

119/GR BK/

A I P S L E T T E R

Volume X, Number 1: January 15, 1990

A newsletter for users of the NRAO
Astronomical Image Processing System

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TeXset by WDC

Limited Distribution of 15JAN90

The 15JAN90 release of *AIPS* has a number of problems that have been fixed in the 15APR90 release. The most important of these are in the processing and calibration of VLA spectral line data, including mislabeling of all line frequencies. There are also problems in the reading and processing of MkIII VLBI data in the 15JAN90 release. For more details, see the article "Changes of Interest to Users: 15APR90" in this AIPS Letter.

The VMS installation procedures for 15JAN90 have been tested and debugged. The Unix installation procedures have not yet been thoroughly tested but are not known to contain serious problems.

We will therefore ship the 15JAN90 release only to those sites that tell us that they will not be adversely affected by the known problems. Sites that have requested the 15JAN90 release and do not inform us (by E-mail, telephone, or regular mail) that they wish to receive it, despite the problems, will be shipped the 15APR90 release when it is available.

The delay associated with waiting for 15APR90 will not be severe, because we are modifying our quarterly procedures to try to ensure that the tapes from a given release are shipped by the release date, rather than the month later as has been the practice in the past. We anticipate shipping the 15APR90 release by 15 April.

AIPS VMS Support

The use of *AIPS* on VMS systems at the NRAO has decreased dramatically in recent years as faster non-VMS machines have become available. Few VMS related problems in *AIPS* are now found at the NRAO and we depend on outside users to find and report them. The NRAO support of VMS *AIPS* is likely to diminish further as ancient VMS *AIPS* machines are phased out of operation. We hope to be able to distribute VMS installation tapes for the foreseeable future but the general level of support for VMS is likely to erode further. Support of FPS array processors will also become very problematical. If anyone wishes to be a beta test site for VMS and/or APs please contact us.

AIPS X-Windows TV

Recently there has been much activity at the NRL and the NRAO directed towards the development of an X-Windows implementation of the *AIPS* TV display. Such a TV display should work on a wide variety of workstations now on the market. This display will be similar to the *AIPS* TV display currently available on Suns and should work over networks that support Berkley sockets. The initial versions of this software is currently being tested and we hope to distribute this software in the 15OCT90 release. For further details contact Chris Flatters at NRAO-Socorro.

AIPS on Crays

We are currently working on installing *AIPS* on Cray computers under UNICOS, Cray's UNIX. This effort has been based on work done on Cray Research facilities with collaboration from the University of Minnesota. An *AIPS* system has been developed at Cray Research and put into operation at the U. of Minn. This system uses the virtual TV with the display facility being provided by a SUN workstation.

This project is going well. *AIPS* has been shown to work in this environment with a relatively small number of limitations. Of these the most serious are the lack of interactivity on the display and limited access to tapes. The display difficulties can be overcome by separately running *AIPS* on the workstation. Real-time run times on the Cray naturally depend on the machine loading but, for a lightly loaded Cray X-MP running tasks well suited to the Cray, the ratio of real times to those obtained using a SUN 3/60 favor the Cray by factors of 100 to 200.

The NRAO intends to distribute at least the partial UNICOS implementation on the installation tapes for the 15APR90 release. We plan to continue this work and expect some five Cray sites to be running *AIPS* by late summer. Some, but not all, of these sites will entertain visitor processing and further announcements about this can be anticipated in the NRAO Newsletter. We are discussing the possibility of having a one day Cray *AIPS* school sometime next summer. If you are interested please contact Bob Burns. A final decision will be made by the next *AIPS*letter. Technical details about *AIPS* on Crays may be obtained from Kerry Hildrup at NRAO-Charlottesville.

User Agreement

Starting with the 15OCT89 release of *AIPS* all user sites will need to provide the NRAO with a signed "User Agreement" form. This "User Agreement" will be a no-cost item for sites engaged in basic research in astronomy. The need for an *AIPS* "user agreement" has arisen for several reasons. The most important is that we want all *AIPS* sites to obtain their copies of *AIPS* from the NRAO and thereby to be made aware of the restrictions that apply to their use of the code and to our support of it. For sites doing astronomical research, these restrictions are only to maintain the proprietary nature of the code and to direct third parties who wish to receive the code to the NRAO. Once properly signed, a User Agreement remains valid for 5 years and does not need to be renewed before this time. A copy of this agreement is printed in the back of this *AIPS*Letter. The agreement should be signed by an individual in a position to take responsibility that the user group will follow the agreement. This may be a department chairman or an administrative officer. Mail signed forms to Amy Shepherd, NRAO, Edgemont Road, Charlottesville, VA 22903-2475

Personnel

There are two personnel changes in the *AIPS* group this quarter; Eric Greisen has taken a one-year leave of absence and is currently working with the Australia Telescope in Epping, NSW. E-Mail addressed to Eric at NRAO during his absence will be forwarded. Dean Schlemmer has joined the *AIPS* group in Charlottesville as the Software Administrator. Dean will become the primary contact person in the *AIPS* group for the *AIPS* user community. His E-mail address and telephone number are `dschlemm@nrao.edu` and (804)296-0352.

Document and Software Distribution by AIPSSERV

The NRAO maintains a mail-based file server, AIPSSERV, which is available for use by *AIPS* users to fetch files from CVAX. Detailed instructions for using this facility may be obtained by sending an E-mail message containing the single word "help" to one of the following addresses:
`aipsserv@nrao.edu`, `aipsserv@nrao.bitnet`, ...!uunet!nrao!aipsserv or 6654::aipsserv.

We intend to use this facility to distribute text files such as a.) the data files needed as input to the ionospheric Faraday radiation correction, b.) notes about problems encountered in installation procedures, and c.) the contents of the CHANGE.DOC files (documentation of software changes). A general guide to special files for distribution by AIPSSERV will be kept in file DOC:README. To obtain a text file in plain text form send AIPSSERV a message of the form "`sendplain logical:filename.ext`" where `logical` is the logical name of the directory and `filename.ext` is the name of the desired file. For example to be sent a copy of the README. file send AIPSSERV the message "`sendplain DOC:README.`". Multiple files may be obtained by multiple "sendplain" commands one per line.

Documentation

Several *AIPS* publications are currently being revised and will soon be available for distribution. These items may be ordered on the form at the end of this *AIPS*Letter.

The first two of these are the *AIPS COOKBOOK* chapters on calibration of VLA and VLBI data using the *AIPS* calibration package. These describe in some detail the use of the calibration package of tasks and procedures. These are ready for distribution and can be ordered using the form at the back of this issue. Chapter 10 describes processing VLBI data in *AIPS* and chapter 99 describes calibrating VLA data. These chapters will be sent automatically to sites requesting the 15JAN90 release of *AIPS*. A full-scale version of the *AIPS COOKBOOK* and an *AIPS* Managers' manual are being planned for later this year.

The second document being revised is the programmers' manual "Going *AIPS*". This manual is being rewritten to reflect the many changes made in the *AIPS* software system during the recent overhaul. Outstanding orders for these items will be held until the documents are ready; these items may be ordered using the form at the end of this issue. Volume 1 is currently being printed and will be available soon.

Summary of Changes: 15 October 1989 — 15 January 1990

We are no longer printing the contents of the software change documentation file CHANGE.DOC. The old version of CHANGE.DOC are kept in area HIST with names CHANGED.yyr where yy are the last 2 digits of the year and r is the release date code (A,B,C and D being 15JAN, 15APR, 15JUL and 15OCT). Anyone wishing to see the details previously given in these files may obtain them as described in the article on AIPSSERV. To obtain this documentation file for 15JAN90 send AIPSSERV the message "**sendplain DOC:CHANGED.90A**". A summary of the changes made to the *AIPS* software is given in the following sections.

Changes of Interest to Users: 15JAN90

A number of new tasks are introduced in this release. **RSTOR** will convolve CLEAN components with a Gaussian and add them to an image. **SOLCL** will apply system temperature measurements for solar observations made with the VLA. **UVMTH** will time average one uv data file and will add, subtract, multiply or divide the averaged values to/from/by/into the visibility data in another uv data file. **BLFIT** will solve for source and/or antenna positions from residual phases in an **SN** or **CL** table. **TBIN** can read external FITS-like tables of the form written by **TBOUT** and convert them into *AIPS* tables. **ACFIT** will determine the amplitude of antenna gains for spectral line uv data by fitting a "template" spectrum to the observed autocorrelation spectra. A new adverb, **FQTOL**, was added to **DBCON** to allow user control of the definition of FQ ids.

BPASS can now divide line uv data by continuum data from another file. The polarization calibration task **PCAL** will now apply ionospheric Faraday rotation corrections before determining the instrumental and source polarizations. Corrections for ionospheric Faraday rotation are now applied in any routine that applied the polarization correction. Faraday rotation corrections are made using task **FARAD** and ionospheric monitoring data in files obtainable from AIPSSERV ("**sendplain AIPSIONS:TECB.yy**" where yy are the last 2 digits of the year). **MK3IN** can now read data from polarization experiments done with the MkIII VLBI system. **LISTR** now can have a fixed scaling for amplitude listing, separate scaling for amplitude and RMS values and a Dec-10 like gain listing option. **SNPLT** can now plot Doppler offsets from a **CL** table. **UVFIX** can now process compressed format uv data and a correction has been made in its computation of the correct orientation of the field at the standard epoch. **UVCOP** can now select either auto- or cross- correlation data to copy. **UVSUB** can now process images as large as 4096x4096. **UVHGM** can now plot FQ id numbers.

A bug was fixed in **VLBIN** in the lobe rotation of station "B" data in MkII VLBI spectral line data. Numerous bugs were fixed in **CVEL** which corrects spectroscopic interferometer data for the earth's rotation. A bug was fixed in verb **GET** which caused minimum match to fail if there were more than 10 potential matches. A bug was fixed in **POPS** which caused it to abort if the user typed in "DOWAIT=.FALSE." or similar constructs on machines using IEEE format floating point. A bug in the table handling routines caused an error if **RECAT** had been used; the routines tried to find the files under the old slot numbers.

The *AIPS* table access routines have been modified to recatalog "forgotten" *AIPS* tables; reading a "forgotten" table with **PRTAB** or other task will cause it to be recataloged. The Unix file destruction routines have been streamlined to speed up the destruction of files. A bug in **UVFLG** was fixed that caused it to make no entries in an **FG** table if no source was specified. A bug was fixed in the data flagging routines which caused flags for some sources to be ignored for some times. **WTMOD** no longer unflags bad data. **TVFLG** had a number of bugs fixed. Several problems were fixed in **SPLIT** that caused incorrect frequencies and *u*, *v* and *w* values to be written. Several bugs were fixed that caused **MX** and **UVSUB** to introduce stripes into images if the 'GRID' option was used. Bugs were fixed in **FILLM** which caused flagging of shadowed data to fail. A logic error was fixed that caused **UVFIX** to ignore user supplied values of UT1-UTC and IAT-UTC. **ANCAL** now checks for blanked values in the input **CL** table before applying the new calibration. **APCLN** and **RSTOR** had bugs fixed which could cause failure when processing non square images. **UVFND** now warns about compressed data before dying.

Changes of Interest to Programmers: 15JAN90

A package of J2000 precession routines is now available; **JPRECS** is the highest level routine. New routines **HIMERG** and **HIADDN** simplify the concatenating of history files; two copies of the same file will not be written to the output file. Utility routine **GETFQ** will get the information for a given **FQID** from the **FQ** table. The axis labels for plots are now allowed to be 20 characters rather than 8. New routine **PUTCOL** stores a given value into an *AIPS* table entry. Parsing routine **GETNUM** now returns a value of **DBLANK** when it attempts to read a bad value. A number of improvements were made to the **DDT** tests. The terminal input routines **INQ**, **INQINT**, **INQFLT** now accept free format input. **APLVMS:ZMKTMP** was modified to handle the large **PIDs** allowed under VMS 5.?. The **DOCWHO**, **DOCGRIP** and **DOCPUBL** documentation directories which were release specific have been made nonrelease specific and have the new logicals **AIPSWHO**, **AIPSGRIP**, and **AIPSPUBL**. Also the **AIPSIONS** directory was added for the ionospheric monitoring data.

Changes of Interest to Users: 15APR90

Several new tasks were added to 15APR90. **SPFLG** which edits data in the time and frequency domain in a manner similar to **TVFLG** was added. **TBAVG** will average all data at a given time over baseline and write a new *uv* data file. This is useful for measuring the time variable flux densities of point sources. **UVBAS** fits a "continuum" baseline to a visibility spectrum and subtracts it from the data. This allows a much faster alternative to **UVSUB** for continuum subtraction for the cases in which this technique can be applied. **MK3TX** will read text files from Haystack format "A" and "B" tapes and write them to a disk file.

All of the *AIPS* tasks and *AIPS* itself can now optionally write line printer output to a file as well as to the printer. There was a major upgrade to **TVFLG**. The new features include **UNDO**, **REDO** and new **CLIP** options for flagging, saving flagging commands in a temporary table (**FC**) for undoing flags and for recovering if the program or machine crashes, avoiding displaying long time sequences with no data, editing autocorrelation data, and more. The concept of windows was added to the *AIPS* TV model. This allows more efficient use of workstations and greatly improves the speed of operations such as **TVMOVIE** on them. The "Resize" button on the workstation TV display now toggles between a full size display and a smaller, user selected one.

UVFND now has the options to display data with weights exceeding a given value and to search both sides of the uv plane in the 'UVBX' option. **SWPOL** will now switch the polarizations for selected antennas; this is useful for VLBI data which was mislabeled at the correlator. The ionospheric monitoring data was added to the **AIPSIONS** directory. Several new options were added to **CLCOR**: 1) correct for an antenna position error, 2) insert MkIII "manual" phase cals and 3) correct for the difference between single- and multi-band delays in MkIII VLBI data. **PRTAB** will now handle up to 1024 keyword/value pairs in a table header. **ANCAL** will now process multiple IFs in a single run. **PRTUV** now works on compressed data and a problem which occurred when a file had more than 30 sources was fixed. **UVFLG** was changed to allow editing "Channel 0" data and then copying the **FG** table to the line data file without editing the channel ranges. **UVFLG** now also has an option to set a mask to flag arbitrary combinations of polarization correlation. **SDTUV** was modified to work on more antennas.

The handling of frequencies for VLA spectral line data was improved. **FILLM** was mislabeling the frequencies of the data by half the total bandwidth and had several other related problems. The use of frequencies was made consistent in **FILLM**, **SPLIT**, **UVCOP**, **MX** and **HORUS**. Also a number of other corrections were made in the calibration of spectral line data. A problem in **SPLIT** writing compressed data was corrected.

A number of problems in the processing of MkIII VLBI data were fixed. In **MK3IN** the processing of phase cals had several serious bugs removed and the specification of antennas and timeranges was made friendlier. A number of bugs in **CALIB** and the calibration routines which occurred for MkIII data were fixed. Bugs were fixed in **BATER** which probably kept it from working. A frequency scaling problem in **UVPLT** was fixed.

Changes of Interest to Programmers: 15APR90

DGHEAD now includes the source frequency offset if data from a single source is selected. **FUDGE** now processes compressed data. New routines **VISUNP** and **VISPCK** simplify unpacking and packing (compressed) uv data. Several serious problems in **FILAI2**, used in *AIPS* VMS installations, were fixed. A makefile (**MAKEFILE**) was added to **YSVU** to assist in the creation of SSS for Sun TVs. The current logical *AIPS* version (**TST**, **NEW** and **OLD**) was added to **DMSG.INC** and to the accounting file. This allows **PRTAC** to distinguish between different releases of *AIPS*.

AIPS USER AGREEMENT

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

BASIC RESEARCH IN ASTRONOMY

THIS AGREEMENT, made this ____ day of _____, 19____, between ASSO-
CIATED UNIVERSITIES, INC./NATIONAL RADIO ASTRONOMY OBSERVATORY,
Charlottesville, Virginia, hereinafter called the Developer; and _____
_____ hereinafter called the User.

WHEREAS, the Developer has developed an Astronomical Image Processing System
(AIPS) under agreement with the National Science Foundation; and

WHEREAS, the Developer desires to promote basic research, particularly in astronomy,
throughout the world; and

WHEREAS, the Developer has determined that distribution of AIPS to User will further
such research.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein
contained, the parties agree as follows:

1. For no charge, Developer hereby grants to the User a non-exclusive right to use the
Astronomical Image Processing System (AIPS).
2. User acknowledges that the AIPS software/system, including all documentation, will
be used primarily by User for basic research.
3. The Developer agrees that it will make available to User updates and modifications to
AIPS; however, Developer is under no obligation to do so.
4. The AIPS software/documentation shall not be transferred, sold, or assigned to a third
party.
5. AIPS shall not be copied or duplicated except as follows:
 - a. AIPS may be copied for backup purposes.
 - b. AIPS may be duplicated and run on all systems supported by the User's AIPS
Manager, who will be the designated operational contact person between the User
and Developer, provided that its use on all such systems is in accordance with the

dictates of this agreement.

6. The obligation to use, install, and run AIPS shall be the sole responsibility of the User. It IS UNDERSTOOD THAT THE DEVELOPER MAKES NO WARRANTIES, CLAIMS, OR OTHER ASSERTIONS, IMPLIED OR OTHERWISE, CONCERNING THE PERFORMANCE OR INTEGRITY OF AIPS OR THE SUITABILITY OF AIPS FOR A PARTICULAR PURPOSE.
- 7 User acknowledges that any data, tapes, or containers received from the Developer are and shall remain Developer's property and shall be returned upon request of the Developer, when updated materials are requested by User or at termination of this agreement.
8. This Agreement shall remain in effect for a period of five (5) years from the date hereof.

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERATORY

Company

Signature

Signature

Title

Title

Please indicate technical contact person (i.e. AIPS Manager):

Rev. E12/4/89

AIPS Order Form

1. Name and address of Contact Person: _____

☐ Address label on back is correct _____

include street address for UPS delivery _____

(N.B.: If you have received a plastic mailing container from us, we insist that you use it for a reorder. Also return tape(s).)

2. ☐ new order ☐ reorder

Version of *AIPS* currently running: _____

3. *AIPS* version desired: ☐ 15-Jan-1990
☐ 15-Apr-1990

4. Tape type desired:
(*AIPS*, VMS only) ☐ Vax/VMS BACKUP

(*AIPS*, Unix only) ☐ Unix tar

Version of Unix system in use:
N.B. we need to know this.

e.g., bsd4.x, Sys III, Sys V, V7, etc.

(*AIPS*, neither Unix nor VMS) ☐ FITS compressed text format

(DDT test package: \geq 15APR89) ☐ FITS binary data ("large" on 6250 bpi only)

5. Tape density desired: ☐ 1600 bpi ☐ 6250 bpi ☐ QIC 24 (tar only)

6. There are gripes on (returned) tape: . . . ☐ Yes ☐ No

7. Printed documents requested: ☐ Full 15OCT86 *COOKBOOK* (no binder)
☐ revised *COOKBOOK* chapters (10 and 99)
☐ 15APR90 *GOING AIPS* Vol 1 (no binder)
☐ 15APR90 *GOING AIPS* Vol 2 (no binder)

8. Custom binders requested: ☐ *COOKBOOK*
(now free) ☐ *GOING AIPS*, Vol. 1 ☐ *GOING AIPS*, Vol. 2

Send order form to: *AIPS* Group, NRAO
Edgemont Road
Charlottesville, VA 22903-2475 USA

DATED MATERIAL - DO NOT DELAY

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January 15, 1990



A I P S L E T T E R

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CHARLOTTESVILLE, VA.

MAY 10 1990

New *AIPS* Distribution Procedures

As of the 15APR90 release of *AIPS* we are adopting new distribution procedures. The preparation for the release now begins a month before the release date rather than on the release date. We are also testing the installation procedures before each release is shipped to minimize the difficulties in installing *AIPS*. We hope that this procedure will allow us to begin shipping more reliable versions of *AIPS* by the release date.

Recent Developments

Much of the software activity in the last quarter has been in debugging calibration software; this is reflected in the many bug fixes described in a later article. Other areas that are being actively developed are 1) imaging and deconvolving uv data in arbitrary order, 2) an interactive baseline-based uv data editing routine for VLBI data, 3) continued development of *AIPS* X-windows displays (discussed further in another article), 4) *AIPS* under Unicos (also discussed in another article), and 5) processing of MkIII VLBI data (also discussed later).

The programmer documentation, *Going AIPS*, has been revised to reflect the state of *AIPS* as of the 15APR90 release and is now available. The user documentation, the *COOKBOOK*, is currently being revised. Chapters describing the processing of VLBI data (Chapter 10) and calibrating VLA data (Chapter 99) are currently available. All documentation may be ordered using the order form at the end of this *AIPS*Letter.

~~all~~, ~~q~~-routines compiled at highest optimization level, default optimization level on rest; all files on local disk.

X-windows Support

The *AIPS* group has ported the SunView screen server to the X Window SystemTM using the XView toolkit. A beta test version of XVSS will be distributed as part of the 15JUL90 release of *AIPS*. Sites may obtain this version earlier using AIPSSERV. Availability via AIPSSERV was announced on the Bananas mail exploder.

XVSS will require the XView toolkit, which is freely available via anonymous ftp from sites which distribute the X Window System, and a window manager that handles virtual color maps according to the final version of the Inter-Client Communications Conventions Manual (the ICCCM). Some people may disagree with our use of the XView toolkit but it did allow us to move the screen server to the X Window System in a very short time. The XView toolkit has been tested on Sun hardware and on the DECstation 3100; it should work on any Unix system that is compatible with BSD Unix.

The NRL group has been working on an alternative screen server that uses no toolkits. This does not have some of the features of XVSS but is noticeably faster and may be preferred by users with slower workstations such as Sun 3s. We will distribute this alongside XVSS when it becomes available. Further details will be announced when available. (X Window System is a trademark of the Massachusetts Institute of Technology.)

MkIII VLBI data

There have been a number of recent improvements in the AIPS task, MK3IN, that reads Haystack format VLBI "A" tapes. This task is now more reliable and may produce useable output but is still incompletely tested. Much of the current activity is in determining appropriate calibration procedures to remove the instrumental artifacts of the MkIII system as well as normal amplitude, delay and rate calibration. The software distributed in the 15APR90 release may be adequate for processing MkIII data but users should carefully examine the data at each step of the processing. Use of bandpass calibration is recommended even for continuum data; especially if both sidebands are used. A number of other problems have been noted with data read by MK3IN but it is not yet known if these are due to errors in the data or in MK3IN.

User Agreement

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AIPS under Unicos

The 15APR90 release includes an implementation under the Cray Research Inc. (CRI) UNICOS operating system. UNICOS is derived from UNIX System V and supports varying degrees of Berkeley UNIX features depending on the revision level. The UNICOS implementation was developed on Cray X-MPs starting under UNICOS 5.0.13 with cft77 3.1 using the CRI facilities at Mendota Heights. The requirements for Y-MPs, and especially Cray 2s, may differ. Systems running revision levels of UNICOS prior to 5.0.13 also may encounter problems, particularly with regard to the availability of Berkeley UNIX features. The UNICOS port is still in a state of flux, but has been developed to the point that it has passed the DDT and has been put into production at the University of Minnesota using a virtual TV interface to the Sunview Screen Server (SSS) program via TVMON. Areas still under development include the magnetic tape interface (FITS-disk files work), various data conversion Z-routines, dynamic pseudo-AP memory management, and interactive virtual TV functions. Further optimization, including auto-tasking and perhaps data storage, also are under development. A summary of timings for the large DDT problems on a lightly loaded Cray X-MP/416 (using only a single processor) compared to an empty Sun 3/60 is shown below. The typically scalar DDT problems appear in the upper portion of the table. Those that make use of the pseudo-AP library appear in the lower portion. All times are in seconds.

TASK	(N) ¹	Cray ² X-MP			Sun ³ 3/60			Sun: Cray	
		CPU	WALL- CLOCK	C:W	CPU	WALL- CLOCK	C:W	CPU	WALL- CLOCK
CCMRG	(1)	4	5	.80	24	45	.53	6.0	9.0
COMB	(8)	32	40	.80	464	752	.62	14.5	18.8
UVSRT	(2)	38	60	.63	300	1022	.29	7.9	17.0
UVDIF	(2)	14	24	.58	532	562	.95	38.0	23.4
SUBIM	(2)	6	8	.75	100	156	.64	16.7	19.5
APCLN	(1)	398	526	.76	26105	26653	.98	65.6	50.7
APRES	(1)	13	15	.87	1898	2116	.90	146.0	141.1
ASCAL	(1)	48	55	.87	15894	16024	.99	331.1	291.3
MXMAP	(1)	13	16	.81	1491	1721	.87	114.7	107.6
MXCLN	(1)	459	486	.94	33175	34087	.97	72.3	70.1
UVMAP	(1)	11	40	.28	1308	1579	.83	118.9	39.5
VTESS	(1)	60	69	.87	7196	8291	.87	119.5	120.2
TOTAL	(22)		1344			93008			69.2

¹Number of times problem executed (times represent sum of executions).

²Cray X-MP/416 (SN218): 15APR90 AIPS: UNICOS 5.0.13 with cft77 3.1; 256 Kword pseudo-AP; hardware gather/scatter; SCILIB CFFT2 for FFTs; no auto-tasking; Q-routines optimized "full", all optimization suppressed on rest; scratch files through 128 Mword SSD via logical device cache.

³Sun 3/60G (KONG): 15OCT89 AIPS; SunOS 3.5; MC68881 co-processor; 64 Kword "vanilla" pseudo-AP; Q-routines compiled at highest optimization level, default optimization level on rest; all files on local disk.

Supercomputing AIPS Workshop

The NRAO, in cooperation with Cray Research Inc. (CRI), plans to hold a workshop on the installation, operation, and management of AIPS on supercomputers. The meeting will be primarily directed to those planning a new installation of AIPS on their supercomputer but will also be a workshop for those currently running AIPS on supercomputers. CRI has graciously agreed to host the workshop, so it will take place at their facilities in Mendota Heights (Minneapolis), Minnesota, on September 10 and 11, 1990. Included in the program will be a tour of their research facilities. Participants should plan to arrive in Minneapolis on Sunday evening September 9. Activities will terminate by noon on Tuesday September 11.

For detailed information contact Bob Burns at the NRAO in Charlottesville, 804-296-0229, E-mail bburns@nrao.edu.

Document and Software Distribution by AIPSSERV

The NRAO maintains a mail-based file server, AIPSSERV, which is available for use by *AIPS* users to fetch files from *CVAX*. Detailed instructions for using this facility may be obtained by sending an E-mail message containing the single word "help" to one of the following addresses:
aipsserv@nrao.edu, aipsserv@nrao.bitnet, ...!uunet!nrao1!aipsserv or 6654::aipsserv.

We intend to use this facility to distribute text files such as (a) the data files needed as input to the ionospheric Faraday radiation correction, (b) notes about problems encountered in installation procedures, and (c) the contents of the *CHANGE.DOC* files (documentation of software changes). A general guide to special files for distribution by AIPSSERV will be kept in file *DOC:README*. To obtain a text file in plain text form send AIPSSERV a message of the form "**sendplain logical:filename.ext**" where **logical** is the logical name of the directory and **filename.ext** is the name of the desired file. For example to be sent a copy of the *README* file send AIPSSERV the message "**sendplain DOC:README.**". Known problems and workarounds for 15APR90 *AIPS* will be distributed as files *DOC:VMSNOTES.90B* and *DOC:UNIXNOTES.90B* for the VMS and UNIX installations. Multiple files may be obtained by multiple "sendplain" commands one per line.

Summary of Changes: 15 January 1990 — 15 April 1990

We are no longer printing the contents of the software change documentation file *CHANGE.DOC*. The old version of *CHANGE.DOC* are kept in area *HIST* with names *CHANGED.yyr* where *yy* are the last 2 digits of the year and *r* is the release date code (A,B,C and D being 15JAN, 15APR, 15JUL and 15OCT). Anyone wishing to see the details given in these files may obtain them as described in the article on AIPSSERV. To obtain this documentation file for 15APR90 send AIPSSERV the message "**sendplain DOC:CHANGED.90B**". A summary of the changes made to the *AIPS* software is given in the following sections.

Changes of Interest to Users: 15APR90

Several new tasks were added to 15APR90. **SPFLG** which edits data in the time and frequency domain in a manner similar to **TVFLG** was added. **TBAVG** will average all data at a given time over baseline and write a new uv data file. This is useful for measuring the time variable flux densities of point sources. **UVBAS** fits a "continuum" baseline to a visibility spectrum and subtracts it from the data. This allows a much faster alternative to **UVSUB** for continuum subtraction for the cases in which this technique can be applied. **MK3TX** will read text files from Haystack format "A" and "B" tapes and write them to a disk file.

All of the *AIPS* tasks and *AIPS* itself can now optionally write line printer output to a file as well as to the printer. There was a major upgrade to **TVFLG**. The new features include **UNDO**, **REDO** and new **CLIP** options for flagging, saving flagging commands in a temporary table (**FC**) for undoing flags and for recovering if the program or machine crashes, avoiding displaying long time sequences with no data, editing autocorrelation data, and more. The concept of windows was added to the *AIPS* TV model. This allows more efficient use of workstations and greatly improves the speed of operations such as **TVMOVIE** on them. The "Resize" button on the workstation TV display now toggles between a full size display and a smaller, user selected one.

UVFND now has the options to display data with weights exceeding a given value and to search both sides of the uv plane in the 'UVBX' option. **SWPOL** will now switch the polarizations for selected antennas; this is useful for VLBI data which was mislabeled at the correlator. The ionospheric monitoring data was added to the **AIPSIONS** directory. **PRTAB** will now handle up to 1024 keyword/value pairs in a table header. **ANCAL** will now process multiple IFs in a single run. **PRTUV** now works on compressed data and a problem which occurred when a file had more than 30 sources was fixed. **UVFLG** was changed to allow editing "Channel 0" data and then copying the **FG** table to the line data file without editing the channel ranges. **UVFLG** now also has an option to set a mask to flag arbitrary combinations of polarization correlation. **SDTUV** was modified to work on more antennas and a number of other errors corrected. A problem with determining subarray number was fixed in **UVCOP** which now also copies all catalog header keyword/value pairs. Errors in **UVFIX** which caused it to fail on compressed data were fixed. A bug in the calibration routines was causing the gain stabilization to fail. A bug in **TKSLICE** was causing it to go into an infinite loop. A bug in **XMOM** caused it to fail under all circumstances. Several bugs in **SNPLT** causing problems with **OPTYPE='SUM'** were fixed. A number of labeling problems in **KNTR** were fixed. A number of problems in the virtual TV "Z" routines which caused remote TVs over internet to fail were fixed. The default behavior in **TACOP** when no output file was specified is now more sensible.

A bug that had disabled **PLCUB** was fixed. **UVPLT** now correctly scales u, v, and w for the actual frequency of that data. A bug in the FITS reader which caused only a single character to be read from character entries in a FITS ASCII table was fixed. Several errors in **SLCOL** were fixed which caused **BLC** and **TRC** to be ignored.

The handling of frequencies for VLA spectral line data was improved. **FILLM** was mislabeling the frequencies of the data by half the total bandwidth and had several other related problems. The use of frequencies was made consistent in **FILLM**, **SPLIT**, **UVCOP**, **MX** and **HORUS**. Also, a number of other corrections were made in the calibration of spectral line data and in **FILLM**. A problem in **SPLIT** writing compressed data was corrected. Bugs were fixed in **BATER** which probably kept it from working.

A number of problems in the processing of MkIII VLBI data were fixed. In **MK3IN** the processing of phase calcs had several serious bugs removed and the specification of antennas and timeranges was made friendlier. Also, there were several errors in the correction for the fractional bit error. A number of bugs in **CALIB** and the calibration routines which occurred for MkIII data were fixed. Several new options were added to **CLCOR** that are useful for MkIII data: 1) correct for an antenna position error, 2) insert MkIII "manual" phase calcs and 3) correct for the difference between single- and multi-band delays in MkIII VLBI data.

Changes of Interest to Programmers: 15APR90

DGHEAD now includes the source frequency offset if data from a single source is selected. FUDGE now processes compressed data. New routines VISUNP and VISPCCK simplify unpacking and packing (compressed) uv data. Several serious problems in FILAI2, used in AIPS VMS installations, were fixed. A makefile (MAKEFILE) was added to YSVU to assist in the creation of SSS for Sun TVs. A number of errors in the DeAnza "Y" routines were corrected. The current logical AIPS version (TST, NEW and OLD) was added to DMSG.INC and to the accounting file. This allows PRTAC to distinguish between different releases of AIPS. AXSTRM now gives frequency labels in exponential notation if the range of the format is exceeded. New routine KEYCOP copies catalog header keywords from one file to another. A bug in the logic for averaging frequencies in MX was fixed.

Changes of Interest to Users: 15JUL90

A number of new verbs were added to manipulate AIPS tables entries; GETTHEAD, PUTTHEAD, TABGET, and TABPUT can read and write table header keywords and table entries.

The 'CALC' option in SETJY was updated to use the latest spectra for 3C48, 3C138, 3C147 and 3C286. Also, the QUAL adverb was added. VLBIW can now handle lower sideband data. POSSM can now plot multiple IFs on the same plot. A number of tasks had task specific adverb arrays replacing APARM, BPARM Some of these are CLCOR, UVCOP, and UVFIX. A number of bugs in BPASS were fixed. More bugs were also removed from FILLM. POSSM no longer tried to plot flagged channels.

The gridding routine UVGRID, used by MX can now grid data in arbitrary order. This eliminates the need for sorting data if natural weighting is being used and the 'DFT' model calculation is used. UVCOP can now select by source, qualifier, FQ id, and IF range. PRTTP now has a terse output format for FITS files. MX again works for 16 fields. A number of problems were fixed in LWPLA, the task that sends plots to postscript printers.

Changes of Interest to Programmers: 15JUL90

The flagging (FG) tables now include a frequency (FQ) identifier. SOURNU now uses the correct null (selects all) value of QUAL. The new routines CLSEL, SNSEL, SUSEL, and FGSEL can copy CL, SN, SU and FG tables selecting a range of IFs. An X-windows AIPS TV XVSS was added and is in the beta test stage. There was a major change in the directory structure for the virtual TV routines to accommodate the X-windows versions. The maximum number of AIPS files that can be open simultaneously was increased to 20 in all 3 categories.

AIPS USER AGREEMENT

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

BASIC RESEARCH IN ASTRONOMY

THIS AGREEMENT, made this ____ day of _____, 19____, between ASSO-
CIATED UNIVERSITIES, INC./NATIONAL RADIO ASTRONOMY OBSERVATORY,
Charlottesville, Virginia, hereinafter called the Developer; and _____
_____ hereinafter called the User.

WHEREAS, the Developer has developed an Astronomical Image Processing System
(AIPS) under agreement with the National Science Foundation; and

WHEREAS, the Developer desires to promote basic research, particularly in astronomy,
throughout the world; and

WHEREAS, the Developer has determined that distribution of AIPS to User will further
such research.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein
contained, the parties agree as follows:

1. For no charge, Developer hereby grants to the User a non-exclusive right to use the
Astronomical Image Processing System (AIPS).
2. User acknowledges that the AIPS software/system, including all documentation, will
be used primarily by User for basic research.
3. The Developer agrees that it will make available to User updates and modifications to
AIPS; however, Developer is under no obligation to do so.
4. The AIPS software/documentation shall not be transferred, sold, or assigned to a third
party.
5. AIPS shall not be copied or duplicated except as follows:
 - a. AIPS may be copied for backup purposes.
 - b. AIPS may be duplicated and run on all systems supported by the User's AIPS
Manager, who will be the designated operational contact person between the User
and Developer, provided that its use on all such systems is in accordance with the

dictates of this agreement.

6. The obligation to use, install, and run AIPS shall be the sole responsibility of the User. It IS UNDERSTOOD THAT THE DEVELOPER MAKES NO WARRANTIES, CLAIMS, OR OTHER ASSERTIONS, IMPLIED OR OTHERWISE, CONCERNING THE PERFORMANCE OR INTEGRITY OF AIPS OR THE SUITABILITY OF AIPS FOR A PARTICULAR PURPOSE.
- 7 User acknowledges that any data, tapes, or containers received from the Developer are and shall remain Developer's property and shall be returned upon request of the Developer, when updated materials are requested by User or at termination of this agreement.
8. This Agreement shall remain in effect for a period of five (5) years from the date hereof.

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

Company

Signature

Signature

Title

Title

Please indicate technical contact person (i.e. AIPS Manager):

Rev. E12/4/89

AIPS Order Form

1. Name and address of Contact Person: _____

☐ Address label on back is correct _____

include street address for UPS delivery _____

(N.B.: If you have received a plastic mailing container from us, we insist that you use it for a reorder. Also return tape(s).)

2. ☐ new order ☐ reorder

Version of *AIPS* currently running: _____

3. *AIPS* version desired: ☐ 15-Apr-1990
☐ 15-Jul-1990

4. Tape type desired:
(*AIPS*, VMS only) ☐ Vax/VMS BACKUP

(*AIPS*, Unix only) ☐ Unix tar

Version of Unix system in use: _____
N.B. we need to know this. e.g., bsd4.x, Sys III, Sys V, V7, etc.

(*AIPS*, neither Unix nor VMS) ☐ FITS compressed text format

(DDT test package: \geq 15APR89) ☐ FITS binary data ("large" on 6250 bpi only)

5. Tape density desired: ☐ 1600 bpi ☐ 6250 bpi ☐ QIC 24 (tar only)

6. There are gripes on (returned) tape: . . . ☐ Yes ☐ No

7. Printed documents requested: ☐ Full 15OCT86 *COOKBOOK* (no binder)
☐ revised *COOKBOOK* chapters (10 and 99)
☐ 15APR90 *GOING AIPS* Vol 1 (no binder)
☐ 15APR90 *GOING AIPS* Vol 2 (no binder)

8. Custom binders requested: ☐ *COOKBOOK*
(now free) ☐ *GOING AIPS*, Vol. 1 ☐ *GOING AIPS*, Vol. 2

Send order form to: *AIPS* Group, NRAO
Edgemont Road
Charlottesville, VA 22903-2475 USA

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Edgemont Road
NRAO

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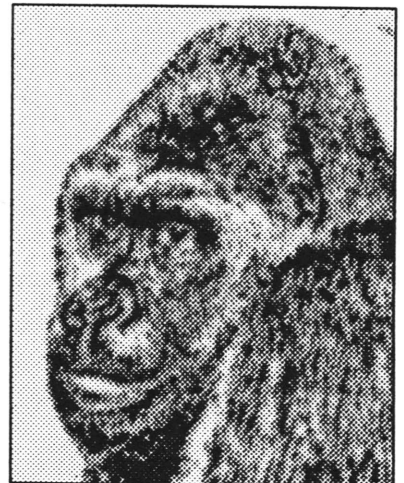
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National Radio Astronomy Observatory
Edgemont Road
Charlottesville, VA 22903-2475



April 15, 1990



AIPSLETTER

v. 10, no. 3, 1990

was not issued

A I P S L E T T E R

Volume X, Number 4: October 15, 1990

A newsletter for users of the NRAO
Astronomical Image Processing System

October 15, 1990

Edited by
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TEXset by WDC

Recent Developments

In recent months there have been several significant changes in the personnel of the *AIPS* group which are discussed in following articles. Due to these changes the 15OCT90 release may be canceled. Most of the recent effort has gone into further development of workstation TV displays, debugging interferometer calibration software and improved interferometer imaging software. There is now an *AIPS* programmer available for consultation at most times; see the article on the Designated AIP for more details. Since there was no *AIPS*Letter distributed for the 15JUL90 release of *AIPS* so this letter describes activity since the 15APR90 *AIPS*Letter.

Personnel

There are two recent personnel changes: Kerry Hilldrup has left the NRAO for a new job at Goddard Space Flight Center. Kerry was one of the early members of the *AIPS* group and deserves much of the credit for the success of *AIPS*. He has put enormous effort into making *AIPS* run on various machines around the world. He has provided invaluable assistance to many of our user sites and has maintained the Unix and Cray implementations of *AIPS*. We will miss his expertise and wish him well in his new job.

The other personnel change is the addition of Brian Glendenning from the University of Toronto. Brian has a strong background in data visualization and has a scientific interest in emission line studies of galaxies. We feel that he is a very strong addition to the *AIPS* team, he provides expertise in critical areas. We are happy that he has chosen to come to NRAO.

X Window System TVs

Beginning with the 15OCT90 release of *AIPS* we are shipping XAS, an implementation of the *AIPS* TV server for the X Window System developed by Tom Pauls (pauls@cira3.nrl.navy.mil) at NRL, in addition to XVSS. XAS requires X11 revision 3 or later and a display with an 8-bit (256 color) pseudocolor visual. XVSS requires X11 revision 4 or later and version 2.0 (or later) of the XView toolkit. XVSS will run on displays with pseudocolor visuals of at least 8-bits. Since it is more general in its treatment of displays XVSS is somewhat slower than XAS. The following table gives the timings for common operations on a SPARCstation 1GX running OpenWindows 2.0 (the presence of the GX frame buffer makes little difference to the timings).

Operation	XAS time/s	XVSS time/s	Ratio
Initialize	2.6	10.7	4.1
Load 512 pixel image	12.5	15.0	1.2
Label 512 pixel image	3.7	6.0	1.6
Redraw (zoom factor 1)	1.6	2.3	1.4
Redraw (zoom factor 2)	2.0	4.1	2.1

The *AIPS* release of XAS does not support VMS at the Z-routine level but the original NRL Z-routines are available as unsupported code. We do not currently have the equipment necessary to test these in NRAO. For the time being, we suggest that VMS users that wish to use XAS contact NRL in the event of any difficulty.

Source code for the three *AIPS* TV servers (SSS, XAS and XVSS), as well as the original NRL Z-routines for XAS, is now stored in a primitive form of Unix shell archive in directory YSERV. Users with non-Unix machines can dearchive the files with a FORTRAN program included in the *AIPS* distribution. This is intended to simplify the installation of these programs, particularly on machines which do not run *AIPS* itself. See the file **README** in YSERV for further details.

A new document, **TVOVER.TEX** (in *AIPS* memo format), gives an overview of the various *AIPS* TV servers in the Unix environment and includes installation instructions.

User Support for *AIPS* Installation

With the departure of Kerry Hilldrup from the *AIPS* project (see article above) we will temporarily have diminished capacity to assist users in the installation of *AIPS*. We hope to have a replacement for Kerry soon and that this situation will soon change. In the mean time Chris Flatters (505-835-7209, e-mail: cflatters@nrao.edu) and Brian Glendenning (804-296-0286, e-mail: bglenden@nrao.edu) will be able to offer limited assistance.

Product Review

MULTINET: TCP/IP FOR VMS

With the trend towards Unix-based machines as a solution to the increasing demand for computer cycles, and the current investment in existing VMS-based processors both within NRAO and in the general *AIPS* community, there is an obvious need for networking and compatibility products to make VMS and Unix systems communicate smoothly. One such product that two NRAO sites have purchased is *MultiNet*, sold by TGV, Inc. These are installed on TUCVAX and MTNVAX at NRAO's Arizona Operations, and on CVAX at Charlottesville.

MultiNet is a package of TCP/IP utilities that provide such common Unix commands as `telnet`, `rlogin`, `ftp`, `finger`, and more for VAX/VMS machines. The package also contains an optional Network File System (NFS) server and client, thereby permitting disks on Unix and VMS processors to be shared almost transparently. It even allows tapes on the VMS system to be accessed from Unix systems via the `rmt` utilities.

The attributes that VMS (or rather the RMS layer) imposes on files is taken care of on the Unix NFS-mounted disks by storing a hidden "dot" file for each RMS file created from the VMS side on the Unix disk. This hidden file is merely a file definition language (FDL) description of the VMS file. Thus, file attributes such as record length, carriage control, *etc.* can be preserved.

MultiNet also allows some interesting configurations in a DECnet environment. It allows the creation of a TCP/IP link over an existing DECnet connection, and vice versa, *i.e.* running a DECnet channel over a TCP/IP link. It also supports the SLIP protocol so that serial line connections are possible. The domain name service (DNS, often called `bind` on some Unix systems) is fully supported.

There are many other features of *MultiNet* that make it even more useful. Space considerations prevent a detailed description of these, but some of the more useful are: `talk`, `whois`, `ping`, `nslookup`, remote printing (both ways), and `traceroute`. At the NRAO sites that use it, *MultiNet* has become a very popular and widely-used tool.

For more information contact TGV, Inc., 603 Mission St., Santa Cruz, CA 95060, phone (408) 427-4306. We end this product review with our usual caveat: *"Please note that our mentioning of the availability of this product does not constitute any sort of endorsement of it."*

.....
VMS & DECnet are Trademarks of Digital Equipment Corporation
Unix is a Trademark of Bell Laboratories
MultiNet is a Trademark of TGV, Inc.

Supercomputing *AIPS* Workshop Canceled

Due to the departure of Kerry Hilldrup, the *AIPS* supercomputing workshop planned for this fall has been canceled. The next general *AIPS* school will include a session on *AIPS* on Crays.

Designated AIP

The *AIPS* group has a programmer available for assistance with bugs or related problems with *AIPS* software. This person is referred to as the Designated AIP. The Designated AIP position is rotated among *AIPS* programmers for two week periods. This person typically spends part of the time in Charlottesville and part in Socorro. Due to office and other difficulties we cannot give a telephone extension at this time. Users needing assistance from the Designated AIP are urged to use e-mail whenever possible. Mail sent to aipshelp@nrao.edu (or 6654::aipshelp on SPAN) will be read daily by the current designated AIP. The current Designated AIP schedule is available in the TST version of the help file AIPSHelp on NRAO *AIPS* systems. It can be obtained via AIPSSERV (for more details, see below) by sending the message "sendplain hlpfil:aipshelp.hlp" to aipsserv@nrao.edu.

User Agreement

Starting with the 15OCT89 release of *AIPS* all user sites need to provide the NRAO with a signed "User Agreement" form. This "User Agreement" is a no-cost item for sites engaged in basic research in astronomy. The need for an *AIPS* "user agreement" has arisen for several reasons. The most important is that we want all *AIPS* sites to obtain their copies of *AIPS* from the NRAO and thereby to be made aware of the restrictions that apply to their use of the code and to our support of it. For sites doing astronomical research, these restrictions are only to maintain the proprietary nature of the code and to direct third parties who wish to receive the code to the NRAO. Once properly signed, a User Agreement remains valid for 5 years and does not need to be renewed before this time. A copy of this agreement is printed in the back of this *AIPS*Letter. The agreement should be signed by an individual in a position to take responsibility that the user group will follow the agreement. This may be a department chairman or an administrative officer. Mail signed forms to Amy Shepherd, NRAO, Edgemont Road, Charlottesville, VA 22903-2475

Documentation Available

Revised editions of the user documentation, the *AIPS* Cookbook, and programmer documentation, *Going AIPS*, are available and may be ordered on the form at the end of this *AIPS*Letter. In addition, the following *AIPS* memos are available: No. 63 (5-June-90) "AIPS DDT History" by Glenn Langston and Kerry Hilldrup; No. 64 (7-July-90) "AIPS Calibration Summary" by Glenn Langston; No. 65 (16-July-90) "Installing AIPS on an IBM RISC Sys6000 and Performance Results for Convex C-220 and SUN SPARC Computers" by Eric W. Greisen and Mark Calabretta

Document and Software Distribution by AIPSSERV

The NRAO maintains a mail-based file server, AIPSSERV, which is available for use by *AIPS* users to fetch files from CVAX. Detailed instructions for using this facility may be obtained by sending an E-mail message containing the single word "help" to one of the following addresses:
`aipsserv@nrao.edu`, `aipsserv@nrao.bitnet`, ...!uunet!nrao1!aipsserv or 6654::aipsserv.

We intend to use this facility to distribute text files such as (a) the data files needed as input to the ionospheric Faraday radiation correction, (b) notes about problems encountered in installation procedures, and (c) the contents of the CHANGE.DOC files (documentation of software changes). A general guide to special files for distribution by AIPSSERV will be kept in file DOC:README. To obtain a text file in plain text form send AIPSSERV a message of the form "sendplain logical:filename.ext" where logical is the logical name of the directory and filename.ext is the name of the desired file. For example to be sent a copy of the README. file send AIPSSERV the message "sendplain DOC:README.". Known problems and work-arounds for 15OCT90 *AIPS* will be distributed as files DOC:VMSNOTES.90D and DOC:UNIXNOTES.90D for the VMS and Unix installations. Multiple files may be obtained by multiple "sendplain" commands one per line.

Summary of Changes: 15 January 1990 — 15 April 1990

The software change documentation files for various releases of *AIPS* are kept in area HIST with names CHANGED.yyr where yy are the last 2 digits of the year and r is the release date code (A, B, C and D being 15JAN, 15APR, 15JUL and 15OCT). Anyone wishing to see the details given in these files may obtain them as described in the article on AIPSSERV. To obtain this documentation file for 15OCT90 send AIPSSERV the message "sendplain DOC:CHANGED.90D". A summary of the changes made to the *AIPS* software is given in the following sections.

Changes of Interest to Users: 15JUL90

A number of new verbs were added to manipulate *AIPS* tables entries; GETTHEAD, PUTTHEAD, TABGET, and TABPUT can read and write table header keywords and table entries. An X-windows *AIPS* TV, XVSS, was added to AIPS. This is a translation of the SunView version SSS but running under the XView toolkit. UVAVG will now work for compressed uv data. SUBIM now copies header Keyword/value pairs. Polarization calibration was enabled in POSSM. CVEL was modified to deal with multiple FQ id groups.

The 'CALC' option in SETJY was updated to use the latest spectra for 3C48, 3C138, 3C147 and 3C286. Also, the QUAL adverb was added. VLBIN can now handle lower sideband data. POSSM can now plot multiple IFs on the same plot. A number of tasks had task specific adverb arrays replacing APARM, BPARM Some of these are CLCOR, UVCOP, and UVFIX. A number of bugs were fixed in BPASS, FILLM and MK3IN. POSSM no longer tries to plot flagged channels.

The gridding routine UVGRID, used by MX can now grid data in arbitrary order. This eliminates the need for sorting data if natural weighting is being used and the 'DFT' model calculation is used. UVCOP can now select by source, qualifier, FQ id, and IF range. PRTPP now has a terse output format for FITS files. MX again works for 16 fields. Bugs in the handling of channel averaging in MX were fixed.

A number of problems were fixed in LWPLA, the task that sends plots to LaserWriter printers. A number of bugs in the bandpass calibration routines were fixed. A number of corrections were made to MK3IN;

especially improved was the handling of the end of tape. FITTP no longer permanently converts FQ table to CH tables on the input file. Several problems were fixed in TVFLG and SPFLG. CLCAL now smooths only the requested sources when smoothing is applied.

Changes of Interest to Programmers: 15JUL90

The flagging (FG) tables now include a frequency (FQ) identifier. SOURNU now uses the correct null (selects all) value of QUAL. The new routines CLSEL, SNSEL, SUSEL, and FGSEL can copy CL, SN, SU and FG tables selecting a range of IFs. An X-windows *AIPS* TV XVSS was added and is in the beta test stage. There was a major change in the directory structure for the virtual TV routines to accommodate the X-windows versions. Also the installation of the *AIPS* workstation TVs was better documented. The maximum number of AIPS files that can be open simultaneously was increased to 20 in all 3 categories. The "Z" routines needed for the UniCOS system on Crays was added and appear in logical directory APLCRI. Signal exception handling was cleaned up for Suns and serious arithmetic exceptions are now trapped.

Changes of Interest to Users: 15OCT90

New interactive data editing task IBLED for baseline oriented uv data editing was added. A new task CLSMO was added to smooth CL tables. New task DAYFX patches up data read by FILLM which occasionally mislabels the day number of data when appending a new tape to an existing file. Verb PUTHEAD can now write keyword value pairs into a catalog header. All *AIPS* plotting tasks can now optionally put their plots directly onto a TV display rather than going through an intermediate plot file and TVPL.

The X-windows *AIPS* TV display program XAS, written by Tom Pauls of the Naval Research Lab. has been added to the system. Makefiles and other installation procedures are also provided (for SSS and XVSS also). This version of the *AIPS* TV display was discussed more fully in a previous article.

An extensive revision of the SunView *AIPS* TV display program SSS increased the number of intensity levels from 64 to 111 and allowed 4 graphics overlay planes. The *AIPS* model of TV displays was enhanced to allow a variable "gamma" correction so that colors on different displays will appear the same. A number of verbs were added to allow users to save the currently displayed colors by saving and manipulating the "Output Function memory" lookup tables. Print files in program *AIPS* and all tasks were cleaned up; if the file is not to be printed, but to be stored in a user specified file, then it is no longer printed as well.

PRTAN will give a semi graphical display of the positions of the antennas for the VLA. SETJY can now process multiple flux calibrators using the OPTYPE='CALC' option. UVFND can now process multi-source data in a reasonable fashion. VLBIN now writes FQ tables. Many time displays were modified not to show 60 seconds or 24 hours. The calibration package was improved to allow calibration of IQUV type data; especially CALIB, MULTI and INDXR. UVBAS was modified to interpolate in frequency; it also now interpolates in amplitude and phase rather than real and imaginary.

UVCOP will now select data by QUAL; it also tries to estimate the size of the output file for multi-source files. TVFLG and SPFLG were speeded up and other improvements made. CVEL was corrected to deal with multiple subarrays and a large number of sources. A problem with FQ ids was fixed in ACFIT. A number of potential problems in PCAL are now trapped. In particular, if no polarization model or total intensities were provided PCAL would return a model with all parameters set to zero and proceed happily. The default in SPLIT is now to write crosscorrelation data only.

Numerous bug fixes were made to FILLM. Problems in CALIB with multiple subarrays and compressed single source data were fixed. Bugs in GAPLT which caused it to fail under all circumstances were fixed. A bug was fixed in the calibration package flagging routine which caused flagging a limited number of spectral channels to fail. An error in CLCOR for OPTYPE='PCAL' (MkIII VLBI manual phase cal.) was corrected.

A serious error in **AVSPC** causing it to fail was fixed. Numerous problems in **DFTPL**, especially the handling of the increment were fixed. A number of errors were fixed in **MK3IN** and it is now believed to correctly read both continuum and line data from MkIII VLBI correlators.

Changes of Interest to Programmers: 15OCT90

A new routine, **IMGERR**, allows simple access to *AIPS* image files and will optionally read and write and associated "error" plane. Two new stand-alone programs, **SHOPA** and **SHOPB**, help generate shopping lists for *AIPS* subroutines. The *AIPS* tape handling routines were cleaned up. Routine **AN10RS** was rewritten to properly handle the case of excluded antennas.

Changes of Interest to Users: 15JAN91

Task **CALIB** was split into two tasks, **CALIB** to do amplitude and phase calibration and selfcalibration and **FRING** for fringe fitting VLBI data. **CALIB** and **FRING** can now optionally update a single SN table and **CLCAL** can be instructed to use only this table. In all cases **CLCAL** now leaves SN tables as it found them rather than merging them together. **CLCAL** can update an output CL table by first flagging any existing entries corresponding to selected data. **CLCAL** can also now select solutions by antenna.

SNPLT can now plot values against time, elevation, hour angle and LST and can optionally plot error bars. **POSSM** can now shift the phase center of the data before plotting it. Verb **TVMOVIE** has been made to run faster on workstation TV displays. **MX** can now fully process arbitrarily sorted data. **HORUS** can make an image up to 4k x 4k on any computer. **CLIP** was modified to allow specification of baselines to be processed. **FILLM** can now handle VLA data that requires up to 8 output files rather than the previous limit of 4. **UVCOP** may now give progress messages. **LISTR** can now select sources by **CALCODE** and **LR** and **RL** are supported for **OPTYPE='LIST'**

A number of problems were fixed in **FRING** which caused problems with multi-polarization fringe fitting. A problem was fixed in **CLCAL** which caused a single blanked IF in the input SN table to cause all higher numbered IF to also be flagged. A number of cases of problems with *uv* data containing only LL data were fixed; this was especially a problem in **BPASS**. A serious error in **SWPOL** was fixed. A number of problems in **MX** involving imaging multiple spectral channels were fixed. Several bugs were fixed in **IBLED**. A number of plotting options were fixed in **GAL**. The fractional bit correction for **delay_by_record** data was corrected in **VLBIN**. **ANCAL** had a number of serious problems fixed: a variable type mismatch caused it to fail when trying to interpolate measured antenna temperatures and a logic error caused corrections for the phased VLA to be low by a factor of the square root of the source flux density.

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AIPS USER AGREEMENT

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

BASIC RESEARCH IN ASTRONOMY

THIS AGREEMENT, made this ____ day of _____, 19____, between ASSO-
CIATED UNIVERSITIES, INC./NATIONAL RADIO ASTRONOMY OBSERVATORY,
Charlottesville, Virginia, hereinafter called the Developer; and _____
_____ hereinafter called the User.

WHEREAS, the Developer has developed an Astronomical Image Processing System
(AIPS) under agreement with the National Science Foundation; and

WHEREAS, the Developer desires to promote basic research, particularly in astronomy,
throughout the world; and

WHEREAS, the Developer has determined that distribution of AIPS to User will further
such research.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein
contained, the parties agree as follows:

1. For no charge, Developer hereby grants to the User a non-exclusive right to use the
Astronomical Image Processing System (AIPS).
2. User acknowledges that the AIPS software/system, including all documentation, will
be used primarily by User for basic research.
3. The Developer agrees that it will make available to User updates and modifications to
AIPS; however, Developer is under no obligation to do so.
4. The AIPS software/documentation shall not be transferred, sold, or assigned to a third
party.
5. AIPS shall not be copied or duplicated except as follows:
 - a. AIPS may be copied for backup purposes.
 - b. AIPS may be duplicated and run on all systems supported by the User's AIPS
Manager, who will be the designated operational contact person between the User
and Developer, provided that its use on all such systems is in accordance with the

dictates of this agreement.

6. The obligation to use, install, and run AIPS shall be the sole responsibility of the User. It IS UNDERSTOOD THAT THE DEVELOPER MAKES NO WARRANTIES, CLAIMS, OR OTHER ASSERTIONS, IMPLIED OR OTHERWISE, CONCERNING THE PERFORMANCE OR INTEGRITY OF AIPS OR THE SUITABILITY OF AIPS FOR A PARTICULAR PURPOSE.
- 7 User acknowledges that any data, tapes, or containers received from the Developer are and shall remain Developer's property and shall be returned upon request of the Developer, when updated materials are requested by User or at termination of this agreement.
8. This Agreement shall remain in effect for a period of five (5) years from the date hereof.

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

Company

Signature

Signature

Title

Title

Please indicate technical contact person (i.e. AIPS Manager):

Rev. E12/4/89

AIPS Order Form

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☐ Address label on back is correct _____

include street address for UPS delivery _____

(*N.B.*: If you have received a plastic mailing container from us, we insist that you use it for a reorder. Also return tape(s).)

2. ☐ new order ☐ reorder

Version of *AIPS* currently running: _____

3. *AIPS* version desired: ☐ 15-Oct-1990
☐ 15-Jan-1991

4. Tape type desired:

(*AIPS*, VMS only) ☐ Vax/VMS BACKUP

(*AIPS*, Unix only) ☐ Unix tar

Version of Unix system in use: _____

N.B. we need to know this.

e.g., bsd4.x, Sys III, Sys V, V7, *etc.*

(*AIPS*, neither Unix nor VMS) ☐ FITS compressed text format

(DDT test package: \geq 15APR89) ☐ FITS binary data ("large" on 6250 bpi only)

5. Tape density desired: ☐ 1600 bpi ☐ 6250 bpi ☐ QIC 24 (tar only)

6. There are gripes on (returned) tape: . . . ☐ Yes ☐ No

7. Printed documents requested: ☐ Full 15JUL90 *COOKBOOK* (no binder)
☐ 15APR90 *GOING AIPS* Vol 1 (no binder)
☐ 15APR90 *GOING AIPS* Vol 2 (no binder)
☐ *AIPS* Memo No. 63
☐ *AIPS* Memo No. 64
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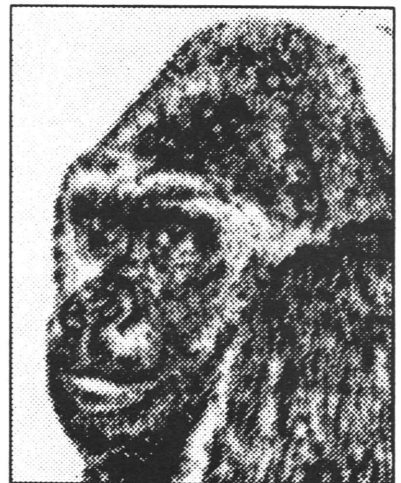
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SEP 17 1991

BASIC RESEARCH IN ASTRONOMY

THIS AGREEMENT, made this ____ day of _____, 19____, between ASSOCIATED UNIVERSITIES, INC./NATIONAL RADIO ASTRONOMY OBSERVATORY, Charlottesville, Virginia, hereinafter called the Developer; and _____ hereinafter called the User.

WHEREAS, the Developer has developed an Astronomical Image Processing System (AIPS) under agreement with the National Science Foundation; and

WHEREAS, the Developer desires to promote basic research, particularly in astronomy, throughout the world; and

WHEREAS, the Developer has determined that distribution of AIPS to User will further such research.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties agree as follows:

1. For no charge, Developer hereby grants to the User a non-exclusive right to use the Astronomical Image Processing System (AIPS).
2. User acknowledges that the AIPS software/system, including all documentation, will be used primarily by User for basic research.
3. The Developer agrees that it will make available to User updates and modifications to AIPS; however, Developer is under no obligation to do so.
4. The AIPS software/documentation shall not be transferred, sold, or assigned to a third party.
5. AIPS shall not be copied or duplicated except as follows:
 - a. AIPS may be copied for backup purposes.
 - b. AIPS may be duplicated and run on all systems supported by the User's AIPS Manager, who will be the designated operational contact person between the User and Developer, provided that its use on all such systems is in accordance with the dictates of this agreement.
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7. User acknowledges that any data, tapes, or containers received from the Developer are and shall remain Developer's property and shall be returned upon request of the Developer, when updated materials are requested by User or at termination of this agreement.

8. This Agreement shall remain in effect for a period of five (5) years from the date hereof.

YOUR INSTITUTION

ASSOCIATED UNIVERSITIES, INC./
NATIONAL RADIO ASTRONOMY OBSERVATORY

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Rev. 05/16/91

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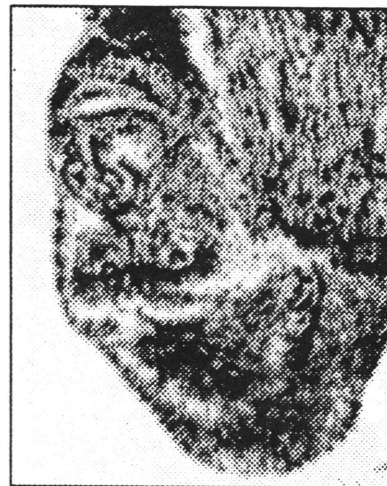
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JANUARY 15, 1991
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THIS ISSUE CONTAINS THREE AIPSLATTERS
(Volume XI - Numbers 1, 2, & 3)



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