AIPSLETTER

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National Radio Astronomy Observatory

A newsletter for users of the
Astronomical Image Processing System

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Personal Notes

At the invitation of the Peoples' Republic of China, Kerry Hilldrup spent the month of December in Beijing (Peking). While there he installed the Charlottesville PL/I package of VLA reduction programs on their IBM 4341. He also lectured at several sites on the NRAO computer facilities and the reduction of VLA data. He reports being treated quite royally and having a very good time. He would like to say "duo xie" (many thanks) to all the people at Beijing Astronomical Observatory, Miyun Station, Peking University Department of Geophysics, Shaanxi Astronomical Observatory (Xi'an), Zijin (Purple) Mountain Observatory (Nanjing), and the Chinese Academy of Sciences, who helped to make his visit so pleasant.

The 1984 UniForum (Unix) meeting and vendor exhibit show was held 17-20 January at the Washington Hilton in Washington, DC. Because the meeting was within easy driving distance eight NRAO people attended (Kerry Hilldrup, David Brown, Don Wells, Joe Burch, and Ted McKenna from Charlottesville; Dale King, Alan Ferris, and Bob Vance from Green Bank). The vendor exhibits were quite impressive. Almost *every* major vendor was exhibiting Unix products: IBM (PC/IX), DEC (Ultrix), DGC (Unix under AOS), Amdahl (UTS), Gould-SEL, AT&T (System V) ...

Don Wells attended the "Workshop on the Applications of Supermicrocomputer Workstations in Physics and Astronomy", held 20-22 January at the University of North Carolina, Chapel Hill, and presented an invited paper entitled "Crystal Gazing, IV. Workstations in Astronomy — Image Processing and Data Analysis". He reports that the quality of the invited talks from scientists and vendor representatives was unusually high and that a good time was had by all. Astronomy was well represented (KPNO, CfA, ESO, CTIO, STScI, NRAO, plus various universities). Comparative benchmarks on the exhibited machines should become available in 1-2 months.

We Need Your Advice!

It is now completely obvious that a revolution in computer technology is in progress. A variety of new and powerful supermicro machines are appearing on the market, at much lower prices than we are accustomed to paying for the previous generation of supermini machines. At the Chapel Hill Supermicro Workshop ten days ago machines built by SUN, IBM, HP, MassComp, Ridge, Apollo, and LMC were demonstrated. All of these machines are capable of running AIPS, in principle. In practice, of course, some degree of customization is required for each system, especially for the graphics and imaging interfaces. The price, performance, and superb graphics provided in these systems make them very attractive for use with AIPS. Judging from remarks made by vendor engineers, system programmers, and marketing people it is quite obvious that "you ain't seen nothin yet!". This technology is improving *very* rapidly, and the AIPS user community clearly stands to benefit greatly from the improvement in the price/performance ratio and from improvements in functionality as well.

We first discussed the idea of putting AIPS on a supermicro in the 15NOV82 *AIPSLETTER*, and we solicited comments, suggestions, *etc.*, from our users. During the past 14 months a number of astronomers have called us and asked about the possibility of using the new hardware. We have been forced to tell them that the only *proven* combination of hardware for AIPS is a VAX under VMS with an I^2S Model 70 display and FPS 5000-series AP. This situation frustrates both us and our users because we all know that we should be able to exploit the supermicros. As one user told us three months ago, "I could either buy *two* MassComps or *one* VAX750." We think he ultimately settled for the 750 because he knew that it would work immediately and he did not want to be a pioneer.

The Penn State group has begun the process of establishing a system called "PSAIPS" which is based on a Charles River Data supermicro computer. Several other sites have told us that they have SUN workstations and might want to install AIPS on these machines. We know of one MassComp which has been purchased for astronomy in addition to the one which NRAO itself recently purchased for Green Bank. It seems clear that at least one of these sites will eventually produce a port of AIPS to their machine. Other sites may be able to duplicate such ports, but *until the Charlottesville programmers have one or more of these machines with which to work, we recommend strongly that user sites should be cautious in procurements of supermicro systems for use with* AIPS. We have proposed to acquire a 68000-based development system for Charlottesville. Probably this will be a MassComp MC-500 configured for image processing rather than data acquisition (note: we think of the MassComp as a *generic* supermicro system). The final decision on the funding of this proposal is *imminent* (1-2 months). We would like to know how our user community feels about this proposed procurement. This leads us to pose several specific questions to our user community:

1. Do you have or do you intend to purchase a particular supermicro? If so, what vendor, model, and peripherals? What will you do with it?
2. Would you consider purchasing a supermicro, rather than a VAX/VMS, system if the NRAO developed and supported such a system configuration?
3. We would like to try to get some kind of survey of the potential market size for various classes of machines which we can use both for our own planning purposes and to influence vendors to assist us. If the price were, say, $55K for a VAX750-class CPU with 474 MB of disk and no AP (*i.e.* an "image processing workstation"), would you buy it? How much extra would you pay to get an AP? If the price were, say, $150K for a VAX780-class CPU, 950 MB of disk, and an AP (*i.e.*, a *real* "AIPS machine"!), would you buy it? On what time scale might you be in a position to buy either of these hypothetical systems? *Please note that the prices, disk sizes, and CPU performances mentioned here are highly speculative and should be regarded as imaginary until actual systems are assembled in the lab and evaluated.*

Please send your responses to this appeal to Don Wells in Charlottesville. We will be making the initial procurement decisions for 1984 soon. Your advice in this matter will be of most assistance to us if it can arrive by early in March.

The Gripes Column

During the last 60 days we received 111 gripes (741 through 851, 1.8 per day). Five of these were entered by hand from a letter more than six months old. Again, we would like to encourage contact persons (site managers) to use the GRITP utility. While reviewing the GRITP recipe given in the 15NOV83 *AIPSLETTER*, we discovered a typographical error (second YES left out) and so we present a corrected version below:

```
SET DEFAULT NEW
@[-]MOUNT                (mount tape on drive 1)
RUN [.LOAD]GRITP
1                        (drive number)
WRIT                     (WRITe or VERIfy?)
YES                      (do verify pass?)
YES                      (init the file?)
@[-]DISMOUNT             (dismount drive 1)
```

A contact person can write the gripes on the tape which he sends in for a new version of AIPS. If the proper box is marked on the order form we will copy the gripes from tape to disk before overwriting the tape.

Some users have been confused by a side effect of the synchronization of the Gripe mechanism with the 60-day cycle. The problem is that the gripes which arrived late in the cycle could not be answered by the time we decided to send out the responses. We marked them "to be continued". In some cases the response field may have been left blank. In either case some recipients wondered what was happening. Sorry about that. For the current cycle we will use some special phrase to indicate that we are merely acknowledging receipt of the gripe and will send a proper response in the next cycle.

The Portability Column

We have changed the name of this column to match its content more precisely. From now on all discussions of our Unix implementations will occur here under the heading of "CPU/OS Combinations".

CPU/OS Combinations

VAX/4.2bsd: On 14 December David Garrett reported to us that AIPS was installed on the Texas VAX. David still has an August 83 version of AIPS. He has sent us revised Z-routines which we are examining. Note: this is the only AIPS-under-Unix implementation which is currently believed to work.

IBM/UTS: There is still some trouble with Fortran. Kerry is trying to figure it out. Amdahl held an initial meeting of its UTS Users' Group during the UniForum meeting in Washington. They insisted that they will support full System V Unix (both "native" and under VM), full duplex terminals, and a "high performance" Fortran compiler later this year.

Gould-SEL/MPX32: We recently inquired about the status of **AIPS** on the SEL. Jan Bystedt of Stockholm Observatory replied and we learned that the **15NOV83** *AIPSLETTER* considerably overstated the situation (we had misinterpreted the wording of a previous telex). As of 9 January the Fortran has been ported, but the Z-routines are not yet finished.

MassComp/Unix: Tests are currently underway in Green Bank. We will report on them in the next *AIPSLETTER*. *Please note that, although the NRAO may support* **AIPS** *on MassComp computers some day, we do not do so now and make no promise to do so in the future. If you purchase a MassComp for running* **AIPS** *at this time, you must be prepared to do any necessary software development yourself.*

Image Displays

Eric is revising Walter's modifications to the Y-routines and expects they will be released for **15MAR84**. A special meeting was held January 13 at NCAR in Boulder, CO among representatives of five major astronomical institutions (KPNO, STScI, NRAO, CfA, NAIC). They agreed to work toward implementation of GKS conventions in their software packages. A long range goal for **AIPS** is to make our software interface to imaging devices (currently the Y routines, TEK routines, and plot files) conform to the GKS standard. However, it is unclear at present how soon and how completely this goal may be realized.

APs

Pat Moore (Jodrell Bank Radio Astronomy Labs) writes: "Lars passed on your telex to me about the FPS 5205. **AIPS** does indeed work on it. We had to re-link the AP code as it has 4.5K table memory. I also removed the two corrected FPS routines in `WDC.LIB` as these seem to be fixed in the latest release of the maths library. In fact the latest version of the maths library automatically sizes table memory and will work with both 2.5 and 4.5K so it would ease the distribution if you could supply this new version ..."

During the past two months Bill and Don have reviewed the architectures of the CSPI Mini-MAP and the STAR-100 (factory sales representatives came to CV to discuss the machine with us). Currently we still consider the Numerix MARS-432 as the new AP which looks easiest to implement for **AIPS**. We are awaiting the arrival of more documentation on the MassComp AP-501 in order to pursue our analysis of it further.

Please note that, although the NRAO may support **AIPS** *on additional APs some day, we do not do so now and make no promise to do so in the future. If you purchase an AP other than the FPS models 100, 120B, 5105, and 5205 for running* **AIPS** *at this time, you must be prepared to do any necessary software development yourself.* Anyone who wants to consider non-FPS APs for use with **AIPS** should study the information given in **AIPS** Memo No. 30 ("AIPS and Array Processors"). This document has already been given to two vendors so that they will know what we would like to see in an AP.

AIPS Memo Series

We printed the initial **AIPS** Memorandum Series list in the **15MAY83** issue. Since then, there have been several interesting additions to the Series. The additions are listed and abstracted below. Copies of the memoranda may be obtained by writing to:

Nancy Wiener
Computer Division Secretary
NRAO
Edgemont Road
Charlottesville, VA 22901

The additions to the AIPS Memorandum Series are

#	DATE	TITLE	AUTHOR
27	83/05/20	Non-linear Coordinate Systems in AIPS	Eric W. Greisen
	83/11/15	(corrected and revised)	
28	83/05/19	Map Names	R. D. Ekers
29	83/11/30	Array Processor Memory Size	W. D. Cotton
30	83/12/02	AIPS and Array Procesors	W. D. Cotton, D. C. Wells

27: AIPS has been revised recently to support several projective geometries and a non-linear velocity axis. The present memorandum contains a description of the FITS-like nomenclature used to describe these coordinates and of the algebra implemented to compute their values. The use of Galactic as well as Celestial coordinates is explicated. A guide to the routines in AIPS which implement these constructs is given. *Revised November 1983* to correct typographical errors and to implement relativistic velocity computations.

28: Proposed conventions for naming images including a classification field are described. The use of wild cards and methods to imply multiple executions of programs via lists are suggested. The problem of tasks requiring more than one input or output image is also discussed.

29: An investigation of the effects of array processor memory size on current tasks in AIPS is described. For modest memory sizes, the effects are found to be small. To do the current CLEAN algorithm with a large AP memory would be very inefficient. Methods to improve the existing tasks and to employ large AP memories are also discussed.

30: This memorandum provides a brief overview of the software structure of AIPS with considerable detail on the use of array processors by AIPS tasks. It is concluded that "it is beyond our current ability and desire to support an AP which cannot emulate the current functions of our FPS AP120Bs." The use of AIPS in a supercomputer environment is also discussed.

Summary of Changes: 15 Nov – 14 Jan

These changes are listed in detail in the CHANGE.DOC file reproduced later in the *AIPSLETTER*. Due to vacations and other projects, it has been a relatively quiet two-month period. Most of the changes were in the nature of bug fixes and minor improvements. Arnold Rots did submit three new tasks (**TVCUB**, **TVSLD**, **TVSLV**) pertaining to pseudo three-dimensional displays of spectral-line cubes and two new tasks (**TVHXF**, **TVHLD**) pertaining to histogram equilization of large dynamic range images. **LGEOM** is a new version of **GEOM** capable of handling larger images and rotations. It will work only on virtual-memory machines such as VAXes. The new pseudoverb **ERASE** allows the deletion of sequential lines from a procedure.

The only pervasive improvement during this period was to the handling of catalog files. The new (**15NOV83**) naming conventions, particularly the defaults on sequence number, require the user to have a catalog on each disk. Since this may not always be the case, we have made the catalog handling routines be as forgiving as possible. Of course, the user already running **AIPS** can create any missing catalog files with the sequence

```
> STORE 1                (save environment)
> RESTART
?  < user-number >
> RESTORE 1              (recover environment)
```

This will turn off the numerous, now mostly insignificant, error messages. The array used by the *POPS* language processor inside **AIPS** was made larger to provide more temporary work space and to make more

room for new symbols and procedures. This revision makes obsolete all **SAVE/GET** files created prior to the **15JAN84** release.

MX received a wide variety of corrections and improvements. The most significant was the ability to grid and clean correctly multiple frequency channels in a single map. The concatenation of data sets by **UVLOD** was made more understandable both by changes to the adverbs and program and by additions to the help file. **PRTTP** has a new **PRTLEV = -1** to provide very brief summaries of FITS files. **DISKU** now uses the **DOALL** adverb to control the additional display of the size and name of each individual file. The rotation-curve fitting task **GAL** now has the ability to prepare plot files of its results. **UVPLT** and **VBPLT** now allow the user full control over the plot axes including *u*, *v*, and *w*. **VBPLT** also handles defaults in the same manner as **UVPLT** and writes a plot file which is understood by **EXTLIST**. The image statistics verbs **IMSTAT** and **TVSTAT** now display the *approximate* total flux over the selected areas. **CLIP** no longer flags pure zero fluxes unless requested to do so and **UVCOP** will accept negative times.

A wide variety of minor bugs were fixed. Among the more prominent was a bug in **PCNTR** which required all three input images to have the same name. The contour drawing routine did not handle blanked, floating-point images correctly. **MCUBE** did not compute the correct reference pixel value except when the reference pixel position of the first image was one. **XGAUS** was, because of errors, overly inclined to tell the user that the fit was probably bad. **BLANK** had a couple of minor bugs in its TV method, one of which caused it to abort.

CHANGE.DOC: 15Nov83–14Jan84

1662. *November 15, 1983* MX *Bill*
Fixed not to make quadruple size grid scratch file if no CLEANing was requested.
Moved nowhere.

1663. *November 16, 1983* MX.HLP *Bill*
Revised discussion of uniform weighting and **UVBOX** in particular to remove some nonsense copied from **UVMAP.HLP**. Also added a discussion about how to avoid some of the problems with using the gridded subtraction method.
Moved nowhere.

1664. *November 17, 1983* MX *Bill*
Revised to default CLEAN window to **IMSIZE - 10** and to use a 9^{th} order polynomial in the gridded interpolation routines. Also changed **MX.HLP**.
Moved nowhere.

1665. *November 18, 1983* APCLN *Bill*
Changed to check that dirty map is in integer format.
Moved nowhere.

1666. *November 18, 1983* CLIP *Bill*
Fixed not to clip points with zero amplitude if no minimum flux density was specified.
Moved nowhere.

1667. *November 18, 1983* UVMAP.HLP, MX.HLP *Bill*

Added statments by Jacqueline to the effect that the only weighting scheme to use for zero spacing fluxes is the number of *uv* cells in the center of the *uv* plane missed.
Moved nowhere.

1668. *November 18, 1983* MX *Bill*

Fixed bugs which caused some of the scratch files to be much larger than necessary.
Moved nowhere.

1669. *November 20, 1983* TVBLNK *Eric*

The blink routine was overlooked when changing the interactive TV routines to prohibit cursor wrap around. Fixed now.
Moved nowhere.

1670. *November 20, 1983* FITTP *Eric*

Fix format of "writing file" messages.
Moved nowhere.

1671. *November 22, 1983* APCLN Help *Tim*

Added by Editor from CHKOUT *history file:* Revise HELP to make PH-cleaning appear more attractive.
Moved nowhere.

1672. *November 23, 1983* MX *Bill*

Added by Editor from CHKOUT *history file:* Make beam the same size as the map when not cleaning (NITER = 0).
Moved nowhere.

1673. *November 23, 1983* UVLOD *Eric*

Stop it from overwriting the header with > 7 random parameter types.
Moved to VLA (15Sep83 version), nowhere else.

1674. *November 25, 1983* PUTHEAD *Eric*

The EXPLAIN portion of the Help file listed keywords which are only available to GETHEAD as well as the legitimate ones.
Moved nowhere.

1675. *November 25, 1983* Z routines *Eric*

Fix a message in ZCREAT (Vax version) to fit on one line. Remove an infinite loop on error in the Modcomp version of ZACTV8.
Moved ZACTV8 to OLD:, nowhere else.

1676. *November 26, 1983* UVPLT, VBPLT *Eric*

Revise both to allow the user full control over the range of his plot when the axes are U, V, or W. (Before it forced a - to + range.) Bring VBPLT up to the changes made some time ago in UVPLT (Change 1398). The axis plot types are now defaulted individually and fixed-scale plots are allowed even in the axis types are defaulted.
Moved nowhere.

1677. *November 28, 1983* MX *Bill*

Fixed bug which caused one of the scratch files to be too small.
Moved nowhere.

1678. *November 28, 1983* VM *Tim*

Added by Editor from CHKOUT *history file:* Fix divide by zero on restart.
Moved nowhere.

1679. *November 30, 1983* EXTLIST for VBPLT *Eric*

Revise VBPLT to make sure all defaulted adverbs are filled in before plot files are created and to call the plot type number 10. Revise EXTLIST (subroutine AU8A) to accept type 10 as a version of UVPLT file with a different offset to the adverbs and with some additional info desired.
Moved nowhere.

1680. *December 2, 1983* PRTTP *Eric*

Revise code and HELP file to have a new PRTLEV = -1. This level produces a 1–2 line summary of each FITS file, rather than the longer IMHEADER-like print out. Thus, about 15 files will fit on a page rather than 2.
Moved nowhere.

1681. *December 2, 1983* DBCON *Eric*

A typo caused the output name not to be generated correctly when defaults were used.
Moved to OLD and VLA this date, nowhere else.

1682. *December 5, 1983* ZMOUNT *Gary*

ZMOUNT (VAX VMS) had two problems that could arise when a user allocates a tape outside of AIPS with a DCL allocate command and then tries to mount and dismount the tape using the AIPS verbs. First, the mount command could not distingish between the device being already mounted and the device being allocated, but not mounted. This would produce a "device already mounted by this process" message even when it was just allocated. This has been fixed. The second problem (which has not been fixed) occurs when the user does a dismount. The device is dismounted, but the allocation done at the process level is still in effect. VMS will not allow an image to deallocate a device allocated at the process level. The user still must exit AIPS to deallocate the tape drive.
Moved nowhere.

1683. *December 5, 1983* QUICK and OERROR *Eric*

The VAX does not perform -3.0 ** 2.0 any longer. Hence, add code to test for negative argument and require an integer exponent. Add error message to OERROR.
Moved nowhere.

1684. *December 5, 1983* MCUBE *Eric*

Found a serious error when the reference pixel of the input reference "plane" is not 1. In that case, the output "cube" had the wrong reference value. Fixed up the computation of the reference value.
Moved nowhere.

1685. *December 6, 1983* ZCMPRS *Gary*

This program was leaving 1 granule too much when truncating (compressing) a file.
Moved nowhere.

1686. *December 6, 1983* XGAUS *Eric*

Correct an error in the test on the validity of the answers. It was not applying the center pixel position correctly. Also change to blank those components selected to be null via the TEK cursor and to skip validity testing on them.
Moved nowhere.

1687. *December 7, 1983* ZM70XF *Gary*

This routine will now print the VAX VMS system error message when an error occurs while writting to the TV. This may help us track down some obscure errors that occur at the VLA, but not in Charlottesville.
Moved nowhere.

1688. *December 7, 1983* FPARSE *Gary*

This subroutine was overwritting the **OBSERVER** name before printing UV data (**TPHEAD**, **PRTTP**). This bug was introduced when the "WEIGHT SCALE FACTOR" was added to the UV FITS history.
Moved nowhere.

1689. *December 12, 1983* Modcomp *Eric*

Update the following **.E** files (link-edit commands) for the new subroutine names:

NNLSQ	**VBCAL**	**UVMOD**	**IMMOD**	**VBMRG**	**VBCOR**
AVER	**DESCM**	**STRIP**	**BLOAT**	**UVDGP**	**CORER**

Moved to **OLD:** and to Modcomp, nowhere else.

1690. *December 12, 1983* Modcomp discovered *Eric*

The Modcomp compiler is again pointing out uninitialized variables and the like:
TKVECX — Delete this no longer used routine.
SUBHDR — **K4CTP** again misspelled **K4CTY**.
ZVOLNA — (Modcomp version) had a blank line.
Moved from Modcomp, nowhere else.

1691. *December 12, 1983* IMSTAT, TVSTAT *Eric*

Add code to have the total flux on clean maps displayed.
Moved nowhere.

1692. *December 12, 1983* CONDRW *Eric*

The routine was not checking for blanked floating pixels since they are indicated in a separate place in the header from the indication for integer images. Correct this and relink **CNTR**, **PCNTR**, and **GREYS**.
Moved nowhere.

1693. *December 13, 1983* VM *Tim*

Added by Editor from **CHKOUT** *history file:* Some algorithm changes and on-going revisionism affecting the **HELP** file.
Moved nowhere.

1694. *December 14-15, 1983* Modcomp .E, .R files *Eric*

Create linkedit and task-build command files for the Modcomp to use on the following programs:

`FILAI2` `CATCHG` `CATCHR` `BLANK` `XMOM` `FIXUSR`

Revise, for changed overlays

`APCLN.E` `SUMIM.E` `UVSRT.E`

Correct errors:

`XGAUS.R` `XPLOT.R`

Moved to Modcomp this date, nowhere else.

1695. *December 14, 1983* AU1A *Eric*

The variables `T` and `F` were not declared or dataed, but were used to call file open routines!
Moved from Modcomp this date, nowhere else.

1696. *December 15, 1983* XSMTH *Eric*

Modcomp discovered that `K4DMN` was misspelled as `K2DMN`.
Moved from Modcomp this date, nowhere else.

1697. *December 15, 1983* UVLOD *Eric*

The call to `UVINIT` in the FITS data subroutine did not make allowance for different size output records. Change `IVMAX` to be `32 * 17 / NDTOT`.
Moved nowhere.

1698. *December 17-19, 1983* Misc *Eric*

The Modcomp has had a hard time with the non-standard tasks. Many have "wrapped" the address limit and numerous Fortran errors have been found. The link and task build files have also needed work (or creation). Done so far:

- `UVFIL` — Create the `.E`, `.R` files. `K2IMS` misspelled `K2SEQ`.
- `SLICE` — Remove the big buffer from the main to a new layer of subroutine and reduce it to 2048 X 9. I suspect 8 is all that is required. Add test to make sure buffer does not overflow. Revise the `.E` file.
- `GNPLT` — Some variables were not declared in the common of the main program block.
- `NNLSQ` — Remove several lower case comments, replace a `TYPE` statement with correct `MSGWRT` call.
- `MOMFT` — Add proper declares in the main.
- `CNVRT` — Missing `MSG` includes when referencing `NLUSER`.
- `ASCOR` — Lower case comment.

Moved to Modcomp this date, nowhere else.

1699. *December 19, 1983* PCNTR *Eric*

`N12` was not declared or data'ed. As a result, the 2nd and 3rd input names were changed to the first name.
Moved to the Modcomp and the VLA this date.

1700. *December 19, 1983* AJAX *Eric*

Create new service program for use on public catalog AIPS systems only. It deletes non-cataloged scratch files. Also create `.E` and `.R` files.
Moved to Modcomp, nowhere else.

1701. *December 28, 1983* VM *Tim*

Added by Editor from **CHKOUT** *history file:* Changes to the Fortran and the **HELP** files.
Moved nowhere.

1702. *December 29, 1983* CLIP, UVCOP *Eric*

Fix **CLIP** so that it does not flag pure 0.0 visibilities when the min allowed flux was set by the user to 0.0. Change formats of final "copied" messages to allow larger numbers.
Moved nowhere.

1703. *December 29, 1983* REBOX *Eric*

Subroutine **TVLOCA** did not handle the Class argument correctly — using the wrong kind of character comparison. This made it think the image was not present when an **INCLASS** was specified.
Moved nowhere.

1704. *December 29, 1983* TV3DIM *Arnold*

New **HELP** file for 3-D display programs **TVCUB**, **TVSLD**, **TVSLV**.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1705. *December 29, 1983* TVCUB *Arnold*

New task to prepare a map cube for 3-D solid body display.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1706. *December 29, 1983* TVSLD *Arnold*

New task to make 3-D solid body display of a map cube. Works only on VAXes because of memory requirements.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1707. *December 29, 1983* TVSLV *Arnold*

New task to display 3-D solid body images made by **TVSLD**.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1708. *December 29, 1983* TVHXF *Arnold*

New task to calculate TV transfer function based on histogram equalization.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1709. *December 29, 1983* TVHLD *Arnold*

New task to load high dynamic range maps in 12 bits and compress this to 8 bits by histogram equalization in the TV. Note that this assumes the presence of at least a 12-bit IFM (not in **CTVC.INC**). At the VLA we are planning to upgrade our IFMs to 13 bits; when that is done this task will be updated. Needs **POPS:SUBLIB**.
Moved to **AIPS::**, **VAX3::**, and **CVAX::[.15JAN84]**.

1710. *December 30, 1983* MODCOMP discovered *Eric*

More errors from the MODCOMP compiler:

NNLSQ — Called a **MOD** of an Integer*4 argument.
PRTGA — Init common variable in a **DATA**, blank line.
CATCHR — Error in format statement.

Moved from Modcomp this date, nowhere else.

1711. *December 30, 1983* KONTR *Arnold*

Replaced by current VLA version (**CVAX**:: version was several updates behind).
Now identical on **AIPS**::, **VAX3**::, and in **CVAX**::**[.15JAN84]**.

1712. *December 31, 1983* PRTCC *Eric*

Add a high-order decimal place to the "sum" column for Cas A and the like.
Moved nowhere.

1713. *December 31, 1983* DISKU *Eric*

Add a **DOALL** option to the **HELP** file and code. If **DOALL** is true, the program will list, for a single user, all files individually by size and type.
Moved nowhere.

1714. *January 2, 1984* GAPLT *Eric*

Fix up a variety of Fortran errors, primarily the initialization of Common variables in **DATA** statements. Create a **.E** and a **.R** file.
Moved from Modcomp this date, nowhere else.

1715. *January 3, 1984* Missing Catalog Files *Eric*

When one disk is missing a catalog file for the user, many programs fail. To reduce this problem, special tests for this condition have been put in **CATDIR**, **MCREAT**, and **UVCREA**. Everything should be relinked.
Moved nowhere.

1716. *January 3, 1984* GRTOTEX *Don*

Now uses value of VMS logical symbol **TARGET** as destination directory. Allows retry on **OPEN** failure.
Binary copy moved to nodes **AIPS**:: and **VAX3**::.

1717. *January 4, 1984* MX *Bill*

Fixed two bugs, the first caused **MX** to read past the end of the CLEAN component file when subtracting components from several fields by the DFT method. The second bug was the the zero spacing flux density was not being corrected for the flux density already subtracted.
Moved nowhere.

1718. *January 5, 1984* ZACTV9, ZSTOPA *Gary*

These routines now handle the longer terminal names such as **TTA15**:. I also rewrote the routines in FORTRAN and replaced the assembler versions. This should make maintenance easier in the future.
Moved nowhere.

1719. *January 6, 1984* MX, SET1VS, GET1VS *Bill*

Stripped the data reformatting routines from **MX** and put them in the non-standard library. **SET1VS** and **GET1VS** will return a single true stokes' value or RCP or LCP per requested frequency channel from an arbitrary *uv* data base.
Moved nowhere.

1720. *January 6, 1984* IBUILD.COM, ICOMPAI.COM *Gary*

Entry 1718 required some changes to the installation procedure. **ZACTV9** was the only macro subroutine in **AIPVMS** so the macro logic was removed from **ICOMPAI**. **ZSTOPA** was assembled (now compiled) as a special case in **IBUILD**.
Moved nowhere.

1721. *January 6, 1984* TVHLD *Arnold*

Added input parameter that gives the user a choice of 10 to 13 bits for loading. The **DATA** statement for **IFMBIT** has to reflect the number of bits available in the I^2S IFM (13 at VLA).
Moved to **AIPS**::, **VAX3**::, and **CVAX**::**[.15JAN84]**.

1722. *January 8, 1984* LGEOM *Don*

New task — a variation on task **GEOM**. It has a working array declaration of 300000 (15 times larger than **GEOM**), and therefore is able to rotate very large images by angles 15 times larger than can **GEOM**. For images 512^2 and smaller it can rotate through *any* angle, positive or negative, even greater than 90 degrees. Note: *this task will not be able to run on all computers. It may not even behave properly on all VAXes under all conditions.*
Moved nowhere.

1723. *January 8-9, 1984* GEOM, LGEOM Helps *Don*

Added explanation of the numerical analysis aspects of polynomial interpolation.
Moved nowhere.

1724. *January 9, 1984* DESCM *Bill*

Changed to create output file about the size to be actually used rather than the size of the input file.
Moved nowhere.

1725. *January 9, 1984* MX *Bill*

Fixed bug in **MXMAP** and **MXREST** in which **DSKFFT** was called with the second dimension of the image being the same as the first. This should have caused problems in all non-square maps.
Moved nowhere.

1726. *January 9, 1984* MAPCR *Eric*

Put in a check on the file creation so that scratch files can go to any disk if they fail to go to the requested disk. This is needed for WaWa IO tasks since they usually specify a disk for scratch files and they require that there be a user catalog file on that disk.
Moved nowhere.

1727. *January 10, 1984* UVLOD *Eric*

Drop adverb **DOEOF** and add new adverb **DOCONCAT** (initially false). Change **NCOUNT** and **BCOUNT** to apply on all values of **DOALL**. Allow wild-card source name matching. These changes should make it clearer when concatenation is desired and when it is not. If **DOALL** is true, **DOCONCAT** is ignored and all source structures on the tape matching **SOURCE**, **BAND**, **QUAL**, **NCOUNT**, and **BCOUNT** lead to individual *uv* files. If **DOALL** is false, then only one output *uv* file is created. It will contain the data from the first (**DOCONCAT** false) or all (**DOCONCAT** true) source structures matching the selection adverbs. Fix **UVCREA** to have the correct message level on file creation. Revise **POPSDAT.HLP**, **DAPL.INC**, **CAPL.INC**, and create **DOCONCAT.HLP** to explain the new adverb. Rewrite portions of **UVLOD.HLP** to give clearer inputs, help, and explain.
Moved nowhere.

1728. *January 10, 1984* BSTRT1 *Eric*

Change **VER** to **'NEW '**, add a second version ID of **'NEW:'**. The former is needed to start **AIPSB**, the latter to let **AIPSB** find its memory files. I suspect that **BSTRT1** has not worked correctly for some time.
Moved nowhere.

1729. *January 10, 1984* ZDCHIN, ZACTV9 *Gary*

Change so that **DEVTAB(33)** and **DEVTAB(34)** are initialized to 2 (tape drives). This means that the default set up allows up to four tape drives on a system without the AIPS manager having to set the devtab with **SETPAR**. **ZACTV9** was not initializing **SYSOUT**.
Moved nowhere.

1730. *January 10, 1984* GAL *Gustaaf*

GAL plots the fitted rotation curve and the actual rotation curve in one panel. The latter curve is determined by integration in concentric rings. The plot file is added to the velocity field as an extension file. **APARM(9)** and **APARM(10)** control whether or not a residual output map or a plot extension file is created. See **HELP** and **EXPLAIN** files for details.
Moved nowhere.

1731. *January 10, 1984* K array *Eric*

Increase the size of the **K** array (*POPS* language work area) to provide more storage for temporary literals and compiled code (both temporary and procedures). Revised were:

- **DCON.INC** — Raise **K** to 10752 words.
- **DAPL.INC** — Raise non-adverb **K** to 7390.
- **INIT** — Raise **MPAGE** to 54.
- **POPSGN** — Change temporary area to 250 words, addresses of adverb area and total size parms.
- **AIPS** — Change temporary area to 250 words (in **GTLINE**).
- **AIPSB** — Change temporary area to 250 words.
- **AIPSC** — Change temporary area to 250 words.
- **SGLOCA** — Change **SAVE/GET** file version number to 5.
- **AU2A** — Change **SAVE/GET** file version number to 5.
- **FILAIP** — Change size of **ME**mory file (add 16 blocks).
- **FILAI2** — Change size of **ME**mory file (add 16 blocks).

Moved nowhere.

1732. *January 11, 1984* BLANK *Eric*

Correct 2 bugs affecting **TVCU** method: a failure to resume **AIPS** on error in the initialization routine and a bad call sequence when redrawing the polygons after a vertex was reset.
Moved nowhere.

1733. *January 11, 1984* Misc gripes *Eric*

Minor revisions done because of gripes:

- **UVCOP** — Allow negative times in the copy. Use default times only if **TIME1** >= **TIME2**.
- **SMOTH** — Allow **RA...** x **DE...** axis pairs as well as **LL** x **MM**.
- **UVFND** — Change a record counter to floating to avoid overflow.
- **PRTMSG** — Add a bit about **PRNUMBER** to **HELP** file.
- **CLRMSG** — Add a bit about **PRNUMBER** to **HELP** file.
- **UVSRT** — Change sequence number limits to 9999 in **HELP** file.
- **CORMS** — Add test for non-integer input images.
- **POPSDAT** — Have **TVALL** use **J** rather than **I** for a temporary variable.
- **UVLOD** — Correct spelling error in Inputs part of **HELP**.
- **PRTIM** — Add remarks to **HELP** file to clarify scaling.

Moved nowhere.

1734. *January 12, 1984* SETLOC *Eric*

Fixed a bug in preparing the top label strings for the case where both position axes are numbered more than 2. The Y value was not being used correctly.
Moved nowhere.

1735. *January 12, 1984* PBCOR *Eric*

An essential variable was not initialized in the test on the frequency axis. The Vax would accept velocity axes and the Modcomp would screw up as a consequence.
Moved to Modcomp this date, nowhere else.

1736. *January 13, 1984* APIO *Bill*

New (nonstandard) routine to transfer image-like data from disk to the AP. This routine handles file opening, initialization, buffer flushing in a way more or less transparent to the programmer.
Moved nowhere.

1737. *January 13, 1984* UVINTP *Bill*

Added a new call argument to tell which portion of the vis record is to be used as a work array.
Moved nowhere.

1738. *January 13, 1984* MX *Bill*

Corrected method used for mapping and cleaning multiple frequency channels into a single map. The previous method only worked in the case that the channels were very narrow. Also fixed to show the final image in each channel if **DOTV** is set. Also fixed error in the logic for determining when to quit a major CLEAN cycle. Added **APIO** to several routines. Also changed **MX.HLP**.
Moved nowhere.

1739. *January 13, 1984* APROLL *Bill*

Now supresses level 6 messages from **ZCREAT**.
Moved nowhere.

1740. *January 14, 1984* ERASE *Eric*

New pseudoverb to erase (delete) one or more consecutive lines from a procedure. New file: **ERASE.HLP**, revised **POPSDAT.HLP** (add pseudoverb), **POLISH** (trap out-of-sequence pseudoverb number), **EDITOR** (accept and perform extra functions for **ERASE**), and **EDIT.HLP** (remove reference to *RANCID*).
Moved nowhere.

Changes: 15-Jan-1984 version of AIPS

This publication is intended to provide corrections and updates to the *AIPS COOKBOOK* in order to fill the gap between publication dates. We also hope that users will annotate their current copies of the *COOKBOOK* rather than request a new copy at each publication date.

This Section will provide details of the changes to the 15-Sep-1983 *COOKBOOK* caused by changes in software between the 15-Nov-1983 and 15-Jan-1984 versions of *AIPS*. The changes during this period have almost no effect on the *COOKBOOK*.

Section 13

Add to TVINTER, Page 56:

TVHLD	T	Load high precision image, do equalization	§
TVSLV	T	Display TVSLD output on TV	§
TVHXF	T	Interactive histogram equalization of image	§

Add to ANALYSIS, Page 59:

LGEOM	T	Large map interpolation and rotation	§

Add to CUBE, Page 60:

TVCUB	T	Prepare cube for TVSLD 3-D "solid"	§
TVSLD	T	Prepare 3-D image from TVCUB "cube"	§
TVSLV	T	Display TVSLD output on TV	§

Add to POPSYM, Page 63:

ERASE	PV	Delete line(s) of a procedure	§

Add to INDEX, Page 65:

ERASE	PV	Delete line(s) of a procedure	§

Add to INDEX, Page 66:

LGEOM	T	Large map interpolation and rotation	§

Add to INDEX, Page 69:

TVCUB	T	Prepare cube for TVSLD 3-D "solid"	§
TVHLD	T	Load high precision image, do equalization	§
TVHXF	T	Interactive histogram equalization of image	§

Add to INDEX, Page 70:

TVSLD	T	Prepare 3-D image from TVCUB "cube"	§
TVSLV	T	Display TVSLD output on TV	§

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Page 100, § Z.3.6.

Add paragraph to § Z.3.6 "Monitoring disk space on the MODCOMP":

Sometimes there are scratch files which are no longer in use and can be deleted. One way to do this is to exit to monitor level (prompt **$**) and type:

$ JOB ↵	to init the job control processor.
$ ASS 5 LO 6 LO ↵	to assign the terminal.
$ EXEC AJAX,LMV ↵	to delete any scratch files.

AJAX does take a while to finish so be patient. It will report any files it deletes. Do *not* run **AJAX** if any tasks are executing.

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AIPS Order Form

1. Name and address of Contact Person: _____

   ☐ Address label on back is correct _____

   _____

   _____

   _____

   _____

2. ☐ new order ☐ reorder
   (*N.B.*: If you have received a plastic mailing container from us, we insist that you use it for a reorder.)
   Version of AIPS currently running: _____

3. Tape type desired:
   ☐ VAX/VMS **BACKUP**
   ☐ Simple blocked card images
   ☐ FITS compressed text format

4. AIPS version desired:
   ☐ 15-Jan-1984
   ☐ 15-Mar-1984

5. Tape density desired:
   ☐ 800 bpi
   ☐ 1600 bpi
   ☐ 6250 bpi

6. There are Gripes on the tape:
   ☐ Yes
   ☐ No

Send order form to: AIPS Group
National Radio Astronomy Observatory
Edgemont Road
Charlottesville, VA 22901 USA

January 15, 1984

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

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AIPSLETTER

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National Radio Astronomy Observatory

A newsletter for users of the
Astronomical Image Processing System

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804–296–0211 (FTS 938–1271), x266

TEXset by EWG

Thanks for Your Help

In our 15JAN84 *AIPSLETTER* we asked for comments and advice regarding supermicro development projects which the Charlottesville programmers might undertake. The *AIPSLETTER* editors agreed in advance that a response of three or more letters would be counted as a success. In fact, to date, we have received exactly three letters, and we are grateful to the thoughtful people who took the time to compose them. Their prestigious letterheads are very useful to us in our dealings with vendors. The three responses did not directly answer all of the questions which we posed, but taken all together they tend to confirm our own judgement that the best investment for radio astronomy this year would be to concentrate on larger, more powerful systems instead of on cheaper workstations. At this time we are seriously considering the procurement of a substantial supermicro system (including an AP) but have not yet made a final decision on whether to proceed with the project. We will welcome any further letters on this subject.

FITS Tables Extension

At the urging of IAU Commission 5, an international group was formed to design an extension to the FITS format for the transmission of tabular data. This group has produced a draft agreement which is being circulated for comment via the Astronomical Image Processing Circular (Ed. R. Albrecht, now at European Southern Observatory, Garching). Copies of the document, *Generalized FITS Extensions with Application to Tables* by Harten, Grosbøl, Tritton, Greisen, and Wells, may be obtained by writing to the AIPS group in Charlottesville. In the 15MAR84 release, we have added support for this tentative agreement to the AIPS code. Task FITTP will write clean components in either our old Table format or the new one. (Use the old format for porting data to pre-15MAR84 AIPS systems.) Task IMLOD will read either format automatically. We are planning to develop an internal, generalized Table format for AIPS and to create tasks to perform a wide variety of operations on such files. When we do so, FITTP, IMLOD, and UVLOD will acquire the capability to handle tables in a much more general fashion.

Going AIPS

The current release contains a nearly complete version of the new AIPS programmers' manual entitled *Going AIPS*. The manual was written primarily by Bill Cotton with some help from Don Wells, Eric Greisen, and Gary Fickling. It is intended to be of use to anyone wishing to write or modify programs in the AIPS system — from minor modifications of existing programs, to entire packages of software, to installations on new operating systems and peripheral devices. *Going AIPS* will replace Volume II of the old AIPS Manual Series when some of the most detailed, and still relevant, information from that volume is transferred to Volume III. Some of the more arcane parts of AIPS are documented for the first time in *Going AIPS* (*e.g.*, TV displays, the AP interface, AIPS FITS tape conventions, etc.). There is also a prominent discussion of the Skeleton tasks which make it easier for users to add many types of new tasks to AIPS. In detail, the contents of *Going AIPS* are:

1. Introduction
   philosophy, style, language, documentation
2. Skeleton Tasks
   FUDGE, **TAFFY**, **UVFIL**, **CANDY**, etc.
3. Getting Started — Tasks
   how they work, how to write and install one
4. The **AIPS** Program
   POPS language processor, installing new verbs and adverbs
5. Catalogues
   data catalogues, image catalogues, coordinate systems
6. Disk Files
   file management, I/O
7. Devices
   tapes, graphics
8. WaWa ("Easy") I/O
   use, weaknesses
9. TV Displays
   fundamentals, current applications, Y routines
10. Plotting
    plot files: writing and reading
11. Using the Array Processor
    coding for FPS in Fortran and lower levels, the pseudo AP
12. Z Routines
    commons, routines by category
13. FITS Tapes
    images, *uv* data, extensions both old and new

We intend to update and upgrade this manual as needed to reflect the current state of AIPS. We would appreciate any and all comments on the manual — use the **GRIPE** mechanism or write to us directly. The DEC **RUNOFF** program is used to organize the document. This means that it has a proper Table of Contents, running page headings, and a real Index. The output of this program may be found in the file **DOCTXT:ALL.MEM**. This file should produce acceptable results on standard printers. Bound copies of *Going AIPS* also should be obtainable *someday* by writing to us in Charlottesville — but they are *not* available at present.

The Portability Column

CPU/OS Combinations

Unix in General: Our efforts to "support AIPS under the Unix operating system as well as we support it under VMS" are proceeding. Large parts of AIPS have now executed under Unix on three completely different CPU architectures (VAX, IBM, and 68000), implemented under three different dialects of Unix (V7, 4.2bsd, and System-III). The VAX/4.2 implementation is now in production use at Texas, our principal test site (see David Garrett's report below). We are not yet sufficiently satisfied with our Unix implementations to begin releasing copies of them. When we are satisfied this will be signaled by the appearance of a Unix "tar" tape option on our order forms. Unix sites who wish to place advance orders may do so (several sites have now done this).

The Unix "Portable Fortran Compiler": Most Fortran compilers used in Unix systems are derived from the original Fortran-77 compiler (called "f77") which was constructed at Bell Labs circa 1978. This compiler has a portable, machine-independent syntax analyzer. The back-end of the compiler, which produces the machine code, is actually the back-end of the "C" compiler. One result of this design is that bugs in the syntax analyzer are *portable.* Likewise, the portable support library may also contain portable bugs. We have now seen a number of versions of this compiler and are aware of a substantial number of bugs in both the compiler and its run-time library. Some of these bugs have been fixed in the compilers and libraries supplied by certain vendors, but other vendors are supplying copies of f77 which contain easily detectable bugs. In light of these observations, we think that *all* versions of f77 should be considered guilty until they are proven innocent. We now have a suite of test problems which we use to screen out the versions of f77 which still have too many bugs. We hope eventually to put this suite into such a form that we can distribute it so that others can use it, but at present it is not ready for public distribution. We are willing to advise and assist (in a limited way) anyone who wants to test some version of f77. At this time the only versions of f77 which we regard as acceptable are the 4.1bsd, 4.2bsd, and MassComp (2.0 version only) compilers. The Amdahl compiler still does not pass our tests and the original MassComp compiler didn't either. The fact that we have accepted a compiler does not mean that it is bug-free. It merely means that we have succeeded in working around the remaining bugs in order to bring AIPS up (some bugs are more serious than others for AIPS installation).

VAX/4.2bsd: David Garrett (University of Texas, Austin) writes [1 March 1984]: "The current version of AIPS running on our VAX11/780 under Berkeley 4.2 Unix is an update of a version that has been running here for several years. Kerry Hilldrup has made some modifications and extensions of my original Z routines for this version. He has also developed some SED and shell scripts to translate the FORTRAN code to something acceptable to the Unix f77 compiler. On our VAX, AIPS resides on its own 90 MB disk, 25 MB of which are used for the source code and executable files. Users can also mount their own disk packs for use as a privately owned second disk in AIPS. Typically, 10 to 15 people spend a total of 100 hours in AIPS each month and use a total of 10 hours of CPU time."

"Our AIPS looks much like the versions running at the VLA or in Charlottesville. Except for a few TV routines, we can and do run all the normal AIPS verbs and tasks. Many users (including myself) have brought back EXPORT tapes from the VLA for full data reduction (UVMAP, APCLN, ASCAL, etc.) locally. We do not have an array processor, so the AP tasks take about 10 times longer than at the VLA. For example, UVMAP uses 15 CPU minutes to process snapshot data with 10,000 visibility points compared to 1–2 minutes at the VLA. Cleaning 1000 components from the inner quarter of a 512^2 image takes much of a working day under normal computer loads, so such tasks are usually submitted as AIPS batch jobs. Because of the lack of an AP and because of disk space problems, I encourage the local VLA users to bring back EXPORT tapes

of snapshot data, but to reduce their full synthesis data at the VLA (a few 8-hour synthesis maps have been reduced locally but it is a very long process)."

"At least half of the local users are optical astronomers who use the image display routines on their CCD images. These users would like to see more general image analysis routines. Graphic output is displayed on a TEK4025, several TEK4010 emulators, a Printronix line printer/plotter, a ZETA pen plotter, and a Jupiter-7 color monitor. The Jupiter-7 has only one plane or channel, so TV functions requiring more (*e.g.* **TVMOVIE**) are not implemented. All the cursor functions used in **AIPS** are available on the Jupiter-7 and TEK4025."

SUN/4.2bsd: David continues: "I am currently [1 March 1984] installing AIPS on our SUN-150 workstation (also running Unix 4.2bsd). I have successfully run the AIPS setup routines **FILINI**, **SETPAR**, and **POPSGN**. These programs give the system-dependent Z routines a pretty good workout, so I am confident that not too much work remains. However, we currently do not have enough space on the disk attached to our SUN to do much more than a test run of AIPS."

Gould-SEL/MPX32: Jan Bystedt (Stockholm Observatory) writes [9 March 1984]: "... we have many problems with the MPX! The manuals do indeed look nice but they are heavily contaminated by little bugs ... by the end of April we hope to start production."

MassComp/Unix: AIPS is alive and well on the Green Bank MC-500. The main information conveyed by this fact is that MassComp's Fortran compiler, like the 4.2bsd compiler, is now good enough for AIPS. MassComp's Unix is quite conventional and it is no surprise that AIPS runs happily under it. The speed of the machine is not too embarrassing, but until it receives its hardware FP board (in the near future) there is no point in quoting any benchmarks. We are unable to implement graphics support because we are running over a phone line from Charlottesville to Green Bank and can't see the hardware. A few days ago Kerry Hilldrup got a person in Green Bank to mount an EXPORT tape and began testing **EXIND** with it. This established that tasking works, but the tape positioning routine **ZTAPE** has some difficulties. Development is continuing and we will give another report in the next *AIPSLETTER*. *Please note that, although the NRAO may support AIPS on Masscomp computers some day, we do not do so now and make no promise to do so in the future. If you purchase a MassComp for running AIPS at this time, you must be prepared to do any necessary software development yourself.*

Image Displays

New displays supported: The **15MAR84** release contains Y-routines for the I^2S Model 75 and DeAnza displays. These routines were developed by International Imaging Systems and by Walter Jaffe of the STScI, respectively, and installed in AIPS by Eric Greisen. The Model 75 is sufficiently similar to the I^2S Model 70 that no major problems were encountered with that conversion. However, the DeAnza posed some problems. At Walter's suggestion, the AIPS I/O for TVs was revised to isolate TV operations (open, close, read, write) from those of other devices (*e.g.* disks). Double-buffer read/writes and simultaneous image loading to more than one image memory were dropped.

Walter writes [24 Nov 1983] "... The Y-routine part is fairly straightforward. ... In most cases I have followed the I^2S calling sequences without change, including parameters like VERTICAL RETRACE which have no direct application on the DeAnza. There are other cases where the changes are larger, and some things that were present on the I^2S but either under or not utilized are omitted. This includes histograms and feedback/ALU functions."

"I have set up the routines to utilize STANDARD memory planes in the DeAnza (*i.e.*, 512^2 pixels). If someone has a DeAnza with EXTENDED memory (1024^2 stored but 512^2 displayed) some changes will have to be made. The minimum change is that the RESOLUTION register initialization value in **YINIT** would

have to be changed from Z0040 to Z0060. This will allow loading 512^2 images with no further changes. To make **YSPLIT** effective for roaming over a 1024^2 image stored in one extended plane would require changes that I haven't thought about enough to make suggestions. Similarly I haven't studied the consequences of driving 1024^2 display hardware (Video Output Controller in DeAnza lingo)."

"I have similarly assumed a trackball driver to the cursor. Using a joystick would require small changes. I have assumed a programmable cursor, like that on the I^2S, but have indicated in **YCRCTL** what to change if only a hardware cursor is available. In this case **YMKCUR** would have to be stubbed."

"Note that the DeAnza can only connect one plane to a gun at any time. Thus the operation of **TVON** and **TVOFF** are somewhat altered, as is the implementation in **YSPLIT**. For the most part I choose the lowest plane specified to turn on if more than one is requested."

"For better or worse, I have followed your I^2S example and restructured the DeAzna lowest level interface. ... To make it work, you need a bunch of OPCODE definitions that are contained in a module delivered by DeAnza called **IP8IOF.MAR**. I did not include it here because it is copyrighted DeAnza software, but it should be present on any DeAnza installation. It needs to be assembled and included in one of the OLBs used for link editing."

"The VMS installation of the DeAnza is very idiosyncratic and non-transportable. It could not possibly work in anything like its current form on a Modcomp. The Y-routines would have to be modified extensively to accomodate a different driver."

'Note also that the DeAnza driver can be restructured in real time by a number of programs provided by DeAnza. One of these, for instance, allocates memory planes and Vidio Controllers among users. You may find, say, that your DeAnza has 4 memory planes but you can only access two of them because someone has set up the driver that way."

"The DeAnza has an enormous number of internal registers, all of which must be set right to make it work. To avoid having to reset them at the beginning of every elemental operation (which slows things down a lot), I keep a large set of software registers in the **DTVC/CTVC** common. These I check before elemental operations to see if the hardware needs updating. They must of course be correctly initialized (by **YINIT** for instance) to work. Because I didn't want to meddle with the current use of the **DTVC** areas, including dummy and spare areas, I just added the new words on to the end of the common, in an array called **YBUFF**, which is saved and restored by **TVOPEN** and **TVCLOS**, along with the rest. ..."

"In the Y-routines I specify positions in **YBUFF** using **PARAMETER** definitions contained in an include file. I include it here with the Y-routines, but it has to be installed in the **INCS**: logical subdirectory."

MassComp/I^2S Model 75: Recently we learned that I^2S (International Imaging Systems, Milpitas, CA, 408-262-4444) is marketing a Model 75 with a 68000-based host computer attached (their model H68E). In fact, this host is made by MassComp! The implications of this are that I^2S now has a Multibus interface for the Model 75 and the appropriate Unix drivers and support software. Strictly speaking, this hardware/software support applies only to MassComp CPUs, but it would not be very surprising if the adaptation to other Multibus CPUs under Unix proved to be straightforward. The Unix support might also apply to some extent to non-Multibus systems. We have not yet asked I^2S about these possibilities. *Our mentioning of the availability of this product does not constitute any sort of endorsement of it or of the vendor involved.*

APs

Our evaluations of various APs and supercomputers continue. Recently we have been concentrating on the MassComp AP-501 because of its remarkably low price/performance ratio (or, equivalently, its high

"bang-per-buck" ratio). Early in March five NRAO personnel (Bill Cotton, Bob Duquet, Eric Greisen, Gareth Hunt, and Don Wells) visited MassComp's factory to obtain more information about MassComp and its products, especially the AP-501. Although the pipeline speed of the AP-501 is about the same as that of the AP-120B, the memory size is smaller. This weakness is offset by high bandwidth to central memory and low OS overhead. We are not yet sure whether, on balance, the total system will display attractive performance for AIPS AP tasks, and we have requested further information from MassComp in order to help make a decision.

Summary of Changes: 15 Jan – 14 Mar

These changes are listed in detail in the CHANGE.DOC file reproduced later in the *AIPSLETTER*. The group has been busy during the past two months, but its most significant accomplishments will not be visible to the average user. This release does, however, contain seven new tasks. **UVAVG** is a powerful new task to average (over time) or to merge *uv* data sets sorted either in "BT" or "TB" order. It will reduce the number of sorts required and will eliminate a lot of the use of **AVER** and **VBMRG**. **BCAL1** and **BCAL2** are a pair of experimental tasks written by Craig Walker. They apply additional calibration to *uv* data on a baseline, rather than antenna, basis. **PLCUB** is a plot program for 3-dimensional images. Each row is plotted as a panel in a grid in the 2nd and 3rd coordinate axes. **DCONV** is an experimental Gaussian deconvolution task which will probably be used most on spectral-line moment maps. **QMSPL** is a task to translate AIPS plot files to the Quality Micro Systems Lasergrafix 1200 (300 dots/inch) laser printer. Finally, **NOBAT** is a task which reserves the array processor for the high priority user. A completely rewritten, essentially complete programmers' manual, called *Going AIPS*, also appears in this release (see previous article).

A variety of tasks received significant improvements. **DBCON** will merge, rather than simply concatenate, the input data sets when the two sort orders are identical. As with **UVAVG**, this improvement should reduce the need for sorting. The paraform task **CANDY** now uses the **INFILE** adverb and the paraform task **TAFFY** can handle much more complicated algorithms involving scrolling, multi-row buffers. The roller for the array processor was improved and now appears in all AP tasks. The tentative international agreement on FITS extensions for tabular data has been implemented in **IMLOD** and **FITTP** for AIPS clean components. The old AIPS extension format will continue to be supported as well. The television code was revised in a substantive way (see previous article), particularly in the handling of I/O operations. Versions of the AIPS TV routines are now available for I^{2}S Models 70 and 75 and for DeAnza TV displays. However, the only change that the user should notice is that image loading can now be done only one channel at a time.

Several bugs have been eradicated. Bugs in **MX** affecting the DFT component subtraction, bandwidth synthesis, and the scaling of histograms have been corrected. **VM** received its usual complement of unspecified corrections and improvements. **UVSRT** will finally copy gain files. **CONVL** no longer shifts the image center when convolving two images. And the full 48 characters of the **VERSION** adverb are now supported on Vaxes.

CHANGE.DOC: 15Jan84–14Mar84

1741. *January 17, 1984* ASSIGNP.COM *Gary*

Logical name **HIST** changed to **HST** to keep from conflicting with program **HIST.FOR** during updates.
Moved to **OLD:**. Will be on **15JAN84** tape.

1742. *January 17, 1984* TVWIND *Gary*

Moved from **AIPSUB** to **APLSUB** to allow linking of **TVHLD**.
Moved to **OLD:**. Will be on **15JAN84** tape.

1743. *January 17, 1984* MX *Bill*

Fixed bugs in DFT subtraction routine which caused problems for more than 1024 components at a time.
Moved to **OLD:**. Will be on **15JAN84** tape.

1744. *January 20, 1984* MX *Bill*

Fixed another bug in the bandwidth synthesis portion of the gridding routine and a similar bug in the gridded subtraction routine.
Moved to **OLD:**, to VLA on 8-Feb-1984.

1745. *January 20, 1984* Help files *Eric*

Updated general **HELP** files to reflect changes up to **15JAN84**. Files changed were **TVINTER**, **ANALYSIS**, **CUBE**, **POPSYM**, **INDEX**, and **WHATSNEW**. Fixed spelling in **UVLOD** Help file.
Moved to **OLD:**, to VLA on 8-Feb-1984.

1746. *January 23, 1984* VM *Tim*

New version of **VM**, should be better. Also includes **CVMN.INC** and **DVMN.INC** and the Help file.
Moved nowhere.

1747. *January 23, 1984* SMOTH *Arnold*

Fixed bug related to the input beam position angle when specified by the user. Edge of map is now indefinite instead of zero. HELP now includes obscure error codes.
Moved to **AIPS::LOAD**, **VAX3::LOAD**, **CVAX::[.15MAR84.NOTST.PGM]**.

1748. *January 24, 1984* IMLOD *Ed/Eric*

The precision of the correction parameters for fixing up IMPS-like FITS reference pixel values was declared only **REAL*4**. Fixed to **REAL*8** in **DMLT.INC**.
Moved to **OLD:**, to VLA on 8-Feb-1984.

1749. *January 26, 1984* UVMAP.HLP *Bill*

Now tells the user the correct values for **STOKES** to use for spectral line.
Moved to VLA this date, to VLA again on 8-Feb-1984.

1750. *January 26, 1984* VM *Tim*

Added by Editor from **CHKOUT** *history file:* Fixed problem with **NPOINTS**.
Moved from VLA this date, nowhere else.

1751. *January 27, 1984* CITCC *John*

Added by Editor from **CHKOUT** *history file:* Fixed bug that writes zero flux density cc's.
Moved nowhere.

1752. *February 1, 1984* BLANK.R *Eric*

Added by Editor from CHKOUT *history file:* Corrected terminal assignments (Modcomp TOC file for BLANK).
Moved nowhere.

1753. *February 3, 1984* DBCON *Bill*

Modified to merge input data files if the sort orders are the same. This saves an extra sort when combining 'XY' etc. sorted data. Also changed: DDBC.INC and DBCON.HLP.
Moved nowhere.

1754. *February 3, 1984* VBCIT *John*

Installed modifications supplied by Tim Pearson (CIT) that allow orbiting VLBI observatories.
Moved nowhere.

1755. *February 3, 1984* VBLIN *John*

Fixed bug that caused AIPS restart to be skipped when certain inputs were incorrectly specified.
Moved nowhere.

1756. *February 5, 1984* UVSRT *Eric*

Corrected buffer subscripts to allow GA files to be copied correctly.
Moved to OLD: this date, to VLA on 8-Feb-1984.

1757. *February 7, 1984* MX *Bill*

Fixed a number of bugs and problems. (1) The maximum brightness residual pixel in the CLEAN window only is used for scaling the pixel brightness histogram. (2) The output reference frequency and channel increment were corrected in the case of bandwidth synthesis. (3) The beam header is updated every time a beam is made and after the first beam is made the destroy-on-fail flag is removed. (4) The number of frequency channels in the data is checked for agreement with the requested number when doing bandwidth synthesis.
Moved to OLD:, VLA, VAX3 on Feb. 8. Will be on 15JAN84 tape.

1758. *February 7, 1984* ZACTV9 *Gary*

Two bugs in activating batch jobs; the routine was looking for AIPSB in the string INAME instead of in PNAME, and the variable UIC was used in the call to $CREPRC instead of %VAL(UIC). These errors did not go to any site except the VLA.
Moved to OLD:, VLA, VAX3 on Feb. 8. Will be on 15JAN84 tape.

1759. *February 8, 1984* CANDY *Bill*

Added adverb INFILE and example code for using CANDY. Also removed scratch file (and BADDISK adverb). The output file is now used as the scratch file and converted to integer at the end if necessary. Also changed CANDY.HLP and put a few details in the EXPLAIN section.
Moved nowhere.

1760. *February 8, 1984* ZQCREA.MAR *Gary*

Changed so that "disk quota exceeded" error returns the same error code (3) as "disk full" error. This will cause the scratch file creation routines to try another disk.
Moved nowhere.

1761. *February 9, 1984* TAFFY *Bill*

Modified to allow **DIDDLE** to defer returning the next output row. This allows the use of scrolling buffers. Also modified **TAFFY.HLP** accordingly and added an **EXPLAIN** section.
Moved nowhere.

1762. *February 11, 1984* MX, UVPLT *Ed*

Modified the help file for **MX**. Made slight changes in the help file for **UVPLT**.
Moved nowhere.

1763. *February 11, 1984* CLIP,UVFLG,PRTAN,IMLOD *Ed*

Added **EXPLAIN** sections to the above help files.
Moved nowhere.

1764. *February 14, 1984* VBLIN *John*

If bandwidth in VLB data headers are abnormally small, reset BW=2000.0 kHz. Also modified the Help file.
Moved nowhere.

1765. *February 15, 1984* TKPL, TKCLR (New) *Gary*

TKPL now uses subroutines to perform two Tektronix specific functions. This should make it easier to modify the task for other graphics terminals. **TKPL** now uses **TKCLR** to clear the screen and **TKCHAR** to write characters.
Moved nowhere.

1766. *February 16, 1984* BPROLL (AP roller) *Bill*

Added a new subroutine to roll a task out of the AP. It will save only the memory specified and if 0 words are to be saved the AP is released, the task is delayed, and the AP reassigned. **BPROLL** calls **APROLL** and then destroys the scratch file if the contents of the AP memory are to be saved. A new common (**/BPROLC/**), obtained from the include files **DBPR.INC** and **CDBR.INC**, is needed. This common contains information telling whether the AP is rollable, the time the AP was assigned, the time until the AP is to be given up, and the task delay time after the AP is given up. These values are set by **BPINIT**. In this scheme, the time between rolls can be more-or-less determined by **BPINIT** and can be a function of the *POPS* number. Added **NOBAT** to the list of AP tasks in **BPINIT**. Other files affected:

PASS1.FOR **PASS2.FOR** **BPROLL.FOR** **APROLL.FOR**
BPINIT.FOR **DBPR.INC** **CBPR.INC**

Moved nowhere.

1767. *February 16, 1984* MX *Bill*

Added many calls to **BPROLL** (see entry 1766). All AP routines except **MXADD** and **MXBHIS** can now roll out of the AP. Some of the routines may still hog the AP too long and may need a bit more fiddling. Also fixed bug in DFT subtraction which caused it to lose records if it rolled out of the AP.
Moved nowhere.

1768. *February 17, 1984* MX *Bill*

Fixed bug inserted in entry 1767 which caused **MX** to attempt to restore the components to a field for which none had been removed.
Moved nowhere.

1769. *February 20, 1984* TV routines *Eric*

Following work by Walter Jaffe to adapt AIPS to a DeAnza television device, the TV system has been redesigned in part. The largest change was to have all I/O go directly through a TV I/O routine which is now called solely by Y routines. This means giving up the attempt to double buffer TV I/O, but that never bought us much. For other reasons, I separated the open and close operations into Y routines (which call Z routines). Changed are Vax Z routines and I^2S Y routines:

- **ZFIO** — Replaced TV part with error message.
- **ZMIO** — Replaced TV part with error message.
- **ZM70XF** — Dropped all references to **TVMAP**.
- **ZOPEN** — Added error test for TV, no longer do TV devices.
- **ZM70OP** — New: opens TV devices (I^2S M70 on Vaxes anyway).
- **ZM70CL** — New: closes TV via call to **ZCLOSE**.
- **ZM70MC** — New name for **ZIIMC.MAR**, dropped **ZTVMC.FOR**.
- **YTVOPN** — New: calls **ZM70OP** to open device.
- **YTVCLS** — New: calls **ZM70CL** to close device.
- **YTVMC** — New: calls **ZM70MC** to do master clear operation.
- **TVOPEN** — Changed to call **YTVOPN**, not **ZOPEN** for TV device.
- **TVCLOS** — Changed to call **YTVCLS**, not **ZCLOSE** for TV device.
- **YIMGIO** — Removed from **TVPL**, revised to handle 4 angles (0–3 for right, up, left, down). This will now be the main routine to write to the TV.
- **YGYHDR** — Now a 2nd level Y routine: changed the angle definition.

Moved nowhere.

1770. *February 20, 1984* "New" Y routines *Eric*

Revised a variety of the lower level service routines:

- **YCNECT** — (Formerly **ICNECT**) a TV-independent vector generator which can be replaced on those TVs having a hardware vector generator. Also changed call sequence to single channel and use **YIMGIO**.
- **IMVECT** — Changed calls to **ICNECT**.
- **IZERO** — Changed call sequence, now supports other TV writing modes and uses **YIMGIO**.
- **YCHRW** — (Formerly **IMCHRW**) a TV-independent character generator which can be replaced on those TVs having a hardware character generator. Now uses **YIMGIO** and changed call sequence to a single channel.
- **IMANOT** — Uses **YIMGIO** and sets corners correctly for various possible TV modes. Now supports **IANGL** = 0 or 3 only.
- **IMCHAR** — Calls **YCHRW** now and supports **IANGL** = 0 or 3 only.
- **BLTFIL** — Changed call to **ICNECT** to **YCNECT** and channel number.
- **TVFIDL** — Changed to single channel input argument.
- **YCUCOR** — Changed to include graphics overlay planes (affects **TVBOX**, **TVWIN**, **TVSTAT**).

Moved nowhere.

1771. *February 20, 1984* TV common *Eric*

The method of opening the TV (no MAP parameter) and the TV device common (add a spare buffer for device-dependent parameters) were changed. Files changed:

TVOPEN — Dropped MAP from call sequence, now fills full common.
TVCLOS — Now saves all common except first 29 words.
DTVC.INC — Added declare of YBUFF(168).
CTVC.INC — Added YBUFF in common.

Moved nowhere.

1772. *February 20, 1984* Applications *Eric*

Numerous application routines needed changes to avoid using the old Z routines for TV I/O operations and for the changed call sequences mentioned above. Included are:

DECBIT — Added argument to return lowest channel selected.
TVLOAD — Dropped map I/O, changed call sequence to load single plane, call YIMGIO.
IENHNS — Fixed call to IMCHAR (angle = 3 now), dropped background plane entirely, use IZERO.
TVPL — Removed YIMGIO, added IISVEC (renamed TVVEC), changed to trap plot file angles = 1 and convert to TV convention (3), changed call to TVOPEN. Changed to use lowest channel number in TVCHAN.
BLANK — Changed calls to TVOPEN, TVLOAD, DECBIT. Can now leave TV open now rather than switching between map and non-map a lot.

Moved nowhere.

1773. *February 20, 1984* AIPS subroutines *Eric*

Changed subroutines in AIPSUB for the above revisions. Files modified:

AU5 — Changed TVOPEN and DECBIT calls.
AU5A — Changed TVOPEN call, TVLOD to use lowest channel given only. Corrected DECBIT, TVLOAD calls.
AU5B — Changed TVOPEN call.
AU5C — Changed TVOPEN call, use YIMGIO now. Be careful about a possible zero divide.
AU5D — Changed TVOPEN calls to 1, DECBIT call, corrected call to MOVIST.
AU6 — Changed TVOPEN, DECBIT calls. Still allow compound TVCHAN values in TVSCROL and OFFSCROL.
AU6A — Changed TVOPEN, DECBIT calls. Still allow compound TVCHAN values in TVTRAN, TVLUT, *et al.*
AU6B — Changed TVOPEN call, cleaned up a bit.
AU6C — Changed TVOPEN, DECBIT calls and call to TVFIDL to use lowest channel only.
AU6D — Changed TVOPEN call.
GRBOXS — Corrected error tests and added message.
GRLUTS — Changed angle in call to IMCHAR for vertical string.
GRPOLY — Corrected error test.
HIENH — Changed call to DECBIT, fixed comments re channel numbers.
IAXIS1 — Changed calls to IZERO, angle to IMANOT (vertical), cleaned up a little.
ITICS — Cleaned up typing a little.
TVFIND — Added check that user-indicated image is of correct type.

Moved nowhere.

1774. *February 20, 1984* Other applications *Eric*

Modified subroutines **IMOPEN** (new call to **TVOPEN**) and **TVDISP** (use **YIMGIO** not **MINIT** and **MDISK**). Modified tasks **APCLN**, **APGS**, **VM**, **IMLHS**, **MX**, **REGLR**, **UVDIS**, **APMAP**, and **UVMAP** to new call sequence of **TVOPEN** and to use **YIMGIO** rather than the old double-buffer I/O (**MINIT** and **MDISK**).
Moved nowhere.

1775. *February 20, 1984* ZQASSN *Eric*

Added by Editor from **CHKOUT** *history file:* Corrected Vax version to return an error code on invalid name.
Moved nowhere.

1776. *February 21, 1984* NOBAT *Bill*

New task which looks like an AP task but really isn't. It will suspend itself for a period of time and then quit. Also a new Help file.
Moved nowhere.

1777. *February 21, 1984* CONVL *Bill*

Fixed several bugs which caused the center to be shifted in most cases of convolving two images. Fixed several other minor bugs and added calls to the AP roller.
Moved nowhere.

1778. *February 22, 1984* APROLL, BPROLL, SNCRC *Eric*

Minor standardization to typing principally. Move from **NOTSUB**: to **APLSUB**: Now the AP tasks should link correctly.
Moved nowhere.

1779. *February 22, 1984* VBLIN *John*

Added corrections for the fractional-bit-shift error in VLB data due to incremental delay tracking in the correlator.
Moved nowhere.

1780. *February 22, 1984* VERSION *Eric*

The VAX (at least) versions of the directory searching routines were truncating the **VERSION** adverb at 20 characters. Corrected are **TXTMAT** (comments), **ZTXMAT** (VAX version), and **ZDIR** (VAX version). The Modcomp doesn't really use **VERSION**, but changed the comments to **ZTXMAT** (Modcomp) anyway.
Moved nowhere.

1781. *February 22,1984* XYVAL *Gustaaf*

A bug was fixed, which caused erroneous results when **XYVAL** was used with a "FELOCITY" axis without the non-linear position axes.
Moved nowhere.

1782. *February 22, 1984* UVAVG *Craig*

Program **UVAVG** was installed in **NOTST**. It averages or merges data in 'TB' or 'BT' order. It will also reduce the size of a data set by not writing every output record. **UVAVG** replaces **AVER** and **VBMRG**, providing the added capability of using 'TB' sorted data and so avoiding many sorts.
Moved nowhere.

1783. *February 22, 1984* BCAL1, BCAL2 *Craig*

Programs **BCAL1** and **BCAL2** were installed in **NOTST**. They provide the ability to correct a data set for non-closing errors based on results from a point source calibrator.
Moved nowhere.

1784. *February 23, 1984* Modcomp Z routines *Eric*

Brought the Modcomp versions of the Z routines up to date for the new TV I/O system. Changed **ZOPEN**, **ZFIO**, **ZMIO** to refuse to do things for the TV. Created **ZM7OCL** (calls **ZCLOSE** simply) and **ZM7OOP** (does TV assignment). Renamed **ZTVMC** to **ZM7OMC** and removed references to double buffer I/O. Modified **ZM7OXF** to remove the double buffer I/O.
Moved nowhere.

1785. *February 23, 1984* VM *Tim*

Changed to write out the current **VM** image after every iteration. Also releases AP slightly more often. Also changed **HELP** to reflect these improvements. Changed **DVMN.INC** and **CVMN.INC** also.
Moved to **15JAN84** areas on VLA vaxes.

1786. *February 23, 1984* LINIO *Gustaaf*

Entered this routine in **NOTSUB** area. It reads/writes a real array from/to disk, taking care of the appropriate scaling. It could replace calls to **MDISK**.
Moved nowhere.

1787. *February 23, 1984* CONVL *Bill*

Fixed bug in check for valid Gaussian beam introduced in last fix.
Moved nowhere.

1788. *February 24, 1984* VM *Eric*

The checkout system was violated again and the corrections made to **VM** for the new TV routines were lost. They have been reinstalled.
Moved nowhere.

1789. *February 24, 1984* TV HELP files *Eric*

Clarified what certain verbs now do with decimal coded values of **TVCHAN** (take the lowest). Changed are **TVCHAN**, **TVPL**, **BLANK**, **TVLOD**, **TVALL**, and **TVFIDDLE** Help files.
Moved nowhere.

1790. *February 27, 1984* IBUILD.COM *Gary*

This procedure was not compiling the batch fix up start routine, **ZSTRTS**.
Will go on **15JAN84** tape.

1791. *February 28, 1984* TK open/close *Eric*

Created new Z routines **ZTKOPN** and **ZTKCLS** to open and close the graphics device. These are simple on Vax and Modcomp since they are allowed to call **ZOPEN** and **ZCLOSE**. However, they allow special calls to be added to do setup and close operations such as those required for RetroGraphics. Made a version of **ZTKOPN** and **ZTKCLS** based on Jaffe's **ZOPEN** and **ZCLOSE** modifications for RetroGraphics and stored them in the **APLDEA:** area. Revised **XGAUS**, **XPLOT**, **TKPL**, **TKSLAC**, **AU9A**, and **AU9B** to call these Z routines rather than **ZOPEN** and **ZCLOSE**.
Moved nowhere.

1792. *February 28, 1984* DEANZA Y routines *Walter/Eric*

Created a new directory [.APL.YSUB.DEA] and stored the Y routines developed by Walter at the STScI for the DeAnza TV display. Revised by Eric so that they are complete and match the current call sequences and functions of the Y code. Created the

ZDEAOP ZDEAMC ZDEAXF ZDEACL

subroutines using Walter's code as a base. Some of the Y routines are very similar in the I^2S and DeAnza implementations. These are

YCUCOR YCURSE YSLECT YLNCLR YCHRW YCNECT

Others were modified in at least some significant ways including

YINIT YTVCIN YZERO YTVCLS YTVMC YTVOPN
YCRCTL YIMGIO YLUT YOFM YSCROL YSPLIT
YZOOMC

There are also 4 level-2 Y routines: YMKCUR and YGGRAM talk to the TV and YLOWON and YTCOMP perform minor logical functions. NOTE: the colors in YGRAPH are not correct at least for graphics plane 3 at this time. There is also a special DeAnza include file YDEA.INC in the INCS: area. NOTE also: some of the DeAnza routines are not written in AIPS-standard Fortran. They will work on a Vax only.
Moved nowhere — to go to STScI for retesting.

1793. *February 28, 1984* QMSPL *Eric*

Released this tentative version of TKPL designed to work on the QMS laser printer. It contains some non-standard, Vax-dependent coding and is not fully debugged. However, some of our sites have the QMS printer and we do not. Hopefully, one of those sites will fix up the character spacing and add some sort of gray scale capability and send it back to us. Put the Fortran in NOTPGM: and a Help file in HLPFIL:.
Moved nowhere.

1794. *February 29, 1984* CONVL *Bill*

Put in some scaling factors to try to prevent overflows when dealing with images with *A LOT* of power at some spatial frequencies. Also changed DCVL.INC and CCVL.INC.
Moved nowhere.

1795. *March 1, 1984* TVSLV, TVHXF, TVHLD *Eric*

These three are seriously non-standard and will work only on I^2S TVs with a VAX VMS system. Revised them, however, to have new call sequence to TVOPEN, to use YIMGIO (TVHXF) or ZM70XF (TVHLD) rather than previous I/O routines, and to be somewhat more standard in typing and in attempting not to be so dependent on the particular TV.
Moved nowhere.

1796. *March 1, 1984* BPINIT *Eric*

Removed PHCLN from the list of AP tasks.
Moved to VLA this date, nowhere else.

1797. *March 2, 1984* TV routines *Eric*

Changed SETTVP to display and set all TV characteristic parameters. Does basic set on change level 2 and full set on level 3. Corrected ZM70OP (Vax) to close FTAB entry on failure of the assignment and YIMGIO (M70 and DeAnza) to handle the angle parameter correctly.
Moved nowhere.

1798. *March 6, 1984* MX *Bill*

Fixed bug in residual histogram handling; now it only updates **RESMAX** in **MXMAP** and **MXRHIS** if no CLEANing has been done on this channel. After this, **RESMAX** (the maximum residual) is only changed by **MXACLN**; this is now more or less the same method that **APCLN** uses. Also changed **DMX.INC** and **CMX.INC**.
Moved nowhere.

1799. *March 6, 1984* UVAVG *Craig*

Removed restrictions on **XINC** and **YINC** in **UVAVG**. The average time had been limited to just over a day which was causing problems.
Moved nowhere.

1800. *March 6, 1984* VM *Tim*

Changed stopping criterion. Also changed **HELP**.
Also in VLA VAXes, minus new TV stuff.

1801. *March 5, 1984* AP task lists *Eric*

Fixed lists of AP tasks in **AU2** and **AIPSC** (dropped **PHCLN**, added **MX**) and in **BPINIT** (wrong number of tasks given in **DATA**).
Moved nowhere.

1802. *March 5, 1984* MSGHDR *Eric*

Verb **TPHEAD** did not give the Declination in the usual sexagesimal units due to a bad test in **MSGHDR**. Fixed it.
Moved nowhere.

1803. *March 7, 1984* MX *Bill*

Removed the calls to **BPROLL** where the roller could mess up the integer values set by **MXCCRM** and used by **DIRADD**.
Moved nowhere.

1804. *March 7, 1984* APROLL, BPROLL *Bill*

Added warning about rolling dropping a few bits in integer values.
Moved nowhere.

1805. *March 7, 1984* APCLN *Bill*

Added calls to the AP roller.
Moved nowhere.

1806. *March 8, 1984* MX, APCLN *Eric*

Corrected TV scaling. Was wrong whenever it switched scales by a factor of 10 (or so).
Moved nowhere.

1807. *March 12, 1984* UVSUB *Bill*

Changed call to **APROLL** to **BPROLL**.
Moved nowhere.

1808. *March 12,1984* PLCUB *Gustaaf*

Put the new task **PLCUB** in the **NOTPGM** region. It plots the fraction of the cube specified by **BLC** and **TRC** in a mozaic consisting of panels plotted within a larger frame. Each of the panels shows pixel value plotted against the coordinate along the first axis of the cube. The larger frame has the second axis of the cube as x-axis and the third as y-axis.
Moved nowhere.

1809. *March 12, 1984* VM *Tim*

Added by Editor from **CHKOUT** *history file:* Change algorithm.
Moved nowhere.

1810. *March 13, 1984* UVAVG *Craig*

Fixed bug that was capable of causing an abort on the last call to the accumulation routine. Failures were obvious (the program claimed the sort order was incorrect) so previous data run through the program should be ok.
Moved nowhere.

1811. *March 13,1984* DCONV *Gustaaf*

I entered this map deconvolution program in **NOTPGM**. Most details are given in the **EXPLAIN** file. It is meant primarily for moment maps. Experience with this program, ideas, and suggestions are welcome.
Moved nowhere.

1812. *March 13, 1984* IIS M75 Y routines *Eric/IIS*

International Imaging Systems has supplied us with a version of the Y routines for their model 75 display. Since they were based on an earlier release of AIPS, I've checked them over and made revisions as needed to match current routines. In general, the M75 and M70 subroutines are very similar and some are identical. For this reason, there was no problem making the minor revisions. The M75 library uses the Z routines of the M70 library. Users should note that I^2S used lower case and some Vax-extended Fortran 77 constructs in their code. These could be fixed easily, but have not been at present. Routines inserted in subdirectory **APLM75**: are

YALUCT	YCHRW	YCNECT	YCONST	YCRCTL	YCUCOR
YCURSE	YFDBCK	YGGRAM	YGRAFE	YGRAPH	YGYHDR
YIFM	YIMGIO	YINIT	YLUT	YMAGIC	YMKHDR
YMNMAX	YOFM	YRHIST	YSCROL	YSHIFT	YSLECT
YSPLIT	YSTCUR	YTVCIN	YTVCLS	YTVMC	YTVOPN
YZERO	YZOOMC				

Moved nowhere.

1813. *March 13, 1984* YLNCLR *Eric*

Moved this one from **AIPIIS**: to the **APL** TV areas. Now there are no Y routines under the **[...AIPS...]** subdirectory.
Moved nowhere.

1814. *March 14, 1984* FITS TABLE extension format *Gary*

AIPS now supports the new FITS extension file of type **TABLE** for clean component files. The following files were modified:

FITTP	—	Now writes either the old or new table format for CC files.
FITTP.HLP	—	Added new adverb **DONEWTAB** to allow choice of old format in case user needs to read tape on an old version of AIPS.
POPSDAT	—	Added new adverb **DONEWTAB**.
IMLOD	—	Reads both new and old format for CC files.
CMLT.INC	—	
DMLT.INC	—	
CFTP.INC	—	
DFTP.INC	—	
CAPL.INC	—	New adverb **DONEWTAB**.
DAPL.INC	—	New adverb **DONEWTAB**.

Moved nowhere.

1815. *March 16, 1984* GOIN AIPS *Bill*

Put the **RUNOFF** source files of the programmer manual (*.RNO, *.RNT, *.RNX, *.INC) and the printer file (ALL.MEM) in the **DOCTXT** area. ALL.MEM can be printed directly on a standard line printer. NOTE: Versatecs will produce useable but unpleasing results.
Moved nowhere.

Changes: 15-Mar-1984 version of AIPS

This publication is intended to provide corrections and updates to the AIPS *COOKBOOK* in order to fill the gap between publication dates. We also hope that users will annotate their current copies of the *COOKBOOK* rather than request a new copy at each publication date.

This Section will provide details of the changes to the 15-Sep-1983 *COOKBOOK* caused by changes in software between the 15-Jan-1984 and 15-Mar-1984 versions of AIPS. The changes during this period have almost no effect on the *COOKBOOK*.

Page 36-37, § 9.5.

Replace paragraph on pages 36-37 with:

Several spectral-line oriented displays are available. The task **XPLOT** will plot each row on the TEK graphics screen. Task **PLCUB** creates plot files with small panels of 1-D plots of image rows arrayed on a grid in the 2nd and 3rd coordinate axes. **RGBMP** creates a cube of three planes from an arbitrarily sized cube which can then be used for a false color display using the verb **T3COLOR** (after appropriate **TVLOD**s). The zero and first moments produced by **MOMNT** can be loaded into separate planes of the TV device with **TVLOD**. Then the verb **TVHUE** will produce a color display where color (hue) represents the first moment value and intensity represents the zero moment value. **TVHUE** allows interactive enhancements as well. The verb **TVMOVIE** will load subimages of each plane of a cube into portions of the TV memory with labeling and then display them in sequence at a user-controlled rate. **REMOVIE** allows a previously loaded "movie" to be rerun.

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Section 13

Add to UVPR, Page 52:

BCAL1	T	Find baseline-based uv calibration	§
BCAL2	T	Apply baseline-based uv calibration	§
UVAVG	T	Average or merge BT or TB sorted uv data	§

Add to MAPETC, Page 53:

DCONV	T	Gaussian deconvolution of an image	§

Add to PL2D, Page 58:

PLCUB	T	Plot rows of image on a 2-D grid	§9.5
QMSPL	T	Display plot file on QMS laser printer	§

Add to SL1D, Page 58:

PLCUB	T	Plot rows of image on a 2-D grid	§9.5

Add to CUBE, Page 60:

DCONV	T	Gaussian deconvolution of an image	§
PLCUB	T	Plot rows of image on a 2-D grid	§9.5

Add to APTASKS, Page 61:

NOBAT	T	Reserve array processor, otherwise dummy	§

Add to INDEX, Page 64:

BCAL1	T	Find baseline-based uv calibration	§
BCAL2	T	Apply baseline-based uv calibration	§

Add to INDEX, Page 65:

DCONV	T	Gaussian deconvolution of an image	§

Add to INDEX, Page 67:

NOBAT	T	Reserve array processor, otherwise dummy	§
PLCUB	T	Plot rows of image on a 2-D grid	§9.5
QMSPL	T	Display plot file on QMS laser printer	§

Add to INDEX, Page 70:

UVAVG	T	Average or merge BT or TB sorted uv data	§

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AIPS Order Form

1. Name and address of Contact Person: _____

   ☐ Address label on back is correct _____

   _____

   _____

   _____

   _____

2. ☐ new order ☐ reorder (*N.B.*: If you have received a plastic mailing container from us, we insist that you use it for a reorder.)

   Version of AIPS currently running: _____

3. AIPS version desired:
   - ☐ 15-Mar-1984
   - ☐ 15-May-1984

4. Tape type desired:
   - ☐ VAX/VMS BACKUP
   - ☐ Simple blocked card images
   - ☐ FITS compressed text format

5. Version of Z routines desired:
   - ☐ Vax VMS
   - ☐ Modcomp

6. VAX load modules desired: (requires 2nd 1600 bpi tape)
   - ☐ Yes
   - ☐ No

7. Tape density desired:
   - ☐ 800 bpi
   - ☐ 1600 bpi
   - ☐ 6250 bpi

8. There are Gripes on the tape:
   - ☐ Yes
   - ☐ No

Send order form to: AIPS Group
National Radio Astronomy Observatory
Edgemont Road
Charlottesville, VA 22901 USA

March 15, 1984

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

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A I P S L E T T E R

Volume IV, Number 3: May 15, 1984

National Radio Astronomy Observatory

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

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804–296–0211 (FTS 938–1271), x266

TEXset by EWG

Personal Notes

In March, Thad Polk, an undergraduate majoring in mathematics at the University of Virginia, began working with the *AIPS* programmers as a part-time research assistant. His first *AIPS* task, NINER, was completed in time for the 15MAY84 release. A 2-D Median Window task is already working and will be released for 15JUL84.

During the first week of April, twenty-five members of the NRAO computing staff from Charlottesville, Socorro, Green Bank, and Tucson met for three days at Green Bank to discuss "Computing Problems of High Performance Synthesis Mapping". The first day was devoted to the scientific potential of the VLA and its impact on present and proposed computing facilities at NRAO. The remaining two days were concerned with the technical options available for achieving desired increases in computing performance. Supercomputers, super-array processors, and multiple systems were discussed in some detail. While no clear consensus emerged, work was begun on the task of finding answers to the many technical questions about the proposed alternatives. *AIPS* was discussed as a part of NRAO's present mapping capabilities. This NRAO internal workshop was an excellent opportunity for NRAO's programming staff to get together informally and to discuss common problems and goals.

Don Wells and Eric Greisen gave a presentation entitled "NRAO's *AIPS* and its Future" at Goddard Space Flight Center, Greenbelt, Maryland, on 25 April 1984. After the talks, Goddard personnel described their image processing systems and gave Eric and Don a tour of their computing facilities, including a Cyber 205.

Six NRAO personnel (Bob Burns, Bill Cotton, Bob Duquet, Gareth Hunt, Ken Sowinski, and Don Wells) spent 1–3 May in Minneapolis visiting the offices of Cray Research, Control Data, and Star Technologies. This was to gather information on various high performance computing systems manufactured by these vendors. Two questions are: (1) the suitability of these machines as hosts for *AIPS*, and (2) the ability of their vector hardware to execute synthesis mapping algorithms. Our studies of these subjects will continue.

Supermicro Decision

After much discussion, the NRAO Computer Division has decided *not* to embark on a supermicro development project this year, even though the project was authorized and funded by NRAO's "Research Equipment" committee. The project we were considering would have involved purchasing about $50K of image processing peripheral devices (including an AP) for a MassComp MC-500 system which will be acquired anyway for another project. Our motivation in proposing this R&D project was that if we could develop a high-powered *AIPS* at lower cost, then NRAO would be able to acquire greater total computing power with the funds which are expected to become available over the next few years. MassComp's AP-501 array processor was the chief reason why we considered that vendor for our proposed project. We analyzed this AP in detail (see the discussion on pp.5–6 of the 15MAR84 *AIPSLETTER*). In the end, we were not convinced that our synthesis mapping code would run fast enough in it (compared to a VAX750 plus FPS5205) to *guarantee* that we would gain the desired "bang-per-buck" advantage. (We now realize that the FPS5205 architecture is especially strong for synthesis mapping and other array processors have great difficulty in competing with it.) We are disappointed that this concept did not work out, but we have learned a lot during the evaluation.

If our objective had been to develop a medium-powered *AIPS* at lower total cost (the sort of system many universities would want), the decision would probably have been different. We felt that NRAO could not justify expending its own limited manpower resources on such a project at this time. Instead, we will continue to advise, encourage, and give moderate help to various university groups who want to develop such systems. Our generic Unix port project directly supports supermicro implementations of *AIPS* (most supermicros run Unix). It is likely that our continuing study of various array processor and supercomputer options for *AIPS* will have a good "spinoff" effect for supermicro array processor implementations.

The Portability Column

CPU/OS Combinations

VAX/4.2bsd: John Bally (Bell Labs, Holmdel) reports [25 April 1984] that he and his associates are now running the new Unix *AIPS* in production mode on their VAX. It has now replaced the old Unix *AIPS* for reducing VLA data at Bell Labs.

SUN/4.2bsd: David Garrett (University of Texas, Austin) reports [14 May 1984] that he got *AIPS*, including tasks, to run on his SUN system, but that he is not currently using it in production due to insufficient disk capacity.

CRDS/UNOS: Colin Lonsdale (Penn State University) reported recently that *AIPS* woke up and talked to him. He has exercised many of the verbs, but has not yet initiated a task.

IBM4341/VM+UTS: The most recent version of Amdahl's Fortran compiler (version 2.2 "with advanced fixes") is a great improvement. Large portions of *AIPS* now appear to function correctly (UVLOD, APCLN, etc.). Kerry Hilldrup has concentrated on improving the details of the implementation, such as efficiency in task initiation (most of this work is believed to be applicable to running *AIPS* under other Unixes). Two bugs in Amdahl's code currently prevent completion of the project: a problem with writing a second file on an output tape after a tape motion operation and errors in the compilation of Fortran expressions involving complex variables. The latter problem prevents UVMAP from functioning. We are waiting for fixes to these bugs, but we have become fairly optimistic that implementation of *AIPS* on the IBM architecture under UTS is likely to succeed soon.

APs

Bill Cotton, Bob Duquet and Don Wells have spent a lot of time during the last three months evaluating various APs and supercomputers for ynthesis mapping applications. Several other NRAO persons have also been involved in the discussions of technicalities, strategies and options. We have visited sites where super-APs and supercomputers are in use. We have had telephone conference calls with other supercomputer sites and with manufacturers. We have collected manuals, studied them, and written memoranda. Finally, groups of NRAO personnel have visited four vendors. This process has been time consuming, but it has also been educational. It is not yet finished. In particular, we may decide to make one or more benchmark evaluations during the next few months.

Existing APs, super-APs and supercomputers resist simple classification schemes. A variety of architectural differences frustrate our efforts to decide which machines are best for which purposes now, and which machines have the best potential for the future. In the course of our studies we have become increasingly impressed with the success of the old FPS120B (now 5205) architecture in our applications. Undoubtedly we have adapted our algorithms, and our thinking, to suit the strengths (and the weaknesses) of the 120B, and now need to rethink our algorithms to make them run properly on various other vector pipeline devices.

It remains true that the FPS 5105 and 5205 are the only APs for which *AIPS* implementations are available.

Summary of Changes: 15 Mar – 14 May

These changes are listed in detail in the CHANGE.DOC file reproduced later in the *AIPSLETTER*. There are 95 entries in CHANGE.DOC this period including six new tasks, three more paraform tasks, and three new verbs. Perhaps the most fascinating of the new tasks is **NINER** written by Don's student Thad Polk. It applies 3 x 3 matrix operators to images for lots of interesting purposes such as edge enhancement. **BLSUM** is a new task to sum images over "blotch" regions. It has already been used extensively to produce spectra summed over irregular regions specified using a selected channel or continuum image. **XBASL** fits n^{th}-order polynomials to each row of an image. Although useful for removing spectral baselines, its fitting algorithm needs to be made more efficient. **PLROW** is a task which plots image profiles without the perspective used by **PROFL**. **IRING** is a new analysis task which determines radial intensity profiles of projected disk sources. **STEER** is an image deconvolution task implementing another version of Clean. The new paraform tasks, called **PFPL1**, **PFPL2**, and **PFPL3**, are designed to simplify the creation of new plotting tasks.

On **EXIT** and **RESTART**, **AIPS** now saves the user's *POPS* environment (i.e., adverb values, procedures) in a **SAVE** area called **LASTEXIT**. When the user logs back in to **AIPS** at a later time, **AIPS** automatically restores this environment. Thus, users will no longer see the "virgin" *POPS* unless they invoke it deliberately via a **RESTORE 0**. There are three new verbs designed to make the handling of catalogue files more congenial. **EGETNAME** performs the **GETNAME** operation, but, if the catalogue slot is empty, it returns an **ERROR** adverb rather than aborting the input line or procedure. **RENUMBER** allows the user to rearrange the order of images in the catalogue and **RECAT** compresses the catalogue. Catalogue listings (**MCAT**, **UCAT**, **CATALOG**) may be in alphabetical order if the new adverb **DOALPHA** is true. **EXTDEST** is now more complacent about destroying extension files and will accept **INVERS** = 0 to mean the most recent and **INVERS** = -1 to mean all extension files of the specified type. **ALLDEST** has a **DOCONFRM** option which allows for interaction during the global file deletion process. Under control of the local *AIPS* Manager, **TIMDEST** has disk-dependent, hard-coded time limits rather than a single limit for all files. **GRIPE** has user name, address, and phone adverbs. It will ask for this information only if they are blank and, in that case, will fill in the adverbs.

Several of the *uv* tasks received significant improvements during the period. ASCOR was completely rewritten to support line as well as continuum data bases. UVCOP acquired a channel select option, DBCON became less fussy about frequency differences, and UVFND added a minimum flux to the CLIP operation. UVFLG learned to read a RUN file containing a sequence of editing commands and to count flagged records more meaningfully. The scaling in UVPLT and VBPLT came under more control including the option to self-scale just one of the axes and to self-scale within a restricted range of the actual plot parameters. Non-*uv* tasks also received some improvements. A new version of GAL was released which includes two more functional forms and better controls over the fitted parameters and the fitting areas. MCUBE was fixed to handle errors better, to provide progress reports, and to be more forgiving about inexact input axis values, especially when writing a new output cube. DISKU received a DETIME option to display only "older" files and PRTTP learned about the new FITS Tables extension.

There were a few somewhat significant bugs in MX which were corrected during the period. These applied particularly to an overflow and the *w* term in the gridded subtraction routine. The blotch algorithms in BLANK and TVSTAT were inconsistent in the handling of edge pixels and were corrected during the development of BLSUM. Gripes, the *AIPSLETTER*, and the *COOKBOOK* will be typeset henceforth using version 1.0 of TEX. This version is commonly known as TEX82 and we hope you like the revised fonts.

CHANGE.DOC: 15Mar84–14May84

1816. *March 19, 1984* — Help files — *Eric*

Updated *COOKBOOK* files COOKI.TEX and COOKM.TEX and general Help files APTASKS, UVPR, PL2D, SL1D, CUBE, MAPETC, and INDEX for changes up to 15-Mar-1984.
Moved nowhere.

1817. *March 19, 1984* — Transport procedures — *Gary*

AIPS no longer fits on one tape. I have split the files between two tapes. One tape contains source code and command procedures. The standard installation procedures can build an *AIPS* from this tape. The second tape (optional) tape contains the executable modules and object module libraries needed by the shortcut procedure. The procedures and documentation files changed are

ILOAD	ICREATE	ICOMPAI	ICOMPAL	
ISHORTINS	IPROMPL	TRANSPRT	TRANS2 (new)	
MV2C1002	MV2C1004	MV2C1005	MV2C1007	MV2C1008

Moved to OLD, went out on tape to VLA.

1818. *March 20, 1984* — CONVL — *Bill*

Added by Editor from CHKOUT *history file:* Fixed bug in units calculation.
Moved nowhere.

1819. *March 20, 1984* — VM — *Tim*

Added by Editor from CHKOUT *history file:* Added more info to HELP file.
Moved nowhere.

1820. *March 22, 1984* — VBFIT, VBBIG — *Bill*

Changed to call standard AP roller.
Moved nowhere.

1821. *March 22, 1984* MCUBE *Eric*

No error code was set when the input plane did not align with the output cube, but the output plane number was not set fully. Thus, I/O errors arose in some cases. Fixed this and added a progress message since the thing runs slowly on big cubes.
Moved nowhere, should go to OLD and VLA.

1822. *March 22, 1984* NOBAT *Eric*

The Vax ZDELAY routine has a limit of one hour. Some versions of NOBAT allow longer time delays — so changed the routine to delay no more than 30 minutes and to loop to use up the requested time. Reworded the HELP file some too. Moved program to APLPGM from NOTPGM.
Moved nowhere, should go to OLD and the VLA.

1823. *March 22, 1984* CNVRT *Eric*

Increased the buffer sizes.
Moved nowhere.

1824. *March 26, 1984* UVCOP *Bill*

Added channel select option, BCHAN and ECHAN. Also changed UVCOP.HLP.
Moved nowhere.

1825. *March 26, 1984* DBCON *Bill*

Changed not to be so picky when combining line data bases. Now required frequency to agree within 0.001 of first frequency, the channel separation to agree within 0.001 of a channel, the coordinate reference pixel to agree to within 0.001, and the coordinate rotation (whatever it means on this axis) to agree to within 0.001.
Moved nowhere.

1826. *March 28, 1984* MX *Bill*

Fixed two bugs: (1) MXCCRM usually had an extraneous call to MSGWRT,
(2) the sign of the w term for the gridded-FFT subtraction method was normally reversed; for spectral line data the value was also slightly wrong.
Moved nowhere.

1827. *March 29, 1984* ZM70XF, image storage device *Eric*

Wrote four new Y routines to handle the NRAO Image Storage Device. These apply only to NRAO I^2S Model 70 displays. They are YISDRM (read/write data memory), YISDSC (read/write disk cylinder), YISJMP (jump to micro processor address), and YISMPM (read/write micro processor memory). YISDSC and YISJMP transfer no bytes in the data buffer. The Vax and Modcomp versions of ZM70XF were revised to handle this in the obvious way (write the header, skip the buffer I/O). Before now, ZM70XF handled 0 bytes as a special case to initialize double-buffer write I/O — a mode not allowed since the 15MAR84 release.
Moved nowhere.

1828. *March 29, 1984* PRTTP, IMLOD, GTWCRD, CH2NUM *Gary*

Updated PRTTP to recognize the new FITS table extension format. I stripped some subroutines from IMLOD to be used in PRTTP and put them in the general subroutine area. GTWCRD is similar to GETCRD, but is general enough to recognize forms such as NAXISn where n is an integer. CH2NUM will convert a character substring of digits to an integer number.
Should go to VLA, OLD, 15MAR84 tape.

1829. *March 30, 1984* Crazy adverbs *Eric*

There really is no defense against insane adverb values (*i.e.* INDISK = 1.35E11) — too many routines would have to act paranoid. Fixed AU3, however, to guard against bad INDISK values.
Moved nowhere.

1830. *March 30, 1984* ASCOR *Bill*

This task was totally rewritten. It should now handle both continuum and line data. The user now gives the frequency of the second gain channel to use in interpolation instead of giving weights. Also added/changed DASC.INC, CASC.INC, and ASCOR.HLP.
Moved nowhere.

1831. *April 5, 1984* ASCOR *Bill*

Fixed a few bugs in the interpolation scheme. If the preceding or following solution at a given time is flagged (but not both flagged), then the other is used for a given IF.
Moved nowhere.

1832. *April 6, 1984* MX *Bill*

Fixed bug in gridded subtraction and restoring routines which caused garbage output if too many CLEAN components were used (more that about 10,000, depending on the map size).
Moved to OLD and VLA. Will be on 15MAR84 tape.

1833. *April 6, 1984* ASCOR *Bill*

Fixed bug which caused most of the data to be flagged if only 1 IF was present in the data. The routine to adjust the phases to a common reference no longer will flag data.
Moved nowhere.

1834. *April 6, 1984* GAL *Gustaaf*

A complete new version of GAL is available now. The most important new features are : (1) You may specify subsections of the velocity field, *e.g.* annuli, sectors, or both. (2) Two new functional forms of the rotation curve have been added. (3) You may specify any combination of parameters which you want to be fixed, *i.e.* not participating in the fitting process. See GAL.HLP.
Moved nowhere.

1835. *April 9, 1984* Transport procedures *Gary*

Second pass on the *AIPS* doesn't fit on a tape problem. (See entry 1817). A 6250 tape still contains the files necessary for the "shortcut installation". I also changed the procedure that builds ASSIGNL.COM (IPROMPTL) to put the name LOCAL in ASSIGNL.COM.

ICOMPAL	ISHORTINS	IPROMPL	TRANSPRT	ILOAD
MV2C1002	MV2C1003	MV2C1004	MV2C1005	MV2C1007

Will go on 15MAR84 tape.

1836. *April 9, 1984* SET1VS *Bill*

Fixed bug in the Q and U polarization selection sections. Affected MX.
Moved to OLD and VLA. Will be on 15MAR84 tape.

1837. *April 9, 1984* MCUBE *Eric*

Added by Editor from CHKOUT *history file:* Improved error messages.
Moved nowhere.

1838. *April 10, 1984* Pseudo AP VMOV, CVMOV *Bill*

Changed element count to pseudo I*4. This was causing the Pseudo AP version of MX problems for large (≥ 1024) gridded FFT subtractions.
Moved to OLD and VLA. Will be on 15MAR84 tape.

1839. *April 11, 1984* Blotching *Eric*

In developing BLSUM, I found some problems with the standard blotch algorithms. Changed were:

BLTGLE — Test position now floating point.
BLTLIS — (New) finds the line segments in the current row which are inside the blotch regions. It is this algorithm primarily which caused problems such as leaving out edge pixels. It is now isolated and will spread through *AIPS* uniformly.
BLTFIL — Change to call BLTLIS.
AU6D — Change to call BLTLIS.
BLANK — Change to call BLTLIS.

Moved nowhere.

1840. *April 11, 1984* BLSUM *Eric*

New task: It uses one plane of a "blotch image" to set a blotch region and then sums the flux in the blotch area both for the blotch image and for each "plane" of a second image. The primary use will be with spectral line problems with the blotch image being some continuum or line-sum image and the second image being the full cube. BLSUM will accept the cube in several transpositions. New files: BLSUM.FOR, BLSUM.HLP, DBLS.INC, CBLS.INC, and EBLS.INC.
Moved nowhere.

1841. *April 11, 1984* *APL.INC *Eric*

There was a comma missing from each of these — leading to a strange and very long variable name. Fixed DAPL.INC and CAPL.INC.
Moved nowhere.

1842. *April 12, 1984* PRTGA, GAPLT *John*

PRTGA and GAPLT have been modified to print and plot GA files even when there is no AN (antenna) extension file present. Antenna names default to AN01, AN02, etc.
Moved nowhere.

1843. *April 12, 1984* GAL *Gustaaf*

Made some minor changes in the output formats, since sometimes output conversion errors were likely to occur.
Moved nowhere.

1844. *April 12, 1984* PLCUB *Gustaaf*

PLCUB now handles blanked data correctly.
Moved nowhere.

1845. *April 16, 1984* MV2C06AN *Bill*

Added (1) the array name, (2) the precessed position to the description of the AN files header.
Moved nowhere.

1846. *April 16, 1984* GSTROT *Bill*

New subroutine which computes the mean and apparent GST at UT=0 and earth rotation rate at a given Julian date.
Moved nowhere.

1847. *April 16, 1984* UVLOD *Bill*

Modified to fill in the array name and position, GST at UT=0, the earth rotation rate, and the precessed position in the AN file header. UVLOD was moved to NONSTANDARD (Oh, No!!!) due to the use of the precession routines.
Moved nowhere.

1848. *April 16, 1984* PRTAN *Bill*

Corrected misspelling of the abbreviation of Equatorial. Reference date now is given in the form "30-APR-1982". The array name and precessed position are printed out.
Moved nowhere.

1849. *April 17, 1984* APROLL *Bill*

Fixed bad branch if AP file already exists.
Moved to VLA this date. Moved to OLD in time for 15MAR84 tape.

1850. *April 17, 1984* VBLIN *John*

VBLIN now inserts reference date, RA and DEC (ref date), GST at UT = 0 hr on reference date, earth rotation rate on reference date at UT = 0 hr and array type (VLBI) in AN extension file. Also changed the HELP file.
Moved nowhere.

1851. *April 18, 1984* XGAUS *Eric*

Corrections made: restart AIPS on error in the initialization routine and report any problems with too few data samples per row and exit early.
Moved nowhere.

1852. *April 18, 1984* BLSUM, BLTFIL *Eric*

Fixed formats to avoid overflows better and added ERR= branches to prevent large numbers of VAX error messages. Made REDO option work by resetting *all* parameters, not just some. In BLTFIL, corrected the y-range finding loop to check all polygons correctly.
Moved nowhere.

1853. *April 18, 1984* XBASL *Eric*

New task to fit n^{th} order polynomial baselines to each row of an image. It writes out the image corrected for the (additive) baseline and, optionally, writes out images of the baseline parameters. It is, optionally, an interactive task very similar to XGAUS in its use of the TK graphics device. New files: XBASL.FOR, XBASL.HLP, DBAS.INC, CBAS.INC, and EBAS.INC.
Moved nowhere.

1854. *April 18, 1984* GOINAIPS: CHAP6.RNO *Bill*

Fixed the example showing the use of ZTOPEN. As shown, the example didn't work.
Moved nowhere.

1855. *April 18, 1984* Paraform Plot Tasks *Gary.*

The following tasks are templates for making plot files:

PFPL1 — Used if the plot's X and Y axes are the same as the map.
PFPL2 — Used if the plot's X axis is a slice of the map.
PFPL3 — Used if the plot's axes have no relation to the map.

The following subroutines are used by the plot programs.

Plotting:

PLMAKE — Create a plot extension file.
PLPOS — Position at a point.
PLVEC — Draw a vector to a new point.
PLGRY — Draw Grey scales at a point.
PLEND — Clean up routines.

General:

SETUP — *AIPS* plot program initialization.
VECWIN — Calculate BLC, TRC from defaults.
MAKNAM — Calculate map name from defaults.
INTMIO — Open a map file, set up for double buffering.
REIMIO — Set up for a second I/O pass through the map.
GETROW — Read a row of the map.

Moved nowhere.

1856. *April 18, 1984* PLROW *Gary*

New task to plot the rows of a map. The X axis is position, the Y axis is map intensity. The rows can be offset from each other by setting adverb OFFSET.
Moved nowhere.

1857. *April 18, 1984* UVFLG *Bill*

Modified to read an editing table from a text file in the RUN area using KEYIN. The text of KEYIN, etc. are appended to the end of the text file. Due to the use of KEYIN, UVFLG was moved to NOTSTANDARD (Oh, no!!!!). Also changed was UVFLG.HLP and UVFLG.E (for the ODDCOMP).
Moved nowhere.

1858. *April 18. 1984* CHAP10.RNO *Gary*

The use of some of the PCODES was changed in the paraform plot routines in an attempt to be more consistent. I also expanded some sections.
Moved nowhere.

1859. *April 18, 1984* GOINAIPS CHAP3.RNO *Bill*

Expanded the description of DIE and corrected a number of typos.
Moved nowhere.

1860. *April 18, 1984* VBLIN *John*

Added by Editor from CHKOUT *history file:* Modify Explain file.
Moved nowhere.

1861. *April 23, 1984* AIPSTR.COM, AIPS.COM *Gary*

Removed startup message about mounting tapes. Most users felt it was not needed since tapes can be mounted inside AIPS. Also the procedure was very site specific. I also added a message giving the specific version/date at startup. Thanks to John Spencer at NRL for the suggestion.
Moved nowhere.

1878. *May 1, 1984* RENAME *Eric*

Corrected AU7 to test for file busy soon enough in a RENAME. It was renaming the file in the directory part, then finding the busy condition and refusing to fix the header part.
Moved nowhere.

1879. *May 1, 1984* QUEUES *Eric*

Changed AUB to display "failed" batch jobs for 15 rather than 30 days.
Moved nowhere.

1880. *May 1, 1984* GO *Eric*

Corrected AU2 test for "task" name AIPS. . It was blocking any task with the first 2 characters AI or the second 2 characters PS.
Moved nowhere.

1881. *May 1, 1984* Map scaling *Eric*

The conversion from floating to integer did not take into account the possible scaling of the floating image. Changed MSCALE and MSCALF to use the scaling parms as input/output variables and to apply the old scaling along with the new. The only tasks which had to be changed were COMB and CORMS which call MSCALE and MSCALF directly. Ten others call them via CONVRT which did things in an acceptable manner. These should be relinked, however.
Moved nowhere.

1882. *May 2, 1984* STEER *Tim*

New deconvolution task. Quick and shoddy implementation of David Steer CLEAN algorithm. Supposed to work well for extended sources. TJC has not had much luck with it.
Also at VLA VAXs 15MAR84 version.

1883. *May 3, 1984* FFT Help *Eric*

The *uv* coordinates of FFT were fixed up long ago, but the HELP file still contained a warning about them. Changed the warning to a discussion of the *uv* axis info.
Moved nowhere.

1884. *May 3, 1984* ABACKUP.COM, ARESTORE.COM, *.HLP *Gary*

This is a new set of backup and restore procedures to be used instead of BCKAIPS and RESAIPS. The new procedures are incompatible with the old ones, so I could not delete the old ones. The new procedures allow the user to choose one or all of several disks. Also the procedures do not abort because a message file or TGET file is on disk one on the restore. An expanded EXPLAIN section describes the use and limitations of the procedures in detail. These procedures should be much more flexible and (I hope) foolproof.
Moved nowhere.

1885. *May 3, 1984* BCKAIPS, RESAIPS, .COM, .HLP *Gary*

Modified these to notify users of the existence of ABACKUP and ARESTORE.
Moved nowhere.

1872. *April 26, 1984* MCAT, CATALOG, UCAT *Eric*

Added adverb DOALPHA to request that the listing be alphabetized. This is a bit slower — suprisingly not very much — and is limited to blocks of no more than 200 entries per alphabetization. Files affected: AU3 (pick up adverb), CATLST (change call sequence, do alphabetization also), CHXPN1 (New: expand to 1 char / integer), POPSDAT.HLP (new adverb), DAPL.INC, CAPL.INC, CATALOG.HLP, MCAT.HLP, UCAT.HLP, and DOALPHA.HLP.
Moved nowhere.

1873. *April 27, 1984* EGETNAME *Eric*

New verb: does GETNAME but returns also an ERROR adverb (−1 means no error, 1 means slot empty) and does not take a *POPS* error path if the slot is empty. This will be very useful in procedures such as:

```
PROC ZAPIT(J)
FOR I = 1 TO J; EGETNAME(I)
IF ^ERROR THEN ZAP; END
END
FINISH
```

Files affected: ERROR.HLP, EGETNAME.HLP, POPSDAT.HLP, CAPL.INC, DAPL.INC, and AU8.
Moved nowhere.

1874. *April 27, 1984* Gripe adverbs *Eric*

Created string adverbs GRNAME, GRADDRES, and GRPHONE for use by the GRIPE verb. If they are blank, GRIPE will ask for user input and fill in the adverbs with the response; otherwise it will use the adverbs. Files affected: DAPL.INC, CAPL.INC, POPSDAT.HLP, AUC.FOR, GRIPE.HLP, GRNAME.HLP, GRADDRES.HLP, and GRPHONE.HLP.
Moved nowhere.

1875. *April 27, 1984* Auto SAVE / GET *Eric*

Changed AIPS to save automatically the user environment in a SAVE file called LASTEXIT on EXIT and RESTART and to recover that environment the next time the user logs in. Files affected: SGLAST (do SAVE / GET of LASTEXIT), SGLOCA (new arguments for this special file name), AU1 (call SGLAST to do save), and AIPS (call SGLAST to do get).
Moved nowhere.

1876. *May 1, 1984* RECAT, RENUMBER *Eric*

New verbs to change the catalog slot numbers of images. RECAT compresses the catalog keeping the present order of the files. RENUMBER changes the slot number of one image at a time to any desired, valid number. Files changed: POPSDAT.HLP (new verbs, adverb), DAPL.INC, CAPL.INC, VERBS (call AU3B), VERBSC (stub AU3B), VERBSB (call AU3B), AU3B (new verb routine for these), RENUMB (new subroutine does one renumbering), SGLOCA (change SAVE/GET version to 6), AU2A (change SAVE/GET version), and new HELP files for RENUMBER, RECAT, and SLOT.
Moved nowhere.

1877. *May 1, 1984* AIPSC *Eric*

Fixed up subroutine CU8 in AIPSC so that it picks up the immediate argument to EGETNAME and clears names on verbs CLR2NAME and CLR3NAME. Fixed VERBSC to call CU8 — it must have done so once and somehow that fix got lost. *Mea culpa,* presumably.
Moved nowhere.

1862. *April 23, 1984* TAPE.HLP *Gary*
In response to complaints, I put a second copy of TAPU.HLP under the name TAPE.HLP. Moved to OLD and the VLA.

1863. *April 23, 1984* BCKAIPS.COM, RESAIPS.COM *Gary*
The default for VMS BACKUP was changed from /REWIND to /NOREWIND in version 3.4 (some time ago). These routines were going to the end of tape to write their data or, in the case of an uninitialized tape, not working at all. These routines are not very sophisticated and a user unfamiliar with the messages from VMS BACKUP or a user who does not understand exactly what these routines are doing can still get into trouble.
Moved to VLA. Will be on 15MAR84 tape.

1864. *April 23, 1984* IRING *Gustaaf*
Task IRING was installed into *AIPS*. IRING determines the radial intensity distribution of a disk projected onto the celestial plane. Possible applications include: total HI maps or optical photometry maps of a disk galaxy. See IRING.HLP.
Moved nowhere.

1865. *April 24, 1984* EXTDEST *Eric*
Changed to allow INVERS = -1 (to mean all) and INVERS = 0 (to mean highest in header). Revised files AU8.FOR and EXTDEST.HLP.
Moved nowhere.

1866. *April 24, 1984* TIMDEST, ALLDEST *Eric*
Added a confirm option to ALLDEST and changed the hard coded time limits for TIMDEST to be a function of disk number with a separate limit applying to SAVE/GET and TPUT/TGET files. Files involved: POPSDAT.HLP, DAPL.INC, CAPL.INC, DOCONFRM.HLP, TIMDEST.HLP, ALLDEST.HLP, AU3A.FOR, CONFRM.FOR (new).
Moved nowhere.

1867. *April 24, 1984* DISKU *Eric*
Added adverb DETIME to have DISKU display only those catalogued files (and their extensions) older than DETIME days. Fixed Help and Fortran files.
Moved nowhere.

1868. *April 24, 1984* PLCUB *Gustaaf*
A few necessary error messages were added to the code.
Moved nowhere.

1869. *April 24, 1984* GAL *Gustaaf*
Fixed a bug, which spoiled the rotation curve plot if an output map was requested.
Moved nowhere.

1870. *April 25, 1984* SET1VS *Bill*
Fixed bug in the sign of U polarization data. Affected MX.
Moved nowhere.

1871. *April 25, 1984* AIPSTR.COM, AIPS.COM *Gary*
These routines now set default protections to allow full access (RWED) for group. This was getting some people into trouble when they ran *AIPS* from their own area with a different default protection.
Moved nowhere.

1886. *May 3, 1984* Inputs files, *.HLP *Gary*

Changed INTAPE limit from 2 to 9. Some installations have more tape drives than we do. (*Editors' note:* the GO verb handles tape and disk limits now rather than depending on the information in the inputs files.)

APMAP	AVEOT	AVFILE	AVMAP	AVTP
EXFND	EXIND	IMLOD	MOUNT	PRTTP
REWIND	TPHEAD	UVLOD	WSLOD	

Moved nowhere.

1887. *May 3, 1984* ZDOPR4 *John Spencer/Gary*

Put in a version of ZDOPRT under this name that works for the PRINTRONIX printer.
Moved nowhere.

1888. *May 3, 1984* CNVRT *Gary*

Subroutine SLNXT was not detecting the last slice file correctly. The task went into an infinite loop after converting the file and the slice files but before updating the history.
Moved nowhere but probably should go to VLA.

1889. *May 4, 1984* TVWEDGE *Eric*

Modified AU5C to prevent zero divides when the image is constant and to have more accuracy when the image has a small intensity range with a large offset. Integer overflows were possible in the latter case.
Moved nowhere.

1890. *May 4, 1984* UVFND *Eric*

Added a minimum flux option to OPCODE = 'CLIP'. Changed the Fortran and the Help files.
Moved nowhere.

1891. *May 7, 1984* UVPLT, VBPLT *Eric*

Added test for no points found in the self-scale routine. They died before, but the error messages will now be more self-explanatory.
Moved nowhere.

1892. *May 7, 1984* APIO *Bill*

Fixed bug which causes integer overflow on big transfers such as 2048 gridded-FFT subtractions in MX.
Moved to VLA this date, nowhere else.

1893. *May 8, 1984* UVPLT, VBPLT *Eric*

Changed the scaling so that self-scaling is done on either one or both axes. Added BPARM(3) < 0.0 to mean restrict the selected data samples to the range specified by BPARM(4)-BPARM(5), BPARM(6)-BPARM(7), but with self-scaling of the selected samples. Changed VBPLT.FOR, UVPLT.FOR, VBPLT.HLP, UVPLT.HLP, DVBP.INC, CVBP.INC, DUVP.INC, and CUVP.INC.
Moved nowhere.

1894. *May 8, 1984* UVFLG *Eric*

Added another counter to count actual visibilities which have their weights changed by the current execution of UVFLG. There are now two counters reported: "samples selected" (all polarizations and frequencies for selected antenna pair(s) and time(s)) and "vis. flagged" (each complex number counts if its weight was flagged or unflagged).
Moved nowhere.

1895. *May 8, 1984* XMOM *Eric*

Fixed a spelling error in the Help file and tried to clarify what sort of moments are computed.
Moved nowhere.

1896. *May 8, 1984* VBLIN *John*

Added by Editor from CHKOUT *history file:* Check for standard VLB NUG frequencies and sidebands.
Moved nowhere.

1897. *May 9, 1984* MX *Bill*

Fixed bug in MXGRID which caused it to fail when tapering using the pseudo AP.
Moved nowhere.

1898. *May 9, 1984* QHEADER *Eric*

Added an asterisk after the pixel number whenever that pixel number is not the "reference pixel". If any occur, an explanation of the asterisk appears at the bottom of the display.
Revised subroutine QIKHDR.
Moved nowhere.

1899. *May 9, 1984* MCUBE *Eric*

Made it more forgiving about the garbage axis values which it seems to receive. The test was changed from 0.1 pixel to 0.2 pixel. On a new output image (only), if the rounded pixel position (based on axis values) matches the sequential position, then the program issues a warning rather than a "fatal" error message.
Moved nowhere.

1900. *May 10, 1984* CORFQ *Bill*

Changed OPcode in call to MAPOPN to HDWR; the second call to ZOPEN was failing because exclusive use of the file was taken by MAPOPN. Also changed CORFQ to tell if it failed rather than the "ENDS SUCCESSFULLY" message it was giving. Also the header is not updated if it fails.
Moved nowhere.

1901. *May 10, 1984* VBLIN *John*

Fixed bug in VBLIN that applied the wrong phase correction for the fractional-bit-shift error. The error occured only when APARM(9)=1; that is, when FBS error correction enabled.
Moved nowhere.

1902. *May 11, 1984* Going AIPS *Bill*

Minor revisions/corrections to all chapters, modified files: (ALL.MEM is the printer listing.)

ALL.MEM	GOINAIPS.RNO	GOINAIPS.RNT	GOINAIPS.RNX
CHAP2.RNO	CHAP3.RNO	CHAP4.RNO	CHAP5.RNO
CHAP6.RNO	CHAP7.RNO	CHAP8.RNO	CHAP9.RNO
CHAP10.RNO	CHAP11.RNO	CHAP12.RNO	CHAP13.RNO
REST.RNO			

Moved nowhere.

1903. *May 11, 1984* CORFQ *Bill*

Modified to update frequency in the ANtenna file header.
Moved nowhere.

1904. *May 11, 1984* VBPLT *John*

Added missing parameter MAXPLT to call of subroutine SCALVB in main program, VBPLT.
Moved nowhere.

1905. *May 11, 1984* SNCR, SNCRB, SNCRC *Bill*

These routines now give the requested size of the file in blocks (512 bytes) instead of bytes as a pseudo I*4 when there is insufficient disk space.
Moved nowhere.

1906. *May 11, 1984* GRTOTEX *Eric*

Revised the macro file for Gripes and named it GRIPEMAC5.TEX so that it will work with TEX82. Revised GRTOTEX to refer to this file, to put the release date info in a macro with the phone number, and to offer the option of initializing the Gripe file on exit.
Moved nowhere — it is our private service program.

1907. *May 11, 1984* UVLOD *Gary*

Added by Editor from CHKOUT *history file:* Add explanation of NCOUNT = 0.
Moved nowhere.

1908. *May 11, 1984* ZQTAPE *Ray Norris/Gary*

The Kennedy 900 tape drive had trouble with a backfile or backrecord when the tape was at the BOT mark. Changes in ZQTAPE test for this condition. Thanks to Ray Norris at CSIRO for the code.
Moved nowhere.

1909. *May 11, 1984* PRNTMN *Ray Norris/Gary*

VERSON was not initialized to blanks when part 4 of the manual was printed.
Moved nowhere.

1910. *May 14, 1984* NINER *Thad/Don*

New experimental task derived from paraform TAFFY, and using its scrolling buffer logic. Computes various functions of the three-by-three matrix of pixels which includes and surrounds each pixel in an image (nine pixels total, hence its name). The most interesting operator in the current version is the "Sobel" edge enhancement filter.
Moved nowhere.

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Changes: 15-May-1984 version of *AIPS*

This publication is intended to provide corrections and updates to the *AIPS COOKBOOK* in order to fill the gap between publication dates. We also hope that users will annotate their current copies of the *COOKBOOK* rather than request a new copy at each publication date.

This section will provide details of the changes to the 15-Sep-1983 *COOKBOOK* caused by changes in software between the 15-Mar-1984 and 15-May-1984 versions of *AIPS*. The changes during this period cause minor additions to the *COOKBOOK*.

Page 13, § 4.3.

Replace the first paragraph of § 4.3 with:

The inputs you have specified for *AIPS* at any given time may be saved on disk by typing:

> SAVE *aaaaa* $^{C}_{R}$	where *aaaaa* is any string of up to 12 characters.
> GET *aaaaa* $^{C}_{R}$	will restore these inputs at a later time.

These commands save or restore all the inputs and the rest of your **AIPS** "environment". For this reason, they must be the only commands on the input line. **AIPS** automatically saves the environment in an area called **LASTEXIT** whenever an **EXIT** or **RESTART** command is processed. A **GET LASTEXIT** is automatically executed whenever that user logs back in to the **AIPS** program. Thus, each user retains his own environment from one use of **AIPS** to the next. To obtain a null version of the adverb values and the rest of the environment, type:

> RESTORE 0 $^{C}_{R}$

Page 14, § 4.5.

Add a second paragraph to § 4.3 :

There are two verbs which can alter the catalog numbers assigned to files. **RENUMBER** moves a file to an empty, user-specified slot. **RECAT** simply compresses the catalog without changing the order of the entries in the catalog.

Page 27, § 7.3.

Replace the first paragraph on top of page 27 with:

Plot files (and other "extension files") are automatically deleted when an image is deleted by ZAP. However, large plot files should be deleted as soon as they are no longer needed:

> INP EXTDEST $^{C}_{R}$	to review the inputs required.
> INDI *n* ; GETN *ctn* $^{C}_{R}$	where *n* and *ctn* select the disk and catalog numbers of the map file.
> INEXT 'PL' ; INVERS *m* $^{C}_{R}$	to set the type to PL (plot) and the version number to be deleted to *m*. $m = -1$ means all and $m = 0$ means the most recent (highest numbered).
> EXTDEST $^{C}_{R}$	to do the deletion.
> INVERS 0 $^{C}_{R}$	to reset the version number to its default — usually advisable.

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Page 31, § 8.2.

Add to the end of § 8.2 the paragraph:

The interactive task BLSUM employs a method similar to that of TVSTAT. The TV cursor is used to mark a region of interest in a "blotch" image. Then BLSUM finds the flux in that region not only in the blotch image but also in each plane (separately) of a second image. More than one region of interest may be done in any given execution of the task. In spectral line problems, the blotch image is often the continuum or the line sum while the second image is the full "cube" (see § 9.3) in almost any transposition. However, numerous continuum applications also exist (*e.g.* polarization, comparison across frequency).

Page 33, § 8.3.4.

Add to the end of § 8.3.4 the paragraph:

The interactive task XBASL finds and removes n^{th}-order polynomial baselines from each row of an image. Since data may contain baselines which are more complicated than those handled by XGAUS, it may be appropriate to run XBASL first and then apply XGAUS to its output.

Page 36, § 9.5.

Insert as the third paragraph of § 9.5:

Even with instruments such as the VLA, errors in calibration can cause the actual zero point (or continuum intensity) to vary with frequency. The task XBASL may be used to fit and remove additive, n^{th}-order polynomial baselines from transposed cubes. Although XBASL is usually used in batch-like modes, the most sensitive results may be obtained by using this task's interactive options. These allow the user to reset the baseline windows and the order of the fit, among other parameters.

Page 37, § 9.5.

Change the sixth paragraph of § 9.5 to:

There are several spectral-line analysis tasks in *AIPS*, some of which may be of interest for other kinds of data. The task BLSUM (see § 8.2) calculates fluxes in irregular regions for each frequency in a cube. The task XMOM calculates a set of n–1 dimensional maps of the weight and moments 0 through 3 from a data cube. Task MOMNT is similar, but uses a more powerful and expensive blanking method. NNLSQ performs a constrained non-linear deconvolution of the spectra. XGAUS is an interactive task to fit up to four Gaussians to each row of a cube (see § 8.3.4). XSUM sums or averages each row to produce an n–1 dimensional image. GAL fits models of galaxy rotation to images of the predominant velocity (*e.g.* the first moment maps written by XMOM, XGAUS, and MOMNT).

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Section 13

Add to MAPETC, Page 53:

STEER	T	Image deconvolution by David Steer clean method	§
XBASL	T	Removes n^{th}-order baselines from map rows	§8.3.4, 9.5

Add to CATINFO, Page 55:

EGETNAME	V	Fill INNAME *et al.* from slot number of INDISK	§
RECAT	V	Compress catalog file renumbering entries	§4.5
RENUMBER	V	Renumber a catalog entry	§4.5

Add to PL2D, Page 58:

PFPL1	T	Plot task paraform: x and y same as image	§
PLROW	T	Plot rows of image w user-controlled spacing	§

Add to SL1D, Page 58:

PLROW	T	Plot rows of image w user-controlled spacing	§
PFPL2	T	Plot task paraform: x is a slice of image	§
PFPL3	T	Plot task paraform: x and y no relation to image	§

Add to ANALYSIS, Page 59:

NINER	T	3 x 3 matrix operator on images	§
BLSUM	T	Sums images over polygonal regions	§8.2, 9.5
IRING	T	Finds radial intensity profile of projected disk	§

Add to CUBE, Page 60:

BLSUM	T	Sums images over polygonal regions	§8.2, 9.5
XBASL	T	Removes n^{th}-order baselines from map rows	§8.3.4, 9.5

Add to INDEX, Page 64:

BLSUM	T	Sums images over polygonal regions	§8.2, 9.5

Add to INDEX, Page 65:

EGETNAME	V	Insert map name by catalog number	§

Add to INDEX, Page 66:

IRING	T	Finds radial intensity profile of projected disk	§

Add to INDEX, Page 67:

NINER	T	3 x 3 matrix operator on images	§
PFPL1	T	Plot paraform: x/y same as image	§
PFPL2	T	Plot paraform: x is slice of image	§
PFPL3	T	Plot paraform: x/y no relation to image	§
PLROW	T	Plot rows of image w user spacing	§

Add to INDEX, Page 70:

RECAT	V	Compress catalog file	§4.5
RENUMBER	V	Renumber a catalog entry	§4.5
STEER	T	Image Clean deconvolution by D. Steer	§

Add to INDEX, Page 71:

XBASL	T	Removes n^{th}-order baselines from rows	§8.3.4, 9.5

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AIPS Order Form

1. Name and address of Contact Person: _____

   ☐ Address label on back is correct _____

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   _____

   _____

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2. ☐ new order ☐ reorder (*N.B.*: If you have received a plastic mailing container from us, we insist that you use it for a reorder.)

   Version of *AIPS* currently running: _____

3. *AIPS* version desired:
   ☐ 15-May-1984
   ☐ 15-Jul-1984

4. Tape type desired:
   ☐ VAX/VMS BACKUP
   ☐ Simple blocked card images
   ☐ FITS compressed text format

5. Version of Z routines desired:
   ☐ Vax VMS
   ☐ Modcomp

6. VAX load modules desired:
   (requires 2nd 1600 bpi tape)
   ☐ Yes
   ☐ No

7. Tape density desired:
   ☐ 800 bpi
   ☐ 1600 bpi
   ☐ 6250 bpi

8. There are Gripes on the tape:
   ☐ Yes
   ☐ No

Send order form to: *AIPS* Group
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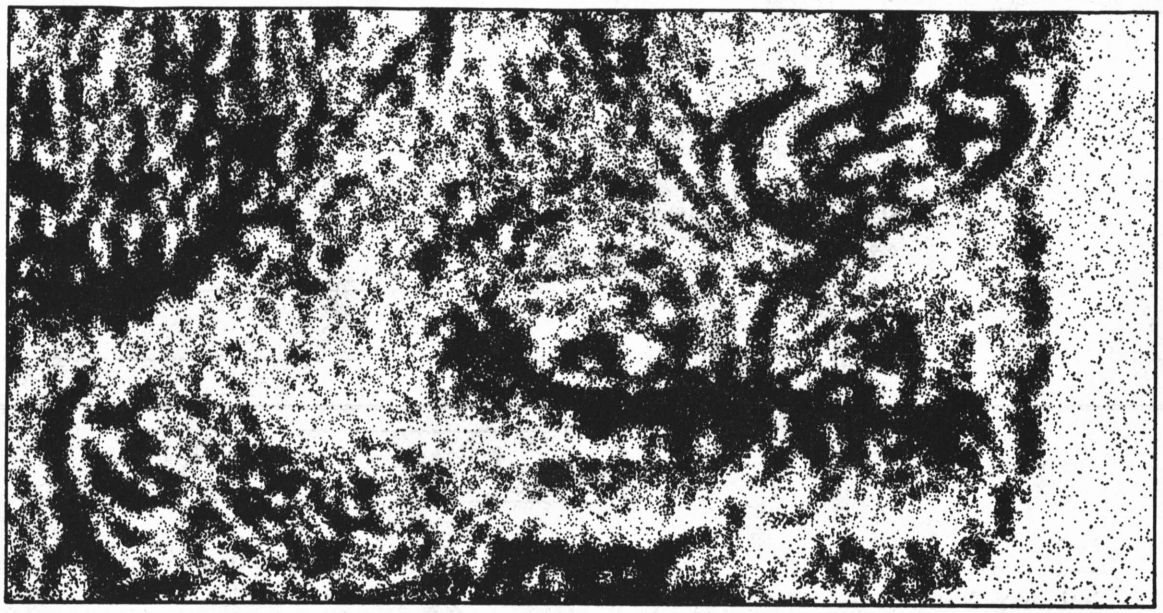

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A I P S L E T T E R

Volume IV, Number 4: July 15, 1984

National Radio Astronomy Observatory

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

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TEXset by EWG

Personal Notes

Frank Swesty, an astronomy/physics undergraduate at Pennsylvania State University, is working with Kerry Hilldrup as an NRAO summer student. Frank is working on improving the efficiency of the Unix Z-routines and on the distribution kit for the *AIPS* Unix implementation.

Gustaaf Van Moorsel, Arnold Rots, and Don Wells attended the "International Workshop on Data Analysis in Astronomy" held at Erice in Sicily, May 28 to June 4. Gustaaf presented a paper on his *AIPS* task GAL ("An Automated Method of Velocity Field Analysis") and Arnold discussed his experiments with his *AIPS* tasks TVCUB, TVSLD, and TVSLV ("Display of 3-Dimensional Data in Radio Astronomy"). Don gave an invited paper on the overall design, policies, and plans of the *AIPS* project.

Calibration and Editing

We are designing in *AIPS* a package of calibration and editing routines for radio synthesis data. This package will be designed for use with both VLA and VLBA data, but we hope it will be useful for other instruments as well. We are considering a variety of data display and editing functions in addition to data correction and calibration functions. Among the corrections and calibrations being considered are instrumental gains determined from calibrator source observations, bandpass calibration, polarization calibration, phase corrections due to doppler tracking, and phase corrections determined from accurate geometric and atmospheric models. The polarization calibration task is being developed currently by Larry Molnar at SAO.

We would like to make this package as useful as possible to the astronomical community and invite all comments and suggestions. Please send your remarks to Bill Cotton or Craig Walker in Charlottesville.

Application Code Contributions Solicited

A new task called **XTRAN** has been contributed by the Astronomy Department at the University of Texas (see entry dated 28 June in **CHANGE.DOC** below). The task was developed on the Texas Vax (under Unix) as an *AIPS* task — we understand that David Garrett adapted a program by Chet Opal of NRL. Frank Bash and Michele Kaufman brought the program from Austin when they visited Charlottesville to use the *AIPS* systems here for image processing. **XTRAN** and its Help file arrived as a tape of ASCII card images, one 80-character card per block. We read the two files from tape to disk, compiled the task, and linked it immediately on our *AIPS* under VMS (this was a pleasant demonstration of the portability of properly written *AIPS* code). When the task was executed, however, we discovered a little problem: the calling sequence for subroutine **MAPCR** has been changed since **15SEP83**, the version of the Texas *AIPS* (see the **MAPCR** entry in **CHANGE.DOC** for 28 June and the **15NOV83** *AIPSLETTER* entry 1623). This problem was corrected quickly and the task was used by Michele and Frank for registering optical images of M81 with their radio maps. We will distribute **XTRAN** with the present and future releases of *AIPS* so that other astronomers can use it. We are grateful to our friends at Texas and commend them for their willingness to share code with the community of astronomers.

We will be happy to accept other *AIPS* tasks from user sites and to distribute them as part of *AIPS*. For VMS sites, the best tape format is probably Files-11 (the default format produced by the **COPY** command in VMS). The VMS **BACKUP** format is acceptable, but less desirable. For Unix sites, "tar" is probably best. For all sites, a very safe tape format is 80-character ASCII card images, one card per block, in separate files each terminated by a tapemark, with an extra tapemark at the end, and NO tape labels. If blocking is desired a good choice is 36 80-character ASCII cards per block (2880 bytes per block, same as the FITS tape format).

Coming Attractions

New Release Schedule: As of this date, *AIPS* will be released every three months rather than every two months. We believe that *AIPS* is now a mature product and no longer requires rapid updates. The rate at which significant corrections and additions are made has dropped with time and with the increased load imposed on the *AIPS* Group by maintenance and by planning for the VLBA and other future developments. The new release schedule should reduce some of our overhead and expenses and should reduce the disruption at the VLA and other sites caused by frequent source code changes. Versions of *AIPS* will be "frozen" on the 15^{th} of January, April, July, and October. As is our current practice, these versions will be installed and tested promptly at the VLA. After some weeks of use — and perhaps some corrections — the new version will be released to non-NRAO sites.

Generalized Tables Support: Test tapes for the new FITS Tables Extension have been exchanged between NRAO and the European Southern Observatory at Garching. Preben Grosbøl of ESO recently [27 June] informed us that the tables code of ESO's MIDAS system is now able to read *AIPS* clean component and antennas extension files written in the new format. We are not yet able to read tables written by MIDAS. The present tables implementation, in tasks **IMLOD** and **UVLOD**, is intended to read only the CC and AN files which have been written by task **FITTP**. During the past month, we have developed a very general design for tables extension files in *AIPS* and have coded the basic library subroutines. Experimental versions of **APCLN** and **MX** now write clean components in the new disk file format and a version of **PRTCC** and a new task **PRTAB** display them. (*AIPS* users will be happy to hear that the new format is able to handle an *unlimited* number of clean components!) The development is proceeding nicely but, because it involves major changes in *AIPS*, we have deferred distribution of the code until the **15OCT84** release of the system. It now appears that full

generalized support for tables may be available by then. When this support is available, we expect to have no difficulty reading the ESO test tape.

GOING AIPS: The NRAO print shop has printed 150 copies of the 15MAY84 version of this *AIPS* Programmer's Guide. At present, covers are being printed; bound copies should be available by the end of July. We have included a box for "*GOING AIPS*" on the order form (see page 15 of this *AIPSLETTER*). The order form has been changed in other ways in an attempt to make it simpler. For example, VAX load modules are only available on VAX BACKUP tapes and the choice of Z routines is meaningful only on card-image tapes. Such questions are now shown as subsidiary to the "tape type" question.

The Portability Column

CPU/OS Combinations

IBM4341/VM+UTS: We are pleased to report that, on 21 June, the task UVMAP worked. This means that, finally, we are able to read visibilities (task UVLOD), make dirty maps (task UVMAP), clean them (task APCLN), and write out the results (task FITTP) with *AIPS* on the IBM architecture under Amdahl's UTS operating system. This success is due mostly to an accumulation of fixes to the bugs which existed in Amdahl's Fortran compiler. Various minor problems remain and many nonstandard tasks have not yet been installed and tested. We are unsure when users will be able to use the IBM4341 for *AIPS* computing. Benchmark information is not yet available. NRAO's IBM4341 has neither an image display nor an AP at present, but it does have a fine Calcomp pen plotter which *AIPS* can utilize. A note for prospective *AIPS* sites: UTS is a derivative of Version-7 Unix and is a true Unix timesharing operating system executing in a single virtual machine under the "VM" (virtual machine) system on IBM and IBM-compatible CPU's. Amdahl markets it as a licensed, supported software product. Amdahl has announced that UTS will be brought into conformance with Bell's System V by about the end of 1984.

APs

Representatives of Numerix Corp. visited our Charlottesville offices on 22 June to discuss their MARS-432 "super" array processor. This machine was deliberately designed to be a replacement for the FPS AP-120B, but to be 2.5 to 3 times as fast as that AP. It is architecturally very similar, although it is not identical (*i.e.*, custom microcode for the AP-120B won't port to the MARS-432). Its library is effectively *identical* to that of the AP-120B (*i.e.*, same names, same arguments, same functionality). It has a Fortran compiler which replaces FPS's Vector Function Chainer. This means that large portions of *AIPS* probably can be made to operate on the MARS-432 with only minimal effort. Indeed, because of the compiler, even NRAO's custom microcode routines could be installed in the AP in a suboptimal form while being recoded. Numerix is developing high-performance interfaces to several hosts (including a 3 MB/sec VAX interface); for *AIPS* use these developments are just as important as the faster floating point pipelines. In its minimum configuration (64K words), the MARS-432 costs about $100K. We think that 512K words of memory is a more attractive configuration — at a price of about $125K. On the whole, we think that the MARS-432 would be the easiest new AP on the market to adapt for use with *AIPS*. *Our mentioning of the availability of this product does not constitute any sort of endorsement of it or of the vendor involved.*

It remains true that the FPS 5105 and 5205 are the only APs for which *AIPS* implementations are available.

15JUL84 Unix Kits

Even though we have been bold enough to include a box for a Unix version of *AIPS* on the *AIPS* Order Form, it should be understood that the Unix implementation is still in its infancy. Installation of a Unix *AIPS* is a rather manual process at present. A lengthy letter describing the necessary steps will accompany each kit.

Summary of Changes: 15 May – 14 July

These changes are listed in detail in the CHANGE.DOC file reproduced later in the *AIPSLETTER*. It has been a quiet two-month period — at least as far as entries in **CHANGE.DOC** are concerned. There are two new tasks. **XTRAN**, contributed by the University of Texas, solves for optical plate constants and interpolates the image onto a proper coordinate system. **MWFLT** applies a nonlinear lowpass filter to the input image creating an image of the median, mode, or clipped average within a floating window of specified size. Two fairly new tasks received major upgrades. **NINER** now has eleven built-in filter masks and two more non-linear operators. **XBASL** uses a much faster algorithm to fit polynomials to image rows (*i.e.*, spectra). This algorithm is described in the new *AIPS* Memo No. 31, *Polynomial Approximations to Discrete Functions*, by Harvey S. Liszt and Eric W. Greisen. Four older tasks also were modified significantly. **FITTP** and **UVLOD** now support antenna files under the international FITS tape format for tables. **MX** handles large (> 32767 component) cleans. **UVSUB** can now do a division by the source model as well as a subtraction. Finally, the meaningless procedure **QEXIT** was deleted.

VAX users and, especially, system managers will also be interested in the changes to the VAX versions of **ZACTV9** and **ZESTEX**. These changes allow *AIPS* tasks to know the "process" logical symbols as well as the "group" symbols.

CHANGE.DOC: 15May84–14Jul84

1911. *May 15, 1984* ZESTEX, ZDCHIN, ZACTV9 *Gary*

Experimental changes in 15JUL84 version at Charlottesville to use the **SPAWN** library routine instead of the **CREPRC** system service. The advantage is that the entire context of the master process (**AIPS** language interpreter) is copied to the subprocess. This allows the user to set process logical symbols different from the *AIPS* defaults without affecting other users. It was a little tricky setting things up so that tasks would work with the debugger.

ZDCHIN — This routine now sets up the error log file for processes that crash. The files will now be of the form *taskname*.**ERR**. Previously all tasks wrote to **ERROR.DAT**.

ZACTV9 — Uses **SPAWN** instead of **CREPRC**.

ZESTEX — This is our exit handler. To use the debugger **SYS$INPUT** must be properly assigned to the user's terminal. However, an assignment other than **NLA0:** for **SYS$INPUT** implies that the process does not shut down after the image (task) exits. I had to add code to the exit handler to shutdown the process upon exit.

Moved nowhere.

1912. *May 17, 1984* APGS, STEER *Tim*

APGS and its bastard, STEER, did not handle rectangular images correctly. I have changed a number of MINIT calls to do this.
Also in VLA VAXes.

1913. *May 18, 1984* General HELPs *Eric*

Upgraded general Help files for 15MAY84 release. Done so far WHATSNEW.
Moved nowhere, needs to go to OLD and VLA.

1914. *May 21, 1984* ZDCHIN, ZACTV9 *Gary*

Fixed a bug introduced in the "spawned tasks" change (entry 1911). The spawned processes did not like to share the message terminal when they were told their SYS$OUTPUT by LIB$SPAWN on startup. Thus, only one task at a time could be run from AIPS using a separate message terminal. Now the message terminal is determined in ZDCHIN when the task starts up. I have not relinked all of the tasks.
Moved nowhere.

1915. *May 21, 1984* VBLIN *John*

Added APARM(10) which when > 0 forces VBLIN to recalculate u, v, and w. If APARM(10) < 1, VBLIN will pass u, v, and w found in the VLB input data records into *AIPS*.
Moved nowhere.

1916. *May 25, 1984* YINIT (Model 75) *Eric*

Corrected call sequence of YINIT for the I^2S Model 75.
Moved to Goddard this date, nowhere else.

1917. *May 25, 1984* IF.HLP *Gary*

This disappeared some time back. I made a new one.
Moved nowhere.

1918. *May 25, 1984* ZACTV9 *Gary*

Logical names for SYS$INPUT are different if AIPS started from a command procedure or not. Had to assign and deassign SYS$INPUT to get the right one passed to task, so task can be run under the debugger.
Moved nowhere.

1919. *May 30, 1984* FITS table routines *Gary*

New subroutines to handle tables on FITS tapes:

- **CHKTAB** — Sorts out table fields to make sure they are valid.
- **DCODEF** — Decodes number in form of character string using F77 rules.
- **EXTHIS** — Adds history record for FITS extension table.
- **EXTREQ** — Parses required cards of FITS extension header.
- **SETDEF** — Sets up some default values for table extension.
- **SKPEXT** — Skips an unknown extension file.
- **SKPTAB** — Skips an unknown table extension file.
- **TABHDR** — Parses cards for a FITS table extension header.
- **TABLIN** — Reads a line from the data section of a table.

Moved nowhere.

1920. *May 30, 1984* FITTP, IMLOD, UVLOD, FITTP.HLP *Gary*

Modified to allow an option to use new FITS table extension file formats for ANtenna files. Some subroutines were taken out of IMLOD and made into general FITS table handling subroutines. See the previous entry.
Moved nowhere.

1921. *June 4, 1984* ZACTV9 *Gary*

More side effects from change from CREPRC to SPAWN (entry 1911). AIPS could not get input from a VMS batch process after a task was spawned. Fixed it by deassigning instead of reassigning logical name for SYS$INPUT passed to task.
Moved nowhere.

1922. *June 8, 1984* XBASL *Eric*

The old version was very slow due to the use of the non-linear least squares package based on LMSTR1. Furthermore, LMSTR1 did not return appropriate answers for linear problems — giving instead approximate ones within some measure of its mysterious TOLerance argument. Changed XBASL to use orthogonal polynomials of order up to 7. These may be precomputed and need to be changed only if the baseline region changes. For speed, the entire polynomial computation is done in advance. This requires a large buffer (currently 8 x 850) which may give problems on the Modcomp. New files: DPLY.INC and CPLY.INC to hold the parameters of the polynomial fitting. Also minor revisions to the Help file.
Moved nowhere.

1923. *June 11, 1984* MX *Bill*

Fixed bugs involved with restarting. Should not blowup when restarting with more than 32767 components; should work OK when the peak in the map is outside of the clean window (at least as well as can be expected); now checks if the history file rather than the map file exists in the history routine.
Moved VLA this date.

1924. *June 12, 1984* Installation Procedure *Gary*

ISHORTINS — The "shortcut" installation procedure was asking for a second tape even with the one 6250 tape configuration. In F$GETDVI call, changed TAPE to "TAPE".

IPROMPTL — Took out question about TV type. The shortcut procedure installs the load modules linked with the I^2S Model 70 routines because they are the only ones we keep available.

ILOAD — Put the TV type question in here, the main routine for the full installation. Also added a default TV directory (the I^2S 70 directory) for people without TVs.

Moved nowhere.

1925. *June 13, 1984* MX *Bill*

Modified to use up to 255 CC files when a single output frequency channel is being processed. Thus up to 8,353,800 components per field are allowed for continuum or single line channel maps. Also modified MX.HLP, DMX.INX, CMX.INC.
Moved nowhere.

1926. *June 13, 1984* CONVL *Bill*

Fixed bug in flux scaling for VM maps.
Moved VLA this date.

1927. *June 13, 1984* PRTAN *Bill*

Added version number to output; now properly handles the case when there are fewer entries than the number requested.
Moved nowhere.

1928. *June 14, 1984* UVLOD *Bill*

Modified to always write an AN file.
Moved nowhere.

1929. *June 14, 1984* ASCOR *Bill*

Modified not to interpolate over 3 days in time.
Moved nowhere.

1930. *June 15, 1984* XXPTS *Bill*

Modified both the VFC and PSAP versions of this routine. The location of the frequency table expected in the AP is now consistent with PTDIV.
Moved nowhere.

1931. *June 15, 1984* UVSUB *Fred*

I added an option which causes the task to divide the observed visibility by the model visibility, rather than subtract. Division is requested by setting the newly added adverb, OPCODE, equal to 'DIV '. Any other setting of OPCODE causes subtraction to occur. The division option may be helpful in solving for correlator offsets. The setup for calling XXPTS was changed so that the same setup could be used to call PTDIV (see entry 1930, above). Also modified CSUB.INC, DSUB.INC, and UVSUB.HLP. I deleted the line from UVSUB.HLP which calls UVSUB "The Battery-Powered CLEAN", since that is not an accurate description.
Moved nowhere.

1932. *June 18, 1984* FITTP *Gary*

Fixed error in saving the antenna array number which is encoded in the baseline value. FITTP was writing a zero (array 1) for this value no matter what the array number.
Moved to VLA, OLD.

1933. *June 18, 1984* NINER *Thad*

NINER has been updated since the last release. It now has eleven, rather than just two, filter masks built in to the software. Two more OPCODE's have also been added. The first is 'KRSH' for the Kirsch edge enhancement operator whose result depends on the largest directional gradient at each input data point. Its results are similar to those produced by the Sobel operator, but it is slower. The second OPCODE is 'WALL' for the Wallis operator. This operator computes the base ten log of the normalized quotient of each pixel over the product of the four adjacent pixels and is sensitive to point sources. NINER will also print out the current row number every tenth row if requested. The Help file has also been updated appropriately.
Moved nowhere.

1934. *June 18, 1984* MWFLT *Thad*

This is a new task which is designed to apply nonlinear lowpass filters to images. It uses the "scrolling buffer" concept with space for a 31 row buffer. Currently, there are three OPCODE's. The first is 'MW ' which returns the median of the pixels in the window at any given time. The second is 'MODE' which returns the mode of the pixels in the window. The third is 'ALFA' which returns the average of those pixels in the window which are within a given range of the distribution.
Moved nowhere.

1935. *June 25, 1984* ZACTV9 (old and new versions) *Gary*

A bug in this routine could cause AIPS to hang starting a task if the following conditions were met: (1) VERSION was set to NEWPSAP. (2) The task being activated did not exist in PSAP but did exist in NEW. (3) The computer was busy. The bug was in the code that tried to determine if the task started successfully. The erroneous code was not exported anywhere except to the VLA.
Moved to OLD, VLA, VAX3.

1936. *June 26, 1984* APIO *Bill*

Fixed bug which caused an incorrect window to be specified to MINIT for large transfers with a window specified. Caused failure of MX for 4096 maps.
Moved to VLA this date, nowhere else.

1937. *June 26, 1984* MX *Bill*

Fixed MX to put AP tables where corrected version of XXPTS now expects them.
Moved nowhere.

1938. *June 26, 1984* AU8 *Gary*

EXTDEST with INVER = -1 would return an error condition whenever it deleted extension files. This prevented EXTDEST from being used in a FOR loop.
Moved nowhere.

1939. *June 27, 1984* ZDOPR2.MAR, ZDOPR3.FOR *Gary*

I put in some quick "fixes" for these routines, before sending out the 15MAY84 tape. These routines are old versions of ZDOPRT that are still used be some sites that write to the Versatec in non-NRAO ways. They have not been updated for the COPIES option that was added to ZDOPRT. I put NCOPY in the call sequence so they would work, although NCOPY is still not implemented (one always gets 1 copy).
Moved to OLD.

1940. *June 27, 1984* PASS2 *Bill*

Modified to work properly (I hope) for 4096x4096 FFTs. Multiple calls to MINSK are made as necessary.
Moved to VLA this date, nowhere else.

1941. *June 28, 1984* MAPCR *Bill*

Clarified documentation in precursor comments; also corrected *GOING AIPS* Chapter 8 to describe the current argument list.
Moved nowhere.

1942. *June 28, 1984* PASS2 *Bill*

Fixed a bug introduced in previous fix; affected only 4096 transforms.
Moved VLA this date, nowhere else.

1943. *June 28, 1984* XTRAN *Univ. Texas*

New task from the University of Texas at Austin. Solves for the plate constants for an optical image based on the coordinates of reference stars and interpolates the image onto a proper coordinate system. Also XTRAN.HLP.
Moved nowhere.

1944. *July 3, 1984* VBLIN *John*

Added by Editor from CHKOUT *history file:* Change the error sent to DIE when NPOINTS exceeded.
Moved nowhere.

1945. *July 4, 1984* GAL *Gustaaf*

The sign of the residual map has been reversed. It now contains the observed velocities minus the model velocities.
Moved nowhere.

1946. *July 5, 1984* UVERR.FOR, UVERR.HLP *Gary*

An old version of FITTP (15MAY83 and earlier) would write an incorrect header for UV data that had been combined using DBCON. The incorrect version of FITTP would store the random parameters as UU VV WW BASELINE DATE DATE TIME1 instead of the correct values UU VV WW BASELINE BASELINE DATE DATE. This would cause wild date values to be calculated when the data was restored from tape. This program will stuff the correct header values when reading from tape. This program is not sophisticated enough to handle parameters different from those listed above.
Moved to VLA and VAX3.

1947. *July 9, 1984* APIO *Bill*

Fixed bug in doing multiple segment transfers on backwards file access.
Moved to VLA this date, nowhere else.

1948. *July 10, 1984* VBANT *John*

Fixed a bug in VBANT that wouldn't allow the task to find source flux densities beyond the first entry in the flux list in the calibration text file. Also VBANT.HLP and added cpu times to VBLIN.HLP.
Moved nowhere.

1949. *July 11, 1984* VBFIT, VBBIG, VBCOR *Bill*

Fixed normalization of frequency averaging to agree with current practice in VBLIN, that is average rather than sum the channels. Also added trap in FRCAL3 in VBFIT and VBBIG to keep from blowing up when calculating the signal to noise ratio for bad data.
Moved nowhere.

1950. *July 11, 1984* ZDCHIN *Eric*

Added two lines setting the variables for number of words per long integer and per logical. These will actually not take effect until later when the DDCH.INC *et al.* are also released in their new forms.
Moved nowhere.

1951. *July 11, 1984* QEXIT *Eric*

Changed POPSDAT.HLP to delete this meaningless procedure. In fact, it was setting PRIORITY to 22 which was being saved for the next log in and consequently messed up subsequent PRTMSGs.
Moved nowhere.

1952. *July 11, 1984* MX *Eric*

Found a bug which caused bad addressing into the CC file for multi-channel jobs. The bug was put in MX during the fix for very large cleans.
Moved nowhere.

1953. *July 11, 1984* ZESTEX, ZDCHIN *Gary*

More side effects to the spawn change (see entry 1911). Tasks were being aborted by control Y issued from the parent process. When AIPS was being run from EMACS, ZESTEX was deceived into thinking AIPS was a task, thereby shutting down the subprocess when AIPS did an exit.
Moved nowhere.

1954. *July 11, 1984* PRTTP *Gary*

Bug in printing extension files when header goes over one buffer. ICARD was not reset to 1.
Moved nowhere.

1955. *July 12, 1984* VBLIN *John*

Added by Editor from CHKOUT *history file:* Change DFT normalization.
Moved nowhere.

1956. *July 12, 1984* GAPLT *John*

Added by Editor from CHKOUT *history file:* Fix divide by 0.0 bug and error in GA interval calculation.
Moved nowhere.

1957. *July 13, 1984* PLCUB *Gustaaf*

PLCUB now gives more information about the cube being plotted on the plot itself.
Moved nowhere.

1958. *July 16, 1984* IBM/UTS discovered *Kerry/Doug*

Several include files produce common block alignment errors on operating systems that care about such alignments. In particular, the alignment errors are due to the placement of LOGICAL variables in the common block statements. Since the ANSI standard recognizes only LOGICAL*4, other operating systems may not support LOGICAL*2. The common blocks have been rearranged such that LOGICAL variables precede INTEGER variables. Changed were:

CCAL.INC	CFFT.INC	CFIL.INC	CGAI.INC	CGRY.INC
CKAL.INC	CMAP.INC	CMEM.INC	CMX.INC	CSC.INC
CSUB.INC	CTVD.INC	CUVF.INC	CUVP.INC	CVCL.INC
CWIN.INC				

Moved nowhere.

1959. *July 16, 1984* 4.xBSD Unix discovered *Kerry/David Garrett*

4.xBSD Fortran compilers complain about common block labels that are the same as program unit names. Changed were:

CMLT.INC — Changed label MLTAPE to MLTAP.
CPTP.INC — Changed label PRTTP to PRTTAP.

Moved nowhere.

1960. *July 16, 1984* IBM/UTS discovered *Kerry/Doug*

VKEY.INC had too many continuations in a DATA statement. Some Fortran compilers restrict the number of continuation statements (typically 19).

Moved nowhere.

1961. *July 16, 1984* IBM/UTS discovered *Kerry/Doug*

Several include files used variables in common block statements that were not declared in the corresponding declaration include file. Changed were:

DBLK.INC — Declared INTEGER*2 NE2CNO.
DFRN.INC — Declared REAL*4 TINT.
DGNP.INC — Declared INTEGER*2 BUFF1(256).
DVMN.INC — Declared REAL*4 RNPPB.

Moved nowhere.

1962. *July 16, 1984* IBM discovered *Doug/Kerry*

Integer constants and expressions were found in calls to functions and subroutines. In the directory [.APL.SUB] changes were made in the files:

AXSTRN — I*2 expression replaced with temporary variable.
IMANOT — I*2 expressions replaced with temporary variables.
LABINI — I*2 expression replaced with temporary variable.
QRFAC — I*2 expressions replaced with temporary variables.
SLBINI — I*2 expression replaced with temporary variable.
UVDISK — I*2 expression replaced with a temporary variable.

Moved nowhere.

1963. *July 16, 1984* IBM discovered *Doug/Kerry*

Integer constants and expressions were found in calls to functions and subroutines. In the directory [.AIPS.SUB] changes were made in the files:

AU5 — temporary I*2 arguments substituted.
AU6B — temporary I*2 arguments substituted.
AU6D — temporary I*2 arguments substituted.
AU9 — temporary I*2 arguments substituted.
AU9A — temporary I*2 arguments substituted.
CHGRIP — temporary I*2 arguments substituted.
ICOVER — temporary I*2 arguments substituted.
INIT — temporary I*2 arguments substituted.
LTSTOR — temporary I*2 arguments substituted.
STORES — temporary I*2 arguments substituted.
TVFIND — temporary I*2 arguments substituted.

Moved nowhere.

1964. *July 17, 1984* IBM discovered *Doug/Kerry*

Several N*n* variables were not initialized or declared. In [.AIPS.PGM] the routines corrected were:

AIPMAN — had N7 uninitialized.

In [.APL.PGM] the routines corrected were

FITTP — (SUBROUTINE FITHIS) had N80 uninitialized and undeclared.
SUBIM — had N8 uninitialized and undeclared.
XSMTH — (SUBROUTINE XSMHED) had N1 uninitialized and undeclared.

In [.NOTST.APG] the routines corrected were

NTERP — had N3 uninitialized and undeclared.
UVDIS — (SUBROUTINE TVDISP) had NO uninitialized and undeclared.

In [.NOTST.PGM] the routines corrected were

CORMS — (SUBROUTINE COMBIN) had N7 uninitialized and undeclared.
— (SUBROUTINE COMBHI) had N6 uninitialized and undeclared.
DCONV — Changed MSGWRT(N9) to MSGWRT(N8).
GAPLT — (SUBROUTINE GETMAX) had NO uninitialized and undeclared.
IMMOD — (SUBROUTINE IMMHED) had N4 uninitialized and undeclared.
PLCUB — Changed MSGWRT(N9) to MSGWRT(N8).
UVFIL — (SUBROUTINE UVFILN) had NO uninitialized and undeclared.
UVLOD — (SUBROUTINE UVFDAT) had N8 uninitialized and undeclared.

In [.NOTST.SUB] the routines corrected were

IMIO — had NO uninitialized and undeclared.

Moved nowhere.

Changes: 15-July-1984 version of *AIPS*

This publication is intended to provide corrections and updates to the *AIPS COOKBOOK* in order to fill the gap between publication dates. We also hope that users will annotate their current copies of the *COOKBOOK* rather than request a new copy at each publication date.

This section will provide details of the changes to the 15-Sep-1983 *COOKBOOK* caused by changes in software between the 15-May-1984 and 15-July-1984 versions of *AIPS*. The changes during this period cause only very minor additions to the *COOKBOOK*.

Section 13

Add to ANALYSIS, Page 59:

MWFLT	T	Image lowpass filtering: median, mode, average	§
XTRAN	T	Optical plate solution and correction	§

Add to INDEX, Page 67:

MWFLT	T	Image lowpass filtering: median, mode, average	§

Add to INDEX, Page 70:

UVERR	T	Load incorrect UV FITS from <= 15May83	§

Add to INDEX, Page 71:

XTRAN	T	Optical plate solution and correction	§

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AIPS Order Form

1. Name and address of Contact Person: _____

   ☐ Address label on back is correct _____

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

2. ☐ new order ☐ reorder

   Version of *AIPS* currently running: _____

3. *AIPS* version desired:
   (Shipped 4–6 weeks after release date)
   ☐ 15-Jul-1984
   ☐ 15-Oct-1984

4. Tape type desired: (VMS only)
   ☐ VAX/VMS BACKUP
   VAX load modules desired:
   (requires 2nd 1600 bpi tape)
   ☐ Yes
   ☐ No

   (UNIX only)
   ☐ UNIX tar
   Version of UNIX system in use: _____

   (Neither UNIX nor VMS)
   ☐ Simple blocked card images
   ☐ FITS compressed text format

   Version of Z routines desired:
   ☐ VAX VMS
   ☐ Modcomp
   ☐ UNIX

5. Tape density desired:
   ☐ 800 bpi
   ☐ 1600 bpi
   ☐ 6250 bpi

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

7. Printed documents required:
   ☐ 15SEP83 *COOKBOOK*
   ☐ 15MAY84 *GOING AIPS*

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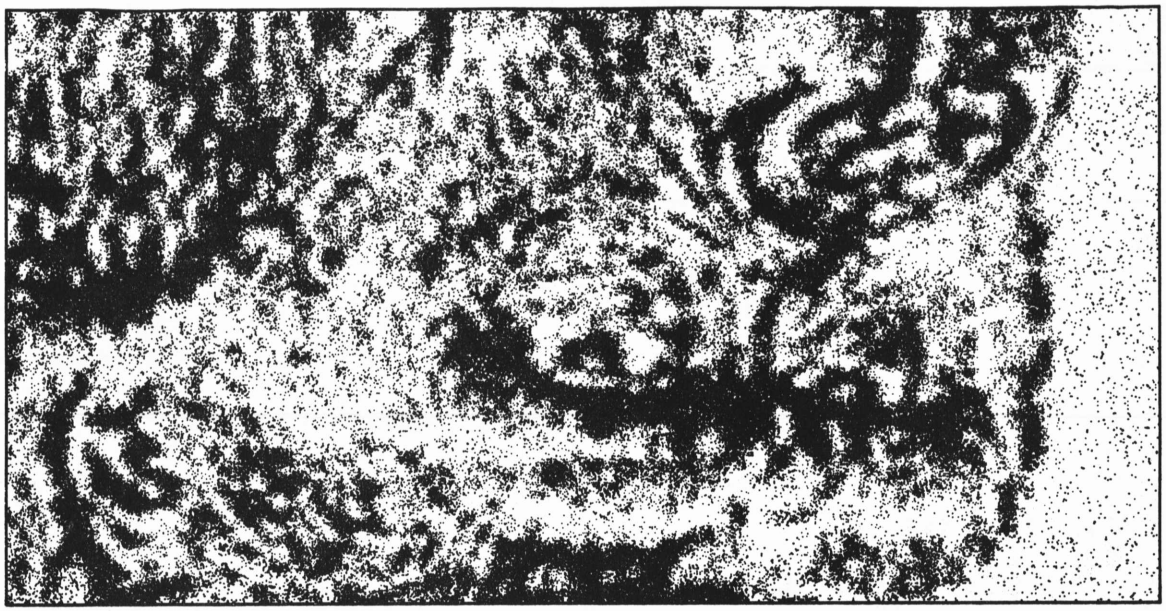

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National Radio Astronomy Observatory
Edgemont Road
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A I P S L E T T E R

Volume IV, Number 5: October 15, 1984

National Radio Astronomy Observatory

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

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TEXset by EWG

Personal Notes

Gustaaf Van Moorsel has accepted a position with the Space Telescope European Coordinating Facility in Garching bei München, West Germany, effective 1 December. He and his family are spending the months of October and November at the VLA in New Mexico before their move to Bavaria. We are sorry to see him go because he made a substantial contribution to the *AIPS* project during his year in Charlottesville (tasks **GAL** and friends) and because it was so pleasant to work with him. Gustaaf's NRAO friends all wish him well in his new position.

Don Wells was one of four invited speakers at an internal "Technical/Scientific Workstation Roundtable" organized by the Laboratory Data Products division of Digital Equipment Corp., and held at Marlboro, MA, 21 August. Don presented the requirements and desiderata for future DEC image processing workstation products from the *AIPS* point of view, stressing the desirability of DEC offering image display and vector hardware products in their future supermicro workstations. On 28 August, Don gave a colloquium on "Astronomical Image Processing" at the Department of Astronomy of the University of Illinois.

Bill Cotton, Bob Duquet, and Kerry Hilldrup traveled to Minneapolis, MN, 7–9 October to visit the Computer Center of the University of Minnesota in order to learn about the potential for use of their Cray-1S and other facilities by NRAO under the NSF's "Supercomputer Initiative" program. They also visited with our astronomer friends at Minnesota who have recently ported parts of *AIPS* to the Minnesota Cray (see the discussion under the CPU/OS heading below). On the second day, Bill, Bob, and Kerry visited the offices of Cray Research in Mendota Heights to discuss the properties of Cray's COS operating system as a host for *AIPS*. (COS release 1.14, due out in December, appears to have just about all features needed for running tasks under control of program **AIPS**.) On the whole, they came away favorably impressed with the potential of the facilities at the University of Minnesota to become a supercomputer *AIPS* site and with the software support provided by Cray. In the labs at Mendota Heights, they saw the first Cray-2 and were amazed by its small physical size and wonderful liquid immersion cooling system ("it's a work of art").

Computer Advisory Committee Meeting

In 1982, to aid NRAO computer personnel in the planning process, NRAO asked a group of nine distinguished industrial and academic computing people to act as an advisory committee. This committee (chaired by Dr. Kenneth King of Cornell University) held its first meeting at Socorro in March of 1982. The committee prepared a report after that meeting in which they urged that NRAO formulate a long-range plan and the committee offered to review the plan when it was ready. The computer personnel proceeded to act on this recommendation. The portions of the plan having to do with computing at Green Bank and Tucson were relatively non-controversial and their plans were completed by September 1983; implementation of the plans was initiated by the end of 1983. The planning process for synthesis mapping was much more complicated; it involved extensive study and discussion inside NRAO by many people over a long period of time.

A key document was VLA Scientific Memorandum No. 150, "Astronomical Requirements for Future VLA Processing", by Ron Ekers, Ed Fomalont, and Frazer Owen, September 1983. This report reached the conclusion that achieving the full scientific potential of the VLA would involve vastly more computing than NRAO is now capable of providing. A companion memo, VLA Computer Memorandum No. 168, "A Computer Plan for the VLA", by Bob Duquet, Gareth Hunt, and Bob Burns, September 1983, gave a preliminary evaluation of various technical options (supermicros, superminis, super-APs, and supercomputers) which might enable NRAO to satisfy the scientific needs of the VLA. A special scientific review committee, composed of six NRAO staff members and six visitors and chaired by Dr. Joseph Taylor of Princeton University, met in Charlottesville in September 1983 to review these documents (along with the Tucson and Green Bank plans), with special emphasis on the scientific justifications. This committee's recommendation regarding the VLA computing plans was:

> "... the [VLA] is known to be capable of addressing important scientific problems for which, at present, sufficient number-crunching capability is unavailable. We are convinced of the need for computing capacity at least in the 'small supercomputer' range ... construction of the VLBA will, of course, add to this need. We urge NRAO to proceed with a detailed plan for achieving this kind of computing capacity in the most expeditious manner possible."

After this review, the NRAO scientific staff and computer personnel discussed the subject for many months, made trips to visit a number of vendors and computing centers, and prepared a large number of memoranda bearing on all aspects of the problem. An internal symposium of the NRAO Computer Division was held at Green Bank in April with the theme "Computing Problems of High Performance Synthesis Mapping" (see the discussion in the 15MAY84 *AIPSLETTER*). During the period from April to August of 1984, revised versions of three planning documents were prepared for presentation to the Computer Advisory Committee as a proposed long range plan. A number of people in Charlottesville and Socorro worked on this computer plan and the requirement to reach consensus undoubtedly improved its quality significantly. The final version of the proposed computer plan concluded that the scientific requirements implied a need for a *sustained* computing capacity of 60–80 MFlops (million floating operations per second) and an I/O capability to match the computing speed. It further specified a supercomputer as the preferred hardware option, with *AIPS* running interactively in the supercomputer. Copies of the three planning documents went to the advisory committee in August.

The computer advisory committee held its second meeting at Green Bank on 18–19 September. On the first day, NRAO personnel presented the scientific justification, reviewed the technical options, described a specific hardware and software implementation plan, and discussed several other issues (management, communications, funding levels, *etc.*). Much discussion between and among the NRAO staff and the committee occurred at meal times and in Green Bank's lounge. Green Bank proved once again that it is a nice place to hold a modest-sized meeting (about 45 persons in this case). The final written report of the committee

has not yet become available, but NRAO personnel came away with several strong impressions, based on the verbal comments made by the committee:

- NRAO's plan to utilize supercomputers for synthesis mapping was strongly endorsed by the committee (1) as the best, and possibly only, solution available at this time to meet the scientific needs and (2) as the path which offered the best long-term growth potential.

- The committee recommended that NRAO take early steps to get needed supercomputer experience. Specifically, it should bring up *AIPS* on these machines using computer time made available through the NSF supercomputer initiative. In addition to gaining experience, this approach should provide NRAO's user community with improved capabilities in the near-term using existing facilities.

The NRAO will attempt to make use of Class VI machine time made available under the NSF's supercomputer initiative. Readers of this issue of the *AIPSLETTER* will see evidence in the Personal Notes section that NRAO's computer personnel have already begun to act along these lines. The procurement of a Class VI machine by, and its implications to, NRAO are currently being studied at the technical level.

Coming Attractions

We hope to make another survey of the *AIPS* sites sometime during the next few months. It is possible that the survey may be made before 15 January 1985. The questionnaires will be mailed to the *AIPS* "Contact Persons" and will ask about CPUs, operating systems, vector processing hardware, RAM and disk capacity, peripherals (image displays, plotters, *etc.*), CPU utilization estimates, *etc.* The number of *AIPS* sites has grown greatly during the past two years and NRAO is very interested in assessing the available resources in the community. We are grateful for the spirit of cooperation which the contact persons displayed during our previous surveys and trust that they will help us again this time. A summary of the results will appear in the first *AIPSLETTER* after the survey is completed.

The Gripes Column

Yes, yes, we know you haven't received any responses from us in a long time. We assure you that we are almost ready to mail a *huge* pile of Gripe responses (extending through the first week of October). Gripes continue to arrive at a rate of about 1.5 per day; the count passed 1300 earlier this month. A distressing fraction of all Gripes receive "to be continued" designations and the cumulative total of "tbc" Gripes grows inexorably. We are happy to report, however, that a significant fraction of the oldest tbc's have been satisfied by recent improvements in *AIPS*. Please bear with us and keep submitting Gripes.

Here is a gripe we received a few months ago:

> "It is 10:46 on a Saturday night and I am unable to locate the essential alcoholic ingredients for the 'banana daiquiri' described on page 5 of the '*AIPS COOKBOOK*'. This should be kept in the *AIPS* Caige please."

The Portability Column

CPU/OS Combinations

Cray-1/COS: In a memo dated 13 September, John Dickey of the University of Minnesota gave us a progress report on the University of Minnesota Cray implementation of *AIPS*. The Cray-1 is the first machine of the Minnesota Supercomputer Institute (a Cray-2 and a Cyber 205 are scheduled for delivery in 1985). At present, Minnesota is one of three centers where the NSF will fund large scale scientific computing by the holders of existing research grants. The Minnesota radio astronomers have a few projects which are sufficiently computer intensive that they have decided to explore the feasibility of using the Cray in conjunction with their Vax to do high volume *AIPS* processing. They applied for a grant of 5 hours of Cray time and it was approved. The memo goes on: "We started by converting the Z routines to work using Cray Fortran under COS. These are now working, although not necessarily optimized. Then we separated from *AIPS* a sample task (we started with IMEAN) with all of its subroutines and compiled this on the Cray, linking with our new Z routines. This is also now completed and working; it gives the same results as the Vax for the same map ... we are now in the process of implementing larger tasks in the same way (UVMAP is next) ..." The memo gives more details about the relation between the Vax "front-end" and the Cray in their implementation. (They have program AIPS in the Vax; an alternate strategy would be to put program AIPS in the Cray.) This work has been done by one person, Bob Garwood, apparently during the last three months.

CRDS/UNOS: On 02 August, Colin Lonsdale of Pennsylvania State University informed us about progress on the "PSAIPS" project. He said that they had some 10 *AIPS* tasks running on their 68000-based system under UNOS (CRDS's Unix lookalike), including UVMAP, APCLN, and a local task called BLPL (a variation on TKPL) which drives their pen plotter (a Bausch & Lomb HIPLOT DMP-40). Later [20 August], Colin sent us a letter in which he reported that 16 tasks now worked (he described them as "a minimum subset for useful research"). Colin enclosed a listing of the message file from a test run and two plots: one produced by task BLPL on the HIPLOT pen plotter and one produced by a modified version of PRTPL on their PRINTEK dot matrix printer/plotter (1800 by 1450 dots, about $2000, "graphics of excellent quality"). Colin also enclosed a nice grey scale plot of the same data with a superimposed contour map using task GREYS with the PRINTEK plotter. Regarding speed, Colin says: "according to figures given to me by Kerry for a 256^2 map with 12000 visibility points, and running a similar task with 8100 visibility points, we are about 5 times slower than the Vax running PSAP code" (*i.e.*, a 780 without an FPS AP). Colin goes on to note that replacing the present CPU chip set with newer, faster chips (the 68020 and 68881) should allow the PSAIPS system to approach 780 performance more closely, probably within a year. For recent news about the PSAIPS array processor implementation, see the discussion in the AP section below.

MASSCOMP MC-500/Sys.III: Kerry Hilldrup made several trial installations of the *AIPS* Unix installation kit on the Green Bank Masscomp during August, September, and October. All that can be said is that the basic parts of *AIPS* work. The magnetic tape software interface is incomplete at present. No decision has been made regarding whether this implementation will be made fully operational.

IBM4341/VM+UTS: Much further progress has been made since the last *AIPSLETTER*. Early in October the task MX began to work, which makes the IBM installation effectively a "state-of-the-art" *AIPS*. As this *AIPSLETTER* was going to press, plans were well advanced to reconfigure the disk resources on the Charlottesville IBM for limited production trials.

APs and other Vector Processing Hardware

We are pleased to announce that it is no longer true that the FPS 38-bit AP architecture is the only one implemented for *AIPS*! The honor of constructing the first non-FPS vector hardware implementation of *AIPS* goes to Pennsylvania State's PSAIPS project, as reported in the first item of this section:

Sky SKYMNK (and "Warrior"): Eric Feigelson of Penn State reported [11 October] that about 20 (out of about 100) of the *AIPS* "pseudo-AP" subroutines have now been converted to make Fortran calls to the library of the Sky AP (*i.e.*, subroutine calls have replaced DO-loops). Penn State personnel are currently concentrating on the subset of the pseudo-AP routines which **UVMAP** uses, but expect to convert all of the pseudo-AP library eventually, perhaps within about six months. In this implementation approach, all tasks work at each stage. As each subroutine is converted, the tasks which use it can be relinked. The tasks just go faster and faster as more routines are converted. The use of the vector hardware has already made a big speedup in FFT operations. Penn State is currently doing this work with Sky's older AP (the SKYMNK "micro number cruncher") but expects that the code will port to the Warrior when it becomes available near the end of the year. (The Warrior will be several times faster and its software is upward compatible with the SKYMNK.)

About Sky and its Warrior AP: The vendor is Sky Computers, Inc., Foot of John Street, Lowell, MA 01852, (617)454-6200. Their Warrior is a two-board array processor capable of up to 15 million 32-bit floating point operations per second (it uses 3 Weitek 5 MHz pipeline chips, two adders and a multiplier, and computes in IEEE FP format). The Warrior is compatible with VME buss systems and offers a 16KB cache memory for internal arithmetic operations. The price is $14900 for quantity one. The Warrior also supports Versabus systems by using a VME-to-Versabus adaptor (this is what Penn State will use for their CRDS computer). *AIPS* sites who might want to consider this AP for other buss specifications (e.g., Unibus or Multibus) should contact Sky and encourage them to support other busses.

About vector devices in general: In his report of 11 October, Eric Feigelson made an interesting observation about the Penn State AP experience: substituting vector calls for certain DO-loops actually caused the code to *slow down!* He said that this is because, with the current PSAIPS AP (the SKYMNK), the overhead of setting up a vector call was such that for DO-loops of less than 10 floating operations it was faster to use the host scalar FP hardware. To fully understand such a vector unit, one wants to know yet another timing parameter: the vector length for which the setup time is equal to the vector FP time (the vector "half-length"). For the FPS AP-120b and the Numerix MARS-432 (see p.3 of the 15JUL84 *AIPSLETTER*), this length is about 2. For the Cray-1, it is about 7–10. For the Cyber 205, it is about 100 (the Cyber 205 is often said to be a "long vector" machine). This length parameter has a profound effect on the coding style of a programmer who understands its implications, especially when the half length is greater than about 10. *AIPS* vector processing code is currently written in the style appropriate for machines with half-lengths of order 2. It will be necessary to restructure the inner loops in the pseudo-AP library in order to make efficient use of machines with half-lengths of order 10 or more. For example, the inner loop of the *AIPS* gridding routines (see the DO 100 loop in subroutine APGRD4) usually has a length of 7. A Cray-1 will probably perform with 30-50% efficiency on such code, but a Cyber 205 will be unlikely to deliver more than 10% of its nominal performance (as with the SKYMNK it might even be faster to use the scalar FP hardware!). With a suitable transformation of the code to lengthen the vectors in the innermost loops, both the Cray and the Cyber would approach the limits set by their respective FP pipelines. In the case of APGRD4, this transformation can probably be done by permuting the order of the three DO-loops and adding code to avoid problems with vector dependencies. Probably the same transformation will be good for the Warrior AP as well. In summary, it appears that producing a "long vector" implementation of the pseudo-AP routines will be an important step for implementations of *AIPS* on both supercomputers and APs.

It remains true that the FPS 5105 and 5205 are the only APs for which *AIPS* implementations are currently available from NRAO (see Penn State for Sky Warrior code!).

Image Displays

I^2S Model 75: Users at the University of Washington and Goddard Space Flight Center have now confirmed that the I^2S Model-75 implementation of *AIPS* works, although there is a hint that pixel positions are not accurately corrected for zoom and scroll. The mystery of the trackball buttons was solved (see CHANGE.DOC entry #2031), allowing the 15OCT84 release to handle button values more transparently. The I^2S Model-75 is sold with two 512^2, 8-bit memories per board. For a variety of technical reasons, these memories are independent for loading images, but not for their look-up tables, zoom, and scroll. Worse yet, only one of each pair may be turned on at a time. These limitations caused the programmer at I^2S to choose to suppress the second channel of each board in designing the *AIPS* implementation. Eric has reviewed this decision in detail and, reluctantly, confirms the difficulties for both programmer and subsequent user in reversing it. Therefore, users of the Model-75 must inform *AIPS*, through the installation procedure or SETTVP, that there is only one 512^2 gray-scale memory per board, at least until further notice.

Comtal Vision One: We recently received Y-routines for this image display from John Dickel and Andy Lubenow of the University of Illinois. They are not included in the 15OCT84 distribution because we just haven't had time to load them and check the interfaces. We will be happy to send copies of them to any *AIPS* site which wants them before the 15JAN84 release (we already have one request).

Printing and Plotting Devices

QMS Lasergrafix 1200 and 800: We reported in the 15NOV83 *AIPSLETTER* that we had made trials of the Lasergrafix 1200 plotter and had developed experimental support code for this machine (task QMSPL in the non-standard program directory). In August, NRAO issued a purchase order for a QMS model 800, which is software compatible with the 1200, but is based on the Canon LBP-CX laser engine rather than the Xerox XP-12. Both the Canon and the Xerox engine use dry toner on 8.5 by 11 plain paper at 300 dots per inch. About the vendor: QMS, Inc. (formerly Quality Micro Systems), P.O. Box 81250, Mobile, AL 36689, (205)633-4300. The 1200 model sells for about $25K, the 800 model for about $10K. We know of one university *AIPS* site which ordered an 800 model soon after NRAO did. *Late flash:* Our Lasergrafix 800 was delivered on October 19, but was not set up in time to produce this *AIPSLETTER*.

Abstracts of Selected Recent Memos

AIPS Memo No. 31: "Polynomial Approximations to Discrete Functions", Harvey S. Liszt and Eric W. Greisen, July 1984, see box on order form on last page of this *AIPSLETTER*.

> This memo discusses a system of orthogonal polynomials which offer better performance than older methods for fitting one-dimensional functions. The new method was proposed and used some years ago by HSL for the fitting of spectral baselines in single-dish data. The VLA can now produce large data cubes, some of which also require the correction of spectral baselines. To perform this function, the *AIPS* task **XBASL** was written. As originally implemented, this task used the non-linear least squares routines used by other *AIPS* tasks such as **SLFIT** and **IMFIT**. However, this version of **XBASL** was very slow. A new version, using Liszt's method, is quite a lot faster and appeared first in the 15JUL84 release of *AIPS*.

AIPS Memo No. 32: "Tables in *AIPS*", Chapter 14 of *Going AIPS*, 27 July 84; "Generalized FITS extensions, with application to Tables", by Harten, Grosbol, Tritton, Greisen, and Wells, draft as of 15 August 84; see box on order form on last page of this *AIPSLETTER*.

> The first half of this memo adds Chapter 14 to the 15MAY84 edition of *Going AIPS*. This chapter starts out by giving all the gory details of the AIPS tables implementation which is included in the 15OCT84 release. It then documents the new tables subroutines which appear in this release: TABINI, TABIO, TABCOP, GETCOL, FNDCOL, and CTINI. The second half of the memo is a copy of an up-to-date version of the paper which defines the new FITS extension design and its use for tables (which is now supported by tasks IMLOD, UVLOD, and FITTP).

VLA Scientific Memorandum No. 153: "Observing with Offset Phase Tracking and Antenna Pointing Positions", Ed Fomalont and Ken Sowinski, 9 August 1984, available from the VLA.

> In the C and D configurations, low level, relatively constant correlated signals occur at the shorter spacings. These spurious signals produce artifacts near the phase center of the map and limit the sensitivity of deep integrations in the D and C configurations at 20cm and 6cm after about 10 hours of integration. If the phase tracking position is significantly displaced from the antenna pointing position, it is possible to place these artifacts outside of the primary beam area. It should then be possible to reach the expected sensitivity levels for long integrations. This memo gives recipes and discussions of observing procedures, Dec-10 procedures, and finally discusses the use of the *AIPS* task UVFIX to correct the times of visibility samples and to shift the phases to the antenna pointing position.

Summary of Changes: 15 July – 15 October

These changes are listed in detail in the CHANGE.DOC file reproduced later in the *AIPSLETTER*. We have been busy during the past quarter — there are 186 entries in the CHANGE.DOC file. This new record is due, only in part, to the increase in our cycle time. The remainder results from a variety of widespread changes in *AIPS* and from recent work on the backlog of Gripes. Two important groups of subroutines have been introduced: one to handle tables-format extension files and the other to perform generalized modeling in the *uv* plane. *AIPS* Clean Component files were converted to tables format. The catalog header format was changed to contain a long-integer value for both the number of components and the number of visibilities. Yes — to handle tables correctly, we decided to allow long integers (INTEGER*4) where needed and have begun to remove the obnoxious "pseudo I*4" we were using in hopes of porting *AIPS* to old PDP-11 computers. This conversion is being done fairly gradually. We have renamed several fundamental routines to temporary names (*i.e.*, MINIT became MINI3) and will retrofit the code over time to long-integer versions of the routines under their old names. We have already changed the accounting file format to avoid integer overflows when it is not cleared often enough by the *AIPS* Manager. The system-wide routine which opens catalog files has been made smart enough to create and initialize the files if they are found to be missing. As a result of these and other changes, SAVE/GET files from previous releases cannot be used in the 15OCT84 release. Because of the format changes, old versions of *AIPS* cannot be run with the data areas used by the 15OCT84 version. A format conversion program, CATCHT, is provided with the release. We have also taken steps to avoid zero axis increments in the catalog headers and have used the IBM/Unix project to detect and correct numerous minor programming errors. We have begun to depend on the host operating system to tell *AIPS* programs how large files actually are, rather than trying to predict their sizes. This will save some disk space when all the disks are not identical.

There are two new verbs and nine new tasks in this release. The verbs are **WEDERASE** to zero-fill step wedges on the TV display and **PCAT** to list all file types in the first or second "half" of the catalog file (with adverb **SLOT** defining the boundary). Thad has contributed the tasks **PATGN** to create images of user-specified test patterns and task **PGEOM** to convert images between rectangular and polar coordinates. Gustaaf has left us the task **WARP** for modeling galaxies in which the position angle and inclination vary with radius. Bob Sault and Tim wrote **UVSEN** to compute the sensitivity and rms sidelobes of an input *uv* data set. Tim also contributed **APVC** to deconvolve images by a generalized van Cittert iteration. Eric wrote **PRTAB** to display general tables extension files on the terminal or line printer. Bill added a set of three tasks to take randomly sampled, single-dish measurements and convert them into an image. **PRTSD** prints portions of such data, **SELSD** selects and converts the data to be gridded, and **GRIDR** grids the samples and produces a gridding-corrected image.

Significant improvements have been made in a variety of tasks. In the display area, **IMEAN** now allows up to 512 boxes in the histogram and **PRTIM** up to 7 digits in the printed values. The contouring tasks, **CNTR**, **PCNTR**, and **GREYS**, support a wider dynamic range by using a level-dependent format to display the **LEVS** values and allowing 30 such values. The printing tasks **PRTIM**, **PRTUV**, **UVFND**, and **PRTCC** all support a **DOCRT** option properly. Among *uv*-plane tasks, **UVCOP** now supports the **UVRANGE** adverb. **UVSUB**, **ASCAL**, **VSCAL**, **VBFIT**, and **MX** all offer new options using the generalized modeling package of subroutines. **MX** catalogs its work file, allowing faster restarts and removing some of the redundant use of **UVSUB**. **VBFIT** finds more accurate solutions for up to 20 antennas by using individual time values for each sample. **VBCOR** offers time smoothing by antenna of the delay and rate solutions before correcting the data. **TOVLB** has been cleaned up a lot to preserve, among other things, the history information when converting VLBI data to the CIT format. Among map analysis tasks, **COMB** now uses the **BADDISK** adverb. **LGEOM** can handle larger arrays and has a reversed sign of its shift parameters and a better Explain file. **MWFLT** offers a new normalization operator to enhance low levels in high-contrast images.

Improvements have been made in a variety of verbs as well. **INPUTS** has an abbreviated display for array adverbs which are all, or mostly, null valued. **EXTLIST** handles tables files and gives some information on files of types it does not support fully. **SPY** has a **DOALL** option allowing the user to see all tasks which the system will allow him to see. (Vax users should note that **SHOW SYS** runs at a special privilege not normally allowed for user programs.) **IMPOS** and **IMXY** return **TVBUT**, the value of the button pushed, for use in procedures primarily. **TIMDEST** will now destroy "busy" files if they are too old and applies a 3.0-day limit to cataloged scratch files and a 0.25-day limit to empty catalog files.

A variety of bugs no longer appear in the **15OCT84** release. Interactive tasks, such as **XGAUS**, resume **AIPS** on all normal error conditions. **PRTTP** and **TPHEAD** can handle *uv*-FITS data with 7 real axes. The Help file for **UVCOP** describes all of its options and several other Help files are also more helpful. The obsolete tasks **TOAIP** and **VBBIG** no longer appear. A Vax timing problem in the verb **GO** appears to be solved. **TVLOD** has a useful logarithmic transfer and handles compound values of **TVCHAN** as advertised. **CURVALUE** now reads other users' data from the TV memory rather than generating error messages and **TVFIDDLE** starts out with the correct colors in that portion of its operation. **IMVAL** and **QIMVAL** provide correct map values in the presence of blanking and at the edges of the image.

CHANGE.DOC: 15Jul84–15Oct84

1965. *July 17, 1984* DCH Common *Eric*

Revised DDCH.INC, IDCH.INC, CDCH.INC to specify the number of words per long integer (NWDPLI) and the number of words per logical (NWDPLO). Yes — this means two important things. First, INTEGER*4 is now allowed in *AIPS* although INTEGER*2 will remain the default. Second, logical variables may be LOGICAL*2 or LOGICAL*4 as needed, but LOGICAL*1 is now explicitly prohibited. The correct order of variables in a common is double precision (REAL*8), single precision (REAL*4), long integer (INTEGER*4), logical (LOGICAL*2 on Vax and Modcomp), integer (INTEGER*2). The code was revised prior to the recompilation and relinking of the new 15OCT84 area.
Moved nowhere.

1966. *July 17, 1984* All Fortran *Eric/Gary*

In anticipation of changing the call sequences of several fundamental subroutines, a program was run on all Fortran modules to convert all references to those routines to new, temporary names. The existing routines were also renamed to these new names. Thus, all code will still run with the old routines while we work slowly to convert to new routines with INTEGER*4 rather than INTEGER*2 or Pseudo-INTEGER*4 arguments. The code was revised prior to the recompilation and relinking of the new 15OCT84 area. The revised modules were:

DUVH.INC	renamed as DUV3.INC	CUVH.INC	renamed as CUV3.INC
ZFIO	renamed as ZFI3	ZMIO	renamed as ZMI3
MINIT	renamed as MINI3	MDISK	renamed as MDIS3
UVINIT	renamed as UVINI3	UVDISK	renamed as UVDIS3
MINSK	renamed as MINS3	MSKIP	renamed as MSKI3
ZCREAT	renamed as ZCREA3	ZCMPRS	renamed as ZCMPR3
COMOFF	renamed as COMOF3	MAPSIZ	renamed as MAPSI3
ZEXIST	renamed as ZEXIS3		

Moved nowhere.

1967. *July 17, 1984* PATGN *Thad*

New task to create user specified test patterns. It will produce a Gaussian profile, a Lorentzian profile, and a zone plate pattern (this pattern has a wide variety of frequencies at all possible angles). Its main use is in testing the response of other image processing tasks. Also PATGN.HLP.
Moved nowhere.

1968. *July 17, 1984* MWFLT *Thad*

A normalization operator has been added to MWFLT. This operator reduces the dynamic range of an image while enhancing its lighter features. This operator works well on images which have very strong sources that obscure finer details.
Moved nowhere.

1969. *July 18, 1984* ISHORTINS.COM *Gary*

Two bugs in the short installation procedure for 6250 tapes. It tried to load a backup set from an obsolete TV directory, [AIPS.*new*.AIPS.YSUB.IIS]. Also two labels were called REST.
Will be on 15JUL84 tape going to VLA.

1970. *July 18, 1984* U15JUL84 *Gary*

Updating instructions for 15JUL84 release.
Will be on 15JUL84 tape.

1971. *July 18, 1984* UVLOD *Gary*

Bad GO TO 170 in subroutine UVFEXT for null table was changed to GO TO 270.
Moved nowhere.

1972. *July 18, 1984* GAL *Gustaaf*

Introduced a more proper way of weighting when plotting the observed rotation curve.
Moved nowhere.

1973. *July 18, 1984* SUBIM *Gary*

Added by Editor from CHKOUT *history file:* Fortran compilation error detected during update.
Moved to OLD, nowhere else.

1974. *July 19, 1984* IMLOD *Bill*

Fixed buffer size in FITDA2 to read 4096-pixel, integer images correctly.
Moved nowhere.

1975. *July 19, 1984* General Help files *Eric*

Updated all the general Help files for changes of 15-May and 15-Jul-84. Checked them against the current *COOKBOOK* to make sure they were ok. Files revised:

WHATSNEW	ANALYSIS	INDEX	MAPETC	CATINFO
PL2D	SL1D	CUBE	UVPR	VLBI
POPSYM	CURSOR	APTASKS		

Moved to OLD this date, nowhere else.

1976. *July 19, 1984* ZACTV9 *Gary*

Added by Editor from CHKOUT *history file:* Timing problem in Vax version.
Moved to OLD this date, nowhere else.

1977. *July 19, 1984* MX *Eric*

Added by Editor from CHKOUT *history file:* Corrected bug in setting CC version number for multi-channel mapping. Was entered when multi-version CC files were allowed for single images.
Moved to OLD this date, nowhere else.

1978. *July 25, 1984* CONVL *Bill*

Fixed bug which caused unexplained failure if convolving image had no Stokes axis.
Moved nowhere.

1979. *July 27, 1984* IBM discovered *Doug/Kerry*

Integer constants and arithmetic expressions found in calls to subroutines and functions. They were replaced with temporary integer arguments. In APLPGM, the routines corrected were:

FITTP — In FTUVAN, 7 replaced by N7.
FITTP — In NEWUEX, 7 replaced by N7.
IMEAN — I*2 expressions replaced.

Moved nowhere.

1980. *July 27, 1984* IBM discovered *Doug/Kerry*

Integer constants and arithmetic expressions found in calls to subroutines and functions were replaced with temporary integer arguments. In NOTAPG the routine corrected was ASCAL.
Moved nowhere.

1981. *July 27, 1984* ASCAL, VM *Eric*

During work on the Tables development, I have fixed these two a bit. In ASCAL, there was a serious error in the convergence testing in the L1 solution method. This method may be more useful now. In VM, I removed references to CC files and fixed up the typing a bit.
July 30: fixed VSCAL for the same bug found in ASCAL.
Moved nowhere.

1982. *July 27, 1984* Tables finally *Eric*

Developed a general design for disk files to hold tabular data. In general, these will be extension files to normal and *uv* images. The format is described in CHAP14.RNO. The service subroutines developed are:

- CTINI — (To be renamed CCINI someday) creates and initializes a CT (components table) file — this is a good example routine for other types of tables files.
- FNDCOL — Returns the logical or physical column numbers of the columns headed by specified strings.
- GETCOL — Returns the value in a specified row and column of a table.
- TABCOP — Copies tables files from one catalogued file to another.
- TABINI — Creates/opens a tables extension file initializing the (new) file if needed and setting up the I/O.
- TABIO — Does reads and writes of full rows of tables and of other data structures within the table file.
- ZFIO — New version - uses I*4 record number.

Moved nowhere.

1983. *July 27, 1984* EXTLIST *Eric*

Added support for tables (TA and CT) extension files to subroutine AU8A. Fixed up the Help file too.
Moved nowhere.

1984. *July 30, 1984* ZACTV9 *Gary*

ZACTV9 has a test to make sure that the task it spawns actually starts up. The test is to make sure it does a minimum amount of I/O (10 direct I/Os) in a certain time limit. The time limit was increased from 30 seconds to 150 seconds. It was possible for AIPS to start a task, and then report that the task was hung.
Moved to VLA and 15JUL84 tape on 29Aug84.

1985. *July 31, 1984* PRTAB *Eric*

PRTAB is a generalized print task for tables extension files. It also is a good example program to describe how the file may be accessed in detail. It will print selected portions of tables on the line printer or on the CRT, with the latter option fully and correctly supported. Also a new Help file and new Includes CPTB.INC and DPT.INC.
Moved nowhere.

1986. *August 1, 1984* GAL, GAL.HLP *Gustaaf*

Added by Editor from CHKOUT *history file: ????.*

Moved nowhere.

1987. *August 2, 1984* IBM/UTS discovered *Doug/Kerry/Eric*

Expressions passed as arguments to subroutines and functions have been assigned to temporary variables of appropriate type and length. The temporary variables are then used in place of the expressions in the calling sequence. In AIPPGM, the routines corrected were:

CATCHG — In CATDIT, I*2 expression replaced.
GRITP — I*2 expressions replaced.
GRTOTEX — I*2 expression replaced.
POPSGN — I*2 expression replaced.
PRNTMN — In PRNTIT, I*2 expressions replaced.

In NOTAPG, the routines corrected were:

APGS — Integer constants replaced by I*2 variables. Removed unused CC file reference.
ASCAL — Integer constants and expressions replaced by I*2 variables. Corrected convergence test in L1 method.
BSCAL — Same as for ASCAL.
CONVL — Expressions in call replaced with temporary variables.
FFT — Integer constants replaced by I*2 variables.
MX — Integer constants replaced by I*2 variables.
STEER — Integer constants replaced by I*2 variables. Removed unused reference to CC files.

In NOTSUB, the routines corrected were:

EMPTY1 — 8 replaced by N8.
EMPTY2 — 8 replaced by N8.
FILL1 — 8 replaced by N8.
FILL2 — 8 replaced by N8.
GETSTN — 8 replaced by N8.
PRTERR — 7 replaced by N7.
SAVHDR — 8 replaced by N8.
SGEFA — 1 replaced by N1 and I*2 expressions replaced.
SUMARY — 8 replaced by N8.
TBLIO — 7 and 9 replaced by N7 and N9.
TVDISP — 1 and 3 replaced by N1 and N3.
UVHIST — 1, 2, 4, 100, and 16384 replaced by N1, N2, N4, N100, and N16384. Also replaced 100 with HUND as pseudo I*4 initialized /100, 0/ in call to VCLR. Expressions 2*NX and NY/2 replaced with M and L in call to MINI3 (M and L assigned prior to call).
XPOSE — 2 replaced by N2 and I*2 expressions replaced.

Moved nowhere.

1988. *August 2, 1984* PASS2 *Bill*

Added an option of forward transform (IDIR=4) to return full complex rows with the zero spatial frequency in the center cell (nx/2+1).

Moved nowhere.

1989. *August 2, 1984* CGDS.INC, DGDS.INC *Bill*

New Includes to be used with *uv*-model data computation routines.

Moved nowhere.

1990. *August 2, 1984* VBCOR *Bill*

Added antenna-based smoothing to the delay and rate solutions before applying to the data. Added adverb TIMSMO, deleted adverbs LEVS and BADDISK. Added utility routines BOXBSM and DRBSMO to NOTSUB. Also changed VBCOR.HLP, DFRC.INC and CFRC.INC.
Moved nowhere.

1991. *August 4, 1984* CGAI.INC *John*

Added by Editor from CHKOUT *history file:* Fixed order of parameters in common.
Moved nowhere.

1992. *August 6, 1984* VBLIN.HLP *John*

Added by Editor from CHKOUT *history file:* Added estimate of number of output records.
Moved nowhere.

1993. *August 9, 1984* UVFLG.HLP *Bill*

Added example for an editing entry entered in a table in a RUN file.
Moved nowhere.

1994. *August 10, 1984* UV modeling package *Bill*

This is a new, improved, general package of subroutines to compute model *uv* data values based on either clean components or images. The model can be either subtracted (multiplied by an arbitrary constant) from or divided into a *uv* data set. Currently can accept up to 16 Clean components tables or 16 images (but not mixed), will handle stokes I, Q, U, and V and the usual assortment of frequency channels. This package should be able to replace all current *uv* model computation software in *AIPS*.
There are several methods available in the package: CLEAN components can be dealt with either by DFT or gridding and interpolation (the package can be instructed to pick the fastest under the circumstances) and images can be FFTed and interpolated. The DFT methods will handle data in any sort order, but the interpolation methods require data in 'X*' order (* means anything). To declare the package common and to divide or subtract the model, I added the following:

DGDS.INC	CGDS.INC	UVMDIV	UVMSUB
VISDFT			

where VISDFT is called by UVMDIV and UVMSUB for the DFT method. Also added the following utility routines:

UVMTYP	GRDSET	GRDSUB	GRDAT
GETCTL	CCSGRD	GRDCRM	ALGSUB
INTPFN	FFTIM	UVDOUT	UVDPAD

and the AP routines:

SAPSUB:UVINT	SAPSUB:APINT	FPSSUB:UVINT
APINT.AP	UVINT.VFC	

where the .AP routine is in WDC.AP. Also updated FPSSUB:WDC.LIB.
Moved nowhere.

1995. *August 16, 1984* NULB *Gustaaf*

Added subroutine NULB to the NOTSUB area. This utility finds a root of a function which changes sign over a given interval, and does not need derivatives. It combines linear interpolation with inverse quadratic interpolation.
Moved nowhere.

1996. *August 16, 1984* MACHIN *Gustaaf*

Added subroutine MACHIN to the NOTSUB area. This utility determines the machine accuracy of the computer being used.
Moved nowhere.

1997. *August 17, 1984* ZSTOPA *Gary*

Did not rename after AIPS exit if TT name was a TX. (DMF type controller name).
Moved to VLA and 15JUL84 tape on 29Aug84.

1998. *August 20, 1984* FITTP, PRTTP, UVLOD *Gary*

Several fixes for the 15JUL84 versions. FITTP was always putting an EXTEND = T for antenna data, even when the files were written with the old format. The FITS paper says that a reader should be able to handle this situation, but I fixed it to avoid confusion. UVLOD could not handle the old format for antenna files when EXTEND = T was found in the header. This was fixed. PRTTP would not print properly for 8 axis on *uv*-FITS tape.
Moved to VLA and 15JUL84 tape on 29Aug84.

1999. *August 20, 1984* KEYIN, VBANT *John*

The subroutine KEYIN which reads the calibration text file in the VLB task VBANT now dies gracefully when it encounters too many system temperature entries (over 4500 per station).
Moved nowhere.

2000. *August 20, 1984* CSC.INC *John*

Rearranged the order of the parameters in the COMMON statement back to the way they were in January 1984.
Moved nowhere.

2001. *August 23, 1984* UVPLT *Eric*

Added test for an increment of 0.0 on the Stokes axis. Such an increment was being written on VLA UVFITS tapes of spectral-line data, but confused some of the algorithms for handling all of the possible Stokes parameters.
Moved nowhere — should go to OLD and the VLA.

2002. *August 27, 1984* CONVL *Simon/Eric*

A bad GO TO was put in when the call sequences were corrected to avoid computations and constants.
Moved nowhere.

2003. *August 28, 1984* CLNSUB *Bill*

Fixed improper rounding in decoding component pixel location (it was fixing instead). This error may cause problems in CLEANs done on large or multiple fields with the pseudo-AP. Since the Vax has a 24 bit fraction CLEANing multiple fields with the current version of MX will not work properly.
Moved nowhere.

2004. *August 29, 1984* CSC.INC *Kerry*

Reordered common block to eliminate alignment error.
Moved nowhere.

2005. *August 31, 1984* UVSEN *Tim*

Added by Editor from **CHKOUT** *history file: ?????. A Fortran file which will not compile in the current version and an associated Help file were received. See later change entries #2024 and #2066.*

Moved nowhere.

2006. *August 31, 1984* APVC *Tim*

Added by Editor from **CHKOUT** *history file: ????. A Fortran file which will not compile in the current version, an associated Help file, and two Include files,* **DVC.INC** *and* **CVC.INC**, *were received. See also entry #2019.*

Moved nowhere.

2007. *September 5, 1984* Modcomp Z routines *Eric*

Renamed the Modcomp Z routines **ZFIO**, **ZCREAT**, **ZMIO**, **ZCMPRS**, and **ZEXIST** as was done for the Vax during the current update. Also done in the Unix area, but these are probably not current versions.

Moved nowhere.

2008. *September 6, 1984* VBFIT *Fred*

I changed the handling of the data point time tags that get sent into the least-squares solution subroutine, **FRCALC**, so that every data point comes in with its own time tag (except that **NFREQ** frequency channels are assumed to have been sampled simultaneously). This enhancement to a private version of **VBFIT** that was used by Peter Wilkinson and Joan Schmelz in their QUASAT simulations decreased the anomalous phase residuals that they were seeing from a level of a few degrees to a level of only tens of millidegrees. Because a new very large data array is required now, the storage requirements for **VBFIT** have grown considerably — it's not likely to fit on, say, the Modcomp. There still is some compromise made in the FFT solution routine, so, whenever highly accurate results are desired, the least-squares solution option should be used.

I also increased array sizes and associated size calculations so that the program now can handle as many as 20 antennas (the old limit was 10). This change makes the program **VBBIG** obsolete. (However, I haven't yet removed **VBBIG** from *AIPS* — just in case we have second thoughts on the matter.) I also made grammatical corrections in a few of the comment statements.

Moved nowhere.

2009. *September 6, 1984* FILLR *Bill/Kerry*

New task, reads VLA Modcomp archive data tapes and produces *AIPS* catalogued data files. New files: **FILLR**, **FILLR.HLP**, **DFLR.INC**, **CFLR.INC**, **DMC.INC**, **CMC.INC**. Also has new Z routines:

ZDM2DL — Converts padded Modcomp 6-byte double precision to local double precision.
ZRM2RL — Converts Modcomp REAL words to local single precision.
ZMCACL — Converts Modcomp compressed ASCII to uncompressed ASCII.
ZRDMF — Converts DEC-10 Magtape Format words to pairs of local short integers.

Moved nowhere.

2010. *September 6,1984* WDC.AP, WDC.LIB *Bill*

The corrected versions of the FPS routines **RECT** and **VRVRS** were put into the FPS libraries and removed from the NRAO FPS AP microcode libraries.

Moved nowhere.

2011. *September 7, 1984* New adverbs *Eric/Bill*

Changed POPSDAT.HLP, DAPL.INC, and CAPL.INC to allow two new adverbs, VLAOBS and VLAMODE, for the new FILLR task. Bill owes us their Help files.
Moved nowhere.

2012. *September 10, 1984* GRINDEX, GRLIST *Eric*

Changed AUC to display the *AIPS* version on Gripe index and list. Convert from ZFI3 to ZFIO (leaving the file to be limited to < 32768 records).
Moved nowhere.

2013. *September 10, 1984* Format change!! *Eric*

Developed a stand-alone program CATCHT to convert CC files to the new Tables format. It also revises the header format primarily to have the (*uv*) group count and the number of Clean iterations true I*4 parameters. The parameters K2ALT and K2TYP had to be moved as well. Subroutine CTINI is retained for this routine only.
Moved nowhere.

2014. *September 10, 1984* Support new format *Eric*

To support the new header format, changed:

CHDR.INC — K3NIT and K3GCN replaced K2NIT and K2GCN — order of variables changed also. Added K2RES and K2RESN to point to spare words at the end and the number of such spare words.
DHDR.INC — Ditto.
CUVH.INC — Recreated with this name, removed line numbers.
DUVH.INC — NVIS changed to INTEGER*4.
VHDRIN — Changed to compute new parameters and simplified.
LSTHDR — Changed K2GCN and K2NIT to I*4 and fix formats — new call sequence.
AU3 — Fixed call sequence to LSTHDR.
MSGHDR — As LSTHDR.
QIKHDR — As LSTHDR.
AU8A — Modified to use INEXT = 'CC' as a tables extension file.
UVPGET — Changed to get number *uv* samples as I*4 and to test for 0 increment in Stokes and substitute + or −1.
UVCREA — Changed number of *uv* samples to I*4.

Moved nowhere.

2015. *September 10, 1984* I/O routines *Eric*

Made the promised INTEGER*4 versions of things:

ZMIO — (Vax) changed sector address to I*4.
UVINIT — Changed call sequence to make NVIS, VISOFF, and BO real rather than pseudo I*4. Changed PI*4 to I*4 in the FTAB as well. Fixed bug affecting tape I/O.
UVDISK — Changed to use true I*4 in the FTAB.
ZI32IL — (Vax) changed to produce true I*4 — generalized it to work on all 16-bit machines.
ZILI32 — (Vax) New to receive true I*4 produce FITS-standard 32-bit integers — generalized it to work on all 16-bit machines.

Moved nowhere.

2016. *September 10, 1984* CC file routines *Eric*

Changed to support CC files in Tables format:

CCINI	—	(Was briefly CTINI.) New routine to create, init, open CC table files.
ASCAL	—	Changed to use tables CC files, call true I*4 versions of UVINIT, UVDISK, DUVH.INC. Fixed bug as well.
BSCAL	—	As ASCAL.
VSCAL	—	As ASCAL.
APCLN	—	Changed to use table format, I*4 counters, and to call FSWTC3 rather than FSWTCH.
DCLN.INC	—	Changed counters to I*4.
CCLN.INC	—	Put counters in correct order for I*4.
MX	—	Changed to use tables format, use NVIS as I*4, use other I*4 counters, drop multiple CC files for one image.
DMX.INC	—	Made counter I*4.
MX.HLP	—	Corrected grammar in first line.
PRTCC	—	Rewritten as version of PRTAB. Moved to APLPGM from NOTPGM.
DPCC.INC	—	New Include for PRTCC.
CPCC.INC	—	New Include for PRTCC.
CITCC	—	Changed to support CC in Tables form and fixed up typing some.
CCMOD	—	Changed to support CC in Tables form and fixed up typing some.
SUMARY	—	Changed to read tables, use I*4 counters (new call sequence).
UVSUB	—	Changed to support new header and read CC in tables form.
DSUB.INC	—	Made counters I*4.
CSUB.INC	—	Put I*4 counters in correct order.
VBCC	—	Changed to support CC in Tables form and fixed up typing some.
VBPLT	—	Changed to support CC in Tables form and fixed up typing some.
XXFIT	—	Changed to support tables form of CC.
SUBIM	—	Changed to use TABCOP to copy new-format CC files.
VBFIT	—	Standardized some. Changed to support tables form of CC, to use I*4 counters, and to use UVINIT, UVDISK, and UVH.INC. Fixed bug in handling NITER = 0.
VBFIT.HLP	—	Corrected description of default on NITER.

Moved nowhere.

2017. *September 10, 1984* UV routines *Eric*

The *uv* format changes involve going to the I*4 versions of UVDISK, UVINIT, and the *uv*-header common. K2GCN becomes a true I*4 as does NVIS. Changed counters to I*4 as well. Some of the NOTST ones got some typing corrections too. Changed are:

CLIP	CORER	CORFQ	FUDGE	PRTUV	UVCOP
UVEXP	UVFND	UVPLT	UVSRT	ALGSUB	UVDOUT
UVMTYP	UVAVG	UVFIL	APMAP	ASCOR	AVER
BCAL1	BCAL2	BLOAT	DESCM	GNPLT	STRIP
TOAIP	TOVLB	UVDGP	UVERR	UVFIX	UVFLG
UVMOD	VBANT	VBCAL	VBCIT	VBCOR	VBMRG
VLBDR	WSLOD	FILLR	UVMAP		

Changed only from UV3.INCs to UVH.INCs:

ANTDAT	GETVIS	SETVIS	VISCHK	DRBSMO	FFTIM
GETCTL	GNFSMO	GNSMO	GRDAT	GRDSET	GRDSUB
SET1VS	UVMDIV	UVMSUB	GAPLT	PRTDR	PRTGA

Moved nowhere.

2018. *September 10, 1984* more UV routines *Eric*

The *uv* format changes involve going to the I*4 versions of UVDISK, UVINIT, and the *uv*-header common. K2GCN becomes a true I*4 as does NVIS. Changed counters to I*4 as well. Changed are:

- MERGE — Changed subroutine call sequence: NREC now true I*4.
- FSWTCH — Changed subroutine call sequence: BO1, BO2 true I*4.
- FSWTC3 — (New temporary): the old FSWTCH.
- UVDPAD — Changed as above. Corrected failure to exit with message on scratch file creation error.
- VISDFT — As above. Changed 'CT' to 'CC'.
- DBCON — As above. Changed NWORDS computation for *uv* pointers.
- DDBC.INC — Changed NVIS1 and NVIS2 to true I*4 (for DBCON).
- DWIN.INC — Changed NVIS to true I*4 (for WSLOD).
- CWIN.INC — Changed NVIS to true I*4 address (for WSLOD).

Moved nowhere.

2019. *September 10, 1984* Map routines *Eric*

Changed references to the number of iterations making them INTEGER*4. Changed:

- VM — Changed number iterations, fixed bad DATA statement, fixed references to "last 2 R*4 parts of header" to be machine independent.
- APGS — Changed number iterations, removed unused and incorrectly DATAed variable. Fixed to call FSWTC3 rather than FSWTCH.
- STEER — Changed number iterations, removed unused and incorrectly DATAed variable. Fixed to call FSWTC3 rather than FSWTCH.
- APVC — Changed number iterations, removed unused and incorrectly DATAed variable. Fixed to call FSWTC3 rather than FSWTCH and changed MINIT and MDISK to MINI3 and MDIS3. Corrected several long lines (1 in code itself).
- AU5C — Changed K2NIT (being cleared for IMERASE, TVWEDGE).
- AU6D — Changed K2NIT (tested for clean image).
- BLSUM — Changed reference to number iterations.
- DBLS.INC — Added I*4 header variable to BLSUM Include.
- EBLS.INC — Added I*4 header variable to BLSUM Include.
- IBMTP — Changed references to number iterations, must limit output information to 32760.
- IMEAN — Changed use of number iterations to test if Clean.
- PRTIM — Number iterations now I*4.
- MOMFT — Number iterations now I*4.
- REGLR — Number iterations now I*4.

Moved nowhere.

2020. *September 10, 1984* printing on CRT *Eric*

Converted the PRTIT subroutine in PRTAB to be a general purpose subroutine called PRTLIN. It prints on either the CRT or the line printer handling 2 lines of page titles and, with the CRT, asking the user if he wants to quit. Changed PRTAB, PRTCC, PRTUV, UVFND, and PRTIM to use this routine. The first two only required minor revisions, but PRTUV, UVFND, and PRTIM required a lot of changes. Also changed PRTUV.HLP, UVFND.HLP, and PRTIM.HLP to add the DOCRT option. Changed DUVF.INC and CUVF.INC to specify DOCRT. Changed PRTAB Fortran and Help files to use default 'TA' for INEXT. Corrected PRTIM computation of the number of columns which will fit on the page.

Moved nowhere.

2021. *September 10, 1984* FITS parsing *Eric*

The FITS parsing needs some revision too. The header common was reordered a bit and 2 parameters became true I*4. There was also an error affecting PRTTP and TPHEAD on *uv* FITS files with 7 "real" axes. Changed are:

FPARSE — Modified to decrement the offset for Groups axis parameters, to set GROUPs parameter on NAXIS1, to check on GROUPS keyword, and to set real I*4 rather than Pseudo I*4. New call sequence.
FWRITE — Changed call sequence to FPARSE with initialized GROUP parameter.
MSGHDR — Dropped offset for the dummy axis on *uv*-FITS headers.
PRTTP — Changed call sequence to FPARSE.

Moved nowhere.

2022. *September 11, 1984* XGAUS, XBASL, BLANK *Eric*

Fixed minor errors causing AIPS to remain suspended on certain failures or to acquire a secondary resumption on others.
Moved nowhere.

2023. *September 12, 1984* WHATSNEW *Eric*

Deleted 15Mar - 15Jul section, added things for the stuff above.
Moved nowhere.

2024. *September 12, 1984* UVSEN *Eric*

This is a task to determine rms sidelobe and sensitivity. Revised it to handle true I*4 in *uv* I/O and retyped it a good bit to make it more standard. Also fixed up Help file.
Moved nowhere.

2025. *September 11-13, 1984* Bugs *Gary/Eric*

The update of yesterday had a bunch of bugs. Fixed so far are:
(1) File size computations in UVCREA, VBFIT, ASCAL, BSCAL, and VSCAL.
(2) The call sequence to FNDCOL in VBFIT and the number of keywords to check (3 not 2).
(3) An infinite loop in PRTIM when the header was not for a clean map in JY/BEAM.
Moved nowhere.

2026. *September 12, 1984* New header, CC changes *Gary*

Changes made for the new header and CC formats:

FITTP — New header format and reads new CC files.
IMLOD — New header format and writes new CC files.
UVLOD — New header format.
UVERR — New header format.
ZCMPRS — New Long Integer version.
GETHUT — (new subroutine) gets headers, units, *etc.* for a table.
DEHD.INC — Declares common for FITS extension file reading routines.
CEHD.INC — Common for FITS extension file reading routines.
DTHD.INC — Declares common for FITS table file reading routines.
CTHD.INC — Common for FITS table file reading routines.
DFIT.INC — New header format.
VFIT.INC — New header format.
VFUV.INC — New header format.
VKEY.INC — New header format.
DUIN.INC — Changed IBLANK to I*4.
DMLT.INC — Changed IBLNK to I*4.

Moved nowhere.

2027. *September 13, 1984* UVINIT *Eric*

Added tests and message on illegal arguments in order to avoid divides by zero.
Moved nowhere.

2028. *September 13, 1984* ZDCHIN, ZESTEX *Gary*

Fixed bug that made these routines confuse **AIPSC** with a version of **AIPS**. Thus the **AIPSC** process would not exit and the user would see a **$** prompt.
Moved to **OLD**, VLA, will be on **15JUL84** tape.

2029. *September 14, 1984* Installation procedure *Gary*

Changed installation files:

ILOAD — Was using a local and global **TVDIR**. This caused the default **TVDIR** for no TV to not be set. Changed to all global.

ICOMPAL — Changed to access different **YFOR.CT1**s for different TVs.

YFOR.CT1 — Three versions of this file are found in the respective **YSUB** directories.

Moved to **OLD**, will be on **15JUL84** tape.

2030. *September 14, 1984* VBLIN *Eric*

Revised the counters and header references to new format in true **INTEGER*4**. Changed **UVINI3** and **UVDIS3** to **UVINIT** and **UVDISK**.
Moved nowhere.

2031. *September 14, 1984* IIS Model 75 *Eric*

Revised **YCRCTL** to convert the 15 distinct values produced by the Model 75 trackball buttons to the 4 values produced by the Model 70 trackball buttons. Thus buttons F1, A1, A2, and A3 are now "button A", buttons F2, B1, B2, and B3 are now "button B", buttons F3, C1, C2, and C3 are now "button C", and buttons D1, D2, and D3 are now "button D".
Moved nowhere.

2032. *September 14, 1984* TOAIP, VBBIG *Eric*

These tasks have been deleted. **TOAIP** was replaced long ago by **VBCIT** and **VBLIN**. **VBBIG** was a special version of **VBFIT** which was made obsolete by the improvements in **VBFIT** listed above.
Moved nowhere.

2033. *September 14, 1984* UVCOP.HLP *Eric*

The Help file for **UVCOP** did not describe two of its options: deleting flagged data and removing subarray information. These were once described there, but apparently were replaced sometime.
Moved nowhere.

2034. *September 14, 1984* COINC *Gustaaf*

Subroutine **COINC** checks if two maps are exactly coincident.
Moved nowhere.

2035. *September 14, 1984* Helps *Bill*

Added by Editor from **CHKOUT** *history file:* Made Help files for the new adverbs **VLAMODE** and **VLAOBS**.
Moved nowhere.

2036. *September 15, 1984* TOVLB *John*

The code which reads the *AIPS* visibility data has been cleaned up. Fixed a bug which caused TOVLB to accept only the first twelve characters specified by the adverb OUTFILE. TOVLB now writes the observing bandwidth in the CIT Merge header record.
Moved nowhere.

2037. *September 17, 1984* UVMDIV, UVMSUB, VISDFT *Bill*

Modified to give optional percent done when using the DFT model computation method.
Moved nowhere.

2038. *September 19, 1984* WARP *Gustaaf*

A new task WARP was put into the test area NOTPGM. WARP is a task which models galaxies in which the position angle and the inclination vary with radius. It is meant to be applied to a galaxy velocity field after the task GAL has supplied the right values for the kinematical center and the systemic velocity. For the moment, WARP only handles linear dependencies of position angle and inclination with radius. WARP even handles galaxies in which the warping gives rise to double profiles: in that case WARP should be given two input maps. See also WARP.HLP.
Moved nowhere.

2039. *September 19, 1984* GAL *Gustaaf*

Added by Editor from CHKOUT *history file: ????. (The Fortran and Help files were modified.)*
Moved nowhere.

2040. *September 19, 1984* VBCIT *John*

Corrected error in setting the number of vis records in the catalog header record. Now CAT3(K3GCN) = XVSMAX.
Moved nowhere.

2041. *September 20, 1984* FPARSE *Eric*

Corrected call sequence to that expected by FWRITE and PRTTP. Relinked AIPS (for TPHEAD) and PRTTP.
Moved nowhere.

2042. *September 21, 1984* ALGSUB *Bill*

Fixed bug with correlator correction factor for multi-channel data.
Moved nowhere.

2043. *September 21, 1984* UVMDIV *Bill*

Fixed call sequence to UVMSUB.
Moved nowhere.

2044. *September 21, 1984* GRDCRM *Bill*

Modified to look for CC rather than CT files and not to assume the order of data in the physical record.
Moved nowhere.

2045. *September 24, 1984* PRTIM *Eric*

There was a bug in computing which columns to do on each page. For some reason, PRTIM escaped disaster most of the time — but not always. Fixed it.
Moved nowhere.

2046. *September 25, 1984* DGDS.INC, CGDS.INC *Bill*
Changed comment about the purpose of the Include.
Moved nowhere.

2047. *September 25, 1984* CMETHOD, CMODEL *Bill*
New adverbs used to specify the method and model type for computing visibility model values. Also changed and/or added: CAPL.INC, DAPL.INC, POPSDAT.HLP, CMETHOD.HLP, and CMODEL.HLP.
Moved nowhere.

2048. *September 25, 1984* UVSUB *Bill*
Added new *uv* modeling package: now will subtract or divide an arbitrary number of CLEAN components from up to 16 files or subtract or divide model values derived from up to 16 images. Added the adverbs CMETHOD, CMODEL. Also changed: DSUB.INC, CSUB.INC, and UVSUB.HLP
Moved nowhere.

2049. *September 25, 1984* SETGDS *Bill*
New utility routine to setup for calls to UVMDIV, UVMSUB. Locates the specified model files in the catalogue, *etc.*
Moved nowhere.

2050. *September 25, 1984* DIRDEC *Eric/Kesteven*
A Fortran error could arise in the algorithm for finding x, δ using y, α in the ARC projective geometry. Added a test on the $\cos^{-1}$ function and reworded the error message. Also modified the error message (only) in DIRRA.
Moved nowhere.

2051. *September 26, 1984* UV modeling *Bill*
Added options to the DFT modeling routine VISDFT: (1) NONEG, which terminates reading a given CLEAN components file when the first negative component is reached, and (2) a point source model. Modified: DGDS.INC, CGDS.INC, VISDFT, UVMSUB, UVMDIV, GRDCRM, also retrofitted UVSUB, UVSUB.HLP.
Moved nowhere.

2052. *September 26, 1984* PRTUV, UVFND *Eric*
Fixed relatively new bug in PRTUV that prevented starting more than halfway through the data base. Changed both to round the weights. Cleaned up the page headers for the line printer on both.
Moved nowhere.

2053. *September 26, 1984* CONVL.HLP, PBCOR.HLP *Don*
Revised confusing wording in explanation of the DGAU opcode of CONVL and added a brief EXPLAIN section about its intended usage. Corrected minor spelling error in PBCOR Help file.
Moved nowhere.

2054. *September 27, 1984* VISDFT *Bill*
Added scratch file creation if necessary.
Moved nowhere.

2055. *September 27, 1984* MWFLT.HLP *Don*

Revised explanation of DPARM(1) option.
Moved nowhere.

2056. *September 27, 1984* Modcomp Z's *Eric*

Brought the Modcomp Z-routines up to the current standards of the Vax:

ZTFILL — Changed non-map I/O to use an I*4 block counter.

ZFI3 — Changed to move the address of the block counter to the FTAB and to use I*4. Fixed error recovery bug.

ZFIO — ("New") ZFI3 as above with an I*4 block number in the call sequence.

ZCMPRS — ("New") Uses true I*4 arguments in the call sequence for before and after file sizes.

ZMIO — ("New") Uses true I*4 argument in the call sequence for the block number.

Moved nowhere (the Modcomp update is scheduled for the 15OCT84 release!).

2057. *September 28, 1984* PRTGA *Eric*

Changed PRTGA.HLP (only) in order to change the names of the adverbs used. YTYPE and YPARM are too important to UVMAP and MX to be used (with different normal values) for some unrelated task.
Moved nowhere.

2058. *September 28, 1984* CNTR et al. *Eric*

Changed the display of the LEVS values to display a value-dependent number of digits after the decimal point. Revised routines COMLAB and GREYS, relinked CNTR and PCNTR. Changed CNTR.HLP, PCNTR.HLP, and GREYS.HLP to allow a wider range of LEVS.
Moved nowhere.

2059. *September 29, 1984* ASCAL *Bill*

Modified to use standard *uv* model computation routines so that it will now read multiple CC files. Also modified so that it can be instructed not to divide the data by a model. This will allow use of UVSUB and DBCON to construct a file of calibrator source data already divided by the model. With option, no output visibility data file is written. Also changed CCAL.INC, DCAL.INC, and ASCAL.HLP.
Moved nowhere.

2060. *September 30, 1984* VSCAL *Bill*

Modified to use standard *uv* model computation routines so that it will now read multiple CC files. Also modified so that it can be instructed not to divide the data by a model. This will allow use of UVSUB and DBCON to construct a file of calibrator source data already divided by the model. With option, no output visibility data file is written. Also changed DVCL.INC, CVCL.INC, and VSCAL.HLP.
Moved nowhere.

2061. *October 1, 1984* VBFIT *Bill*

Modified to use standard *uv* modeling routines; now can read multiple CC files and an arbitrary number of components. Also modified so that it can be instructed not to divide the data by a model. This will allow use of UVSUB and DBCON to construct a file of calibrator source data already divided by the model. With option, no output visibility data file is written. Also removed a number of literals from call arguments. Also changed: VBFIT.HLP, DFRN.INC, CFRN.INC.
Moved nowhere.

2062. *October 1, 1984* VBPLT *Bill*
Allowed to use its GST option.
Moved nowhere.

2063. *October 1, 1984* PRTCC, PRTAB *Eric*
Added tests on ECOUNT and BCOUNT to avoid looking past the end of the table.
Moved nowhere.

2064. *October 1, 1984* ASCAL, VSCAL *Eric*
Added message giving details when the data are found to be missorted despite the header codes.
Moved to VLA Vaxes (15JUL84 version), nowhere else.

2065. *October 1, 1984* VM *Frank Evans/Tim*
New, rewritten VM uses about 50% less disk space and about 30% less CPU and, also, looks considerably nicer inside. Includes new catalog routines, the new Includes DVMN, CVMN, EVMN, IVMN, VVMN, and a new Help file.
Moved nowhere.

2066. *October 1, 1984* UVSEN *Bob Sault/Tim*
New task which calculates the surface brightness sensitivity of the *uv* coverage in a data base.
Moved nowhere.

2067. *October 1, 1984* PUTHEAD, GETHEAD *Eric*
Corrected AU7A for new catalog header pointers and to handle the true I*4 parameters in the header. This was forgotten in the big update.
Moved nowhere.

2068. *October 1, 1984* XXFIT *Eric*
Fixed bad call sequence to TABIO (an I*2 argument remained) for writing the CC file.
Moved nowhere.

2069. *October 1, 1984* TVLOD *Eric*
Rearranged handling of TVCHAN by AU5A. It was, through TVWIND, making a compound channel number (*i.e.* 23) into the highest available channel rather than the lowest of the requested ones.
Moved nowhere.

2070. *October 1, 1984* UVSEN *Eric*
Corrected declarations of BO, VO and include DUVH, CUVH rather than DUV3, CUV3.
Moved nowhere.

2071. *October 1, 1984* TVHLD *Arnold*
Extended the range for the background rejection level to cover the entire range of pixel values.
Moved to VLA, nowhere else.

2072. *October 2, 1984* UV modeling routines *Bill*

Made a number of changes to allow use with MX. Changed VISDFT and GRDSUB not to call GRDAT if NGRDAT is true. XPOFF, YPOFF now carried for each field. Several routines now examine OSFX, OSFY to see if they may need double size grids and GRDAT no longer doubles FLDSZ for this occurence. Files changed: ALGSUB, CCSGRD, FFTIM, GRDAT, GRDCRM, GETCTL, GRDSUB, UVMDIV, UVMSUB, VISDFT, DGDS.INC, and CGDS.INC.
Moved nowhere.

2073. *October 2, 1984* IMVAL, QIMVAL *Eric*

Revised AU9 and rewrote CUBINT to handle interpolation near image edges and blanked pixels. These verbs did not return correct values within 6 pixels of an image edge or in the presence of blanking.
Moved nowhere.

2074. *October 2, 1984* COMB *Eric*

This task really should be rewritten from scratch. Patched it some more, however, to add adverb BADDISK to Help file and to use it in creating the scratch file. (Note: the internal variable IBAD was used, but never initialized, by COMB!)
Moved nowhere.

2075. *October 2, 1984* CORMS *Tim*

Added by Editor from CHKOUT *history file:* "Rotate tires."
Moved nowhere.

2076. *October 2, 1984* RMTST *Tim*

Added by Editor from CHKOUT *history file: ????.*
Moved nowhere.

2077. *October 3, 1984* SPY *Eric*

Added a DOALL option to allow listing of all processes in the system rather than just the ones that seem to be *AIPS* processes. Changed AU2, ZTQSPY (Vax), ZTQSPY (Modcomp), and SPY.HLP.
Moved nowhere.

2078. *October 3, 1984* IMEAN *Eric*

Changed Fortran and Help files to allow 512 boxes in the histogram plot. 128 were allowed previously.
Moved nowhere.

2079. *October 3, 1984* PRTIM *Eric*

Changed Fortran and Help files to allow NDIG up to 7 rather than the old limit of 4. (Requires INTEGER*4.)
Moved nowhere.

2080. *October 3, 1984* ANALYSIS *Eric*

Changed this general Help file to mention CNVRT since it is now needed for MX output among other things. Also fixed the *COOKBOOK* file COOKM.
Moved nowhere.

2081. *October 4, 1984* SAPSUB:AP1GRD *Bill*

Corrected the declaration of a PI*4 variable (added the (2)).
Moved nowhere.

2082. *October 5, 1984* MULCLN *Bill*

Modified this array processor VFC routine to clean each field separately. This requires changes in the tasks calling this routine (MX and APCLN). Changed FPSSUB:MULCLN.VFC, FPSSUB:MULCLN, SAPSUB:MULCLN. Added the microcode routines CLNMAX and CLNPKS to FPSSUB:WDC.AP and WDC.LIB. In the PSAP version, these functions are incorporated into MULCLN.
Moved nowhere.

2083. *October 5, 1984* APCLN *Bill*

Modified to use current version of MULCLN.
Moved nowhere.

2084. *October 5, 1984* MX *Bill*

Added new *uv* modeling routines. Changed adverb DOCAT to CMETHOD. Components in multiple fields are now found independently and without large offsets added to the pixel positions. This should remove a number of problems occurring with multiple fields especially with the pseudo-AP (new MULCLN).
When there are too many residuals in the top bin of the residual histogram to fit in the AP, every n^{th} residual is loaded with n such that the residuals in the AP will sample all appropriate regions of the residual image.
The *uv* data work file is now catalogued and may be specified in restarting MX. It is called IN2NAME, IN2CLASS, *etc.* Also changed: MX.HLP, DMX.INC, CMX.INC.
Moved nowhere.

2085. *October 5, 1984* SAPSUB:CVMUL *Bill*

Modified to use real rather than complex arithmetic.
Moved to IBM this date, nowhere else.

2086. *October 5, 1984* MX *Kerry/Bill*

Cleaned up a few declarations, *etc.*
Moved to IBM this date, nowhere else.

2087. *October 8, 1984* TRANSPRT *Gary*

This procedure was not sending the YFOR.CT1s in the three subdirectories with TV routines. Will be on second group of 15JUL84 tapes.

2088. *October 8, 1984* MOD *Eric*

Add error test to QUICK to avoid a zero divide in the MOD function.
Moved nowhere.

2089. *October 8, 1984* TVLOD *Eric*

Corrected ISCALE routine to do a better job of the logarithmic transfer functions. To avoid zero arguments to the LOG function, it is necessary to add a bias to the argument. This bias was 1.0 which was negligible for most scaled-integer images — but serious for many floating-point images. Changed to a data-dependent bias. Fixed precursor comments in RNGSET.
Moved nowhere.

2090. *October 8, 1984* GRINDEX *Eric*

Changed AUC to get Version and name correct in GRINDEX. The Gripe file reading routine returns fields with leading blanks suppressed. Thus, the position of the Version portion must be computed, not assumed.
Moved nowhere.

2091. *October 8, 1984* TVWEDGE, etc. *Eric*

Fixed a bug in TVFIND which caused strange responses to the request to point at the desired image.
Moved nowhere.

2092. *October 8, 1984* WEDERASE *Eric*

New verb: does an erase of a wedge image on the TV. Modified AU5C for this and created WEDERASE.HLP. Also added WEDERASE to POPSDAT.HLP. Fixed wording of IMERASE.HLP.
Moved nowhere.

2093. *October 8, 1984* EXTLIST *Eric*

Modified EXTLIST (subroutine AU8A) to be more informative on extension files that it is not supposed to support.
Moved nowhere.

2094. *October 8, 1984* TOVLB *John*

Added by Editor from CHKOUT *history file:* Changed TOVLB to write *AIPS* history into CIT history records and Help file to add adverb SCALR1.
Moved nowhere.

2095. *October 9, 1984* IMPOS, IMXY *Eric*

Changed AU5 to return the adverb TVBUT on IMPOS and IMXY as well as TVPOS. Also changed IMPOS.HLP and IMXY.HLP.
Moved nowhere.

2096. *October 9, 1984* XYPIX *Eric*

DZ was not initialized which could cause computational problems even though the error did not affect the answers.
Moved nowhere.

2097. *October 9, 1984* MX, APCLN Helps *Eric*

Removed remarks about limits on NITER.
Moved nowhere.

2098. *October 9, 1984* IMHEADER et al. *Eric*

Changed LSTHDR, QIKHDR, and MSGHDR to display more digits on small (VLB) axis increments and fewer (3 decimals) on larger increments (> 1).
Moved nowhere.

2099. *October 9, 1984* PRTUV Help *Eric*

Corrected Help portion to refer to CPARM rather than APARM.
Moved nowhere.

2100. *October 9, 1984* ZCREAT, ZCREA3, ZQCREA, ZQCRE3 *Gary*

Renamed ZQCREA to ZQCRE3. Changed ZCREA3 to use ZQCRE3. Put in a new ZCREAT which uses I*4 and gets the requested number of bytes, and returns the actual number of bytes of the created file, taking into account block sizes and granularity. ZQCREA (new) is called by ZCREAT.
Moved nowhere.

2101. *October 9, 1984* PGEOM *Thad*

New task based on GEOM which changes an input map into polar coordinates.
Moved nowhere.

2102. *October 11, 1984* ALGSUB, GRDAT *Bill*

Fixed problem in oversampling logic which caused errors when ALGSUB was used by MX.
Moved nowhere.

2103. *October 11, 1984* MX *Bill*

Fixed bug in finding first maximum residual in MXMAP. Changed use of DXCG, DYCG, DZGC to agree with current *uv* modeling package.
Moved nowhere.

2104. *October 11, 1984* ZEXIST, ZCREAT *Eric*

Created versions of ZEXIST and ZCREAT which use true I*4 arguments. Changed call sequence additionally adding an output argument to ZCREAT giving the actual file size obtained. Henceforth we will not have to guess this via the parameter NSPG (number sectors per granule), which is in reality disk and system dependent. Done so far:

ZEXIST — (Vax, macro) nearly null change since pseudo and true I*4 are the same on Vaxes.
ZEXIST — (Modcomp) almost as easy.
ZCREAT — (Modcomp) added two arguments to call sequence — a buffer and the actual created size. Made it call ZFSIZE.
ZFSIZE — (Modcomp - 2^{nd} level) uses file info REX service on file that it must open first.

Moved nowhere.

2105. *October 11, 1984* CATOPN, CATCR *Eric*

Changed format of first record of catalog files to have the create time in words 4 - 9 and the last access time in words 10 - 15. Changed CATCR to use full I*4 in ZFIO, ZCREAT, and ZEXIST (avoiding a dependence on NSPG). Changed CATOPN to update the last access time. Also changed CATOPN to create and initialize a catalog file if one does not exist. We should have far less trouble with missing catalogs now. A negative disk number input to CATOPN now means do not update or create the catalogue file being opened (for use by DISKU and TIMDEST).
Moved nowhere.

2106. *October 11, 1984* TIMDEST *Eric*

Added to AU3A new time limits for catalogued scratch files (3 days) and empty catalogue files (0.25 days). The latter uses the changes made in CATOPN and CATCR. Changed to delete files even if they are marked busy so long as they are older than the time limits. Changed to use ZFIO rather than ZFI3.
Moved nowhere.

2107. *October 11, 1984* DISKU *Eric*

Changed call to CATOPN to use negative volume numbers in order to avoid creating and/or updating catalog files. Changed to use real I*4s and ZFIO and ZEXIST rather than ZFI3 and ZEXIS3. Apply 3 days or DETIME to listing catalogued scratch files.
Moved nowhere.

2108. *October 11, 1984* PCAT *Eric*

New verb to list all files in a portion of the catalog. Changed AU3 and CATLST to perform the work and POPSDAT.HLP to declare the verb and created PCAT.HLP to describe the verb.
Moved nowhere.

2109. *October 11, 1984* PRTMSG *Eric*

Changed PRTMSG subroutine to assume priority of 0 if the input value is 22. Thus, it will ignore the crazy value caused by use of the now deceased QEXIT procedure.
Moved nowhere.

2110. *October 11, 1984* SG version *Eric*

Increased the "current" SAVE/GET file version number to 7 because of all the new adverbs and PCAT. Changed the DATA statement in AU2A and SGLOCA to enforce this.
Moved nowhere.

2111. *October 11, 1984* ZMSGDK (Modcomp) *Eric*

Changed the Modcomp disk I/O for messages routine to match the changes in ZFI3 required to allow I*4 for the new ZFIO.
Moved nowhere.

2112. *October 11, 1984* LEVS *Eric*

Changed LEVS to 30 values. Required changes in POPSDAT.HLP, DAPL.INC, CNTR, PCNTR, GREYS, DGRY.INC, COMLAB, and CONDRW. VBFIT and DFRN.INC were revised to avoid problems, but don't use the extra values. Also changed the Help files for LEVS, CNTR, PCNTR, and GREYS.
KONTR, KONTR.HLP, and PCNTREQ.INC were also revised. they are so grossly non-standard and disorganized that the conversion was exceedingly messy and almost certainly will not work. Fortunately, we don't have a Zeta plotter and really don't care.
Moved nowhere.

2113. *October 11, 1984* CAPL.INC *Eric*

Found a misordered adverb in this common and corrected order.
Moved nowhere.

2114. *October 11, 1984* VM *Tim*

Added by Editor from CHKOUT *history file:* "Keep other buggers' hands off." and " ".
Moved nowhere.

2115. *October 12, 1984* EXIT *Eric*

Changed AU1 to avoid creating empty CA files and then deleting them on exit. Use ZFIO rather than ZFI3.
Moved nowhere.

2116. *October 12, 1984* WHATSNEW *Eric*

Bring this Help file up to date.
Moved nowhere.

2117. *October 12, 1984* UVCOP *Bill*

Added adverb **UVRANGE** to select data in a given range of projected baselines, also changed **UVCOP.HLP**.
Moved nowhere.

2118. *October 12, 1984* Single dish gridding software *Bill*

Added a number of new tasks to take randomly sampled single-dish measurements and convert them into an image. The measurements are given in a pseudo *uv* data base. Should handle continuum or spectral-line data. Also added were the Help files. Also added GRIDR to the list of AP tasks in **BPINIT**. The tasks are:

PRTSD — Prints selected portions of the data.

SELSD — Selects a subset of the data to be gridded, converts the coordinates to proper projected coordinates, and changes the format of the data.

GRIDR — Convolves the single disk samples onto a grid and then normalizes the result to remove the convolving function. Unsampled regions are magic value blanked.

Moved nowhere.

2119. *October 13, 1984* LGEOM *Don*

LGEOM has been changed in three ways:
(1) The dimension of the working array has been raised to 700000, which permits LGEOM to perform arbitrary transformations of images up to 800-square. A series of test runs on **CVAX** during a typical afternoon (*i.e.*, with a typical heavy job mix) showed no unusual "thrashing" behavior. **CVAX** has 3.75 MB. Machines with substantially less memory might not perform as well (**LGEOM** needs 0.5 MB in its working set for large problems).
(2) The interpretation of the sign of **APARM(1)** and **APARM(2)** has been reversed so that objects now move to the *right* for positive offsets. Note: old **GEOM** still uses the old convention.
(3) The routines which compute the interpolating weights now keep them in an array to avoid recomputation. This appears to speed up the algorithm by 10-20 percent in many cases.
Moved nowhere.

2120. *October 13, 1984* DEVI.INC, CEVI.INC *Don*

Added variables **SAVWTS** and **LRECUR** to hold the precomputed table of interpolating weights in **LGEOM**.
Moved nowhere.

2121. *October 13, 1984* LGEOM.HLP *Don*

A very extensive Explain file has been added.
Moved nowhere.

2122. *October 13, 1984* GEOM.HLP *Don*

Revised to point out that **LGEOM** is now the preferred task for linear geometric transformations.
Moved nowhere.

2123. *October 13, 1984* TVFIDL *Eric*

Corrected setting of the previous position of the cursor for the color contours when switching to them. The wrap-around protection was causing the algorithm to fail.
Moved nowhere.

2124. *October 13, 1984* CURVALUE *Eric*

Corrected AU6B for the new form of the LG and NG transfer functions used by TVLOD. Also test for correct user ID and read from TV for mismatch (on systems with private user catalogs).
Moved nowhere.

2125. *October 13, 1984* INPUTS *Eric*

Changed AU1A to display `*all 0`, `*rest 0`, `*all ' '`, or `*rest ' '` when the remainder of an array is filled with null values. Long arrays will no longer occupy so much display space if they have only null values.
Moved nowhere.

2126. *October 13, 1984* TVWEDGE *Eric*

Corrected AU5C in its scaling for images of constant intensity to give some sort of wedge which can be labeled correctly. Also brought WHATSNEW Help file up to date.
Moved nowhere.

2127. *October 15, 1984* Accounting *Eric*

The accounting file has had a problem with integer overflows if more than abount 32000 tasks have been run without the *AIPS* Manager doing anything. This is the time to fix that since the 15JUL84 release cannot work as the OLD version due to the other format changes. Therefore changed:

DMSG.INC — Account file entry number became I*4.
CMSG.INC — Rearranged to get correct word alignment.
ACOUNT — New format of AC file: I*4 used for current entry and max entry numbers, added another pointer, changed to use ZFIO.
ZCPU — (Vax) changed to return IO count as real I*4 (no real change).
ZCPU — (Modcomp) Ditto — no change since IO count unavailable.
FILINI — Changed to new AC format for initialization.
FILAIP — Changed to new AC format for initialization.
FILAI2 — Changed to new AC format for initialization.
PRTACC — Changed to handle new AC file format for reading and initialization. Uses ZFIO and new ZCMPRS.

Moved nowhere.

2128. *October 15, 1984* Modcomp Z's *Eric*

Changed:

ZFDLGN — Argument made true I*4 for file size.
ZCREAT — Corrected bugs (wrong variable name).
ZCMPRS — New call sequence: drop input size, final size becomes input/output, IERR = -1 means no compress done, add a scratch to call sequence.
ZCMPR3 — Changed call to ZFDLGN.
ZCREA3 — Changed call to ZFDLGN.
ZDESTR — Changed call to ZFDLGN.
ZMSGOP — Changed call to ZFDLGN.
ZOPEN — Changed call to ZFDLGN.
ZRENAM — Changed call to ZFDLGN.

Moved nowhere.

2129. *October 15, 1984* UVCOP *Bill*

Modified to accept *uv* data sets with a minimum complex axis length of 2 rather than 3.
Moved nowhere.

2130. *October 15, 1984* FUDGE *Bill*

Modified to accept *uv* data sets with a minimum complex axis length of 2 rather than 3. Also changed to call ZCMPRS rather than ZCMPR3.
Moved nowhere.

2131. *October 15, 1984* VBCIT *John*

The SEQOUT parameter did not work. It has been fixed.
Moved nowhere.

2132. *October 15, 1984* VBFIT *John*

The description of the BPARM(1) parameter in the explain file claimed that frequency averaging would take place when BPARM(1) ≥ 0. In fact, frequency averaging occurs when BPARM(1) ≤ 0. The Explain file has been corrected.
Moved nowhere.

2133. *October 15, 1984* UVINI3 remains *Eric*

Removed UVINI3 and UVDIS3 and their remaining usage:

- UVINIT — Corrected a comment.
- EXPND — Changed MSGWRT calls, changed to use new UVINIT and UVDISK with real I*4s.
- APROLL — Changed to use new routines (by the old names).
- FITTP — Corrected to use DUVH.INC and UVINIT *et al.*, removed an IMPLICIT NONE statement.

Moved nowhere.

2134. *October 15, 1984* ZCMPRS, ZQTRUN *Gary*

Changed calling sequence and made ZCMPRS receive any requested number of bytes for the file size and return the actual file size after adjusting for disk granularity.
Moved nowhere.

2135. *October 15, 1984* IMLOD, UVLOD *Gary*

Changed to stuff a non-zero axis increment for axes with zero axis increments and one pixel on the axis.
Moved nowhere.

2136. *October 15, 1984* ZCMPRS tasks *Eric*

Some tasks already called ZCMPRS and needed the call sequence fixed. Done were FUDGE, SELSD, and UVLOD.
Moved nowhere.

2137. *October 15, 1984* Interactive tasks *Eric*

Interactive tasks should not return an "abort" code to AIPS when the user asks for a premature halt unless they produce output data files. Fixed were PRTIM, PRTUV, PRTCC, PRTAB, UVFND, and XPLOT.
Moved nowhere.

2138. *October 15, 1984* CONVL.HLP *Don*

Inserted explanation of action of CONVL when convolving a Gaussian with a CLEANed image (CONVL tries to convolve with a Gaussian which will increase the beam size from the existing value to the desired value).
Moved nowhere.

2139. *October 15, 1984* VBANT *John*

VBANT now prints the flux density and source name taken from the input calibration file (VLBI). VBANT also prints this information in the history file.
Moved nowhere.

2140. *October 15, 1984* Unix discovered *Kerry*

Several programs, subroutines and Include text files contained COMMON statements that produced alignment errors under operating systems that care about such alignments. In particular, the alignment errors are due to the placement of LOGICAL variables in the common block statements. Since the ANSI standard recognizes only LOGICAL*4, some operating systems may not support LOGICAL*2. The common blocks should be arranged in descending order of item length, *i.e.*, 8-byte items followed by 4-byte items followed by LOGICAL variables (which may be 2 or 4 byte depending on what the operating system supports) and finally 2-byte items. In addition, COMMON block labels should not bear the name of program units in which they are defined. In the directory APLPGM, changes were made in the files:

EXFND — Rearranged common labelled EXFNDC to eliminate alignment error.
SLFIT — Rearranged common labelled GDATA to eliminate alignment error.

In the directory APLSUB, changes were made in the files:

CHKTAB — Rearranged common labelled TABHDR to eliminate alignment error. Also relabelled common TABHDR as TBHDR since this common is also defined in the subroutine TABHDR.
EXTHIS — Same as for CHKTAB.
SETDEF — Same as for CHKTAB.
TABHDR — Same as for CHKTAB.

In the directory NOTSUB, changes were made in the files:

PLEND — Rearranged common labelled PLTCOM to eliminate alignment error.
PLGRY — Same as for PLEND.
PLMAKE — Same as for PLEND.
PLPOS — Same as for PLEND.
PLVEC — Same as for PLEND.

Moved nowhere.

2141. *October 15, 1984* Unix discovered *Kerry*

In the directory INCS:, changed DGNP.INC by declaring IVER since CGNP.INC refers to it in a COMMON statement.
Moved nowhere.

2142. *October 15, 1984* Unix discovered *Kerry*

Some Unix Fortran compilers interpret the first character in FORMAT statements as a control character. The formats in subroutine QUEST in the program SETPAR which list the current values of the SP file caused problems. A blank has been inserted at the start of each one.
Moved nowhere.

2143. *October 15, 1984* Unix discovered *Kerry*

Hexadecimal constants being used in data initialization were replaced by equivalent decimal values. Changed were:

PRNTMN — Z000C changed to 12.
YTVCIN — In APLIIS, Z8000 changed to -32768.
YTVCIN — In APLM75, Z8000 changed to -32768.
YTVCIN — In APLDEA, Z8000 changed to -32768.

Moved nowhere.

2144. *October 15, 1984* Unix discovered *Kerry*

The preprocessor used under Unix to transform ENCODE/DECODE statements into Fortran 77 internal WRITE/READ constructs mishandles a few cases for reasons not yet determined. Until fixed, these statements have been rearranged so that the preprocessor performs the proper transformation. Programs changed were BLSUM, CORER, and PROFL.
Moved nowhere.

2145. *October 15, 1984* Unix discovered *Kerry*

Under UTS, for some undetermined reason, the code in APCLN which tests for the center of the dirty beam to be within a specified value range fails even though the beam center is in fact within those bounds. Assigning the moderately complicated arithmetic expression used in the IF statement to a variable and using the variable in the test yields the proper behavior. Code in subroutine BMSHP in APCLN changed.
Moved nowhere.

2146. *October 15, 1984* Unix discovered *Kerry*

The Fortran ANSI standard does not require that real FORMAT specifiers add a leading zero for values less than one. The subroutine FRMT will strip off trailing zeros as well as the decimal point if there is no fractional part. This means that under operating systems that choose not to add a leading zero, zero valued items will be stripped away completely and FRMT will return a blank. Added code to handle zero-valued items as a special case. In particular, FORM2 is generated using an I FORMAT specifier.
Moved nowhere.

2147. *October 15, 1984* Unix discovered *Kerry*

Various syntactical errors were discovered. In the directory AIPSUB, changes were made to the files:

AU1 — Inserted missing comma in declaration statement.
AU8 — Inserted missing comma in declaration statement.

In the directory APLPGM, changes were made to the file:

COMB — Excessive parentheses eliminated from an explicit DO in an ENCODE statement item list. Otherwise, Unix compiler complains about an invalid complex number.

In the directory NOTSUB, changes were made to the files:

IMIO — Changed statement labelled 980 from 'PRINT IT ALL' to CONTINUE.
LINIO — Changed two uses of immediate character strings in executable statements to references to real variables correctly initialized. We cannot allow statements of the type IF (OPCO.EQ.'FINI') GO TO 999.
SGEFA — Commented out IMPLICIT NONE statements.

Moved nowhere.

2148. *October 15, 1984* IBM discovered *Kerry*

A floating-point round-off problem within **GETNUM** can cause integer values assigned to *AIPS* adverbs to be one less than desired. In **APLSUB:GETNUM**, changed:

```
IF (IDEC.GT.-28) X = X * SIGN * (TEN**IDEC)
```

to

```
IF (IDEC.GT.-28) X = X * SIGN / (TEN**(-IDEC))
```

Moved nowhere.

2149. *October 16, 1984* Modcomp Z's *Eric*

Changed **ZFSIZE** to avoid opening for a second time a file that is already open. Changed it also to have a **DATA** statement giving the number sectors per granule for each disk separately — this will be installation dependent. Changed **ZCREAT** and **ZCMPRS** to provide an **LUN** to **ZFSIZE**, the latter in order to avoid the secondary open.
Moved to **15OCT84**.

2150. *October 17, 1984* UVSUB *Bill*

Fixed problem with **FACTOR**; it wasn't being used.
Moved to **15OCT84**.

Changes: 15-July-1984 version of *AIPS*

This publication is intended to provide corrections and updates to the *AIPS COOKBOOK* in order to fill the gap between publication dates. We also hope that users will annotate their current copies of the *COOKBOOK* rather than request a new copy at each publication date.

This section will provide details of the changes to the 15-Sep-1983 *COOKBOOK* caused by changes in software between the 15-May-1984 and 15-July-1984 versions of *AIPS*. The changes during this period caused only very minor additions to the *COOKBOOK*. We hope to publish a new version of the *COOKBOOK* with the next release. Any suggestions and contributions would be welcome.

Page 25, § 7.1

Replace the **LEVS** *example with:*

```
> LEVS -1, 1, 2, 4, 6 CR
```

to get actual contours at -1, 1, 2, 4, and 6 times the basic level set by **PLEV** or **CLEV**. The **LEVS** need not be integers, but they should not require more than 4 significant digits.

Section 13

Add to UVPR, Page 52:

UVSEN	T	Find sensitivity and rms sidelobes of data set	§

Delete from UVPR, Page 52, **VBBIG** *entry.*

Delete from MAPETC, Page 53, **VBBIG** *entry.*

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Add to MAPETC, Page 53:

GRIDR	T	Grid pseudo-uv, single-dish data into image	§
APVC	T	Image deconvolution by van Cittert iteration	§

Add to CATINFO, Page 55:

PCAT	V	List all files in "half" of catalog	§

Add to TVGEN, Page 55:

WEDERASE	V	Erase wedge image on portion of TV channel	§

In PL2D, Page 58, change entry to:

PRTIM	T	Print image intensities on line printer or terminal	§5.1

Add to ANALYSIS, Page 59:

PGEOM	T	Convert image between polar and rectangular coords	§
PATGN	T	Make images of test patterns	§
WARP	T	Fit model of warped galaxy	§

Delete from VLBI, Page 61, **TOAIP** *and* **VBBIG** *entries.*

Add to APTASKS, Page 61:

APVC	T	Image deconvolution by van Cittert iteration	§
GRIDR	T	Grid pseudo-uv, single-dish data into image	§

Add to INDEX, Page 64:

APVC	T	Deconvolution by van Cittert iteration	§

Add to INDEX, Page 66:

GRIDR	T	Grid pseudo-uv, single-dish data	§

Add to INDEX, Page 67:

PATGN	T	Make images of test patterns	§
PCAT	V	List all files in "half" of catalog	§
PGEOM	T	Convert image rectangular/polar coords	§
PRTAB	T	Print table file contents	§
PRTSD	T	Print single-dish "uv" data file	§

Add to INDEX, Page 68:

SELSD	T	Prepare single-dish "uv" data for **GRIDR**	§

Delete from INDEX, Page 69, **TOAIP** *entry.*

Add to INDEX, Page 70:

UVSEN	T	Find sensitivity, sidelobes of data set	§
WARP	T	Fit model of warped galaxy	§
WEDERASE	V	Erase wedge image in TV channel	§

Delete from INDEX, Page 70, **VBBIG** *entry.*

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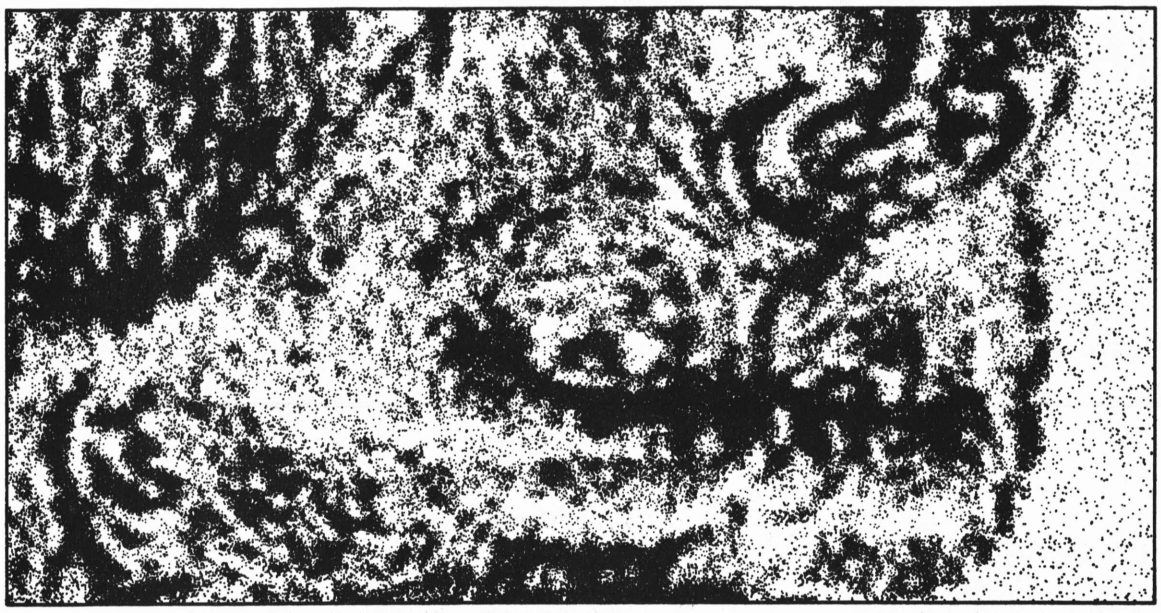

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