

The AIPS Wishlist

Eric W. Greisen

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1 INTRODUCTION

I have been asked to convert the normal "Wishlist" maintained for AIPS into a document for discussion. In particular, I have attempted to assign some priorities to things. This is somewhat hard to do since some items are normally low priority but can become temporarily important for some reason. Others are intrinsically low priority, but, because they are easy or are part of a program being changed for other reasons, are more likely to get done. Rather than assign simple numbers to priorities, I have attempted to describe these other considerations.

As a further variable for debate, I have added "***" before those items which I think are likely to be done in in the next year and "??" before those upon which work might be done in in the next year. I have also added tentative assignments. In general, I have taken on more in these than I can realistically do. It is my intention in some of these to do some detailed design plans and then to ask someone else to complete the coding.

2 GENERAL MAINTENANCE

These items normally do not require much continuous effort. However, when they need doing, they receive more or less top priority.

1. ** Source code/library maintenance, version updating (Gary, all)
2. ** AIPSLETTER:
 - ** writing --- carry new section on software changes (Eric, Don)
 - ** type setting (Eric)
 - ** mailing (Nancy)
3. ** Gripes:
 - ** receipt (Nancy)
 - ** initial review (Eric)
 - ** first-pass responses (all)
 - ** "to-be-continued" (Nancy, all).

4. ** COOKBOOK:
 - ** maintain, publish (Eric, Don, Nancy)
 - ** rewrite (for 15OCT85) including
 - = ** some instructions for Unix installations (Kerry)
 - = ** proof read and correct (Alan Bridle)
5. ** GOING AIPS:
 - ** maintain, publish (Bill, Eric, Nancy)
 - ** check (for 15OCT85) including
 - = ?? new *DCH.INC files and other *.INCs
 - = ????
6. ** Source code export (all)
7. ** Simple bug corrections (all)

3 PROJECTS IN PROGRESS

These items do not require a high level of effort at this time. However, they are important and will be assigned all the man power needed to complete them in a timely fashion.

1. ** Code development and debugging: (Eric, Don, Pat)
 - ** develop system for maintaining all code levels at VLA as well as in CV
2. ** Cray Project:
 - ** finish and test Z's (Kerry, Bob Duquet)
 - ** get tapes to work, fix system problems (Kerry, Bob Duquet)
 - ** write Y's for TV by wire and Ramtek (Eric)
 - ** special AP package: continue testing (Bill, Don)
3. ** VAX speed up:
 - ** try /OPTIMIZE and debug it this time (if possible) (Gary, Pat)
 - ** hierarchal directory structure (Gary, Pat)
 - ** "midnight" job on new directories, multiple CPUs (Gary)
 - ?? try shared-image libraries and load modules (Gary, Pat)
 - speed up pseudo-AP (beyond /OPTIMIZE) ? (Pat?)
4. ** Calibration and Editing project:
 - ** system support (Bill, Eric)
 - ** format design (Bill, Eric)
 - ** fundamental service routines (Bill)
5. ** UNIX Project:
 - ** clean up installation (15JUL85 tapes) (Kerry)
 - ?? clean up Z's (Kerry)

6. ** Image storage unit and control panel: (Don, Arnold)
7. ** Certification and Benchmarking Package (Don)
8. AIPS Site Survey (Don, Nancy)
 - program to synthesize forms from WHOGETS.ADR, (Don)
 - ?? make sense of current WHOGETS.ADR "contact" entries (Don, Nancy)
 - ** organize files of all correspondence with users and sites (Nancy).
9. ?? Portability improvements
 - ?? Remove complex arithmetic wherever possible (Bill, whoever)
 - ** Check VAX Z routines for more detailed comments and clarity (Kerry, Eric, Gary)
 - Make more Z routines generic - maybe not Z afterwards (Kerry, Eric, Gary)
 - ** Implement "path" concept of hierarchical host- and device-dependent libraries (Pat, Gary, Kerry, Eric, Don)
10. Add EXPLAIN files (non-programmers)
 - UVSEN (Tim)
 - XGAUS, BLANK, et al. (Jacqueline)
 - ?????

4 SYSTEM IMPROVEMENTS

These items are harder to prioritize because they tend to be system wide in their impact. We can get along for a while without doing them, but the work of doing them will then grow with time. They tend to be fairly easy to do, but to take some time because they are spread out over many modules. Also, some of them cannot be done a bit at a time since they involve converting all routines which call some routine (for example).

4.1 Higher Priority:

1. ** Get new Z routines into everything: (Eric, all)
 - ** ZFIO, ZMIO
 - ** NSPG (in ZEXPNDs)
 - ZEXPND - make Zs and insert (????? -new needed ?)
2. ** Scratch files:
 - some concept of preferred disk for scratch (???)
 - ** BADDISK more widespread (whoever, Has been started)
 - User number in task names (ignored sometimes, used others)?

3. ** Other temporary things removed: (Eric, Gary)
 - ** MINIT, MDISK, MINSK, MSKIP
 - ** COMOFF, FSWTCH
 - ** INTYPE, IN2TYPE, IN3TYPE
4. ** Documentation:
 - ** advertise 6250 bpi better (Cookbook, Helps, ...) (Eric)
 - ** Volume 2: what's left? Move it to Volume 3. (Eric)
 - ** Volume 1:
 - = ** listing of all HELP/EXPLAINS most important, but probably ok, (Eric, Don)
 - = ** discard Chapter 1, update Chapter 2, (Eric)
 - = what needed for Chapter 3, (Pat ?)
 - = ** maybe rename as "AIPS User Reference Manual"? (Eric)
 - = ** do the printing with final AIPLAS (Eric)
5. ?? Backups of data to be faster and more selective
 - ?? VAX BACKUP (i.e. host dependent) to allow file selection on write (Gary, Pat)
 - ?? VAX BACKUP (restore mode) to allow file selection and insertion in directory (Gary, Pat)
 - ?? FITTP, IMLOD to do tables faster (Gary)
6. Intertask communication:
 - level 1: leave "message" to APCLN, MX to quit at next major loop, etc.
 - level 2: return adverbs.
 - spawn and attach operations (? see Gripe 1421)
7. ** Go over all AP tasks:
 - ?? Develop better queue for AP - ASCAL admit it's done
 - ** Do they close the AP whenever possible (VM et al. suspect, also VBFIT)? (Pat, Bill)
 - ** Do they all use the roller where it might be needed? (Pat, Bill)
 - ?? Why does FPS AP hang up sometimes? (Bill, Pat, Gary)
8. ** Gain files to standard Table type: (Bill, John)
 - ** fix ASCAL, VBFIT (Bill)
 - ** fix ASCOR, VBCOR, VSCAL, BSCAL (Bill)
 - ** fix GNPLT, PRTGA (Bill)
 - ** fix FITTP, IMLOD, UVLOD to handle them (Gary)
 - ** all tasks which copy gain files (Eric, whoever)
9. ?? Remove INTYPE except where required (Eric, whoever)
10. ?? Debate default on OUTDISK = 0 re private packs. (Eric)
11. ** Keep track of current tape position (via dummy files?) (Eric, Gary, Kerry)
12. ** Standardize KEYIN package of subroutines (Bill near done, Eric)

13. ?? Reduce global adverb conflict problems (Eric, whoever)

4.2 Lower Priority:

4.2.1 Display:

1. ?? printer routines DOCRT option:
 - ?? EXFND, PRTACC, PRTAN, PRTDR, PRTGA, PRTTP
2. ?? printer routines system-dependent printer size:
 - ?? PRTIM, PRTUV, PRTMSG, PRTHI, ...
 - ?? EXFND, PRTACC, PRTAN, PRTDR, PRTGA, PRTTP
3. ?? Star positions on plots (Eric, Don, Gary?)
 - ?? Task to build star table from star catalogs (Don)
 - ?? Subroutine to plot star table (Eric)
4. ?? Clean beams on plots (Eric, Gary?)
5. Adverb to limit plot file size: die if too much plot ?
6. UVPLT to average channels
 - ?? Bug: crashes Modcomp half the time
7. Printing tasks:
 - ?? PRTIM: change FACTOR to physical units / printed integer
 - ?? PRTUV: bug - prints 1 too many lines on default # lines
 - ** PRTCC: bug - can't find requested disk for some reason
????

4.2.2 Source Code Maintenance:

1. ?? FUDGE, TAFFY (Eric, Gary, Bill)
 - ?? clean up declares (separate commons)
 - ?? isolate output file stuff (for easy removal)
 - ?? explain second input file better
2. Start standardizing things
 - CANDY important
 - ** Install MAT on CVAX and try it on the code

3. Documentation:
 - ?? WHATSUP and selective UPS files (Pat, Eric)
 - = method for auto generation
 - = install method in code
 - = generate files
 - = PRNTMN to pick them up
 - ?? AIPS Manager manual: (Eric, Gary, Kerry, Don)
 - = ?? service programs
 - = ?? magic places to change in code (TIMDEST, ...)
 - = ?? System configuration recommendations
 - = ?? implementing various peripherals
 - ?? AIPS memos to be finalized:
 - = ?? Use of EMACS editor with AIPS files (Don)
 - = ?? Mailing List Package (Don)
 - = ?? Checkout System (Gary)
 - XREFS:
 - = ?? program to read Modcomp XREF tape, make sorted files, print
 - = Vax version of XREFS
 - = Vax cross reference by task rather than individual module
4. HI file access easier in WaWa package
5. ?? Havlen/Fomalont "DEMO" image file? (Eric)
 - ?? under the mythical user number 1? (Eric, Gary)
6. ?? Review AIPS coding standards. (Eric)
 - ?? Develop a plan for changes (if any). (Eric, Don, Bill)

5 TASKS

These are tasks which are likely to be a lot of work, but they will require only one person at a time per task. All of these need doing.

5.1 High Priority (important Tasks):

1. ** MX (Bill, Pat?)
 - ** bug: restart with old work file message appears twice
 - ** put PHAT value and # components / field in HI file
 - ** problem with grid correction (also UVMAP) -> clean failure
 - ** display all or selected dirty fields on TV
 - ** TXINC, TYINC option
 - ** NITER < 0 => stop at first negative
 - ** turn off "write" flag when image is stable (and be patient about setting it busy again when it must)
 - ?? output both clean and residual image
 - rename shift parameters
2. ** APCLN (Bill, Pat?)
 - better beam fit (also MX)
 - ** stop on first negative option
 - ** save residuals and cleaned image option (???)
3. ** UVMAP (Bill, Pat?)
 - ** Bug: fails to do natural weighting ??
 - ** (PSAP version) bugs re GRIDAP call, sign of DXCOR/DYCOR
 - Sum weights near center (guide for ZEROSP)
 - Zero spacing for multiple channels
 - ** TXINC, TYINC option
4. ** ASCAL (maybe redone via Calibration package) (Bill)
 - ** Bug: fails on BPARM(1) = -1 option
 - ?? ignores NCOMP ???
 - remove READ status on model file when done with CC file
 - option to feed sky coordinates for point model
 - summary statistics on bad solutions (i.e. > 10%) and on RMS, mean for each antenna/IF
 - self-contained plot option (???)
5. ** UVSUB (Bill, Pat?)
 - ?? ignores NCOMP ???
 - point and Gaussian options
 - allow multiplication by model as well as division
 - ** (UVMSUB) recognize STOKES < 0 images (and matching data)
6. ?? Rewrite COMB: (Eric)
 - ?? faster
 - ?? floating and/or integer inputs ok
 - ?? Documentation confusing (may be better a bit now)
 - Generalized operators
 - check OPCODE list against IPPS operators
 - ?? Remove bias in $\sqrt{A^2+B^2}$ images (option)
 - ?? include CORMS options

7. ** RUN files:
 - ** user #1 = Manager - provide RUN procs for transport (Gary)
 - RUN files to/from FITS tape (requires a text file writing routine!)
 - Machine-independent editor for RUN files - a dream, we don't have the time
8. IMLOD, UVLOD, FITTP (Gary)
 - ** bug: DOTABLE fails between FITTP and UVLOD at least
 - ** bug: map processing level lost between FITTP and IMLOD
 - ** bug: MX map of 0 iterations has unknown records on FITTP
 - ** bug: OUTSEQ = -1 option fails on IMLOD, maybe UVLOD too.
 - ** drop BLC, TRC option (FITTP)
 - ** DOALL option for FITS files (IMLOD, UVLOD)
 - ** Option to ignore tables extensions (IMLOD only)
 - combine UVLOD and IMLOD
9. Check times in DBCON (Doarray set for no arrays)
 - Correct position shift (incl u, v, w)
10. ?? BLOAT: generalize to build 16 chan from 2 8-chan, etc.

5.2 New, Significant Tasks:

1. ?? AIPS table files; what next: (Eric, whoever)
 - ** sort/merge/resort in one task
 - ?? flag
 - ?? plot
 - ?? histogram
 - others: check IPPS AUTOPHOT list.
 - interactive editing task
 - translate between table and ASCII formats
2. ?? Interactive (TV) visibility data editing: (Eric, Bill)
 - ?? display in current sort order
 - ?? allow (software) zoom
 - ?? flagging
 - ?? enhancement functions (of TV display)
3. Calibration and Editing project: applications software
 - Task to compute scan averages and rms for print and autoedit
4. ?? Dicomed tasks - DICPL, DICTV, DICTP ? (Eric, Pat?)

5. ?? Improved Geometric Capabilities: (Don, Thad)
 - ?? finish cleanup of PGEOM
 - ?? speed up LGEOM
 - Combine LGEOM, PGEOM, and HGEOM tasks into one?
 - task to "feather" re-projected images into giant mosaics
 - Design new "LGEOM":
 - = avoid virtual memory
 - = utilize vector hardware (both PSAP and 120B)
6. Combine single-dish and interferometer data
7. ?? "UNARY" operator task (Don, Thad)
 - ?? check IPPS "unary minus" menu
8. Rebuild Measuring Engine as AIPS Task (Don)
 - integrated into AIPS
 - catalogs and measurements as tables files
 - solve plate constants against multiple catalogs
 - measurement process driven by tables of coordinates
 - image capture with precise geometry
 - digital/analog image registration using two TVs
9. ?? Simple task to make image by gridding uv data
10. APCLN-like task for non-symmetric beams

5.3 Medium Priority (lots Of Work, Less Used Programs)

1. GRAYS:
 - use TV LUT as option
 - load w functype (?? - QMSPL offers this)
2. ?? GETERR: (Eric, Gary)
 - ?? drop NGAUSS argument, inside NGAUSS -> MGAUSS
 - ?? Fix SLFIT (also test on DEXP, TOL to GETERR)
 - ?? add baseline fitting to SLFIT - how to store answers?
 - ?? Fix new IMFIT

3. ?? Slices (Eric design, Gary)
 - ?? print out values (verb?)
 - ?? convert to tables format
 - plot multiple offset slices
 - Moment fit slices
 - BLSUM: option to catalog results (???)
 - Find along curved tracks
 - ?? SLICE:
 - = ?? make 2-d image from cube.
 - = ?? fails on XGAUS (.CENTR) images ?
 - ?? SLFIT:
 - = ?? clean up units, display
 - = ?? fit a baseline
4. ?? XGAUS (Eric)
 - various restart options: use table, separate task to build output images, ...
 - ?? error ? on NGAUS = 4
 - ?? 2-D in, 1-D out fails ?
 - ?? bug in CENTR maps (NGAU=2)
 - ?? "no plot when fitting 1 profile"
5. Continuation line (or something) for long ADVERB = *, *, *, ... statements.
6. GNPLT - (do after gain file format change):
 - Capabilities of GAPLT
 - Alternate plot symbols
 - other axis types and scalings (esp. "scan number")
7. ?? IMMOD - Clean up: (Eric)
 - ?? BMAJ, BMIN = radii in asec, not axes
8. ?? UVMOD - Clean up. (Eric)
9. ?? PBCOR: (Eric, Gary, Ed)
 - ?? rewrite to standards
 - ?? allow non-VLA antennas
 - ?? tell true cutoff (3%) in help file
10. VBPLT:
 - check use of JULDAY
 - speed it up
 - ignore deleted antennas
 - average channels option
 - all baselines on one plot option with/without data
11. Rewrite RM:
 - easy inputs
 - standard or user-friendly units and code
12. Header: shift parameters to more user-oriented meaning

13. Read/write FITS files from/to disk.
14. Rewrite IMFIT, JMFIT:
 - to standards
 - to write components in a CC file
 - print RMS before fit
 - accept initial guesses for 0-level, slope
 - print scaling of units with answer as well as at start
15. Clean up new line tasks (Gustaaf's)
 - to standards and to work as advertised
 - generalize
 - IRING: fix help (see gripe 1566)
 - ?? GAL: bugs (Don)
16. Clean up other line tasks: (MOMNT, SMOTH, ...)
 - to standards in units and coding
 - produce a history file
 - generalize
 - ????

6 MISCELLANEOUS

These items are easier to do and need doing. Some are simply in the nature of bug checking, others are responses to Gripes.

6.1 Verbs:

1. ?? How to pick up new adverbs easily despite LASTEXIT (Eric)
2. ?? Verb to insert a pixel value in an image. (Eric)
3. ?? Verb to insert a comment in the history file. (Eric)
4. ?? INPUTS, HELP, EXPLAIN should use SCHOLD for screen full (Gary)
 - ?? HELP to have line printer option too ??? (Eric)
5. ?? Verb to "set TV cursor on RA,Dec" - i.e. graphics box (Eric)
6. ?? TKSET - clarify cursor positioning in the Help file (Don)
7. ?? EXTLIST: (Eric, Gary)
 - ?? display slice fit results
8. ?? (VAX) REWIND available as quick return (???) (Gary)
9. ?? TKSLICE (Gary)

- ?? display y axis even if undefined units
 - ?? y-axis label often fails actually
 - ?? poor choice of defaults (also SL2PL)
10. TV labeling:
- include user character string
 - clean beam
 - new LTYPES: source name, angular scale, freq
11. TV:
- ?? graphics images that are off affect cursor image
 - anti-wrap algorithm causes strange behavior at high zoom
 - new spiral hue/intensity LUT (see gripe 1218)
 - ?? TVBLNK change Button C to do both LUTs together
 - TVBOX-like to set up inputs to MX
12. Convert FRMT to a Z routine.
13. Have Z routines report errors in blocks. (Eric, Gary?)
- ?? ZCREAT
 - ?? ZEXPND, etc.
14. Verb to catalog extension files
- (Add tests for primary type = desired extension type to TKSL verb, SL2PL, PRTAB, ...)
15. Verbs:
- FINDSPACE - find disk number with most space
 - FINDNAME - find image with some name parms.
16. Catalog: NEXT
- return array of catalog numbers (???)
 - rename a set of maps to sequence the SEQ #s (???)

6.2 Tasks

1. ?? batch problems (Eric)
 - ?? AIPSC : option to turn off checking (some procs get 0 divide?) or make response to errors optionally less drastic (Eric)
 - ** reduce delay times at start up; first loops in QMNGR (Eric)
2. ?? Source code import
 - ?? Check in COMTAL Y routines (Eric)
 - Other submitted programs: ???
3. ?? Check buffer size for UV tasks: enough for line? (Bill)
 - ?? UVPLT (see gripe 1478)

4. ?? UVFLG - Change to accept APARM(9) = 400 as = 4.
5. ?? PRTAN - spelling of "FEED", null Sidebands not blank (Bill)
6. ?? VBCOR - Explain differs from Help on meaning of BPARM (Bill)
7. ?? TVHXF, TVHLD - YIMGIO error 2 (Eric)
8. SUBIM - DOALL option
9. ?? Tape handling (Eric)
 - ?? Does PRTP count label files as files - it should.
 - OR: change AVFILE (incl. in tasks) to skip label files without counting them.
 - Use tape file to keep track where we are on tape
10. PCNTR
 - accept and convert I, Q, U images also
11. Upgrade EXFND to be like UVFND in STOKES and output format
12. UVEXP - error leading to apparent loss of sort order ?
13. VBFIT (Bill)
 - print accounting of flagged/blown solutions (like ASCAL)
 - ?? Explain refers to non-existent table for APARM(3)
 - Option to print delay, rate, S/N, oversampling used.
 - ?? Inputs has default for solution interval in wrong place.
 - ?? Ignores BADDISK.
14. UVCOP
 - ?? Copy from time1 > 0 to end if time2 = 0
 - DOALL option, different user option
 - option to start with smaller output file (disk-full problems)
15. UVAVG
 - ?? Delete AVER (???)
 - Bugs: apparently reporting times out of order
16. CLIP
 - Support STOKES (a la UVFND) - how? if V too large, flag RR, LL?
 - ?? Explain APARM defaults better
 - ** Fails to clip all points below lower limit (????)
17. Rewrite CCMOD (see Benson's version); pixels may be better than asec (???)
18. SUMIM:
 - Other ways to get input images besides DO loop on INSEQ
 - Bug? (reported 10**31 peak from it)

19. ?? Source-code export: (Eric, Kerry, Gary)
 - ?? FITS version of EXPTAP (called EXPFIT currently)
 - ?? a reader program (requires text write routine!)
20. ?? VBCIT: error testing needed on DATAN2
21. ?? NTERP: error access violation line 225 or so

7 OTHER THINGS

These are other suggestions, some good and some bad, recorded here so they will not be lost. We might get to these some day.

1. Users' Group: meetings, software exchange, etc. (???)
2. Improve the computation of the vertical scaling of PROFL plots.
3. False color usage in areas of:
 - polarization
 - spectral index
 - UV
 - spectral-line: sum(I), velocity, width
4. Fancier contouring:
 - bold, labeled contours
 - ingoing ticks for minima
 - follow contour
5. Other axis types:
 - Mercator
 - Aitoff projection
6. ?? PRTPL (Gary, Eric)
 - ?? speed - new bit routine, quick gray-scale
 - ?? line width control (for low-resolution devices)
 - ?? better grey scale options and algorithm (like QMSPL)
7. Compare CONVL and SMOTH
8. APMAP
 - DOALL option
 - bad sort (???)
 - Could we replace it with a procedure that would "pipeline" UVLOD, UVSRT, and UVMAP, maybe as a "task" which would initiate them as sub-sub-processes? (?????????)
9. Task to do direct Fourier transform mapping

10. Task to remove current clean comps from image and put back with another size.
11. Grid to output image (e.g. time-baseline) (extend GRIDR ?)
12. Task to find and classify sources.
13. FINISH should be ok at end of any line in proc
14. PROC(array) should work when called as PROC(scalar)
15. IMHEADER (n) ; QHEADER (n) (???)
16. Investigate troubles with blank tapes on DOEOT.
17. An AIPS Tee-Shirt?!?