A I P S L E T T E R

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A newsletter for users of the NRAO
Astronomical Image Processing System

Written by a cast of *AIPS*

Edited by

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General developments in *AIPS*

Current and future releases

We have formal *AIPS* releases on an annual basis. We recommend a full binary installation method for both the frozen and development versions for MacIntosh OS/X (PPC and Intel chips), Solaris, and Linux (32- and 64-bit) systems, but all architectures can do a full installation from the source files. If you develop *AIPS* code locally, you will need to do a source-level installation. The current release is called `31DEC09` and is now "frozen." If you took a development copy of this version at some earlier date, you should use the "Midnight Job" (MNJ) to bring it up to date. You need to run a MNJ only once in 2010 to convert your copy of `31DEC09` into the frozen version. When patches to `31DEC09` are announced, you may apply them with the MNJ. This *AIPSLetter* is intended to advise you of corrections and improvements in this release.

We have begun a new version, called `31DEC10`, which is now under development by the *AIPS* Group. You may fetch and install a complete copy of this version at any time. Having fetched `31DEC10`, you may update your installation whenever you want by running the MNJ. This uses cvs, rsync, and/or transaction files to copy and compile the code selectively based on the code changes and compilations we have done. We expect users to take their source-only or binary version of `31DEC10` *AIPS* over the Internet (via *anonymous* ftp). Both versions require you to copy the installation procedure `install.pl` via `ftp`; the source-only version also requires you to ftp the 97-Mbyte `31DEC10.tar.gz` compressed tar file. Linux sites will almost certainly have `cvs` installed; other sites may have installed it along with other GNU tools. Secondary MNJs will still be possible using `ssh` or `rcp` or NFS as with previous releases. We have found that `cvs` works very well, although it has one quirk. If a site modifies a file locally but in an *AIPS*-standard directory, `cvs` will detect the modification and attempt to reconcile the local version with the NRAO-supplied version. This usually produces a file that will not compile or run as intended.

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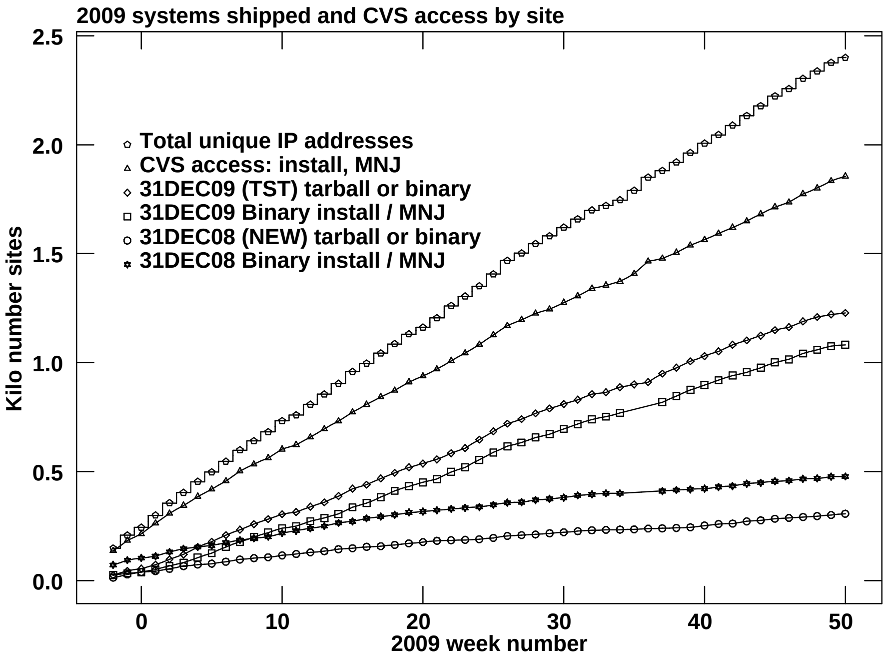
Installing a new version

If compiling locally, new releases must be installed from the tar ball for that release. If using the binary installation, a full new installation must also be done with `rsync`. The `cvs` system requires this. When installing a new AIPS release in a system that already has a previous release, we recommend that `install.pl` be used and that the previous release be left in place, at least until the new installation has been seen to work. If you do this, then you will not have to re-edit the disk, printer, and tape lists and can simply skip all those pages in the `install.pl` menus. The old `$HOME/.AIPSRC` file may be left in place, but it will need to be edited. The lines giving the `DOWNLOADED` and `UNPACKED` parameters should be cleared and the `CCOMOPT` line should be changed to point to the current release rather than the previous one — the `-I` parameter really should be `-I$INC` but it gets its full path name instead. This forces a re-edit with each release. If you have made special versions of `UPDCONFIG` and `do_daily.`*host*, you should preserve them under new names and restore them after the install. If you have an odd set of AIPS versions, the `$AIPS_ROOT/AIPSPATH.*SH` files may need to be edited after the install to set the desired versions.

For Linux, Solaris Ultra, and MacIntosh systems, a binary installation could be available from DVD, supported by `install.pl`. Alternatively, the frozen version may be installed with the binary installation method now present in `install.pl`. The ftp site for downloading files directly has been eliminated.

AIPS Distribution

From the NRAO system logs, we count apparent MNJ accesses, downloads of the tar balls, and `rsync` accesses by unique IP address. Since DSL and some university and other connections may be assigned different IP addresses at different times, this will be a bit of an over-estimate of actual sites. However, a single IP address is often used to provide AIPS to a number of computers, so these numbers are at the same time an under-estimate of the number of computers running current versions of AIPS. In 2009, a total of 307 different IP addresses downloaded the frozen form of `31DEC08` and 1228 IP addresses downloaded `31DEC09` in tarball or binary form. Fully 1855 IP addresses accessed the NRAO cvs master. Each of these has at least installed some version of AIPS and 507 appear to have run the MNJ at least occasionally. The total number of unique IP addresses in these three lists was 2399. 478 sites accessed `31DEC08` in binary form, while 1082 sites used the binary form of `31DEC09`. The attached figure shows the cumulative number of unique sites, cvs access sites, tar-ball/binary download sites and binary access sites known to us as a function of week in 2009. These numbers represent substantial increases (more than 10%) over those for 2008.



Since the registration system, always under-utilized, has now been abandoned, we are left with analysis by IP address. The table below lists the IP addresses for 2009 by the final qualifier for shipments of `31DEC09`, `31DEC08`, and access to the cvs site. The numbers in the cvs column include those sites that install or run a midnight job for these releases. The comments come from what appears to be a semi-official list of Internet codes. Sorting is on the "unique" column, which counts unique IP addresses over the other three columns:

Code	31DEC08	31DEC09	cvs site	unique	Comments
net	22	130	490	554	Network
edu	34	213	344	401	US Educational
uk	12	102	85	132	United Kingdom
jp	16	73	50	87	Japan
com	15	43	51	74	US Commercial
de	5	29	61	73	Germany
org	6	30	50	57	Non-Profit Organization
in	16	29	38	56	India
es	9	33	36	50	Spain
pl	1	32	29	42	Poland
it	2	28	25	34	Italy
br	20	13	16	30	Brazil
nl	3	20	25	29	Netherlands
au	2	12	22	28	Australia
ca	5	15	24	26	Canada
fr	3	21	16	23	France
ru	2	21	13	22	Russian Federation
za	3	10	7	19	South Africa
mx	4	12	6	14	Mexico
gov	1	9	6	12	US Government
se	0	4	10	10	Sweden
ie	4	6	6	8	Ireland
mil	2	2	6	7	US Military
tw	0	6	6	7	Taiwan
ar	4	3	3	6	Argentina
fi	1	4	5	6	Finland
be	3	2	3	5	Belgium
cl	1	3	4	5	Chile
pt	1	1	4	4	Portugal
dk	1	0	2	3	Denmark
arpa	0	3	2	3	Old style Arpanet
at	0	2	3	3	Austria
yu	0	3	2	3	Yugoslavia
hu	0	3	1	3	Hungary
nz	1	1	1	2	New Zealand (Aotearoa)
ae	1	2	0	2	United Arab Emirates
lv	1	2	1	2	Latvia
ch	1	1	2	2	Switzerland
gr	0	2	1	2	Greece
cn	0	2	0	2	China
kr	1	1	1	1	Korea (South)
il	0	1	1	1	Israel
bg	0	1	1	1	Bulgaria
sa	0	1	0	1	Saudi Arabia
ro	0	0	1	1	Romania
tr	0	0	1	1	Turkey
Unknown	104	297	394	545	
Total	307	1228	1855	2399	

Preview of coming attractions

The 31DEC10 release already contains a few changes that we decided were a bit risky or not needed in 31DEC09. UVRFI is a new task that implements two methods for excising RFI from data without flagging the data samples. It shows some real promise in cases which are suited to the algorithm. The old task RM has already been revised to read image cubes with FQID axes (as now produced by FQUBE and MCUBE) and to have an additional method for searching for the best fit rotation measures. New tasks are being developed to evaluate tables and *uv*/image data left behind by pipelines. The installation procedure has been given code to avoid common problems when the site name or architecture changes at a site installing a new version of *AIPS*.

Improvements of interest to users in 31DEC09

We expect to continue publishing the *AIPSLetter* every six months along with the annual releases. There are a number of new tasks released in the last 6 months along with a variety of improvements to IMAGR and other tasks. The new tasks include FQUBE to build image cubes with an FQID axis to describe irregularly distributed frequencies, FARS to determine best estimates of rotation measure by the Faraday rotation synthesis algorithm, CAPLT to plot closure amplitudes with source models, SNCOP to average IFs within an SN table and copy the averages to an SN table of another data set, BLCHN to perform channel-dependent baseline corrections, ATLOD to translate ATNF and ATLBA data into *AIPS*, and SUFIX to correct source assignments in *uv* data sets. The new verb FILEZAP allows one to delete an external file from within AIPS. IMAGR now can do baseline-length dependent time averaging on input, can switch from OVERLAP 2 mode to OVERLAP 1 mode automatically, and can delete boxes which overlap in more than one facet. In the first half of 2009, IMAGR learned how to create Clean boxes automatically supported by new tasks SABOX and FILIT. The latter task was improved in recent months as well.

Normally, bugs which are created in an *AIPS* TST version and then fixed in that same version before its release get little or no discussion in the *AIPSLetter*. Since a rather large number of sites now install the TST version of *AIPS* during its development, this is somewhat of an oversight. We urge you to run the "Midnight Job" at least once after 31DEC09 is frozen to bring it up to date and to fix all bugs of this sort. We will discuss below a particular set of errors that accompanied the change in antenna file format and have set up a web page http://www.aips.nrao.edu/problems.shtml which we hope to maintain to emphasize such matters. It is linked from the main *AIPS* web page so it is not necessary to remember the above URL. Other bugs of this sort are mentioned below for IMAGR, FILIT, and EDITR. We urge active sites to use the MNJ and, when something odd occurs, to examine CHANGE.DOC using the cgi tool available from the *AIPS* web page under documentation. Please do not hesitate to e-mail daip@nrao.edu with any questions or suspicions that there are problems.

31DEC09 contains a change in the format of antenna files which will be discussed in detail below. Previous releases will not understand the antenna coordinates for arrays that were traditionally left-handed (VLBI primarily). The format change occurs automatically when any 31DEC09 antenna-file specific code reads the file, after which older releases will have difficulties. Major changes were made to the display software last year in 31DEC08. Older versions may use the 31DEC08 display (XAS), but 31DEC08 code may not use older versions of XAS. FITS-IDI data from the DiFX correlator, now in use for the VLBA, requires 31DEC08 or later. 31DEC04 through 31DEC10 use a new numbering scheme for magnetic tape logical unit numbers that is incompatible with previous versions. Thus all tape tasks and the server TPMON must be from a recent release. Other than these issues, 31DEC08 is compatible in all major ways with the with the 15OCT98 and later releases. There are significant incompatibilities with older versions. Note that the only version which we patch for major errors is 31DEC09; even 31DEC08 is no longer changed.

Imaging

FARS

FARS is a new task to perform Faraday rotation synthesis on images of Q and U made at a variety of frequencies. The user prepares two cubes of these images using FQUBE and TRANS. The task determines the Faraday rotation free ($\lambda = 0$) brightness and the Faraday depth of the media on the way from the source to the observer. The main ideas of the algorithm are described by M. A. Brentjens and A. G. de Bruyn in Astronomy & Astrophysics, 441, 1217-1228 (2005). The task Fourier transforms the data at each spatial pixel along the λ^2 axis. A simple version of Hogbom Clean is used to find a small number (usually 1 or 2) of complex components. The position of these components on the transformed axis corresponds to the rotation measure of that component while the real and imaginary values correspond to the Q and U of the component. The task then produces images of Q, U, and rotation measure for each of the allowed components. This task is new and experimental and will undoubtedly require improvements in the algorithm, in user controls, and in documentation. Nonetheless, it offers a significant step up from the rather simple algorithms in, for example, *AIPS* task RM.

IMAGR

IMAGR has acquired yet more capabilities. Perhaps of greatest interest, is the new capability to average a time-sorted input file in time with an averaging interval that depends upon projected baseline length. The input parameters are the size of the overall image and the maximum allowed averaging interval, with the default to do no averaging. This should make the task run faster since it can reduce the size of the work file considerably. It will, however, change the image some since it will have preferentially averaged short spacing data, thereby changing the cell sampling seen in uniform weighting. A modest taper could be used to compensate.

In high-dynamic range imaging with multiple facets, it is recommended to begin in `OVERLAP = 2 ; ONEBEAM FALSE` mode for the most accurate beam pattern and to avoid sidelobes of the strongest sources. However, when the dynamic range of the residual images is reduced, the need for this accuracy is very much less. At that stage, Cleaning all the facets in each round, perhaps with only one beam, would be rather faster and of sufficient accuracy. The new adverb OVRSWTCH has been added to IMAGR to have the task itself perform this switch at an appropriate moment. This puts the task in OVERLAP=1 mode in which overlapping Clean boxes cause instabilities. Therefore, a new routine was added to check for overlapping Clean boxes and to drop the smaller one in each overlap when in this mode. In OVERLAP=2 mode, this clean-up operation is not automatic but is available from the TV menu.

Another new user option is one that controls whether the Clean of the next spectral channel starts with all the boxes used for the previous spectral channel or starts over with whatever boxes were specified in the inputs and input BOXFILE.

A number of internal matters were also improved. IMAGR will now append keywords for average zenith and parallactic angle only for observations that cover a small time range for which these averages are then meaningful. The auto-boxing routine would refuse to make boxes around single bright pixels, so the routine that finds the maximum in the residual changed to use the average of adjacent pixels in pairs for the maximum. Infinite loops may have been seen by users until this was fixed. The Clean Components are now restored to all resolutions in multi-resolution Clean. This allows the output images to be used in FILIT and SABOX for all resolutions. `OVERLAP = 1` mode seemed to have trouble stopping at a FLUX cutoff. It would Clean all facets below FLUX and then re-image them finding several very slightly above FLUX and so on and so forth. The test for "is there anything to Clean now" was changed to use `1.05 * FLUX` to avoid this useless extra computation.

IMAGR is now very much more careful about using a pre-existing work file. It did not seem able to confirm that such a file was actually appropriate for the current input adverbs and so would use ones that did not have the new parameters. Pre-existing workfiles are now deleted unless `ALLOKAY = 2`, which tells the task that the contents of the workfile are current and useful. The tests on the data to determine if sorting to *uv*-plane order had errors which caused IMAGR to sort data rather often when the data did not need to be sorted. These are corrected and avoid a potentially lengthy sort operation. The code that found a list of model facets which could be subtracted at the same time had an error that caused the list making to stop at any facet with no components. All components were eventually subtracted, but the data were read more times than necessary.

Miscellaneous

FQUBE is a new task to build image cubes with an irregular frequency ID ("FQID") axis for which the correct frequencies of each plane are determined by a table look up. It is meant to simplify the serious complexities of MCUBE. MCUBE was corrected for a bug limiting the output axis to 2048.

FILIT was corrected for bad errors when OBOXFILE was the same as BOXFILE. It has new options to check boxes for overlap between facets, to enter the next facet number directly (rather than jumping by ± 1), and to delete all boxes in the current facet.

IMAGE extensions in FITS are a standard form which AIPS has not previously recognized. IMLOD and FITLD were changed to recognize this form of FITS file and to make one or more images in the AIPS catalog from them.

COMB was changed to copy attached tables other than Clean Components. This enables the FQ table to be preserved.

SAD and IMFIT and JMFIT did incorrect things with the image rotation on the deconvolved component parameters when one or both widths were indeterminate.

UV data

Antenna tables

The format of the AIPS antenna tables was changed. The main purpose of the change was to take control of the geometry of the antenna locations quoted in the file. Previously, AIPS and other packages had to know whether right-handed or left-handed geometries were used according to the array name in the file — and that was sometimes uncertain. Now there are two new header keywords TFRAME to define the terrestrial frame for the antenna locations (*e.g.,* ITRF) and XYZHAND to define the handedness (now always RIGHT). An automatic translation occurs using the array or station names to determine what handedness is used and to force it to right-handed. Two columns were added to the antenna file itself, DIAMETER of the antenna in meters and BEAMFWHM of the antenna as a function of IF in degrees per meter wavelength. At present these columns are little used, but there are several heterogeneous arrays (such as CARMA and ALMA) which have come into operation or soon will be in use.

This change was introduced into 31DEC09 en masse on September 20, 2009. This change will produce errors when the new antenna files are used by software that does not understand the new handedness, such as 31DEC08 and earlier versions of AIPS and other software packages. These errors will not produce messages in most cases. When 31DEC09 (or later) touches an antenna file it fixes its format if needed. But then, when an older version reads a "fixed" VLBI file it will make a wrong assumption about handedness. This includes UVFIX, plot routines doing elevation or parallactic angle, CLCOR 'POLR', 'PANG', 'ANTP', 'IONS', 'ATMO', *et al.* corrections, UVFLG elevation flagging, CALIB elevation cutoff for gain normalization, TECOR, ANTAB with opacity corrections, DELZN, CAL, LPCAL, CVEL, and probably others. Negative elevations are a common symptom of this error; use UVPLT to plot the elevations in your data to test for the problem. A RUN file named ANFIX8 was patched into 31DEC08 to correct "fixed" antenna files. Note that VLBA data pre-processed into the NRAO archive will have the new convention, causing old AIPS versions to have trouble with the latest archive data. Archive files in FITS-IDI format are safe, but more numerous and bothersome.

Unfortunately, the change also contained a number of outright errors. FITLD was left able to record some antennas with the wrong B_y coordinate if they did not occur in the first FITS-IDI file. A large number of archive files affected by this bug are being corrected, but a procedure ANCHECK is available as a RUN file to check your VLBA pre-processed data for this error.

The application of polarization calibration was completely broken in 31DEC09 from September 20 to November 17. The results of PCAL and friends were probably fine, but the application of those D terms was badly messed up. The POLR option in CLCOR corrected the CL table properly but only corrected the first IF in the polarization solutions in the antenna table. That error was fixed November 26.

The executive summary of the above is that you should use `31DEC09` or `31DEC10` and make sure that your version is up to date.

Other changes

CLCOR was changed so that `'ANTP'` and `'ANTC'` operations compute delays internally with respect to antenna one. The absolute delays for the EVLA which uses Earth-centered antenna coordinates were way too large for storage in single-precision. Note that the `CL` table is in single precision which limits the accuracy of large shifts for VLBI and other long baselines.

FRING was changed to handle time intervals with only one sample and, similarly, to force a delay-only form of solution if requested. The output frequency increment and reference pixel were corrected.

CALIB was changed to use `ICHANSEL` rather than `BCHAN` and `ECHAN` to define the spectral channels to be averaged.

BPASS had an egregious error causing it to average all channels rather than use `ICHANSEL` correctly in those modes that use that adverb.

BLCAL was changed to use `ICHANSEL`; previously it averaged all channels.

BLCHN is an experimental, channel-dependent version of `BLCAL`. It produces a `BD` table but applies its corrections directly to an output file. The `BD` table can be displayed by `POSSM` and `BPLOT`.

TVFLG was corrected for a memory error which caused it to die when more than six spectral channels were used. `TVFLG` and `SPFLG` now offer an option of TV transfer functions which will be useful for high dynamic range data (or RFI). Reading of the antenna file for baseline lengths was corrected.

SPLAT was corrected to clean up empty output files, to write a correct index table with the output (source numbers became confused sometimes), to write a null `CL` table with output multi-source files, to avoid difficulties in unusual data sets with random parameters that change on output, to handle removing the polarization calibration from the output files, and to avoid the header alternate reference pixel which is often incorrect.

SPLIT was corrected to clean up empty output files, to handle the new antenna file format when removing polarization calibration from output antenna files after application, and to avoid the header alternate reference pixel which is often incorrect.

FO tables are a new kind of table to carry the frequency offset applied to the data as a function of time. It is hoped that these may be used by other software to tell *AIPS* about Doppler tracking if any. `SPLIT` and `SPLAT` copy the frequency information (if there is any) in the `CL` table to an output `FO` table. `CVEL` and others will use an `FO` table in preference to a `CL` table if possible.

CVEL was corrected to use the proper sub-array number, to create an index table for the output file, and, most importantly, to write an output `FO` table containing the sum of the frequency offsets now applied to the data.

SNFLG can now flag data based on discrepant gains in an `SN` table.

UVFLG now offers the option to flag antennas for shadowing and baselines for being too short. This will work well only if the antenna file contains all of the antennas, not just those currently being used.

VBGLU was changed to not require index tables with the input data sets (it did not use them), to make an output index table, to avoid excess error messages, and to get correct start and stop times for the input data sets.

ATLOD is a task to translate Australian "RPFITS" format into *AIPS*. It is now updated and shipped with *AIPS* instead of having to come from the ATNF.

TACOP was changed to allow dropping of flagged table rows.

UVFND will now examine phase as well as amplitude to find questionable samples.

GETJY now uses "robust" averaging methods which should make its results a bit more reliable.

CLIP was given the option to flag a number of spectral channels surrounding the offending data sample.

FILLM was changed to adjust the requested stop time so that the test is effectively on the center of the integration rather than the end.

EDITR had an error from Jan. 31 to June 30 in transferring "flag above and below for one antenna" commands to the output flag table.

SUFIX is a new task which allows the source number to be changed for ranges of times. It may be needed when the on-line system confuses source IDs in fast switching.

SNCOP is a new task that will average specified IFs in an `SN` table and then write that average to an `SN` table of another data set. This may be used to apply delay solutions from good IFs to those damaged by RFI or to transfer gains from a single IF subset to the parent multi-IF data set as when a spectral feature is used to determine delays or gains.

Display of *uv* data

CLPLT was changed to plot symbols correctly and to plot models preferably at the location of the input data samples or at a regular grid of time samples (which will be less accurate).

CAPLT is a new task which is a variation on `CLPLT` to plot closure amplitudes around sets of four baselines. Plotting of models with multiple plots per page is supported.

PRTUV was changed to use a fixed format by default. The reading of the data to determine the best format is too expensive with the new volumes of data. The user may still control the formats with adverbs.

UVPLT and `WIPER` were given the `NCHAV` adverb to display multiple channels with some averaging for improved signal to noise.

FRPLT was changed to accept `DOACOR`, to plot phase or amplitude only solutions when requested, to do fixed scale plotting correctly when requested and for a few other minor matters.

Miscellaneous

FREESPAC now reports disk space in Mega-bytes because diska are getting larger and larger.

FILEZAP is a new verb to delete external files from within `AIPS` if, for example, the task you are to use will not over-write an existing file and you want to do so.

CookBook files were updated to drop `TIMDEST` and `MX`, add `FILEZAP` and `ATLOD`, describe multiple new `IMAGR` options, `SABOX`, `FILIT`, Slice files from `ISPEC` and `BLSUM`, `UVMOD` allowing 999 components, and `FRING` no-rate change.

Recent *AIPS* and related Memoranda

All *AIPS* Memoranda are available from the *AIPS* home page. There are two newly revised memoranda in the last six months.

110 Strategy for Removing Tropospheric and Clock Errors using `DELZN`, Version 2.0
Amy J. Mioduszewski & Leonid Kogan (NRAO)
August 31, 2004; Revised October 21, 2009
This memo provides a guide to scheduling and reducing phase reference experiments in order to improve the astrometric accuracy and image quality of a target source. The recommended procedure includes occasional short periods of observations of calibrator sources around the sky, interspersed with the desired phase reference observations, from which the troposphere modeling errors can be determined using a new *AIPS* task `DELZN`. The recommended observing procedure, data reduction, running of `DELZN` and application of corrections to the phase reference data are covered.

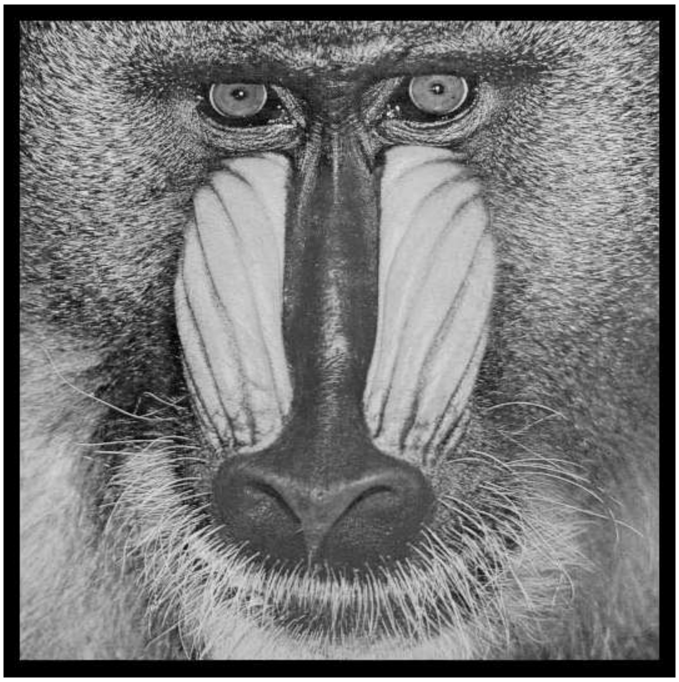
114 The FITS Interferometry Data Interchange Convention
Eric W. Greisen (NRAO)
June 25, 2009; Revised December 15, 2009
The FITS Interferometry Data Interchange Convention ("FITS-IDI") is a set of conventions layered upon the standard FITS format to assist in the interchange of data recorded by interferometric telescopes, particularly at radio frequencies and very long baselines. It is in use for the VLBA telescope for data from the current hardware correlator and the future software correlator and has also been used with other correlators such as the JIVE correlator for the EVN. This convention is intended to separate a standard set of conventions from those used within particular software packages such as *AIPS*.

Patch Distribution for `31DEC08`

Because of the extensive use of binary installations, we now patch the master copy of the most recently frozen version. Older versions are not corrected even for egregious errors. Thus, `31DEC08` was patched during 2009 and `31DEC09` will be patched as needed during 2010. Your copy of them may be corrected simply by running a Midnight Job. Information about patches and the code may be found using links from the main *AIPS* web page or by *anonymous* `ftp` to the NRAO server `ftp.aoc.nrao.edu`. Documentation about patches to a release is placed on this site at `pub/software/aips/`*release-name* and the code is placed in suitable sub-directories below this. Patches to older releases are kept here as well, but they will require local compilation.

The `31DEC08` release is no longer available for installation and will no longer receive patches even for egregious errors. It had a number of important patches during 2009. They are

1. `CALIB` could infinite loop if the first `NX` record was of 0 length *2009-01-27*
2. `TYAPL` would apply the highest flag table without permission when it should just be copied *2009-02-04*
3. `OFM` files were not adjusted to the new TV intensity ranges *2009-04-02*
4. `IMAGR` TV option `"FORCE A FIELD"` caused all facets to be re-imaged; scratch files were way too large sometimes *2009-04-22*
5. `DBCON` copied keyword `MAXBLINE` which confused later imaging routines *2009-04-27*
6. `IMAGR` had a limit test that was too small affecting restoration of large numbers of CCs from one facet to another *2009-05-18*
7. `IMAGR` had a tendency to sort input data sets when it did not really have to do so *2009-06-19*
8. `install.pl` skipped the automatic tarball download when one was missing *2009-07-26*
9. `FITLD` did not correct the AN table frequency when rearranging frequency order for IDI-format data *2009-08-18*
10. `BPASS` did not translate the `ICHANSEL` adverb correctly, causing all channels to be averaged *2009-11-11*
11. `ANFIX8` is a new `RUN` file and procedure to correct antenna files back to `31DEC08` geometry *2009-11-30*



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