AIPSLETTER

Volume XVIII, Number 2: October 15, 1998

A newsletter for users of the NRAO
Astronomical Image Processing System

Written by a cast of *AIPS*

Edited by
Eric W. Greisen
National Radio Astronomy Observatory
520 Edgemont Road, Charlottesville, VA 22903–2475
804–296–0211; Fax 804–296–0278
aipsmail@nrao.edu

General developments in *AIPS*

Current and next release

The October 15, 1998 release of Classic *AIPS* is now available. It may be obtained via *anonymous* ftp or by contacting Ernie Allen at the address given in the masthead. 15OCT98 is also available on CDrom as well as the more traditional tape media. *AIPS* is now copyright ©1995 through 1998 by Associated Universities, Inc., NRAO's parent corporation, but may be made freely available under the terms of the Free Software Foundation's General Public License (GPL). This means that User Agreements are no longer required, that *AIPS* may be obtained via anonymous ftp without contacting NRAO, and that the software may be redistributed (and/or modified), under certain conditions. The full text of the GPL can be found in the 15JUL95 *AIPSLetter*. Details on how to obtain *AIPS* under the new licensing system appear later in this *AIPSLetter*.

The next release of *AIPS* will be 15APR99. It is possible to get early access to, and remain current with, this release by running a "midnight job"; see the *AIPS* home page for further details. Note that this allows your site to receive the latest improvements and bug fixes, at the cost of also receiving the latest bugs. The latter can and will be fixed as rapidly as possible when the programmers are notified of them at daip@nrao.edu.

Highlights

This release contains a new version of XAS which will emulate an IIS Model 70 doing full color displays on those terminals which support "24-bit TrueColor" X-Windows visuals. This enables stunning overlays of multi-spectral images, interactive hue-intensity displays, roam and other split-screen algorithms, and more. The ability to have more than one TV on a single TV-host has been developed, as has the ability to adapt the screen-full function of print routines to the current size of the workstation window.

The automatic transfer of calibration information from the VLBA correlator to *AIPS* appears to be working in the new release. Users will no longer have to extract these data laboriously from log files. VLBI fringe fitting and model fitting also received significant attention for this release. Interactive data editing using the TV graphics planes also improved significantly.

Improvements of interest to users in 15OCT98

The 15APR98 *introduced numerous changes which are not compatible with previous releases. Disk files written by previous versions are read transparently by* 15APR98 *and* 15OCT98 *(including* SAVE/GET *files), but users must not attempt to read disk files written by either of these versions with earlier versions.* 15APR98 *and* 15OCT98 AIPS *cannot start previous versions of tasks and the TV displays of the versions are incompatible. The TV displays of* 15OCT98 *and* 15APR98 *are also not fully compatible.* SAVE/GET *files for* 15OCT98 *cannot be read by* 15APR98 *and earlier releases;* 15OCT98 *will translate old* SAVE/GET *files when it first reads them.*

VLBI data processing

FITLD: Calibration transfer

While VLBA calibration data usually has to be extracted from log files by an observer, it has long been a goal of the VLBA project to extract these data at the correlator automatically and to include them as part of the data set that is sent out to the observer.

This capability has been tested within NRAO with the result that several problems were discovered. Most of these arose from misunderstandings between the VLBA online group and the *AIPS* group concerning the formats of the binary tables that were to carry the calibration data. We believe that these problems have now been resolved and the 15OCT98 version of FITLD should be capable of reading calibration data from the VLBA when it is made available to observers outside NRAO.

The process for handling calibration transfer through FITLD is not yet fully automatic. Since VLBA data sets often require several files to be concatenated, much of the calibration data may be duplicated. Some *AIPS* tasks may encounter problems as a result of the duplicated information. Users should, therefore, run TAMRG on the calibration tables to remove the redundant records. The EXPLAIN file for FITLD suggests suitable inputs to TAMRG for this procedure. This will be handled in a more convenient way in a future release of *AIPS*.

Other correlators that produce data in the FITS Interferometry Data Interchange format that is used by the VLBA should be aware that FITLD now checks the format of incoming tables much more thoroughly than it did before (the detection of problems in calibration transfer had been hampered by inadequate checks); this means that FITLD may now reject some data that would have been passed by previous versions. The difficulties that arose during the testing of VLBA calibration transfer also made it clear that the existing definition of the FITS Interferometry Data Interchange format (VLBA Correlator Memo No. 108) was no longer adequate. A new definition of this format is now available in draft form. This may be obtained by anonymous ftp from ftp.aoc.nrao.edu as either

/pub/staff/cflatter/FITS-IDI.ps (PostScript) or
/pub/staff/cflatter/FITS-IDI.pdf (Adobe PDF)

It may also be obtained through the Web page at http://www.aoc.nrao.edu/~cflatter/FITS-IDI.html. A list of errata is maintained at http://www.aoc.nrao.edu/~cflatter/FITS-IDI-errata.html.

FITLD: Lower sideband and other corrections

When reading data in FITS Interferometry Data Interchange format (as used by the VLBA correlator), FITLD reverses the order of lower sideband frequency channels so that they are sorted into ascending order of frequency. This requires FITLD to recalculate the reference frequencies for the lower sidebands so that the frequency channels are labelled correctly. This calculation has been performed erroneously with the result that frequencies for lower sidebands may be up to a channel bandwidth in error. Frequencies in FITLD were also rounded to integer multiple of 10 kHz. This led to shifts of a few kHz in the labelling of lower sideband frequencies. Both problems have been corrected in 15OCT98.

FITLD was making source tables with multiple occurrences of essentially the same source and with multiple occurrences of the same source number attached to different sources. The VLBA Correlator treats the same source, with different CALCODE as a different source. This causes *AIPS* to have things in the source table that it cannot properly address and is simply due to the VLBA antennas passing on CALCODEs while non-VLBA ones do not. FITLD was changed to drop CALCODE as a data selection adverb and to allow for source renumbering even while reading the first input file. The list handling was changed to include current additions to the source list when checking the next input source and to allow for the case in which 2 or more source numbers would both be translated into the same output source number.

Fringe fitting

The FFT stage of KRING received a lot of attention since the last release. Extrapolation of delay and rate solutions is now allowed both forward and backward in time; a pre-FFT stage solution for each antenna is sought as follows. KRING looks backwards to find the last good solution whose listed SNR exceeds some multiple of the FFT SNR threshold. If such a solution is found, its delay and rate solutions are adopted for the current solution and a new phase is computed. If the SNR of this solution exceeds the FFT SNR threshold by the above-mentioned, KRING skips the FFT stage. This pre-FFT stage is carried out for each antenna. After going through the entire data set, KRING will, optionally, do a "backwards" pass in which it looks forward instead of backward for solutions to extrapolate.

A test suite of simulated data is available to check that KRING is producing the correct theoretical answers. The calculation of signal-to-noise ratio during the FFT stage has now been revised. The new calculation is derived in *AIPS* Memo No. 101 (see below). A problem with multi-band delays was also corrected. Users are advised to run trial data sets through KRING to compare with their results from FRING and provide feedback if there are any qualms about this new, in principle better, task.

The new calculation of SNR implemented in KRING will replace the SNR calculation in FRING in the 15APR99 release. For this release, the calculation of the minimum frequency increment needed was improved. Cases in which the lower and upper sidebands each had a 0-frequency offset channel caused particular problems.

Miscellaneous corrections

PCCOR was corrected to read enough of the file to find a good record for the FQ number of the present data. It calculates the highest and lowest frequencies to use independent of their order in the PC-table record.

delay calibration A long-standing error in a low-level routine caused delay corrections not to be applied if they were zero for the first IF channel. Values for the other IFs were not checked.

ACCOR was corrected to prevent it from using flagged data, which it used happily before.

RESEQ is used to re-sequence antenna numbers, primarily for space VLBI data. It was corrected for numerous gross errors, all of which caused it to fail completely.

Interferometric data handling

SPLAT and SPLIT

A new task called SPLAT was developed. It has all of the capabilities of SPLIT plus two new options. (1) It can assemble the calibrated and edited data for selected sources into new multi-source output file. (2) It can average the calibrated data in time and in groups of frequency channels. The task can be useful in applying the preliminary calibration of fringe rate and delay. The output of SPLAT will have much less data because of the averaging.

SPLIT was also changed to allow boxcar averaging of adjacent groups of channels to produce a spectral-line output data set of fewer channels. The task was corrected to handle the option of looping over subarrays even when there is no data for the source in some of the subarrays. Logic errors in the counting of flagged and passed samples were corrected. The task (and UVCOP) were changed to get rid of the random parameter called REMOVED, a disk-space wasting concept.

Interactive data editing

The EDIT package in *AIPS* uses the graphics channels of the TV display to provide tools for editing *uv* data based on the data themselves (tasks EDITR and SCMAP) and on the contents of system temperature or calibration tables (tasks EDITA and SNEDT). These capabilities were introduced in the previous release and have been, with significant user input, greatly improved in this release. The class now allows crowded data displays in the edit area, *i.e.*, displays with more than one data sample at the same horizontal TV pixel. Flagging a single "time" in such a display is actually flagging a time range. To aid the flagging of crowded displays, a conservative "flag point" and a more daring "flag fast" (no TV button required) edit modes were added. The option to display a second observable from the primary antenna/baseline was added as were menu items to select the next antenna and baseline. An "expert" mode was added in which the keyboard is used as the command input device rather than the TV cursor/mouse. You may switch easily between the expert and TV menu modes. The color assignments were also changed to get a more legible display.

Bandpass calibration problems

A number of significant bugs were found in the bandpass solution tasks CPASS and especially BPASS. In the latter, the worst was an addressing error that caused, in the presence of channel-dependent flagging, good weights to be assigned to bad channels with the highest numbered channels being lost. The fit routine did not provide enough information to invoke the interpolation option when a channel was fully flagged and the interpolation method, when invoked, did not do quite the right thing. BPASS and the bandpass application routines did the correct thing when calibrator autocorrelation spectra were applied to source autocorrelations and when calibrator cross-correlations were applied to source cross-correlations. However, in the other two cases which sometimes apply, the amplitudes were wrong by a square or square root. The bandpass application routines did not correctly handle the case when an antenna is missing from the BP table but present in the data. Both tasks suffered from errors determining whether the data-set was single or multi-source and what the maximum antenna number was. When an antenna was omitted from the AN file, the maximum antenna number would be wrong and the output BP table corrupted. (Note — this error was corrected in a significant number of tasks affecting fringe fitting, polarization calibration, display tasks, and more.) CPASS was corrected to write usable weights for all polarizations and IFs, not just the first.

FLGIT and UVFLG

FLGIT is a new task intended primarily to flag channel-dependent interference from spectral-line observations. It has been used with considerable success for 74-MHz and P-Band observations of continuum sources made with numerous spectral channels to allow for RFI excision and to avoid bandwidth smearing. FLGIT has two modes. For both, it applies calibration under the usual options. Then it flags channels with excessive amplitude and either fits a linear baseline to the real and imaginary spectra using a selected set of channels or runs a median window filter through the spectrum. Any channels with residuals greater than user-specified limits are flagged. The output of the task is a calibrated (if requested) and edited data set. A flag table may be applied on input; none is generated.

Spurious fringes appear due to pulse cal injection. If the fringe rate is close to zero, these spurious fringes are not removed by the fringe rate stopping procedure. The time interval required to suppress the spurious fringes was calculated by Kogan in VLBA Test Memo No. 58, 1998. A new option has been added to UVFLG to flag the calculated time interval around which the fringe rate is zero. The length of this interval depends on the suppression factor given in APARM(5), while APARM(6) > 0 causes a display of the source, time, baseline, and U, V of expected zero fringe rate ($U = 0$). The user should pay special attention to the PCAL tones at the vicinity of the printed points.

Miscellaneous improvements

TI2HA is a new task which converts the recorded times to hour angles. This will allow time averaging of data taken with the same array on multiple days.

PHNEG is a new task to reverse the sign of the phase.

UVCOP was changed to allow up to 50000 flags to apply to a single time, which is ten times the normal limit. The `SUBARRAY` adverb was also added.

FITTP always writes *uv* data as floating point so the `DOTWO` option was dropped.

DBCON had an error when re-weighting two data sets in the same sort order, causing the data to be compromised.

Autocorrelation phases actually are non-zero for cross-hand polarizations. A number of tasks were fixed to allow for this.

Calibration times used to be required to be the same for all antennas in an `SN` or `CL` table. For this release, the calibration application routines were changed to allow each antenna to occur at its own set of times. `INDXR` now uses this option for `USUBA`-like VLBI data sets and `CLCAL` will write subarray 0 to the output `CL` table for such data sets if requested.

UVSRT now has a much bigger sort buffer which should make it run faster.

Imaging and modeling

Array design

The new task `CONFI` implements the algorithm to optimize antenna array configuration by minimizing side lobes described by L. Kogan, MMA Memo No. 171, May, 1997. The task finds the array configuration which has the minimum worst side lobe over a specified circular area of the sky. The initial configuration is taken from the input file or calculated as

a homogeneous configuration on the circumference;
a configuration on the circumference with a progressively increasing spacing;
a homogeneous configuration on two circumferences; or
a homogeneous configuration on the three circumference;

The optimization is constrained in topography, in "donuts," or in two circles. The process of finding the configuration is iterative. At each iteration the position and value of the worst side lobe in the given sky area is found. Then a small correction of each element position is provided to minimize the value of the worst side lobe. The configuration found and relevant *uv* coverage are plotted on the same plot (on TV or in a file). The coordinates of the final configuration are recorded in the output file in normalized form or in meters. The task can be useful in the design of MMA, LSA, and other arrays.

Interferometric imaging

`IMAGR` was corrected to survive a missing `AN` file and was changed to use the current total iteration count over all fields to set cutoffs and other limits. Bill Cotton and Jim Condon have made available a new service via the World-Wide Web for users of `IMAGR` for low frequency radio interferometer data. This Web service at `http://www.cv.nrao.edu/ bcotton/NVSSAIPS.html` uses the NRAO/VLA Sky Survey (NVSS) catalog to produce a list of potentially confusing sources around a specified celestial position. The result is in the form of an *AIPS* RUN file that may be cut and pasted into an *AIPS* window that sets up the input adverbs for *AIPS* task `IMAGR` to add extra fields around these confusing sources. Selection of source is by region of the sky and peak 20-cm flux density after correction for the antenna gain at the frequency of observation. The NVSS survey was made with the NRAO VLA array at 20-cm wavelength (1.4 GHz) with a resolution of 45", full sky coverage north of -40 degrees declination, and a limiting source peak brightness of about 2.5 mJy (worse near the galactic plane). The NVSS is nearing completion and the catalog contains more than 1.8 million sources.

`FLATN` is the task which regrids multiple fields produced by `IMAGR` onto a single image and geometry. It had minor annoyances corrected, a new option to control the center coordinate added, and another new option to apply radial and 3D corrections to the fields as they are regridded. `OHGEO` had this option corrected for images made with `IMAGR`'s `DO3DIMAG` option.

`MWFLT` wrote its output rows one row too soon leading to errors in the source declinations.

Single-dish imaging

The 12m telescope can process data so that the "off" and "gain" scans have scan numbers in a different range than those of the main source. `OTFUV` was changed to read the off and gain scan numbers from the main data while applying the scan number range (`BCOUNT` and `ECOUNT`) as a limit only to the primary source.

Modeling

`OMFIT`'s error bar analysis has now been tested using a suite of simulated data to check that the analysis works correctly even when the weights are not properly scaled. A new model component that allows time-variable position offsets has been added. This model could easily be generalized to deal with time-variable fluxes if there is user demand. `OMFIT` now self-calibrates multiple Stokes and IFs separately. Also, it can solve for station-based time-independent amplitude offsets, finding separate offsets for each Stokes and IF. This capability is not offered by either `CALIB` or by `DIFMAP`. These offsets are, of course, supplied with proper error bars. A PERL script is now available for converting `DIFMAP` model files into `OMFIT` input files. This script has been used to convert an initial model developed using `DIFMAP` into an `OMFIT` input model which was then used to refine the model and calculate error bars. For more details, please write to kdesai@nrao.edu.

The Gaussian fitting tasks `IMFIT`, `JMFIT`, and `SAD` were given a new option to apply radial bandwidth smearing to the Clean beam that is used as an initial guess for components and that is used in deconvolving the fit component. They were corrected to handle images which lack proper coordinate information in a happier fashion. Task `CCMOD` had numerous corrections made to its model computations, data management, and documentation.

Data display

Truecolor TV display

In `15OCT98`, the `XAS` display server implements two different models of TV display. In the familiar model, the chosen single image is loaded into 8-bit display memory by `XAS` using most but not all of the 256 values available. A hardware look-up table is then applied to control the pseudo-color display. In the new model, images in the `XAS` memory are converted through separate (software) look-up tables, summed, converted through another look-up table, and only then moved to a 24-bit display buffer. This is slower than the first mode, since every time one wants to change a look-up table, the full images have to be recomputed and re-loaded to the display memory. But, it is rather faster than was expected and the new model allows different images to be used for each of the 8-bit segments of the display memory, permitting for example, separate red, green, and blue images to be overlayed. This "truecolor" display allows us to look at full-color images, to compare one-color images from multiple sources (*e.g.*, optical, radio, X-ray), and to implement full displays in which the intensity of the display is controlled by one image while the color is controlled by another image. This last, done by verb `TVHUEINT`, is very useful for zero and first moment images of spectral cubes, for polarization intensity and angle images, for intensity/depolarization displays, and so forth. The logic inherent in having separate look-up tables for separate parts of the image, which is not available when using the hardware LUT, allows the 24-bit mode of `XAS` to offer split screen functions as well. The verb `TVROAM` will display images much larger than the TV display, allowing you to any region the size of the display interactively. Split screen also allows adjusting one image's LUT while looking at both images in `TVBLINK` operations.

The 24-bit mode is the default if your display is capable of it. However, you may turn off this default with a parameter in your `.Xdefaults` file; see `HELP XAS` for details of this and other parameters. `XAS` now contains both the image catalog and the status parameter information for its display. Therefore, all AIPS programs will know which mode the TV is in and, when appropriate, take advantage of that mode. In 24-bit mode (and 8-bit for that matter), you are strongly encouraged to use shared memory. For Solaris systems, this will require adding a line to the file `/etc/system` saying, for example, `set shmsys:shminfo_shmmax=4194304`. This is 4 Megabytes which is enough for normal, smaller-size screens even in 24-bit mode. 5 or 6 Megabytes may be needed for larger display screens. (1–2 Megabytes are needed for shared memory with 8-bit pseudocolor.)

Multiple TV displays

An often-requested feature that has been missing from AIPS is the ability to run more than a single instance of the XAS TV Server — and the corresponding tektronix, message, and TV lock dæmons — on a single host. This is particularly desirable in environments where a central compute server is used with X terminals, low-end desktops, and/or PC's running non-Unix systems. Users reducing multiple projects have also requested the ability to have separate TV and message servers for their separate streams of thought. In this release one can now do precisely this with a simple extra option on the command line:

```
$ aips tv=local
```

will cause the system to use Unix-based sockets instead of the more traditional Internet (or Inet) sockets for communication between AIPS or its tasks and the TV servers. The limit on concurrent instances of such "local" TVs is now 35 per host; this is in addition to the one usual Inet socket based TV. Full details are available in AIPS Memo No. 99 (see below) and in the AIPS manual page and on-line help file. These documents tell you how to run more than one instance of the local, Unix-socket servers and how to connect to an instance that is already running. Note that the servers run on the same machine that is being used for running AIPS and its tasks and can receive commands only from that computer. However, the windows that display the TV images, tektronix plots, and messages will appear on the device to which the $DISPLAY variable is pointed. These windows are accessible only to the servers on the main computer.

Printing to the CRT

All tasks that offer the alternative of printing to a line printer or to the workstation window ("CRT") pause when the CRT "page" is full and ask the user for permission to continue. Previously, the page-full condition was defined simply by a number stored in the system parameter (SP) file for the computer. Since the CRT is almost always a workstation window of variable size these days, the use of a fixed number is annoying. With 15OCT98, all AIPS printing offers the option to use the current size of the window for the next page of printing. This is requested by setting the fixed page size ≤ 0 in the system parameter file. The previous behavior is also available; simply set the page size to the desired positive number of lines. But try the new option; you will like it.

Miscellaneous improvements

KLEENEX is a new verb to exit from AIPS while ordering all servers (TV, TV lock, message, Tek) to terminate. This verb is strongly recommended to users of the Common Desktop Environment and other screen managers that attempt to checkpoint your environment when you exit.

UVPLT was changed to loop over IF and subarray as well as spectral channel if requested. Bandwidth synthesis may now be plotted fully.

SNPLT now plots flagged samples with a different symbol than good samples.

STARS was confused about which axis position angle is measured from (should be North to East) and had no defense against mixing units in transposed images.

Improvements in system matters in 15OCT98

AIPS Manager related items

ME files The POPS memory was made about four times bigger for compiling complex procedures. The code was changed to use parameters to set the memory size and to reformat older, smaller POPS memory structures as they are read in (with GET or when starting AIPS). During installation, old ME files in the DA00 areas will have to be deleted so that they can be replaced with the new, larger ones. The FILAIP program and SYSETUP procedure will normally be used to make the new files.

TC files The `SHOW` and `TELL` communication files were found to be inadequate both for the number of commands that they could hold and for the number of users that they could support. A new `TC` file was created with a slightly different name and a new, larger structure. Several low-level routines were changed so that they remove obsolete entries in this file, leaving room for new, potentially useful entries. `FILAIP` and `SYSETUP` will create the new files during installation.

DADEVS The manner in which disks are selected for use in a given `AIPS` run was revised. Now, required disks are always included first, local disks are second, and optional disks selected on the command line (`DA=`...) are third. Because NFS is very slow when writing message files ($\approx$ 1 second per line), site-wide `DADEVS.LIST` files should almost never specify a required disk. If a user wants to have his messages and other basic files remain independent of the computer being used, then that user may specified a required disk in a personal copy of the disk list in a `$HOME/.dadevs` file.

Readline A new version of the GNU command-line-editing package is being shipped with `15OCT98`. It appears to be more reliable than the older version and resolves a number of problems encountered on 64-bit architectures (alphas).

AXLINUX A new architecture has been added to *AIPS* with this release, namely `AXLINUX`. This architecture represents the Linux operating system running on Alpha hardware (from DEC/Compaq or other vendors). The port itself was relatively easy, apart from some minor incompatibilities with an old version of readline (see above). However, the performance attainable with this combination has not been as good as we hoped. As the GNU compilers become more mature within the Alpha environment, we expect this to change (as it did, rather dramatically, for *AIPS* on Intel/Linux about a year ago).

Page full The *AIPS* Manager should consider running `SETSP` to change the CRT line count to 0 for all computers so that the new CRT page-full handling will be invoked; see above.

Programming considerations

A number of wide-spread problems were found in the *AIPS* code that need to be mentioned here:

Antenna numbers are given in the `AN` file as data in each record. There is no requirement that the number of records match the highest antenna number or even that they be in numerical order. A new routine, `ANMAXA`, was written to return the maximum antenna number in the `AN` file. `GETANT` was changed so that the Common parameter `NSTNS` is the maximum antenna number and `TELNO(`i`) = `i at all times. Numerous tasks in bandpass and polarization calibration and fringe fitting failed badly in `AN` files had missing or out-or-standard-order records.

Multi-source detection in *uv* tasks was confused by the presence of an `SU` file. A multi-source file is one with a `SOURCE` random parameter (`ILOCSU` ≥ 0 after a `UVPGET` call). A source table must be present in this case, but it is allowed to be present in the other case as well, even if its meaning is not entirely clear. `ILOC` pointers indicate valid data when they are ≥ 0; numerous tasks tested for > 0 only.

***uv* scaling** is based on the header reference frequency. *uv* values must be scaled from that frequency to the frequency of the data being displayed, copied, or otherwise used. Several display tasks neglected to do this, although all imaging and calibration ones got it right.

Baseline selection via the `ANTENNAS` and `BASELINE` adverbs was clarified for this release. The cleaned up meanings are described in the help files. Subroutine `SETANT` was written to convert the user adverbs into useful Fortran variables, while `REQBAS`, `AN1ORS` and `BASLST` were revised to follow the new conventions. These adverbs are still not implemented inside the `UVGET` calibration package.

Y2K compliance was asserted for `15APR98`, but, as will be the case lots of places beside astronomy, a few things were overlooked. The VLBA correlator was used to produce a data set "observed" and correlated in the year 2000. The correlator programmers did a good job of using the new date format, including using it in various date-related keywords in tables. This had been overlooked in *AIPS* and is now implemented for FITS reading (now) and writing (after 31-Dec-1998) in `15OCT98`.

Formatting of displayed strings was made simpler with the addition of a new subroutine `REFRMT` which allows you to use a wide format (*e.g.*, `I6`) for something that might be that wide but is usually only one or two digits. A call to `REFRMT` squeezes out the consecutive blanks. There is a mechanism to keep consecutive blanks where desired as well.

Patch Distribution

As before, important bug fixes and selected improvements in `15OCT98` can be downloaded via the Web at:

`http://www.cv.nrao.edu/aips/15OCT98/patches.html`

Alternatively one can use *anonymous* `ftp` on the NRAO cpu `aips.nrao.edu`. 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. Information on patches and how to fetch and apply them is also available through the World-Wide Web pages for *AIPS*. As bugs in `15OCT98` are found, the patches will be placed in the `ftp`/Web area for `15OCT98`. No matter when you receive your `15OCT98` "tape," *you must* fetch and install these patches if you require them.

The `15APR98` release had a number of important patches. These were

1. `FITLD` makes incorrect source tables and numbers. 1998-04-19 and 1998-04-23
2. `TEKSRV` error for SGI and DEC computers. 1998-04-23
3. `DBCON` reweights the wrong thing. 1998-04-28
4. `BPASS` handles flagged channels and interpolation wrongly. 1998-05-05, corrected 1998-06-18
5. `IMAGR` can get wrong frequency in output image. 1998-05-05, corrected 1998-05-06
6. Digital Unix version 4.0D tape problems. 1998-06-05
7. Y2K addition to FITS table readers. 1998-06-05
8. `DBCON` has trouble with multiple sources. 1998-07-05
9. `FITLD` labels LSB data incorrectly. 1998-07-06 and 1998-07-21 and 1998-08-18
10. `FTPGET` for SUL gets library name wrong. 1998-07-29
11. `M3TAR` handles double-precisions wrongly.. 1998-08-18

AIPS Distribution

A total of 278 copies of the `15APR98` release were distributed to 260 sites. Of these, 128 were in source code form and 150 were distributed as binary executables. This is rather more than those of `15OCT97` (107 copies), `15OCT96` (222 copies), and `15APR97` (148 copies), perhaps reflecting the lower rate of developments in previous releases and the new capabilities of `15APR98`. The figures on computers using *AIPS* are affected by the percentage of *AIPS* users that register with NRAO. Of 260 non-NRAO sites receiving `15APR98` only 76 (29%) have registered. We remind serious *AIPS* users that registration is required in order to receive user support. The first table below shows the breakdown of how the copies of `15APR98` were distributed and includes both source-code distributions and binary distributions. The second table below is based on registered installations of `15APR98` and suggests that the distribution over operating systems was heavily weighted toward Solaris with Linux as a distant second.

ftp	CDrom	8mm	4mm	ZIP	Floppy
224	45	6	3	0	0

Operating System	No.	15APR98 %	15OCT97 %	15APR97 %	15OCT96 %
Solaris/SunOS 5	243	66	50	66	46
PC Linux	70	19	23	16	19
HP-UX	6	2	3	6	4
Dec Alpha	26	7	9	6	10
SunOS 4	14	4	14	5	13
SGI	10	3	1	1	5
IBM /AIX	2	1	0	0	4
Total	371				

Recent *AIPS* Memoranda

The following memoranda are available from the *AIPS* home page.

99 Multiple TV Servers on a Single Host
Patrick P. Murphy
May 29, 1998
Since the network-related overhaul of *AIPS* in 1992, it has not been possible to have more than one instance of the "TV" (image display) server or its ancillary servers on a single host. This has proven to be an inconvenience in many environments, and debilitating for *AIPS* users where X terminals or their equivalent are widely deployed. With recent changes in the `15OCT98` version of *AIPS*, this restriction has now been lifted. This memo describes how the use of Unix domain sockets enables one to have multiple instances of the TV and other servers on a single host, displaying either to a single X11 display or multiple displays.

100 The Creation of *AIPS*
Eric W. Greisen
July 27, 1998
At this writing, the *AIPS* package of software has been in active development and use for over 19 years. The present manuscript is an attempt to summarize the discussions and earlier software packages that led to the creation of *AIPS* and to describe what *AIPS* was like during its formative years.

101 The Calculation of SNR in `KRING`'s FFT stage
Ketan M. Desai
October 8, 1998
This memo describes the SNR calculation during the FFT stage of `KRING`. I describe the assumed statistical properties of the visibilities used for the fringe search and show how `KRING`'s SNR estimate differs from that in `FRING`. I also discuss the probability of false detection, a statistic users have often requested be reported while fringe-fitting.

AIPS on CDrom

Starting with `15APR98`, we have made *AIPS* available on CDrom. The initial tests using recordable CD's were very successful, and resulted in a CD with source code, two binary versions (Linux and Solaris), and a GNU-zipped version of the documentation (`TEXT`) area. It was possible to either perform a full installation on disk (*i.e.*, copying the binaries from CD to local disk), or to run from the CD. In the latter case, the "footprint" on the local disk was under 10 Megabytes! (This figure does not include user data, obviously.) Furthermore, the setup script was given the ability to switch between a "run from CD" installation and a "full" installation. The fact that 34 Linux and 11 Solaris versions of the CDrom were distributed suggests that this functionality, and the availability of *AIPS* on this new medium, will be of considerable use to the Astronomical Community.

AIPS Order Form for **15OCT98** ***(Unix, "tar" format)***

Available under the Free Software Foundation's General Public License

Order online: http://www.cv.nrao.edu/aips/forms/aipsorder.html

AIPS is available via anonymous ftp to aips.nrao.edu (192.33.115.108)

1. Name and address of Contact Person: ______________________

☐ Check here if address on back is ok. ______________________

(Include street address for UPS delivery) ______________________

____

I ☐ want ☐ do not want to receive paper copies of the Aipsletter

The latest AIPSletter is always online at: http://www.cv.nrao.edu/aips/

2. ☐ New order ☐ ReOrder Do you have an old User Agreement? ☐ Yes ☐ No

Have you registered previously? ☐ Yes ☐ No

(Registration is free to educational/research sites and is required *on every release* if you want support from NRAO)

3. Tape "media" desired: .... ☐ CDROM (with Linux and Solaris binaries)

We reserve the right to institute a media charge at any time

☐ Exabyte (5GB) ☐ Exabyte (2.2G) ☐ 4mm DDS DAT

☐ QIC 150 (150MB) ☐ 9-track 6250 bpi

☐ Check here for BINARY TAPE (load and go), exabyte or DAT only, and indicate OS/hardware

☐ Sparc/Solaris 2.6 (SC4.2) ☐ Sparc Ultra (SUL) 2.6/SC4.2 ☐ Sparc/SunOS 4.1.2 (SC2.0.1)

☐ Intel Linux (g77/egcs, RedHat 5) ☐ Silicon Graphics IRIX 6.4 ☐ IBM RS6000/AIX 3.2

☐ Dec Alpha/OSF-1 4.0 ☐ Alpha Linux (g77/egcs, RH5) ☐ HP-UX (HP2, 9000/780 up)

4. Computer(s) make, model and OS version: ______________________

Include hardware/software/quantity info, e.g. ______________________

Sparc Ultra 2/SunOS 5.5/21, etc. ______________________

5. DDT test package (15JAN94 version): .... ☐ (includes small, medium, and large tests;

(FITS tape) NOTE: Also available via ftp on aips.nrao.edu in `/aips/DDT/*` and on the CDROM

6. Printed Documents Requested: .... ☐ AIPS Cookbook (http://www.cv.nrao.edu/aips/cook.html)

☐ AIPS Memos: ______________ Going AIPS (15APR90) ☐ Vol 1)☐ Vol 2

(See separate list at ftp://aips.nrao.edu/pub/aips/TEXT/PUBL/AIPSMEMO.LIST

7. Custom 3-ring binders may be requested when you register your copy of AIPS.

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

Web: http://www.cv.nrao.edu/aips/

Anonymous ftp: aips.nrao.edu/pub/aips/

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

FIRST CLASS

To:

DATED MATERIAL-DO NOT DELAY