

# The AIPS Wishlist

Eric W. Greisen

15 October 1987

National Radio Astronomy Observatory  
Edgemont Road, Charlottesville, VA 22903-2475  
804-296-0211 (FTS 940-7211), x328; TWX 910-997-0174  
aipsmail@nrao.bitnet (or @nrao.arpa)

## INTRODUCTION

The Wishlist for *AIPS* has appeared in the same format since its initial publication as *AIPS* Memo No. 34 (February 1985). That format emphasized priorities and contained an effort to assign meaningful priorities to the items enumerated. Since then, *AIPS* has grown larger, more complex, more diverse, and much more wide spread, while the personnel level assigned to *AIPS* has remained constant at best. The description of priorities is difficult since (1) low priority items can become, at least temporarily, high priority for some reason, (2) low priority items are sometimes done because they are easy, fun, or part of a program being changed for higher priority reasons, and (3) there is little to differentiate the many essentially equal priority items listed. This was true in 1985 and is even more difficult today. In fact, with our personnel stretched as thin as it is these days, assigning priorities is often simply a bad joke. Therefore, it seems prudent to reorganize this document into sections divided by type of program. Within those sections, I will attempt to sort things in rough priority order.

The sections chosen are (1) General maintenance, (2) System code, (3), System-wide projects, (4) Tasks: UV, (5) Tasks: calibration and editing, (6) Tasks: image making, (7) Tasks: image, (8) Tasks: display, (9) Tasks: tape, (10) Tasks: extension files, (11) Verbs: application, (12) Verbs: system or *POPS*, and (13) Documentation.

A code is shown to the left of all items listed. The code is “\*\*” for those items which I think have a good chance to be done in the next year and “??” before those upon which work might be done in the next year. Items not falling into one of these classes are preceded by “.” to make their lower priority more visible. The last publication of the Wishlist was on 13-February-1987 as *AIPS* Memo No. 49. Items which have been added or revised since the last publication have the codes “Nx” or “nx” (where “x” is “”, “?”, “\*”, or “.” and “N” means new and “n” means revised in a minor way). Similarly, items which have been completed, one way or another, since the last publication are marked with a “Dx”.

Numbers in parentheses in the text are references to gripes on the particular subject which provide additional comments expanding on the necessarily brief descriptions appearing in this document. The text of the gripes is found in *DOCGRIP*: on the Charlottesville VAX. In addition, notebooks containing the gripes are in the *AIPS* Caiges at the VLA and in Charlottesville.

## 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 (all)
  - D\* extend midnight job to maintain all code levels on VLA Convex as well as on CV Convex
  - \*\* extend midnight job to maintain all **NEW** code in Cray version
  - \*\* **REMOVE/PUTBCK** to delete from object libraries when needed on CVAX
2. \*\* *AIPSCLETTER*:
  - \*\* writing (Eric, Don, Alan)
  - \*\* 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, Alan, Nancy)
  - \*\* some instructions for UNIX installations (Kerry)
5. \*\* *GOING AIPS*:
  - \*\* maintain, publish (Bill, All)
6. \*\* Certification and Benchmarking Package (DDT) (Eric, Phil, Don)
  - n\* 15JAN88 version, data and procedures
  - N\* 15JAN88 version for VLBI, data and procedures
7. \*\* *AIPS* Site Survey (Don, Nancy, Alan)
  - D\* analyze returns from 1986 survey
  - N\* prepare and send out 1987 survey
8. \*\* Source code export (all)
  - \*\* Several suggested improvements (2152-2160)
9. ?? Review *AIPS* coding standards. (Eric)
  - \*\* Develop a plan for changes (if any). (Eric, Bill)
  - \*\* Memo re language standards (Eric)
10. \*\* Simple bug corrections (all)
11. \*\* Users' Group: meetings, software exchange, etc. (Don, Alan)
  - D\* 1987 *AIPS* Workshop - October ?? (Alan)
  - D\* "Exploder" for Users' Group E-mail (Don)
  - .. Set up computer bulletin board - ???
  - DN Set up file transport mechanism (*AIPSSERV*) (Don)
12. .. Biannual *AIPS* Workshops (Alan)

## SYSTEM CODE

1. \*\* Cray Project:
  - \*\* write Y's for TV by wire (Eric, Don)
  - \*\* special AP package: continue testing (Bill, Don, Kerry)
  - n\* move to 15JAN88 release (?? — Kerry)
  - \*\* develop remote device handling: terminal, tape, TV (Don)
  - \*\* install under Westinghouse COS at Pittsburgh (Kerry)
  - \*\* export to "vanilla COS" sites (Kerry)
2. \*\* UNIX Project:
  - \*\* clean up Z's (Kerry)
3. \*\* Portability improvements
  - n\* Go to ANSI-standard Fortran 77 (Eric)
    - n\* All variables, including in Z's, to standard
    - n\* ENCODE to in-core WRITE
    - n\* Hollerith to CHARACTER where possible
    - n\* Use intrinsic functions without mixed mode
    - n\* Turn on ANSI-standard switch in CVAX compilations
  - ?? Remove complex arithmetic wherever possible (Bill, whoever)
  - \*\* Check VAX Z routines for more detailed comments and clarity (Kerry, Eric)
  - n\* Make more Z routines generic — maybe not Z afterwards (Kerry, Eric)
  - n\* Better segregation of device-specific code: tape, TKs, ... (Kerry, Eric)
4. N? Improve *AIPS* usage from private accounts
  - N? VMS — what are the problems?
  - N? UNIX — ditto, tapes
5. \*\* VAX speed up:
  - \*\* try /OPTIMIZE and debug it this time (if possible)
  - ?? try shared-image libraries and load modules
  - .. speed up pseudo-AP (beyond /OPTIMIZE) ?
6. ?? (VAX) REWIND available as quick return (???)
7. N? Installation procedures (Eric, Kerry)
  - N? VMS ILOAD limited to 6 interactive *AIPS* (2740)
  - N\* VMS documentation needs more explanation
8. ?? Source-code export: (Eric, Kerry)
  - ?? FITS version of EXPTAP (called EXPFIT currently) — done?
  - ?? a reader program (requires text write routine!)
9. .. Convert FRMT to a Z routine.
10. .. Have Z routines report errors in blocks. (Eric?)
  - ?? ZCREAT
  - ?? ZEXPND, etc.
11. ?? *AIPS* maintenance tools
  - ?? Make into verbs/tasks for user 1 only ?
  - .. COPY to be able to do format conversion like UPDATE ?

## SYSTEM-WIDE PROJECTS

### Higher priority:

1. \*\* Get complete control over map format (Eric, all)
  - \*\* Fully remove integer from more flexible routines
  - N\* PATGN still writes integer images (2800)
2. N\* Image scaling problems
  - N\* IMVAL fails to recognize blanks after scaling (2788)
  - N\* PUTVAL ignores scaling (2927)
3. \*\* MSGWRT has problems with NINTRN > 10 ?
4. \*\* Remove INTYPE except where required (Eric, whoever)
  - N\* PRTCC won't read uv files (2846)
5. \*\* Get new Z routines into everything: (Eric, all)
  - \*\* ZFIO, ZMIO
  - \*\* NSPG (in ZEXPNDs)
  - .. ZEXPND — make Zs and insert (???? -new needed ?)
6. \*\* Other temporary things removed: (Eric)
  - \*\* MINIT, MDISK, MINSK, MSKIP
  - \*\* COMOFF, FSWTCH
  - \*\* INTYPE, IN2TYPE, IN3TYPE
7. ?? Mysterious, non-repeatable problems
  - ?? AP hangs up — maybe controller problem
  - \*\* Tektronix 4012 cursor reading on the Convex (2570 and others)
  - ?? I<sup>2</sup>S interactive verbs hang CV Convex
8. ?? Under VMS, page full locks terminal (2475, 2480)
9. ?? Image units, fluxes (Eric)
  - ?? IMEAN, IMSTAT, etc. recognize JY/PIXEL units
  - ?? these routines convert to flux if NITER = 0, but clean beam okay?
  - N? IMEAN: put mean and rms on plots
10. ?? Reduce global adverb conflict problems (Eric, whoever)
11. N? I/O buffers: system-dependent sizes
12. N? through several "Z" includes ?
13. N. through dynamic memory allocation ?

### Lower priority:

1. ?? GETERR: (Eric)
  - ?? 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

- 
2. .. Scratch files:
    - .. Some concept of preferred disk for scratch (???)
    - ?? Some concept of scratch-only disks (???)
    - .. User number in task names (ignored sometimes, used others)?
  3. .. One-dimensional data:
    - .. "Front-end" to read in single-dish data
    - .. Better handling methods (multi-source *uv* format?)
  4. ?? FUDGE, TAFFY (Eric, Bill)
    - ?? clean up declares (separate commons)
    - ?? isolate output file stuff (for easy removal)
    - ?? explain second input file better
    - N\* bug in windowing in TAFFY (2636)
  5. .. Start standardizing things
    - .. CANDY important
    - \*\* Install MAT on CVAX and try it on the code
  6. .. Intertask communication:
    - \*\* priority and CPU limit adverbs
    - ?? Add SHOW and TELL to more tasks
    - .. level 2: return adverbs.
    - .. spawn and attach operations (? 1421)
    - .. save ephemeral results in file and pick up in POPS
  7. ?? Debate default on OUTDISK = 0 re private packs. (Eric)
  8. .. Header: shift parameters to more user-oriented meaning
  9. \*\* Standardize KEYIN package of subroutines (Bill near done, Eric)
  10. \*\* 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)? (Bill)
    - \*\* Do they all use the roller where it might be needed? (Bill)
    - ?? Why does FPS AP hang up sometimes? (Bill)
  11. .. Code revisions:
    - .. Make update installation easier
    - .. Change TST/NEW/OLD nomenclature to date names ????
    - .. Paraforms for reading more than one image
    - .. GTPARM use Help file to get parms by name from TD file ????
    - .. Allow subdirectories in user catalogs ????
    - .. User catalogs to carry total file size ????
    - N. User catalogs to carry file creation date ????
  12. .. HI file access easier in WaWa package

## TASKS: UV

### Higher priority:

1. \*\* UVSUB (Bill)
  - D? ignores NCOMP ???
  - \*\* troubles with multiple CC files (2519-2520, 2627)
  - D. point and Gaussian options
  - .. allow multiplication by model as well as division
  - D\* (UVMSUB) recognize STOKES < 0 images (and matching data)
  - N? problem subtracting LL correlator (2565)
2. N? UVFND (Eric)
  - .. add opcode to display flagged data
  - N? add SOURCES, FLAGVER, etc. options (2942)
  - N\* fails on DOCRT = 79 (2968, 2970)
3. N? PRTUV (Eric, Bill)
  - N\* fails on DOCRT = 79 (2968, 2970)
4. N? UVDIF (Eric)
  - N\* fails whenever BIF > 0 (2969)
5. D\* uv gridding task — spectral cube (UVMG) (Eric)
  - D\* Subroutine package to grid data to file in current sort
  - D\* Task wrapped around to build cataloged file
  - D\* Options: smoothing to grid, cell sizes
  - D\* Option: real and imaginary vs amplitude and phase
6. .. UVCOP
  - .. DOALL option, different user option
  - N? recompute time range before writing to history file (2764)
  - .. option to start with smaller output file (disk-full problems)
7. ?? CLIP: strange flux clipped on Convex (2219)
  - \*\* EXTIO errors reported (2534, ...)
  - N? separate U, Q, V clip levels (?)
8. .. UVAVG
  - ?? Delete AVER (???)
  - .. Bugs: apparently reporting times out of order
  - N? fails sometimes with overflow (2694)
  - N? in MERG mode, deletes some baselines (2888)
9. .. VLBI improvements: (John, Bill, Phil)
  - .. VBLIN shouldn't be case-sensitive in station names
  - .. Interactive edit/plot on DR files
  - .. uv plots with error bars
  - DN VLBIN needs option not to recompute u and v (2773)
10. ?? VBCIT: error testing needed on DATAN2
  - N\* antenna file not correct on output (2827)

## Lower priority:

1. ?? Check buffer size for *uv* tasks: enough for line? (Bill)  
?? UVPLT (1478)
2. .. UVFIX (Bill)  
.. several good suggestions for code and explain (2460)  
N? conversion error (2649)  
N? errors at high declination (2905)  
N? does only one subarray in an execution (2905)
3. .. Check times in DBCON (Doarray set for no arrays)  
.. Correct position shift (including *u*, *v*, *w*)  
.. Clarify or change subarray handling (2085) (Bill)
4. ?? BLOAT: generalize to build 16 chan from 2 8-chan, etc.  
?? Add to *COOKBOOK*
5. .. Extend *uv* format to include linear polarization (Bill, Eric)
6. N. Create VLA Observ files with *ATPS* (???)

## TASKS: CALIBRATION AND EDITING

## Higher priority:

1. \*\* General:  
\*\* system support (Bill, Eric)  
D\* improve the user interface (Bill, Alan)
2. D\* Interactive (TV) visibility data editing: (Eric)  
D\* display in current sort order — use *uv* gridding  
D\* allow (software) zoom  
D\* flagging  
D\* enhancement functions (of TV display)
3. N\* CALIB (Bill)  
N\* flux bootstrap failing with no error messages (2903)  
N\* problem reported with only one source in file (2951)  
N\* add BIF and EIF (2952)  
N? add line printer/DOCRT option (2953)  
N\* give source name as well as time on closure errors (2954)  
DN gaussian components in the input models
4. D? BCAL $\pi$ : rewrite with revised design  
D? Bugs giving math errors (2212)  
D? History file incomplete (2213)  
D? Current tasks non-portable

5. N\* LISTR (Bill)
  - ND GAIN option fails (2583)
  - N. include user scale factor (2544)
  - ND bug when ANTENNA or BASELINE arrays are full (2867)
  - N\* ignores SOURCES in some cases (2900)
  - N\* doesn't handle STOKES as advertised (2901)
  - N\* incorrect times listed sometimes (2937)
  - N\* problems display IFs (2955, 2956)
  - N\* problem getting both amp and phase of gains (2959)
  - N\* error initializing (*sic.*) baseline file (2960)
6. N\* FILLR (Bill)
  - N? suppress tape length warning messages (2714)
  - N\* adapt to new on-line format (Dale)
7. N\* INDXR (Bill)
  - ND better default for time increment (2868)
8. ?? UVFLG — Change to accept APARM(9) = 400 as = 4.
  - ?? Clarify the confusing array of options (2437, ...)
  - ?? be more communicative (2530)
  - \*\* Failing on Convex (*e.g.*, 2174) and VAX (2243)
9. .. Calibration and Editing project: applications software
  - D\* stand-alone CLCAL task for CL table interpolation (Bill)
  - D\* stand-alone CLCOR task for CL table correction (Bill)
  - D\* polarization calibration (Bill)
  - \*\* spectral bandpass calibration (Phil)
  - ?? Task to display spectra from set of maps
  - D? Task to display spectra in *uv* plane: POSSM
  - N\* Task to index raw Modcomp data tapes
  - N. Task to be clone of Dec-10 VISPLT (2772)
  - N? corrections for atmospheric Faraday rotation (Bill, Carl)
  - N. Handle linearly polarized inputs

## Lower priority:

1. \*\* ASCAL (maybe redone via Calibration package) (Bill)
  - \*\* Gain file open error (2126)
  - .. 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 (???)
  - \*\* DOCAT option failing in VSCAL
  - N? improve help file re BITER (2635)
  - N? VSCAL doesn't work (2655)
  - N\* format error abort (2842)
2. .. Gain files to standard Table type or replace: (Bill, Phil)
  - .. fix ASCAL, VBFIT (Bill)
  - .. fix ASCOR, VBCOR, VSCAL (Bill)
  - .. fix GNPLT, PRTGA (Bill)

3. .. VBFIT — may be replaced by CALIB (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 ??
  - .. Option not to write an output *uv* file
    - .. Keep DR files with input *uv* file, recognize by version #
  - .. Option to give list of reference antennas (1813)
  - ?? Add info to help/COOKBOOK per gripe 2077
4. N? PRTGA: error handling in formats is needed (2675)

## TASKS: IMAGE MAKING

1. N? CCMERG — improve handling of flagged components (Eric)
  - ?? Message to reflect number unflagged in/out
  - ?? Message to say omitted (or lost) number components due to flags
2. \*\* MX (Bill)
  - D\* Fails in spectral-sum mode (2089)
  - \*\* Locks on one component: (Convex many gripes, VAX too (2124))
  - \*\* Beam-patch troubles → clean divergence (2128)
  - \*\* Stokes V is actually Stokes I on Convex
  - D? Funny output image sizes — explain or change
  - \*\* Put PHAT value and # components / field in HI file — latter done
  - \*\* Problem with grid correction (also UVMAP) → clean failure
  - ?? Display all or selected dirty fields on TV
  - \*\* TXINC, TYINC option
  - \*\* NITER < 0 implies stop at first negative
  - \*\* turn off “write” flag when image is stable (and be patient about setting it busy again)
  - ?? output both clean and residual image
  - \*\* On NITER=0, do not set clean beam — confuses CONVL ??
  - \*\* Check handling of BOX — 10<sup>th</sup> unused, funny ordering, ...
  - \*\* Make it work with STOKES 'R' and 'L'
  - \*\* Drop XPARM and YPARM inputs
  - .. rename shift parameters
  - ?? adapt to handle wider fields such as 327 MHz
  - N\* GETCTL bug affecting production of RR or LL maps (2554)
  - N\* aborting for overflow in gridding (2806)
  - N? ignores alternate velocity axis parameters (2926)
  - N? output naming problems, overwriting current files (2933)

3. **\*\* APCLN, SDCLN** (Bill, Eric)
  - .. better beam fit (also **MX**)
  - \*\*** save residuals and cleaned image option (???)
  - .. Other clean-area options, *i.e.*, mask image (2489)
  - \*\*** ignores any scaling given in header (2503, 2671)
  - \*\*** fails if rolled in restore step ?
  - D\*** fails on Button D push
  - N\*** better error handling on **ZEXPND** error (2544)
  - N?** failed on a 4096x2048 image (2710)
  - N\*** restart problems on cubes (2756)
4. **\*\* UVMAP** (Bill)
  - \*\*** Produces artifacts in images on Convex (2193)?
  - .. Sum weights near center (guide for **ZEROSP**)
  - .. Zero spacing for multiple channels
  - \*\*** **TXINC**, **TYINC** option
  - \*\*** Drop **XPARM** and **YPARM** inputs
  - N\*** **UVWTFN** option not working (2882)
5. **?? VM, VTESS** (Tim, Bill)
  - ??** Scale clean image correctly to be usable initial guess
  - ??** **VTESS** leaves image status set
  - N\*** fix to do standard handling of **BLC/TRC** (2572)
  - N?** zero spacing flux not used (2573)
6. **.. Single dish to AIPS:** (Bill)
  - ??** Pseudo-*uv* gridding to allow other geometries (**SELSD**)
  - N\*** define random parameters correctly and document
  - N?** upgrade **SELSD**, **GRIDR**, **PRTSD** to match
  - N.** single-dish **CLEAN**
  - D.** Combine single-dish and interferometer data (**IM2UV**)
7. **N?** Two-resolution clean, based in **APCLN** (Bill, Eric)
8. **.. APCLN-like task** for non-symmetric beams: done to 1<sup>st</sup>-order
9. **N?** Task to put CC's from one file into another image (2581, Bill)
10. **.. Task** to remove current clean comps from image and put back with another size.
11. **.. Task** to do direct Fourier transform mapping
12. **N?** Difference mapping
13. **N.** changes to handle 8000 spectral channels ??

## TASKS: IMAGE

1. **?? FFT** (Bill, Eric?)
  - ??** Option: output amplitude, phase images
  - D?** Option: output *uv* data base (what level to be considered 0, *i.e.*, unsampled?) — **IM2UV**
  - .. Option: clipping output to user-specified value(s)
  - N?** fails on galactic coordinates (2750)

- 
2. \*\* COMB: (Eric)
    - ?? Documentation confusing (may be better a bit now)
    - ?? Cannot combine partly overlapped cubes (2462) ?
    - .. Generalized operators (more than 2 images, many ops incl. FFT)
    - .. Pixel-weighted averages ...
    - .. check OPCODE list against *IPPS* operators
    - N? poor default for maximum error (2607)
    - N? put shifts for alignment into history file (2731)
    - N\* update POLC correction method (2757)
  3. N? PBCOR (Eric)
    - N? ignores users input and OBS positions (2580) ?
  4. N? MCUBE reported alignment problems (2763)
  5. .. SUBIM
    - .. DOALL option
    - .. ZINC option, but over all dimensions 3-7 or just 3?
    - .. Option to sum/average over the XINC by YINC box
  6. .. CONVL: (Bill)
    - .. Compare CONVL and SMOTH
    - .. add progress messages, decimation of output (2483)
    - ?? input file marked write (2485, 2507)
    - D\* wrong extrema in header (2487)
    - N? trouble with small windows (2670)
    - N\* random bad lines on Convex ?? (2895)
  7. .. BLANK (Eric)
    - .. Option: blank other maps same as current one (*i.e.*, imag. part)
    - .. Option: non-magic and non-zero blank values
    - .. Option: fill in blanked from surround
    - N\* DOINVERS "reversed" from TVSTAT (2863, ...)
    - N? display values interactively as one goes (2904)
  8. .. SUMIM:
    - ?? Other ways to get input images besides DO loop on INSEQ
    - ?? Images taken as planes of one input cube: task or option
    - .. Bug? (reported  $10^{31}$  peak from it)
  9. .. BLSUM
    - .. option to catalog results (???)
    - .. Improve help, output data (2463-4, 2485)
    - .. go to table method like XGAUS (below)
    - N? display, explain units, show rms (2728)
  10. ?? 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"
    - ?? test EDROP, BDROP for bad values (no pixels left)

- 
11. N? **XBASL** (Eric)
    - \*\* Convex finds bugs in **XBASL** (2038)
    - N. rewrite in table form as for **XGAUS** (2700)
    - N? selection by **FLUX** not good if mean of image is zero (2922)
  12. ?? **IMMOD**, **UVMOD**, **CCMOD** — Clean up: (Eric, ?)
    - ?? **IMMOD**: **BMAJ**, **BMIN** = radii in asec, not axes
    - ?? **UVMOD**: divide by 0.0 in **BESSEL** for **DISK** option ??
    - ?? **CCMOD** doesn't handle input table correctly (2206)
    - .. Rewrite **CCMOD** (see Benson's version); pixels may be better than asec (???)
    - N? error in position angle input, **POINT** mode confusing, inputs get integerized (2775)
  13. .. **IMFLT** fails? (2433)
  14. .. Rewrite **XTRAN** to use ST extension files (Eric?)
    - ?? explain what **NPOINTS** is used for
    - N? documentation confusing (2676)
  15. ?? Rewrite **IMFIT**, **JMFIT** to one task(?):
    - ?? **DOWID**(2-n) ignored on Convex?
    - ?? **JMFIT** convergence criteria too lenient (1763)
    - ?? to standards
    - ?? accept initial guesses for 0-level, slope
    - ?? solution outside field (2425)
    - ?? **JMFIT** bad errors, answers at low S/N (2592, ...)
    - ?? add **PRTLEV**, bigger field (2425)
  16. ?? Task to find, fit and classify sources.
    - ?? use methods, *et al.* from fitting tasks
  17. ?? Improved Geometric Capabilities: (Don, Eric)
    - ?? **HGEOM** blows up on high ( $10^9$ ) brightnesses
    - ?? speed up **LGEOM**
    - ?? **LGEOM** shifts zero point 0.5 pixels (2502)
    - .. 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**)
    - N? add "spherical cube" geometry (from COBE project)
  18. .. Rewrite **RM**:
    - .. easy inputs
    - .. standard or user-friendly units and code
  19. .. Task to fill in blanked pixels: interpolate, extrapolate
  20. ?? "**UNARY**" operator task (Neil, Don, Eric)
    - Dn task **MATHS** to do unary operations
    - ?? check **IPPS** "unary minus" menu
  21. .. Clean up Gustaaf's line tasks
    - .. to standards and to work as advertised
    - .. generalize
    - .. **IRING**: fix help (1566)
    - .. **IRING**: format for number points too small (2549)
    - ?? **GAL**: bugs (Don)

- 22. .. Clean up other line tasks: (MOMNT, SMOTH, ...)
  - .. generalize, to standards in coding
  - ?? SMOTH, MOMNT cannot handle blanked pixels ???
  - ?? MOMNT message re history gives wrong moment number
  - .. ????
- 23. .. 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: 1<sup>st</sup> part done
  - .. digital/analog image registration using two TVs

## TASKS: DISPLAY

### General:

- 1. .. Printing tasks:
  - N? option to go to file rather than printer (2845, 2863)
- 2. \*\* Plotting
  - ?? Plot labels overlap, fix TKPL, TVPL, QMSPL to try to avoid (Eric)
  - \*\* ASPMM message appears even when using input value
  - ?? Coordinate routines can abort on bad coordinates (2438)
  - N? allow user string to be added to plot (2648)
- 3. ?? Star positions on plots (Eric, Don)
  - ?? Add search of star catalogs to STARS (Eric, Don)
- 4. ?? Clean beams on plots (Eric?)
- 5. ?? Plotting
  - ?? Better handling of narrow x axes (labels overlap)
  - ?? to put their parameters in history file also?
  - ?? option to put BLC/TRC on the plot
- 6. .. Fancier contouring:
  - .. bold, labeled contours
  - .. ingoing ticks for minima
  - .. follow contour
- 7. .. False color usage in areas of:
  - .. polarization
  - .. spectral index
  - .. *uv*
  - .. spectral-line: sum(I), velocity, width
- 8. .. Disk space problems
  - .. Seek disk with room for print files in line printer and QMSPL
  - .. Adverb to limit plot file size: die if too much plot ?

## Higher priority specifics:

1. **n\*** **PRTIM** (Eric)
  - ?? change **FACTOR** to physical units / printed integer
  - N\*** inputs limits on **INC**, **FACTOR** too low (2697, 2698)
  - N\*** limit to 4 digits too small (2695)
  - N\*** error on images with only 2 axes (2659)
  - N\*** ignores current image scaling (2671)
2. **N?** **QMSPL** (Eric)
  - N?** get blanked pixels to be pure white (2643)
  - N?** clear fonts from printer memory ??? (2976)
3. **.. GREYS:**
  - ..** use TV LUT as option
  - ..** load with functype (?? — **QMSPL** offers this)
  - ..** use white contour line over black grey pixel ??? very hard
  - N?** label the step wedges (2639, 2641)
4. **.. UVPLT** to average channels
  - ?? Binning options like **IMVIM**
  - N.** add **SOURCES**, **FLAGVER**, etc. options (2935)
5. **D\*** Add **IVAS** to *AIPS*
  - D\*** Bring up on CV Convex
6. **N\*** Develop TV by wire as a workable system
  - N\*** SUN Y routines

## Lower priority:

1. **.. Map** vs map plotting (**IMVIM**):
  - ..** allow rms images, plot points with error bars (2682)
  - ..** binning options: convolve with rms gaussian ???
2. **?? TVHXF**, **TVHLD** problems
  - ?? Differ between Charlottesville and VLA ??
  - ?? Fails on Convex (2527, 2825)
3. **?? PRTPL** (Eric)
  - ?? speed — new bit routine, quick grey-scale
  - ?? line width control (for low-resolution devices)
  - ?? better grey scale options and algorithm (like **QMSPL**)
  - N?** does it still work at all?
4. **.. Improve** the computation of the vertical scaling of **PROFL** plots.
5. **.. VBPLT:**
  - N\*** doesn't work when **ANTENNAS** specified (2672)
  - ..** check use of **JULDAY**
  - ..** speed it up
  - ..** average channels option
  - ..** all baselines on one plot option with/without data
  - ..** plot points with error bars

6. .. **GNPLT**, **GAPLT** — (do after gain file format change):
  - ?? Fails to handle time limits correctly (2201, 2203)
  - .. Capabilities of **GAPLT**
  - .. Alternate plot symbols
  - .. other axis types and scalings (esp. "scan number")
  - ?? clear **READ** status
  - ?? alternate plot method (2055)
  - ?? **GAPLT** to be less sensitive about missing **AN** file (2774)
7. **n**. **PCNTR** (??)
  - .. accept and convert **I**, **Q**, **U** images also
8. **N**. Convert pen plotter code to standards
  - N?** import CSIRO version of **KONTR**
  - N**. **PRFPL**: add line printer option for values (2705)
  - N**. **PRFPL**: add output to **QMS** (or better yet a plot file) (2754)
  - N?** make a **PENPL** to interpret plot files to pen plotters
9. ?? Dicommed tasks — **DICPL**, **DICTV**, **DICTP?** (Eric)
10. \*\* Image storage unit and control panel: (Arnold)
11. **N**. support a graphics package or two — **PGPLOT** or **MONGO**

## TASKS: TAPE

### Higher priority:

1. ?? Read/write **FITS** files from/to disk (port, user save) (Bill, Eric)
  - D?** Change to new sequential I/O methods: **VMS**, **UNIX**, ...
2. **n\*** **FITTP** (Eric, Bill)
  - D\*** to write 32-bit integer
  - \*\* to write 32-bit floating
  - .. add "verify" option
  - N\*** improve help file re **DONEWTAB** (2645)
3. **n\*** **IMLOD** (Eric, Bill)
  - D\*** to read long blocks, floating
  - D\*** fails to load all history cards
  - N?** skip over *uv* files (2736) and vice versa
  - N\*** default output class failing ? (2685)
  - N\*** convert output name to upper case (2805)
  - \*\* bug: map processing level lost between **FITTP** and **IMLOD** on **DOALL** true?
  - D\*** bug: **MX** map of 0 iterations has unknown records on **FITTP**
  - \*\* rename **NFILES** adverb to avoid conflict

4. **n\*** UVLOD (Eric, Bill)
  - D\*** to read long blocks, floating
  - ..** combine UVLOD and **IMLOD**
  - \*\*** **DOALL** option for **FITS** files
  - N\*** convert output name to upper case (2805)
  - \*\*** on Convex ignoring **BCOUNT**?
  - ..** add *uv*-range, time range options (2505)
5. **n\*** PRTP (Eric, Bill)
  - \*\*** doesn't detect 'Pipeline' image names, **IMLOD** does ???
  - N?** skip over "unrecognized" files (2677)
  - N\*** floating divide by zero (2696)
6. **..** UVEXP — error leading to apparent loss of sort order ?
7. **..** Investigate troubles with blank tapes on **DOEOT**.
  - \*\*** Add to help files: **DOEOT**, **FITTP**, etc.
  - \*\*** Get VLA blank-tape fixup method for all VAXes

### Lower priority:

1. ?? Tape handling (Eric, Kerry)
  - ..** change **AVFILE** (incl. in tasks) to skip label files without counting them.
  - N\*** should not go forward on **REWIND** on Convex (2585, 2908)
  - N.** **AVTP** - option to find file by keyword value (2629) ?
2. **\*\*** Tape dummy files (Eric, Kerry)
  - ?? Keep track of current tape position (Eric, Kerry)
  - \*\*** Rename from **TA** to something else
3. ?? Backups of data to be faster and more selective
  - ?? Improve speed of **BAKTP**, **BAKLD** on UNIX (Don)

## TASKS: EXTENSION FILES

1. ?? *AIPS* table files; what next: (Eric, Bill, whoever)
  - ..** convert  $\geq 1$  image to table
  - ?? convert table to  $\geq 1$  image — see **XGAUS**
  - ?? translate between table and ASCII or spread-sheet formats (DIF format)
  - ..** others: check *IPPS* **AUTOPHOT** list.
  - ..** interactive editing task (spread sheet ?)
2. ?? **PRTAB**
  - ?? **BCOUNT** = **ECOUNT** fails (2522)
  - N?** add more selection criteria (2954)

- 3. ?? Slices (Eric design)
  - ?? print out values (verb?)
  - ?? Display on TV like TKSLICE
  - ?? convert to tables format
  - N? overlay plots by arc seconds not points (2717)
  - .. plot multiple offset slices
  - .. Moment fit slices
  - .. Find along curved tracks
  - N. other more flexible plot options, *e.g.*, log-log (2680)
  - ?? SLICE:
    - ?? Option to limit interpolation order to 0, linear, ...
    - ?? make 2-d image from cube.
    - ?? fails on XGAUS (.CENTR) images ?
  - ?? SLFIT:
    - ?? clean up units, display (see gripe 2795 for summary)
    - ?? fit a baseline
  - N? SL2PL seems to refer to format revision A ?? (2803)

## VERBS: APPLICATION

- 1. ?? Verb to "set TV cursor on RA,Dec" — *i.e.*, graphics box (Eric)
  - N? verb to convert RA,Dec to pixel coordinates (2748)
- 2. ?? Verbs like CELGAL for ecliptic-celestial/galactic coordinates (Eric)
- 3. ?? Verb to display convolution/deconvolution of beams (2501)
- 4. ?? TKSET — clarify cursor positioning in the Help file (Don)
- 5. ?? EXTLIST: (Eric)
  - ?? display slice fit results
  - ?? display the file sizes
  - N\* format problems on slices (2814)
- 6. .. Verb to catalog extension files
  - .. (Add tests for primary type = desired extension type to TKSL verb, SL2PL, PRTAB, ...)
- 7. N\* MAXFIT fails on the Convex (2637)
- 8. ?? TKSLICE (Eric)
  - ?? display y axis even if undefined units
  - ?? y-axis label often fails actually
  - \*\* extend plot range a bit for clarity
  - N? loses to current image scaling (2605)
  - N? aborts if the min equals the max (2683)
  - N? remove PIXRANGE from TKASLICE (or use it!)
- 9. .. TV labeling:
  - .. clean beam
  - \*\* Stars
  - .. new LYPES: source name, angular scale, freq
  - N\* TVLABEL: Convex bug on rotated images (2758)
  - N\* TVLABEL: ticks too short on the IVAS (2759)

- 10. .. TV:
  - .. anti-wrap algorithm causes strange behavior at high zoom
  - .. new spiral hue/intensity LUT (1218)
  - .. TVBOX-like to set up inputs to MX
  - .. TV version of TKSlice
  - \*\* Change DOPOS to something else in TVMOVI
  - N? Set RA and dec shifts with cursor (2712)
  - N? interactive TV display of coordinates (2747)
  - N. display images aligned by coordinates (2896)
- 11. .. IMHEADER(n) ; QHEADER(n) (???)

## VERBS: SYSTEM OR POPS

- 1. ?? *POPS*
  - .. Continuation line (or something) for long ADVERB = \*, \*, \*, ... statements.
  - ?? Bug leads to procedures being concatenated after an EDIT
  - ?? or otherwise messed up (2569)
  - N? GO SPLIT does proc SPLITS — min match problem (2962)
- 2. ?? System access:
  - ?? Verb to drop to DCL subprocess (2210)
  - ?? Verb for quick logoff ?? (2210)
  - N. standards for system-dependent verbs
- 3. ?? How to pick up new adverbs easily despite LASTEXIT (Eric)
  - ?? User DEFAULT RUN file, if present, instead of loading LASTEXIT
  - ?? Autoload RUN NEWPARMS to make sure new adverbs present (??)
  - ?? Adverb to suppress saving LASTEXIT on EXIT, RESTART
  - ?? Drop RESTART
- 4. ?? 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)
  - ?? batch jobs not delete CA files, messages
  - .. Verb to submit a single task as a batch job (2211)
  - N. batch work files by user number (2615)
  - N\* SUBMIT fails if two doing it at the same time (2616)
- 5. N? Gripe problems (Eric)
  - N\* GRDROP fails in GRIPR (2711)
- 6. ?? ZAP to deal with bad headers, missing CB files ???
- 7. ?? TIMDEST to detect and handle errors better
- 8. ?? ALLDEST apply DOCONFIRM to SAVE/GET files
  - N\* should not destroy recent, "active" files (2699)
- 9. ?? Clarify *POPS* environment in GET help file — procs can be lost
- 10. ?? Verb to display HELP INDEX by keyword(s) match. (Eric)
  - N? search for string over help files (2811)
- 11. ?? Improved categories for general HELP files (Eric, Alan)

12. \*\* INPUTS (Eric)
  - \*\* Adverb to start with page *n*
  - ?? Limit display to selected category of parameter (CALIB, 2573)
13. ?? History file manipulation (Eric)
  - ?? Verb to insert a comment in the history file.
  - ?? Verb to edit history file — delete by task, line numbers
  - N\* all tasks should create an empty HI file if one is missing (2640)
14. ?? RUN files:
  - ?? User/system RUN file index verb
  - ?? RUN file form for SAVE operation
  - .. 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
15. .. FINISH should be ok at end of any line in proc
16. .. PROC(*array*) should work when called as PROC(*scalar*)
17. ?? Verb to kill a batch job ??? (Eric)
18. .. Verbs:
  - .. FINDSPACE — find disk number with most space
  - .. FINDNAME — find image with some name parms.
19. .. Catalog: NEXT
  - .. return array of catalog numbers (???)
  - .. rename a set of maps to sequence the SEQ numbers (???)
  - N\* catalog listings to go on to next disk if catalog file missing (2925)

## DOCUMENTATION

### Higher priority:

1. N\* COOKBOOK (Eric)
  - N\* move new general help files into COOKBOOK
  - N\* update since last revision !!!
  - N\* calibration chapter (Alan, Bill)
  - N\* FITS disk usage
2. N\* Help file improvements (all)
  - N\* improve system file name descriptions for VERSION, INFILE, etc.
  - N\* update all general help files listing tasks/verbs (2782)
3. .. Add EXPLAIN files (non-programmers)
  - .. UVSEN (Tim)
  - .. XGAUS, BLANK, et al.
  - D\* CALIB (Alan, Bill)
  - .. Many others

## Lower priority:

1. \*\* Miscellaneous:
  - \*\* advertise 6250 bpi better (*COOKBOOK*, Helps, ...) (Eric)
  - \*\* Volume 2: what's left? Move it to Volume 3. (Eric)
  - .. Public display of **HELP INDEX** ??? (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,
    - \*\* maybe rename as "*AIPS* User Reference Manual"? (Eric)
    - \*\* do the printing with final **AIPLAS** (Eric)
2. .. Programmer documentation:
  - ?? **WHATSUP** and selective **UPs** files (Eric)
    - .. method for auto generation
    - .. install method in code
    - .. generate files
    - .. **PRNTMN** to pick them up
    - M.** subroutine help library ?
  - ?? *AIPS* Manager manual: (Eric, Kerry, Don, Laura Carriere)
    - ?? service programs
    - ?? magic places to change in code (**TIMDEST**, ...)
    - ?? System configuration recommendations
    - ?? implementing various peripherals
  - .. **XREFS**:
    - .. Vax version of **XREFS**
    - .. Vax cross reference by task rather than individual module
3. ?? *AIPS* memos to be finalized:
  - ?? Use of **EMACS** editor with *AIPS* files (Don)
  - ?? Mailing List Package (Don)
  - ?? Checkout System (Eric)
4. ?? Havlen/Fomalont "DEMO" image file? (Eric)
  - ?? under the mythical user number 1? (Eric)
5. .. An *AIPS* Tee-Shirt? — never a serious priority