A I P S L E T T E R

Volume XII Number 1: April 15, 1992

A newsletter for users of the NRAO
*A*stronomical *I*mage *P*rocessing *S*ystem

Written by a cast of *AIPS*

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15APR92 Available, but Support for VMS and FPS Questioned

The 15APR92 version of *AIPS* is now available. However, the last computer running the VMS operating system in the AOC in Socorro was unplugged in April, while NRAO Charlottesville's old VAX has been limping along without a service contract for some time now, and threatens to die at any moment. In other words, we have been unable to test the 15APR92 version either on a VMS operating system or on an FPS array processor. Given all the changes described later in this AIPSLETTER, it is almost certain that there will be significant problems executing the 15APR92 version of *AIPS* on a VMS machine. In addition, of course, we can no longer write a VMS-BACKUP-format release tape.

We know that this is an unfortunate situation. But we do not know how unfortunate. We *must* hear from you as soon as possible if you expect to require that *AIPS* continue to run on FPS array processors and/or under the VMS operating system. If we have little or no response, then we will continue as we are, paying unreliable lip service to VMS and abandoning array processors. If there is overwhelming response, then NRAO will have to consider buying — or accepting a donation of — a small, modern VMS computer. If there is a modest response, then we will consider cooperative arrangements with some VMS-based institution to develop and maintain the necessary VMSisms.

VMS fans, the ball is now in your court — please send us your thoughts on this matter using any of the addresses in the masthead.

Along similar lines, system managers should be aware that 15APR92 *AIPS* supports Sun computers as Berkeley operating systems. We are examining Sun's shift to Bell UNIX-based operating systems, but do *not* support them in the current release.

Personnel

Dean Schlemmer has left the *AIPS* group and NRAO to work at the University of Virginia.

Chris Flatters has returned to Socorro to develop software for orbiting VLBI observations.

Gareth Hunt will (mostly) be leaving the *AIPS* group to become project manager for the *AIPS*++ project.

Brian Glendenning will (mostly) be leaving the *AIPS* group to become project computing scientist for the *AIPS*++ project.

A New Face for *AIPS*

When *AIPS* was first designed, NRAO was considered to be advanced to have three computers — a ModComp, a VAX, and an IBM mainframe — in the same building. Primitive file transfers were possible between the first two of these, but "sneaker-net" was still the most common means of file and data transfer. Things have changed! At this writing, there are 57 computers running *AIPS* in the AOC in Socorro and an additional 28 in Charlottesville. For all the obvious maintenance, reliability, disk conservation, and user convenience reasons, these computers should share their resources in a relatively transparent way without degrading their performance. **15APR92** *AIPS* is the first "network-wise" release and is based upon principles pioneered by Mark Calabretta at the Australia Telescope.

Network "wisdom" required changes to the way *AIPS* is installed, to the directory structure, and to the way the **AIPS** program is started. The main points of interest are summarized here. More details will be found in the *AIPS Unix Installation Guide* and the *AIPS Unix Porting Reference Manual* that will accompany the **15APR92** release. For users, the most visible changes are

- **15APR92** *AIPS* includes a new server process which provides graphics display capability for workstations. It is called **TEKSERVER** and provides a fast, Tektronix-emulation window for *AIPS* graphics tasks such as **TKPL** and **XGAUS**. It plots lines and characters much faster than do the TV server programs.
- Users may specify, when they start **AIPS**, which computers are to provide the data areas. One simply adds **da=***host1*,*host2*,... to the command line to have *host1*, *host2*, ... *AIPS* data areas included along with those of any default hosts. This has the disadvantage that **INDISK**s and **OUTDISK**s can change if you change your selection of disk hosts. However, it has the advantage that you do not waste time accessing and — usually accidentally — writing data areas on computers you do not desire. *AIPS* disk reservation and disk-dependent **TIMDEST** limits are supported through the full set of available data areas.
- Users may specify, when they start **AIPS**, which device or workstation is to provide the display services. One adds **tv=[***tvdisp***][:][***tvhost***]** where *tvdisp* is the device/workstation on which the displays appear and *tvhost* is the computer that will run the server processes for these displays. Both of these default to your workstation, even if you are **rlogin**'d to some other computer. The full functionality of this option is available only under X-Windows, but the script will run the **SSS** server when *tvhost* is running SunView. There is only one image catalog file for each potential display machine, and the correct one is used no matter what machine is running your **AIPS** program.
- **15APR92** *AIPS* contains a full implementation of remote tape handling (see section below). Users may specify on the **AIPS** command line a list of computers which may be used to provide remote tape services. Adding **tp=***host1*,*host2*,... to the command line insures that the remote tape daemons have been started on *host1*, *host2*, ... in case they had not been started earlier.
- If more than one printer device is available, the **AIPS** startup script provides a menu for easy selection. Adding **pr=***n*, where *n* is the *AIPS*-assigned number of the desired device avoids repeated looks at the full menu.

For *AIPS* Managers, the significant changes are

- The *AIPS* environment is configured via plain-text files to list the disks with time-destroy limits and exclusive user lists (**$NET0/NETSP**), to list the required (disk 1 or more) and optional disk areas (**$NET0/DADEVS.LIST**), to list host names, architectures, sites, and descriptions (**$AIPS_ROOT/HOSTS.LIST**), and to list the system-parameter files (**$NET0/SPLIST**). The program **SETSP** sets parameters in the (numerous) **SP** files, while procedures **SYSETUP** and **DASETUP** set up the basic control files (**AC**, **GR**, etc.) and data areas, respectively.
- The directory tree has been changed to support multiple architectures and multiple hosts. There are architecture-specific areas for binaries, memory files, libraries, and a new **PREP** area for intermediate results of compilation and linking.
- The installation process (finally) contains an **INSTEP1** procedure. It will automate — for the commonly used *AIPS* architectures — most of the process of setting up and preparing the *AIPS* system for re-compilation.

- The **15APR92** version of **LIBR** and **LINK** in **$SYSSUN** contain support for SUN shared libraries. Dynamic linking can reduce the size of the binary load modules from 300 to about 80 Megabytes. Under this option, **COMLNK** often produces alarming messages about unresolved external references, but it produces working executables anyway. Programs running while their shared libraries are rebuilt have had a nasty habit of dying abruptly, however, and all tasks using the **APLNOT** library require over 8 Mbytes of swap space whether they use the few memory-hungry subroutines or not.

Workstation TV Displays

The *AIPS* package can use the MIT X-Windows System for grey-scale display on workstation computers through a program called the television server. **XAS** is the most portable of the *AIPS* television servers since it uses vanilla X11 services. This means that **XAS** should function with all X-Window System managers, including **olwm** (OpenLook), **olvwm**, **twm**, **tvtwm**, and others. For **15APR92**, **XAS** was rewritten to use the same Y and Z routines as the **XVSS** (OpenLook) and **SSS** (SunView) servers. It was given 2 grey-scale memory planes and 4 graphics overlay planes with a much wider dynamic range for the images. All color, zoom, scroll, cursor, and window resize/move functions are now fully and correctly supported. **XAS** now allows (via the **.Xdefaults** file) user-defined cursor shape, graphics and cursor colors, and initial geometries. All three servers were given a new function to tell the client their basic parameters. This allows **TVINIT** (subroutine **YINIT**) to test the parameters of the TV servers and correct the TV parameter file. Subroutine **YWINDO** will also do this on TV open if a window-size error occurs. This allows different users to use different servers on same the host (at different times) without requiring an *AIPS* Manager to reset the TV parameter file.

Remote Tapes

An *AIPS*-like solution to provide remote tape services was implemented in **15APR92**. A daemon program, **TPMON**, was written to receive, effectively, tape Z-routine calls over some network socket and then execute them on the local host. The new *AIPS* procedures automatically see that appropriate **TPMON**s are running locally and will also start them on remote machines as specified by the user. **TPMON1** handles pseudo-tape disk files and hence is needed even on tape-less computers. **TPMON2**, **TPMON3**, ..., **TPMON***n* handle true tape devices 1, 2, ..., $(n-1)$, respectively. For real tape devices, the **MOUNT** command is now required and the user may specify a remote computer and remote tape drive number at that time. For pseudo-tape disk files, the user specifies **INFILE** or **OUTFILE** with the grammar:

INFILE = '<*host_name*>::<*logical_name*>:<*file_name*>'

where <*logical_name*> must be an environment variable known to the remote **TPMON**, *i.e.*, **FITS** or some other generic variable such as **HOME** (note that both of these are on the remote machine). User-defined variables will not be known to the remote **TPMON** and, hence, cannot be used. Tapes must also be **DISMOUNT**ed from the **AIPS** program either explicitly or automatically in the **EXIT**. Even the abort handler will attempt dismounts from **AIPS**!

Memory Files

The structure of *AIPS* **ME**mory files was also revised in **15APR92**. Space for POPS procedures and for temporary and permanent variables was increased:

950	→	1450 words of temporary literal storage
14760	→	21928 words of program storage
4173	→	6221 words of variable storage
4096	→	10240 words of source (text) storage.

The work area for text is now kept in core to save disk. This has the side effect of speeding *POPS* compilations enormously. The "virgin" *POPS* vocabulary (**RESTORE 0**) area is now in a release-dependent, *POPS*-number-independent file, while the user temporary storage area (**STORE 1 / RESTORE 1**) area is kept in host-dependent, *POPS*-number-dependent files. Storage areas 2 and 3 have been eliminated since they are seldom used and the files are now large (150 Kbytes per *POPS* number per host per storage area).

Additional Improvements in 15APR92

Other corrections and improvements made to *AIPS* for the **15APR92** release include:

AFILE Introduced new task to manipulate text A-files produced by the Haystack VLBI **FRNGE** program.

AHIST Developed new task to produce an "adaptive" (rolling window) histogram-equalized image.

AIPS Corrected conversions between celestial and galactic coordinates to account correctly for epoch and created a new **AIPS** help file which is also available as a UNIX **man** page.

BPASS Corrected and improved the handling of multiple polarizations with large numbers of IFs/channels and the handling of changes in reference antenna (required for interpolating in time).

CALIB Raised buffer sizes which were limiting self-calibration models to the first 1000 clean components.

CHNDAT Corrected the handling of the frequency increment in a large number of calibration and other *uv*-data routines.

CLCOR Changed opcode meanings to help users avoid a common input error for polarization-angle corrections.

CLIP Improved to work on compressed *uv*-data.

CVEL Rewrote to handle multi-source files more simply and to clean up numerous other details.

DDT Modified for running the huge test and added a whole new spectral-line test called **VLAL**.

FILLM Corrected (u, v, w) to make them refer to the reference frequency rather than the frequency of the current scan, changed **VLAOBS** default to mean all programs matching the other adverbs, corrected date in appended files, weights, default integration time, and first entry in CL tables.

FITLD Wrote new task to load any number of FITS images and *uv*-data sets from tape.

FITTP Dropped the conversion of FQ to CH tables and the warning about binary extension files, corrected limits on the number of columns in tables, and added support for new VLBA binary tables.

FRING Corrected least-squares fitting, the use of flagged or uninitialised data, and the optional display of the results.

HOLGR Submitted from the AT a new task to process antenna holography data.

IMLIN Added new task to fit the continuum with a polynomial baseline and subtract it from spectral-line images.

KNTR Added the option to plot the half-power beam contour.

LISTR Improved the scan listing format and corrected the calculation of the matrix average and RMS of phase.

LWPLA Made the Postscript output more readable so that the files may be edited using public domain tools and corrected handling of long buffers of grey pixels and characters.

MAPIT Changed automatic imaging and self-calibration routines to allow more user input, an OLAF-like interactive mode, and an initial self-calibration model.

MK3IN Added the capability to select scans based on the A-file text information, corrected the sign of the phases of the phase cals, added tables to contain Haystack **FRNGE** results, and made numerous minor corrections and documentation improvements.

MX Improved the minor cycle cleaning step by including a larger portion of the synthesized beam during the early stages of deconvolution; this mainly helps data with very poor phase calibration.

PHSRF Added new task to reference all channels of a *uv*-data set to the phase and, optionally, amplitude of the average of a set of channels.

SBCOR Installed temporary new task to correct VLBI data that contain mixed MKIII/VLBA baselines.

SN2CL Fixed bugs related to duplicated records and unselected calibrators.

SNCOR Added options to zero fringe rates, to multiply amplitudes, to flag solutions with delays or rates outside specified ranges, and to reference all phases to a single IF.

SNPLT Changed to allow plotting of all IF-dependent variables on the same page and to allow plotting of the SNR/weight column.

SPLIT Corrected error which could cause some data to be written without the bandpass correction.

STARS Added columns to allow 20 different types of star markers, rotations, and labels and changed plot tasks to support them.

TVFLG Rearranged and reworded the menu, speeded handling of graphics channels for workstations, corrected gridding and other errors.

UVCOP Corrected to scale (u, v, w) to new reference frequency when selecting by FQ ID.

UVLIN Added new task to subtract continuum from spectral-line *uv*-data using a linear fit to real and imaginary parts.

UVLSF Submitted new task to subtract a least-squares-fit linear continuum/bandpass from spectral-line *uv*-data, with the option to write a continuum *uv*-data file.

UVSUB Improved to work on compressed *uv*-data.

VBPLT Corrected plotting of VLBI closure-phase models.

XTRAN Corrected handling of negative declinations in finding coordinates from optical images.

ZABORS Fixed a nagging problem in the *AIPS* abort handlers which occasionally caused tasks to hang waiting on message or accounting files.

Communications

The `15APR92` version of *AIPS* is now available via a variety of tape formats including Exabyte, QIC-24 Cartridge, TK50, and 9-track 1600- and 6250-bpi tapes and also via Internet `ftp`. We urge you to obtain the latest version. The *AIPS* group is unable to provide useful support for releases which are now more than a year out of date. In addition, this release supports new capabilities for the VLA and VLBI, has modern, networked support for tapes, displays, etc., and is incompatible in significant ways with previous releases (thereby inhibiting partial installations).

The next planned release of *AIPS* will be as `15APR93`, but a VLBI-oriented `15OCT92` release may also be made. Significant bug fixes will be made available via anonymous `ftp` (see "Patch Distribution" below). This should reduce the total effort required to maintain *AIPS* at NRAO and the user's home institution. The *AIPS* News Letter will be targeted for the 15th of April and October in future, omitting the January and July issues. There are two quick ways to distribute news to the *AIPS* community. The old way — which still works — is to send mail to bananas@nrao.edu for forwarding to all addresses in that exploder. The new way is to post a message with the USENET News group "alt.sci.astro.aips". This news group allows *AIPS* users to discuss methods of radio-astronomical data reduction and provides a forum for discussion of *AIPS* questions, bugs, and features.

System managers should be aware that `15APR92` *AIPS* supports Sun computers as Berkeley operating systems. We are examining Sun's shift to Bell UNIX-based operating systems, but do *not* support them in the current release.

VLBA/VLBI Post-processing Software

VLBI Polarization Calibration

The **15APR92** release of *AIPS* contains the initial version of routines that allow the calibration of polarization sensitive VLBI data. These routines are incorporated into the standard *AIPS* calibration tasks, principally **PCAL** and **SPLIT**. However, the details of the calibration procedure differs substantially from those used for VLA data. Optimal procedures have not yet been established so documentation is not well developed. Persons wishing to calibrate VLBI polarization data should contact Bill Cotton (Internet: bcotton@nrao.edu). The software in the **15APR92** release only allows imaging data which has both cross polarized correlations (RL and LR) measured for each visibility. The next release will allow imaging with only RL or LR for sources with weak circular polarization.

VLBI Data Processing Workshop

On March 19, 1992 a small workshop was held in the AOC to discuss the current state of the VLBI software within *AIPS* and the plans for future development. The workshop was an informal one, but lists of suggestions and priorities were developed.

The Workshop started with a presentation by Bill Cotton of the programmer's view of multi-IF VLBI calibration. One of the principal points that Bill made was that display of multi-IF VLBI data is not satisfactory at all, and this area should be an area of active research. The second presentation was by Richard Porcas. He gave a user's view of the current software and pointed out areas that need improvement and development, and also areas where possible pitfalls can occur.

We spent a considerable amount of time discussing ideas for improving the software and the whole VLBI system. A list of the suggestions, arranged by general priority, follows:

Short-term priorities (< 6 months):

- Write a task to generate an HF table (the table that contains the output of the Haystack **FRNGE** program) from an *AIPS* CL table. The HF table will then be passed to the NASA **SOLVE** package to facilitate comparison between the *AIPS* and Haystack fringe-fitting tasks and, ultimately, the VLBA and MkIII correlators.
- Encode the integration time of a given visibility spectrum as a random parameter.
- Frequency shift MkIII data by a small amount so as not to lose the information in the channel at 0 MHz (relative). As a side benefit of this change, encode the lower sideband (LSB) and upper sideband (USB) data as separate IFs (in *AIPS* parlance). One advantage of this latter change is that it will obviate the need for the 130 degree difference between USB and LSB for VLBA – non-VLBA baselines.
- Develop a faster, more sophisticated version of **IBLED**, possibly incorporating table editing.
- Write a task to provide a data summary; *i.e.*, a list of the amount of data per IF per baseline.
- Develop a baseline-by-baseline fringe-fitting task followed by an antenna-based determination of residual rates and delays. This should lead to increased robustness of fringe-fitting, but would not have the signal-to-noise-ratio advantages of full global fringe fitting.
- Encode multi-band delay explicitly inside the SN and CL tables.
- Revamp **ANCAL** for multi-IF data
- Establish user documentation for various aspects of VLBI software.
- Create an e-mail exploder limited to those interested in VLBI software within the *AIPS* context. (*Eds. note: the AIPS USENET News group "alt.sci.astro.aips" and the bananas e-mail exploder offer less limited, but entirely suitable, mechanisms for this.*)

Longer-range ($\leq$ 2 years) priorities:

- Develop fringe-rate mapping for spectral line data.
- Generate multi-IF displays.
- Improve phase-referencing and Astrometry — John Conway and Tony Beasley will begin this development by attempting to provide geometrical and atmospheric corrections to a modified version of **CLCOR**.

Other suggestions for less essential, but nonetheless useful, developments:

- Read the #SK file in **MK3IN** to determine various parameters of the observation.
- Keep the amplitude of the phase-cal tone. We may need an explicit phase-cal table since the VLBA will have multiple tones per BBC.
- Combine spectral and IF averaging inside **SPLIT**.
- Add a task to estimate the coherence time of the data.
- Write an image editor, *i.e.*, have the ability to place a box on an image and edit the clean components within that box from the CC file. (*Ed. note: this is already available in* **TAFLG**.)
- Allow greater flexibility in using starting models, *e.g.*, allow the use of multi-component models without having to encode them as CC files attached to an image.
- Create the ability to plot a model map in one step.
- Write a task to take the phase difference between two sets of simultaneous VLBI data (*e.g.*, S/X), and to be able to use this to correct for ionospheric refraction or to scale atmospheric refractive effects from one frequency to another.

Patch Distribution

Since $\mathcal{AIPS}$ is now released only annually, we have developed a method of distributing important bug fixes and improvements via *anonymous* **ftp** on the NRAO Cpu **baboon** (192.33.115.103). Documentation about patches to a release is placed in the anonymous-ftp area **pub/aips/***release-name* and the code is placed in suitable subdirectories below this.

Reports of significant bugs in **15APR91** $\mathcal{AIPS}$ have been relatively few; however, the documentation file **pub/aips/15APR91/README.15APR91** mentions the following items:

CALIB Corrected limit in self-calibration to allow > 1000 clean components for the source model.

CLIP Increased buffer size to allow clipping > 256 channels of spectral line *uv*-data.

FILLM Fixed calculation of (u, v, w) coordinates to be relative to a fixed reference frequency and made other less significant changes.

HORUS Fixed errors for uniform-weighted spectral-line images $\geq$ 1024x1024. Also fixed **MX**.

MAPIT Improved logic and interactivity of the procedures for automatic imaging and self-calibration.

VTESS Patched to allow it to handle 4096x4096-pixel images.

INSTEP4 Corrected procedure to compile and link all programs in the **AIPNOT** directory.

SunOS Described a work-around to a common bug in SunOS which causes **f77** to compile **DATA** statements incorrectly.

SunOS Revised **SYSSUN** procedures to support dynamic (shared) libraries for $\mathcal{AIPS}$ executables.

Note that we do not revise the original **15APR91** tape for these patches. No matter when you received your **15APR91** tape, you must fetch and install these patches if you require them. There are three documentation files, **README.15APR91**, **README_TOO.IBMRS6000**, and **README_TOO.SPARC**. A sample **ftp** session, with *italic font* for commands typed by the user, is given below.

```
% ftp 192.33.115.103                                  (if baboon.cv.nrao.edu doesn't work)
Connected to 192.33.115.103.
220 baboon FTP server (SunOS 4.1) ready.
Name (192.33.115.103:glangsto): anonymous                              (any one can log in)
331 Guest login ok, send ident as password.
Password:  glangsto@nrao.edu                                (use your e-mail address)
230 Guest login ok, access restrictions apply.
ftp> cd pub/aips/15APR91                             (go to the directory with patches)
250 CWD command successful.
ftp> ls                                                  (list the directory contents)
200 PORT command successful.
150 ASCII data connection for /bin/ls (192.33.115.103,3154) (0 bytes).
HELP
Q
QY
README.15APR91
226 ASCII Transfer complete.
42 bytes received in 0.0064 seconds (6.4 Kbytes/s)
ftp> get README.15APR91                                  (get the instruction file)
200 PORT command successful.
150 ASCII data connection for README.15APR91 (192.33.115.103,3155) (4741 bytes).
ftp> cd Q/PGM/NOTST                                  (go to the directory with CALIB.FOR)
250 CWD command successful.
ftp> ls                                                      (list the contents)
200 PORT command successful.
150 ASCII data connection for /bin/ls (192.33.115.103,3164) (0 bytes).
CALIB.FOR
226 ASCII Transfer complete.
11 bytes received in 0.03 seconds (0.35 Kbytes/s)
ftp> get CALIB.FOR                                        (get the program)
200 PORT command successful.
150 ASCII data connection for CALIB.FOR (192.33.115.103,3165) (102399 bytes).
226 ASCII Transfer complete.
local: CALIB.FOR remote: CALIB.FOR
104866 bytes received in 1.1 seconds (90 Kbytes/s)
ftp> quit                                                 (exit the program)
221 Goodbye.
```

Installing Patches

The *AIPS* files must be placed in the correct *AIPS* source areas, compiled, and linked for the fixes to take effect. These steps should only be done by the local *AIPS* Manager.

1. Set the *AIPS* environment variables (**$CDTST** or **CDNEW**) before you can compile and link.
2. Move the old version of the software to be changed to a backup area.
3. Move the new version to the replacement position.
4. Compile and link the software (**COMRPL** and **COMLNK**).

These steps are summarized in the **README.15APR91** file.

A sample session for **CALIB** is listed below:

```
% $CDTST                                    (Create the AIPS environment)
% mv $QPGNOT/CALIB.FOR $QPGNOT/CALIB.15APR91   (make the backup)
% mv CALIB.FOR $QPGNOT                      (move the patch)
% COMLNK $QPGNOT/CALIB.FOR                  (Compile and link the patch)
```

If no errors are logged, the patch is complete. Do the others.

As bugs to **15APR92** are found, the patches will be placed in the **ftp** area for **15APR92**.

Latest *AIPS* Memos

Below is a list of the latest *AIPS* Memos.

MEMO	DATE	TITLE and AUTHOR
69	91/03/28	The 1990 *AIPS* Site Directory. Alan Bridle and Joanne Nance, NRAO
70	91/04/24	The 1990 *AIPS* Site Survey. Alan Bridle and Joanne Nance, NRAO
71	91/04/08	A Comparison of DDT results IBM RS/6000 and Convex C-1. Patrick P. Murphy, NRAO
*72	91/05/07	*AIPS* Imaging and Self-Calibration: MAPIT Glen Langston, NRAO
*73	91/05/16	*AIPS* DDT History (supersedes memo 63) Glen Langston, Pat Murphy and Dean Schlemmer, NRAO
74	91/08/08	*AIPS* at the Australia Telescope National Facility Mark Calabretta, ATNF
75	91/09/23	15APR91 DDT Results on a Sun IPC, Sun Sparc-station 2 Convex C1, and an IBM RS/6000-Model 550 Brian Glendenning & Gareth Hunt, NRAO
*76	91/11/27	Summary of *AIPS* Continuum UV-data Calibration from VLA Archive Tape to UV FITS Tape (supersedes memo 68) Glen Langston, NRAO

To order, use an *AIPS* order form or e-mail your request to aipsmail@nrao.edu. Memos can also be gotten via anonymous **ftp**, except for figures which may be missing in those denoted by an asterisk.

To use **ftp** to retrieve the memos:

1. **ftp** baboon.cv.nrao.edu or 192.33.115.103
2. login anonymous, for password use your e-mail address
3. cd pub/aips/memos
4. (get/read AAAREADME for more information)

For a complete listing of the *AIPS* memos series, contact Ernie Allen at any of the addresses in the masthead.

Gripes Database

The gripes of *AIPS* users are currently recorded in an emacs-based *Gripes Database*. This database lists in chronological order the gripes of *AIPS* users, and, in many cases, the answers to these gripes. This database may be viewed by the astronomical community via an anonymous login on the cpu **gripe**. The viewing program supports VT100 terminals as well as most, if not all, workstation windows.

Full instructions for using the Gripe database may be obtained via anonymous **ftp** to baboon (192.33.115.103). The file is called **GRIPE.README** and is located in the area **pub/aips/gripes**. To use the gripe database from a computer running the unix operating system type:

rlogin gripe.nrao.edu -l gripe

The Gripes database will automatically begin execution.

Below is an example of the Gripes database form to view very recent Gripes that have keywords beginning with Work. Any mail sent by the session illustrated will go to glangsto in Charlottesville.

```
    AIPS Gripes Selection/options

 Selection criteria
     User (Joe Blow)                    ------------------------------
     Status (new, answer)               ----------
     Keyword (MX, tape, Work-Around)    Work----------
     Beginning date (dd-mmm-yyyy)       15-Dec-91__
     Beginning Gripe no. (3456)         4700_
     Arbitrary string in a gripe        ----------------------------------

 Options
     Display (index, full, one, exit)   index__
     E-Mail address (jblow@esu.edu)     glangsto@nrao.edu----------------

 Please send comments and complaints to glangsto@nrao.edu
     ^P moves up   the screen,   (^P= control-P)
     ^N moves down the screen,   <return> to see gripes
     Gripes are best viewed with a VT100 or an XTERM
```

When the Gripe database user types a <return>, the database will show all gripes with number greater than 4700 which have a "work-around".

```
                    AIPS Gripe index

  No.    User              Date         Status      Keyword(s)
4756   Elias Brinks        16-FEB-1992  ANSWER NEW   Work-around
     Adding files to tape after AVFILE doesn't work.
4757   Elias Brinks        16-FEB-1992  ANSWER NEW   Work-around
     add GETO2NAME verb
4763   Alan Bridle         13-APR-1992  ANSWER NEW   WORK-ROUND
      Slow Convex AIPS startup Script
```

Gripes 4756, 4757 and 4763 may be viewed in turn with still more <return>'s.

Upon the Gripe database user typing another <return>, the database will show the text for gripe 4756.

```
                    AIPS Gripe report _GRIPE-NO: 4756

_GRIPE-ENTERED: 16-FEB-1992 18:50:00   _SYSTEM: taos.aoc.nrao.edu
_STATUS: ANSWER NEW  _KEYWORD:  Work-around
_ONE-LINE: Adding files to tape after AVFILE doesn't work.
_USER: Elias Brinks   _USER-NUMBER: 1276   _AIPS-RELEASE:  15APR92

_GRIPE: Tape handling in AIPS TST is not fail safe. I tried to "edit" an
  existing Exabyte tape, sitting on TAOS and using its drive. I used
  AVFILE to skip a number of files. When I attempted to write a file
  (in fact overwriting an existing one) with FITTP and DOEOT -1 an error
  message appeared: ZTAP: LUN 31 IO ERROR AT 1 OP OF BAKF ERROR CODE 0005
  What's worse, as I had my FITTP set up in a POPS loop, when it got to
  the second file, the tape REWOUND!!!!! (and there is no off-line button
  on an Exabyte!!!

_ANSWERED-BY: Eric Greisen/Glen Langston     _ANSWER-DATE:  1992-March-9
_ANSWER: The Exabyte tape problem is a SUN Exabyte driver bug that
will only allow files to be written at the beginning of tape
or the end of information (double end-of-file or EOT).  Exabyte tapes
can be edited on IBM computers.

Your procedure would have worked much better if you had specified
DOWAIT = TRUE.  This allows FITTP to return a completion code to AIPS
which will stop the FOR loop before any further damage is done.
WAITTASK should only be used interactively or when you are certain you
want to continue even if the task involved fails.
```

Gripes 4757 and 4763 may be viewed with still more <return>'s.

In order to improve access to the Gripes database, we expect to move it from a computer in Charlottesville to one in Socorro. We will then change the alias **gripe** so that remote users should see no change. Suggestions and feedback from the community concerning the Gripes and the database would be appreciated.

AIPS Order Form for 15APR92 ***(Unix)***

1. Name and address of Contact Person: _____
☐ Check here if address on back is ok. _____
(Include street address for UPS delivery) _____
_____

2. ☐ New order ☐ ReOrder

Do you have an AIPS user agreement? ☐ Yes ☐ No
(The agreement is a prerequisite for obtaining AIPS code)

3. Please specify CPU and OS version: _____
(Include Make/Model of computer and Version number of Operating System, e.g.
Sun 4/SunOS 4.1.1, DecStation 3100/Ultrix 4.0, IBM RS/6000-530/AIX 3.1, etc.)

4. DDT test package (15APR89 version): ..... ☐ (includes small, medium, and large tests;
(FITS tape) 9-track 1600bpi tape does not have large)

5. Tape "media" desired: ..... ☐ 9-track 1600bpi ☐ 9-track 6250 bpi
(Unix "tar" format) ☐ Exabyte (2.2G) ☐ Internet FTP
☐ QIC 24 Cartridge

6. Are there "gripes" on the returned tape? ☐ Yes ☐ No

7. Printed Documents Requested: ..... ☐ 15OCT90 AIPS Cookbook
Going AIPS (15APR90) ☐ Vol 1 ☐ Vol 2
☐ AIPS Memos: _____
(See separate list)

8. Custom 3-ring binders ..... ☐ Cookbook
Going AIPS ☐ Vol 1 ☐ Vol 2

Send this order form (or an electronic equivalent) to:

AIPS Group
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903-2475
USA

Network Addresses

Internet: aipsmail@nrao.edu
UUCP: ...uunet!nrao.edu!aipsmail

April 15, 1992

AIPSLETTER
National Radio Astronomy Observatory
Edgemont Road
Charlottesville, VA 22903-2475

NON - PROFIT ORG.
U.S. POSTAGE PAID
PERMIT # 373
CHARLOTTESVILLE, VA

FORWARDING AND RETURN
POSTAGE GUARANTEED,
ADDRESS CORRECTION REQUESTED

To:

Library
Nat. Radio Astronomy Obs.
Edgemont Road
NRAO

DATED MATERIAL - DO NOT DELAY

A I P S L E T T E R

Volume XII, Number 2: October 15, 1992

A newsletter for users of the NRAO
*A*stronomical *I*mage *P*rocessing *S*ystem

Written by a cast of *AIPS*

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AIPSLETTER Number, Personnel Changes

This AIPSLETTER is the second of two letters in volume XII of the series. The letter for the 15APR92 release of *AIPS* was erroneously labeled volume X, number 1.

Gustaaf van Morsel has rejoined the *AIPS* group, this time stationed in Socorro, NM. His considerable experience will be a great help in providing user support and on-the-spot debugging at the AOC.

Darrell Schiebel has joined NRAO in Charlottesville to work on the *AIPS*++ project.

Ger van Diepen is visiting Charlottesville for one year from Dwingeloo also to work on the *AIPS*++ project.

15OCT92 Available

The 15OCT92 version of *AIPS* is now available. It contains significant improvements in "television" displays for workstations and in various tasks of particular interest to the VLBI community. These improvements will be described in some detail below.

The last VMS machine directly accessible to the NRAO *AIPS* group has now been dismantled. This means that we cannot write a VMS-BACKUP-format release tape. VMS users can get the code via `ftp` in Unix compressed `tar` format or, by special arrangement, in plain text. Tapes in the Unix compressed `tar` format are available in several shapes (half-inch reels, DATs, Exabytes). A "compressed-FITS-text" format could be made available on tape if there is sufficient demand. The program to read such a tape was never fully developed for VMS, however. It lacks one easy and two less easy Z routines for VMS. We could write the remaining code, but we have no way to test it. Nonetheless, we will attempt this route if our users seem to need it.

So far as we know, *AIPS* will still work on FPS array processors. However, we will no longer support those devices, and may develop code using Q routines that have no FPS version.

We had hoped to offer support for several additional flavors of Unix in this release. That hope will now have to be placed on the next release. Of particular urgency is Sun's shift to the Bell-UNIX-based operating system they call Solaris. Hewlett Packard (HP-UX) and Silicon Graphics versions are also anticipated. Both of these will require assistance from non-NRAO sites.

Calibration Improvements in 15OCT92

Changes to Calibration Tables and Time Systems

In the 15OCT92 release there were significant changes made to the contents of the calibration tables and to the time system used for *uv* data. These changes were driven by the needs of the VLBA and result in smaller sizes for CL tables.

While forward compatibility is not a problem, these changes have resulted in some incompatibility between 15OCT92 (and later) versions of *AIPS* with previous releases. Due to a bug in the older software, the new CL tables cannot be applied in systems older than 15APR92. New CL tables can be applied by older versions if a patch is made to $APLSUB/CLREFM.FOR (see the Patch Distribution article below). Alternatively, VLA data can be recalibrated in older systems by deleting the new-format CL and SN tables and creating a new, old-format CL table using INDXR. The final CALIB and CLCAL (and CLCOR for polarization data) steps of the calibration need to be repeated. Your editing and determination of secondary calibrator fluxes (FG and SU files) are not affected by these changes.

The CL and SN tables were changed to include a multi-band delay column for each polarization. This multi-band delay is not a part of the residual calibration but is kept for model accountability. Also, the phase for each IF was changed to be at the reference channel for that IF rather than at the over-all reference frequency. This means that this phase is no longer a function of the single band delay.

The system temperature values were removed from the CL table. Separate TY tables have been implemented to contain system-temperature information.

The model accountability in the CL table has been changed. The geometric portion of the model delay is given as a time series polynomial (column GEODLY) and columns GEOPHA and GEORAT have been removed. There is a single atmospheric group delay and first time derivative per antenna/time (ATMOS and DATMOS). Each polarization has a separate clock epoch and rate error (CLOCK*n*, DCLOCK*n*). Each polarization also has a dispersive term (DISP*n* and DDISP*n*) which is the phase delay at a wavelength of 1 meter and scaled as wavelength squared.

The time system associated with *AIPS* time labels for *uv* data was simply assumed to be IAT. Our new scheme will allow any time system with a fixed offset from UTC. This offset is carried in the AN table along with a character string label specifying the time system.

VLBI Polarization Calibration and Imaging

The 15OCT92 release contains a number of enhancements to the VLBI polarization calibration and imaging capabilities of *AIPS*. *AIPS* Memo Number 79 describes several techniques for polarization calibration and suggests a method of calibration and imaging of VLBI polarimetric data.

A procedure called CROSSPOL was implemented to simplify the calibration of the cross-polarized delay and IF-peculiar right-minus-left (R–L) phase difference. This procedure is defined by entering RUN CROSSPOL, and it has both inputs and explain documentation. The end result of the procedure is an SN table containing the appropriate cross-polarized delay and phase corrections to be applied to a CL table.

CROSSPOL begins by copying a user-selected subset of his/her data, usually a single baseline observation of one or more strong calibrator sources. A parallel-hand fringe fit is run on this subset to correct the R and L delays and phases. Then, the R and L polarizations are swapped for one of the antennas using task SWPOL and FRING is run again to determine cross-polarized single- and multi-band delays (and any IF-dependent peculiar R-L phase differences). Finally task POLSN munges the output of this last FRING, producing an SN table which is copied back to the original data (where it can be applied using CLCAL.

Imaging of data with asymmetric coverage (some data samples with one, but not both, cross-polarizations) is supported in this release. Procedure CXPOLN simplifies the process, using a combination of the new task UVPOL and the old familiar MX to produce complex dirty images and beams. New task CXCLN will then do a complex Högbom CLEAN deconvolution of the Q and U images. This procedure is defined by entering RUN CXPOLN, and it has both inputs and explain documentation.

VLBI data input

A number of changes as well as bug fixes were made to **MK3IN**, our task to read Haystack-format MkIII VLBI correlator tapes. **MK3IN** now offers the option to split upper and lower sidebands into separate IFs. In order to support this, the maximum number of IFs allowed in *AIPS* was raised to 28. **MK3IN** now shifts all frequency channels by one-half of a frequency cell to avoid the zero frequency and no channels are automatically blanked. This produces 8 frequency channels for double-sideband data. **AIPS** verb **TELL** can now be used to terminate **MK3IN** gracefully.

Data editing

The baseline-oriented interactive editing task **IBLED** was substantially rewritten to be considerably faster and to handle the flag command table, more than one polarization, multiple frames in the data, the master file, workstation windows, and numerous other matters correctly. It now also offers the option to flag on "decorrelation", defined as the ratio of the vector- to the scalar-averaged amplitudes, and on the ratio of any 2 IFs present in the data. It also offers the one- versus all-source option for each flag prepared and will also determine a "best" time interval by default. **TVFLG** and **SPFLG** were also changed to pick up some of the better changes to **IBLED**, including on-line help for all menu items, cataloging even temporary master files, more flexible and correct handling of Stokes flag masks, and more efficient application of flagging to single-source files. **SPFLG** was given a new menu option to show the next baseline.

Total electron content data for FARAD

The *AIPS* task **FARAD**, which corrects for ionospheric Faraday rotation requires total electron content data for the period of observation. These data are distributed with *AIPS* in the directory with the logical name **$AIPSIONS**. The data files follow the naming convention **TEC***s*.*yy* where *s* is a station code and *yy* is the last two digits of the year. Currently data are only available from Boulder (station code B), the closest ionosonde to the VLA, and are complete up to May 1992.

The data are also available from baboon.cv.nrao.edu by anonymous ftp (from area **pub/aips/TEXT/IONS**). We will announce the availability of new ionospheric data on bananas and the alt.sci.astro.aips newsgroup as soon as we receive updates from Boulder.

Additional Improvements in 15OCT92

TV servers and programs

Almost all TV applications verbs and tasks were changed to take full advantage of the new asynchronous capabilities of **XAS** (see below). As a result, displays change less smoothly, but much faster. Verbs **GREAD** and **GWRITE** were added to allow users to read and set the colors of the TV graphics overlay planes. Two new tasks were created to allow nearly full color displays even on workstations (see *AIPS* Memo Number 82 for additional details). One of these, **TVHUI**, does a TV display, with optional output file, in which one image controls intensity, a second image controls hue, and a third, optional, image controls saturation. All levels of a single TV memory are used and the results are surprisingly good (at least without the saturation image) on workstations with only about 200 levels. This task should be used with spectral-line moment images, continuum polarization images, and numerous other possibilities. The second task is called **TVRGB** and is used to display independent red, green, and blue images using a single TV memory. A "median-cut" algorithm is used in the histogram of the images colors to optimize use of the limited number of levels available on the TV. This task can be used to display "true-color" images and outputs from **TVHUI** and **RGBMP**, or to compare images such as comparing optical and radio images of a source or even the same image with significantly different scalings. Both tasks offer a menu of interactive enhancement and display options.

A number of changes have been made in the **15OCT92** version of the *AIPS* television driver **XAS**, resulting in considerably improved performance. First, the **DISPLAY** variable was changed from *host*:**0** to simply **:0**,

where possible. This should prompt the X server to use Unix sockets rather than Internet sockets, with some improvement in performance. Second, the "blit" of the image from XAS's memory to the display was changed to be as large as possible on each display update. Previously, only a row at a time was blitted when the image was zoomed and/or contained graphics overlays. Third, the XAS memory was changed to use, optionally, the X extension called "shared memory." This greatly improves blit speed after an initial overhead to synchronize the memories. Fourth, the application code was provided with the option to ask XAS to delay updating the display until instructed to do so. This allows multiple graphics planes to be turned on with a single screen update, a full image to be loaded with a single blit to the display rather than one blit per row, multiple line segments of a plot to be drawn with a single blit to the display rather than very many small blits, and so forth. This option, implemented with subroutine YHOLD, is dangerous in that it requires considerable care on the part of the application programmer to make certain the the display is brought up to date whenever required. As some protection against programmer error, subroutine TVCLOS forces synchronization. Also the new XAS allows the user to set (via his or her .Xdefaults file) a maximum number of commands to be done asynchronously before XAS itself forces an update of the screen.

The older television drivers, XVSS and SSS, were changed to allow the YHOLD command and SSS even supports it. A bug in the screen addressing for all three drivers was corrected. This caused too many pixels to be sent to the display frequently, but no serious error. The output buffer in XAS, which was too small to support reading a full image row of the TV, was increased. The new XAS was changed to allow users to set the maximum image intensity used. This allows one to choose between high dynamic range (up to 237 levels) and the distraction caused by using different workstation color tables when the cursor is inside and outside the *AIPS* TV window. The XAS help file was also improved.

Tape programs

The performance of Berkeley sockets over Ethernet connections depends critically on the size of the data blocks being transmitted. If they are too small (requiring many connections) or too large (requiring subdivision into multiple segments), then the throughput is reduced by factors of two or more. For the 15OCT92 version, we changed the remote tape open and I/O routines to raise the assigned buffer sizes to the maximum size we could ever need (29000 bytes). This was the simplest of several solutions to give optimal performance, *i.e.*, performance equal to that for directly-connected tape devices. See *AIPS* Memo Number 80 for details.

A number of other changes were made to tape programs. FITTP was given the ability to write out the extra keywords now recorded with *AIPS* image and *uv* headers. A special form is used so that *AIPS* FITS readers (FITLD, IMLOD, UVLOD) can now read the parameters and put them back into the *AIPS* headers' keywords. A "new" tape operation was created to allow FITTP to write anywhere on a tape. Previously, at least on Exabytes, it was restricted to writing either at the beginning of tape or at the end-of-information. BAKLD and BAKTP were made to work better and to work on IBMs. Several minor inadequacies were corrected in FILLM. Serious bugs in writing the frequency into the antenna file and in setting the final file size were corrected. In addition, support for "on-line" uses of FILLM and for AIPS' SHOW and TELL verbs was added. Additionally, the procedure which starts the remote tape dæmons was made more powerful, the tape Z routines were given more explanatory error messages, bugs reading labeled tapes were corrected, and mounting of remote tapes on Convexes was made somewhat more reliable.

New programs for optical data

Several new tasks were added to 15OCT92 *AIPS* primarily to assist in the reduction of optical data. New task STFND uses a threshold-area algorithm for finding stars. New task GSCAT reads the STScI Guide Star tapes to find stars in the neighborhood of a specified coordinate. New task GSTAR converts the files created by GSCAT to *AIPS* ST tables to be used for plotting, for locating optical counterparts, and/or for transforming celestial and image coordinates. New task STRAN attempts to identify stars on optical images automatically using the list of stars in an ST file. Also, the median-window-filter task, MWFLT, was improved to do either a high- or a low-pass filtering.

Miscellaneous changes

Other corrections and improvements made to *AIPS* for the 15OCT92 release include:

ACFIT Added the option to write the baseline-corrected, total-power spectra to an output file.

CLCOR Added option to correct blanked phases using any valid ones with specified relationships between the IFs.

DBCON Changed to correct the u, v, w to reference channel one, allowing correct imaging of multi-channel continuum data which are first SPLIT and then DBCONed. Also fixed to handle more channels and/or IFs.

HYB New procedure to simplify "hybrid mapping" using CALIB and MX with user editing of the CC file and a contour plot.

LISTR Corrected bug that caused the wrong columns to be printed when examining tables, corrected bugs handling times in tables and multi-band delays, and changed it to examine the full data set to determine the scaling for GAIN listings.

LWPLA Changed to produce Postscript suitable for encapsulating and to offer additional user controls over plot orientation, fonts, and the like. Corrected handling of vectors that go partly off the page in all plot programs. The error was serious only for LWPLA apparently.

POSSM Corrected its handling of flagged data and of times, changed it to plot a line at 0 in phase, real, and imaginary plots, changed it to use the full TV screen when DOTV is true, and to be properly interactive when doing multiple plots to the TV. Corrected the EXTLIST display of POSSM plot files as well.

UVCOP Corrected the handling of the reference frequency in the antennas files.

UVPRT New task to print *uv* data in the format of PRTUV, but with application of all standard calibrations and a special mode for holography data.

VBPLT Corrected to use data from the desired subarray and CC file, to apply baseline-dependent calibrations, and to show the CC file used.

Miscellaneous changes for programmers

Several rather technical but useful changes were made to this release which are primarily of interest to programmers.

ZACTV9 Rewrote the task activation to use POSIX standards, to create the task as a grandchild process thereby avoiding the accumulation of zombie processes, and to avoid creating link files in load-module areas when tasks are not being debugged.

ZABOR2 Took advantage of the change to ZACTV9 to allow tasks being run in the presence of the debugger to trap exceptions normally unless they are being run in debug mode and to allow all tasks to trap floating-point exceptions.

COMLNK Changed compilation procedures to use list files to determine which programs should be optimized at which levels on which hosts.

TSKHLP New subroutine to allow run-time help information from inside tasks read from files named $HLPFIL/HLP*taskname*.HLP and displayed with MSGWRT.

APLNOT Cleaned up this area deleting unused subroutines which caused unresolved external reference messages to appear when linking with shared libraries. Also changed several tasks to provide the large buffers in the tasks rather than declaring them in the subroutines where they are actually needed. Large buffers declared in subroutines appear in all load modules, whether they are used or not, when shared libraries are used. Some large buffers and a few unavoidable unresolved references still remain.

TEXT The *AIPS* text areas containing ionospheric data, TV OFM tables, and publications (COOKBOOK, AIPSLETTERs, *AIPS* Memos, old CHANGE.DOC files) will be included on the release tape this time. They were inadvertently omitted in recent years.

Patch Distribution

Since *AIPS* is now released only semi-annually, we have developed a method of distributing important bug fixes and improvements via *anonymous* ftp on the NRAO Cpu baboon (192.33.115.103). Documentation about patches to a release is placed in the anonymous-ftp area **pub/aips/*release-name*** and the code is placed in suitable subdirectories below this. Reports of significant bugs in 15APR92 *AIPS* have been relatively few; however, the documentation file pub/aips/15APR91/README.15APR92 mentions the following items:

INSTEP1 This initial installation procedure could clobber existing files if restarted.

START_AIPS AIPS start-up script failed when there is only one printer at a site or when there is a numeric digit in the host name of a TV server.

ZVTP*.C $APLBERK versions of remote tape open and I/O routines altered for significantly better performance.

MX Spectral-line data with poor phase calibration may fail to converge in cleaning due to an error in the test for divergence.

XTRAN Raised the size of the images and the number of stars that can be used to transform an (optical) image to standard coordinates.

Note that we do not revise the original 15APR92 tape or tar files for these patches. No matter when you received your 15APR92 tape, you must fetch and install these patches if you require them. See the 15APR92 AIPSLETTER for an example of how to fetch and apply a patch.

One more patch has been added to the 15APR91 area in addition to those listed in the previous AIPSLETTER. This is

SPLIT An error in $APLNOT/CLREFM.FOR prevented modern CL tables from being used by older versions.

As bugs to 15OCT92 are found, the patches will be placed in the ftp area for 15OCT92.

VLBI Summer School Announced

The NRAO will hold a summer school in Socorro, NM June 23–30, 1993. Continuing the series of NRAO summer schools, this school will emphasize VLBI theory and techniques. In particular, we wish to provide students and other future users with an opportunity to become familiar with the capabilities and user aspects of the VLBA. The program will include lectures and demonstrations by NRAO staff members and by several invited speakers from the VLBI community.

If you are interested in attending the summer school you should contact Terry Romero at:

NRAO Summer School on VLBI Techniques
National Radio Astronomy Observatory
P. O. Box 0
Socorro, NM 87801

or

email: tromero@nrao.edu
fax: (505) 835-7027

Improved Tape Support Planned

We are planning to put greater support for a variety of tape devices into the *AIPS* tape Z routines. We would very much like to hear from all sites using tape devices on workstations except those using ordinary Exabytes with standard SCSI controller. Please let us know the manufacturer, model, controller, software driver, and any changes you have had to make to the *AIPS* Z routines for your tape devices. Please address your comments to eallen at the addresses in the masthead. He will forward them appropriately.

Latest *AIPS* Memos

Below is a list of the latest *AIPS* Memos.

MEMO	DATE	TITLE and AUTHOR
*76	91/11/27	Summary of *AIPS* Continuum UV-data Calibration, from VLA Archive Tape to UV FITS Tape (supersedes memo 68) Glen Langston, NRAO
77	92/09/03	Summary of DDT Accuracy Results Ernest Allen & Glen Langston, NRAO
78	92/06/01	Object-Oriented Programming in AIPS Fortran W. D. Cotton, NRAO
79	92/06/09	Polarization Calibration of VLBI Data W. D. Cotton, NRAO
80	92/06/30	Remote Tapes in AIPS Eric W. Greisen, NRAO
81	92/08/26	Tape and TV Performance in AIPS Eric W. Greisen, NRAO
82	92/09/24	Replacing the Convexes — New Color Algorithms in AIPS Eric W. Greisen, NRAO

To order, use an *AIPS* order form or e-mail your request to aipsmail@nrao.edu. Memos can also be gotten via anonymous `ftp`, except for figures which may be missing in those denoted by an asterisk.

To use `ftp` to retrieve the memos:

1. `ftp baboon.cv.nrao.edu` or 192.33.115.103
2. Login under user name anonymous and use your e-mail address as a password.
3. `cd pub/aips/TEXT/PUBL`
4. Read `AAAREADME` for more information.
5. Read `AIPSMEMO.LIST` for a full list of *AIPS* Memos.

AIPS Memos from Number 69 through 82 are present in this area as well as a few of the earlier ones. All are avaiable in paper form from Ernie Allen at the addresses in the masthead. Note that the anonymous ftp areas for memos, the `COOKBOOK`, and other text files have been changed to parallel the areas in the main *AIPS* directory tree.

Computing at the NRAO

The computing environment at the NRAO, both in Charlottesville and in Socorro, has been changing fairly rapidly. All of the old VAX 780s with their FPS array processors have been dismantled and carted away. The Convex C-1 computers will be phased out soon. We anticipate that the Charlottesville C-1 and one of the two C-1s at the AOC will be turned off around January 1, 1993. The other C-1 will be operated for some period of time without a maintenance contract, perhaps up to six months. This will affect *AIPS* users since we will no longer have a Convex cpu to test Convex-specific matters, we will no longer have any hardware TV devices (*e.g.*, IIS Models 70 and IVAS), and we will be operating with rather fewer half-inch tape drives.

To replace the Convexes, NRAO has recently purchased five IBM RS/6000 Model 560 workstations, each with 64 Mbytes of memory, an Exabyte tape, and 3 Gbytes of local disk. One of these is in Charlottesville and the other four are at the AOC. These workstations achieved a rating of 2.56 *AIPS*marks, where a Convex C-1 achives about 1.0. *AIPS*marks are based on the total time to run the large DDT test, as 5000 divided by this total time in seconds minus 60% of the real time of ASCAL. In addition, the NRAO has bought one large workstation for data visualization for each site. These are also IBM RS/6000 Model 560s, but equipped with a Model 7235 POWERgraphics GTO subsystem plus 256 Mbytes of memory and 3 Gbytes of local disk. Both are supplied with the AVS data visualization software package.

The "basic" workstations are already in routine use for data reduction with *AIPS* and other software. However, we are still trying to decide how best to use the visualization stations. To discuss this, we are holding a meeting October 19–20 involving people from both sites and from at least one non-NRAO site (University of Illinois).

We have also purchased a significant number of new tape devices, primarily Exabytes and DATs. In Charlottesville, there are now six tape devices on the IBM RS/6000 Model 530 called `lemur`, two each of half-inch, Exabyte, and DAT types. These replace the six half-inch drives of the VAX and Convex. A public Sun is also equipped with both an Exabyte and a DAT drive. At the VLA site, a Sun has been purchased to copy half-inch data tapes from the on-line system to Exabyte tapes for export from the site. The full VLA archive is being copied from (old) half-inch tapes to Exabytes. The AOC anticipates having three half-inch drives on Sun workstations for this project and for reading half-inch tapes generally. And all of the public workstations at the AOC have an Exabyte drive and many will also have a DAT drive. These replace the eight high-speed half-inch drives currently on the AOC Convexes.

All of the IBM workstations in Charlottesville (3) and the AOC (6) plus one Sun IPX in Charlottesville and seven Sun IPX's at the AOC are for public, but assigned, use. All public workstations have an Exabyte tape drive and 2 or more Gbytes of local disk. Visitors should call John Spargo at the AOC and Jim Condon in Charlottesville well in advance ($\geq$ 2 weeks) to arrange for use of these workstations.

At the VLA site, there is now a Sun workstation called `miranda` for visiting observers. A near-real-time version of FILLM is available to fill data into *AIPS* as it arrives. An Exabyte tape drive is also available on `miranda` to export data in FITS format for further reduction at the AOC or elsewhere. To sign up for `miranda` and reserve disk space (data files will have a lifetime of three days unless other advance arrangements are made), contact George Martin at the AOC at least one working day before the observing run.

And a Brag

On May 6, 1992, the VLBA Correlator obtained its first astronomical fringes using the W3(OH) masers at 18-cm wavelength. Within 12 hours, these data were read into *AIPS* 2000 miles away. The data were promptly sorted and plots produced of both the visibility functions and the spectra. AIPS' verbs even allowed the few minor rough spots in this data transfer to be covered over so that correctly annotated plots were produced.

AIPS Order Form for 15OCT92 *(Unix)*

1. Name and address of Contact Person: _____
☐ Check here if address on back is ok. _____
(Include street address for UPS delivery) _____
_____

2. ☐ New order ☐ ReOrder
Do you have an AIPS user agreement? ☐ Yes ☐ No
(The agreement is a prerequisite for obtaining AIPS code)

3. Please specify CPU and OS version: _____
(Include Make/Model of computer and Version number of Operating System, e.g.
Sun 4/SunOS 4.1.1, DecStation 3100/Ultrix 4.0, IBM RS/6000-530/AIX 3.1, etc.)

4. DDT test package (15APR89 version): ..... ☐ (includes small, medium, and large tests; 9-track 1600bpi tape does not have large)
(FITS tape)

5. Tape "media" desired: ..... ☐ 9-track 1600bpi ☐ 9-track 6250 bpi
(Unix "tar" format) ☐ Exabyte (2.2G) ☐ DAT
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