day meeting was attended by all but one of the invited companies, resulting in an open and effective dialog on the value of such telescopes and their future market. It is clear that most of the companies were interested in the tech transfer potentials and that additional meetings of this sort will be forthcoming. We anticipate that the result of such discussions to be a tech transfer partnership of AURA/NOAO with one or more such companies. The progress of this and other tech transfer activities will be reported in future Newsletter articles.

Dave Crawford

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Electronic Submission of Telescope Proposals (1Jun94)

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Electronic Submission of Telescope Proposals (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

This semester Kitt Peak encouraged the submission of observing proposals via e-mail. We had experimented with a LaTeX observing form and electronic submission for the previous summer's "queue" program, and this was clearly a highly desirable option to pursue for our normal proposal sequence. As described in the last Newsletter, we "reinvented" the observing proposal form, keeping only the questions pertinent to the TAC and internal technical reviews. We obtained Chris Biemesderfer's expertise in implementing the system. We were prepared for the usual bumps and start-up problems, but in fact the process proceeded painlessly and smoothly.

To begin with, nearly everyone (95%) used the new, shorter LaTeX form, either electronically or via paper. All together we received 231 proposals for the fall 1994 semester. This is about 30 proposals below our usual average, but the removal of Hydra from the 4-m and the unavailability of COB for the first half of the semester can easily account for that - at least we don't think that anyone was so attached to the old system (15 paper copies due by 5 pm) that they decided not to apply for time!

Of the 231 proposals, 168 (73%) were submitted through e-mail. Of these, 53 (31%) included one or more figures. Roughly 40% of the previous semester's proposals contained figures, so we feel it fair to say that electronic submission did not unduly discourage the inclusion of figures. Unsurprisingly, a large fraction (43%) of the proposals

were received on the last day, and about 25% of the e-mail submissions arrived during the last night. (We would like to thank those of you who sent your proposals in early!)

This first venture at electronic submission went a lot more smoothly and effortlessly than any of us expected. Jeannette Barnes provided the expert assistance needed to massage roughly 20 proposals, and to provide answers for technical questions to people wishing to use the new system. Chris Biemesderfer's template and processing software proved so robust that once we began the submission process (28 Febuary) we never had to call on him for support. Pat Patterson, Marlene Saltzman, and Judy Prosser ran the system, handling numerous inquiries from users, fixing proposals that needed a little help, and overseeing the processing and printing of the proposals.

One of the more commonly occurring problems dealt with figures that had not been submitted correctly. The mechanism for electronic submission of encapsulated PostScript files had to be followed exactly, and a misplaced comma on the "subject" line was sufficient to require hand-editing on our end, or resubmission of the EPS file by the author. We will make the system more robust on this end to handle common problems such as this for the next time.

Most of the effort on this end, though, was spent in fixing about a dozen proposals that did not print out reasonably. We concluded that these investigators had not tried to print the document themselves. This time we "made it right" for these folk, but the responsibility belongs to the proposer to submit proposals in the form they wish to have reviewed by the TAC. If one has problems, we are happy to help before the deadline; otherwise, we still accept typed copies via regular mail!

What would we change for next time? We are planning to make a few minor changes to the form and submission process, but we found that this was substantially easier on us than the old system. We have identified only a few improvements to make the system more bulletproof. If you have comments about the new submission process, please direct them to kpnoprop-help@noao.edu.

Phil Massey, Jeannette Barnes, Pat Patterson

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Save the Bits Archive Update (1Jun94)

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Save the Bits Archive Update (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

As we go to press, the "Save the Bits" archive has been in operation for 9 months. Since 20 July 1993, 140,000 images have been archived totaling about 275 Gbytes. The FITS header catalog alone totals 300 Mbytes (minus whitespace). Images are archived from optical and IR nighttime instruments at both KPNO and NSO, using the WILDFIRE and ICE software.

FITS translation of 87 tar tapes from the 3 month phase-in period has been completed, adding 20,000 images and 50 Gbytes to the archive. Automatic tape duplication and verification features are being added; 4 exabyte 8505 tape drives are in place to support this. We are looking into making the header catalog accessible via a database server. An archive Mosaic/WWW page, http://iraf.noao.edu/iraf_staff/seaman/archive.html, is available with more information.

The archive has already proven useful. Two long term observing programs monitoring solar system and extragalactic objects have been organized to rely on images contributed by observers. The archive simplifies such ad hoc scientific collaborations by avoiding data chasing headaches - an observer with a convenient hour angle observing window need only snap the requested picture, and then e-mail a unique image identifier to the PI. No tapes, ftp, or any other fuss is necessary.

On the operations side, an ongoing 2.1-m PSF monitoring program relies on data retrieved from the archive tapes. An atlas of CCD problem

frames is being compiled in a similar way. Lastly, images from five separate nights have been recovered following observer mishaps.

As a reminder, the official KPNO policy is that data acquired using Observatory telescopes and instruments are held proprietary to the observer for 18 months. After that period, the Observatory's copy of the data may be made available to the community at the Director's discretion.

[Figures not included]

Rob Seaman, Caty Pilachowski, Bruce Bohannan

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Make Your CCD Observing Logs Automatically! (1Jun94)

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Make Your CCD Observing Logs Automatically! (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

Keeping good records of observations as you make them is often crucial to your analysis later on. We are in the process of introducing a new capability that will log observations automatically to help you with this task. The new automatic logging routines fill out the observing logsheets as the observations are obtained, as well as offering convenient mechanisms for documenting individual observations and the observational setup. The logsheets are generated in the form of TeX files, which can be viewed on the screen, printed out, or saved as PostScript files. We believe that the automatic logging procedures will offer a significant reduction in workload by freeing you from the need to write down all the basic information for all exposures by hand, leaving you to intercede only to add specific comments.

Automatic logging is done by a set of routines available from the IRAF ICE data-taking package. To activate automatic logging, you call the loginit routine before taking the first observation or calibration exposure. Loginit fills out the logsheet headers and lets ICE know that automatic logging is desired. When an observation is completed, ICE will extract most of the parameters required by the logsheets from the observation header. You can then call the remark routine to add comments, seeing values, focus settings, or any other information not known to ICE, to the logs as desired. Just as with paper logsheets, you can also revise the logsheet headers or the record for any observation at any time later. Other routines can be called to view the logs on the screen or print out paper copies. Since Tex is used to format the logs, you can also use Tex macros to format the entries. We have prepared a brief manual on automatic observation logging, which may be obtained by anonymous ftp from ftp.noao.edu, in the subdirectory kpno/manuals.

As of May 1994, automatic logging is available for CCD direct imaging at all telescopes (except for the Schmidt) and the 2.1-m Goldcam spectrograph. This feature will be implemented for other instruments over the next few months.

[Figure not included]

Tod Lauer, Stephane Courteau, Rob Seaman

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New Manual For 0.9-m Telescope Operation (1Jun94)

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New Manual For 0.9-m Telescope Operation (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

As noted in the March 1994 NOAO Newsletter (see "Direct Imaging Improvements," p.40), we have been revising our direct imaging manuals and separating out the telescope operations guides. The manual for the 0.9-m telescope is now available as a hypertext Mosaic document through the NOAO home page (URL = http://www.tuc.noao.edu/noao.html) or directly through URL = http://www.tuc.noao.edu/0.9m/manual.html

The hypertext format offers a rapid way to find the information you need at the telescope. The hypertext philosophy, however, is somewhat inconsistent with a classic, linear, paper manual. Therefore, for those who prefer paper over bits (e.g., convenient airplane reading material), a compressed version of the 38-page manual is available as 0.9manual.ps.Z via anonymous ftp to ftp.noao.edu in the subdirectory kpno/manuals (see following article).

Wider use of Mosaic for telescope and instrument manuals will be considered if the 0.9-m experiment is well received. I welcome your comments, criticisms, and suggestions for improvement of this draft manual.

George Jacoby

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Manuals by FTP (1Jun94)

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Manuals by FTP (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

A number of user manuals for KPNO instruments, computers, and telescopes are available for electronic retrieval from the NOAO anonymous ftp area, within the kpno/manuals subdirectory. These manuals are in a compressed PostScript format, as denoted by the .ps.Z filename extension. The README file contains a current listing of the available manuals within this directory as well as instructions on file retrieval and decompression for printing out on a PostScript laserwriter. Asummary of the retrieval procedure follows:

```
ftp ftp.noao.edu (or 140.252.1.24)
login as anonymous
use your e-mail address as the password
cd kpno/manuals
bin(set binary mode)
get README
get manual_name.ps.Z
quit(exit from ftp)
```

The manuals currently available are:

4mechspec.ps.Z	Echelle Spectrograph
ccdlog.ps.Z	Observation logging
ccdphot.ps.Z	CCD Photometer
coudespec.ps.Z	Coude Spectrograph
crsp.5.ps.Z	Cryogenic Spectrograph
direct.ps.Z	Direct CCD Imager
hydramanual.ps.Z	Hydra/Bench Spectrograph
ice.ps.Z	CCD Observing
mountman.ps.Z	Mountain Computers
rcspx.ps.Z	R-C Spectrograph
schmidt.ps.Z	Burrell Schmidt
0.9manual.ps.Z	0.9-m Telescope

Dick Joyce

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4-inch Filter Requests (1Jun94)

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4-inch Filter Requests (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

Due to the numerous locations at which 4-inch filters can now be used on the mountain, competition for our specialty filters is expected to be high, since our supply of these filters is limited. For example, we have only one set of 4-inch redshifted Ha filters. If you require a specific 4-inch filter and can't live with a 2-inch substitute, we urge you to note this in your proposal and to make certain that your observing run preparation form is submitted well in advance of your run with a statement regarding your filter needs.

We will attempt to obtain duplicates of high-demand 4-inch filters in the future; however, this will be a slow process because of the high cost of most of the filters.

Sam Barden, Ed Carder, Jim DeVeny

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Say Goodbye to T-tapes (1Jun94)

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Say Goodbye to T-tapes (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

The Save-the-Bits project on Kitt Peak has been so successful that we have decided to use it as a replacement for the T-tapes, which have been used for many years as a temporary backup system for observers. With the beginning of the fall observing semester on 15 August, the venerable T-tapes will disappear from the mountain, and observers will no longer be advised to make backup copies of their data to leave behind for temporary storage downtown. However, observers are still advised to make careful copies of their data for transport to their home institutions. Although the data are being archived automatically each night by the Save-the-Bits project, this should only be viewed as an emergency backup by the observer. Taping data and/or transporting it back home is still the observer's responsibility.

Caty Pilachowski

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Tape Recycling - The End is Near (1Jun94)

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Tape Recycling - The End is Near (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

We have announced in the last few issues of the NOAO Newsletter that non-staff tapes held in the CCS storage areas dated earlier than 1990 will be automatically recycled on 1 July. This recycling effort will affect all tapes held in our storage areas including, but not

restricted to, T-tapes. If you have any concerns about this effort
please contact Jeannette Barnes (jbarnes@noao.edu) immediately.

Jeannette Barnes, Bruce Bohannan, Steve Grandi

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KPNO Users Committee Report (1Jun94)

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KPNO Users Committee Report (1Jun94)
(from KPNO, NOAO Newsletter No. 38, 1 June 1994)

The Users Committee met in Tucson on 7 and 8 December 1993. The Committee members present were William Keel (Alabama), Elizabeth Lada (Maryland), Harold McAlister (Georgia State), Frazer Owen (NRAO/Socorro), Abi Saha (STScI), and John Salzer (Wesleyan). Rosemary Wyse (Johns Hopkins) could not be present for the meeting. Seth Tuttle, who is the NSF Program Manager for NOAO, also attended the sessions.

During the two-day meeting, which included a half-day joint session with the CTIO Users' Committee, we were presented with a variety of reports covering many aspects of KPNO management, operations, and planning. The review of ground-based optical/IR astronomy, with an emphasis on NOAO, requested by the NSF was also described to us. This report contains a summary of the presentations we heard and our specific recommendations regarding KPNO facilities. Beyond these operational suggestions, we are deeply concerned with the potential impact of the forthcoming review, and we close this report with a statement of our concerns.

Presentation Summary

The current management approach was described by the three Co-Directors: Caty Pilachowski, who oversees administrative tasks; George Jacoby, who handles mountain issues; and Todd Boroson, who provides leadership to instrumentation projects and who also serves as liaison to the Gemini project.

The Co-Directors' presentations were followed by status reports in response to the Committee's recommendations made following our 1992 meeting as described in the NOAO Newsletter (March 1993, No. 33, p.37). Bruce Bohannan reported that mountain staffing remains "one-person deep" in every technical area, a potentially serious problem for which present levels of funding do not appear to offer a solution. Taft Armandroff reported on the status of spectrograph camera upgrades, and he and Ian Gatley described potential partnership possibilities involving KPNO. Of particular interest is a collaborative effort with the US Naval Observatory Flagstaff Station to build a 1024 X 1024 InSb array. Dave De Young, who continues to oversee the TAC process, told the Committee that our recommendation for specific responses to applicants who were not allocated observing time had now been fully implemented. Todd Boroson reported on queue scheduling experiments at the 2.1-m and 0.9-m telescopes during the summer and fall of 1993 which provided valuable insights into the realities of this approach. Phil Massey reviewed the upgrade at the 4-m telescope. Bruce Bohannan told us that the "save-the-bits" program, a minimalist approach to data archiving, was now routine.

In addition to these updates from last year, the Committee heard reports on: Gemini instrumentation from Todd Boroson; the activities of the O/UV and IR programs from Taft Armandroff and Ian Gatley; various telescope projects from Todd Boroson including programs for constructing large format, mosaiced CCDs; the improvement of seeing and image quality from Ron Probst; mountain operations from Bruce Bohannan; the 4-m renovation project from Phil Massey; the status of the WIYN telescope from Dave Silva; and the use of IRAF/ICE on the mountain from Bruce Bohannan. A session devoted to proposals and TAC issues was led by Dave De Young, who described changes in the TAC and scheduling processes that should increase the efficiency in these areas. Phil Massey described a new, shorter proposal form that permits electronic submission, and Todd Boroson commented further on queue scheduling with its mix of advantages and disadvantages.

The Co-Directors presented the Committee with an initial summary of the responses to the questionnaire electronically mailed to the user community this fall. At the time of the meeting, KPNO had received 164 responses from the 500+ recipients. Highlights from this initial analysis showed that access to instrumentation is the most cited reason for applying for Kitt Peak time, even in cases where users have telescope access through their home institutions. Slightly more than half of the respondents use federal support for travel and 13% do not apply due to lack of any available travel funding. There is a strong interest in queue observing, a preference for 3-night 4-m runs, and a continuing program of short (2-4 week) student visits to Tucson in connection with telescope access. The responses show a high level of satisfaction with visitor support, with the reliability of telescopes and instrumentation, and with related documentation. When asked to rank what they saw as being most important for the future, users overwhelmingly selected "keeping the telescopes open" as the single highest priority item, followed by maintaining a strong instrumentation and detector program, maintaining excellence in visitor support, the continued support for IRAF, and the implementation of non-traditional approaches to scheduling.

The Budget

During the joint CTIO/KPNO session, Hugh Van Horn, the new Director of the Division of Astronomical Sciences at NSF, reported on the NSF budget picture. He anticipates level funding for astronomy into the future and pointed out that big telescope projects and flat funding preclude a "business as usual" approach to ground-based astronomy. He described the charge made to an Optical/IR Review Committee to be constituted under the National Academy's Committee on Astronomy and Astrophysics. The Review Committee will assess the coming decade of activity in optical/IR astronomy and in doing so will carefully examine the mission of NOAO. It will provide specific recommendations to NSF for optimizing scientific progress and improving the effectiveness of NSF support for astronomy. These recommendations will be made to NSF by 1 January 1995. We will return to this topic in the closing paragraphs of this report.

Van Horn's comments were followed by Sidney Wolff who addressed the NOAO FY 1994 budget picture and long-range plans and provided a status report on the Gemini project, which she considers to be central to the future of NOAO, seeing the US Gemini Office as potentially a fourth division within NOAO. She also envisions a substantial reorientation of Kitt Peak and Tucson operations in support of Gemini. In connection with planning for the future, George Jacoby reported on an internal series of staff workshops under a program called "NOAO 2000" which are aimed at identifying priorities in the Gemini era, preparing a plan for NOAO leadership in the US community, and preparing for the NSF review of NOAO. As a result of this review, the AURA contract for NOAO management, which normally would have itself been reviewed for renewal consideration this year, has been extended for an additional two years to take it through the 1994 O/IR Review Committee process.

Committee Recommendations

In executive sessions, the Users' Committee formulated specific recommendations and concerns that were presented to the Co-Directors at the end of the meeting. These issues are summarized in the remaining paragraphs of this report.

Intrinsic Seeing Evaluation

It has become a well documented fact that effective seeing of less than one arcsec is routinely obtained by some telescopes on Kitt Peak, destroying the myth that it is not a good seeing site. We note the success of the mountain effort to improve dome seeing conditions and image quality through 10 fm imaging of heat sources and through routine monitoring of collimation. These actions are winning significant gains in this fundamentally important area. We recommend that in addition to continuing this effort, KPNO undertake the determination of the intrinsic seeing conditions on Kitt Peak. This will not only define the limit to be pursued by the image quality monitoring effort, but will furnish proof of the viability of Kitt Peak as a prime observing site.

Mountain Staffing

The Committee continues to be very concerned about the one-person depth of mountain staffing. We commend the mountain staff, under Bruce Bohannan's leadership, for the fine job they do, but it is only a matter of time before the thinly stretched staff will encounter circumstances it cannot handle. This is a very fragile situation, and we hope that funds can be identified to provide some degree of staff expansion on the mountain.

Spectrograph Cameras

We reiterate our recommendation from last year that priority be given

to maintaining and upgrading existing spectrographs, especially in the cases of GoldCam and in a plan for a 4-m instrument obtained either by fixing CryoCam or providing for a replacement. We believe that the current budget situation lends difficulty in justifying a new fiber-fed instrument for the 4-m telescope.

Queue Scheduling

This approach to obtaining data offers many advantages that can promote observing efficiency while saving money. The experiences with queue scheduling during 1993 were a mixed success, but we believe the advantages can outweigh the disadvantages. We thus encourage the Observatory to continue exploring the process. Because WIYN will have extensive queuing of proposed science, the methodology will ultimately be perfected there. The innovations discovered by WIYN can be exported to the scheduling of other Kitt Peak telescopes.

User Survey

We strongly applaud the e-mail survey of the user community as well as the obvious intention of the Co-Directors to pay careful attention to the results of the survey. The committee looks forward to seeing a detailed discussion of this survey.

KPNO Directorship

The Committee is very pleased with the energetic commitment to the Observatory shown by the Co-Directors, and we congratulate them for the fine jobs they did in this capacity. Shortly after the Committee met in Tucson, two of the Co-Directors took on other responsibilities so that KPNO now has a single Acting Director, Caty Pilachowski. We encourage the NOAO Director to move quickly towards the appointment of a permanent KPNO Director.

CAA Review of NOAO

Since various subsets of the US community have access to significant private northern-hemisphere optical facilities, we are concerned that KPNO appears uniquely vulnerable during the CAA review. We urge a careful examination of the observatory's operations and facilities, and that the review committee be as accurately informed as possible of the costs and productivity of KPNO facilities. We note that the KPNO management already assembled some such material for the Town Meeting at the Washington AAS meeting in January.

The very characteristics of KPNO users, many of whom are junior and therefore less influential in setting national astronomy priorities and who are often completely dependent on national facilities, means that this review could have a dramatic effect on decades of astronomy to come. It is crucial that the review incorporate the needs of today's real users rather than a perhaps dated perception of their needs.

It is imperative that the broadest possible community input and consensus be obtained on these decisions. Any acceptable solution to the funding quandary must be generated by the community rather than imposed by a minority.

A catalyst for the CAA Committee appears to be a memorandum written by Sandra Faber in which she has suggested radical alterations in the operation of KPNO, including the privatization of the observatory. Our Committee feels that the very existence of KPNO is threatened by the current financial climate as well as by a political situation in which universities are competing directly with KPNO for funding, rather than collaborating with KPNO to ensure that the maximum amount of forefront science is done with available federal funding, and to continue to allow all the scientific community access to state-of-the-art instrumentation and facilities. The entire optical/IR user community must become aware of the situation and make their views known (pro or con). To bring people up to date, we hope to obtain Faber's permission to widely circulate her memorandum among the KPNO user community. We strongly urge all users of KPNO to consider the contents of her memo and the implications for future access to telescopes, and to become active participants in the committee process by communicating their opinions to the CAA Committee Chair, Richard McCray (oirpanel@jila.colorado.edu).

Once again, we encourage users of Kitt Peak National Observatory to take advantage of this Committee as a formal means of communication with the Kitt Peak and NOAO management. It is our experience that the Users' Committee does indeed play a useful role in representing the user community and that our opinions are given careful attention by the KPNO staff. The continuing members of the committee will be:

Bill Keel
keel@bildad.astr.ua.edu
Elizabeth Lada
lada@astro.umd.edu
John Salzer

    slaz@parcha.astro.wesleyan.edu
Rosie Wyse
    wyse%wyser@jhmail.hcf.jhu.edu

Hal McAlister (Georgia State, Chair)

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From the NSO Director's Office (1Jun94)

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From the NSO Director's Office (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

After review by the AURA Board, the report of the NOAO/NSO Visiting Committee was forwarded to the National Science Foundation and shared with the NSO staff as well as with the OIR Panel chaired by Richard McCray of the NRC Committee on Astronomy and Astrophysics. It is impossible to do full justice to the report in a short summary such as this. The report conveys an overall very positive message in regard to the functioning of NSO; at the same time, the need was stressed to develop a far-term perspective plan for NSO covering some 15 to 20 years. The report emphasized the importance of NSO's program in near-infrared (1 to 5 um) research in terms of its science potential, but it also expressed concern about NSO attempting too many instrumentation projects given the funding and manpower available. It expressed caution with regard to the all-reflecting coronagraph and adaptive optics programs.

On 1 March, I implemented the new NSO management plan. In it I defined a seven-member management team covering all three NSO Divisions (NSO/SP, NSO/KP and NSO/GONG), representing 3 and 2 branches in NSO/SP and NSO/KP respectively. The members of the team are: Jack Zirker (science branch/SP), Rex Hunter (administration and facilities/SP), Jim Moore (project and science facilities/SP), Doug Rabin (science branch/KP), Jeremy Wagner (administration, projects and operations/KP), and John Leibacher/Jim Kennedy (NSO/GONG). In addition, as observers representing our partner agencies, Harry Jones (NASA) and Don Neidig (PL/USAF) take part in the weekly management team meetings. I, myself, continue to divide my time equally between the NSO/SP and NSO/KP sites.

During the spring joint NSO staff meeting at Sac Peak, we focused on the NSO Future Directions Plan, which responds to the need expressed by the OVC for a far-term perspective. The plan focuses on the understanding and prediction of the solar cycle and its related short- and long-term variability. GONG, and its ability to measure flows, temperatures and magnetic fields in the solar convection zone, plays a crucial role in this program. Starting with these observations spanning one or two solar cycles, the observations of the activity in the solar photosphere and in the solar envelope made with existing telescopes and improved instrumentation take on a whole new dimension. The NSO staff is presently developing this plan with the aim of including broad participation by the solar astronomy and solar-stellar communities.

I am pleased to announce that the NSO/SP Vacuum Tower Telescope has again a working correlation tracker, thanks to the cooperation by Thomas Rimmele and the Kiepenheuer Institute. This is an interim solution combining still functioning parts of the broken-down NSO and KIS correlation trackers. The definition of a new correlation tracker is underway. Dick Dunn also expects improvements in the image quality at the NSO/SP Vacuum Tower Telescope by modifying the window support and thermal control system. At the NSO/KP McMath-Pierce facility we are implementing a seeing monitor system which will result in a "seeing budget" of the atmosphere and different parts of that telescope with the goal of assessing and ultimately improving its image quality by e.g. controlling the mirror temperatures under solar irradiation conditions.

The international Gemini program to build two 8-m telescopes attracts most of the attention of our nighttime colleagues within NOAO. It was the central discussion topic at the NOAO-2000 meeting which was held on Sac Peak at the end of March. It tends to cast its shadow on the NSO program which wants to focus on research related to the origins of the solar cycle (its Future Directions Plan). Although the prime focus of

the CAA OIR Panel is the NOAO nighttime program as it relates to Gemini, the future of the solar program is part of its charge. I advise the members of the solar community to stay aware of the panel's progress and to express their views to its chairman (caa@nas.edu) or to Bob Rosner, the primary spokesman for solar physics on the panel.

Jacques M. Beckers

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Plans to Observe Jupiter/SL9 Encounter from Sac Peak (1Jun94)

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Plans to Observe Jupiter/SL9 Encounter from Sac Peak (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

A special nighttime observing program will observe the encounter of the comet P/Shoemaker-Levy 9 (SL9) with the planet Jupiter at the Vacuum Tower Telescope at NSO/Sac Peak. With funding from a NASA grant, M. Penn (NSO), J. Luu (Stanford) and J. Kuhn (NSO) will collect a time series of observations of Jupiter during the encounter. The program will image Jupiter in continuum (400-600 nm) and methane absorption bands (750-890 nm), and collect slit spectra (1500 nm) along the Jovian equator. The observations will have a rapid cadence (15 sec) and should cover several hours (4-6) each night during the encounter; the data will be useful to investigate oscillations which may be generated by the comet collision. During a test run in March, short exposures combined with good seeing produced some excellent continuum images.

[Figure not included]

An image of Jupiter taken with the Vacuum Tower Telescope on 22 March 1994. A Galilean satellite shadow is visible in the bottom center.

Matt Penn

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Flare Genesis Test Flight (1Jun94)

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Flare Genesis Test Flight (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

The Flare Genesis payload was tested 23 January 1994 in a balloon launch from Ft. Sumner, New Mexico. This is a joint project of the NSO/SP Air Force group (PL/GPSS) and the Johns Hopkins University Applied Physics Laboratory to eventually obtain high-resolution vector magnetograms during a high-altitude circumpolar balloon flight. Successes of the test flight included the thermal performance, telemetry, gondola performance, reliability of the filter, and ability to command the telescope. Problems were encountered in handing off from the coarse pointing system to the 10" LCD system. We believe these problems were created by a wind gradient between the balloon and the payload that existed at the 80,000 ft. altitude the mission was flown at. Since the telescope was pointed south and the flight was drifting east, a net torque results on the solar panels. At 125,000 ft. where the Antarctic mission will be flown, this torque is reduced by a factor of about eight, so no problems are expected. As a precaution we decided to add an intermediate pointing system. GPSS is

currently writing the Executive Control Program for the flight, which will control the scientific experiment sequencing and collect the data. APL is completing the vector magnetograph payload and improving the pointing performance. PL/SX in Albuquerque and APL will modify the gondola by shortening it to make recovery in Antarctica easier.

Steve Keil

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Fourier Transform Spectrometer Update: The KCI Beamsplitter and Software Plans (1Jun94)

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Fourier Transform Spectrometer Update:...(1Jun94)
The KCl Beamsplitter and Software Plans
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

The KCl beamsplitter, damaged back in September, has now been replaced. The new unit was installed during the last week of April (as this is being written), and will, we expect, prove to be acceptable. We have thus recovered the far-infrared (out to 20 um) capabilities of the FTS.

We are currently reviewing the status of the available FTS data reduction software. At this time we have several different file formats and a rather convoluted path through the system. In order to consolidate the software and ease maintenance problems, we are contemplating supporting only FITS format files, and embedding the software system within an Xwindow and IRAF environment. Users who wish to voice their opinions should contact Frank Hill.

Frank Hill

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Sac Peak's World Wide Web Server (1Jun94)

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Sac Peak's World Wide Web Server (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Sac Peak information is available through a WWW server. Information about NSO, general information, local SP events, and the SP telescopes is online at http://www.sunspot.noao.edu. Contributions, new ideas, etc. are welcomed and encouraged by everybody and can be e-mailed to fstauffer@sunspot.noao.edu.

Fritz Stauffer

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Sac Peak ESF Computer Retired (1Jun94)

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Sac Peak ESF Computer Retired (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

The SP Evans Solar Facility Perkin-Elmer 3220 computer was officially finally disconnected on 8 April. This computer had served the facility well for a decade, but was hopelessly outdated. All observing programs have been successfully transitioned to the new control system called ESFICC.

The control system has been in operation at the SP/VTT since July 1992, and at the ESF since October 1993. The control system provides new capabilities for the ESF. Observations can be made with a flexible configuration of instruments, telescopes, film cameras, CCD cameras, photo-diodes, and photomultipliers. The coronagraph pointing uses solar coordinates, which allows sophisticated region scanning. The coelostat has limited pointing ability which also uses solar coordinates. Other features are that observations can be monitored remotely, an accurate time base locked to IRIG drives the experiments, and detailed information for the observations is recorded and saved for future reference.

Another new feature is that the documentation and system capabilities are available electronically with a World Wide Web server at SP. The address is http://www.sunspot.noao.edu, and then select the "John W. Evans Solar Facility." We all wish ESFICC a long and happy life.

Fritz Stauffer

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The First Evidence of Solar Cycle 23? (1Jun94)

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The First Evidence of Solar Cycle 23? (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Each year since 1990, magnetic field observations have been obtained with the magnetograph at the Vacuum Telescope at Kitt Peak by Sara Martin and Karen L. Harvey during each spring and fall to detect the first bipolar regions of cycle 23. Initial analysis of the pole-to-equator, time-series magnetograms suggests that in the spring of 1993 small bipolar regions emerging at high latitudes showed a preferential orientation that is reversed from the lower-latitude active regions, but is consistent with the region orientation for the next sunspot cycle. We suggest that this component of activity may represent the beginning of magnetic flux emergence of Cycle 23. Further observations are being made to verify this conclusion and to follow the development of the ensemble of activity belonging to the next solar cycle in its earliest stages.

Karen Harvey

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Lou Gilliam Retires (1Jun94)

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Lou Gilliam Retires (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Lou B. Gilliam has retired as Chief Observer at the Evans Solar Facility at the National Solar Observatory after 32 years of service. Obviously, he will be sorely missed by all the staff at Sac Peak and the many visitors that he has assisted over the years. Lou has co-authored numerous papers and participated in many experiments and observational developments at the Evans Solar Facility. He was awarded the first AURA Distinguished Service Award in 1991. NSO wishes Lou the best in his retirement.

Rex Hunter

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Sunspot Education Center and Science Museum (1Jun94)

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Sunspot Education Center and Science Museum (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

The National Solar Observatory, in partnership with the State of New Mexico, Apache Point Observatory and the US Forest Service is developing a world-class education center and museum to be located at Sunspot, New Mexico. Plans include an auditorium/theater, science museum, visitor facilities, interpretive trails and a scenic vista point overlooking the Tularosa Basin.

The budget for the project is approximately $1.2M with about 90% of the funding in place. Funds were derived from the State of New Mexico and an Intermodal Surface Transportation Enhancement Act (ISTEA) grant from the Federal Highway Administration. Currently, biological assessments are being completed on the site, rfp's are being evaluated for selection of an architectural firm, and planning continues by the partners.

It is expected that a ground-breaking will take place this fall in conjunction with the 25th anniversary of the dedication of the Vacuum Tower Telescope. Construction should begin soon thereafter with an expected completion date of June 1995.

Rex Hunter

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The Annular Eclipse at Sunspot, New Mexico - 10 May 1994 (1Jun94)

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The Annular Eclipse at Sunspot, New Mexico - ...(1Jun94)
10 May 1994: Science Experiments at NSO/Sacramento Peak
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Four experiments will be run by scientists at the National Solar Observatory (NSO) at Sacramento Peak during the upcoming annular eclipse. A scientist from Sunspot, Stephen Keil, will lead an experiment using both the large Vacuum Tower Telescope and an instrument in the smaller Hilltop Observatory. The experiment will use the limb of the moon to calibrate the solar images from both observatories. Since the limb of the moon is a sharp edge, scientists can study how the Earth's atmosphere distorts the moon, and then correct for these distortions. This correction can also be applied to

small features visible on the surface of the Sun, and in this way smaller details can be resolved on the solar surface.

A second project will use the large Vacuum Tower Telescope run by Rudolf Komm and Wolfgang Mattig (Kiepenheuer Institute, Freiburg, Germany). This experiment will also use the sharp edge of the lunar limb to correct the image distortions caused by the Earth's atmosphere. By using dark lines that appear in the solar spectrum, this study will also investigate the temperature and velocity of gas at different layers in the solar atmosphere.

Another project to be run during the annular eclipse will use the telescope at the Evans Solar Facility. Jean Arnaud (Toulouse Observatory, France) will study the polarization of the ring of sunlight at the peak of the eclipse to measure the magnetic field of the Sun. Magnetic fields have long been known to occur in sunspots, but this experiment will concentrate on measuring the weak magnetic fields on other parts of the solar surface. This project will also study prominences at the limb of the Sun. As the lunar limb moves across a prominence, small details will be measured, hopefully providing scientists with the best maps of a prominence ever made.

A final project will be run by Bernard Jackson (University of California, San Diego). With collaborators, Jackson will study the height variation of temperature in the solar atmosphere, using data from the Full-Limb coronagraph in the Hilltop Dome. The darker-than-normal skies near the maximum phase of the eclipse may allow observations of very faint structures high in the solar atmosphere. These data will refine previous theories about the heating of large structures in the solar atmosphere; some of these structures are so large that they stretch all the way to Earth!

Matt Penn

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McMath-Pierce Solar-Stellar Program Update (1Jun94)

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McMath-Pierce Solar-Stellar Program Update (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Our nighttime program of high resolution, synoptic spectroscopy, which now accepts proposals on a semester basis, operates innovative programs primarily in the area of solar-stellar astrophysics. However, any project that utilizes the unique capabilities of the McMath-Pierce facility can be considered. Some of the projects which were supported during the past semester included (by title and PI): "Fluorescent Clues to the Shock Structure of Late-type Giant Stars" (D. Luttermoser, CSC/IUE), "Determination of Starspot Parameters of Active Stars" (D. O'Neal, Penn State), "Surface Imaging of Two Active Stars" (I. Tuominen, Helsinki), "Short-Term Variability of Luminous K Stars: A Test of Hydrodynamic Modeling" (M. Cuntz, HAO), "A Search for New Proto-Planetary System Candidates" (K.-P. Cheng, GSFC), "Mass Motions in `Naked' T Tauri Stars" (M. Giampapa, NSO), "Ha Variation in (zeta) Aurigae Binaries and Cool Supergiants" (J. Eaton, Tennessee State), and "Radial Velocity Observations of a Ori, a Sco, and a Her" (M. Smith, CSC/IUE).

The proposal deadline for the spring 1995 semester is 15 October 1994.

Mark Giampapa

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NSO Observing Proposals (1Jun94)

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NSO Observing Proposals (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Current deadlines for submitting observing proposals to the National Solar Observatory are:

(1) 15 July 1994 for the fourth quarter of 1994 for solar instrumentation and (2) 15 October 1994 for the spring semester (January-June) of 1995 for the NSO/KP Solar-Stellar Spectrograph. Forms, information and a Users' Manual may be obtained from the Telescope Allocation Committee at NSO/SP, P.O. Box 62, Sunspot, NM 88349, for the Sacramento Peak facilities (sp@sunspot.noao.edu) and at NSO/KP, P.O. Box 26732, Tucson, AZ 85726, for the Kitt Peak facilities (nso@noao.edu). A TeX or UNIX roff version can be e-mailed at your request or obtained by anonymous ftp from ftp.sunspot.noao.edu or on the WWW at http://sunspot.noao.edu/SP-home.html.

Dick Altrock

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NSO Telescope/Instrument Combinations (1Jun94)

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NSO Telescope/Instrument Combinations (1Jun94)
(from NSO, NOAO Newsletter No. 38, 1 June 1994)

Vacuum Tower Telescope (SP):	Echelle Spectrograph
	Universal Spectrograph
	Horizontal Spectrograph
	Universal Birefringent Filter
	Fabry-Perot Interferometer Filter System
	Advanced Stokes Polarimeter
	Slit-Jaw Camera System
	Correlation Tracker
	Branch Feed Camera System
	Horizontal and Vertical Optical Benches for visitor equipment
	Optical Test Room
Evans Solar Facility (SP):	40-cm Coronagraphs (2)
	30-cm Coelostat
	40-cm Telescope
	Littrow Spectrograph
	Universal Spectrograph
	Spectroheliograph
	Coronal Photometer
	Dual Camera System
Hilltop Dome Facility (SP):	Ha Flare Monitor
	White-Light Telescope
	20-cm Full-Limb Coronagraph
	White-Light Flare-Patrol Telescope (Mk II)
	Sunspot Telescope
	Fabry-Perot Etalon Vector Magnetograph
	Mirror-Objective Coronagraph (5 cm)
	Mirror-Objective Coronagraph (15 cm)
McMath-Pierce Solar Telescope Facility (KP):	160-cm Main Unobstructed Telescope
	76-cm East Auxiliary Telescope
	76-cm West Auxiliary Telescope
	Vertical Spectrograph: IR and visible gratings
	Infrared Imager
	Image Stabilizers
	1-m Fourier Transform Spectrometer
	Stellar Spectrograph System
	3 Semi-Permanent Observing Stations for visitor equipment

Vacuum Telescope (KP): Spectromagnetograph
                        High-l Helioseismograph

Razdow (KP): Ha patrol instrument

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Global Oscillation Network Group (1Jun94)

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Global Oscillation Network Group (1Jun94)
(from GONG, NOAO Newsletter No. 38, 1 June 1994)

The Global Oscillation Network Group (GONG) Project is a community-based activity to develop and operate a six-site helioseismic observing network for at least three years, to do the basic data reduction and provide the data and software tools to the community, and to coordinate analysis of the rich data set that should result. The Project is currently looking forward to deployment of its first sites in 1994, and a fully operational network and data management and analysis center in 1995. GONG data will be available to any qualified investigator whose proposal has been accepted; however, active membership in a GONG Scientific Team will allow early access to the data and the collaborative scientific analysis that the Teams have already initiated. The GONG Newsletter provides status reports on all aspects of the Project and related helioseismic science.

This year's annual GONG Meeting - Helio- and Astero-Seismology from the Earth and Space: GONG '94 - was held in Los Angeles 16-20 May, hosted by UCLA and USC. Special sessions were held at the joint session of the American Geophysical Union and the Solar Physics Division of the AAS - Recent Advances in Helioseismology - on 23 May, and at the International Astronomical Union General Assembly - Helio- and Astero-seismology - on 18 August. In addition to these scientific meetings, two workshops/schools are of particular interest. Last year, GONG organized a workshop in Ahmedabad, India to encourage research in helioseismology in conjunction with the establishment of a GONG site at Udaipur. Following on its success, GONG is putting together a second workshop to be held in Sydney, Australia this June, in the same spirit of encouraging research interest in helioseismology in Australia in

[Figure not included]

The GONG network in its "close" configuration. The six shelters are being outfitted and undergoing qualification tests on the banks of the Rillito river at the University of Arizona's agricultural test station.

association with our establishing a GONG site at Learmonth, Western Australia. The workshop is being sponsored by the IPS Radio and Space Services (our host organization at Learmonth) and the School of Mathematics and Statistics of the University of Sydney, with support from the NSF and the Australian government (DITRD). Finally, Teo Roca-Corts is organizing the "Sixth Canary Islands Winter School" at the Instituto d'Astrofisica des Canarias, devoted this year to "The Structure of the Sun," 5-16 December.

Sites

The Project was pleased to have Sushant Tripathy, from the Udaipur Solar Observatory, as the first official GONG Scientific Site Visitor. Tripathy was with us from 21 January to 21 March, and learned to operate the GONG Pipeline. He also studied a set of High-l Helioseismometer data to search for the chromospheric mode. The second Scientific Site Visitor, Cristina Soares from the IAC at Tenerife, arrived on 19 April. She brought a set of images from the TON (Taiwanese Oscillation Network) instrument at Tenerife, and will be gaining experience in the reduction and analysis of imaged helioseismic data.

Notwithstanding the uncertainties in the budget and the deployment schedule, we have been pushing forward on the plans to do the initial preparation of the various sites to receive their stations. At Big

Bear, several trips have been made by the technical staff to explore the engineering issues involved in the needed fill in the lake adjacent to the causeway. The permitting process required for this has gotten underway.

In February, Jim Kennedy visited Spain, India, and Australia for meetings with the various parties involved.

At El Teide, Teo Roca-Cortes, Pere Palle, and Jim selected the precise location of the stations. They met with the IAC administrative staff and discussed details and procedures for obtaining permits and setting up local construction contracts. It is expected that the work will begin in July.

Jim and Arvind Bhatnagar met with Embassy and Department of Space officials in Delhi, and with R.K. Varma, Director of the Physical Research Laboratory (PRL), in Ahmedabad. (PRL is the Udaipur Solar Observatory's (USO) administrative base.) In Udaipur, Jim and Arvind met with the contractors who are currently developing the new USO campus. They selected the final location for the station, made adjustments to the planned road to the site, settled a number of other details, and held a press conference for the local and regional press.

The meetings in Australia included stops in Perth and Sydney. In Perth, Jim briefed the US Consul General and met with engineers from the Asset Services group that will do the site work at Learmonth, which should begin in June. Jim also stopped in Sydney for meetings with David Cole (Director of IPS Radio and Space Services), his staff regarding a wide range of administrative details, Peter Wilson, Chris Durrant, and several others, at Sydney University to discuss the state of the project and to continue preparations for the June workshop in Sydney.

Jim also visited CTIO to discuss site preparation in early May.

The State of Hawaii and NOAA have still not finished all of the details regarding their land transfer arrangement on Mauna Loa; however, it looks like this should not affect our desire to begin work on the site in the fall. The reordering of the deployment has moved Mauna Loa to next spring at the earliest, and relieves some of the pressure to get access to the site.

Instrument

Preproduction work continues on the system that circulates clean air through the optical system, and this unit is now being tested; however, overall development work on the GONG instrument is nearly finished.

The production liquid crystal modulators that allow us to measure the line of sight magnetic field were received and tested. Most of the units were acceptable but a few failed to meet specifications. One of the units was used in the prototype to obtain a full observing day of magnetograms every minute. The noise level per pixel is about 10 gauss in a single observation. Adding 10 or 20 minutes of images produces the expected improvement in signal-to-noise ratio. There do not appear to be any unexpected artifacts in the time averaged magnetogram.

Data since 2 January have been acquired using the new interferometer cubes. The new cubes have been tested and appear to be very good. The uncalibrated images from the new cubes have less spurious modulation than data from the old cube. Once calibrated, images show no signs of residual rings. Also, the project is now able to record raw calibration images at any time during the day as opposed to the rather narrow time window with the old cube. Lastly, the spatially averaged modulation from images from the new cube shows less temporal variation than the averaged modulation from images from the old cube.

Technical activities are beginning to shift from component production and assembly to integration. The six field stations, located at the Campbell Farm integration site, are increasingly the center of attention (see photo). The shelters are already powered up, although the only load at this time is due to the air conditioners, lights, and uninterruptible power supplies. Weatherproof external cable raceways have been installed and cable production is underway. All of the optical tables have been installed, awaiting the arrival of the Doppler imager components. In the near future, part of the production work force will be shifting their work stations from benches in the basement of the NOAO building, to the integration site.

We recently experienced an interesting side effect of running six "remote" GONG instrument stations (or even shells of stations) side by side. Our Sensaphone~ dial-up system is programmed to call a list of home and office telephone numbers anytime a site reports an anomalous condition. This would occur, for example, if there were a commercial power failure or a failure of an air conditioner in one of the shelters. In its current configuration, however, the GONG six-site "network" is supplied by a common power source, which was recently interrupted at two o'clock in the morning. This caused all six

shelters plus the portable lab building to contend for the four outgoing telephone lines simultaneously, trying to call the homes and offices on the preprogrammed list. The three of us who are lucky enough to have our home phone numbers programmed into the system then began contending for the same four telephone lines in order to call the individual machines back to acknowledge the problem and thereby reset the dial-out "alert" condition. This had to be accomplished during the one-minute pause before the given unit would give up waiting and call the next individual on the list. We are all looking forward to getting the units out into the field so that our power failures can be distributed more randomly.

Data System

A major transition of the Data Storage and Distribution System (DSDS) is underway. When completed in June, the DSDS will be on two Sun SPARC10s with Solaris 2.3 using Oracle's data base management system and with a new design for the file catalog. Despite various problems that were encountered with Oracle's DBMS and with Solaris, the conversion, which began during the fall, is still on schedule. All the database applications have been converted and parallel testing is underway.

The Data Management and Analysis Center (DMAC) has recently calibrated and produced site-day l-v spectra and 4-minute averages for 19 prototype data days: 10, 12, 16-18, 24-25, 29-31 December; 2, 8-9, 13, 15-16, 21 January; and 26-27 February. The prototype instrument recorded data on 22 March and on 1-3 April. The DMAC will reduce these days in the near future. We continue to gain experience with the baseline merging algorithm. The Modulation Transfer Function (MTF) of every image from each site will be determined and used to correct the spherical harmonic coefficients (SHC) of the image. The SHCs of simultaneous images will be combined using a weighted average, with the weights being the estimated errors in the MTFs. We have determined that the MTF is most accurately determined in spatial wavenumber or k-space and are working on the calibration from k to spherical harmonic degree l. This has proven to be a subtle and involved step requiring the consideration of the spatial Nyquist wavenumber, which varies as a function of degree, spatial position, and time. We have devised a calibration scheme that is a good compromise between speed and accuracy.

The artificial data set is now complete, providing us with an 18-day time series of images with known input parameters. Two realizations of degraded artificial data have been constructed, and a portion of these 216 site days are being reduced to spherical harmonic coefficient time series as the first step in a large-scale merging test.

The sixth meeting of the DMAC Users Committee (DUC) was held at the GONG DMAC Building in Tucson on 7 January 1994. Roger Ulrich, Todd Hoeksema and Tuck Stebbins (chair) were present, and the Project was represented by Frank Hill, Jim Pintar, Ed Anderson, Mark Trueblood and Jim Kennedy. Topics discussed included: the artificial data generation project, the baseline detrending scheme, network deployment strategies and their interaction with DMAC development, DSDS development, MTF correction, image registration, peak finding, 16-bit versus 32-bit time series, and development of procedures for detecting data reduction errors and reporting these errors to the community.

During March, the Project had an "opportunity" to practice handling data reduction errors when a problem was discovered that affected the registration of images in heliographic coordinates. This error affects data products stored in the DSDS products that have been distributed to users, and software (GRASP) that has been distributed to users. A bug fix report has been sent to the recipients of GRASP 93.2 advising them of the problem in GRASP along with instructions as to how to fix the relevant parts of the code, and a notice published in the GONG Newsletter.

Programmatics

As a result of the initial $250K shortfall in this year's budget, it has been necessary to further delay the deployment. Taking the longer view, the realities of the changing US Federal budget climate have forced us to change the ordering of the deployments as well. With the advice and consent of both the GONG Scientific Advisory Committee (SAC) and the DMAC Users Committee (DUC), the project came up with a compromise between the deployment schedule and DMAC readiness, with some options.

The original strategy called for deploying the first two stations close to home. Installing the Big Bear station first would allow us to gain experience with relatively short supply lines and ready access to our full resources. Deploying the second station on Mauna Loa extended this concept one more step. However, this scheme required the deployment of the four stations before three of them would be at the 120x longitude increments required to provide minimal 24-hour coverage opportunities that might allow scientific work to begin.

The question was, realistically, when would the fourth station be in service? There is every reason to believe that next year's budget process will proceed as glacially as it has in the recent past. Thus, we risk not knowing our budget to within several hundred thousand dollars until February or March 1995. We feel fairly confident about proceeding with the deployment of three stations during the October 1994 to March 1995 period, based on low-side budget projections. However, if those pessimistic projections are realized, no further stations can be deployed until the beginning of FY 1996 (October 1995).

It is our view that delaying the commencement of even limited science operations until after October 1995 is unacceptable. After considerable soul searching, and with input from the SAC and DUC, we have decided to deploy the first three stations at 120d increments. In order to do this as rapidly as possible and with the least short-term cost, we will "deploy" the Big Bear station temporarily in its current location at the "Farm" here in Tucson. This station will be commissioned in September or October this year. It will be moved to Big Bear after the other five stations have been deployed. The second station will be deployed at El Teide on Tenerife, probably in December, depending on the vagaries of ship schedules and weather. The third station will be deployed to Learmonth in January or February 1995, subject to the same considerations.

Of the two possible three-site subnetwork combinations, this is technically the better one, and it is the cheapest one as well. Site survey data show that this subnetwork has the potential to improve the 1-day sidelobe by a factor of about 40 over a single site. This should provide a meaningful improvement in the scientific inferences drawn from such data. (It should be noted that the addition of the remaining three sites will improve the 1-day sidelobe by yet another factor of seven.)

We appreciate only too well that this shift in strategy is not without its risks. The first "real" deployment will take place many thousands of miles from Tucson, at a time when there is the potential for an occasional bout of nasty cold and windy weather. The same is true of the second deployment, except that Learmonth summers are renowned for their extreme heat, and occasional cyclones. Nevertheless, on balance we believe these risks are manageable and warranted.

The schedule for the deployment of the remaining three stations, plus the relocation of Big Bear, will depend on both the amount and timing of the FY 1995 budget. At the moment, the order is likely to be Cerro Tololo, Udaipur, Mauna Loa, and then Big Bear. If the budget is reduced again, these will be delayed until October 1995 and later. Even with a reasonable budget level, we will have to delay shipping the fourth (CTIO) station until after the budget is firm. If that occurs as late as March, as it did this year, it is unlikely that work would begin there before May.

John Leibacher and the GONG Team

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The US SAC Meeting (1Jun94)

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The US SAC Meeting (1Jun94)
(from USGPO, NOAO Newsletter No. 38, 1 June 1994)

The principal advisory committee to the USGPO, the US SAC, met in Tucson in April, in preparation for the Gemini Science Committee meeting in Cambridge, England. Attending the US SAC meeting were the following members:

- Charles Beichman (JPL/IPAC)
- Todd Boroson (NOAO/USGPO)
- Fred Gillett (NOAO/KPNO)
- John Huchra (CfA)
- Frank Low (U. of Arizona)
- Gerry Neugebauer (Caltech)
- Pat Osmer (Ohio State)

Steve Ridgway (NOAO/KPNO)
Malcolm Smith (NOAO/CTIO)
Charles Telesco (NASA/MSFC)

Here is a short summary of the discussion. We emphasize that none of these statements represents a decision, but rather the consensus of this advisory committee at the time that they met. A number of these issues (the instrument complement and the instrument specifications in particular) were later reviewed with somewhat different outcomes by the Gemini Science Committee.

1) The project is on budget and on schedule. The Gemini Board initially approved a project budget with 10% contingency on large contracts. 40% of those are now committed, and the contingency on the remaining large contracts is still approximately 10%.

2) A revision was made to the proposed complement of first-light instruments. Motivated by discussions within the communities of other partner countries, the US SAC endorsed the idea of delaying the High Resolution Optical Spectrometer slightly and including, instead, a copy of the moderate resolution Multi-Object Spectrograph (MOS) and a mid-IR imager. This list was provisional and was considered by the Gemini Board in mid-May.

3) The specifications of two of the instruments, the MOS and the IR (1-5 um) spectrometer, were discussed in detail. Because there is no optical imager among the first-light instruments, the US SAC encouraged the inclusion of an imaging capability for the MOS. The design goal for this instrument is a 5 arcminute field with 0.07 arcsecond pixels. For the IR spectrometer, the committee stressed the importance of a small pixel scale to sample well the diffraction limited images at 2 um. For both instruments, the US SAC encouraged the design teams to investigate the possibility of an integral field mode, in which spectra can be obtained of a large number of contiguous points within a two-dimensional sky region.

4) The process by which groups would be selected to build the US-allocated instruments was discussed. These instruments are the IR (1-5 um) Imager (already allocated to the University of Hawaii), the IR spectrometer, the IR arrays and controllers, and the Optical detectors/acquisition cameras. It was argued that the process should allow open and fair competition, but should be streamlined to permit the project to go ahead with a schedule that has phase A design studies underway by the end of 1994. The USGPO was encouraged to develop a plan for such a competition, with the understanding that an impartial group would be selected by the NSF to make the evaluations.

5) The USGPO was encouraged to continue and expand its outreach activities, including colloquia at US institutions, displays and presentations at scientific meetings, articles in popular and professional magazines and newsletters, and e-mail announcements.

Todd Boroson

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Keeping the Community Informed (1Jun94)

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Keeping the Community Informed (1Jun94)
(from USGPO, NOAO Newsletter No. 38, 1 June 1994)

We have recently begun to send out communications by e-mail on a semi-regular basis, aimed at keeping the US community informed about the activities of the Gemini project and the USGPO. The first of these concerned the various roles of the USGPO and a general description of the issues which we consider important. The second was a set of notes from the recent US SAC meeting (summarized above). The distribution list was assembled to include everyone who has expressed an interest in keeping informed about the project. We have asked the recipients to circulate the text and the ideas around their departments, but we would be happy to add to the distribution anyone who sends us a note. E-mail to usgpo@noao.edu.

Todd Boroson

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The USGPO Staff Doubles Its Size (1Jun94)

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The USGPO Staff Doubles Its Size (1Jun94)
(from USGPO, NOAO Newsletter No. 38, 1 June 1994)

Kathy Wood has recently been hired as a Technical Administrator for the US Gemini Project Office. Wood has a degree in Astronomy and has worked at TRW and Coherent Inc. She has been involved in a number of NASA projects, and will play an important role in helping to run the procurement and management of the US-allocated instruments as well as working on the various outreach activities of the USGPO.

Todd Boroson

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IRAF Update (1Jun94)

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IRAF Update (1Jun94)
(from CCS, NOAO Newsletter No. 38, 1 June 1994)

Intensive work continued during this quarter on the development of the IRAF GUI facilities in preparation for the release of IRAF Version 2.11 later this year. In previous Newsletters this release has been referred to as IRAF Version 2.10.3, a patch to IRAF Version 2.10. Due to the extensive amount of work done on this version however, it was decided to release 2.10.3 only internally and to upgrade the status of the public version to a full release - IRAF 2.11. IRAF V2.11 will be made available for all supported platforms, as time permits, with SunOS, Solaris, and DEC Alpha/OSF being the highest priority for the initial release (the latter two are new ports).

The GUI development effort during this quarter has concentrated on the GUI system software, the Ximtool image display server, and the prototype application GUIs. New versions of Ximtool and Xgterm (the graphics terminal emulator) are now available in the pub directory on iraf.noao.edu. This software is still under development and is still considered alpha test software; the software is not fully tested, and some planned features remain to be implemented. The new version of Ximtool is a major new version, however, with lots of new features. Anyone who downloaded an earlier version will definitely want to update to the new one. Much work has also been done on the GUI system software but this directly affects only developers; anyone interested in using this software should contact us for more information.

The ADASS USENET news hierarchy mentioned in the last Newsletter is now entering beta testing, with a dozen or so sites currently connected. Anyone wishing to help beta-test the network news facility should contact us (news@iraf.noao.edu) to set up a news feed. You can also read and post to the ADASS news groups remotely by using any NNTP based newsreader to access iraf.noao.edu as an NNTP news server. Although this facility is still in beta test with a limited distribution, people are encouraged to use the new medium for any IRAF related queries or comments.

A Frequently Asked Questions (FAQ) list for IRAF is now available in the iraf/v210 directory on iraf.noao.edu. Users will find this FAQ

list a valuable source of information about IRAF. If you have a question about installing, configuring, or using IRAF you may want to look in this file first before contacting the IRAF Hotline. We are always happy to answer questions, but the FAQ may be a faster way for you to get help, especially during the off-hours. We will update the file as new FAQ are identified.

Several new IRAF manuals have become available over the past few months. They can be found in the iraf/docs directory on iraf.noao.edu. Lindsey Davis has written A Reference Guide to the IRAF/ DAOPHOT Package (see the file daorefman.ps.Z). Lisa Wells has completed two new documents: Photometry Using IRAF (photom.ps.Z) is a short overview of the different tasks used in IRAF to do photometry, and Rectifying and Registering Images Using IRAF (reg.ps.Z) is a cookbook for image registration. Several other documents are nearing completion and will be availabile shortly.

Doug Tody, Jeannette Barnes

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1994 Software Conference Update (1Jun94)

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1994 Software Conference Update (1Jun94)
(from CCS, NOAO Newsletter No. 38, 1 June 1994)

The Fourth Astronomical Data Analysis Software and Systems (ADASS) Conference will be held this year in Baltimore, Maryland, at the Omni Inner Harbor Hotel, on 25-28 September. The Space Telescope Science Institute is the host organization. Sponsors for the conference include the Space Telescope Science Institute, the National Optical Astronomy Observatories, the Smithsonian Astrophysical Observatory, the Dominion Astrophysical Observatory, the National Radio Astronomy Observatory, the National Aeronautics and Space Administration, and the National Science Foundation. The ADASS Conference provides a forum for scientists and programmers concerned with algorithms, software, and software systems employed in the reduction and analysis of astronomical data.

The members of the Program Organizing Committee for this year's Conference are Rudi Albrecht (ST-ECF), Roger Brissenden (SAO), Carol Christian (CEA/UCB), Tim Cornwell (NRAO), Dennis Crabtree (CADC/DAO), Daniel Durand (CADC/DAO), Bob Hanisch (STScI), Rick Harnden (SAO), George Jacoby (NOAO), Barry Madore (IPAC), Dick Shaw (STScI), Karen Strom (U. of Massachusetts), and Doug Tody (NOAO).

The meeting agenda will consist of invited and contributed talks and poster sessions with an emphasis on the following special topics: Astronomical Data Modeling and Analysis, Design and Development of Graphical User Interfaces, Network Information Systems, and Parallel and Distributed Processing. Contributed papers and posters are not limited to these topics, and we encourage participation from anyone with an interest in astronomical software. Special interest "Birds of a Feather" sessions will also be held.

The invited speakers for this year's Conference include Bob Brown (STScI), Joan Centrella (Drexel), Christine Falsetti (NASA Science Internet), Andrea Ghez (UCLA), Graham Hill (Dominion Astrophysical Obs.), Juri Toomre (Colorado, tentative), Don Schneider (Inst. for Advanced Study/Penn State, tentative), Jean-Luc Starck (Obs. of Nice), and David van Buren (Infrared Processing and Analysis Center).

The schedule for Birds of a Feather sessions is still under development, and anyone interested in organizing a BOF should contact the Local Organizing Committee as soon as possible.

The abstract and early registration deadlines are 15 July. Registrations will be accepted after that date at a higher fee.

For further information please send mail to softconf@stsci.edu or look at the information on the World-Wide Web with the home page address http://ra.stsci.edu/ADASS.html. Betty Stobie, the Chair of the Local Organizing Committee, can be reached by phone at (410) 516-8671 or by FAX at (410) 516-6864.

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NOAO FTP Archives (1Jun94)

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NOAO FTP Archives (1Jun94)
(from CCS, NOAO Newsletter No. 38, 1 June 1994)

The various FTP archives for the NOAO can be found in the following FTP directories. All archives are provided on Sun or DECstation servers, so please log in as anonymous and use your e-mail address as the password. Alternate addresses are given in parentheses.

ftp ctios1.ctio.noao.edu (139.229.2.1), cd ctio
CTIO archives - Argus and 1.5-m BME information, 4-m PF plate catalog, TEX template for e-mail proposals, filter library, instrument manuals, standard star fluxes.

ftp ftp.sunspot.noao.edu (146.5.2.1), cd pub
Directory containing SP software and data products - coronal maps, active region lists, sunspot numbers, SP Workshop paper templates, information on international meetings, SP observing schedules, NSO observing proposal templates, Radiative Inputs of the Sun to the Earth (RISE) newsletters and SP newsletters (The Sunspotter).

ftp ftp.noao.edu (140.252.1.24), cd to one of the following directories:

aladdin (gemini.tuc.noao.edu) - Information on the Aladdin program which is a collaboration between NOAO and the US Naval Observatory to develop a 1024 X 1024 InSb infrared focal plane at the Santa Barbara Research Center.

catalogs - Directory of astronomical catalogues, at this time only the Jacoby et al. catalog, "A Library of Stellar Spectra", and the "Catalogue of Principal Galaxies" are here.

fts (argo.tuc.noao.edu, cd pub/atlas) - Directory containing solar FTS high-resolution spectral atlases.

gemini (gemini.tuc.noao.edu) - Information from the Gemini Project.

gong (helios.tuc.noao.edu, cd pub/gong) - Directory containing GONG helioseismology software and data products - velocity, modulation and intensity maps, power spectra.

iraf (iraf.noao.edu) - IRAF network archive containing the IRAF distributions, documentation, layered software, and other IRAF related files. It is best to login to iraf.noao.edu directly to download large amounts of data, such as an IRAF distribution.

kpno (orion.tuc.noao.edu) - KPNO directory containing filter information, hydra information, new LaTeX observing form templates, instrument manuals, KPNO observing schedules, platelogs for 4-m PF, user questionnaire, reference documents (wavelength atlases), sqiid scripts for data reduction.

kpvt (argo.tuc.noao.edu) - Directory containing various KP VTT solar data products - magnetic field, He I 1083 nm equivalent width, Ca II K-line intensity.

noao (gemini.tuc.noao.edu) - Miscellaneous databases, report from Gemini WG on the high resolution optical spectrograph.

nso (orion.tuc.noao.edu) - Directory containing NSO observing forms.

preprints - NOAO preprints that are available electronically.

sn1987a (helios.tuc.noao.edu, cd pub/sn1987a) - An Optical Spectrophotometric Atlas of Supernova 1987A in the LMC.

starform_project (mira.tuc.noao.edu, cd pub/sfproject) - Directory containing progress reports and information on when/where to obtain SQIID star formation project data.

tex - LaTeX utilities for the AAS/ASP.

utils - Various utilities but only contains some PostScript tools
at this time.

weather (gemini.tuc.noao.edu) - weather satellite pictures.

wiyn (orion.tuc.noao.edu) - WIYN directory tree containing
information relating to the WIYN telescope, including information
relating to the NOAO science operations on WIYN.

The following numbers are available for the machines mentioned above:

```
 argo.tuc.noao.edu         = 140.252.1.21
 ctios1.ctio.noao.edu      = 139.229.2.1
 ftp.noao.edu              = 140.252.1.24
 gemini.tuc.noao.edu       = 140.252.1.11
 helios.tuc.noao.edu       = 140.252.8.105
 iraf.noao.edu             = 140.252.1.1
 mira.tuc.noao.edu         = 140.252.3.85
 orion.tuc.noao.edu        = 140.252.1.22
 ftp.sunspot.noao.edu      = 146.5.2.1
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Questions or problems may be directed to the following:

Steve Heathcote (sheathcote@noao.edu) for the CTIO archives,

Frank Hill (fhill@noao.edu) for all solar archives,

Steve Grandi (grandi@noao.edu) or Jeannette Barnes (jbarnes@noao.edu) for
all others (and they will direct your questions as needed).

Jeannette Barnes

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